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Modelling a Guaranteed Retirement Account System in the United States

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Introduction:

In recognition of the fact that America's employer-based private pension system is broken, comprehensive reform options are under discussion at the highest level[1] of government. Retirement USA[2] (R-USA), a group representing think tanks, unions, advocacy groups and academics working to secure Americans' retirement, has identified ten core principles for the design of a quality pension system of the future. The only reform proposal that fulfils each of these requirements is the Guaranteed Retirement Account (GRA)[3]. As part of the ongoing research into the GRA, this working paper seeks to model the size of a present-day, federal GRA system in the United States.

The paper is structured as follows: Section 2 describes the methodology and data sources for modelling the GRA; Section 3 describes the results under a different set of assumptions; and Section 4 presents conclusions.

Section 2: Methodology and Data Sources

The model is built around projections for the labor force and labor force participation obtained from the Department of Labor[4]. These projections extended to 2050 in five year age groups.

2.1) Initial conversion of DC accounts

Creating a GRA system will provide an opportunity for existing employer-based defined contribution (DC) pension account holders to convert the balances of their accounts into the GRA. A breakdown of existing defined contribution balances by age group does not exist, but estimates of balances in five-year age brackets were estimated in two different ways. First, participation rates in 2008 by age were found in the Survey of Program Participation. Survey evidence on average balances for 401K participants in ten-year increments was obtained from the EBRI/ICI Participant-Directed Retirement Plan Data Collection Project. Using these two data sources and the estimated number of employees per age group, estimates of average DC balances per employee in the five-year age brackets (not the average for employee enrolled in the 401K) were created. Second, the EBRI/ICI averages were used to calculate the proportion of 401K balances in the ten-year age groups. Five-year age groups were then interpolated from the ten-year groups. Using the total value of all DC pensions from the Flow of Funds report from the Federal Reserve, average balances were obtained. The latter methodology was chosen.

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[1] Private Pensions: Alternative Approaches Could Address Retirement Risks Faced by Workers but Pose Trade-offs, US GAO, July 2009; Annual Report of the White House Task Force on the Middle Class, Office of the Vice President of the United States, February 2010

[2] http://www.retirement-usa.org/

[3] Guaranteed Retirement Accounts: Toward retirement income security, Ghilarducci, T, EPI Working Paper 204, November 2007

[4] Available at http://www.bls.gov/emp/ep_data_labor_force.htm

The percentage of those estimated balances by age that would actually be converted is unknown and impossible to estimate. It was assumed that half would be converted. This produced estimates of the initial balance of the GRA, and a breakdown of the balances by age group.

2.2) Inflows and Outflows of Funds to and from a GRA system

Inflows of funds are a function of employment levels and earnings. As mentioned above, employment projections out to 2050 were calculated from long term forecast of the labor force and the participation rate by the Department of Labor[5]. To model earnings levels, current earnings levels were obtained from the Employment Report from the Department of Labor. These earnings were then assumed to grow at a constant rate during the forecasting period. CBO projections assume that real incomes grow at 1.4% per year. The baseline GRA projections use the same assumption. The contribution rate of 5% of pre-tax income (2.5% from employee and 2.5% from employer) and the government contribution then allow the calculation of annual inflows into the GRA.

The GRA system's liabilities for people of working age at the end of the first year are the initial converted DC balances, increased by the guaranteed real return, plus the inflows. The GRA system's assets for people of working age at the end of the first year are the initial converted DC balances, increased the assumed real rate of return on the GRA portfolio, plus the inflow into the GRA. Hence, assets and liabilities of the GRA evolve differently as long as the return on assets is different from the 3% real return that is guaranteed to participants.

After retirement age, the inflows into the GRA are assumed to drop to zero. Both liabilities and assets fall by the assumed annuity rate (calculated from the social security cohort life tables) at the end of the year, after being grown by the guaranteed real return rate and the assumed portfolio real return rate respectively. For a detailed discussion of the evolution of individual accounts in the GRA, see Appendix 2.

