Journal of the American Planning Association

ISSN: 0194-4363 (Print) 1939-0130 (Online) Journal homepage: https://www.tandfonline.com/loi/rjpa20

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To cite this article: John Pucher (1988) Urban Travel Behavior as the Outcome of Public Policy: The Example of Modal-Split in Western Europe and North America, Journal of the American Planning Association, 54:4, 509-520, DOI: 10.1080/01944368808976677

To link to this article: https://doi.org/10.1080/01944368808976677

Urban Travel Behavior as the Outcome of Public Policy:

The Example of Modal-Split in Western Europe and North America

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Urban transportation systems and travel behavior vary widely, even among countries with similar per-capita income, technology, and urbanization. This article compares modal-split—how people get from place to place—for 12 countries in Western Europe and North America. Differences in travel behavior arise largely from public policy differences, especially from differences in automobile taxation. In addition, variations in transit subsidies, land use controls, and housing programs significantly influence travel choices, although sometimes only indirectly. The success of public transportation depends more on supportive urban development and automobile taxation policies than on transit subsidies. The absence of such complementary policies in the U.S.—unlike the other countries studied—explains the ineffectiveness of the attempt to revive American public transportation exclusively through large subsidies.

There are large differences in urban transportation systems and urban travel behavior even among countries with comparable standards of living and similar levels of technology, industrialization, and urbanization. Adjusting for differences in climate, topography, population density, and various socioeconomic factors does not explain much of the variation among such countries. One could argue that the unexplained variation arises from differences in culture, mentality, or the underlying preferences of each country's inhabitants; but such factors are subjective and difficult to quantify.

I maintain that differences in travel behavior are largely due to differences in public policies. Although differences in culture and mentality influence travel preferences, the aspects of culture and mentality that affect transportation choices are themselves partly the result of long-term public policies. Observed travel behavior is not simply the outcome of consumer sovereignty. Indeed, in some cases, policies are so extreme, and the choices so restricted, that the resulting travel behavior—in particular, mode of travel—is practically foreordained.

In this article, I examine the relationship between public policies and travel behavior. I use modal-split to describe differences in travel behavior. Modal-split measures the percentage distribution of tripmaking by mode—whether people travel by car, bus, train, bicycle, or foot, for example. Although it is only one of many aspects of travel, it provides a convenient index by which to measure variation. I compare transportation policies and travel behavior for 12 countries in Western Europe and North America: Great Britain, the Netherlands, Belgium, France, Switzerland, Italy, Austria, West Germany, Denmark, Sweden, Canada, and the United States. Because those countries have similar levels of economic development, it is easier to identify the impacts of public policy. I analyze differences in public policy particularly to determine to what extent countries offer inducements that favor the automobile or mass transit. I examine transportation policies such as subsidization and taxation, which directly affect travel choices, as well as nontransportation policies such as land use controls and housing programs, which only indirectly influence travel behavior.

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Public policies are obviously not the only determinants of travel behavior; nor are they the only explanation for differences in travel behavior between the United States and other countries. But I contend that public policies play a more important role than underlying social or cultural preferences in the evolution of transportation systems and travel behavior in the countries I studied. At the very least, public policies magnify whatever differences underlying preferences would have generated.

Variation in modal-split

In spite of similar levels of per-capita income, technology, and urbanization, the countries of North America and Western Europe have very different urban transportation systems. Perhaps the most obvious indicator of those differences is modal-split.

Table 1 presents urban modal-split distributions for all the sample countries except Belgium. They reflect tripmaking for all purposes, not just for commuting to work.[1] In the United States, the automobile dominates urban travel, accounting for 82 percent of all trips. By contrast, the automobile is used for 74 percent of trips in Canada and for less than 50 percent of trips in the Western European countries. Indeed, the Swiss, Swedes, Italians, and Austrians use autos for less than 40 percent of their trips.

Conversely, public transport is the least important mode of travel in the United States, used for only 3 percent of urban trips. The other countries use public transport for much higher proportions of urban trips; the percentages range from three to eight times higher: from 11 percent in Germany, France, and Sweden up to 19 percent in Great Britain, 20 percent in Switzerland, and 26 percent in Italy. Only in the Netherlands is the transit share of modal-split not substantially higher than in the U.S. (5 percent vs. 3 percent). The similarity is due not to extensive automobile use in the Netherlands, but to the high level of bicycle use there (29 percent of all trips), which largely substitutes for mass transit. Likewise, the transit share of modal-split in Denmark is lower than one might expect, almost certainly because of widespread bicycle use (20 percent of trips).

There are even large differences in the amount of walking. Americans make only 11 percent of their trips by foot, compared to about 30 percent for most Western Europeans. The Netherlands and Denmark (at about 20 percent) fall below that average European level—again, probably because they use the bicycle more.

As one might expect from its high auto share of modal-split seen in Table 1, the United States has by far the highest level of automobile ownership—555 cars per 1,000 inhabitants. Canada and Germany come closest to the American level, with 435 cars per 1,000 population. The other countries have roughly 300 to 400 cars per 1,000 inhabitants. Consistent with high rates of auto ownership, Americans also drive more miles than any other nationality surveyed, except the Swedes (Table 2).

The low transit share of urban travel in the United States yields correspondingly low transit ridership in aggregate and thus few transit trips per capita. The Western European countries and Canada have roughly three to four times as much transit use per capita as in the United States—from 77 to 114 trips vs. only 28 in the United States (Table 2).

