The New Swedish Pension System
by Edward Palmer[1,2]

Overview of the Reform

In a series of steps in the 1990s, Sweden converted a two-tier defined benefit scheme from 1960 into a combination of notional defined contribution (NDC) pay-as-you-go and financial defined contribution (FDC) schemes. The reform was driven by the threat of future large contribution rate increases, redistributional unfairness in the design of the old system and a goal of providing a framework that would promote mandatory saving through the pension system – but with privately managed assets.

The overall contribution rate for the two schemes together is 18.5 % of earnings, with a split of 16/2.5 between the notional and financial account schemes. The annuity in both schemes is based on lifetime account values and life expectancy at retirement. Accounts in the NDC system earn an economic rate of return, whereas accounts in the FDC scheme earn a financial rate.

The reform creates mandatory insurance without redistribution – other than over the individual's own lifetime, and the redistribution from men to women embodied in the unisexual life expectancy factor used to compute annuities, both in the NDC and FDC schemes. Redistribution is financed through general revenues, instead of through the insurance system, with the most important example being a new guarantee benefit for low-income pensioners. Also, all non-contributory credits are financed with general revenues, and money is transferred to the NDC and FDC schemes to support these credits. As a part of the reform, a separate deduction for pensioners was abolished putting all forms of pension income and earnings on the same tax status.

The remainder of this paper focuses on why the reform was undertaken and how the new system is designed.

The Problems Confronting Reformers

In 1990, a government commission that had been working during the second half of the 1980s concluded that the defined benefit system then in place, which combined a flat rate benefit (*Folkpension*) with an earnings-related scheme (*Allmänna tilläggspension* - called *ATP*) requiring 30 years of coverage for a full benefit and basing the benefit itself on an average of a participant's best 15 earnings-years, was financially unstable. With

long-term rates of real economic growth considerably under 2 % these schemes would require such high contribution rates that it was unlikely that future workers would be able to honor "commitments."

In addition, numerous studies had demonstrated that the 15/30 year rule transferred money from blue-collar workers and others who worked long careers to persons with shorter earnings careers and steeper income profiles (Ståhlberg 1990). This is, in fact, a typical characteristic of schemes that base the computation of benefits on the best "x" years of some number of years that is less than lifetime earnings. These schemes are usually to the disadvantage of persons who start work early and have long working careers compared to those who enter the labor force much later after a period of higher education. This was why Swedish reformers focused the new system on lifetime accounts.

Increases in longevity were also putting financial pressure on the system. With every new projection, demographers were adjusting life expectancy upwards. In fact, unisexual life expectancy, based on actual outcomes, was increasing at the rate of about one year for every 10 years that passed. Put in another way, persons born in 1950, who would become pensioners in 2015, would live 6 years longer than persons who became 65 in 1965, shortly after the system was implemented (1960), and this trend was projected to continue, and perhaps become even sharper. To offset the effects of increasing longevity in the old system, the workforce would have to continue to grow and at a pace sufficient to finance all of these additional years. Sweden has had a birth rate of around 2 children per woman during most of the past century, which is just short of what is needed to reproduce the population, but far from enough to support an increase in longevity.

Since the 1960s, net immigration and the entrance of women into the formal workforce has accounted for labor force, growth. However, women born in the mid-1940s and later now work about the same number of years as men, so there can only be gains from encouraging both men and women to participate *longer* – or to accept that pension rights will have to respond to changing life expectancy.

The following table illustrates the problem. In 1960 there were about 3.5 persons contributing per old-age beneficiary, and about three contributors per old-age and disability recipient together. By the turn of the century, there were about 2.6 contributors per old-age beneficiary, but only about 2 workers per old-age and disability recipient together. By the year 2030, present demographic projections indicate that, with a retirement age of 65 as now, the ratio of old-age pensioners to contributors will be around 1.8, and that the ratio old-age plus disability recipients to contributors will be around 1.5.

There are two conclusions to draw from this. The first is that the *de facto* retirement age must increase, or benefits must be adjusted downwards with increasing longevity. The new NDC and FDC schemes do just this. The second observation is that there are too many people on disability, and that the upward trend in disability grants must be reversed. Older workers who too easily qualify for disability today must be kept in the workforce longer by offering them suitable work environments, including the option to work less than full time, and perhaps with more flexible schedules. (This would probably be welcomed by everyone in the labor force, and especially parents with young children.) Older workers will probably have to get used to smaller earnings gains, too, and to maintaining their human capital for much longer periods.