[5] Available at http://www.bls.gov/emp/ep_data_labor_force.htm

Section 3: Simulation Results

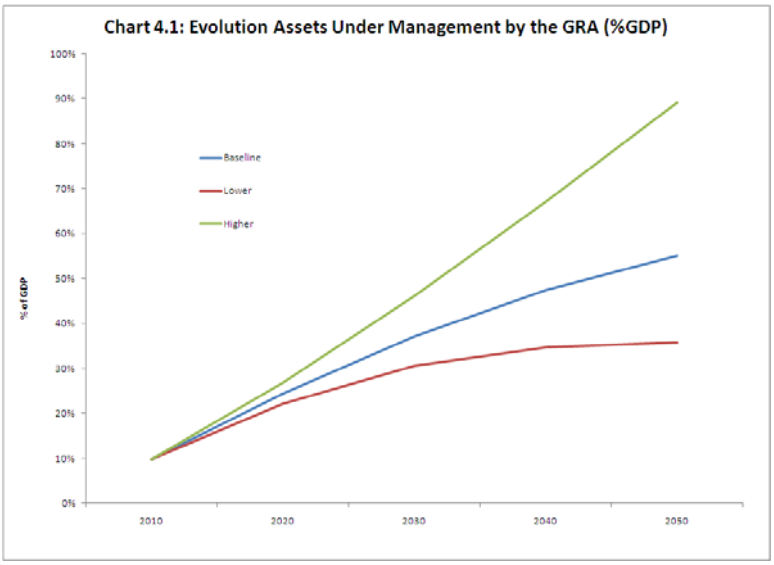
The model was used to project the evolution of the GRA. The base year was set as 2009, as it is the last hard data we have and the official projections for employment, etc., run from 2010 to 2050. The central scenario contains our best forecasts for the variables in the model, including the official forecasts used in other government projections (such as a consistent growth in real wages of 1.4% per year, which the CBO uses in its forecasts). The "Lower Scenario" assumes the GRA will experience lower than expected investment returns, while life expectancy rises faster than expected. The "Higher Scenario" is the opposite, representing rapid investment return and a slower increase in life expectancy. Many of the assumptions in the model remained constant across all three scenarios[6]. Table 3.1 outlines the set of assumptions for the variables that changed in each of the three scenarios.

Table 3.1: Inputs into three GRA Forecasting Scenarios

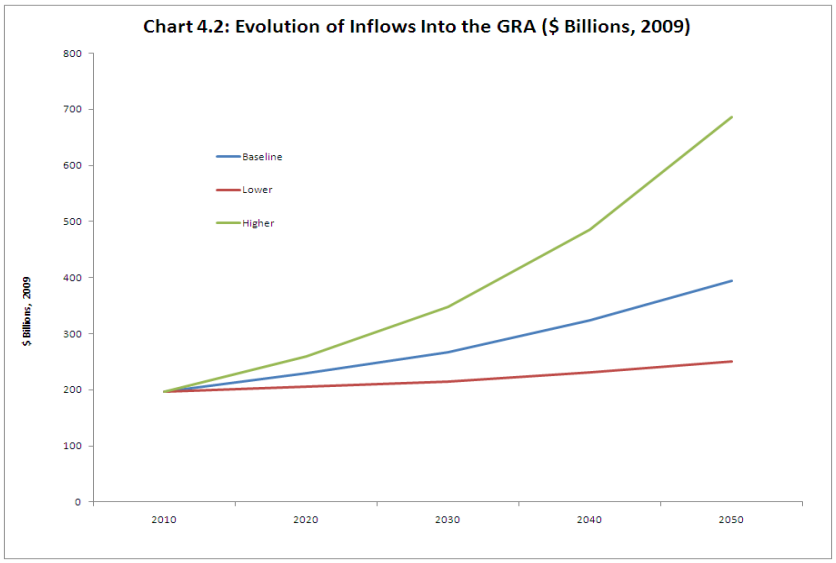
Assumptions	Lower Scenario	Baseline Scenario	Higher Scenario
Number of Years in Retirement in 2050	17	19	25
Growth of Nominal Earnings	2.0%	3.4%	5.0%
Inflation Rate	2.0%	2.0%	2.0%
Real Rate of Earnings Growth	0.0%	1.4%	3.0%
Actual Achieved Real Return on GRA Portfolio	3.5%	4.5%	5.5%
Costs as % of Assets	0.5%	0.5%	0.5%
Actual Achieved Real Return on GRA Portfolio After Costs	3.0%	4.0%	5.0%