Americans' greater use of the automobile is not primarily due to greater affluence. In fact, seven of the ten European countries in this study had higher per-capita incomes than the United States in 1980, some of them much higher—for example, Switzerland,

Table 1. Modal-split in urban passenger transport (as percent of total trips)

		MODE					
Country		Auto	Public transport	Bicycle	Walking	Motorcycle + moped	Others
United States	(1978)	82.3	3.4	0.7	10.7	0.5	2.4
Canada	(1980)	74.0	15.0	←		11.0	→
West Germany	(1978)	47.6	11.4	9.6	30.3	0.9	1.1
Switzerland	(1980)	38.2	19.8	9.8	29.0	1.3	1.9
France	(1978)	47.0	11.0	5.0	30.0	6.0	1.0
Sweden	(1978)	36.0	11.0	10.0	39.0	2.0	2.0
Netherlands	(1984)	45.2	4.8	29.4	18.4	1.3	1.0
Italy	(1981)	30.6	26.0	←		43.4	→
Austria	(1983)	38.5	12.8	8.5	31.2	3.7	5.3
Great Britain	(1978)	45.0	19.0	4.0	29.0	2.0	1.0
Denmark	(1981)	42.0	14.0	20.0	21.0	...	3.0

Sources: Pucher, Hendrickson, and Macneil 1981: 466; German Ministry of Transport 1984: 44; Webster et al. 1986: 46–86; Haskoning Koninklijk Ingenieurs- en Architectenbureau 1984: 60; Austrian Ministry of Transport 1985: 818; Italian Ministry of Transport 1985: 11; Central Bureau of Statistics of the Netherlands 1986; Swedish Ministry of Transport 1978; Statistics Canada 1982; Federal Department of Statistics for Switzerland 1985: 53.

Sweden, and West Germany. Only Italy and Great Britain had substantially lower per-capita incomes (World Bank 1982).

Low population density may explain some of the auto's greater dominance in the United States. Sweden, which also has a low population density, has fewer cars but the per-capita mileage is also high. Overall population density in a country, however, is not the main explanatory factor. Canada, for example, has a lower population density than the United States (16 vs. 25 persons per km^2); yet the transit modal split in Canada is more than four times as high as that in the United States (15 percent vs. 3.4 percent) (U.S. Department of Commerce 1987: 815–17). *Urban* population density is obviously a more important factor, but as I discuss below, variations in urban density levels result partly from governmental land use and transportation policies.[2]

Variation in transit policies

One might expect that public transit is more important as a mode of travel in those countries where it has been most subsidized. That postulated link does not seem very strong, however, based on a comparison of the standardized subsidy levels in Table 3 with the modal-split distributions in Table 1. Despite its reputation for auto dominance and low quality transit service, the United States subsidizes its transit passengers more per ride than any other country. In 1982, for example, the operating subsidy per passenger trip amounted to 86 cents in the United States compared to 69 cents in the Netherlands, 41 cents in France, 23 cents in Italy, and only 13 cents in Switzerland (U.S. equivalents; see Table 3). Because the proportion of Americans who make trips by public transit is so much lower than elsewhere, the figures on total subsidy get more diluted for the United States than for other countries when we calculated the subsidy on a per-capita basis, spread over the entire population. But even the per-capita subsidy in the United States ($23 per year) is not especially low relative to other countries; it is about average for the sample, exceeding the level in five of the other countries.[3] Sweden ($52) and Denmark ($41) have the highest per-capita subsidies; Switzerland ($14) and Great Britain ($19) have the lowest (again, in U.S. equivalents; see Table 3).

Another way of gauging subsidy levels is to examine the percentage of costs they cover, or the converse—percentage of costs passengers must pay through fares. All countries subsidize public transit to some extent; it is not profitable anywhere. But the degree of unprofitability varies widely. Subsidies finance roughly one-third of costs in Germany, Switzerland, and Great Britain, but about three-fourths of costs in the Netherlands, Belgium, and Italy (see Table 3). The United States again is near the upper end of the scale, subsidizing 63 percent of costs.

Table 2. Levels of auto use and transit use

Country	Autos per thousand inhabitants (1985)	Auto km. driven per inhabitant (1982)*	Transit passenger trips per capita (1982)
United States	556	7.7	28
Canada	435	n.a.	77
West Germany	435	4.6	97
Switzerland	400	6.0	106
France	385	4.5	84
Sweden	385	8.0	71
Netherlands	333	3.9	80
Belgium	345	4.2	85
Italy	370	3.4	85
Austria	345	3.4	101
Great Britain	333	4.3	114
Denmark	294	4.2	83

* In thousands

Sources: Motor Vehicle Manufacturers Association 1987: 36–37; International Road Federation 1983; and data collected by the author directly from transport ministries in each country and from the Transport and Road Research Laboratory, Department of Transport of Great Britain, Crowthorne, England.

Two factors help explain the paradox of large transit subsidies and low transit ridership in the United States. First, although they are now at high levels, transit subsidies were practically nonexistent through the 1950s and remained low until the late 1960s. Only in the decade following 1970—when subsidies increased 14-fold—did government financial support reach its current high level (Altshuler 1981: 31–42; Pucher 1982; American Public Transit Association 1987: 18–19, 57–60). Especially during the 1950s and

Table 3. Levels of subsidies and services, 1982

Country	Operating subsidy			Vehicle-km. of transit service per capita
	Per capita*	Per passenger*	As percent of operating costs	
United States	23	0.86	63	9.4
Canada	25	0.33	51	18.0
West Germany	34	0.35	38	31.7
Switzerland	14	0.13	28	16.3
France	22	0.41	57	11.1
Sweden	52	0.73	60	57.1
Netherlands	27	0.69	78	8.8
Belgium	20	0.53	73	8.0
Italy	20	0.23	70	11.0
Austria	22	0.20	52	16.4
Great Britain	19	0.19	32	37.8
Denmark	41	0.35	45	n.a.

