Some Issues In Granting
Park Concessions in Smaller Countries

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Economics Working Paper #36

July, 1985

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Dedication

1. Introduction

National parks surely stand as the supreme acknowledgement of the importance of a country's natural heritage. The decision to establish a national park is never a product of complete consensus, of course. Even those who support creation of a park often disagree about policies administrators should adopt to maximize the park's value to society.

Providing one source of disagreement is the decision about the extent to which a park's natural features should be sacrificed to development. In part, parks are established to preserve natural features, but those natural features must be altered to allow access and to enhance the experience of park visitors. The competing objectives of preservation and development are recognized in the legal acts which establish parks. New Zealand's National Parks Act is representative of many when it requires that parks be administered so that:

> They shall be preserved as far as possible in their
> natural state. . . (but)
> . . .the public shall have freedom of entry and
> access to the parks. . . (and)
> . . .development and operation of recreational
> and public amenities and related services
> appropriate for the public use and enjoyment
> of the park may be authorized.[1]

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[1]New Zealand, National Parks Act 1980, Part 1, sec. 4(2)(a); sec. 4(2)(e); sec. 15(2). Enactment No. 66, 1980.

Further complicating the decision about the <u>extent</u> of development is the necessity to choose the <u>method</u> of providing development in the park. In particular, park authorities must decide whether to use public resources or allow private firms to provide particular products and services to park visitors.

For some parks, the difficulty in determining the quantity and appropriate method of providing development is compounded because development itself is not valuable to all park visitors. For parks in many smaller countries like New Zealand, developed facilities are attractive mainly to visitors from other countries. For these parks, development enhances the value of the park to foreign visitors but reduces the value of the park to domestic visitors who prefer unaltered natural features.

This paper restricts itself to types of park development which attract foreign tourists but alter natural features of value to domestic visitors. In addition, this paper limits itself to cases where park authorities choose to allow private firms to provide park development. If they permit private development, park managers typically grant firms concessions to provide particular services in the park. The purpose of this paper is to use economic theory to predict the effect on park development of the type of private concession granted, particularly whether a firm is granted an exclusive concession or whether competing firms are allowed to offer the product or service. That is, the

paper compares park development resulting from monopoly concessions to development resulting from competing concessions and evaluates use of the two policies in parks where development is valuable mainly to foreign visitors.

The next section of this paper defines development as alterations to the park which attract foreign visitors. The adverse affect of development and congestion on domestic visitors is considered in the third section. Sections four and five develop the main model and its implications, concluding that monopoly concessions maximize profit from sale of developed services to foreigners and that monopoly development means less development is produced than under a competitive allocation of concessions. Reduced development and fewer foreign visitors resulting from monopoly concessions imply increased value to domestic visitors.

Subsequent sections address potential complications. The effect of price discrimination on profit and output is considered. The dubious value of price controls on both competing and monopoly concessions is presented. Advantages and disadvantages of integrating several products under one concession are discussed.

This paper addresses a limited number of the possible management strategies for national park concessions. The paper does not consider taxation, quantity restrictions, zoning, or government ownership of concessions. Despite its limits, this model is of interest to countries where development of natural areas attracts foreign visitors and

foreign currency at the expense of domestic citizens who either cannot afford to use developed areas or prefer undeveloped areas.

2. Development

Although development within a park can take many forms, development considered here has specific characteristics. Park development is defined in this paper as changes in the natural area that appeal to foreign visitors. Development is any alteration in a park's original condition, whether foot trails or luxury resorts, attractive to foreign tourists. To yield interesting results, development in a park must also have negative value to domestic visitors. That some alterations in a park are desired by domestic visitors is indisputable. Of concern here, however, are alterations in excess of those desired by domestic visitors. Development is whatever foreigners like and natives dislike.

Development has two dimensions. The first is the pure quantity or capacity dimension. The number of restaurant tables is a measure of quantity of development. An increase in the quantity of development means an increase in the ability of the park to accommodate foreign visitors. Naturally, additional capacity is costly to produce.

