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by

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Intergenerational Fiscal Balance in Australia: Should We Use Fiscal Sustainability or Intergenerational Equity?*

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Abstract

The burgeoning of the Australian welfare state in the post-World War Two era, combined with the projected rise in the dependent-to-working population ratio from around 2011, is projected raise social expenditure substantially, potentially exposing Australia to enormous fiscal pressure. Contemporary measures of budget balance do not take into account the fiscal impact of such long-term cost determinants. Moreover, there is no agreed conceptual framework for the design of public policies to address this problem. This paper presents two simple models for two competing concepts for measuring intergenerational fiscal balance: Fiscal sustainability and intergenerational equity. These concepts are then used to illustrate the implications for the design of public policies to address the fiscal implications of long-term cost determinants. Investment in education is used to highlight the application of these two competing concepts since it is a quintessential example of generational transfer and a potentially potent policy measure for reducing the real value of debt passed from the current generation to future generations.

Key Words: : fiscal sustainability; intergenerational equity; investment in education.

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1. INTRODUCTION

Popular attention in Australia has focused increasingly on the long-run consequences of demographic change. However, public debate about the need to consider the implications of current government policy for future generations has been conducted outside of any framework of objectives. In essence, the general objective is to balance the budget, but there are various conceptual frameworks within which to pursue this aim. Two such frameworks are fiscal sustainability and intergenerational equity. If society aims for one of these objectives, but subsequently finds that the other better measures the true impact on the economy, what would be the fiscal and economic implications? What would it mean for the design of policies? Does pursuit of one objective ‘buy’ more time to implement policy change before the Australian ‘baby boomers’ reach pension age? These and other questions cannot be satisfactorily answered without a clear conceptual framework.

Intergenerational fiscal imbalance is a form of cost shifting. The conventional wisdom holds that the current generation is shifting a fiscal ‘burden’ to future generations. The main issue for consideration in this paper is whether the extent of this purported cost shifting depends on the conceptual framework of measuring intergenerational fiscal imbalance. The basic question is: do we need to close the fiscal gap through specific fiscal intervention, or will future generations achieve higher productivity levels sufficient to cover the fiscal gap on the basis that public programs financed by the present generation will pass on to the next generation?

The paper itself is divided into three main sections. In section 1, a simple set of expressions will be developed to characterise cost shifting under two concepts of inter-temporal fiscal balance, namely, fiscal sustainability and intergenerational equity. Given the definitional complexities involved, to simplify this task, general definitions will be used to enable the basic features of each concept to be clearly identified. It will be argued that these concepts involve differing views about the extent of intergenerational fiscal imbalance. In section 2 cost shifting will also be shown to be influenced by broad economic factors (such as the real interest rate) and modelling assumptions (like the choice of discount rate); the choice of concept can thus be demonstrated to produce differing results. The paper ends in section 3 with a brief application of this discussion to policy making in contemporary Australia, using investment in education as example of an illustrative policy variable.

2. INTERGENERATIONAL FISCAL BALANCE

All notions of long-term fiscal balance have, as their basic assumption, the proposition that the budget is balanced in the long run; that is, the present value of revenue is equal to the present value of expenditure. Seigniorage revenue is assumed to be unimportant, and thus is ignored. If the government has net worth at the beginning of the period, then the government could run down its worth by a stream of deficits, the present value of which equals the current stock of net worth. Alternatively, if the government has net debt at the beginning of the period, then the government would need to generate a net surplus stream, the present value of which would equal the opening value of net debt. For the time being, it is assumed, for convenience, that the current net worth or net debt is zero, and so the inter-temporal budget constraint is, in its simplest form, given by the stylised expression:

$$PV\Sigma(T - G) = 0 \quad (1)$$

where:
PV = the present value of the sum future income streams from period t=1 in perpetuity, that is, ${}_{t=1}\Sigma^{\infty}\ 1/(1 + r)^t$
T = the future stream of government revenue: T_t
G = the future stream of government expenditure: G_t

If we partition the inter-temporal budget constraint between the current generation (generation 1) and all future generations (generation 2), then we get:

$$PV\Sigma(T_1 - G_1) + PV\Sigma(T_2 - G_2) = 0 \quad (2)$$

From equation (2), if generation 1 ran a deficit so that $T_1 - G_1 < 0$, then generation 2 would have to raise taxes or reduce expenditure to restore budget balance. Thus generation 1 shifts fiscal burden to generation 2.

