In Defense of Pay-as-You-Go (Paygo) Financing of Social Security

Robert L. Brown*

Abstract

Today's proposals to create larger social security funds and then invest them in the private sector are intended to create more rapid economic growth, which would make it easier to pay social security benefits in the long run. These proposals are also aimed at enhancing intergenerational equity by making today's workers pay for a greater proportion of their future benefits.

The important public policy issues inherent in such proposals are numerous: questions of whether prefunded social security plans are demographically immune; whether prefunding social security can increase gross national savings and worker productivity; whether there are better ways to create a healthy economy; whether social security is best offered as a defined-benefit plan or a defined-contribution plan. This paper explores each of these important public policy issues in the context of the social security systems of Canada and the U.S.

I. Introduction

This paper discusses the issues surrounding the level of funding for the social security systems in Canada and the U.S., which is an important public policy agenda item at this time. The paper does not present a balanced discussion of the issues; rather, it presents a defense of pay-as-you-go (paygo) financing as the preferred method. Many authors are now speaking in favor of a more fully funded system (see, for example, Robson 1995, Slater 1995, World Bank 1994, and Kotlikoff et al. 1996), and they appear to have the ear of policymakers.

In short, my purpose is to pose important questions that need to be answered by policymakers before any move is made to larger prefunding of social security.

I think that actuaries, by their training, have a natural predisposal to favor prefunding. As stated by Miles Dawson (1917):

> ...actuaries approach it as if it were settled in advance that there ought to be a reserve and after a good deal of study and investigation are not so certain they are right.

For the discussion that follows, the meanings of the words *paygo* and *funded* need to be carefully understood. Neither word is taken in its absolute meaning. For example, paygo funding is not to meant to imply no contingency fund at all. In fact, the paper assumes that any system that carries only a small contingency (no more than two years of benefit expenditures) is a paygo system. Similarly, funded does not mean absolutely fully funded; any scheme that creates investable funds measurably larger than a small contingency reserve is included in the category of "prefunded" schemes.

The Old Age and Survivors Insurance and Disability Insurance (OASDI) system today has a fund that is expected to grow for the next decade or so. However, that fund is not expected to exceed two years' worth of benefit expenditures (or if so, only slightly). Thus, this paper categorizes the OASDI system as paygo. Similarly, the Canada/Quebec Pension Plan (C/QPP), today, carries a side fund of about two years' worth of benefits; thus this paper refers to the C/QPP as paygo today. However, recent government amendments to the plan would raise the contribution rate by 73% over the next six years and create a fund worth five years of benefit expenditures. Thus, the amended C/QPP is not referred to as paygo.

One important aside is the stability of contributions, an issue often raised as a public policy goal of any financing scheme for social security (certainly it

*Robert L. Brown, F.S.A., F.C.I.A., A.C.A.S., is Professor in the Department of Statistics and Actuarial Science and Director of the Institute of Insurance and Pension Research at the University of Waterloo, Waterloo, Ontario N2L 3G1, Canada.

was a prime motivating factor for recent amendments to the C/QPP). As discussed in the next section, the contribution rates for a fully funded scheme are a function of the real rates of return earned by the funds. Thus, a truly fully funded scheme does not create stable contribution rates. Rates rise and fall inversely to real interest rates. However, contribution rates fluctuate more than interest rates because each year's contribution must cover both the value of the benefits earned for the year and the actuarial experienced gain or loss on the benefits for all past years.

A pure paygo system has contribution rates that rise and fall with the ratio of retirees to workers and the rate of increase of national incomes. Thus, a pure paygo system also cannot have stable contribution rates. Both systems require immediate attention if any variable evolves other than the modeled expectations. However, either a paygo system with a small contingency fund or a partially funded system that can use its reserves to soften the immediate need for contribution rate changes can result in achieving level and stable contribution rates for long periods.

II. WHY THE INTEREST IN PREFUNDING SOCIAL SECURITY?

Many industrialized nations are currently considering some form of prefunding of their social security systems; this is certainly true in Canada and the U.S. Proposals that have been put forth to change social security range from relatively small (for example, how a small proportion of surplus assets are invested) to very dramatic (for example, the total replacement of the present social security system with individual savings accounts, such as in Chile).

The supporters of these various proposals claim that today's younger workers and tomorrow's working generation will be better off with a changed social security system. But after a half century of relative stability in the philosophical underpinnings of social security, why the apparent sudden interest in change?

One of the driving forces for reform is the impending dramatic shift in the demographics underlying social security. These forces have been widely analyzed and are well understood. First, life expectancy has improved substantially and is continuing to improve. Statistics for Canada and the U.S. are given in Tables 1 and 2.

More important, however, are the impending demographic dependency shifts as we anticipate the movement of the baby boom out of the labor force and its replacement by the baby-bust cohort. This fast approaching force is seen clearly in Figures 1 (Canada) and 2 (the U.S.).

TABLE 1
LIFE EXPECTANCY IN CANADA

	At Birth		At Age 65	
Year	Male	Female	Male	Female
1921	58.8	60.6	13.0	13.6
1961	68.4	74.2	13.5	16.1
1991	74.6	80.9	15.7	19.9

Source: Statistics Canada.

TABLE 2
LIFE EXPECTANCY IN THE U.S.

|	At Birth		At Age 65	
Year	Male	Female	Male	Female
1920	55.6	57.6	12.2	12.7
1960	66.8	73.2	12.9	15.8
1990	71.8	78.8	15.1	19.0

Source: U.S. Life Tables.

FIGURE 1
LIVE BIRTHS IN CANADA
1920–1995
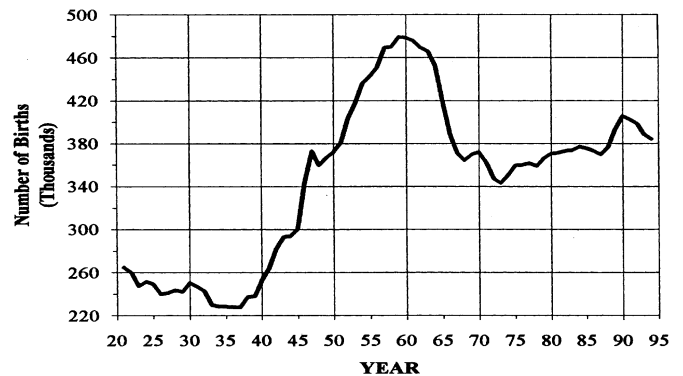
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We have already experienced the economic impact of the baby boom in its youth and in its entry into the labor force. When baby boomers bought homes, house prices and mortgage rates rose measurably. When they entered the workforce, youth unemployment rates skyrocketed. Their entry into the labor force has also been blamed for dampening rates of productivity improvement as business chose to buy cheap labor instead of more expensive capital.

FIGURE 2
LIVE BIRTHS IN THE U.S.
1920–1995
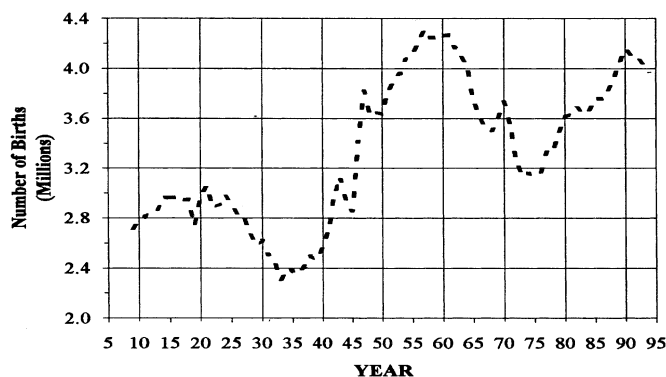
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Those who favor prefunding of social security to some extent argue that the resultant large asset pools can be invested to aid in overcoming the impact of these demographic shifts on paygo contribution rates. Through enhanced economic growth, it is said, faster wealth creation makes larger wealth transfers possible. For example, assume that the cost of retirement income security and health care for the aged today costs 12.5% of all wages from all workers. That means that a worker who is paid for a 40-hour week has to work 5 hours to take care of the benefits for the dependent elderly. Assume that over the next 35 years the ratio of elderly to workers doubles. With no change in worker productivity, each worker would have to contribute 25% of wages, or work 10 hours, to take care of the benefits for the dependent elderly. However, if every worker were to become twice as productive (which would require only 2% improvement per annum for the 35 years), then each worker would produce enough goods and services to meet the needs of the dependent elderly in the same 5 hours it takes today.

