7. The interest payment abroad would be subject only to withholding tax in Australia at a rate of 15 per cent, less than the U.S. company tax rate of 34 per cent and substantially less than the Australian company tax rate of 49 per cent.

8. It would, of course, be possible to measure nominal income correctly (regardless of the inflation rate) if capital gains were taxed annually on an accrual basis. In this case, measurement errors in nominal depreciation would not matter. Unfortunately, it is much more difficult to implement full accrual taxation of capital gains than it is to implement comprehensive indexation.

9. Specifically, with a 49 per cent tax rate, the after-tax cost of borrowing at a 4 per cent real interest rate is .51 (.04) = .0204 in an indexed tax system, compared with .04-(.144 × .49) = -.0306 in the unindexed tax system.

10. At a 5 per cent inflation rate, a nominal interest rate of 9.2 per cent leaves tax-exempt lenders with a 4 per cent real rate of return on loanable funds. The welfare cost of the tax subsidy of debt is approximately proportional to the square of .092 in an unindexed tax system and to the square of .04 in an indexed tax system. The latter is only 18.9 per cent of the former.

11. This requirement is obviously geared to individual taxpayers rather than to large corporations which borrow offshore. In the latter case, the corporation can be required to calculate average outstanding monthly loan balances in its own accounts.

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CHAPTER 7

Some Business Tax Reform Issues

WAYNE MAYO*

1. INTRODUCTION

The two major measures affecting business investment decisions that came out of the 1985 Australian tax reform exercise are the capital gains tax (CGT) and the full imputation system of company tax. Comprehensive inflation adjustment, while discussed at some length in the Draft White Paper on the Reform of the Australian Tax System (1985), has been put on the back-burner.[1] The accelerated 5/3 depreciation system for plant and equipment remained unchanged, despite some questioning of its merits in the Draft White Paper and elsewhere.

Some have argued that the 5/3 system is a reasonable surrogate for comprehensive inflation adjustment. With the CGT taxing only real gains and not the associated inflationary component, there is the question whether business income taxation arrangements are, despite the absence of formal comprehensive indexation, steadily moving more towards an indexed basis.

This chapter addresses this question by first comparing, in Section 2, a comprehensive nominal business income tax base with the more commonly discussed comprehensive real income tax base, reflecting briefly on the neutrality properties of the fully nominal base. The relevance is then assessed, in Section 3, of the indexed CGT and 5/3 depreciation in terms of adjusting for inflation in our essentially nominal business tax system. The treatment under post-CGT arrangements of income-tax balancing adjustments on disposal of depreciable assets is central to this assessment.

Section 4 analyses possible efficiency gains from replacing 5/3 depreciation with alternative arrangements, using marginal effective tax rates to provide numerical comparisons. The analysis draws out the incentive given to debt funding by accelerated depreciation with associated exacerbation of distortions to investment decision-making. Finally, Section 5 draws together the earlier discussion, adds some related comments on the proposed full imputation system and suggests some possible future business tax reforms — in the context of retention in the forseeable future of an essentially nominal income tax base — to fit with the major efficiency gains ushered in by the full imputation regime.

2. COMPREHENSIVE INCOME TAX BASE

A starting point for analysing our post-tax-reform business investment environment is the comprehensive income tax base. A practical definition of the comprehensive income tax base is:

(1) annual receipts (including interest receipts) derived by owners of all business assets — stocks, fixed assets and monetary assets — less the annual costs (including interest costs) of deriving those receipts; plus

(2) the change in value of the capital assets over the year (i.e., economic depreciation). If the value increases, the change is a capital gain adding to income. If it decreases, the change is a loss which reduces income.

The comprehensive income tax base could be in real or nominal terms. For the nominal income tax base, nominal interest receipts are assessable income and nominal interest costs are deductible. The change in capital value is the "full nominal" change — that is, nominal economic depreciation, including full nominal capital gains when the value increases.

For a real income tax base, the change in value of capital assets is the real change. For both monetary and non-monetary assets the real change in value is the nominal change less the inflation rate times the depreciated or principal value of the associated asset (i.e., its decline in real value) at the start of the year. Subtracting the decline in real value of monetary assets (i.e., the inflation rate times the principal outstanding at the start of the year) from the associated nominal interest payments corresponds to including only real interest payments in the tax base. For a fixed asset, subtracting the decline in the real value of the asset (the inflation rate times its depreciated value) from its nominal change in value gives the adjustment from nominal to real economic depreciation.

Were (uniform) inflation at the rate i acting to increase the value of a fixed asset with a market value of K at the start of the year, the market value of the asset at the end of the year would be $(1 - s)(1 + i)K$, where s is the rate of physical deterioration of the asset (or, more strictly, the proportional reduction in its value in the absence of inflation). The annual nominal reduction in the value of the asset, or economic depreciation, D, is therefore given by:

$$\begin{aligned} D &= K - (1 - s)(1 + i)K \\ &= sK - i(1 - s)K \\ &= (s(1 + i) - i)K \end{aligned} \qquad (1)$$

This result is obtained and the associated neutrality properties are discussed in, for example, Samuelson (1964), King (1977, p. 242), Swan (1978 — Proposition 1A, p. 3) and Mayo (1984, p. 34). The Draft White Paper (Appendix 19-C) compares the neutrality properties of nominal economic depreciation with historical cost depreciation, including 5/3 depreciation. The second form of equation (1) above illustrates the difference under inflation between historical cost and economic depreciation: sK is the historical-cost reducing-balance deduction allowed at the rate of physical deterioration; and the adjustment required to achieve economic depreciation is $i(1 - s)K$. When the estimates for s and i correspond to actual outcomes, the annual depreciated value K under a depreciation scheme represented by equation (1) — perhaps described as nominal replacement cost depreciation — would correspond to the actual market value of the asset.

The neutrality properties of a "full nominal" income tax system derive from the full before-tax nominal income from all alternative investments being subject to tax. The investor is not able to shift his investment strategy to avoid tax on the inflationary component of particular investments. The inflationary component of income from financial investments, from fixed assets and from stocks is taxed across the board.

A system of full nominal taxation will have real wealth and equity effects, particularly in relation to unanticipated inflation, and would involve the equity effect described by Swan (1978, p. 13) as a "redistribution by stealth from capital to labour". That does not imply, however, that the taxation of nominal income

from all sources in an even-handed way will greatly affect before-tax investment decisions (although general equilibrium effects are inevitable). In any case, in the absence of comprehensive inflation adjustment, the inequities of a full nominal system have to be weighed against the inefficiencies and inequities of current arrangements with their remaining loopholes, concessions and biases.

The economic depreciation formulation in equation (1) above is converted to real economic depreciation, D_r, according to:

$$\begin{aligned} D_r &= D + iK \\ &= (s(1 + i) - i)K + iK \end{aligned} \qquad (2)$$

The loss in the real value of the asset, iK — or, in the terminology of Swan (1978), the "capital maintenance adjustment" — is added to economic depreciation, which is negative income, to get the net reduction in value of the asset in real terms. This is the result derived by King (1977, p. 242) and by Swan (1978 — Proposition 2A, p. 4) and by Mayo (1984, p. 40) with accompanying numerical illustrations. The Draft White Paper proposes this as the basis for an indexed effective-life depreciation regime for durable assets which could accompany a comprehensively indexed income tax system.