*In 1982 U.S. dollars.

Sources: Based on data collected by the author directly from transport ministries in each country and on unpublished data provided by the Transport and Road Research Laboratory, Department of Transport of Great Britain, Crowthorne, England, 1985.

Note: In general, data exclude commuter rail. Figures for Sweden and Denmark include some short-distance public transport in rural areas.

1960s, when transit ridership fell to less than half its pre-World War II level, most transit firms had to fend for themselves. The deterioration of the transit systems, as well as the long-term loss of patronage, through large-scale migration to the suburbs and the concomitant rise in automobile ownership, made it more difficult to rejuvenate public transportation even with large subsidies in the 1970s and 1980s (Dunn 1981: 73–92; Jones 1985: 13–95).

By contrast, European transit has a longer history of subsidization. Since the early 1900s, it has been an important component of local public services, and public financial support did not generate controversy when deficits arose (Dunn 1981: 57–72; Bonnafous 1984; European Council of the Ministers of Transport 1987). Most European transit systems maintained ridership levels and improved service at the same time American systems were deteriorating. Maintaining and modernizing public transit in Europe has cost less than the rebuilding efforts often necessary in the United States (Dunn 1980: 41–42).

A second explanation for the paradox is the inefficient design of the American subsidy program. Several studies have documented the rapid cost increases and productivity decline in the American public transportation industry (Pickrell 1983; Pucher 1982; Jones 1985: 13–27). In addition, a large proportion of capital subsidies has gone toward financing construction of new rail rapid transit systems, which have produced little growth in nationwide aggregate ridership and no increase at all in transit modal-split (Altshuler 1981: 42–49, 430–41). This inefficiency in both operations and capital investment has vitiated the American subsidy program. By contrast, Switzerland, noted for its high productivity, manages to provide high-quality transit service and to maintain a high transit modal-split with less than a sixth of the per-passenger subsidy of the United States.

Both historical differences in subsidy levels and variations in the effectiveness of subsidization suggest that comparisons of current subsidy levels can be misleading.

One could look at differences in the amount of transit service supplied as a more direct index of transit support, especially since transit is publicly owned or operated almost everywhere. As Table 3 shows, the United States provides much less transit service than most other countries. The exceptions are the Netherlands and Belgium, again because bicycling is more common there.

That index of transit support, however, has some deficiencies as well. To some extent, supply responds to demand rather than inducing it; thus, supply levels only partly reflect government policy. Moreover, as with subsidies, one needs to look at trends over long periods to identify impacts on travel behavior. Finally, supply levels such as vehicle kilometers of service do not reflect quality of service. Most subjective comparisons of public transportation indicate that Canada and Western Europe have a much higher quality of service than the United States (Dunn 1981: 55; Cervero 1986).

Variation in policies for bicycling and walking

With more and better transit services, Europeans obviously have a more attractive alternative to the automobile than Americans. Moreover, the opportunities for walking and bicycling in Europe are superior to those in the U.S., as the modal-split statistics in Table 1 suggest. That is not simply a matter of topography and population density. A few regions of the United States are as flat and as densely populated as the Netherlands and thus potentially as conducive to bicycling. Yet nowhere in the United States does bicycling even approach the level of importance it holds for the Dutch. Various levels of government have subsidized the construction and maintenance of bikeways with completely separate rights of way in the Netherlands, Belgium, Denmark, Germany and—to a lesser extent—in the other Western European countries. The northern European countries especially provide extensive, coordinated networks of bikeways in both urban and rural areas, and they either give bicycle traffic priority over autos or at least treat it equally (Webster and Bly 1980; Webster et al. 1986; Urban Consortium 1980). In contrast, the few bikeways that exist in the United States are, in general, uncoordinated, poorly maintained, and—because they are not usually separated from auto traffic—dangerous for bicyclists.

Public policies in Europe explicitly encourage not only bicycling but also walking. There is hardly a city in Europe without at least one pedestrian zone, and many cities have extensive districts in which automobile traffic is prohibited (Urban Consortium 1980; National League of Cities 1980). In comparison, pedestrian malls in the United States are fewer, less extensive, and less well coordinated with overall urban development than in Europe (Pushkarev and Zupan 1977).

Moreover, walking in American cities can be dangerous. Over the past 20 years, approximately 40 percent of all persons killed in motor vehicle accidents in American urban areas have been pedestrians or bicyclists; the number of such deaths ranges from 6,000 to 7,000 per year (Meyer and Gomez-Ibanez 1981: 258; National Safety Council 1985). Because of the short trip distances involved, those figures translate into extremely high fatality rates per mile of walking or bicycling, much higher than corresponding fatality rates for automobile occupants per passenger mile of travel. Although the federal government has instituted

strict regulations to improve the safety of car occupants, it has paid little attention to the equally serious problem of pedestrian and bicyclist safety (Altshuler 1981: 211–51). It appears that public policy in the United States favors auto users even in the area of traffic safety. Directly comparable statistics on accident rates of nonautomotive modes in Europe are not yet available. Nevertheless, it is clear that public policies there at least reflect a much greater concern for the safety of pedestrians and bicyclists than in the U.S.