The full results from the GRA simulations can be found in Appendix 1. Once established, the GRA fund would grow to a large scale. Assets under management in 2050 could be anywhere from $12 trillion to $30 trillion in 2009 dollars. This would represent somewhere between 36% and 89% of US GDP, as shown in chart 4.1

[6] Percentage of employment in the private sector = 80%, Percentage of private sector employees with a DB plan = 17%, Percentage of DC current pensions balance converted = 50%, Annual growth rate of GDP = 2.2%, Contribution rate for employee and employer = 2.5% each. Government subsidy = $600 per year, indexed to inflation. Guaranteed return above inflation = 3%.



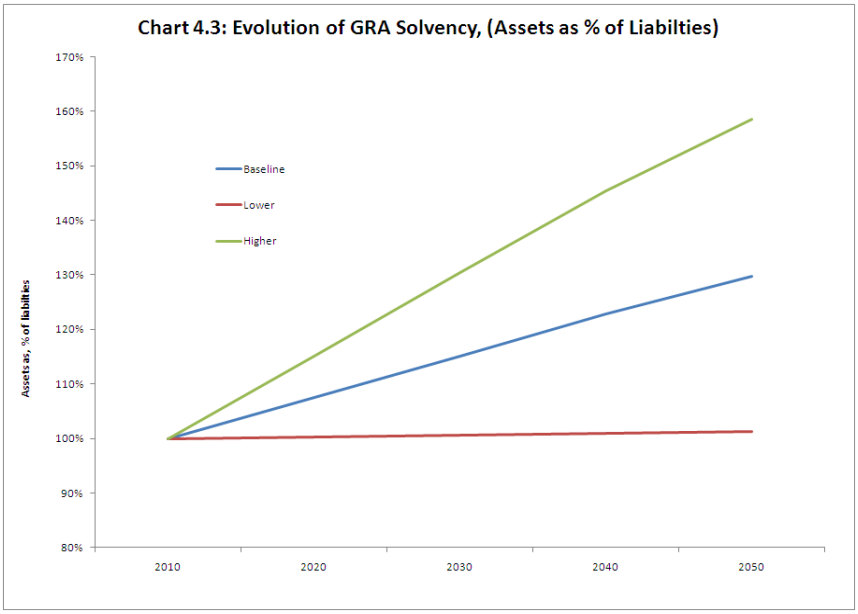
One of the keys drivers of the divergence in assets under management is the large divergence of inflows into the GRA. By 2030, between $200 billion and $350 billion, in 2009 dollars, could be committed on an annual basis into the GRA. This grows to between $250 billion and $690 billion in 2050. The spectrum of possible evolutions of inflows is shown in chart 4.2



The solvency of the system is obviously of vital importance if it is to exist in perpetuity. The key measure of the GRA solvency is assets as a percentage of liabilities. If assets in the GRA grow at an annual average compound real return of 3% (after costs), then assets and liabilities of the fund track each other perfectly. In this scenario the solvency ratio remains at 100% throughout the simulated period. This scenario, however, would be unprecedented in modern history. As explained elsewhere[7], since 1927 there has never been a period of 30 years or longer where the real return on a balanced portfolio of large stocks, small stocks, corporate bonds, and Treasuries does not exceed 3% per annum.

[7] What rate of return can a GRA system credibly guarantee?, SCEPA Working Paper 2010-3, David Stubbs, June 8th 2010.

Indeed, the baseline scenario uses an average annual compound return of 4.5% (before costs, 4% after costs). Under this assumption, the solvency of the GRA system improves steadily until 2050, when the system is holding assets equivalent to 130% of liabilities. This rate of return is still well below the median average annual return one could expect over several decades, as detailed in Stubbs 2010[8]. Based on historical precedent, one could expect a real average annual return in the region of 5% to 6%. Hence, the higher scenario assumes a pre-cost return of 5.5% per year. Under this assumption, the solvency of the GRA system improves at a faster pace than in the baseline scenario, leaving the system holding assets equivalent to 160% of liabilities in 2050.



