ANALYSIS OF PROPERTY VALUES, LOCAL GOVERNMENT FINANCES AND RESERVATION OF LAND FOR NATIONAL PARKS AND SIMILAR PURPOSES

Clem Tisdell
School of Economics
The University of Queensland
Qld. 4072, Australia

*Leonie Pearson**
Sinclair Knight Mertz
590 Orrong Road
Armadale, Vic. 3143, Australia

The impact on local government finances of the reservation of land for national parks in local government areas has been a bone of contention. This article identifies conditions in which the reservation of land for national parks increases total rateable unimproved property values in a local government area. The level of a local government's receipts from rates tends to move in the same direction as the total value of rateable property in its local government area. Thus, even though national parks and similar natural areas are not rateable, it is possible that the reservation of some local government areas for such protection can increase revenue from rates. However this is not always so and conditions for an increase in local government revenue are specified. Local governments may wish to maximise their income for discretionary expenditures rather than total receipts. Conditions are specified in which the reservation of local areas for national parks fosters – and conflicts with – this objective. Depending upon the nature of the relevant functions, local government finances may benefit from the existence of national parks in a local government area or be adversely affected by their presence. As far as we are aware, the conditions for this have not been previously specified.

1. INTRODUCTION

There has been considerable controversy in Australia about whether the presence of national parks (or similar natural areas) in a local government area creates an economic burden for local government (e.g. LGAQ, 2000; Ryan and Schwartz,

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2000). Some local governments hold the view that the creation of national parks (or similar protected areas such as some state forests) lowers their rateable property-base and hence their total revenue from rates levied on the unimproved value of property. In addition, many councils believe that costs of council operations do not fall commensurably with loss of tax revenue in such cases. National parks in Australia do not pay council rates.

In contrast, the presence of national parks or similar areas may increase the unimproved value of land, the main tax base for local government in Queensland. For example, Pearson *et al.* (2001) report that properties in Noosa (on the Sunshine Coast of Queensland) that have a view of Noosa National Park (headland section) have a higher unimproved value than those which do not, all other variables being equal. It may also be true generally that the presence of Noosa National Park keeps property values higher throughout the Noosa local government area than would be so in its absence.

While the unimproved value of land is difficult to estimate, it is generally based on the market value of sales of comparable land, exclusive of the value of buildings and other improvements on this land. In Queensland, unimproved land valuations are determined by the state Department of Natural Resources and are reviewed annually in accordance with the Queensland *Valuation of Land Act* (1944), as amended. Such valuations only apply to freehold land.

In the case where improvements exist on the land involved, the Queensland *Valuation of Land Act* (1944) defines the unimproved value of the land as "the capital sum which the fee simple of the land might be expected to realise if offered for sale on such reasonable terms and conditions as a *bona fide* seller would require assuming that at the time at which the value is required to be ascertained for the purpose of this Act, the improvement did not exist". This is further clarified in the Queensland Land Court decision in the case of the *State Insurance Office (Queensland) vs. Valuer General* (1981 7 QLCR at 180) in which it is stated that the unimproved value relates to land "notionally stripped of its improvements and viewed in its natural state but in the environment (with all its inherent advantages, facilities and services, etc.) in which the subject land is actually situated at the relevant date of the valuation". Thus improvement in the surrounding environment may increase the unimproved value of land, and such improvement will normally be reflected in the market price for the land. The law affecting the valuation of land in Australia as a whole is outlined in Hyam (1995); further discussion can be found in Trimboli (1979) and Meeking and Blackwell (1997).

Although reserving some land for a national park can raise remaining property values in a local area, which is probably the case at Noosa, this is a necessary but not a sufficient condition for increasing the rateable property-base in a local government area. This is now examined from a theoretical perspective. As a starting point, the rateable property-base available to a council is considered as a function of the land area reserved for national parks within the council's area. It is assumed that the larger is the rateable property-base the higher is the total amount of rates available to a council. The analysis will subsequently be extended to take

account of the expenditure side of a council's budget and the net budgetary impact of withdrawing rateable land to reserve it for national parks.

