Political economy and pensions in ageing societies – a note on how an "impossible" reform was implemented in Sweden

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Abstract
Ageing puts a strain on most countries' pension systems; forecasts show them to be more or less unsustainable. Evidence from social choice research, theoretical as well as empirical, does not seem to offer a way out of the dilemma, as the median voter will resist a reform. Despite this, Sweden has implemented a major reform, supposedly making the system sustainable. The question in this paper is thus: how was it possible to launch such a reform in Sweden? The analysis is based on majority voting models. Important explanatory factors are age structure as well as the age of the median voter; both of these go against the probability of a reform. A focus on age structure in combination with transitional rules and specific features of the reform may provide an explanation.

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Political economy and pensions in ageing societies – a note on how an ”impossible” reform was implemented in Sweden.

1. Introduction

Most countries have pay-as-you-go, defined-benefit pension systems, making them sensitive to the foreseen demographic changes of ageing populations. While reform proposals in other countries have been met with fierce resistance and large demonstrations by the “grey panthers”, Sweden has implemented a major reform, supposedly making the system sustainable.. A quick look into what can be expected from a social choice perspective tells us that the reactions in these countries are the expected ones, and the successfully implemented reform in Sweden is a much more unexpected outcome. The question in this paper is thus: how was it possible to launch such a reform in Sweden when it, so far, has not been possible in other, similar countries?[1]

The paper is organised as follows. The next section is a brief review of ageing and pay-as-you-go pension systems. Swedish demographic development and pension history during the 20th century confirm these results, as is shown in section 3. Sections 4 and 5 discuss expected voting behaviour in response to the reformed system. Section 6 concludes the paper.

2. Pay-as-you-go, ageing, voting and rate of return

Population ageing means that the old age dependency ratio will increase. Table 1 shows the dependency ratio for some European countries.

[1] Since the Swedish reform there have been similar reforms in other countries. Poland and Latvia are two examples, both being transition economies with the old pension systems broken down. Italy has a reformed system similar to the Swedish one. However, the transition period is so long and “extra benefits” promised so large that its sustainability is questioned (Franco, 2002)

Table 1. Number of people 65 years and older in relation to number of people aged 15-64 (16-64). Per cent.

	1985	2002	2020**	2050**
France	19.6	24.9*	32.6	46.0
Italy	18.6	26.9	36.7	61.0
Spain	18.6	25.0	30.6	60.0
Sweden	26.7	26.5	34.5	42.0

*) 2001. **) Forecasts.
Note that these figures are an underestimation when it comes to sustainability of pension systems as entry to the labour market is far later than at the age of 15, and that exit from the labour market to a high degree is earlier than 64.
Source: OECD Labour Force Statistics (2003); Eurostat

Pay-as-you-go pension systems' sensitivity to demographic changes is well-known and follows from the budget restriction of such a system:

$$q = b/w \; R/L \qquad (1)$$

where q is the contribution rate, b average benefit, w average wage, R number of pensioners and L number of workers. b/w is the replacement rate and R/L the old age dependency ratio. From an individual point of view (or a micro perspective) R can be interpreted as number of years as a pensioner and L as number of years working in the labour market. Table 2 uses the formula to show the importance of the foreseen changes.

Table 2. The required contribution rate at different combinations (assumptions) of the replacement ratio and the old age dependency ratio.

		R/L			
		0.33*	**0.40**	**0.50**	**0.60****
b/w	**0.50**	16.5	20.0	25.0	30.0
	0.60	20.0	24.0	30.0	36.0

*) corresponds to 45 years of work (20-64) and 15 years as a pensioner (65-80).
**) compare the forecasts for Italy and Spain in 2050.

Combining the information in tables 1 and 2, there is no doubt there will be a pressure on the pay-as-you-go pension systems.[2] Despite this anticipated strain, majority voting is predicted

[2] Note that the figures in table 1 show 'number of persons' while it is labour force / working hours that are of interest when discussing pension systems. Using 'labour force' instead of 'number of people' gives a ratio of 35 instead of 27 for Sweden in 2002. Deducting those in the labour force being from work (due to unemployment,

not to favour a reform. The standard setting of a voting model is as follows: assume 3 co-living generations, young (y), middle-aged (m) and old (o). People work during their first 2 periods of life and are retired during the last one; y+m=L and o=R in eq. 1. While working, people pay contributions, q, to the pension system. The sum of contributions (q w L) in one period is used for expenditures on pension benefits (b R) in the same period. The rate of return on contributions is the growth rate, i.e. changes in productivity (w) and demography (R/L) (Samuelson, 1958).

