APPENDIX TO DISCUSSION PAPER 170, LIFETIME GENERATIONAL ACCOUNTS FOR THE NETHERLANDS, BY HARRY TER RELE AND CLAUDIO LABANCA

This appendix describes the data sources and the processing of the data in the paper. Section A does this for the expenditure side of government finances and Section B for the tax side. Section C, D and E respectively describe how the Generational Accounting exercise is carried out for the past, for the future and how the past and future are combined. Section F describes the construction of lifetime primary incomes and Section G the LGA calculations. Section H discusses other inputs.

This technical appendix serves two purposes. The first is that it describes the procedure of the calculations in details. This may be helpful to those who want to replicate the results or who want to perform similar calculations for other countries. The second purpose is that it records exactly where the data and the calculating procedures are stored in CPB databases. It contains links to the inputfiles and the outputfiles (both in Excel). It also contains a file that presents how the present value calculations are carried out. However, these calculations are carried out in a model solving program used at CPB and may not transferrable. It serves as an aid for those who want to replicate the calculations but cannot be readily used by other institutions.

If the hyperlinks below don't work, please access the files working with the accompanying article.

A. Expenditure side

Classification

1) Data on expenditure are derived from the CPB data base on government finances, which is partly available at the CPB website http://www.cpb.nl/cijfer/lange-tijdreeksen-overheidsfinancien. The full data set is available at CPB. For the years back to 1969, the revised national accounts (NA) data are used. For 1950-1968 the non revised NA data are used. This is discussed in Bos (2006).

2) Expenditure is classified into defence, general government (the sum of public administration and safety expenses), infrastructure, health care (which is broken down into long term care , health care and a residual term), education, social security (which is broken down into public pensions, sickness and disability benefits, child allowances, unemployment benefits, welfare expenses and a residual term), transfers to corporations and international cooperation (consisting of development aid and transfers abroad).

3) Data on health care divided into long term care and health care are available back until 1969. Before 1969 we made the decomposition by assuming that the 1969-share applied in earlier years as well.

4) Expenditure on General government and Education are not equal to the benefits from these items. The investments in these categories (respectively investments in buildings and school buildings) are not included in the benefit concept but replaced by an imputed term for benefits from these buildings. This term is described in the main

text[1] and equals depreciation plus the product of the real discount rate and the public capital stock in these two categories of buildings. Valuations of these stocks are provided by Statistics Netherlands.

In the case of infrastructure the same procedure is followed. The difference with general government and education is that this expenditure item consists only of an investment component[2](or it is assumed to be so). This item is thus replaced by the imputed benefit term.

5) For imputing benefits from the capital stock we assume a real interest rate of 3%, which equals the real discount rate. This ensures that the present value of the benefits of the capital stock equals the investment, thereby securing the zero sum property of Generational Accounting. Figures for the capital stock were provided by Statistics Netherlands back to 1950, and for depreciation back to 1970. For the period 1950-1969 we assumed a constant depreciation rate. This constant value is the average depreciation rate observed in years the 1969-1974. This assumption seems to be reasonable because the volatility of depreciation rate over time is low.

For some years figures recorded by CPB for Capital Consumption were different from those provided by Statistics Netherlands for Investments. We decided to use CPB data on consumption.

The figures on the capital stock and depreciation from Statistics Netherlands, as well as the calculation of the (imputed) net benefits from the capital stock, are located at CPB at: http://www.cpb.nl/sites/default/files/capital.xls

Age profiles of benefits

Age profiles for the base year for which the benefits can be attributed to individuals are mainly data based.[3] They are derived by looking at the average benefits each cohort received relatively to other cohorts in the base year. For all those items whose benefits can not be individualized a flat age profile is assumed. Thus a flat age profile is assumed for: general government, defence, infrastructure, transfers to corporations, international cooperation and non tax revenues.

For earlier years we assumed that the shape of the age profile for each type of expenditure is time invariant, and that its level is adjusted in each year in order to arrive at the realized level of expenditure. The adjustment is uniform for each age group *i*. This is done as follows for each item *n* and for each year *t*[4]:

---

[1] Formula (2.2)

[3] These age profiles are derived from various sources. The profile for health care consists of the profiles for cure and care, which are both based on information provided by the RIVM (2007). The age profile for the disability benefits are based on Van Sonsbeek en Alblas (2010), as it is the future use of this government program. The profile for public pensions is based on its institutional arrangement. It is granted to individuals as from the age of 65. Being a flat rate system, only granting a higher benefit to singles than to married individuals, it is imputed to rise slightly with age due to an increasing share of single households. The profile for unemployment benefits and social assistance are assumed to be flat between the ages of 20 and 64 due to lack of information.