2. IMPACT OF NATIONAL PARK RESERVATION ON LOCAL GOVERNMENT TOTAL RATEABLE PROPERTY VALUES AND TOTAL LEVEL OF RATES

Take any particular local government area and assume that its land area is K, that X represents the area of land subject to council rates and $K-X$ is the amount of land allocated to national parks or similar uses and not rateable. The land area $K-X$ is not rateable. The total unimproved value of rateable properties, V, in the local area can then be specified by

$$V = f(X) \text{ where } X \leq K \text{ and } V = 0 \text{ for } X = 0 \quad (1)$$

Of relevance for considering the impact on total unimproved rateable property value of national parks is the nature of dV/dX, the marginal impact on unimproved rateable land value as a result of increasing the quantity of rateable land, thereby reducing the quantity of land reserved for national parks. The expression, dV/dX, represents the marginal change in the total unimproved value with respect to area of rateable land. V/X represents the average unimproved value of land per unit area of rateable land.

It will also be supposed that the total level of rates collected by a council, R, is a positive function of the total unimproved value of its rateable property, V, that is

$$R = g(V) \text{ where } g' > 0 \quad (2)$$

In these circumstances whether or not a council would benefit in terms of its total rates depends upon the allocation of land in its local government area to national parks, and whether

$$V' = f'(X) = 0 \text{ for a value of } X < K \quad (3)$$

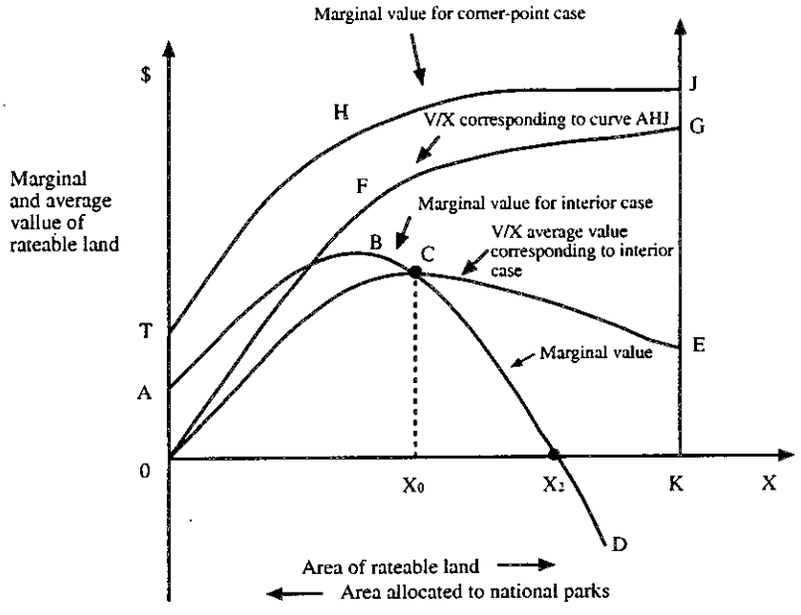
$$\text{or } V' = f'(X) \geq 0 \text{ for } X = K \quad (4)$$

If expression (3) holds, an interior mathematical solution occurs and the council can maximise its rateable property values by ensuring that a suitable quantity of land is reserved for national parks or natural areas. If equation (3) is satisfied for $X = X_2$, rateable property values are maximised when the area allocated to national parks or similar natural areas is $K = X_2$. If equation (4) applies, a corner-point mathematical solution occurs, implying that none of the local area should be allocated to national parks or similar natural areas if the council wants to maximise its rateable property-base and its receipts from rates.

The two cases – an interior solution and a corner-point solution – are illustrated in Figure 1. Two cases are illustrated there, namely an interior solution and a corner-point one. In the former case, average rateable value of land is shown to rise at first as more land is reserved for national parks, then fall as indicated by curve OCE for average rateable property values, V/X. The corresponding marginal curve for total rateable property value V', is as indicated by curve ABCD. This latter curve equals

FIGURE 1

LAND ALLOCATIONS REQUIRED FOR A LOCAL GOVERNMENT TO MAXIMISE TOTAL RATEABLE UNIMPROVED PROPERTY VALUE



zero when X_2 of the local area is available as rateable property and $K - X_2$ is reserved for national parks.