As time goes on, the GRA is forecast to accumulate assets that do not correspond with any individual claims. These assets form a Rainy Day Fund for the GRA system, which builds up over periods of good returns and smaller than expected increases in life expectancy. If returns are higher than the guaranteed rate of return, then the value of the funds committed to the GRA will exceed the promises made to the contributor. This additional money serves to insure the GRA system against the possibility of the contributor living longer than can be forecast at the time of annutization. The number of extra years the money would support the individual after their claims have actually been exhausted is the Time-Equivalent Surplus. This is one mechanism that allows the GRA system to promise constant, inflation adjusted payments to retirees for as long as they live. It also makes it unlikely the GRA system would be a drain on the federal budget. For a more detailed discussion on these issues, see Appendix 2.

[8] Ibid.

Section 4: Conclusion

Guaranteed Retirement Accounts address every failing of the current system and have a realistic chance of securing the retirement of future generations of Americans. As outlined in this paper, once established, the GRA system will grow to manage assets between 36% and 89% of US GDP by 2050. Such a large scale is likely to create challenges. GRA holdings could grow so large that changes to the portfolio would start to "move markets" on their own. This would introduce additional volatility into financial markets and would impair the performance of the GRA as prices rise when it is buying and fall as it is selling. This paper does not attempt to quantify the point at which this impact would start to manifest itself; estimating the size of the markets over many decades is almost impossible. However, rising liquidity duration[9] would be a warning sign for GRA administrators.

When the GRA fund increases to a market–moving size, new funds could be invested into other assets classes, including foreign securities, commodities and physical assets with predictable cash flows such as infrastructure assets[10].

[9] Liquidity duration is the number of securities of a certain type that an investor or fund owns, divided by the average number of those securities that are traded daily. A high figure shows that a fund would have to spread their selling over many days in order to not disrupt the normal functioning of the market

[10] A further discussion of infrastructure investment by large pension funds can be found in: What rate of return can a GRA system credibly guarantee?, SCEPA Working Paper 2010-3, David Stubbs, June 8th 2010; and Pension Fund Investment in Infrastructure, OECD Working Paper on Insurance and Private Pensions, No. 32, Georg Inderst, January 2009

Appendix 1: Full results from GRA Simulations

Table A1.1 Data Summary - Lower Scenario					
Year	2010	2020	2030	2040	2050
Total Value of GRA Assets ($ Trillions, 2009)	1.39	3.94	6.72	9.50	12.22
Total Value of GRA Assets (% of GDP)	10%	22%	31%	35%	36%
Total Liabilities ($ Trillions, 2009)	1.39	3.93	6.68	9.40	12.06
Total Liabilities (as % GDP)	10%	22%	30%	34%	35%
Assets as % of Liabilities	100%	100%	101%	101%	101%
"Rainy day Fund" ($Billions, 2009)	0.00	1.66	13.69	33.96	57.51
"Rainy day Fund" (as % of liabilities)	0%	0%	0%	0%	0%
Net worth of GRA System ($trillions 2009)	0.00	0.01	0.04	0.09	0.15
Net worth of GRA System (as % of GDP)	0%	0%	0%	0%	0%
Net worth of GRA System (as % of liabilities)	0%	0%	1%	1%	1%
Total Inflow ($Billions)	196	206	215	231	251
Value of Fees/Costs ($billions)	7	20	34	47	61

Table A1.2 Data Summary - Baseline Scenario					
Year	2010	2020	2030	2040	2050
Total Value of GRA Assets ($ Trillions, 2009)	1.39	4.32	8.19	12.97	18.77
Total Value of GRA Assets (% of GDP)	10%	24%	37%	47%	55%
Total Liabilities ($ Trillions, 2009)	1.39	4.02	7.12	10.56	14.47
Total Liabilities (as % GDP)	10%	23%	32%	39%	42%
Assets as % of Liabilities	100%	107%	115%	123%	130%
"Rainy day Fund" ($Billions, 2009)	0.00	1.96	21.23	67.98	143.68
"Rainy day Fund" (as % of liabilities)	0%	0%	0%	1%	1%
Net worth of GRA System ($trillions 2009)	0.00	0.30	1.08	2.41	4.30
Net worth of GRA System (as % of GDP)	0%	2%	5%	9%	13%
Net worth of GRA System (as % of liabilities)	0%	7%	15%	23%	30%
Total Inflow ($Billions)	196	229	267	323	394
Value of Fees/Costs ($billions)	7	22	41	65	94