In terms of the direct funding of social security in Canada and the U.S., the ability of enhanced worker productivity to solve the financing problems as projected is more limited. In both Canada and the U.S., the accrual of benefits is linked to a wage base that is indexed to national wages. Thus, any productivity improvements that are reflected in national wages prior to retirement immediately create larger social security benefits at retirement. After retirement, again in both

Canada and the U.S., benefits are indexed to cost of living as measured by the consumer price index (CPI). Thus, it is only after retirement that increased worker productivity creates a discount rate in terms of the cost of social security. To achieve the full cost benefit of gains in productivity, price-indexed pre-retirement formulas would be necessary. For a full discussion of this matter, see Moorhead and Trowbridge (1977).

If prefunding social security results in faster wealth creation, then why wasn't social security established on a fully funded basis from the beginning? [For a more complete discussion of the history of this debate within OASDI, see Derthick (1979, Chapters 10/11).]

If social security is financed on a (paygo) basis, then the implicit "rate of return" of such a financing arrangement is the rate of increase of employment earnings (subject to social security contributions); see, for example, Treuil (1981). This, in turn, is normally highly correlated to the total of the growth rate of the labor force (including part-time work) and the per-worker rate of productivity increase.

A fully funded social security scheme has an actuarial discount rate equivalent to the real rate of interest (real rates because social security benefits are indexed to inflation).

According to the Canadian Institute of Actuaries (1996, p. 3), in the 1960s demographic and economic variables, if assumed long-term into the future (after a ten-year transition from existing values), favored paygo financing on the basis of cost. In particular, in the 1960s in Canada (when the C/QPP was introduced on a quasi-paygo basis), reasonable actuarial assumptions would have been as follows:

Senior dependency ratio	0.33
Annual increase in real wages	2.0%
Real rates of return	2.0%

These underlying assumptions would have led to the following projected costs for Canadian social security as a percentage of payroll for paygo versus fully funded arrangements.

Funding Arrangement	Projected Cost as Percentage of Payroll
Paygo (mature plan)	11.0%
Fully funded	16.5%

But times have changed. The future is not what it used to be. Today's long-term assumptions (again after a ten-year transition from existing values) in Canada would be closer to the following (CIA 1996):

Senior dependency ratio	0.40
Annual increase in real wages	1.0%
Real rates of return	4.0%

These factors lead to the following projected costs:

Funding Arrangement	Projected Cost as Percentage of Payroll
Paygo (mature plan)	14.5%
Fully funded	7.2%

While factors in the U.S. would not favor prefunding to the same extent, because real interest rates are lower and annual wage increases higher than in Canada, the forces now also favor fuller funding in the U.S. as well.

Hence the pressure to consider a shift to greater funding of social security. Just as paygo financing makes sense for cost containment when real interest rates are lower than the growth rate of real wages (as in the 1950s and 1960s), so too a conversion to more funding seems to make sense when real interest rates are higher than real wage growth prospects (as in the 1990s).

But is a prefunded scheme more secure? Can productivity rates be increased by prefunding social security? Are prefunded plans demographically immune? How long will factors favoring prefunding last? Would switching back and forth between financing arrangements be accepted as good public policy? These are the questions that should be posed by public-policymakers before any switch in funding methods is adopted. The rest of the paper explores many of these issues.

III. IS A FUNDED PENSION DEMOGRAPHICALLY IMMUNE?

One problem with any discussion around the optimal financing arrangement for social security is confusion between what is true on a microeconomic basis and what is true on a macroeconomic basis.

This is sometimes referred to as the "Fallacy of Composition," whereby it is assumed that what is true for an individual will necessarily be true in aggregate [see Barr (1993) and Krugman (1996)]. For example,

if I stand at a concert, I can see better, but if everyone stands, then no one has an improved view. Clearly, for an individual to save for retirement, consumption must be foregone during one's working lifetime, with money set aside in savings. These funds are then used to buy goods and services post-retirement. Thus, it would seem logical for a nation to provide for its citizens' post-retirement needs by designing a prefunded social security scheme that accumulates large account balances that can be used to fund post-retirement consumption.

Francisco Bayo (1988, p. 178), Deputy Chief Actuary of OASDI, says this turns out not to be true:

> For Social Security, you cannot accumulate assets; that is, claims from somebody else's production. If we have a large amount of money in the Social Security trust funds, we have a claim on ourselves, which does not have much meaning. The truth is, whatever is going to be consumed—be it a product that you can get a physical hold of, or services that are very difficult to hold—those products cannot be stockpiled. They have to be provided at the time of consumption. No matter what kind of financing we are going to have in our Social Security program, you will find that the benefits that will be obtained by the beneficiary in the year 2050 will have to be produced by the workers in the year 2050, or just a few years earlier.

Nicholas Barr (1993, p. 220) says it even more strongly:

> The widely held (but false) view that funded schemes are inherently "safer" than PAYGO is an example of the fallacy of composition. For individuals the economic function of a pension scheme is to transfer consumption over time. But (ruling out the case where current output is stored in holes in people's gardens) this is not possible for society as a whole; the consumption of pensioners as a group is produced by the next generation of workers. From an aggregate viewpoint, the economic function of pension schemes is to divide total production between workers and pensioners, i.e. to reduce the consumption of workers so that sufficient output remains for pensioners. Once this point is understood it becomes clear why PAYGO and funded schemes, which are both simply ways of dividing output between workers and pensioners, should not fare very differently in the face of demographic change.

Thus, a review of the literature indicates strongly that prefunded social security systems do not overcome the impact of the impending demographic

shifts. (The paper discusses the countervailing impact of foreign investment later.) The pension income of any decade must come out of the national income of that decade. However, there may still be reasons to consider a prefunded scheme as economically advantageous.

As Barr (1993, p. 223) later allows, declines in the working aged population can be offset by increased productivity amongst the remaining workers or by increased labor force participation rates (for example, among women), so long as output is maintained. It is also, in principle, possible to maintain the consumption of both workers and pensioners with goods produced abroad, provided the country has sufficient overseas assets to do so.

> The crucial variable is output. A decline in the labor force causes problems for any pension scheme only if it causes a fall in output; the problem is solved to the extent that this can be prevented. The choice between PAYGO and funding in the face of demographic change is therefore relevant only to the extent that funding (as is sometimes argued) systematically causes output to be higher.

Thus, we have arrived at two important truths. First, no pension plan, private (see Schieber and Shoven 1994) or public, prefunded or paygo, is demographically immune. Second, the real security behind any pension plan is a healthy economy. Wealth cannot be transferred until it is created. And the more wealth that is created, the easier it is to transfer some to the retired elderly.

For prefunding to have any consequence on the security of social security, three requirements must be satisfied (all three); namely:
• Prefunding must increase gross national savings
• Those increased savings must be invested in a manner that increases worker productivity
• The prefunding must be the best way to achieve the first two requirements. If there is an alternative public policy that can increase savings and worker productivity either more efficiently or with less risk, then (by definition) it should be the preferred route (this assumes that no two alternatives have exactly the same impact).

Given these three criteria, how does the literature grade the prefunding of social security as the preferred proposal?

Does the prefunding of social security increase gross national savings (versus, for example, increased hoarding or increased surplus on the current account of the balance of payments)? There is an abundance of literature on this topic [for example, see Ricardo (1817), Daly (1981), Aaron (1982), Barr (1993), Burbidge (1987), or Atkinson (1995)], but no clear conclusion. This turns out to be a very difficult question if you allow for behavioral response (or Ricardian equivalence).

