

The Ralph Report and Business Investment Decisions

Matt Benge

Economics Department (Faculties)

Australian National University

April 1999

*Address: Economics Department (Faculties), Building 26,
Australian National University, ACT 0200.*

E-mail Address: Matt.Benge@anu.edu.au

Phone: (02) 6249 3744.

*Submission to the 'Review of Business Taxation' on its document *A Platform for Consultation*.*

EXECUTIVE SUMMARY

This submission examines the effects on business investment decisions of the following suggested tax changes:

- the elimination of accelerated depreciation;
- a reduction in the company tax rate from 36 to 30 per cent;
- the termination of the indexation of capital gains; and
- making only 80 per cent of capital gains taxable.

These tax changes will affect investment decisions by changing costs of capital (ie, the minimum real pre-tax rate of return at which an investment is profitable). The submission shows that a very attractive feature of the proposed reforms is the way in which they would largely eliminate tax biases over which investments a firm undertakes. Firms would have much more incentive to invest in areas which provide the highest pre-tax returns which yield the highest returns for the economy as a whole than they do at present. The tax changes would also eliminate much of the tax bias over whether investment takes place in unincorporated enterprises or widely-held companies.

Nevertheless, the submission argues that there is a very troubling aspect of the proposed reforms. This stems from the fact that at least on our estimates the reforms would involve a quite substantial general increase in the effective tax impost on the income of new investments in Australia. The effects of such an increase in capital taxation will be to lower the long-run capital stock in Australia and to lower wage rates. If the reforms were revenue generating, this would provide the government with additional funds to cut income tax rates to offset the impact on wages. However, the reforms are claimed to be broadly revenue neutral. This raises important concerns about the package.

Our (admittedly fairly rough) estimates suggest an overall increase in the total costs of using capital of about 2.4 to 5.6 per cent. Using the lower of two estimates of elasticities that have been made available to the author, this converts to a fall in the long-run capital stock of between 1.8 and 4.3 per cent and a fall in wage rates of between 1.3 and 3.0 per cent. While these estimates rest on a set of assumptions which are open to question, they seem large enough to suggest that this issue needs to be examined seriously.

Only a few days have been available to write the submission which has been prepared in haste. The aim of the submission is not to recommend any particular alternatives to the proposals that have been suggested. It is more to document the fact that at least on the author's calculations, the proposals appear to increase taxes on capital quite markedly and this may have important effects on the long-run capital stock and wages.

There may be important issues that have been overlooked in the very simple analysis which is employed in this paper. If so, these need to be identified before we can have very much confidence that the proposals would offer net benefits.

The Ralph Report has put forward the possibility of retreating from the complete removal of accelerated depreciation and reduction in the company tax rate to 30 per

cent. If a less extreme change were contemplated, the Ralph Committee has suggested providing some given rate of loading on effective lives to all assets. While there has been insufficient time to write up an analysis of this proposal, it does not appear to be neutral with respect to assets of different economic lives. An alternative of allowing a fixed fraction of expenditure to be deducted immediately with the remainder written off on the basis of its economic lives is suggested. At least in the absence of inflation, this would be neutral with respect to assets of different economic lives. This option could easily be explored further.

1. INTRODUCTION

While outlining options rather than making definitive policy recommendations, the 'Review of Business Taxation' chaired by Mr John Ralph in its two volume document *A Platform for Consultation* (hereafter the Ralph Report) has effectively proposed sweeping changes to business taxation in Australia. The Review's terms of reference directed it 'to examine reforms to business investments and the scope for certain specified options in relation to capital gains taxation (CGT) within a revenue neutral context and within the goal of moving towards a 30 per cent company tax rate'.¹ The specific suggestions of the Ralph Report which will be analysed in this note are that accelerated depreciation provisions should be eliminated, the company tax rate reduced from 36 per cent to 30 per cent, the indexation of capital gains should be terminated and capital gains taxed at reduced rates. The aim of this paper is to examine the effects of these reforms on business investment decisions.

The question of how Australia's current corporate tax provisions affect incentives to invest was investigated in Bengtsson (1998). In that paper, investment incentives were analysed in terms of costs of capital (ie, the minimum real pre-tax rate of return at which investment becomes profitable). Costs of capital were estimated for a variety of types of investment by unincorporated enterprises and widely-held companies owned by Australian non-corporate shareholders. It was shown that Australia's current depreciation provisions led to a given firm (which could either be an unincorporated enterprise or a widely-held company) facing costs of capital which varied across different investment options. Costs of capital for certain forms of investment (such as very short-lived and very long-lived equipment) tended to be lower than for other types of investment. This means that these investments become profitable when they generate lower real pre-tax rates of return than other forms of investment.

In the absence of taxes, there would be incentives for firms to invest in areas which yield the highest returns. If taxes bias investment between different types of asset, investment options which yield the highest post-tax returns will not necessarily yield the highest pre-tax returns. It is the pre-tax return which generally reflects the benefit to the economy as a whole from an investment. As the Ralph Report suggests, there is a strong *prima facie* case for treating all forms of business investment as neutrally as possible so that investment is not channelled away from areas yielding higher returns to the economy to areas yielding lower returns. This will generally tend to maximise the earnings on any given level of capital invested in Australia.

However, the neutrality of the tax treatment of different forms of business investment is not the only issue of concern. The proposed reforms would appear to push up taxes on the income generated by new capital invested in Australia quite considerably. Such taxes will be referred to as taxes on capital in the remainder of this note. Despite the package being put forward as one which is broadly revenue neutral, our estimate is that the overall effect is to boost the total cost to users of new capital by

¹ See Ralph et al (1999, p. 63).

between 2.4 and 5.6 per cent.² This will tend to discourage new capital investment and the long-run capital stock in Australia. It would also be expected to lower wages.