Dependency Rate. Pensioners as a percent of contributors.

Year	1960	1970	1980	1990	1997
1. Old age benefits	754	969	1382	1554	1592
2. Disability benefits	145	212	303	361	417
3. Contributors	2692	3422	4126	4387	4160
4. Dependency = 1./3.	0.28	0.28	0.33	0.35	0.38
5. Dependency = (1.+2.)./3.	0.33	0.35	0.41	0.44	0.48

Source. Palmer (2001).

Table 1 illustrates the financial problem resulting from both demographic and economic developments in the future. With no reform and a long-term real growth rate of 1 %, the contribution rate would have to be around 29 % in 2040, when persons born in 1975 – that is current new entrants into the labor force – would reach the age of 65. With 2 % growth in the contribution base, the picture is better, although there is still a considerable cost increase.

The reform stabilized the system. Table 1 shows two "options" – one with per capita wage indexation and one with wage sum indexation in the NDC scheme – and assuming the whole system is NDC with a contribution rate of 18.5 %. The figures assume there is no reserve fund, which there in fact is, so that the financial picture is better in practice. In addition, for purposes of comparability with the old system, the guarantee benefit, which is financed over the state budget, is included in the new system calculations.

Table 1. Contribution rate needed for balance without a fund.

Year	2000	2020	2040	2060
Old system				
1 % growth	16	24.1	28.7	29.8
2 % growth	16	20.6	22.5	22.9
New system - per capita wage indexation				
1 % growth	16	19.5	19.9	20
2 % growth	16	18.8	19.4	19.6
New system - wage sum wage indexation				
1 % growth	16	19.5	19.3	19.1
2 % growth	16	18.9	18.8	18.8

The first option in the table reflects the actual form of indexation chosen, although the second option would correspond to employing the balance index, which adjusts balances to the rate of return that the system can afford, and which is discussed at the end of this paper. The system goes towards its long run equilibrium contribution rate of 18.5 %, and, as time passes, the main difference between the long-run macro level   and the contribution of 18.5 % paid by participants is the cost of the guarantee – financed with separate revenues from the state budget.

The remainder of this paper focuses on the reform itself, and discusses some of the critical choices made by the Swedish politicians in constructing the reform. A lengthier discussion of the political process can be found in Palmer (2001).

Considerations in the Transition from the Old to the New System

How to make the transition from one to another system is one of the most difficult issues in reforming pension systems. People have acquired rights under the old system, and these should be honored. However, as in the old Swedish defined-benefit scheme, it can be difficult to give the rights a precise value since the system to be replaced requires knowledge of the entire working career to determine the outcome for the individual.

In the old Swedish earnings-related defined-benefit scheme, a full benefit was based on the best 15 of 30 years of coverage. It is usually not possible to identify the best 15 years of an individual's working career until one has the entire earnings record at hand. Furthermore, at any point in time, the majority of participants would not already have the necessary 30 years for a full benefit, and there is no way of knowing in advance whether they would actually fulfil the 30-year requirement before retiring. Many people are emigrants or immigrants and would not have been in Sweden all their lives anyway. All of these considerations together meant any attempt to calculate acquired rights in the old system at the time of the conversion to the new scheme would be based on some imprecise and arbitrary method.

In light of the difficulty of calculating acquired rights in the old system, in the reform proposal passed by Parliament in 1994, it was decided to create accounts in the new system based on computerized earnings and contribution records from 1960, i.e. the period for which records have been kept for the earnings-related ATP scheme introduced in 1960. The transition would then be matter of deciding which birth cohort would be the first to be covered in the new system and whether the transition should be gradual for some birth cohorts, using a weighted average benefits computed according to the old and new rules, or whether the first birth cohort covered in the new scheme should have its entire benefit calculated according to the new rules.

At the one extreme, one could argue in favor of implementing the new system beginning only with new entrants into the labor force at the time of the reform.[3] This would recognize the "contract " for workers already covered by the old system. This was not feasible, however, since one of the two major driving forces behind the reform was to create a financially stable system. Had the old system been retained, calculations of the

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[3] The Italian reform, legislated a year after the Swedish reform, chose transition rules along these lines.

future wage base and benefit commitments indicated that the ratio of payments to the wage sum would increase to 27-29 % (see Table 1), with the not so unrealistic long-run real growth assumption of one per cent.

