

The strengths and failures of incentive mechanisms in notional defined contribution pension systems

Angelo Marano – Ministry of Labor and Social Affairs

Carlo Mazzaferro – University of Bologna and CAPP

Marcello Morciano – University of East Anglia, ISER and CAPP

*Seminar 25/11/2011
Bank of Italy, Rome*

disclaimer

1

Overview

- Pension systems based on NDC principle
 - Sweden (1994), Italy (1995), Latvia (1996), Poland (1999)
 - Several other countries adopted it or are discussing whether to go in such direction
- There are still misunderstanding about the nature of NDC systems
- Key points: **actuarial equity and incentive neutrality**
- What about the failure of NDC systems to guarantee actuarial equity and incentive neutrality when **social assistance pensions** are considered?
- How to address the problem?
- How to assess the effects of the changes envisaged
 - microsimulation

2

1. NDC systems

$$p^{NDC} = \varepsilon MC$$
$$MC = \sum \alpha W (1 + \delta)^{L-i+1}$$

- *Replicate individual saving*
 - Without the need to fund the pension system (thus addressing 1st generation problem)
- *Macroeconomic aspects*
 - Financial sustainability
 - Automatic adjustments
 - Possibility to add social assistance financed with general fiscal revenues
- *Microeconomic aspects*
 - (Almost) actuarial equity among individuals
 - Everybody gets the same (internal) rate of return
 - Which is close to the one one could get from actuarial calculations
 - Incentive neutrality with respect to retirement. As you get what you put in the system, with some additional assumption (on interest rates and amount of saving):
 - Neutrality with respect to the choice of the retirement age
 - Neutrality with respect to the choice of the exit age from the labor market
 - Neutrality with respect to the labor – leisure trade-off
 - Neutrality with respect to the choice to contribute or work in the shadow economy
 - Indeed, should NDC contributions enter the tax wedge?
- *Shortcuts*
 - Shifting risks upon individuals rather than the collectivity
 - An important incentive mechanism of traditional defined benefits systems disappear

3

2. How things change in presence of social assistance pensions?

- Failure to deliver actuarial equity and incentive neutrality when social assistance pensions cannot be fully cumulated with NDC pensions
 - low earners may retire with a NDC pension lower than the social assistance minimum they would get anyway
 - individuals that will retire with a NDC pension just above social assistance minimum will be not as much better off, with respect to people that never worked, than their contributions would justify
 - a sort of poverty or unemployment trap arise, but here one cannot contrast it with activation policies or conditionality, apart from the means-test
- Thus a distinctive regressive feature of NDC systems arises
 - which adds to the other one: different life expectancy by socio-economic status (i.e. education attainments see Mazzaferro, Morciano, Savegnago 2011)

4

2.A Italy

The Italian institutional setting for a (not married) individual

You can partly accumulate NDC and social pension by non considering 1/3 of the NDC pension in the means test for social assistance

$$SA = \max(0; 5592 - [y - \min(\beta * P_{-NDC}; \alpha * 5592)])$$

where

SA: social assistance minimum

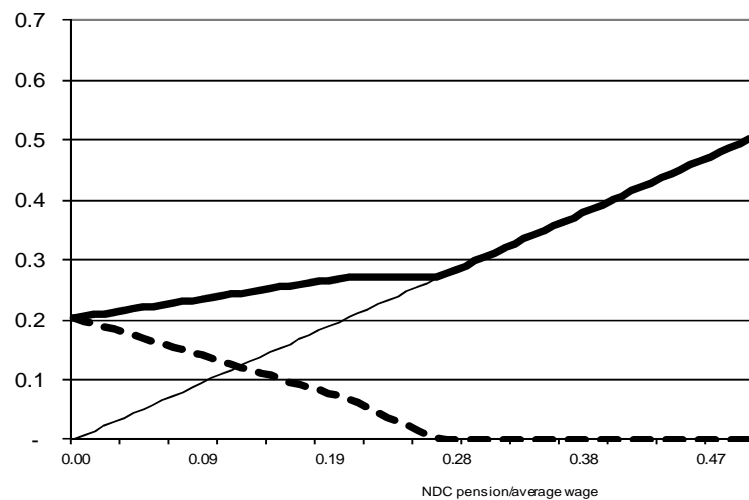
P_{-NDC} : old age NDC pension

Y: total income (P_{-NDC} + other sources)

$$\alpha = \beta = 1/3$$

5

Fig. 1a - Italy: NDC pension, social assistance integration and totale income as % of average wage



