# The Essence of Social Security:  Debunked Myths

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## I  The Essence of Social Security

A Social Security system is a social contract that sets out a process to decide what proportion of a country's Gross National Product its elderly residents can consume without any need for them to be in the active workforce.  That is its essence on a macro-economic level.  On a micro-economic level it is a process to decide what proportion of each worker's output will be transferred to its non-active elderly population for their consumption.

That is the entire story.  But, once understood, many myths underlying today's social security policies and procedures are easily seen to be just that:  myths.

## II  How different is Paygo Social Security from Fully-Funded Social Security?

First, I acknowledge that there are an infinite number of alternatives available between purely paygo social security and fully-funded social security.  However, by analyzing what is true at these two polar opposite end points, we can resolve most of the supposed funding issues for systems in between.

Start with paygo financing.  Note, first, that social security needs to be financed;  it does not necessarily need to be funded.  It is beneficial to have its financing be sustainable and stable.  To do that may require carrying some reserves, but pure paygo financing is a perfectly acceptable method of running a social security system.

In a pure paygo system, workers forego a certain amount of take-home pay (which is a proxy for ability to consume) by making contributions to the social security system.  Assume a worker makes a 10% contribution.  This is absolutely the same as saying that a worker takes one half day of production and passes it over to a retired elderly person, who is normally not in the work force, for them to consume.  The money (representing goods and services not consumed by the worker) comes in in the morning and goes out in the afternoon allowing for an equal amount of consumption of goods and services by the elderly.

The workings of a fully funded program are slightly more complex, but virtually equivalent.  Again, let's assume our system will require 10% contributions from each worker to be fully funded.  What happens in this system is that the worker foregoes 10% of his/her consumption so as to buy assets (e.g., stocks and bonds) that are kept in some safe retirement savings vehicle managed by some financial institution (the assets may be housed internally to the social security system).

When the worker retires, he/she then liquidates these assets, turning them into money to buy goods and services for consumption.

If we look at this through a microscope, on a certain day there are workers searching for owners of assets (e.g., stocks and bonds) who want to sell them for money and there are retired elderly who have assets (e.g., stocks and bonds) who are looking for buyers so as to get money to purchase goods and services.

Almost identically to the paygo system, the worker foregoes consumption (say 10%) and transfers money to an elderly asset owner to acquire his/her assets. The elderly person, in turn, sells certain assets to get money to pay for consumption. But the end result is identical. The worker gives up consumption of a certain portion of his/her output and transfers the right to this consumption to an elderly retiree.

One middle ground method of financing a social security system is to have assets backing the system (either partially or fully-funded) but those assets are all government bonds. Now if the country's economy is a closed economy and workers are the source of both social security contributions and income taxes, then the impact on the economy of this country and its workers/ producers is identical both as to the size of the demand for money (i.e., foregone consumption) and as to the timing of that demand for money whether the system is purely paygo (no assets) or fully-funded or any alternative in between. It is only a choice of whether the worker pays taxes out of his/her right pocket to buy back the bonds as needed or whether the worker pays contributions to the social security system out of his/her left hand pocket. But the systems are identical both as to the size of the cash flow demand and its timing.

Now, if the country's economy is not closed, and if any assets of the social security system are invested offshore (which may be difficult politically) then the different funding mechanisms will not be absolutely identical, but will be so close as to only have implications in the systems decimal places. Further, investing offshore creates currency exchange risk.

Finally, if one is wise in investing off shore, one needs to find a country that does not have the same demographics as the home country. Otherwise, you have not mitigated the "funding" risk.

**III Are Fully-Funded Social Security Systems Demographically Immune?**

We can see clearly from the previous discussion, that fully funded social security systems are not demographically immune. The Aged Dependency Ratio (often defined as the ratio of those aged 65 and over to those aged 20 to 64) is as important to a fully funded system as it is to a paygo system. This ratio will decide how easy/hard it will be for workers to find persons trying to liquidate assets (those 65+) or alternatively how easy/hard it will be for the elderly to find buyers of their

assets (those 20-65) and thus how much gross national product will be effectively transferred.