Variation in taxation of autos

I argued above that the alternatives to the automobile are more attractive in Europe than in the United States and that the difference is primarily due to public policies. The governments of Europe also discourage automobile use directly through heavy taxation of both gasoline and auto ownership.

The United States charges the lowest gasoline taxes of any of the countries in this study, although the proportional differences have been declining over time. Both in 1978 and in 1987, the smallest difference in gasoline tax rates was between the United States and Canada. In 1978, the tax rate was almost twice as high in Canada as in the United States but in 1987 it was only one-fourth higher (see Table 4). The differences between the United States and Western Europe have been much greater. Effective gasoline tax rates (as a percent of pretax price) ranged from four to 11 times higher in Europe in 1978 and from three to eight times higher in 1987. Although the ratios of rates between the United States and Western Europe have thus declined, the absolute differences in tax rates have actually increased: from 222 percentage points difference in 1978 between the United States and the most highly-taxed country (then Italy) to 310 percentage points difference between the United States and the most highly-taxed country (Denmark) in 1987 (see Table 4). The differences in gasoline prices have also increased over time. In 1978 gasoline cost about one-third as much in the United States as in the country with the highest price (18 cents per liter vs. 59 cents per liter in Italy); by 1987, Americans paid only one-fourth as much as car drivers in the countries with the highest-priced gasoline (25 cents per liter vs. 99 cents per liter in Denmark and Italy; see Table 4 and Figure 1). The price differential arises overwhelmingly from deliberate taxation policies in the various countries, not from differences in the cost of petroleum.

Similarly, the countries have widely disparate tax rates for auto ownership. Whereas the sales tax on new cars is, on average, only 5 percent in the United States, it is 33 percent in France, 47 percent in the Netherlands, and ranges all the way up to 186 percent in Denmark (see Table 4). Dramatizing the effect of such a high tax, the Danish Ministry of Transport describes the policy as paying for three cars and getting only one (Eriksen 1983).

In a somewhat different approach, the International Road Federation (1983) reports annual tax payments for medium-sized cars. As Table 4 shows, that statistic also places the United States at the bottom of the list—only $119 per year compared to averages of $450 to $825 in Western European countries. Moreover, the European countries use most of the proceeds from the higher automobile and gasoline taxes not for highway expenditures, but for general revenues (Bon-

Table 4. Taxes on auto ownership and use

Country	Avg. gasoline price/litre (1978)*	Avg. gasoline price/litre (1987)*	Taxes on gasoline as percent of pre-tax price (1978)	Taxes on gasoline as percent of pre-tax price (1987)	Sales taxes as percent of pre-tax price for new, medium-sized car (1982)	Average annual taxation on car of 1500cc** (1982)
United States	0.18	0.25	23	45	5	119
Canada	0.19	0.37	41	56	n.a.	n.a.
West Germany	0.46	0.61	138	138	14	566
Switzerland	0.51	0.68	170	170	8	587
France	0.56	0.81	170	317	33	730
Sweden	0.41	0.66	108	133	41	450
Netherlands	0.50	0.80	156	245	47	825
Belgium	0.50	0.69	163	178	25	606
Italy	0.59	0.99	245	285	22	n.a.
Austria	0.48	0.75	117	150	52	525
Great Britain	0.32	0.63	100	178	25	652
Denmark	0.50	0.99	178	355	186	758

* In current U.S. dollars.
** In 1982 U.S. dollars.
Sources: International Road Federation 1983: 162–63; Eriksen 1983: 15–17; Jeschke and Kunert 1985; Organisation for Economic Co-operation and Development 1987: 284–89, 305; German Ministry of Transport 1985.
Note: Effective tax rates are shown here both for gasoline and for car purchases. Such rates express tax payments as a percentage of pre-tax price as opposed to purchase price including tax.

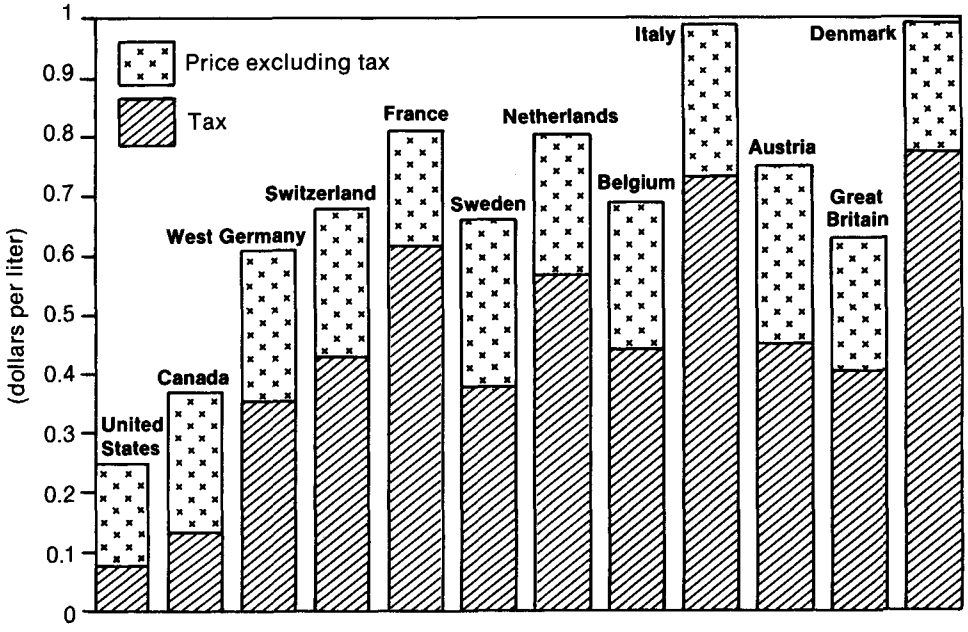

Figure 1. Gasoline prices and taxes, 1987. *Source: Organisation for Economic Co-operation and Development (1987: 284–305).*

