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**Non-Financial Balance Sheets for the Netherlands:
Use, Compilation and Extensions**

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NON-FINANCIAL BALANCE SHEETS FOR THE NETHERLANDS

USE, COMPILATION AND EXTENSIONS

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NON-FINANCIAL BALANCE SHEETS FOR THE NETHERLANDS

Summary: This paper presents the results of the Dutch balance sheets for non-financial and financial assets, the main methodological and practical issues for compiling the non-financial balance sheets and possible improvements and extensions. It describes the main characteristics and results of the non-financial and financial balance sheets. The complete balance sheet for the Netherlands shows that net worth, the sum of non-financial and financial assets, increased from 1546 billion euro in 1996 to 3875 billion euro in 2009. It addresses theoretical issues and data problems in the compilation of non-financial balance sheets, and includes suggestions for further research and possible extensions of the financial and non-financial balance sheets to meet data gaps that became evident during the recent financial crisis.

Keywords: Financial assets, non-financial assets, net worth, financial crisis

1. Introduction

Statistics Netherlands recently started to compile non-financial balance sheets. Time series for fixed assets, based on gross fixed capital formation, were already available for the reference years 1969-2009. The main purpose of compiling complete non-financial balance sheets was to serve as input in the calculation of growth accounts and multi-factor productivity for Dutch industries. Time series of non-financial balance sheets for the reference years 1996-2009 have been available since 2010.

Financial balance sheets are compiled by Statistics Netherlands starting with the reference year 1990. The availability of complete balance sheets for the Netherlands now offers the possibility to analyse net worth.

Besides its use in the growth accounts and for analysing wealth, the non-financial balance sheets are also used in studies about sustainability issues. In addition, the non-financial balance sheets can be used to analyse the relationship between changes in the value of non-financial assets and the business cycle. This relationship gained much public attention due to the recent financial and economic crisis. The available statistical data proved to be rather well suited for this type of analysis. However, extensions are needed to cope with the data gaps pointed out by the IMF Staff and the FSB Secretariat in the report *The Financial Crisis and Information Gaps*.

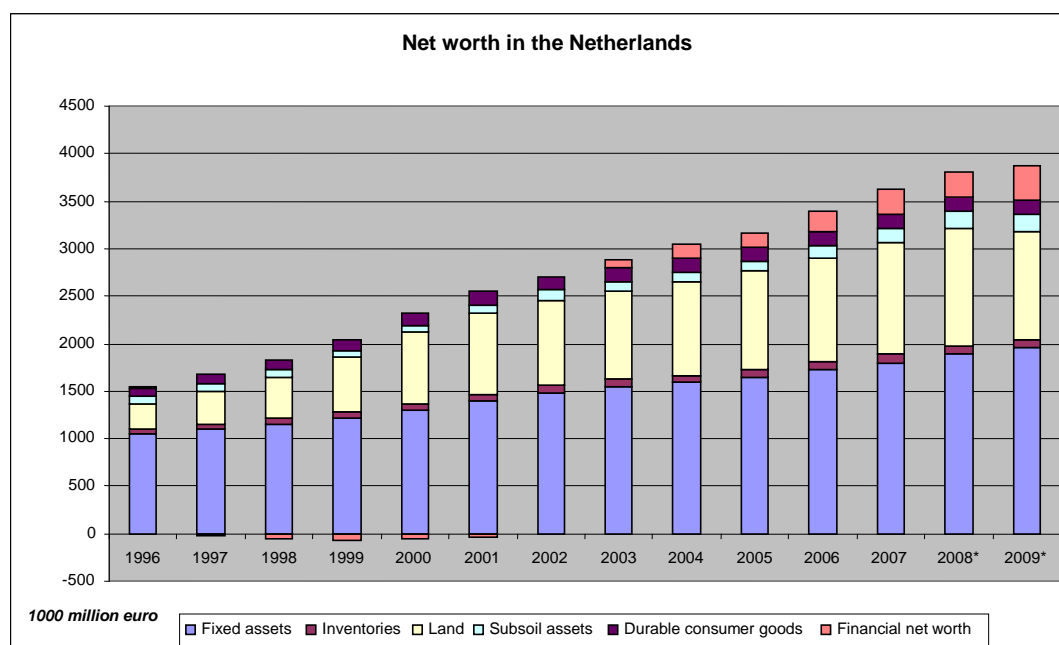
This paper is structured as follows: Section 2 starts with a summary of the results of the Dutch financial and non-financial balance sheets. Section 3 describes the compilation of non-financial balance sheets for the Netherlands, emphasising methodological and practical issues. Section 4 suggests improvements of the Dutch non-financial balance sheets, and extensions to the present sectoral accounts for non-financial and financial assets to better cope with the data needs as were felt during the recent financial crisis.

