

## Generational Accounting in the Nordic Countries

Carl E. Gjersem

---

This article can be downloaded from: [http://www.nopecjournal.org/NOPEC\\_2002\\_a01.pdf](http://www.nopecjournal.org/NOPEC_2002_a01.pdf)

Other articles from the Nordic Journal of Political Economy can be found at:  
<http://www.nopecjournal.org>

Carl E. Gjersem\*

# Generational Accounting in the Nordic Countries

On February 23, 2001 a workshop on «Generational Accounting in the Nordic Countries» was held in Reykjavik, Iceland, arranged jointly by the Institute of Economic Studies at the University of Iceland and the Ministry of Finance in Norway. This paper describes the main ideas in generational accounting, and gives an overview of results from the papers presented in the workshop. Finally, it sums up some important lessons and remaining challenges in generational accounting and for the sustainability of fiscal policy. JEL Classification: E6, H4, H6

During the 1990, a new and promising measurement method for the long-term sustainability of public finances was developed and put to use by economists, governments and international organisations. This measure was, of course, based on generational accounting. A generational account is the net present value of expected current and future taxes paid and transfers received over the rest of life by a representative individual of a given age and sex. The sum of generational accounts for all current and future individuals forms part of the government intertemporal budget constraint, together with the net present value of other

government expenditure and government debt (or wealth). If there is balance between revenues, expenditure and debt, then current tax structure may be sustained for the future. If the debt is too large, future generations will have to pay higher net taxes through rising taxes or lower transfers.

The recent literature on generational accounting comprises Auerbach, Kotlikoff and Leibfritz (1999), a collection of applied papers on generational accounts in 27 countries around the globe. In another important presentation, EU (1999) includes studies for 12 of the EU-countries based upon a common framework. An earlier comparative study is OECD

---

\* The author is currently on leave from the Norwegian Ministry of Finance and works for the OECD. The views expressed here belong to the author and do not necessarily reflect the views of any of these institutions. Corresponding Address: OECD, Economics Department, 2 rue André-Pascal, 75775 Paris Cedex 16, France. E-mail: carl.gjersem@oecd.org

(1995). These studies present and extend the basic methodology and present a quite diverse spectrum of results and challenges for more than 30 countries. Still, the Nordic countries are not all represented in these presentations.

In February 2001, a workshop was organised by the Institute of Economic Studies at the University of Iceland and the Ministry of Finance in Norway. The aim of this workshop was to give an overview of results from Generational Accounting in the Nordic countries, to discuss special items related to each country, and to present views on the use of generational accounts. Furthermore, the aim of the workshop was to identify common problems related to generational accounts and to discuss some potential solutions. There were an international overview presentation, and separate presentations from Denmark, Finland, Iceland and Norway. Among the participants from outside the Nordic countries were representatives of the OECD, the US Government Accounting Office, the German Bundesbank and Freiburg University, and Birkbeck College in London, UK.<sup>1</sup> Some of the papers that were presented at this workshop are included in this issue.

### **An overview of generational accounting**

In the short term, sustainable public finances are usually about restraining debt and deficits while allowing room for fiscal stabilisation. In the longer term, objectives are less clear. In a recent OECD publication (OECD, 1999)

it is pointed out that among 28 member countries, only four has a regular report on the long term outlook (10-40 years) for public finances. Issues of sustainability have thus usually been addressed in terms of the effects of public debt on the economy.

A reason for this short-sightedness in fiscal policy is of course that the uncertainty surrounding future revenues and expenditure is large, and that projections are notoriously unreliable. The use of numerical economic models in policy formulation is not well established in most countries. The views on such applications is rather negative (i.e., in CBS (1995) where the role of long term projections in budget analysis is somewhat surprisingly rejected). Still, modelling techniques and the databases have never been as good as today.

