DETERMINATION OF THE MAXIMUM AFFORDABLE PRICE FOR NEGATIVELY GEARED INVESTMENTS IN RESIDENTIAL PROPERTY

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ABSTRACT

Potential investors who have decided to use negative gearing to acquire an investment in residential property must decide on the maximum amount they can afford, given their financial circumstances and the financial attributes of the property. This article develops a simple model to assist potential investors to make this decision. The model is developed in an Australian institutional environment, but is sufficiently general that it should be readily adaptable to suit other countries that permit negative gearing. The characteristics of the model are analysed algebraically and numerically and the model is found to give plausible results. Some implications for interest rate policy are also noted.

Keywords: Residential property investment, negative gearing

INTRODUCTION

A negatively geared investment is one in which the income produced in a financial year is less than the expenses incurred from owning it. That is, the taxable income produced by the investment is less than zero. The investor intentionally makes a loss, which is then offset against other income to reduce the total tax paid. The compensation for this loss is the expected future capital gain on the investment.

Many countries, including Australia and New Zealand, permit landlords to negatively gear their property investments (Ellis and Andrews, 2001). Negative gearing is particularly attractive to investors who have moderate to high incomes, and who invest in growth assets such as shares and property. Probably the most popular use of negative gearing is to finance investment in residential property. For example, an Australian survey found that the desire to engage in negative gearing was the second most common motivation cited by individuals who were investors in residential property (Australian Bureau of Statistics, 1999). This popularity is due to the relatively high loan-to-value ratio that a property investment can support, the low yield on property and the view that this type of asset is fairly low risk. Our discussion will be restricted to residential property investments.

Where non-cash items, such as building write-offs or depreciation on fixtures and fittings, can be claimed as a tax deduction against rental income, it is possible that a negatively geared investment may produce a loss for tax purposes, yet also yield a positive cash flow to the investor. More often, however, this is not the case, and negative gearing will produce a negative cash flow to the investor, at least in the initial stages of the investment. Therefore, the investor will have to inject cash into the investment. The capacity of an investor to "subsidise" the investment in this way is not infinite and, in practice, most investors will specify an upper limit on the cash "subsidy" that they are willing and able to provide. We call this limit the investor's "cash flow constraint" or the property's "required subsidy".

Residential investment properties typically provide rental yields of between four and eight percent. Yields for non-residential property can range from four to twelve percent, depending on the risk attached to the rental income and the potential for capital gain. In Australia, residential properties that have the lowest rental yields are generally older houses and apartments in inner suburbs. Properties in these locations have continued to be attractive to investors, due in particular to the high capital gains often achieved and the low vacancy rates. Developers offering new apartments to the market, which are sold off the plan or at completion, have provided rental guarantees of up to seven percent for periods of one year or longer. It is likely that these artificial yields may not be sustained beyond the period of the guarantee (Wakelin and Wakelin, 2002). Yields of up to eight percent are common with managed apartments. This type of property comes under the *Managed Investments Act* 1998 and is regulated by the Australian Securities and Investment Commission in much the same way as managed funds.

The categories of residential investment property referred to in the preceding paragraph are not exhaustive. Indeed, there are many other varieties of residential property and when combined with a range of financing options, there is an increasing need for analytical models to assist investors. In Australia, negative gearing has received a good deal of exposure in the popular press and in many popular financial publications.[2] Much of this commentary takes an extreme position in either opposing or supporting this approach. In this article, we do not take any position in this debate. Rather, we accept that many investors choose to negatively gear investment properties and our objective is to determine for such an investor, the maximum affordable property price given the circumstances in which the investment is to be made.

A MODEL TO DETERMINE THE MAXIMUM AFFORDABLE PROPERTY PRICE

In this section, we derive a model that may be used to determine – for a given investor in a given property investment environment – the maximum price that can be paid for a property without violating the investor's cash flow constraint. By property investment environment, we mean a credible set of assumptions about the attributes of the investor and the attributes of the property. We provide a numerical example in a later section.

2. See, for example, Keenan (2001).

Consider an investor who has decided to use negative gearing to acquire an investment property. The investor has a cash flow constraint of C dollars per annum and, given this constraint, wishes to calculate the maximum property price (V^{max}) that is affordable.

To solve this problem, we require details of the investor's attributes and the property's attributes. These requirements are set out below.

Investor attributes:

We assume that the investor has a cash deposit (D) that is currently earning interest of r % per annum.[3] The investor therefore requires a loan, which we assume to be an interest-only loan, of $V - D$, the difference between the property price and the deposit. The investor's marginal tax rate is t.

