# Infometrics Report

# 1 Role of savings*

People save for a number of different reasons. Keynes (1936) noted the following eight reasons why people save:

| | |
|---|---|
| ***Precaution:*** | To build up a reserve against unforeseen contingencies |
| ***Foresight:*** | To provide for an anticipated future relation between income and the needs of the individual or family different from that which exists in the present |
| ***Calculation:*** | To enjoy interest and appreciation |
| ***Improvement*** | To enjoy gradually increasing expenditure |
| ***Independence:*** | To enjoy a sense of independence and a power to do things |
| ***Enterprise:*** | To secure a masse de manoeuvre to carry out speculative or business projects |
| ***Pride:*** | To bequeath a fortune |
| ***Avarice:*** | To satisfy pure miserliness, ie unreasonable but insistent inhibitions against acts of expenditure as such |

To this already extensive list it should perhaps also be added that people can also save unintentionally or as a matter of habit or custom.

The actual level of savings at any point in time is influenced by a complex interaction of factors. There will often be counteracting influences from these factors so that the overall impact of either an event or a policy on saving will depend on the relative importance of these counteracting forces. To complicate matters further, the simultaneity of events makes it very difficult to measure the direct impact of each sub-influence.

The key focus of this chapter is to develop a theoretical model of consumption and saving to provide a structure for discussing the issues surrounding saving behaviour. In particular we will discuss the impact that the interaction between the private and public sectors has on saving, the accumulation of wealth and on national welfare. This model should not be viewed as a definitive explanation of saving behaviour, but merely as a way of structuring a discussion of influences on saving behaviour. Indeed it is the nature of models to greatly simplify life in order to focus on a few salient issues. But in so doing they can ignore factors that might be very important to significant segments of society. This is most pertinent in the area of savings, given the wide range of reasons that people save, the complexity of factors that might influence people's willingness and ability to save, and the different circumstances facing individuals - not just across society but at different periods of their lives.

The chapter begins with a brief discussion about the economic problem: how does society allocate and organise its limited resources to satisfy the more extensive demands of its citizens. The influence that savings has on resolving this problem is then introduced. Factors that influence savings behaviour are discussed in section 3. This discussion is based on a formal model that is presented as the appendix to this chapter. Section 4 summarises the implications that the theoretical model has for retirement saving.

* This chapter benefited from valuable comments made to an earlier draft by both Andrew Coleman and Benjamin Hunt, they of course are not responsible for the views and opinions of Infometrics expressed in this chapter.

The chapter highlights that the key implications for government policy are:

- Governments should not attempt to encourage savings by manipulating the market return to saving - in fact removing any distortions that currently exist is the best policy makers can do.

- Government's share of output should be optimised to reflect, as perfectly as possible, household preferences for the public goods and services that governments produce.

- Government operations need to be managed to ensure that public goods are provided as efficiently as possible.

- To the extent that market failures exist that prevent all consumers from purchasing the retirement income security that they desire, there is a role for government to provide some retirement security. In order to minimise the impact of the inevitable distortions to private sector behaviour that will arise from government funding such schemes, such programmes should be limited and directed specifically at those for whom the market fails.

## 1 The economic problem

Individuals or households attempt to maximise their standard of living given the resources available to them. Living standards improve when they receive greater satisfaction or utility. The utility function for a representative household, *a*, could be expressed as:

$$U_a = \sum \beta_i C_{a,i} + \sum \varphi_j G_{a,j} + \sum \psi_k Z_{a,k} \qquad (1)$$

Where:
- $C_{a,i}$ = consumption by household *a* of product *i*
- $G_{a,j}$ = the amount of government service *j* received by household *a*
- $Z_{a,k}$ = other factors that give satisfaction to household *a* (eg warm summers, leisure, home team sporting victories)
- $\beta, \varphi, \psi$ = parameters measuring the amount of satisfaction received from each activity

Given free choice, individual households will consume a different proportion of these goods and activities depending on their tastes, desires and needs. For each household or individual one could conceptually map the different combinations of consuming different amounts of these goods that would give an equal level of satisfaction. Such maps are called indifference curves. Consumption at any point on the curve will give the consumer the same amount of satisfaction and so the consumer is "indifferent" about moving between different combinations on the curve.

A map of indifference curves measuring the relative preference of consuming different types of goods would be convex to the origin. This is because people put more value on scarce goods and so require greater compensation in terms of abundant goods before foregoing a unit of the scarce good. This can be represented graphically by curves like **WW** in Figure 1 (in this case we are measuring relative preference for capital (K) and labour (L) intensive goods, eg cars and haircuts). Consumption at any point on **WW** would yield consumers with the same level of satisfaction as anywhere else on the curve, A parallel curve that is further from the origin would yield a higher level of satisfaction and welfare.

Individual households will attempt to maximise their expected utility subject to a budget constraint that will in turn be determined by the national resource constraint, which may be defined by a Cobb-Douglas production function:

$$\sum Y_a = Q = \alpha K^{\phi} L^{(1-\phi)} \qquad (2)$$

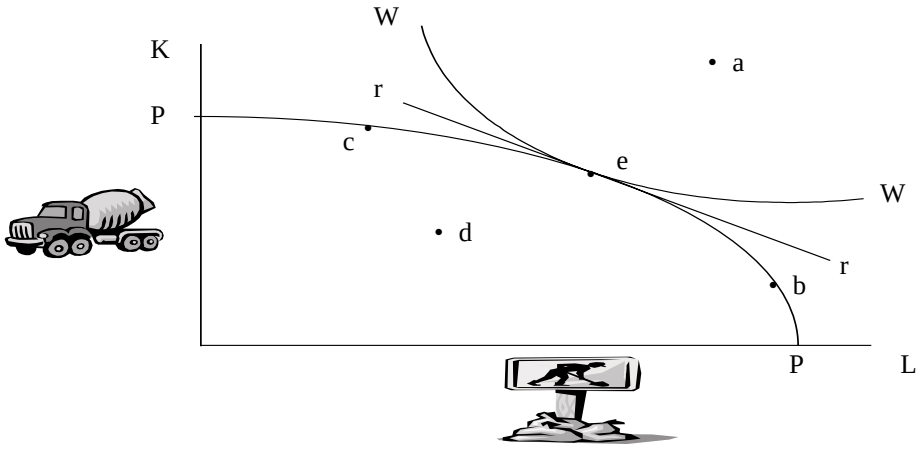
Where:
- Y = Income
- Q = National output
- K = The economy's capital stock
- L = The economy's stock of labour
- $\alpha$ = Total factor productivity
- $\phi$ = The proportion of output attributable to the utilisation of capital, as distinct from labour ($0 \le \phi \le 1$)

Equation (2) implies that the productive use of the economy's resources will place an upper limit on the sum of individuals' incomes. The actual level of output will depend on the amount and mix of resources used and the available technology. The potential production possibilities could be illustrated as a curve that is concave to the origin (eg **PP** in Figure 1), reflecting the law of diminishing returns - eventually the shortage of one input will constrain production no matter how many other inputs are used (eg there are limits to the amount of

wheat that one acre of land can yield, no matter how many workers, harvesters, or amounts of fertilisers used).

The interaction of the economy's production possibilities and the desires of society will determine the mix of goods produced and consumed. The relative scarcity of inputs required to produce the goods that society desires will determine the cost of producing these goods. How much people are willing to pay for each good and the cost of producing these goods will determine how much of each good is produced. This is illustrated in Figure 1, where point **e** represents the economic welfare maximising production and consumption point[1]. This is the point where the welfare curve **WW** is tangential to the production possibility frontier **PP**, and so represents the highest level of welfare that can be delivered from fully utilising the resources available. This is known as the *pareto efficient* point of production as it is the point of production that best meets the desires of society.

