Public finances, markets and the health and long-term care services

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1. INTRODUCTION

The demand for health and long-term care is expected to increase in the future. This expectation is partly due to the expected ageing of the populations, and partly based on the past growth trend, which many interpret as a sign of general willingness to use a rising share of incomes for these services, especially as technological progress brings new and better treatments available. Furthermore, productivity growth in these services is on average low, which increases the relative price of these services (the so-called Baumol effect). In the Nordic countries this development is likely to have a profound influence on public finances, since most of these services are currently paid by tax revenues. Recent estimates of the European Commission (EC, 2012) show that these public expenditure items will increase in the Nordic countries[1] 3.1 – 5.1 % of GDP, i.e. by 27 – 54 per cent by 2060.

This creates a many-faceted challenge. First, taxes in total are already relatively high in the Nordic countries. Thus an urge to curb the rise in expenditure is understandable. This may, however, contradict the second aspect, namely that spending increasingly on health may improve welfare and add healthy years to life expectancy, and thus reflect rational choices on how to spend the resources in a society where real incomes rise. Intergenerational fairness is also an issue, since population ageing may shift the tax burden of health and long-term care services unjustly between cohorts and generations. Other possible worries include the prospect that the increase in the demand for labour in the care sector will crowd out other production. Technical progress has a dual effect in health care. It makes cost savings possible by increasing productivity, though this may be in the form of rising quality, which is hard to detect, but the extended use of new technologies may also increase costs.

Several strategies have been suggested to meet these challenges. Some of them aim at higher productivity, such as introduction of quasi-markets in public production or outsourcing the services to private producers. Others recommend increasing reliance on private wealth and insurance to top up the publicly financed services. It would alleviate the dilemma between budget restrictions and welfare-improving increases in health expenditure, but is limited by the informational difficulties inherent in health issues that warrant strong public sector presence at least in regulation, monitoring and supervision. A third option is to strengthen the tax base by e.g. longer working lives and increasing immigration. The demand effect may be reduced via user payments, which may be politically more feasible than tax increases. It is not clear, however, on what principles user payments should be introduced, when the services are still to be accessible to all citizens, and distributional concerns should be taken into account.

The aim of this study is to illustrate uncertainties related to the future health and long-term care costs, to assess reforms that aim to limit the growth of these costs and increase tax revenues and to discuss the responsibilities of the public and private sectors in financing and producing these services.

[1] Sustainability Report 2012 of the EC does not include Iceland.

2. HEALTH, WELFARE AND THE PUBLIC SECTOR

2.1 IS HEALTH A SUPERIOR GOOD?

Good health is valuable. And health care is an essential input in the production of health. Hall and Jones (2007) argue that as people get richer and consume more, the marginal utility of consumption falls rapidly. On the other hand, the marginal utility of living longer does not decline. If spending on health extends life, it is no wonder that the willingness to pay for improved health is likely to rise sharply with income. As a result, the share of health in expenditure grows with income. This is consistent with the development of health care spending as a percentage of GDP in most developed countries since the 1960s[2]. Thus there principally might not be a problem in the growing GDP share of health expenditure. It merely is a reflection of what people rationally want. There may well be, however, a problem in how to finance this. Another problem is whether people make rational choices involved with health care. The large demand for treatments and medicines that are not evidence-based or clinically proved to be effective is one sign of irrationality. A third problematic issue is moral hazard related to unhealthy life styles, promoted by underpricing in publicly provided care.

2.2 INFORMATION, RISK, UNCERTAINTY, AND THE ROLE OF THE PUBLIC SECTOR

There are several reasons, such as informational difficulties, redistribution and externalities related to health, which support the involvement of the public sector in financing and regulation of health services. Individual saving is inefficient, since there is large variation in needs for medical care between individuals. Private insurance is problematic because of adverse selection and moral hazard, and persons with pre-existing health problems are seldom welcome as customers. Events whose occurrence does not depend on whether they occur to others, can be to some extent covered by private insurance, but extensive aggregate health risks, such as epidemics are not insurable. High coverage and redistribution is difficult to reach in private finance. All these problems speak for mandatory arrangements. Furthermore, people in general are not able to make well-informed decisions on health issues, so they would benefit from public monitoring and supervision. For cost-containment, the public sector needs to regulate the supply of services it produces itself or finances but which are produced by the private sector.

Most of the reasons above are also relevant for long-term care services, but to a different degree (see Cremer et al., 2012). The costs come from housing arrangements and nursing, and thus remain well below those of expensive medical treatments. Making informed decisions concerning care services is in principle easier for people, unless the incapacity to make decisions is the reason for care need. On the other hand, there is a great deal of evidence that people generally understate the probability and the severity of care need that may occur in the distant future. From an insurer's

[2] There is an extensive literature which studies whether health expenditure increases faster than income (luxury good) or at a slower pace than income (necessity). Studies using individual data typically find low elasticities, but national level studies suggest high elasticities. Getzen (2000) claims that it is the size of national health budget that is relevant for overall health expenditure, not the demand of individuals.

point of view, adverse selection and moral hazard are relevant problems, and the need for care is often difficult to observe objectively. Thus the mandate for publicly financing the services at least up to a generally accepted minimum level is clear also concerning old-age care.

2.3 How the Nordics organize and finance health care and old age care – a comparative view

The overarching principles of the Nordic welfare model - universalism and equity - describe well also the goals and main features of the health and old age care systems in the Nordic countries. Equity is promoted both in access and in the care outcomes, even though with varying success. Moreover, progressivity related to tax-financing allocates a major share of the funding burden to affluent citizens. Organization of care is decentralized either to the regional, county or municipal level, but countries have recently tightened the regulatory frameworks to improve equity. The services are produced mainly by the public sector although the share of private production is increasing.

There are many trends that challenge the health care model. The most obvious problems are the increasing costs related both to population ageing and pharmaceutical and technological developments. Other challenges are the intensifying demand for increased individual choices and better access to and quality of care, enhancing possibilities for cross-border service shopping, inefficient use of ICT and insufficient coordination between different tiers of public and private production and between public and private financing of care. The goal of small socio-economic differences in health outcomes is harder to achieve with health policy since they often stem from differences in lifestyles.

In Finland municipalities have the responsibility to provide and finance health care and old-age care services, but can freely choose whether to produce or outsource them. Primary health care is provided by single municipalities or in co-operation with the others. Specialized health care services are organized by federations of municipalities. Municipal health care is mainly financed by local taxes and block grants from the central government and dominantly still produced by the municipalities even though some outsourcing has taken place.

Citizens can also use private services and apply for a partial reimbursement from the National Health Insurance System. A third increasingly important element is occupational health care, which has expanded its services from prevention also to outpatient treatments. Occupational care is financed by employees' and employers' contributions to National Health Insurance. Private health insurance markets are emerging, but small.

