2

The Social Benefits and Costs of the Automobile

Joel Schwartz

Have we been forced into automobile dependence by an unholy alliance between carmakers, roadbuilders, and government planners? From the perspective of the automobile's critics, Americans have an irrational love affair with the automobile that results in a range of social ills from pollution to congestion, makes us dependent on unstable oil-producing countries, and drains our private and public coffers of scarce resources that would be better put to other uses. On the other hand, for its proponents, the automobile is the most convenient and flexible transportation that humankind has yet invented, giving people a degree of social and economic opportunity and autonomy unprecedented in human history.

The automobile's critics—urban planners and environmental, anti-suburb, and anti-automobile activists—claim that urban "sprawl" forces people to drive by pushing them far from work, shopping, and other activities. Americans' reliance on the automobile, they say, is not a choice, but a necessity forced on people by suburban development patterns that require an automobile for most travel. These development patterns have in turn been encouraged, so the argument goes, by implicit and explicit subsidies that make

Joel Schwartz is a visiting fellow at the American Enterprise Institute, where he studies air pollution, transportation, climate change, and chemical risks. He is the author of *No Way Back: Why Air Pollution Will Continue to Decline* and the forthcoming AEI book *Air Quality in America*. He holds a bachelor's degree in chemistry from Cornell University and a master's degree in planetary science from the California Institute of Technology. In 1993, he studied European approaches to transportation and air quality policy as a German Marshall Fund Fellow.

traveling by car seem much cheaper than it really is.

The result of automobile favoritism, in the view of critics, has been a wide range of automobile-imposed ills, such as sprawling suburbs that thwart community involvement, long commutes that steal time away from social and family interaction, air pollution, injuries, obesity, and a drain on families' budgets from excessive transportation costs.[1] If people had to pay explicitly for the full social costs of driving, they argue, people would live in denser, more urbanized housing and walk or use public transit for most travel. Furthermore, people would be happier and healthier as a result of these lifestyle changes.

This view is mistaken. If Americans were forced into suburbs and driving against their will, we would expect transportation and land use to look quite different in other countries with policies less favorable to automobile travel. Yet people all over the world choose suburban lifestyles and automobile-based transportation as soon as they become wealthy enough to afford them. This is true in Europe, where, despite $5-per-gallon gasoline and other high automobile-related taxes, as well as widely available public transportation, automobiles account for about 78 percent of all motorized travel and transit accounts for about 16 percent.[2] Transit's share of all European motorized travel dropped 35 percent from 1970 to 2000 and continues to decline. Europe's old central cities are now surrounded by suburbs that look very much like their American counterparts. People also choose driving in the developing world, where demand for automobiles is rising faster than income, despite poor roads and high levels of traffic congestion.

Even without reference to other countries, the claim that Americans had the automobile forced on them does not stand up to scrutiny. By 1930, Americans already owned an average of three automobiles for every four households, showing that Americans embraced automobile travel long before there were interstate highways and long before the postwar suburbanization of American metropolitan areas.

The critics have it exactly backwards. The automobile is a powerful enabling technology, allowing people the world over to satisfy what seems to be a deep-seated human desire for space, privacy, mobility, and autonomy. Automobile travel has vastly increased humankind's wealth and prosperity. Compared to other modes of travel, the speed and

[1] See, for example, Reid Ewing, Rolf Pendall, and Don Chen, *Measuring Sprawl and Its Impact*, Smart Growth America, 2003, at *www.smartgrowthamerica.com/sprawlindex/MeasuringSprawl.PDF* (May 16, 2005); Jane H. Kay, *Asphalt Nation: How the Automobile Took Over America and How We Can Take It Back* (New York: Crown, 1997); James J. MacKenzie, Roger C. Dower, and Donald D. T. Chen, *The Going Rate: What It Really Costs to Drive* (Washington, D.C.: World Resources Institute, 1992); Public Interest Research Group, *More Highways, More Pollution: Road-Building and Air Pollution in America's Cities*, March 2004, at *www.uspirg.org/reports/MoreHighwaysMorePollution3_04.pdf* (May 16, 2005); Michelle Ernst, *Mean Streets 2004: How Far Have We Come? Pedestrian Safety, 1994–2003*, Surface Transportation Policy Project, November 2004, at *www.transact.org/library/reports_html/ms2004/pdf/Final_Mean_Streets_2004_4.pdf* (May 16, 2005); and Surface Transportation Policy Project, "Transportation Costs and the American Dream: Why a Lack of Transportation Choices Strains the Family Budget and Hinders Home Ownership," July 2003, at *www.transact.org/library/decoder/american_dream.pdf* (May 16, 2005).

[2] Transit's share includes inter-city bus and rail travel in addition to travel within metropolitan areas. See European Communities, *Panorama of Transport: Statistical Overview of Transport in the European Union*, Part 2 (Luxembourg: 2003), at *http://epp.eurostat.cec.eu.int/cache/ITY_OFFPUB/KS-DA-04-001-2/EN/KS-DA-04-001-2-EN.PDF* (May 16, 2005).

flexibility of automobile travel gives people access to many times more choices of housing, jobs, and consumer goods, and gives employers a much wider pool of potential employees. Automobile travel is also far cheaper than transit, with direct costs only about one-fourth as much per passenger-mile of travel. Even after including the most extreme and implausible estimates for the health costs of air pollution and other negative side effects of automobile travel, automobiles still cost only about half as much as transit. The automobile also creates new social opportunities, allowing people to visit friends and relatives who would be too far away by other transport modes. Not only do wealthier people choose automobiles—automobiles also help people become wealthier.

While the automobile confers enormous benefits, automobile travel also has undesirable side effects. As with most things in life, automobile travel includes a set of unavoidable trade-offs among things people want and things they do not want. Most people prefer flexible, rapid, and safe transportation to work, shopping, and leisure. Most people also dislike congestion, noise, accidents, and pollution.