One of the most important reasons to reform the old system was to achieve long-run financial stability. Starting the reform with new entrants would thus have been far too slow to obtain financial stability. So, it was not realistic to take this path. More importantly, it would be unlikely that future workers would be willing to support a system at such a high contribution rate. In other words, it was in any case questionable whether acquired rights implying such a high future contribution rate would be honored in the future if the slow transition model were to be adopted.

The reform had to work much faster to achieve the goal of financial stability in the nearest decades. The transition rule adopted was to base the old-age benefit on a weighted average of benefits computed according both the rules of the old and the new system. The reform specified in 1994 had a transition rule for persons born 1935-1953. As the reform process drew out in time, the first age cohort chosen in the legislation was the birth cohort of 1938. The cohort born in 1938 would reach the minimum retirement age of 61 in 1999, and the normal retirement age of 65 in 2003, and by 2003 this age cohort would be able to have a contribution record covering 43 years from 1960 – from age 22.

Note that prior to the 1960 reform workers were only covered by a low flat-rate benefit – the early counterpart of the guarantee in the new system. Consequently people really had no acquired rights derived from an earnings related scheme prior to 1960. For this reason, it did not seem unfair to base the new system on earnings starting from 1960. The final decision was that persons born in 1938 would receive 4/20 of their benefit from the new system and 16/20 from the old system; persons born in 1939 would have a new-to- old-system ratio of 5/20 and 15/20 etc. Persons born in 1954 and later are completely in the new system.

In retrospect, this transition scheme was unnecessarily slow. A complete transition beginning with a specific birth cohort, or a quicker weighting scheme (for example 10 years) would have been preferable. With the weighting model chosen, the small percentages at both ends (proportions of 17/20, 18/20,19/20 in the new system and 3/20, 2/20 and 1/20 in the old system, etc.) do not make a lot of difference for the average beneficiary. Furthermore, with real per capita wage growth of over 2%, all participants except those with short earnings careers are better off in the new system. In fact, the old system was not more generous than the new system under all circumstances, only under conditions that were very difficult or impossible to support financially – that is real long-term economic growth under 1.5% .

Finally, *the financial account scheme* started with contributions paid from 1995. This means that only new entrants into the labor force from 1995 are completely covered in the financial account system, although individual fund choices were postponed until the autumn of the year 2000. Persons born in 1938 have only very small financial account values since. Firstly, most of their earnings career had passed by 1995, and second, the transition rule puts them mainly in the old system. The inclusion of older birth cohorts in the FDC scheme was, thus, mainly symbolic. It would have been logical to start the financial scheme with a younger age cohort, and perhaps to have made it optional for

persons who because of their age at the time of introduction of the scheme, would not be able to accumulate large account values. [4]

Description of the New Pension System

Contributions from earnings

The total contribution rate to the earnings-related NDC and FDC schemes is 18.5 % (on earnings net of the deduction for contributions). This is split, between 16% for the NDC and 2.5% for the FDC scheme. Contributions are noted on the notional accounts and transferred to the financial accounts together with contributions financed from the state budget for non-contributory rights – for childcare, military conscription and higher education - and rights derived during periods covered by other forms of social insurance, the main examples being parental leave, sickness, unemployment and disability. For the transition cohorts, the contribution rates of 16 % and 2.5% are weighted by the percentage of participation of each in the new system in creating accounts.

Contributions are paid on earnings above the minimum level at which income must be declared for tax purposes (presently about 900 dollars per year) and up to a ceiling of about 29 000 dollars, using an exchange rate of 10 kronor per dollar. (The Swedish krona has fluctuated between 5.5 and 11.0 kronor per dollar since 1995 and is presently close to its least favorable conversion level.) The ceiling is rather low, which is connected to the fact that most Swedes also belong to a quasi-mandatory scheme that supplements the public schemes. From 2002, the ceiling is indexed to the per capita wage, thereby taking into account both price and real wage growth.

In principle, it would have been logical to simply have a *pension contribution rate* levied on individual earnings. The economic logic of this is that in the long run it is the employees who pay the contribution rate anyway, through foregone present or future increases in real wages. There is empirical evidence based on large changes in employer contribution rates in the 1970s that this has also been the case in Sweden.