For example, we would think that the creation of a paygo social security system, which creates no assets but does provide real retirement income benefits, would necessarily decrease gross national savings. However, the literature finds that this intuitive impact can easily be offset (and was in the U.S. after the introduction of OASDI) by two behavioral responses. First, if the provision of social security results in earlier retirements for workers than would otherwise be possible, those workers will then save as much as before the provision of paygo social security to achieve full economic independence, even with earlier retirement (that is, they still have to save as much privately because they are now providing for a longer period in retirement).

Second, according to the literature, we must factor in the desire of people to create bequests to the next generation before we can know the impact of paygo social security on gross national savings. That is, when younger workers provide their parents with retirement income security through paygo social security, their parents, in turn, work hard to provide an inheritance for their children. Equivalently, there may be the removal of a negative bequest through the advent of social security in that workers no longer need to directly support their parents in retirement. The game may, therefore, be a zero net sum (see Barro 1974 and Poterba 1994).

Of importance here is the replacement rate provided by the social security system. In this regard, Canada and the U.S. are very similar. In both countries, a worker consistently earning the average industrial wage will realize a replacement ratio of about 40% from the total social security system (in Canada this includes Old Age Security and perhaps some Guaranteed Income Supplement). Poorer workers realize higher replacement ratios, and wealthier workers less. However, the social security system does not, in and of itself, provide full retirement income security—far from it. Thus, other forms of savings are essential. The arguments above about behavioral response may not be as applicable to systems that do provide full retirement income security (for example, some European systems).

In Chile, in 1980 when the social security system was financed on a paygo basis, the gross national savings rate was 21.0%. In 1981, Chile introduced a mandatory individual retirement savings scheme requiring 10% contributions from all workers (and nothing from the employer). The Chilean gross national savings rate dipped substantially in the early 1980s, and stood at 18.8% in 1991 (Uthoff 1993). In a more recent paper, Holzmann (1997) finds empirical evidence of both increased national savings and enhanced worker productivity in Chile after the 1981 social security reforms. However, Holzmann concludes that:

> the direct impact of the reform on private saving was low, or perhaps even negative.

According to Holzmann, the increase in national savings and the increase in worker productivity were because of higher growth rates in the economy.

Even if gross national savings are increased, has the history of such schemes shown that these savings are invested in a manner that increases worker productivity?

Again, the literature is inconclusive. For every plan that seems to create a healthier economy, there are examples where funds are used for purely political purposes, to reward political friends, to prop up failing industries, or even straight fraud on the part of the political masters. According to Rosa (1982, p. 212), the experiences of Sweden and Japan (from whom one might expect above average results in this matter):

> offer powerful evidence that this option may only invite squandering capital funds in wasteful, low-yield investments [which] should give pause to anyone proposing similar accumulations elsewhere.

Finally, even if the answers to our first two criteria were positive, is the raising of social security contribution rates to create investable funds the preferred policy option? Aaron (1982), after lengthy empirical analysis of the U.S. savings rates (personal, plus business, plus government, less depreciation) and labor force participation rates from 1930 to the late 1980s, says no.

> If our objective is to increase the rate of capital accumulation, we should ask which instruments are best for achieving that end. Prominent on the list would be direct assaults on the federal deficit, incentives to business investment, and the withdrawal of incentives that promote inefficient investments...
> I conclude also that if we wish to increase capital formation, the proper objective is the total saving

rate, and that raising social security payroll taxes or cutting social security benefits is a poor device for achieving that objective unless we favor them on other grounds. (Aaron 1982, p. 51–52)

J. D. Brown (1972) provides another reason for not using social security to create investable funds as the preferred public policy alternative. He argues that social security should not become an instrument of fiscal policy. If the plan is prefunded to any great extent, then contribution rates or benefits might be moved up or down for the impact that would have on the general economy (for example, to dampen inflation). Social security should not be manipulated for such general fiscal motives, according to Brown.

This "fiscal policy" effect was seen in the Singapore National Provident Fund in the early 1980s. When substantial wage awards were made, these were "mopped up" by concomitant increases in the rate of contribution to the Provident Fund (Deutsch and Zowall 1988, p. 72–81).

IV. POLICY ALTERNATIVES

A wide variety of proposals for the privatization of social security have been put forth. We examine several of these proposals in their broadest aspect (that is, not with any particular proposal in mind) and attempt to outline their advantages and disadvantages. "Privatization," as discussed below, includes both a shift from paygo social security to more prefunding, with assets invested in the private sector (such as is occurring now in Canada) or the more radical change where a paygo system is replaced by a defined contribution individual-account system such as in Chile.

A. Keep Social Security as a Defined-Benefit Plan, but Invest Assets Privately

Keeping social security as a defined-benefit plan, as is now the case in most systems, (including Canada and the U.S.) has a number of advantages, including low administrative costs. Also, by continuing the defined benefit nature of the program, all participants share in the risks inherent in saving for retirement, including inflation, mortality, selection of investments, and the risk of variable rates of interest at the time when accumulated assets are used to buy a retirement annuity or other retirement income vehicle. Further, it is relatively easy to include important ancillary benefits in a defined-benefit plan, such as disability income

and survivor income benefits, without having to take regard for the risk profile of any individual participant.

However, the establishment of a higher level of prefunding, and the creation of significant investable funds, as is happening in Canada at this time, have many associated problems. First, if the assets are invested totally in government bonds, has anything been gained over a purely paygo system? Workers are both social security contributors and taxpayers, and it is doubtful that they care about the destination of their paycheck deductions, only the total. In this regard, as the social security system builds up prefunded assets and buys government bonds, governments can use these funds to finance their expenditures while either not raising taxes or actually lowering them. Thus, workers experience higher social security contributions than would be necessary under pure paygo financing, but lower general tax rates. The total, however, has not changed as to size or timing.

Similarly, when the baby boomers start to retire, they will demand the return of their government bond IOU. While social security contribution rates will not have to rise when the demographic shift takes place, taxes will have to be raised to pay off the redeemed bonds (unless the government is completely debt free and running an operating surplus). Again, the total burden on workers is exactly the same, in both size and timing, as it would have been on a pure paygo financing basis.

As an aside, the impact on an individual worker may not be quite the same, however. This is because of the difference in effect between a progressive tax regime versus a flat (some would say regressive) payroll tax for social security. Thus in the lifetime of a worker in the baby-boom generation, the impact of fuller funding would be an increased regressive social security payroll tax but decreased progressive income taxation during the working years, and an increased progressive income tax during retirement.

Thus, except for the important psychological impact that by each generation paying for its social security "in full," they gain a higher moral level of claim on their prospective benefits, the prefunding of social security with all assets being government bonds seems rather pointless. In reality, the financing is still paygo. The total cost of social security to the workers has not changed in any way. In fact, it may work against the creation of a healthier, more productive economy, if these funds are merely used by the government to finance deficits based on consumption-targeted spending (for example, welfare payments). This may be especially important in the U.S. where the OASDI annual surplus is included in the unified federal budget and can be used to mask deficits. The only real debate here is whether payroll taxes (which is what social security contributions are seen to be) have a different impact on labor force productivity than other forms of taxation. This matter is discussed in detail later in the paper.

B. What if the Decision Is To Invest in Private-Sector Assets?

First, we would have to determine whether the macroeconomic balance sheet has changed at all. That is, if social security stops buying government bonds and buys corporate debt and equities, but the private sector commensurately decreases its purchase of corporate debt and equities and substitutes government bonds, then nothing has changed in total. If the result is not a zero-sum game, then presumably governments have to find new funding means for their debt. One would expect the government would have to raise its bond interest rates to make this happen. Ultimately, these higher interest charges fall back onto the workers.

Even if that zero-sum game is not the outcome, the ability of a prefunded system to create more savings is highly debatable, as is the ability of such savings, if realized, to create higher productivity. However, the expectation of productivity gains is higher if assets were invested in the private sector, rather than in government bonds, if the economy is undercapitalized. That is an essential part of the public policy process—the determination of the extent to which the economy is undercapitalized.

This "increased savings" could have a perverse effect if it inhibits consumer spending. By saving, we could create the "paradox of thrift," whereby business does not spend on plant and equipment when consumption declines, even with enhanced savings. This is exactly what happened in the Great Depression.