The history of the automobile is mainly a story of how Americans got more of what they wanted out of the automobile and less of what they did not want. Technology has drastically reduced air pollution from automobiles and continues to do so. Automobiles built during the past few years will be more than 90 percent cleaner over their useful lives when compared with the average car on the road today.

Automobile safety has also substantially improved. Per mile of driving, the risk of dying in a car accident has declined more than 75 percent since 1960. Suburbanization, facilitated by the automobile, also allowed tens of millions of Americans to move to larger homes and to areas with less traffic congestion, less crime, and quieter streets.

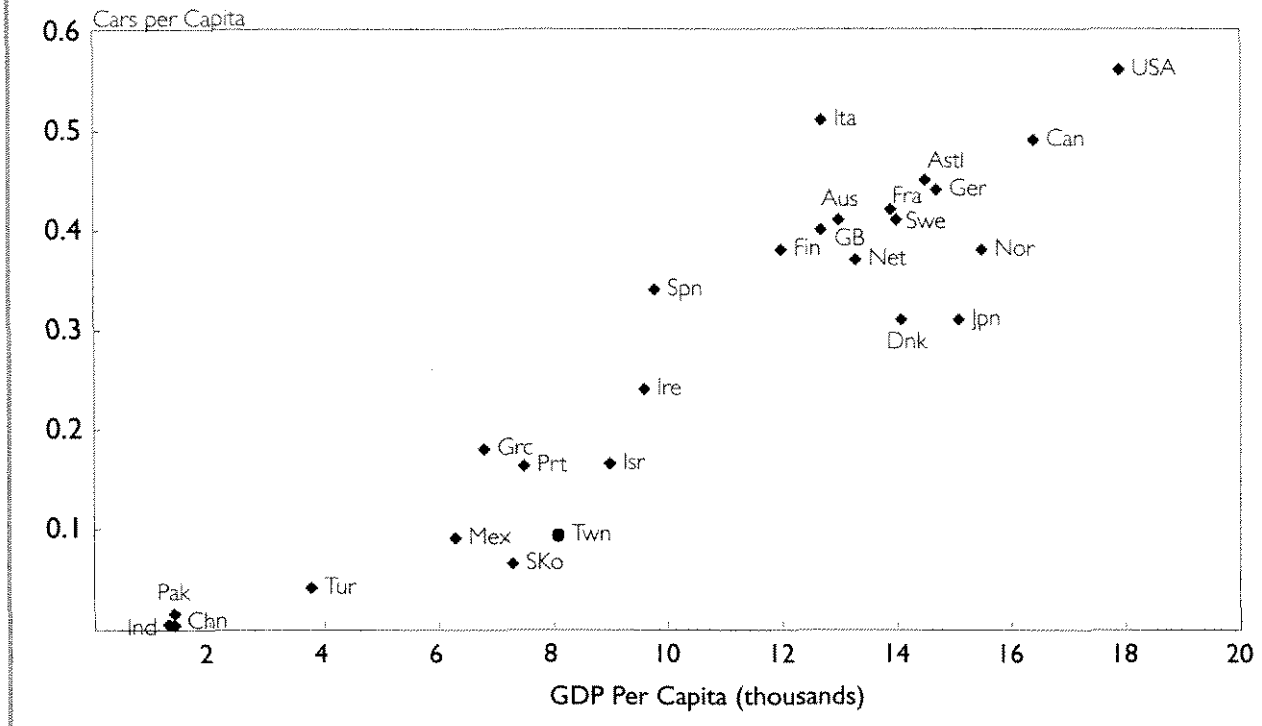
Based on evidence to be presented below, this chapter will show the following: The dominance of automobile transportation over other modes is mainly the result of consumer choice, rather than subsidies or coercion, and overall, the automobile and its associated road and street infrastructure delivers huge net benefits to Americans that could not be obtained by any other means currently available or likely to be available for the foreseeable future. In addition, as will be shown here and in other chapters of this book, the benefits of automobile travel can be retained and augmented while, at the same time, undesirable side effects can continue to be reduced.

A Worldwide Love Affair with the Automobile

Americans have a "love affair" with the automobile, or so goes the conventional wisdom. Driving and suburbs are so popular in America because public policy makes driving artificially cheap, land-use planning favors suburbs, and transit is starved for funding. On the other hand, in this view, other wealthy countries tax drivers to make them pay their fair share of the costs they impose on others, and planners ensure that people live in dense cities with convenient public transit.

Data from around the world, however, show that the conventional wisdom is mistaken. After accounting for income—as measured by gross domestic product (GDP) per capita—automobile ownership and use follows a similar pattern all around the world. For example, FIGURE 1 shows the relationship between cars per capita and GDP per capita in 1992 in a sample of 26 countries, ranging from very poor to the richest in the world. Note the strong correlation between income and car ownership.

Figure 1 The Heritage Foundation



Notes: The countries clustered at the lower left are Pakistan, China, and India. Aus = Austria; Astl = Australia. GDP per capita is at purchasing power parity (PPP), meaning that GDP levels across countries were estimated by asking how much it would cost in a country's local currency to buy a given basket of goods and services.

Source: J. Dargay and D. Gately, *Income's Effect on Car and Vehicle Ownership, Worldwide: 1960–2015* (New York: C. V. Starr Center, New York University, 1997).

FIGURE 2 shows the trend in car ownership versus income. The head of each arrow gives the value for 1992, while the tail gives the value for 1970. Both axes are on a logarithmic scale, meaning that each factor-of-10 increase in GDP or car ownership covers the same physical distance along an axis of the graph. For example, the distance traversed is the same in going from a GDP per capita of 100 to 1,000 as it is for going from 1,000 to 10,000. This makes it easier to see the path taken by countries at very low GDPs per capita. Note that increases in cars per capita track closely with increases in GDP per capita. Furthermore, note the steeper slope for poorer countries, which means that, at lower incomes, automobile ownership rises more rapidly with increasing income than it does for wealthier countries. In fact, car ownership seems to be leveling off in the U.S., suggesting that ownership is reaching "saturation"—that is, an ownership rate of about one car for every licensed driver.

