

# **Are Roads Public Goods, Club Goods, Private Goods, or Common Pools?\***

by

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## **I. Introduction**

An answer to the question posed in the title is offered in the following presentation by theoretically differentiating between the four concepts in the question and the institutional conditions that might create them, and then by examining the historical evolution of road provision systems in the United Kingdom. One conclusion is that roads are never public goods in a Samuelson (1954, 1955) sense. This answer may be surprising, since highways and roads are frequently cited as "important examples of production of public goods," ( Samuelson and Nordhaus 1985: 48-49). The second conclusion is that specific roads and road systems can be and have been (and indeed, still are in various places around the world) club goods, private goods, or common pools, depending upon the institutional environment in which the roads are provided.<sup>1</sup> To support these conclusions, the following presentation is divided into six sections beyond this introduction, beginning in Section II where definitions of public goods, club goods, private goods, and common pools are offered and compared.

An extensive system of voluntarily created and maintained roads existed in medieval Great Britain, but actions taken by various kings undermined the incentives to maintain the system. In order to understand both the voluntary arrangements and their breakdown, Section III presents a theoretical examination of the institutional characteristics that apply for successful voluntary provision of a club good. The analysis is then employed in Section IV to describe the early history of voluntary community-level road provision in Great Britain, as well as the actions by kings that broke down the incentives for members of some communities to cooperate in road provision. In order to make up for the reduction in voluntary road provision, the state was forced to create new institutions. Therefore, Section V follows with a theoretical examination of alternative institutional arrangements that were established. One was a mandated-contribution system which attempted to force local communities to maintain roads, but this system failed. This was followed by decisions to allow private entities to produce roads and control access so tolls could be charged.<sup>2</sup> Section VI considers the rise and fall of Great Britain's mandated system and then its toll road arrangement. Despite initial success and widespread use of toll roads, however, the political manipulation of institutionalized incentives and tolls led to significant inefficiencies within this system and its ultimate demise. As a consequence, public financing of

free access roads evolved, but the result is a tragedy of the commons, not a Samuelsonian public good. Conclusions in Section VII briefly note the substantial mix of club and private roads that still exist around the world along side publicly provided common pool systems. This Section also contends that similar analysis applies to a number of other so-called "public goods".

## **II. Public Goods versus Private Goods, Club Goods, and Common Pools**

Samuelson's (1954, 1955) seminal analysis indicates that the key *characteristics of public goods are: (1) non-excludability, and (2) non-rivalrous consumption, which combine to produce (3) free riding, and therefore, (4) "private provision of these public goods will not occur" (Samuelson and Nordhaus 1985: 713) because coercive power is required to collect from non-paying free riders.*<sup>3</sup> As a contrast, private goods are often characterized as being completely rivalrous in consumption in that one individual's use of the good means that it is completely gone so no other individual can use it. However, excludability produces the same consequence, as the owner can dictate use and prevent others from using the good. Indeed, "private" generally refers to sole ownership and therefore the control of access, so the key characteristic of a private good, as the term is used here, is that it is owned by a single economic entity (e.g., an individual, a firm) with a right to exclude any other user. Thus, a private good need not be entirely consumed as the result of a single use (e.g., a road on a privately owned farm with a locked gate which can handle more traffic than it does; the viewing of a movie in a theater with several seats). In such circumstances, the owner can either use the good repeatedly before it is ultimately depleted, or allow access by others if the fully internalized benefits of doing so exceed the fully internalized costs, but the good still can only be non-rivalrous to those individuals who are given access permission by the owner (e.g., people who pay a toll; those who pay to see a movie). Therefore, in comparison to a public good, a *private good's characteristics are: (1) excludability, (2) possibly, but not necessarily, rivalrous consumption (non-rivalrous consumption for those who obtain permission to access also is possible), (3) non-owners must pay for use, and (4) private provision occurs if it is allowed and profitable.*

Define a club to be a voluntarily-formed close-knit group of individuals who have a multi-dimensional web of mutually beneficial interactions. Since the club is voluntary, individuals who do not cooperate with others in the club are not likely to be accepted as members (i.e., individuals voluntarily accept

membership and are voluntarily accepted for membership). A club good is one that is produced within (or purchased by) a club and then consumed by all the members of the club. That is, access is free to members of a club (e.g., residents of a gated development whose homeowners' association owns the roads in the community), but not for non-members. Thus, a club good differs from a private good in that it "belongs" to and is used by a limited voluntary association of decision-makers who face collective decision-making costs. If high decision-making costs prevent an agreement, the good may not be produced, since no authority in the club has coercive power to mandate that individuals contribute. Therefore, if the good is produced (or purchased), it is done so voluntarily by the cooperating club members. Furthermore, for individuals outside the club, access requires obtaining permission from the club (members may agree to allow access by at least some non-members, depending on the costs and benefits of doing so in the context of their collective decision-making process). Such a good also can be non-rivalrous in consumption for those with access, *given* the size of and restrictions on access created by the club, so in this sense it can look like a public good.<sup>4</sup> Such non-rivalry applies *because* access is limited, however. For comparison then, *a club good is: (1) non-excludable for club members but excludable for outsiders, (2) possibly (but not necessarily) non-rivalrous for those with access, (3) subject to collective decision-making costs, but within a voluntary close-knit group that can exclude free riders, and (4) voluntarily produced if high decision making costs do not prevent it.*

The common pool terminology usually is applied to a natural resource such as a fishery, but it also can describe many goods and services that are freely provided for some reason [often by the state (see Stroup 1964; Neely 1982; Benson 1990: 97-101; Rasmussen and Benson 1994: 17-37), but also perhaps by a private entity - e.g., consider a shopping mall parking lot before Christmas]. A common pool exists when all people (or simply a number of people who face very high collective decision making costs) have free or "common" access to a scarce good or resource that is subject to rivalry in consumption because one individual's use diminishes the benefits that another user gains. This diminution often involves crowding (congestion) and a deterioration in quality for all users (e.g., highway travel time rises, surface damage increases) as the result of over use. This has been called the "tragedy of the commons" (Hardin 1968), of course, and it arises as a negative externality because no user is fully liable for the cost of his or her use. Crowding and rapid quality

deterioration is not the only consequence of common access to a rivalrous good or resource, however. The deterioration in quality could be offset with appropriate investments in maintenance, but individuals with common access do not have incentives to make such investments because they cannot charge others who consume the benefits or prevent them from doing so (other drivers will add trips on the highway), thus creating a positive externality problem in the form of underproduction of maintenance. Indeed, while it might be contended that "non-excludable public goods" and "free-access common pools" are simply two terms for the same concept because the under-investment implications are the same, this inference is inappropriate.<sup>5</sup> As Minasian (1964: 77) explains, the public goods terminology often is "asserted" to imply that non-excludability is an intrinsic problem that cannot be resolved without coercing free riders into paying for the good. In contrast, the common pool terminology emphasizes that incentives arise because of the legal or customary definition of property rights, and therefore, that another rights assignment can alter incentives. To emphasize the distinction, *a common pool is characterized by: (1) non-excludability, (2) rivalrous consumption (congestion), (3) excess use because of negative externalities, and under-maintenance due to positive externalities, and (4) either production by nature (a resource) or by someone with incentives to provide it free of charge* (often the state, as discussed below).

With these definitions in mind, let us consider the institutional environment that creates the potential for roads as club goods, and then turn to the actual development of such roads in Great Britain.

### III. Collective Decision-Making Costs and Club Goods

**III.1. A Small Club.**<sup>6</sup> Assume that two individuals, Dick (D) and Jane (J), with utility functions

$$(1) \quad v_i(F_i, R) = F_i R, \quad i = D, J,$$

form a club and are in a position to produce and jointly consume a club good. In this utility function,  $F_i$  is the number of units of a pure private good (something like food, which is assumed to be completely excludable in consumption, perhaps for technological reasons or perhaps because each individual has a right to exclude the other from using the good), while  $R$  is the club good for this two-person community.  $R$  is non-rivalrous in consumption and freely accessible to Dick and Jane. Further assume, for simplicity, that the production technology is such that a specific combinations of resources is needed to produce one unit of  $F$  and the same combination is required to produce exactly one unit of  $R$ , so each individual owns resources (e.g., land and

labor hours) dictating a capacity to produce  $X_i$  total units of  $F_i + R$ .<sup>7</sup> For expository purposes also let Dick owns enough resources so that  $X_D \geq X_J$ . To maximize utility each individual decides how to allocate resources between  $F$  and  $R$ , but the amount of the club good,  $R$ , each consumes is  $R = R_D + R_J$ .

Consider the Cournot-Nash non-cooperative outcome as a benchmark against which other solutions can be compared. This solution arises when Dick and Jane adopt a set of strategies,  $S_i^C$  (superscript  $C$  represents the Cournot-Nash solution from this point forward), which establish the best response that each individual can make to the other individual's allocation decision:

$$(2) \quad S_i^C = (F_i^C, R_i^C).$$

With this set of strategies, the utility maximizing problems are solved by maximizing<sup>8</sup>

$$(3) \quad v_D = F_D R = (X_D - R_D)(R_D + R_J^C)$$

and  $(4) \quad v_J = F_J R = (X_J - R_J)(R_J + R_D^C).$

Since both individuals are assumed to have the same utility function, the outcome of their strategic maximization is determined by their initial production capacities ( $X_i$ ). Consider an example. Assume that  $0.5X_D \leq X_J > 0$ , which produces unique Cournot-Nash equilibrium strategies  $S_D^C = (0.5X_D, 0.5X_D)$ , and  $S_J^C = (X_J, 0)$ . This means that the total amount of the club good,  $R$ , produced is  $R_D = 0.5X_D$ , and that Jane free rides on Dick's efforts, although importantly, Dick still chooses to produce the good. Thus, a Cournot-Nash equilibrium generates utility levels for Dick and Jane of:

$$(5) \quad v_D^C = 0.25 X_D^2,$$

and  $(6) \quad v_J^C = 0.5 X_D X_J.$

While other Cournot-Nash outcomes are obviously possible depending on the distribution of production capacities,<sup>9</sup> the key implications derived below using this one do not change. Therefore, this solution appears as point C in Figure I, and it will be compared to other possible outcomes. After all, the Cournot-Nash solution is not likely to arise in a small club. It is widely recognized, for instance, that both game theory and experimentation demonstrates that cooperation can arise through repeated interactions which create both a willingness to cooperate and a potential to punish non-cooperative behavior through strategies like tit-for-tat [and others discussed by Ridley (1996: 53-84)]. A repeated-game situation does not guarantee unconditional cooperation, as the dominant strategy still depends on expected payoffs, frequency of interaction, time

horizons, and other considerations (Ridley 1996: 74-75), but if a small number of individuals form a club, they have already cooperated because they expect sufficient payoffs given their expectations about the frequency of interaction over their time horizons. In fact, the club may well form because a non-cooperative solution is recognized as Pareto inferior, so if promises are enforceable at low cost within the club (perhaps through tit-for-tat strategies or social pressures such as reputation sanctions as discussed below) and the cost of bargaining is low, two individuals should be able to negotiate and establish an efficient allocation of resources (Coase 1960). Therefore, so let us consider the characteristics of a bargaining outcome for the individuals and goods described above.

Represent the pair of counter pledges in a bargain between Dick and Jane as  $(Y_D, Y_J)$ . These  $Y_i$  are commitments to sacrifice units of the private goods,  $F_i$ , by reallocating resources to the production of the club good,  $R$ . Consider situations in which  $Y_D + Y_J$  equals the marginal cost of producing  $R$ , and further assume for simplicity that the marginal cost is equal to one:  $Y_D + Y_J = 1$ .<sup>10</sup> The problem for each individual is to decide how much additional production of the club good above the level provided in the Cournot-Nash non-cooperative solution should be pledged. Represent the additional amount of the club good by  $G_i$ , with  $Y_i$  dictating how many units of the private good,  $F_i$ , the individual must sacrifice for the additional amount of the club good,  $G_i$ . Then each individual wants to maximize the utility function,

$$(7) \quad v_i = F_i R = (F_i^C - Y_i G_i)(R^C + G_i),$$

over  $G_i$ . This maximization produces a

$$(8) \quad G_i = (F_i^C - Y_i R^C)/2Y_i.$$

Assume that the first pledges are not binding, but simply offers that are subject to additional bargaining. Therefore, if a pair of offered pledges leaves an opportunity for one or both of the individuals to improve their position without harming the other, the individuals will be able to renegotiate (adjust their pledges) before resources are actually committed. This implies that if the trade is achieved, then  $G_D^T = G_J^T$  (from this point onward a superscript T refers to the trading solution achieved through bargaining and cooperation).<sup>11</sup> Given the assumption made above about the distribution of resources (production capacity), the result involves pledges

$$(9) \quad Y_D = X_D/(X_D + 2X_J)$$

and (10) 
$$Y_J = 2X_J / (X_D + 2X_J),$$

implying that (11) 
$$G_D^T = G_J^T = 0.5X_J.$$

Therefore, the equilibrium levels of utility for Dick and Jane are

(12) 
$$v_D^T = 0.25 (X_D^2 + X_D X_J - X_J^2),$$

and (13) 
$$v_J^T = 0.25 X_D X_J + 0.5X_J^2.$$

Comparison of these levels of utility to the Cournot-Nash equilibrium for equations (5) and (6) reveals that  $v_i^T > v_i^C$ , since it is assumed that  $0.5X_D > X_J > 0$ . This equilibrium is represented by the point T in Figure I, which lies on the Trading Possibility Frontier (TPF), defined as the set of Pareto optimal allocations of  $(F_D, F_J, R)$ , such that  $v_i(F_i, R) > v_i^C$ .<sup>12</sup> This is a Pareto solution for the club itself (Dick and Jane), of course, but not necessarily for society as a whole wherein giving non-members access to R might be Pareto improving. In order to consider this issue let us explore consequences of expanding the club.