The fallacy that fully funded systems are demographically immune can be explained through the "Fallacy of Composition".  An analogy will illustrate this nicely.  If you are an individual at a concert and your view is blocked, you can see better if you stand up.  But, if the entire audience stands up, you are no better off.

To take it to an extreme, if there are NO workers, then there will be no production of gross national product.  There will be no contributions to a paygo system, but also no ability to sell one's assets in a fully funded system.  In short, there has to be production of gross national product before it can be distributed.  Wealth brings high wages;  high wages do not bring wealth.

To determine the required contribution rate for a paygo social security system, the rate of return that is implicit in the calculation is the growth rate of the earnings base on which contributions are paid.  This is effectively the rate of growth of the economy which, in turn, is a function of the growth rate of the labour force and the rate of productivity growth.

To determine the required contribution rate for a fully funded social security system, the rate of return that is implicit in the calculation is the rate of return on invested assets.  Thus, there will be times when a paygo system will require lower contribution rates that a fully-funded system (most of the second half of the last century) and there will be times when a fully-funded system will require lower contribution rates that a paygo system (most of the first half of this century).  There is nothing to say in advance that one system is inherently cheaper than the other.

## IV  Which is More Volatile:  PAYGO or Fully-Funded Systems?

As was mentioned above, a goal for a sound social security system is sustainable and stable financing.  By definition, are paygo systems more stable or are fully-funded systems?

The volatility in the cost/contributions for a fully–funded system will be the volatility of the rates of return of its invested assets.  As we all know, volatility of interest rates is very high.  They are not highly predictable even in the relatively short run (e.g., ten years).

The volatility in a paygo system is the size of the wage base upon which contributions are made.  This is turn depends upon a number of demographic and economic variables including:  fertility rates, migration rates, labour force participation rates and productivity improvement rates.  Life expectancy (mortality rates) was not included in this list because it has an equal impact on either/both paygo and fully-funded systems.  Further, many systems have now introduced

Automatic Balancing Mechanisms which make these systems highly immune to changes in life expectancy.

I would suggest that I would rather have to predict the cumulative impact of the above list of demographic/economic variables than to have to predict interest rates into the future. The above variables can be influenced somewhat by government policy and some moves in one variable can offset unexpected moves in another variable (e.g., using migration to replace non births).

But, to conclude, there is nothing inherent in a system being fully-funded that makes it more stable or more predictable than a paygo system.

## V What should We Avoid in Designing a Social Security System?

We have discovered that there is not as much of a difference between paygo social security systems versus fully-funded systems as the "myths" would lead us to believe.

That being the case, is there any reason why we should care how the systems are financed?

The answer is a definite *yes*. One must design the financing of the system in a manner that absolutely minimizes the expense burden on the participants and the risks that the participants must assume. That being the case, it becomes rapidly apparent that the worst way to design a social security system is as an "Individual Account Defined Contribution" system.

Such a system makes a number of assumptions that are just patently false.

1. Workers are capable of optimal investing and asset management.
2. If they are not capable themselves, then they can purchase asset management at a very low expense ratio.
3. Workers, if given investment fund options, will choose wisely and will also follow a life-cycle model of investing where they slowly move from a high equity portfolio to more fixed income as they near retirement (or, even better, they buy deferred annuities as they near retirement).
4. Workers can buy individual life annuities as a fair actuarial price.

Each of these assumptions is false.