— NDC pension - - - Social assistance integration — Total income

Implicit marginal tax rate and Net Present Value Ratio (NPVR) of NDC pensions when taking social assistance into account

- Implicit marginal tax rate

$$1 - (\Delta Y / \Delta P_{\text{NDC}})$$

- (Modified) NPVR

$$(VA_{\text{P_NDC}} - VA_{\text{SA}}) / VA_{\text{CONT}}$$

Assuming for simplicity

$VA_{\text{P_NDC}} / VA_{\text{CONT}} = 1$ (i.e. assuming NPVR of NDC pensions = 1 if social assistance does not exist)

7

Fig. 1b - Italy: implicit tax rate on the NDC pension considering social assistance

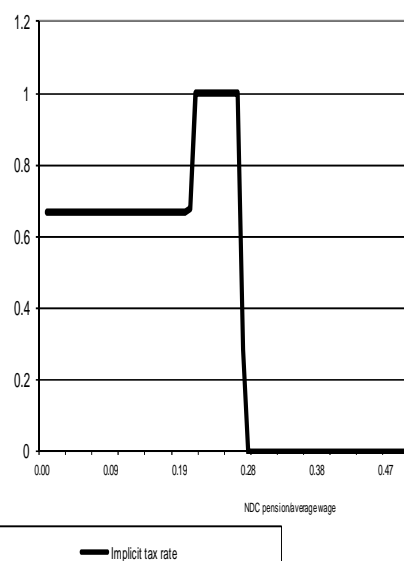
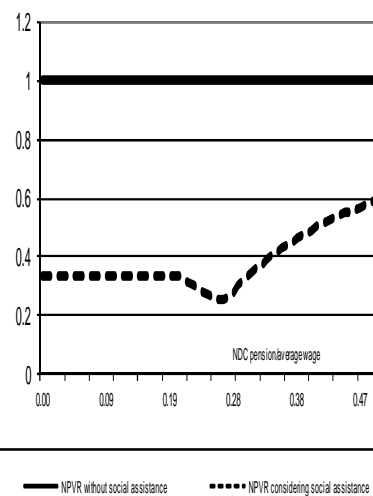


Fig. 1c - Italy: net present value ratio (NPVR) of the NDC pension considering and not considering social assistance



2.B Sweden and Poland

Fig. 2.a - Sweden: NDC pension, social assistance integration and total income as % of average wage

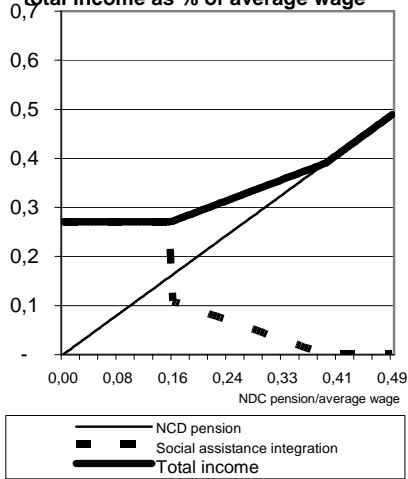


Fig. 3.a - Poland: NDC pension, social assistance integration and total income as % of average wage