If this really is a broadly-revenue-neutral move, this appears to be a very troubling feature of the proposal. If the proposal lowers wages without gaining additional revenue with which to provide a fund for the government to cut taxes on labour income and compensate workers, this seems likely to be undesirable unless there are very strong offsetting benefits. One possible reason why a revenue-neutral package might end up boosting taxes on new capital is as follows. The reductions in depreciation rates affect only new investment whereas the reduction in the company tax rate affects past investments as well as new investments. To the extent that such a move provides a windfall to past investment it may mean that a higher effective tax impost is created for new investments.

The paper presents a simple model to estimate the sizes of the falls in Australia's long-run capital stock and wages. It is estimated that the changes would reduce long-run capital in Australia by between 1.8 and 4.3 per cent and wages by between 1.3 and 3.0 per cent.

It should be noted at the outset that while conclusions about the increased taxation of capital are reasonably robust, conclusions about the effects on long-run capital stock and wages are based on an extremely simple model. In this model the economy is treated as involving two factors of production only, capital and labour. It is assumed that capital is acquired by Australia on world markets at a fixed price and production is subject to a constant returns to scale technology. Perhaps most importantly, Australia is treated as though it produced a single good. A multisector CGE model such as the Monash model is likely to provide more-accurate estimates of the likely magnitudes of changes in capital stock and wages than our very simple model as well as providing useful information on intersectoral effects. It would be very helpful to use such a model for less 'rough-and-ready' estimates than are contained in this paper. There is nonetheless an advantage in the very simple methodology used in this paper. The simplicity of the model makes our analysis transparent. It is expected that while a more sophisticated model would change some magnitudes, the general direction of the effects would be much as reported in this paper.

The structure of the remainder of this paper is as follows. Cost of capital expressions are derived in section 2 and it is shown that the elimination of accelerated depreciation would not completely remove tax biases in the presence of inflation. The

² This total cost to users of capital is often referred to as the 'user-cost' or as the 'rental-cost' of capital. Consider an individual with an asset worth \$100,000 at the beginning of the year who rents it out for a year and receives a payment one year later. Initially suppose that there are no taxes. If it is known that the asset will be worth \$85,000 and the owner of the asset demands a return on his capital of 10 per cent, the rental payment would need to be \$25,000. Of this \$15,000 would compensate for depreciation and \$10,000 for the cost of the capital employed. The user-cost per dollar of investment would be 0.25. In the presence of taxes, accelerated depreciation and other tax incentives can reduce the cost of investment. Now suppose that the user cost is 0.25 on some form of investment in the presence of accelerated depreciation. Assume that removing accelerated depreciation raises the user cost to 0.26. This would be a 4 per cent increase in the user cost which is in the range of what we estimate to be likely to occur.

move would lead to a tax bias favouring assets which depreciate more slowly (although it will be shown later that this bias is small). The extent of investment biases for unincorporated enterprises and Australian-owned widely-held firms are examined in section 3. The analysis is extended to consider foreign-owned companies in section 4 and estimates of changes in the capital stock and wages are derived in this section. Concluding comments are provided in section 5.

2. ELIMINATING ACCELERATED DEPRECIATION AND COSTS OF CAPITAL

Firms have incentives to invest until the marginal product of capital is equal to the user cost of capital or, equivalently, until the net of depreciation marginal product of capital is equal to the cost of capital. King (1974 and 1977) examined investment incentives under a number of possible tax systems. Benge (1998) modified King's work to take account of Australian tax provisions. In that paper cost-of-capital expressions were derived for both unincorporated enterprises and companies.

In this section the cost-of-capital expressions of Benge (1998) are modified to take account of the elimination of accelerated depreciation. Except where otherwise indicated, assumptions are as in the earlier paper and are discussed more fully there. In particular, uncertainty is ignored, it is assumed that all investors are taxed at a uniform rate $m > 0$ and it is assumed that the companies being analysed are widely-held firms owned by Australian non-corporate shareholders.

As was shown in the earlier paper, unincorporated enterprises have incentives to invest until investments generate a real pre-tax rate of return of

$$\rho_u = \frac{(1 - m(k + Z_u))(i(1 - m) - \pi + \delta(1 + \pi))}{(1 - m)(1 + \pi)} - \delta \quad (1)$$

where m is the marginal tax rate of investors, k is the investment allowance (if any), Z_u is the present value of depreciation allowances per dollar of investment discounted at the rate $i(1 - m)$, i is the nominal interest rate (assumed to be constant for convenience), π is the (constant) rate of assumed inflation, and δ is the geometric rate at which the real revenues derived from an asset are assumed to decay.

For companies owned by domestic non-corporate shareholders, costs of capital will depend on dividend policy and Benge (1998) and the earlier paper discusses a number of possible cases. The tax system will normally provide incentives for domestically-owned firms to distribute franked dividends and to refrain from paying unfranked dividends. The base-case companies considered in that paper are assumed to do this. In this paper when considering domestically-owned companies we restrict our attention to these base-case companies. It is straightforward, however, to extend the analysis to other categories of domestically-owned firms. For base-case companies, if shareholders are taxed at the rate m , the cost of capital is

$$\rho_c = \frac{(1 - c - (m - c)(k + Z_c))(\phi - \pi + \delta(1 + \pi)) + b\alpha c\pi}{(1 - m)(1 + \pi)} - \delta \quad (2)$$

where c is the accrual-equivalent rate of capital gains tax, Z_c is the present value of depreciation deductions per dollar of investment discounted at the rate $\phi = (i(1-m) - \alpha c\pi)/(1-c)$, b is the proportion of the capital stock which is financed by debt and α is an expression which takes the value 1 if it is assumed that real gains accrue on shares and 0 if nominal losses accrue. If real losses but nominal gains accrue, it is assumed that c is zero.