2. Net worth of the Netherlands

The non-financial balance sheets for the Netherlands are available for the period 1996-2009. A breakdown is available for industries and the five institutional sectors: non-financial corporations, financial corporations, general government, households and non-profit institutions serving households. The value of the non-financial assets is estimated for many individual items so a detailed breakdown can be published.

The changes between non-financial balance sheets in different points in time are shown by the items opening balance sheet, revaluation, acquisition of assets, other changes in assets and the closing balance sheet. Also statistical discrepancies are introduced as a category in order to cope with differences between the closing and opening balance sheet caused by the use of different surveys for successive periods.

Figure 1 shows the aggregate non-financial balance sheet combined with the financial balance sheet for the Netherlands for the period 1996-2009. Net worth grew from 1546 billion euro in 1996 to 3875 billion euro in 2009. This means an average growth rate of 6.5 percent. The value of Dutch GDP increased by an average of 4.1 percent in this period.



The combination of non-financial and financial balance sheets shows that financial assets, which are equal to the net Dutch position to the rest of the world, contribute only a minor

part to the net worth of the Netherlands. For 2009 this contribution was 9.3 percent. For 1997 to 2002 the contribution of financial assets to net worth was even negative. This was mainly caused by the increased price of securities on international stock markets during the dotcom bubble. This price rise affected the liability side on the balance sheet of financial and non-financial corporations more than the asset side. In 2008 financial net worth dropped because of the decrease of equity prices. In 2009 financial net worth increased considerably due to the recovery of the stock markets.

The growth of the non-financial assets, consisting of fixed assets, inventories, land, subsoil assets and consumer durables, was mainly caused by the growth of fixed assets and land. Both developments are due to the rise in real estate prices. In the Dutch non-financial balance sheets the value of dwellings, buildings and structures is included in fixed assets while the value of the land underlying the dwellings, buildings and structures is part of the asset category land. Any price change of real estate that differs from the change in the costs of construction results in a value change of land.

In the Dutch non-financial balance sheets consumer durables are a memorandum item. Strictly speaking, consumer durables are not fixed assets. The purchase of these items is seen as consumption. In this paper consumer durables are included in net worth because the focus is on the total wealth of the Dutch population. Also for country comparisons the inclusion of consumer durables can be informative because they contribute to household wealth.

Figure 1 shows that the value of consumer durables, which are by definition owned by households, grew moderately (on average 3.3 percent between 1996 en 2009). So their share in net worth decreased.

Table 1 in the annex of this paper presents the numbers behind figure 1. Table 2 shows the non-financial and financial balance sheets for the main institutional sectors within the Dutch economy. Deconsolidation of the figures for the whole economy shows that households and non-profit institutions serving households mainly contribute to Dutch net worth.

Tables 3 and 4 in the annex show the breakdown of non-financial and financial balance sheets into types of assets. The asset types that mostly contribute to net worth are real estate and land, long-term bonds, shares and other equities, directly or by way of their pension claims.

The next part of this paper concentrates on the compilation of the non-financial balance sheet for the Netherlands. Several theoretical issues and data problems had to be solved in this rather new area of interest. Section 3 concentrates on the main issues. A detailed description of the method for estimating the non-financial assets can be found in Van den Bergen et al. (2010) on which the next section of this paper is based.

3. Compilation of non-financial balance sheets

The Dutch non-financial balance sheets include data on fixed assets, inventories, the most important types of land, subsoil assets and consumer durables. The category dwellings is part of the fixed assets. According to the European System of Accounts (ESA95) non-financial assets can be divided into produced assets and non-produced assets. The types of produced assets are fixed assets, inventories and valuables. Consumer durables are only recognized as a memorandum item. The category valuables is not included in the Dutch non-financial balance sheet because there are no good data sources available for estimating their value. The only assets included from the non-produced assets are subsoil assets and the most important types of land. Land for construction and recreation, and intangible non-produced assets are the most important categories that are missing. Although the Dutch non-financial balance sheet as published today is incomplete, it does represent most of the total value of the non-financial assets in the Netherlands.

3.1 Fixed assets

Apart from livestock for breeding, dairy and draught, the net value (net capital stock) of all assets is estimated with the Perpetual Inventory Method (PIM). Estimates of livestock are based on direct surveys of the number of animals, multiplied with the value of these animals on the market.

A detailed description of the method for estimating net capital stock is given by Van den Bergen et al. (2008). This paper here will only present a short overview. The net capital stock of the fixed assets is calculated as net present values of the current and future capital services a capital good is expected to generate during its remaining service life. Future capital services are based on estimates of the (gross and) productive capital stock. For this purpose, the following data are required:

- Time series of gross fixed capital formation and prices by industry, asset type and institutional sector. Time series were compiled from 1953 onwards using a wide range of different sources. For the year 1952, a starting capital stock was derived from an inventory of the capital stock that was still in operation after the Second World War.
- Survival functions. These are required to estimate gross capital stock. For the manufacturing industry, directly observed capital stock benchmarks were combined with discard surveys to estimate survival functions. For non-manufacturing industries, different sources were used, for example car registers, company records and literature.
- Age efficiency profiles. For estimating the productive capital stock, age efficiency profiles are necessary. Due to the lack of reliable data, age efficiency profiles from the Australian Bureau of Statistics and the US Bureau of Labour Statistics were used as our main sources.
- Discount rate. The real discount rate used to calculate the net present value of future capital services was set at 4 percent.

