Social security reform: is the Brazilian pension system actuarially fair?

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Objectives:

1. Compare the current rules for retirement in the Brazilian public pension system and 3 reform proposals (under analysis in the Congress)
2. Calculate how actuarially fair is the Social security Factor (*SSF*) and propose and estimate the Actuarially Fair Social Security Factor (*AFSSF*)

The Brazilian Public Pension System (current rule):

1. Benefit

Elegibility condition for retirement
- 35/30 years of contribution (Men/Women)
- No minimum age requirement

Value of the Benefit (*Sb*)

$$Sb = f.M$$

$$f = \frac{Tc.a}{Es}\left(1 + \frac{Id + Tc.a}{100}\right)$$

f	→	Social Security Factor
M	→	Average highest 80% monthly earnings
TC	→	Contribution time (years)
a	→	Social Security tax rate (0.31)
Id	→	Age at the retirement date
Es	→	Life expectancy (average W/M)

2. Contribution rates

Employer: 20%

Employee:

Monthly wage (BRL)	Employer Contribution Rate (%)
Up to 1,174.86	8
1,174.87 to 1,958.10	9
1,958.11 to 3,916.20	11

Current rule and reform proposals:

1. Current rule
2. Average 36 last monthly earnings
3. Rule 85/95 → *Id* + *TC* = 85(W) or 95(M)
4. Average highest 80% monthly earnings (extinguishes the Social Security Factor)

Results

Replacement Rate (*TR*)

Age / CT	Earnings	Current Rule Men	Current Rule Women	Rule 85/95 Men	Rule 85/95 Women	Average highest 80% monthly earnings	Average 36 last monthly earnings
51 / 35	Low	0.5100	0.5531	0.5100	0.7966	0.7752	0.9805
	Medium	0.4828	0.5531	0.4960	0.7966	0.7752	0.9805
	High	0.4828	0.5531	0.4960	0.7966	0.7752	0.9805
60 / 35	Low	0.6715	0.7744	0.7966	0.7966	0.7752	0.9805
	Medium	0.6715	0.7744	0.7966	0.7966	0.7752	0.9805
	High	0.6715	0.7744	0.7966	0.7966	0.7752	0.9805
70 / 35	Low	1.0348	1.1928	0.7966	0.7966	0.7752	0.9805
	Medium	1.0348	1.1928	0.7966	0.7966	0.7752	0.9805
	High	1.0348	1.0704	0.7966	0.7966	0.7752	0.9805

Actuarially Fair Rate (*a_fair*) (%)

Age / CT	Earnings	Current Rule Men	Current Rule Women	Rule 85/95 Men	Rule 85/95 Women	Average highest 80% monthly earnings	Average 36 last monthly earnings
51 / 35	Low	23.26	25.23	23.26	36.33	35.36	44.73
	Medium	22.02	25.23	22.63	36.33	35.36	44.73
	High	22.02	25.23	22.63	36.33	35.36	44.73
60 / 35	Low	25.28	29.15	29.98	29.98	29.18	36.91
	Medium	25.28	29.15	29.98	29.98	29.18	36.91
	High	25.28	29.15	29.98	29.98	29.18	36.91
70 / 35	Low	29.29	33.76	22.54	22.54	21.94	27.75
	Medium	29.29	33.76	22.54	22.54	21.94	27.75
	High	29.29	30.29	22.54	22.54	21.94	27.75

Internal Rate of Return (IRR) (% per year)

Age / CT	Earnings	Current Rule Men	Current Rule Women	Rule 85/95 Men	Rule 85/95 Women	Average highest 80% monthly earnings	Average 36 last monthly earnings
51 / 35	Low	2.37	2.64	2.37	3.87	3.78	4.56
	Medium	2.00	2.46	2.09	3.69	3.60	4.39
	High	1.87	2.33	1.96	3.55	3.46	4.25
60 / 35	Low	2.62	3.14	3.24	3.24	3.14	4.00
	Medium	2.41	2.94	3.05	3.05	2.95	3.81
	High	2.27	2.80	2.90	2.90	2.80	3.66
70 / 35	Low	3.17	3.75	2.10	2.10	1.99	2.96
	Medium	2.95	3.53	1.86	1.86	1.75	2.73
	High	2.79	2.93	1.71	1.71	1.59	2.57

Effective Contribution Rate (*a_ef*) (%)