**Figure 1: Pareto efficient production and consumption**




The other points illustrated in Figure 1 are either not physically possible, (eg point **a**) or deliver lower levels of economic welfare. Points **b** and **c** would fully utilise the available resources, and would conceivably yield quite similar measures of GDP as point **e**, but the mix of goods produced at **b** and **c** do not match the desires of society as well. The welfare curves that intersect these points would be considerable closer to the origin than **WW**, and so would be associated with lower levels of national welfare. Point **d** would obviously be inferior to **e**, yielding unemployment as well as lower living standards.

In this simple two good example, which ignores external trade, as long as there are no market failures market forces could be expected to generate the ***optimal welfare production and consumption outcome***. The interaction of supply and demand through **PP** and **WW** would result in prices for goods that reflect their relative utilisation of capital and labour, and the relative demand for capital and labour intensive products. In this case the relative price of capital and labour would be given by the slope of the tangent to **PP** and **WW** at **e**, **rr**. This is the real exchange rate between capital and labour.

Thus the basic model we have is that individuals acting independently will each attempt to maximise their living standards subject to the resources available to them. These resources will be principally be income they receive from working and investing. There will be limits

[1] The term welfare is used here in the economic sense and represents a measure of living standards. From a national perspective it would represent the sum of every household's utility functions as presented in equation 1.

to the amount of income that each individual can generate and this will place a limit on the amount of goods and services that can be consumed. Given this limit, each individual will choose a mix of consumption and saving, and working and leisure that will give them the greatest level of satisfaction.

## *2 The importance of savings*

In the absence of overseas borrowing, this gross investment will need to be funded by current savings which is the amount of current income that is not consumed. The amount that people choose to save will depend on the trade-off between the welfare they receive from greater expected incomes in the future (and therefore a greater future consumption potential) and the loss of foregone consumption today. This trade-off can be illustrated in Irving Fisher's two period model of intertemporal consumption choices as described in Levacic and Rebman (1982) and illustrated in Figure 2. Ignoring uncertainty, it argues that satisfaction or utility (U) can be simplified as being simply a function of consumption today ($C_0$) and in the future ($C_1$), and that wealth (W) equals income today ($Y_0$) plus the value of future income($Y_1$) discounted by the interest that can be earned between the two periods (*i*), ie

$$U = f(C_0, C_1) \quad (3)$$

$$W = Y_0 + Y_1/(1 + i) \quad (4)$$

Then if we assume that all wealth must eventually be consumed (ie in this example within the two time periods), then it also follows that

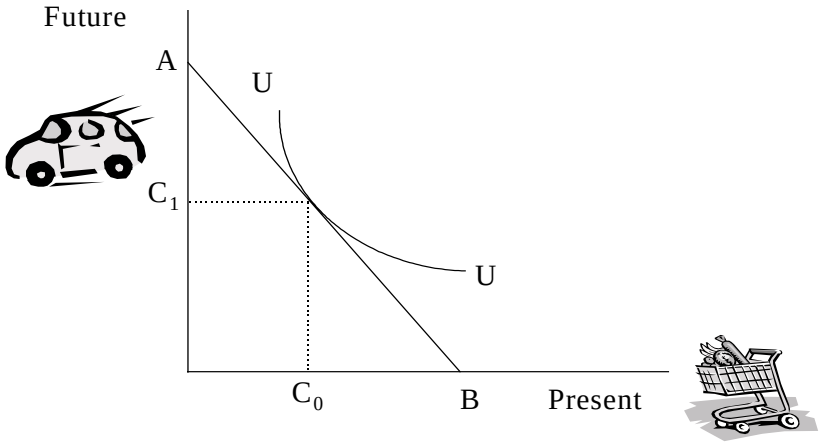
$$W = C_0 + C_1/(1 + i) \quad (5)$$

Equation (5) can be re-arranged to determine how future consumption is dependent on current consumption decisions and lifetime wealth:

$$C_1 = W(1 + i) - C_0(1 + i) \quad (6)$$

This equation gives the budget line as presented as the line **AB** in Figure 2, which gives all the possible combinations of dividing the consumption of one's wealth between the present and the future. The slope of the line **AB** will be -(1 + *i*), which reflects that by holding off consumption today and investing these sums at an interest rate of *i* allows a larger amount of consumption in the future. The distance that the budget line is from the origin will be determined by the size of one's total wealth.

**Figure 2: two period model of intertemporal consumption choices**



The choice of when one consumes will depend on the utility function. One will continue to consume more today until the marginal utility derived from consumption today matches the marginal utility of consuming in the future. To consume any less today would mean that you are foregoing satisfaction today that will not be matched by a sufficiently large enough increase in consumption in the future to match the current loss. To consume more today than that suggested by intertemporal balance will not provide sufficient satisfaction today to compensate for the loss of future consumption. This optimal point will be at the point where the utility indifference curve **UU** is tangential to the budget line **AB** in Figure 2, implying consumption today of $\mathbf{C_0}$ and of $\mathbf{C_1}$ in the future[2].

The key issue is the role of individuals' preferences between consuming today or in the future and the impact this has on:

- determining market interest rates,
- the determination of lifetime wealth, and
- growth rates.

Interest rates provide an incentive for individuals to hold off consumption today, which in turn provides the funds for investment, which allows an expansion of the nation's capital stock, which expands the country's production potential, which in turn allows greater consumption in the future.

This chain of events also indicates why distortions to the capital market are likely to have detrimental impacts on the growth in living standards. If interest rates are for any reason held lower than where a free market would set them (eg interest rate controls), then the incentives to provide funds for investment will fall. However, the artificially lowered interest rates will also lower the costs of investing and so encourage greater investment activity. The net result is a disequilibrium between saving and investment activity. Past experience with interest rate controls indicates that increases in credit rationing behaviour tends to replace the relative price rationing process of market interest rates. These quantity controls tend to result in a poorer allocation of capital, and hence lower growth, as it is more difficult to graduate the trade-off between risk and profitability.

Some additional implications also need to be noted:

- the distortionary impacts of artificially high interest rates will be equally harmful in reducing the economy's ability to deliver the potential amount of economic welfare,
- as distortions to other factor markets (labour, raw materials) will also influence the relative price of capital, they will also have damaging impacts on the allocation of resources, medium term growth and standard of living prospects.

This last point is important when considering the impacts of international trade and the movement of capital between countries. With open capital markets, it could be reasonably argued that the price of capital is set in world markets and that the time preferences in any one country will have little impact on interest rates and the availability of capital. This would suggest that capital accumulation can occur reasonably independently of national savings

[2] This simple model assumes perfect foresight of the future. This assumption is relaxed in the next section by allowing for subjective discount rates, finite lives with a non-zero probability of death in each time period, and peoples' preference for taking risks with their money.

rates. Indeed a number of countries, including New Zealand, have managed to grow with persistent current account deficits, and so the amount of capital accumulation does not need to be limited by the amount of home country saving. There are a number of caveats that need to be considered:

- High saving countries tend to have stronger growth records[3].
- Over-reliance on the use of debt can increase the cost of capital.
- The absence of a savings constraint on growth does not alter the importance of clear relative price signals.
- Improving education outcomes might be the most effective long term approach to increasing capital accumulation by encouraging a virtuous circle between education, incomes, saving and capital accumulation.

It is worth discussing each of these points in a bit more detail.

***High saving and high growth***: Although faster growing countries tend to have higher saving rates, it is not obvious that it is actually high savings that lead to an increase in growth performance. Instead it seems that the interaction between growth and savings is a simultaneous one. Experience from the take-off in growth in East Asian countries suggests that growth rates improved before there were improvements in savings[4]. Such events could have resulted from the increases in incomes reducing the number of liquidity-constrained households and so allowing households to increase savings to more desired levels. It seems that a virtuous circle ensued once this process began, with increases in savings allowing an accumulation of capital which in turn raised output and incomes and so allowed further improvements in savings.