When voting on the size of the system, i.e. on the level of q, each generation maximises (remaining) lifetime utility.

Maximise V_i (q) (2)

V_y (q) = U_1 (1-q) + U_2 (1-q) + U_3 (G 2q)

V_m (q) = U_2 (1-q) + U_3 (G 2q)

V_o (q) = U_3 (G 2q)

with w standardised to 1 and where G is the population growth rate. Differentiation with respect to q gives

$$q_y < q_m < q_o;$$

i.e. the most preferred contribution rate increases with age (Browning, 1975, Sjoblom, 1985).

The young generation has a full lifetime ahead and votes for an optimal contribution rate, q* (= q_y), from a lifetime perspective. For the middle-aged generation, the payments during their first period are sunk costs; even high contributions during their remaining working period will be low in relation to expected benefits. Thus, they vote for a level beyond the lifetime optimal one. This goes even more for the old generation. The median voter – the one with the decisive vote – belongs to the middle-aged generation and will vote for an expansion, not a retrenchment, of the system.[3]

Ageing triggers two opposite forces, making the effect of ageing on a pay-as-you-go system ambiguous. First, the age of the median voter increases, further strengthening the expansive

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sickness and so forth) gives a ratio of 44. Using the last definition, prognoses for 2020 and 2040 give ratios of 60 and 70 respectively SCB, 2005).

[3] The analysis is often conducted under the assumption that voting takes place once and for all and that the outcome will be binding for future generations. This is of course not possible in a democracy but it turns out that

tendency inherent in democracies with pay-as-you-go systems. Second, ageing depresses the growth rate, i.e. the rate of return in pay-as-you-go systems, making a transition to a funded system an attractive option, especially in a life cycle perspective. [4]

So far, according to empirical results, the former tendency seems to have been the stronger:

"The most striking result ... lies in the strong and significant positive effect of median voter age on program size. ... one year adds half a percentage point to the GNP share of social security benefits." (Breyer & Craig, 1997, p. 719)

3. Pension history in Sweden

The Swedish experience strongly confirms these results, and its pension history follows closely the results of both theoretical (Browning, 1975, Sjoblom, 1985) and empirical (Breyer & Craig, 1997) research. The first Swedish pension system was introduced in 1913, starting at a low level as a funded defined contribution system with a small means-tested defined benefit part. With the introduction of the basic pension, decided on in 1946, the defined contribution feature was replaced by a defined benefit one. The latest reform reverses these features once again. In table 3 only the main events in the pension history are shown. Lots of minor steps, all expanding the benefits, were taken in-between. So, during the 20th century there was expansion at an increasing rate up until the latest reform, launched in 1994, and implemented in 1999.

Table 3. Main events in Swedish pension history, share of young people and share of elderly in the population and the age of the median voter in selected years.

	Pension benefit in relation to average industrial wage	20-25 / 20 +	65 + / 20-64	The age of the median voter (20 +)*

the results of the simple set-up of the voting model are not jeopardised by these assumptions. See for example Sjoblom (1985).

[4] The ambiguity may not be a real one even with r > g as the rate of return in the pay-as-you-go system may be higher than the one in a funded system for the median voter:

$$g(i) > r > g(j); \quad \text{for } i = m, m+1, \ldots D \text{ and } j = 20 \ldots m-1$$

meaning that everyone who is m years and older has a rate of return that is higher than the rate of return in the capital market, while those who are younger get a lower return. D is time of death.