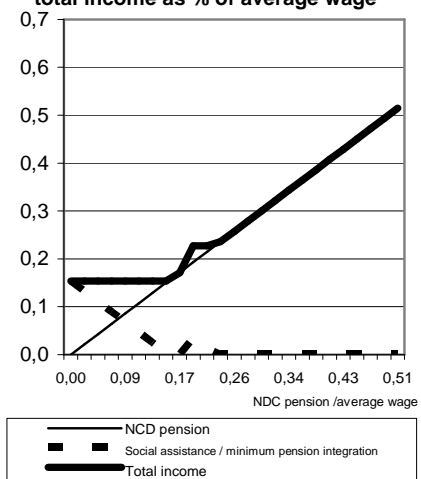


Fig. 2.b - Sweden: Implicit tax rate on the NDC pension considering social assistance

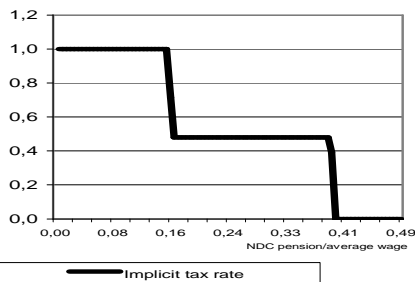


Fig. 3.b - Poland: Implicit tax rate on the NDC pension considering social assistance and minimum pension

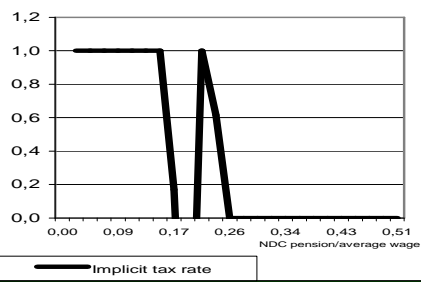


Fig. 2.c - Sweden: net present value ratio (NPVR) of the NDC pension considering and not considering social assistance

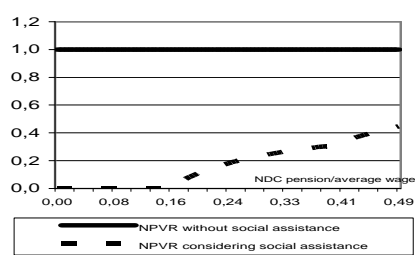
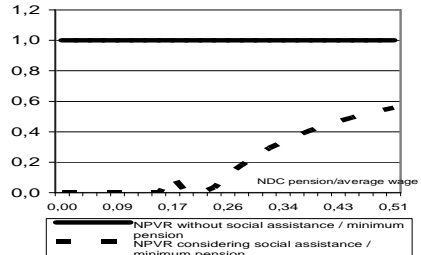


Fig. 3.c - Poland: net present value ratio (NPVR) of the NDC pension considering and not considering social assistance and minimum pension



2.C An underestimated problem?

- Currently 5 ml pensioners benefit from the Italian minimum pension (2.2 are old age pensioners still in the DB system “integrazione al minimo”, 0,8 social assistance pensioners, the others receive “integrazione al minimo” as invalids or survivors)
- Increasing role of minimum pension in the Polish NDC system (Chlon-Dominczak and Strzelecki 2010)
- Replacement ratios are expected to significantly drop after 2030 (see below)
 - even taking into account longer working life and private provision
 - thus more people could end up with pensions not significantly higher than social assistance than could be inferred by only looking at current replacement rates
- Particularly for low earners, it will take a substantial part of their working life to mature a NDC pension equal to social assistance → Table

11

Table 1 - Number of years of contribution needed to mature a NDC pension equal to social assistance benefits (in Italy and Sweden) and to social security minimum pension (in Poland)¹