The second dimension of development is its quality or intensity. An increase in this dimension of development does not increase the number of foreign visitors that can be

accommodated, but does make the park more attractive to those visitors. Improvements in hotel rooms in a park is an example of an increase in quality of development. The number of rooms, and thus capacity of the park, has not changed, but the value of those rooms to a foreign visitor has increased. An increase in quality of development increases the amount foreigners are willing to pay to visit the park.

Both dimensions of development are costly to produce. Both consume resources which have alternative use in the domestic economy. Any decision about development by private firms or by park managers must count this cost against the benefit of development. Direct cost, however, is only one of the sacrifices required to provide park development.

3. Domestic Visitors, Development, and Congestion

Foreign visitors are not the only individuals affected by park development. Policy suggested by this model must incorporate assumptions about the impact of park development on domestic visitors as well. Domestic visitors are assumed not only to eschew developed facilities, but to actively dislike them. Increases in development reduce the park's value to domestic visitors. The park is valuable to domestic visitors for its natural features, not its development.

An individual living in the country visits the park if the value (reservation price) of the visit exceeds its cost,

primarily travel cost. Market demand is the appropriate summation of individual reservation prices. Without other restrictions, the number of domestic visitors increases until value to the last visitor is equal to travel cost. Increases in development shift back the market demand curve for the park, reducing the number of domestic visitors.

It would be incorrect to assume a park's value to domestic visitors is altered only by the extent of development. Such a restriction neglects an important additional characteristic of recreation within parks: congestion. Largely because entry is not restricted,[2] people tend to continue arriving at parks past the point where congestion becomes an important consideration. Thus, the demand function of each potential park visitor must include congestion as an independent variable. An increase in congestion--an increase in the number of other visitors-- reduces each individual's demand for the park.

A park visit's value to a domestic visitor falls as the number of other park visitors increases.[3] In the simple case, it does not matter if the other visitors are foreigners since anyone's presence causes undesired congestion. By implication, an additional foreign visitor

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[2]Even with restricted entry or admission fees, congestion may be a factor. Because the number of visitors is smaller, the magnitude of the congestion effect is correspondingly less important, however.

[3]That it reduces the value of a visit is one of several ways to view the effect of congestion on an individual. For some examples see Newbery (1975) and Price (1980).

means the last domestic visitor decides not to visit the
park.[4] Since the last domestic visitor's value was just
equal to cost, an additional person in the park reduces that
visitor's value and means the visit is foregone. A more
complicated assumption, which has no effect on the model's
conclusions, allows an individual to have a different
attitude toward congestion caused by foreign visitors than
congestion caused by domestic visitors. In this case, one
additional foreign visitor may reduce the number of domestic
visitors by more than or, more likely, less than one.[5]

In summary, park development affects domestic visitors
both indirectly and directly. Because it attracts foreign
visitors, development indirectly influences the park's value
to domestic visitors. Additional foreign visitors mean
additional congestion, fewer domestic visitors, and lower
value to domestic visitors. The park's value to domestic
visitors is directly affected by the quantity and intensity
of development since development alters attractive natural
features.

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[4]Foreign visitors are likely also adversely affected
by congestion. However, the paper ignores the effect of
congestion on foreign demand, thus avoiding the (unlikely)
question of whether entry by domestic visitors should be
restricted in order to increase revenue from foreign
visitors. In New Zealand, for example, restricting entry by
domestic visitors would be politically impossible. It is
easy to imagine that foreign visitors are culturally
conditioned to accept more congestion than domestic
visitors. If so, ignoring congestion effects on foreigners
may not do too much violence to reality.

[5]Foreign tourists are concentrated in developed areas
of the park and so have limited affect on domestic visitors.

4. Comparing Monopoly and Competition

Faced with the necessity to control quantity and intensity of development, many park authorities choose to provide development using government resources. Public production of goods and services in parks is common. Of interest to this paper, however, are those cases where park managers grant permission for private firms to provide facilities within parks.

Park managers place a variety of restrictions on concessions and use a variety of techniques to grant concessions within parks. At the most fundamental level, however, park managers decide whether to grant exclusive right to provide a product or service or to grant some non-exclusive right. That is, the park manager chooses to create a monopoly or to encourage competition in providing development.