The IMF evidence that high growth is associated with high savings rates might also reflect that many countries do not have sophisticated capital markets and therefore do not have as ready access to international capital markets. For such countries the level of domestic saving would then become more critical for growth performance. This result might be highlighted further if the countries with limited access to international capital markets tended to be poorer. High saving, poorer countries which are "catching up" with the richer nations of the world could therefore be well represented amongst the stronger growing countries.

***Debt impact on the cost of capital***: Over-reliance on the use of debt to finance investment will increase perceptions of risk to creditors as it means that negative shocks can have a far more serious impact on company viability. This will be reflected in market interest rates through increases in country risk premiums. Of course under-reliance on debt can mean that companies (and the country as a whole) will miss potentially profitable investment opportunities.

***Price signals influence quality of investment decisions***: Even if the level of savings is not critical to the rate of capital accumulation or growth, it seems that the importance of price signals is. Barro (1991) has presented some evidence that price distortions can be detrimental to growth performance. In a study of growth performance in 98 countries between 1960 and 1985, Barro used deviations in a country's price for investment goods (including financing costs) from the international mean price as a proxy for either artificially

[3] IMF (1995) p69
[4] IMF (1995) p69

high or low investment prices as a source of economic distortions. He estimated that for each standard deviation that a country's price for investment goods differed from the international mean price, there was an associated 0.4% decline in per capita growth rates on average. This may not seem very large, but it would represent one third of New Zealand's average per capita growth over the period 1970-95. Of equal interest was the evidence that the sign of the deviation was not important, an overly-low investment price seems to be equally as damaging to growth prospects as an overly-high price. Although the veracity of Barro's empirical evidence has not gone unchallenged[5], his results are consistent with the theoretical model that has been presented here because undistorted price signals are the important mechanism that link individuals' demand for goods and services to businesses' efficient use of resources.

***Improving human capital promotes saving and investment***: According to Barro, factors that are associated with higher rates of capital accumulation and growth, are higher levels of human capital (proxied by school enrolments) and lower levels of government consumption. In both of these cases Barro indicates that higher capital accumulation may not be the underlying cause of higher growth, but the transmission path through which human capital and government consumption impact on growth.

Greater schooling leads to higher levels of human capital which encourages greater investment, as access to a skilled labour force provides investors with more investment opportunities. An increase in skills is also likely to raise incomes and so also encourage higher rates of saving. This would suggest that promotion of education can be beneficial for growth prospects. The government's involvement in providing education will depend on the extent to which the benefits to society from education exceed those to the individual.

With government consumption, Barro's results support the conventional view that government consumption crowds-out more efficient private sector investment activity thus imparting a detrimental impact on economic growth. However, as indicated in our proposed welfare function, government activity can also have a positive impact on living standards. So the interrelationship between government activity and growth is likely to be more complex than suggested by the results of Barro.

## 3 Interpretation of model

A formal theoretical model of saving behaviour is presented in Appendix A at the end of this report. This section presents the intuitive results of this model. Society is split into two types of consumers:

1. Liquidity-constrained households who have no practical access to any credit and so their spending patterns will be highly correlated with their current income (this group are some time referred to as "rule of thumb" consumers).

2. Forward-looking consumers who attempt to smooth their consumption over time (this group are sometime referred to as "risk sharers").

Splitting society into two such groups was proposed by Campbell and Mankiw (1989) as a way of marrying the intellectual appeal of forward-looking consumption theories based on Friedman's permanent income hypothesis (1957), with empirical evidence that indicates that current income has a greater impact on current consumption behaviour than a permanent income-type hypothesis would suggest. A recent study from the IMF suggests that a consumption model incorporating both model types of consumption behaviour outperforms either in isolation when applied to Canadian data over the period 1974-90 (Bayoumi 1997).

[5] See for example Levine and Renelt (1992)

However, forward-looking components were 2-3 times better at explaining movements in consumption than simple income effects.

The Reserve Bank of New Zealand's core forecasting model also splits households between forward-looking and "rule of thumb" consumers. Their calibration of the model resulted in a 70:30 split between forward-looking and rule-of-thumb consumers (p60, Black et al 1997).

While liquidity-constrained households' consumption rates will be determined entirely and simply by their current income levels, influences on consumption in forward-looking will be more complex. They are attempting to smooth their consumption through time and will consume a proportion of their expected lifetime wealth. Their levels of consumption in any time period will be positively influenced by (see equations A4-A7 in Appendix A):

- a change in their net asset position (eg due to an unanticipated capital gain)
- an increase in their long run earning ability (ie an increase in human wealth)
- a reduction in expected tax rates (which increases private wealth), and
- a reduction in their savings preference.

In other words, the amount that forward-looking households save or dissave will be influenced by changes in their perceptions of lifetime wealth and/or a change in their preference for saving. Their savings preference will in turn be influenced by changes in (see equation A8):

- market interest rates (ie the return on saving or opportunity cost of not consuming today),
- one's preference or averseness to risk (ie one's risk preference will influence the amount of return one will accept for foregoing current consumption).
- the involvement of government ( ie the relative size of government and the services that the government provides)
- life expectancy
- subjective incentives to save or conversely the amount that the value of future consumption is discounted against current consumption,

From these two lists it is clear that an increase in wealth (or one's perceived wealth) will generally increase consumption. With no change in savings behaviour, an increase in wealth is also likely to result in a similar proportional increase in savings. The net impact of the influences listed above on the saving rate is less clear. We will therefore discuss each of these factors in turn.

## Interest rates

The initial view is that an increase in interest rates implies an increase in the return to saving and so we would expect saving rates and the amount of saving to increase. But as interest rates also influence the cost of financing capital accumulation, the overall impact is not necessarily so straightforward. An increase in interest rates can put in place a number of

counteracting forces which mean that the net outcome actually depends on the dominating factor. An examination of four possible separate transmission paths will illustrate.

1. The first is the obvious one that an increase in interest rates raises the opportunity cost of current consumption relative to future consumption. As a result for a given level of expected wealth we will respond to the increase in interest rates by reducing our willingness to consume and so be expected to increase savings.

2. But a change in interest rates could result from an increase in the nation's potential rate of growth. If this occurred it might also influence our perceptions of wealth and this may have some offsetting impacts on current consumption. For example if an increase in interest rates did increase the supply of savings, depending on the state of the economy and the factors behind the interest rate increase, this could be associated with a subsequent increase in investment activity and long run economic output. This would raise the wealth perception of forward-looking agents (this usually takes place through an increase in asset prices). The increase in asset prices can take place quite quickly and so provide a stimulus to consumption that offsets, at least part, of the initial increase in saving.

3. If the increase in interest rates was not associated with an increase in growth potential, then it would simply represent an increase in the cost of capital and a deterioration in investment activity. In which case the wealth effect mentioned above would not materialise—it could even mean a decline in wealth perceptions.

4. The net debt or asset position of the country will also influence the overall impact of a change in interest rates. For example, the existence of a net debt burden would mean that an increase in interest rates will increase the nation's debt servicing cost, and so effectively lower wealth and so also encourage an increase in saving. Note that the overall impact on the balance of payments is not clear, as the induced increase in savings will also reduce the demand for imports.

***Policy options:*** as stated above the net impact of a change in interest rates will depend on the dominating factor. Equally as important is the factor behind the change in interest rates. In a small open economy like New Zealand, we have very little influence on changing the deep factors underlying real interest rates. Most of the factors that we observe as a change in interest rates are in actual fact either changes in relative prices between different forms of debt (rather than a change in the cost of debt per se) or a change in perceptions of risk. Thus interference into capital markets is only likely to reduce the efficiency of capital markets by distorting important information about relative prices and riskiness of capital projects. We address this issue of risk preferences below.