- Time series of other changes in the volume of assets like purchases of second hand assets, reclassifications and bankruptcies. Although sales and purchases of second hand assets are part of the gross fixed capital formation, for practical reasons they are registered as other changes in assets in the PIM framework.

With these data, balance sheets of fixed assets were constructed at the level of 57 industry branches, 20 asset types and 18 institutional (sub)sectors.

3.2 Inventories

ESA 95 distinguishes 4 different kinds of inventories: materials and supplies, work in progress, finished goods and goods for resale.

For work in progress except livestock raised for slaughter, an estimate is made based on investment statistics. Like livestock for breeding, dairy and draught, the estimates for livestock raised for slaughter are based on direct surveys of the number of animals, multiplied with the market value of these animals.

For the other types of inventories, a detailed description of the methods used is given in Taminiou-Van Veen et al. (2009). The current paper provides an overview of the main issues. For materials and supplies, goods for resale and finished goods, estimates are based on business surveys. In these business surveys, companies are asked for the balance sheet at the beginning of the year, the changes in inventories and the balance sheet at the end of the year. A drawback of these surveys is that the balance sheet at the beginning of the year is often recorded in prices of the previous year, whereas the balance sheet at the end of the year is recorded in prices of the current year. As a consequence, the value that is entered as changes in inventories is in reality the combination of both changes in inventories and revaluation. In order to estimate the changes in inventories, the revaluation has to be calculated. To do this in an accurate way the revaluation is done at the level of commodities. Therefore, the balance sheets (by industry) have to be divided into commodities first.

To break down finished goods and goods for resale into commodities, turnover by commodity is used for most industries. It is assumed that the ratio of sales per product group also applies to inventories. The source that is used for this breakdown only has data for large firms. It is therefore assumed that small firms have the same division by commodity as large firms. A direct survey of physical inventories by commodities is used for the oil industry. These data are combined with data on price changes in these commodities to estimate monetary balance sheets.

Inventories of materials and supplies in the manufacturing industry, including the oil industry, are allocated to commodities using the ratio by product group of intermediate purchases as derived from the business surveys.

Construction has no inventories of finished products. All finished products are directly recorded as gross fixed capital formation. For the inventories of goods for resale in construction it is assumed that they comprise the same commodities as the materials and supplies, since it is not plausible (or even possible) that goods for resale are the same

goods as the finished products. The estimations are based on the distribution of use by commodity in the supply and use tables of the national accounts.

For trade, the turnover by commodity derived from the business statistics is used to estimate the inventories. For this fixed ratios have been used to arrive at the division by commodity.

In the remaining industries, materials and supplies, finished goods and goods for resale are small. For this reason, and since no data are available on a breakdown by industry, we made no division by commodity. The inventories in these industries are revaluated with the consumer price index.

The breakdown of inventories by industries into institutional sectors corresponds with the distribution of production and use of the industries by institutional sectors.

3.3 Consumer durables

A detailed description of the method used for estimating consumer durables is given in Taminau-van Veen (2010). The current paper gives a short overview. Evidently, consumer durables are owned by households and accordingly they are presented on the balance sheet of the institutional sector households. The net value of consumer durables is estimated for 7 different types of consumer durables. The estimation method is identical to the method for estimating fixed assets. The PIM is used to estimate the net value of the consumer durables. Time series for the consumption of consumer durables are used as input in the PIM. Time series for investments are available from 1953 onwards. They are taken directly from the national accounts. The starting capital stock for 1952 is based on the consumption in 1953 and the estimated service lives for the consumer durables.

We used various data sources for the service lives of consumer durables. We did not take trade in second hand assets into account, since most of it takes place between consumers. Two exceptions are made. The first exception is the consumption of second hand lease cars. This is the reciprocal of the sales of second hand lease cars by the industry renting of movables. The second exception is made for trade margins (and value added tax) on the purchase of second hand cars. By treating these margins as trade in second hand assets, these margins receive the same age-price profile as the older cars on which they are levied.

3.4 Land

Before we could make land estimates we had to solve several theoretical issues related to land. One of them is that the market value of land could not be determined in a straightforward way because land cannot be physically separated from a building or structure on it. Separating the value of land and that of buildings requires some theoretical assumptions. Furthermore, it can be questioned whether all land should have a value, in particular land owned by the government, that cannot be used for any private purpose.