These data suggest that high automobile ownership in the U.S. is due largely to high incomes rather than to specific policies toward automobiles. Per capita income in the United States has been and continues to be about 15 percent to 40 percent higher than in other Western countries.[3] This would be expected to be associated with greater per capita automobile ownership. Americans adopted the automo-

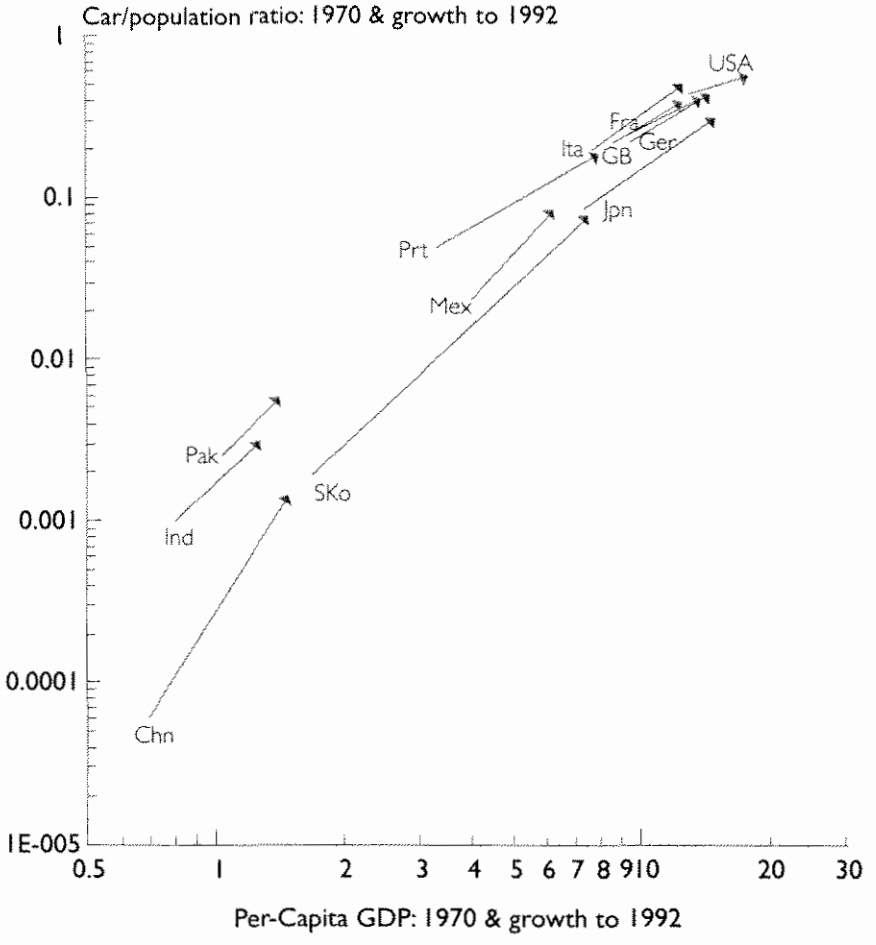
[3] United Nations, *Human Development Reports*, at *www.undp.org/hdr2003/indicator/excel/hdr03_table_1.xls*.

bile as their main form of transportation long before the creation of the interstate highway system or the postwar suburbanization of metropolitan areas that supposedly facilitated the automobile's dominance. By 1930, Americans already owned more than three automobiles for every four households.[4]

Once differences in income are accounted for, these data show nothing particularly special about the United States in terms of automobile ownership. All around the world, people purchase automobiles as soon as they become wealthy enough to afford them. Given that automobiles represent a major expenditure, this suggests that people around the world perceive large net benefits from automobile travel.

Figure 2 The Heritage Foundation

Trend in Car Ownership vs. Per Capita GDP, 1970–1992



Source: J. Dargay and D. Gately, *Income's Effect on Car and Vehicle Ownership, Worldwide: 1960–2015* (New York: C.V. Starr Center, New York University, 1997).

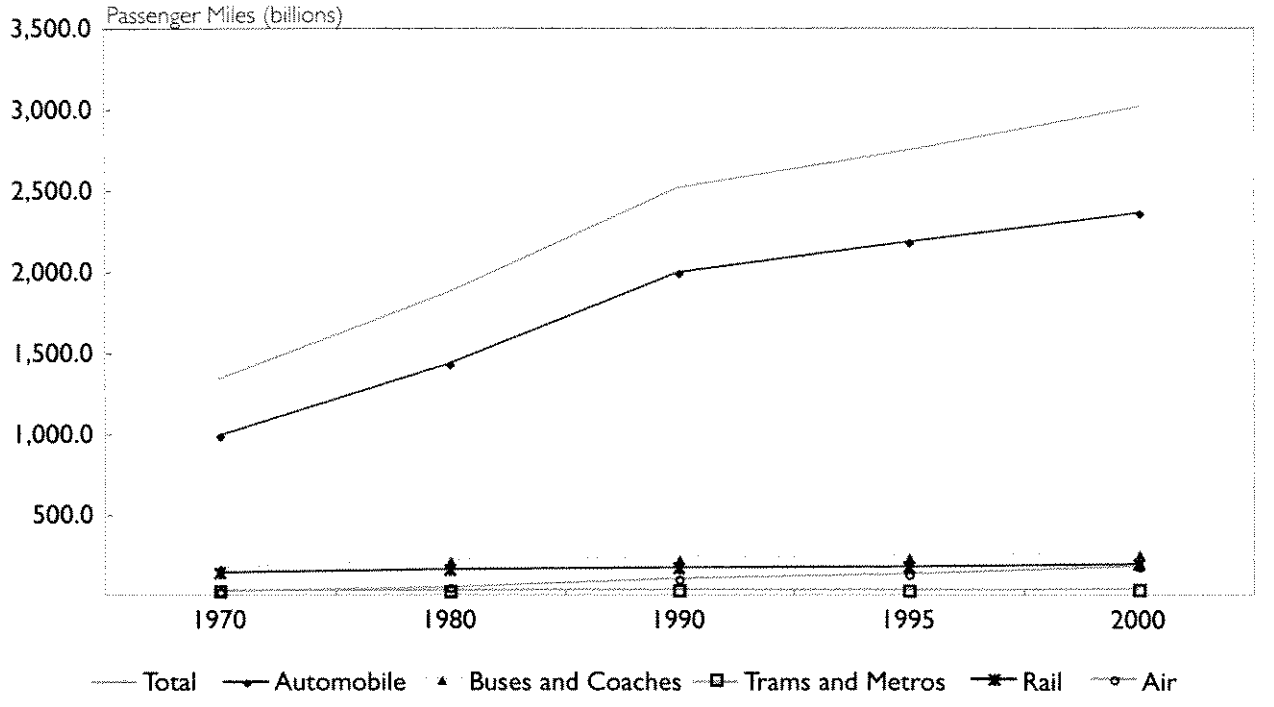
People purchase automobiles even in countries with few roads, widespread public transit, and heavy traffic congestion. The demand for automobiles is increasing more quickly than income in developing countries, while demand for road travel is relatively insensitive to the marginal costs of additional road travel. Thus, "income matters more than gasoline prices."[5] Howev-