Such a combination of non-rateable and rateable land (involving $K - X_2$ of the local area allocated to national parks and X_2 subject to rates) maximises total rateable property values because $dV/dX = 0$ ensures that the second order condition for a maximum is satisfied, namely $V'' < 0$. Also, the total amount of revenue available to the council from land rates is at a maximum because $R = g(V)$ and $g' > 0$, as set out in expression (2). In other words, the revenue of council from rates is assumed to rise with an increase in the value of rateable property values in its local government area.

To illustrate the corner-point case, property values per unit of property are assumed (in Figure 1) to fall as indicated by curve OFG (in Figure 1) as a greater area of the local government area is allocated to national parks. In this case, the marginal value curve, THJ is above the average value curve and is of positive value throughout. Thus, if any of the local government area is allocated to national parks, the total value of the rateable property-base of the local council declines. Consequently, the total value of rates collected by the council falls. In such cases, councils may have a negative attitude to the presence of national parks in their local region.

Little is known empirically about the shape and positions of the type of functions depicted in Figure 1. However, the relevant functions are likely to vary between local areas. They may also be flat over some ranges. Empirical evidence is needed to throw more light on this matter.

Note also that inverted U-shaped functions do not necessarily imply that an interior solution is optimal. In some cases, it is possible for V' to be positive for all values at $X < K$ and to be positive or zero at $X = K$. Furthermore, as can be seen from Figure 1, maximising the value of rateable property *per unit area* does not maximise total rateable property value. In the inverted U-shaped case, the former result occurs for X_0 (that is for $K - X_0$ reserved for national parks) whereas the latter occurs for X_2 which implies less land reserved for national parks. It is possible that individual landholders might prefer the former situation but the council may prefer the latter. So some conflict between interest groups can arise.

3. NET BUDGET CONSEQUENCES FOR LOCAL GOVERNMENT OF RESERVATION OF LAND FOR PROTECTED AREAS

Ultimately, local government bodies are more likely to be interested in the net impact on their budgets of the allocation of local land to national parks rather than its impact solely on their receipts. Infrastructure within national parks is usually provided and maintained by the relevant state parks and wildlife service organizations. In Queensland, this is the Queensland Parks and Wildlife Service, now a part of the Environmental Protection Agency. Thus local councils are likely to escape some of the costs associated with land allocated to national parks compared to a situation in which this land is rateable property. Nevertheless, local councils are usually responsible for public roads which intersect national parks and for general access roads to the perimeters of national parks, and often for parking areas just outside national park boundaries.

Suppose that local council outlays can be divided into (a) obligatory outlays for infrastructure and (b) discretionary outlays. Furthermore, suppose that obligatory outlays are a function of the total area of its rateable property and can be indicated by the function, $C(X)$. The aim of the council is assumed to be to maximise its discretionary income, Y.

This can be expressed as a desire to maximise

$$Y = g(V) - C(X) \tag{5}$$

$$= g[V(X)] - C(X) \tag{6}$$

where $g' > 0$. This can be simplified to

$$Y = h(X) - C(X) \tag{7}$$

and will be at a maximum when

$$Y' = h'(X) - C'(X) = 0 \tag{8}$$

and the relevant second order condition is met. This is assuming an interior solution occurs.