1901-1910 Decision on the introduction of a general old age pension.	11 %	14.0	16.7	40
1945 Decision on a basic pension 1946	16%	10.8	15.9	42
1957 ATP-referendum, ATP being a supplementary pension based on the loss of income principle.	35%	8.4	19.0	45
1969 Pension supplements (= an income-tested increase in basic pension) are introduced		11.7	22.8	46
1975 Retirement age lowered from 67 to 65 in 1976	40	9.4	26.4	46.5
1990 The Pension Committee's report showing the system's unsustainability and unfairness; no measures suggested.	65	9.3	30.8	46
1994 Parliament decides on a new pension system	>65**	8.8	30.2	48
2000 A new pension system in function	50-60%	7.7	29.4	47.5

*) 1901-1910 there was no universal right to vote in Sweden. The median age is therefore calculated for men. The voting age was lowered during the 20th century, from 21 years of age to 18. Despite this the median age is calculated on those 20 years and older.
**) In the early 90s there was an economic crisis in Sweden with negative economic growth over a number of years. The pensioners were not hurt by the crisis.
Source: Kruse (2003), Kruse (1994).

According to Breyer & Craig (1997) most changes in pension systems are passed in parliaments without big political battles.[5] They maintain that explanations of pension reforms lie in the age structure. In *table 3* the age structure in Sweden is shown at points in time when important changes took place. Two age groups are shown, the young ones having no, or only a few, years in the labour market, and the group already pensioners. As discussed in section 2, the first group is expected to vote for an optimal range, while the second one votes "the more, the merrier". The development of the age structure, with the youngest age group almost halved, the oldest one increased by more than 75% and the median voter age gone up by 8 years, gives the background to the changes in pensions expenditures, totally in accordance with expected outcome; an expansion even further beyond the one in the citation above. The expansion, in combination with the design (DB, price-indexed pay-as-you-go system) and

ageing made the old system unsustainable. However, even so, as discussed in the previous section, a public choice analysis of public pensions shows that an over-expanded system is an equilibrium when majority voting is applied. Moreover, this equilibrium is stable and will be hard – impossible? – to reform in a democracy (see for example Browning, 1975, Cremer & Pestieau, 2000, Sjoblom, 1985, Verbon, 1993).[6] Still, a new system was introduced.

4. Who would vote for the new system?

A comparison of the net present value in the new and the old systems for each age group (and socio-economic group within age groups) would answer the question. These calculations are still to be done. Pending these results we tentatively discuss what might be expected.

The most important differences between the old and the new pension systems are the change from a price index to a growth index, and the change from a defined-benefit to a defined-contribution system.

There is no obvious conclusion to be drawn on voting behaviour concerning the index change. With a positive growth rate and a price index, the pensioners' standard of living falls behind that of the working generation, and vice versa. Thus, the income distribution between pensioners and the working generation is determined by the growth rate and not by what is considered an optimal lifetime distribution of consumption. With a growth index pensioners and workers share the fruits of good years and the burden of lean years. So, voting behaviour depends on how the voters perceive the risk of low/no growth. To my knowledge, there is no empirical evidence of age differences in risk perception vis-à-vis future growth; however, being close to retirement might increase risk aversion, making older people more inclined to vote for keeping the price index. Besides, as the growth index makes the system robust to economic and demographic changes, young people may have stronger preferences for the growth index than older persons, as they are to live a whole life in the system. Anyhow, there is no solid information on whether different age groups have different preferences with respect to the indexation method.

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[5] This is very much true for the Swedish pension history. All reforms but the ATP-reform in the late 1950s were broadly agreed upon. See Kruse, 2003.

[6] See however Sinn & Uebelmesser, 2002, where the indifference age is calculated for a specific reform proposal and compared to the median age. Until around 2015 there will be a reform possibility in Germany; thereafter gerontocracy will prevent a reform.

With a defined-benefit design, the contribution rate has to be adjusted to changes in economic conditions and demographic structure. In order to pay for the "promised" benefits in the old system, it was forecasted that the contribution rate would have to be raised from around 25% of wages in the middle of the 90s to around 40% in the year 2015 (SOU 1990:76). All young people should thus expect to pay high contributions without receiving higher benefits. These are expected to vote in favour of a reform that retrenches the system, in perfect accordance with Browning (1975). However, also in accordance with the median voter model, the older generations will resist a reform. This also goes for the major part of the working generation; their paid contributions are sunk costs and they prefer higher contributions for the short remaining working period in order to get the higher "promised" benefits. Furthermore, note that the median voter has only 17-18 years left to pay (high) contributions, assuming a "normal" retirement age of 65, but as much as around 20 years to receive benefits as a pensioner.

