

PAYGO v SAYGO: Prefunding Government-Provided Pensions

Andrew Coleman

Motu Economic and Public Policy Research
andrew.coleman@motu.org.nz



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Introduction

This note outlines some of the key issues concerning the economics of making the transition from a pay-as-you-go to a save-as-you-go pension system. There is a large literature on this topic, starting with Diamond (1965). Recent surveys include Diamond (1998), Lindbeck and Persson (2003), and in the New Zealand context, Littlewood (2010).

New Zealand operates a textbook defined benefit government tax and pension scheme. In countries that operate these schemes, older people are paid a pension whose value is a fraction of contemporaneous wages. In New Zealand's case, a couple over 65 is paid between 65 and 72.5 percent of average ordinary time earnings.

Pension schemes can be classified according to how they are funded. Under a pay-as-you-go (PAYGO) scheme, each year's pension payments are financed from contemporaneous tax collection. Under a pure save-as-you-go (SAYGO) scheme, taxes are collected in advance and accumulated into a fund, and the pension is financed by drawing down the fund. A save-as-you-go scheme is considered fully funded if each cohort contributes enough in taxes that the fund is expected to cover their retirement pension entitlements. A SAYGO scheme can be operated as a defined benefit scheme, in which the pension received by retirees does not depend on the investment returns of the fund, and can be identical to that received under a PAYGO scheme. Alternatively, it could be operated as a defined contribution scheme, in which case the pension received depends on the investment returns to the fund.

The key similarities and differences between PAYGO and SAYGO systems



It's easier to share the pot if the grandparents have provided the table.

are best understood by considering the perspective of a cohort born in a single year. It is clearest to consider the case when the country is demographically stable, that is when the same number of people are born each year and each cohort has the same life expectancy. Under a PAYGO scheme, the cohort pays a fraction (\mathcal{P}_p) of their income as taxes each year, funds that are directly transferred to those receiving a pension. In return, the cohort gets a pension equal to a fraction of contemporaneous wages when they reach the entitlement age. Under a SAYGO scheme, the cohort pays a fraction (\mathcal{P}_s) of their income as taxes each year, which is placed in a fund that accumulates dividends and interest. When they reach the age of entitlement, pensions are paid by drawing down the fund. Sufficient taxes are paid that the fund is just exhausted when the last of the cohort dies. If all cohorts operate under a SAYGO system, a large quantity of capital is accumulated, even though each cohort ultimately reduces its fund to zero. If all cohorts operate under a PAYGO system, there is no capital accumulation.

Five questions

From the perspective of a newly born cohort, there are two key questions.

- (1) Under what conditions would a cohort prefer a mature PAYGO system to a mature SAYGO system?
- (2) If an economy starts with a PAYGO system, under what conditions is it worth making the transition to a SAYGO system?

From the perspective of the economy as a whole, there are three additional questions.

- (3) If an economy has a SAYGO system, how should the funds be invested?
 - (4) If an economy makes the transition from a PAYGO to a SAYGO system, what happens to national saving?
 - (5) If it is worthwhile prefunding a pension system, should the government prefund other aspects of government expenditure?
- (1) Under what conditions would a cohort prefer a mature PAYGO system to a mature SAYGO system?

If the future size of the pension is the same, a newly born cohort will prefer a PAYGO system to a SAYGO system if the necessary tax payments are lower, that is, if $\mathcal{D}_p < \mathcal{D}_s$.

This condition will hold if the growth in wages in the economy is higher than the returns to investing in capital. In these circumstances, a cohort will make a lower return from accumulating capital than it would do from giving a fraction of its income directly to contemporaneous pensioners, in exchange for receiving a fraction of the income of future (highly paid) workers when they are old. When these circumstances hold, it is dynamically inefficient for a cohort or country to operate a SAYGO system. It should

transfer to a PAYGO system.