In addition, in recent years the future implications of current budgetary policies have climbed on the agenda as the combined effects of growing public sectors and unfavourable demographic trends on the expected future tax burdens have become clearer. A number of objections to measuring the long-term sustainability and the intergenerational stance of fiscal policy by looking at annual public budget figures can be raised. Such figures are subject to political pressure, to obsolete measurement and accounting principles, and to a range of other considerations without economic significance. Important considerations may be decided by the label one chooses for specific public cash flow, not by the real economic content and implications of that flow.<sup>2</sup>

- 
1. Regretfully, Sweden was not represented. Results for Sweden has been presented in earlier papers, and are included in the paper by Raffelhüschen in this volume.
  2. One example is the budgetary treatment of some similar cash flows: if government receives money today against a promise to pay back a cash flow in the future, how is that handled in the government accounts? If one labels the first transaction as pension contributions and the second as pension payments, then a payg-system will register the first as a tax and not register the later obligation at all until payment is due years hence. If the label is

Introduced by Auerbach, Gokhale and Kotlikoff in a number of papers in the late 1980s and early 1990s (see e.g. Auerbach, Gokhale and Kotlikoff (1991)), the methodology of generational accounting has now brought long term perspectives into fiscal analyses for a large number of countries. Formally, the starting point for generational accounting is the government intertemporal budget constraint. This identity, expressed in present values, can be written

$$\text{Public wealth} + \text{present value of net taxes} = \text{present value of government consumption}$$

In this identity, *net taxes* are defined as all present and future age dependent taxes less transfers, and *government consumption* is defined as all other items in the government budget except interest on wealth (debt). While taxes and transfers (both in cash and in kind) typically are age dependent, government consumption is a catchall for non-age dependent items in the public budgets. In the identity, *public wealth* is defined as consisting of *current net wealth* (or debt, as may be) and the amount required for the constraint to conform to the sign of equality, which may be called *implicit public wealth* (or debt). The implicit wealth expresses the net present value of the changes in taxes, transfers or other expenditure that will be necessary in the future for the Government to fulfil its liabilities. This wealth may be positive or negative, of course. The sum of explicit and implicit debt is the *intertemporal public liabilities (IPL)* of a given policy. The intertemporal public liabilities of a country are a much more meaningful expression than current net wealth (debt).

The sum of expected future net taxes for each cohort (or generation) measured as net present values, is the *generational account*. The sum of generational accounts for current and future generations is part of the government's intertemporal budget constraint. A basic assumption in the generational accounting methodology is that the net present value of taxes paid over life generally can be established by extraction information from administrative registers, surveys and other sources. In those areas where we know that changes will take place in the future, they can be modelled explicitly (a typical example is the phasing in of pension systems).

As current generations already have paid and received some of their lifetime taxes and transfers depending on age, the accounts for different generations cannot be compared. The current new-born generation and future generations are the only ones with full and comparable generational accounts. In the first papers the budget identity were balanced by increasing the present value of net taxes on future generations with an amount equal to the intertemporal public liabilities. The ratio of the accounts of new-born to accounts of net yet born children thus expressed how much higher tax burdens future generations would have to face under the present budgetary policy (e.g., Auerbach et al., 1993). Still, when the denominator approaches zero or if the denominator and numerator have opposite signs, the interpretation of the ratio between current and future new-born generations' accounts meets with obvious problems. Also, an interpretation of higher or lower net taxes for future generations is that concurrent generations in the future may face

---

changed so that the first transaction is to raise a loan and the second to pay back the instalments, then the treatment in the government account is completely different, especially with regard to including the capital item (the loan). There is no economic rationale for treating identical cash flows differently just because of the chosen label.

different tax schedules during the same period of time.