Table A1.3 Data Summary - Higher Scenario					
Year	2010	2020	2030	2040	2050
Total Value of GRA Assets ($ Trillions, 2009)	1.39	4.77	10.18	18.36	30.38
Total Value of GRA Assets (% of GDP)	10%	27%	46%	67%	89%
Total Liabilities ($ Trillions, 2009)	1.39	4.14	7.80	12.62	19.16
Total Liabilities (as % GDP)	10%	23%	35%	46%	56%
Assets as % of Liabilities	100%	115%	130%	145%	159%
"Rainy day Fund" ($Billions, 2009)	0.00	2.34	31.25	119.76	291.79
"Rainy day Fund" (as % of liabilities)	0%	0%	0%	1%	2%
Net worth of GRA System ($trillions 2009)	0.00	0.62	2.37	5.74	11.22
Net worth of GRA System (as % of GDP)	0%	4%	11%	21%	33%
Net worth of GRA System (as % of liabilities)	0%	15%	30%	45%	59%
Total Inflow ($Billions)	196	260	347	485	687
Value of Fees/Costs ($billions)	7	24	51	92	152

Appendix 2: Assets, Liabilities, the Rainy-Day Fund, the Net Worth of the GRA System and the concept of Time-Equivalent Surplus

The GRA's liabilities are the claims of its participants. This is simply the sum of all contributions into the GRA by employees and their employers (together totalling 5% of the pre-tax wages) grown at 3% a year over inflation. These claims must be fulfilled by the assets of the GRA, which are the proceeds from the investment of those contributions. Those proceeds are uncertain. If they undershoot the 3% real return that is guaranteed to participants, the net worth of the system for current participants (its assets minus its liabilities or workers and retirees) will be negative. Faster growth in assets, however, would lead to positive net worth for current participants.

Once established, the GRA will exist in perpetuity. Given the uncertainty of life expectancy, the proposal addresses the issue of intergenerational relationships. When a GRA holder dies before exhausting their claims on the GRA fund, a death payment of half of their remaining balance (representing the employee's contribution to the GRA) is returned to the family. The other half is kept within the GRA system as part of the Rainy Day Fund. This fund exists to shield the GRA system from prolonged periods of investment underperformance, representing assets that cannot be claimed by individual participants.

If, however, the participant lives longer than anticipated, he or she will continue to receive payments from the GRA system after their claims have been exhausted. This suggests they would either be paid out of money owed to other people or from the aforementioned Rainy Day Fund. If that individual participant's return on their GRA contributions undershot the guaranteed rate of return, then one of these two options would have to be taken. But as outlined elsewhere,[11] the rate of return guaranteed to participants (3% real) is deliberately low to help ensure that invested assets grow faster than the liabilities based on them. This creates a surplus over time.

This differential continues into the retirement years. The model assumes that the annual payout is simply a function of the balance of the account at retirement, the number of years of expected retirement for the individual and the rate of return on the funds as they await dispersal. That annutization calculation is conducted on the claims amassed not the value of the assets, and the rate of return assumed in that calculation is the guaranteed rate of return and not the actual rate achieved (which is of course uncertain at the time of the annuitization).

