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The Norwegian NDC Scheme: Balancing Risk Sharing and Redistribution

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ABSTRACT

The Norwegian NDC Scheme: Balancing Risk Sharing and Redistribution*

The main goals of reforming the Norwegian old-age pension system toward nonfinancial defined contributions (NDC) in 2011 were to improve long-run fiscal sustainability and labor supply incentives. Maintaining much of the redistributive effects of the former public pension system was also an important concern. Econometric analyses reveal the 2011 reform's significant effects on postponing retirement. Results from a dynamic microsimulation model show that the reform is expected to have substantial effects on old-age pension expenditures in the long run without any large negative distributional effects. Macroeconomic analyses indicate that the reform is likely to make a great fiscal impact in the long run, and higher employment plays an important role in this aspect.

KEYWORDS: Pension Reform, Early Retirement, Labor Supply, Fiscal Sustainability, Income Distribution

JEL CODES: H55, J22, H30, D31

Abbreviations and Acronyms

AFP	*Avtalefestet Pensjon* (Early Retirement Scheme)
BPU	Basic Pension Unit
DB	Defined Benefit
GDP	Gross Domestic Product
NDC	Nonfinancial Defined Contribution
NIS	National Insurance System

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1. Introduction

Norway's National Insurance System (NIS) was established in 1967 and is the first and most important pillar of the Norwegian pension system. In 2016 cash benefits from the central government to households from the long-term arrangements in NIS (old-age pensions, disability pensions, and survivors' pensions) amounted to more than 10 percent of gross domestic product (GDP) for mainland Norway. NIS is an integrated part of the central government and financed pay-as-you-go (PAYG). Since 1967, the system has been based on defined benefits (DB).

Because of growing longevity and the large cohorts born after World War II approaching retirement age, it was evident toward the end of the 1990s that maintaining the original DB system for old-age pensions would lead to a substantial growth in old-age pension expenditures in the coming decades. When NIS was established in 1967, there were about four persons in the labor force for each old-age and disability pensioner. In 2008 this ratio had fallen to 2.7. Without any reform, projections from Statistics Norway indicate that the ratio may decrease to 1.8 in 2050.

A Pension Commission was appointed in 2001 to discuss possible reforms of NIS. The Commission report's (NOU 2004: 1) main suggestion was to reform the Norwegian old-age pension system toward a nonfinancial defined contribution (NDC) scheme, which was already implemented in Sweden, Italy, Latvia, and Poland (see Chlon-Dominczak, Franco, and Palmer [2012] for a survey). Two agreements in the Norwegian Parliament in 2005 and 2007 indicated that a broad majority supported a reform along the suggested lines, with some adjustments. The new system was approved by the Parliament in the spring of 2009, and main parts were implemented from January 1, 2011.

During the whole reform process, effects from different designs on total labor supply and old-age pension expenditures were calculated by the dynamic microsimulation model MOSART (see Fredriksen [1998] for documentation of an earlier version). Given the uncertainty regarding labor supply effects, assumptions made during the reform process were based on

evaluations of the incentive structure in combination with possible effects from these changes discussed in the economic literature. By incorporating direct effects on pension expenditures and employment effects into a general equilibrium model, it was also possible to calculate possible direct and indirect effects on government revenues and other expenditures to sum up long-term effects on fiscal sustainability. Illuminating the necessity for the reform and possible effects of different designs may have made it easier to reach a political agreement in a situation when public finances were exceptionally good in Norway.

Important elements of redistribution in NIS from persons with high labor incomes to those with low labor incomes are maintained in the new system. Possible horizontal distributional effects from different designs of the system were also analyzed during the reform process using the MOSART model. Because effects from the reform on replacement rates depend on how much retirement is postponed, calculations of adequacy also had to be based on persons with given levels of incomes and assumptions regarding age of retirement. Such calculations are documented by Christensen et al. (2012).

A research project executed at the Norwegian Institute of Social Research and the Rokkan Centre (Ervik and Lindén 2014) found that the political process was of great importance for implementation of the reform. Representatives from the different political parties participated in the Commission, and the Centre-Right Wing Government up to 2005 and the following Social Democratic Government had a common understanding of why a reform was necessary.

In 2008, the Prime Minister of the Social Democratic Government succeeded in making a tripartite agreement with the Norwegian Confederation of Trade Unions and the Confederation of Norwegian Enterprises to incorporate the former early retirement scheme (AFP) in the private sector as a supplementary pension in the new NDC system. Under the old early retirement scheme, it was possible to retire between age 62 and 67 with no consequences on the level of old-age pension benefits from the age of 67. This system obviously stimulated early retirement, conflicting with the main principles of the NDC system.

However, no final agreement was achieved between the government and public-sector trade unions to reach a similar solution during negotiations in 2009. Neither the early retirement scheme nor occupational pensions have been adapted to the new NDC system. Nonetheless, an agreement between the government and the trade unions regarding the main principles for this unsolved challenge was reached in the spring of 2018.

2. Norway's pension system

As in many other countries, Norway's pension system is built on three pillars:

- The National Insurance System (NIS)
- Occupational pensions, including early retirement schemes
- Private savings (partly tax-deductible) for future pensions

2.1. Public old-age pensions

As discussed by Christensen et al. (2012) and not influenced by the reform, NIS is an integrated part of the central government budget and financed PAYG. Yearly expenditures do not have to be balanced by specific contributions and pension expenditures are covered by general tax revenues. The system is thus nonautonomous and does not fulfil criterium 2 for an NDC system, as outlined by Börsch-Supan (2006), who says that this kind of system should "include a mechanism that links the final balance with the demographic and macroeconomic environment." However, in Norway this criterium is fulfilled for the central government budget in general by the Fiscal Policy Rule, which states that in the long run over the business cycle, the use of petroleum incomes should be equal to the real return from the capital in the government Petroleum Fund, estimated at 3 percent per year. In the new Norwegian pension system, no automatic mechanism stabilizes old-age pension expenditures other than the life expectancy adjustment counteracting growing life expectancy.

As opposed to the Swedish system, which includes an automatic tightening because of demographic and macroeconomic developments other than growing life expectancy, Norwegian politicians must discuss to what degree the central government budget should be

tightened by tax increases or by expenditures other than old-age pension benefits. A tightening mechanism like that used in Sweden would mean a much stronger tightening of old-age benefits in Norway in the coming decades than what will follow from growing life expectancy. Financing old-age pension expenditures PAYG has caused the present implicit contribution rate to be far lower than the accrual rate in the new system (see section 4.1). Norway is now moving away from an abnormal situation of a low ratio of old-age pensioners to persons in the working force. Small cohorts of old-age pensioners born in the period between the two World Wars will now be replaced by large cohorts born in the decades after World War II. Strong growth in participation rates among women and high net immigration have in addition created a favorable ratio between the labor force and the number of old-age pensioners that cannot last.