**III.2 A Large Club.** Shitovitz and Spiegel (2002) generalize a two person model such as the one outlined above to consider N individuals. A generalization is not provided here. Instead, simply note that under what appear to be reasonable assumptions, Shitovitz and Spiegel (2002) demonstrate that the key conclusions from the two person model outlined above hold for an N person model.<sup>13</sup> Specifically, a unique Cournot-Nash and a unique trading equilibrium can exist, and furthermore: (1) a trading equilibrium must be a Pareto optimum for the N individuals involved in it (the summation of the equilibrium MRS for all N individuals equals 1,  $\sum MRS_i = 1$ ); (2) the Cournot-Nash solution is not a Pareto Optimum ( $MRS_i = 1$  for some individuals, so the sum of  $MRS_i$  over all N consumers cannot equal one;  $\sum MRS_i > 1$ ); (3) the total amount of R produced along the TPF is greater than the amount produced in the Cournot-Nash equilibrium, so  $R^T > R^C$  if a trading equilibrium is achieved; (4) each individual contributes more to club good production in the trading equilibrium than in the Cournot-Nash equilibrium; and most importantly, (5) the trading equilibrium is *strongly preferred by all N individuals* over the Cournot-Nash equilibrium. Therefore, in theory at least, a non-rivalrous club good can be efficiently produced as a result of the voluntary decisions by the members of a club who then have free access to use the good. This really should not be a surprising result, of course, if transactions costs are sufficiently low. As Coase (1960) explains, under these circumstances, efficiency alone determines the resulting allocation of resources. Of course, while circumstances under which a few (e.g.,

two) individuals achieve a trading equilibrium involving a club good might be envisioned [e.g., low bargaining and enforcement costs as suggested by Coase (1960), perhaps due to a repeated game], as the number of individuals in a community (club) increases, the transactions costs of bargaining and enforcement may rise. Therefore, the size of a club may be constrained by such costs to the degree that there may be external benefits that the club members do not fully recognize and internalize. Perhaps a knowledgeable and benevolent coercive authority could impose a system that would improve on a completely voluntary club arrangement? Key questions then become: (1) are the limits on size sufficiently binding so that a club is likely to be too small relative to the efficient scale of production of some club goods,<sup>14</sup> and (2) if this is the case, will a coercive authority implement a more efficient arrangement? Consider the first question here and the second in Section V.

If there are potential net social benefits from expanding production of a club good beyond its current scope, then their clearly are incentives to do so. Thus, as Demsetz (1967) suggests, when externalities become significant, institutional (e.g., property rights) changes are likely. Two such institutional developments are discussed here because they appear to be particularly relevant for the historical evolutions examined below: (1) the substitution of norms or customs for repeated bargaining, and (2) the development of higher order cooperative clusters that allow limited kinds of inter-group interaction (e.g., club good production).<sup>15</sup>

**III.3. Community Norms as Substitutes for Bargaining.** Let "rules" refer to behavioral patterns that other individuals expect a person to adopt and follow within the club as individuals pursue various interdependent activities and actions. The rules one individual is expected to follow influence the choices made by other individuals: like prices, rules coordinate and motivate interdependent behavior. In this context, note that while much of game theory implies that individuals calculate the best strategy in each interaction, but in reality, it is often rational for individuals to adopt rules that guide their behavior under many circumstances, in order to reduce decision-making costs (Hayek 1973). Rules of thumb might be adopted by individuals who are not able to use conscious reason to evaluate every option in the array of available alternatives, for instance, because there are significant limits on abilities to reason and absorb knowledge (O'Driscoll and Rizzo 1985: 119-122), and community-wide rules can be adopted to reduce the need for

bargaining or other collective decision making activities. Therefore, while the transactions costs of reaching an agreement rise as N increases, members of a group may find it useful to economize on such costs by voluntarily adopting rules and avoiding the need to renegotiate with changing conditions such as an increasing group population.

While the most obvious rules may be "positive laws" created by legislation, there are many other types of rules that may actually be more important guides to most behavior (Ellickson 1991). In fact, within close-knit groups rules tend to arise as "customs" or "norms" which do not require explicit codification or backing by coercive threats. Indeed, as Nee (1998: 87) suggests, "Norms are implicit or explicit rules or expected behavior that embody the interests and preferences of members of a close-knit group or community." A key distinguishing characteristic of widely-held customary norms is that a rule of obligation is initiated voluntarily by an individual's decision to behave in particular ways under particular circumstances, but then numerous individuals who interact with one another and observe each others' behavioral patterns, emulating behavioral patterns that appear desirable so that such behavior and accompanying expectations spread (Mises 1957: 192).<sup>16</sup> In other words, customary norms evolve spontaneously from the bottom up, and they are voluntarily accepted .

Consider an example. Vanberg and Congleton (1992: 420) note that most forms of interaction are not actually characterized by game-theoretic models which assume that the individuals must play. In reality, people often have an "exit" option, and the exit threat can be more powerful than strategies like tit-for-tat under some circumstances. Specifically, Vanberg and Congleton (1992: 420) explain that "In practice, the net benefits of exit depend on the availability of alternatives (or more specifically, on the expected payoffs from those alternatives), whether such alternatives exist in the form of potential interactions with other players or in solitary activity." Thus, the exit threat becomes credible when each individual is involved in several different games with different players, in part because the same benefits of cooperation may be available from alternative (competitive) sources. And of course, even in a very primitive setting, individuals are generally involved in at least one close-knit "community" as described by Taylor (1982: 26-30), wherein "the relations between members are direct and ... many-sided" [also see Bailey (1992) and Ellickson (1993)] - i.e., a club.

Given the availability of competitive alternatives, all members of the club have a refuse-to-play

option, so they may cut off all relationships with someone that they know has been untrustworthy in dealings with anyone else in the group. And importantly, to the extent that information, or "truthful negative gossip" (Ellickson 1991: 180-182), can travel from one bilateral game to another, the negative consequences on reputation can limit the non-cooperative player's ability to enter into other games. This means that an attractive strategy may be adopt a rule of thumb: ***unconditional cooperation whenever an individual chooses to enter into some form of interaction, along with exit and the spread of information about any noncooperative behavior***. Vanberg and Congleton (1992) refer to this response as "prudent morality," and given that reputation information spreads quickly within a group and everyone spontaneously responds to information, the noncooperative individual is excluded from all interaction with any member of the community. Such spontaneous ostracism can be a very significant punishment, creating strong incentives for individuals in a club to behave cooperatively in every game with other members, whether that game is one-shot or repeated.<sup>17</sup> The boycott response to information becomes a norm that guides behavior, as everyone is expected to ostracize a noncooperative individual.

With regard to roads, Ellickson (1993: 1372) notes, in examining the historical development of property rights in land "affirmative covenants that impose duties" typically evolve as norms. Imagine an agricultural community for instance, where no system of roads exists. Two neighbors may find it beneficial to interact on certain dimensions (socially, religiously, economically), so they begin to travel back and forth between their locations. Neither prevents the other from doing so, and a mutual obligation to respect rights of passage arises (e.g., an easement is recognized). These individuals may develop similar relationships with other neighbors and a network of easements develops. Perhaps a central location becomes attractive as a market, a site for a religious structure, or a meeting place (clubs generally meet, after all), and/or perhaps individuals find it beneficial for some parcel of land to be used by the community as a whole (e.g., a community pasture, a hunting area) and everyone travels to it. In addition, perhaps individuals own dispersed plots of crop land in order to reduce their risks or take advantage of different types of land that have comparative advantages in different crops (Dahlman 1980). In order to travel to the central location and/or the common property from the outlying farms, and/or to travel to dispersed plots, individuals have to cross other individuals' land, but since everyone benefits from the interaction that takes place at the central or

common location or on dispersed plots, each land owner has incentives to routinely allow others in the community to pass over their land, although probably only along a certain route (easement). People in the community come to expect such rights and customary obligations to allow passage arise. Indeed, as Ellickson (1993: 1381) concludes, "a human group invariably opens a significant portion of its territory to public use," recognizing that "public" denotes access privileges only for community members, not state ownership or free access to people outside the community, unless such access is recognized for some outsiders too. The alternatives, bilateral bargains between every traveler and all land owner whose land is crossed, or a community-wide multilateral bargain, involve very high transactions costs.

**III.4 Club Hierarchies.** No community evolves in complete isolation. Parallel localized communities develop that are geographically proximate to any particular group, making inter-group competition, emulation, and cooperation possible. Anthropological and historical evidence suggests that inter-group conflict has been an almost ubiquitous characteristic of human history, of course, but cooperative arrangements and inter-group norms also can and often do evolve between members of different groups (Benson 1999a). Hardin (1982: 184) suggests that "Large-group Prisoner's Dilemmas might be resolved as a byproduct of smaller subgroup interactions. But this could be strictly a spontaneous voluntaristic by-product..." Importantly, however, communities need not formally "merge" and accept an entirely common set of rules governing all types of interaction. Individuals from different communities only have to expect each other to recognize common rules pertaining to the types of inter-group interactions (e.g., trade, road access) that evolve. Given the importance of frequent interactions and reciprocity, trust relationships, and reputation effects, there clearly is a limit to the size of a single close-knit community, but a much larger web of communities can develop for certain functions if it is "overlaid by a network of much smaller subgroups, each concerned with its own conventional behaviors with respect to specific subgroup goals" (Hardin 1982:184). Indeed, Llewellyn and Hoebel (1961: 53) point out that the traditional western bias of trying to delineate some all-embracing system of governance for a society as a whole can be very misleading [also see Pospisil (1971)].<sup>18</sup>

Suppose, for example, each localized group's norms regarding travel across other members' lands can continue to govern its own members, while a different set of rules apply for access to roads for certain

members of neighboring communities, and even for people from vary distant communities (e.g., merchants, courting swains). Even in primitive societies, entrepreneurs establish extensive trade networks that cross community boundaries, for instance (Ridley 1996: 195-211), and trade between some members of different local communities may require linking a portion of each communities' road system. Perhaps traveling traders could negotiate access on each trip and pay tolls, but incentives arise to encourage members of each group to recognize rights to access to the linkage roads (although perhaps not to all road) for those engaged in trade or other value-generating activities. Hoebel (1954: 122) provides an interesting example, explaining that if an Ifugao (a primitive tribal society in the Philippines) left his home district he would move through a "neutral zone" into a "feudal zone" where, "Permanent feuding relations with certain families in the area are the thing", and then into a "war zones" where, "Anybody in the area is killed on sight. Head-taking expeditions make their stealthy raids in such areas whenever heads are wanted for purely prestige or religious reasons." Yet, a "courting swain" had customary immunity from attack when traveling outside his home district, probably because one way to end a feud was through intermarriage and the entire Ifugao society recognized the advantages of peace (Hoebel, 1954: 122-124). In sum, the analysis in this section contends that: *(1) voluntary production of club goods is possible for a small group because transactions costs are likely to be low (e.g., due to repeated dealing incentives), (2) larger groups can also produce club goods if the group is made up of individuals involved in a multi-dimensional web of mutually beneficial relationships (e.g., due to exit threats and resulting ostracism sanctions), (3) even larger close-knit groups can produce club goods by lowering transactions cost through the substitution of customary rules or norms for repeated bargaining, and (4) if various club goods have different efficient sizes, a hierarchy linking of clubs can evolve, with narrowly-focused norms to support production of those club goods which have large efficient scales compared to localized clubs while local clubs develop those goods that are smaller in scale.*<sup>19</sup> Now let us turn to the early system of road provision in Great Britain where such arrangements actually developed, not once, but twice.