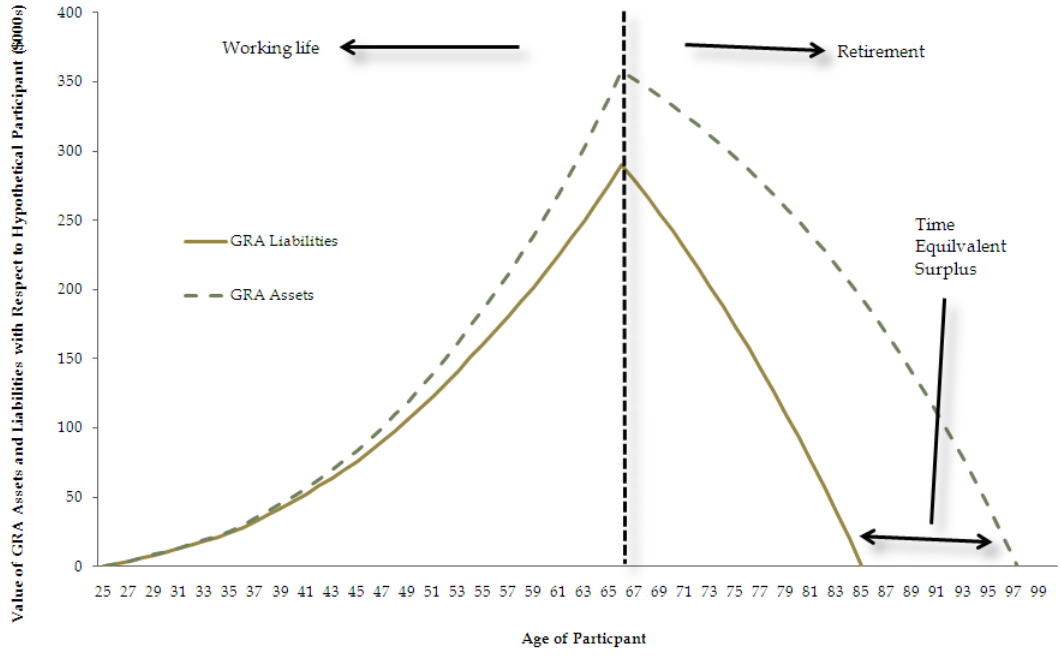
For example, take Mrs X. She starts work in 2010 at age 25 earning $37,000. Her income steadily grows to around $100,000 (in 2010 dollars) in her fifties and up to her retirement at age 65, year 2040. Throughout this time, 5% of her salary is being committed to the GRA (half from her, half from her employer). The GRA promises her a return of 3% after inflation but actually generates a real return of

[11] What rate of return can a GRA system credibly guarantee?, SCEPA Working Paper 2010-3, David Stubbs, June 8th 2010

4% after costs. The value of her GRA fund is roughly $290,000, and the value of the money contributed after investment returns is $358,000, 23% higher than the claims she has on the GRA.

At the point of retirement, the GRA annuitizes her holdings of $290,000, assuming a life expectancy of 84 and a retirement period of 19 years.[12] The GRA also continues to promise her a 3% real return on the balance of funds in her GRA account during retirement. This equates to an annual payment of around $20,000. This payment reduces the balance of her account to 0 at age 84. If Mrs X dies before she reaches 84, half the remaining balance of her GRA account is returned to her family and half is retained in the GRA's Rainy-Day Fund. If she lives longer than expected she is not a burden on others in the system or on the RDF. This is because the value of the assets is still positive at age 84. Indeed, assuming the assets continued to grow at 4% real after costs, then by paying out $20,000 every year, the balance of the assets would not reach zero until age 96. This 12 year difference is called the Time Equivalent Surplus (TES) and is the first line of protection of the GRA's solvency from unexpected increases in life expectancy. The evolution of the assets and liabilities of the GRA regarding a single individual like Mrs X is shown in chart A2.1

Chart A2.2: The path of an individual's GRA claims and the value the funds committed*



*Assuming guaranteed rate of 3% and investment returns after fees of 4%

As shown in chart A2.2, the value of the TES in years is a non-linear of the difference between the rate of return on contributed funds and the rate of return on those funds that was promised to participants. When the investment return is lower than the guaranteed rate, there is a negative TES or as "Time-Equivalent

[12] The current estimate used by the trustees of Social Security

Deficit". This however plateaus at around -10 years as the raw funds contributed with any investment returns provide a floor to the assets account. On the other hand, as a positive gap between investment returns and the guaranteed rate the increases the TES grows exponentially. This is because if the investment returns during the retirement period are high enough (2% higher than the guaranteed rate is enough) then the increase in the assets every year is more than the reduction from the annuity payment and hence the value of the assets rises whilst the liabilities decline, making the TES infinite.

Chart A2.2: As Investment Returns Exceed the Promised Rate of Return, The Time Equivalent Surplus Increases Markedly