Under the old system, old-age pensions could be claimed from age 67 and were tested against earnings until age 70, until a stepwise repeal of this test was imposed between 2008 and 2010. Under the new system, old-age pensions may be drawn partly or completely between the age of 62 and 75, with actuarial adjustment and without any earnings test.

From accumulated entitlements at retirement age A, $W_{A,}$ annual pension benefits for a cohort K retiring at that age are calculated by dividing by *divisors* $\Phi_{K,A}$ reflecting remaining life expectancy at that age. Calculation of divisors for a cohort is based on common mortality tables for men and women.

$$B_{K,A} = W_A / \Phi_{K,A} \quad (1)$$

where:

$B_{K,A}$ = Annual pension benefits for persons from cohort K retiring at age A

W_A = Accumulated entitlements at age A, and

$\Phi_{K,A}$ = Divisors for persons from cohort K retiring at age A.

The actuarial design reflected in (1) says that the account value of accumulated entitlements is divided by the number of expected years as retired. Early retirement leads to lower annual benefits because accumulated entitlements must be divided by more years. This is also the case when life expectancy increases for a given retirement age. Lower benefits when life expectancy increases may be counteracted by postponing retirement.

Statistical observations for the first years after the reform and econometric analyses based on these observations by Hernæs et al. (2016) show that the reform has already led to postponed retirement (that is, people are working longer).

To meet the criteria for NDC, the connection between pension entitlements and former labor incomes is closer in the new system compared to the old. Between ages 13 and 75, entitlements for old-age pensions in the new system are credited to individual accounts by 18.1 percent of annual labor income up to a ceiling of 7.1 times the basic pension unit (BPU),[1] corresponding to approximately 120 percent of the average wage level. In addition to the ceiling for accumulation of entitlements, a guarantee pension of 2 BPU for singles and 1.9 BPU per person for couples is an important redistributive element.

The guarantee pension is means-tested with 80 percent against income entitlements, and even persons with small incomes will obtain a level of pension benefits somewhat higher than the minimum level (Figure 2.1).

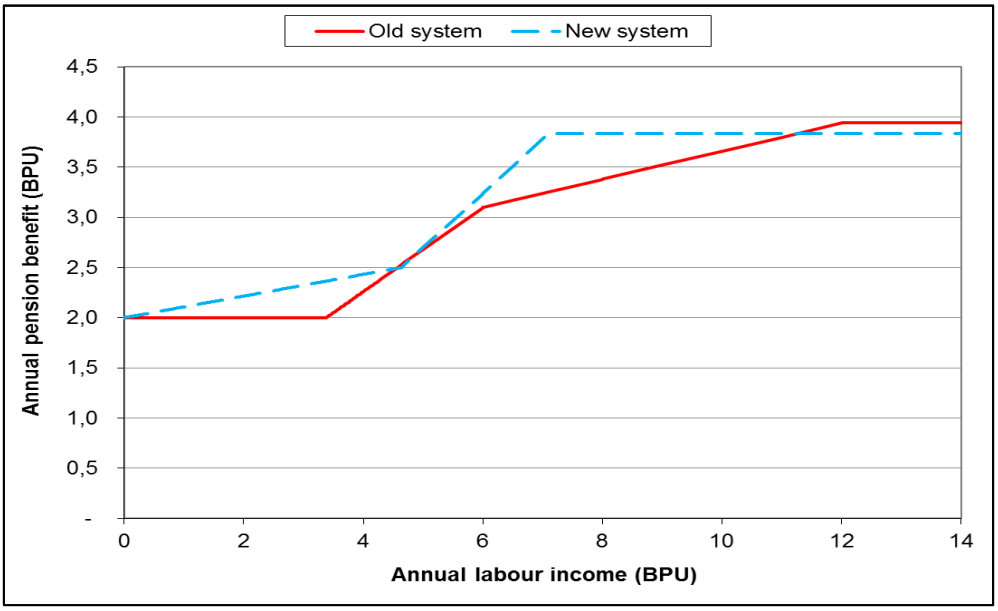
The connection between annual pension benefits and former labor income is shown for a single person with constant labor income during a period of 40 years. Life expectancy adjustments are not taken into consideration, thus Figure 2.1 represents the system for accumulation of entitlements.

The ceiling on annual incomes for full accumulation of entitlements at 7.1 BPU in the new system compared to 6 BPU in the old means that persons in this interval especially gain from the change in the accumulation model. Because of high participation rates among women

[1] The BPU is a measurement unit in NIS corresponding to about one-sixth of the average annual wage level for a full-time employee; it was indexed to about 94,000 NOK as of May 1, 2017.

and a rather compressed distribution of labor income in Norway, a large majority of yearly labor market income is in the interval 4.5–7 BPU. Like the Swedish pension system, Norway's system may be characterized as NDC with important elements of redistribution.

Figure 2.1: Annual labor incomes and annual pension benefits in Norway's old and new pension systems



Note: Figure is for a single person assuming constant labor income for 40 years.

In the new system, pension entitlements during accumulation are indexed according to the average wage rate. After retirement, income pension in payment is indexed to the wage rate but a fixed component of 0.75 percent per year is subtracted. The level of the guaranteed pension will be adjusted by growth in wages but reduced with higher life expectancy. In demographic projections from Statistics Norway, life expectancy at the age of 67 is assumed to increase by approximately 0.5 percent per year in the long run. Then the indexation of minimum pensions will usually be stronger than for ordinary pensions in payment.

While the actuarial part of the new pension system was effective for all new retirements from January 1, 2011, a transitional arrangement was introduced for the reform of accumulation of entitlements. Persons born in 1953 or earlier will accumulate their pension entitlements according to the old system. In the group born from 1954 to 1962, pension entitlements will be partly calculated from the old system and partly from the new, with an increasing share; for example, pension entitlements for persons born in 1954 will be 90 percent based on the

old rules and 10 percent on the new. Persons born in 1963 and later will earn their pension entitlements completely according to the new system. The Norwegian Labor and Welfare Administration (NAV) developed a website where everyone can get their pension benefits calculated for different assumptions about future wage level and retirement age.

2.2. Disability pensions and old-age pensions for those formerly disabled

Under the old system, disability pension and old-age pension were interconnected, and disability pensioners usually kept their pensions unchanged when they were transferred to old-age pension at age 67. About 10 percent of the population aged 18–67 is on disability pension, and at age 66 about 33 percent of the new old-age pensioners are considered the former disabled. A new disability scheme was implemented in 2015. With this scheme, disability benefits are calculated as short-term benefits with a replacement rate of 66 percent and taxed like earnings.