Reflecting the reduced form of D_r in equation (2) — $s(1 + i)K$ — the Draft White Paper (1985, p. 206) explains that the annual allowances would be "obtained by applying the corresponding effective-life reducing balance rate to the (indexed) depreciated value of the asset at the start of the year increased by the general inflation rate for that year". The indexed depreciated value is the replacement value of the asset in question. In practice, because of the need to apply estimates for s and i and because market value can change for a variety of reasons, the associated depreciated value of the assets — i.e., their replacement value — could differ considerably from actual market value. Table 19C.1 (p. 229) in the Draft White Paper — reproduced in Table 1 below — contrasts the year-by-year historical-cost reducing-balance allowances, economic depreciation and the corresponding indexed effective-life depreciation — or (real) "replacement cost" depreciation — for a particular fixed asset whose actual value is changing according to equation (1) above with assumed fixed values of s and i.

3. CAPITAL GAINS TAX AND 5/3 DEPRECIATION

We know that nominal, and not real, interest payments remain in the post-reform business tax base. To assess whether the capital gains tax, together with 5/3 depreciation, amount to a move towards partial indexation of the system, it is necessary to look at the post-CGT treatment of depreciation allowances on the sale of depreciable plant and equipment. In particular, we need to start by looking at the income-tax balancing adjustments on disposal of depreciable assets, which were not changed in the reform process.

Depreciation allowances represent an estimate of the annual reduction in value of the associated asset. *The income-tax balancing adjustments ensure that over the period of use of the asset, only the nominal loss (i.e., nominal reduction in capital value) is allowed as a deduction for income tax purposes.* This results because the adjustments "claw back" to assessment the excess of the sale price over the depreciated value (up to the amount of previously allowed depreciation deductions) and allow additional deductions where the sale price is less than the depreciated value.

As shown by equation (1), even where the actual rate of physical deterioration of the asset corresponds to the rate — s in equation (1) — estimated as the historical-cost declining-balance rate for income tax depreciation purposes, *the historical cost allowances — represented by sK in equation (1) — are too generous under*

Table 1:—Alternative Depreciation Arrangements (of an asset costing $1000 whose value is declining at 15 per cent before inflation)

Year	No inflation		8 per cent inflation			
			Nominal income		Real income	
	Declining balance depreciation (= economic dep) (a)	Depreciated value	Economic depreciation (b)	Depreciated value	Indexed depreciation (d)	Depreciated value (e)
1	150	850	82	918	162	918
2	127.5	722.5	75.3	842.7	148.7	842.7
3	108.4	614.1 (= sale value)	69.1	773.6(c) (= sale value)	136.5	773.6 (= sale value)

(a) The declining balance rate from the effective-life system is 15 per cent, the same as the rate of deterioration of the asset's value. These historical cost allowances only correspond to economic depreciation when there is no inflation.
(b) With 8 per cent inflation, the asset's value is declining at a rate of 8.2 per cent (i.e., (1 − 0.15)(1 + 0.08) − 1). Annual economic depreciation comprises the declining balance rate applied to the depreciated value at the start of the year increased proportionately by the inflation rate, less the rate of inflation times the depreciated value. (See equation (1).)
(c) If historical cost declining balance depreciation were applied instead of economic depreciation, the balancing adjustment on disposal would bring to assessment $159.5, the excess of deductions over economic depreciation over the 3 years.
(d) The declining balance rate applied to the depreciated value at the start of the year increased proportionately by the inflation rate, i.e., economic depreciation as in footnote (b) plus the rate of inflation times the depreciated value. (See equation (2).)
(e) The depreciated value (i.e., here the market value) is the same as in the nominal income case with economic depreciation allowed.

inflation compared to nominal economic depreciation. For example, if the declining-balance rate corresponding to the asset's rate of physical deterioration is 15 per cent with 8 per cent inflation, the asset's actual value is declining at only 8.2 per cent (i.e., (1 − 0.15)(1 + 0.08) − 1). The 15 per cent reducing-balance allowances, which are still allowed under our effective-life depreciation arrangements as an alternative option to 5/3 depreciation arrangements, are too generous compared with the actual nominal change in value of the asset. 5/3 depreciation is even more generous — especially, as discussed later, for longer-lived assets.

In other words, against the benchmark of a full nominal income tax base, historical cost allowances are invariably too generous under inflation. Nevertheless, the income-tax balancing adjustments catch up with this generosity at the time of sale by clawing back the deductions in excess of actual decline in value.

The balancing adjustments therefore operate on the basis of a nominal (unindexed) income tax system. This is illustrated in Table 1. It shows that under 8 per cent inflation an asset costing $1000 with a 15 per cent rate of physical deterioration would, with declining balance depreciation also allowed at 15 per cent, attract a claw-back of $159.50 when sold after 3 years' use for $773.60. $159.50 of deductions are allowed in excess of nominal economic depreciation in the 3 years prior to sale.

Table 1 also shows the indexed effective-life deductions according to equation (2) above that would be allowed over the 3 years of use of the asset. In this case, there would be no claw-back of indexed depreciation allowances on sale even with no change to the current nominal balancing adjustment provisions. In this hypothetical illustration, the $773.60 depreciated value of the asset at the end of year 3 — or the replacement value referred to earlier — corresponds to its actual market value.

Another way of looking at this is to observe that the original $1000 cost of the asset compounded forward at the 8 per cent inflation rate (i.e., the indexed cost base, $1259.70) less the indexed depreciation allowances also compounded forward at 8 per cent ($486.10) equals the $773.60 replacement value of the asset. This shows the link between depreciation allowances under unindexed and indexed income tax systems: in the unindexed case, the depreciated value plus previous depreciation allowances equals the original cost of the asset; in the indexed case, the indexed depreciated value plus previous depreciation allowances compounded forward at the rate of inflation equals the indexed cost base of the asset. When the depreciation allowances under the unindexed and indexed systems are given by equations (1) and (2) respectively, as would be the case with comprehensive nominal and real tax bases, the depreciated values in both systems are equal for each asset, and if the estimates for s and i in those equations correspond with actual outcomes, the depreciated values equal the market values of the assets. In both systems, the balancing adjustment provisions operate around the depreciated value resulting in extra assessable income or extra deductions depending on whether the sale price is actually greater than or less than this value. In other words, under either an unindexed or indexed system the balancing adjustment on disposal would operate around the depreciated value in the same symmetrical way but the computation of the depreciated value would differ.

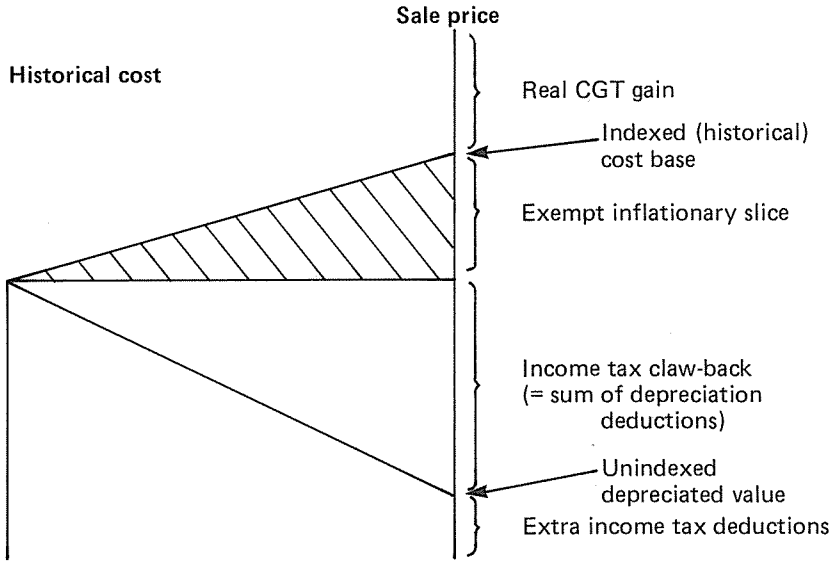
Regardless of the annual depreciation deductions, the depreciated value under an indexed income tax system could in practice be calculated at the end of each year by subtracting the annual depreciation allowance from the depreciated value at the start of the year indexed to the end of the year at the annual inflation rate. In contrast, under an unindexed system the annual depreciation allowance is simply

subtracted from the depreciated value at the start of the year. (This means that, if the same declining balance write-off rate applied annually to the depreciated value under each system, the indexed depreciated value would always be greater than the unindexed depreciated value where there is inflation.)