If we are concerned with the determinants of the rise in social expenditure and the implications for generational fiscal sustainability, then, to focus on social expenditure, equation (2) is again partitioned between social expenditure for each generation (G_{s1} and G_{s2}) and other government consumption (G_c) as follows:

$$PV\Sigma(T_1 - G_{s1}) + PV\Sigma(T_2 - G_{s2}) = PV\Sigma G_c \tag{3}$$

Government social expenditure is defined as transfer payments (like pensions) and other payments that can be assigned to individuals, namely, health and education. On the other hand, government consumption consists of public services that cannot be readily assigned to individuals (such as defence and public transport), and represents the residual, so that total government expenditure is given by $G = G_{s1} + G_{s2} + G_c$.

If we suppose that generation 1 balances the budget (so that, in present value terms, $T_1 = G_{s1}$ + the portion of G_c attributable to generation 1), and similarly with generation 2. If we further suppose that the population ages, the implication being that generation 2 has to pay higher transfer payments, and so G_{s2} rises. In order to balance the budget, again in present value terms, generation 2 has to raise taxes, reduce transfers or cut other government expenditure.

Equation (3) above is the basic form of Auerbach and Kotlikoff's (1999) generational accounting model. In this model $T_2 > T_1$, measures the increase in taxes to be faced by generation 2 and represents Auerbach's conception of generational fiscal imbalance. As Auerbach *et al*. (1999, p. 32) point out, this model can to be interpreted to mean that each generation would pay taxes according to the costs incurred; that is, the cost of the transfer payments, education and health, and the taxes net of these payments represents each generation's contribution to government consumption. In essence, this is a basic model of *fiscal sustainability*.

The alternative concept of intergenerational fiscal balance, *intergenerational equity*, can be illustrated by extending the basic version of Auerbach and Kotlikoffs's (1999) model in equation (3). The extension involves further partitioning of social expenditure between its consumption and investment components. Transfer payments are benefits to the recipient, which are consumed in the period that the individual receives the transfer. Other social services are a mix of services. Some are services the benefits of which are consumed immediately (such as the administration of transfer payments), and some are services the benefits of which are enjoyed over the remaining life of the individual and passed-on to future generations. The latter category of social services is in the form of an investment, the building of social and human capital. This is easiest to see in public education. Education equips individuals to be productive throughout their working life, and some portion of that generation's efforts adds to the stock of knowledge, which is handed over to future generations. Similarly, health expenditure lifts the wellbeing of the population, which contributes to productivity, and increases longevity, which enhances experience and spurs greater contributions to innovation.

In terms of the model, taxes paid by generation 1 cover transfers and some social services the benefits of which are enjoyed by generation 1. The portion of social expenditure, the benefits of which are passed on to generation 2, should be paid by generation 2. This benefit is reflected in a 'transfer tax' from generation 1 to generation 2, which is denoted δ. As the tax is in the form of a transfer, the inter-temporal budget balance is maintained. Thus, the inter-temporal budget balance under intergenerational equity is given by:

$$PV\Sigma(T_1 - \delta - G_{s1}) + PV\Sigma(T_2 + \delta - G_{s2}) = G_c \quad (4)$$

The transfer tax can be conceptualised in at least two ways. In the first place, the transfer tax can be considered as a reduction in T_1; that is, a subsidy to generation 1 for creating social capital. Second, a reduction in G_{s1}, that is, social investment is capitalised by generation 1 and then depreciated over the life of generation 2.