The Ralph Report suggests eliminating accelerated depreciation but not indexing depreciation allowances for inflation. To model this proposal it is assumed that an asset costing a dollar in year 0 with cash flows which decay at rate δ would be allowed a nominal depreciation deduction of δ in year 1, $\delta(1-\delta)$ in year 2, $\delta(1-\delta)^2$ in year 3 and so forth. This depreciation scheme would mirror economic depreciation in the absence of inflation. This means that for an unincorporated enterprise

$$Z_u = \frac{\delta}{1+i(1-m)} \sum_{t=0}^{\infty} \left(\frac{1-\delta}{1+i(1-m)} \right)^t = \frac{\delta}{i(1-m) + \delta} \quad (3)$$

For a company

$$Z_c = \frac{\delta}{1+\phi} \sum_{t=0}^{\infty} \left(\frac{1-\delta}{1+\phi} \right)^t = \frac{\delta}{\phi + \delta} \quad (4)$$

This system of depreciation will be referred to as the historical cost approximation to economic depreciation (HCAED). Assuming, as is currently the case, that there is no investment allowance ($k=0$) the cost of capital for an unincorporated enterprise becomes

$$\rho_u = \frac{\left(1 - \frac{m\delta}{i(1-m) + \delta} \right) (i(1-m) - \pi + \delta(1+\pi))}{(1-m)(1+\pi)} - \delta$$

Simplifying

$$\rho_u = r - \frac{im\pi(1-\delta)}{(i(1-m) + \delta)(1+\pi)} \quad (5)$$

where $r = (i - \pi)/(1 + \pi)$ is the real interest rate.

One immediate observation is that assuming m and π are both positive, the cost of capital rises with δ .

$$\frac{\partial \rho_u}{\partial \delta} = \frac{im\pi(1+i(1-m))}{(i(1-m) + \delta)^2(1+\pi)} > 0$$

This means that the HCAED will not be neutral with respect to the rate of depreciation, δ . In particular, the tax system will tend to bias investment in favour of assets which depreciate slowly (δ is low). Such investments will be profitable when

they generate lower real pre-tax rates of return than are required on investments with higher rates of δ . This property of the HCAED was pointed out by Auerbach (1979). This is a major difference from the three idealised depreciation schemes discussed in Benge (1998) (nominal economic depreciation, real economic depreciation and expensing) where costs of capital would be independent of δ .

It is instructive to consider two polar cases. If real cash flows do not depreciate, $\delta = 0$. In this case

$$\rho_u = r - \frac{m\pi}{(1-m)(1+\pi)} \quad (6)$$

This is the cost of capital for an unincorporated enterprise derived in Benge (1998) (see Table 2) for the case where firms are allowed to claim deductions for real economic depreciation (the fall in the real value of assets). Clearly if δ is zero, real cash flows do not decay over time and if deductions were allowed for the fall in the real value of an asset, no deductions would be allowed. Under HCAED no depreciation deductions are allowed either. Thus, for such an asset, real economic income is being taxed.

At the other polar extreme, $\delta = 1$. For such an asset

$$\rho_u = r \quad (7)$$

This is the expression given in Table 2 of Benge (1998) for the case when nominal economic depreciation is deductible and firms are taxed on the full nominal income from an investment. To see this, consider such an investment costing a dollar which generates a real pre-tax rate of return of $r = 0.05$. If $\delta = 1$, such an investment generates a single positive cash flow one year after it is acquired and then expires. Assume that the inflation rate is 5 per cent per annum so that $i = 0.1025$. An individual on tax rate m would receive an after-tax interest rate of $i(1-m)$ from lending and this is the after-tax nominal cost of borrowing. If the investment costing a dollar provides a real rate of return of 5 per cent this means that the single positive cash flow in year 1 must be \$1.1025. After deducting the dollar in depreciation, the investor's taxable income would be 10.25 cents and $10.25m$ cents would be paid in tax. This would leave the investor with nominal after-tax wealth of $1+i(1-m)$ which is what would have happened if the dollar had been invested in bonds. Thus, on such an investment the full nominal economic income is taxable and if the investment generates a real pre-tax rate of return of r , it is a breakeven investment.

While expressions are more complex, the same intuition carries over to the case of investment by an unincorporated enterprise. Under the HCAED the cost of capital for such an enterprise becomes

$$\rho_c = \frac{\left(1 - c - \frac{(m-c)\delta}{\phi + \delta}\right)(\phi - \pi + \delta(1 + \pi)) + b\alpha c\pi}{(1-m)(1+\pi)} - \delta$$

This can be simplified to

$$\rho_c = r - \frac{\pi}{1 + \pi} \left[\frac{(1 - \delta)(m - c)\phi}{(1 - m)(\phi + \delta)} + \frac{\alpha c(1 - b)}{1 - m} \right] \quad (8)$$

Provided $\pi > 0$ and $m > c$, the corporate cost of capital will also rise with δ .

$$\frac{\partial \rho_c}{\partial \delta} = \frac{\pi(m - c)\phi(1 + \phi)}{(1 + \pi)(\phi + \delta)^2} > 0$$

Once again, it is instructive to examine polar cases. If $\delta = 0$,

$$\rho_c = r - \frac{\pi}{1 + \pi} \left[\frac{m - c}{1 - m} + \frac{\alpha c(1 - b)}{1 - m} \right] \quad (9)$$

This is the corporate cost of capital under real economic depreciation provided in Table 3 of Bengtsson (1998). If, on the other hand, $\delta = 1$,

$$\rho_c = r - \frac{\pi \alpha c(1 - b)}{(1 + \pi)(1 - m)} \quad (10)$$

This is the corporate cost of capital under nominal economic depreciation from Table 3 of Bengtsson (1998).