With the introduction of the indexed CGT, the determination of the depreciated value for balancing adjustment purposes has not been changed. The standard determination of the unindexed depreciated value has been retained. Further, the indexed cost base for CGT purposes is simply the historical cost indexed forward to the time of disposal, regardless of the depreciation deductions attracted by the expenditure in question — including at the extreme when immediate write-off applies, such as with mineral exploration expenditure. The operation of the unindexed balancing adjustment is illustrated in Figure 1, together with the inflationary slice which is exempt from CGT assessment. The diagram shows that the income-tax balancing adjustment and CGT provisions operate to remove the slice of inflationary gains from an otherwise unindexed income tax base (incorporating, of course, historical cost, rather than nominal replacement cost, depreciation). If, for example, the asset is sold for more than its indexed (historical) cost base, the income-tax balancing adjustments continue to operate to claw back all the previously allowed depreciation deductions and the CGT taxes the nominal capital gain less the associated inflationary component. The slice of inflationary gains aside, whether extra assessable income or extra deductions arise at the time of asset sale hinges on whether the sale price is greater or less than the standard (unindexed) depreciated value.

FIGURE 1

Unindexed system



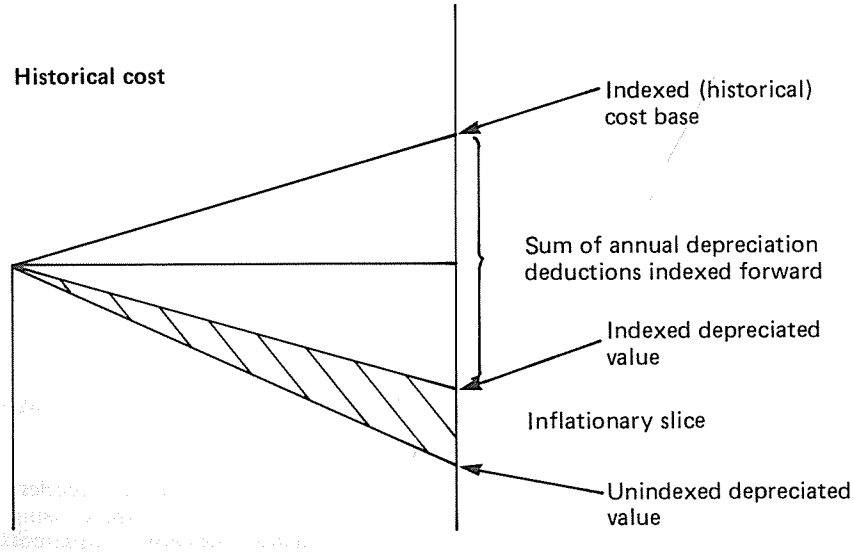
In other words, the CGT and balancing adjustment provisions operate appropriately within our essentially nominal (and, strictly, historical cost) income tax system, with its allowance of full nominal interest deductions, to achieve the policy requirement to tax only real capital gains. Full nominal losses are allowed through depreciation allowances plus the effect of the nominal balancing adjustments when depreciable assets are sold for less than their historical cost, but *only* the real component of nominal gains is taxed when the assets are sold for more than their historical cost — contrary to the interpretation often put on the system that "real gains are taxed but *only* nominal losses are allowed".

This latter interpretation would only be appropriate if for some reason the indexed slice were left out of an otherwise comprehensively indexed tax base. This is shown in Figure 2 where the balancing adjustments and CGT operate around the indexed depreciated value. Where the asset is sold for more than the indexed depreciated value, the excess is clawed back into assessment, i.e., the indexed depreciated value doubles for the indexed cost base for CGT purposes. Where the asset is sold for less than the indexed depreciated value, extra deductions are allowed but, with the inflationary slice removed, deductions would only be allowed for the amount that the sale price is less than the unindexed depreciated value.

The inflationary slice left out of the tax base in Figure 2 is applicable to the case of an otherwise fully indexed system (including only real interest in the base) but not to an unindexed system like ours. In practical terms, for example, depreciable assets generally reduce in value even under inflationary conditions. The indexed depreciated value in Figure 2 — deriving from, say, annual straight line depreciation allowances from the accelerated 5/3 system — could happen to correspond to the sale price of such an asset held for some time under inflationary conditions.

FIGURE 2

Indexed system



The unindexed depreciated value is the asset's historical cost less the sum of the previously allowed 5/3 depreciation deductions. If, under our unindexed income tax system, the asset were sold for an amount equal to the indexed depreciated value, the exclusion of the indexed slice of Figure 2 would mean that there would be no claw back of the excess deductions allowed, even though the full nominal interest payments on funds borrowed to acquire the asset would be deductible.

In summary, the method of determination for depreciable assets of the indexed CGT cost base and the balancing adjustments on disposal shows that the effect of the CGT is to include the real component of nominal capital gains in our essentially nominal (or unindexed) income tax base. The exclusion of the inflationary component is a concessional exemption against the benchmark of a full nominal income tax base. Continuing to exclude indexing from the determination of the depreciated value for balancing adjustment purposes and continuing to index the historical cost forward to determine the indexed cost base for CGT purposes mean that *the CGT does not represent a move towards an indexed system, but rather a partial inclusion of nominal gains previously excluded from our unindexed tax system.*

As mentioned earlier, against the benchmark of a full nominal income tax base and the associated allowance of nominal economic depreciation, historical cost depreciation also represents concessional treatment. 5/3 depreciation is even more generous under inflationary conditions than reducing-balance historical-cost depreciation (on the basis of the assumption — which is an empirical question — that the actual rate of decay of depreciable assets is not greater than the effective-life reducing balance rate, which in turn is less than the 5/3 rate of write-off). Figure 3 illustrates this situation where, in terms of handling inflation in a full nominal system, 5/3 depreciation is even further from ideal economic depreciation (as per equation (1) and Table 1) than the effective-life depreciation system that remains in the law as an optional alternative to 5/3 depreciation. The question arises whether there is an economic role for 5/3 depreciation, particularly in the absence of any immediate move towards a fully indexed system.