The main problems of health care in Finland are inequality and delays in access to primary care, and by Nordic standards also weaker outcomes, when measured by health or life-expectancy. Several

overlapping channels of health care financing create incentives for suboptimal behaviour[3]. The aggregate costs are still, however, relatively low.

Old-age care is financed by municipalities, but increasingly produced by the private sector and non-profit organizations. Also the municipalities have changed their way of producing long-term care. Retirement homes and wards of health centres have been largely replaced by sheltered housing with 24-hour assistance. One reason for the transition is that in this way municipalities save money, since the customers pay for their housing services and medicines in sheltered housing. The central government has instructed municipalities to substitute institutional care with home care. Municipalities finance LTC services with local taxes and block grants from the central government.

The problems of the current system and the projected large expenditure increases due to population ageing have sparked an extensive reform process. The four largest political parties agreed in March 2014 that the responsibility to organize health and long-term care services will be transferred from municipalities to five new regional organisations in 2017. These organizations are financed by municipalities using weighted capitation principle. Other details of the major organisational and financing reform will be settled during year 2014.

In Sweden provision of health and long-term care is also decentralized. County councils have the main responsibility for providing health care. Services are mainly financed by local taxes and grants from the government. Patients can choose their service provider from a group of qualified providers in primary care. This recent reform has increased the supply of the private services so that a third of primary care practises are currently privately owned (Glenngård, 2013). Even some hospitals have been privatized. Patients can contact specialists directly without any permission from a general practitioner, which is one reason why specialized medical care has a large role compared to primary care.

The outcomes of the Swedish health care systems are considered to be excellent in international comparisons. The health status of the population is one of the best in the world and life expectancy is one of the longest. There are, however some problems like differences between regions and hospitals regarding access to some operations and in efficiency and quality of care (Baroni and Axelsson, 2012). These differences are revealed by regular public comparisons. The possibility to freely choose the provider is likely to improve access to primary care and reduce further the relatively small inequalities of the system.

Municipalities are responsible for providing long-term care in Sweden. As in Finland, an increasing share of the services is produced by the private sector. Another common feature is that municipalities pay income transfers to informal caregivers and the terms and the size of the transfers vary between municipalities. The transition from institutional care to home care and sheltered housing has not always been managed well, which has caused queues to institutional care in some municipalities. The costs of health and long-term care are well above the OECD average in

[3] An example is that separate financing of primary and secondary health care creates a moral hazard to provide a suboptimally low amount of services in primary care.

Sweden. If related to other Nordic countries, only Denmark allocates as high a share of GDP to those services.

In Denmark regions have the main responsibility for organizing and financing health care. Long-term care is provided by municipalities. General practitioners, who are working as self-employed professionals, have a major role in primary care. Citizens typically register with a GP, who acts as a gate-keeper to specialized services. Regions run hospitals, which arrange specialized inpatient health care. Practicing self-employed specialists and hospital-based ambulatory clinics provide corresponding outpatient care.

Public health care is financed by tax collected by the central government. The revenue is allocated to regions and municipalities using a formula that takes into account age structure, risks and socio-economic indicators of the population. The municipalities must make a co-payment to the regions for hospital treatment of their citizens (Vrangbaek, 2013).

There are two types of voluntary private insurance available. Supplementary insurance is used to bypass the queues in public hospitals. They are often financed by employers. The more popular complementary insurance is used to finance co-payments for medications and some services.

The health care system scores high in the area of customer satisfaction, but some indicators like healthy life expectancy do not reach the high Nordic standards. Health inequalities are low. Specialized care is concentrated to a few large hospitals, which increases efficiency. The model of organizing primary care is somewhat problematic, since it does not foster coordination of primary and secondary care (OECD, 2013a).

Public long-term care for the elderly is extensive in Denmark. It is financed mainly by local taxes and grants from the central government. User fees and rents comprise a minor share of financing even though the emphasis is centred on home care and sheltered housing instead of nursing homes. There is a free choice of home help providers for those who are eligible. Citizens eligible for institutional care have a guaranteed access within two months.

In Norway municipalities provide and finance primary care. Citizens choose and register with a general practitioner (among those who have contracted with municipalities), who will evaluate the need for care and offer treatments. As in Denmark, this self-employed GP acts also as a gate-keeper to specialized treatments. Services are financed by local taxes and block grants from the central government. Out-of-pocket payments from patients account for a third of the total costs of the primary care provided by general practitioners (Lindahl and Ringard, 2013).

The central government is in responsible for arranging and financing secondary health care. Four regional non-profit health enterprises run the public hospitals. The central government allocates money to the health enterprises according to a priori assessed needs and activity indicators. Municipalities participate in the activity-based financing of medical treatments of their residents in hospitals. All inpatient care in public hospitals, including pharmaceuticals, is free of charge.

Health policy is relatively successful when measured by health indicators. As in Sweden and Finland, there are, however, regional disparities in access and quality of care. Recruitment of doctors and nurses is sometimes difficult in rural areas.

Municipalities provide and finance long-term care of the elderly in Norway. As in the other Nordic countries, home care and sheltered housing are replacing institutional care. Voluntary organizations have earlier produced a large share of the services, but are increasingly integrated in the public system. As in Finland, out-of-pocket payments can be up to 85 per cent of the patients' income in institutional care, but comprises still a small share of the total costs. The share of GDP spent on health and long-term care services is somewhat higher in Norway than the OECD average.

Iceland differs from the other Nordic countries in several ways. Provision and funding of health and long-term care is largely centralized. Doctors in both primary care and hospitals are salary earners, but out-patient specialized care is provided by self-employed specialists. Even their services are mainly publicly financed. As in Sweden, general practitioners in primary care do not have a gate-keeping role. Therefore it is quite obvious that any problems in access to or in quality of primary care increase demand for specialized care. Health care is financed mainly by general taxation. The share of out-of-pocket costs is comparable to other Nordic countries (Ásgeirsdottir, 2009).

The health outcomes are excellent in Iceland. Both life expectancy and number of healthy years are high. The spending cuts due to the deep economic crisis have been moderate in the health care sector.

Iceland has a history of arranging old-age care in institutions. Even though the emphasis is now on increasing home care, a relatively high share of the oldest old is still living in nursing homes. Furthermore, there are quite many people on waiting lists. One reason for this situation is that municipalities promote the use of state-financed institutions instead of home help that municipalities finance themselves (Sigurðardóttir, 2013). The total fiscal burden of long-term care is not, however, very large, since the age structure is relatively young in Iceland.

As described above, there are large differences in Nordic countries in organization and financing of health and long-term care, but rather low differences in outcomes. This is probably reflecting the very similar values and goals regarding to health and long-term care. The differences allow learning from the best practices and avoiding weak spots. It seems that free choice of the primary care producer is a permanent element of future health care. If so, promoting competition between the providers and educating customers towards informed choices are needed to fully utilize the potential of the trend. Also the payment arrangements for the private producers are important for keeping the costs in check, the capitation principle being the prime candidate. Gate-keeping practices are another potential driver for low costs. They apply to division of labour between nurses and doctors as well as to access to specialized care.