[4] $pop_{i,t}$ stands for number of people of age i in year t.. Data on population for the period 1950-2007 were provided by CBS (Statistics Netherlands).

$$age\_\text{profile}_{i,t}^n = age\_\text{profile}_{i,2008}^n \times \frac{realized\_aggregate_t^n}{\sum_{i=0}^{99} age\_\text{profile}_{i,2008}^n pop_{i,t}}$$

for t < 2008   (1)

The procedure for education differs using modified age profiles in the past. Education age profiles have been modified to take into account that less people attended university before 1980. Starting from the 1980 age profile we assumed benefits from education for the 20-24 years old to decrease gradually until their level in 1950 equals 40% of their 1980 level. This reflects the increasing use of tertiary education in the period 1950-1980. For the age groups of 17 to 20 we imputed a linear interpolation between the (unchanged) value at 16 and the value at 20 for the period 1950-1980.

Data on aggregate expenses and benefits are at:
http://www.cpb.nl/sites/default/files/benefits-first-part-final-scr.xls, where the sheet 'gov_macro' contains the results. The transformation of expenditure into benefits takes place in:
http://www.cpb.nl/sites/default/files/capital.xls.

The age profiles in terms of their shape can be found in:
http://www.cpb.nl/sites/default/files/benefits-first-part-final.xls, spreadsheet 'age_profile'. Modified age profiles for education can be found in the spreadsheet 'educ_profile' of the file Benefits_First_Part_Final.xls .

The information on non-tax revenues, and its decomposition into the parts of it, are available at
http://www.cpb.nl/sites/default/files/1950-2003.xls. The part of non-tax revenues that consists of revenues from gas and from financial assets does not form part of the benefit concept. The rest of it however, mostly consisting of government sales and received subsidies from abroad, is included in the form of negative net benefits.

B. TAX/BURDEN SIDE

General assumptions

Data on past taxes have been drawn by past National Accounts[5]. The classification of taxes in the NA's have been changed in order to fit our purpose. For the past we classify taxes into:
1) Aggregate direct taxes on households, which are defined as the sum of taxes on wages, social security contributions (both paid by employees and employers) and inheritance taxes (labelled as capital taxes in national account). They are for our purpose broken down into taxes on wages, pensions (the sum taxes paid on public and private pension benefits), government transfers (other than the public pension), capital income and 'other'[6].
2) Indirect taxes, which are defined as the sum of value added taxes, excise duties, environmental taxes, motor vehicle taxes, taxes on passengers cars and motorcycles, real estate transfer taxes, import duties and taxes on

---

[5] Source CBS (Statistics Netherlands)
[6] That is a residual term.

insurance premiums. The indirect taxes are broken down into the same categories as taxes on households (see previous point), but additionally include taxes on child allowances.

3) Corporate taxes (net of corporate taxes paid on gas) plus taxes on dividends.

4) Capital taxes, which are defined as the sum of property taxes and taxes on net wealth of individuals.

5) Other taxes, which is a residual item presented by the standard NA. In our generational accounts it is enclosed by indirect taxes: each indirect taxes item includes a proportional (to the weight of the item in total indirect taxes) share of other taxes.

Non tax revenues are added to taxes in the LGA-calculations. However, in line with the CPB practice, they are presented in the paper as negative expenditure, reflecting the fact that they mainly involve government sales and subsidies received from abroad. As in Ter Rele (1998), gas revenues and revenues from financial assets are not included among them. These are two forms of revenues from government assets.

Seigniorage is added to each item of indirect taxes in proportion.

Direct taxes on households

Direct taxes on households and its decomposition into the items, are constructed in a two step procedure. The first step starts with setting up the decomposition for recent years. For the years 2005-2007 the decomposition into the items mentioned above are based on the figures constructed by the Social Security department of CPB. These figures are consistent with the NA's. The construction of the first step figures continues by determining the tax share in its corresponding tax base (wage income, pension income. etc.)[7] in 2005. For the years before 2005, we use this item-specific tax share in income to calculate a first result for tax revenues of each item, assuming a constant item-specific tax share back in time.[8] Subsequently the sum of all these constructed items is calculated. This procedure takes place in rows 4 till 12 of worksheet 'New Classification' in http://www.cpb.nl/sites/default/files/taxes.xls.