[4] American households were substantially larger back then—more than four people per household, compared with about 2.6 today. The number of automobiles per person in 1930 was about 0.22. Automobile ownership rates were calculated from U.S. Bureau of the Census, *Historical Statistics of the United States; Colonial Times to 1970, Part 2*, September 1975, at *www2.census.gov/prod2/statcomp/documents/CT1970p2-01.pdf* (May 16, 2005), and Federal Highway Administration, *Highway Statistics Summary to 1995*, 1997, at *www.fhwa.dot.gov/ohim/summary95/index.html* (May 16, 2005).

[5] Peter Gordon and Harry Richardson, "The Geography of Transportation and Land Use," in R. Holcombe and S. Staley, eds., *Smarter Growth: Market-Based Planning Strategies for Land-Use Planning in the 21st Century* (Westport, Conn.: Greenwood Press, 2001).

Figure 3 The Heritage Foundation

Total Passenger Miles of Travel by Travel Mode in the European Union, 1970–2000



Notes: "Rail" includes both commuter rail and inter-city rail. "Buses and Coaches" includes both urban and inter-city buses. "Trams and Metros" includes all metropolitan rail transit, except for commuter rail. Data are for the 15 member countries in the European Union.

Source: European Communities, *Panorama of Transport: Statistical Overview of Transport in the European Union*, Part 2, 2003

er, because of poorer roads, these increases in demand for cars and driving have occurred under "congestion levels and traffic conditions that would appall Americans."[6]

When it comes to automobile use, people in other wealthy countries also resemble Americans. Automobiles account for about 88 percent of all person-miles of motorized travel in America and about 78 percent in Europe.[7] Just as in the U.S., public transit's share of all travel has been declining for decades. In U.S. metropolitan areas, transit accounted for about 3.6 percent of motorized travel in 1970 but only about 1.9 percent in 2000.[8] Europeans used

[6] *Ibid.*

[7] U.S. Department of Transportation, Bureau of Transportation Statistics, *National Transportation Statistics 2004*, January 2005, at *www.bts.gov/publications/national_transportation_statistics/2004/index.html* (May 16, 2005); European Communities, *Panorama of Transport*, Part 2.

[8] U.S. data are for travel within metropolitan areas only. Transit accounted for 1.1 percent of all person-miles of motorized travel in 2002 in the U.S. as a whole. National data for 1970 were not available. In 1980, transit accounted for 1.4 percent of all passenger-miles of motorized travel. Bureau of Transportation Statistics, *National Transportation Statistics 2004*; Wendell Cox, "U.S. Urban Personal Vehicle & Public Transport Market Share from 1900," The Public Purpose, 2004, at *www.publicpurpose.com/ut-usptshare45.htm* (May 16, 2005).

Table 1 The Heritage Foundation

European Market Share of Each Transportation Mode, 1970–2000

Year	Autos	Buses and Coaches	Trams and Metros	Rail	Air	All Transit
1970	73.9%	12.6%	1.8%	10.2%	1.5%	24.6%
1980	76.3%	11.6%	1.4%	8.3%	2.5%	21.2%
1990	79.2%	9.1%	1.2%	6.6%	3.9%	17.0%
1995	79.5%	8.7%	1.1%	6.2%	4.6%	15.9%
2000	78.3%	8.5%	1.1%	6.3%	5.8%	15.9%

Notes: "Rail" includes both commuter rail and inter-city rail. "Buses and Coaches" includes both urban and inter-city buses. "Trams and Metros" includes all metropolitan rail transit, except for commuter rail. Data are for the 15 member countries in the European Union.

Source: European Communities, *Panorama of Transport: Statistical Overview of Transport in the European Union*, Part 2, 2003.

transit for 25 percent of motorized travel in 1970, but only 16 percent by 2000.[9] Between 1980 and 1995, transit's share of all person-miles of travel declined 14 percent in London, 24 percent in Paris, 60 percent in Frankfurt, and 19 percent in Stockholm.[10]

Many Americans are under the impression that Europeans travel a great deal on trains, but even in 1970, urban and inter-city rail accounted for only 12 percent of all passenger-miles of motorized travel, declining to 7.4 percent in 2000.[11] Most of this travel is on inter-city and commuter rail. Urban rail—the trams and metros that come to mind when thinking about how Europeans get around their cities—accounted for only 1.1 percent of passenger-miles in 2000. The decline in rail transport's share is due in part to increases in automobile travel, but probably even more so to increases in air travel, driven by lower costs from airline deregulation. Air's share of all motorized passenger transport nearly quadrupled in Europe between 1970 and 2000.[12] Rail's share of passenger travel decreased despite large expansions of high-speed rail in several European countries during the past few decades.