4. ALTERNATIVE ACCELERATED DEPRECIATION ARRANGEMENTS TO 5/3 DEPRECIATION

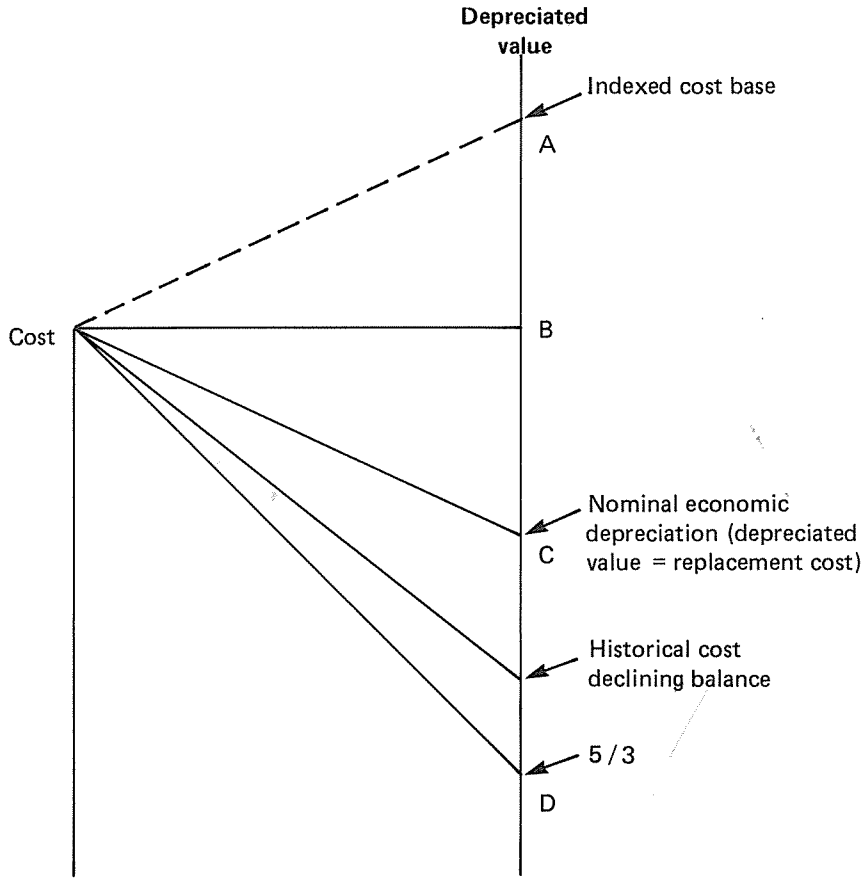
5/3 depreciation has never been presented by governments as an offset for the effect of inflation on historical cost depreciation allowances. When it was announced back in 1982 many reasons were given in support of it, to stimulate investment activity, to bolster international competitiveness, etc., but no reference at all was made to inflation. It has only been since then that some economics writers have presented 5/3 as an, admittedly very rough, offset to the effects of inflation. It is, however, only in a fully indexed system, with real interest in the tax base, that accelerated historical cost depreciation — presumably as a rough surrogate for indexed effective-life or (real) replacement cost depreciation — can offset the effect of inflation. A feel for this can be obtained from Figure 3 by comparing indexed depreciation allowances represented by distance AC in the figure and 5/3 allowances given by distance BD. With the fixed 5-year or 3-year straight line allowances under 5/3, nevertheless, at a specific level of inflation, the adjustment can only be correct for depreciable assets with a specific rate of decay. Relative biases between assets with different lives would be unavoidable — as they are with 5/3 in our unindexed income tax system.

In our current system, the stimulation of investment activity through accelerated depreciation for plant and equipment would be better attempted using accelerated write-off arrangements which minimise distortions between different

equipment types. One common way of comparing different write-off regimes in this regard is by comparing marginal effective tax rates applying under each regime to investments in plant of varying durability.

FIGURE 3

Comparison of depreciation systems



Marginal effective tax rate analysis

The (marginal) effective tax rate for a particular investment is usually defined on the basis of a comparison of its before-tax and after-tax return, such that:

$$\text{effective tax rate} = \frac{\text{before-tax return minus after-tax return}}{\text{before-tax return}} \qquad (3)$$

Effective tax rates may be calculated in a partial equilibrium framework whereby

by the before-tax return is fixed regardless of the tax regime under study. Alternatively, the calculation could be done on the basis of the before-tax return required to achieve a given after-tax return. This has more of the flavour of a general equilibrium analysis capturing the equalisation of after-tax returns (with the same risks involved) regardless of the tax arrangements in place. In this case, the more generous the tax treatment the lower is the before-tax return required to achieve a given after-tax return and the lower is the effective rate.

The before and after-tax returns in the effective tax rate calculation could be expressed either on a nominal or real basis, causing the effective tax rate measure to be in nominal or real terms respectively. In either case, when the before-tax return is reduced by tax in proportion to the statutory tax rate the effective tax rate will equal that statutory rate.

In the case of the interest from financial investments, when full nominal interest is taxed, the nominal effective rate will equal the statutory rate because the before-tax return is reduced in proportion to that statutory rate (assuming the interest rate is not affected by the tax). Similarly, when nominal economic depreciation of durable assets is allowed, nominal income taxation will reduce the before-tax return of marginal, minimal risk investments (i.e., investments with a nominal before-tax return equal to the going interest rate) in those assets in proportion to the statutory tax rate (Mayo, 1984; p. 36).[2] If, however, nominal income taxation incorporating economic depreciation applies but the effective tax rate is computed using the going real after-tax interest rate as the benchmark return required, the real effective tax rate for investments in both financial and durable assets will be higher than the (single) tax rate by the same amount.[3]

An alternative and simple way of calculating effective tax rates for a particular investment in depreciable plant — paralleling the above partial equilibrium approach which assumes a fixed before-tax return for each investment[4] is to determine the present value (with discounting at the after-tax interest rate) of actual tax payments under the relevant depreciation regime as a proportion of the present value (PV) of taxable income were economic depreciation allowed. In terms of establishing the relative distortions between different plant items (or between plant and non-plant investments), it does not matter whether nominal or real economic depreciation — with nominal or real interest in the base respectively — is used as the benchmark for effective tax rate determination.

Given that our system is essentially nominal with nominal interest included in the base, however, it would seem logical to use nominal economic depreciation as the benchmark. An effective tax rate equal to the statutory tax rate would then arise if the PV of the depreciation allowances of the regime under study equalled the PV of the annual nominal economic depreciation (in all of this it is assumed that the tax value of available deductions is realised immediately). Using real, rather than nominal, economic depreciation as the benchmark will, as discussed above, simply lift the effective tax rates overall depending on the level of inflation. In illustrating inter-plant distortions and more broad-based distortions between plant investments and other investments such as in financial assets, the absolute level of the effective tax rates is not important; what is relevant is relativities between the effective tax rates, determined on a consistent basis, of different investments.

Table 2 shows, using a 5 per cent level of inflation and depreciable assets with effective lives from 3 to 20 years, that *regardless of whether nominal or real effective rates are used for comparative purposes, 5/3 depreciation causes a large spread of effective rates over the different plant lives.* The rates fall considerably the longer the plant lives: from 45.5 per cent to 28 per cent using nominal effective rates. This partial analysis shows the strong biases towards longer-lived invest-

Table 2:—Effective Tax Rates of Investment in Plant with Different Effective Lives Under Different Depreciation Regimes (a)

Effective Asset Life	Nominal Economic Depreciation (b) (%)	Historical Cost Declining (c) (%)	5/3 Depreciation (d) (%)	Indexed Declining Balance (e) (%)	60% Loading (f) (%)
Nominal Effective Tax Rates (g)					
3	46	44.8	45.5	30.7	36.8
4	46	44.3	39.8	30.7	36.8
6	46	43.2	39.5 (h)	30.7	36.3
8	46	42.3	35.5	30.7	36.1
10	46	41.4	32.9	30.7	35.7
15	46	39.8	29.7	30.7	35.2
20	46	38.6	28.0	30.7	34.7
Real Effective Tax Rates (i)					
3	69	67.2	68.3	46	55.2
4	69	66.5	59.7	46	54.9
6	69	64.8	59.2	46	54.4
8	69	63.5	53.3	46	54.2
10	69	62.1	49.4	46	53.6
15	69	59.7	44.6	46	52.8
20	69	57.9	42.0	46	52.1

(a) 5 per cent inflation, 15 per cent before tax interest rate and a 46 per cent tax rate are assumed.