Economics provides an extensive body of theory to predict behavior of monopolistic and competitive industries. This paper does not add to that theory but does apply it to the model of optimization of small-country park development. In particular, the theory of monopoly and competition is used to predict the degree of development in a park under monopoly and competing concessions.

Although it is uncommon to do so, park managers could allow unrestricted provision of services within the park. With no entry restrictions, firms open facilities in the

park as long as they anticipate earning economic profit. Firms enter the park and produce additional development until average revenue from development equals average cost. Because of their aversion to unrestricted development, managers usually limit the number of competing concessions, if competing concession are permitted at all. It is these more common limited concessions that are defined as competing concessions here.

If the number of concessions granted to provide a given service is greater than one but less than would occur with no restriction on entry, firms behave in a manner different than predicted by the economic model of perfect competition, and respond in one of several ways. One possibility is that firms tacitly or openly collude and act like a monopoly. Firms may also act in a manner consistent with some model of cooperative oligopoly. The first result, being identical to monopoly, is considered in the monopoly section of the paper.

The second possibility implies some result between competition and monopoly so long as cooperation is imperfect and given the temptation to cheat on any cooperative agreement. If choices by firms in a cooperative oligopoly yield greater development and lower profit than monopoly, the policy advantages of monopoly remain and the discussion of competitive concessions below apply as well to cooperative oligopoly.

The third possibility, of interest to this section, is that firms compete. Even though entry is restricted, the nature of competition between firms is essentially similar to competition under unrestricted entry. Each firm tries to attract tourists by reducing price. Depending on assumptions about response by firms, price may fall to marginal cost. If firms are described by some non-cooperative oligopoly, price above marginal cost is possible although competition in product quality erodes economic profit. This result is quite consistent whether the model is of competitive firms where entry is restricted or for models of non-cooperative oligopoly, Cournot-Nash equilibria being an example.

Firms also compete by increasing product quality. Here quality is a characteristic which is readily observed and appeals to foreign visitors. In trying to attract foreign visitors, competing firms increase quality for the same reason they reduce price.'

The pressure on competing firms to reduce price and increase quantity and quality (intensity) is a result of the fact that a competing firm's price and output decisions have

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'This view of quality is somewhat different from common practice where quality is a valuable characteristic not apparent to consumers before purchase. If quality is not readily measured, firms may misrepresent themselves and compete by reducing quality to reduce cost. If quality is measurable, predictions about competition and monopoly also depend on whether quantity and quality are substitutes, the degree of substitutability, and behavior of higher order derivatives of the consumer demand function. Only unusual changes in this paper's model would alter conclusions here. See the appendix.

an external effect on other firms. When it increases
quantity of development, a competing firm ignores the effect
of its decisions on other firms. The competing firm ignores
the fact that increases in quantity ultimately reduce price
received by other firms. The firm also ignores the fact
that increases in its development quality (at a given price)
reduce demand for development produced by other firms.

By contrast, a monopoly recognizes the effect of its
output and intensity decisions, since all consumers are
customers of the monopoly. The monopoly only cares about
increases in quantity that increase profit given the lower
price. The monopoly only cares about increases in intensity
of development as they increase total willingness to pay for
development by foreigners. Because it recognizes that
effects external to competing firms are internal to the
monopoly, the monopoly produces less development quantity
and less development intensity than produced by competing
firms.

5. Monopoly is Superior

A park manager's objective is to allow that quantity
and intensity of development which maximizes net social
welfare. For the usual applications of welfare economics,
net social welfare is defined as the sum of consumer and
producer surplus, the area under the appropriate demand

curve[7] less opportunity cost of production. By this definition, monopoly is considered inferior to perfect competition since the monopoly produces an output at which some consumer and producer surplus is lost.

