Capital gains, negative gearing and effective tax rates on income from rented houses in Australia

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Abstract

This paper reports estimates of effective tax rates on rental property income in Australia. We consider three capital gains tax regimes – the current Australian system, that which prevailed between 1985 and 1999 and a realisation tax that attempts to mimic an accruals tax. We report estimates for each regime in two scenarios—slow anticipated real capital gains and very rapid unanticipated real capital gains. Our results suggest that negative gearing should be retained and capital gains taxation reformed to approximate an accruals tax. We argue that this desirable package would be no harder to administer than the current regime.

Keywords: capital gains tax, interest deductibility, accruals, realizations, Australian tax system.

JEL Code: H24

I. Introduction

This paper estimates the effective rates of tax on real income from assets such as rented houses under the present system of taxing capital gains in Australia, and under the system that operated between 1985 and 1999. We also estimate the rates that would apply under a means of approximating a real capital gains tax on accruals inspired by Vickrey's (1939) proposal for implementing averaging in an income tax system. All these effective rates are calculated for the case in which negative gearing (NG) is allowed and for the case in which it is denied. NG is the practice of allowing landlords who have borrowed to buy rented houses to deduct from their other taxable income the excess, if any, of the resulting interest payments over the rent, net of other expenses, from these investments.

In our view, the appropriate way to reform the Australian income tax system is to move it further towards a system of taxing real income, rather than nominal income, while at the same time continuing to allow NG. Those who view NG as a tax loophole, appear to neglect the fact that, on the one hand, the amount of income generated by an asset such as a rented house is independent of how its ownership is financed while, on the other hand, the amount of tax collected will be an increasing function of the gearing ratio—the ratio of the owner's loan to the value of the house—if tax is collected from the lender on the interest paid by the owner, but not allowed as a deduction from the owner's taxable income from the house. To deny NG would be to impose a cascading tax on using financial intermediation to allow an efficient sharing of property ownership among wealth holders (Fane and Richardson, 2004).

Our recommendation that the tax system be moved towards a tax on real income can be justified as follows. If real income and nominal income are correctly measured, the ratio of the expected real income from any asset to its expected nominal

income is the ratio of the real interest rate to the nominal interest rate and is therefore the same for all assets, risk considerations aside. In principle, therefore, it would not much matter if the basis of the income tax were nominal income, rather than real income, provided that all tax rates were set accordingly and adjusted by the appropriate amount whenever inflation changed. In practice, it is obviously simpler to tax real income and not to have to change tax rates whenever expected inflation changes.

Henceforth, we use the term 'ideal income tax' to mean a tax on real income and in comparing two systems of taxing capital gains that are equally costly to administer, we argue that the better system is the one that more closely approximates a tax on real capital gains on accrual.

Since an accruals based capital gains tax (CGT) would be very costly to administer, capital gains are invariably taxed on realization, when the asset's value can be observed, because it has been sold. The problem with this is that, "when the liability for tax is based simply on the algebraic difference between the sale and purchase prices of the asset, the taxpayer benefits from deferral of the tax (he in effect receives an interest-free loan from the government equal to the deferred tax.)" (Sieper, 1986 p.299.)

The implicit provision to taxpayers of an interest free loan between the accrual of capital gains and their realization creates two inefficiencies. First, it provides an incentive to over-invest in assets with long maturities and a high proportion of capital gains to total income. Second, once an investment has been made, taxation on realization, rather than on accrual, creates a 'lock-in' effect, since selling an asset on which taxable gains have accrued results in the taxpayer terminating the implicit

interest free loan from the government. The effect of the lock-in is to make the CGT into "a transactional tax on the disposal of assets, analogous to a stamp duty."[1]

Between 1985 and 1999, real capital gains in Australia were added to other income and taxed at the full income tax rates applied to other sources of income. However, following the recommendations of the Ralph Committee, the base of the CGT was changed in 1999 to half of nominal gains, still on realization.[2] In justifying this reform, the Ralph Committee[3] noted the lock-in effect of CGT on realization and stressed that its proposed reform would lower effective marginal tax rates on capital gains by reducing the taxable base to 50 per cent of realised gains (see Section 18 of the report).

There is some discussion in the Ralph Report of perceived problems with indexation[4] but its main focus is simply on justifying a reduction in CGT with little rationale given for the method by which such a reduction should be delivered. One of the Report's preliminary discussion documents notes that while international treatment of CGT varies widely it is generally more favourable to taxpayers than it was in Australia at the time.[5] Some OECD countries (e.g. Austria, Korea, New Zealand and Switzerland) do not tax capital gains either separately or as normal income. Others (e.g. the UK and US) have separate CGTs at concessionary rates and still others (e.g. France, Japan and Luxembourg) tax realized capital gains on the same basis as income from other sources.[6] In any case, as the Ralph Report acknowledged, "[t]he fact that other countries have made the judgment that their national interest is

[1] New Zealand Treasury (2001b), ¶2.28.
[2] A number of other reforms were also introduced including the abolition of averaging for capital gains.
[3] See section 16 of Department of the Treasury (1999b).
[4] In brief, the Review felt that indexation of capital gains sat awkwardly with the non-indexation of other forms of income and so led to unnecessary complication in the business tax code. See Section 12 of Department of the Treasury, 1999b.
[5] See also Department of the Treasury (1999c).
[6] See Department of the Treasury (1999c), Table 4.5 and Tax Review 2001 - Final Report, ¶2.23.

best served by taxing capital gains more lightly than other income is not necessarily a conclusive argument that Australia should follow the same path." (Department of the Treasury, 1999a, Section 11 ¶11.5 p.284).

The Ralph reform certainly lowers the rate of CGT on assets whose prices have risen rapidly relative to inflation, but it actually raises the rate of tax on an asset whose price has risen by less than twice the rate of inflation. The estimates that we report below confirm that by giving tax concessions that are larger, the larger the real gain on the asset, the Ralph reform tends to exacerbate the growth in asset values associated with any given increase in the growth, or level, of earnings. Since the converse also holds when earnings fall, the overall effect of the reform is to magnify the fluctuations in asset values associated with any given fluctuation in earnings.