Disability pensioners earn entitlements for old-age pensions based on the income they had before they were disabled. As in the old system, they will be transferred to old-age pensions at the age of 67. Because persons receiving disability benefits are not able to work after this age, to counteract lower pensions due to higher life expectancy, the government decided that the reduction in yearly benefits caused by growing life expectancy for a newly disabled person at age 67 should be only one-half of the reduction implemented for a former nondisabled person retiring at this age. Over time this more lenient life expectancy adjustment for those who are formerly disabled will increase incentives for getting qualified as disabled before obtaining old-age pension. By 2018 the life expectancy adjustment of old-age pensions for those formerly disabled is to be evaluated, considering whether nondisabled persons compensate for the life expectancy adjustment by working longer.

2.3. Survivors' pensions

Survivors' pensions are also interconnected to the old system for old-age pensions. Given own income and the number of common children, a surviving spouse may get extra pension benefits dependent on the accumulated entitlements of the deceased spouse. If the surviving

spouse receives old-age benefits, s/he may also get a supplementary survivors' pension means-tested against her/his own entitlements for supplementary/income-dependent pension. Most surviving spouses are women, and normally their personal pension entitlements are significantly lower than the corresponding entitlements of their husbands.

2.4. Occupational pensions

Occupational pensions in the central and local government sector and a general old-age pension system existed before NIS was established in 1967. Since then old-age, disability, and survivors' benefits from the central and local government occupational pensions have been coordinated with the corresponding benefits from NIS, giving a total level slightly above what follows from the government occupational pensions alone.

In the private sector, huge variation has existed in the occupational pension schemes with respect to benefit levels, duration of benefits, indexation, and whether the schemes are DB or defined contribution (DC). Before 2006 each company could choose whether to offer supplementary pensions to its employees, and many companies did not provide any occupational pensions at all. In general, benefits from occupational pensions in the private sector have been significantly less generous than the corresponding benefits in the public sector. Occupational benefits in the private sector are mainly supplementary and usually not coordinated with NIS, although they are often designed to obtain a certain total replacement rate. In 2006 a minimum level of supplementary pensions was made mandatory by law for all employees, and companies must at least pay 2 percent of wages exceeding 1 BPU into a DC pension scheme.

From 1973 to 2010 the retirement age for old-age pension benefits in NIS was 67 years. To allow tired workers to retire before the age of 67 without using the disability pension scheme, an occupational early retirement scheme (AFP) was introduced in 1989 as a result of a 1988 tripartite agreement between the Norwegian Confederation of Trade Unions (LO), the Confederation of Norwegian Enterprises (NHO), and the Norwegian government. By this agreement it became possible for wage earners in the private sector covered by the scheme to retire at the age of 66. The scheme was gradually spread to other collective agreements

including the public sector, and the earliest possible retirement age was gradually reduced to the age of 62. All employees in the public sector and about 60 percent of those in the private sector are covered by an early retirement agreement.

Before the reform of the system for old-age pensions in NIS in 2011, early retirement was possible with hardly any consequences for future benefits from NIS after the age of 67. The early retirement scheme in the private sector was included and adapted to the new old-age pension scheme in NIS as a part of the pension reform in 2011.

In the public sector, only a partial agreement was reached between the trade unions and the government during negotiations in 2009 on how to adapt the former early retirement scheme to the new system. Therefore, means testing of benefits from the early retirement scheme against labor incomes between the ages of 62 and 67 from the old system has to date been maintained in the public sector, and retirement before 67 has been of minor consequence for old-age benefits after the age of 67.

3. Labor market effects and challenges

Labor supply is important not only for the level of pension entitlements but is also decisive for fiscal sustainability in the long run. One of the main aims of the Norwegian pension reform, like the former NDC reforms in Sweden, Latvia, Poland, and Italy, is to increase incentives for labor supply.

Postponing retirement may have a double effect on fiscal sustainability because of a combination of lower pension expenditures and higher tax incomes. As discussed in Fredriksen et al. (2017), three kinds of employment effects may be expected because of the reform:

- Effects on working hours prior to retirement age caused by a closer connection between pension entitlements and labor incomes with the new system.
- Immediate effects on retirement.
- Postponed retirement when life expectancy increases.

3.1. Effects on working hours

Changes in accrual of pension entitlements create a closer connection between pension entitlements and former earnings with the new system.

- The rule making entitlements dependent on the 20 years with highest labor incomes is abolished.
- While 40 years of accumulation were necessary to achieve full pensions with the old system, all years with labor incomes may increase entitlements with the new.
- While yearly income smaller than 1 BPU (equal to about one-sixth of average annual labor incomes) does not produce any extra entitlements with the old model of accumulation, even small incomes count with the new system.
- Under the old system, incomes between 6 BPU (equal to average annual labor incomes) and 12 BPU only produced one-third of full entitlements. Under the new system, full entitlements are accumulated up to yearly incomes of 7.1 BPU. Far more persons are in the interval 6–7.1 BPU than above 7.1 BPU.
- Under the old system, the special supplement for persons with low pension entitlements was means-tested with 100 percent against income pensions. Under the new system, means testing of the guarantee pension against income pensions is reduced to 80 percent.

Stensnes (2007) estimated the labor supply incentives at the intensive margin under the old and new systems. According to his estimates, the reform implies that 1 NOK extra labor market earnings raises the present value of future pension benefits from 0.101 NOK to 0.157 NOK, on average.

This corresponds to a 5.1 percent increase in the perceived effective wage rate. This estimate should be considered conservative, because it does not take into account that individual income dependency becomes more transparent and more similar between individuals in the new system. With a compensated labor supply elasticity of 0.5, the shift to the new pension system increases working hours prior to retirement by 2.5 percent.

3.2. Immediate effects on retirement

Several studies find that labor supply is more elastic on the extensive than on the intensive margin (Heckman 1993; Gruber and Wise 2004; Chan and Stevens 2003; Immervoll et al. 2007). Through microsimulation, the analysis herein also accounts for heterogeneous retirement behavior. In the first econometric study of the effects of the Norwegian pension reform on retirement, Hernæs et al. (2016) find that the reform has a significant positive immediate effect on labor supply for 63-year-old workers in the private sector with access to the former early retirement scheme. The analysis compares the 1946–1947 birth cohorts, who reached 63 years in the two years prior to the reform in 2010–2011, with the 1949 cohort, who reached 63 in 2012. The results are in line with previous analyses of the effect of changes in the earnings test for those aged 67–69 in the Norwegian public pension system. First, there was an increase in the threshold (Hernæs and Jia 2013) and then there was the stepwise removal of the test over the period 2008–2010 (Brinch, Hernæs, and Jia 2017), both of which significantly increased labor supply. Note that repealing an earnings test increases pension expenditures. However, Hernæs et al. (2016) find that tax revenues on increased earnings more than compensate.

In their analyses, Hernæs et al. (2016) exploit that different groups of employees are affected in completely different ways by the reform. They divide employees, both pre- and postreform, into three main groups:

- Employees in the public sector who all have access to the former early retirement scheme (AFP).
- Employees in the private sector with access to AFP.
- Employees in the private sector with no access to AFP, including the self-employed.