A reduction in taxes paid by generation 1 is problematic from the point of view of presenting the fiscal accounts and public financing, since a reduction in taxes would create a deficit (recalling that part of the general government consumption (G_c) would be paid by generation 1). Amortising the social capital, and thus reducing recorded government expenditure would overcome the problem of the presentation of the accounts. The reduction in taxation would be financed by debt, which is a vehicle for deferring costs to the future.

From the perspective of generation 2, the implication of the two models is that the conceptual framework of intergenerational equity delivers a higher fiscal burden to generation 2 than the framework of fiscal sustainability, because $PV\Sigma(T_2 + \delta - G_{s2}) > PV\Sigma(T_2 - G_{s2})$. The debt created by generation 1, δ, will require repayment by generation 2. However, the size of the additional burden depends on the passage through time of the interest rate on debt and the growth rate of the economy.

3. DETERMINANTS OF THE MAGNITUDE OF COST SHIFTING

3.1. GDP growth and real interest rates

If government expenditure is not matched by government revenue contemporaneously, then the stock of government debt will change. It was noted earlier that intergenerational equity may create a higher level of debt for generation 2. The implications of the creation of public debt by generation 1 on generation 2 depend on the interplay between the long-term paths of the interest rate and the GDP growth rate.

To demonstrate the implications of debt creation under intergenerational equity, the ratio of government debt to GDP is examined. This approach is sometimes called the 'accounting approach' to fiscal sustainability, and contrasts with the present value approach (International Monetary Fund (IMF), 1996, p. 108; Cuddington, 1996, p. 20).

A continuous increase in the ratio of debt to GDP is likely to eventually undermine the confidence of lenders in the ability of the government to service the debt, and hence the debt ratio represents a measure of the sustainability of government finances. The mathematical expression of this is given by the following equation:

$$\Delta d_t = Pd_t + (r - g) \cdot d_{t-1} \tag{5}$$

where:

Δd_t = the change in the debt-to-GDP ratio in the current period

d_{t-1} = the stock of debt-to-GDP ratio in the previous period

Pd_t = primary fiscal balance-to-GDP ratio, $Pd_t > 0$ is a deficit

r = real interest rate

g = real GDP growth rate

Equation (5) is the *temporal* budget balance for period t. In a situation where the interest rate exceeds the growth rate, the debt ratio will rise, since interest payments add more to debt than growth adds to GDP, for a given level of primary surplus. In this situation, the fiscal position is unsustainable regardless of the current level of debt, unless the government raises the primary surplus sufficient to offset this effect.

Using the temporal budget constraint and following IMF (1996, p. 67), the basic *inter-temporal* budget constraint can be derived.

Starting with equation (5), the debt ratio in period t is derived as follows:

$$\Delta d_t = Pd_t + (r - g) . d_{t-1}$$

$$\Delta d_t = d_t - d_{t-1}$$

$$d_t - d_{t-1} = Pd_t + (r - g) . d_{t-1}$$

$$d_t = Pd_t + (r - g) . d_{t-1} + d_{t-1}$$

$$d_t = Pd_t + (1 + r - g) . d_{t-1}$$

In the long run, debt must be extinguished (i.e. no Ponzi games), and so $d_t = 0$. The equation above is converted to present values where r and g are compound rates that yield equation (6a):

$$0 = Pd_t + (1 + r - g) . d_{t-1} \qquad (6a)$$

However, the IMF assumes that the discount rate is equal to the difference between the real interest rate and the GDP growth rate, which gives:

$$0 = PV\ \Sigma Pd_t + d_{t-1} \qquad (6b)$$

Equation (6b) indicates that the present value of the future stream of primary surpluses must be equal to the opening stock of debt. (The IMF's choice of discount rate is merely a convenience, which is discussed below). The next step is to extend the *intertemporal* budget constraint in equation (6a) into an *intergenerational* budget constraint by partitioning the equation between generation 1 and generation 2.