Who will decide how these assets are to be invested? Will they be used for political purposes, for lemon-aid (that is, to prop up ailing industries), or will they end up producing higher levels of wealth creation? Should the investment of these assets be restricted to the domestic market? If so, will that not mean that the social security funds (and government) will have an undue level of control over domestic capital markets and society?

This was discussed in some detail in the U.S. in 1935 (see Derthick 1979). Under the proposed amendments to the C/QPP, the Canadian government will establish a panel of experts who will work at arms length from government to invest the funds that will now accrue.

What if the investment is done passively, to achieve an index rate of return? Can the capital markets remain efficient if the majority of investment funds are passively invested? Such funds follow the market rather than leading it. Private capitalism works because management is forced by stockholders to excel. How do passive funds achieve this?

Are there enough high-quality assets available to invest wisely the several hundreds of billions of dollars (trillions in the U.S.) that will become available? This is a particularly interesting point. The funds of a prefunded social security scheme will build up rapidly now as the baby boom prefunds its benefits. However, the same baby-boomers will also be saving in their own pension plans and individual accounts for the remainder of their retirement needs. In fact, there are many who claim that today's hot stock market is the result of the influx of these new funds (without any privatization of social security). Thus, it could be argued that the social security system will be buying when asset values are high.

Then, when the baby boom retires, it will force the liquidation of the social security funds to a great extent, again at the same time as the baby-boomers are liquidating their other retirement plan assets. As stated by Schieber and Shoven (1994):

> This could depress asset prices, particularly since the demographic structure of the United States does not differ that greatly from Japan and Europe, which also will have large elderly populations at that time.

Thus, it can be logically argued that a prefunded system is doomed by being in the position of buying high and selling low. In fact, this logical argument concludes that the assumptions upon which the arguments for prefunding social security are based are internally contradictory. The move to prefunding is grounded on the assumption that real rates of return will continue to exceed the growth rate in real wages. If that weren't true, then paygo financing would be preferred. However, how can we continue to expect these current high real rates if we create hundreds of billions of new gross national savings and investable funds?

As an important aside, if the baby-boomers attempt to retire over a very short time horizon (they were born over a 15-year period), the drop in asset values intended to fund their retirement if all these assets were offered for sale at the same time, combined with the rise in the price of goods and services as we turn to the baby-bust generation for production of these goods and services, means that realized real retirement income will be lower than expected. That is, there will be free market incentives for later retirement regardless of what is done within the social security programs (Goss 1988, p. 304).

Offshore investment might be preferable for at least three reasons. First, as previously stated, the domestic capital market is not large enough for the prudent investment of such large funds. Second, diversification of risk in any portfolio is generally advised. Third, by investing in countries that do not share the aging populations of Canada or the U.S. (that excludes all of Europe, Japan, Australia, and New Zealand), or countries where workers do not care to retire at some fixed or early age (presumably developing nations), it might be possible to dampen the impact of the impending retirement of the baby-boom generation in North America. This might be referred to as demographic profile diversification. Interestingly, this might also decrease or eliminate the need for government-sponsored foreign aid.

However, this is not without some significant investment risk and political difficulties. One could expect heated debate if it were suggested that social security should build up large investable funds, only to have them invested offshore.

There are other problems associated with a prefunded social security, however, even if invested widely in the private sector. First, prefunded schemes are exposed to the risk of unforeseen inflation (that is, inflation that decreases real rates of return) because of the length of time between contribution and payment of retirement income. In this regard, inflation nearly destroyed several funded schemes in Europe earlier in this century (for example, France and Germany—see Linton 1935, p. 365). This may be one reason that these schemes now are funded on close-to-paygo financing. Prefunded provident funds that exist in many developing countries are also experiencing problems with the effects of inflation.

Second, with the creation of these large investment funds, there will be strong and continuous pressure to expand social security benefits in an era when such expansion would be misguided public policy. The history of the C/QPP provides strong evidence for this. Because of low early contribution rates and a healthy contingency fund, politicians steadily increased the

benefits of the C/QPP during its first 25 years. Based on the latest actuarial projections, of the 14.2% ultimate contribution rate required to fund the C/QPP, 2.4 percentage points come from the expansion of benefits just mentioned (Canada 1996, p. 46). This reason also was often used to continue basic paygo financing for OASDI over its early years [see Derthick (1979, Chapter 11)].

Finally, the creation of funds to invest requires that social security contribution rates must be set higher initially, in the short run, than those required under pure paygo financing. Is this optimal public policy? There are several reasons why the answer might be no.

First, there is evidence that social security contributions, whose impact is the same as payroll taxes, could hurt job creation.

> These [social security contribution rate] increases have had and will continue to have a negative impact on the labor force. By [between 1986 and] 1993, the rise in contributions by employers and employees had reduced employment and the participation rate by nearly 26,000 jobs and 0.12 percentage points, respectively. By the year 2016, the increase in C/QPP contributions will have reduced the participation rate by approximately 0.5 percentage points. (Italianno 1995)

This effect is especially pronounced if social security taxes are levied on only part of the worker's income (for example, in Canada, C/QPP contributions are levied only up to the year's maximum pensionable earnings, which is roughly the average industrial wage, while in the U.S., contributions to OASDI cease at $65,400 in 1997). Raising social security contribution rates would have the effect of providing an incentive to pay for overtime instead of hiring new staff. Would it not be preferable to assist job creation now, even if it means higher potential contributions when the baby boom retires, but also when there could easily be labor shortages?

Second, social security contributions are a part of total government taxation. There must be a maximum rate of taxation beyond which actual cash tax receipts decline. Prior to this, resistance to increased taxation will be evident in the proportion of the economy that evades taxation (that is, the underground or cash economy). So long as there exists government debt, is it optimal government policy to increase social security contributions to create huge social security funds or to increase some other form of tax and decrease the deficit and the debt? The level of noncompliance in the Chilean system can be partly explained by this taxation-limit phenomenon.

Third, there may be better ways to increase national savings rates and productivity than to prefund social security. Any government action that increases saving for retirement could be substituted for prefunded social security if the goal is to increase savings and productivity. Clearly, the increased (mandatory) contribution rates needed to prefund social security will decrease the total dollars that can be saved for retirement in any other vehicle and lessen the amount invested in private alternatives. It is surprising, therefore, not to hear more opposition to the prefunding of social security from private-sector-retirement professionals.

Mandating employer-sponsored private pensions or even creating stronger incentives (or weaker disincentives) to private pensions and individual savings accounts (RRSPs in Canada) could have the same effect on savings and productivity. In fact, it might be preferable because it does not bring with it the possibility of undue government influence and does not create any pressure for increasing social security benefits (Derthick 1979, Chapter 11). Is it not better to concentrate on the economic goals directly, rather than on the attempt to achieve them as a by-product of social security financing?

It seems very strange that in both Canada and the U.S. the government is seriously considering a prefunded social security scheme, while at the same time it is putting more limits on the ability of employers and workers to save through private pension schemes and individual accounts (see federal budgets in both countries over the past five years). As long as there is an alternative to prefunded social security that can have the same probability of enhancing savings and productivity, then, for the reasons just listed, it should be the preferred public policy.

Earlier I noted that the prefunding of social security might create a higher moral claim for the generation that paid for the full cost of benefits. This argument is stronger if the assets so created are invested in the private sector, as opposed to buying government bonds. Through the social security system, workers would become owners of capital and could expect to receive a fair rate of return on this capital after they retire. Although this is a strong argument, it still depends entirely on this capital being new and additional and on the capital being used to enhance worker productivity. Again, the basic truths have not changed.

C. Change Social Security to a Defined-Contribution Plan

Another possibility is to turn the present defined-benefit social security system into a defined-contribution scheme in which participants decide how their individual funds are invested. This is an analogy to the Chilean social security reforms, which are discussed more in Section II.D. Several countries have reformed their pension systems along the same lines as Chile did in 1981, including Peru in 1993, Argentina in 1994, Colombia in 1994, and Mexico in 1997. Others considering it are Bolivia and Ecuador.

Certainly it is possible to retain many of the obvious advantages of today's social security system within a defined-contribution scheme. All workers can be covered. Vesting can be immediate. Portability is a given. However, such a shift also has several disadvantages.