Age / CT	Earnings	Current Rule Men	Current Rule Women	Rule 85/95 Men	Rule 85/95 Women	Average highest 80% monthly earnings	Average 36 last monthly earnings
51 / 35	Low	28.05	28.05	28.05	28.05	28.05	28.05
	Medium	29.61	29.61	29.61	29.61	29.61	29.61
	High	30.80	30.80	30.80	30.80	30.80	30.80
60 / 35	Low	28.05	28.05	28.05	28.05	28.05	28.05
	Medium	29.61	29.61	29.61	29.61	29.61	29.61
	High	30.80	30.80	30.80	30.80	30.80	30.80
70 / 35	Low	28.05	28.05	28.05	28.05	28.05	28.05
	Medium	29.61	29.61	29.61	29.61	29.61	29.61
	High	30.80	30.80	30.80	30.80	30.80	30.80

Actuarially Fair Social Security Factor (*AFSSF*)

Years of Contribution		Retirement Age 52	54	56	58	60	62	64	66	68	70
30	AFSSF	0.68	0.71	0.74	0.77	0.81	0.86	0.90	0.96	1.02	1.08
	SSF (Men)	0.55	0.59	0.63	0.68	0.74	0.80	0.87	0.95	1.04	1.13
	SSF (Women)	0.64	0.69	0.74	0.80	0.87	0.94	1.02	1.12	1.22	1.33
31	AFSSF	0.72	0.75	0.78	0.81	0.85	0.90	0.95	1.00	1.07	1.13
	SSF (Men)	0.57	0.61	0.65	0.70	0.76	0.83	0.90	0.98	1.07	1.17
	SSF (Women)	0.66	0.71	0.76	0.82	0.89	0.97	1.05	1.15	1.26	1.38
32	AFSSF	0.75	0.78	0.82	0.85	0.89	0.94	0.99	1.05	1.12	1.19
	SSF (Men)	0.59	0.63	0.67	0.73	0.79	0.86	0.93	1.01	1.11	1.21
	SSF (Women)	0.68	0.73	0.79	0.85	0.92	1.00	1.08	1.18	1.29	1.42
33	AFSSF	0.78	0.81	0.85	0.88	0.93	0.98	1.03	1.09	1.16	1.23
	SSF (Men)	0.61	0.65	0.70	0.75	0.81	0.89	0.96	1.05	1.15	1.25
	SSF (Women)	0.70	0.75	0.81	0.87	0.95	1.03	1.11	1.22	1.33	1.46
34	AFSSF	0.82	0.85	0.89	0.93	0.97	1.02	1.08	1.14	1.21	1.29
	SSF (Men)	0.63	0.67	0.72	0.78	0.84	0.91	0.99	1.08	1.18	1.29
	SSF (Women)	0.72	0.78	0.83	0.90	0.97	1.06	1.14	1.25	1.37	1.50
35	AFSSF	0.85	0.89	0.93	0.97	1.01	1.07	1.12	1.19	1.27	1.35
	SSF (Men)	0.64	0.69	0.74	0.80	0.87	0.94	1.02	1.12	1.22	1.33
	SSF (Women)	0.74	0.80	0.86	0.92	1.00	1.09	1.18	1.29	1.41	1.54
36	AFSSF	0.89	0.93	0.97	1.01	1.06	1.12	1.17	1.25	1.32	1.41
	SSF (Men)	0.66	0.71	0.76	0.82	0.89	0.97	1.05	1.15	1.26	1.38
	SSF (Women)	0.76	0.82	0.88	0.95	1.03	1.12	1.21	1.32	1.44	1.58
37	AFSSF	0.93	0.97	1.01	1.05	1.11	1.17	1.23	1.30	1.38	1.47
	SSF (Men)	0.68	0.73	0.79	0.85	0.92	1.00	1.08	1.18	1.29	1.42
	SSF (Women)	0.78	0.84	0.90	0.97	1.05	1.15	1.24	1.36	1.48	1.62
38	AFSSF	0.96	1.00	1.04	1.09	1.14	1.20	1.27	1.34	1.43	1.52
	SSF (Men)	0.70	0.75	0.81	0.87	0.95	1.03	1.11	1.22	1.33	1.46
	SSF (Women)	0.80	0.86	0.93	1.00	1.08	1.17	1.27	1.39	1.52	1.66

Conclusions

1. Current system is distributive and generous
2. Current system favours women
3. Proposals under analysis would cause the Social Security Tax Rate to be increased
4. Social Security Factor punishes men (compared to women) for early retirement
5. Social Security Factor give women greater incentives (compared to men) for postponing retirement

Four indicators:

Replacement Rate (*TR*)
$$RR = \frac{B_{N+1}}{W_N}$$

Actuarially Fair Rate (a_fair)
$$a_{fair} = \frac{PVB}{PVE}$$

Internal Rate of Return (*IRR*)
$$\sum_{t=1}^{N}\frac{C_t}{(1+IRR)^t} = \sum_{t=N+1}^{Es}\frac{B_t}{(1+IRR)^t}$$

Effective Rate (a_ef)
$$a_{ef} = \frac{PVC}{PVE}$$

Further Information & Contact

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