However, the manager of the sort of park considered in this model does not maximize the usual social welfare function. The manager seeks to maximize the nation's net social welfare, a function of the happiness of the nation's citizens. As such, a manager is interested in foreign visitors only insofar as they spend valuable foreign currency within the country and to the extent that their presence makes domestic visitors worse off. Development, which attracts foreign visitors, is valuable only as it earns foreign currency and costly as it discourages domestic visitors and consumes the country's valuable resources. Making the usual assumptions about functional forms, maximization of social welfare requires choosing that level of park development which equates marginal gain in revenue from foreign tourists (less production cost) with marginal loss of consumer surplus from domestic visitors (less travel cost).

Apparently contradicting traditional theory, this paper concludes monopoly concessions are superior to competing concessions. Not surprisingly, the contradiction

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[7]Choice of the appropriate demand curve to measure consumer value or consumer surplus is a subject of considerable debate but is of no interest here. The discussion here only uses directions of change in areas under demand curves, not exact magnitudes.

is only apparent. Given its assumptions, this paper's conclusion is easy to understand and is consistent with traditional theory. Simply stated, monopoly concessions are superior to competing concessions because monopoly concessions result in more profit from foreign tourists and greater value to domestic visitors.

Foreign visitors to a park are only valuable as they spend foreign currency in excess of cost. A monopoly selling developed facilities to foreigners maximizes foreign currency revenue less operating cost. Competing concessions earn less economic profit than a monopoly, perhaps zero economic profit. Since foreigners are only valuable for their currency, the usual normative judgments against monopoly do not apply. The deadweight loss of consumer surplus due to monopoly pricing is not important since foreign consumer surplus is not important. The usually unimportant (or undesirable) transfer of consumer surplus to monopoly not only is important, but is a desirable transfer from foreigners to a domestic firm.

The profit in foreign currency earned by a monopoly is the first of two reasons monopoly concessions are superior to competing concessions. A monopoly concession is also preferred by domestic visitors. Since they gain value from a park's natural features, any reduction in development makes domestic visitors better off. As previously shown, a monopoly concession produces a lower quantity and quality of development than competing concessions. Domestic visitors

prefer monopoly to competition since less development occurs
under monopoly.

Because it produces less development, a monopoly
concession also serves fewer foreign tourists and, since the
number of foreign tourists is smaller, the number of
domestic visitors increases. Domestic visitors are
sensitive to congestion produced by additional visitors of
any kind. If foreigners do not visit, domestic tourists
take their place.

The conclusion that monopoly is a superior producer of
park development is a result of the interesting assumptions
of the model. Naturally, the conclusions here may be
affected if these assumptions are altered. Subsequent
sections of this paper consider the affect of adding some
complexity to the assumptions.

6. Price Discrimination

The simple theory of monopoly assumes only one price
is charged. The theory's conclusions change when the
monopoly is permitted to price discriminate, price
discrimination being defined as charging different prices to
different consumers, prices based on willingness to pay.

A monopoly which price discriminates earns more profit
than the simple monopoly, profit from two sources. For one,
consumers who purchase the product from the simple monopoly
now pay a higher price, at the extreme, a price equal to
maximum willingness to pay. Second, the price

discriminating monopoly sells its product to consumers who did not purchase from the simple monopoly. A price discriminating monopoly sells its product as long as the price it can charge a consumer or group of consumers is higher than cost of production. If completely successful, the last unit is sold to the consumer who is just willing to pay the cost, the same consumer who would purchase the last unit of output under perfect competition. This perfectly price discriminating monopoly produces the same output as under perfect competition, and earns as additional profit the entire consumer surplus present under perfect competition.

To a park manager, the additional profit earned by a discriminating monopoly makes it more attractive than the usual monopoly. Additional profit is earned from foreign tourists whose currency is valuable. To the extent that a price discriminating monopoly increases output, the superiority of monopoly over competition in supplying development is not assured, however. Since a price discriminating monopoly increases development, domestic visitors are worse off.

Either of the monopoly situations is superior to competition since each either implies more profit from foreigners and, at worst, no more development than under competition. However, without measuring demand curves and assigning relative weights to foreign currency and domestic

consumer value, it is not possible to determine which of the monopoly situations is superior.[8]

7. Price Controls

One popular policy chosen by park authorities who grant private concessions is to regulate prices charged. Two types of price control are considered here: price ceiling on standard monopoly and price floor on price discriminating monopoly.