Each of the three groups is further subdivided dependent on whether its accumulated entitlements meet the requirements for claiming the new NIS pension at age 62. Between the age of 62 and 67, early pension claiming is only allowed if the resulting public pension, after actuarial adjustment, at age 67 is calculated to be above the guaranteed NIS pension. Subdividing both pre- and postreform cohorts gives comparable groups, with different incentives due to the reform. The postreform group with private AFP and the option of claiming

the new pension at age 62 was not exposed to the confiscatory earnings test that was the case for the prereform group. This group's economic returns from work were much higher than those of the prereform group, and Hernæs et al. find significantly higher labor force participation and earnings. In the private sector, the postreform group entitled to AFP, but not eligible for early claiming of the new pension, was exposed both to the "carrot" (higher returns) and the "stick" (no early retirement) compared to the corresponding prereform group. Since its response was quite similar to the group where only returns from work were higher, it seems that almost all the response was from the incentives, the "carrot." However, disability was also significantly higher in the postreform group. The postreform group with no access to AFP, but with enough entitlements to retire at age 62, experienced a reduction in access age because of the reform. Hernæs et al. (2016) find that the reform causes a small, but significant, reduction in employment and labor earnings for this group.

In the public sector, the old AFP has been preserved up to now, implying no changes in access age or in work incentives between age 62 and 67. However, Hernæs et al. (2016) find a small significant effect on employment and labor earnings for persons in this group with enough entitlements to be eligible for public pensions at age 62. Their interpretation of that finding is that some employees find it more attractive to continue in employment because it is also possible for employees in the public sector to combine employment with early payout from the social security pension.

3.3. Effects caused by further growth in life expectancy

Increasing life expectancy was not expected to have a large effect on retirement under the old system, since the annual benefit was independent of the number of years as a pensioner. Under the new actuarial system, increased life expectancy is likely to lower annual benefits and increase retirement age through consumption smoothing (Bloom, Canning, and Moore 2004). The optimal response is then to trade some of the leisure increment for consumption, and postponing retirement is a probable response. A relatively long period of observations after the reform is necessary to make empirical analyses of the effects of increased longevity on retirement age. About 30 percent of individuals will be unaffected by the changes in the early

retirement incentives, since they are disabled before the age of 62. Disability benefits will be replaced by old-age pensions at the age of 67 and disabled individuals cannot counteract the negative benefit effect of the life expectancy adjustment by extending their working career. The government has found it fair that the previously disabled to some extent should be sheltered from the default longevity adjustment in the new system; the benefit cuts implied by the longevity adjustment are therefore reduced by 50 percent for previously disabled old-aged pensioners.

Also when estimating possible effects of increased longevity on average retirement age, it is relevant to take into account that different groups may be affected differently. For those who work until they become old-age pensioners, it is assumed that 20 percent are so healthy that their delay of retirement equals the increase in life expectancy. For the remaining 50 percent working in the private sector, it is assumed that a delay of retirement is equal to two-thirds of the increase in life expectancy. This response neutralizes the benefit cut caused by the longevity adjustment. While assuming a minor response for the 30 percent working in the public sector, in sum these responses imply a 0.5 years' delay of retirement for each year life expectancy increases (0.5 * 2/3 + 0.2 * 1 + 0.3 * 0 = 0.5).

3.4. Total employment effects

From 2013 to 2060 the average remaining life expectancy for men and women at age 62 is expected to increase by about five years, from 22.8 to 27.6 years. Adding the immediate reform effect on retirement of 0.24 years and the effect which increases with remaining life expectancy, the average reform effect in 2060 equals 0.24 + 0.5*5 = 2.74 years for those who are not disabled at the age of 62. Also considering the positive effect on the participation rate for persons younger than 62, updated projections of the direct reform effect from 2016 indicate that the labor force in 2060 may be 276,000 persons, or 8.2 percent, larger under the new system than the old. This is a somewhat larger effect than reported in Fredriksen et al. (2017), caused mainly by stronger growth in life expectancy among men than previously assumed. In addition to the pension reform, net immigration to Norway is the main reason

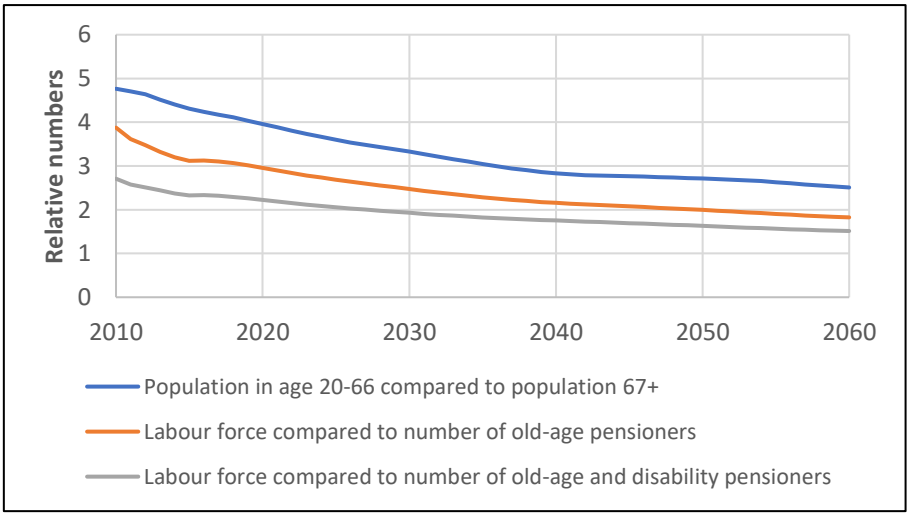
why the total labor force is projected to grow by 856,000 persons, or more than 30 percent, from 2015 to 2060.

4. Fiscal sustainability and sensitivity for demographic development and labor supply

4.1. Financing old-age pension expenditures

As mentioned in section 2, the expenditures of the public pension scheme are financed on a PAYG basis. Contributions and expenditures are integrated components of the entire central government budget. Because of the currently low number of old-age pensioners relative to the size of the labor force, the present expenditure rate is much lower than the accrual rate of 18.1 percent. Actual costs will probably not correspond to this number before population is assumed to stabilize after 2040. Figure 4.1 shows that the number of persons in the labor force relative to the number of old-age pensioners is expected to decrease from 3.9 in 2010 to 1.8 in 2060, based on the medium alternative in the population projections from 2016. The increasing old-age dependency ratio is partly caused by higher life expectancy, but even more importantly by the large cohorts born just after World War II retiring in the current and next decade, replacing much smaller cohorts born between the two World Wars.

Figure 4.1: Labor force compared to number of pensioners (relative numbers)



Source: Statistics Norway.