Property attributes:

We assume that the investor has some idea of the likely location and age of the property and through market research can estimate the following:

Income:	Annual rental income is g % of the property price:	gV
Expenses:	Annual holding cost is h % of the rental income:	hgV
	Annual interest expense is i % of the loan (and $i > r$):	$i(V-D)$
	Annual depreciation is d % of the value of fixtures and fittings, which in turn is f % of the property price:	dfV
	Annual building write-off is b % of the building construction cost, which in turn is s % of the property price:	bsV

The change in the investor's net taxable income (ΔI) as a result of investing in the property is given by rent, less expenses, less interest forgone. After rearrangement, ΔI is given by:

$$\Delta I = V\,[g\,(1-h) - i - (df + bs)] + (i - r)\,D$$

From the definition of negative gearing, the change in net taxable income (ΔI) will be negative; that is, the investment will initially incur a loss from a tax point of view. The change in the tax paid by the investor will be $t\Delta I$. Because ΔI is negative, the change in tax paid will also be negative. That is, the investor will save tax (that is, effectively, have a cash inflow) of $-t\Delta I$.

We now calculate the change in the investor's after-tax cash flow. It has three components:

(a) The pre-tax net cash flow produced by the property:

$= \text{Rent} - \text{Cash expenses}$

$= V g\,(1-h)$

(b) The pre-tax interest on the loan and the forgone interest on the deposit:

$= -i\,(V-D) - rD$

3. This assumption is made for simplicity only. In practice, property investors may use their existing equity in a property as a substitute for a cash deposit, in which case they use up borrowing capacity rather than forgo interest income. Even where a cash deposit is required it is often small compared to the property price so that, within realistic limits, the model is relatively insensitive to the size of D.

(c) The tax saved:

$$= -t\,\{V[g(1-h) - i - (df + bs)] + (i - r)D\}$$

While the sum of (a), (b) and (c) may in principle be positive or negative, in practice, it is usually negative. We therefore assume that it is negative. We also assume that the investor's annual cash flow constraint is C dollars; that is, the investor requires that the annual after-tax cash flow must equal or exceed $-C$ dollars.

Substituting from the above definitions and simplifying gives:

$$0 > P - F \geq -C \qquad (1)$$

where

$$P = [g(1-h)(1-t) + t(df + bs)]V$$

and

$$F = i(V - D)(1-t) + rD(1-t)$$

Before rearranging Equation (1) to solve for V, it is useful to provide the economic interpretation of this inequality.

First, P represents the after-tax net cash inflow generated by the property. In the standard terminology of capital budgeting,[4] the first term within the square brackets (multiplied by V) is the after-tax operating net cash flow while the second term within the square brackets (multiplied by V) is the depreciation tax shield. Thus the sum of these two terms gives the after-tax cash flow from the property without considering how the investment is financed.

Second, F represents the after-tax financing costs. The first term is the after-tax interest cost of the loan, while the second term is the after-tax interest income lost by withdrawing the deposit. Thus the sum of these two terms provides the total after-tax financing cost or financing requirement.

Third, the term on the right-hand side, $-C$, is a negative amount and is the maximum after-tax "subsidy" that the investor is willing to provide. Thus Equation (1) requires that the after-tax cash flow from the property, less the after-tax financing requirement will be negative, but will not breach the "subsidy" limit.

Equation (1) implies that:

$$[g(1-h) - i](1-t) + t(df + bs) < 0 \qquad (2)$$

If Equation (2) does not hold, then the property is, in effect, not negatively geared and the model gives the economically meaningless result that there is no limit to the property value V that the investor would be willing and able to acquire. The greater is V, the greater the net cash flow to the investor and the greater the investor's wealth.

4. See, for example, Brealey and Myers (1996), pp. 118–125 or Brealey, Myers, Partington and Robinson (2000), pp. 136–143.

From Equations (1) and (2):

$$V \le \frac{-[C+(i-r)D(1-t)]}{[g(1-h)-i](1-t)+t(df+bs)} \qquad (3)$$

Equation (3) gives the maximum affordable property price, *V*, given the attributes of the investor as defined by *D*, *r*, *t* and *C*, and given also the attributes of the property as defined by *g*, *h*, *i*, *d*, *f*, *b* and *s*.