First, all the risks of a defined-contribution plan, including the investment risk, the inflation risk, and the mortality risk would fall on the shoulders of the individual worker instead of being shared across the entire population and across generations. As a result, any resulting assets would be invested in less risky instruments than if the plan were left as a defined-benefit plan but in the private sector. This, in turn, would be expected to result in lower long-term rates of return. This is extremely important since, for example, 1% of extra return over the lifetime of a worker would result in a pension that is about 24% larger (see Adams 1967). Even if the only concern is the cost of purchasing an annuity at the time of retirement, 2% of extra return translates into a retirement annuity that is about 17% larger for a fixed purchase price (Coward 1991, p. 66).

Second, the ancillary benefits of the present social security system, including disability and survivor benefits, would be lost or would have to be replaced by a parallel system of some kind. In Chile, extra contributions are required for these benefits, which are purchased from private insurers.

Third, administrative expenses for such a scheme would be much higher than under today's system. In Chile, with advertising costs and sales commission, expenses have run from 12% to 15% of cash flow versus the 1.3% expense ratio for the C/QPP, and 0.8% for OASDI.

Fourth, there may not be enough high-quality assets to match the investable funds now available. In times of poor investment returns, the government may be blamed and may be asked to provide minimum guarantees (which lead to economic distortions and possible antiselection).

Fifth, there is no wealth distribution in such a scheme. A worker who is poor throughout his or her working lifetime is guaranteed poverty in retirement. Similarly, the wealthy worker is guaranteed a wealthy retirement, aided by the tax advantages provided the scheme. In Chile, the results have actually been regressive. Because many of the sales and administrative expenses are per account and not per dollar of cash flow, smaller accounts have paid higher expense ratios than larger accounts.

Sixth, without special legislation, females retire with lower retirement income than males of identical work and contribution records, because of the higher female life expectancy. In Canada, females would also lose the child-rearing dropout provisions of the C/QPP. In the U.S., the dependent spouse benefit would disappear.

Seventh, the transition generation may have to pay twice: first, to fund the new defined-contribution scheme and, second, to pay for the accrued actuarial liability of the previous system (that is, the benefits promised by the previous system or about $600 billion in Canada and about ten times that in the U.S.). Note that it would be 30 to 40 years before the new defined-contribution scheme could pay out anything close to full benefits. In the meantime, the government is responsible for the previous accrued liability runoff. These accrued liabilities are now explicitly part of the national debt. If this debt is financed with something like the recognition bonds being used in Chile, then the first generation under the new scheme would have to pay for both its own new scheme and the debt of the recognition bonds for the previous accrued liability.

The economic impact of this is not immediately clear. Under a paygo social security system, there is an implicit government debt equal to the unfunded accrued actuarial liability of the system. By shifting to a defined-contribution system and issuing recognition bonds equal in value to the accrued benefits of qualified workers, the government has simply made this debt explicit. The recognition bonds do not have to be paid off by the first generation of workers any more than any one generation of workers is expected to pay off the national debt. However, to the extent that it is actually financed in this manner, the transition generation faces double taxation and is poorer to that extent. (The next generation is equivalently wealthier by not having this debt.)

Eighth, if the Chilean experience is any indication, there will probably be a need for some government guarantee of a minimum benefit under the new system (which, unless designed skillfully can be open to abuse and antiselection).

Finally, is there political justification for a free government forcing individual savings when there is no wealth distribution component? As long as there is some income redistribution, the general welfare argument can be used to defend such systems, but what happens when there is no wealth distribution?

D. The Chilean Model Reviewed

The new Chilean social security system was decreed in 1981. Rather than a government-run paygo scheme(s) (as had previously existed in Chile), the new system requires that employees contribute 10% of pay to 1 of 15 investment fund agencies (called AFPs). There is also a 3.5% (approximately) contribution to cover disability income benefits and survivor benefits (provided by private insurance companies). Employers do not contribute, nor do members of the military or self-employed. At the time that these 13.5% contributions were mandated, workers were granted an 18% pay increase (employers incurred this increase but saw their large social security contributions disappear).

Of all eligible workers, 86% are affiliated with the new system, but only 55% of the labor force are contributing members. This represents a high level of non-compliance, apparently mostly from poor workers who will receive the minimum benefit regardless. The government is responsible for all accrued liabilities of the old paygo system and has issued recognition bonds equal in value to the accrued social security benefits for all previous participants who qualify (workers who only had a very short work history under the old social security system were not given any recognition of their accrued benefits). The government also limits the extent to which the rate of return provided by one pension fund can fall below that of the average AFP rate of return and, after annuitization, guarantees annuity payments if the insurance company fails (100% of the minimum pension is guaranteed, plus 75% of the rest of the benefit up to a specified limit). Finally, the government guarantees a minimum benefit under the new system for those who have at least 20 years of coverage under both the old and new plans. If the individual account plus the value of the recognition bond do not create a pension of 85% of the legal minimum wage (90% for those aged 70 or over), or about 30% of the average wage in the country, the government pays the difference. The costs of these guarantees are financed through general tax revenues, which is equivalent to paygo financing.

If the new AFP system can earn an average 7% real rate of return over the lifetime of the average worker, then the new system should provide benefits as large as the old paygo system (assuming only a small change in life expectancy). While the plan did earn such rates in its early years, these would be considered to be very high for a mature economy.

Under the new plan about 40% of total assets are invested in government bonds, which means that to that extent the new plan is still paygo.

As noted earlier, in 1980, under the old paygo financing system, gross national savings in Chile were 21.0% of GDP. After the introduction of the new mandatory individual savings scheme, savings rates dipped in the 1980s and stood at 18.8% of GDP in 1991 (Uthoff 1993).

Obviously, the system includes only wage and salaried employees (for example, not homemakers), and retirement benefits are a direct function of lifetime earnings. That is, there is no redistribution of wealth in the system except for the guaranteed minimum benefit.

All risks (for example, the investment risk, inflation, mortality) are transferred to the individual worker, except for the minimum guarantees listed above.

This generation of workers will, in effect, be paying twice, once to fund their own retirement through the new system (through contributions) and once to pay off the recognition bonds for the accrued liabilities of the old paygo system (through general taxation).

AFP expense ratios for sales commissions, advertising, and general administration are high. Myers (1992) reported that they are 15% of the contributions (higher for lower-wage earners and lower for higher contributors, because part of the fee is flat rate, which makes them regressive). Some estimates now put total sales costs as high as 26% of contributions (Orgill 1996), as salespeople, trying to maximize their commissions, encourage members to switch funds often. This is such a concern that Chile is considering placing restrictions on the ability to switch (such restrictions already exist in Argentina). These Chilean expense ratios compare to ratios of 1.3% for the C/QPP and 0.8% for OASDI.

Almost all (99.8%) of the assets are invested in the Chilean economy. This appeared to be sound policy in the early years of the system because rates of

return averaged 13%. However, in 1995, the AFPs experienced net losses because the Santiago Bourse performed badly (Orgill 1996). There is now general discussion about diversifying the investment funds outside of Chile.

So while the Chilean system of mandatory individual savings accounts has been

> studied and touted as a model from Britain to Uzbekistan, Chile's free-market pension system is suddenly facing a host of challenges: falling returns, soaring costs, and an overdependence on local economic savings. (Myers 1992)

V. CONCLUSION

This paper has explored at some length the advantages and disadvantages of the prefunding of social security. The thesis is that any public policy that purports to enhance the security of social security must satisfy (all) three criteria:
- It must increase gross national savings.
- Those savings must be used in a manner that increases worker productivity.
- There cannot exist a better method of achieving the first two stated goals.

This paper has reviewed a variety of currently proposed alternatives to the financing of social security under these three criteria and has found many unanswered questions and unsatisfied concerns.

In short, I think that any move away from the present close-to-paygo financing of social security in Canada and the U.S. cannot be defended as preferred public policy.

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Discussions

BERNARD DUSSAULT*

Once again, I commend Professor Brown for his valuable contribution to the discussion of the critical issues generally underlying social insurance programs. Financing is likely the most critical one, and Rob raises several issues and questions that deserve to be highlighted and discussed.