3.4.1 Valuing land

Like for any other asset category the preferred way to value land is by using market values. These values can be derived from information on land transactions, i.e. sales and purchases of land. For agricultural land this method can be applied quite easily. However, land very often changes hands together with buildings and structures on it. Using land values derived from transactions without buildings as a proxy for land values underlying buildings and structures may easily lead to downward biases. The reason for this is that most land without buildings and structures is located on the outskirts of cities or in rural areas, whereas most land underlying buildings is located within cities. Land prices in urban areas are often much higher than the land prices in rural areas.

So we decided to estimate the land values by separating the value of buildings from total real estate transaction prices. These transactions usually include the value of land together with the value of buildings or structures on the land. For this the value of the buildings and structures on the land were defined as the depreciated cost of producing the building or structure, which can be measured (at a macro or meso level) with the Perpetual Inventory Method (PIM). The consequence of this way of estimating the value of buildings and structures and the land is that changes in the transaction (market) prices of buildings or structures that differ from the changes in the costs of construction end up as value changes of the land.

3.4.2 Scope of balance sheets for land

In the ESA all land subject to ownership should be valued on the basis of its market price. In cases where ownership cannot be identified, the government could be considered the land owner by default. This means that all land within the borders of the national territory should in principle be represented in the nation's balance sheet, although some land values, like remote and inaccessible deserts or tundra's, may be close to zero. One may expect that all privately owned land has positive values.

For certain parts of government-owned land, like land underlying roads, however one may question whether this land has a value of its own or that the value of this land is already included in the value of adjacent land. For one may argue that the value of the most privately owned adjacent land depends, among other things, on its accessibility to the public infrastructure. An accessible house (including the land) usually has a higher value than a remote house next to a dirt road. This surplus value is created by roads or public means of transport through which the house is easily accessible. In this case including a value for this government-owned land in the balance sheet would lead to double counting.

A second argument against valuing land underlying roads is that it does not seem to have a real market value as long as it is used as such. In the Netherlands, as in many other countries, the government develops spatial zoning plans which predetermine the use of land for various purposes (agriculture, dwelling, office locations, nature, etc.). Land prices depend very much on the kind of economic activities for which the land can be used. Changes in zoning plans will lead via the other changes in volume of assets (a reclassification of land use) to changes in the national balance sheet positions for land.

Based on these arguments, but also due to measurement difficulties, land underlying public infrastructure is not valued as such in the Dutch national balance sheet for land. Only government-owned land underlying buildings and structures, land under cultivation, and construction land is included. Excluded is all government owned recreational land and associated surface water and other land and associated surface water.

3.4.3 Measurement issues

In the Netherlands the land use statistics form a key source in the compilation of balance sheets for land. Land use statistics provide a breakdown of all land (and inland water bodies) in the Netherlands into types of land. They are based on aerial photographs and are published about every three years. Using land use statistics ensures consistency between the sum of the areas of all types of land and the total area of land in the Netherlands.

A disadvantage of the land use statistics is that they are not consistent with the classification of land in the SNA or SEEA. Land under small roads within a neighbourhood is for example classified as land underlying dwellings. Furthermore, the delineation of an area of land is not necessary conform the SEEA, for example when associated surface water is involved. However, the land use statistics are still the most comprehensive source available.

3.4.3.1 Agricultural land

Agricultural land is divided into two separate groups: open farmland and land underlying greenhouses. No difference is made between land for cattle breeding and land for arable farming because in the Netherlands the prices of this different type of land are pretty much the same. Open farmland is further divided into leased and non-leased land. Data shows that the average price for land encumbered with a lease is about half the price of land without a lease on it.

We used several data sources to determine the price per hectare of agricultural land. Different organisations have been responsible for measuring the price of agricultural land in different time periods. All data sources provide the weighted average price per hectare of agricultural land for the whole of the Netherlands, as well as for different regions. Since the resulting prices from the different data sources are within 1 percent of each other, they are treated as a continuous time series.

The value of the agricultural land is subsequently estimated by multiplying the agricultural area with the price per hectare. This means that farmyards and land underlying farms get the same price as the “actual” agricultural land.

3.4.3.2 Land underlying dwellings

The value of land underlying dwellings is measured as the value of the dwelling including the land minus the depreciated cost of building the dwelling. The value of the dwelling including the land is derived from tax registers. In the Netherlands the economic value of every dwelling (WOZ) including land is registered for tax purposes. This value is based on actual prices of dwellings sold and therefore provides an accurate estimate of the

market price, except for the fact that all dwellings are registered in prices of a few years back. In order to estimate the value at current prices, the price index for existing owner-occupied dwellings is used. Although this price index shows the price differences between different kinds of dwellings, it does not correct for the average increase in the size of dwellings over time. As such the price index probably suffers from an upward bias. No data on the size of this bias is available, so for the time being we ignore the expected bias.

The Perpetual Inventory Method (PIM) is used to determine the depreciated cost of dwellings. The PIM measures the net value of dwellings excluding the underlying land, but including the depreciated value of ownership transfer cost. Since the WOZ value is the price for which the dwelling is expected to be sold, it excludes the transfer of ownership cost. For estimating the value of land underlying dwellings, the PIM value excluding transfer of ownership cost is therefore subtracted from the WOZ value.