The most common price control imposed when a concession is granted is a ceiling on the price charged by a monopoly not engaged in price discrimination. This most common price control is also the most clearly incorrect choice. In the usual case, a price ceiling is used to force a monopoly to increase output and to reduce profit earned by the monopoly. Obviously, these two effects are exactly the opposite of the desired result for the manager of the sort of park considered in this model. The price control reduces the valuable currency earned from foreign tourists and increases quantity of development, thus making domestic visitors worse off.

The only potential advantage of a price ceiling on a monopoly is that the monopoly may evade the price ceiling by reducing the quality of development. If the price ceiling is defined on quantity and not accurately defined over

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[8]The same difficulty is present in evaluating an entirely different policy: forbidding any development.

quality, the ceiling can be evaded by reducing the quality of development. It is hard to imagine such an effect justifies the other disadvantages of the ceiling, however.

The second type of price control, of which no obvious example exists, is a price floor on a discriminating monopoly. Assume the monopoly can perfectly price discriminate. If a price floor is imposed above what otherwise would be the competitive output, the monopoly reduces output, since the monopoly would otherwise produce the competitive output. In fact, the price floor could be used to control the output of the monopoly since the monopoly always produces up to the point where the marginal value of additional development to foreigners is equal to the price floor.

Setting price so that quantity chosen by the price discriminating monopoly is the same as that chosen by the standard monopoly yields a result superior to the standard monopoly. Quantity of development is the same as under the standard monopoly, but profits earned from foreigners are higher. The price discriminating monopoly captures all consumer surplus lost by the standard monopoly but produces no more output. In fact, since any output can be chosen by the park authority simply by choosing an appropriate price floor, a socially perfect output choice is possible.

A complication appears if the monopoly cheats on the price floor by altering the intensity of development. Using the opposite argument as presented for a monopoly price

ceiling, the monopoly may increase the intensity of development in response the the price floor. Such an alteration makes domestic visitors worse off and reduces the effectiveness of a price floor in controlling development.

In summary, the usual price ceiling on monopoly concessions is a poor policy in the case of small-country parks since it reduces profit earned from foreigners and increases quantity of development. A price floor on a discriminating monopoly may be useful in controlling quantity of development, depending on the degree to which alterations in quality are used to avoid the price control.

8. Non-Competitive Services

The park manager is faced with more than adopting a policy toward competing concessions. Some concessions provide services which do not compete but are related to one another, a park restaurant and housing accommodations being an example. The park manager may choose to allow separate firms to provide such services or permit a kind of conglomerate merger by allowing one firm to offer several of these services. Two related effects of this integration are relevant in the case of park development aimed at foreign tourists.' First, such integration overcomes some of the the public goods aspects of advertising. Second,

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'The various managerial and pecuniary economies of conglomerate merger are not considered here in favor of addressing aspects unique to this particular type of national park.

integration can assure consumers uniform quality given limited information.

Advertising provides potential foreign visitors valuable information about characteristics of the advertised product. Part of what makes park facilities appealing is the attractive features of the park itself. If one firm advertises the attractions of a park in conjunction with facility advertising, other firms in the park benefit. Visitors attracted to the park because of the advertising use some unadvertised facilities. Because of this public goods characteristic of advertising, firms as a group tend to provide too little advertising. Each firm ignores the benefit to other firms of its advertising and exploits the advertising of other firms. A single integrated firm overcomes the public goods problem since advertising only benefits that firm. The integrated firm produces that quantity of advertising which maximizes the value of all advertising less cost.

Similar reasoning suggests an integrated firm can assure uniform quality from the various components of a developed area. The cost to a foreign visitor of learning about the quality of each service in an area may be substantial. The knowledge that all services in a park are provided by one organization assures the visitor uniform quality from a variety of services.

Of course, sufficient advertising may be provided without vertical integration. Local tourist associations,

local government agencies, or national tourist agencies provide group advertising funded through various contribution schemes or taxes. In this case, integration affords no advantage. Valuable quality information may be provided without integration also. Tour books, ratings, and associations can provide information about quality. Here firms producing development can jointly produce information or independent organizations can gain by selling information.