Thus, the reform will not gain support from a majority, unless some groups can form winning coalitions or the older generations are altruistic towards their children / grandchildren.[7] However, a new defined-contribution system has been introduced, in which the contribution rate is fixed at 18.5% of the wage and the benefits will be determined as described below.[8]

The major part of the new system is what has become known as a notional, defined contribution system (NDC).[9] In an NDC system, pension rights accrue in an individual (notional) account. Each year's contributions (q * y) are added to the account and indexed by the indexation number. If the working period is from year e to year x, the k^{th} individual's accrued pension rights are

$$NW_k = q \sum_{j=e}^{x} y_{k,j} \prod_{j=e+1}^{x+1} (1 + \lambda_j)(1+z_j) \qquad (3)$$

[7] Inrecent decades there has been an increase in bequests. Perhaps this can be interpreted as awareness among the older generation of an over-expanded pension system, for which they compensate their heirs. Note, however, that the distribution of bequests is probably more uneven than the distribution of gains from a pension reform.
[8] The relatively low contribution rate is partly explained by the fact that a basic, guaranteed pension is financed over the state budget and that the disability pension, that used to be a part of the old age system, has been transferred to the sickness insurance.
[9] The description here captures the main features of the Swedish system without going into peculiarities of less importance for this paper.

where NW is notional pension wealth and $y_{k,j}$ is the individual's wage income in the j^{th} year, determined by working hours as well as hourly wage (= $h_{k,j}$ $w_{k,j}$). The indexation is by $(1 + \lambda_j)(1+z_j) = (1+g_j)$, which is the interest on the account, where λ_j is population/labour supply change and z_j the productivity change.

The yearly pension benefit is determined at the date of retirement as notional wealth divided by remaining life expectancy

$$b_{k,\, x+1} = NW_k / \eta_K \qquad (4)$$

where η_K is life expectancy estimated for k's cohort K at the date of retirement. b is thus an actuarially calculated annuity (possibly apart from the risk difference between the sexes and socio-economic groups), which in the NDC system will be indexed by the same factor as the accrued contributions. The options open to an individual to affect his or her pension benefit are through e, y (=hw), and x, while λ and z obviously are exogenously determined.[10] Increased longevity means an increase in the denominator, the "division number" (η_K); the pensioners will bear the cost of demographic pressure, caused by increases in life expectancy through reduced annual benefits.

With this design there is a tight connection between the individual's contributions and benefits received. In the old system, the DB-formula calculated benefits on an average of the 15 best years. 30 years were requested for full benefits with a reduction of 1/30 for each missing year and no increase in benefits for extra years. Contributions were, however, paid during all years. People with flat-rate life income profiles and many years in the labour market (mostly blue collar workers) were disadvantaged, while people in career jobs were favoured. Also, non-market work and leisure were favoured in the old system. This means that blue collar workers (at least young ones) should be in favour of the reform, while white collar workers (especially older ones) should resist the reform. In both systems there is a guaranteed minimum benefit at approximately the same level.

5. Honouring the 'social contract'. Transition rules as an explanation for support of the reform

In order to make the introduction of a new system neutral between cohorts, the new rules could be gradually introduced, only letting new entrants follow the new rules. This means a long transition period with the obvious risk of a breakdown of the system meanwhile. The Swedish system was introduced faster with the following transitional rules; those born 1937 and before (57 years and older at the time of reform decision) belong entirely to the old rules, born between 1938 and 1953 belong partly to the old and partly to the new system, while those born 1954 and later belong entirely to the new system. In table 4 the population is divided into these transitional groups. In addition, the proportion of working life that had passed when the system was decided on is shown. That proportion is a measure of the sunk costs of contributions made and of remaining working time during which adaptation of labour market behaviour to the new rules is possible.

Table 4. The Swedish age structure in the year 1994, and transitional rules.