## Risk preferences

The lower your preference for taking a risk, the larger is the interest rate needed to induce you to save and so forego consumption today. If there is a very low risk preference there is a wedge between the effective discount rate (ie one's natural incentives to save) and the market rate of interest. When this occurs it is usually manifested through a risk premium which raises the cost of capital (market interest rates) above society's true preferences. This means that the rates of capital accumulation will be less than optimal - thus reducing output growth, private wealth and welfare. Reasons why investors might have a low risk preference include:

- a history of poor investment performance,

- the existence of market distortions that lower the effective returns on investment relative to other countries,

- an excessively big government sector which lowers the nation's total factor productivity by more than is warranted by society's preference for public sector goods and services (ie if $\tau_t$,from equation (A10), is greater than (1-$\beta$) from the utility function in equation (A11)).

It should be noted that a risk premium provides valuable information that is important for ensuring that there is an efficient allocation of resources. Indeed over exuberance in capital markets which generate speculative bubbles can be as damaging for long term welfare as the presence of risk premiums. The roller coaster ride in South East Asia in recent years demonstrates the risks involved with over-confidence.

This suggests that artificial interest controls are not the appropriate policy options for addressing risk premiums. Indeed the evidence of Barro (1991) cited above indicates that economic growth is adversely affected if the cost of capital differs (positively or negatively) from prevailing world capital costs.

***Policy options:*** What governments can do is focus on maintaining the size of government so that it is consistent with society's relative preference for public goods (ie (1-$\beta$) in equation (A1)), reduce government involvement in the market economy and promote policies that reduce market distortions.

## Government involvement

An increase in taxes reduces private sector disposable incomes. As long as consumers are not fully Ricardian[6], the increase in taxes will reduce the private sector's expected income stream, and so also private sector wealth. This will lower the private sector's ability to both consume and save. Putting off an increase in taxes will not prevent this reduction in wealth. If the government chooses to fund extra spending through borrowing it will directly reduce government wealth through an increase in public debt ( $B_t^g$ in equation A10). It will also reduce private sector wealth as the market will anticipate that the government will eventually have to increase tax rates and thus reduce people's expected stream of disposable income (see equation A12).

Such a reduction in private sector wealth may be consistent with enhancing national welfare if it reflects society's relative preference for public and private goods or services. That is, if the resulting effective tax rate, $\tau_t$, is more consistent with society's preference for government services, (1-$\beta$) in equation (A1). For although a tax-increased reduction in private saving would reduce wealth by reducing the accumulation of capital, ($K_p$ in equation A2) the increase in taxes will allow for an increase in public sector resources ($K_g$ and/or $L_g$). Thus if the relative demand for government services is greater, an increase in the provision of government services could increase national welfare even though private wealth has fallen.

[6] The theory of Ricardian equivalence states that governments can not alter long term economic performance through changes in fiscal settings. This is because the private sector will perceive that any movement in fiscal settings from what is neutral in the long run will eventually require a policy reversal in the future. Knowing this, private agents will alter their current saving and spending patterns in a way that will offset the government's fiscal actions. Although the pressures highlighted by the Ricardian equivalence theorem might exist, it takes extreme circumstances for private sector reactions to fully offset government actions in the short-term, and our mortality means that many will believe that they will not be around when the eventual policy reversal takes place.

Indeed, as the productivity parameter for the public sector is likely to be lower than for the private sector (ie $\alpha_p > \alpha_g$ in equation A2) it is likely that total output will decline with an increase in the size of government. Public sector productivity is likely to be lower than that found in the private sector because:

- the nature of public goods means that in most cases profit maximisation will not be a driving motive within the public sector, therefore the drive for output and efficiency will not be as pressing as in the business sector,

- the monopoly powers that governments have to raise revenue can reinforce a sense of complacency,

- the lack of financial measure of outputs can make it difficult to objectively measure and reward performance.

The combination of a strong public desire for public goods and low public sector productivity can have damaging impacts on economic performance over time. Poor public sector productivity means that society's demands for public goods may not be met. If politicians choose to respond to this shortfall in meeting public demand by increasing public funding and do not address the issue of poor public sector productivity, the net result is a government sector that continues to grow in proportion to the rest of the economy. But in so doing, the government is taking resources away from the more productive private sector and so reducing the economy's growth potential[7]. So if the expenditure is not effective in delivering the desired public services, then the demand will not be satiated and so the calls for more public expenditure will persist.

The requirement in such situations is for a concentration of effort on ensuring that public expenditure is as effective as possible at delivering the sought-after services. This is equivalent to ensuring that the government productivity parameter in equation (A2), $\alpha_g$, is as large as possible. As in the private sector, increases in productivity require an investment of resources which may be costly in the short term, but if well directed, will ultimately pay dividends. Success in increasing the size of $\alpha_g$ has at least three favourable impacts on growth performance and welfare prospects:

- any increase in $\alpha_g$ will directly improve the growth potential by delivering greater output for each unit of labour and capital employed by the government,

- by increasing the government's effective use of its resources it can limit its demands on tax payers, so allowing a larger proportion of national resources to be managed by the more efficient private sector,

- by minimising the size of government it may also reduce the distortionary impacts that non-market activities might have on overall relative price signals in the economy and so encourage the production mix to be closer to the welfare maximising preference of society.

The planning horizon of governments, which will be influenced by society's time preference for the delivery of government services ($\delta$ in equation A1), is critical in determining the

[7] Recent working papers released by the New Zealand Inland Revenue Department have suggested that a tax burden (and therefore size of government) around 20% of GDP would have been growth maximising for New Zealand in the post World War II period. See for example Scully (1996a, 1996b) and Branson and Lovell (1997).

extent to which governments and voters will be prepared to invest in improving government sector productivity. The greater value that society puts on the future provision of government services relative to the current provision, the greater will be the willingness to invest in productivity improvements. The added complication is that the markets for governments are far from perfect (eg elections are held infrequently and no electoral system will ideally match the electorate's true preferences), and this can result in perverse behaviour and mixed signals from politicians and voters.

Beyond the absolute size of government, governments can also influence private sector saving and investment behaviour through the way they interact with the privates sector: through the design of the tax system, the direction of government spending and the regulatory environment. Either directly or indirectly these factors will influence the allocation of resources in the economy. In many circumstances this reallocation of resources is the primary aim of government involvement (eg the provision of welfare benefits to the needy). In other cases it is the by-product of government's other aims (eg taxes are raised to fund government spending, but all taxes distort private behaviour in some way). We briefly discuss four specific issues: saving incentives, the tax mix, inflation control and government provision of retirement income.

***Saving incentives:*** the evidence on whether tax incentives increase savings behaviour is mixed. For example, three teams of economists using a similar database came up with quite different conclusions in three papers presented in the same journal (Journal of Economic Perspectives, Fall edition 1996). A concern with saving incentives is that they have a stronger impact on the allocation of saving and wealth than on the absolute level (Engen et al 1996). In which case it does question whether they are a desirable feature of tax policy as, even if there is an increase in saving, the reallocation of saving and investment does not mean that they will necessarily generate an improvement in growth or living standards.

***Tax structure:*** Tax systems effect economic and human behaviour. For example an increase in PAYE income tax rates reduces the relative returns from working and receiving wage income. In reaction to such a change, at least some people will change the way they seek a living. Indeed tax changes can influence all five factors underlying economic growth as presented in equation 2: the supply of labour and capital, the interaction between the use of capital and labour and the rate of productivity growth. This means that the tax system may have a greater impact on lifetime living standards through its impact on the returns from saving than through its influence on the level of saving. In a study on the New Zealand tax structure, Branson and Lovell (1997) concluded that reducing the overall tax burden would still be a more potent way of enhancing economic growth than fine tuning the mix between direct and indirect taxes. That is despite estimates of significant costs arising from having a sub-optimal tax structure (16.4% of 1995 real GDP) they felt that the tax design issues were of second order importance in improving economic efficiency when the overall tax burden is high.