11. Conclusion

If parks have particular characteristics, park managers should grant firms exclusive right to provide products or services within the park. Thus, contrary to the usual case, the manager is wise to allow monopoly provision of park development. The particular characteristics include that park development is only attractive to foreign visitors, that foreign visitors are only valuable for the currency they spend, and that development and congestion reduce the park's value to domestic visitors.

A park manager seeks to maximize the sum of foreign currency earnings less production cost of development and consumer surplus of domestic visitors less travel cost. Permitting monopoly to provide development means maximizing net revenue from sale of services to foreigners. Monopoly concessions also mean less development is produced than

under competing concessions. Less development and fewer foreign visitors mean increased value to domestic visitors.

Economists live in a world of curious conclusions drawn from curious assumptions. This paper does not depart that world. With luck, however, the curious conclusions here address real-world problems of policy makers.

Appendix A: Mathematical Model of Monopoly and Competition

One reasonable approach to mathematically describe behavior of competing and monopolistic producers of park development is a model used most recently by Keith Leffler (1982). Leffler's approach is particularly useful for deriving predictions about differences in product quality under monopoly and competition.

This adaptation assumes park development has two characteristics desired by identical foreign tourists. Quantity of development (X) is the characteristic explicitly priced by producers. The second characteristic (Z) is some other desired aspect of development. Producers combine the two characteristics, implying quality of development (q): the proportion of Z per unit output (Z/X). Price per unit X is obviously positively related to q.

An example of this combination of quantity and quality is a hotel room which has some level of quality, perhaps measured as floor space. For a given room, greater quality means more floor space (square metres per room).

Those consumers using developed facilities, foreign tourists, derive value from the two characteristics.[10]

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[10] Expenditures on other goods are assumed constant and so their value to consumers is ignored, Leffler (1982) p. 957.

(1) Total value = t(X,Z) $t_x, t_z > 0$ $t_{xx}, t_{zz} < 0$

Since quality (q) is the ratio of Z to X, marginal value or demand for an additional unit of development (X) includes the value of additional development and the value of the additional quality per unit of development (Z) and is written in a simple form.

(2) Marginal value = $t_x + t_z q$

Firms maximize revenue from sale of development less production cost. Production cost is assumed a function of the two characteristics.

(3) Total Cost = c(X,qX)

Leffler shows that competitive equilibrium maximizes the sum of consumer and producer surplus.

(4) Maximize t(X,qX) - c(X,qX) w.r.t. X,q

Maximization implies first order conditions equating marginal value and cost of quantity and quality.

(5) $t_x + qt_z = c_x + qc_z$

(6) $t_z = c_z$

A monopoly producer of park development maximizes profit given a downward-sloping demand (marginal value) for units of X for each level of quality and is assumed to use the same cost function as under competition.

(7) Maximize $X(t_x + t_z q)$ - c(X,qX) w.r.t. X,q

As in the usual monopoly models, first order conditions include consideration of the changes in marginal value as quantity increases.

(8) $t_x + t_z q + X(t_{xx} + 2t_{zx} + q^2 t_{zz}) = c_x + qc_z$

(9) $X^2 t_{xz} + Xt_z + qX^2 t_{zz} = Xc_z$

The respective first order conditions for competition and monopoly are identical on the right side of the equality. On the left side they differ by the following:

(10) $X(t_{xx} + 2t_{zx} + q^2 t_{zz})$

(11) $X(t_{xx} + 2t_{zx} + q^2 t_{zz})$.

Line (10) shows that, for any fixed level of quality, the monopoly produces less development than under competition. This is the usual result. Condition (11) shows that a monopoly producer of development ordinarily produces lower quality than under competition. Results would be ambiguous except that, in the case of park development, characteristics desired by foreigners and produced by firms are typically substitutes ($t_{xz} < 0$).[11]

Application of Leffler's mathematical model confirms that a monopoly producer of park development produces both a lower quantity and quality of development than under competition. The advantage that these results are explicit and easy to derive is partially offset by unrealistic assumptions about preferences of foreign visitors.[12]

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[11] Leffler shows that for condition 11, sufficient convexity of t_{zz} also leads to monopoly producing higher quality, Leffler (1982) p. 696, note 13.