nafous 1984). The higher tax rates do not result from any greater need for public highway expenditures. In short, government policy has deliberately made auto use and ownership in Western Europe much more expensive than the United States has.

Variation in parking policy and licensing of drivers

The greater availability and lower cost of parking in most American cities has also given the auto a comparative advantage there. A number of empirical economic studies find that parking policy in the United States strongly biases modal choice (Segelhorst and Kirkus 1973; Gillen 1977; Altshuler 1981: 353; Meyer and Gomez-Ibanez 1981: 293–94; Shoup 1982; Miller and Everett 1982; Surber, Shoup, and Wachs 1984). Shoup, for example, notes that 75 percent of all commuters in the United States park in free, employer-provided, off-street parking spaces, and that an additional 11 percent park for free in on-street parking spaces. Moreover, many of those who must pay for parking benefit from employer expenditures that sharply lower fees below their market level (Shoup 1982: 351–52). Even in downtown Los Angeles, slightly more than half of all work commuters park for free. Under most circumstances, in fact, employers pay more to provide free parking than they would to provide free gasoline for all employees who drive to work (Shoup 1982: 351; Wachs 1981: 246). Meyer and Gomez-Ibanez (1981) estimate that "free" parking costs employers from $166 to $1,657 per space per year (in 1985 dollars). Public policy in the United States encourages such expenditures by treating free parking as a tax-free fringe benefit for employees and as a tax-deductible expense for businesses that provide it (see Shoup 1982: 358–63). In contrast, parking in European cities is both more expensive and less available, an obvious disincentive to car use (Urban Consortium 1980; National League of Cities 1980).

There is yet another way European countries discourage auto use. Obtaining a driver's license in Europe is both more difficult and more expensive than in the U.S.[4] Public schools in Europe do not provide free or low cost driving lessons, as in the United States; rather, aspiring drivers in most Western European countries must purchase a legally-prescribed, minimum number of hours of lessons from private driving schools. In France and West Germany, for example, it costs about $600 to $900 for the required instruction. The government-administered tests for the license are much more rigorous in Europe than in the United States, usually demanding a technical understanding of how an automobile works as well as a demonstration of driving ability. Roughly a third to a half of those taking the test fail on the first try and must take another round of lessons before they can try again. Moreover, the minimum age for driving is 18 years in almost all the European countries, compared to 16 years in most American states. Thus, automobile driving starts—if at all—two years later in the life of most Europeans than for Americans.

Variation in roadway subsidies

The government's role in providing the necessary highway infrastructure for auto use also affects modal choice. It is difficult to obtain comparable figures on public subsidies for roadway construction and maintenance for all the countries studied and impossible to obtain such figures for exclusively urban roadways.

The International Road Federation (1983) has complied the best statistics available. Table 5 shows that government roadway expenditures per inhabitant are above average in the U.S., exceeded only by Switzerland, Austria, and Canada. The high cost of building and maintaining Alpine roads leads to the high figures for Switzerland and Austria. Low population density and extreme climatic conditions may cause the high cost in Canada.

These data say little about specifically urban transportation policy. Moreover, they depict the situation for only a single year (1982) and do not necessarily reflect long-term differences. The number of meters of roadway per capita (Table 5) reflects long-term policy differences among the countries, but not differences in the quality of roadways or the extent of government support. According to that statistic, the United States has roughly twice as much roadway per capita as most European countries and three to four times as much as some others. That suggests that the American public sector for many years has supported roadway construction more intensively than most other countries, but the evidence is indirect and inconclusive.

One might argue that user charges in the United States have financed the costs of highways and that motorists as a whole have not been subsidized. It is true that user charges cover most of the government expenditures on roadways, but not all. A recent U.S. Department of Transportation study found that user charges and earmarked taxes at all government levels together financed only $36 billion of the total $52 billion of highway expenditures in 1985 (Lee 1987: 17–19, A-9). The remaining $16 billion (31 percent of the total) came from general government revenues. In examining earlier years, from 1979 to 1984, the Department of Transportation found roughly the same percentage of expenditures financed from general revenues, so that the results for 1985 do not represent an anomaly. As noted already, the situation is reversed in Western Europe, where taxes on gasoline and auto ownership far exceed government expenditures for roadways.

Reported monetary expenditures are less than the full costs of roadway construction and use, which are particularly high in densely-populated urban areas. For example, American public policy has not required auto users to bear the social and environmental costs that are implicit in car use; those costs are in the form of air pollution, noise, traffic congestion, accidents, and neighborhood disruption that roadway construction and use generate (Leavitt 1970; Mowbray 1969; Caro 1975; Schaeffer and Sclar 1975). Society as a whole has had to bear the social and environmental costs, which economists describe as "external costs." The failure of public policy to internalize those costs through surcharges on automobile use means that roadway construction and auto use have been implicitly subsidized by the amount of this underpricing—in addition to providing direct subsidies as measured by reported expenditures. Although most observers acknowledge the existence of those adverse impacts, it is difficult to measure and convert them into monetary terms, which requires subjective—and thus controversial—judgments. For an economist's explanation of that argument and selected empirical estimates, see Meyer and Gomez-Ibanez (1981: 172–79, 206–8).