In a PAYG system in which public pension expenditures are financed by current tax revenues, the implicit contribution rate defined by Disney (2004) may be a simplified measure of each

member's contribution. Disney defined the implicit contribution rate for a public pension scheme as "the average rate (on earnings) that would be required to finance current spending on public pensions without budgetary transfers or the accumulation or decumulation of public pension funds." Under the standard PAYG formula, the implicit contribution rate (CR) may be calculated as the ratio of public pension payments (PP) to labor incomes (LI). Gross pensions are taxed in Norway, but more leniently than labor incomes, and therefore an appropriate implicit contribution rate in accordance with the Disney definition may be formally calculated as:

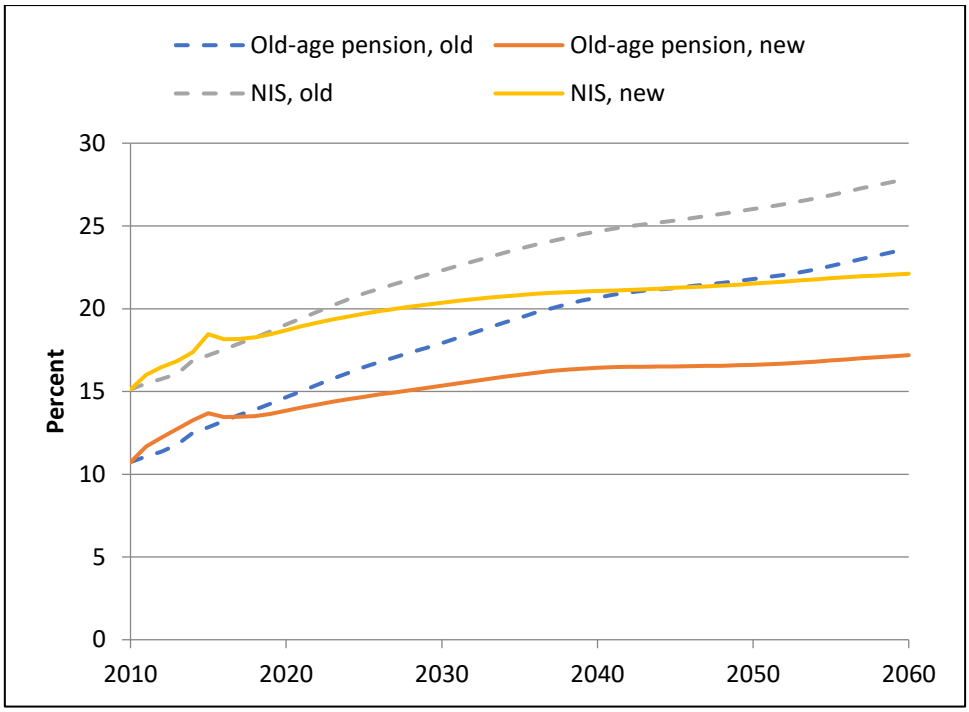
$$CR = \frac{PP}{(LI + \gamma * PP)} \tag{2}$$

The right-hand side numerator represents nominal public pension expenditures, whereas the denominator is the relevant tax base. The parameter γ represents the more lenient taxation of pension incomes compared to wage incomes and is approximated to about 50 percent under the current tax regime. The implicit contribution rate can be interpreted as the tax rate sufficient to finance pension expenditures, assuming that the entire tax burden of pension expenditures falls on labor and pension incomes.

Average implicit contribution rates dependent on the pension system are presented in Figure 4.2 for old-age benefits and NIS, also including disability benefits and survivors' benefits. Under the old system, the implicit contribution rate for old-age pensions would probably more than double from 2010 to 2060, from 10.7 to 23.6 percent. Under the new system, the implicit contribution rate is estimated to increase to 17.2 percent in 2060. Longevity adjustment is the main tightening element of the new system. Larger birth cohorts born after World War II replacing smaller cohorts as pensioners is the main reason for the continued growth in the implicit contribution rate toward 2040 under the new system. However, after 2040, further growth in the implicit contribution rate is rather modest. As shown by Figure 4.2, the implicit contribution rate with the new system will be higher than with the old up to 2017. This is caused by a high rate of claiming old-age pensions in the first years after the

reform, by persons continuing to work. It follows from the actuarial design of the new system that those who claim pensions early will receive lower annual benefits.

Figure 4.2: Implicit contribution rate (%) for pension expenditures under Norway's old and new pension systems



Source: Statistics Norway.

4.2. Fiscal sustainability

When claims on future benefits are not collaterized by real capital, and pensions are financed PAYG as a part of general government finances, an isolated discussion about sustainability of the pension system is not of major importance (recall the discussion in section 2.1). To ensure sustainability in public finances in Norway, politicians must decide whether increasing expenditures for old-age pensions caused by larger cohorts reaching retirement should be met by higher taxes or by tightening the growth in other public expenditures. The question of fiscal sustainability is most properly analyzed using a general equilibrium model (see Fredriksen et al. [2017] for an example). The approach has much in common with the analysis by Coile and Gruber (2003) of effects on the budget balance of a US Social Security reform. In both analyses, expansion of tax bases caused by stronger growth in labor supply is the most important general equilibrium effect.

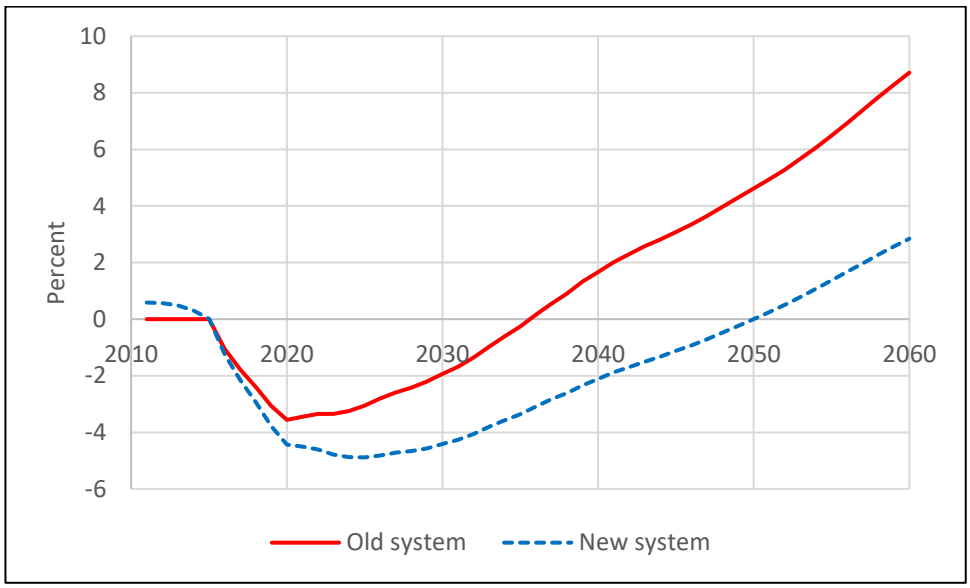
The general equilibrium model used by Fredriksen et al. (2017) is calibrated to detailed National Accounts of 2010, and the development of the main macroeconomic aggregates is in line with observations until 2013. Demographic projections are taken from the medium alternative of the population projections from Statistics Norway (2014). As mentioned above, growing life expectancy and the baby boom after World War II contribute to a strong increase in the old-age dependency ratio toward 2060. The increase is somewhat mitigated by net immigration, which was much higher after 2004 than in earlier years. Except from effects caused by the pension reform, it is assumed that both average future participation rates and working hours remain at their present levels in all population groups defined by gender, age, and education. For tax-financed production of individual services (child care, education, health services, and long-term care), the most recent observations of the gender- and age-specific ratios of users per capita are prolonged, whereas the corresponding service standards (defined as resources per user) in hospital services and long-term care are raised by 0.5 percent per year. This is far lower than the yearly growth up to the beginning of the 2000s. It is assumed that no improvements of standards occur in other individual tax-financed services.