It is comforting that Pierre Treuil's (1981) paper, "Fund Development of an Earnings-Related Social Insurance Plan under Stabilized Conditions" still receives the attention it deserves within the scientific community interested in social programs. The paper develops a series of simple mathematical equations for the fundamental aspects of pension plan financing, be it *no* funding at all (that is, paygo), *full* funding, or *partial* funding.

Using his equations, it can be shown (refer to the complete demonstration at the end of these comments) that the nominal internal rate of return, under stabilized conditions, for an earnings-related pension plan strictly financed on a paygo basis is equal to the annual increase in total earnings, *e*. Given that the rate of return for a fully funded plan corresponds to the yield, *i*, on the fund, the nominal rate of return on a partially funded plan lies somewhere between *e* and *i* in accordance with the degree of funding (or the funding ratio *FR*, which corresponds to the ratio of the actual partial fund to the theoretical fund that would be on hand if the plan were fully funded).

Page 101 of the 15th CPP actuarial report provides further information on the nominal internal rates of return. It is also convenient to present such rates in real terms (which will likely be done in subsequent CPP reports), because a nominal return does not account for the portion of the investment earnings that inflation erodes over time. Obviously, this more accurate characterization of a rate of return (that is, real versus nominal) applies whether or not a pension plan includes price-indexed benefits.

I consider that Professor Brown's characterization of a "prefunded" plan is somewhat loose. Indeed, in his view, any plan creating investable funds measurably larger than the equivalent of two years of benefits would fall in that category. The level of two years is

*Bernard Dussault, F.S.A., F.C.I.A., is Chief Actuary, Public Insurance and Pension Programs, in the Office of the Superintendent of Financial Institutions Canada, 255 Albert, Kent Square, 12th Floor, Ottawa, Canada K1A 0H2.

quite arbitrary, and the notion of measurability is vague at best.

In contrast, Treuil's (1981, p. 243) paper offers a simple objective standard against which the *FR* can be measured. He develops the following equation (Treuil 1981, Eq. 19) for the full-fund/benefit ratio (*FFBR*), which corresponds to the ratio of the full fund at the end of a given year to the next year's benefit payments, of a fully funded plan under stabilized conditions:

$$FFBR = \frac{\ln(PGR) - \ln(FCR)}{\ln\left(\dfrac{1+i}{1+e}\right)}$$

where

$FFBR$ = full-fund benefit ratio
PGR = PAYGO rate
FCR = full cost rate (that is, normal cost)
i = annual nominal yield on the fund
e = annual nominal increase in (employment) earnings.

Using ultimate values (as a proxy for stabilized values) projected in the 15th CPP actuarial report, namely, 0.1425 for *PGR*, 0.1050 for *FCR*, 0.06 for *i* and 0.05 for *e*, we obtain for *FFBR*, in respect of the existing CPP, a value of 31.8. For the CPP changed as under the federal-provincial agreement, the *FFBR* would equal about 26.

These results can be used to measure the *FR* of the CPP. With a two-year fund, for example, *FR* would be equal to 6.3% (that is, 2/31.8). With a 5-year fund as contemplated by the federal-provincial agreement, the *FR* would be equal to 19.2% (that is, 5/26). It cannot be objectively stated that the changed CPP would thereby move from a paygo to a "prefunded" category. But tripling the funding ratio from 6% to 19% still leaves the CPP at a relatively low (partial) level of funding. And it allows its real internal rate of return, measured using the dynamic actuarial valuation model, to increase from about 1.6% to about 1.9% per annum. As explained by Professor Brown, this is a true increase in the real return at the microeconomic level but not necessarily at the macro level.

Demonstration Regarding the Internal Rate of Return

To Be Demonstrated

For an earnings-related pension plan that is financed on a pay-as-you-go basis, the internal rate of return is equal, under stabilized conditions, to the assumed

rate of increase in total employment earnings, and hence to the projected annual rate of increase in either contributions or benefits. *Stabilized conditions* means economic projections based on constant economic assumptions (rates of increase in average employment earnings and in prices) and on an initial stabilized population projected using its underlying constant demographic assumptions (fertility, migration, and mortality). For example, a stabilized population does not necessarily itself remain constant over the years but is deemed to increase at a constant annual rate of increase.

Definitions

x = age last birthday

ω = terminal age of the lifespan

p = assumed constant annual rate of increase in the population by age, sex, and calendar year

s = assumed constant annual rate of increase in average employment earnings by age, sex, and calendar year

e = $(1 + p)^*(1 + s) - 1$ = assumed constant annual rate of increase in total employment earnings by age, sex, and calendar year

IRR = the unknown internal rate of return underlying the transaction consisting of contributions and benefits under the earnings-related social insurance plan

B_x^n = Total benefits payable during year n following attained age x of beneficiaries

S_x^n = Total employment earnings during year n following attained age x of contributors

PGR = pay-as-you-go rate

Derivation

As shown in Treuil's note (1981, appendix E) under stabilized conditions, the paygo rate is constant over the years. This means that irrespective of the value n (year),

$$PGR = \frac{\sum_{x=65}^{\omega} B_x^n}{\sum_{x=18}^{64} S_x^n}$$

The following demonstration rests on the implicit assumption that labor participation rates are constant over the years. For sake of simplicity, it is also assumed that:

- Contributions and benefits are paid annually in advance at the beginning of the year starting with the contributor's or beneficiary's (x-th) birthday.

- The contributory period runs from attainment of age 18 to (including) attainment of age 64
- The retirement pension benefits are payable annually from attainment of age 65 to the beginning of the terminal age.

To measure the internal rate of return underlying the financial transaction consisting of contributions and benefits in respect of a given cohort of people (that is, all persons born in a given calendar year of birth), the present value of the cohort's contributions must be equated with the present value of the cohort's benefits, and the rate of return that renders these two entities equal must then be found one way or another (for example, isolation, trial and error). Under static conditions (that is, static assumptions regarding all economic and demographic factors, like employment, inflation and fertility rates) this financial transaction corresponds to:

present value of contributions

= present value of benefits

Therefore,

$$PGR \cdot \sum_{x=18}^{64} v_{IRR}^{x-18} \cdot S_x^{n+(x-18)}$$

$$= v_{IRR}^{65-18} \cdot \sum_{x=65}^{\omega} v_{IRR}^{x-65} \cdot B_x^{(n+65-18)+(x+65)},$$

where v corresponds to the present value (discounting factor) using the rate IRR as the discount rate (for example,

$$v^{(65-18)} = \frac{1}{(1 + IRR)(65 - 18)}.$$

Isolating the PGR in the equation above, we obtain

$$PGR = v_{IRR}^{47} \cdot \frac{\sum_{x=65}^{\omega} v_{IRR}^{x-65} \cdot B_x^{(n+47)+(x-65)}}{\sum_{x=18}^{64} v_{IRR}^{x-18} \cdot S_x^{n+(x-18)}}.$$

But under stabilized conditions, even for a price indexed plan,

$$B_x^{n+1} = B_x^n \cdot (1 + e)$$

$$S_x^{n+1} = S_x^n \cdot (1 + e).$$

Therefore, replacing these values for B and S in the equation for the PGR above, we have

$$PGR = \frac{v_{IRR}^{47} \cdot \sum_{x=65}^{\omega} v_{IRR}^{x-65} \cdot B_x^n \cdot (1 + e)^{47+(x-65)}}{\sum_{x=18}^{64} v_{IRR}^{x-18} \cdot S_x^n \cdot (1 + e)^{x-18}}.$$

Setting IRR equal to e, the above equation reduces to

$$PGR = \frac{v_e^{47} = \sum_{x=65}^{\omega} B_x^n \cdot (1 + e)^{47}}{\sum_{x=18}^{64} S_x^n},$$

which finally reduces to

$$PGR = \frac{\sum_{x=65}^{\omega} B_x^n}{\sum_{x=18}^{64} S_x^n}.$$

This expression for the *PGR* remains, having replaced *IRR* by *e*, a correct expression for the *PGR* since it corresponds to its definition under stabilized conditions. Therefore, *e*, the rate of increase in total annual employment earnings, is a solution for the internal rate of return *IRR*. It can be demonstrated that there is one positive solution, but it is not the intent here to go into this kind of development.