Utilization of economics of scale and specialization of hospitals have generated positive results both in terms of efficiency and quality. Co-operation between primary care, secondary care and social services are needed to facilitate exchange of information and to provide continuum of services to

customers. Also a flexible reallocation of resources between these services should be enabled due to the large uncertainties related to the needs of the future elderly. Incentives to shift responsibilities and costs to other providers in provision and financing of care should be abolished. One step ahead would be to reduce the overlap in financing sources.

In long-term care the key issue is how long the current trend of increasing the share of home care can continue, since the number of elderly living alone is increasing and the working lives of the potential informal working-age carers are becoming longer. There is also a limit in the health and ability status of the customer after which institutional care provides higher quality and is less costly than intensive formal care at home.

3. WHY HEALTH AND CARE EXPENDITURE KEEPS RISING?

Expenditure on health has increased rapidly during the last 50 years. The ratio to GDP has risen from below 4 per cent to close to 10 per cent in the Nordic countries. It suggests that the welfare states values health highly.

Table 1 Total expenditure on health, % of gross domestic product

	1960	1970	1980	1990	2000	2010
Denmark		7.9	8.9	8.3	8.7	11.1
Finland	3.8	5.5	6.3	7.7	7.2	9.0
Iceland	3.0	4.7	6.3	7.8	9.5	9.3
Norway	2.9	4.4	7.0	7.6	8.4	9.4
Sweden	..	6.8	8.9	8.2	8.2	9.5

Note: For Denmark, the figure for 1970 is actually for 1971.
Source: OECD Health data

3.1 WHAT DRIVES THE EXPENDITURE?

When discussing population ageing and health and long-term care expenditure, a proper way to start is to acknowledge that rather little is known quantitatively and uncertainty is large. This concerns the understanding of the driving forces and causalities both currently and in the past. Projections for the future are thus based on shallow grounds compared to, e.g., pension expenditure projections, and uncertainties are magnified by the obvious possibility that whatever the current connections are, they may change in the future. The most relevant issues include technological change, Baumol's disease, income effects and demographic effects (see, e.g. de la Maisonneuve and Oliveira Martins, 2013, Häkkinen et al., 2007, and Tuovinen, 2013).

Concerning demographic effects, a basic statistical fact is that per capita health and long-term care expenditure is bigger in older age groups than in younger. The magnitudes vary between countries, and need not be completely monotonic by age, but usually people over, say, 60 years of age use more of these services per person than people under 60. And because population ageing usually

means that the number of people over 60 grows more rapidly than those below 60, the worry about increasing costs is obvious.

Häkkinen et al. (2006) used individual-level health and care expenditure for a large sample of persons in ages 65+ in 1998. According to their calculations, 49 % of health expenditure and 75 % of care expenditure went to persons who died in 1998 – 2002. Part of the expenditure for those who died during these years, however, obviously had no causal connection with death. A person who died because of lung cancer in 2002 may have been treated for a dislocated shoulder in 1998. Lassila et al. (2011) elaborated on the results of Häkkinen et al (2006), assuming that the costs that do not depend on the proximity to death are on average the same per capita, within each age group, for those who died and for those who did not. They estimated that 29 % of health expenditure and 51 % of care expenditure depended on the proximity to death. This result lowers markedly the sustainability gap for Finland.

3.2 Future health and long-term costs in Nordic countries

Population ageing has increased interest in the future age-specific public expenditures. The main components of those are pensions and health and long-term care expenditure. International organizations have published country-specific projections for the costs. The idea has been to achieve comparable results by using similar definitions, methods and assumptions for the driving forces of the costs for all the countries. We present two recent projections produced by the Ageing Working Group (AWG) of the European Commission and OECD and discuss their implications. These organizations use the projections to assess the fiscal sustainability of the countries. Projections of AWG are further used, for example, in defining the country-specific Medium-Term Budgetary Objectives of euro area and ERM2 Member States.

Table 2 shows health and long-term care expenditure projections produced by AWG and published in 2012. Health cost projections are based firstly on the EUROPOP 2010 population forecast and secondly on information on age-specific public expenditure per capita, provided by the country experts. An important issue is how this link between age and health care demand will evolve in the future. In the reference scenario of AWG it is assumed that half of the gains in life expectancy are spent in good health. A third component needed for the projections is the future development of unit costs of the health care services, which is assumed to develop at the same rate as GDP per capita. The uncertainty related to the future health care costs has been considered by creating a large amount of scenarios with different assumptions about the influencing factors, their contribution to the expenditure and their future development (EC, 2012).

The process of projecting long-term care expenditure also starts from the population projection, which is used to forecast the size of the future disabled population by age. The data on age-specific unit costs are provided by the country experts and their future values are indexed to growth of GDP per capita. This projection also utilizes the assumption that half of the additional years will be spent in good health and able to function. This calculation gives a forecast for the total in-kind spending on long-term care. Country experts help to divide this amount to informal and formal care costs.

The latter will be topped up with a projection of related cash benefits to reach the public LTC expenditure as the final outcome.

Table 2. Projected public expenditure, percentage points of GDP, AWG

	Health care		Long-term care		Total		Change
	2010	2060	2010	2060	2010	2060	2010-2060
Denmark	7.4	8.3	4.5	8.0	11.9	16.3	4.4
Finland	6.0	7.0	2.5	5.1	8.5	12.1	3.6
Norway	5.8	7.0	3.8	7.7	9.6	14.7	5.1
Sweden	7.5	8.2	3.9	6.4	11.4	14.6	3.2
EU 27	7.1	8.2	1.8	3.5	8.9	11.7	2.8

Source: EC (2012)

As seen in Table 2, increases in health expenditure are rather modest compared to the growth of old age care costs. This was expected, since a large share of the aggregate health care costs is generated during working years, when the greater part of the birth cohort is still alive. Almost all the demand for LTC only develops after age 75. The future fall in mortality rates is projected to take place after working years, which explains the large growth in LTC costs.

Table 3 presents the corresponding projections of the OECD published in 2013 (de la Maisonneuve, and Oliveira Martins, 2013). The starting point of these projections is the average expenditure in 2006-2010. This average has been chosen in order to limit the influence of the Great Recession on the GDP numbers. Another noteworthy issue is that the definitions of the expenditure are different compared to the AWG projection especially in LTC. The OECD only includes expenditure related to institutional care provided in nursing homes and hospitals in this category. This is an obvious deficiency since the services are increasingly based on home care and care in sheltered housing units. The OECD study includes Iceland, which is missing from the projections of the Commission.