***Inflation control:*** The presence of inflation can impact on saving behaviour and economic performance in a number of ways. It can reduce economic efficiency by increasing uncertainty about relative prices. This uncertainty may also encourage an increase in the precautionary motive to save, but this effect is likely to be more than offset by the inflation induced transfer of wealth from creditors to debtors. Inflation quickly reduces the principal of debt. This effect will also influence the way people choose to save—it discourages reliance on nominally anchored saving instruments like annuities in favour of assets that are more likely to appreciate over time like houses.

***Retirement incomes:*** one key service provided by governments is the provision of state-funded retirement incomes. The above analysis demonstrates that any government activity can lower private wealth, incentives to save and potential growth. A government policy like superannuation will have a greater impact on savings incentives as the provision of the government service explicitly reduces a major incentive to save (ie for retirement). Thus the provision of national superannuation comes at the cost of lower growth and lower private wealth.

But society might be willing to forego this lost growth if the public provision of retirement income meets other public desires, say for greater equity or security of retirement income, more effectively than a private scheme. Indeed a recent IMF study argues that market failures in private sector life insurance markets mean that welfare could well be enhanced by maintaining a public funded pay-as-you-go pension scheme, *despite* the loss in economic growth and savings (Valdivia 1997).

## Life expectancy

The incorporation of the probability of survival, $\gamma$, into calculating the effective discount rate, $(\gamma\delta)^v$, has two important influences when considering long term saving behaviour:

1. Changes in life expectancy will influence saving behaviour by changing time horizons. For example an increase in life expectancy would encourage people to place greater weight on the future and therefore increase their savings.

2. An actual change in the age profile of society will also influence the effective discount rate and therefore savings. An older age profile raises the average probability of death and so reduces the incentives to save. Indeed a comparison between Asian and Latin American savings behaviour indicates that a younger age profile was an important reason for higher savings rates in Asia (Dayal-Gulati and Thimann 1997).

This would suggest that a secular increase in life expectancy should underpin a general upward trend in saving behaviour. Yet this effect is likely to be swamped by the effect of an ageing population profile from the 2030s on.

***Policy options:*** uncertainty about one's own life expectancy is likely to mitigate the effect that a general improvement in life expectancy might have on saving behaviour. Indeed the thinness of the private sector annuity market has led some to question whether there might be market failure in the annuity market which would make the shift to private pension provision sub-optimal (despite favourable impacts on economic growth). Valdivia (1997) argues that the absence of an annuity market means that the largest costs of private pension provision are born by retirees that have extensive retirement spells. Thus he argues that there may be merit in extending the age of eligibility to superannuation, eg from the current 65 to 75. This means that individuals would be responsible for ensuring sufficient income from 65-75, but the government would have a role in looking after extensive retirement spans. Such an approach could be a useful compromise solution to retirement saving pressures as it would:

- provide increased incentive for greater private saving,
- would ease government's medium term fiscal concerns,
- be administratively simple to operate,
- provide a more definite saving target while providing a safety net for longer retirement spells.

## Bequests, precaution and independence

Not all wealth is accumulated through savings in one's own lifetime, indeed inheritances and bequests could account for about 50% of a nations accumulated capital stock[8]. If bequeathed wealth is this large it either suggests that saving for retirement is not the only motivating factor for wealth accumulation or that market failures encourage an excessive amount of asset accumulation. Although there is an active economic debate about whether bequests are intentional or not, anecdotal evidence would suggest that a significant proportion of bequests are intentional. There are also at least three reasons why it may be in the interests of even a selfish consumer to hold bequeathable assets during retirement (Coleman 1997):

- An individual may not wish to purchase a nominal annuity when inflation is uncertain, and the price of real annuities may make holding an ordinary asset more attractive.

- An individual wishing to live in his or her existing home may prefer to own it if the price of home-equity based annuities is very high.

- An individual may demand ordinary assets because of uncertainty about future medical and nursing home expenses, given the inability to cash up an annuity at actuarially fair prices in these circumstances.

That is a proportion of bequests could result from a combination of market failings in annuity markets, and precautionary and independence motives for saving. Coleman (1997) notes:

> "There are two key aspects of annuities that fundamentally shape their demand. First, the market for annuities is not fairly priced. The main problem is adverse selection: people who expect to die young will not wish to purchase an annuity, whereas people who expect to live a long time will demand them. The second problem is also caused by information problems: it is very difficult to borrow against an annuity income stream, as the income stream is conditional on the life of the holder. This means people with uncertain consumption paths—particularly the possibility of high medical expenses or nursing home care—will want to hold some ordinary assets (or well priced medical insurance) to meet these contingencies." (p11)

***Policy options:*** market failings in annuity markets imply that government provision of pensions could have some welfare enhancing attributes. The elderly can have precautionary and independence motives for holding assets. This raises the issue of asset or income testing in the provision of state pensions. Hubbard et al (1995) show that in the presence of income or asset tests, government provided pensions will discourage saving by households with low expected lifetime incomes. To the extent that state pension provision removes income uncertainty in low income households it will be welfare enhancing, but it may also diminish welfare to the extent that it discourages the accumulation of private assets that might enhance their independence or provide a buffer against unexpected shocks. These factors suggest that the benefits to low income households from pension generosity and means testing are not necessarily straightforward.

[8] Coleman (1997) notes that estimates can range from 20 to 80%, depending on the method used.

## 4 Implications for retirement saving

The theoretical model of government influence on private saving developed in this paper provides a number of insights on issues that influence the efficiency and sustainability of retirement income policy in New Zealand. In particular any policy will result in trading off different objectives of society. The key benefit from government involvement in the provision of retirement income is that it provides a safety net to individuals who for some reason might not be able to fund their retirement. Such a service is unlikely to be adequately provided by the private sector, but would be valued by society as it would reduce uncertainty and anxiety, and might also appeal to many people's sense of fairness. In other words there could well be a number of public good aspects to the provision of retirement income.

But the public provision of retirement income does not come without costs. The increase in public welfare from a public pension scheme is funded by a decrease in private sector wealth. The model identifies two transmission paths leading to this decline in private wealth:

1. The government will need to raise revenue to fund its public retirement income scheme. Ultimately this requires an increase in the amount of taxes levied by the government. An increase in tax rates (or even the prospect of increased tax rates) will lower perceptions of future after-tax incomes (ie private wealth). This reduction in private income will reduce individuals' ability to save. With less saving there will be less investment and capital accumulation, which will reduce the pace of economic growth.

2. The provision of retirement income by government will also mean that households have less reason to save.

Conceptually there will exist an optimal trade-off point between public and private provision of retirement income. This will be the point where the social benefit of the last dollar spent on the public scheme is equal to the private wealth foregone through the crowding- out effect of the public scheme. Unfortunately, the subjective and unobservable nature of the benefits that citizens receive from public goods means it is very difficult to assess where this optimal point actually is. It is also possible that over-generosity of public pension schemes and attempts at targeting through means testing may not necessarily be optimal for low income households if this discourages them from accumulating wealth enhancing private assets.

Another approach to ensuring that there is adequate provision of retirement income could be to force or encourage individuals to save a proportion of their incomes. Although this approach might avoid many of the deadweight tax losses of a purely public funded scheme, it is not obvious that this will be any less costly in terms of foregone private wealth. This is because any intervention into capital markets will distort market signals to investors. Such distortions threaten to misallocate resources and so reduce economic efficiency. The resulting lower returns on capital will reduce growth prospects and therefore incentives to invest. In terms of the model presented above, market interventions are likely to increase perceptions of the risk of investing.