In this section cost of capital expressions have been derived for unincorporated enterprises and for companies owned by Australian non-corporate shareholders. It has been shown that in times of inflation, the Ralph Report suggestion of basing depreciation allowances on the economic lives of assets would not be neutral. It would tend to promote longer-term investment relative to shorter-term investment. However, this should not be taken to mean that there is a major problem with the HCAED. As will be seen in the next section, at modest rates of inflation, this would lead to very small biases between shorter-term and longer-term investments. Probably a much bigger issue is that difficulties of measuring economic lives of assets will mean that any schedule of rates of depreciation is likely to be a much poorer proxy for economic depreciation than these examples suggest.

3. EFFECTS OF RALPH PROPOSALS ON INVESTMENT BIASES FOR DOMESTICALLY-OWNED FIRMS

The Ralph proposals affect costs of capital for unincorporated enterprises and domestically-owned companies in three main ways:

- the removal of capital gains indexation will tend to raise costs of capital;
- reduced taxes on capital gains will tend to reduce costs of capital;
- the elimination of accelerated depreciation will tend to raise costs of capital.

The other major proposal is to reduce the company tax rate to 30 cents in the dollar. This will not affect incentives for firms pursuing a policy of paying as many franked dividends as possible. This is because reduced company tax collections mean increased personal income taxes (ignoring the fact that some shareholders such as those below the tax-free threshold are unable to claim imputation credits at present).

Changes to Capital Gains Taxation

One suggestion in the Ralph report is to remove capital gains tax indexation and to reduce taxes on capital gains. In this note it will be assumed that reduced rates of capital gains taxation involves 80 per cent of capital gains being taxed. Effects on costs of capital are estimated in Table 1. There are a number of assumptions underlying these estimates. Current depreciation provisions are described in Benge (1998) and the relationship between the rate of economic depreciation, δ , and the set of assets listed in Table 1 is as was assumed in the earlier paper. It is assumed that buildings currently qualify for the 2.5 per cent deduction for 40 years rather than the higher rate of deduction applying to buildings used for eligible industrial activities or short-term traveller accommodation. Other assumptions are as follows:

- shareholders are all taxed at a rate of $m = 0.33$ (the average marginal tax rate of shareholders)³;
- the real interest rate, r , is 5 per cent per annum;
- there is a constant inflation rate of 2.5 per cent per annum which is the midpoint of the Reserve Bank's target range;
- 20 per cent of shares are sold each year;
- 40 per cent of a company's capital is financed with debt;
- shareholders assume that there is a 60 per cent probability of real gains accruing, a 30 per cent probability of nominal losses accruing and a 10 per cent chance of real losses but nominal gains accruing;

With the exception of a minor difference in the assumed inflation rate, all these assumptions are as in Benge (1998). While each of these assumptions could be challenged, the general direction of changes reported in Table 1 seems reasonably robust to minor changes in assumptions.

Costs of capital are reported for equipment with economic lives of 3, 5, 10, 20 and 30 years, for trading stock and for buildings. Results are reported for both companies and unincorporated enterprises.

Table 1 should be interpreted as follows. The figures indicate costs of capital, ie, the real pre-tax rates of return required on various investments. At these real rates of return an investor on a 33 per cent marginal tax rate would earn the same after-tax return as he or she would from investing in bonds which earn a 5 per cent real interest rate.

³ This average marginal tax rate comes from Benge (1998) and was calculated using 1994/95 data. Ideally, it would be updated to take account of more recent data and proposed changes in personal tax rates but this has not been possible in the time available to write this note. A much more important issue is that there is no strong reason for expecting firms to optimise for shareholders on the mean tax rate of shareholders. Many more shares are held by superannuation funds (taxed at 15 per cent) and individuals on the top marginal tax rate (48.5 per cent) than by those close to the mean marginal tax rate and some firms may be acting in the interests of shareholders on these more extreme rates.

Table 1 Effects of Changes in CGT Provisions on Costs of Capital

	<i>3-Yr Eqpt</i>	<i>5-Yr Eqpt</i>	<i>10-Yr Eqpt</i>	<i>20-Yr Eqpt</i>	<i>30-Yr Eqpt</i>	<i>Trdg Stock</i>	<i>Bldgs</i>
<i>Unincorporated Enterprises</i>							
<i>Current CGT Provisions</i>	2.5	3.8	3.8	3.6	3.3	5.0	4.0
<i>New CGT Provisions</i>	2.5	3.8	3.8	3.6	3.3	5.0	4.0
<i>Difference</i>	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<i>Domestically- Owned Companies</i>							
<i>Current CGT Provisions</i>	4.0	4.3	4.3	4.3	4.2	4.6	4.4
<i>New CGT Provisions</i>	4.0	4.5	4.5	4.4	4.3	5.0	4.6
<i>Difference</i>	0.0	0.2	0.2	0.1	0.1	0.4	0.2

The capital gains tax changes do not affect costs of capital for unincorporated enterprises under the assumptions of the model where investors are assumed to acquire these assets directly and operate them over their economic lives. Before and after the change in capital gains taxation, investment in 3-year equipment would need to generate a 2.5 per cent real pre-tax rate of return to become marginally profitable. Investment in 5-year equipment would need to generate a 3.8 per cent real pre-tax rate of return and so forth. Costs of capital are affected, however, for companies. Investors acquire an interest in a company and eventually must sell their interest in the company. When they do so, the capital gains tax impost becomes relevant. The elimination of indexation boosts capital gains taxes that shareholders are required to pay and hence the real pre-tax rates of return required for investment in companies to be marginally profitable.