#### **IV. Roads as Club Goods in Medieval Great Britain**

The Romans, who arrived in 43 A.D., built "great military highways" in Britain in order to move their legions into the remote regions of the Island (Jackman, 1966: 1).<sup>20</sup> While there is little doubt that the Roman

roads, largely constructed with "public" funding, were important transportation arteries for centuries, they were "by no means so good nor so complete" that a much larger system of other roads were not needed (Jackman, 1966: 4; also see Gregory, 1932: 94). These other roads were not funded or maintained by the state (Roman roads that survived into the middle ages were not maintained by the state either).

**IV.1 Roads in the Hundreds System.** Direct knowledge of the process of development and maintenance of roads in Britain before the twelfth or thirteenth century is almost non-existent, but a good deal can be inferred by considering evidence of the kinds of travel that occurred, and by examining the system of roads and customary arrangements for road maintenance that existed shortly thereafter. With the fall of Rome, Europe moved into a period dominated by very localized and largely self-sufficient agricultural communities. Nonetheless, the fact that at least some parts of the road networks were in good condition is evidenced by the records of military marches, some averaging as much as fifty miles per day (Gregory 1932: 94). Furthermore, Royal income for Anglo-Saxon kings was mostly in the form of the agricultural output of the royal estates, and in order to consume this income a King and his household had to travel from estate to estate throughout the year (Benson 1998: 204). Thus, there is substantial evidence that these kings and their courts "moved incessantly around the kingdom, occasionally with the army" (Hindle 1982: 193), requiring passable roads to carry a "very sizable company" (Stenton 1936: 6). While such long distant travel occurred, however, indicating that a system of passable roads linked various parts of the Island, the fact is that the vast majority of road use involved local people traveling short distances (Beresford and St Joseph 1979: 273):

Journeys to markets, churches and courts are the principal exceptions to the generalization that most medieval roads were entirely local in purpose with an ambition no higher than to serve the villagers' immediate wants. There was need for lanes to provide access to holdings in the fields; to take loaded wagons to the windmill or to the watermill in the meadows; to reach the woodland with its timber, its fruit and its pannage for swine; to take the flock to the common pastures and heaths. The course of the roads with a purpose so narrow would be determined only by local needs.

Thus, almost all of the benefits of roads were internal to the members of local-close knit communities, and local institutions and customs determined how those roads were created and maintained.

By the tenth century, there was a clearly recognized hierarchical institutional arrangement in Anglo-Saxon England. Blair (1956: 232) points out that two of the primary purposes of these organizations were to facilitate cooperation in rounding up stray cattle and in pursuing justice.<sup>21</sup> When a theft occurred, for

example, the several "tithings" that made up a "hundred" were informed: they had a reciprocal duty to cooperate in pursuit. A tithing was apparently a group of around ten neighboring families, many of whom probably were kin, while a hundred was a group of around ten neighboring tithing. A primary reason for recognizing reciprocal duties was that these organizations produced a number of valuable benefits more efficiently than individuals could, such as the return of stray cattle, deterrence, restitution to victims of law violations, some forms of credit, and so on.<sup>22</sup> These clearly were close-knit communities with multi-dimension webs of mutually advantageous interactions.<sup>23</sup>

The tithing and hundred performed many functions too, including dispute resolution and road maintenance. Representatives of each tithing traveled to the hundred court, for instance, which met regularly to resolve disputes (Blair 1956: 233). When an individual was charged with an offenses against someone in a different tithing, his tithing also had a customary obligation to bring him to the site of the meeting of the hundred for the trial (Stephen 1883: 71). Furthermore, there were higher order jurisdictions, as a dispute between individuals who were not in the same hundred went to a shire court.<sup>24</sup> Importantly, in the context of this presentation, representatives of each tithing were obligated to travel to the various courts, so local road systems clearly were linked and at least some rights to passage over some of the roads of one local community were recognized for members of other local communities (i.e., interconnecting roads were club goods that had to be extensive in order to produce still another large scale club good: peaceful dispute resolution).

While there are no actual documentation of road maintenance and production before records began to be produced in the twelfth and thirteenth centuries (Webb and Webb 1913: 5), several inferences can be drawn regarding what was done. First, land over which a road passed actually "belonged" to the owner of the land on either side of the road, so if a road was abandoned (e.g., because travelers began beating a different path), it would revert to that landowner (Pawson 1977: 65-66). However, under Anglo-Saxon custom, one of the rights to part of the land (i.e., the road ) was assigned to the extended community (hundred) as an easement: "the right of passage was a communal right" (Pawson 1977: 66). Indeed, the concept of the "highway" initially referred to this customary right of passage rather than to the roadway or path itself (Jackman 1966: 5). Second, road construction and maintenance did not involve anything like modern highway

construction. Individuals had customary obligations to other members of a tithing and hundred to remove any impediments to travel such as overhanging trees, hedges, logs, and perhaps water, through a drainage ditch (Webb and Webb 1913: 6-7, Jackman 1966: 4), not to build roads. In fact, the word "road" apparently comes from the Anglo-Saxon word "ridan" (to ride) which may derive from the verb "rid," meaning to free or clear away any obstruction. Third, the members of the hundred had a customary obligation to make sure that all members maintained the roadways over their lands (Jackman 1966: 33). The actual need for enforcement was rare (Bodey 1971: 14), however, due to the reciprocities that existed within these close-knit communities.

The road system of the hundreds was in place through the middle of the eleventh century and it proved to be adequate enough to make "possible a centralization of national government to which there was no parallel in western Europe" (Stenton 1936: 21) following the Norman conquest in 1066. After all, the dramatic increase in centralization required a substantial amount of travel by royal officials such as tax collectors and judges, and armies when rebellions arose, as well as by politically connected citizens (e.g., Barons, representatives of the major church institutions such as abbeys and monasteries) who had to visit the royal court. At the same time, however, many of the incentives underlying the hundreds were undermined. For instance, William seized virtually all of the land in England, and while he held many large estates for his own use, he also granted use of large tracts to Barons and the Church in exchange for support. Enclosure of some land which had been controlled by local agricultural communities as open fields and common pastures soon followed (Darby 1973: 85). In particular, land granted to the aristocracy, called the demesne, could be enclosed (other types of land were controlled by freeholders who paid rent to the lord, and by the villiens who provided labor to the lords). The Statute of Merton (1236) also permitted the lords to enclose large portions of the "waste," the high woodlands and unimproved pastures that lay in clumps around the arable lands, at the expense of the freeholders and villiens who used such areas, and as noted in Darby (1973: 98-99), grazing was also significantly restricted in the vast royal forests and parks "in the interest of the chase." With increasing enclosure, the potential for straying cattle was diminishing so the value of this cooperative function of the tithing was also declining. Then, in the 1400s, as wool prices rose relative to grain prices, the lords evicted large numbers of tenants and enclosed additional large tracts of land, converting it to sheep pasture from crops and stubble fields upon which cattle had grazed. Hundreds of local villages were abandoned

(Darby 1973: 210-211). Many of the remaining kinship groups and tithing were broken apart as people were driven from their traditional homes. In addition, the Normans replaced the Anglo-Saxon restitution-based "man-price" system (*wer*) with a criminal law system involving fines to and confiscations by the king along with corporal and capital punishment (Pollock and Maitland 1959: 53; Benson 1998: 205). This withdrawal of the right to restitution had significant implications for the tithing and hundred because it substantially reduced incentives to maintain the reciprocal arrangements for protection, pursuit, prosecution, and insurance, and to participate in the local court system. Indeed, the king's expectation that the local communities would continue to provide policing and prosecution in order to collect revenues and property for the crown, without compensation, proved to be unfounded, leading to a long series of institutional changes (Benson 1998: 205-223). Thus, for various interrelated reasons the hundreds became ineffective or disappeared.

While members of local communities probably still had incentives to maintain roads for local use, the breakdown of the voluntary hierarchical tithing-hundred-shire system apparently produced a growing problem of under-maintenance for some long-distance connections. Local freemen were probably less likely to travel between communities, at least voluntarily,<sup>25</sup> so they had weaker incentives to maintain those arteries that were predominantly for long-distant (inter-community) travel, at the same time that the demand for long distance travel was growing from other sources. As noted above, the demand for long-distance travel due to the activities of the king and his court increased dramatically under the Normans. In addition, representatives of the church with its widespread holdings, also traveled extensively, as explained in more detail below. Trade also was expanding throughout eleventh and twelfth centuries (Benson 1989). Most commercial retailing activities took place at fairs during this period, and merchants traveled from fair to fair in order to sell their wares and buy others (Benson 1989), thus requiring increasingly intensive use of some roads (Gregory, 1932: 95; Willan 1976: 13).

Kings claimed royal rights to free passage for themselves and their courts to travel anywhere in their kingdom, as well as for anyone traveling to his court on royal business, and expected roads to be provided for these purposes. This claim was reinforced after William's seizure of land, because, even though he granted fiefs of land to his supporters and others that he wanted support from, he retained a claim of absolute authority over the use and disposition of the land granted to these individuals. Landholders controlled land

only as long as they performed their required duties and paid their required fees. Successes in putting down rebellions (e.g., against William's successor William Rufus in 1088 and 1095, and against Henry I in 1101) tended to strengthen this property rights arrangement, so the Norman kings' claim of free passage, was simply, in their minds, a right to pass over their own lands. Not surprisingly, then, of the three groups demanding access to roads for long distance travel, it was not the royal government that took up the road-provision task after the breakdown of the hundreds; it was the religious and the merchant communities.

**IV. 2. Replacing the Hundreds: Merchants, Parishes, and Monasteries.** Numerous examples of merchants and merchant organizations contributing to the construction and/or maintenance of roads, and especially bridges, can be found (Jackman 1966:15-16, 30-32; Gregory 1932: 97-98).<sup>26</sup> Some guilds were particularly active in this regard, especially when much of the business of the country was conducted at local fairs, and this was the case until the establishment of more permanent markets in the sixteenth century (Benson 1989). However, some guilds and wealthy merchant benefactors continued supporting bridges and roads well into eighteenth century; as Pawson (1977: 73) explains:

Many private improvements were, of course, carried out purely in self interest. New roads were built to promote the exploitation of mineral wealth within estates, and to enable landowners to divert existing highways ... Sometimes an economic interest led to improvements in the surrounding area, benefiting everyone.... However, when there was little direct return to those involved in private schemes, their efforts were primarily for the social good. It was illegal for a toll to be charged on a public highway without the consent of parliament so it was not possible to charge those who benefited from such works except by voluntary means.

Nonetheless, there were actually some very important rewards for such local benefactors. After all, roads played a very significant role in determining the success of a market town (Hindle 1982: 207) and those trading with it, so other members of both the local community and the merchant community tended to be very grateful to someone who aided the two communities in this way. Thus, building and maintaining roads and bridges was an investment in reputation. And for Christians, even more significant personal benefits were anticipated.

The medieval Church probably had greater demands for long distant travel than the royal court. For one thing, the Church was a major trader (Bewes 1923: 9), and in addition, many of the important fairs were held at priories and abbeys. Furthermore, the Church encouraged pilgrimages (e.g., the road from Winchester to the shrine of Thomas Beckett in Canterbury became known as the Pilgrims Way). The Church

also maintained frequent tours by peripatetic preachers and friars, but perhaps the most significant source of Church-related travel was the monasteries, whose scattered estates required constant visits (Gregory 1932: 95; Jackman 1966: 8). Therefore, the Church promulgated the belief that care of the roads was "a work of Christian beneficence, well pleasing to God" (Jackman 1966: 8). This created incentives for private citizens within the Christian community to aid in the maintenance of roads and bridges, and the Bishops' registers throughout the United Kingdom provide ample evidence of such activity (Jackman 1966: 16). Indeed, such religious beliefs explain the development of the long-lasting customary obligation that local parishes accepted for road maintenance (Jackman 1966: 30; Pawson 1977: 68) after the decline of the hundreds. That is, for the purpose of road maintenance (but not for many other functions that had been performed by the hundreds), parishes replaced the hundreds system in the production of this club good, with the aid, encouragement, and where necessary, supervision of the monasteries and bishops of the church. Indeed, and importantly in this context, the monks also accepted a customary obligation to maintain roads, willingly taking on the task because it "was a pious work highly to be commended" (Jackman 1966: 30-31). Thus, the merchants, *and* especially the monks, tended to supplement the parishes where local incentives to maintain roads were relatively weak, perhaps due to substantial long-distant traffic.