Table 3. Projected public expenditure. percentage points of GDP, cost containment scenario, OECD

	Health care		Long-term care		Total		Change
	2006-2010	2060	2006-2010	2060	2006-2010	2060	2010-2060
Denmark	6.3	8.3	2.2	2.8	8.5	11.1	2.6
Finland	5.2	7.3	0.8	1.3	6.0	8.6	2.6
Norway	5.1	7.3	2.1	2.7	7.2	10.0	2.8
Sweden	6.6	8.6	0.7	1.1	7.3	9.7	2.4
Iceland	5.8	7.8	1.7	2.2	7.5	10.0	2.5
OECD	5.5	7.9	0.8	1.6	6.3	9.5	3.2

Source: de la Maisonneuve and Oliveira Martins (2013).
Note: in the cost containment scenario it has been assumed that the contribution of technology and relative price effects to expenditure growth converges to zero in 2060.

Also the projection methods differ. The OECD generates health care cost projections using demographic factors, income growth and residual growth. Population projections for the Nordic countries are adopted from the Eurostat. It is notable that the OECD assumes the whole future

increase in lifetimes being spent in good health. Therefore proximity of death costs and the numbers of deaths dominate the demography-based future expenditure changes. Income growth influences the demand for services with an elasticity of 0.8. The residual, estimated from past data, is interpreted to consist of the contributions from relative prices and technological progress.

The OECD projects the public long-term care expenditure using demographic factors, such as life expectancy and health expenditure and non-demographic factors, such as income, change in relative prices due to the Baumol-effect and informal care supply. Higher life expectancy is expected to lower the age-specific costs in the future due to the assumed healthy ageing. Larger health care investments are likely to increase the prevalence of nonfatal chronic illnesses and thereby expenditure. The Baumol-effect is caused by low productivity growth in the care sector, which tends to increase the price of care compared to prices of goods if wages are identical across sectors. Actually this assumption is almost equivalent to indexing the price of LTC to wages. Income is expected to increase the demand for quality of LTC. Supply of informal care is approximated with the change in the labour force share of the 50-64 year old women.

The outcome differs rather much from the one generated by the Commission. The assumption that additional years are healthy mitigates strongly the influence of population ageing in the OECD projections. Defining LTC costs narrowly to include just institutional care operates in the same direction. On the other hand, OECD adds to health care cost projections the impact of the residual explanatory factor, which contributes strongly to the results. Due to these methodological distinctions the OECD study shows much smaller increases in total expenditure and also differences between countries are much smaller between the Nordics, when compared to the AWG projection.

4 FINANCING FUTURE HEALTH AND CARE EXPENDITURE

4.1 HOW SHOULD THE COSTS BE ALLOCATED BETWEEN GENERATIONS?

If the share of health and long-term care expenditure on total output increases, what if any part of the rise should current generations pay? Not a large part, according to Andersen (2012, p.19: "…both increasing longevity and a trend increase in the demand for public services are factors benefitting future generations, and if current generations via pre-funding as implied by the S2[4] indicator are required to contribute to their financing, it may imply a significant intergenerational redistribution." This concerns also public health and long-term care expenditure, which have an important role in assessments of fiscal sustainability. Sustainability indicators such as S2 do not provide sufficient statistics for policy interventions that aim at fair distribution of resources between generations. For that purpose it is necessary to separate which part of the projected expenditure increase is allocated to the current generations and which part benefits the future generations.

[4] S2 measures the immediate and permanent increase in total taxes/GDP that is needed to finance the future increases in expenditure so that public net debt returns eventually to the current level. Alternatively, there is an immediate cut in expenditure that generates eventually the same net debt.

Andersen continues: “Clarifying an optimal profile for the budget balance and public debt involves issues of intergenerational distribution. Such concerns are also often used to justify policies in this area encapsulated in statements like “not leaving any bills to the children”. However, issues of intergenerational distribution are subtle, and a zero (or constant) net debt is not necessarily tantamount to distributional neutrality.”

“From a policy perspective it is very important to perform such analyses to prepare for the needed prioritization and to inform the general public on what the public sector can be expected to accomplish in terms of service provision. Such analyses are useful in identifying trends which policy makers will have to address, but since they are mainly driven by the fact that future generations are richer and have better options than current generations, it is not obvious that these issues should affect the formulation of short-term budget policies and consolidation targets.”(Andersen, 2012 p.21)

4.2 PAYING BY LONGER WORK CAREERS

4.2.1 Longevity, health and working lives

Both life expectancy and number of years in good health have increased for several decades. The length of working lives shortened, however, until 1990s mainly due to the introduction of early exit routes from employment. The tightened polices, improved working conditions and advanced ability to work in late working ages turned the tide since and actual retirement ages have increased. But there is a need to employ policies ensuring that retirement ages continue to rise in future, because the ageing of baby boomers and the projected continuous increase in retirement years (see Chapter 3) add to the public expenditure.

A comprehensive study shows the pace at which various health indicators have developed in Finland 2000-2011, see Koskinen et al. (2011). Table 4 provides examples of some subjective measures of working ability.

Table 4. Self-assessed health and working capacity in Finland

	Men 55-64		Women 55-64	
	2000	2011	2000	2011
In good or rather good health, % share	48.7	69.1	52.9	72.9
Fully able to work, % share	54.6	71.0	53.5	69.4
Able to work in same profession after 2 years, % share	78.9	89.7	69.3	82,0

Source: Koskinen et al. (2011).

The result of this comparison is that both self-assessed health and working capacity have improved surprisingly fast for people near retirement age in Finland. A comparable positive change in shares has taken place in age group 65-74. Many objective measures of physical ability to function are in line with these results. Also tests of cognitive capacity show some improvement. These are very good news particularly for the welfare of the citizens, but the development provides also a sound basis to the view that an increasing share of people is able to extend their working lives.

4.2.2 The role and possibilities of pension policies

Continuously increasing healthy life expectancy opens up a prospect of longer working lives. A higher retirement age would not only improve the financial sustainability of the pension systems but also expand tax bases and increase tax revenues, strengthening therefore the resources needed to finance the growing costs of the welfare state.

Pension reforms in EU countries have promoted during the last decades higher labour supply by tightening the link between pension benefits and earned wage income, by reducing incentives to retire early and by limiting access to early exit routes. These measures have proven to be efficient, but further progress in retirement ages requires additional reforms.

Finland, Norway and Sweden have introduced a combination of a flexible retirement age and adjustment of pensions to longevity. When lifetimes increase, the monthly pension will be cut, but people have a possibility to compensate for this by working longer. The experiences from Sweden show, however, that this possibility has not been used as much as expected. The Danish reform introduced a scheduled increase in retirement age and a link between this age and life expectancy. Increases in expected longevity lead on a one-to-one basis to an increase in the statutory retirement age. This is expected to have a profound effect on retirement behaviour. A corresponding recent Swedish proposal allocates 2/3 of the increase in expected longevity to the age limits of the public pension system.

In Finland, the next reform, aimed to be implemented in 2017, is expected to increase the lowest eligibility age for old age pensions, but the details and timetable are open. These examples show that the Nordic countries have recognized the need for ensuring a continuous increase in retirement ages, in concordance with longer lifetimes.