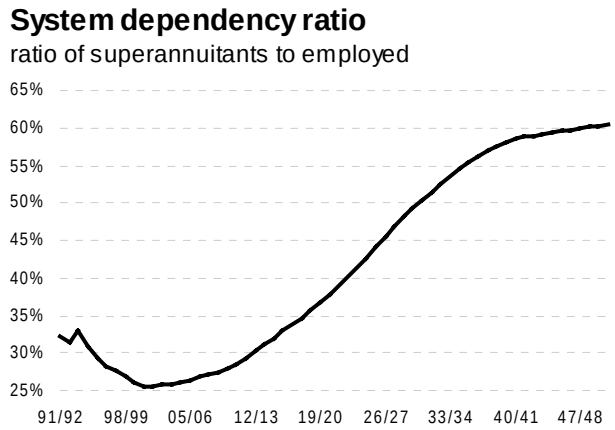
Finally demographic factors could have two offsetting impacts on saving behaviour over the next fifty years. An increase in life expectancy will provide an encouragement for greater private saving. But as the population mix gets older, the proximity to death of the average New Zealander will reduce. Thus aggregate savings could reduce.

# 2 Economic and fiscal implications of an ageing population in New Zealand: model results

This chapter presents the results of modelling the impacts that economic, regulatory and taxation policies might have on a population that will increase in average age over the next 50 years.

Current population projections indicate that the number of New Zealanders aged over 64 is expected to increase from less than 20% of the population today to over 40% in the 2040s. This would imply that under current rules the number of superannuation beneficiaries could increase from around one for every four workers today to one superannuitant for every two workers from the mid 2030s.

*Figure 1: An ageing population*




The fiscal modelling results suggest that unless government spending control is maintained, demographic pressures will induce a considerable increase in tax rates from about 2015 onwards.

If all the adjustment came through income taxes, tax rates in 2050/51 would need to be 7 cents in the dollar higher than the average effective tax rate of 23 cents in the dollar expected after the 1 July 1998 tax cuts (scenario 1).

Such an increase in taxes will impose significant costs on future generations and raises issues of intergenerational equity.

The major increases in government spending will come in health and superannuation. Health spending is projected to increase from its current 5.9% of GDP to 11.0% of GDP in 2050/51. Superannuation is expected to increase by similar amounts, from 5.3% to 10.7% of GDP.

Control of government social spending would be the most direct way of alleviating these fiscal and intergenerational pressures. Holding real per capita spending in social areas (health, education and benefits) at 0.5% lower than trend growth would remove most of these pressures and reduce required tax rises by 4 cents in the dollar (scenario 4).

Two methods of reducing the Government's public pension bill are also examined: increasing the age of eligibility to 75 (scenario 5) and reducing the weekly payment to the level of the

unemployment benefit(scenario 7). Either of these approaches would reduce required tax rates by a further 2 cents in the dollar.

A combination of expense control and either of these superannuation adjustments would leave tax rates in 2050/51 at similar levels to those expected to prevail in 1998/99 (scenarios 6 and 8).

Increased private saving would improve the national debt position, but will have little impact on fiscal settings (scenario 13). How the extra savings are achieved is important— if the policies that induce higher saving also distort normal behaviour so as to lead to a misallocation of resources they could lower growth thus removing the advantages of higher saving.

## *1 Previous modelling work*

*Use of long term fiscal models have demonstrated that the impact of an ageing population is likely to place considerable fiscal pressures on the New Zealand economy in the second quarter of the 21st century. These pressures can be mitigated by stronger economic growth, stronger population growth, fiscal spending discipline and by introducing policy changes that reduce the government's superannuation liability.*

There has been an awareness of this issue for some time and there has already been a body of research into retirement income issues. For example, the issue of fiscal pressures from an ageing population were presented in the reports of the 1992 Task Force on Private Provision for Retirement. Hana Polackova (1997) presents a comprehensive look at the fiscal implications of population ageing in New Zealand. Using Treasury's Long Term Fiscal Model (LTFM), her baseline projection indicated that after a fall in spending pressures over the next two decades, demographic pressures were likely to increase government spending to just under 40% of GDP in the 2040s (from her starting estimate of 32% of GDP in 1996/97). More importantly, she examined the sensitivity of fiscal projections to changes in economic, demographic and fiscal policy assumptions. Her results indicate that the government can reduce the build-up in fiscal pressures by active migration management and sound economic and fiscal management:

- a 0.5% improvement in trend growth would reduce fiscal pressures by 6% of GDP in the 2040s,
- efficiency gains or improvements in social outcomes that helped reduce government spending growth in health, education and social welfare by 0.5% per year would also reduce fiscal pressures by 6% of GDP,
- a 10,000 a year increase in net inward migration would reduce pressures by 3%,

**Sensitivity of long term fiscal outlook to modelling assumptions**

| Assumption | Increase in annual growth rate | Impact on tax requirement as % of GDP |
|---|---|---|
| Trend economic growth | 0.5% | -6.0% |
| Growth of per capita government spending in: | | |
| Health | 0.5% | +3.0% |
| Education | 0.5% | +1.5% |
| Social Welfare | 0.5% | +1.5% |
| Demographics: | | |
| Net migration | 10,000 | -3.0% |
| Mortality/fertility | Moving from medium to high assumptions | -3.5% |

*Source: Polackova (1997)*

Her results also indicated that a reduction in the superannuation benefit to 52.5% of the average wage, instead of the current 65% floor, would itself reduce the fiscal costs by 2% of GDP.

## 2 Need for model development

*This paper extends the Treasury long term fiscal model (LTFM) to include an interaction with the private sector. This approach allows a better assessment of the long term sustainability of fiscal policy and its impact on national saving and debt liability trends.*

The modelling work to date has focused on the fiscal implications of these demographic projections. This seems understandable given the government-provided national superannuation framework that currently exists in New Zealand. But fiscal criteria are too narrow a focus for examining what is a national issue, not just a government issue. We are going to age irrespective of the government's policies and New Zealand as a whole will have to manage this demographic pressure with or without the government's assistance.

The fiscal models that have been used so far have been based on government accounting frameworks. Although they include economic assumptions and inputs, they ignore any feedback and interaction between the government and the private sector. Such an approach has the merit of computational simplicity and transparency, but by ignoring private sector interactions it can at best only provide an indication of fiscal ***solvency***.

Solvency just requires that the public sector's net worth, defined as the current fiscal position adjusted for the discounted flow of future net liabilities, be non-negative. An accounting-based fiscal model may indicate whether the government's proposed mix of spending and taxes based on economic and demographic assumptions, are consistent with meeting its long term financing requirements. But without an interaction with the private sector it may miss many factors that may give a better indication of whether a fiscal policy is actually ***sustainable***. For example, rising inflation, financial repression, high risk premia on public debt, falling secondary market prices, a balance of payments deterioration and a highly inverted yield curve could all indicate that the current fiscal policy stance is not sustainable and that it requires a significant degree of retrenchment.

The approach used in this paper attempts to overcome some of these shortcomings by adopting the approach of Parker and Kastner (1993) of introducing a number of behavioural equations to the Treasury's long term fiscal model (LTFM). These equations allow an interaction between the government's fiscal position and inflation, interest rates, private consumption, private investment and the balance of payments. The interaction remains only partial as economic growth remains an exogenous input into the model. Including a behavioural relationship between fiscal policy and growth would be a desirable area for future work, but goes beyond the scope of the current study.

Allowing partial interaction between the private sector and the fiscal model allows:

- a better basis for assessing the sustainability of a fiscal policy stance, and
- an examination of national savings and debt liability issues.

Details of the model developments are presented in Appendix B at the end of this report.