According to the empirical evidence for Sweden (Palmer and Palme 1989), an increase in the employer contribution rate is eventually passed on to workers, through a combination of higher inflation and lower wage increases. It is also well known that in practice it is difficult to move from employer to employee contributions in a strict accounting sense, since what actually happens is determined by the response of employers in a process that also involves wage-negotiation dynamics. A "clean" shift from employers to workers means that there is no loss or gain for either workers or employers. In practice workers bear the downside risk of a shift away from employer contributions to workers. There is no practical method of assuring that all employers fully compensate their employees for a decrease in the employer contribution rate, although one might claim that locally in smaller workplaces individual workers may have direct influence on what happens, and in larger workplaces unions would supervise the conversion closely.

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[4] More recent reforms of a similar type, for example, in Latvia (Fox and Palmer 1999 and Vanovska 2001) and Poland (Choln, Góra and Rutkowski 1999).

Because of the fear that the conversion would not be perfectly executed, the major unions in Sweden protested, and their voices were heard. The Social Democratic Party, with strong blue-collar labor support among the electorate, favored employer contributions from the outset, whereas the governing opposition parties favored a complete switchover to an employee insurance fee. A compromise was reached at 50-50. In practice, almost all the conversion to employee contributions was implemented in the 1990s by reshuffling existing employee contributions, introduced largely for other purposes. As a result, to date there has been no conversion per se, although the exact goal of a 50-50 split between employee and employer contributions has almost been achieved.

Non-contributory rights and rights for periods of sickness, disability and unemployment covered by social insurance

Since both the NDC and FDC account systems are based on earnings, one of the more important aspects of the reform was to work out rules that provided compensation for time spent out of the labor force in conjunction with child birth. Child rights in the new system make a significant difference, too. Typically, a woman who is at home with children will be almost completely compensated in the new pension scheme – that is will have almost the same account values she would have had if she had full earnings from work during this period.[5]

Briefly, childbirth credits are acquired as follows. Credits are given for a maximum of four years per child, although only one credit can be earned at any given time (two children born two years apart give 6 credit years in total). The credit can be claimed by either parent, but to date is usually claimed by the mother. Claimants are entitled to the most advantageous of: 1) contributions based on 75 % of average earnings for all covered persons; 2) contributions based on 80 % of the individual's own earnings the year prior to child birth: or 3) a supplement consisting of a fixed amount, indexed over time to the (covered) per capita wage.

The cost of financing these credits will vary with the number and timing of births. Calculations performed in conjunction with the reform, based on a future birth rate of 1.8-2.0 children per woman and current patterns of taking leave from the workforce in conjunction with child birth indicate an average cost comparable to around 0.8 percent of the wage sum – or comparable to a contribution rate of about this size. Credits were granted retroactively from 1960. Individual calculations based on a sample of actual earnings records show that, all other things equal, older birth cohorts fared well in the new system due to this rule.[6]

Military conscription rights are based on the daily remuneration of persons doing their service, and educational rights are based on the size of public grants available for higher education. As a matter of principle, one can question the grant of credits for higher education, since the divided to higher education is supposed to be a higher level of human capital and, consequently, higher lifetime earnings than would be the case without this investment. On the other hand, in practice, blue-collar unions supporting traditionally male unskilled and skilled manual-labor occupations have been more successful than

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[5] This is examined in detail in the original calculations for the reform (*Reformerat pensionsystem* (1994).
[6] This is illustrated in the reform calculations (*Reformerat pensionsystem* 1994).

unions representing traditional female occupations that require higher formal education (for example, education, social and health care) in wage negotiations, and there is still little evidence that this will change. Given this lopsided picture of reality, it was easier to argue politically in favor of credits for higher education.

Periods of sickness, disability and unemployment covered by social insurance provide financed rights in both the NDC and FDC schemes. Benefits for sickness and unemployment are treated as earnings in computing contributions. The sickness and unemployment schemes pay for the employer share of the contribution for sickness and unemployment.