(b) With economic depreciation, the nominal effective tax rate equals the statutory 46 per cent rate for each item of plant. Expressed in terms of real effective tax rates the rate is 69 per cent for each class of plant, the same as the real effective tax rate of returns from the financial market.

(c) The nominal and corresponding real effective tax rate falls somewhat the longer the life of the plant reflecting the fact that with inflation historical cost declining balance allowances are more generous (in a present value sense) than nominal economic depreciation.

(d) The effective rates (either nominal or real) fall considerably the longer the life of plant.

(e) The nominal effective rate is constant for all plant lives but at 30.7 per cent is much lower than the 46 per cent nominal return from the financial market. The real effective tax rate is 46 per cent for all plant, but again well below the corresponding 69 per cent rate for returns from the financial market.

(f) The 60 per cent loading lifts the nominal 30.7 per cent effective rate for indexed depreciation towards the 46 per cent level keeping the rate quite consistent across different plant lives. For a given level of inflation, a particular level of loading can broadly provide a specified effective rate for all plant. In contrast 5/3 depreciation could only provide the required rate, at the given level of inflation, for plant of one particular rate of decay.

(g) The present value (PV), with discounting at the after-tax interest rate, of actual tax payments under each depreciation regime as a proportion of the taxable income were nominal economic depreciation allowed. For each asset life a marginal asset is used, i.e. where the PV (with discounting at the before-tax interest rate) of the net receipts stream — which is declining proportionally before inflation at the rate s determined according to the asset's effective life as explained in footnote (c) to Table 3 — is equal to the $1000 cost of the asset. With inflation at the rate i the net receipts stream (and economic depreciation) is declining at the rate $s(1 + i) - i$ as explained in footnote (b) of Table 1. The PV of the depreciation allowances of each asset is given in Table 3. (For PV calculations, the PV of a stream of numbers obtaining at the end of each year with discounting to the start of year 1 is given by $N/(d+r)$, where N is the number at the end of year 1, d is the constant annual rate of decline and r is the discount rate.)

(h) Plant with a 6-year effective life just misses out on the 33 1/3 per cent rate under 5/3.

(i) The PV of tax paid under each depreciation regime as a proportion of taxable income were real economic (or indexed effective-life) depreciation allowed.

ments in the 5/3 depreciation arrangements.[5] (As explained, the fact that Table 2 shows that a real effective rate equal to the statutory 46 per cent would apply with 5/3 depreciation under 5 per cent inflation to an asset with an effective life between 10 and 15 years is meaningless in terms of resource allocation implications.)

The partial equilibrium determination of effective tax rates in Table 2 shows the initial direction of distortions imposed by different depreciation arrangements without necessarily illustrating the final relativities in a general equilibrium context. Equity financing is implicitly assumed, so that the figuring does not include the effects of debt financing which would exacerbate the distortive influences illustrated in Table 2.

The effect of debt financing can, however, be inferred from Table 2. The nominal effective tax rate applying to debt funding is 46 per cent, which corresponds to the nominal effective tax rate applying to plant of different effective lives with nominal economic depreciation allowed for tax purposes (column 2, Table 2). That means that the effective tax rate for plant items of varying durabilities is independent of the debt-equity ratio when economic depreciation is allowed. In other words, the before and after-tax returns from the marginal plant investments are the same as the before and after-tax costs of debt funding. There is no tax bias towards debt. However, under 5/3 depreciation, for example, the effective tax rate for equity-financed plant with a 20-year effective life is only 28 per cent reflecting an after-tax return to the marginal equity investment greater than the after-tax cost of borrowed funds. It would pay the investor to increase the level of debt funding thus further reducing the effective tax rate on the plant investment or, equivalently, further increasing the return on equity funds.

Looked at another way, at the margin the return of a minimal-risk equity investment in plant just covers the opportunity cost of tying funds up in it (i.e., the going before-tax interest rate) plus the nominal economic depreciation of the plant. If nominal economic depreciation is allowed for tax purposes, the taxable return from equity corresponds to the going interest rate. In these circumstances, debt funding with its deductibility of nominal interest can only result in the explicit after-tax cost of debt substituting for the same after-tax opportunity cost of equity funding. There is no tax bias imposed on the plant investment by debt funding (or the deductibility of nominal interest).

However, the more generous, in PV terms, are depreciation allowances compared to nominal economic depreciation, the further the taxable return from equity investments (marginal before tax) is above the going interest rate. Thus, debt funding can take advantage of this bias, exacerbating the distorting effects of accelerated depreciation on investment-decision making. This exacerbation is illustrated in Table 4 which re-works the effective tax rates of the plant investments in Table 2 on the basis of 80 per cent debt funding with nominal interest deductibility allowed. A comparison of Table 4 with Table 2 shows the invariance of the effective rates to changing ratios of debt to equity when nominal economic depreciation is allowed for tax purposes and also shows the bias towards debt funding imposed by accelerated depreciation.

With 5/3 depreciation, for example, the spread of nominal effective rates from 45.5 per cent to 28 per cent for the range of plant durabilities under equity financing has widened to a spread from 43.3 per cent to −43.9 per cent in Table 4 with 80 per cent debt funding. Table 4 also highlights the inappropriateness of allowing indexed declining balance depreciation (or real economic depreciation) when nominal interest is incorporated in the income tax base. In contrast to the stability of effective rates with debt funding when nominal economic depreciation is allowed, 80 per cent debt funding has reduced the nominal and real effective tax

Table 3:—Present Value of Depreciation Allowances ($ per $1000 of investment) (a)

Effective Asset Life	Nominal Economic Depreciation (b)	Historical Cost Declining (c)	5/3 Depreciation	Indexed Declining Balance (d)	60% Loading (e)
3	854	861	857	944	908
4	809	822	857	927	881
6	724	755	796	894	832
8	645	698	796 (f)	864	787 (f)
10	570	649	796	836	748
15	404	552	796	772	664
20	262	481	796	718	597

(a) 5 per cent inflation (i), 15 per cent before tax interest rate and 46 per cent tax rate are assumed. Each asset is held indefinitely. The discount rate for present value determination is the after tax interest rate,r (=0.15(1 − 0.46) = 0.081).

(b) $PV = \$(s(1 + i) - i)/(r - i + s(1 + i)) \times 1000$ where s is the declining balance rate as determined in footnote (c). The formula is derived from an infinite series of depreciation deductions based on equation (1).

(c) Declining balance rate given by 1.5/N, where N is the effective life of the asset. With no inflation, this rate corresponds to the annual rate of reduction of the assets' values. $PV = \$s/(r + s) \times 1000$.

(d) $PV = \$s(1 + i)/(r - i + s(1 + i)) \times 1000$. Derived from an infinite stream of depreciation deductions based on equation (2).

(e) Declining balance allowance based on 1.6 times the corresponding effective-life rate.