Born in the years	Age in 1994	Total number, thousands. (share of the electorate)	Share in the old / share in the new system	Proportion of working life** passed when the system starts in 1999.
1976 / 75	18-19	212, (3.1%)	0 / 100	7%; 9%
1974 / 70	20-24	585, (8.5%)	0 / 100	11%; 20%
1969 / 65	25-29	637, (9.3%)	0 / 100	22%; 31%
1964 / 54	30-40	1 318, (19.2%)	0 / 100	33%; 56%
1953 / 44 1953 1950 .. 1944	41-50*	1 275, (18.6%)	 1/20-19/20 4/20-16/20 .. 10/20-10/20	58%; 78%
1943 / 38 1943 .. 1938	51-56	626, (9.1%)	 11/20-9/20 .. 19/20-1/20	80%; 91%
1937 / 30	57-64	661, (9.6%)	100 / 0	93%; 100%
1929 and before	65 -	1 540, (22.5%)	100 / 0	100%
Total number of voters		6 854, (100%)		

*) in this age group the median voter is found.
**) assuming a working life to be from the age of 20 to the age of 64, i.e. 45 years.
Source: SCB, 1995.

[10] Note specifically that λ will be influenced by the individual's behaviour; however, the individual will not take this into account in her/his decision as the effect is negligible, a 1/N-effect. This external effect is analysed in Kruse & Nyberg, 2004.

For a person born in 1944 the pension benefit will be determined 50-50 by the old and the new rules, while 78% of their working lives has passed.

4.1. Expected voting behaviour in different groups

Combining the age groups in table 4, the transition rules and the features described in the previous section gives an indication of the expected voting behaviour of different groups.

The oldest; 57 years of age and older

The age groups 1937 and older, 32% of the electorate, belong to the old system. Was there any reason for this group to vote against the proposal? Only if they expected the benefits to be increased in the old system. This probability was probably assumed to be low, considering the alarming reports on unsustainability, and despite the experience of the old system's history with more than one expansive decision a year since the late 1960s.

For those with low own pension benefits the guarantee pension replaces the basic pension, being approximately at the same level and also being price indexed. For those with benefits from the ATP-system a so-called adaptation index is expected to increase benefits compared to what would have happened under the old price index rule. This is true if economic growth is positive and above 1.6%; a lower growth rate would lower the benefit compared to the old system. Such a low growth does not seem to be perceived as a likely scenario (despite the experiences in the early 1990s with negative growth!)

The youngest; 18-24 years of age

So, the oldest could be supposed to vote in favour of the reform. This goes for the youngest as well. The age groups born 1970-1976 constitute another 12% of the electorate. The youngest do not have any vested interests in the old system; they are promised a sustainable system with lower contribution rates than they would have had to pay under the old system.

However, within this group of young people, people from different socio-economic groups might vote differently. The old system, with its 15/30-year rules that favoured people in career jobs and those with a short working life, might induce those expecting to belong to these groups to be against the new system. However, there are counterbalancing features: first of all a sustainable system with a lower contribution rate already mentioned; secondly there is

a ceiling on benefits both in the old and in the new system. In the new system the ceiling will be indexed by growth which is of special interest to those in career jobs.

Another reason for voting against is that for the oldest in the group as much as 20% of their working lives may have passed, during which the person may have adapted her/his labour market behaviour to the old system.

If the two groups so far analysed vote in favour of the reform, this represents 44 per cent of the electorate.

Lower middle age; 25-40 years of age

The next two groups in table 2 belonged to the lower middle age when the new system was passed in the Parliament. They were born between 1954 and 1969; they constitute 29% of the electorate. They are not affected by the transition rules although 22 to 56% of their working lives had already passed at the time the system was introduced; i.e. no adaptation to the new rules are possible for a great part of their working lives.

The DB formula in the old system calculated the benefit based on the 15 best income years (incomes above a floor and below a ceiling). Furthermore, 30 years of payments gave a full pension; more years did not add to the benefit, fewer years reduced the benefit by 1/30 for each missing year. If people (women?) in these cohorts adapted their behaviour to these rules they will come out badly in the new system. With the DC formula, benefits are determined by all income (below a ceiling) during all years.

It turns out that the expected outcome for these cohorts compared to the outcome for the cohorts comprised of the transitional rules depends on the future growth rate. With a yearly growth rate of 2% these cohorts get higher benefits than the older working cohorts. At a growth rate of 0% the opposite holds (RFV, 1999). We should not expect these groups to be in favour of the reform.