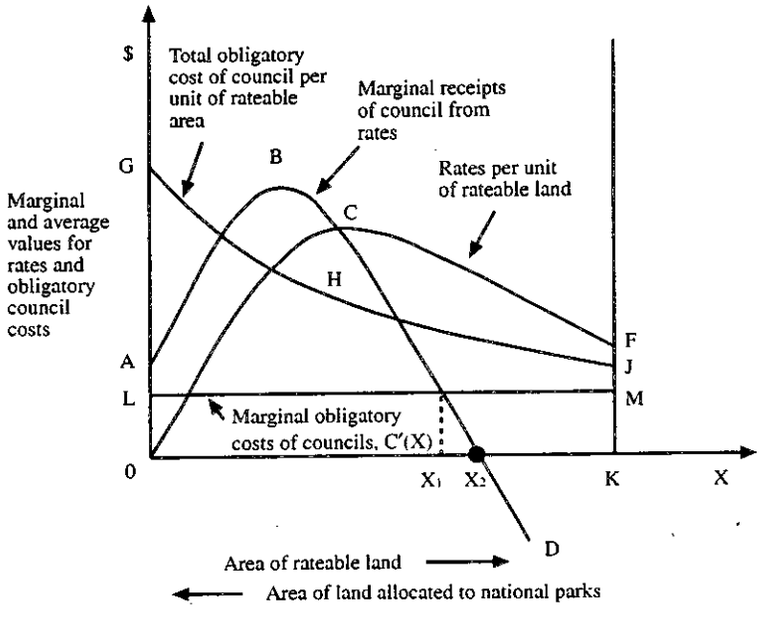
In the interior case, the optimal area of rateable land for maximising the discretionary income of council is that for which marginal value of rates obtained by council equals the marginal cost of obligatory council servicing of this land. Given that the marginal costs of council servicing of land can be expected to be positive for all possible values of X, this implies that the council may maximise its discretionary income by having a larger proportion of its land allocated to national parks than if council was only concerned to maximise its total receipts from rates. A series of diagrams can be used to illustrate several pertinent points.

First, when rateable property values and rates would be maximised by allocating some of the local area to national parks, avoidance of some obligatory marginal servicing costs by council as a result of altered land status from rateable to national park will tend to increase the optimal proportion of the local area to allocate to national parks.

This is illustrated in Figure 2. The curve ABCD represents the marginal value of the rates from council's total land available for rateable purposes. This reaches

FIGURE 2

A CASE IN WHICH A LOCAL COUNCIL MAXIMISES ITS DISCRETIONARY INCOME IF A LARGER PORTION OF ITS LOCAL GOVERNMENT AREA IS ALLOCATED TO NATIONAL PARKS THAN OTHERWISE BECAUSE THIS REDUCES COUNCIL'S OBLIGATORY COSTS



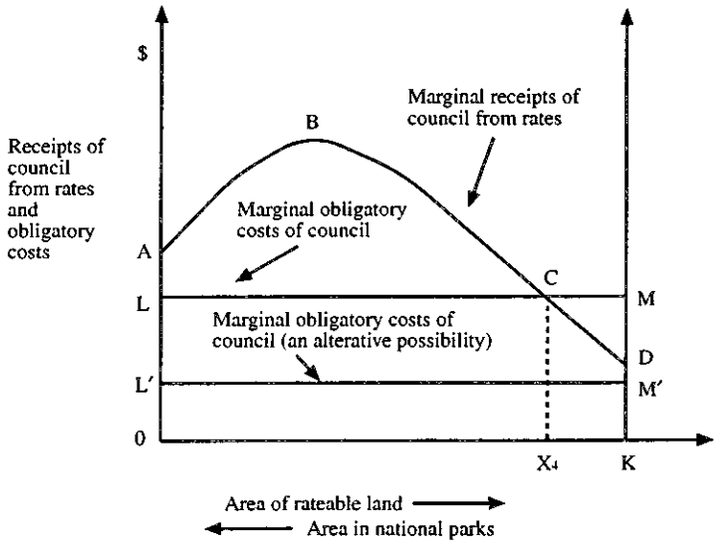
a maximum for $X = X_2$ and corresponds to the situation illustrated in Figure 1. Curve OCF represents average rates per unit of rateable land.

Council's total obligatory costs per unit of rateable land are represented by curve GHJ in Figure 2. For simplicity, council's average variable costs as a function of the rateable land area it services is assumed to be constant and is indicated by the line LM in Figure 2. The difference between this line and curve GHJ represents council's overhead costs on account of its provision of obligatory services. Given that average variable obligatory costs are constant, corresponding marginal costs, $C'(X)$ are also constant and equal to average variable costs. Hence, the line LM is also the marginal obligatory cost curve of council.