In the growing literature on generational accounting, several other options and concepts for solving the intertemporal budget identity have been introduced. Raffelhüschen (1999) points out that the generational imbalance is derived from the intertemporal public liabilities within the government's intertemporal budget requirement, and prefers this measure. The intertemporal public liabilities may also be transformed into a flow measure, by relating it to a permanent reduction (or possibly an increase) with the same net present value in one of the items on the budget. All generations would then face this reduction (increase). Potential measures include the required reduction in all or some age-dependent transfers, the required increase in all or some age-dependent taxes, or the required reduction in government consumption. The first two alternatives are typically hard to reconcile with change - e.g. because of the progressive structure of income taxes, increased revenues from changes in taxation rules will usually imply changes in the age- and sex profile of that tax as well. As transfers typically have a degressive structure, the same argument with an opposite sign may apply. This is of course because changes are marginal while the typical age- and sex-profiles of taxes and transfers used in generational accounting expresses averages. An alternative is the required reduction in general government consumption to restore balance between generations. This variable can be related directly to the budget surplus (deficit).<sup>3</sup>

In the paper by Raffelhüschen in the present volume, a more detailed presentation

of the generational accounting methodology is included.

### Generational Accounting in the Nordic countries

While in general terms rather similar nations, the Nordic countries still differ markedly in economic fundamentals and how the public sector is organised. For all of these countries, generational accounts have been produced, and for some of the countries such accounts have been presented several times already. The presentations at the workshop were all updated with regard to former results.

For **Finland**, generational accounts have been presented on several occasions. The first presentations coincided with the major downturn in the Finnish economy triggered by the breakdown in the COMECON countries. As public budgets were strongly affected, the generational balance based on 1995 budget figures was heavily in favour of current generations. Updated results in the paper by Vanne now show that the recent high growth rates that Finland has experienced both in the economy and in the asset markets have translated into a much stronger generational stance. In fact, based upon current budgets and existing public wealth, future generations will face lower relative net tax burdens over their lifetimes than current new-borns.

In the national accounts, pension assets in the Finnish pension funds are included in the as public wealth. Other assets held by the Finnish central government, are now approx. equal to Finland's gross debt, and the net explicit wealth of the Finnish public sectors equals some 64 per cent of GDP in 2000. The

---

3. Based on these arguments, the indicator of the intergenerational fiscal stance that has been used for the presentations in the Norwegian National Budgets is the required reduction in general government consumption that is necessary to restore balance between generations (see Gjersem in the present volume).

intertemporal public liabilities, as defined in the discussion of the intertemporal budget constraint above and calculated for a standard combination of 5 per cent interest rate and 1.5 per cent growth rate, turns out to be negative (i.e., implicit wealth) and nearly equal to GDP for Finland. Translating this into a flow measure, it leaves room for reducing taxes by 3.4 per cent of GDP on a sustained basis and still preserves generational equality. Calculated for a interest rate of 3 per cent and long term growth of 1.5 per cent, the results still indicates that generational equality is fulfilled in Finland.

Vanne points out that increasing public wealth, driven by strong growth in asset markets, has been the main engine behind the change in the generational stance from 1995 through 2000. This raises the question of how to handle uncertain asset prices in generational accounting. More generally, Vanne worries that temporary effects from business cycles and uncertain wealth together may lead to an excessively rosy picture in such upturns as the Finnish economy has experienced.

In the paper on generational equality in **Iceland**, Hall and Jóhannsdóttir present comprehensive generational accounts for this small, resource-based nation. They show that the economic boom experienced during the latter part of the 1990s has resulted in changes in the public accounts, leading to more generational equity based on the 1998 fiscal accounts. Still, by repeating the calculations back to 1994, the effect of the boom is striking. The results in 1994 show intertemporal public liabilities of 120 per cent of GDP, while in 1998 the sign has changed at -16 per cent. These figures are calculated for growth rate 1.5 per cent and interest rate of 6 per cent. Reducing the interest rate to 4 per cent lowers the liabilities in 1998 even further, to -43 per cent.

The improvements came even though the explicit debt in 1998 was just below 40 per cent of GDP, more or less unchanged over the period. The improvement is solely due to a fall in expenditure combined with increases in revenues. Even though some of this probably is due to temporary business cycle effects, Hall and Jóhannsdóttir point out that the structural deficit has turned to a surplus over the same period. This indicates that the generational balance should stay stronger than in 1994, even if business cycle effects turn negative again.