Table 5. Government roadway expenditures and extent of road network, 1982

Country	Roadway (meters) per inhabitant	Govt. roadway expenditures per inhabitant*
United States	26.6	167
Canada	12.1	213
West Germany	7.9	141
Switzerland	10.5	317
France	14.8	135
Sweden	15.6	86
Netherlands	6.5	49
Belgium	12.9	124
Italy	5.3	128
Austria	14.1	223
Great Britain	6.1	86
Denmark	13.7	145

* In 1982 U.S. dollars.
Source: International Road Federation (1970 and 1983).

Those social and environmental costs probably have been greater in American than Western European cities. Construction of limited-access roadways has also been extensive in Canada and Europe, but only rarely within cities (Dunn 1981; Urban Consortium 1980; National League of Cities 1980; Cervero 1986). Thus, public policy in Europe and Canada has helped those countries to avoid the type of roadway construction so destructive for inner cities and so conducive to suburbanization and auto use.

Variations in land use and housing policies

Urban development policies, although they only indirectly affect transportation, may be as important as direct transportation policies in determining the evolution of transportation systems and travel behavior. Virtually every study of urban transportation confirms the crucial relationship between land-use and urban transportation (for example, Pushkarev and Zupan 1977).

The housing and land use policies of the United States, Canada, and Western Europe have been very different from one another. At one extreme, the American public sector has made few efforts to control urban sprawl or to encourage more compact devel-

opment (Altshuler 1981: 374–408). For the most part, development in the United States arises haphazardly, as private developers and builders try to maximize their profits without coordination and with little regard, if any, for social and environmental consequences. Implicitly, however, the public sector has encouraged low density suburbanization. For example, through tax deductions and mortgage guarantees, the federal government provides large subsidies to homeownership and single-family housing (Altshuler 1981: 23–31; Aaron 1972; Heilbrun 1987: 48–49). State and local governments provide essential capital infrastructure and public services that new suburban development requires—sewers, water lines, fire and police protection, and schools. Moreover, some studies find that the fragmented, uncoordinated structure of local government in American metropolitan areas, by its very nature, has subsidized suburban residents and firms at the expense of their center city counterparts (Rothenberg 1970; Neenan 1970; Heilbrun 1987: 423–49). Finally, the public construction of suburban roadways and limited-access highways within metropolitan areas has spurred the decentralization of population and employment (Schaeffer and Sclar 1975: 84–102; Glaab and Brown 1976: 288, 295–96; Leavitt 1970).

As defenders of the automobile and low density living argue, much of the suburbanization in the United States since the Second World War would have taken place even without those public policies (Meyer, Kain, and Wohl 1965: 9–24; Meyer and Gomez-Ibanez 1981: 4–9, 106; Altshuler 1981: 16–26). Those researchers base their contention on technological advances, income growth, and the assumption that Americans have an underlying preference for low density living. While the amount of suburbanization we can attribute to public policies is subject to debate, there can be no question that policies at every government level in the United States have at least facilitated and accelerated suburbanization.

Suburbanization has been much less extensive in Canada and every country of Western Europe. More significantly, suburbanization in Canada and Western Europe has generally been more coordinated, more compact, and of higher density than in the U.S.

In a comparison of West German and American transportation policies, Dunn (1981: 57–72) found that population densities in German metropolitan areas are twice as high as those in American urban areas, that a significantly higher percentage of metropolitan area population lives in central cities, and that even the most recent suburban development in Germany consists mostly of clustered, multiunit housing that mass transit can readily serve.

Similarly, public policies in Sweden and Denmark generally have guided urban development to be compact and coordinated and thus conducive to transit use (Strong 1971: 1–64; Eriksen 1983; Urban Consortium 1980: 35–42; Anton 1975; Gottfeld 1964; Landell 1972). To some extent, that policy has involved public ownership of urban land and direct control over its development. But the public sector also exerts considerable influence over the development of privately owned land through land use regulations, special development districts, zoning, spatially-differentiated tax rates, selective provision of infrastructure support, and prohibitions of certain types of development. Moreover, mass transit service usually is coordinated with development; local planning authorities situate dense development within walking distance of transit stops; and in some metropolitan areas, local governments practically prohibit low density, scattered development. Such vigorous government intervention greatly facilitates the success of transit.

France and the Netherlands also have stricter urban land use controls than the United States (Strong 1981: 203–380; Gamble 1977; L'Huillier 1976). As in Sweden and Denmark, they generally discourage uncoordinated, low density development and thus promote transit use.

Most Western European countries have a long history of public sector intervention in urban development and much less tendency than the United States to view private market outcomes in urban land use and development as optimal or even acceptable. Thus they are more willing to give the public sector a significant role from the outset, rather than wait for problems to arise before they intervene (Dunn 1981: 2–4, 55–72).