In the second, step we compare the sum of all the constructed items in the years before 2005 with the realized total for the direct taxes on households, which is available from the NA's. Then the percentage difference between the two is calculated for each year. This percentage difference is subsequently used to correct the results of the first step, thereby using this difference for each item. This procedure takes place in rows 28 till 34 of worksheet 'New Classification' in http://www.cpb.nl/sites/default/files/taxes.xls.

This procedure guarantees that the sum of the taxes used in our exercise equals the NA-figure for it. The procedure also takes account of changing relative weights of tax bases. However, it does not capture differences in how tax rates change between the items. It is implicitly assumed that that the tax rate for each item changes with the same percentage (for instance: from 40% to 36% and from 20% to 18%). This assumption is tested in section 6 of the paper by running a sensitivity analysis that imputes a tax share on pensions for 1950 that is half of what it is in

---

[7] These tax bases are all drawn from the NA's. Note that pension income here is the sum of public and private pensions.

[8] The procedure is different for two small items. Taxes on capital income are assumed to have grown in line with GDP, due to a lack of data on the exact tax base, and the unknown item 'other' to have grown in line with pension income.

the base case, and a gradual adjustment to the base case between 1950 and 1990. Varying the taxes on pensions is chosen because this has the largest effect on the age profile of taxes and thus on the LGA-results.

Indirect taxes

The assumptions are almost the same as direct taxes on households. There are some differences though. There is one more sub-item which is child allowances. Spending from child allowances obviously only bears indirect taxes. Indirect taxes are broken down into the above mentioned items (wage income, pension income etc.) by first constructing the net incomes related to these items. Net incomes of each item *n*, in turn, equal before tax incomes of the item (drawn from the NA's) minus direct taxes on households paid (see previous paragraph):

$$NET\_INCOME_{n,t} = INCOME_{n,t} - DIRECT\_TAX_{n,t} \qquad (2)$$

After having summed up total net incomes from the various items we calculate, for each item, the shares that the relative net income forms in the total net income. These shares are assumed to equal the shares in indirect taxes borne by each of the six items[9]:

$$INDIRECT\_TAX_{n,t} = \frac{NET\_INCOME_{n,t}}{\sum_{n=1}^{6} NET\_INCOME_{n,t}} \times TOTAL\_INDIRECT\_TAX_t \qquad (3)$$

In the CPB-calculations, these calculations are carried out in http://www.cpb.nl/sites/default/files/taxes.xls in the sheet 'New_Classification'. This sheet combines the data for 1950-1969 with those for 1970-2007. These data are subsequently copied into the file that serves as the inputfile for the Generational Accounting exercise which is carried out by a model (see section C). The inputfile is:

http://www.cpb.nl/sites/default/files/benefits-first-part-final.xls, where the data are found in sheet 'gov_macro' and the direct input for the GA calculation in 'Gov_macro_export'.

Corporate taxes and taxes on dividends, and Capital taxes

These taxes can directly be derived from the original dataset.

http://www.cpb.nl/sites/default/files/taxes.xls.

Age profiles of taxes

The shape of the age profile of each tax is assumed to be equal to its corresponding tax base. The age profiles for each past year is derived in the same way as it is done in the case of expenditure items, i.e. by using the formula:

---

[9] Ideally, one would attribute indirect taxes in line with the share in consumption. These data, however, are not available. As the major part of private saving in the Netherlands is done in the form of pension saving, which is not included in net income, the mistake involved in linking consumption to net incomes appears to be small.

$$age\_\text{profile}_{i,t}^{n} = age\_\text{profile}_{i,2008}^{n} \times \frac{realized\_aggregate_{t}^{n}}{\sum_{i=0}^{99} age\_\text{profile}_{i,2008}^{n} pop_{i,t}}$$

(4)

In the CPB dataset these calculations can be found at:

http://www.cpb.nl/sites/default/files/age-profile-taxes.xls, where the final data are located in sheet 'Final_smoothed'.

This calculation heavily draws on age specific participation rates and changes therein (see section H). The shape of the age profiles for Corporate taxes and taxes on dividends and for Capital taxes are based on the distribution of asset holdings across age groups.