(f) The slightly lower PV for the 60 per cent loading compared to 5/3 is due to the use under the 60 per cent loading of declining balance depreciation (at the 30 per cent rate), which continues indefinitely here because the plant is held indefinitely, rather than the alternative straight line depreciation (at the 20 per cent rate which would correspond exactly with the 5/3 write-off).

rates for all plant durabilities to −30.7 per cent and −46 per cent respectively with indexed declining balance depreciation allowed. Only if real interest was actually incorporated in the tax base — remembering that all the effective tax rate calculations of Table 4 are worked on the basis of nominal interest being incorporated in the tax base — would the real effective tax rates of (all) the plant investments remain at the statutory 46 per cent rate regardless of the debt to equity ratio when indexed declining balance depreciation was allowed.

Some argue, on this basis, that distortions created by the allowance of deductibility of nominal interest payments in conjunction with accelerated depreciation can be offset by ensuring that only the real component of interest payments is deductible for borrowings used to fund investments which attract accelerated depreciation. Table 2 illustrates the futility of that. If, for example, within an otherwise unindexed system, indexed declining balance depreciation applied and if — problems of the fungibility of debt aside — practicable arrangements could be devised to ensure that for those plant investments attracting the indexed depreciation only real interest deductions were allowed, the real effective tax rate would be 46 per cent, as illustrated in column 5 of Table 2, regardless of the level of debt funding used. Nevertheless, despite these adjustments in relation to the plant investments, the real effective tax rate on returns from the financial market would still be 69 per cent. Major distortions between plant and non-plant investments

Table 4:—Marginal Effective Tax Rates of a Range of Plant Investments Financed by 80 per cent debt (a)

Effective Asset Life	Nominal Economic Depreciation (b)	Historical Cost Declining Balance	5/3 Depreciation (c)	Indexed Declining Balance (d)	60% Loading
Nominal Effective Tax Rates					
3	46	40.7	43.3	−30.7	0.2
4	46	37.5	14.6	−30.7	−0.7
6	46	31.9	13.4	−30.7	−2.4
8	46	27.2	−7.1	−30.7	−3.9
10	46	23.2	−19.4	−30.7	−5.3
15	46	15.1	−35.8	−30.7	−8.1
20	46	9.2	−43.9	−30.7	−10.4
Real Effective Tax Rates					
3	69	61.0	64.9	−46	0.3
4	69	56.2	21.9	−46	−1.1
6	69	47.9	20.1	−46	−3.6
8	69	40.8	−10.6	−46	−5.9
10	69	34.7	−29.1	−46	−7.9
15	69	22.7	−53.7	−46	−12.2
20	69	13.8	−65.9	−46	−15.6

(a) The real and nominal effective tax rates are calculated as in Table 1 but taking into account the effect of deductibility of nominal interest payments on the tax payable under each depreciation regime and the effect of interest deductibility on the tax base of the benchmark nominal and real systems. The interest payments are determined on the basis of annual debt funding — at the going 15 per cent per annum interest rate — covering 80 per cent of the market (or replacement) value of each asset at the start of each year.

(b) The effective tax rates under economic depreciation are independent of the debt to equity ratio. That is because the annual net receipts from each marginal investment underlying these rate calculations just cover the opportunity cost of tying funds up in it (i.e. the going interest rate) plus the change in value of the asset (i.e. economic depreciation). With nominal economic depreciation allowed the annual tax base with equity funding equals the (deductible) interest that would be payable on an annual loan equal to the value of the asset at the start of the year (i.e. with 100 per cent debt funding). No tax advantage can be obtained from debt funding.

(c) The more generous (in a PV sense) the depreciation allowances are compared to economic depreciation the smaller the annual tax base from the capital investment funded by equity and the greater the tax advantage provided by deductibility of interest paid on debt funding of that capital investment. Thus the increasing tax bias under inflation with increasing asset durability when historical cost declining balance allowances or, particularly, 5/3 depreciation allowances apply is greatly exacerbated by debt funding.

(d) At the 80 per cent funding level, the nominal and real effective tax rates with indexed declining balance depreciation applying just happen to turn from 30.7 per cent and 46 per cent respectively under equity funding to −30.7 and −46 per cent respectively under the debt funding. This just reflects the increasing tax advantage of debt funding for higher debt to equity ratios were indexed depreciation to apply within an otherwise full nominal system. With 50 per cent debt funding, the nominal and real effective rates are 15.3 per cent and 23 per cent respectively. Only if real interest were actually incorporated in the tax base would the real effective tax rates of all the plant investments be 46 per cent regardless of the debt/equity ratio (and 30.7 per cent if for some reason nominal economic depreciation were allowed).

could not be avoided. An apparent haven of real income tax base adjustments may be created for plant, but those adjustments are themselves imposing major distortions within an otherwise unindexed income tax system. Partial indexation cannot be a non-distorting substitute for comprehensive inflation adjustments.

Indexed effective-life depreciation

In contrast to 5/3 depreciation, indexed effective-life depreciation maintains a consistent (nominal or real) effective tax rate across all types of plant although, as shown above, only if every investor uses the same proportion of debt funding. The differential effect of variations in debt funding aside, there would be potential efficiency gains from replacing 5/3 with indexed depreciation in terms of improved decisions on the use of different plant items. Nevertheless, applying indexed depreciation in isolation from comprehensive indexation in this way would push the effective tax rate below that applying to after-tax returns from the financial market and that of trading stock generally, as well as other non-plant items. At the relatively low 5 per cent inflation rate assumed, Table 2 shows the nominal effective tax rate for equity-financed plant under indexed depreciation is 30.7 per cent compared to the 46 per cent applicable to monetary assets and liabilities and to stocks generally (stocks with sufficient rapid turnover are effectively taxed on a full nominal basis). Using real effective rates, the comparison is 46 per cent for plant compared to 69 per cent for monetary items and stocks. Table 4 shows that debt funding exacerbates this divergence between the effective tax rate for plant investments and that for financial investments: the rates applicable to financial investments are not affected, but the effective tax rates for plant investments are reduced by debt funding.

The widespread economic distortions associated with indexed depreciation reflected by these effective tax rate differences — in terms of changed financing decisions and choices between plant and non-plant capital items and between plant and stocks — would, even at quite low inflation rates be expected to swamp the efficiency gains that indexed depreciation could bring to decisions between different plant items. It is for such reasons that indexation of depreciation is inappropriate so long as nominal interest is included in the tax base and should await any move to comprehensive indexation of the tax base — as concluded by many writers, e.g., Swan (1978) and Sieper (1986), and in the inflation adjustments chapter of the Draft White Paper. In the context of a policy requirement to accelerate depreciation deductions, indexed depreciation could provide excessively generous, and therefore distortive, treatment even at low inflation rates and the level of concession would be solely dependent on the rate of inflation (e.g., with no inflation there would, of course, be no concession) coupled with the effect of debt funding.

Loading on effective-life rates

General efficiency gains from replacing 5/3 depreciation may, nevertheless, be achievable while still accepting the policy constraint that some form of accelerated write-off for plant is required.

A loading on effective-life rates (increased above the existing 18 per cent loading, which is already available as an alternative to 5/3) to replace 5/3 depreciation could largely achieve the efficiency gains sought by indexed depreciation in terms of reinstating appropriate relativities between plant of different working lives. In addition, the disadvantages of indexed depreciation introduced in isolation from comprehensive indexation could be ameliorated significantly by appropriate determination of the size of the loading.