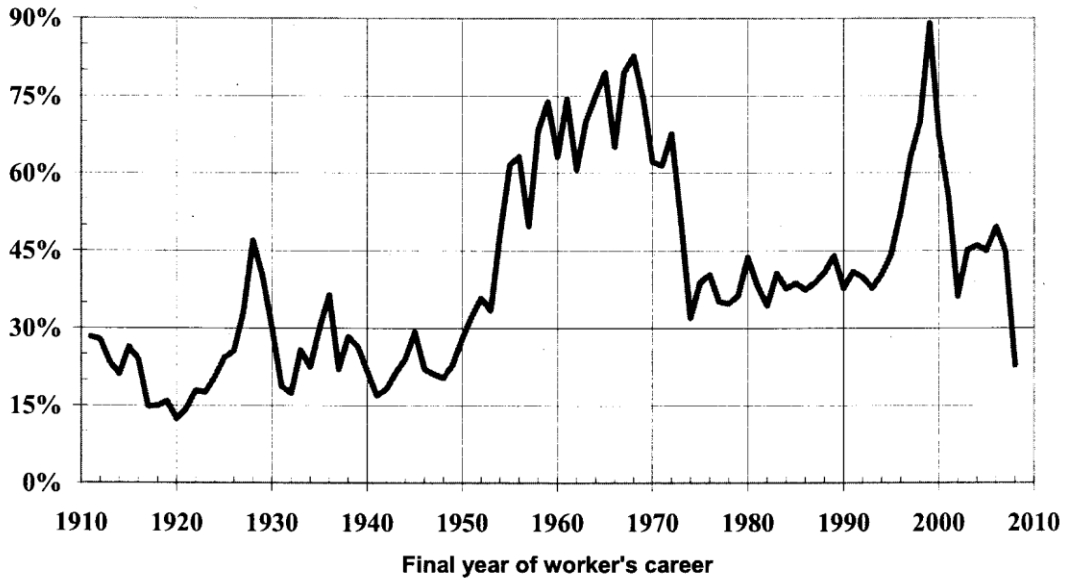1. *Workers are capable of optimal investing and asset management.*

How can an individual worker who has no training or education in business or economics be expected to invest wisely and manage their assets prudently?

As the following graph shows the choice of one's investment portfolio and the timing of the cash flows can clearly have a huge impact on one's standard of living upon retirement.

**Figure 1**

Replacement rate obtained from personal account savings of workers who invest solely in stocks and contribute 4% of annual salary over a 40-year career



**Replacement rate**
(Annuity / Final wage)

Final year of worker's career
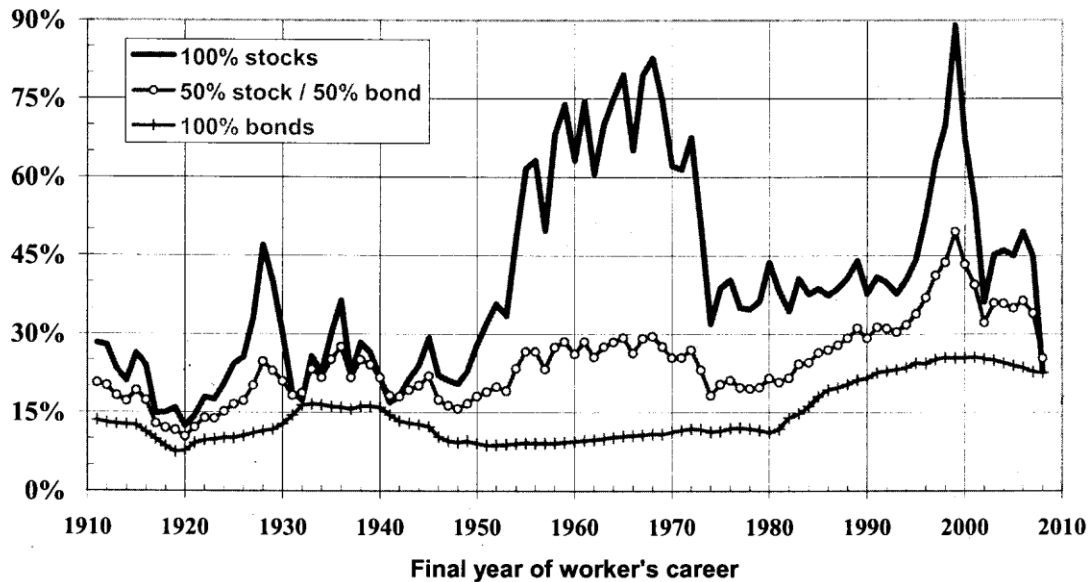
Source: Burtless, (2009)

In the graph above, we see replacement rate as high as 90% and as low as 14%.  And the only variable is the period over which one is working and saving.

Clearly, the worker can decrease the investment risk by choosing less volatile investments such as government bonds.  While it is true that the volatility decreases markedly, so too do the Replacement Rates as seen in Figure 2.