C. The Generational Accounting exercise for the past

This exercise is carried out by a CPB program language. For all separate items of benefits and burdens, it carries out the following calculation to arrive at the present value of the lifetime past benefit or burden of item n for the cohort born in year k:

$$GA\_\text{PV\_past}_{k}^{n} = \sum_{t=k}^{2007} age\_\text{profile}_{k,t}^{n} \times pop_{k,t}^{n} \prod_{j=t}^{2007} (1+i_{j})$$

(5)

Here, i stands for the nominal discount rate which equals the sum of inflation rate and the real discount rate of 3% (see section H). Total benefits and burdens are arrived at by adding up all separate items of which they consist, and net benefits by subtracting total burdens from total benefits.

In the CPB-calculations, these calculations are carried out in http://www.cpb.nl/sites/default/files/profile-mdl.txt. The results of the exercise are at: http://www.cpb.nl/sites/default/files/new-aprofile-out-new.xls. The results for the cohorts that are referred to there as those 60 years or younger (at January 1st, 2007), are used in the LGA exercise (see section E). These results can be found as from column AP. The results of columns A till AO are not used.

D. The Generational Accounting exercise for the future

This exercise is carried out by the CPB model Gamma. This is discussed in van der Horst (2010). If k < 2008 these present values are calculated as:

$$GA\_\text{PV\_future}_{k}^{n} = \sum_{t=k}^{k+99} age\_\text{profile}_{k,t}^{n} \times pop_{k,t}^{n} \prod_{j=t}^{2008} (\frac{1}{1+i_{j}})$$

(6)

and if k $\geq$ 2008 as:

$$GA\_PV\_future_k^n = \sum_{t=k}^{k+99} age\_profile_{k,t}^n \times pop_{k,t}^n \prod_{j=t}^{k} (\frac{1}{1+i_j})(\frac{1}{1+g})^{k-2008} \tag{7}$$

Here, g stands for annual productivity growth. If k≥2008, in line with GA-studies in the world, the results are corrected for productivity differences between the cohorts in order to obtain comparable results.

In section 4.1 of the study we present 5 variants that each represent a way of making policy sustainable in the future. In the CPB dataset the results for these variants for variants 1, 3 and 5 can respectively be found at:
http://www.cpb.nl/sites/default/files/waarnemingen-opb-retro-retrotab-bewerking.xls,
http://www.cpb.nl/sites/default/files/waarnemingen-ti--retro-retrotab-bewerking1.xls, and at
http://www.cpb.nl/sites/default/files/waarnemingen-opb-40-retro-retrotab-bewerking-def.xls.

The results for variants 2 and 4 can be respectively be found at:
http://www.cpb.nl/sites/default/files/pakket-a-retro-opb-retrotab.xls and
http://www.cpb.nl/sites/default/files/pakket-b-retro-opb-retrotab.xls.

E. The Lifetime GA (combining past and future GA)

To arrive at the lifetime GA's in terms of received benefits and burdens the results of past and future GA exercise are first combined. As both the GA for the past as its counterpart for the future have 2008 as the base year for the present value calculation, rather than the birth year of the cohort, we subsequently correct for base year by multiplying the sum of both by a composite discount factor. Equation 8 shows how this is carried out for k < 2008:

$$LGA\_PV_k^n = (GA\_PV\_past_k^n + GA\_PV\_future_k^n)\prod_{j=k}^{2008} \frac{1}{(1+i_j)} \qquad \text{for k < 2008} \tag{8}$$

For k ≥ 2008 the correction for productivity differences, as introduced in the previous section, is undone because the presented result in the paper is the lifetime GA as a percentage of lifetime primary incomes (see section F):

$$LGA\_PV_k^n = (GA\_PV\_future_k^n) \times (1+g)^{k-2008} \qquad \text{for k ≥ 2008} \tag{9}$$

At CPB, these calculations are carried out in 5 separate workbooks, each representing one of the presented ways policy is made sustainable. They are stored in sheet "resultaat_als_percentage" in directories:
http://www.cpb.nl/sites/default/files/waarnemingen-opb-40-retro-retrotab-bewerking-def.xls,
http://www.cpb.nl/sites/default/files/waarnemingen-uitgverl-retro-retrotab-bewerking-def.xls,
http://www.cpb.nl/sites/default/files/waarnemingen-ti-retro-retrotab-bewerking-def.xls,
http://www.cpb.nl/sites/default/files/waarnemingen-geleidelijkl-retro-retrotab-bewerking-def.xls and
http://www.cpb.nl/sites/default/files/waarnemingen-opb-40-retro-retrotab-bewerking-def.xls.