Table 1 indicates that current depreciation provisions do not treat all forms of investment neutrally. Current tax provisions generally tend to favour investment in 3-year equipment and 30-year equipment relative to investment in equipment with lives of 5-to 20-years, buildings and trading stock. With the exception of trading stock, they also generally tend to favour investment by unincorporated enterprises relative to companies. By themselves, changes to capital gains tax provisions tend to boost corporate costs of capital most for investments which are already more-heavily taxed. They also reinforce the tax bias favouring investment by unincorporated enterprises relative to companies.

Elimination of Accelerated Depreciation

The other major change for domestically-owned companies is the elimination of accelerated depreciation. Table 2 indicates the combined effects of the elimination of accelerated depreciation and the changes to capital gains tax provisions on costs of capital for domestically-owned companies.

Table 2 Overall Effects of Ralph Proposals on Costs of Capital

	<i>3-Yr Eqpt</i>	<i>5-Yr Eqpt</i>	<i>10-Yr Eqpt</i>	<i>20-Yr Eqpt</i>	<i>30-Yr Eqpt</i>	<i>Trdg Stock</i>	<i>Bldgs</i>
<i>Unincorporated Enterprises</i>							
<i>Current Provisions</i>	2.5	3.8	3.8	3.6	3.3	5.0	4.0
<i>New Provisions</i>	4.9	4.9	4.7	4.5	4.4	5.0	4.2
<i>Difference</i>	2.4	1.1	0.9	0.9	1.1	0.0	0.2
<i>Domestically- Owned Companies</i>							
<i>Current Provisions</i>	4.0	4.3	4.3	4.3	4.2	4.6	4.4
<i>New Provisions</i>	5.0	5.0	4.9	4.8	4.8	5.0	4.7
<i>Difference</i>	1.0	0.7	0.6	0.5	0.6	0.4	0.3

The figures reported in the table suggest that the combination of measures will make costs of capital for the various forms of investment that unincorporated enterprises much more equal than before. This suggests that biases between the different forms of investment that these firms can undertake will be reduced. A similar pattern is evident in the case of companies. Finally, consider costs of capital for a given type of asset. Under current provisions there are major differences between costs of capital for companies and unincorporated enterprises. This is because of the way that current tax provisions end up clawing back the benefits of tax preferences available to companies but not for unincorporated enterprises. Under the new provisions there would be much less difference between costs of capital for unincorporated enterprises and companies.

Overall Assessment of Changes

It appears that the tax changes would reduce tax biases between the different forms of investment a given business enterprise can undertake. The provisions would also appear to reduce tax biases over whether a given form of investment is undertaken by

companies or unincorporated enterprises. If the suggested reforms were assessed merely on those grounds, they would appear to be a success. It would seem generally desirable for businesses to be making decisions on which investments they undertake based on the inherent profitability of the investments rather than whether or not the investments are lightly taxed. It would also seem desirable for the tax system to not be biasing decisions over whether investment is undertaken by companies or unincorporated enterprises.

The results reported above have all been calculated assuming $m = 0.33$. It was noted that some domestically-owned companies may be acting in the interests of shareholders on more extreme tax rates ($m = 0.15$ or $m = 0.485$). These more extreme tax rates would alter the numbers reported in Table 2 but not the qualitative conclusions. It would still be the case that the combination of measures reduced biases both between the various investments a given firm could undertake and over whether investment was undertaken by unincorporated enterprises or companies.

There are potential benefits in the changes which have not been identified above. One effect of taxing different forms of investment at different rates is that this can provide big incentives for individuals and firms to acquire certain types of assets. Those on low tax rates will have a relative advantage in owning heavily-taxed assets and those on high tax rates will have a relative advantage in owning lightly-taxed assets. Much tax advice and tax avoidance activity can be thought of as the business sector ensuring that differently-taxed assets find their natural homes. These incentives would be diminished by the proposed reforms. Other sensible features of the reforms include making the treatment of sales of buildings and of purchase of used buildings consistent with that of plant and equipment and proposals to amend the treatment of blackhole expenses.

This being said, an obvious effect of the proposed changes is not only to make costs of capital more equal but to increase them for virtually all forms of investment. This raises the questions of the effects of changes on the overall level of capital taxation to which we now turn.

4. EFFECTS ON LONG-RUN CAPITAL STOCK AND WAGES

In this section estimates are made of the effects of the suggested measures on the long-run capital stock and on wages. It is assumed that Australia is a small open capital-importing economy which can acquire as much capital as it wishes at fixed world rates. By increasing tax rates on capital, the measures will tend to reduce Australia's capital stock and put downward pressure on wage rates. A very simple model is put forward in this section to estimate possible consequences.

Australia is treated as being a small open economy which produces a single good, X , with a fixed price which is chosen as the numeraire. Output is produced with capital, K , and labour, L , using a constant-returns to scale technology,

$$X = F(K, L) \tag{11}$$

Capital is imported at a fixed world real interest rate, r , and is subject to a specific tax at rate t . The real wage paid by firms is w . Profit-maximisation by competitive firms ensures

$$F_K(K, L) = r + \delta + t \quad (12)$$

$$F_L(K, L) = w \quad (13)$$

With constant returns to scale, the marginal products of capital and labour are functions of the capital/labour ratio only. This means that equation (12) will determine the capital/labour ratio which will in turn determine the real wage via equation (13).