A much more promising way of reducing the lock-in effect of taxing capital gains on realization is by attempting to approximate an accruals-based tax: what we refer to as an accruals approximation proposal (AA henceforth). Relative to taxing real gains on accrual, this proposal not only reduces the lock-in effect, but has two additional benefits; it reduces the incentive to over-invest in assets with long maturities that are expected to yield large real gains and it reduces the fluctuations in asset values associated with any given fluctuation in earnings. Under this approach, the owner of an asset is deemed to incur CGT liabilities on real gains as they accrue, but allowed to postpone paying CGT until realization. However, in contrast to the present situation, under this system the owner would be deemed to incur interest on these unpaid CGT liabilities as they accumulate.

The "approximation" part of the AA proposal is that it is assumed that the nominal interest rate and the owner's marginal tax rate do not change and that the CPI and the value of the asset grow at constant exponential rates throughout the period for

which the asset was held. This proposal was modelled explicitly by Green and Sheshinski (1978) who suggest it has roots in earlier work by William Vickrey and Martin David, and it is also discussed by Sieper (1986, p.299) who, in turn, cites Meade et al (1978).

It should be stressed at the outset that this paper does not model housing tenure choice, so we do not comment on the consequences of NG and CGT regimes for the relative supply and demand for rental housing versus owner-occupancy. While this has been an important issue in the policy debate surrounding NG and CGT, in our view its settlement depends entirely on the consequences of policy for effective tax rates. Accordingly, in the remainder of this paper we report on estimates of the effective rates of tax on the real income generated by an asset such as a rented house under three alternative CGT regimes—post-1999, 1985–99 and the AA proposal. We do this under two alternative scenarios about the rate of capital gains on houses and for the cases in which negative gearing is allowed and when it is denied. The underlying model is set out in section II, the results are in section III and section IV provides a summary.

II. The measurement of effective tax rates

Under any tax system in which interest is taxed on a nominal basis and capital gains tax is paid only when assets are sold, the present value (PV) at the beginning of year 0 of the pure profit, or super-normal return, Π, to an investment in an asset bought for V_0 at the beginning of year 0 and held for T years before being sold for V_T at the beginning of year T can be written as:[7]

[7] Our conventions on discrete time notation are as follows: each year begins on 1st January and ends on 31st December. We ignore the discount factor between 31st December, year t and 1st January, year t+1. The value of the asset in year t is its value on 1st January, year t. Year t net cash flows, taxes and

$$\Pi = -(1-\alpha)V_0 + \sum_{t=0}^{T-1} \frac{[C_t - i\alpha V_0][1-\beta_t\tau]}{[1+i(1-\tau)]^{t+1}} + \frac{V_T - \alpha V_0 - \gamma\tau(V_T - \lambda V_0)}{[1+i(1-\tau)]^T} \quad (1)$$

Here α is the share of the initial value of the asset financed by borrowing; C_t is the 'net cash flow'—that is, before deducting tax or interest, but net of other expenses—received at the end of year t; i is the pre-tax nominal interest rate; and τ is the investor's marginal rate of income tax. The parameter β_t is used to model the rules on NG. If NG is allowed, β_t is unity in all time periods. If NG is denied, β_t is zero in periods in which the net-of-interest cash flow, $C_t - i\alpha V_0$, is negative. However, even if NG is denied, β_t is unity in periods in which the net-of-interest cash flow is positive; in such periods the issue of whether NG is allowed or denied is not relevant. The parameters γ and λ describe the CGT regime. Under the regime that operated between 1985 and 1999, the base of the CGT was the full real capital gain. That regime can therefore be represented by setting γ equal to unity and λ equal to the ratio of the consumer price index (CPI) in year T to its value in year 0. Under the regime that has operated since 1999, the base of the CGT is half the nominal gain. This regime can therefore be represented by setting γ equal to 0.5 and λ equal to unity.

The first term on the right side of equation 1 is the owner's initial equity outlay; the terms in the summation give the PV of the net cash flows at the end of periods 0 to T–1 inclusive, after deducting tax and interest payments; the final term in equation 1 is the PV of the owner's proceeds from selling the asset, after repaying the loan and paying CGT. It is assumed that the term of the loan is infinite, or at least so long that the nominal amount outstanding remains roughly constant. This assumption could be replaced by assuming a maturity of, say, 30 years. There is of course no

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interest are made on 31st December. The price level is indexed at unity on 1st January, year 0. The annual rate of inflation is assumed to be constant and is denoted π. The price level at the time payments are made in year t, denoted P_t, is therefore $(1+\pi)^{t+1}$.

reason to expect that the maturity of the loan initially negotiated by the owner is equal to the period for which the asset is held before being resold.

Under an exact (discrete time) accruals-based scheme, the CGT liability in dollars for period t, if it were paid at the end of that period, would be $\tau[V_{t+1} - (1+\pi)V_t]$, where π is the rate of inflation of the consumer price index (CPI) and V_t is the value of the asset at the beginning of period t. Under an exactly equivalent scheme, but with payment made when the asset is realized, an owner who had bought it at the beginning of period 0 would have to pay the principal and accrued interest on this period *t* liability, and on the corresponding liabilities for every other period from 0 to *T*–1, inclusive. The interest rate on these nominal liabilities would be the post-tax nominal interest rate, $i(1-\tau)$. The AA scheme approximates the exactly equivalent scheme, as noted, by assuming that the nominal interest rate and the owner's marginal tax rate do not change and that the CPI and the value of the house grow at constant exponential rates throughout the period for which the asset was held. Given these approximations and given the purchase and sale prices of the asset, V_0 and V_T, it can be shown that this scheme is equivalent to setting γ equal to unity and setting λ as:[8]

$$\lambda = (1+\pi)^T . \frac{\rho(1+\hat{g})^T - \hat{g}(1+\rho)^T}{\rho - \hat{g}}, \qquad for\ \rho \neq \hat{g}$$

$$= \frac{V_T}{V_0}\frac{1-\hat{g}}{1+\hat{g}}, \qquad for\ \rho = \hat{g}. \qquad (2)$$