The results for the sensitivity analysis are all located at:

h:\hjmtr\Retro-GA\gegevens_gevoeligheidsanalyse\uitkomsten_3e_ronde\....

Regarding diverging age profiles for education, taxes on pension income and long term care these are respectively located in workbooks:

http://www.cpb.nl/sites/default/files/waarnemingen-gevoeligheidsanalyse-educ.xls,

http://www.cpb.nl/sites/default/files/waarnemingen-gevoeligheidsanalyse-pens.xls,

http://www.cpb.nl/sites/default/files/waarnemingen-gevoeligheidsanalyse-ltc.xls;

and for the case of a 0.5 percent lower and a 0.5 percent higher, for either the past alone or both past and future they are located in workbooks:

http://www.cpb.nl/sites/default/files/waarnemingen-gevoeligheidsanalyse-disconto-m05.xls,

http://www.cpb.nl/sites/default/files/waarnemingen-gevoeligheidsanalyse-disconto-p05.xls,

http://www.cpb.nl/sites/default/files/waarnemingen-gevoeligheidsanalyse-disconto-m05-ooktoek.xls, and

http://www.cpb.nl/sites/default/files/waarnemingen-gevoeligheidsanalyse-disconto-p05-ooktoek.xls.

F . Primary incomes

As it is explained in the main text, primary income is defined as labour income plus self-employed income plus indirect taxes in the economy. The calculation of lifetime incomes involves three steps. In the first we determine the annual primary incomes back to 1946 by using data from National Accounts. In the second we distribute these annual figures into age groups, resulting in a matrix of primary incomes for each age group in the years 1946-2200. The third step uses the matrix and calculates the present value of lifetime primary income for each cohort born from 1946 till 2050.

First step

For the past, annual primary incomes are first calculated by adding the National Account figures for wage income and a constructed term for self-employed income (which equals the product of the number of self-employed and the average wage in that year). These data are available back to 1969. Before 1969, data on the self-employed are lacking and we assumed that its development further back in time coincided with that of wage income. (Note that primary incomes in the years before 1969 are not so important as the first cohort in our exercise only started to participate on the labour market in the mid-1960's). Indirect taxes were subsequently added in order to arrive at our concept of primary income (see main text). This process is carried out in workbook

http://www.cpb.nl/sites/default/files/Loonsom+zelfst.ink_.xls.

For the future, we used the output of the Gamma model which already uses the sum of labour and self-employed income (see second step).

Second step

In this step we use the age distribution of primary income in 2007, as calculated by the Gamma model, as a starting point. This age distribution for 2007 is carried out as follows:

$$PI_{i,2007} = lfp_{i,2007} \, wapr_i \, pop_{i,2007} \times \frac{LT\_WN_{2007} + IND\_TAX_{2007}}{\sum_{i=0}^{99} lfp_{i,2007} \, wapr_i \, pop_{i,2007}} \tag{10}$$

Here $PI_{i,2007}$ stands for primary income of all people of age i in 2007, $lfp_{i,2007}$ for the labour force participation rate of people of age i in 2007, $wapr_i$ for the age profile of wages (derived from a past year)[10], $pop_{i,2007}$ for the number of people of age i in 2007. LT_WN_{2007} and IND_TAX_{2007} respectively represent the sum of labour income and self-employed income and indirect taxes.

The first part of the r.h.s..of (10) measures what the primary income of age group i would be if the age profile of wages would exactly coincide with that of 2007. As this profile is based on a past measurement, this is generally not the case. The second part corrects for this. It calculates the aggregate result obtained if this age profile is used (the denominator of the second part) and the realized aggregate result (the numerator). This ratio is uniformly used across all age groups as a correction factor.

The second part of this second step consists of calculating the distribution of primary incomes across age groups for the past years. The second step results in a matrix which is in rows 120 till 219 of sheet loonsom_per_jaar_en_lftgroep'.xls of workbook http://www.cpb.nl/sites/default/files/berekening-loonsom-cohorten.xls. This result is arrived at by first correcting for differences in age specific labour participation rates in the past years[11], carried out in sheet 'loonsom per persoon' of this workbook, multiplying this result by the number of people of each age and in each year (rows 9 till 108 of 'loonsom_per_jaar_en_lftgroep') and by then correcting the result by a uniform factor that results in the realized aggregate of primary income for each year.