Differences in land use policies are striking even between the United States and Canada, probably the countries most similar in culture, history, geography, and overall land availability. Of those factors that affect travel behavior, the two countries differ only in the way they handle public land use and transportation policies.[5] It is unlikely that cultural differences alone account for a transit share of modal-split that is four times higher in Canada than in the United States. Urban development in Canada is guided by comprehensive regional plans that specifically set out compact, coordinated land use as a goal (Cervero 1986). For the most part, the public sector in Canada has achieved that goal because it retains considerable control over development. For example, local governments place strict limitations on downtown parking and offer tax bonuses for high density development. Moreover, Canada has not had a federal program to promote freeway construction, so Canadian cities have been spared the destruction and disruption that massive construction of urban freeways has caused in the U.S. Finally, Canadian policies explicitly coordinate transit extensions with land use development to ensure their mutual success.

Similarly, the high rate of home ownership in the United States is not simply due to the allegedly uniquely strong preference for single-family housing

in this country. Surveys indicate that homeownership—with a large private yard—is a widespread "dream" of families in many countries in North America and Europe (Dunn 1981: 70; Dietiker and Burger 1985: 112). The lower cost of home ownership in the United States—largely due to public policies I have noted—has enabled a high percentage of Americans to realize their dreams. Because more land is available at the periphery of urban areas than closer in, the vast majority of single-family housing has been built in peripheral areas. Thus, American policies to promote home ownership have also promoted low density suburbanization and—through lack of coordination by land use controls—sprawl.

It may be tempting to suppose that European cities have always been more amenable to transit use than American cities. That is not the case. In fact, urban development in the United States was very dense until the early 1900s (Glaab and Brown 1976: 66–135). Even suburban developments were compact and within walking distance of mass transit. Moreover, mass transit systems in this country were among the most extensive and most technologically advanced in the world. American public transportation completely dominated urban travel, accounting for virtually all urban tripmaking except walking (Dunn 1981: 55; Schaeffer and Sclar 1975: 18–102; Warner 1972: 85–112). It is the changes since the early 1900s—especially since 1945—that have made urban areas in the United States so different from European cities. Divergent developments have not resulted from differences in technological change among the countries. Advances in transportation, communications, manufacturing, and other areas of technology have been roughly comparable. Nor can one argue that differences in urban development are simply due to differences in timing; even the most recent urban development is substantially different between the U.S. and the countries of Western Europe. Instead, differences in public policies appear to explain most of the variation both in land use and in urban transportation.

Conclusions and implications

It is not my purpose to condemn the current pattern of urban land use in the United States or to claim that urban development in Canada and Western Europe has been superior. Nor do I argue that the role of American public policy in urban development and transportation has been excessive, insufficient, or misguided. Those are subjective issues that are not amenable to objective resolution. Rather, I maintain here that current urban transportation systems and travel behavior are—for better or worse—primarily the results of public policy. They are not simply the results of consumer sovereignty or of independent, individual decision making that reveals supposedly innate preferences for mode of travel and way of life.

Cultural differences among countries have played a role as well, both through their influence on individual preferences and in the formation of public policy. Indeed, to some extent public policy is a societal reflection of individual preferences and cultural values in collective decision making. The point is that public policy cannot reflect all individual values. In democratic societies such as those in Western Europe and North America, public policies reflect, at best, the preferences of the majority. Some might consider even that to be a naive hope.

In the case of American transportation policy, several studies have documented the powerful role of the automobile/highway lobby (Mowbray 1969; Leavitt 1970: 107–50; Taebel and Cornehls 1977: 28–84; Altshuler 1981: 26–31). That lobby probably has had far more influence than individual voters in shaping transportation policies at both the federal and state levels. There is little reason to believe that the profit-maximizing interests of the automobile lobby are identical to the preferences of the population as a whole, although they may overlap. Similarly, it is not obvious to what extent policies at the local level reflect individual preferences of the population as opposed to the objectives of special interest groups (Taebel and Cornehls 1977: 93–97; Lupo and Fowler 1971). Caro's exhaustive account of roadway construction in New York provides compelling evidence that transportation policy may be sharply at odds with the preferences of a large segment of society (Caro 1975). Moreover, there is mounting documentation of the more extreme argument that the automobile, petroleum, rubber, and steel industries in the United States colluded to deliberately destroy mass transit systems to eliminate competition, gain monopoly power, and maximize their own profits (Yago 1984: 49–76; Taebel and Cornehls 1977: 70–72; Snell 1974). In short, there is reason to doubt that American urban transportation policies have always reflected citizen preferences or the long-term interests of society as a whole.

Nevertheless, it is probably realistic to assume with Altshuler (1981: 19–23) that most Americans generally have supported the nation's proautomobile, prohighway, prosuburban policies. Likewise, the majority of the Canadian and European populations probably supported the political decisions that shaped the more balanced transportation policies in their countries. If those premises are correct, the crucial impact of public policy has been to increase the importance of the majority's preferences by forcing the minority to adopt the transport preferences of the majority. Some observers downplay the significance of the distinction between individual preferences expressed directly through personal consumption and those reflected only indirectly through public policy (see Altshuler

1981: 24–28). Yet that is exactly the difference between the sovereignty of individual choice in the marketplace and majority rule—or other expressions of power and influence—in the political process (Buchanan and Tulloch 1962).

Public policy has thus magnified whatever differences would have existed among countries on the basis of variation in individual preferences. For example, the overwhelming dominance of the automobile in the United States is almost certainly not the result of everyone's innate preference for that form of travel. Many drivers would switch to mass transit if a feasible transit alternative were available and if land use patterns were not so dispersed and of such low density that transit service is almost invariably of low quality if it exists at all.