The normalized fiscal gap is defined as the deviation between the simulated government budget deficit and the deficit consistent with annual use of petroleum revenues equal to the long-term expected real return of the Government Petroleum Fund relative to GDP for the mainland sector of the Norwegian economy. Figure 4.3 shows the normalized fiscal gap in the no-reform and the reform scenario. The scenarios are basically identical until 2020. In this period the fiscal rule allows successive cuts in tax rates or/and increases in government spending under the assumptions used. After 2020 the no-reform scenario shows a continuous need for reversing the increase in government net expenditures. After 2035 the fiscal gap with the old system becomes positive, passing 8.7 percent of the projected mainland GDP in 2060. The increasing fiscal gap is caused by population aging after 2020 and the diminishing inflow of government petroleum revenues to the Government Petroleum Fund.

From Figure 4.3 it is not evident that Norway needs a pension reform to avoid severe fiscal sustainability problems. The level of fiscal gap is negative in all years until 2035, and the fiscal future for Norway looks much brighter now than when the pension reform process was

initiated. At that stage the real oil price was expected to average less than one-half of the level assumed in this paper. On the other hand, the figure still may serve as a fiscal motivation for the pension reform, because stronger growth in government expenditures than in the tax base after 2020 may undermine the government's finances. The political pressure to increase standards in tax-financed services may also be higher than assumed, and petroleum prices may be lower.

Figure 4.3: Normalized simulated fiscal gap under Norway's old and new public pension systems (% of GDP for the mainland economy)



Source: Fredriksen et al. 2017.

Figure 4.3 shows that the pension reform is likely to reduce the growth in the fiscal gap significantly after 2020. The life expectancy adjustment mechanism is the most important factor. Under the new system, the normalized fiscal gap goes from negative to positive in 2050 and reaches 2.8 percent in 2060. This is 5.9 percentage points lower than in the no-reform scenario. The slight increase in the fiscal gap in the first four years after the implementation of the reform is due to the increase in early withdrawal of old-age pension benefits.

Sensitivity with respect to important assumptions are checked and documented in Fredriksen et al. (2017). Assumptions regarding longevity are very important for the tightening effects of the Norwegian pension reform. Because the reform almost neutralizes the effects on old-age

pension expenditures from further increases in longevity, effects from altering longevity assumptions are much smaller than in the no-reform case. But higher longevity still causes higher growth in tax-financed health and care. Reform effects on the normalized fiscal gap are also checked for different assumptions about delayed retirement in the new system. These assumptions also seem to be significant for the fiscal gap. The close relationship between employment and most tax bases in the Norwegian mainland economy is the main reason.

Growth in real wages in all sectors in Norway normally follows growth in labor productivity in the manufacturing sector exposed for foreign competition. Pension entitlements are also indexed by wage growth. Fiscal sustainability is therefore not much affected by growth in real wages and productivity growth in the private industries. Productivity growth in the public sector, however, has a positive effect on fiscal sustainability. Because a part of government expenditures is financed by returns from the government Petroleum Fund, growth in real wages may even harm fiscal sustainability because the relative importance of the Fund is reduced.

5. Adequacy and distributional effects

5.1. Adequacy

It is highly relevant to discuss whether the reform toward an NDC system will influence the adequacy of the old-age pension benefits in the future as well as the distribution of incomes. As mentioned in section 2.1, a heavy weight was put on these items in the discussion of the Norwegian pension reform. It is not obvious that this concern is necessarily in great conflict with the criteria for an NDC system, and the Norwegian reform of 2011 may at least be characterized as a major step toward NDC compared with the old system.

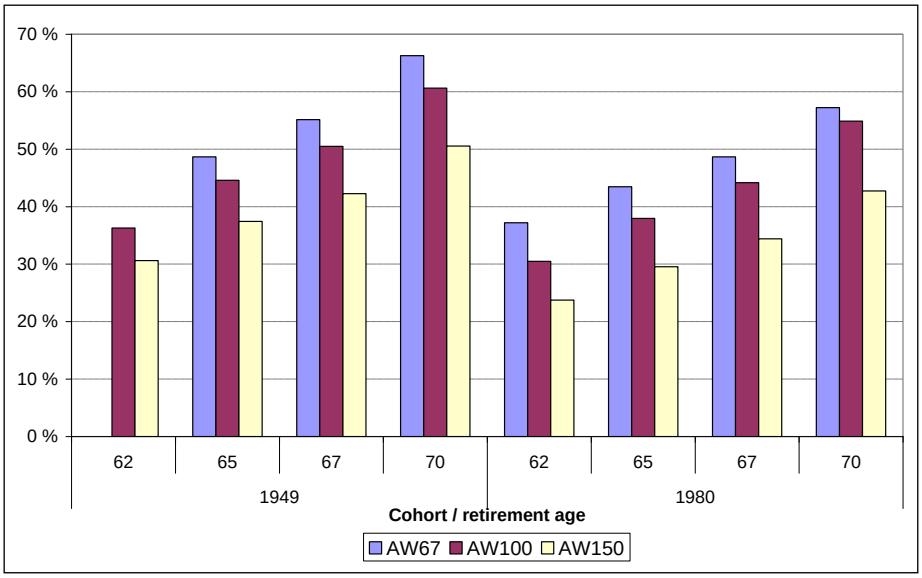
To maintain adequacy in the pension system for persons with low incomes, a guaranteed pension of 2 BPU for singles (corresponding to approximately one-third of average labor incomes) and at present 1.9 BPU for couples was established in the new system, at the same level as the minimum pension in the old system. Minimum pension benefits are not taxed,

and the disposable income for minimum pensioners is presently somewhat below the European Union relative poverty measure of 60 percent of the country median. However, caused by growing labor market participation among women during the past decades, the share of minimum pensioners is diminishing. The relatively high net immigration to Norway during the past decade may have an effect in the opposite direction. Immigrants' labor income is lower than that of natives (especially for women immigrated from Africa and Asia) and immigrants must be resident in Norway for 40 years to be entitled to a full minimum pension. The required number of residency years is lower for refugees. Because the guaranteed pension in the new system will be means-tested against 80 percent of the income pension as presented in Figure 2.1, this change will also result in a decreasing number of minimum pensioners.