[8] Set $V_0 = 1$. The value of the house at the start of period *t* is assumed to be $(1+g)^t$, where $V_T = (1+g)^T$. The dollar value of the real gain during period *t* is: $V_{t+1} - (1+\pi)V_t$. Liability for CGT on this amount accrues at the end of *t*, but is not paid till the start of *T*. The resulting taxable gain at realization is therefore this amount multiplied by $[1+i(1-\tau)]^{T-1-t}$. By using the equation 3 and 4 definitions of ρ and $\hat{g}$, this amount can be expressed as $[1+i(1-\tau)]^T \frac{\hat{g}}{1+\rho}\left[\frac{1+\hat{g}}{1+\rho}\right]^t$. The total taxable gain at *T* is the sum of all such terms from $t = 0$ to $T-1$. Provided that $\rho \neq \hat{g}$, this sum is $\hat{g}(1+\pi)^T[(1+\rho)^T - (1+\hat{g})^T]/[\rho - \hat{g}]$. Setting this equal to $V_T - \lambda V_0 = (1+g)^T - \lambda$, and solving for λ, gives equation 2 for $\rho \neq \hat{g}$. The case $\rho = \hat{g}$ is analogous, but simpler.

Here $\hat{g}$ is the average annual exponential rate of real capital gain over the whole period and ρ is the post-tax real interest rate:

$$(1+\hat{g})^T = \frac{V_T / V_0}{(1+\pi)^T}. \tag{3}$$

$$1+\rho = \frac{1+i(1-\tau)}{1+\pi}. \tag{4}$$

The PV in period 0 of the tax paid by the lender is given by:

$$W = \sum_{t=0}^{T-1} \frac{\tau i \alpha V_0}{[1+i(1-\tau)]^{t+1}}, \tag{5}$$

and the PV in period 0 of the tax paid by the owner is given by:

$$X = \sum_{t=0}^{T-1} \frac{\beta_t \tau [C_t - i\alpha V_0]}{[1+i(1-\tau)]^{t+1}} + \frac{\gamma\tau(V_T - \lambda V_0)}{[1+i(1-\tau)]^T}. \tag{6}$$

The PV of the pre-tax real income received by the lender over the T periods of the loan is:

$$Y = \sum_{t=0}^{T-1} \frac{(i-\pi)\alpha V_0 / P_t}{[1+\rho]^{t+1}} = \sum_{t=0}^{T-1} \frac{(i-\pi)\alpha V_0}{[1+i(1-\tau)]^{t+1}}, \tag{7}$$

where P_t is the CPI at the end of period t, when payments of rent, interest and taxes are assumed to be made. This index is set at unity at the start of period 0, so that $P_t = (1+\pi)^{t+1}$. The terms in the summation in the second version of equation 7 are the lender's pre-tax nominal interest receipts, minus the reduction between the beginning of periods t–1 and t in the real value of the outstanding loan due to inflation, all multiplied by the net of tax nominal discount factor for period t, which is $1/[1+i(1-\tau)]^{t+1}$.

The PV of the pre-tax real income of the owner is:

$$Z = \sum_{t=0}^{T-1} \frac{c_t - \alpha i V_0 / P_t + [v_{t+1} - v_t] + \pi\alpha V_0 / P_t}{[1+\rho]^{t+1}} = \sum_{t=0}^{T-1} \frac{C_t - \alpha i V_0 + [V_{t+1} - (1+\pi)V_t] + \pi\alpha V_0}{[1+i(1-\tau)]^{t+1}}, \tag{8}$$

where $c_t = C_t/P_t$ is the net cash flow in period t deflated by the CPI at the end of period t and v_t is the value of the asset at the start of period t deflated by the CPI at the start of period t, V_t/P_{t-1}. The terms in the summation in the second version of equation 8 are, respectively, the owner's nominal cash flow minus pre-tax nominal interest payments on the loan, the increase in the real value of the asset, $V_{t+1} - (1+\pi)V_t$, between start and finish of period t, and the reduction in the real value of the owner's outstanding loan between periods t–1 and t due to inflation, all multiplied by the net of tax nominal discount factor for period t.

It is easy to see from equations 7 and 8 that the terms in the gearing ratio, α, cancel out in the formula for $Y+Z$, the PV of the combined pre-tax real income of the owner and lender. This confirms the relatively obvious fact that the income generated by the asset is independent of how its ownership is financed. And, provided that NG is allowed (or redundant) so that β_t is unity for all t, the terms involving α also cancel out in the equation 1 formula for Π and in the formula implied by equations 5 and 6 for total tax payments, $X+W$. However, if NG is denied but not redundant, then, taking the other variables and parameters in the above equations as given, Π will depend negatively on α, and $X+W$ will depend positively on α. This result, which holds whatever the CGT regime may be, confirms that the denial of NG (when it is not redundant) imposes a cascading tax on the income from an asset. The extent to which the tax cascades is directly proportional to the extent to which financial intermediation is used to allow efficient specialization among wealth holders in sharing the ownership of the asset.

The effective tax rates that we present in section III are defined as $(X+W)/(Y+Z)$. All our estimates are based on the assumption that the nominal annual interest rate, i, is 8 per cent, that the annual rate of inflation of the CPI, π, is 2 per

cent, and that the owner and lender both face a marginal tax rate, τ, of 48.5 per cent, which is the highest scheduled Australian tax rate of 47 per cent, plus the Medicare levy of 1.5 per cent. Suppose, initially, that the cash flow grows at a constant exponential rate that is correctly anticipated. Given this, we assume that asset prices grow at the same rate as nominal cash flows. Provided that NG is allowed, as we initially assume, the gearing ratio, α, does not affect either Π or the effective tax rate. However, to estimate the effective tax rate from equations 1 to 8, we need to know the ratio, μ, of the value of the asset relative to the cash flow, in any period. Given this ratio and the arbitrarily chosen initial level of the cash flow, the value of the asset in each subsequent period can be derived. From these values it is therefore possible to derive all the right side variables in equations 1 to 8, inclusive. The value of μ is set to make the average of Π, for the 5 and 10 year holding periods, equal to zero. This value was found by searching. We also searched for the values of μ that made the simple average of Π, for the 5 and 10 year holding periods, equal to zero when NG is not allowed. Table 1 gives the values obtained for these various cases.