Air travel appears to be the main substitute for rail travel, while buses appear to be the main substitute for automobile travel.[13] In the U.S. and Europe, automobile and bus travel together account for about the same percentage of total passenger-miles, and the same is true for rail and air travel together.[14] The difference in the U.S. is that rail and buses make up less than 1 percent of total passenger-miles

[9] The European data include both intra- and inter-city transit. Thus, for example, "buses and coaches" includes both transit buses and inter-city coaches, while "rail" includes both commuter and inter-city trains. European Commission, *Panorama of Transport*, Part 2.

[10] Wendell Cox, "Public Transport Market Share Trends: International Urban Areas from 1980," The Public Purpose, 2003, at *www.publicpurpose.com/ut-intlmkt95.htm* (May 16, 2005).

[11] European Communities, *Panorama of Transport*, Part 2.

[12] *Ibid.*

[13] Air travel has probably also replaced some long-distance automobile travel.

[14] U.S. market share was calculated from Bureau of Transportation Statistics, *National Transportation Statistics 2004*.

in these two groups, while in Europe, they account for several percent of passenger-miles.

FIGURE 3 displays the European trend in total passenger-miles of motorized travel, broken down by travel mode. Note the rapid rise in total travel by automobile and airplane, while total travel by other modes has changed little during the past few decades. TABLE 1 summarizes the trend in market share of transit for the various modes. The "All Transit" column gives the total market share for the three public transit modes.

Europeans have also been moving to suburbs that look very much like suburbs in the United States.[15] The fraction of U.S. metropolitan-area residents living in suburban counties grew from 48 percent to 58 percent between 1960 and 1990 and reached 62 percent in 2000.[16] European cities are following similar trends. Between 1968 and 1990, the fraction of Parisians living in suburbs grew from 68 percent to 77 percent. Amsterdam's suburban share grew from 20 percent to 33 percent between 1970 and 1994, while Zurich's grew from 62 percent to 71 percent between 1970 and 1995.[17] London is a rare exception. Its suburban fraction grew only slightly, from 59 percent to 62 percent, between 1970 and 1994. Population densities in European metropolitan areas declined more than 60 percent between 1960 and 1990.[18] Not only suburbanization, but also a decline in the number of people per household explains the density declines observed in Western countries.[19]

About the only major difference between the United States and Europe is in miles of automobile travel per capita each year. When compared at similar per capita incomes, Americans drive their cars about 2,000 more miles per year than Europeans, as shown in FIGURE 4. The graph compares vehicle kilometers traveled each year versus per capita income, showing the trend in both variables from 1970 to 1997.[20] Note that at any given income, Americans drive more. On the other hand, per capita driving is increasing more rapidly in Europe than in the U.S. Between 1980 and 1998, passenger-miles per capita traveled by automobiles increased 55 percent in the European Union but only 25 percent in the U.S.[21]

The data show that people in other parts of the world are not so different from Americans after all. As people become wealthier, they

[15] Harry Richardson and Peter Gordon, *Is Sprawl Inevitable? Lessons from Abroad* (Los Angeles: University of Southern California, November 1999), at *www-rcf.usc.edu/~pgordon/pdf/LESSON_A.pdf* (May 16, 2005).

[16] U.S. Bureau of the Census, "American Factfinder," at *http://factfinder.census.gov/servlet/DTGeoSearchByListServlet?ds_name=DEC_2000_SF3_U&_lang=en&_ts=134655710285*; Alan E. Pisarski, *Commuting in America II*, ENO Transportation Foundation, 1996; and G. Giuliano, *Land Use Policy and Transportation: Why We Won't Get There from Here* (Los Angeles: University of Southern California, July 1999), at *www.usc.edu/schools/sppd/lusk/research/pdf/wp_2000_1002.pdf* (May 16, 2005).

[17] *Ibid.*

[18] Wendell Cox, "International Urbanized Areas: Change in Urbanized Population Density 1960–1990," The Public Purpose, 2001, at *www.demographia.com/db-intlua-area1.htm* (May 16, 2005).