worker's income as % of average income **	Italy			Sweden			Poland***			
	based on replacement ratios in 2006	based on replacement ratios in 2046 (NDC pension only)	based on replacement ratios in 2046 (NDC+private DC pensions)	based on replacement ratios in 2006	based on replacement ratios in 2046 (NDC pension only)	based on replacement ratios in 2046 (NDC+private DC pensions)	years to social assistance minimum		years to social security minimum	
		based on replacement ratios in 2006	based on replacement ratios in 2046		based on replacement ratios in 2006	based on replacement ratios in 2046	based on replacement ratios in 2006	based on replacement ratios in 2046		
50	22.2	28.2	23.1	44.9	56.9	43.5	21.5	28.6	31.8	42.4
75	14.8	18.8	15.4	30.0	37.9	29.0	14.3	19.1	21.2	28.2
100	11.1	14.1	11.5	22.5	28.4	21.8	10.8	14.3	15.9	21.2
125	8.9	11.3	9.2	18.0	22.8	17.4	8.6	11.4	12.7	16.9
150	7.4	9.4	7.7	15.0	19.0	14.5	7.2	9.5	10.6	14.1

Note: ¹ Based on theoretical replacement rates at 65 years of age with 40 years of activity as calculated by the EUI countries in an harmonized way. ² For % difference from 1 we just increased or reduced proportionally the number of years. ³ In Poland the requirement to be entitled to social security minimum pension is 20-25 years of contribution for females and males respectively. Poland did not calculate replacement rates including private provision for 2046.

Source: our calculations based on data from Social Protection Committee (2009), Update of current and prospective theoretical replacement rates - 2004-2046, Report of the Indicator Subgroup, Annex Country Files, Brussels, European Union.

12

3. The case for intervention

- Neutrality and actuarial fairness of the NDC system seem to disappear when social assistance is taken into account
- The concrete risk is that, for some low earners, NDC systems will become nothing more than a flat rate pension systems at the social assistance level (Italy and Sweden) or at the minimum pension (Poland)
- And that for many the returns on contributions will be low as they will end up only slightly above minimum pensions
- In other words, low earners would throw away their contributions, at least in part, i.e. they would not be much better off than if they had never worked (or contributed)

13

Some possibilities

- Abolish social assistance and minimum pensions
 - This would change radically the nature of our society and welfare and is considered non desirable
- Introduce minimum NDC pensions as in Poland
 - It would improve pension adequacy but it could further distorts incentives
- Increase cumulability of NDC and social assistance pensions
 - From $1/3$ to $1/2$
 - Costs limited as increase is limited
 - Possible limit: full cumulability (from $1/3$) to 1
 - Still maintaining the means test
 - With many implication for the financing of the pension system
 - It would be a structural change in terms of regulation (à la Française) of the system

14

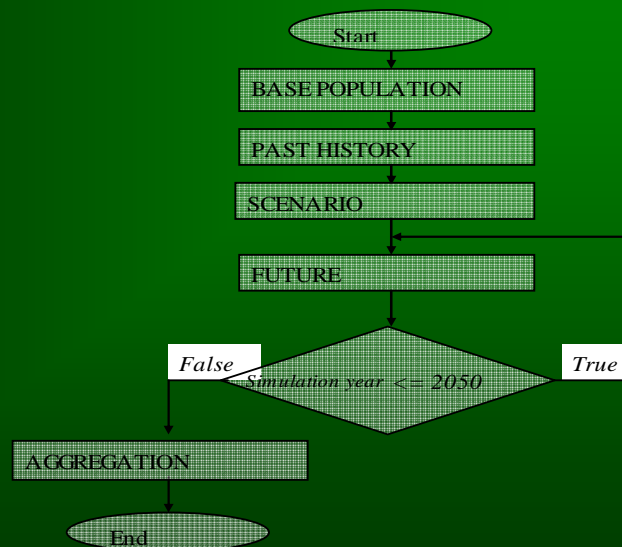
4 A microsimulation analysis

- Assessing the effects of the change by a microsimulation model
 - It allows
 - to follow individuals and study non only averages but also distributions
 - to evaluate inter- and intra-temporal, inter- and intra generational features of the social security system
 - It allows
 - To further study relevance of the phenomenon
 - To evaluate the effect of changes in the accumulation rules of NDC and social pensions