Upper middle age; 41 to 56 years of age

The voting behaviour in these groups is more difficult to foresee. They are encompassed by the transitional rules, which is favourable. However, the share in the new system is greater than the share of working time left for adaptation. As an example, for a person born in 1944

half of the benefits stem from the new system, while only 22% of working life remains. Besides, earlier generations had the opportunity of early retirement without being punished by lower benefits. This is not possible in the new system, which might be regarded as unfair.

Table 5 summarises this discussion on voting behaviour.

Table 5. Expected voting behaviour by age group.

Age group	Expected voting behaviour	Per cent of the electorate
57 years and older	yes	32
51 – 56	yes?	9
41 – 50	?	19
25 – 40	no	29
18 – 24	yes	12
"certain" yes votes		44
"certain" no votes		29

Socio-economic groups

As mentioned before, the old system favoured people with steep life cycle income profiles and short working histories, for example people with long education and in career jobs. Thus, these groups could be expected to resist the reform where these kinds of subsidies are abolished. Blue-collar workers, disfavoured in the old system but treated neutrally in the new one, should be in favour of the reform.

There was a belief that the old system with its DB formula favoured women, with their interrupted careers and lower wages than men. However, some women were favoured and others disfavoured depending on labour market behaviour. Again, well-educated women in white-collar jobs were favoured, while blue-collar female workers were at a disadvantage. Ståhlberg et al. (2004) use a simulation model to estimate the outcome for women with different work behaviour compared to men. The results are shown in the table below.

Table 3. The ratio between typical women's and full career men's annual own annuities, replacement rate and rate of return on lifetime contributions

	Women / Full career men

	Full career woman	Full time/part time woman	10-year woman	Part-time woman
Annual own annuities	0.83-0.99	0.79-0.84	0.35-0.41	0.62-0.67
Replacement rate	1.00-1.22	0.96-1.17	1.22-1.45	1.04-1.25
Rate of return	1.15-1.28	1.17-1.23	3.07-3.92	1.19-1.32

Source: Ståhlberg et al., 2004

"The results show that women on average get lower pension benefits than men. Despite this, women have a higher replacement rate and a higher rate of return on lifetime contributions than men. Part-time women's annual pension is 62-67 percent of full career men's. However, they have a replacement rate 4-25 percent higher than men's and a rate of return which is 19-32 percent higher than men's. If for example men's rate of return would be 3 percent part-time women would have a rate of return of 3.6-4.0 per cent. Full-time/part-time women have a rate of return which is 17-23 percent higher than men's. The 10-year woman gets the minimum pension guarantee. Her rate of return on lifetime contributions is 300-400 percent higher than men's.

Despite lower benefits women have higher replacement rates and higher rate of returns on pension contributions than men. This is due to the uni-sex life tables, the minimum pension guarantee and the pension credits for child rearing." (from Ståhlberg et al., 2004)

The conclusion is that women, as a group, are favoured compared to men in the new system. However, we can not conclude that women would vote in favour of the reform as women were also favoured in the old system.

6. Discussion and concluding comments

The story told in this paper is that the pension history in Sweden follows the pattern expected from political economic analysis, except when it comes to the latest reform. The story says that by a 'smart' use of transition rules it is possible to form a majority in favour of a robust system even if it means a retrenched one.

The success can not only be credited to the transitional rules. The latest reform makes the pension system / benefits depend on economic and demographic changes, including the ageing of the population. The promise of a sustainable system, robust to economic and demographic strains, seems to have been appealing. Moreover, abolishing the "unfair" DB-rules should attract quite a few of the electorate. A coalition of young and old plus a number of middle-aged blue-collar workers suffices to form a majority.

The story could have been told in another way, with a claim of credibility as high as the story just told, focusing on the political skilfulness of the Minister in the Social Ministry and the members of the "Working group on pensions". The reform is the outcome of an agreement between 5 parties in the Parliament, comprising around 85% of the votes. The path to reach consensus is a story that deserves being told in its own right. Important in this context is that that story does not conflict with the story told here.

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