Hall and Jóhannsdóttir use the generational accounting framework to analyse a current suggestion of reforming the fishing permit system in Iceland, an important part of public finances. Based upon introduction of a fishing permit fee, the intertemporal public liabilities are reduced, giving budget room for a further lowering of taxes from 1998. In the analysis, the fishing permit fee is determined so that the net present value of the fee is equal to the government's unfunded pension liabilities. A lower fee would still contribute to turning the generational balance towards the future.

In the literature on generational accounting, earlier authors have noted that their results are quite sensitive to the choice of interest and growth rates. Hall and Jóhannsdóttir use Monte Carlo sensitivity analysis to show how the Icelandic generational accounts vary according to changes in these rates. The authors also point out that an increasing interest rate affects current and future generations differently, as the net tax flows faced during a full life crosses from net taxes to net transfers several times. Especially, the important factor for the results is the magnitude of the gap between the interest rate and growth. For reasonable magnitudes, the changes in liabilities are modest. Such analysis illustrates both the

sensitivity and the paths through which the assumptions influence the results.

The ambitious **Danish** paper by Jensen, Nødgaard and Pedersen addresses the question of fiscal sustainability by combining a numerical overlapping generations model with the generational accounting framework. This work combines the intuitive appeal of generational accounts with more rigorous modelling and the economic feedback mechanisms in the more complete model. In Denmark, there is still a generational deficit in the sense that increased taxation or reduced transfers are needed to equalise burdens over time. In the paper, Jensen et al. estimate this as a permanent income tax rise equal to 3/4 per cent of GDP.

Under the combined approach, the authors can discuss the intergenerational stance in terms of established concepts such as tax smoothing and social welfare functions. The authors point out that tax smoothing should be superior to leaving the intergenerational imbalance to future generations, but also that tax smoothing may result in debt ratios that conflicts with the Growth and Stability Pact of the EMU members. Hence they suggest a path where debt ratios are kept constant; pointing out that this will hurt current generations. Still, the effects seem to be rather small in all of these scenarios. To study the results closer, the authors suggest a social welfare function, still showing small effects. Thus, compliance with the Growth and Stability Pact will only include small intergenerational costs.

In oil-rich **Norway**, public budgets are currently showing enormous surpluses. The established view is that petroleum revenues will fall while pension transfers and other age-related expenses will rise. Thus, long term issues are especially important, and generational accounts have been presented in the National Budgets since the middle of the

1990s. While the first presentations (Auerbach et al. (1993)) showed that future Norwegians would be facing lifetime tax burdens that could well be twice as large as those confronting today's children, continued updates through the business cycle upturn in the 1990s now turn out balanced results. Measured for growth rate 1,5 per cent and interest rate of 5 per cent, as in EU (1999), the current intertemporal liabilities are negative and equal to 26 per cent of GDP. Reducing the interest rate to 4 per cent and the growth rate to 1 per cent results in balancing the accounts and eliminating the liabilities. Recent developments seem to have been working towards a new increase in intertemporal liabilities, though.

Gjersem points out that the presentations of generational accounts in Norwegian public documents have evolved in a number of ways over time. Especially, the presentations has been extended to include a correction factor for the business cycle, based on other modelling efforts in the Ministry of Finance. This extension leads to more stable results over the business cycle. Still, it is quite disturbing to note that even small changes in assumptions may alter the results by much, as shown in the paper by Gjersem. While being a special result of the Norwegian situation, where the large public wealth will remain unaffected by future growth rates while other income and revenue and thus the primary balance will change, it may still indicate that other countries may experience similar uncertainty. Gjersem points out that for Norway, this uncertainty should translate into a necessity to set aside considerable capital during the current period of high petroleum revenues to avoid a severe tightening of general government budgets later on.

As a result of increasing expenditure on old age and disability pensions while revenues from petroleum activities decline, it is clear

that fiscal policy will be facing considerable challenges in the long term. Gjersem shows that the economic modelling approach to government production and purchases of goods and services is important by illustrating the effects of the approach based on using constant shares of GDP per capita for future purchases, as opposed to modelling purchases based on constant volumes per capital combined with price indexing below CPI (as can be established from history). Both approaches can be found in recent work, but they give rather different results. Thus, the paper points out additional uncertainty in an area of modelling where growth in expenditure long and in most countries has been stronger than predicted.