This sequence of calculations is represented by equation (11):

$$PI_{i,t} = \frac{lfp_{i,t}}{lfp_{i,2007}} \times pop_{i,t} \times PI_{i,2007} \times \frac{LT\_WN_t + IND\_TAX_t}{\sum_{i=0}^{99} \frac{lfp_{i,t}}{lfp_{i,2007}} pop_{i,2007} PI_{i,2007}} \tag{11}$$

---

[10] The age profile of wages is derived from CBS, 2000, Sociaal economische maandstatistiek 2000/04, Loon naar opleidingsniveau en beroep, 1997, Voorburg.

[11] These are imputed in sheet part_Claudio of the workbook in h:\hjmtr\Retro_GAberekening_levensinkomens\berekening_loonsom_cohorten. For details on its construction see section H.

Here, $PI_{i,t}$ represents the primary incomes earned in year t by people aged i. The first part of the r.h.s. of (11) captures the correction for age-specific labour participation rates and for the population. The second part captures the correction by the uniform factor.

For the future, the procedure is different. The starting point is the $PI_{i,2007}$-vector described above. The Gamma model extrapolates future age specific incomes by imputing a productivity growth factor and by taking account of expected age specific changes in labour participation.[12] This result is added to the matrix presented in rows 120 till 219.

Third step

The present value of primary incomes of the cohort born in k is calculated as:

$$PI\_PV_k = \sum_{s=k}^{k+99} PI_{s-k,t-k} \prod_{j=k}^{s} \frac{1}{1+i_j}$$

(12)

The calculations are carried out in sheet 'loonsom_per_cohort_CW' of workbook http://www.cpb.nl/sites/default/files/berekening-loonsom-cohorten.xls. The results can be found in row 6 (marked in red). These results are copied to row 53 of the sheet 'resultaat_als_ percentage' of the workbooks mentioned under section E.

Sensitivity analysis

The lifetime incomes in the case of diverging discount rates are carried out for the cases of a 0.5 percent lower and a 0.5 percent higher discount rate. For the case that these diverging rates are only applied to the past the calculations are carried out in respectively
http://www.cpb.nl/sites/default/files/berekening-loonsom-cohorten-interest-m05.xls, and
http://www.cpb.nl/sites/default/files/berekening-loonsom-cohorten-interest-p05.xls.

For the case they are also applied to the future they are respectively in:
http://www.cpb.nl/sites/default/files/berekening-loonsom-cohorten-interest-m05-ooktoek.xls, and
http://www.cpb.nl/sites/default/files/berekening-loonsom-cohorten-interest-p05-ooktoek.xls.

G. The LGAs as presented in the paper

The LGAs are presented in the paper in terms of the present values of item n and of net benefits relative to the present values of lifetime primary incomes:

---

[12] These are derived from Euwals and Folmer (2009). See main text.

$$LGA_k^n = \frac{LGA\_PV_k^n}{PI\_PV_k} \qquad \text{for item n, and} \tag{13}$$

$$LGA_k = \frac{LGA\_PV_k}{PI\_PV_k} \qquad \text{for net benefits.} \tag{14}$$

The results of these calculations can be found in workbook

http://www.cpb.nl/sites/default/files/waarnemingen-opb-retro-retrotab-bewerking-def.xls,

for the case policy is made sustainable as in scenario 1 (see the paper) and one of the 4 other workbooks mentioned

under section E (for scenarios 2 till 5). The results are in sheet 'resultaat_als_ percentage' on rows 82 till 99,

H. Other inputs

Labour participation rate

The labour force participation rate for each cohort has been derived in the following way: we had actual Statistics

Netherlands data on net labour force participation rates for individuals who were between 20 and 65 years old in

2007, 2000 and 1992.We performed a linear interpolation to derive net LFP rates for years 1992-2007 for each

cohort.

For the period 1981-1992 actual data were available (on the website of Statistics Netherlands) on the average net

labour force participation rates for four age groups: 15-25, 25-40, 40-55, 55-65. For the first age group (those aged

between 15 and 25) we assumed the LFP rate for all the cohorts into the group to grow at the same rate as the

average LFP for the age group. By making this assumption we derived the net labour force participation rates for

individuals who were between 20 and 25 years old in years 1981-1992[13].