Not only land values but also volume changes in land use can be derived from the above mentioned sources. It is important to emphasize that the volume change of land is not necessarily equal to change in concomitant land areas. This is because land underlying dwellings can not be treated as a homogeneous asset. Land in the middle of a city usually has a much higher value and is therefore economically speaking of a higher quality than land in smaller villages. In practice, the volume change of land underlying dwellings appears to be higher than the increase in the area of land underlying dwellings. This is consistent with the observation that in the Netherlands most dwellings are being built in densely populated areas where land prices are above average. However, more research is still needed to determine whether the results are plausible.

3.4.3.3 Land underlying non-residential buildings

In principle the value of land underlying non-residential buildings can be estimated in a similar way as the value of land underlying dwellings. A WOZ value is available for almost all non-residential buildings. Excepted are tax exempt buildings such as churches. The main difference is that the WOZ value for non-residential buildings including land cannot be used directly. Unlike dwellings including land, the WOZ value for non-residential buildings including land is not based on actual transactions. The reason for this is that there are few actual transactions in non-residential buildings. The tax authorities apply various methods for estimating the WOZ value of non-residential buildings including land. When possible, the net present value of future rentals is applied as a valuation method. In other cases, the depreciated value of construction costs is estimated based on extensive guidelines.

3.4.4 Volume changes

The accumulation account for land that explains the changes between the opening and closing balance sheets shows a small change in the volume of the land in the Netherlands in the period 1996 - 2009. This change is not caused by a change in the territory but by a change in land use. Due to the increased need for dwellings agricultural land was changed into construction land. This type of land has a higher quality, so that the change in use resulted in a volume change of land.

3.5 Subsoil assets

Several different types of subsoil assets exist in the Netherlands: oil, gas, clay, peat, sand, salt, gravel and limestone. Coal reserves also exist in the Netherlands, but extraction of coal is not economically feasible. The economic value of coal is therefore zero, so coal is excluded from the subsoil assets.

For estimating the value of the subsoil assets, the different types of subsoil assets are divided into two classes: assets with a ‘finite’ and assets with an ‘infinite’ reserve. A truly infinite reserve of a subsoil asset does not exist of course. However, for some assets the ratio between the physical extraction and the reserves is so small that extraction is guaranteed for the foreseeable future. For practical reasons, which are explained in section 3.5.2, it is assumed that the reserve of these assets is infinite. So an equable level of extraction is assumed, while for the finite subsoil assets the value is estimated assuming a decreasing level of extraction.

Section 3.5.1 deals with the subsoil assets with a ‘finite’ reserve: oil and gas. The other subsoil assets are discussed in section 3.5.2.

3.5.1 Oil and gas reserves

An extensive description of the methods for estimating the oil and gas reserves is given by Veldhuizen et al. (2009). In this paper we only present a short overview. The value of an asset in the balance sheet should reflect the value that the asset would have if traded in an open market. Since observed market values for transactions in oil and gas reserves are not widely available, the net present value method is used to give a monetary value to the physical stocks of reserves. The future income flow is calculated by multiplying projected yearly physical extractions with the expected income per unit of the reserves (unit resource rent).

For estimating the physical extractions, we used data on the available reserves and data on the extraction schedule. Data on the available reserves (and on the physical extraction) were derived from reports made by an official research institute (TNO, the Netherlands Organisation of Applied Scientific Research). The physical extraction schedules are based on the remaining reserves, on observed trends in the physical extraction of oil and gas and on government limits on the yearly amount of gas that may be extracted. This results mostly in extraction schedules that are declining linearly.

The unit resource rent is calculated endogenously. The (exogenously estimated) user cost of capital of the fixed assets and the pure profits for sideline activities are subtracted from the gross operating surplus to determine the resource rent for the extraction of oil and gas. Since this operating surplus is only available for the combined activity of oil and gas extraction, the division is based on the ratio between the production values of oil and gas. More future research is required to arrive at a better breakdown.

For both oil and gas, the resource rent is subsequently divided by the physical extraction to arrive at the unit resource rent. Due to large variations in the price of oil and gas, the unit resource rent fluctuates greatly. For calculations of the net present value of future

income it is therefore assumed that the (expected) future real unit resource rent equals the average resource rent in the last three years.

3.5.2 Other subsoil assets

The other subsoil assets important for the Netherlands are clay, peat, sand, salt, gravel and limestone. In principle, the value of the reserve should be estimated in the same way as the value of oil and gas reserves. However, data on the physical reserves of these assets is not available. One of the reasons for this is that the exact size of the reserves is relatively unimportant, since these subsoil assets are available in abundance. Another reason that no extensive research on the available reserves is done, is the relative insignificance of these other subsoil assets in terms of economic value.