15

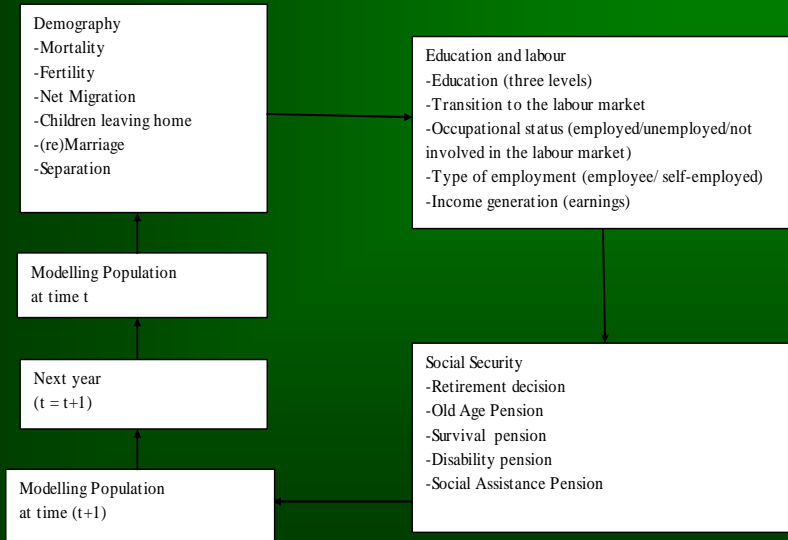
4.1 The CAPP_DYN microsimulation model

We use a large & representative sample of economic agents (individuals and households) drawn from IT-SILC 2007 (earnings 2006).



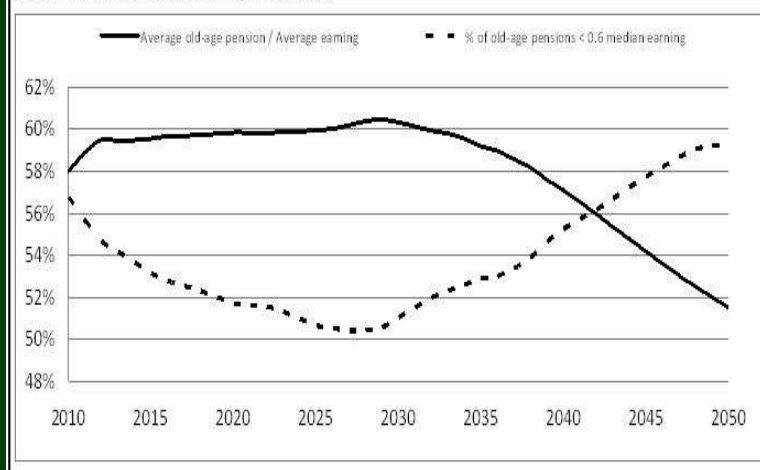
16

The main modules of CAPP_DYN



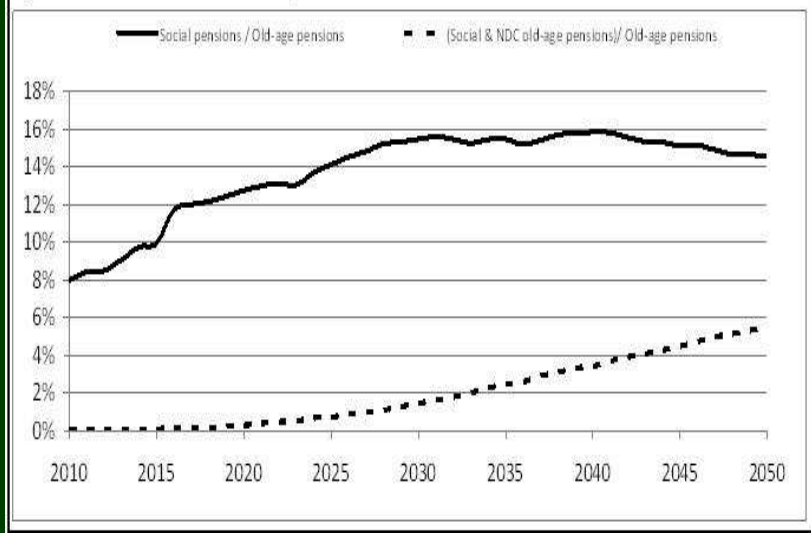
17

Figure 7 - Ratio between average old-age pension and average earning and share of old-age pensions below 60% of the median earning, 2010 - 2050