Under the 5/3 depreciation arrangements, plant attracts 3-year write-off if the straight line write-off rate based on the effective life of that plant type (plus an 18 per cent loading on that rate) is 20 per cent or more; otherwise 5-year write-off applies. Table 2 shows that, compared to nominal economic depreciation, 5/3 depreciation provides little or no incentive to equity investment in shorter-lived items of plant which would have attracted straight line write-off rates around the 20 per cent and 33 1/3 per cent levels (including the 18 per cent loading) under alternative effective-life arrangements. 5/3 depreciation may not increase the generosity of the depreciation allowances of these shorter-lived items much above that which would apply under a standard effective-life historical cost regime (which, as confirmed by column 3 of Table 2, is itself more generous under inflation than nominal economic depreciation). Similar conclusions apply with debt funding included (Table 4) except that the relative advantage of accelerated depreciation increases more rapidly with increasing durabilities. Those shorter-lived items of plant receiving little from accelerated depreciation would typically be high technology items which can rapidly become obsolescent, such as computer hardware — the area where many argue that investment should be encouraged. On the other hand, longer-lived plant items attract relatively much more assistance under 5/3, particularly when gearing is involved, than the shorter-lived items; regardless of their effective working lives above about 6 years, such plant enjoys 20 per cent write-off. The longer the effective life and therefore the slower the rate of decline in economic value from use of the plant, the more out of kilter with commercial realities is the tax write-off under 5/3.[6] 5/3 depreciation strongly biases decisions away from shorter-lived, high technology plant to long-lived plant.

Under 5/3, therefore, businessmen inevitably make decisions on the use of plant and equipment for their operations more on the basis of the tax breaks available than on the truly productive nature of their plant. 5/3 depreciation could actually weaken their ability to compete on the world scene. It is not the overall rate of write-off or the comparison of our rates with overseas rates which are relevant here. If businesses in Australia are investing in an inappropriate mix of plant because the structure of depreciation does not maintain relative write-off rates which reflect commercial realities, Australia's ability to compete would be expected to be adversely affected.

Tables 2 and 4 illustrate the potential improvements in decision-making that could be obtained by replacing 5/3 with a loading system. The loading can, under inflation, keep the spread of effective tax rates across the range of plant types to a minimum, similar to indexed depreciation. But the loading can be selected such that the effective tax rates for plant are much closer to that of monetary items and stocks, with the variation in effective rates caused by different levels of debt funding also significantly reduced compared to that under indexed depreciation. This reduces the overall distortions of stand-alone indexed depreciation. This is not, of course, to deny the efficiency costs of any generous loading, costs underlined by the low and mostly negative effective tax rates resulting in Table 4 for all plant types with a 60 per cent loading and with 80 per cent debt.

In short, replacing the superficial generosity of 5/3 depreciation with an across-the-board loading on the write-off rates based on the effective working lives of plant could help reinstate the commercial relativities between different types of plant. Much of the shorter-lived, high technology equipment would attract faster write-off; some longer-lived items of plant could attract reduced rates. Decisions based more on tax inducements would be replaced by decisions based more on commercial realities.

5. FUTURE REFORM

The 1985 tax reform package has resulted in large volumes of legislative changes which will take time for business and the legal and accounting professions to digest fully. Nevertheless, with the imminent introduction of a full imputation system of company taxation in Australia — the last major measure in the 1985 reform package to be legislated for — it is appropriate to reflect on the potential for evening up further the business tax landscape at some time in the future. In the process of removing the double layer of tax on company income, full imputation inevitably puts the spotlight on profits which are not taxed at the company end through concessional treatment but which are taxed under current classical and proposed imputation arrangements if distributed as dividends.

In looking at possible future business tax reforms it is worthwhile to do so on the basis of retaining an essentially nominal income tax system. Certainly attaining comprehensive indexing is the ideal to keep in sight, but the practical problems of appropriately handling the indexing of all monetary assets and liabilities are very substantial. Even if the difficulties associated with financial institutions identified in the Draft White Paper (see footnote 1) can be satisfactorily resolved, a threshold question to be faced is whether the inevitable distortions remaining in a practical system of indexing monetary items warrant the change in terms of overall efficiency gains. There is also the question whether taxing imputed interest and allowing imputed deductions on an accruals basis for financial items should be achieved on a more consistent and comprehensive basis before embarking on comprehensive indexation. Meaningful reforms can, however, be considered in the absence of such difficult questions being resolved.

Candidates for possible future reform are the 5/3 depreciation arrangements and the slice of inflationary gains exempt under the CGT. Pure efficiency considerations would suggest the replacement of 5/3 depreciation with nominal replacement cost depreciation (according to equation (1)) as an annual estimate of nominal economic depreciation, as well as the inclusion of inflationary gains in the CGT net.

Consideration of the "heresy" of achieving what would amount to full nominal income taxation is perhaps made more possible by overseas reforms, particularly those in the United States, moving to reduce the generosity of accelerated write-off schemes along with reduced tax rates and even to tax nominal capital gains. Further, an assessment of the potential efficiency gains from moving from current arrangements to a full nominal system must include the scope that such a move would provide for reduced tax rates.

For many years during the last decade or so company tax collected has in aggregate approximated what would have been raised had the statutory tax rate applied to a comprehensive real economic income base (see Treasury, 1987, Figure 10, p. 23). In other words, the *average* real effective tax rate approximated the statutory rate in many years. This broad aggregate outcome is, however, quite fortuitous with major differences between our current tax base and a real income tax base tending to cancel out in aggregate. Underlying the broad balance is a host of distortions in investment decision making, reflected in widely divergent *marginal* effective tax rates. These distortions could be ameliorated considerably by a move to a full nominal tax base and tax rates (both corporate and personal) could be reduced significantly, particularly during periods of high inflation, to yield only that revenue that a comprehensive real income tax system would generate. *Questions regarding the complexity of comprehensive inflation adjustments turn into practical and conceptual considerations of continually moving tax rates with a full nominal system to yield what a real income tax system might produce.*

Despite the very strong efficiency arguments in favour of considering the possibility of comprehensive nominal taxation it is, unfortunately, difficult to imagine achieving a shift from 5/3 depreciation to nominal replacement cost depreciation, which could involve businesses paying tax on the estimated nominal increase in the value of their very durable depreciable equipment during periods of moderately high inflation. More conceivable is a shift from 5/3 to a system incorporating a generous loading on effective-life rates plus full nominal capital gains taxation, in conjunction with a significantly reduced company and top personal tax rate. *Revenue considerations would mean that the size of the tax rate reduction would depend largely on how low the loading on effective rates could be kept.* Appropriate re-vamping of our indirect tax arrangements undertaken in conjunction with these changes could, however, also help to provide significant and sustainable income tax rate reductions.

A move to a full nominal CGT also has important implications for future efficiency-based extension of the proposed full imputation arrangements. The proposed qualifying dividends approach to full imputation is but two steps short of what would amount to optional full integration.[7] The first is to allow profits freed from tax at the company level to flow through to shareholders without attracting Australian tax. The second is to allow refunds to Australian resident shareholders of excess imputation credits. While these changes would not formally tax retained income at shareholders' marginal tax rates, post-1 July 1987 bonus issues are to be treated for tax purposes as a dividend distribution and immediate capital re-injection and, therefore, could be used by companies to achieve effectively optional full integration. In other words, bonus issues out of company profits either taxed or untaxed at the company end would enable the company to retain the after-tax profits for re-investment while providing to the resident shareholders the benefits of distribution, including imputation credits (effectively resulting in the capitalised income being taxed at shareholders' rates).[8]

This treatment of bonus issues is also particularly relevant to the impact that the CGT has on the taxing of profits retained by companies. Capital gains arising from retained profits are subject to CGT (if the shares were acquired post-19 September 1985). Even though there is a balancing capital loss realised when these retentions are ultimately distributed, bonus issues can be used to get more immediate relief from the temporary double taxation of retained income. Bonus issues can, as discussed above, be used to turn effectively the retained profits into a capital re-investment with the CGT cost base adjusted up accordingly so that no CGT would apply to the amount of the bonus issue when the shares are sold.