In most countries, the returns to capital exceed wage growth rates. This has been true in New Zealand during the last thirty years, and there is little reason to believe it will not be true in the future. Consequently, the conditions for preferring a mature PAYGO system over a mature SAYGO system are very unlikely to hold.

- (2) If an economy starts with a PAYGO system, under what conditions is it worth making the transition to a SAYGO system?

If the returns to capital exceed wage growth rates, does this mean a newly born cohort would prefer a SAYGO system?

The answer is two-fold. If a new cohort is born into a country where all previous cohorts use a SAYGO system, the answer is “yes.” They will much prefer a SAYGO system to a PAYGO system as it requires lower tax payments for the same pension benefits.

If a new cohort is born into a country where all previous cohorts use a PAYGO system, the answer is less clear. While the cohort would much prefer to use a SAYGO system for their own retirement, as it requires lower taxes, in practice they are also required to pay the pensions of the previous cohort. To make the transition, the cohort would need to temporarily pay higher taxes – a fraction of their income to fund their own pension, and a fraction of their income to pay earlier cohorts. The question, therefore, is whether they would be willing pay higher taxes to make the transition from a dynamically inefficient PAYGO tax-pension scheme to a dynamically efficient SAYGO tax-pension scheme.

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a SAYGO system. This means paying a temporarily high tax rate so that the taxes necessary to fund pensions can be reduced in the long run from ϑ_p to ϑ_s . From the perspective of the first cohort making the transition, by paying temporarily higher taxes they will be buying themselves and subsequent cohorts lower taxes in the future. The extent they will be better off from doing this will depend on (i) the extent to which they benefit from lower taxes in the future, which depends on the difference between the growth rate and the returns to capital, and the length of the transition; (ii) their patience (the extent to which they value the lower taxes in the future compared to the higher taxes now); and (iii) the extent to which they value other cohorts obtaining lower taxes.

The literature does not have a definitive answer to whether it is worth making the transition. Nonetheless, there are several standard results showing how the value of making the transition depends on the extent that the fund is invested in securities that earn a return greater than the risk free interest rate, on the extent that agents are patient, and on the extent that taxes have deadweight costs because they distort behaviour (see the discussion in Lindbeck and Persson, 2003, p. 90).

(a) In the benchmark case that there are no deadweight tax costs, that the fund is invested in risk free securities, and that the psychic discount rate or patience is the same as the risk free rate, the present financial value of making the transition from PAYGO to SAYGO (added up over all agents) is zero. This is because the present value of the SAYGO system is equal to zero (as the present value of pension payments is equal to the present value of tax payments) and while the taxes to fund the SAYGO system are lower than the taxes that would have been paid under the PAYGO system,

additional taxes must be imposed to pay off the existing PAYGO pension claims. However, the transition can be valuable when more realistic conditions are considered.

- (b) If the pension scheme is invested in assets that have a higher return than the interest rate, the transition can be welfare improving because the present value of tax payments necessary to fund the SAYGO system will be lower than the present value of the pension payments.
- (c) If the psychic discount rate (patience) of the population is less than the return to capital, the transition to a SAYGO system can be welfare improving because agents value the benefits of long-term tax reduction more than the costs of temporary tax increases.

The transition to a SAYGO system can also be welfare improving if the cohorts paying the additional taxes gain psychic pleasure from the inheritance of lower taxes they bequeath to subsequent cohorts.

- (d) The costs and benefits of the transition will depend on the extent that there are deadweight costs to taxation: the extent to which there are economic costs because people adjust their behaviour in response to the tax. If the economy is demographically stable, the deadweight costs of raising taxes temporarily are greater than the deadweight benefits from the long-term tax reduction, although the transition may still be worthwhile if the returns are sufficiently high or the people are sufficiently patient. If the country is not demographically stable and the taxes needed to fund a PAYGO system will increase over time, either because of the “baby boom” effect or because of rising

longevity, the transition to a SAYGO system will mean paying temporarily higher taxes in exchange for future taxes that will be lower than they would be under a PAYGO system. Since a temporary increase in taxes is being imposed in order to prevent even higher taxes, the switch to a SAYGO system will reduce the total deadweight loss from taxation. This makes the transition to a SAYGO system more attractive.