The question of how to integrate disability and the old-age scheme is one of the more difficult issues in creating account schemes. The reason is that most people will have worked and contributed through earnings from work during most of their lives. In fact, in Sweden, as in most of the OECD, most new disability grants come after the age of 55. In the Swedish reform model, an imputation of future earnings is made (based on an average of past years earnings), and the contributions calculated on the basis of this imputed income are transferred from the state budget into the NDC and FDC schemes. In this way people get credited account values just as when they earn income from employment, the difference being that the government pays the contribution rate through the disability scheme. This also helps to make transparent all the costs of the growing number of persons on the disability rolls.[7]

A disability benefit is converted into an old-age benefit at age 65 in the Swedish reform legislation. Since the lowest retirement age in the new system is 61, it is not obvious that the conversion should be made at age 65. Instead, it could have been made at the minimum pension age, *i.e.* 61. However, this would have given a very low benefit, and the goal of the Swedish reform was to provide adequate benefits. For persons with long earnings histories, and, in principle, where disability is an event outside the control of the individual, disability is the system alternative offered prior to the minimum age at which an old-age benefit can be claimed, whatever this age is.

In Sweden, and in similar settings where life expectancy from age 60 - 65 is high these days, and where policy makers increasingly want to promote the message that older healthy older workers can and should work longer, a better solution (in the Swedish health and life expectancy context) would have been to have set the *minimum age* for the old-age benefit higher. For example, if it had been set at age 65, people who could not work for medical reasons could (as in the present legislation) qualify for a disability benefit up to the age of 65, where the disability benefit would then be converted into an old-age benefit at the minimum age for claiming an old-age pension.

Setting a higher age for conversion of disability to old-age benefits, together with a high minimum age for claiming an old-age benefit provides a message: Disability is there for persons who cannot continue to work because of medical reasons. Persons who want to exit earlier will have to finance early exit with personal savings or through contributions made earlier to occupational schemes. Wherever the minimum age is set

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[7] There is a separate issue that is being discussed that has to do with the implicit use (by employers, but condoned by the "system") of disability schemes to push older workers out of the workforce. A consensus is beginning to emerge along the lines that this practice is too costly for society, especially in countries like Sweden that expect negative labor force growth in the coming decades. The option would be for employers to offer more flexible working conditions to older workers, and perhaps for older workers to accept changing work tasks that sometimes involve stagnating or lower wages.

for a claim to an old-age pension in the public scheme, it will nevertheless be important to consider coupling this age to life expectancy. This helps to keep the benefit higher at the low end of the scale for persons considering claiming a benefit as soon as they can.

It could be said in retrospect that probably too little attention was devoted to setting the minimum pension age in the Swedish reform, especially, seen against the backdrop of steady improvements in the health of persons under 75 and the fact that the country will to be confronted with a labor shortage from 2010, which cannot be helped by increasing the participation of women – as in some other OECD countries - as female participation has already reached that of men –which has been declining (Palmer 1999b).

Accounts

New accounts were created using information on earnings from existing accounts from 1960 for the NDC scheme and from 1995 for the financial account – FDC -scheme. The financial account scheme began with contributions being paid into an interim lump-sum account at the National Debt Office (Treasury) beginning with earnings from 1995.

The technical conversion of old-system accounts from 1960 into NDC accounts was completed in December 1998. At the same time, individual financial accounts were created for the contributions that had been paid since 1995. The first individual account statements were sent out in the spring of 1999, accompanied by an extensive mass media campaign. Since 1999, account statements are sent out to all participants in the spring of each year. Owing to a delay in the development of IT support for fund choices and accounting, the debut for individual fund choices in the financial account scheme was postponed from the early autumn of 1999 to the autumn of 2000.

Accounts values in the NDC and FDC schemes grow with:

- New contributions and transfers to the system for non-contributory rights and rights gained in connection with insurance periods for, for example, sickness, unemployment and disability.
- A rate of return based on the growth in the average wage rate in the NDC scheme and the return on the individual's fund(s) in the FDC scheme.
- Inheritance gains. Inheritance gains derive from the accounts of persons who die prior to the retirement age. They are distributed to the accounts of survivors in the same birth cohort as the deceased.

All employees and the self-employed are covered in both account schemes from age 16. This follows a long-standing Swedish tradition of truly universal social insurance coverage.

Benefits

A full or partial (25%, 50%, 75%) benefit can be claimed from the NDC and/or FDC scheme separately or together at any age from age 61. There is no upper age limit. A

benefit can be combined with continued work. Contributions paid on earnings from work always yield enhanced account values. A person who claims a partial benefit and/or combines a benefit with work will have the benefit recalculated, based on new account values, upon permanent retirement.