**Figure 2**

**Replacement rate obtained from personal account savings of workers who invest in alternative portfolios and contribute 4% of annual salary over a 40-year career**

**Replacement rate**
(Annuity / Final wage)



Final year of worker's career

Source: *ibid.*

That is, the worker has two choices. Invest heavily in stocks and face a level of volatility that is probably unacceptable. Or, invest more heavily in bonds and fixed-income securities and mitigate the volatility risk but guarantee living at a much lower standard of living in retirement.

The replacement ratios in the above graphs also indicate the impact of the timing risk. This is the risk of being forced to liquidate your assets at depressed values while also buying an annuity when interest rates are low and annuity prices are, therefore, high (as in 2009).

The responsibility of investing and liquidating one's assets is one for which the average worker has little capability. The literature indicates that if individuals are responsible for managing their own capital accumulation, they do so conservatively and achieve lower rates of return.

2. *If they are not capable themselves, then they can purchase asset management at a very low expense ratio.*

One can legitimately argue that there are professionals who can be paid to manage the funds even in the de-accumulation phase. While that is true, it comes at a high cost. It is not unreasonable to assume that a professional fund manager will charge

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2% of assets each year as their management fee.  A 2% per annum fee decreases the ultimate retirement fund (assuming a 35-year experience) by 31.7% (Ambachtsheer, 2008).

Looked at in a slightly different manner, Table 1 tracks the impact of investment expense ratios and shows how profoundly they can affect the aggregate pension benefits and working income replacement ratios of retired plan members.  The data assume an annual contribution to a plan of $10,000 over 40 years for a worker making $50,000 per year.

**Table 1:  Impact of Investment Expense Ratios on Pension Adequacy**

| Expense Ratio | 0% | 0.4% | 1.5% | 3% | 5% |
|---|---|---|---|---|---|
| Accumulated Value (after 40 years) | $777,000 | $707,000 | $551,000 | $400,000 | $272,000 |
| Annual Pension Payout | $45,000 | $41,000 | $32,000 | $23,000 | $16,000 |
| Replacement Ratio | 90% | 82% | 64% | 46% | 32% |

Ambachtsheer, 2008.

Munnell et al (2013) found that:

> "*fees have a significant effect on how much an individual will have at retirement.  An additional 100 basis points over a 40-year period reduces final assets by about one fifth.  Many studies have also shown that actively-managed funds underperform index funds, even before accounting for the higher fees charged by the former.  But broker-sold mutual funds perform worst of all.  One estimate is that broker-sold funds underperform average actively-managed stock funds by 23 to 255 basis points a year. The problem is big because the number of people rolling over into IRAs has increased dramatically.*
>
> *…*
> *The rollover of balances from 401(k)s to IRAs is extraordinary given that participants are typically passive in their interactions with their 401(k) plans. They rarely change their contribution rate or rebalance their portfolios in response to market fluctuations or as they age.*
>
> *Some households may be attracted by the opportunity to obtain a wider menu of investment options or to consolidate their account holdings. But others may be seduced by advertisements from financial service firms*

> *urging participants to move their funds out of their "old," "tired" 401(k) plan into a new IRA."*

Finally, if we are going to design a Defined Contribution Social Security system, at the least it should be run as a large, "collective" fund. This is because size matters.

**Table 2: Investment Fees by Size of Pension Fund**

| Size of Pension Fund | Investment Fees for Large-Cap Equities |
|---|---|
| Individual Account | 250-300 basis points |
| $10 million | 60 basis points |
| $1 billion | 42 basis points |
| $10 billion | 28-35 basis points |

Ambachtsheer, 2008.

Further, and importantly, a large collective fund can invest more widely than any Individual Account, in, for example, private equity or infrastructure. This effectively gives the worker a less risky portfolio.

> 3. *Workers, if given investment fund options, will chose wisely and will also follow a life-cycle model of investing where they slowly move from a high equity portfolio to more fixed income as they near retirement (or, even better, they buy deferred annuities as they near retirement).*

There is no support in the literature for this contention (see Munnell (2013) above). The more choice you give as to investment funds for Individual Accounts, the more likely it is that savings end up in the default option. In Australia, 80% of participants went to the default investment option. This does not have to be totally negative. For example, in Sweden, which offered 456 investment options, the majority of participants ended up in the default fund, but the default fund out-performed nearly all of the other funds, so the story ended well.