The various local, religious, and merchant communities who established and maintained roads in the United Kingdom prior to 1500 were apparently quite effective, given the technology available. Indeed, the "essence of a modern road pattern existed in the early fourteenth century" and transportation of goods and passengers "could be easily and efficiently undertaken by road" at least throughout southern England and the Midlands (Darby 1973: 174, 287). This system of voluntary road maintenance was also ultimately undermined, however, as a consequence of the almost continuous struggle for power between the English kings and the Church. Henry VIII finally dissolved the monasteries in 1536-39, divided their properties, and transferred them to "a class of rapacious landlords who would be slow to recognize any claim upon their rents for the maintenance of roads.... The inevitable result would be a rapid decadence of many highways which had hitherto been in common use" (Jackman 1966: 29; also see Gregory 1932: 96; and Parkes 1925: 7). Local parishes continued to maintain roads in many areas, particularly for local travel (probably 80 to 85 percent of the actual roads in Great Britain), and various merchants and guilds also continued to provide support for

some roads and bridges near market towns, but the elimination of the monasteries and the undermining of the incentives of the Church to encourage its parishioners to maintain roads that were important for long-distant travel was apparently quite significant. The roads that had been maintained with the assistance and urging of the monasteries began to deteriorate (possibly 15 to 20 percent of the roads). Indeed, Jackman (1966: 30-31) contends that the seizure of the monasteries was the primary factor leading to passage of the "Statute for Mending of Highways" in 1555 which mandated that parishes establish a very specific institutional arrangement for maintenance of all roads in each parish. Before turning to the details of this system, let us consider the theoretical impact of such coercion and of alternative policies that might replace the monasteries' direct inputs and encouragement of parish activities.

## **V. Political Substitutes for Voluntary Communities**

Mises (1949: 692) explains that market-failure justifications for state actions "ascribe to the *state* not only the best intentions but also omniscience." He then points out that neither assumption is valid: the state is not purely benevolent since both those who are employed by the state and those who demand state actions have subjective self-interests which may be achieved through the use of coercive power, and furthermore, the state is not all knowing since state decisions are made by individuals, knowledge is widely dispersed across individuals, and the cost of coordination is infinitely high, particularly without market profits and prices as coordinating mechanisms (Hayek 1937). These two assumptions are both relaxed below, beginning with omniscience, in order to get a clearer picture of how and why the United Kingdom's system of road provision evolved as it did.

**V.1. Benevolent State Mandates as Alternatives to a Cournot-Nash Equilibrium with a Club Good, With Incomplete Knowledge.** Suppose that the king is benevolent and desires an efficient level of club good production when voluntary provision does not arise. Clearly, the individual subjective utility functions underlying the unachieved trading solution cannot be known. Therefore, the king must decide how much each citizen will be required to contribute to the provision of the club good. Suppose that the king decides that the "fair" way to pursue production is the traditional Lindahl "public good" equilibrium as defined by Samuelson (1954), Foley (1970) and others. The knowledge requirement for determining such an allocation are actually prohibitive, but even if the necessary knowledge was obtainable, the Lindahl solution

could be achieved only under very limited circumstances. Consider such an allocation using the assumptions outlined in Section III above, for instance, wherein the individual "prices" (taxes, mandated resource contributions) are proportional to the individual's capacity to produce ( $X_i$ ). If Dick and Jane are actually identical then the Lindahl solution corresponds to the trading equilibrium, and both might willingly contribute as ordered, but when individuals differ in their production capacity (e.g., wealth, skills, etc.), as assumed above, the trading and Lindahl solutions will differ. In the two-person case depicted in Figure I, the Lindahl solution is given by:<sup>27</sup>

$$(14) \quad R^L = 0.5(X_D + X_J),$$

$$(15) \quad F_i^L = 0.5X_i, \quad i = D, J,$$

where superscript L (here and hereafter) refers to the Lindahl solution. The levels of utility achieved by each individual in this case are

$$(16) \quad v_D^L = 0.25 X_D(X_D + X_J),$$

and  $(17) \quad v_J^L = 0.25 X_J(X_D + X_J).$

Comparison of these levels of utility to the Cournot-Nash equilibrium from equations (5) and (6) reveals that  $v_D^L \leq v_D^C$ , but that  $v_J^L \neq v_J^C$ , since it assumed that  $0.5X_D \leq X_J > 0$ . Indeed, as Shitovitz and Spiegel (2002) note, if the two individuals differ as assumed above, so that Jane is a free rider in the Cournot-Nash solution, then Jane will also prefer the Cournot-Nash solution to the Lindahl outcome. Therefore, Jane will oppose the move from the Cournot-Nash equilibrium to the Lindahl target. After all, as Nee (1998: 88) explains, "opposition norms" inevitably evolve as the incentives created by formal institutions and sanctions are weak relative to the incentives to pursue personal interests. Given imperfect measurement of contributions or imperfect policing, Jane can shirk (avoid taxes, work less hard than is required, etc.), and even if shirking is likely to be observed, Jane can pursue political actions in an effort to alter the mandated contributions to the production of R (indeed, Jane may do both). Depending on how costly measurement and policing are and/or how vulnerable the political process is to the demands of special-interest actions, the actual outcome of such a mandated effort is likely to be somewhere below the Pareto Frontier. It should approach the Cournot-Nash solution as measurement/policing costs rise, but if such actions are costly, the solution could even make all parties worse off (Benson 2003). Therefore, consider an alternative policy by a benevolent but less than fully

informed government.

**V. 2. An Alternative for the Benevolent State: Privatization.** If a benevolent state authority really wants to establish a policy that might produce a Pareto superior outcome, one obvious option is the creation of private property rights in the open access good. In the case of roads, for instance, the roadways could be privatized so that each individual with exclusive ownership rights can charge a toll to any traveler. In this case, rather than relying on customary norms and their associated ostracism sanctions, or on coercively imposed state sanctions, to induce individuals to provide and maintain roads, they could rely on market forces to do so. If private property rights are complete, and transactions costs associated with enforcing these rights and with bargaining are not prohibitive, a trading equilibrium should emerge as equilibrium prices are determined and each traveler pays each road supplier. One response to this suggestion is that if a market-based system of roads is efficient then why did the system of club-good roads last in Great Britain even after the hundreds arrangements broke down? One answer is that institutional evolution is path dependent (Benson 2003) so the development of the parish-monk-merchant club-good arrangement was less costly, given the institutional environment (e.g., existing customary norms creating rights of passage and community-wide obligations to maintain segments of roads), than development of a market system. Another answer is that the transactions costs of a market system would be very high (indeed, these two answer are not mutually exclusive). This may well have been the case for Great Britain at the time. After all, while there were many large tracts of land by this time, controlled by individual decision makers (e.g., the manor estates and the church holdings that had not been seized), there were also many much smaller landholders (knights and some other freemen), as well as land held in common by groups of individuals (e.g., the common pastures and common fields of the agricultural villages). With this fragmentation of land holdings, the transactions cost arising from a system of toll roads could be quite high, as, for instance, travelers would have to make frequent stops to pay tolls. Given true private property rights, of course, such transactions costs should fall as mergers between toll road owners occur to take advantage of any scale economies in their provision and reduce transactions costs.<sup>28</sup> However, just as state action is not likely to be able to achieve the Lindahl equilibrium for reasons suggested above, state action is not likely to produce a property rights arrangement that would allow an unhindered market solution (i.e., pure private property rights). Indeed, at least part of the answer

actually is that kings are not benevolent so they did not allow private property complete rights to develop (e.g., they claim an exclusive right to charge tolls, as explained below).

**V. 3. Relaxing the Benevolence Assumption: Pursing Self-Interest Objectives Through Manipulation of Property Rights.** As Coase (1960) and Demsetz (1967) emphasize, one motivation for creating property rights (or more accurately, rules of obligation to respect property claims) is to eliminate externalities and facilitate voluntary interaction. Coase (1960) also explains that these institutions determine the distribution of bargaining power and therefore the distribution of wealth, however, and while he did not focus on this issue, these distributional consequences also create incentives to make and alter property rights by manipulating rules. Indeed, as Oppenheimer (1908: 24-25) observes, an understanding of the formation and development of the institutions of the state requires recognition of the fact that

There are two fundamentally opposed means whereby man ... is impelled to obtain the necessary means for satisfying his desires. These are work and robbery, one's own labor and the forceful appropriation of the labor of others.... [T]he warriors' trade ... is only organized mass robbery... Both because of this, and also on account of the need for having, in the further development of this study, terse, clear, sharply opposing terms for these very important contrasts, I propose ... to call one's own labor and the equivalent exchange of one's own labor for the labor of others, the "economic means" for the satisfaction of needs, while the unrequited appropriation of the labor of others will be called the "political means."

Importantly, when rules arise through coercive power they can be institutionalized to facilitate the pursuit of either the economic or the political means of personal wealth enhancement. In fact, "law," the enterprise of subjecting human conduct to the governance of rules, almost always involves often conflicting efforts to achieve both objectives (Benson 1999a). To illustrate this, consider the development of European kingship.

An entrepreneurial leader skilled in organizing joint production of raiding often recognized that an attractive way to gain wealth was through organized aggression against another community (e.g., Vikings). Plunder tends to produce relatively small returns, however, compared to the wealth that might be extorted over time if productive people are subjugated and allowed to continue their productive efforts in exchange for payment of "protection money." Therefore, an entrepreneurial war chief may advocate invasion and occupation of the territory of the other community. Oppenheimer (1908) contends that the origins of the earliest states trace to precisely this situation, as nomadic hunting and/or herding communities from the

relatively infertile mountains, deserts, or sea coasts,<sup>29</sup> invaded and subjugated those who had settled in fertile valleys.<sup>30</sup> Successful war chiefs who conquered other territories often asserted that they were kings, although the result was not necessarily permanent. After all, conquered subjects' promises to honor a king are credible only because of the fear of violence, so the king has to be forever vigilant in policing existing claims, even as he attempts to expand his domain. In fact, the internal dynamics of such a coercive wealth transfer system appear to be relatively unstable (Levi 1988: 44). There are ways to reduce internal resistance, however, and kings have strong incentives to exploit them (Levi 1988: 11). For instance, kings did not simply want to create a monopoly in violence; they also attempted "to act like a discriminating monopolist, separating each group of constituents and devising property rights for each" (North 1981: 230; also see Levi 1988: 10-14). By granting reduced taxes, and even increases in wealth, to those who might be in a position to threaten their control, kings could buy their support, while imposing heavy taxes on those without power.<sup>31</sup> Furthermore, in a dynamic setting where relative power can change (e.g., individuals can organize into groups with collective power), the king has incentives to redistribute wealth as changes occur. Given the kings' use of transfers as a low cost mechanism of insuring against competition, sub-groups had incentives to compete for favorable treatment from kings. Furthermore, kings had incentives to encourage such "rent-seeking" competition (Levi 1988: 12), since by keeping sub-groups divided into adversarial political camps the possibility of a strong coalition forming to challenge for control was reduced. By focusing such competition in "advisory councils" or "representative assemblies," the transactions cost of interacting with various powerful groups was lowered (North 1990: 49-51), and powerful groups also saw their interests linked to the interests of a "sovereign" as they had a more direct say in the decision-making process [note that roads and communications networks connecting the king's central location with the outlying locations of his potential rivals are also important in this context. (Levi 1988: 28)]. Significantly, however, in such a political environment property rights are never "given": they are permanently in play, because as the relative power of sub-groups change, some property rights are reallocated. Furthermore, one imposed change in property rights inevitably sets off a long chain of reactions (Benson 1984, 2003). For instance, the king may claim large amounts of property (e.g., as the Normans kings did) but then the authority will tend to grant "privileges" in the form of various access and use rights to powerful allies or potential enemies. Because of the instability in

the relative power structure, more and more sub-groups have incentives to organize and enter the competition (Benson 1984), but reducing existing privileges undermines support from already active and powerful sub-groups. Thus, more individuals and groups obtain access to "public property," which becomes increasingly plagued by common pool problems. When property rights are subject to authoritarian alterations the result is a continually spiralling race for rents (Anderson and Hill 1990; Benson 1984, 2003) which dissipates wealth as resources are used up in the competitive process of trying to influence the coercive power.

Another closely related reason for the emergence of common pools arises when rights are significantly altered, or when they become sufficiently tenuous due to frequent changes. As Leoni (1961: 17) emphasizes, this has "a negative effect on the very efficacy of the rules and on the homogeneity of the feelings and convictions already prevailing in a given society.... [T]he fact that the very possibility of nullifying agreements and conventions through supervening legislation tends in the long run to induce people to fail to rely on any existing conventions." In other words, the fact that property rights are in play creates uncertainty about the stability of existing rules (obligations), including the security of whatever the property rights assignments might be at any point in time. When this happens, individuals may quit performing previously worthwhile functions (e.g., providing goods or services, as the hundreds and then the monks and parishes did). If the function is demanded by powerful groups, the king may try to force the previous behavior, and if that fails then the king (through a bureaucracy) is likely to begin directly producing the function. Once the king (or a designated bureaucracy) begins to produce such "public services," access becomes something the king can hand out to supporters. Again, as competition for rents expands, many people obtain access to these services. The result is a common pool.