It was argued earlier that the stock of debt must in the long run be equal to the future stream of primary surpluses since the government must be in a position to meet its obligations fully. In the long run a government cannot have debt (Musgrave, 1988). This is called the 'no Ponzi game' condition:

$$\lim_{t\to\infty} d_{t-1}/(1 + r)^t = 0 \tag{6c}$$

This equation holds that the present value of the government's debt in the indefinite future converges to zero. This condition is justified by arguing that lenders would not be willing to allow the government to perpetually pay their interest obligation by borrowing more (Cuddington, 1996, p. 8).

The value of the opening balance of debt (as a proportion of GDP) is affected as we move forward in time by the projected real interest rate and GDP growth rate. Thus, in period 1, for a given g and r in that period, the projected value of the opening value of debt is $d_1 = (1 + r - g)d_0$ and for period 2 it is $d_2 = (1 + r - g)^2d_0$, where r and g are the annualised growth rates over the two periods. Accordingly the projected value of opening value of debt in t periods is $(1 + r - g)^td_0$.

The primary surplus or deficit (as a proportion of GDP) will either add to or reduce the stock of debt as we move forward in time. Therefore the stream of primary surpluses $Pd_1 \ldots\ldots\ldots Pd_t$ will also be affected by r and g from the period in which the primary surplus or deficit is created. So in period 1 the primary balance will be affected by r and g from the 2nd period and each period thereafter to the nth period, so the value in the n^{th} period is $(1 + r - g)^{n-1}$. Pd_1. In period 2 the primary balance will affected by the annualised r and g over the 3^{rd} period to the nth period, so the value in the nth period is $(1 + r - g)^{n-2}$. Pd_2. The period primary balances have an accumulative effect on the opening balance of debt, so the accumulative effect is $\Sigma(1 + r - g)^{n-t}$. Pd_t, where the sum is taken over t=1 to n periods.

Bringing the components together, the inter-temporal budget balance as we move forward in time is given by the following equation:

$$0 = (1 + r - g)^t d_0 + \Sigma(1 + r - g)^{n-t}. Pd_t \quad (7)$$

The inter-temporal budget balance equation (7) is now ready to be extended to consider the implications for generation 1 and generation 2.

For generation 1, the inter-temporal budget equation consists of the opening debt and a stream of primary surpluses and deficits is given by the equation (8) below. Note that generation 1 is not required to obey the rule of inter-temporal budget balance, since this generation has the ability to pass-on the end of period debt, d_{g1}, to the next generation. So the stream is:

$$(1 + r - g)^{n1} d_0 + \Sigma(1 + r - g)^{n1-t}. Pd_t = d_{g1} \quad (8)$$

where: r and g are the annualised rates for period t = 1 to n1.

Generation 2 faces the debt inherited from generation 1 at period n1, plus a stream of primary fiscal surpluses and deficits, which are generated from period n1 + 1 to infinity.

$$(1 + r - g)^{n2-n1} d_{g1} + \Sigma(1 + r - g)^{n2-n1} . Pd_t = d_{g2} \qquad (9)$$

where: r and g are the annualised rates for period t = n1 to n2.

If we assume that generation 2 lives for a finite period of time, then generation 2 can pass-on d_{g2} debt to the next generation. Alternatively, if generation 2 represents all future generations, then generation 2 is required to obey the inter-temporal budget balance rule, and thus the sum of the opening balance of debt and the stream of primary surpluses must add to zero. Thus $d_{g2} = 0$, and n2 goes to ∞. In was argued earlier that intergenerational equity compared to fiscal sustainability implies that debt would be shifted from generation 1 to generation 2, and that generation 2 would need to discharge the debt by raising taxes. From the point of view of generation 2, meeting the debt obligation of generation1 is acceptable so long as generation 2 acquires the social capital made available from the efforts of generation 1. Equation (9) indicates that, depending on the path of interest rates and the GDP growth rate, the debt-to-GDP ratio may rise or fall. If generation 1 has not been successful in managing the macro-economy so the real interest rates regularly exceed the economic growth rate, then this mitigates the advantage to generation 2 as they inherit a larger debt burden for a given level of the social capital.