[Table 1 about here]

To reconcile the values of μ reported in Table 1 with the substantially lower ratios of house values to market rents that are observed in practice, it is necessary to recall that the denominator of μ is the market rent minus expenses on maintenance, management and rates.

III. Real effective tax rates on rental housing in Australia

In this section, we report estimates of effective tax rates on rented houses that are purchased and then re-sold 5 years later, 10 years later or 20 years later.[9] These estimates are derived from the methodology and definitions set out in section II.

We begin by considering the case in which investors expect nominal rents and house prices to grow at 3 per cent per year and in which their expectations are fulfilled.[10] Since inflation is assumed to be 2 per cent per year, the implied rate of growth of real house prices is 1 per cent per year. This is slightly faster than the average rate of growth of real house prices in Australia in the period 1970–96, which was 0.8 per cent per year.[11]

Because the recent growth of house prices in Australia has been so much faster than 3 per cent per year, we also consider a 'boom' case in which house prices jump by just over 100 per cent in a single year. We model this case by assuming that two years after the house is purchased—that is, at the beginning of period 2—expectations of the growth of nominal rents are revised upwards from 3 per cent per year to 4 per cent per year and at the same time the anticipated path of rents is also revised up by 10 per cent.[12] Over 10 years, the average growth in real house prices in the 'boom' case is 9 per cent per year. This is slightly faster than the 8 per cent per average real

[9] We use 'house' as shorthand for 'house or apartment'.

[10] All simulations were performed using an Excel file that can be downloaded at http://rspas.anu.edu.au/~gfane/ Follow link to 'Tax policy and fiscal decentralization'; then go to Fane and Richardson, Spreadsheet used to derive estimates reported in 'Capital gains, negative gearing and effective tax rates on income from rented houses in Australia' [open].

[11] Section 2.2 of Productivity Commission (2003) cites unpublished Commonwealth Treasury data according to which real house prices in Australia grew at 2.29 per cent per year, on average, over the period 1970–2003 and by 70 per cent, in total, over the period 1996–2003. These estimates imply that real house prices grew on average by 0.84 per cent per year between 1970 and 1996 and by 7.9 per cent per year between 1996 and 2003.

[12] The factor by which rents increase between the two periods is therefore 1.144, which can be derived as 1.10 x 1.04. Under the post-99 CGT regime, the factor by which house prices rise relative to rents is 1.82. This factor can be derived from the first two rows of Table 1 as 53.6/29.4. Combining these two factors gives an overall increase in house prices between the two periods of 108 per cent. In the absence of the boom in rents, house prices would have increased by 3 per cent between periods 1 and 2. Therefore the factor by which house prices jump in period 2, relative to what they would otherwise have been is 2.08/1.03. After allowing for rounding errors, this is an increase of 102 per cent.

growth in house prices in Australia over the period 1996–2003, implied by the estimates in Productivity Commission (2003).

It might be argued that Australia's recent housing boom has been more of a bubble than an appreciation caused by underlying fundamentals (rentals in our model). However, changing the way we model the boom would only affect our results to the extent that it changed the proportions in which the real income from housing comes from capital gains (which receive concessionary taxation treatment) and from net rents (which are taxed at the scheduled rate of 48.5 per cent).

The evolution of rents and house prices under the 'no boom' and 'boom' cases is given in Table 2. The initial level of rents in Table 2 is set so as to make the initial value of the house $400,000.

[Table 2 about here]

Under the 1985–99 CGT regime, the same change in expected and actual rents would cause a jump in house prices, relative to what they would otherwise have been, of only 71 per cent, and under the AA scheme this jump would be only 64 per cent. These estimates can be derived from Table 1. The jumps in house prices under the 1985–99 and AA proposal CGT regimes are smaller than under the post-1999 regime, because the rise in the growth of rents from 3 per cent per year to 4 per cent per year has a smaller proportionate effect on the ratio of house prices to rents under these regimes than under the post-1999 regime. This in turn is due to the fact that the faster the growth in house prices, for any given rate of inflation, the larger is the concession in the post-1999 regime's treatment of capital gains, relative to a system of taxing real gains on accrual. The fact that the post-1999 CGT regime magnifies the effect on house prices of a boom in rents is an important argument in favour of the more neutral

system of taxing capital gains that was in place before 1999. And under the AA scheme, the boom in house prices would be slightly smaller still.

While the rate of growth of house prices in the 'no boom' case that underlies the estimated effective tax rates reported in Table 3 is not consistent with recent experience, the rate of growth assumed in the 'boom' case that underlies Table 4 is so rapid that if it had been anticipated, buying and renting housing would have provided a free lunch to investors. We therefore use the Table 3 results as an indicator of effective tax rates given *expected changes* in house prices, and the Table 4 results to indicate how these tax rates are affected by an *unanticipated boom* in house prices.

For the reasons explained in section II, the income tax does not cascade if NG is allowed, and the effective tax rate is therefore independent of the proportion of the purchase price of the house that the landlord finances by borrowing. However, if NG is denied, the effective tax rate depends crucially on this proportion. Tables 3 and 4 report estimates of the effective tax rates based on the assumption that this proportion is either 40 per cent or 80 per cent.

[Table 3 about here]

Table 3 summarises the results for the 'no boom' case. The first panel shows the proportions of real CGT forgiven under each CGT regime. These results help in explaining the patterns of estimated tax rates reported in the subsequent panels. In all the cases considered in Table 3, house prices rise at 3 per cent per year and the CPI rises at 2 per cent per year. The proportions of real CGT forgiven under each regime are therefore independent of whether NG is allowed throughout, or denied throughout.