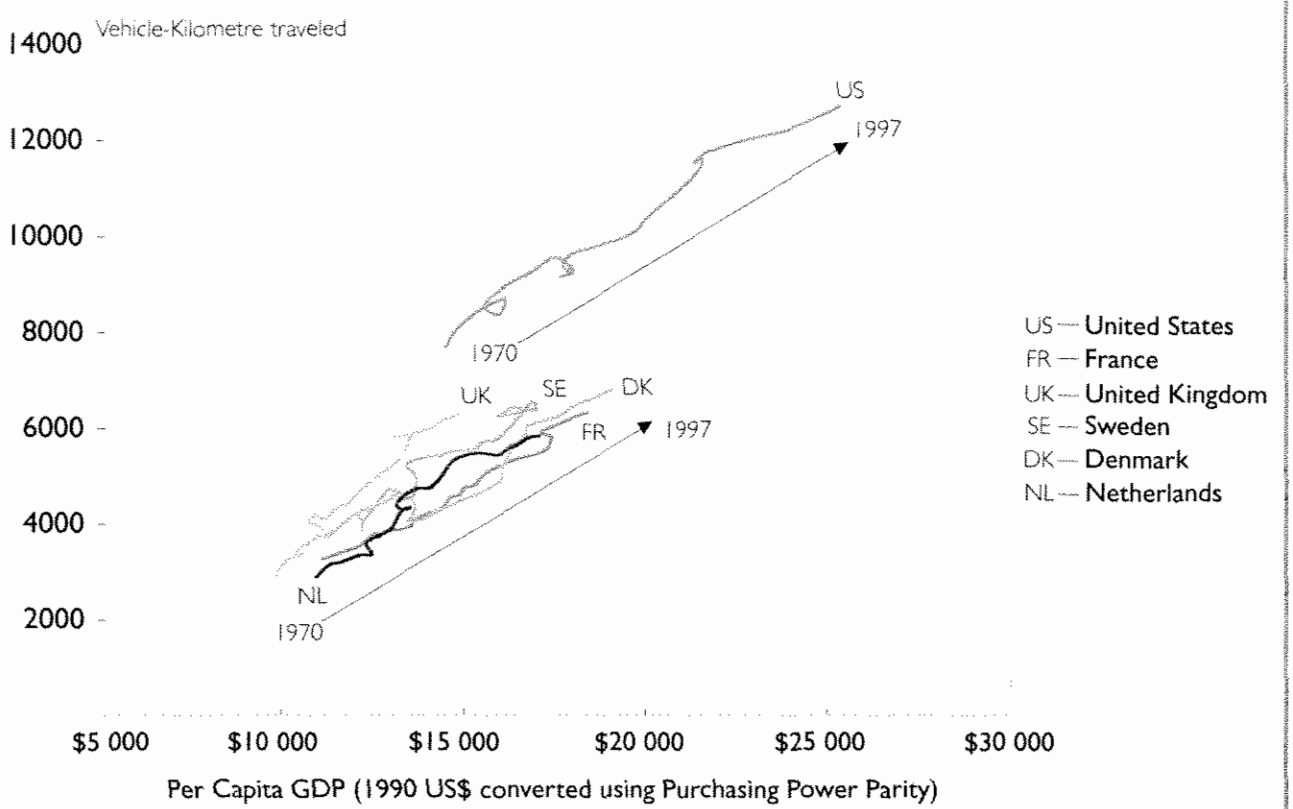
[19] Giuliano, *Land Use Policy and Transportation*, and Randal O'Toole, *Transportation Costs and the American Dream*, Reason Foundation, September 2003, at *www.rppi.org/pb25.pdf* (May 16, 2005).

[20] A mile is 1.6 kilometers.

[21] Bureau of Transportation Statistics, *National Transportation Statistics 2004*; "Passenger Transport Indicators," European Environment Agency, Brussels, September 20, 2001, at *http://themes.eea.eu.int/Sectors_and_activities/transport/indicators/demand/TERM12,2001/Passenger_transport___TERM_2001.pdf* (May 16, 2005); U.S. Bureau of the Census, *Statistical Abstract of the United States*, 2004, at *www.census.gov/prod/www/abs/statab.html* (May 16, 2005).

Figure 4 The Heritage Foundation

Vehicle Distance Traveled Per Year Per Capita and GDP Per Capita in Selected Countries, 1970–1997



Source: International Energy Agency, "Transportation and Energy," 2002, at *www.iea.org/textbase/papers/2002/transportation.pdf* (May 16, 2005).

buy cars and choose suburban lifestyles. The wealthier they become, the more they drive.

These similar transportation and housing trends across countries have occurred despite wildly different public policies toward automobiles and land use. Where the U.S. has relatively low automobile sales and use taxes and decentralized land-use planning, many other countries have made automobile ownership and use far more expensive, and have centrally controlled land-use policies that discourage suburban development. For example, while gasoline is selling for about $2.50 per gallon in the U.S. as of this writing and has typically sold for much less than this amount during the past decade, European gasoline prices are far higher—about $4.00 to $5.00 per gallon prior to the price run-up of the last two years—because Europe has much higher gasoline taxes.[22] High gasoline and other taxes on automobile ownership and use make automobiles far more expensive in European and other countries, such as Singapore, but these high prices have not prevented these countries from following similar trajectories in terms of automobiles and suburbanization.

The case of Singapore—unlike the U.S., a densely populated country with excellent

[22] European Communities, *Panorama of Transport*, Part 2.

mass transit—shows how even extremely restrictive automobile policies have only a modest effect on automobile ownership. In response to a rapid rise in automobile ownership during the 1980s, Singapore in 1990 introduced a quota on the number of new cars allowed in the country each year.[23] The system was implemented by auctioning off permits, which sold for about U.S. $18,000 in 1997. Researchers estimate that this quota system, which increased the cost of purchasing a new car by more than 60 percent, reduced car ownership by only 7 percent to 11 percent. Based on 1997 data, even without the permit system, taxes and fees totaled about 200 percent of the retail purchase price of a new car, so the ownership quota added to already high costs for purchasing a car. Singapore also imposes congestion charges to discourage driving during peak periods.

Thus, even extremely high taxes have a relatively small effect on vehicle ownership. People must perceive enormous and unique benefits from automobile travel to be willing to bear these large costs even where viable alternatives are available.

Despite the costs of owning and operating an automobile, people choose automobiles the world over because no other form of transportation comes anywhere close to providing comparable speed, flexibility, privacy, and convenience. Even in congested central cities, automobile travel is much faster than public transport. In the U.S., when comparing automobile and transit commutes within the same metropolitan areas, the average transit commute takes about 75 percent longer than the average automobile commute, even though transit and automobile commutes cover roughly the same distance on average.[24]

Despite the costs of owning and operating an automobile, people choose automobiles the world over because no other form of transportation comes anywhere close to providing comparable speed, flexibility, privacy, and convenience.

Automobile travel is much faster in Europe as well. For example, the average travel speed in French cities is 80 percent faster by private automobile when compared with transit.[25] Transit is slower largely because of time spent getting to and from stations, waiting for vehicles to arrive, stopping at stations, and transferring between routes, which together add

[23] Data on Singapore are for 1997 and come from Giuliano, *Land Use Policy and Transportation*.