Nor is there any support in the literature for any evidence that workers use a life cycle approach to the management of their portfolio. (*ibid*)

Finally, buying fair market value life annuities may be very difficult.

> 4. *Workers can buy individual life annuities at a fair actuarial price.*

When we move into the de-accumulation phase, the worker can always manage the longevity risk by buying a life annuity. Simple enough, until we look at the cost, especially given today's very low interest rates. However, wherever interest rates happen to be at a given moment, a consistent cause of the high price of life annuities is the factor that the insurance company must include to cover anti-selection (James

et al, 2008).  Anti-selection occurs because the insurance company can never know as much about the annuitant's health and life expectancy as does the annuitant purchaser (the Principle of Information Asymmetry).  Under this Principle, workers who know they are in good health are more likely to buy life annuities or to buy larger amounts.  Those who know they are in poor health will not buy life annuities at all.  Thus, the insurance company must price the annuity assuming a five-star risk.  That is, they price the annuity assuming the purchaser will have very high life expectancy.

In most countries, there is no risk classification for annuities (except in extreme cases where the seriously ill or injured can purchase a Settlement Annuity).  Thus, the norm is that a coal miner who is over-weight and smokes pays the same price for an annuity as a non-smoking school teacher who jogs.  Clearly they are not equivalent risks, but they are normally priced as if they are both five star applicants.

This has the further negative impact of being regressive.  There is clear data (Brown and Prus, 2004, Whitehouse and Zaidi, 2008) that wealthier people live longer.  And this is not because healthier people make more money.  It is because of the stability, socialization and access to care that result from wealth and education (Brown and McDaid, 2003).  Thus, if you charge the same rate for all life annuities, you are penalizing the poor who, it might be argued, are those in most need of being able to transfer the longevity risk.  It is thus debatable as to whether a poorer worker should annuitize at retirement.

If the worker does not buy an annuity, effectively, they must self annuitize.  That is, they must determine a program of income withdrawal that is optimal for them.  Depending on their desire to leave a bequest (which we ignore here), they will want to take out the maximum income possible without creating the threat of outliving their assets.  That is a lot to ask.  Who knows their life expectancy?  And covering your life expectancy is not enough.  One would be wise to cover at least one's life expectancy plus one standard deviation.  So, if workers want to be sure that they will not outlive their assets, they make conservative withdrawals.  That means they live at a lower standard of living than is necessary.  If they take more aggressive withdrawals, then they increase the probability of outliving their assets and thus becoming dependent on government programs for their continued consumption.  (This should also be a concern to taxpayers who will pay those welfare benefits).

Individual Accounts also create a counter-cyclical macro-economic bias.  For example, when a country's economy is hot, one would expect asset values to rise but also one would expect increased demand for labour.  When the stock market is hot, holders of Individual Accounts will see an ability to retire and will then leave the labour force, exactly what the economy does not want.  The reverse holds when the economy cools.  Individual Account values go down and the account holders see that they must remain in the work force, just when you would like them to leave.  (MacDonald and Cairns, 2007).

In short, in the case of a system based on individual accounts where the workers invest their funds, inadequate education of the public, lack of any smart default option and inadequate regulation and supervision of the investment managers may result in poor investment choices, high transaction costs, and thus lower than expected net returns.  To conclude, there appears to be little economic support for Individual Accounts Social Security Retirement Systems (see de Mesa, 1997, Gill, Packard and Yermo, 2004, Sinha and Yanez, 2008, Diamond, 2004 and Diamond and Orzag, 2004).

## Conclusion

This paper has attempted to boil the definition of a social security system down to its most basic level.  In doing so, we have discovered a number of truths.

1. Paygo systems are not remarkably different from fully-funded systems.
2. Fully-funded systems are not demographically immune.
3. Fully-funded systems are not inherently more stable than paygo systems.
4. The least desirable design for a social security system is an Individual Account Defined Contribution system.

It is the expectation of the author that many of the points made in this paper will prove to be contentious.  By debating our different viewpoints, it is hoped that we can all arrive at a more complete understanding of The Essence of Social Security.

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