## *3 Baseline properties*

*Long term forecasts are driven by demographic projections and long term economic and fiscal assumptions. A fiscal response rule is required to ensure that forecasts are fiscally sustainable. The rule used here is to adjust effective income tax rates to ensure that the government's net debt position stays within +/- 20% of GDP.*

The model's baseline is based on Treasury's 1997 Budget three year ahead economic and fiscal projections[1], Statistics New Zealand demographic projections, and Treasury's long term economic and policy assumptions. These include:

### Long-term demographic assumptions

| | |
|---|---|
| Mortality rate: | Medium |
| Fertility rate: | Medium |
| Net Immigration: | 15,000 a year until 1999 |
| | 5,000 a year thereafter |

### Long-term economic assumptions

| | |
|---|---|
| Growth in output per hour: | 1.5% a year |
| Unemployment rate: | 6.0% |
| Average weekly hours: | 39.6 |
| Labour share of output: | 43.9% |
| World bond rate: | 6.0% |

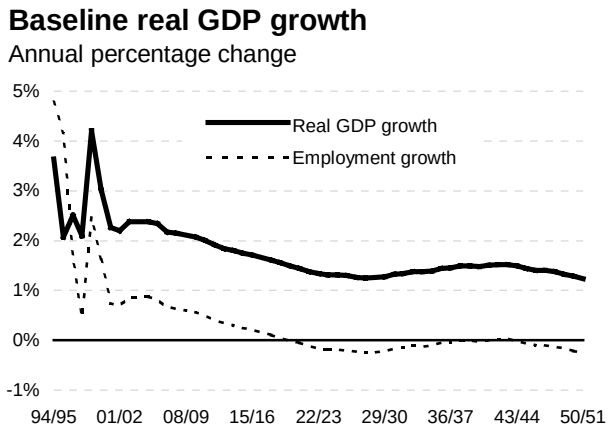
### Long-term policy assumptions

| | |
|---|---|
| Real growth in core government spending[2]: | set equal to real GDP growth |
| Real growth in per capita social spending[3]: | set equal to productivity growth (1.5%pa) |
| Superannuation growth: | grows in line with average wages (65% of average wage) |

Economic growth forecasts in the model are based on a labour production function, ie economic growth equals changes in employment plus changes in labour productivity. Employment growth is determined by the demographic projections underlying the model. With labour force participation, the unemployment rate and average weekly hours worked held constant, the employment growth forecasts simply reflect expected changes in the working age population over time. Labour productivity is determined by the output per hour assumption (1.5% per year in the baseline). The output per hour assumption determines the amount of growth due to factors other than employment growth such as capital accumulation, technology advances, and efficiency improvements. As Figure 3 demonstrates economic growth slows from 2010, this is purely because of the projected decline in labour force growth[4].

[1] The Treasury has since updated these forecasts in their 1997 December Economic and Fiscal Update, but these modifications were minor in the scheme of 50 year projections.
[2] Includes core departments, defence, law and order, and any other discretionary spending.
[3] Includes health, education, and benefits excluding superannuation.
[4] As the average age of the New Zealand population increases the number of people retiring starts to match and even exceed the number of young people entering the labour force.

*Figure 3: Falling labour force means slower growth*




Government expenses are also driven by the demographic projections, with education expenditure influenced by the number of young people, benefits by movements in working age population, and superannuation by the numbers over 64 years old. Health expenses take into account that most is spent on the very young and the very old.

The model can also allow for the amount of government expenditure in social areas (health, education and social welfare) for each individual to increase or decrease. In the baseline scenario growth in per capita government spending is set equal to 1.5% per year, the same as the productivity growth assumption that drives the economic growth forecasts. The link to productivity growth allows for real increases in social expenditure per individual as the economy grows.

One important difference between the model used here and at the Treasury is the treatment of finance management. The Treasury model has a technical assumption that 20% of gross debt is borrowed from overseas and 80% is borrowed domestically. This fits in well with the government's current debt management policy, where exchange rate risk is minimised by fully hedging overseas debt. It is less obvious that this would be an appropriate stance if the government moves into a net asset position. In this case it would make more sense from a risk management perspective to invest a large proportion of the financial assets overseas. Thus unlike the Treasury model, this model assumes that if the government moves into a net asset position the policy rule reverses—80% of assets are placed offshore and just 20% within New Zealand.

The other key difference is that the inclusion of behavioural equations require an explicit fiscal policy rule to ensure economic and fiscal stability. The rule adopted here is that income tax rates are adjusted by 1% a year in order to ensure that the net debt or net asset level does not exceed 20% of GDP[5]. The adjustments were made in a manual iterative way taking account of 20 year ahead projections of net debt (assets). If net debt (assets) are projected to be over 20% of GDP in 20 years time, the effective income tax rate is raised (reduced) by 1%[6].

[5] For modelling purposes only the income tax rates are changed. Other tax rates could be changed but this would simply make the modelling process more complex without improving the information content greatly.

[6] Income tax rates quoted are not statutory tax rates, but the average effective tax rate calculated as the ratio of source deductions to the total compensation of employees.

*Figure 4:*

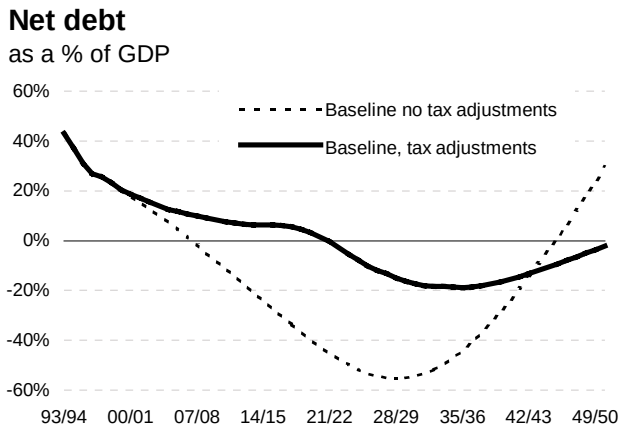
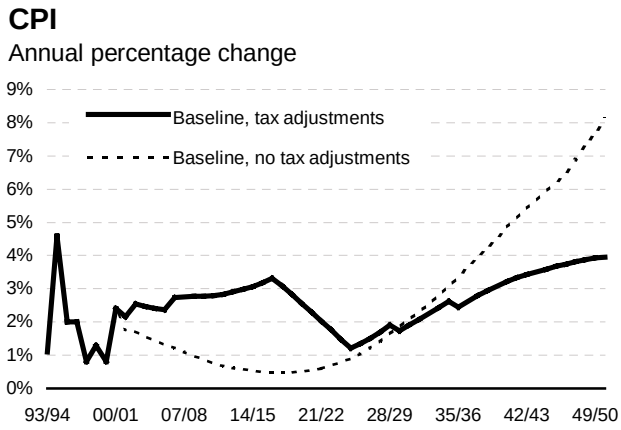


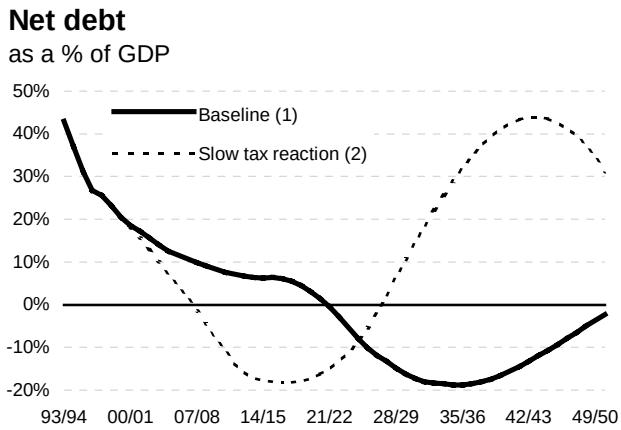

Figure 4 presents a comparison of the net debt position of the baseline projections with and without these tax adjustments. Without tax adjustments net debt levels can swing beyond credible bounds, the volatility of which leads to excessive private sector reactions. This is demonstrated by the comparison of the inflation projections presented in Figure 5. Inflation is likely to be more volatile when there are large swings in fiscal outturns, and this has consequent impacts on economic performance.