If the tax rate on capital rises,

$$F_{KK}dK + F_{KL}dL = dt \quad (14)$$

A conservative assumption would appear to be that such a change has no effect on labour supply. In this case, the proportionate change in K is

$$\frac{dK}{K} = \frac{F_K}{KF_{KK}} \frac{dt}{(r + \delta + t)} = \varepsilon_K^D \frac{dt}{r + \delta + t} \quad (15)$$

where ε_K^D is the elasticity of demand for capital. Dr Yongzheng Yang of the Australian National University has kindly provided an estimate of the elasticity of -1.08 using GTAP.⁴ Professor Peter Dixon has kindly provided information on typical elasticities emerging from the Monash Model. He has advised that for a typical industry

$$X = (aK^{-\rho} + bL^{-\rho})^{-1/\rho} \quad (16)$$

This implies that

$$\varepsilon_K^D = \frac{F_K}{KF_{KK}} = \frac{1}{(1 + \rho)(S_K - 1)} \quad (17)$$

where $S_K = KF_K / X \approx 0.35$ is the capital share and the elasticity of substitution $1/(1 + \rho) \approx 0.5$. Together these imply an elasticity of demand for capital of approximately -0.77 .

In the estimates of changes in long-run capital stock presented below, the more conservative Monash model assumption is used as a way of deriving rough estimates

⁴ In Benge (1999) this was mistakenly treated as being an elasticity with respect to the net price of capital, $r+t$. It should, however, be an elasticity with respect to the gross price of capital, $r+\delta+t$, as in equation (15) above.

of changes in the capital stock. Using the elasticity from GTAP would lead to a larger effect on capital stock. Thus, it is assumed that

$$\frac{dK}{K} \approx -0.77 \frac{dt}{r + \delta + t} \quad (18)$$

If it is assumed that the production function is of the form given in (16) and that labour supply is unchanged, it can be shown that the proportionate change in the wage rate

$$\frac{dw}{w} = \frac{F_{LK} F_K}{F_L F_{KK}} \frac{dt}{r + \delta + t} = \frac{S_K}{(S_K - 1)} \frac{dt}{(r + \delta + t)} \quad (19)$$

Once more setting $S_K \approx 0.35$ implies

$$\frac{dw}{w} \approx -0.54 \frac{dt}{r + \delta + t} \quad (20)$$

To make estimates of the effects of the Ralph-Report measures on Australia's capital stock, it is necessary to make assumptions about the marginal source of imported capital to Australia. This is a very unclear issue. One possibility is that marginal investment is financed by foreign portfolio equity investors in Australian companies who demand a real return on their funds of r^* after taxes levied in Australia. A second is that marginal investment occurs in firms owned by foreign residents but is financed by these firms borrowing from abroad at the real interest rate, r . A third possibility is that funds are acquired by Australian non-corporate shareholders borrowing at the real interest rate, r , (or reducing lending) and injected as equity into Australian firms. A fourth possibility is that the funds are acquired as debt by companies owned by Australian residents borrowing at the real interest rate, r . A fifth possibility is that the funds are acquired by either the owners of unincorporated enterprises borrowing (or reducing lending) at the real interest rate, r . In practice, it is likely that there will be changes in all of these methods of financing if the Ralph Report's suggestions are adopted.

The only cases for which cost of capital expressions have not already been documented involve equity finance or borrowing by a foreign-owned company. Cost of capital expressions in this case follow Bengtsson (1999). If τ is the company tax rate, k is the rate of investment allowance (if any), Z is the present value of depreciation deductions discounted at the nominal rate $i^* = r^*(1 + \pi) + \pi$, the equilibrium real pre-tax rate of return for a foreign-owned, equity-financed firm will be

$$\rho_{fe} = \frac{(1 - \tau(k + Z))(r^* + \delta)}{1 - \tau} - \delta \quad (21)$$

In this case $dt/(r + \delta + t)$ would be taken to be $d\rho_{fe}/(\rho_{fe} + \delta)$ where $d\rho_{fe}$ is the change in the cost of capital brought about by the change in tax provisions.

In the case of debt-financed investment by foreign-owned companies, the cost of capital will be the same as in (21) except that r^* is replaced by the real after-tax cost of debt, $r' = r(1 - \tau) - \tau\pi/(1 + \pi)$. The cost of capital is

$$\rho_{fd} = \frac{(1 - \tau(k + Z))(r' + \delta)}{1 - \tau} - \delta \quad (22)$$

In this case $dt/(r + \delta + t)$ would be taken as being $d\rho_{fd}/(\rho_{fd} + \delta)$.

In practice, foreign-owned firms are generally not financed solely by debt or equity. In the estimates provided below it will be assumed that such a firm finances a fixed proportion, b , of additional capital by debt. In this case, the cost of capital will be

$$\rho_f = (1 - b)\rho_{fe} + b\rho_{fd} \quad (23)$$

and $dt/(r + \delta + t)$ is taken as being $d\rho_f/(\rho_f + \delta)$.

Costs of capital for unincorporated enterprises and companies are calculated using equations (1) and (2) respectively. For unincorporated enterprises $dt/(r + \delta + t)$ is taken as being $d\rho_u/(\rho_u + \delta)$. For domestically-owned companies, it will be assumed that a fixed fraction b of marginal investment is financed by debt. In this case $dt/(r + \delta + t)$ is taken as being $d\rho_c/(\rho_c + \delta)$.