18

Figure 8 - Share of social assistance pensions



19

Table 2- A comparison between NDC old-age pensioners who receive (right) and not receive (left) a social assistance pension

	NDC old-age pensioners not receiving social pensions		NDC old-age pensioners receiving social pensions		Test on the difference	
	mean	sd	mean	sd		
Female	0.39	0.49	0.74	0.44	female	-0.297*** (-72.21)
Couples	0.46	0.5	0.23	0.42	_st1	0.183*** (-37.74)
Single	0.21	0.41	0.22	0.41	_st2	-0.0330*** (-8.44)
Divorced	0.09	0.28	0.2	0.4	_st3	-0.0894*** (-25.44)
Widow	0.24	0.43	0.34	0.48	_st4	-0.0605*** (-13.84)
Seniority at retirement	35.14	7.28	23.94	8.83	acontrib	9.926*** (-110.16)
Less than 10 years	0.01	0.12	0.09	0.28	acontr10	-0.104*** (-29.89)
Between 11 and 20 yrs	0.04	0.19	0.27	0.45	acontr20	-0.249*** (-54.29)
Between 21 and 30 yrs	0.15	0.36	0.39	0.49	acontr30	-0.0746*** (-16.44)
More than 30 yrs	0.8	0.4	0.25	0.44	acontr30p	0.428*** (-111.84)
Previously priv. dep	0.77	0.42	0.63	0.48	lus	
Previously pub. Dep.	0.15	0.36	0.06	0.24	_setpen1	0.0575*** (-12.13)
Previously self empl.	0.09	0.28	0.3	0.46	_setpen2	0.104*** (-35.69)
Replacement rate	0.55	0.13	0.35	0.15	_setpen3	-0.162*** (-38.03)
Retirement age	66.2	1.82	67.43	0.75	ts_ass	0.198*** (-25.95)
					_ts_ass	0.200*** (-94.73)
					eta	-2.374*** (-41.29)
					_etapen	-0.714*** (-78.82)
					grage1	0.154*** (-33.27)
					grage2	-0.0765*** (-15.38)
					grage3	-0.0775*** (-21.88)
Observations	4336		423		N	58238
					t statistics in parentheses	
					* p < 0.05, ** p < 0.01, *** p < 0.001	

20

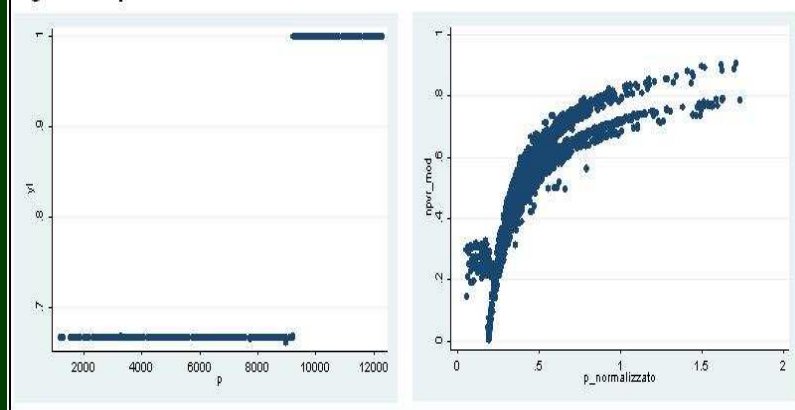
Table 3 - Adequacy for old-age pensioners who receive a social assistance benefit