REFERENCE

TREUIL, PIERRE. 1981. "Fund Development of an Earnings-Related Social Insurance Plan under Stabilized Conditions," *Transactions of the Society of Actuaries* XXXIII:231–49.

FRED KILBOURNE*

Professor Brown has ensured that I will remain a convert to paygo financing of social security programs. But does he realize the risk that his cogent reasoning may lead us, him and me, off the spectrum of acceptable religions and into the darkness of the cult of libertarianism? Let me explain.

I admit to "a natural predisposal to favor prefunding," whether by reason of actuarial training or childhood experiences or DNA wrinkle. But consideration of social insurance financing in the light of grown-up experiences led directly to the paygo temple, where I found Rob Brown writing his paper. As promised in his introduction, the paper is not a balanced discussion of the issues but rather a defense of paygo financing as preferable to full funding. Among the reaons he explores that favor paygo are the following:
- Government may use social insurance funds to finance unrelated expenditures.
- Taxes will have to be raised to pay off social insurance bonds when they are redeemed.

*Fred Kilbourne, F.S.A., F.C.I.A., F.C.A.S., F.C.A., is Independent Actuary at the Kilbourne Company, 12526 High Bluff Dr., Suite 235, San Diego, Calif. 92130.

- Interest rates will go up if the prefunding is by means of government bond offerings.
- Government may exert undue control over companies if the prefunding is by means of stock purchases.
- Large funds may be an attractive nuisance to politicians intent on expanding social insurance benefits.
- The higher payroll taxes needed to support prefunding may hurt the creation of new jobs.
- Higher taxes mean fewer dollars available to individuals for private-sector retirement plans.
- Funds may be used for purely political purposes, including even payoffs and fraud.

So paygo financing is better than full funding for the reasons listed, among others. Indeed, and unfortunately this is true in the real world of grown-up experience, as opposed to the actuarial world for which we all pine. But why must we settle for better? Why not go for best? Deeper cuts in available funds are surely warranted when government expenditures on balance harm those they pretend to help. If higher payroll taxes hurt job creation, perhaps lower taxes will lead to increased job opportunities. And as for fraud, the best prevention may be reduced spending opportunities for a government with a proven track record that includes selling a paygo social insurance system as being fully funded, using social insurance funds to mask a portion of the national debt, and ignoring the looming demographic crisis while pretending to balance the medical part of the system by means of price controls and the shift of home medical care costs to an off-book account, among many other examples of flat-out fraud.

Write on, Professor, and lead us to the promised land at which you have pointed.

ROBERT J. MYERS*

Professor Brown has contributed yet another monumental paper on the financing of social security programs to the actuarial literature. He ably presents the overwhelming arguments in favor of paygo financing—but then, I may be biased in my views because I have strongly believed in this procedure for many years! He reinforces his conclusions in favor of paygo

*Robert J. Myers, F.S.A., F.C.A.S., F.C.A., A.I.A., is Professor Emeritus at Temple University in Silver Spring, Maryland, and a former Executive Director of the National Commission on Social Security Reform and former Chief Actuary of the Social Security Administration. His mailing address is 9610 Wire Avenue, Silver Spring, Maryland 20901.

financing—as so well-stated in the last paragraph of his paper—by carefully analyzing the diverse literature on this subject (generally written by economists).

I agree with Professor Brown's analyses and conclusions in almost all respects, so here I discuss only a few small differences of views. He defines paygo funding as involving a fund balance that is "not expected to exceed two years' worth of benefit expenditures (or if so, only slightly)." In my opinion, such fund ratio should not be more than 100% and preferably should be about 75%.

On the basis of the intermediate-cost estimate in the 1997 Trustees Report, under which the fund ratio for OASDI (including the relatively small outgo for administrative expenses) at the beginning of 1997 is 153% and grows to a maximum of 264% in 2010, Professor Brown classifies the funding as being paygo. On the other hand, I would not do so, but rather define it as "temporary partial-reserve" funding.

More important than the present situation, however, is to consider the original intent when the OASDI program was last reformed (in 1983). The intermediate-cost estimate made then showed a fund ratio of 115% in 1983, increasing to a maximum of about 540% during 2015–19 and then decreasing to 44% in 2060. Certainly, paygo funding was not present!

Professor Brown states that "only 55% of the labor force are contributing members" in the Chilean program. I believe that this is a misinterpretation of the data. This figure really represents the ratio of the contributors in December to the total number of non-retired persons then alive who have ever contributed to the program in the past (many of whom were not in the labor force in that December and thus did not have contribution liability). Nonetheless, I agree that there is a large amount of noncompliance, although this is not necessarily concentrated, as Professor Brown states, among poor workers. The latter do need substantial length of coverage to qualify for the minimum benefit, although they do have a great incentive to underreport their wages for contribution purposes, because they will only get the minimum pension anyhow.

KRZYSZTOF M. OSTASZEWSKI*

Professor Brown's paper provides a review of arguments for pay-as-you-go (paygo) systems of retirement provision. This is a timely topic in view of the worldwide crisis of such systems. Paygo was created

*Krzysztof M. Ostaszewski, A.S.A., Ph.D., is Professor of Mathematics and Actuarial Program Director, University of Louisville, Louisville, Kentucky 40292.

about a century ago by Chancellor Bismarck and gradually adopted in a very large number of countries worldwide. The last decade has brought about increased debate about validity of paygo as a method of retirement benefits provision. Unfortunately, such debate is held simultaneously in four areas, with very little overlap among them. Actuaries are very familiar with the actuarial debate but often complain about being excluded from the political and economic debates, which have greater overlap. Yet again actuaries seem to ignore the fourth area, the financial one, which seems to be completely absent from the actuarial perspective.

The financial pricing of insurance products has gradually become a reality for actuaries. It is no longer possible to price insurance on a static cost-plus-profit-margin basis. Actuaries understand that insisting on cost-plus pricing will eventually make insurance companies obsolete, as alternative risk financing methodologies can be (and are) developed by other financial institutions and capital markets. In the area of social insurance actuarial science, we are, however, persistently stuck in the 1950s.

To Prefund or Not To Prefund Is Not the Question

Professor Brown presents the current crisis of paygo as a debate of funding versus prefunding. Such presentation is astute politically, because it exploits the low level of understanding of capital markets among the general public, but it is such a far cry from the issue being debated that one must only wonder why such misrepresentation appears at all in the actuarial literature.

Paygo's rise and fall coincided with the rise and fall of the command economy. Given the fate of command economies, it would be most interesting to exploit the parallels. In the heydays of socialism, Ludwig von Mises proclaimed that socialism would eventually fail because in the absence of markets, centralized economic decision-makers would be unable to determine prices of resources, and thus would be blinded into repeated misallocations of such resources. World War II and the Vietnam War prolonged the life of socialism by forcing the free world into some command approaches under military stress. A period of prolonged peace meant a quick end to socialism. As Polish comedian Jan Pietrzak once said about the command economies of Eastern Europe: "You would naturally expect the bosses of the national economy, who decided about everything, from the prices of

shoes and milk, to investments in steel plants and wages of rock singers, to be wrong about half of the time. This is how randomness normally works. Yet they were nearly always wrong. One almost wanted to beg them to do something opposite to what their scientific calculations were saying. No such luck."

Government can affect the economic affairs in three ways not directly related to its key function of creating a legal structure for the country. They are:
• Government ownership of means of production
• Government setting prices of goods and services
• Government taxing of economic activities.

The first two of the above have been thoroughly discredited through the experience of command economies. The third one is considered a necessity, because government must raise revenues for its functioning (but this does beg a question of what should be taxed . . .).

Yet it is hard to deny that social insurance constitutes government ownership of means of production of insurance products. OASDI and CPP/QPP are nationalized insurance companies. This is typically countered by saying that they do not just provide insurance (code word: "individual equity") but also social assistance (code word: "social adequacy"). Let us not forget the obvious—so did all national enterprises in all command economies. This is why they were nationalized.