The annuity is calculated as:

Annuity = Account value / unisexual life expectancy from retirement
and

- in the NDC scheme assuming a real annual return of 1.6% during retirement
- in the financial account system taking into account the return on the funds of annuity recipients.

In the financial account system the participant can choose either a fixed or variable life annuity. The fixed annuity is obtained by transferring the participant's financial account to the PPM, the public agency responsible for the financial account scheme. The PPM then calculates an annuity using traditional actuarial standards. If the PPM is successful in determining the life expectancy factor and if its investment of participant assets yields a good return, there could also be a bonus given to participants. Participant can choose to leave their money in financial market accounts, in which case the annuity will be based on value the participant's account balance, and will be recalculated annually. This is what is called a variable rate annuity. Note also that a joint life annuity is also offered, although with a reduction factor of 14 % (for actuarial reasons). Within the FDC scheme, a survivor benefit can also be subscribed to during working years.

In the NDC scheme the permanent life expectancy factor is determined for a cohort in the year in which its members turn 65, even for individuals who claim a benefit before or after this age. The annuity in the NDC system is indexed to the CPI, however a yearly adjustment (up or down) is made for trend divergence of real per capita contribution growth from the growth norm of 1.6 % used in calculating the original annuity value. Even benefits of pensioners born 1937 and earlier are indexed from 2002 with inflation plus the difference between 1.6 % and the actual outcome.

Although early retirement is possible for persons born in 1938 in 2001, most persons born in 1938 are expected to claim benefits in 2003, which has been a "normal" retirement age for over two and a half decades, in part owing to contractual arrangements covering about 90 per cent of employees. In addition, a guarantee supplement cannot be claimed until the age of 65, which for persons born in 1938 is in the year 2003.

The following tables provide an illustration of how the system works and the replacement rates an individual born 1975 with earnings from age 22 can expect based on different market rates of and present life expectancy estimates for a person in the 1975 cohort. The tables are from Palmer (2000) and Palmer (2001b). These references also explain the

Table 1. NDC. An example with an individual who begins work at 22 and works every year until he/she decides to retire fully at sometime between age 61 and 70. Contribution rate on earnings=18.5 %. Values in US dollars.

Age	Earnings. Individual growth of 2 % per annum	Capital index. 2 % per annum	Capital balance. End of year	Unisex life expectancy. Swede born 1975	Annuity. Based solely on life expectancy	Replacement rate. % of earnings last year	Unisex life expectancy and 1.6% growth. Swede born 1975	Annuity. Based on life expectancy and a real return of 1.6%	Replacement rate. % of earnings last year
22	27061	1.000	5006						
23	27602	1.020	10213						
24	28154	1.040	15626						
::	::	::	::						
::	::	::	::						
::	::	::	::						
::	::	::	::						
60	57432	2.122	414368						
61	58580	2.165	433493	24.24	17096	0.30	19.69	21043	0.37
62	59752	2.208	453217	23.41	18516	0.32	19.14	22654	0.39
63	60947	2.252	473557	22.59	20061	0.34	18.58	24397	0.41
64	62166	2.297	494528	21.78	21746	0.36	18.02	26287	0.43
65	63409	2.343	516150	20.97	23588	0.38	17.45	28342	0.46
66	64677	2.390	538438	20.16	25603	0.40	16.88	30580	0.48
67	65971	2.438	561411	19.36	27814	0.43	16.30	33024	0.51
68	67290	2.487	585088	18.55	30262	0.46	15.72	35716	0.54
69	68636	2.536	609488	17.76	32944	0.49	15.14	38654	0.57
70	70009	2.587	634629	16.96	35927	0.52	14.54	41906	0.61

characteristics and logic of the new system in greater detail.

The older worker who postpones claiming a full benefit after age 61 benefits through three factors in the DC framework. The first is additional contributions. The second is wage indexation of accounts in the NDC scheme and market returns on FDC accounts not converted into benefits. The third is that life expectancy declines with increasing age. For the older worker, the latter two are generally more important. One of the advantages that can be claimed for defined contribution notional and financial account schemes is that workers can combine work (full or part-time) with a partial or full benefit from either or both of the social insurance schemes.