Swedish generational accounts have been presented by Olsson (1995), Hagemann and John (1999) and also by Lundvik, Lüth and Raffelhüschen (1999).<sup>4</sup> Olsson in 1995 found that future generations' payments will exceed the current new-borns' by far, but that actual reforms in the taxation and social security fields combined with a fast recovery to «normal» levels of unemployment and macro-economic activity would turn this imbalance in favour of future generations. These calculations were obtained using an interest rate that was one percentage point above the growth rate. At higher and more realistic interest rates, they were less favourable for the future generations. While Olsson pointed out that the calculations were highly sensitive to these assumptions, he also used interest and growth rates in excess of most other authors.

Represented in the EU-survey published in 1999, Lundvik et al. report intertemporal public debt at over two times Sweden's GDP in 1995. This is despite the fact that Sweden has a rather low explicit debt figure. Sweden

thus seems to represent a Scandinavian welfare state alike Norway but without petroleum wealth. Still, in 1995 Sweden was on the way of preparing major tax and pension reforms in order to adjust to internal EU settings. In fact, taking into account these reforms, Sweden would get a much better position. Moreover, taking the medium-term budget projections into account, it is pointed out by Hagemann and John (1999) and by Raffelhüschen in the present volume, that Sweden would be very close to the Danish figures. In the Lundvik et al. study, which comprised part of a much larger work in EU (see EU (1999) for a detailed description), no business cycle adjustment or medium term budget projection was taken into account. Thus, combining the to studies it seems now clear that business cycle effects and other effects are as important for Sweden as for the other Nordic countries.

In the final paper, Raffelhüschen presents how generational accounting in the Nordic countries compares to results from a large number of other countries. This **international comparative study** of generational accounting comprises analyses of fiscal policy in USA, Switzerland, Iceland, Norway and 12 of the EU countries, including Finland, Sweden and Denmark. As international comparisons typically are hard to carry out, as conceptual and methodological issues tend to confuse issues and results, great care has been taken to deal with such problems in this study through a common framework and broad co-operation between researchers in all countries. Thus, the comparison is based on 1995 as a common base year, and as far as possible on common assumptions on other items. While the assumptions are common, they may not coincide with the preferred

---

4. Sweden was not represented at the workshop in Reykjavik.



assumptions in each of the countries. The paper ranks the countries according to the intertemporal public liabilities, placing Ireland and Norway on the top and Sweden and Finland at the bottom. Denmark and Iceland fall in the middle. Compared to the papers in the current volume, developments in fiscal policy in some of these countries since 1995 may seem to have influenced the ranking.

The paper shows that demographic developments will put social transfer systems in most of these countries under pressure, and high debt ratios are already calling the sustainability of present fiscal policy into question. Some parts of current policy will obviously come under pressure as time goes by. An example is that countries that has opted for price indexing in their transfer system are formally in a better position than countries that practise wage indexing, but also that such policies will be hard to follow as the distance between wage earners and recipients of transfers, such as pensions, increases. The paper shows that developing cross-country comparisons of the sustainability of fiscal policy is feasible, and also how different approaches may and will affect the calculations and thus the intergenerational stance of a country's policy.

### Remaining challenges

In most industrialised countries, issues concerning sound and sustainable finances are high on the political agenda. Growing debt burdens induce rising interest payments and force politicians to economise on other spending items. Traditional fiscal indicators based on cash-flow accounts fail to address ageing phenomena because future liabilities of pay-as-you-go retirement and health care systems are absent from current fiscal flows. Hence, cash-flow deficits and the size of

outstanding debt are unreliable as indicators of fiscal sustainability.