Since data on the reserves is not available and the physical reserves are much larger than the yearly extraction, it is assumed in the calculations of the net present value of future income that the reserves are infinite. As the net present value method heavily discounts income far in the future, the error made by assuming that the physical reserves are infinite instead of just being very large is relatively small.

A consequence of assuming the physical reserves to be infinite is that there is no longer any depletion of these subsoil assets. No matter how much extraction there is, the remaining physical reserves remain infinite. Depletion is therefore nonexistent. For reserves that are very large compared with the extraction, however, depletion is also very small (although not zero), so once again the error that is made in the monetary balance sheet is probably not very large, perhaps a few percent of the total value. Physical balance sheets for these subsoil assets are not feasible, since infinite numbers can obviously not be published in a balance sheet.

Since the physical reserve is assumed to be infinite, the physical extraction schedule is also endless. Declining extraction trends as used for the extraction of oil and gas are therefore not plausible. It is assumed for the physical extraction schedule for all subsoil assets that the future yearly extraction equals the average extraction in the past three years.

The extraction of the other subsoil assets takes place in two different industries: in the industry extraction of other subsoil assets, and in the chemical industry as a sideline. Since extraction of subsoil assets is a side line activity of chemical industry the unit resource rent cannot be estimated by using the available industry profits. The unit resource rent is therefore directly estimated by assuming that the unit resource rent equals the unit resource rent for the corresponding subsoil asset in the industry extraction of other subsoil assets.

As for oil and gas, the resource rent of the other subsoil assets is calculated by subtracting the (exogenously estimated) user cost of capital of the fixed assets and the pure profits for sideline activities from the gross operating surplus. Micro data shows that in the years 2005, 2006 and 2007, the ratio between gross output and the resource rent is fairly similar for most subsoil assets. The resource rent is therefore divided into the different types of

subsoil assets according to the distribution of the production value into these subsoil assets.

For all the different subsoil assets, the resource rent is subsequently divided by the physical extraction in order to arrive at the unit resource rent. For calculations of the net present value of future income it is assumed that the (expected) future real unit resource rent equals the average real resource rent in the last three years.

Since both the real unit resource rent and the yearly physical extraction are assumed to remain constant over (infinite) time, the net present value of future rentals can be simplified to the yearly expected (real) resource rent divided by the (real) discount rate. As a real discount rate is set at 4 percent, the value of the subsoil assets therefore equals 25 times the expected real resource rent.

4. Possible improvements and extensions

The balance sheet for the Netherlands provides a reliable and nearly complete picture of financial and non-financial assets in the Netherlands. However, improvements can still be made to increase the quality of the figures. Also the usability of the complete balance sheet could be improved, for example by providing more information on different types of assets or institutional sectors. Section 4.1 describes possible methodological improvements of the non-financial balance sheet. Section 4.2 explores data gaps and possible extensions of the complete balance sheet and its sectoral division.

4.1 Methodological issues

The present non-financial balance sheets for the Netherlands include data on fixed assets, inventories, the most important types of land, subsoil assets and consumer durables. The balance sheets are not yet complete, however. The most important missing assets are valuables, construction land and privately owned recreational land and intangible non-produced assets like purchased goodwill, brand names, the radio spectrum and dairy quota. Furthermore, land underlying tax-exempted buildings, like churches, are excluded in the figures, since no data on the value of these real estate objects is available from the tax registers. Finally, water resources and non-cultivated biological resources should be added although their values are likely to be small. Further research into these assets is required.

A second aspect that needs improvement is the breakdown of land by industry. For the banking and insurance industries, data from company reports may be used to estimate the value of land. The breakdown of the other industries should also be improved. Using the breakdown of buildings and dwellings by industry poses problems when price changes vary across industries. A relative price increase in an industry leads to a higher share of this industry in the total value of the buildings, and thus to a higher share in the volume of land. A relative *price* increase therefore leads to a *volume* increase in land. A way forward might be to use the breakdown of the volume change in buildings by industry to

divide the volume change of land into industries. This method needs to be explored further.

A third type of improvement is the division of the costs for producing oil and gas, where due to data restrictions the resource rent was divided between oil and gas based on relative production values. This is probably an inaccurate assumption, because experts indicate that the costs per unit of extracted oil are larger than the cost per unit of extracted natural gas. As a result, the resource rent for oil and the monetary value of oil reserves are likely to be inflated. Future research aims to solve this problem.