SOME CHARACTERISTICS OF THE MODEL

We can explore the characteristics of Equation (3) by rewriting it as Equation (4) and investigating the signs of the first derivatives.

$$V^{max} = \frac{-[C+(i-r)D(1-t)]}{[g(1-h)-i](1-t)+t(df+bs)} \qquad (4)$$

For space reasons, we omit the details and summarise the findings in Table 1.

Table 1: Signs of the First Derivatives of V^{max}, the Maximum Property Price

Parameter	Sign
Gross rental yield *ie* rent as a proportion of property price (*g*)	Positive
Depreciation rate on fixtures and fittings (*d*)	Positive
Value of fixtures and fittings as a proportion of property price (*f*)	Positive
Building write-off rate (*b*)	Positive
Building construction cost as a proportion of property price (*s*)	Positive
Holding costs as a proportion of rent (*h*)	Negative
Interest rate on the loan (*i*)	Negative
Interest rate forgone on savings (*r*)	Negative
Deposit (*D*)	Positive
Investor's cash constraint or "subsidy" required (*C*)	Positive
Investor's marginal tax rate (*t*)	Positive

Each of these signs has a plausible explanation. The parameters *g*, *d*, *f*, *b* and *s* contribute to after-tax cash flow either directly or via the depreciation tax shield and hence the derivative has a positive sign. Parameters *h*, *i* and *r* decrease after-tax cash flow and hence the derivative has a negative sign. The derivative with respect to the deposit (*D*) has a positive sign because a higher deposit reduces the after-tax cash outflow as less needs to be borrowed. The derivative with respect to the "subsidy" (*C*) has a positive sign because the more the investor can afford to subsidise the investment, the more that can be borrowed and hence the higher the property price can be. Finally, the derivative with respect to the tax rate (*t*) has a positive sign.[5] This result holds because the "subsidy" required of the investor is defined as an after-tax amount that equals the after-tax cash flow of the investment (including the financing cost). The higher the tax rate, the greater must be the required before-tax amounts to achieve this equality, and hence the greater must be the property price (*V*).

5. This result holds provided that Equation (2) is satisfied.

In our model, the potential investor is assumed to know the maximum "subsidy" and the maximum property price reflects this amount. In practice, while a potential investor may well have an estimate for the "subsidy", it will in fact be the residual item once the property has been acquired. The investor will have to subsidise the investment to whatever extent is necessary. It is therefore worthwhile investigating further the relationship between the property price and the "subsidy" required.

In a practical case, the actual property price V^{A} may well be less than $V^{\max}$. Indeed, if the estimate of the maximum "subsidy" is accurate, then the investor will be seeking a property where $V^{\mathrm{A}} \leq V^{\max}$. In this event, both the net cash flow from the property and the net financing requirement will fall compared to a property acquired for $V^{\max}$, but the net financing requirement will fall further. The outcome is that a lower cash "subsidy" (C) will be required. We can show this using a simple comparative statics approach in which we now regard C in Equation (1) to be a function of V. Using the definition of a derivative[6], we obtain:

$$\Delta C = -\{[g(1-h)-i](1-t)+t(df+bs)\}\Delta V \qquad (5)$$

Using Equation (2), it follows from Equation (5) that if ΔV is positive (negative) then ΔC will also be positive (negative). In a practical situation, Equation (5) would be useful to a potential investor who wishes to answer a question such as "For every $1 increase in property value, how much extra will I need to commit to paying as a subsidy?". Similarly, Equation (5) can be rearranged to answer the reciprocal question, "For every $1 increase in the subsidy, how much more valuable a property can I afford?".

IMPLICATIONS OF THE MODEL

The residential property market plays a pivotal role in many economies. It is well established that conditions in this market have a major impact on consumer wealth, and hence may be a significant influence on spending and investment decisions in general, and on the building and construction industry in particular (Case, Quigley and Shiller, 2001; Girouard and Blöndal, 2001). In addition, because many voters have much of their wealth invested in the family home, the residential property market is more politically sensitive than most markets. Consequently, most governments and central banks maintain a careful watch over the residential property market and are well aware that their decisions may affect this market significantly. In particular, the general level of interest rates is widely recognised in both the academic literature and the commercial literature as having a major impact on the residential property market (see, for example, Englund and Ioannides, 1997; National Australia Bank, 2001).[7] In this section, we draw out some of the possible implications of our analysis for interest rate policy.

From the viewpoint of an individual investor, any single variable in Equation (4) may change while all others remain fixed. For example, by switching from one lender to another, an investor may be able to obtain a lower loan interest rate (i) while maintaining the same deposit interest rate (r). However, at the aggregate level, this is unlikely to be the case as deposit rates and loan rates generally move together strongly.