Furthermore, social insurance systems set prices of insurance products (retirement annuities) without regard for market prices. And while in the area of ownership of means of production, social insurance in the United States and Canada can be considered a minor factor, because there is a large private sector in the insurance industry, its effect on pricing is major. Repeated studies of Robert Myers have established that Social Security and Medicare have granted benefits many times (as much as ten times) more than the actuarial accumulated value of payroll taxes paid, not just for the poor (which social adequacy calls for) but for entire generations. This means that off-balance-sheet accumulated obligations of social insurance have collateralized the wages of future generations, and such collateralization far exceeds any official measure of public debt. Obligation to pay is an obligation to pay, and it will have the same effects in the future, regardless of whether we call it public debt or social insurance benefits promises. Social insurance is fully funded with our children's and grandchildren's wages. Nowhere else, neither in politics, nor in economics, nor in finance, is this a debate about prefunding. If actuaries continue debating this as a "prefunding versus paygo" issue, then actuaries will become equivalent to medieval scholars debating devils on the pinhead.

The debate is about moving the insurance companies embedded in OASDI and CPP/QPP to the private sector. It is about privatization.

Old Age Crisis?

Neither is the issue demographics. If indeed baby-boomers were the problem, they would have saved for their own retirement. But they have not because capital assets embedded in social insurance have been grossly mispriced, thus communicating false signals to the boomers. When they were young, they perceived Social Security and CPP/QPP as providing a comfortable living. Now they repeatedly hear that they should not count on receiving any money from social insurance. The irony lies in the fact that "no money from Social Security" is an optimistic scenario. The alternative has been presented in many countries worldwide—raise payroll taxes to astronomical levels and make social insurance the only system of retirement provision. That is one more lesson we have learned from command economies: the government owner of the means of production finds it difficult to coexist with private-sector competitors and usually seeks a monopoly. The pessimistic scenario may indeed be that we will also receive our Social Security checks, and only those checks.

Professor Brown claims also that there has been a historical change in the economic assumptions of the system, because wages are not growing as they used to historically ("The future ain't what it used to be"). Yet in the U.S., income from capital constitutes about 80% of national income, as it used to. Yes, the share of wages has fallen. But the share of proprietors has risen. People choose to be self-employed. They derive their incomes differently. And the growth of the overall economy, while stagnated in the 1970s, has taken a decisive upturn in the 1980s, and indeed in the U.S. we are suddenly surprised by the national income growth exceeding that of the gross domestic product since 1995. What can be said is that people do not care to be paid in wages as much as they used to. Could social insurance payroll taxes be a reason for that? Could Chile's noncompliance figures be artificially inflated by Professor Brown, while projecting an artificially optimistic picture of compliance in the U.S. and Canada? How is it possible that social insurance has sunk so deeply into a crisis during a period of long economic expansion? The fate of social insurance is

indeed explained best by the Yogi Berra Law of Economics: "If people do not want to come to the ballpark, ain't nobody gonna stop them."

Who Exactly Claimed That "Fallacy of Composition"?

Professor Brown attributes a fallacy of composition to his imaginary opponents. Yet I know of no one who proposes privatization and puts forth such fallacies. Professor Brown does not name anyone either. In reality, privatization is proposed because economic decision-makers should know the prices of resources they use. I personally support privatization because I want people to feel their pain. It is politically expedient to tell others that we feel their pain, but no medical professional would suggest that we eliminate pain altogether. It is politically expedient to promise people a free lunch and not having to worry about retirement, but proposing complete removal of the link between individual savings and individual retirement is the economic equivalent of the elimination of pain. And let us remember that nobody can really feel our pain; other people can only offer us either painkillers or hallucinatory drugs.

Private savings is not "demographically immune." Private savings produces information about forward prices of resources, as embedded in capital markets. If we want to retire, we must take forward positions.

Is an economy in which resources are priced by all, not by centralized government decision-makers, "safer"? If variance is the measure of risk, then such an economy is riskier. If probability of living in poverty is the measure of risk, then such economy is indeed safer. There is no "composition" involved in this argument.

"The real security is the healthy economy," as Professor Brown says. Can we achieve such economy without free markets for retirement provision? Can we achieve it with government ownership of means of production, central planning of prices, and central planning of our retirement?

Show Me the Money?

Because Professor Brown misrepresents the alternative to paygo as "funding" (while a "funded" government scheme is even more than paygo a centralized government ownership of the economy), he manages to yet again revive the "double" payment myth. He claims that if we privatize, young people will have to pay for their own retirement and for current retirees.

Alas, they have to do that in paygo as well. Because this is achieved with the same cash flow, we are to believe that there is no "double payment." In privatization, this one cash flow also achieves both purposes, but miraculously becomes two entries. To those who still believe this, I suggest that they consider for a moment accounting for received payroll taxes if OASDI or CPP/QPP were not a government entity. What would be the liability created by the premium received?

The myth is appealing to the uninformed, because it "shows them the money." But money is not tangible. Money is not a real object. Money is an abstract concept. Nobody can "show me the money." Money is an abstract measure of human labor. We do use different units in measuring labor in different jurisdictions, and prices of labor do fluctuate. Forward labor, which we buy when we save for retirement, has uncertain prices. This is how all forward markets work. But I purchase forward labor regardless of whether my retirement savings flows to government or to the private sector. The difference lies only in the method of pricing of my purchase.

If I am required to purchase forward labor at prices set by Social Security actuaries by giving up 12.4% of my wages, I can only pray that government actuaries can calculate correctly. Yet as Professor Maltsev, one-time adviser of President Gorbachev pointed out, there was once a man in Moscow who was responsible for setting more than 20 million prices for the entire empire of the Soviet Union. That man must have been a genius. That man should have been put forth as a candidate for the Nobel Prize in Economics, or maybe a special Nobel Prize of Prizes of the Twentieth-Century Command Economy Experiment.

Chile

Professor Brown lists the failings of the Chilean privatization of paygo social insurance. Just like all criticisms of capitalism, this one is also really a veiled compliment. Low compliance in Chile? You do not have to comply any more in Chile if you have saved enough. Falling returns? Then Great Britain in 1897, when it refunded its national debt at 2.5%, must have been at the very bottom of its economic crisis. Falling savings rate? Not according to the official Chilean government figures. But savings rate is measured differently by different people. Regardless of measurement, Chile has a higher savings rate than the U.S., Canada, or Germany. And Chileans can see how much they earn on their savings; so if it is not enough, they

receive signals they should save more. This is a far cry from what the American public knows about its own retirement.

As Harry Markowitz put it: "Granted that the invisible hand is clumsy, heartless and unfair, it is ever so much more deft and impartial than a central planning committee." The invisible hand makes us feel our pain. It also lets us feel our joy.

AUTHOR'S REPLY

ROBERT L. BROWN

I would like to thank the four discussants for their thoughtful contributions. It is especially gratifying to have the support of actuaries like Bernard Dussault and Bob Myers, who have such long and learned experience with Social Security in North America. It is somewhat less fulfilling to have comments that imply that one is attempting to mislead or misrepresent the discussion. Certainly, I can assure readers that that was not the attempt. Perhaps it is evidence that in this area we are still going from the crawling to walking stage and that much more work is required before we can attempt to run.

In response to Bernard Dussault's comments, the reader is reminded that all the equations presented assume demographic stability. It is only with this assumption of stability that these important equations can be derived. However, stability is not a real-world characteristic, especially at this time as we anticipate the coming retirement of the baby-boom generation and its support by the baby-bust generation. Thus readers must keep in mind that while these equations are extremely important and helpful, they do not portray the world in which social security reform is taking place.

Regrettably, in this extremely important public policy area, the voices of actuaries are not being heard to the level that we might expect. Oftentimes, the public-policymakers turn to welfare economists for input, and not actuaries.

I hope that papers such as this, and the added important discussions, will assist the actuarial profession in attaining a level of prominence in the continuing reform of social security systems around the world.

Additional discussions on this paper will be accepted until April 1, 1998. The author reserves the right to reply to any discussion. See the Table of Contents page for detailed instructions on the submission of discussions.