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4.2.3 Paying by working longer: the Finnish case[5]

In Lassila and Valkonen (2014) we ask whether longer working lives can bring sufficient tax revenues in Finland to pay for the growing public health and care expenditure that longer lifetimes cause. We picked results from studies concerning retirement decisions and pension policies, the role of mortality in health and long-term care costs, and errors in mortality projections, and combined them into a numerical OLG model where changes in mortality have direct effects both on working careers and on per capita use of health and long-term care services. Although there are huge uncertainties concerning future health and long-term care expenditure when people live longer, our simulations show that with policies directed to disability pension eligibility rules and old-age pension eligibility ages, it seems quite possible that generations enjoying longer lifetimes can also pay for the full costs by working longer.

[5] This section draws heavily on Lassila and Valkonen (2014).

We considered three alternatives for the future average effective retirement age. In the first, pension rules are not changed but longer expected lifetimes affect retirement decisions of the individuals. In the second, pension age limits are linked to life expectancy – a possible reform that is currently discussed in Finland. The third is a technical 'no change' alternative where the average effective retirement age remains at the current level. The first and second alternatives are derived from Määttänen (2014), who studied how policies aiming to extend working lives affect individual labour supply decisions and income distribution of employees close to the earliest eligibility age for retirement. He used a stochastic life-cycle simulation model that depicts the decision-making of wage earners in different situations. The model groups individuals based on age, gender and education. Wage earners face the risk of losing their jobs, the risk of becoming disabled and the risk of a surprisingly long life.

According to the estimates of Määttänen (2014), adding an additional 3 years to the life expectancy of a 30-year-old would extend working lives by 6 months, assuming that any health problems are likewise postponed by 3 years. We used this estimate in the numerical OLG model in such a way that, if pension rules were left unchanged, the change in life expectancy automatically affects the length of working lives in accordance with the ratio depicted[6]. In the baseline scenario the realized retirement age will rise by a year and a quarter at every education level from 2013 to 2063. With the ongoing change in education structure and the influence of recently implemented pension reforms, the result is an increase in the actual average retirement age by about two years in 50 years.

In the retirement age reform alternative, the earliest pensionable age is linked to the adulthood life expectancy. Adulthood is defined as having begun at age 18. The pensionable age adjusts every year to changes in mortality so that it divides the expectancy for time lived as an adult to working lives and retirement years at the same ratio (roughly 2:1). If the life expectancy of a 63-year-old grows by just over six years over a period of 50 years, this link would raise the pensionable age by four years. The earliest eligibility age for the part-time pension and the unemployment pathway are changed to the same degree as the pensionable age, since, according to Määttänen (2014), simply raising the pensionable age would not really extend working lives due to an increased use of other exit routes from working life.

Linking the retirement age to life expectancy affects the length of working lives. Based on the model used by Määttänen, raising the lowest eligibility ages for the old age pensions, the unemployment pathway and the part-time pension by two years would extend working lives by 7 months. This estimate has been calculated in a situation where life expectancy has already been extended by three years from the current situation. If longevity increases as projected by Statistics Finland, the retirement age reform raises the average retirement age by over a year by the 2060s, compared to the baseline scenario (see Lassila, 2014, for details).

[6] It should not, however, be expected that better health would automatically and fully reduce the willingness to apply for a disability pension. According to Börsch-Supan (2007), differences in prevalence of disability pensions between EU countries reflect country-wise rules and admission practices, not observed health differentials. Thus constant monitoring and adjustment of rules is required in practice, and the study described above should be interpreted in that vein.

We then studied the consequences of these three working life alternatives with 500 population paths, where mortalities develop according to a stochastic population projection produced by Juha Alho in 2013, based on Statistics Finland's 2012 projection. We simulated the sustainability of public finances using a numerical overlapping generations model of the type originated by Auerbach and Kotlikoff (1987). It is modified to describe a small open economy and calibrated to the Finnish economy.

We made two sets of sustainability calculations. In the first set, based on the study by Häkkinen et al. (2006), proximity to death affects the use of health and long-term care services. The second set of sustainability projections is based on per capita health and LTC costs that stay constant in each age group in the future. These calculations are naïve in the sense that they ignore the concentration of expenditures on the last years of life and assume that the age profile of per capita costs does not change in time (see also Häkkinen et al., 2007).

Life expectancy does not uniquely define what happens in different age groups in the population, and using expectancy calculated for one period leaves out variations in other periods. Thus the relationship between sustainability gaps and life expectancy has variations. The average dependencies are shown in Table 6. The numbers in the cells are averages and standard deviations within quartiles of life expectancy. In each quartile Q1, Q2, Q3 and Q4 there are 125 observations, of which the means and standard deviations are calculated.

Table 5 shows that if life expectancy increases but working lives do not, i.e. the 'No change in careers' alternative, public finances will certainly be in difficulties, even if proximity of death is fully accounted for. In this alternative the higher the life expectancy, the larger the sustainability gap will be. But even with current retirement rules (if disability rules are adjusted for better health) the lengthening of the careers would make the sustainability situation much better. And with the described retirement age reform, the sustainability gap would not be sensitive to life expectancy.

According to bottom rows in Table 5, if health and long-term care expenditure depend entirely on age, as the naïve modelling assumes, Finnish public finances would be in deep trouble. Sustainability gaps would be higher in all work career scenarios, and they would be increasing with longevity even if the retirement age reform is carried out.

Table 5. Selected economic variables under different working lives, by life expectancy quartiles

Total life expectancy at 30 in 2063 (TLE)	Q_1 TLE < 87.3		Q_2 87.3 < TLE < 89.3		Q_3 89.3 < TLE < 90.9		Q_4 90.9 < TLE	
	Mean	*Std*	Mean	*Std*	Mean	*Std*	Mean	*Std*
Average effective retirement age in 2063								
No change in careers	60.9	*0.0*	60.9	*0.0*	60.9	*0.0*	60.9	*0.0*
Current retirement	61.6	*0.23*	62.0	*0.11*	62.3	*0.10*	62.7	*0.22*

rules								
Retirement age reform	62.4	*0.52*	63.2	*0.26*	63.8	*0.21*	64.7	*0.48*
Sustainability gap, % of GDP, when care need estimates take account of proximity of death								
No change in careers	2.5	*0.22*	2.8	*0.18*	3.0	*0.16*	3.4	*0.22*
Current retirement rules	2.0	*0.15*	2.2	*0.16*	2.3	*0.14*	2.4	*0.13*
Retirement age reform	1.5	*0.09*	1.4	*0.10*	1.4	*0.09*	1.4	*0.09*
Sustainability gap, % with naïve care need estimates								
No change in careers	4.2	*0.65*	5.2	*0.53*	5.9	*0.47*	7.0	*0.67*
Current retirement rules	3.8	*0.56*	4.5	*0.48*	5.1	*0.41*	5.9	*0.53*
Retirement age reform	2.8	*0.44*	3.4	*0.41*	3.9	*0.35*	4.4	*0.38*

Note: sustainability gap is measured with S2 indicator.