Under the post-1999 CGT regime, the proportions 'forgiven' are in fact negative; that is, the PV of CGT collected is higher than it would be under a CGT on real gains on accrual. The reason is that house prices are assumed to rise at 3 per cent

per year and inflation is 2 per cent per year. Tax on half the nominal gain (1.5 per cent per year) therefore exceeds tax on the entire real gain (1 per cent per year). This disadvantage to the owner is reduced by the fact that CGT is paid on realization, not accrual, and this partially offsetting advantage is greater, the longer the period for which the asset is held. The table shows that even for a 20 year investment, the PV of the CGT paid under the post-1999 regime is more than under a CGT on real gains on accrual. However, for a sufficiently long-term investment, the advantage to the landlord of postponement would more than offset the disadvantage of paying tax on half of nominal gains, rather than the lesser amount of the whole real gain. The reason is that, in the limit, as the holding period became arbitrarily long, the CGT on realisation would grow at 3 per cent per year and its present value at time 0 would therefore tend to zero, since the after tax discount rate is about 4 per cent per year; in contrast, the PV of real accrued gains would remain finite and positive.

Under the 1985–99 CGT regime, the proportion of real CGT forgiven is always positive and this proportion increases with the length of the investment. The reasons are straightforward: the landlord benefits from being able to postpone tax payment from accrual to realization, without having to pay interest on the implicit loan from the Australian Tax Office (ATO), and the amount of this benefit is bigger, the longer the period of this implicit interest free loan. Under the AA scheme, the amount of tax forgiven is always zero for the cases analysed in Table 3. The reason is that in Table 3 it is assumed that house prices rise at a constant geometric rate between purchase and sale and this is also the assumption on which the approximation is based. In this case, the ‘approximation’ therefore holds exactly.

The second panel in Table 3 is relevant if NG is allowed. Under the post-1999 CGT regime, the effective tax rate exceeds the scheduled rate of 48.5 percent in each

of the three cases reported, but the excess is smaller, the longer the period of the investment. These results follow immediately from the corresponding results in the first panel. Similarly, under the 1985–99 regime with NG allowed, the effective rate of tax on real income is always less than 48.5 percent, and the amount of the shortfall increases with the length of the investment. These results also follow immediately from those in the first panel: the 1985–99 regime taxed real gains, but taxed them only on realization, not on accrual. Finally, since the AA proposal holds exactly in the cases analysed in Table 3, the effective tax rate under this proposal is exactly equal to the scheduled rate of 48.5 per cent, whatever the length of the investment.

The third panel of Table 3 applies to the situation in which NG is denied and the gearing ratio is 80 per cent. The effective tax rates for each regime are all substantially higher than the scheduled rate of 48.5 per cent and also higher than in the corresponding cases in which NG is allowed. Under the 1985–99 CGT regime, the effective tax rate is 63 per cent for a 5 year investment, 59 per cent for a 10 year investment and 53 per cent for a 20 year investment. Under the other two CGT regimes, the effective tax rates are slightly higher still.

The bottom panel of Table 3 applies to the situation in which NG is denied, but the gearing ratio is only 40 per cent. It can be seen that the denial of NG in this case has no effect on the effective tax rate under the post-1999 CGT regime. The reason is that when the gearing ratio is only 40 per cent interest payments would be less than net rent. Under the other two CGT regimes, the denial of NG does slightly increase the effective tax rate even when the gearing ratio is only 40 per cent, but the effect is small, because the amount by which interest payments exceed net rents is small. The reason that (with rents rising at 3 per cent per year and NG allowed) interest payments are higher under the 1985–99 and AA regimes than under the post-

1999 CGT regime is that, as Table 1 showed, the ratio of the house price to the rent (and therefore of the loan to the rent, given that the loan is initially 40 per cent of the price) is 32.8 under the 1985–99 CGT regime and 32.1 under the AA regime, but only 29.4 under the post-1999 regime.

Table 4 reports the same variables that are reported in Table 3, except that Table 4 is based on the 'boom' case in which the level and the rate of growth of rents both increase in period 2 in the way that is described in Table 2. As explained at the beginning of this section, the effect of this boom in rents is to raise house prices by 102 per cent under the current CGT regime and by 71 per cent and 64 per cent, under the 1985–99 and AA regimes respectively.

[Table 4 about here]

The first panel of Table 4 shows the proportion of real CGT that is effectively forgiven under each CGT regime. Table 1 showed that the effect on house prices of the boom in rents depends on whether NG is allowed or denied. As a result, the proportions of CGT forgiven under each regime depend on whether NG is allowed or denied. The results given in Table 4 refer to the case in which NG is allowed.

In all cases, the proportion of real CGT foregone is higher in Table 4 than in the corresponding cells in Table 3. In the case of the 1985–99 CGT regime, the reason for the higher proportion of real CGT forgiven in the Table 4 scenario than in the Table 3 scenario is that the assumed jump in prices in the Table 4 scenario occurs in year 2, which is near the beginning of the investment period; the advantage of postponing payment of CGT until realisation is therefore greater in the Table 4 scenario than in the Table 3 scenario, in which gains accrue steadily throughout the investment period.

The timing of the boom in house prices within the investment period also explains why the proportion of CGT forgiven under the AA proposal is higher in Table 4 than in Table 3. Under an ideal CGT on real accrued gains, the landlord would be liable immediately for the entire real capital gain that actually occurs in year 2. If payment were delayed, interest would accrue on the tax debt outstanding. However, if the sale of the house does not occur until year 5, 10 or 20, then the AA approach would deem the jump in prices that actually occurs in year 2 to have been evenly spread out throughout the entire period for which the house is owned. It would therefore give the owner an interest free loan on the part of the overall real gain that actually occurred in year 2. In contrast, under the Table 3 scenario, the AA system corresponds exactly to a real CGT on accruals because in Table 3 it is assumed that the rate of growth of house prices is constant throughout the period.

What is remarkable about the Table 4 results in the case of the AA proposal is that, despite the fact that the Table 4 scenario appears to be highly biased against it—in the sense that the scenario assumes that the real capital gains are heavily concentrated at the start of the investment period, whereas the AA scheme assumes that they are evenly spread throughout the investment period—the proportion of the real accrued CGT tax forgiven is only 2 per cent for a 5 year investment and only 10 per cent for a 20 year investment. This shows that the AA approach is fairly robust with respect to the timing of gains within the investment period.