While in some circumstances the transition from a PAYGO to a SAYGO system could be advantageous to all cohorts, since all cohorts could benefit from lower future taxes, it will almost certainly involve large intergenerational transfers, as in practice some cohorts will gain more than others and some may lose. If a country decides to move from a PAYGO system to a SAYGO system, the resultant pattern of intergeneration redistribution can be altered by choices made about the nature, size and duration of the temporary tax increases. For instance, if middle-aged people were intergenerational beneficiaries of a PAYGO system, because of baby boom effects, temporarily high income taxes could be used to pay for the transition to a SAYGO system, as these fall more on middle-aged people than younger or older people.

(3) If an economy has a SAYGO system, how should the funds be invested?

A SAYGO fund could be invested in government securities, or it could be invested in a portfolio of diverse private sector and foreign assets. The main reasons to invest a SAYGO fund in non-government securities is to give returns that are likely to be higher than those on domestic government bonds, and to reduce the risk of very low returns if the returns to domestic government

securities are lower than expected, for instance if governments default, inflate, or expropriate. This is the standard approach adopted by private sector funds, and is the approach advocated by a majority of the literature analysing the appropriate investment strategy for SAYGO schemes (e.g. Diamond, 1997, or the review by Lindbeck and Persson, 2003).

There is a contrasting view that a SAYGO fund should not be invested in private sector securities while the government issues debt. This is because the fungibility of finance means any government debt can be considered an offset to the securities held by a government trust fund. To see this, note that a government could change a PAYGO tax-pension system to a SAYGO tax-pension scheme at a stroke by issuing a large amount of debt and transferring the assets to a pension trust fund. From that point forward, the SAYGO pension scheme would be funded by each cohort paying a low long-term “pension” tax, and additional taxes would have to be imposed to reduce the debt. From this perspective, the issue of the optimal portfolio for a SAYGO fund needs to be analysed from the perspective of the government’s overall balance sheet. Authors such as Littlewood (2010) argue that a government should not invest in a diverse portfolio of assets while it still has outstanding debt, unless the overall risk-return characteristics are particularly favourable. He has further argued that the New Zealand context is such that the risk-return trade-off is not favourable, and that the New Zealand Superannuation Fund should only invest in government securities – or, better still, should not exist at all, but the funds just be used to retire debt. While this view is somewhat extreme, it is consistent with the mainstream view that the holdings of a SAYGO fund should depend on risk-return characteristics.

The risk-return analysis for a SAYGO scheme or the government balance sheet

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more generally is more complex than the standard risk-return analysis for a private sector fund. Rather, it has to take into account the risk-return characteristics of different assets compared to the income flows and tax payment liabilities accruing to different groups in the economy. These characteristics crucially depend on whether the SAYGO scheme has defined benefit or defined contribution characteristics.

New Zealand's pension scheme is largely a defined benefit scheme, as the pension is defined in advance as a certain fraction of contemporaneous wages. There is little reason to believe that the defined benefit characteristics of the scheme would change if it were prefunded. If it remains on a defined benefit basis, the risk that asset returns on a diverse portfolio of assets is different than expected falls on current and future agents, primarily taxpayers, although some changes to retirement benefits can be considered. The Government is exceedingly well placed to manage this risk, as by issuing or reducing debt and by making gradual changes to the parameters of the tax and pension system it can spread this risk over current cohorts of taxpayers who already own assets, current cohorts of taxpayers who have few assets, future tax payers, and current and future retirees. In addition, it is also well positioned to take advantage of the average return differences between government securities and a diverse portfolio of other assets, as it has little need to hold government securities for liquidity purposes.