3.2. Discount rates and the distant future

The inter-temporal fiscal balance equations ((8) and (9)) for generation 1 and generation 2 refer to fiscal streams as we go forward in time, and thus do not account for time preference. However, we have already seen that the IMF (1996, p. 67) simply assume that the discount rate, i, is equal to the difference between the real interest rate and the GDP growth rate, so that equation (8) collapses to:

$$(1 + r - g)^{n1}d_0 + \Sigma(1 + r - g)^{n1-t}. Pd_t = d_{g1}$$

$$PV(1 + r - g)^{n1}d_0 + PV\Sigma(1 + r - g)^{n1-t}. Pd_t = PVd_{g1}$$

$$PV(1 + 0)^{n1}d_0 + PV\Sigma(1 + 0)^{n1-t}. Pd_t = PVd_{g1}$$

However, this assumption appears to have been made purely for convenience.

The choice of discount rate has been an unresolved debate in the economics literature for many years, and remains disputed (Portney and Weyant, 1999, p. 7). The conventional wisdom within governments generally is to use a discount rate that reflects the opportunity cost of capital. For example, the US Office of Management and Budget (United States Government, 2001) and the Department of Finance (D of F, 1987) both recommend a real discount rate of 7 per cent. For most decisions concerning committing resources to policy change, this calculus seems reasonable; the net benefits of that decision should exceed the opportunity cost of the resources in their next best alternative use. However, when the discount rate is applied to a stream of costs and benefits into the distant future, it is clearly apparent from the present value formula that the net benefit to the next generation has very little weight for present day decision making.

Portney and Weyant (1999, p. 5) contend there is considerable unease in the economics literature over the choice of discount rate. However, this unease appears to arise from some confusion between economic efficiency and distributional equity. Consider a policy change where the effects are immediate and the benefits exceed the costs. We might still object to the policy change on distributional grounds: For instance, if the benefits are received by the wealthy, and the costs are incurred by the poor. The argument is similar for policy change into the distant future. Even if it is efficient to reject a policy to address the fiscal impact of demographic change because there is a better financial return to be had by investing in government bonds, one might still reasonably object to the latter on distributional grounds, in this case the distributional impact between generation 1 and generation 2, especially if there is doubt that compensation will be available to future generations.

This argument is not to suggest that the discount rate should be negative or zero. The view put by Portney and Weyant (1999, p. 7) is that the discount rate should be positive, but beyond 40 years lower discount rates should apply and that the longer the time horizon the lower the discount rate: That is, the discount rate is non-constant. Another implication is that the design of policy affecting the intergenerational transfer should be from the current wealthy, not the current poor. We thus argue that the discount rate, i, should be small positive number, which is quite different number from the IMF's assumption of the difference between the real interest rate and the GDP growth rate.

3.3. Fiscal sustainability and intergenerational equity

We now examine the change in the value of debt created by one generation and paid by another when it is combined with the two basic concepts of inter-temporal fiscal balance.

We argued earlier that fiscal sustainability can be characterised as in equation (3):

$$PV\Sigma(T_1 - G_{s1}) + PV\Sigma(T_2 - G_{s2}) = PV\Sigma G_c$$

It was also shown in this section that intergenerational equity can be characterised as in equation (4):

$$PV\Sigma(T_1 - \delta - G_{s1}) + PV\Sigma(T_2 + \delta - G_{s2}) = G_c$$

However, it was also argued that, in the framework of intergenerational equity, debt as a proportion of GDP created by generation 1 and passed on to generation 2 would grow or diminish according to the path of the real interest rate and economic growth rate, expressed in equation (8):

$$PVdg1 = PV(1 + r - g)^{n1}d_0 + PV\Sigma(1 + r - g)^{n1-t}. Pd_t$$

It was also noted earlier that $PV = {}_{t=1}\Sigma^{n1} (1 + i)^{-t}$, and i is the annualised inter-temporal rate of time preference reflecting a non-constant and declining time preference as the horizon moves to the distant future.