Much of the discussion of distributional effects of the new pension system compared to the old has been limited to the accumulation rules and based on simplifying assumptions of a fixed level of income and 40 years of accumulation (recall Figure 2.1). It is evident that persons with somewhat above-average income will gain from the reform before taking the life expectancy adjustment and lower indexation of benefits in payments into account. Persons with low incomes may also gain from the new system of accumulation because minimum pensions were 100 percent means-tested against income pensions with the old system.

In Christensen et al. (2012), replacement rates for the old and the new system are compared at given wage levels, ages at withdrawal, and with 43 years of fixed labor income. Gross pension benefits in percentages of average wages are shown in Figure 5.1, which illustrates that replacement rates in Norway's new pension system rise rapidly when retirement is postponed. For a person from the 1949 cohort with average wages, the replacement rate is about 36 percent for retirement at age 62 compared to 60 percent for retirement at age 70. Replacement rates decline as the average wage increases, caused by the guaranteed pension and the ceiling on annual pension-qualifying income. For a given retirement age, the replacement rates for the 1980 cohort are much lower, giving strong incentives to postpone withdrawal when life expectancy increases.

Figure 5.1: Gross total public pension benefits under Norway's new pension system by cohort, retirement age, and income level (% of average wage level)



Source: Christensen et al. 2012.
Note: The calculations assume a working career of 43 years, life expectancy of 84 years for persons born in 1949, and of 87 years for persons born in 1980. AW100 indicates 100 percent of average wage, and so on.

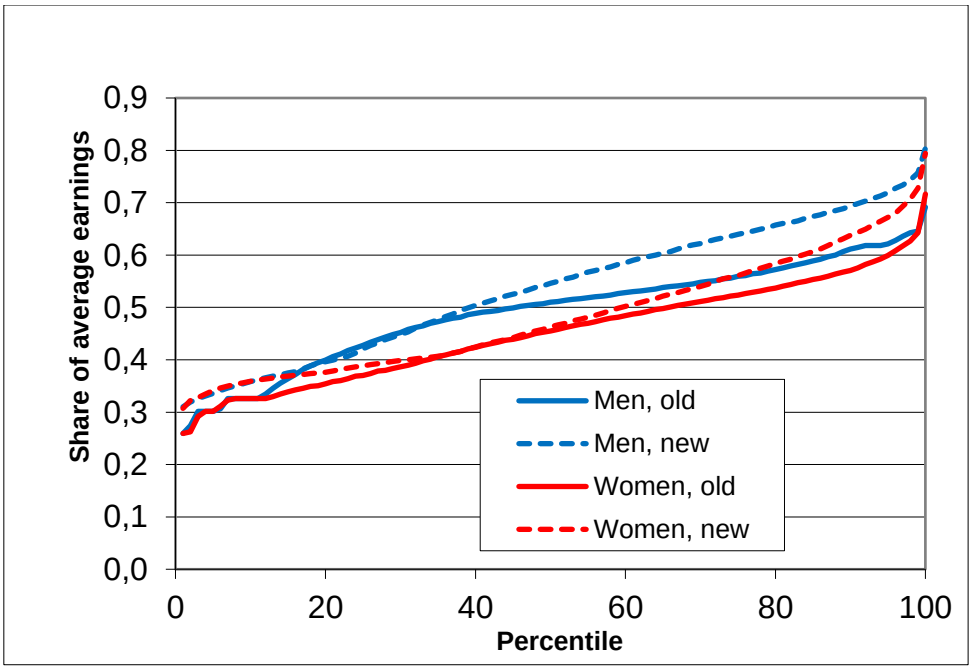
5.2. Distributional effects

Using the MOSART model, the distribution of old-age benefits between individuals is analyzed beyond the stylized calculations presented above. A microsimulation approach permits a more accurate description of the distributional consequences and opens the possibility to include behavioral effects. Even with this approach, it is convenient to restrict the analysis of distributional effects of the pension reform to pension benefits, leaving aside how the pension premiums paid by employees are distributed among individuals. The pension reform will also permit future lower taxes or a higher level of tax-financed government services than if the old system had been preserved. That is also likely to have distributional consequences that are not included in this analysis, since their inclusion would necessitate speculative assumptions about future policy decisions.

In the first round of analyses presented in Christensen et al. (2012) and Fredriksen and Stølen (2014), the focus was on the horizontal distribution of old-age benefits from the new model for accrual of entitlements in 2050 (Figure 5.2). By this limitation one can conveniently ignore indexation and actuarial adjustment through the flexible pension scheme. These elements of

the reform have only small effects on the horizontal distribution of pension benefits. If distributional analyses are made after behavioral effects are included, these analyses will be a poor approximation for changes in welfare because they also reflect a voluntary shift in retirement ages.

Figure 5.2: Estimated distribution of pension benefits in 2050 by income percentile and gender (share of average earnings)



Source: Fredriksen and Stølen 2014.
Note: Benefits are shown for a constant wage level before indexation and before exposure to the life expectancy adjustment divisor.

A more favorable model for accrual of entitlements, before considering lower indexing of benefits than wage growth and adjustments for increasing life expectancy, means that no one seems to be worse off. While the figure gives a good indication of horizontal distributional consequences, it is misleading regarding the level of entitlements. For the bottom two deciles the benefit level will somewhat improve. This is mainly because the old system applies 100 percent means testing of the special supplement against the income-based pension, whereas the guaranteed pension in the new system is means-tested against the income pension at only 80 percent. Because of more favorable accrual of pension entitlements for unpaid child care, the improvement between the tenth and the thirtieth decile is a bit larger for women than for men.

Accrual of benefits for old-age pensioners between the second and the fifth deciles is almost unaffected by the reform. The top five pension income deciles will experience an increase in entitlements, reflecting a somewhat increased accrual coefficient, and full accumulation of entitlements between 6 and 7.1 BPU with the new system, against only one-third with the old. The improvement for these deciles is larger for men than for women.