## **VI. Evolving Public Road Policy in the United Kingdom**

After seizure of the monasteries, parishes continued to maintain many roads used by parish members but without the help and encouragement of the monks they were unwilling to maintain the heavily traveled arteries, at least at a level that was satisfactory to many who wanted to use them, including the representatives of the state. Therefore the Statute for Mending of Highways (1555) simply ordered the parishes to do, by themselves, what they had been doing with the help and encouragement of the monks in the past.

**VI. 1. The Mandated Parish System.** The local justices-of-the-peace (JP) was ordered to appoint

two parish surveyors of highways, chosen by from a list provided by each parish.<sup>32</sup> The surveyors were ordered to travel the parish at least three times a year to inspect the roads and bridges, see to it that landowners were keeping roads and ditches clear of impediments and announce before the church meeting any violators of the statute. They were also required to collect and account for the fines, compositions and commutations that arose as a result of the failure of individuals to contribute their required inputs (discussed below) to highway maintenance. The JPs were to audit the surveyors' accounts, hear pleas of excuse for non-fulfillment of the statute's input-contribution requirements, levy fines and order seizures for violations, and when necessary, collect a tax from the parish residents to cover an extraordinary expense. Both the JPs and the surveyors were to perform their tasks without compensation. All of the manual labor, tools, horses and carts needed for repairing the roads were to be provided by the parishioners, also without any compensation. Specifically: "Every person for every plough-land in tillage or pasture" and "every person keeping a draught (of horses) or plough in the Parish" had to provide a cart with oxen or horses, the necessary tools, and two men annually to work four eight-hour days (raised to six days in 1563) in road maintenance on the days chosen by the surveyors. Those households which did not own farm land, horses, or a plough were also required to provide labor, either in person or hired, for the same period.<sup>33</sup> As Parkes (1925: 8) notes, however, "Though an elaborate system, it neither sought to introduce any effective method of repair nor took heed of the frailty of human nature."

For the roads where travel remained largely local, the mandated obligations of the highway statute of 1555 were largely unnecessary, and for roads that were heavily used by travelers who did not live in the local community [e.g., government officials, freight traffic carried by heavy wagons and long pack trains, and herds of cattle going to market, all of which "kept the roads in a perpetual slough" (Parkes 1925: 6-7), particularly in the area of London], they were largely unsuccessful (Albert 1972: 8; Darby 1973: 290, 372; Pawson 1977: 68-69). The burdens placed on the parishioners seemed to them to be very inequitably distributed (Webb and Webb 1913: 29) [indeed, these cost were often made even higher because the best time of the year for road repairs was also the busiest time of the year for most parishioners since they were engaged in agricultural production (Parkes 1925: 9)], and as a result, many did not show up for the mandated work, others sent their children or some other substitute instead, and those who did present themselves for work, "often poor men

who could ill afford wageless days - would spend most of their time in standing still and prating, or asking for largesse of the passers-by ... so that they became known as The King's Loiterers, in derision of their earlier title, the King's Highwaymen" (Parkes 1925: 9). This meant that JPs were obliged to collect large numbers of fines (Willan 1976: 3).

A long series of additional statutes attempted to create sufficient negative incentives for the parishioners and surveyors to do their mandated duties. Ultimately none worked and the system of fines evolved into commutations to be collected from individual parishioners that relieved their obligations to perform the statutorily mandated duties and allowed the JPs to hire laborers to work under the supervision of the surveyors (Pawson 1977: 71; Webb and Webb 1913: 20-21). These funds also proved inadequate for the heavily traveled arteries, however: "Indeed, what with the lack of any definite valuation roll or fixed assessment, the complications and uncertainty of the law, and the unwillingness of both Surveyors and Justices to be at the trouble of legal proceedings against their neighbors, it is plain that under the commutation system the greatest inequality and laxness prevailed" (Webb and Webb 1913: 36). Thus, commutations were supplemented with a general highway tax from the mid-seventeenth century onward. However, an even more important source of funds was generated through the criminal law by fines levied by the royal courts through presentment or indictment of the parish as a whole for the non-repair of its highways (Webb and Webb 1913: 51-61). Some parishes were perpetually under indictment, and "At varying dates in the different Counties, but eventually ... nearly all over England, it became the regular thing for a parish periodically to find itself indicted at the Sessions for neglecting to keep its highways in repair" and to pay a substantial fine rather than repair the roads (Webb and Webb 1913: 53-54). Despite these sources of revenues, however, the quality of road and bridge construction and repair on the major arteries did not compare to what had been done under the supervision and encouragement of the monks in the previous centuries (Parkes 1925: 30; and see Jackman 1966: 48-49). Part of the problem was that surveyors, typically farmers who served for a single year, had no expertise in organizing road repairs and no incentives to see that it was done well (after all, some other farmer would be responsible for taking care of the problems next year if they were not completed), in contrast to the monks who had specialized in such activities and considered them to be long-term obligations to God. In addition, the mandated repair procedure (e.g., periodic large scale efforts rather than ongoing repairs as

damage began to appear) was not an efficient way to carry out the task (LaMar 1960: 8-10).

The failure of the mandated parish system to maintain the major long-distance arteries left parliament with relatively few options. One that was tried was a long series of regulations defining "unreasonable" uses of the roads and establishing weight limits, limits on the number of horses, and so on (Pawson 1977: 74-75). That is, there was an attempt to ration the commons through various restrictions on how it could be used. Surveyors and JPs were expected to enforce these laws, but they were reluctant to do so. A second and more important approach was to loosen the central government's control over and claim to tolls.

**VI.2. Private Toll Roads and Turnpike Trusts.** The right to charge a toll in the United Kingdom had been severely restricted, in part because tolls were an important source of royal revenues (Jackman 1966: 11). Kings had long required that tolls be collected from travellers who crossed certain bridges or used some roads. These revenues were not earmarked for road maintenance, however, so they went into the general treasury. Officials who collected tolls also retained a portion for their own purposes, but those purposes rarely included road maintenance. These officials were reluctant to grant the power to charge tolls to others in fear of losing this source of revenues, although kings, and later parliament, had the power to grant the right to collect tolls to private individuals or organizations. In fact, there is evidence that burgesses (merchants who formed local governments in market towns) in several communities had petitioned for and been granted the right to collect tolls as early as 1154 (Jackman 1966: 9-11). Furthermore, there was one situation under which tolls could be collected by a private citizen without getting government permission: land owners could charge for passage through private land as long as an easement (customary or mandated) had not already been established. Not surprisingly, there is considerable evidence that enterprising land owners began to establish new "private roads" that allowed travellers to avoid the "ill-repaired public highways" (Pawson 1977: 73-74) and charge tolls for access. This option was severely limited, however, both by the fragmentation of land and by the fact that easements through many feasible routes already existed. But members of several parishes recognized that these private toll roads suggested an alternative way to finance their required road maintenance activities, and the early market-town toll roads provided clear precedent for granting the right to limit access and charge tolls. Thus, while a long series of parliamentary acts were passed beginning in 1663 enabling the establishment of local ad hoc bodies known as "Turnpike Trusts," it must be emphasized that

these were not parliamentary innovations. The initiative was always at the local level (Albert 1972: 12), as parishioners had to petition parliament for each segment of road on which they wanted to establish tolls.<sup>34</sup>

After about 1700 the turnpike-establishment process became fairly standardized. A group of local landowners and/or merchants would accumulate the money necessary to fund pursuit of a Turnpike Act in parliament and to carry the cost of the trust through its start-up period (Moyes 1978: 406). Turnpike Acts established a Turnpike Trust and granted it an exclusive right to operate a road (generally for 21 years), fundamentally altering the customary right of passage for most travelers (but see discussion of exemptions below), but trustees did not have complete private rights to the roads they were to operate. They were responsible for erecting gates to collect tolls, appointing collectors and a surveyor to supervise repairs, and a Clerk and Treasurer to administer the trust, but they were required to be unpaid. The tolls to be charged for various types of traffic were often specified in the legislation, and the funds collected could only be applied to the road named in the Act. No revenues could be diverted to other uses or retained as profit. If the tolls were insufficient to cover costs at particular times (e.g., up front), trusts were allowed to borrow at a rate of interest fixed by the Act.

Turnpikes were usually existing highways, although new roads were also built, particularly after 1740, and more importantly, the extent of "usable" roads for heavy traffic expanded significantly (Webb and Webb 1913: 144). The early turnpikes were maintained using the same techniques as the monasteries and parishes had employed before (Darby 1973: 374), but much more intensively (Pawson 1977: 107). However, Trusts employed paid surveyors who, through specialization, developed expertise in road maintenance, and after about 1750 there is considerable evidence of experimentation and innovation in construction and maintenance by some of these specialists. Webb and Webb (1913: 144) note, for instance, that

Between 1750 and 1770, when the number of Turnpike Trusts was actually trebled, the contemporary self-complacency over the new roads rises to dithyrambic heights, "There never was a more astonishing revolution accomplished in the internal system of any country,' declares an able and quite trustworthy writer in 1767, 'than has been with the compass of a few years in that of England. The carriage of grain, coals, merchandize, etc., is in general conducted with little more than half the number of horses with which it formerly was. Journeys of business are performed, with more than double expedition.... *Everything wears the face of dispatch* ... and the hinge which has guided all these movements and upon which they turn is the reformation which has been made in our public roads [the turnpikes]."

Innovations in surfacing, road widening and banking (Webb and Webb 1913: 133-134), and later,

improvements in administration (primarily through the combination of small turnpike trusts into larger administrative units supervised by professional road managers/surveyors, as discussed below) all made travel in the United Kingdom faster and less expensive. As the preceding quote suggests, Turnpike formation really accelerated during the 1750s (and actually, during the 1740s as well), and by 1770 Trusts controlled almost 16,000 miles of turnpikes (Moyes 1978: 407). Note that the period of rapid expansion in turnpikes (1740-1830) involved a dramatic increase in heavy long-distance traffic due to the industrial revolution. Indeed, the early period of the industrial revolution was supported by turnpike road (and to a degree, by water) transport, rather than by the railroad system that often seems to get credit for supplying the transportation needs of the revolution (Pawson 1977: 338).<sup>35</sup> Yet, aspects of the industrial revolution also helped lead to the demise of the turnpike system as competing modes of transportation, including the developing railroads, and shippers, including manufacturers who wanted reduced their own transport costs (part of which was the tolls they had to pay), manipulated the political process. Thus, turnpike activity peaked in about 1830 when there were 1,116 Turnpike Trusts operating 22,000 miles of roads (Roth 1996, 176), and declined thereafter.

**VI.3. The Decline of the Turnpike System.** The Turnpike era came to an end due to a combination of at least three political economy factors. First, the mandated structure and characteristics of the trusts created significant principal-agent problems. The Trustees were not allowed to paid or earn profits, so other income generating activities (farms, businesses) commanded most of their attention. Therefore, they generally were not interested in the day to day operation of the road. Toll gates were farmed out, and while trustees were suppose to monitor the gate-keepers and surveyors, their incentives to do so were very weak. Furthermore, there was no threat of takeover when a trust was operated inefficiently, so the competition for control that regulates managerial behavior in modern for-profit corporations was not at work. With little monitoring and no competitive threat, corruption was rampant "and only a small part of the money collected for the upkeep of the road was in fact used for that purpose" (Hindley 1971: 63). Many small trusts borrowed excessively because they had to make up for their inefficient management systems, and then were unable to meet their debt payments.

Second, the political limitations on trusts also led to significant complaints by shippers and travellers. While they probably did not want to pay tolls at all, that may not have been the most significant cost imposed

by the turnpike system. A serious complaint was that there were too many toll booths, requiring too many stops, thereby slowing transportation services unnecessarily. Gregory (1932: 193) suggests, in fact, that this was the most important complaint against the turnpikes, concluding that: "Road users declared that they would rather pay twice the amount if they could be saved the annoyance of the delay." This problem resulted from the fact that most of the turnpike trusts controlled only short sections of roadway within a parish, so travellers had to pay new tolls each time they left one trust's road and entered another (Webb and Webb 1913: 177). While consolidation of small trusts was desirable, the trusts operated at the prerogative of parliament, and any formal consolidation required parliamentary approval. Some efforts were made to obtain parliamentary approval to combine small trusts into larger organizations, particularly after the reason for doing so was articulated by John Loudon Macadam, beginning around 1810, but parliament did not respond with necessary enabling legislation that might have led to widespread consolidation, choosing instead to deal with such proposals individually and quite slowly (Webb and Webb 1913: 177-180). The cost of influencing parliament combined with political resistance to consolidation (e.g., by local trust employees such as toll collectors who did not want to lose jobs, and probably by competitive modes that did not want competition from more efficient turnpikes, as explained below) meant that the vast majority of the small trusts remained independent until their bankruptcy and demise.