If prefunding were associated with a move to a defined contribution scheme, the risk will largely fall on future cohorts of retired people. This would represent a considerable change. The current defined benefit PAYGO pension system creates an asset whose returns are tied to future domestic wages. Moreover, it is the

primary way most people can obtain an annuitised income stream in retirement. Thus the PAYGO pension system creates an asset that may be difficult to replicate in the market economy. Unless the government introduces a new asset such as a bond tied to the growth in wages, the transition to a defined contribution SAYGO system will also involve the elimination of the PAYGO asset, which reduces risk sharing possibilities. Nonetheless, by investing the assets of a SAYGO system in a diverse portfolio of assets, including foreign assets, the system would reduce the risk facing retirees that domestic wage growth is lower than wage growth in other countries. Consequently, it is plausible that by investing in diverse assets a defined contribution scheme reduces the risk facing retirees. The potential differences between the returns to domestic wages and the returns to diverse assets is a reason to consider a fund with a mixture of assets with both types of returns. Shiller (1993) has strongly argued that the Government could do this by creating new assets whose returns are tied to nominal GDP.

As Diamond (1997) emphasises, the choice of assets held in a prefunded SAYGO system should also be affected by the normal issues of transactions costs, inflation, and expropriation (default) risk. High transactions costs in particular can significantly reduce the returns to the scheme. These issues are particularly important if the pension scheme has a large defined contribution aspect, for then retirees will bear the costs and risks directly – especially inflation risk. There is also the risk that a large government scheme will be adversely affected by a desire by government agents or political parties to intervene in corporate management. Nonetheless, Diamond argues that a Government scheme can be run well with low transactions costs and little risk of additional government

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intervention in the private sector if it uses professional wholesale money managers. This, of course, is the basis of the model adopted by the New Zealand Superannuation Fund.

(4) If an economy makes the transition from a PAYGO to a SAYGO system, what happens to national saving?

There are four main issues.

- (a) In a demographically stable economy, with zero economic growth, the government saving rates under both a PAYGO and a mature SAYGO system are the same: zero. This is obvious in a PAYGO system, for the taxes are directly transferred to pensioners. It is also the case for a SAYGO system, for the contributions made by taxpayers into the accumulated fund exactly offset the withdrawals by the retired. However, even though the two systems have the same zero saving rate, under a SAYGO system the economy has accumulated an asset fund, whereas under a PAYGO system there is no accumulation. The key difference, therefore, is the quantity of wealth in the economy, not the saving rate.
- (b) If the growth rate is positive, a SAYGO system will both have a positive flow saving rate and a steadily increase stock of assets. This is because the contributions by young cohorts will exceed the withdrawals of old cohorts, as new cohorts earn more at each age than their elders did. In contrast both the saving rate and the stock of accumulated funds in a PAYGO system will be zero.
- (c) If the economy makes the transition from a PAYGO system to a SAYGO system by raising taxes, the

government saving rate will be positive as the asset fund is accumulated.

- (d) The effect on national saving from making the transition from a PAYGO to a SAYGO system will depend on the extent to which households change their consumption and saving behaviour in response to the change. The answer is not straightforward, as the extent to which aggregate household saving will respond to a transitional increase in taxes followed by a long-term decrease in taxes will depend on the demographic composition of the population and the extent that people attempt to smooth consumption through time. Diamond (1997) provides a comprehensive analysis of the topic, discussing how the overall effect on accumulated national savings will depend on various factors that affect the extent to which Ricardian equivalence holds. These include the timing of tax and benefit changes, the extent that some households dissave when taxes are raised in the transition period, the extent that some households are unresponsive to inducements to save, the extent that the government offsets the additional pension savings by reducing other saving, and the effect of lower long-run tax rates on saving. He notes that it is possible for national savings to rise by more than the increase in government savings, because the reduction in taxes in the long run provides a better incentive to accumulate capital. While there is little solid empirical evidence on this point, he argues that, on balance, “a near-term tax increase to build and maintain a permanently larger trust fund would increase national saving” (p. 65).