In all the Nordic countries, the results from the generational accounting methodology seem to indicate that fiscal policy is in or rather close to intergenerational balance. Still, the papers here show that the measurement of generational accounts is highly sensitive to temporary business cycle fluctuations. This should remind both policy makers and experts that the basic problem of separating business cycles from growth still remains in all long term budgeting and planning. Optimistic projections during upturns and pessimistic projections in downturns may be found in public document and projection papers decades back, and are still a major problem in all such work. In the papers in this volume such difficulties are illustrated and some solutions suggested. Still, only further research will show whether these methods are robust over time.

In Norway, a large part of the strong current stance stems from oil revenues, some already obtained these last years but a large part to be earned in the future. In Finland, the combination of high asset prices and the recovery from the fall of the Soviet Union is the explanation. In Iceland, abundant resources these last years have improved the situation enormously. For all countries, the question of what part of the improvement that will stay permanent through the next business cycle is still unanswered. Other uncertainty related to future public income and wealth is also important, and hard to model and present.

The results are also sensitive to assumptions about productivity growth and the discount rate. This is presented in the Norwegian study and illustrated further in the Icelandic paper. It is quite disturbing to note that even small changes in assumptions may change the results so much, especially in

the Norwegian accounts. This situation means that strong policy recommendations based on generational accounts alone are not warranted.

Differences between the Nordic countries may still be due to the different methodology, different time horizons and – in some cases – different policy assumptions and population projections. Still, generational accounting seems to offer a practical way of modelling the public sector in a long-term perspective and illustrating the effects of different policies and assumptions. While there are some areas where uncertainty still exists, these challenges are the same as can be found in other modelling approaches. Formal economic models are needed to analyse the magnitude of future challenges and the policy changes needed today. Especially, a combination of models as shown by Jensen et al. seems to be a promising approach. Generational accounting is one of several methods telling us something about how large the current surpluses or how small the deficits should be.

Generational accounting points out the importance of a broad strategy to meet the future challenges of ageing, aiming to strengthen the economic fundament for future welfare by measures to promote a well functioning economy, high employment and sound public finances through a tight fiscal policy. Generational accounting puts together all items in the general government accounts with a view to future development through changing demographics, and thus offers such an integrated approach. Generational accounting applied and presented with care and caution is a valuable tool with intuitive appeal to the general public, and supplemented by other models it illustrates the need for budget discipline now to avoid hardship on future generations.

## References

- Auerbach, Alan J., Laurence J. Kotlikoff and Willi Leibfritz, 1999. *Generational accounting around the World*. The University of Chicago Press.
- Auerbach, A., J. Gokhale, and L. J. Kotlikoff, 1992. *Generational Accounting: A New Approach to Understand the Effects of Fiscal Policy on Saving*, *Scandinavian Journal of Economics*, 94, 303-318.
- Auerbach, A., J. Gokhale, L. Kotlikoff and E. Steigum Jr., 1993. *Generational Accounting in Norway: Is Norway Overconsuming Its Petroleum Wealth*, *SNF-report 75/93*. Bergen: Foundation for Research in Economics and Business Administration.
- CBO, 1995. *Who pays and when? An assessment of generational accounting*. A Study by Congressional Budget Office, The Congress of the United States. November 1995.
- EU, 1999. *EUROPEAN ECONOMY*. Reports and studies. No. 6. 1999. Office for Official Publications of the EC, Luxembourg.
- Hagemann, Bob and Christoph John, 1999. *Generational Accounts in Sweden*. In Auerbach, Kotlikoff and Leibfritz (ed's) *Generational accounting around the World*.
- Lundvik, Petter, Erik Lüth and Bernd Raffelhüschen, 1999. *Sweden: The Swedish welfare state on trial*. In EU (1999) *EUROPEAN ECONOMY*. Reports and studies. No. 6. 1999.
- OECD, 1995. *Ageing populations, pension systems and government budgets: how do they affect savings?* By Willi Leibfritz, Deborah Roseveare, Douglas Fore and Eckhard Wurzel. Economics Department Working Paper No. 156.
- Olsson, Hans, 1995. *Generationsräkneskaper*. Ds 1995:70. Stockholm: Finansdepartementet. Report to ESO.
- OECD, 1999. *PUMA Focus no. 14*, 1999.