The differences between the results in Tables 3 and 4 are by far the greatest in the case of the post-1999 CGT regime. Whereas this regime produces more CGT revenue than the others in the Table 3 scenario, it produces far less in the Table 4 scenario. This illustrates the main defect of this regime; when nominal capital gains are low, relative to the rate of inflation, it yields far more revenue than a CGT on real

accruals, but when nominal gains are high, relative to the rate of inflation, it yields far less. At least for short-term investments, this CGT regime could be defended as an approximation to a CGT on real gains on accrual if the rate of inflation were half the rate of nominal gains on realisation. But since the rate of nominal gains on realisation and the rate of inflation over the period for which an asset is held can both be easily observed, there is no need to use this approximation, which may lead to large errors, as it does in the situation both of Table 3, in which half of the nominal gain is less than the rate of inflation, and of Table 4, in which half of the nominal gain is far more than the rate of inflation.

The second panel in Table 4 shows the effective tax rates on the income from rental housing in the case of the postulated housing boom when NG is allowed. As just noted, the AA proposal's approximation to a real CGT on accruals is fairly accurate, particularly for short-term investments. As a result, the effective tax rate is only very slightly below the scheduled rate of 48.5 per cent for a 5 year investment and not far below 48.5 per cent even for a 20 year investment. The 1985–99 CGT regime is not such a good approximation to a real CGT on accruals as the AA proposal, but the difference is not large, at least for the 5 year investment period. In contrast, the post-1999 CGT regime grossly under-taxes income from rental housing for all investment periods. The reasons for this are, of course, the same as those just given to explain why this regime results in such large proportions of real capital gains tax being forgiven.

A surprising feature of the Table 4 results for the post-1999 CGT regime is that the effective tax rate generally increases with the maturity of the investment, despite the fact that there are benefits to landlords from postponing CGT payments from accrual to realisation. The offsetting factor is that the longer the period for which

the house is held, the smaller is the share of the total real income that is attributable to the once-off jump in house prices in period 2—which is taxed at less than half the scheduled rate of 48.5 per cent—and the larger are the shares of the total real income that are derived from:

- rent, which is fully taxed at the scheduled rate of 48.5 per cent, and
- the real capital gains at 2 per cent per year that accrue steadily from year 2 until the house is sold. Since half the nominal gain of 4 per cent per year in this period happens to equal the whole real gain, these gains are also taxed at 48.5 per cent on realisation, although the rate of taxation of these gains on an accruals basis is admittedly less, because of the gain from delay.

IV. Overview and summary

Section III showed that the denial of NG can result in substantial over-taxation of the income from debt-financed rental housing under plausible assumptions about the *anticipated* capital gains on housing. Although the denial of NG would not greatly affect the effective tax rates if the gearing ratio is only 40 per cent, Table 3 shows that if the gearing ratio is 80 per cent, the effective tax rates would range from 53 per cent to 65 per cent, depending on the duration of the investment and on the CGT regime in place. Table 4 presented results for the case in which, in addition to anticipated increases, there is also an unanticipated doubling of house prices. These results show that, under the current CGT regime, even the denial of negative gearing is not sufficient to keep the effective tax rate on the real income from debt-financed rental housing at the top marginal rate of 48.5 percent. The reason is that if there is a very large boom in house prices, almost all the real income from rental housing accrues in the form of capital gains and these are grossly under-taxed by the present CGT

regime, and would have been somewhat under-taxed by the previous CGT regime, which did not tax real gains until they were realized. With the AA scheme in place, the denial of NG would result in the over-taxation of the income from an investment with a gearing ratio of 80 per cent even in the case of the very large boom in house prices assumed in Table 4.

We argued in section I that an ideal income tax would tax real capital gains on accrual. Although it would be an administrative nightmare to estimate and tax the gains on all assets every year, it would not be difficult to approximate an ideal CGT more closely than was done by the regime that Australia had in place between 1985 and 1999, let alone by the one that we now have.

Section II showed that no more information would be needed from individual taxpayers to implement the AA scheme than that needed to implement either the current CGT regime, or the one in place in the period 1985–99. The only information that individual taxpayers need supply in order to implement any of these regimes is the dates at which the asset was bought and sold—that is time 0 and time T, in the notation of section II—and the value of the asset at these two dates, V_0 and V_T. Under all three of these CGT regimes, tax would be paid on $\lambda(V_T - V_0)$, and under each regime λ can be calculated from V_0, V_T and information that is common to all tax payers and readily available to the ATO.

Equation 2 shows how, under the AA proposal, λ depends on the average nominal interest rate and the change in the CPI over the period for which the asset was held. The 1985–99 regime, effectively set $\lambda = P_T/P_0$. The post-1999 CGT regime can be thought of as setting $\lambda = 0.5 + 0.5V_T$. The actual calculation of λ is admittedly trivial in this last case and most complex under the AA system. To implement the latter, the ATO's Tax Pack might include a table whose columns showed the number

of years, T, for which the asset was held and whose rows showed ranges of the ratio of V_T/V_0. Tax payers would then select the value of λ from the appropriate cell.