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(5) If it is worthwhile prefunding a pension system, should the government prefund other aspects of government expenditure?

The fungibility of finance means that the logic of a prefunded SAYGO tax-pension system can be extended to other aspects of fiscal policy. A government could temporarily raise taxes and build up an asset fund in order to reduce the long term taxes needed to pay for health care or education. Alternately, it could temporarily raise taxes to reduce taxes in the long run by eliminating debt. In each case there would be a temporary increase in the saving rate and a long term increase in savings. Pushed to extremes, a large Government trust fund could make taxation unnecessary.

In addition to the issues discussed above, whether a generation will wish to impose temporarily large taxes on itself in order to accumulate a large trust fund for itself and its heirs will depend on its confidence that such a fund can be appropriately managed and not dissipated by a future government. Historic experience may make a society otherwise willing to build a fund somewhat wary. Unless a fund is clearly earmarked for a particular purpose and ring-fenced from other government accounts, it is very difficult to (i) ensure the fund is spent on its ostensible purpose; (ii) ensure taxes are lowered in the long run; and (iii) ensure government debt is not increased, offsetting the fund. For a fund to be successful, there has to be appropriate “political architecture” to ensure subsequent governments abide by its intentions.

Ultimately, no government can be bound by its predecessors. Yet a combination of constitutional protections and cultural preferences can make it difficult for a government to alter the intent of an earlier government unless the change is

overwhelmingly politically popular. A society wishing to set up an asset fund needs to do it in a way that generates continuing and popular support for its purpose, so that the fund is difficult to raid for other reasons. This is the core “political architecture” of the fund; the literature considering the viability of moving to a prefunded SAYGO pension scheme has agreed that good architecture is essential to the continued viability of the fund. It further argues that it is relatively straightforward to create sound foundations for a long term prefunded pension scheme. This is because (i) it is relatively straightforward to identify the recipients of the fund, making it difficult to surreptitiously raid the fund; (ii) it is straightforward to articulate the purpose of the fund; and (iii) when mature, the fund involves relatively few intergenerational transfers. In practice, many countries not only ring-fence the fund, but use particular taxes to contribute to the fund as a means of strengthening the identification of the fund with a particular purpose. In the United States, for instance, there is a dedicated social security tax imposed separately from income tax that is used to fund retirement incomes.

The New Zealand Superannuation Fund was partially set up on these principles. The fund is earmarked and its accounts are identified separately in the Government accounts. Its purpose is explicitly stated to help prefund future pension entitlements, and to prevent taxes from being higher in the future than they otherwise would be. However, it is funded out of general taxation rather than a dedicated tax, which lessens the extent to which it is distinct. It is noteworthy that the current government found it relatively straightforward to stop new contributions to the fund, claiming that it was not prepared to issue additional debt in order to make additional contributions. From this experience, it

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would appear that the “architecture” of the fund is not as strong as its founders intended.

Conclusion

The literature on government pension schemes largely argues that a well structured prefunded SAYGO pension scheme will raise national savings (accumulated assets) relative to a PAYGO scheme. During the transition from a PAYGO system to a partially or fully prefunded scheme, national saving (flow measure) should also rise. Moreover, a mature SAYGO system will allow lower taxes than a mature PAYGO scheme, which may encourage private asset accumulation further.

While the transition from a PAYGO system to a SAYGO system is likely to raise national savings, it will not necessarily raise welfare. In the circumstances prevailing in New Zealand, the transition essentially requires a temporary increase in taxes to prevent taxes from rising even higher in the long term. These taxes will in part fall on different cohorts, making the estimation of the welfare consequences of the transition complicated. The clear beneficiaries from the reform will be future generations. Nonetheless, it is possible that many current working age people will benefit from temporarily higher taxes now if their future tax liabilities are sufficiently lower than they otherwise would have been. The number of currently alive people benefiting from the transition will depend on the extent they are patient, the extent the returns to the fund are high, and the extent to which the transition lowers the total deadweight costs of taxation.

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