[12] If foreigners have different preferences for development characteristics, both monopoly and competitive

Appendix B: Mathematics of Domestic Visitor Value

The previous section shows a simple mathematical model predicting the differences in development quality and quantity between monopoly and competition. The model predicts that a monopoly produces less development and attracts fewer foreign visitors than do competing firms. A park manager wishes to maximize value of the park less cost to the nation's citizens. A monopoly producer of development earns greater profit than competing producers and, as this section shows, monopoly concessions also yield greater value to domestic visitors than competing concessions.

The model must show the effect on domestic visitor value of increases in the number of foreign visitors and of increases in development. Let the net value of the park to domestic visitor i be given by the following:

(11)   Net value = $V^i(X,G) - C^i$ V_x, $V_g < 0$

Where   V = the reservation price of domestic visitor i

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firms produce a variety of products with different proportions of the characteristics (Leffler, 1982, p. 957, note 5). Lancaster's (1979) model of monopolistic competition is a useful framework in this case. Lancaster's model cannot compare quality under competition and monopoly since more than one quality product is produced in each market structure. Monopoly does earn greater profit than competition. In addition, under conditions relevant to park development, monopoly produces lower total output than competition (Lancaster, 1982, p. 283). Under the same conditions, the monopoly also produces a smaller variety of products than does a competitive industry. The first two of these implications confirm results in this paper's model. The third is of no great interest here.

and reservation prices are arranged in
order of decreasing reservation price,
X = quantity of development,[13]
G = the number of foreign visitors (F) plus the
number of domestic visitors (N), G=N+F, and
C = travel cost, assumed identical for all domestic
visitors.[14]

Domestic visitors continue to enter the park until the
cost of travel is just equal to the reservation price for
the last (Nth) visitor.

(12) $v^N(X,G) = C$

Total value of the park to domestic visitors is the
sum of reservation prices less travel cost to those who
visit the park.[15]

(13) Total value = $\sum_{i=1}^{N} [v^i(X,G)-C]$

The equilibrium condition in equation (12) defines the
number of visitors N as an implicit function of C, G, and X.
Derivatives of the equilibrium condition incorporating the
implicit function yield the comparative statics sought here.
What is the effect on domestic visitors of an increase in

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[13]Quality of development is omitted to reduce
mathematical complexity. Its inclusion in no way alters
results.

[14]Travel cost need not be assumed identical. If each
traveller has different cost, the V function can be defined
as rank-ordered reservation prices net of travel cost for
domestic visitors. Travel cost is then included in the V
function. Results are not affected.

[15]The reservation price and cost to those who do not
visit is ignored. They gain no value from the park. In
fact, the value of the park to any citizen who does not
visit is assumed zero. Inclusion of this latter (option
value) makes conclusions from the model even stronger.

the number foreign visitors? Take the derivative of the
equilibrium condition (12) with respect to F where G=F+N.

(14) $\quad N_f V_g + V_g = 0$

(15) $\quad N_f = -1$

An additional foreign visitor means one domestic
visitor chooses not to visit. The reduced number of
domestic visitors coupled with the lower value to the
remaining domestic visitors means an increase in the number
of foreign visitors reduces the net value of the park to
domestic visitors. Since competing concessions attract more
foreign visitors than monopoly concessions, monopoly
concessions are preferred by domestic visitors.

Increases in development also make the net value of
the park to domestic visitors fall. Take the derivative of
equation (12) with respect to X.

(16) $\quad V_x + V_g N_x = 0$

(17) $\quad N_x = -V_x/V_g < 0$

Additional development reduces the number of domestic
visitors. Fewer domestic visitors and lower value to the
remaining visitors means increases in development reduce net
value of the park. Since competing concessions produce more
development than monopoly concessions, monopoly concessions
are preferred by domestic visitors.

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