Thus it seems quite possible that longer working lives bring sufficient increases to tax revenues to offset the effects of growing health and care expenditure that longer lifetimes cause. If longer lifetimes will in the future imply a significantly smaller per capita need for welfare services in any given age group than currently, as in the method that includes the proximity of death in Table 5, a modest reform in the earliest eligibility ages for pensions would suffice. If the expenditure grows more rapidly, a tighter reform would be needed. There probably is a limit on how long average working careers could and should be obtained with pension policies. If we knew this limit, it would still be uncertain whether the careers would be long enough to cover the growing health and LTC expenditure in all likely alternatives. But in any case they would pay a quantitatively significant amount.

4.3 Does immigration help to finance the health and long-term care costs?

Immigration into Nordic countries has increased continuously during the last few decades. The incomers are mostly working-aged people that can have a large impact on the economies and public finances of the host countries. This section discusses the potential of immigration in financing the increasing costs of health and long-term care. We study the issue utilizing a life cycle perspective in which both natives and the foreign born go through childhood, working age and retirement years, interacting in each phase with markets and public finances.

There is a growing literature on the fiscal impacts of immigration, summarized e.g. by Rowthrorn (2008), Pekkala Kerr and Kerr (2011) and OECD (2013b). The main message from these surveys is that generally the influence on the public finances of the host countries has been modest. At the same time it has been noted that the result depends on many qualifications of the immigrants such as age, education and employment rates.

The task of measuring the influence of immigration is not easy due to insufficient statistics and methodological problems. An example is that not enough is known about remigration. Any cross-

sectional study is likely to give too negative results on the role of the immigrants if a substantial share of those move back to their countries of origin after their working years or after experiencing weak labour market performance. In that case they do not consume the health and LTC resources of the host country during their old age. Another problem is the long horizon needed to evaluate the outcomes, since in optimal data people are followed from birth to death. This long horizon also brings about issues like how to deal with economic growth and discounting.

The method we use is based on an overlapping generations model (FOG) calibrated to the Finnish population and economy (for details of the model, see e.g. Lassila, Valkonen and Alho, 2011). These types of numerical OLG models, originated from Auerbach and Kotlikoff (1987), combine the ability of generational accounting models to follow the life-cycle incidence of taxes and transfers and the ability of dynamic general equilibrium models to study how changes in market prices influence the results[7]. Specifically, links between population structure and the pension system and demand for health and long-term care services are modelled in detail. Immigration increases tax revenues and alleviates the crowding-out problem caused by increased labour demand in the health sector. In the model version used, the budgets of the social security institutions and municipalities are balanced period-by-period by adjusting taxes and contribution rates, but the central government keeps the tax rates fixed and allows debt to adjust.

We use simplest possible assumptions about the immigrating population. To be precise, we assume that new immigrants are in all economic aspects similar to the current population. We know well that this practice overestimates the employment rates observed in cross-sectional studies. On the other hand, the employment rates are likely to be higher later during the working lives of the immigrants and those who are not in the labour force are not eligible for many earning-related benefits. The age structure of the new immigrants follows the net immigration numbers provided by the 2012 population projection of Statistics Finland.

Table 6 compares the outcomes of two simulations, one in which the net migration is 17 000 persons/year from 2013 forward and another in which net migration is zero. A large share of those 17 000 belongs to the age group 20-64, which is here considered as the working age population. Immigration increases the working age population by almost 630 000 persons in 2060, which is 24 %. Due to the young age structure, they contribute more to GDP and tax revenues than expenditures. Therefore a snapshot from one period gives a quite positive picture of the effects. To assess the long-term effect, a sustainability gap from the years 2013-2113 was calculated. The sustainability gap expresses the immediate need to adjust public finances, which would eventually bring the public debt/GDP to its starting level. A long simulation period allows also including the pension and health and LTC costs due to ageing migrants. The sustainability gap decreases by 1,6 per cent in this calculation due to migration.

[7] A similar method has been used e.g. by Storesletten (2000) and Schou (2006). The most comprehensive model analysis is provided by Schultz-Nielsen and Tranæs (2014), who study fiscal sustainability implications of immigration in Denmark. They divide the immigrants according to countries of origin as Western and non-Western. A reduction of 5000 in number of non-Western immigrants would contribute positively by 0.12 percentage points of GDP to sustainability measured with the S2 indicator. This is largely due to their low employment rate. Western immigrants improve sustainability.

Table 6. The fiscal impact of migration in Finland in year 2060

	Working-age population	Health and LTC expenditure/ GDP	Pension expenditure /GDP	Total taxes/ GDP	Public debt/ GDP	Sustainability gap (S2)
Baseline projection	3185115	9.3	13.1	45.8	35.4	2.1
Zero net migration	2555628	10.4	14.9	48.0	41.7	3.7

The result requires some explanation. With immigration, educational costs are saved. Another issue is timing of revenues and expenditure. As majority of public expenditure is generated during retirement years and most tax revenues during working lives, the public sector benefits from the expansion of population[8]. The size of the simulated fiscal effects is comparable to the results of other studies, especially when the assumption of the high employment rate of the immigrants is considered.

The final conclusion is that even increasing the working age population by a quarter would not abolish the current sustainability gap in Finland. On the other hand, a clearly positive contribution is possible to achieve. Our projection for the future increase in health and long-term costs is 1 % of GDP in 2010-2060, see Lassila and Valkonen (2013). A yearly increase of 17 000 immigrants would suffice well to finance those costs if employment rates of the future immigrants would be as high as among the native population. On the other hand, this would not be nearly enough if the expenditure projections of EU Commission or OECD would come true.

4.4 Sharing the burden – public and private financing of health and long-term care

The Nordic countries are well-known for using mainly tax revenues to finance the publicly provided health and LTC expenditure. This allows striving for redistribution both in financing and provision of services. The competing financing system - social insurance - often has a flat contribution rate, but involves also some redistribution because the tax base is earned income. Countries that use tax-financing often restrict the access to care by gate-keeping arrangements. Another typical element is that the services are mainly produced in public sector. The role of social insurance used to be much higher in the 1960s than currently in the Nordic countries (Wagstaff, 2009). Nowadays tax-financing either dominates or is the sole form of public funding of the services.

From the point of view of the user of the services both financing methods provide insurance against high expenditure. Another common feature is deductibles, which allocate part of the costs to the customers. These out-of-pocket payments raise the threshold of using the public services and

[8] This effect is similar to gains of expanding a pay-as-you-go pension scheme by adding young participants in the system. The exact gain depends on the lag between paid contributions and received pensions and the difference between the interest rate and growth rate of the economy.

thereby limit the costs. However, it has been argued that this incentive falls disproportionally on the poor, because the fortunate ones use the services less and can afford the payment.