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6. Because the derivatives in this case are independent of V we can use an equality sign. In other cases the relationship would be only approximate.

7. Although, somewhat surprisingly, there appears to be only a weak relationship between interest rates and the prices of real estate investment trusts (Mueller and Pauley, 1995).

Similarly, from a policy viewpoint, the government will usually need to accept that it cannot influence, say, deposit rates without also influencing loan rates in the same direction. We model this feature by regarding the investor's loan rate (i) to be some positive function of the investor's deposit rate (r).[8] For example, if financial intermediaries price loans simply by adding a fixed margin (m) to deposit rates, then $i = r + m$.

From a policy viewpoint, an important issue is the extent to which property demand is likely to respond to a shift in the general level of interest rates. In the context of our model, this issue involves the elasticity of V^{max} with respect to the investor's loan rate (i). The required elasticity, η, is defined as:[9]

$$\eta = -\frac{\partial V^{max}}{\partial i}\frac{i}{V^{max}} \tag{6}$$

Differentiating Equation (4), substituting in Equation (6) and rearranging gives:

$$\eta = -i\,(1-t)\left(1-\frac{1}{\partial i/\partial r}\right)\frac{1}{C/D+(i-r)\,(1-t)} - \frac{i(1-t)}{[g(1-h)-i](1-t)+t(df+bs)} \tag{7}$$

From Equation (7), the elasticity depends on the ratio of the "subsidy" (C) to the deposit (D) rather than the individual numerical values of C and D. While Equation (7) is rather complex, it can readily be interpreted by noting that a reasonable approximation is achieved if we assume that loan rates and deposit rates move on a point-for-point basis. In this case, $\partial i/\partial r$ is equal to 1 and therefore:

$$\eta = -\frac{i(1-t)}{[g(1-h)-i](1-t)+t(df+bs)} \tag{8}$$

To the extent that it is believed that changes in loan rates (i) exceed (fall short of) changes in deposit rates (r), the approximate elasticity given by Equation (8) will exceed (fall short of) the true elasticity given by Equation (7).

If no depreciation or building write-off is allowed, then Equation (8) simplifies further to:

$$\eta = -\frac{i}{g(1-h)-i} \tag{9}$$

To compare Equations (8) and (9), note that from Equation (2), the denominator of Equation (8) is negative. Since the term $t\,(df + bs)$ must be zero or positive, it follows that $g\,(1-h) - i$ must be negative. The effect, therefore, of allowing tax deductions for depreciation ($d > 0$) and / or for building write-off ($b > 0$) is to increase the elasticity.

8. We are grateful to Philip Brown for suggesting this approach.
9. The minus sign is included so that the elasticity will be measured as a positive number.

Substituting realistic values into Equations (8) and (9) provides plausible estimates of the elasticity of V^{max} with respect to i. Examples are provided in Table 2.

It is clear from inspection of Equations (8) and (9), and is illustrated in Table 2, that allowing deductions for depreciation and/or a building write-off leads to a higher elasticity. In some cases, the effect is very large. For example, if the interest rate is 5%, the tax rate is 50% and the net rental yield is 2%, then the elasticity is 1.67 if there are no deductions, but is 3.33 if deductions are 1.5%. If the net rental yield is 3%, the elasticities become 2.50 and 10.00 respectively. Therefore, while the derivatives with respect to the depreciation rate (d) and the building write-off rate (b) (see Table 1) suggest that these government concessions may well lead to higher property prices, they may also lead to property prices being more vulnerable to shifts in interest rates. The prices of these properties may therefore be more volatile. Another implication is that there may be different effects in different geographical areas. For example, in older areas, many buildings will already have been fully written off for tax purposes[10] and according to the model, these areas may experience lower price volatility, other factors being equal.

10. In Australia, the write-off is available only on buildings constructed after 1987. In terms of our model, $b = 0$ for pre-1987 buildings in Australia.