It follows in this case that the local council's discretionary income is maximised when $K - X_1$ of its area is allocated to national parks. At X_1 the marginal contribution to council rates from rateable property just equals council's marginal obligatory servicing costs. Thus, equation (8) is satisfied. Taking into account council's avoided cost, it is optimal to allocate an additional area, $X_2 - X_1$, to national parks to maximise the local council's discretionary income, compared to the situation in which the council's obligatory costs are ignored.

FIGURE 3

A CASE IN WHICH REDUCTION OF COUNCIL'S COSTS INCREASES THE DISCRETIONARY INCOME OF A LOCAL COUNCIL FROM HAVING PART OF ITS LOCAL AREA IN NATURAL PARKS, AND A CASE WHERE IT DOES NOT



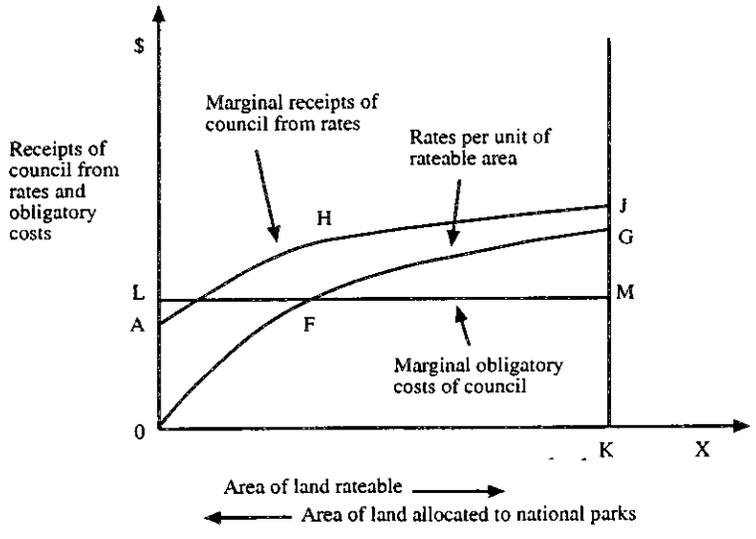
Secondly, the avoidance of obligatory costs by a council, as a result of local land being allocated to national parks, may convert what would be, in the absence of consideration of such costs, a corner-point solution into an interior one. In other words, the situation is altered from one in which no allocation to national parks is optimal from the point of view of local council to one in which some such allocation is optimal.

This is illustrated in Figure 3, in which the curve ABCD represents the marginal contribution to the receipts of local council from land rates of retaining rateable property. In the absence of obligatory council costs, council maximises its discretionary income by having none of its local area in national parks. However, if the local council has marginal obligatory servicing costs indicated by line LM, its discretionary income will rise if $K - X_4$ of its local area is allocated to national parks. But if the local council's obligatory service costs are as low as those indicated by line $L'M'$, the level of the discretionary income of the local council is reduced if any of its local government area is allocated to national parks or similar areas.

Lastly, Figure 4 illustrates another case where a local council loses discretionary income if any of its local area is allocated to national parks. In this case, curve OFG represents council rates on average per unit of rateable land and curve AHJ is the corresponding marginal curve. If LM represents marginal obligatory costs of council for servicing its rateable land, any allocation of its local land area to national

FIGURE 4

A CASE IN WHICH LOCAL COUNCIL HAS REDUCED DISCRETIONARY INCOME IF LAND IS ALLOCATED TO NATIONAL PARKS



parks will reduce the level of total discretionary income available to the local council. A corner-point solution exists in which the council maximises its discretionary income by having all land of its area rateable, and none of it in national parks.