In order to estimate aggregate changes in user-costs of capital, it is necessary to estimate an average change in user costs. In 1995/96 ABS capital stock data record that the net capital stock of private enterprises included \$201.9 billion of equipment and \$214.9 billion of nondwelling construction. To derive weighted average costs of capital, a 48.4 per cent weighting for equipment and a 51.6 per cent weighting for buildings is employed. However, there appears to be no data which would allow one to calculate the relative proportions of equipment investment with differing economic lives. To estimate an average cost of capital for equipment investment, an unweighted average of 5-year, 10-year, 20-year and 30-year equipment is used. Note that 3-year equipment has been excluded from this average because it appears that very few types of equipment are treated as having an economic life of less than three years.

Estimates of taxes on capital as a proportion of the *gross-of-depreciation* return to capital are presented in Table 3. For all estimates in Tables 3 and 4, it is assumed that $r = r^* = 0.05$, $\tau = 0.36$ under current provisions and $\tau = 0.30$ under the new provisions. It is also assumed that the indexation of capital gains is abolished and that only 80 per cent of gains are made taxable. In Table 3 it is also assumed that $m = 0.33$, $a = 0.2$ is the proportion of shares sold each year, $\pi = 0.025$ and $b = 0.4$.

This table says that weighted average costs of capital rise by 2.4, 4.3 or 5.6 per cent if, respectively foreign-owned companies, domestically-owned companies or unincorporated enterprises are the marginal investors in Australia. This converts to a fall in the long-run capital stock of between 1.8 and 4.3 per cent if labour supply is unchanged and a fall in wage rates of 1.30 to 3.0 per cent.

Table 3 Proportionate Changes in User-Costs of Capital

$$r = r^* = 0.05, m = 0.33, a = 0.2, \pi = 0.025, b = 0.4$$

	<i>Foreign- Owned Companies</i>	<i>Domestically- Owned Companies</i>	<i>Unincorp. Enterprises</i>
<i>Equipment</i>	0.063	0.039	0.077
<i>Buildings</i>	-0.013	0.048	0.036
<i>Weighted Average</i>	0.024	0.043	0.056

These estimates are clearly dependent on the assumptions outlined above. Table 4 presents estimates of proportional changes in weighted-average user costs under a variety of other assumptions.

Table 4 Proportionate Changes in Weighted-Average User Costs

$$r = r^* = 0.05$$

	<i>Foreign- Owned Companies</i>	<i>Australian- Owned Companies</i>	<i>Unincorp. Enterprises</i>
$m = 0.33, a = 0.2, \pi = 0.025, b = 0.4$	0.024	0.043	0.056
$m = 0.33, a = 0.2, \pi = 0.025, b = 0.0$	-0.001	0.074	0.056
$m = 0.33, a = 0.2, \pi = 0.025, b = 1.0$	0.082	0.001	0.056
$m = 0.33, a = 0.1, \pi = 0.025, b = 0.4$	0.024	0.044	0.056
$m = 0.33, a = 0.5, \pi = 0.025, b = 0.4$	0.024	0.043	0.056
$m = 0.15, a = 0.2, \pi = 0.025, b = 0.4$	0.024	0.016	0.021
$m = 0.485, a = 0.2, \pi = 0.025, b = 0.4$	0.024	0.084	0.097
$m = 0.33, a = 0.2, \pi = 0.00, b = 0.4$	0.026	0.012	0.056
$m = 0.33, a = 0.2, \pi = 0.025, b = 0.4$	0.023	0.072	0.054

It is clear from Table 4 that results appear to be quite sensitive to assumptions made about m and b . However, the base-case assumptions reported in Table 3 do not appear extreme. This suggests that a fall in long-run capital stock of between 1.8 and 4.3 per cent and a fall in wages of between 1.3 and 3.0 per cent may not be

unreasonable as rough estimates assuming no change to labour supply. If labour supply were to fall as a result of the reduction in wages, this would tend to augment the fall in capital.

Falls in the capital stock and wages of these magnitudes seem to be a very troubling consequence of the proposed measures. What is especially troubling is that the measures have been proposed as a broadly revenue-neutral change. If the change is broadly revenue neutral, it means that the government will have no capacity to finance tax cuts to offset the fall in wage rates on labour incomes.

It is well known that in a small open economy with a constant returns to scale technology, taxes on capital invested in the economy will be inefficient. As Gordon (1986) has pointed out, taxes on capital will be borne by immobile factors (labour in our model) just as if these factors were taxed directly. However, taxes on capital impose an unnecessary excess burden by leading to an inefficiently small level of capital stock relative to what would be the case if the immobile factors were taxed directly. Diewert and Lawrence (1997 and 1998) have warned that taxes on capital can impose severe marginal excess burdens. Benge (1999) shows that with constant returns to scale and capital and labour as the only factors of production, even at quite modest tax rates, the marginal excess burden of taxing capital can be substantially higher than that of taxing labour income.⁵ This means that labour can be made substantially worse off if taxes on capital are increased and the revenue used to provide tax cuts on labour income.

It should be noted, however, that increasing taxes on capital to lower taxes on labour is a much more benign policy than changing capital taxation in a way which boosts taxes on new investment without increasing capital tax revenue. This is because in this latter case, the government gains no revenue with which it can finance cuts in taxes on labour income to offset the fall in wages.