Year	Average social pension as a percentage of:		Average level of (social pension + old age pension) as a percentage of:	
	average old-age pension	average earning	average old-age pension	average earning
2020	17.40%	10.40%	37.40%	22.40%
2030	17.30%	10.40%	37.10%	22.30%
2040	17.90%	10.10%	40.90%	23.10%
2050	18.50%	9.40%	47.10%	24.00%

21

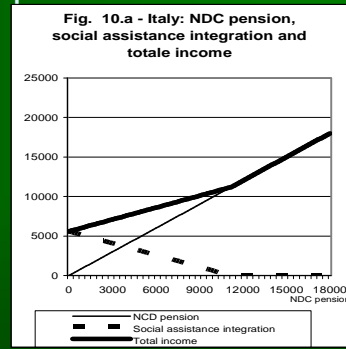
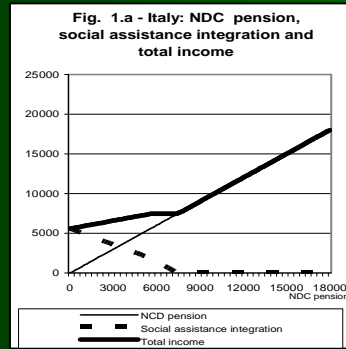
Implicit tax rate and Net Present Value Ratio for (single) old age pensioners who receive a social assistance pension

Figure 9- Implicit tax rate and NPVR in the base case



22

4.3 Increasing from 1/3 to 1/2 (or 2/3) the possibility to accumulate NDC and social assistance pensions



- Costs not very important
 - No expenditure in the short term as still the old DB system applies
 - Expenditure as 0.7% of total earnings in 2050
 - The pension expenditure to GDP ratio is expected to drop sharply after 2040

Figure 13 - NPVR with $\alpha=1/2$ (left) and $\alpha=2/3$ (right)