4.2 Possible extensions and data gaps in the context of the financial crisis

4.2.1 Commercial real estate

The value development of real estate played a crucial role in the recent financial and economic crisis. Following the SNA and ESA, the value of dwellings, commercial real estate and land underlying buildings in the non-financial balance sheet is based on market prices. Since no representative market prices are available due to the thin market for commercial real estate the present value of the future revenues is used as an indicator for the market value. One may however wonder if these estimated future revenues are realistic. For example, the market for commercial real estate currently suffers from a considerable number of vacant units. Due to the economic crisis and changes in economic activity many offices, shopping centers and business premises are currently empty. Experts on commercial property expect that the majority of these offices will never be used again so the economic value of these assets is probably lower than prices on the market. From an analytical point of view, it would be interesting to confront market values of commercial real estate with the revenues of the industry real estate activities. Confronting these revenues with the capital cost of commercial real estate could indicate a value gap or difference between a market value and economic value. For the users of the non-financial balance sheets subdividing commercial real estate into categories would show the risks the owners bear. In addition, information on vacancy rates of real estate, may be used to make corrections on capital cost. Together, this information can be used in productivity analysis and may be useful to monitor the vulnerability of real estate to changing market circumstances.

4.2.2 Households accounts

The sectoral breakdown of the Dutch financial and non-financial balance sheets follows the data requirements of Eurostat, the statistical bureau of the European Union. This sectoral breakdown is not sufficient for monitoring financial stability and analysing imbalances in the economy. The subprime crisis showed that more statistical information is needed on certain groups of households and different types of loans. An extension of the sectoral breakdown to income groups of households may be necessary for the financial as well as the non-financial balance sheets. In this way the ratios of real estate value to mortgage liabilities for different income categories within the household sector could be estimated and vulnerabilities could be discovered in time.

4.2.3 Non-financial corporations and financial enterprises

Some industries like construction, transport, real estate owners and brokers and financial activities were more severely hit by the recent financial and subsequent economic crisis than others. It would be interesting to analyse the consequences of the crisis on industry-specific balance sheet positions. Analysing balance sheets at the level of industries may also indicate the vulnerabilities of different industries to real estate price changes or changes in interest rates. Unfortunately, an industry break-down of the Dutch balance sheet is not available. The complete balance sheet of the Netherlands is only available at the level of the main institutional sectors. At this level the consequences of the crisis are not visible in a satisfactory way. Therefore, we should explore to what extent the current balance sheets can be compiled for different industries. An industry break-down already exists for non-financial assets. For the financial balance sheet it is more difficult to determine industry-specific assets and liabilities. The balance sheet is based on data from enterprise units, whereas establishments units are used for the industry breakdown. Future research should investigate to what extent the financial balance sheet can be extended with industry information.

4.2.4 Frequency

For the Netherlands financial and non-financial balance sheets are compiled on an annual basis. For analysing a financial crisis and its consequences for the real economy, next to structural information also short term information is necessary to detect imbalances... An example of a possibly threatening imbalance for households and financial corporations is the combination of growing unemployment, decreasing prices of dwellings and increasing interest rates for mortgages. In the Netherlands information about unemployment and part of the financial balance sheet is available on a quarterly basis. Extending the release of a complete balance sheet with a quarterly frequency is desirable. Due to serious data problems it is probably not feasible to construct a complete balance sheet for all items on a quarterly basis. Therefore, it should be investigated for which items a quarterly balance sheet can be compiled.

4.2.5 Financial balance sheets

The financial balance sheets for the Netherlands are published for the main institutional sectors with a restricted subdivision for the financial corporations and general government. The level of detail published for the financial instruments is rather restricted due to the low reliability of the sources used. In order to cope with data needs for tracking imbalances, the level of detail of the financial instruments should be extended, especially for certain types of liabilities like mortgages and loans. Information on this last type of instrument is now only available for long and short term loans. A proper analysis of financial markets and the vulnerability of financial corporations to credit risks requires a subdivision of loans and bonds according to time to maturity and exposure to country risks.

5. Conclusions

Statistics Netherlands has only recently started with the compilation of non-financial balance sheets. This enlargement of the national accounts turns out to be very useful since it offers the possibility for several analyses, like international comparison of net worth and the calculation of growth accounts and multi-factor productivity. With the combination of financial and non-financial balance sheets we can discover the vulnerability of economic actors to changing circumstances in the real and financial economy. To do this effectively extra details in the financial and non-financial balance sheets and in the subdivision of institutional sectors are desirable. The Dutch experience with compiling non-financial balance sheets shows that certain assumptions are necessary to deal with theoretical issues and restricted data sources. Although a few asset categories are still missing, Statistics Netherlands considers the non-financial balance sheet as a reliable picture of all assets since it represents most of the total value of non-financial assets in the Netherlands.