Under the concept of intergenerational equity, generation 1 passes-on social capital to generation 2, and, given the benefit principle, generation 1 pays less tax and incurs debt. The debt accumulates according to the passage of annual investment in social capital over the life of generation 1, δ_t, and the present value of that debt is transformed according to the passage of the GDP growth rate, the interest rate and the inter-temporal discount rate. The present value of debt under the concept of intergenerational equity is:

$$PVd_{g1} = PV(1 + r - g)^{n1}d_0 + PV\Sigma(1 + r - g)^{n1-t}. (Pd_t + \delta_t) \qquad (10)$$

If, under fiscal sustainability each generation pays taxes according to the costs incurred, so that $PVd_{g1} = \delta = 0$, then equation (9) reduces to:

$$PVd_{g1} = PV(1 + r - g)^{n1}d_0 + PV\Sigma(1 + r - g)^{n1-t}. Pd_t \qquad (11)$$

Thus, the difference between these two concepts (i.e. the difference between (10) and (11)) is the value of the debt passed from generation 1 to generation 2:

$$PV\Sigma(1 + r - g)^{n1-t}. \delta_t \qquad (12)$$

This debt to be paid by generation 2 is in addition to the taxes paid (T_2), net of transfers received by the government (G_2).

Recalling the inter-temporal budget balance given in equation (4) is $PV\Sigma(T_1 - \delta - G_{s1}) + PV\Sigma(T_2 + \delta - G_{s2}) = PV\Sigma G_c$, then by incorporating the effects of interest rates, GDP growth rate and the discount rate, the equation becomes:

$$PV\Sigma(T_1 - \delta_t - G_{s1}) + PV\Sigma(T_2 + (1 + r - g)^{n1-t}. \delta_t - G_{s2}) = PV\Sigma G_{c,} \tag{13}$$

In terms of Auebach's generational accounting model, the measure of the intergenerational imbalance to the burden of generation 2 is where:

$$T_1 - \delta_t < T_2 + (1 + r - g)^{n1-t}. \delta_t \tag{14}$$

Overall, the difference between fiscal sustainability and intergenerational equity was shown to be the value of debt passed from generation 1 to generation 2, which reflects that portion of social expenditure incurred by generation 1 which is of benefit to generation 2. If the benefit for generation 2 of the investment in social capital by generation 1 exceeds the cost of the investment passed to generation 2 through debt, then *ceteris paribus* it is the debt to GDP ratio that matters, not absolute real debt. It was shown that the present value of the debt ratio will grow or diminish according to the difference between the real economic growth rate and the real interest rate and the discount rate. The capacity if generation 2 to meet the debt obligations will depend on the benefits of generations 1's investment in social capital by generation 2.

It is now possible to draw some conclusions concerning cost shifting between generations under the two competing concepts of inter-temporal fiscal balance; fiscal sustainability and intergenerational equity. In particular, under the concept of intergenerational equity, social investments by generation 1 can benefit generation 2 and that, accordingly, generation 2 should share the cost. Under the concept of fiscal sustainability, each generation must meet the expenditures incurred by that generation. Thus the difference between fiscal sustainability and intergenerational equity is the value of debt passed from generation 1 to generation 2, reflecting that portion of social expenditure incurred by generation 1 which is of benefit to generation 2. If the benefit to generation 2 of the investment in social capital by generation 1 exceeds the cost of the investment passed to generation 2 through debt, then *ceteris paribus* it is the debt to GDP ratio that matters for sustainability not absolute real debt.

We have also shown that the present value of the debt ratio grows or diminishes according to the difference between the real economic growth rate and the real interest rate and the discount rate. The capacity of generation 2 to meet the debt obligations will depend on the benefits of investment in social capital by generation 1 captured by generation 2.