Third, there was significant political opposition to the trusts themselves. Opposition came from those involved in competitive transportation modes such as the river and canal barges and railroads (see the discussion below), from the trade centers that already had effective transportation connections and feared competition from other centers if their road connections were improved, from some landowners and farmers who feared that better roads would make it easier for their low-wage laborers to be attracted away, from farmers who supplied local markets and feared that improved roads would bring in competition from distant suppliers, from heavy road users who did not want to pay tolls for access even though they wanted the roads to be maintained, and so on. Therefore, in order to gain sufficient support for passage, Turnpike Acts always had to reflect significant political compromise, including long lists of toll exemptions for powerful individuals and groups who opposed each Act (Albert 1972: 12, 24-29). Agricultural interests and in some areas, industrial groups, were particularly effective at obtaining exemptions (Jackman 1966: 260-261). Often those

with exemptions were some of the worst abusers of what to them remained a common pool resource. Exemptions also grew over time (individual Trust Acts were annually renewed, with revisions possible), seriously reducing trust revenues (Jackman 1966: 261). Politics, rather than economic considerations, also determined the tolls that could be set. Thus, for instance, "There was no invariable relation, and no necessary connection, between the amount that it cost to keep a particular mile of road in repair, and the amount that could be collected in tolls" (Webb and Webb 1913: 216). Indeed, just as some road users who did considerable damage to roads were exempted, prohibitively high tolls were established for some types of transportation that did little damage, if that transportation option threatened the market for other politically influential road users or other transport modes such as railroads.

***VI.3.1. Politics and the inefficiency of transportation systems: an example.*** The inefficient allocation of transport services resulting from political manipulation of tolls can be seen by examining parliamentary treatment of the steam-powered carriages which began to appear on the roads of the United Kingdom in the 1820s. Indeed, while it is widely believed that the general use of mechanically propelled road vehicles began in the late nineteenth century, the fact is that sophisticated steam powered road vehicles had both commercial and technical success sixty years earlier (Gurney 1831: 12; Dance 1831: 45; Dalglish 1980: 117). These vehicles could maintain high sustained speeds relative to horse-drawn carriages (24 miles per hour over four miles, and an average of 12 miles per hour over longer distances) and carry more passengers (up to 14 in 1831). Estimates of relative operating costs suggest that steam carriages could run at about a half to a third of the cost of horse-drawn stage coaches (Gurney 1831: 18; Dalglish 1980: 122), and in the absence of discriminatory tolls, per passenger fares were apparently about one half those of stage coaches (Gurney 1831: 12; Dance 1831: 45). These vehicles were also much safer as they were much less likely to overturn, and steam engines did not "run away with" passengers the way horses could (Gurney 1831: 20). Steam carriages also threatened railroads, which generally were granted monopolies over particular routes (Dalglish 1980: 117), allowing them to charge relatively high prices for passenger services. After all, the steam carriages could compete in terms of speed and they were not limited by the need for rail lines. These threats were not allowed to develop, however, as Parliament responded to political demands from railroad and horse-carriage related interests.

Parliamentary imposed tolls for steam carriages were set at least six times higher than those on horse-drawn stage coaches (Gurney 1831: 22; Dalglish 1980: 117). Furthermore, parliament imposed outright prohibition of steam carriages in a large number of Turnpike Acts (Dance 1831: 48). These very high tolls and prohibitions were imposed despite the fact that "highway engineers were unanimous that injury to the road surface from the action of horses' feet exceeded that caused by the wheels of traffic by a factor of three" (Dalglish 1980: 119). Steam carriages had innovative braking systems that did not lock and drag, as well as one driving wheel with the potential of engaging a second to prevent slippage, both of which did less damage to roads than horse-drawn carriages. Furthermore, the wheels on horse-drawn vehicles were necessarily made narrow to reduce the effort required of the horses, and these narrow wheels caused considerable rutting. Steam carriages, on the other hand, had very wide tires in order to give them greater traction, and these wide tires did virtually no damage to road surfaces, according to engineers such as Thomas Telford (a leading engineer and road builder who co-founded the Institute of Civil Engineers and was its first President) who testified before a Parliamentary Select Committee convened in 1831 to consider the exorbitant tolls on steam carriages and to consider the potential future use of mechanical (steam and petroleum powered) vehicles (Dalglish 1980: 118-119).

In light of their safety, cost advantages, speed, capacity, and reduced road damage, the 1831 select committee recommended that the tolls on steam carriage be dramatically reduced (Select Committee on Steam Carriages 1831; Gurney 1831), and if this had occurred, there is "little doubt that a network of good toll roads would have soon been built to take the new vehicles" and that a substantial part of the United Kingdom's railway system would not have been built (Dalglish 1980: 128). However, as Dalglish (1980: 125) notes: "we can well imagine what happened. The many interests - corn merchants, harness makers, horse-copers, railway promoters, iron masters hoping to make rails, and those who were simply against change - would unite against steam carriages. It was only necessary for parliament to do nothing for them to be killed off, and nothing is what it did" [Dance (1831: 46) also notes that coach proprietors, coachmen, and postboys were in the opposition]. As a result, the use of mechanical vehicles on Britain's roads was delayed for some 60 years.<sup>36</sup>

The success of the railroad- and horse-carriage-related interests allied against steam carriages appears

to be an important reason for the demise of the turnpike trusts, because it meant that the highways were not competitive with the developing railroads. With the development of the short lines between Stockton and Darlington in 1825 and then between Liverpool and Manchester in 1830, for instance, stage coaches, postchaises and private horse-drawn carriages passenger traffic by turnpike between these points declined dramatically. The turnpikes had come to depend on such passenger traffic for revenues, in part because so many other forms of traffic had toll exemptions or limitations. Ironically, for the horse-drawn passenger service and its supporters who joined the railroads to prevent the development of the steam carriage industry, the advantage going to the railroads quickly led to the decline of their industry as well. Without the steam carriage as a more effective competitor for the railroads, "The transfer of this business was instantaneous and complete. Every coach had to be taken off the road the moment the railway was open to the towns along its route" (Webb and Webb 1913: 215). As the railroads spread, road traffic declined. The last stage coach between London and Birmingham went out of business in 1839, for instance, with other routes from London ending their runs over the next few years (to Bristol in 1843, Plymouth in 1847, Bedford in 1848). Thus, turnpike toll revenues fell by one third between 1837 and 1850 as railroads spread through the country. More and more Trusts were unable to maintain their financial solvency, forcing defaults on debt payments (for many, creditors took immediate possession of all revenues to cover interest on bonds, leaving no funds to cover maintenance costs).

**VI.3.2. Public takeover of roads.** Rather than recognizing the underlying incentive problems and lifting the imposed constraints that created them (e.g., allowing trusts to earn profits and charge market determined tolls, allowing competition for ownership to develop) parliament began to empower the trusts to draw on "statute labor" (the labor that the parishioners were mandated to provide under the 1555 highway statute). Initially the trusts were required to pay wages fixed by parliament, but later a portion of the labor was required without payment (Hindley 1971: 62). Some trusts were even given parliamentary authority to appropriate materials without payment. Furthermore, under the law, the parishes had never lost the liability for road maintenance, and while they were supposedly able to recover any money they spent from the turnpikes' revenues, the trusts that failed in their road maintenance were generally so far in debt that parishes had little chance of repayment. As chronic insolvency spread, the burden of maintenance for more and more

turnpikes was shifted, once again, onto the parishes. The same incentives were at work in the parishes that existed at the beginning of the turnpike era, of course, so this simply led to resistance (shirking, etc.) which actually flared into a "conclusive popular rebellion known as the Rebecca Riots" in South Wales during 1842-43 (Webb and Webb 1913: 217). This resulted in a royal Commission to inquire about the grievances in South Wales, and finally to the dismissal of all Turnpike Trustees throughout the area and the merger of all trusts into "County Road Boards" which took over the roads, their debts, and the tolls of the former trusts. A "General Superintendent of County Roads in South Wales" was appointed by the central government, putting the roads in the area "Under what was virtually Government control" which also loaned 218,000 Pounds to counties so they could pay off creditors and consolidated debts at low interest rates (Webb and Webb 1913: 219-220). These county organizations were able to substantially reduce the number of toll gates as well as the level of tolls that had led to the revolts. Furthermore, they actually were able to operate efficiently enough to pay off the accumulated debts over the next 30 years, suggesting that if Parliament had responded earlier to the need for consolidation, the riots and subsequent government control might have been avoided. In fact, if consolidation of a similar "sort could have been done with the English Turnpike Trusts in 1844, they might have been spared the long-drawn-out agony of the ensuing half-century. But every attempt at legislation was defeated.... So far as the government was concerned, under the timid and unresourceful advice of the Home Office, and the refusal of successive Cabinets to trouble themselves about the subject, the Turnpike Trusts were allowed to go on just as before, annually getting their expiring terms renewed by Parliament, as a matter of course, falling, most of them, progressively further and further behind their task, and many of them, deeper and deeper into insolvency" (Webb and Webb 1913: 220).

A Select Commission of the House of Commons was formed in 1864 to consider the question of how to end all tolls. The Commission's report concluded that the tolls were "unequal in pressure, costly in collection, inconvenient to the public, injurious as causing a serious impediment to intercourse and traffic", all of which arose because of the politically created constraints on the trusts, of course. However, the Commission concluded that the trusts should be abolished, and that the roads should be turned over to a government authority, as in South Wales (Quoted in Webb and Webb 1913: 221). Again, Parliament did not respond to these recommendations by establishing a general policy. Instead, a gradual abolition of more and

more tolls began.<sup>37</sup> Most Trusts were renewed each year, although from 1864 onward, 20 to 30 trusts were dissolved annually, with the roads turned over to a local parish or a highway district. Dissolution accelerated, however, and in 1871 all tolls were ended in the London area. The number of trusts was down to 854 in 1871, 588 in 1875, 184 in 1881, 71 in 1883, 15 in 1887, and 2 in 1890. The last trust ended operations in November of 1895.

The increasing rate of dissolution of the trusts rapidly placed thousands of miles of roads back into the care of the parishes, leading to increased local resistance. In order to mitigate some of the local opposition the central government began giving Grants in Aid in 1876 to help pay for maintenance. Then in 1878 the Highway and Locomotive Act ordered the counties to contribute half of the annual cost of maintaining the former turnpike roads. The Local Government Act of 1888 granted more aid from the central treasury to counties for road maintenance but required the counties to take over full maintenance obligations from the parishes for all of the "main" roads. County governments were becoming the local road authority, and the parishes were finally formally dissolved of their road maintenance liability in 1895. "Thus at length the British road system was placed under control of elected public authorities each representing larger areas" (Gregory 1932: 196). Funding shifted from tolls to county (or in places, Borough or other local government<sup>38</sup>) taxes along with subsidies from the central government, and government expenditures on roads increased rapidly. The average government expenditure per mile of county roads rose from 43 pounds in 1890 to 69 pounds in 1902, for instance while expenditures on urban roads increased from 49 to 207 pounds over the same period (Gregory 1932: 196).

**VI.3.3. *The commons problem.*** Free access to roads led to new types of road users. By the end of the nineteenth century many highways had more bicycle traffic than horse drawn traffic, and virtually every country home had a bicycle. As Webb and Webb (1913: 240-241) report, "What the bicyclist did for the roads, between 1888 and 1900, was to ... accustom us all to the idea of our highways being used by other than local residents. It was the bicyclist who brought the road ... into popular use for pleasure riding." Pleasure riding is pretty attractive when one does not have to pay for it, of course. In addition, while excessive tolls had kept the steam carriage off the roads, the end of tolls and the development of light internal combustion engines in 1885 led to the introduction of the first petroleum driven motor cars in England in about 1894. The

commons problem quickly became evident as bicycles and automobiles alarmed horses and pedestrians, and raised dust due to their speed (roads were largely still surfaced with gravel at this time): "the turning loose on our roads of tens of thousands of heavy vehicles, often travelling at speed of an express train, amounted to a real aggression on the safety and comfort of all the other users of the roads" (Webb and Webb 1913: 214). Accidents increased dramatically, generally at the cost of those who did not enjoy the benefits of the new transportation methods (pedestrians, users of horses), and road damage significantly increased maintenance costs.<sup>39</sup> Those who wanted to use the roads for traditional horse-drawn traffic protested loudly, but with no tolls to manipulate, raising barriers to road use by bicycles and automobiles proved to be difficult. Efforts to prevent their use was successfully resisted by the growing political influence of motor vehicle owners, although several actions were taken to limit their access. The Motor Car Act of 1903 required new vehicles to be registered and licenses and to carry "conspicuous identification numbers back and front", for instance, and drivers were also required to be licensed. The costs of automobiles were also increased due to requirements of lights and alarms that could be sounded, and speed limits were established. These limitations were clearly not sufficient, of course, and the use of motor cars expanded, with their accompanying externalities.