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Table 1. Non-financial and financial balance sheet for the Netherlands by type of asset

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008*	2009*
<i>Closing balance sheet; 1000 mln euro</i>														
Fixed assets	1052	1097	1152	1218	1302	1400	1486	1553	1600	1651	1729	1799	1892	1951
Inventories	55	58	61	63	68	70	72	71	70	73	76	87	91	85
Land	264	348	437	581	753	853	904	932	985	1037	1098	1180	1233	1145
Subsoil assets	68	76	76	69	71	87	100	103	99	110	133	149	177	175
Total non-financial assets	1440	1580	1725	1932	2194	2410	2561	2659	2754	2871	3036	3215	3393	3356
Durable consumer goods	98	102	109	117	126	136	143	146	146	146	149	154	157	156
All assets	1538	1682	1834	2048	2320	2546	2705	2805	2899	3017	3185	3369	3550	3511
Financial assets	1124	1267	1423	1776	2075	2367	2353	2559	2752	3151	3665	4178	4096	4251
Liabilities	1116	1288	1482	1844	2137	2397	2357	2488	2596	3010	3458	3919	3845	3888
Financial net worth	8	-21	-58	-69	-62	-30	-4	72	157	141	207	259	252	363
Net worth	1546	1661	1775	1980	2258	2516	2701	2876	3056	3158	3392	3628	3802	3875

* provisional figure

Table 2. Non-financial and financial balance sheet of the Netherlands by institutional sector

Institutional sector	Type of worth	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008*	2009*
<i>Closing balance sheet; 1000 mln euro</i>															
Non-financial corporations	Non-financial assets	566	611	658	724	803	864	907	930	958	989	1030	1083	1131	1112
	Financial net worth	-384	-476	-532	-668	-645	-562	-464	-426	-402	-492	-485	-495	-284	-327
	Net worth	182	135	126	57	158	302	443	504	556	497	545	587	846	785
Financial corporations	Non-financial assets	43	47	53	59	67	72	70	68	65	61	60	58	57	55
	Financial net worth	-65	-86	-129	-146	-173	-142	-102	-86	-64	-85	-71	-52	-43	-16
	Net worth	-22	-38	-75	-87	-106	-70	-32	-18	0	-24	-11	5	14	39
General government	Non-financial assets	298	317	329	337	357	391	420	440	445	465	503	537	586	587
	Financial net worth	-169	-170	-175	-142	-146	-148	-162	-173	-185	-180	-171	-159	-160	-171
	Net worth	129	147	154	195	210	243	258	267	261	285	333	378	426	417
Households and non-profit institutions serving households	Non-financial assets	631	707	793	927	1093	1220	1308	1366	1432	1503	1592	1691	1777	1757
	Financial net worth	626	711	777	887	903	821	724	757	808	897	933	966	739	877
	Net worth	1256	1418	1570	1815	1996	2041	2032	2123	2240	2400	2525	2657	2516	2633
Total economy	Non-financial assets	1538	1682	1834	2048	2320	2546	2705	2805	2899	3017	3185	3369	3550	3511
	Financial net worth	8	-21	-58	-69	-62	-30	-4	72	157	141	207	259	252	363
	Net worth	1546	1661	1776	1980	2258	2516	2701	2876	3056	3158	3392	3628	3802	3875

* provisional figure

Table 3. Non-financial balance sheet of the Netherlands

	1996	2008*	2009*
<i>Closing balance sheet; 1000 mln euro</i>			
Dwellings	447	934	975
Non-residential buildings	218	363	382
Civil engineering works	192	311	312
Transport equipment	35	49	47
passenger cars and other vehicles	17	28	25
trains and trams	3	5	5
ships	8	10	10
aircrafts	6	6	7
Machinery and equipment	118	157	158
Computers	7	13	13
Other tangible fixed assets	15	28	28
Software	5	16	16
Other intangible fixed assets	13	17	17
Cultivated assets	3	3	3
Transfer costs of ground	0	-	-
Fixed assets	1052	1892	1951
Inventories	55	91	85
Land underlying dwellings	174	994	918
Land underlying non-residential buildings	46	157	139
Land under cultivation	43	82	88
Land	264	1233	1145
Oil and gas reserves	66	171	170
Other subsoil assets	2	5	5
Subsoil assets	68	177	175
Total non-financial assets	1440	3393	3356
Textile and clothings	12	17	17
Leather goods and footwear	3	4	4
Home furniture	25	39	39
Household appliances	13	22	22
Household articles	7	13	13
Vehicles	25	38	36
Other durable consumer goods	13	25	24
Durable consumer goods	98	157	156
All assets	1538	3550	3511

* provisional figure

Table 4. Financial balance sheet of the Netherlands

	Financial assets			Liabilities		
	1996	2008*	2009*	1996	2008*	2009*
<i>Closing balance sheet; 1000 mln euro</i>						
Monetary gold and special drawing right	15	12	20			
Currency	0	9	12	-	0	0
Transferable deposits	9	129	115	11	81	100
Deposits in euro's				6	-	-
Other deposits	105	365	305	115	484	414
Bills and short term loans	12	13	12	2	122	125
Long term bonds	99	513	568	252	947	995
Financial derivatives				3	-16	17
Short term bonds	153	395	445	95	326	285
Long term loans	140	866	765	77	457	368
Shares and other equities	562	1722	1942	530	1384	1531
Net equity of households in life insurance and pension funds reserves	1	1	1	4	10	10
Other accounts receivable and payable	28	71	66	23	50	43
Financial net worth				8	252	363
Total	1124	4096	4251	1124	4096	4251

* provisional figure