The above two steps towards optional full integration are simple conceptually but involve significant practical considerations. The second of these — international implications aside — would, for example, ideally require that a comprehensive, non-prospective full nominal CGT be operative. As discussed by Benge and Robinson (1986, p. 113), in the absence of a comprehensive nominal CGT, at the extreme all shares would end up in the hands of tax-exempt shareholders on dividend day and all company tax revenue would evaporate. *A full nominal CGT would, therefore, seem to be a pre-requisite within our unindexed tax system for opening up the possibility for continuing improvements in company and shareholder taxation.*

6. CONCLUSION

The indexing arrangements of our CGT amount to a concessional exemption for the inflationary component of capital gains from an otherwise unindexed tax base.

The effect is to leave an inflationary slice of income out of an unindexed tax base, rather than necessarily to pave the way for comprehensive indexation of the tax base.

It is impossible for 5/3 depreciation to adjust appropriately for inflation — even for investments in particular depreciable assets — in the absence of comprehensive indexation involving the inclusion of only real interest in the tax base. Comprehensive inflation adjustments are unlikely to be achievable in the medium term. It is appropriate, therefore, to contemplate future possible changes to business tax arrangements that could improve the efficiency of these arrangements, in the absence of comprehensive indexation.

As reflected in widely divergent marginal effective tax rates, 5/3 depreciation imposes major distortions on inter-plant, as well as plant versus non-plant, investment decisions; distortions which both encourage, and are exacerbated by, debt funding of investments. These distortions could largely be removed by replacing 5/3 depreciation by nominal replacement cost depreciation (as an estimate of annual nominal economic depreciation). Such a change would be unlikely in practice as it could involve businesses paying tax on the estimated annual nominal increase in the value of their very durable depreciable equipment during periods of moderately high inflation.

Nevertheless, even under the constraint that concessional treatment be provided for investment in plant and equipment, efficiency gains in terms of more balanced decisions regarding the use of plant items of different durabilities could be achievable by replacing the 5/3 system with a loading on effective-life depreciation rates. Commercial decision-making could, in principle, be further improved by removing the indexing concession from the CGT. Such a change, in practice, could only be considered in conjunction with a significant reduction in the company and top personal tax rate (paid for by the replacement of 5/3 and a possible revamping of indirect tax arrangements).

The result would be a more balanced treatment of business incomes, fitting well within the international scene and providing the basis for extending even further the major reform proposed for company and shareholder taxation to take that reform further towards full integration. The full imputation proposal, in fact, reflecting as it does the lengths policy-makers in this country are prepared to go to even up the business tax landscape, augurs well for future business tax reform.

Footnotes

* Department of the Treasury, Canberra. The views expressed are not necessarily those of the Treasury or the Government. The chapter benefited from comments made at the Monash conference, particularly by John Bossons and Charles McLure.

1. Appendix 18-A of the Draft White Paper aims at presenting a blueprint for the comprehensive indexation of durable assets, stocks and monetary assets and liabilities. The practical difficulty of excluding "financial institutions" from the "rule-of-thumb" exclusion method presented for the indexing of monetary items was the main reason for the Government's conclusion on page 208 of the Draft White Paper that, "Such a comprehensive approach involves a large number of difficult practical questions. The Government, nevertheless, considers that future implementation of comprehensive real income taxation may be possible" and on page 237 that, "detailed study of the issues involved, particularly the practical difficulties associated with adjustments to monetary items, is warranted." It is notable that the Government did not include revenue considerations as a reason against such further study. Paragraph 18A.27 of the Draft White Paper discusses alternative ways of treating financial institutions under comprehensive indexation, but the basic problem remains of restricting alternative arrangements to "financial institutions" and to financing operations of taxpayers generally.

2. For an extension of the neutrality properties of economic depreciation beyond the minimal-risk investments implied here to risky investments see Mayo (1984, p. 42).

3. With comprehensive nominal income taxation, the real after tax return, r^*, is given by:

$$r^* = r_b(1 - t) - i$$

where r_b = before tax (and after inflation at the rate i) return, and
t = tax rate.

Therefore, the real effective tax rate, e^*, is:

$$e^* = \frac{r_b^* - r^*}{r_b^*}$$

$$= \frac{r_b - i - [r_b(1 - t) - i]}{r_b - i}$$

$$= \frac{tr_b}{r_b - i}$$

In other words, for investments marginal before tax (i.e. with a nominal return of r_b) which after nominal income taxation have a return of $r_b(1 - t)$, the real effective tax rate is uniformly higher than the tax rate by a factor of $r_b/(r_b - i)$.

Only if real income tax applies (with real economic depreciation attracted by durable assets) such that

$$r^* = r_b - (r_b - i)t - i$$
$$= (r_b - i)(1 - t)$$

does the real effective tax rate for each investment equal t. In this case, if depreciation attracted by durable assets is less generous in PV terms than real economic (or indexed effective-life) depreciation, the real effective tax rate of the durable asset investment is greater than t.

4. Under this simple PV approach to effective tax rate calculation the effective tax rates are generally only the same (for each investment) as those calculated using rates of return according to equation (3) (with the partial equilibrium approach) when economic depreciation is allowed for tax purposes. What is relevant, however, is the dispersion of effective tax rates under each depreciation system not the absolute size of the effective tax rates for a particular investment.

5. Auerbach (1979) and Abel (1981) analyse the effect of an increase in the rate of inflation on the durability of capital using a general equilibrium model. Abel concludes that the effect of inflation leading to an increase in the durability of capital can be reversed if the ratio of the nominal discount rate to the rate of asset decay is less than a "critical factor" dependent on the rate of taxation.

6. Again the assumption is that the actual rate of plant decay is not greater than the scheduled rate of write-off determined by the Commissioner under the effective-life system (see footnote (c) Table 3). Inflation will then always put a gap between the tax write-off and the actual nominal decline in value as per equation (1), and the gap will be exacerbated by 5/3 for longer-lived plant especially. This assumption is supported by the fact that where it can be established that an item of plant has a shorter life than is reflected in the relevant scheduled rate, a higher rate may be allowed. Further, gradual and persistent technological change will be reflected in the relevant scheduled rate. Under the balancing adjustment provisions also, where an item is scrapped prematurely its depreciated value may be claimed in the year of disposal.

7. Replacing the originally announced compensatory tax approach to full imputation with the qualifying dividends approach (where imputation credits attach to dividends only to the extent that company tax has been paid on the income underlying the dividend) does not pose any significant problems whereby tax-preferred income passing through the company chain is assessed at a lower rate than the rate at which associated expenses — particularly interest expenses — are deducted. In contrast to the classical system (see Mayo, 1987), the worst assessability/deductibility mismatch possible under imputation when tax-preferred income is involved (and when a rebate of tax is given on gross dividends passing through the corporate chain and not on dividends net of associated expenses) would be that interest on borrowings by companies attracts deductibility at the company rate while the gross dividend income is taxed at the shareholder's rate (or attracts dividend withholding tax). Moreover, as shown by Mayo (1987) the qualifying dividends approach ensures that with full distribution to resident shareholders, deductibility of the expenses associated with the dividends also applies at the individual shareholder's rate.

8. The importance of bonus issues in this regard is discussed in Bossons (1988).

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