It was explained earlier how reducing the company tax rate while eliminating accelerated depreciation might boost the effective tax impost on new capital investment even though it is a revenue-neutral package. In the very short period available to write this note, it has not been possible for the author to attempt to confirm that the package is revenue neutral. From his (admittedly less than comprehensive reading) it is unclear how the present value of taxes collected from companies and their shareholders and from unincorporated enterprises is expected to change as a consequence of the suggested reforms. It is the present value of the change in tax collections rather than the change in tax collections in any one year which is relevant when assessing the revenue neutrality of the proposals. Approximate revenue neutrality appears to be claimed on the basis that there is a very minor annual deficit by the year 2003/2004. A fuller analysis of this issue would be required before the revenue neutrality of the package could be independently

⁵ Note, however, that in Benge (1999) tax rates are expressed as a specific tax rate, t , divided by the cost of capital, ρ . To estimate consistent marginal excess burdens using the elasticities of demand for capital outlined in this paper, tax rates should be calculated as $t/(\rho+\delta)$. This will tend to make estimates of taxes on capital lower than those presented in the earlier paper. This means that marginal excess burdens of taxes on capital will tend to be lower than those presented in that paper.

confirmed. If the package were to raise additional revenue in present value terms than at present, this would tend to reduce concerns about the package as this would offer some scope for the government to reduce rates of income tax to offset any fall in wage rates. However, the concerns voiced in Benge (1999) that small taxes on capital can impose substantially higher marginal excess burdens than taxing labour income directly would continue to be relevant.

5. CONCLUDING COMMENTS

This note is very much a first attempt to analyse some of the suggestions contained in the Ralph Report. The topic is an important one. In the very few days available to the author to examine this issue, it has not been possible to do justice to the topic.

There are definitely some attractions in the direction of reforms suggested in the Ralph Report. A strong advantage is the way in which the reforms would reduce the extent to which the tax system biases decisions on the types of investment businesses undertake and whether investment takes place in widely-held companies or unincorporated enterprises. Moreover, by taxing income more comprehensively, the reform would reduce the scope for those on higher tax rates to acquire lightly-taxed assets. There may be further advantages that have not been analysed in the report. In particular, the reduced company tax rate may make it less attractive for multinational firms to transfer-price profits out of Australia.

There is, however, a very big concern with the proposals. The reforms are aimed at being revenue neutral. However, on the estimates provided in this paper they constitute a very high increase in the tax rate on new capital. This will tend to reduce Australia's steady-state capital stock and lower wage rates. If the package really is revenue neutral, the government will acquire no additional revenue with which to compensate workers for any fall in wage rates. A much fuller analysis of this issue seems necessary before such a change is adopted.

There are also other unattractive features of the proposal that have not been analysed in the paper. One obvious issue is that the reduction in the company tax rate without a commensurate reduction in the top personal marginal tax rate will increase the prospect of companies being used to shelter income from these higher personal marginal tax rates. Moreover, if incentives for firms to distribute franked dividends are removed, this can have a marked effect on investment incentives. This is commented on in Benge (1998) but has not been discussed in this paper. A further issue is that the company tax rate provides a way of taxing economic rents. This is a very attractive form of tax revenue. Economic rents need not be closely associated with capital investment. The package may reduce Australia's ability to tax economic rents while boosting taxes on new capital invested in Australia.

There is one final comment that should be made in conclusion. The Ralph Report has suggested the option of retaining some measure of accelerated depreciation by providing a uniform loading on to effective life depreciation. In the time available it has not been possible to write up the effects of this change. It is straightforward to show, however, that such a measure would tend to bias investment in favour of short-lived investment at least in the absence of inflation. It may be that this would offset

the effect noted above that the HCAED would tend to advantage longer-lived relative to shorter-lived investment in the presence of inflation. Whether this is a very good offset or not requires further analysis. There is, however, an alternative which would be neutral with respect to asset life in the absence of inflation. As is explained in Harberger (1980), this is to allow a given fraction, e , of investment to be deducted immediately with the remainder, $1 - e$, being written off over its economic life. This provides a relatively neutral method of providing some element of accelerated depreciation if this is desired.

REFERENCES

- Auerbach, A.J., 1979, 'Inflation and the Choice of Asset Life', *Journal of Political Economy*, 87, 3, 621-638.
- Benge, M.N., 1998, 'Depreciation Provisions and Investment Incentives Under Full Imputation', *Economic Record*, 74, 227, 329-346.
- Benge, M.N., 1999, 'Marginal Excess Burdens of Taxes on Capital and on Labour Income in a Small Open Economy', Working Paper No. 364, Working Papers in Economics and Econometrics, Australian National University.
- Diewert, W.E. and D.A. Lawrence, 1997, 'Dynamic Deadweight Loss of Capital Taxation in Australia, Tasman Asia Pacific, Paper presented to the International Conference on Public Sector Efficiency, University of New South Wales, November 27-28.
- Diewert, W.E. and D.A. Lawrence, 1998, 'The High Costs of Capital Taxation in Australia', *Agenda*, 5, 3, 355-372.
- Gordon, R.H., 1986, 'Taxation of Savings and Investment in a World Economy', *American Economic Review*, 76, 1086-1102.
- Harberger, A.C., 1989, 'Tax Neutrality and Investment Incentives', in H.J. Aaron and M.J. Boskin (eds.), *The Economics of Taxation*, Brookings.
- King, M.A., 1974, 'Taxation and the Cost of Capital', *Review of Economic Studies*, 41, 21-35.
- King, M.A., 1977, *Public Policy and the Corporation*, Chapman and Hall, London.
- Ralph, J.T, R. Allett and B.Joss, 1999, *Review of Business Taxation: A Platform for Consultation: Discussion Paper 2, Building on a Strong Foundation*, AGPS, Canberra.