Table 7 Public expenditure on health, % total expenditure on health, TEH

	1960	1970	1980	1990	2000	2010
Denmark		83.7	87.8	82.7	83.9	85.1
Finland	54.1	73.8	79.0	80.9	71.3	75.4
Iceland	66.7	66.2	88.2	86.6	81.1	80.4
Norway	77.8	91.6	85.1	82.8	82.5	84.7
Sweden	..	86.0	92.5	89.9	84.9	81.5

Note: For Denmark, the figure for 1970 is actually for 1971. Public funds are state, regional and local government bodies and social security schemes. Public capital formation on health includes publicly financed investment in health facilities plus capital transfers to the private sector for hospital construction and equipment. Private sources of funds include out-of-pocket payments (both over-the-counter and cost-sharing), private insurance programmes, charities and occupational health care.

The type of financing varies between the services provided and between the practices followed in different countries. Table 8 illustrates the large share of tax finance in Nordic countries compared to the OECD average, but reveals also large differences between the Nordics. The Icelandic financing scheme most resembles the OECD average, whereas tax-financing is the only source of public financing in Denmark and Sweden. A specific feature in Finland is that occupational health care provides also medical treatments. Firms pay directly more than half of the expenditure in occupational health care, which contributes to the relatively high share of private financing. Another reason is that National Health Insurance reimburses a rather low share of the expenses.

Table 8. Health care financing in 2011

	Denmark	Finland	Iceland	Norway	Sweden	OECD34
General government	85	60	51	73	82	35
Social insurance	0	15	30	12	0	37
Private + other	15	25	19	15	18	26

Note: OECD34 is average of 34 OECD countries where data was available.
Source: OECD Health Statistics 2013.

Many of the services in old age care, such as housing and housekeeping, are available in the market and are also used by others than the disabled elderly. Therefore it is not clear how extensively these services should be financed publicly for other than redistributional reasons.

Private health insurance is mainly financed by employers in the Nordic countries and the main aim is to speed up the employees' access to care. In Finland the extended occupational health care serves the same purpose. The popularity of other types of health insurance has increased recently, but only in Denmark is a large share of population covered by them. There is no long-term care insurance in the Nordic markets.

The responsibilities of private and public sector in financing health and long-term care will be continuously put to the test in the future. Population ageing increases the number of people needing the services and technological developments, medicalization and increasing income will enhance the services asked for. It would be very informative for the individual citizens if the public sector could indicate the amount of resources to be allocated, the priority order to be used and the quality of care offered well in advance. That would allow use of private saving and insurance and the development of private insurance markets. Currently the public promise is so vague at least in Finland that any provision to top up publicly financed services with privately financed ones in an informed way is very difficult. Part of the explanation is that municipalities are allowed rather freely to organize health and old age care and the outcomes differ. In this respect social insurance gives citizens better guidance than a tax-financed system.

The possibility to finance privately health care and long-term care services often engenders controversy due to distributional issues. But the fact remains that private financing is increasing anyhow, simply because these services are highly valued. It is better that the roles of public and private money are well defined and designed so that the fortunate ones have incentives to use their own money and thereby limit the tax burden. An example of this is introduction of vouchers as an alternative to publicly provided services. The vouchers could be priced so that the customers have to use some money out-of-pocket, but they are given a possibility to choose the producer and to top up the services with their own money. Those who have no extra means available or no capacity to make informed choices between the private producers can still rely on public provision.

Since the need for care varies markedly between individuals, complementary care and co-payments for public care are more efficient to finance with private insurance than individual saving if fairly priced insurance is available. This is because individual provisions for the risks require large savings, which may turn out to be unnecessary, if the services are not needed.

4.5 CAN WE REDUCE THE BILL?

One way of reducing the costs is to try to influence the demand for services. Allocation of resources to prevention may provide some opportunities, but general informing campaigns are not likely to be efficient in all cases. Economic incentives, such as user payments are known to limit the moral hazard related to demand for the underpriced services. An even more precise instrument would be to differentiate the size of the user payments so that illnesses due to unhealthy life-styles have higher fees. The redistribution problems can be limited by linking the size of the user payments to income and possibly also to wealth. This type of design is, however, quite complicated and disregards the uncertainties related to the links between income, life-style and illnesses. An alternative to differentiated user payments is to increase taxes on goods and services known to be unhealthy. It lowers the need instead of making the use of services more expensive.

Another way is to ease the expenditure burden is to continuously increase productivity, but this is easier said than done. An increasing share of health and long-term care services is produced in private sector. But to operate well publicly financed private production presumes skilled purchasing, competition, regulation and monitoring. There is also a risk that if private producers are

rewarded on a fee-for-service basis, the services offered are not always medically justified. Also in public production the emphasis should be on incentives to operate efficiently, but also on respecting the choices of the customers, access without delay and high quality.

Rationing and prioritization of care is one solution to the expenditure growth. Actually it can be considered as an unavoidable feature in a system where the services are highly valued and underpriced. Rationed resources must be allocated somehow, and prioritization is an obvious candidate for this task. Breyer (2013) separates several levels and types of rationing. Primary rationing means that society limits the resources used for health care, because there are also other needs. Secondary rationing refers to outright allocation of limited resources, such as donor organs. When public resources are rationed by the society, there is still a question whether a private market for services is allowed. If not, the services are under hard rationing according to the terminology used by Breyer. Under soft rationing, markets provide substitutive or supplementary services. Another question is whether rationing is implicit, meaning that physicians make the decisions case-by-case, or explicit, meaning that society defines and informs the rules that are followed in the provision of public services.

When governments aim to increasingly use primary rationing and prioritization in the future as an instrument for saving health and LTC costs, the issues described above must be openly discussed. Hard rationing aims at equal access, but it is still not easy to justify and difficult to carry out in practise. Soft rationing operates better when it is explicit. Also equity speaks for explicit instead of implicit rationing, but the rules are not easy to make and maintain.

5 Concluding comments

The Nordic countries are facing the prospect of an increasing ratio of public health and long-term expenditure to total output. This may become problematic if it leads to rising tax rates. Otherwise there seems to be no strong reason to reconsider the role of the welfare state in respect to these issues. Barr (2001) argues that the combination of public funding and public production of health services for which the Nordic countries have opted can both contain costs and promote access to the services. The weaknesses are in consumer choice and in waiting lists (Barr, p. 70). Freedom of choice has increased and access to care has improved recently, but there is still much to do especially in Finland. The new EU directive will give more visibility to these weaknesses.

The scale of public funding perhaps needs reconsideration. Barr (2010) argues that, because people have very different tastes, topping up public long-term care funding should be an option, from private saving or through supplementary private insurance, if that is available. This may also be defended as a political price for a mandatory system that covers everyone. One recommendation by Cremer et al. (2012) concerning long-term care is that the government should provide education and information on the risks of dependence and the type of services that may be required. Many people seem to be unprepared for the risks of old-age dependence, in the same way people were unprepared for old-age income risks half a century ago.