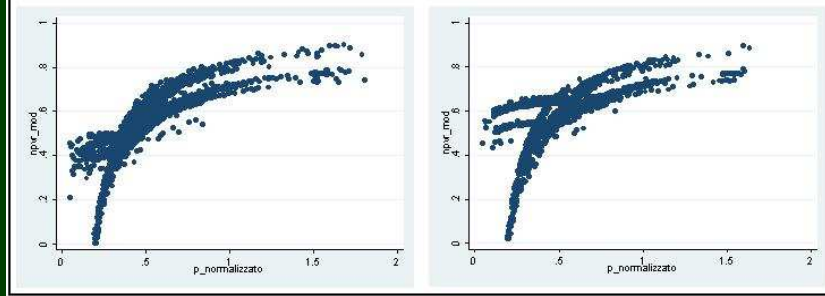
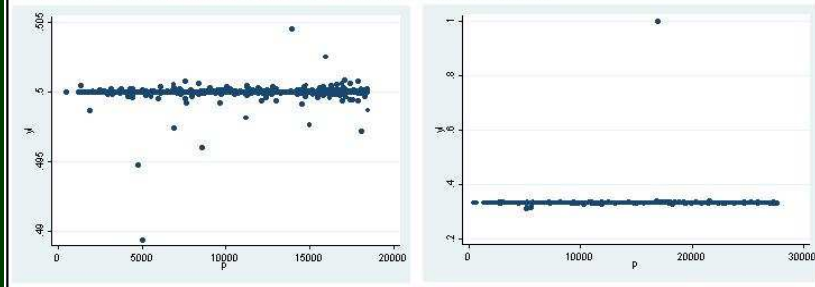
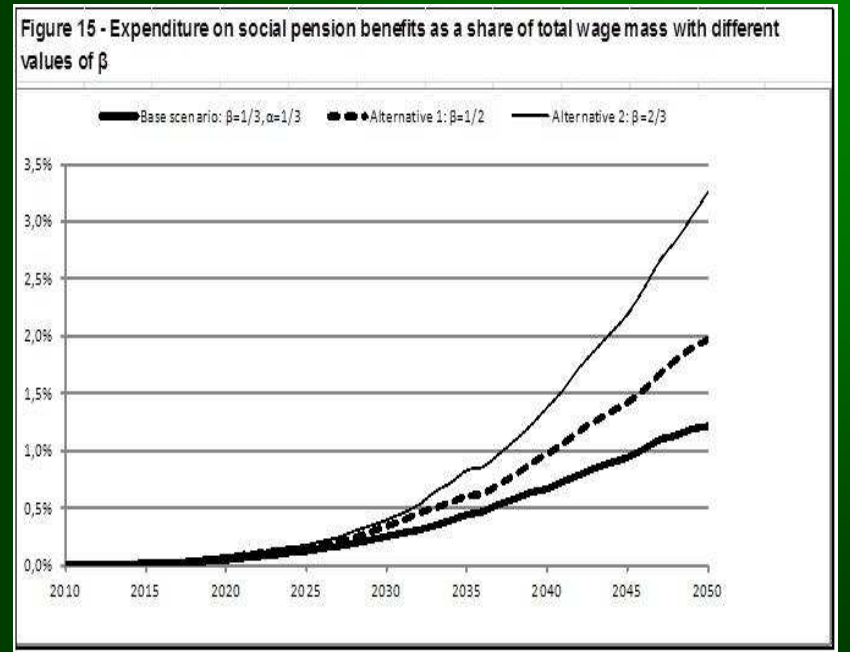
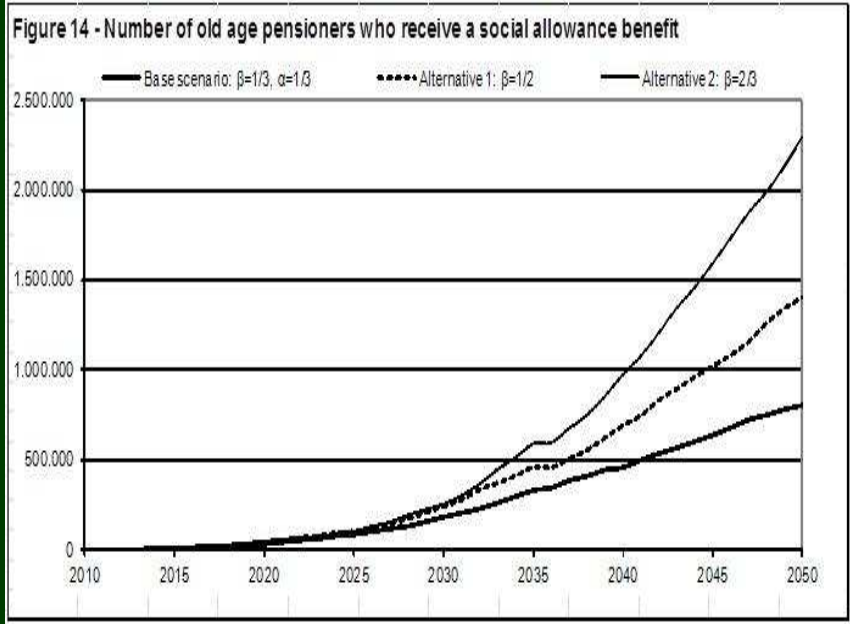


Figure 12 - Implicit tax rate with $\beta=1/2$ (left) and $\beta=2/3$ (right)





Conclusions

- When social assistance is taken into account NDC pension systems fail to deliver incentive neutrality and actuarial equity
- Low earners in particular, could receive from their NDC pension not much more than they would get anyway as social assistance.
- NDC systems thus show an important regressive feature
- The problem could be particularly relevant as NDC systems are less “generous” than previous DB systems
- Working on an increase of the possibility to accumulate NDC and social assistance pensions could reduce the size of the problem
- [It could be that the only structure fully coherent with the NDC principle is allowing full accumulation of the two pensions, with social assistance pensions playing as an universalistic, although means tested, zero pillar]
 - [which would imply a radical change in the financing structure of the pension system]

Further work to be done:

effects of alternative measures
combining with differential mortality by socio-economic status