4. DISCUSSION AND CONCLUSIONS

Whether the local government has an economic advantage from the presence of national parks in its local area depends on the specific circumstances. When council expenses do not fall proportionately with the loss in its income from land rates due to land being locked up in national parks, it need not be financially disadvantaged by the presence of national parks in its area. Consider, for example, the situation illustrated in Figure 2. Compared with a situation where no national parks exist in a local area, the relevant local government can gain revenue in this case if some of its area, $K - X_1$, is allocated to national parks. But its costs in proportion to its rateable land rises in this case because of overhead costs. Other favourable cases are possible even if council's variable costs per unit of rateable area rise somewhat due to establishment of national parks.

Naturally, the above analysis requires some simplifying assumptions. For example, land is assumed to be homogeneous in nature, or if heterogeneous, mixed in its qualities in fixed proportions. Such an assumption can be relaxed in principle, but this is likely to make the problem analytically difficult.

Furthermore, the question arises about how to differentiate between obligatory council servicing and discretionary expenditure by council. The division is indistinct at the margin, and in part determined by social perceptions, but nevertheless is a useful distinction. It parallels a similar concept for managerial behaviour introduced by Williamson (1964). Williamson (1964) develops a utility maximisation model for managers of companies in which he assumes that managers have preference for managerial slack as well as greater funds for discretionary investment spending. Also, the assumption that local governments aim to maximise discretionary income may be subject to criticism. Nevertheless, it has some parallels with Niskanen's (1981) view that bureaucracies try to maximise the size of their budget. If this were literally true for local governments, they would try to maximise their rateable property values – the case considered in the second section of this note. But there is also no a priori reason to rule out the modified hypothesis that local government bodies may wish to maximise their discretionary income. If this is the case, they will be somewhat more favourably disposed towards the presence of national parks or similar natural areas in their local area.

While this simplified analysis does help in clarifying many of the important local public finance issues involved in reservation of local areas for national parks, it is also clear that this type of analysis is in its infancy and that little or no in-depth empirical work has carried out on the type of relationship which underlie it.

An additional contentious issue is whether or not national parks increase incomes in their local area or reduce them. Clearly, once again the situation varies with circumstances. However, the loss of local income as the result of the establishment of national parks can be considerable, particularly in developing

countries, as a study of Khao Yai National Park in Thailand indicates (Kaosa-ard, 1995). On the other hand, positive (sometimes substantial) local income benefits can emerge from increased tourism, as seems to be the case for Noosa National Park (Pearson *et al.*, 2000) and as observed elsewhere in Australia, for example in Budderoo National Park in Southern NSW (Gillespie, 1997). Nevertheless, the situation has to be carefully assessed to ensure that all local social costs and benefits are taken into account in the overall social evaluation of the provision of protected areas.

Furthermore, it might be emphasised that this analysis can be applied to local government land areas assigned to uses apart from their allocation to national parks if the areas so allocated are not subject to local rates.[1] Examples include unassigned crown land, municipal parks, some state forest areas, and reserved areas for Aboriginal and Torres Strait Islanders (ATSI). The actual impacts on property values in such cases can be complicated just as they are in the case of the assignment of areas for national parks; much more complicated than is apparent from the above analysis. The above analysis concentrates on general features and thus ignores factors such as the spatial distribution of the assignment of non-rateable land in local government areas.

If land assigned to a national park or protected area is not previously rateable land (as for instance is the case for crown land, and much state-held land), and if the assignment results in higher property values on average in the local government area surrounding the protected area, total rateable property values will rise, even though no rates are payable on the protected area. In addition, if the presence of the park or protected area imposes little extra cost on the relevant local council, council's net revenue can be expected to rise as a result of establishment of the protected area. However, when rateable land must be forgone to establish a national park or protected area, the net income available to the relevant council can be (but need not be) reduced by the establishment of the protected area, as the above analysis demonstrates. Furthermore, where the assignment of land for a national park or protected area pre-empts its future assignment as freehold land, a local council may lose potential future income because the extent of its future rateable land is less than otherwise would be the case. The above analysis may also be used to examine this possibility. In many cases in Queensland, it is this possibility of missing out on a future opportunities to increase their rateable tax-base which is of greatest concern to local councils.

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1 This statement holds for reserved areas for Aboriginal and Torres Strait Islanders (ATSI). ATSI areas are not subject to local government land rates.

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