The data can be found at :

http://statline.cbs.nl/StatWeb/publication/?VW=T&DM=SLNL&PA=71882NED&D1=15&D2=0&D3=1-

4&D4=160-210&HD=110217-1327&HDR=G1,T,G2&STB=G3

For all the cohorts between 25 and 59 we derived the labour force participation for the period 1981-1992 by

assuming that the change in the average within group LFP, provided by Statistics Netherlands, equals the change in

the Labour Force Participation for each separate group. Thus for the age group 25-40 actual data on labour force

participation have been imputed to the 32 years old cohort. For the age group 40-55 to the 47 years old cohort. For

the age group 55-65 to the 59 years old cohort. Linear interpolations between LFP rates of 25 and 32, 32 and 47, 47

and 59 years old cohorts have made it possible to derive LFP rates for all the cohorts aged 25 to 59. Finally for those

who were 59-65 years old we derived at first the LFP rate for 65 years old individuals. To do that we assumed, as for

those cohorts belonging to the 15-25 age group, that the 65 years old LFP rate followed exactly the same pattern of

the average age group rate (that is the 59 years old cohort LFP rate). Thus we derived LFP rates for 65 years old

---

[13]That is what we were interested in because we set the LFP rate for individuals aged 15-19 equal zero

individuals in years 1981-1992. Then we linearly interpolated between the 59 years old LFP rate and the 65 years old LFP rate obtaining the participation for all the cohorts between 59 and 65 in the period1981-1992.

In the CPB dataset these can be found at: http://www.cpb.nl/sites/default/files/lfp.xls.
These results are copied to http://www.cpb.nl/sites/default/files/age-profile-taxes.xls, and the data in sheet 'Final Smoothed'. These data are also used in the calculation of lifetime primary incomes where they are copied to workbook http://www.cpb.nl/sites/default/files/berekening-loonsom-cohorten.xls, in sheet 'part_Claudio'. They are also copied to the inputfile for the GA-calculations. This inputfile is: http://www.cpb.nl/sites/default/files/benefits-first-part-final.xls, where the data are found in sheet 'Particip' and the direct input for the GA calculation in 'Particip_export'.

It was not possible to acquire age specific labour force participation rates for the years before 1981. We therefore used the overall change to extrapolate backwards the age specific participation rates.

Demography
Data on the past demography are from Statistics Netherlands.

Discount rate
We assumed the real interest rate to equal 3%. The nominal interest rate in year t is equal to 3% plus inflation in year t. Data on inflation rates back to 1950 have been drawn from the national accounts[14]. For years 1948 and 1947 the national account did not include any figure for the inflation rate. We drew those numbers from the "Statistisch zakboek 1949". The former publication by Statistics Netherlands includes a table on the wholesale price index for the missing years. We derived the inflation rate as the percentage change in the wholesale price index in years 1947, 1948.
Data can be found in: http://www.cpb.nl/sites/default/files/benefits-first-part-final.xls, spreadsheet 'Discount'.

Data for Table 3.1
These data are at http://www.cpb.nl/sites/default/files/benefits-first-part-final-scr.xls in rows 193-218.

Aggregate net benefits
Annual net benefits and its components, as presented in figure 3.1 of the paper, are stored in
http://www.cpb.nl/sites/default/files/van-tekort-naar-netto-profijt.xls.
It uses data from sheet 'NB' of workbook
http://www.cpb.nl/sites/default/files/expenditure-new-dataset.xls.

---

[14]in the national account the variable used is labelled as Gross Domestic Product Deflator

Decomposition in section 4.2

This decomposition is carried out in workbook http://www.cpb.nl/sites/default/files/macro-profijten.xls.

References

Bos, F., 2006: De Nederlands collectieve uitgaven in historisch perspectief, CPB Document 109, The Hague.

Euwals, R. en K. Folmer, 2009: Arbeidsaanbod en gewerkte uren tot 2050, CPB Memorandum 225.

Ter Rele, H., 1998: Generational accounts for the Netherlands, *De Economist*, 146, 555–584.

Van der Horst, A, L. Bettendorf, D. Draper, C. van Ewijk, R. de Mooij en H. ter Rele, 2010: Vergrijzing Verdeeld, CPB Special Publication 86, The Hague.

Van Sonsbeek, J.M., en R. Alblas, 2010, Langetermijn raming arbeidsongeschiktheidsregelingen, January 2010, Ministry of Social Affairs and Employment.