Table 2: Elasticity of Maximum Affordable Property Price (V^{max}) with Respect to the Loan Interest Rate (*i*)

Panel A: Loan interest rate = 5%

	Net rental yield = 1%			Net rental yield = 2%			Net rental yield = 3%		
	t = 0	t = 25%	t = 50%	t = 0	t = 25%	t = 50%	t = 0	t = 25%	t = 50%
d′ = 0	1.25	1.25	1.25	1.67	1.67	1.67	2.50	2.50	2.50
d′ = 0.5%	1.25	1.30	1.43	1.67	1.76	2.00	2.50	2.73	3.33
d′ = 1.0%	1.25	1.36	1.67	1.67	1.88	2.50	2.50	3.00	5.00
d′ = 1.5%	1.25	1.43	2.00	1.67	2.00	3.33	2.50	3.33	10.00

Panel B: Loan interest rate = 10%

	Net rental yield = 1%			Net rental yield = 2%			Net rental yield = 3%		
	t = 0	t = 25%	t = 50%	t = 0	t = 25%	t = 50%	t = 0	t = 25%	t = 50%
d′ = 0	1.11	1.11	1.11	1.25	1.12	1.25	1.43	1.43	1.43
d′ = 0.5%	1.11	1.13	1.18	1.25	1.28	1.33	1.43	1.46	1.54
d′ = 1.0%	1.11	1.15	1.25	1.25	1.30	1.43	1.43	1.50	1.67
d′ = 1.5%	1.11	1.18	1.33	1.25	1.33	1.54	1.43	1.54	1.82

Panel C: Loan interest rate = 15%

	Net rental yield = 1%			Net rental yield = 2%			Net rental yield = 3%		
	t = 0	t = 25%	t = 50%	t = 0	t = 25%	t = 50%	t = 0	t = 25%	t = 50%
d′ = 0	1.07	1.07	1.07	1.15	1.15	1.15	1.25	1.25	1.25
d′ = 0.5%	1.07	1.08	1.11	1.15	1.17	1.20	1.25	1.27	1.30
d′ = 1.0%	1.07	1.10	1.15	1.15	1.18	1.25	1.25	1.29	1.36
d′ = 1.5%	1.07	1.11	1.20	1.15	1.20	1.30	1.25	1.30	1.43

Notes: (i) t is the investor's marginal tax rate.
(ii) d′ = df + bs and is the combined effect of depreciation on fixtures and fittings and the building write-off.
(iii) Net rental yield = g (1 – h) and is the gross rental yield less holding costs.

EXAMPLE

Set out below is an example using realistic values for the various parameters. We use Equation (4) to determine the maximum affordable property price, given the following attributes of the investor and the property.

Investor attributes:
Deposit = D = \$40 000
Current deposit interest rate = r = 3% pa
Tax rate = t = 48.5%
Annual cash flow constraint = C = \$4800

Property attributes:
Rent as a proportion of property value = g = 5%
Holding costs as a proportion of rent = h = 25%
Loan interest rate = i = 7%
Depreciation expense = d = 15%
Fixtures and fittings as a proportion of property price = f = 1%
Building write-off as a proportion of construction cost = b = 2.5%
Construction cost as a proportion of property price = s = 60%

Substituting these values in Equation (4) generates V^{max}, the maximum value for V:

$$V^{max} = \frac{-[C+(i-r)D(1-t)]}{[g(1-h)-i](1-t)+t(df+bs)} \quad (4)$$

$$= \frac{-[\$4800+(0.07-0.03)\,(\$40000)\,(1-0.485)]}{[0.05\,(1-0.25)-0.07]\,(1-0.485)+(0.485)[(0.15)(0.01)+(0.025)(0.6)]}$$

$$= \$643\ 847$$

This result can be explained by substituting $V = V^{max}$ into Equation (1) and making the following calculations using that equation:

After-tax property net cash flow, *P*:

After-tax cash flow $= g\,(1-h)V^{max}\,(1-t)$
$= (0.05)\,(1-0.25)(\$643\,847)(1-0.485)$
$= \$12\,434.30$

Depreciation tax shield $= t\,(df + bs)V^{max}$
$= (0.485)\,[(0.15)\,(0.01)$
$+ (0.025)(0.6)]\,(\$643\,847)$
$= \$5152.38$

After-tax property net cash flow, P $= \$12\,434.30 + \$5152.38$
$= \$17\,586.68$

After-tax financing requirement, F:

After-tax interest cost $= i\,(V^{max} - D)(1 - t)$
$= (0.07)\,(\$643\ 847 - \$40\ 000)(1 - 0.485)$
$= \$21\ 768.68$

After-tax interest income forgone $= rD(1 - t)$
$= (0.03)\,(\$40\ 000)(1 - 0.485)$
$= \$618.00$

After-tax financing requirement, F $= \$21\ 768.68 + \$618.00$
$= \$22\ 386.68$

These calculations show that, if the property price is $V^{max} = \$643\ 847$, then the total after-tax financing requirement is \$22 386.68 which exceeds the total after-tax property net cash flow of \$17 586.68. The "subsidy" required is the difference between the two and equals \$4800.00, which the investor can just afford, because it is equal to the investor's cash constraint.