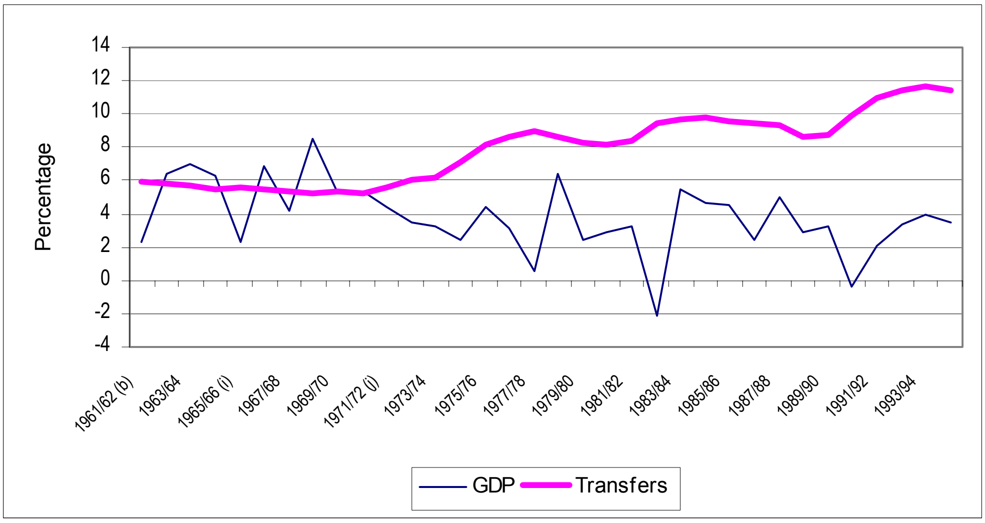
4. IMPLICATIONS FOR POLICY DESIGN

With the aid of the inter-temporal budget balance equations for fiscal sustainability and intergenerational equity (equations (3) and (14)), various observations can now be made about the design of policies aimed at addressing long-term cost determinants of social expenditure, including demographic change. In essence, governments can influence taxes (i.e. T_1 and T_2) and government expenditure (i.e. G_1, G_2 and G_c) through specific policy adjustments and by stimulating of economic growth. These policy adjustments are achievable identically under both concepts.

Central to our argument is the fundamental point that policymakers need to be clear about which framework is most appropriate; that is, fiscal sustainability or intergenerational equity, since the choice of framework implies alternative views about the nature, timing and direction of policy to address the long-term cost drivers of social expenditure. As a salient example, we now discuss the structure of social expenditure as an investment good.

In Australia, over the past 40 years, total transfer payments (for all jurisdictions) under the social welfare system have doubled, as a proportion of GDP, from about 6 per cent to just under 12 per cent, despite a fall in the dependency ratio and rising per capita GDP. The pattern of transfer payments is shown in Figure 1. Transfer payments rise during times when GDP performance dips (e.g. 1979, 1984, 1992), as expected, and when GDP recovers, transfer payments should fall, but payments have not fallen back to their previous levels. Once these transfers are paid, they tend to 'stick' to the recipients, probably due to their disincentive effects.

Figure 1: Responsiveness of Transfer Payments to GDP, 1960 to 2000



Source: Reserve Bank of Australia (1997) and various bulletins

However, various factors are at play. Pensions are paid irrespective of the level of economic activity. With the Australian economy currently running near the full capacity utilization, raising the rate of workforce participation to the upper end of the participation rate achieved in other OECD countries would boost GDP growth and reduce transfer payments (Commonwealth of Australia, 2003, pp. 4-32). This could be achieved by adjusting retirement income policy to encourage older workers to stay in the workforce for longer (e.g. raising the superannuation preservation age closer to the pension age), reviewing the social security and tax systems to remove disincentives to entering the workforce for earning higher incomes, boosting the health status particularly by reducing mental disorders and musculo-skeletal disease which are the main reasons for disability support pensions, and boosting the educational status of the workforce as more highly trained persons are more likely to participate in the workforce. However, there is a much broader problem than marginal adjustments to workforce participation in order to reduce transfer payments, and that is to adjust the balance of social expenditure between depreciation and new investment.