The United States offers only limited consumer choice in urban transportation. For the vast majority of Americans, the alternative to the automobile is immobility. Only in the central cities of the largest, most densely populated metropolitan areas is transit service sufficiently available to provide a viable alternative to the auto for the whole range of urban transportation needs and not just for commuting to work.[6] Not surprisingly, almost all Americans—*under those circumstances*—say that they prefer the auto and buy their own as soon as they can afford to. But that does not mean the extreme dominance of the automobile would have arisen without public policies that both directly and indirectly encouraged Americans to use the automobile. Large subsidies to suburbanization and auto use over many decades in the United States have made auto use very appealing if not irresistable. Since the same policies contributed to the decline of mass transit, that alternative was eliminated for most Americans anyway.[7]

One cannot interpret the overwhelming dominance of the automobile in the United States as indicative of any innate preference of Americans for cars. On the basis of evidence in Western Europe, where automobile use has been increasing although public transit remains a viable alternative, it seems likely that most people do indeed prefer the flexible, convenient, individualized transportation that cars provide. But looking at the same evidence, it is also clear that the extreme dominance of the auto in the United States is not simply a matter of individual consumer choice. When public policy allows a real choice between the auto and mass transit, a far higher percentage of the population travels by mass transit.

In this article I have documented the role of public policy in determining the developments in urban transportation and travel behavior in the United States, Canada, and ten countries of Western Europe. In that respect it is primarily of historical interest. But it also has a practical implication for current policy. A high transit share of modal-split is not the outcome simply of large transit subsidies but rather of a range of complementary protransit public policies as well. Most important of those policies are heavy taxation on auto use and stringent land use controls that encourage compact urban development.

Attempts to revive mass transit in the United States through massive subsidies have produced disappointing results: negligible increases in ridership and no change at all in transit's share of urban tripmaking. That is partly because flaws in the design of the subsidy program for public transportation have rendered it inefficient. Yet the almost total absence of necessary complementary policies in land use and auto taxation has probably been even more significant in handicapping transit. Whether or not the revival of mass transit in the United States is an appropriate policy goal is a subjective issue. But if that is the goal, the public sector must implement the necessary land use and taxation policies to support mass transit. Relying solely on transit subsidies may be easier politically, but it is certain to be an ineffective and extremely costly approach.

Author's note

The research for this article was funded by the Alexander von Humboldt Foundation of West Germany. I deeply appreciate the support of both that foundation and the Transportation Institute of the University of Muenster, West Germany, which provided research facilities, technical assistance, and above all, friendship during the two-year period of the study. I also thank the European Council of the Ministers of Transport (Paris), the Transport and Road Research Laboratory (Crowthorne, England), and the individual ministries and departments of transportation in the countries I studied. Without their help in gathering and evaluating the necessary information, the study would have been impossible. Finally, I thank Mr. Samy Amer of Rutgers University for his technical assistance.

Notes

1. The surveys on which the distributions in Table 1 are based generally define a trip as a one-way journey from any origin to any destination.
2. In addition, there is the practical problem that comparable data on urban densities are virtually impossible to obtain on a uniform, comprehensive basis for all the countries of the study.
3. The high subsidy values for the United States do not result from an overvaluation of the dollar relative to other currencies. That became a confounding factor in international comparisons only later, especially in 1984 and 1985.
4. I obtained information on requirements for the driver's license in the ten countries of Western Europe in interviews with ministries of transport and with the official information bureau of each country's consulate in the United States.
5. An anonymous referee suggested that the higher transit modal-split in Canada is primarily due to the higher percentage of Canadians living in large cities, which by their nature tend to be more conducive to transit use. In fact, 46 percent of Americans lived in metropolitan areas with at least a million inhabitants in 1980, while only 30 percent of Canadians resided in that size metropolitan area in 1981 (U.S. Department of Commerce 1987, Tables 19–23; Statistics Canada 1987, Tables 2–1 to 2–9). For all metropolitan areas with over 250,000 inhabitants,

the percentage of total population is still higher for the United States (65 percent vs. 52 percent in Canada); For central cities only the United States has a higher percentage of its population in cities with at least a million inhabitants (8 percent vs. 0 percent), whereas a larger percentage of Canadians live in central cities with at least 500,000 residents (16 percent vs. 13 percent). Thus the size distribution of Canadian cities does not appear to explain the greater use of transit there. It is the greater density of Canadian cities that makes them more conducive to transit, but that arises to a considerable extent from public policy, which supports the hypothesis of this article.

6. One might argue that people who prefer mass transit always have the option of moving to central cities that offer a high level of transit services. That, however, completely ignores factors such as accessibility to the workplace, quality of schools, crime rates, tax rates, housing cost and availability, and socioeconomic clustering, which limit choice of residential location within metropolitan areas. Similarly, it is unrealistic to expect that even households that want an alternative to the auto should choose among different metropolitan areas primarily on the basis of transit availability. Too many other considerations—most important of which is employment possibilities—prevent such freedom of choice.
7. Public policies are not the only factors that restrict modal choice in the United States. To the extent Americans would have suburbanized and shifted to the auto even without such policies, that also would have impaired the economic viability of mass transit and of central cities in general. Unlike the biases that public policies introduced, however, one could view the resulting impacts on travel and location choice as truly the outcome of market forces and consumer choice rather than public sector intervention.

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