Most participants (85-90%) in the public scheme are also covered by an occupational scheme that provides a supplement to the public scheme. The supplement to a benefit for the individual varies among the major schemes. For example, an occupational scheme replaces earnings above the ceiling in the white-collar and public employee schemes, but also provides a supplement for persons below the ceiling, which is the emphasis within the blue-collar scheme. The occupational schemes for blue-collar and municipal employees converted to financial defined contribution schemes in conjunction with the reform of the public system in the 1990s. Table 2 takes this into account, by attempting to compute the overall replacement rate for a person who, in addition to the public schemes, has a DC financial supplement in an occupational scheme.

The outcome for the individual depends, not surprisingly, on the financial rate of return assumed for the financial account schemes. The table provides examples with rates of return of 2 %, 5 % and 8 %. A rate of 2 % is close to the real rate of economic growth in the past four decades, as well as the return on government bonds (which was probably closer to 3 % as the actual rate was artificially held down during a long period in the 1960s and 1970s). A market rate of return of 5 % represent a portfolio consisting of a 50-50 average of bonds and equities, and a rate of 8 % depicts an equity portfolio, with an average historic return for this investment form from the past half century.

In practice, both economic growth and financial returns have been volatile, and in any given period of 5-10 years the results can vary greatly, as is familiar. For this reason, it is advantageous for participants that they do not have to claim their NDC and FDC annuities at the same time – or in full. Even with a rate of return of "only" 2 %, the replacement rates are relatively high for career workers entering the workforce in recent years (and born 1975 in the example), according to Table 2.

Table 2. Replacement Rates. Annuity as a per cent of last earnings.

Age	PAYG. Contribution rate of 16 %	Public Second Pillar (2.5%) + Group Occupational (3.5%) Return of :			Total. Public PAYG and Second Pillar plus Group Occupational Return of:		
		2%	5%	8%	2%	5%	8%
61	0.32	0.12	0.23	0.47	0.44	0.55	0.79
62	0.33	0.13	0.25	0.52	0.46	0.58	0.85
63	0.35	0.14	0.27	0.57	0.49	0.62	0.92
64	0.37	0.15	0.29	0.63	0.52	0.66	1.00
65	0.39	0.15	0.31	0.69	0.54	0.70	1.11
66	0.42	0.16	0.33	0.76	0.58	0.75	1.18
67	0.44	0.17	0.36	0.83	0.61	0.80	1.27
68	0.47	0.18	0.39	0.92	0.65	0.86	1.39
69	0.50	0.19	0.42	1.01	0.69	0.92	1.51
70	0.53	0.20	0.45	1.12	0.73	0.98	1.65

Note. The individual's earnings are assumed to grow at a real rate of 2 % per year throughout the earnings career. The rate of growth used for indexation of capital in the PAYG system is 2 %.The pay-as-you-go, second-pillar and occupational annuities are all based on unisex life expectancy and a real rate of return on capital from retirement of 1.6 %.

The guarantee benefit

There is a guarantee benefit for the "lifetime poor, " available from age 65. The qualification age of 65 reflects the idea of a "normal" retirement age. This probably could have been set at an even higher age in Sweden, where life expectancy is high and increasing due to substantial improvements in health and work industrial environments.

Persons who cannot work for medical reasons will have disability benefits – including those born with incapacitating disabilities – so the guarantee will also apply even to disability recipients when their benefits are converted to old age benefits, also at age 65. The guarantee benefit is an inflation-indexed supplement (with a specified maximum) to the total benefit provided by the NDC and FDC earnings-related schemes. The guarantee is financed with general revenues.

Together with a means-tested housing allowance, it will usually be sufficient to meet the subsistence norm established by the National Welfare Board. Since it is prorated with regard to years of residence, with 40 years needed for a full amount, it is possible that late-working-life immigrants may nevertheless fall under the subsistence norm and be in need of social assistance, provided by local authorities.

The initial level of the guarantee was set at a high enough gross value to align it after-tax with the commensurate benefit in the old system. Since the level of the guarantee is determined by Parliament, whether or not it increases in the future is a social policy issue. The advantage of separating the guarantee from the NDC and FDC insurance schemes is that politicians are given free hands to change it when they desire, without affecting the insurance schemes.