The cost of road maintenance and improvement due to these "new users" rose rapidly during the first decade of the twentieth century and the central government was continually pressed to provide relief to the local taxpayers. It was felt that the users of motor vehicles should share in the costs of maintenance but the local road authorities (counties, boroughs, etc.) were not able to collect from most of them who traveled through their areas because they could not charge tolls. Finally a national tax on petrol was established in 1909 along with increased licensing fees paid to the central government. These new road revenues were administered by a new Road Board with the power to subsidize local road authorities, not for general maintenance, but for specific types of road improvements and new roads. The new road users demanded a very different type of road than horse-drawn transport required, after all, and as the political power of the owners of motor vehicles increased, more pressure was brought to bear on Parliament to provide roads suitable to such traffic.

The Road Transport Board was created in 1918 to coordinate all work on roads during the First World War, and it continued to function after the war as a Department of the Ministry of Transportation. Its

role was one of centralized supervision of road development, but it also was given the power to allocate grants from the central government's Road Fund (Gregory 1932: 248). Roads were divided into three classifications based on width (60 feet for first class and 50 for second), and up to 50 percent of the cost of maintenance and improvement of first class roads was to come from the national government. Second class roads were to get up to 25 percent and third class roads were to receive no aid. At the time, 26,000 miles of Britain's 179,000 total miles was classified as first class, and 15,800 miles fell into the second class. As Gregory (1932: 248) notes, however, "It is a natural desire of local road authorities to transfer roads from the grant-less third class", so local authorities began finding ways to claim that more of their roads were wide enough to warrant subsidization. This did not mean that roads actually had to be widened, however: "Each class must have a minimum carriage way of 20 feet, with one footpath. Therefore a third class road which has a footpath and a grass verge on each side, can be promoted to the second class and made eligible for a grant, by the simple process of absorbing a footpath and part of the verge into the carriage way, to the detriment of the safety of the pedestrian and the appearance of the road" (Gregory 1932: 248-249). Grants could then be obtained to surface formerly graveled third class roads with tar. Thus, more and more of the funding of roads was being shifted to the central government.

## **VII. Conclusions**

The contention that roads are not public goods, but that they can be club goods, private goods, or common pools, depending on the institutional arrangement that exists, is supported above by an examination of the evolution of road provision in Great Britain. Indeed, recognition of the fact that public roads are really common pools and that other arrangements have existed in the past under different institutional environments reinforces Minasian's (1964: 79) point that the outcomes we observe are a result of the property-rights/institutional arrangements that exist and "alternative exclusion and incentives systems" produce very different results. This opens up a much larger set of policy options beyond government taxation and financing of roads. After all, the analysis presented here is not just supported by the historical evolution of road provision in Great Britain.<sup>40</sup> The fact is that both private and club provision of roads are prevalent today. Roth (1996, 180-197) documents several private road projects in developing countries, for instance,

where governments have found that the private sector can respond to demands for highways more effectively and more quickly than the state can.<sup>41</sup> Roth also cites examples in developed countries, including two privately built highways in Great Britain (the Dartford River Crossing Ltd.'s toll bridge crossing the Thames, and Midland Expressway Ltd.'s M6-Toll Road, a 27 mile expressway to relieve congestion in one of England's busiest urban areas). Privately financed highway projects are also appearing in the U.S. (e.g., the Dulles "Greenway" project in Northern Virginia and the State Road 91 project in Orange County, California).<sup>42</sup> Large proprietary business operations also provide streets and even highways. Consider Disney World, for instance [see Foldvary (1994)]. Smaller scale business operations also provide streets (or substitutes for streets: mall parking lots and corridors are substitutes for public streets that reduce the costs of shopping in business districts criss-crossed by public streets, for instance). In addition, many residential developments actually include streets that are private or club goods (Foldvary 1994). The actual number of these arrangements is not known, but estimates of the number of United States residents living in gated communities ranged up to 8,000,000 in 1995 (Benson 1998:93) and this is only a small portion of the communities that do not rely on the government for streets. Many are built by developers who factor consideration of the cost of streets in the prices of lots or homes. As residents move in they often form home ownership associations, and at some point these associations generally join with and ultimately replace developers in coordinating street maintenance. Thus, these streets become local club goods. There also are cases where streets were actually owned by a local government that deeded them to local homeowners associations (Newman 1980). This mix of private and club goods clearly demonstrates that roads are not necessarily public goods, and an examination of the traffic situation on many modern public roads demonstrates that even publicly provide roads are not public goods in a Samuelson sense. This is made quite apparent by a simple examination of the level of traffic congestion in most urban areas of the United States, the United Kingdom, and numerous other parts of the world (e.g., consider Seoul, Korea's congestion problems, for instance).

The focus in this paper has been on roads, but the same analysis appears to apply to numerous other so-called public goods. Consider education for instance, with its mix of private schools and home schooling, community based (club) schools such as those provided by various religious organizations, and crowded

inefficiently run and expensive public schools. Or consider policing. In the United States today there are roughly three times as many private security personnel as there are public police, and there are also large numbers of community level crime control activities, such as crime watch and neighborhood patrols (Benson 1998: 15-25, Benson and Mast 1981). Furthermore, public police find their files crowded with cases that cannot even be investigated due to the excess demand for their services, and victimization surveys suggest that most crimes against persons and property are not even reported as victims are, essentially, crowded out of the system. Indeed, the evolution of the institutions of policing in Great Britain is very similar to the evolution of road provision described above (Benson 1994). Similarly, public court backlogs and delay force many disputes to be dropped while many more disputants choose to go to private or club alternatives: direct negotiation, or mediator/arbitrators service, some of which are offered for a price while others are provided by communities such as trade associations [see Bernstein (1992) and Benson (1995, 1999b) for instance]. In fact, a claim that roads, education, policing, or courts [or most (perhaps all?) other publicly financed goods or services] are public goods, even up to the point where crowding sets in, is of little real relevance for public policy because, as Minasian (1964: 79-80) explains, "the theory [of public goods] generates economic analysis which is not based on the opportunity cost notion." Rationing of scarce goods can not be avoided by declaring that no one can be excluded; this simply means that first-come-first-serve and its accompanying congestion costs determine who gets what, or that regulations limiting use must be passed. Individuals and close knit-communities look for alternative means to produce the desired services, however, and a mix of club and private goods inevitably exist. And importantly, these alternative sources of the desired goods would provide a lot more of them if property rights were not constrained by the state in order to meet the demands of special interest groups.

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## Endnotes

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1. Like television signals, different institutional arrangements create different incentives for the allocation of resources, as explained in Minasian (1964), who criticizes the theory of public goods. Consideration of other allegedly public goods has led to similarly criticisms (Coase 1974; Benson 1994).
2. Other alternatives may exist (e.g., public roads fully financed by tolls), but these dominated in the United Kingdom.
3. Non-rivalrous consumption means that even though one person consumes the benefits of the good, everyone else can consume the same undiminished benefits. Non-excludability means that, not only unlimited numbers of people consume the benefits, but no one can be prevented from consuming them even if they do not pay their share of the costs. Free access to a non-rivalrous good creates "free-rider" incentives: individuals recognize that they can consume the benefits without paying, so they will not voluntarily pay for the good, and this means that private producers will not produce the good because they cannot collect revenues to cover costs (or at least, that they will not produce enough of the good because, while everyone can free ride, some may not).
4. Indeed, for simplicity, the model presented below characterizes a club good as non-rivalrous for the club members club, even though a club good can be rivalrous, in that use by one individual reduces the value somewhat, but not completely, for other users (e.g., congestion). If such costs are born by club members, and therefore, internal to the collective decision-making process of the club, then the club may still provide the good. This characterization of a club good adds considerable complexity to the model, however, without changing the implications of relevance here.
5. They can be related because initially a good or resource can have the characteristics of a public good but given the inevitable congestion that arises with free access, it will become a common pool.
6. The following model is based upon the Shitovitz and Spiegel (2002) analysis of pure public goods, but with added consideration of transactions cost issues that are likely to constrain the size of a voluntary community. Therefore, while Shitovitz and Spiegel (2002) would call  $R$  a public good, it is labeled as a club good below for reasons that, if not already apparent, will be as the arguments are developed below.
7. This assumption simplifies the analysis considerably by allowing decentralized production without an impact on output (Shitovitz and Spiegel 2002).
8. As Shitovitz and Spiegel (2002) note, this means that for the chosen strategies  $(S_D^C, S_J^C)$ ,  $v_i(F_i^C, R^C) \geq v_i(F_i, R)$  for all  $(F_i, R_i) \in S_i$ , where  $R^C = R_D^C + R_J^C$ , and for Dick  $R = R_D + R_J^C$  while for Jane  $R = R_D^C + R_J$ .
9. The free-rider result reflects the assumption that  $0.5X_D \leq X_J > 0$ , for instance. Shitovitz and Spiegel (2002) demonstrate that if  $X_D \leq X_J > 0.5X_D$ , both individuals will actually contribute positive amounts to the club good, although Pareto superior options are still available. Drawing upon Bergstrom, et al. (1986) and Shitovitz and Spiegel (1998), they note that this case means that the two individuals consume the same bundles since first-order conditions produce  $F_D^C = F_J^C = R^C = (X_D + X_J)/3$ .

10. Shitovitz and Spiegel (2002) motivate this assumption by noting that if the sum of the pledges exceed the marginal cost of producing R then some of the pledged resources could be reallocated to make either Dick or Jane or both better off, and similarly, if the sum of the pledges are less than the marginal cost of producing the club good, the amount of resources pledged will not be sufficient to produce another unit.

11. Shitovitz and Spiegel (2002) illustrate this by explaining that if both traders agree that additional units of the club good should be provided then they may initially accept the minimum of  $G_D^T$  and  $G_J^T$ . However, since renegotiation is allowed, each individual can increase his or her pledge,  $Y_i$ , and, from equation (8), the preferred amount of the increase in  $G_i$  is diminishing in  $Y_i$ . Therefore, the individual who has the highest  $G_i$  will offer a slightly increased pledge ( $Y_i$ ) while the individual with the lowest  $G_i$  will offer a reduced pledge ( $Y_i$ ), and this continue until  $G_D^T = G_J^T$ . Note that it is a subset of the Pareto frontier given the resources that exist in the community, an issue that becomes important in Section V below.

12. Shitovitz and Spiegel (2002) also demonstrate that if  $X_D \leq X_J > 0.5X_D$ , the trading equilibrium occurs where  $F_D^T = F_J^T = 0.5 R^T$ , and  $R^T = 0.5 (X_D + X_J)$ . Both consumers prefer this result to the Cournot-Nash solution described in note 9, however, and this is the key point.

13. Also see Mileron (1972), Bergstrom, et al. (1986), Bernheim (1986), and Shitovitz and Spiegel (1998, 2001). Shitovitz and Spiegel (2002) assume that  $i$  in equation (1) now varies from one to  $N$ , with  $N \geq 2$ , and that each individual's utility is the strong monotonic increasing quasi-concave function in equation (1). They further assume that each individual can consume the full quantity of R that is produced by all individuals:  $R = \sum R_i$ , where  $R_i$  is the quantity of R produced by  $i$  for all  $i = 1$  to  $N$  (that is, R remains non-rivalrous in consumption, so). Then, if the utility functions are differentiable and  $(\delta MRS_i / \delta F_i) > 0$ , while  $(\delta MRS_i / \delta R) < 0$  for all individuals  $\{MRS_i$  is the marginal rate of substitution for individual  $i$ , which is the marginal utility of  $F_i$  divided by the marginal utility of R:  $MRS_i = [\delta v_i(F_i, R) / \delta F_i] / [\delta v_i(F_i, R) / \delta R]\}$ , and all individuals have an  $X_i > 0$ , and production technology is as assumed above (i.e., a specific combination of resources is required to produce one unit of F and that same combination is required to produce one unit of R), it follows that the Cournot-Nash and trading equilibria can be derived. For a Cournot-Nash equilibrium, each individual  $i$  assumes that the other  $i-1$  individuals' contributions to R will not be affected by her particular contribution choice. Regarding the trading equilibrium, continuous utility functions guarantees existence of a TPF, and given that the utility on the boundary of the consumption set is zero and that utility increases monotonically in the interior of the consumption set, it must be that the quantities of both R and F consumed by each individual will be positive on the TPF. Therefore, if a trading equilibrium is achieved the club good will be produced. This trading equilibrium must satisfy four conditions. First, summing over all  $i$  from one to  $N$ ,  $\sum F_i^T + R^T = \sum X_i$ . In addition,  $G^T = R^T - R^c > 0$ ,  $Y_i / [(F_i^c - F_i^T) / G^T] \leq 0$  for all  $i = 1$  to  $N$ , and  $v_i(F_i^c - Y_i G_i, R^c + G_i)$  is quasi-concave and strictly increasing in G over the range from 0 to  $G^T$ , reaching a maximum over its defined domain at  $G^T$ .