*Figure 5: The consequence of volatile fiscal outturns*




The tax rule used is based on 20 year ahead forecasts of the fiscal position, and this approach seems to work well in keeping net debt within its -20 to +20% of GDP target range. It is interesting to note that a smaller forecast horizon is not as successful in managing the fiscal position, even with the same objective. This is demonstrated in Figure 6 which presents the net debt profile of operating the same rule but only using three year ahead forecasts of net debt to trigger a tax reaction. By delaying the decision to raise taxes the government cannot prevent net debt levels exploding to over 40% of GDP (or it requires greater action than a 1% a year tax rate change to stabilise the fiscal position). Interestingly the delay in fiscal reaction also requires greater tax increases than the more proactive approach. The average effective income tax rate in the baseline needs to increase from 23 cents in the dollar in 1998/99 to 30 cents in the dollar by 2050/51, the delayed tax increase scenario has rates going up to 42 cents in the dollar.

*Figure 6: The cost of delaying fiscal actions*




There is still plenty of scope for discretion in how the government may choose to manage their fiscal affairs within the -20% to +20% of GDP net debt target range adopted here. This discretion can mean that the national debt liabilities calculated in the model (which include public and private debt) will be influenced by the timing of tax changes introduced. Small changes in debt liabilities (eg < 10% of GDP) are unlikely to provide any meaningful information.

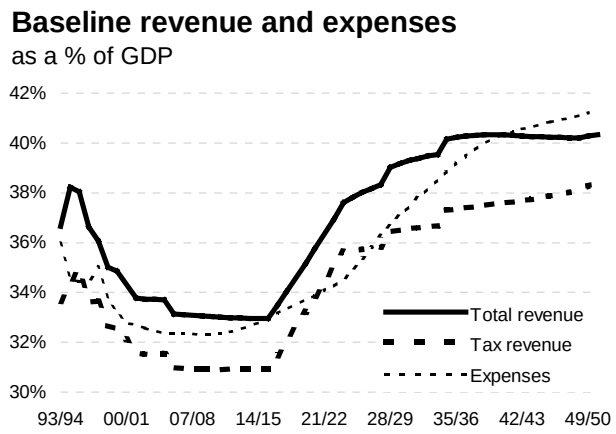
## *4 Baseline results*

*Demographic trends could double the government's spending in health and superannuation over the next fifty years. As a result tax rates would need to be a third higher in the 2040s than they are today and the nation's net debt liability would almost double to 130% of GDP.*

The fiscal projections presented by the baseline model (scenario 1) seem quite unpalatable for the children of today. Although there is scope for some tax cuts over the next decade, the expected growth in expenses to 41.3% of GDP in 2050/51 requires substantial tax increases from 2015/16. The effective income tax rate initially falls from 23 cents in the dollar to 20 cents in the dollar for ten years following 2005/06, but then rises to 30 cents in the dollar by 2034/35.[7]

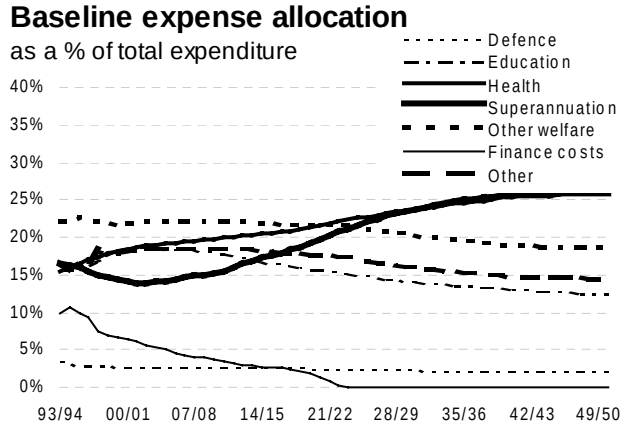
[7] These effective income tax rate numbers differ from the data presented in the graphs (like Figure 7). Tax revenue data includes taxes received from other sources (eg GST and company taxes) and the total revenue includes non-tax revenue (in particular interest income from the government's gross financial assets).

*Figure 7*




Demographic factors are the main reason for the increase in fiscal expenses. Health and superannuation costs are the major drivers of expense increases. Health expenses increase from 5.9% of GDP in 1996/97 to 11.0% of GDP in 2050/51. National superannuation also increases from 5.3% of GDP to 10.7% over the same period. Both of these factors are driven by the projected increase in the proportion of older people in New Zealand. The model also implicitly assumes that the same mix between private and public provision of health and superannuation that currently occurs will continue into the future.

*Figure 8*




The increase in taxes represents an inequitable transfer of resources between generations. The current generation enjoys the benefits of lower tax rates during their working life *and* also benefit from the higher taxes paid by the next generation. With no incentives to increase private savings the next generation is also burdened by an increasing debt liability. At present the national external debt level is $75.5 billion or 78.8% of GDP. If the economy and fiscal policy develops along the lines of the baseline scenario, there will be little incentive for the private sector to change its spending patterns. The economy will consequently continue to run persistent current account deficits in excess of nominal GDP growth and the debt liability is projected to increase to 131% of GDP by 2050/51—thus further increasing intergenerational inequities.

It is important at this stage to put a health warning on this national debt result (and also the baseline results in general, see model interpretation box). New Zealand ran current account deficits persistently over the estimation period of the behavioural equations, and this might

bias the forecast projections. Thus it is often better to think about the baseline as a benchmark for analysis rather than as an accurate forecast of what will happen. In this respect the scenarios presented below should be assessed on the basis of whether they improve or worsen the outlook compared to the baseline or compared to each other.

**Note on model interpretation issues:**

1. *Relativities* are more important than absolute values. For example, the current account was in deficit for the whole of the estimation period, so it takes extreme results to force projections of surpluses,

2. *Fifty years is a long time* and the compounded effects over such a period can be very large. This again implies scenario comparisons are more important than the model estimates in themselves

3. The results have only meaning from a fiscal, inter-generational equity or economic efficiency perspective. They do *not* take into account social preferences - although they can highlight the opportunity cost of social preferences. For example, the model may indicate that a certain policy will require future tax increases or a higher future national debt liability, but society might be prepared to accept these costs if the perceived social benefits of the policy are sufficient.

## 5 Scenarios

*Fiscal pressures on future generations can be mitigated through a combination of fiscal restraint, reduced government provision of superannuation and increased private saving.*

The baseline model run (scenario 1) suggests that the current policy mix could impose significant costs onto future generations of New Zealanders. Before examining the impacts of policy options that might alleviate these pressures, it may be useful to examine how robust the baseline insinuation of such costs really are.

### Impact of different economic growth projections

As noted above, Hana Polackova (1997) estimated that a 0.5% increase in trend growth (holding other factors at the baseline assumptions) could reduce the tax burden by 6% of GDP in the 2040s. We get similar results, but not quite as strong as Polackova. When output per hour growth is increased to 2.0% pa (from the baseline's 1.5% growth) and per capita social expense growth is held at 1.5% (the same as in the baseline), projected expenses in 2050/51 are reduced by 4.5% of GDP from 41.3% to 36.8% of GDP. The average tax burden over the 50+ years to 2050/51 is also reduced by 4 cents from 26.2 cents in the dollar to 22.0 cents. The intergenerational costs are also lowered considerably. Tax rates in 2050/51 only rise to 26 cents in the dollar not 30 cents, and the projected national debt liability in 2050/51 stands at 97.0% of GDP instead of 130.9%.