[24] Commute times by metropolitan area and mode were calculated by Wendell Cox from 2000 U.S. Census data. See *Urban Transport Fact Book*, "U.S. Metropolitan Area Journey to Work Time: Transit and Other, 2000," at *www.publicpurpose.com/ut-jtw2000msatime.htm* (May 16, 2005). National average commute time is from U.S. Department of Transportation, Summary of Travel Trends, 2001 National Household Travel Survey, 2004, at *http://nhts.ornl.gov/2001/pub/STT.pdf* (May 16, 2005).

[25] Rémy Prud'homme and Chang-Woon Lee, *Size, Sprawl, Speed and the Efficiency of Cities*, Observatoire de l'Économie et des Institutions Locales, Paris, November 1998, at *http://mapage.noos.fr/rprudhom/SSS.doc* (May 16, 2005).

an average fixed time cost of about 16 to 20 minutes to a typical transit trip.[26]

Given the speed differential between cars and transit, commuting by car provides access to more than three times the land area in a given amount of time.[27] The speed differential is even greater during off-peak travel periods because driving becomes faster while transit service is either the same or slower.

Public transit also provides access only along transit corridors, further reducing the area accessible by transit relative to cars. For example, if only one-half of households and employers are practically accessible by transit, the automobile's speed and accessibility advantage would combine to put 12 times as many employers within reach, when compared with transit, for any given commuting time.[28] The real transit-accessible fraction is probably lower than one-half, so this is likely an underestimate of the automobile's advantage in providing greater job access. Automobiles put far more housing, work, shopping, entertainment, and social choices and opportunities within reach than do other modes of transportation.

Research on employment supports the conclusion that access to an automobile increases job opportunities. A recent study of people in a welfare-to-work program in Los Angeles concluded that owning an automobile increased by 12 percent the likelihood that participants would land a job.[29] A study of people without a high school degree in Portland, Oregon, concluded that car ownership was associated with an 80 percent increase in the likelihood of being employed and a $275 increase in average weekly wages.[30] Researchers from the University of California estimate that boosting minority car ownership rates to the same level as whites would eliminate 45 percent of the black–white employment gap and 17 percent of the Latino–white employment gap.[31]

Policymakers have focused on transit as the way to increase job access for low-income people, but as a recent study concluded, transit does not serve the needs of poor households. Rather, automobile-based solutions will "allow [welfare] participants to be both independent and to optimize their work force, educational, personal, familial, and social opportunities."[32]

---

[26] Edward L. Glaeser and Matthew E. Kahn, *Sprawl and Urban Growth*, working paper, National Bureau of Economic Research, May 2003, at *www.tricc.org/docs/delivery.pdf* (May 16, 2005).

[27] The land area accessible within a given amount of time scales as the square of the ratio of vehicle speeds. If cars are 75 percent faster, then a car provides access to three times the land area ($1.75 * 1.75 = 3.06$).

[28] Calculate this as follows: Transit can cover one-third the land area based on speed. Furthermore, assume that only one-half of all homes have access to transit and that only one-half of all employers are accessible by transit. $1/3 * 1/2 * 1/2 = 1/12$; that is, one-twelfth as many potential employers are within reach by transit when compared with the automobile.

[29] Paul M. Ong, *Car Ownership and Welfare to Work*, University of California Transportation Center, Berkeley, February 26, 2001, at *www.uctc.net/papers/540.pdf* (May 16, 2005).

[30] Kerri Sullivan, *Transportation & Work: Exploring Car Usage and Employment Outcomes in the LSAL Data*, Portland State University, Portland, Oregon, 2003, at *http://web.pdx.edu/~jdill/LSAL_Sullivan.pdf* (May 16, 2005).

[31] Steven Raphael and Michael Stoll, *Can Boosting Minority Car-Ownership Rates Narrow Inter-Racial Employment Gaps?* University of California, Berkeley, June 2000, at *www.brookings.edu/es/events/bwpua/2000/o6raph_stoll.pdf* (May 16, 2005).

[32] Alissa D. Gardenhire and M. William Sermons, "Understanding Automobile Ownership Behavior of Low-Income Households: How Behavioral Differences May Influence Transportation Policy," in *Personal Travel: The Long and Short of It*, Transportation Research Board *Transportation Research Circular* E–C026, June 28–July 1, 1999, at *http://gulliver.trb.org/publications/circulars/ec026/05_gardenhire.pdf* (May 16, 2005).

Walking and transit are insufficient to satisfy the full range of people's needs and desires in work, shopping, socializing, and entertainment. As a result, even large increases in residential density have only a small effect on driving per capita. For example, data for the U.S. indicate that, all else equal, doubling residential density reduces per capita miles of driving by only about 10 percent.[33]

Experience around the world thus suggests that suburban, automobile-based lifestyles are not just an American cultural or policy phenomenon, but are also the result of deep-seated human aspirations that transcend culture and public policy. If so, rather than bemoaning the way people want to live, public policy should be geared toward helping people reap the benefits of their preferred lifestyles while minimizing the undesirable side effects. Automobile travel offers something that people the world over find compelling and far superior to any other option available.

Net Costs or Net Benefits?

Critics of the automobile and suburban lifestyles claim that the popularity of automobiles and suburbs results not from people's genuine preferences in a free market, but from government policies that subsidize automobiles and roads, and therefore suburbs, at the expense of transit and central cities.[34] In reality, as shown above, people choose automobile travel worldwide, regardless of government policies for or against cars. Policies that discourage automobile travel work against people's preferences and have only a marginal impact on automobile ownership and use. People choose automobiles even though they are costly to own and operate—suggesting that people the world over perceive enormous net benefits from automobile travel.

Could the automobile's critics be correct that reliance on the automobile for most travel is actually making people worse off overall? Given the global preferences for the automobile, this charge seems absurd on its face. Part of the problem may be that we tend to take the benefits of automobile travel for granted while the costs, such as air pollution, congestion, and accidents, are more salient. Thus, a more hardheaded look at all the costs and benefits of automobiles and roads is worthwhile to see how our best quantitative estimates compare with people's actual behavior.

For several reasons, estimating the costs and benefits of automobile travel turns out to be a difficult enterprise.