Judged by the criterion of how closely each regime approximates an ideal CGT under a wide range of alternative assumptions, Tables 2 and 3 show that the 1985–99 CGT regime is clearly superior to the present regime if NG is allowed. In one case (Table 3, 20 year investment period) the effective tax rates under the two regimes are both close to the scheduled rate of 48.5 per cent, but in all the other cases, the effective tax rate is closer, and sometimes (Table 4) much closer, to the scheduled rate of 48.5 percent under the 1985–99 regime than under the post-1999 regime. Under the post-1999 regime, the taxation of capital gains is substantially too heavy for 5 year investments if real capital gains are small relative to the rate of ongoing inflation (Table 3), but the proportion of real capital gains forgiven rises to a massive 56 percent for 20 year investments under the assumptions of Table 4. Since the administrative costs of the 1985–99 and post-1999 CGT regimes are the same, there is no justification for the adoption of the economically inferior regime.[13]

The advantage of the AA scheme over the system that applied from 1985 to 1999 is that it would greatly reduce both the distortions that, as noted in section I, result from a simple tax on realized gains—namely, the lock-in effect and the incentive to over-invest in assets of long maturity that yield most of their income in the form of capital gains. Under both the present and the 1985–99 CGT regimes, asset holders only have an incentive to sell assets if the gain in efficiency is large enough to offset the private loss that results from paying CGT, rather than delaying payment (Sieper, 1986). If asset holders knew that by postponing CGT payments they were incurring future liabilities of a roughly similar magnitude to the gross gains from

[13] The only information needed to estimate tax liabilities under the 1985–99 regime, but not needed under the post-1999 regime, is the consumer price index. The cost to the ATO of making this index available to taxpayers is obviously negligible.

postponement—and this is the rationale for equation 2—they would have an incentive to sell assets whenever there was a gain in efficiency from doing so. Under this regime, the CGT would no longer operate, ex post, like a distorting tax on the transfer of assets.

Since the AA proposal is not a perfect approximation to a CGT on real accrued gains it would not completely eliminate the lock-in (or lock-out) effect: "[a]ssets achieving above-normal rates of return initially would still be subject to a lock-in effect because an investor anticipating only normal returns from the asset in the future would be able to spread the accrual pattern retrospectively imputed for this gain over several years by holding onto the asset. Likewise, an asset that had declined in value would offer its owner the incentive to sell." (Auerbach, 1991 p.168). Auerbach instead suggests a scheme that assesses CGT liability on the basis of the return that would have been earned if the investor had reached their current position through investing at the risk-free rate of interest. If V_s is the value at the date when it is sold of an asset that has been held for s years and on which no dividends have ever been paid, then the investor's tax liability in Auerbach's scheme is on the amount $(1-e^{-tis})V_s$ where i is the risk-free rate.[14]

Auerbach's proposal was the basis for a recent CGT reform suggested in New Zealand in the McLeod Report (New Zealand Treasury, 2001a), which adapted it to a year-by-year setting. This risk-free return method (RFRM) would operate in the following fashion: the tax payable on a relevant asset would be calculated as (the value of the net asset at the beginning of the tax year) x (inflation-adjusted risk-free rate of return) x (investor's tax rate) where the net asset value is the opening market value of the asset reduced by any outstanding principal on related debt. So, again, the

[14] If dividends have been paid, they would be treated as share buy-backs and the investor would receive credits for any taxes paid on the dividends. See Auerbach (1991) for details.

tax base here is just the amount that would have been earned, net of inflation, if the money invested in the asset had instead been put into a risk-free investment.

These schemes do represent a simple way to index the tax base and, as the McLeod Report notes, also avoid any issues involved in redefining ordinary income as capital gains. The McLeod proposal does, however, rely on the observation of asset values every year and, as such, requires more information than the scheme we examine here. The McLeod Report suggested that it should be applied only to assets with an independently verifiable value, such as interests in listed companies and unit trusts. Where asset values are imperfectly measurable, it is not clear that the RFRM is superior to alternative CGT schemes: see Auerbach, 2001, pp.11-13.

Furthermore, both of these schemes raise certain equity concerns: tax liabilities are independent of *actual* asset returns so an investor's tax liability does not depend on whether they have incurred a capital gain or loss. An investor with an asset worth $100,000 at the end of a period has the same tax liability whether the asset has fallen in value from $500,000 or risen from $50,000, a proposition which might strike many taxpayers as inequitable.

At the cost of some extra administrative complexity, it would be possible to modify equation 2 to make the AA proposal coincide more closely with an ideal CGT. This could be done by classifying assets into groups—"houses", "apartments", "farms", "equities" and so forth—and then deeming that the proportion of the overall capital gain that occurred during year *t* for an asset bought in year 0 and sold in year T was the same as the observed proportion of the overall gain (that is, between years 0 and T) that occurred during year *t* in the price index of the group to which it belongs. Whether or not it would be sensible to improve the approximation to an ideal CGT in this way depends on the difficulty of explaining the system to tax payers and voters,

the difficulty of classifying assets into broad groups and the gain in accuracy of the resulting approximation. Since Table 4 suggests that the gain in replacing the AA proposal with an ideal CGT on accruals would often be small, it is likely that the gain from replacing it by a better approximation would be even smaller. Since the costs of classifying assets into broad groups and of explaining the new system to tax payers and voters would not be trivial, it would probably not be sensible to try to improve on the simple approximation in equation 2. Besides, merely replacing Australia's present very inadequate CGT with the equation 2 approximation to an ideal CGT would be a very substantial political achievement.

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Table 1. The estimated ratio of the house price/annual rent, with and without negative gearing, at given underlying parameters[a]

CGT Regime	Post-1999	1985–99	Realisation approximation to real CGT on accruals[b] (AA)
Level of the house price/annual rent ratio when NG allowed:			
Rents rise at 3% p.a.	29.4	32.8	32.1
Rents rise at 4% p.a.	53.6	50.4	47.2
Level of the house price/annual rent ratio when NG denied:			
Rents rise at 3% p.a.; gearing 40%	29.4	32.6	32.0
Rents rise at 4% p.a.; gearing 40%	43.2	42.0	40.8
Rents rise at 3% p.a.; gearing 80%	22.0	22.9	22.7
Rents rise at 4% p.a.; gearing 80%	27.3	26.8	26.4
Jump (%) in the house/price rent ratio (at given gearing ratio) needed to keep expected future investor returns constant if NG is denied[c]:			
Rents rise at 3% p.a.; gearing 40%	0.0	–0.7	–0.3
Rents rise at 4% p.a.; gearing 40%	–19.4	–16.7	–13.7
Rents rise at 3% p.a.; gearing 80%	–25.3	–30.3	–29.3
Rents rise at 4% p.a.; gearing 80%	–49.1	–46.8	–44.2

Notes:

[a] The assumed parameters are $\pi = 0.02$; $i = 0.08$; $\tau = 0.485$. The 'gearing ratio' is the initial level of the owner's borrowing divided by the value of the house.