Reserve funds in the NDC scheme

The NDC scheme has a buffer fund that arises due to fluctuations in the sizes of birth cohorts, but which will also pick up remaining imperfections in the practical design of the scheme. Reserves, accumulated within the framework of the old system, were approximately 450 billion kronor at the end of the year 2000. (GDP was around 2100 billion kronor.) These reserves will help in financing the transition period – when the large cohorts born in the 1940s are only partially within the new system.

The Balance Index - Financial stability and the NDC Scheme

In principle, the NDC system is financially stable if the figure for life expectancy used in computing NDC annuities is on average correctly estimated, and if the rate of return in the account scheme follows the rate of growth of the contribution base. In addition, reserves in the demographic buffer fund would need to earn a rate of return also equivalent to the rate of growth of the contribution base.

These conditions are both necessary and sufficient even to provide an annuity that is indexed to economic growth, i.e. the rate of growth of the contribution base, as long as the contribution base is not *forever decreasing*. With a forever declining workforce, there will be a tendency towards negative imbalance, the extent of which depends on the strength of the downward trend (Palmer 1999a). With a gradual decline, the problem is not especially serious, although it must be dealt with.

Of course, the annuity in the NDC scheme does not necessarily have to be indexed to economic growth, although the argument in favor of doing so is that there will normally be room to do this and that this is a way to distribute the economic dividend

(positive or negative) generated over and above productivity growth. In principle, an actuary could also calculate the NDC annuity according to normal actuarial standards.

In the Swedish scheme, the life expectancy factor used in calculating the annuity is not a forward-looking cohort life expectancy estimate, but an estimate based on the outcomes of the immediate past for older cohorts. In practice, this generosity comes at the expense of coming generations, and could be avoided by calculating the annuity factor with a cohort-based forecast.[8] Swedish politicians have also chosen to index accounts and annuities with the change in the contribution wage per contributor, i.e. the per capita wage. The choice was based on the desire to give pension capital and, hence, pensions, a rate of growth commensurate to average wage growth. If the scheme is only subject to pure demographic cyclical variation, or a trend increase in the labor force this will never create financial stability problem. This does not work financially, however, if the workforce declines. Put in another way, the scheme can not afford to index with per capita wage growth if the labor force is diminishing in size, putting a negative drag on productivity growth (Palmer 1999a).

The final bolt in the Swedish NDC system is the balance index, designed to compensate for any remaining sources of financial imbalance. The balance index works as follows (Settergren 2001). An evaluation of the present value of assets and liabilities is made, based on current information rather than a forward looking projection – the reason for this is to disjoin the index from political judgments. When the current valuation of assets falls short of the valuation of liabilities and the index falls under unity, both account values and benefits are deflated by the difference between the actual index value and unity. Positive indexation occurs in a recovery until the balance index once again reaches unity. Simulations performed by the National Social Insurance Board in support of the legislation of this index show that this method works satisfactorily under a wide variety of system chocks.

Conclusions

Sweden introduced what this author and others claim is a paradigm change in our way of viewing pension schemes. This is not the place to discuss all of the ramifications of this change. The meaning of NDC is discussed and elaborated in Góra and Palmer (2001) and the important role of the balance index as the final link in the NDC scheme is discussed in Settergren (2001).

The paradigm change involves separating out social policy from social insurance. Social insurance is designed as a traditional defined contribution insurance. The NDC and FDC schemes have a clear advantage over the traditional defined benefit schemes of social security that tend to mix the goals of redistribution and insurance in the same benefit package, but sometimes in a way that actually leads to perverse redistribution, as in the old Swedish system.

Notional accounts (PAYGO) can be combined easily with financial accounts, to avail the advantages of both. The result of moving in the direction of DC schemes is that the risks within the system are moved from future workers to present workers while they are working. In other words, the burden of increasing longevity and perhaps trends

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[8] The Latvian version of the Swedish reform does this, for example.

towards earlier exit from the workforce is no longer passed forward to coming generations. The rules governing commitments are clearly specified, and the burden of acting is placed on workers while they are in the workforce.

Finally, the introduction of NDC and FDC accounts together with equal tax treatment of earnings and pensions helps reduce the implicit tax force on remaining in the workforce that characterizes many schemes. Sweden, along with Japan and the US, was already among the leaders in the OECD in retaining older workers in the workforce (see Gruber and Wise 1999 and Palme and Svensson 1999), and the new reform moves Sweden even farther in the direction of removing barriers to increasing the de facto age of exit from the workforce.

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