One of the main factors driving the decline in the fertility rate is the rise in the educational attainment of the younger generation – which has delayed the timing of family formation and reduced the opportunity for child bearing – but it is the educational attainment that creates the increase in human capital needed to sustain strong productivity into the future. Similarly, one of the main factors driving the rise in longevity is the development of new medical technology – which has reduced morbidity and extended life – but it is the longer life expectancy that enables the gathering of greater experience to drive productivity. Thus, in terms of intergenerational equity, much of the future growth in productivity that will determine future living standards is due to investments made by the current generation in education and life-long experience. Investment in social expenditure, rather than being a tax burden on the next generation, can be regarded as a bequest to the next generation in macroeconomic terms.

Drawing on various studies in endogenous growth economics, Dowrick and Day (2003) distinguish between embodied and disembodied knowledge as determinants of economic growth. There are two components of knowledge accumulation; skills, which are embodied in people and thus die with them, and ideas, which are disembodied and exist forever (or are replaced with more illuminating ideas). The latter have the characteristics of being non-rival, non-excludable and unbounded, and thus constitute a pure public good. This implies that if left to competitive market forces, there will be an under-supply of ideas, and thus public intervention is required to subsidize the generation of ideas through research, hence stimulate growth up to the socially optimal level. While Dowrick and Day (2003, p. 5) argue that disembodied knowledge is more likely to drive economic growth that embodied knowledge, essentially because of greater endogenous 'spillover benefits', they also argue that accumulation of human capital through education and training 'is the oil that lubricates the engine of growth: without it, growth grinds to a halt'. A survey of recent studies by these authors indicates that the 'level effect' on long-run productivity of an additional year of Australian schooling is between 4 to 8 per cent and suggests an increase in the long-run rate of growth in GDP is about 0.5 percentage points.

Health technology and healthier life styles that extend longevity (and reduce morbidity) mean that people can accumulate knowledge and use it productively in the workplace or the community for longer periods. Health status is thus a precondition for knowledge accumulation and productivity. A greater proportion of the early part of life can be devoted to education (such as the attainment of higher degrees) if there is a reasonable expectation that productive life will be longer. The Melbourne Institute (2000, p. 22) cites several international studies that confirm that there are strong positive returns to higher quality education.

The Productivity Commission (2003, p. 23) argues that social capital is generally agreed to refer to social norms and/or social networks, and that social trust is a close proxy for it. The Commission identifies various studies indicating that (the measured index of) trust is deteriorating in Australia and in some other countries, such as Britain and the United States. In addition, the Commission (2003, p. 34) outlines work on the relationship between trust and economic performance, indicating that a 10-percentage point increase in the trust index is associated with a 0.8 percentage point increase in the annual per capita GDP growth.

The notion of an earlier generation bequeathing assets, including wisdom, to a younger generation is not new, but the difference now is the formation of contemporary social policy. The basic problem is that we need to induce higher rates of knowledge accumulation (and hence productivity per worker) in the future as the working proportion of the population dwindles. This brings into focus a major difference between fiscal sustainability and intergenerational equity. Under fiscal sustainability, where generation 1 is constrained to balancing the budget, investment in social and human capital is also constrained. Evidence of this constraint is seen in the estimated rate of return on tertiary education. The Melbourne Institute (2000, p. 2) estimates that the average social rate of return to tertiary education is about 16.5 per cent, which exceeds the private rate of return, and is one of the best investment returns available in the Australian economy. This is indicative of the constrained supply of human investment goods. By contrast, the model of intergenerational equity provides for social and human capital investment by generation 1 to be funded by generation 2 (to the extent that generation 2 receives benefits). This model is not constrained by the pressure of balancing the budget. By treating (selected) social expenditure on education as an investment instead of an expense, this enables the constraint to be lifted enabling a greater level of investment by generation 1. This type of investment may take many years to bear fruit, and thus to be relevant to the upswing in the dependency ratio (projected to occur from 2011).

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