[b] In the cases analysed in this table, the AA scheme 'approximation' is exactly equivalent to a CGT on real accrued gains because the assumption on which it is based holds exactly: house prices grow at a constant exponential rate—either 3% p.a., or 4% p.a.

[c] The estimates in the third panel can be derived (rounding errors aside) from those in the first two panels. For example, under the post-1999 CGT regime, with a gearing ratio of 40% and with rents and house prices growing at 4% p.a., the denial of NG causes the house price/rent ratio to fall from 53.6 to 43.2, that is by 19.4%. Note that when NG is allowed, the house price/rent ratio is independent of the gearing ratio. These estimates are not forecasts of the effect on house prices of the denial of NG: if NG were denied, expected future returns might fall, or they could be maintained by a combination of rent increases, reductions in house prices and portfolio re-allocation to reduce gearing ratios.

Table 2. Alternative assumptions about rents and house prices[a]

	Annual rent			Value of house at start of period NG allowed, post-1999 CGT regime		
Year (1)	'No boom' case (2)	'Boom' case (3)	Ratio (3)/(2) (4)	'No boom' case (5)	'Boom' case (6)	Ratio (6)/(5) (7)
0	13,592	13,592	1.00	400,000	400,000	1.00
1	13,999	13,999	1.00	412,000	412,000	1.00
2	14,419	16,015	1.11	424,360	857,887	2.02
3	14,852	16,656	1.12	437,091	892,203	2.04
4	15,297	17,322	1.13	450,204	927,891	2.06
5	15,756	18,015	1.14	463,710	965,007	2.08
6	16,229	18,736	1.15	477,621	1,003,607	2.10
7	16,716	19,485	1.17	491,950	1,043,751	2.12
8	17,217	20,264	1.18	506,708	1,085,501	2.14
9	17,734	21,075	1.19	521,909	1,128,921	2.16
10	18,266	21,918	1.20	537,567	1,174,078	2.18
11	18,814	22,795	1.21	553,694	1,221,041	2.21
12	19,378	23,706	1.22	570,304	1,269,883	2.23
13	19,960	24,655	1.24	587,413	1,320,678	2.25
14	20,558	25,641	1.25	605,036	1,373,505	2.27
15	21,175	26,667	1.26	623,187	1,428,446	2.29
16	21,810	27,733	1.27	641,883	1,485,583	2.31
17	22,465	28,843	1.28	661,139	1,545,007	2.34
18	23,139	29,996	1.30	680,973	1,606,807	2.36
19	23,833	31,196	1.31	701,402	1,671,079	2.38
20	24,548	32,444	1.32	722,444	1,737,923	2.41

Note:

[a] It is assumed throughout that $\pi = 0.02$; $i = 0.08$; $\tau = 0.485$. In the 'no boom' case, actual and expected rents and house prices grow at 3 % p.a.. The 'boom' case is initially the same, but at the start of period 2 in the 'boom' case, expectations about the level and rate of growth of rents are revised upwards to those given in column 3. See section III for more details. The house prices for period 2 onwards in the 'boom' case are derived by multiplying the rent by 53.6, which is the Table 1 estimate of the house price/rent ratio for the post-1999 CGT regime when NG is allowed and when the expected rate of growth of rents and house prices is 4 % p.a..

Table 3. Effective tax rates[a] and proportion of real CGT forgiven, in PV terms, when rents and house prices grow at 3% p.a. ('no boom' case)[b]

Duration of investment	5 years	10 years	20 years
Proportion of real CGT forgiven (%):			
Post-1999 CGT regime	–38.5	–25.5	–3.5
1985–99 CGT regime	4.0	8.8	17.8
Approx to accruals CGT regime	0.0	0.0	0.0
Effective tax rate on real income (%):			
Negative gearing allowed:			
Post-1999 CGT regime	52.7	51.3	48.9
1985–99 CGT regime	48.0	47.4	46.4
Approx to accruals CGT regime	48.5	48.5	48.5
Negative gearing denied (Initial loan/value of house = 80%)			
Post-1999 CGT regime	64.9	60.2	53.9
1985–99 CGT regime	63.2	59.1	53.3
Approx to accruals CGT regime	63.2	59.6	54.6
Negative gearing denied (Initial loan/value of house = 40%)			
Post-1999 CGT regime	52.7	51.3	48.9
1985–99 CGT regime	48.4	47.7	46.5
Approx to accruals CGT regime	48.7	48.6	48.5

Notes:

[a] The effective tax rate is measured as the ratio of the PV of total tax payments by the lender and the house owner to the PV of the total pre-tax real income by the lender and the house owner, as detailed in section II. All PVs are estimated using net of tax interest rates.

[b] See Table 2 for the assumed paths of rents and house prices in the 'no boom' case**.**

Table 4. Effective tax rates[a] and proportion of real CGT forgiven, in PV terms, given our assumed boom in rents and the associated housing price boom under each CGT regime[b]

Duration of investment	5 years	10 years	20 years
Proportion of real CGT forgiven (NG assumed to be allowed) (%):			
Post-1999 CGT regime	49.0	51.1	56.0
1985–99 CGT regime	5.5	13.0	24.1
Approx to accruals CGT regime	2.0	5.3	9.5
Effective tax rate on real income (%):			
Negative gearing allowed:			
Post-1999 CGT regime	27.8	28.9	29.2
1985–99 CGT regime	46.2	43.7	40.6
Approx to accruals CGT regime	47.7	46.6	45.5
Negative gearing denied (Initial loan/value of house = 80%)			
Post-1999 CGT regime	38.1	39.2	38.8
1985–99 CGT regime	51.9	49.0	45.7
Approx to accruals CGT regime	53.1	51.1	49.2
Negative gearing denied (Initial loan/value of house = 40%)			
Post-1999 CGT regime	30.1	31.8	32.4
1985–99 CGT regime	46.6	44.5	41.9
Approx to accruals CGT regime	47.9	47.0	46.3

Notes:

[a] As for Table 3.

[b] See Table 2 for the assumed paths of rents and house prices in the 'no boom' case.