14. Whether there are net social benefits from expansion depends in part on the consequences of expansion on the characteristics of club good itself. At some point, as  $N$  expands, congestion sets in, so further increases in  $N$  has offsetting marginal effects on utility for every member: the quantity of the club good can increase as  $N$  increases, while its "quality" decreases due to congestion costs, higher maintenance costs, and so on. Thus, the optimal  $N$  is likely to be finite, and for at least some club goods, quite small, although the optimal  $N$  for other club goods may be much larger.

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15. These institutional developments clearly do not exhaust the possibilities, however, and others may be equally or even more important for other times (e.g., where technologies differ), places (e.g., where different social, political or economic conditions apply), or club goods.

16. Fuller (1981: 227-228) explains that "Where customary [norms do] ... in fact spread we must not be misled as to the process by which this extension takes place. It has sometimes been thought of as if it involved a kind of inarticulate expression of group will... This kind of explanation abstracts from the interactional process underlying customary law and ignores their ever-present communicative aspect." Habits or conventions often arise as individuals attempt to economize on time and effort required in calculating tradeoffs in similar circumstances (Hayek 1973), for instance, and many of these habits or conventions are repeatedly observed by others who begin to anticipate the behavioral patterns under similar circumstances, and take these expectations into account in various decisions. Such behavioral patterns can also be emulated by others so the norms and corresponding expectations spread through the community. Rules also can be explicitly and voluntarily created through contracting. The resulting contractual rules only apply for the negotiating parties and for the term of the contract, but others may voluntarily emulate the behavior by adopting the same rule, resulting in a community wide norm.

17. Vanberg and Congleton (1992: 421) suggest that another strategy is unconditional cooperation until or unless noncooperative behavior is confronted, and some form of explicit punishment of the non-cooperative player as exit occurs. They label this strategy "retributive morality," but such violence is risky, so with competitive options and the ability to spread information, prudent morality is a better strategy.

18. Various levels of custom not only can be very different in content and procedure, but they are different for a reason, as Fuller (1981: 241-242) illustrates:

That the family cannot easily organize itself by a process of explicit bargaining does not mean there will not grow up within it reciprocal expectancies... Indeed the family could not function without these tacit guidelines to interaction... At the midrange, it should be observed that the most active and conspicuous development of [custom]... in modern times lies precisely in the field of commercial dealings. Finally, while enemies may have difficulty in bargaining with words, they can, and often do, profitably half bargain with deeds...

That [customary norms are]... at home across the entire spectrum of social contexts does not mean that [they retain]... the same qualities.... At the terminal point of intimacy [custom]... has to do, not primarily with prescribed acts and performances, but with roles and functions.... In the middle area, [custom] ... abstracts from qualities and disposition of the person and concentrates its attention on ascribing appropriate and clearly defined consequences to outward conduct. Finally, as we enter the area of hostile relations.... the prime desideratum is to achieve - through acts, of course, not words - the clear communication of messages of rather limited and negative import; accordingly there is a heavy concentration on symbolism and ritual.

19. Transactions costs also imply that there are limits to how extensive an inter-group network of cooperation can be, but there are other reasons to expect that these limits can be broken down if it is desirable. After all, as Mises (1957: 257) explains, "Man is not the member of one group only and does not appear on the scene of human affairs solely in the role of a member of one definite group. In speaking of social groups it must be remembered that the members of one group are at the same time members of other groups. The conflict of groups is not a conflict between neatly integrated herds of men. It is a conflict between various concerns in the minds of individuals." For example, a medieval merchant generally was simultaneously a member of the merchant community, a religious organization, and

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perhaps an urbanized community or neighborhood association, and the geographic dimensions of each varied. Thus, he was in fact familiar with the behavioral rules of several different groups and was in a position to facilitate the development of inter-group ties.

20. There is evidence of a network of roads in Britain prior to the Roman conquest, although much of it is indirect (Jackman, 1966: 3; Gregory, 1932: 45-55).

21. Both can probably be characterized as club goods since cattle were generally held in community pastures to capture scale economies in herding (Dahlman 1980), and policing presumably produced community wide deterrence effects.

22. See Benson (1998: 198-203) for more detailed discussion of these organizations.

23. The hundreds were described in some of the king's early codes, so Lyon (1980: 67, 84) argues that as kingdoms grew kings needed a way to organize local government; thus, they presumably established the tithings and hundreds as local judicial administrative units. However, as Blair (1956: 235) points out, such an interpretation is erroneous because it "mistake[s] the nature of Anglo-Saxon legal codes which were not so much concerned with promulgation of new law as with codification of established custom. There is little doubt that the hundred [and tithing] was functioning as a unit" before it appeared in any code.

24. Above the shire court there was, apparently, a third level of court "which were, so to speak, hundreds in themselves" (Stephen 1883: 67). Note, however, that the higher level courts were not anything like modern courts of appeal. They were simply increasingly inclusive with jurisdictional rules requiring that a dispute be handled by the least inclusive group that encompassed the parties in the dispute. Also note that the rules applied in these courts were customary rather than royal in origin. A panel of jurors with equal numbers of representatives from the separate tithing supervised the trial, which general involved oath taking (reflecting the important role of reputation in these communities) or ordeal (reflecting the strong religious beliefs of the time).

25. The Normans did mandate that local freemen travel to royal courts, although there was considerable resistance to such requirements (Benson 1998: 210-212).

26. Note that the "commercial community" of this period can also be characterized as a club ruled by customary norms, as merchants established their own participatory dispute resolution forums at each market and fair (Benson 1989). The earliest merchant guilds also arose spontaneously, both to provide protection for foreign merchants away from their homes, and to protect against unknown foreign merchants who might take advantage of a local merchant and then never be seen again (Milgrom et al. 1990: 4).

27. This example also draws from Shitovitz and Spiegel (2002).

28. Furthermore, tolls are not always charged for privately provided roads. A business community may not charge tolls because it build the roads in order to attract customers (e.g., consider Disney World) who pay prices for goods or services that cover road costs. Similarly, residential developers may build roads to make their lots more valuable, thereby covering the cost of the roads through the prices charged for those lots. Furthermore, limits on access can be achieve by means other than money prices if such

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limits are desirable and the collection of tolls proves to be too costly. Thus, for instance, some private residential communities discourage through traffic by limiting access to one or a few entrances and/or by installing traffic control devices like speed bumps. Others place gates at their entrances with either coded locks or security guards.

29. Groups relying on hunting tended to develop improvements in technologies for hunting which enhanced their wealth in the short run, but the long-run effect was often quite different. Many migratory animals were hunted into extinction by primitive groups (Ridley 1996: 227-247), for instance, because ownership could not be established until an animal was killed. However, because the members of the group relying more on hunting develop new weapons and other inputs to hunting (e.g., horses, ships), and became skilled in the use of those inputs, they develop a comparative advantage in violence.

30. Carneiro (1970) agrees but adds that successful creation of relatively permanent states of this type occurred where exit by those being subjugated was very difficult due to the surrounding hostile environment (e.g., oceans, deserts, mountains, other hostile communities).

31. There are many other options as well. See Levi (1988) and Benson (1999a) for details.

32. The JP office was created in 1326 with a mandate "to keep the peace" (Stephen 1883: 190). Appointed by royal commission for each county, JPs were to pursue their duties without monetary compensation. Over thirty statutes between the late fourteenth and the middle of the sixteenth centuries establishing additional functions for JPs including those dealing with the road maintenance.

33. See Webb and Webb (1913: 14-26) for more details on this statute and others which followed.

34. For extensive discussions of Turnpike Trusts, see Pawson (1977), Webb and Webb (1913), and Albert (1972).

35. The correspondence between the timing of the turnpike era and the beginnings of the industrial revolution is more than accidental. As Webb and Webb (1913: 143-144) explain, With the coming the Industrial Revolution, with a rapidly increasing population, with manufactures ready to leap from the ground, with unprecedented opportunities for home and foreign trade, improvement of communication between different parts of the kingdom became, from the standpoint of material property, the most urgent requirement. Today, the railway and the tramway, the telegraph and the telephone, have largely superseded roads as the arteries of national circulation. But, barring a few lengths of canal in the making, and a few miles of navigable river estuaries, it was, throughout the eighteenth century, on the King's Highway alone that depended the manufacturer and the wholesale dealer, the hawker and the shopkeeper, the farmer, the postal contractor, the lawyer, the government official, the traveller, the miner, the craftsman and the farm servant, for the transport of themselves, and the distribution of their products and their purchases, their services and their ideas.... And all contemporary evidence indicates that, what with the surface-making and embanking, widening and straightening, levelling and bridging, the mileage of usable roads was, by the eighteenth-century Turnpike trusts, very greatly extended.

Indeed, the tremendous increase in economic activity that began during the mid to late 1700s could not have occurred without the simultaneous improvements in transportation. Furthermore, the development of the British railroad system did not really begin until the 1820s as the turnpike system was nearing its

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peak (Pawson 1977: Fig. 3, page 8), and well after the beginnings of the industrial revolution.

36. The steam carriage industry did not give up. For instance, at least one group including Thomas Telford initiated an effort to run steam-carriage services on their own improved road between London and Birmingham, with intentions of extending the services beyond this route (Dalgleish 1980: 125-128). This group organized the "Steam Company," surveyed the route, and gained support from innkeepers and canal operators (who hoped to compete with railroads by connecting with the steam carriages). The railway serving the route objected strongly, but the group apparently was relying on Telford's prestige to carry them through parliamentary approval. Telford died in September 1834, however, the project was abandoned. Yet another initiative by the advocates of steam-powered road travel was the formation of the "Institute of Locomotion for Steam Transport and Agriculture" for the purpose of pursuing the application of steam power to transportation, agriculture and other economic purposes through both economic and political means (Gordon 1833: 1). Their political efforts to alleviate the restrictions on steam carriages clearly continued after the 1831 Select Committee report [see for instance, the report of the Select Committee on Mr. Goldsworthy Gurney's Case (1834); Gurney was an active advocate and promoter of steam carriage transportation (Gurney 1831)], but to no avail.

37. The Highway Act of 1862 actually started the process of creating Highway Boards throughout the rest of the United Kingdom to which the turnpikes could be entrusted.

38. The Local Government Act of 1858 authorized any parish to become an "Urban Sanitary District", and these districts could not be included in any larger Highway District (Gregory 1932: 195). Parishes whose local officials wanted to maintain control of their roads used this process to do so, and as a consequence, a number of small districts avoided political consolidation.

39. Pounding of the road surfaces when dry created an unanticipated problem of "waviness" (Gregory 1932: 257), the use of "armoured tires" with iron studs on automobiles to prevent side slipping further damaged road services, and ruts were created during rainy weather.

40. For example, the British experience with toll roads has an American counterpart. The first toll road company in the U.S. was chartered by Pennsylvania in 1792, in order to provide a highway between Philadelphia and Lancaster. Klein and Fielding (1992) report that between 1792 and 1845 1,562 turnpike companies in the Eastern United States established over 10,000 miles of roads. As Gunderson (1989: 192) notes, "Relative to the economy at the time, this effort exceeded the post -World War II interstate highway system that present day Americans assume had to be primarily planned and financed by the federal government." Similarly, Klein and Yin (1996) point out that about 150 private toll roads were opened in California between 1850 and 1902. Klein (1990) explains, however, that numerous government mandated toll exemptions for powerful interest groups tended to undermine the incentives to build private toll roads (government regulations often explicitly prevented profit taking, just as in Great Britain).

41. Many developing countries are franchising roads to private firms which construct the roads and then operate them, charging tolls to earn the costs of construction and operation, **and** to cover franchising fees paid to the government (Pereyra 2002). Indeed, providing such roads are so attractive, in part because of their impact on real estate values, that it is becoming increasingly common for governments to auction franchises (Engel, et al. 2002).

42. The Intermodal Surface Transportation Efficiency Act of 1991 actually attempted to stimulate

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privately provided toll roads, bridges and tunnels in the United States (as long as they are not part of the interstate highway system) by making them eligible for a 50 percent grant from the Highway Trust Fund, and in an effort to take advantage of these available funds a number of states have passed their own legislation to allow private provision of roads. However, some of the largest and most important private highway projects have refused federal funds in order to avoid the added complications that accepting such funding entails.