If the investor acquires a property for, say, $V^A = \$600\ 000$, then a lower cash "subsidy" will be required. Using Equation (5), the change in the "subsidy" is found to be – \$383. Therefore, the required "subsidy" is $C + C = \$4800 - \$383 = \$4417$.

The components of this amount can be explained as follows. If the property price is $V^A = \$600\ 000$, and all other parameters remain unchanged, then:

Total after-tax property net cash flow is:

$$g\,(1 - h)V^A(1 - t) + t\,(df + bs)V^A$$

$$= (0.05)(1 - 0.25)\ \$600\ 000\ (1 - 0.485) + (0.485)[(0.15)(0.01) + (0.025)(0.6)]\ \$600\ 000$$

$$= \$16\ 389$$

Total after-tax financing requirement is:

$$i\,(V^A - D)(1 - t) + rD\,(1 - t)$$

$$= (0.07)(\$600\ 000 - \$40\ 000)(1 - 0.485) + (0.03)(\$40\ 000)(1 - 0.485)$$

$$= \$20\ 806$$

In this case, the cash "subsidy" required of the investor is \$20 806 – \$16 389, which equals \$4417.

The initial case and this later case are compared in Table 3.

Table 3: Comparison of a Property Acquired for the Maximum Price with a Property Acquired for Less than the Maximum Price

	Initial case: Property price V^{max} = $643 847	Later case: Property price V^{A} = $600 000	Change = Later *minus* Initial
After-tax property net cash flow	$17 586.68	$16 389.00	– $1197.68
After-tax financing requirement	$22 386.68	$20 806.00	– $1580.68
Cash "subsidy" required	$ 4 800.00	$ 4 417.00	– $ 383.00

While the total after-tax net cash flow from the property has fallen by $1197.68 (*ie* from $17 586.68 initially to $16 389.00 later), the total after-tax financing requirement has fallen by the greater amount of $1580.68 (*ie* from $22 386.68 to $20 806.00). In consequence, the required cash "subsidy" has decreased from $4800.00 to $4417.00. This is a fall of $383.00, which equals the difference between $1580.68 and $1197.68.

CONCLUSION

Where an investor has decided to acquire a residential property using negative gearing, the investor must ensure that the price paid for the property is affordable, given the investor's cash constraint. The model developed in this article allows an investor to calculate the maximum affordable price for a residential property, given the financial attributes of the investor and the property. The model gives plausible results when realistic values of the parameters are used. In addition, the model suggests that tax concessions in the form of allowable deductions for depreciation or for a building write-off will tend to increase the value of a residential property, but may also increase the vulnerability of the investment to an increase in interest rates.

REFERENCES

Australian Bureau of Statistics, 1999, Household Investors in Rental Dwellings, *Year Book Australia 1999*, 207–208, Canberra.

Brealey, R. and Myers, S., 1996, *Principles of Corporate Finance*, 5th edn., McGraw-Hill, New York.

Brealey, R., Myers, S., Partington, G. and Robinson, D., 2000, *Principles of Corporate Finance*, McGraw-Hill, Sydney.

Case, K., Quigley, J. and Shiller, R., 2001, Comparing Wealth Effects: The Stock Market versus the Housing Market, *NBER Working Paper 8606*, National Bureau of Economic Research, November.

Ellis, L. and Andrews, D., 2001, City Sizes, Housing Costs, and Wealth, *Research Discussion Paper 2001-08*, Reserve Bank of Australia, October.

Englund, P. and Ioannides, Y., 1997, House Price Dynamics: An International Empirical Perspective, *Journal of Housing Economics*, 6(2), 119–136.

Girouard, N. and Blöndal, S., 2001, House Prices and Economic Activity, *Economics Department Working Papers No. 279*, Organisation for Economic Co-operation and Development, January.

Keenan, A., 2001, Is it Good to Gear?, *The Sunday Age*, Melbourne, 13 May.

Mueller, G. and Pauley, K., 1995, The Effect of Interest-Rate Movements on Real Estate Investment Trusts, *Journal of Real Estate Research*, 10(3), 319–325.

National Australia Bank, 2001, Australian Markets Outlook: Are House Prices Rising Too Quickly?, 7 December.

Wakelin, M. and Wakelin, R., 2002, *Streets Ahead*, Hodder Headline, Sydney.

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