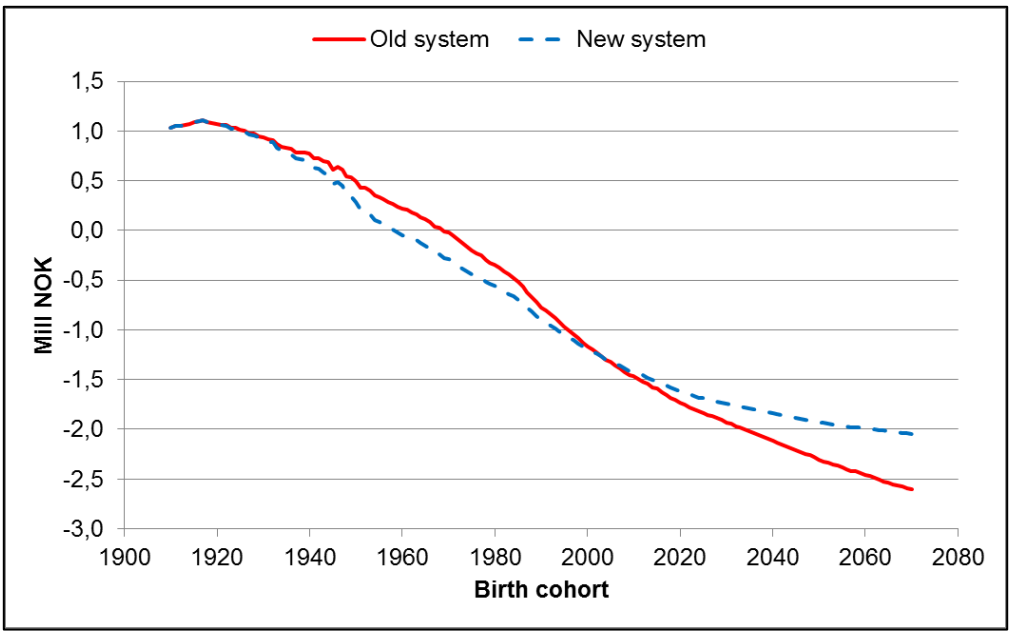
Christensen et al. (2012) also present overall distributional effects from the old-age pension system, including behavioral effects, by calculating total old-age pension benefits over the period as pensioner relative to total lifetime earnings, by income group and gender. The comparison is based on simulated earnings over the lifecycle for persons born during the 1990s and is illustrated for the old and new pension systems. Due to limited space, only a short summary is included in this paper.

When the components for longevity adjustment and lower indexation of benefits in payment are included, everyone receives lower total benefits relative to total lifetime earnings. Although persons with high labor market incomes seem to lose less from the reform than persons with medium incomes (Figure 5.2), NIS for old-pension incomes is still highly redistributive over the lifecycle. Total lifetime pensions are only around 20 percent of total lifetime earnings for men from the third decile and above and for women from the fourth decile and above. Because women live longer than men, and elements in the model for accrual of entitlements favor women, total pensions relative to total earnings are higher for women than for men for every level of earnings. Because of the minimum pension benefit, average total old-age pensions were almost equal to average total earnings for both men and women in the first decile under the old system. With the assumptions made, this ratio was reduced to only 60 percent under the new system. However, for the calculations presented in Christensen et al. (2012), the previously disabled, who account for about 33 percent of the population at age 66, were assumed to be exposed to the same longevity adjustment as others, from age 67. Therefore, longevity adjustments for the previously disabled were reduced to one-half of the adjustment of others as a preliminary solution. A continuation of this arrangement will obviously create tension in the new system because it increases incentives to become qualified as disabled before the age of 67.

Analysis of distributional effects from the pension reform is further extended in Nicolajsen and Stølen (2016), which shows that the results differ depending on how the effects are measured. One of the results is that total benefits over the period as old-age pensioner seem to be more equally distributed under the new system than the old. The apparent conflict between distributional effects measured in this way compared to the results referred to above is caused by the fact that many men with high education and incomes from age 62 or older combined full-time jobs with partial withdrawal of old-age benefits after the reform in 2011. These men will be punished with lower annual benefits, and because men with high education normally have higher life expectancy than average, they will get lower total pension payments than if they postponed withdrawal.

Fredriksen and Stølen (2017) calculate distributional effects of the old-age pension system and the reform by comparing the total expected discounted contributions to the system with the expected discounted sum of benefits for every cohort born between 1910 and 2070. Figure 5.3 shows that the cohorts who established the PAYG system in 1967 experienced a substantial gain by letting future generations pay.

Figure 5.3: Net discounted value at age 62 for old-age pension benefits and contributions, all inhabitants, net discount rate of 2 percent (million NOK in 2011 equivalent)



Source: Fredriksen and Stølen 2017.

With a positive net discount rate (the difference between the rate of interest and wage growth), the discounted value of contributions is higher than the future benefits for younger cohorts even if the amount of contributions is equal to the amount of benefits in fixed wage amounts. Because of the reform in 2011, future pension benefits will be tightened, but future contributions will also be reduced. With a positive net rate of interest, cohorts born between 1950 and 1980 are those who are most hurt by the reform, while cohorts born after 2000 gain.

6. Summary and loose ends

So far it seems that the reform of the Norwegian old-age pension system toward an NDC scheme in 2011 has successfully:

- Improved long-run fiscal sustainability.
- Created better labor supply incentives.
- Maintained much of the redistributive effects of the former public pension system.

The tightening components of the reform (i.e., the actuarial system with life expectancy adjustments and lower indexation of benefits in payments than average wage growth) will obviously reduce growth in old-age pension expenditures. Econometric analyses also confirm that the reform has created better labor supply incentives. By eliminating the means testing of benefits in the former early retirement schemes against labor incomes, the reform caused an immediate incentive effect to postpone retirement for those employed in the private sector. When life expectancy increases, the adjustment mechanism will obviously create incentives to postpone retirement, but a lot of uncertainty still remains regarding the magnitude of this effect. This also means large uncertainty about effects on future tax incomes.

Even though the pension reform almost counteracts the further increase in life expectancy, the reform does not prevent a further increase of the fiscal burden of old-age pension expenditures. Large cohorts born after World War II replacing earlier small birth cohorts is the main reason. Expenditures for public health and care services will also increase due to

population aging. When public expenditures increase faster than the tax base, even Norway's solid public finances may meet sustainability problems. These challenges will be visible in the coming years when further growth in government services, or further tax cuts, must be reduced to fulfil the Fiscal Policy Rule.

According to the goals of the reform, adequacy of benefits is maintained if withdrawal of old-age pensions is postponed, counteracting the life expectancy adjustment mechanism. Although the reform somewhat benefits persons with higher-than-average incomes, the main redistributive effects of the former pension system are maintained. And although cohorts born between 1950 and 1980 are those most hurt by the reform when comparing expected discounted value of pension benefits with expected contributions over the working period, the total effect on the distribution of lifetime incomes between cohorts is small.

Preserving important elements from the old occupational pension system for employees in the public sector up to now has been the main remaining challenge for the reform. A preliminary agreement between the government and the trade unions in the spring of 2018 about the main principles for adapting public sector occupational pensions to the reformed NIS indicates that this challenge may be solved. This agreement will increase incentives to postpone retirement for these employees and thus contribute to improved fiscal sustainability.

When about 40 percent of the Norwegian population is on disability pension at the age of 66, a more lenient system for life expectancy adjustments may have significant effects on government expenditures and may create incentives to become qualified as disabled before the age of 67. This effect may be somewhat modified by lost entitlements for the early retirement supplement and no accumulation of entitlements for old-age pensions if one becomes disabled after the age of 62.

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