Paying the increasing tax burden by working longer seems to be a viable option in the Nordic countries. It also appears to be fair in the sense that generations that live longer also pay more. Future cohorts are expected to live longer, so they should work longer and pay more taxes. One could actually ask what if any part of the cost increase in health and long-term care should current generations pay?

Pension policy is not the only instrument in increasing labour supply. Measures such as tighter rules in unemployment allowances and obligations to accept also low-paid jobs have proven to be very efficient in Germany. We have also shown that higher immigration could be part of the solution, on the condition that the employment rates of the immigrants are high enough.

Literature:

Andersen, T.M. (2012): “Fiscal sustainability and fiscal policy targets”. Institut for Økonomi, Aarhus Universitet, Aarhus. Economics Working Papers, No. 2012-15.

Ásgeirsdottir, T. L. (2009): “The Icelandic Health Care System”, in Magnusses, Vrangbaek and Saltman (eds.), Nordic Health Care Systems: Recent Reforms and Current Policy Challenges. London: McGrawHill.

Auerbach, A. J. and Kotlikoff, L. J. (1987): Dynamic Fiscal Policy. Cambridge University Press, Cambridge.

Barr, N. (2001): The Welfare State as Piggy Bank. Oxford University Press.

Barr, N. (2010): “Long-Term Care: A Suitable Case for Social Insurance”, Social Policy and Administration, vol. 44, No. 4, pp. 359-74.

Baroni, E. and Axelsson, R. (2012): Pensions, health and long-term care, Asisp annual national report 2012: Sweden. Brussels: European Commission, 2012. pp. 1-58.

Breyer, F. (2013): Implicit Versus Explicit Rationing of Health Services. CESifo DICE Report, 11, issue 1, pp. 07-15.

Börsch-Supan, A. (2007): Work disability, health, and incentive effects. MEA Discussion Paper No. 135-07, Mannheim.

Cremer, H., Pestieau, P. and Ponthiere, G. (2012): The economics of long-term care: A survey. Nordic Economic Policy Review, Vol. 2, 2012, pp. 107-148.

de la Maisonneuve, C. and Oliveira Martins, J. (2013): Public spending on health and long-term care: a new set of projections. OECD Economic Policy Papers No. 06. Paris: OECD.

EC (2012): Fiscal Sustainability Report 2012. European Economy 8|2012.

Getzen, T. (2000): “Health care is an individual necessity and a national luxury: applying multilevel decision models to the analysis of health care expenditures”. Journal of Health Economics, 19(2), pp. 259-270.

Glenngård A.H. (2013): Swedish Health Care System, 2013. In S. Thomson, R. Osborn, D. Squires and M. Jun (eds.) International Profiles of Health Care Systems, 2013, The Commonwealth Fund.

Hall, R.E., and Jones, C.I. (2007): "The Value of Life and the Rise in Health Spending." The Quarterly Journal of Economics 122(1), pp. 39-72, February 2007.

Häkkinen, U., Martikainen, P., Noro, A., Nihtilä, E., and Peltola, M. (2006): Kuoleman läheisyys ja terveyden- ja vanhustenhuollon menot. Appendix 1 of the report: Kautto, M., Häkkinen, U., Laine, V., Parkkinen, P., Parpo, A., Tuukkanen, J., Vaarama, M., Vihriälä, V. and Volk, R. (2006): Hoivan ja hoidon taloudellinen kestävyys. Stakes.

Häkkinen, U., Martikainen, P., Noro, A., Nihtilä, A. and Peltola, M. (2007): Aging, health expenditure, proximity of death and income in Finland. STAKES Discussion Papers 1/2007, THL.

Koskinen, S., Lundqvist, A. and Ristiluoma, N. (eds.) Terveys, toimintakyky ja hyvinvointi Suomessa 2011. Terveyden ja hyvinvoinnin laitos (THL), Raportti 68/2012. Helsinki 2012.

Lassila, J. (2014): Example Calculation of the Financial Effects of the Pension Reform. In Lassila, J., Määttänen, N. and Valkonen, T. (2014): Linking retirement age to life expectancy – what happens to working lives and income distribution? Finnish Centre for Pensions, Reports 02/2014.

Lassila, J., Valkonen, T. and Alho, J.M. (2011): Assessing the sustainability of health and long-term care financing and the usefulness of policy guidelines based on demographic forecasts. In Honkatukia, J. (ed.): Three takes on sustainability. Government Institute for Economic Research, Publications 58, Helsinki.

Lassila, J. and Valkonen, T. (2013): Julkisen talouden rahoituksellinen kestävyys. ETLA Reports 3.

Lassila, J. and Valkonen, T. (2014): Longevity, working lives and public finances. Manuscript.

Lindahl, A.K. and Ringard, Å. (2013): Norwegian Health Care System, 2013. In S.Thomson, R.Osborn, D. Squires and M. Jun, (eds.) International Profiles of Health Care Systems, 2013, The Commonwealth Fund.

Määttänen, N. (2014): Evaluation of Alternative Pension Policy Reforms Based on a Stochastic Life Cycle Model, In Lassila, J., Määttänen, N. and Valkonen, T (2014): Linking retirement age to life expectancy – what happens to working lives and income distribution? Finnish Centre for Pensions, Reports 02/2014.4

OECD (2013a): OECD Reviews of Health Care Quality: Denmark 2013: Raising Standards, OECD Publishing.

OECD (2013b): “The fiscal impact of immigration in OECD countries”, in International Migration Outlook 2013, OECD Publishing.

Pekkala Kerr, S. and Kerr, W.R. (2011): "Economic Impacts of Immigration: A Survey," Finnish Economic Papers, Finnish Economic Association, Vol. 24(1), pp. 1-32, Spring.

Rowthorn, R. (2008): “The fiscal impact of immigration on the advanced economies”, Oxford Review of Economic Policy, Vol. 24, No. 3, pp. 560-580.

Schou, P. (2006): “Immigration, integration and fiscal sustainability”. Journal of Population Economics, Vol. 19, issue 4, pp. 671-689.

Schultz-Nielsen, M.L. and Tranæs, T. (2014): Indvandrere og danskeres nettobidrag til de offentlige finanser. Rockwool Fondens Forskningsenhed, Arbejdspapir 30.

Sigurðardóttir, S.H. (2013): Patterns of care and support in old age. School of health sciences, Dissertation Series No. 40, Jönköping 2013.

Storesletten, K. (2000): “Sustaining Fiscal Policy through Immigration”. Journal of Political Economy, Vol. 108, No. 2, pp. 300-323.

Tuovinen, M. (2013): Terveysmenojen kasvu. Valtiovarainministeriön Keskustelualoite 1/2013.

Vrangbaek, K. (2013): Danish Health Care System, 2013.In S.Thomson, R.Osborn, D. Squires and M. Jun, (eds.) International Profiles of Health Care Systems, 2013, The Commonwealth Fund.

Wagstaff, A. (2009): Social Health Insurance vs. Tax-Financed Health Systems - Evidence from the OECD. Policy Research Working Paper 4821, World Bank, Washington, DC.