First, some of the costs are non-monetary—for example, the health damage caused by air pollution or the time motorists spend driving—and therefore must be estimated indirectly.

Second, many costs related to automobile use are "bundled" into the cost of other goods and services. "Free" parking at a shopping mall is an example. Parking facilities cost money to build and maintain, and there is also a cost of devoting land to parking that could otherwise have been put to other productive uses. Motorists do not pay any of these costs directly; instead, they end up paying them implicitly through the cost of products purchased at the mall.

---

[33] Don Pickrell and Paul Schmiek, *Trends in Personal Motor Vehicle Ownership and Use: Evidence from the Nationwide Personal Transportation Survey*, Volpe Center, U.S. Department of Transportation, Cambridge, Massachusetts, April 23, 1998, at *http://npts.ornl.gov/npts/1995/Doc/Envecon.pdf* (May 16, 2005).

[34] See, for example, Richard J. Jackson, M.D., M.P.H., and Chris Kochtitzky, M.S.P., *Creating a Healthy Environment: The Impact of the Built Environment on Public Health*, Sprawlwatch Clearinghouse/Centers for Disease Control, Washington, D.C., 2002, at *www.sprawlwatch.org/health.pdf* (May 16, 2005), and MacKenzie, Dower, and Chen, *The Going Rate: What It Really Costs to Drive*.

Third, it is not clear whether some costs related to automobiles should be included in the cost tally. For example, many employers provide free or subsidized parking to their employees. Should this driving-related cost be included in a tally of the costs and benefits of automobiles, or is it—like, for example, employer-paid health care, or employer-subsidized office cafeterias or transit passes—just another employee benefit or business cost?

Fourth, for reasons that will be discussed below, the benefits of automobile travel are difficult to quantify precisely.

With these issues and concerns in mind, the rest of this section evaluates the costs and benefits of automobile travel. As we shall see, estimates in the research literature support what worldwide experience seems to tell us: The benefits of automobile travel far outweigh the costs.

Benefits of Automobile Travel. At a minimum, we can assume that the benefits of automobile travel are at least as large as the total amount that consumers willingly spend each year to travel by automobile. People simply would not spend the thousands of dollars they spend each year on automobile ownership and use if they did not believe that the benefits of automobile travel at least equaled the direct costs of obtaining those benefits. But the full social benefits of automobile travel are much larger than this.

The previous section showed that owning an automobile increases poor people's likelihood of landing a job. The speed and flexibility of driving also provides access to better housing and a greater choice of both houses and neighborhoods.[35] Large supermarkets and warehouse stores could not exist without automobiles, and these stores provide access to a greater variety of consumer goods and lower prices for those goods. While many consumers may lament the demise of the corner grocery or the local department store, it is consumers who have voted with their feet—and their cars—for greater variety, lower prices, and the ability to transport several shopping bags' worth of purchases home in a single trip.

Automobiles also increase social and recreational opportunities, putting within reach friends, relatives, and parks that were formerly too far away. And the automobile creates greater quality-of-life competition among cities by allowing people to move to places that most closely fit their particular interests.

The automobile has greatly increased America's economic productivity by giving workers a greater choice of accessible jobs and employers a greater choice of workers. The result is better matches between people's skills and employers' needs. The road network and motor vehicles have also increased Americans' safety by providing for rapid responses to medical emergencies.

Not only are Americans far more mobile than they were before the advent of the automobile, but that mobility is much more evenly spread throughout society. Only the wealthy rode inter-city trains in 1900. Most urbanites did not regularly ride streetcars and rarely traveled more than several miles from home. Today, more than 90 percent of households own at least one car, and whether their car is a new Mercedes or an old Geo Metro, both provide fast, flexible travel, and drivers of both cars "deal on equal terms for space on

[35] This qualitative discussion of automobile benefits is summarized from Randal O'Toole, *The Vanishing Automobile and Other Urban Myths* (Bandon, Ore.: Thoreau Institute, 2001), pp. 85–88, and from e-mail discussions with Randal O'Toole.

the highway, parking at the shopping mall, and fuel in their tanks."[36]

Transit advocates imagine there was a pre-automobile Golden Age where anyone could go anywhere at a time of their choosing. This Golden Age never existed when transit was the only travel option. However, automobile travel, while not an unmitigated blessing (see below), has provided for the vast majority of Americans a level of mobility and opportunity that is unparalleled in human history.

The concrete benefits of automobile travel can be quantified by looking at how much people appear to value automobile travel in terms of dollars. FIGURE 5 provides a schematic of the benefits of automobile travel. The shaded area represents what people spend directly on automobile travel, including purchase and maintenance of cars, gasoline, tolls, parking, and taxes. This total expenditure equals the cost per mile of travel, multiplied by the total miles traveled.

The curved line is called the demand curve. It represents how much automobile travel people would be willing to buy at any given price per mile of travel. In other words, the demand curve represents how much people value each additional increment of automobile travel. The demand curve slopes downward toward the right because each additional increment of travel would be expected to be less valuable than previous increments. For example, in a world with no vehicle travel, the ability to travel a few hundred miles per year by car would be enormously valuable to most people. On the other hand, those already driving 10,000 miles per year might not find a few more miles of driving particularly valuable. After all, they would have used the first 10,000 miles of travel to make trips that they considered more important than the trip they would make with the next few miles of travel.

The difference between the price consumers pay for a good and the value to them of that good is known as the consumers' surplus.[37] The total benefits of automobile travel are the sum of out-of-pocket costs and consumers' surplus (the total area under the demand curve in FIGURE 5). As shown in FIGURE 5, consumers' surplus could represent the largest portion of the total benefits. Uncertainty about total benefits arises because we are unsure how much people would value those first few hundred miles per year of automobile travel.

Transit advocates imagine there was a pre-automobile Golden Age where anyone could go anywhere at a time of their choosing. This Golden Age never existed.

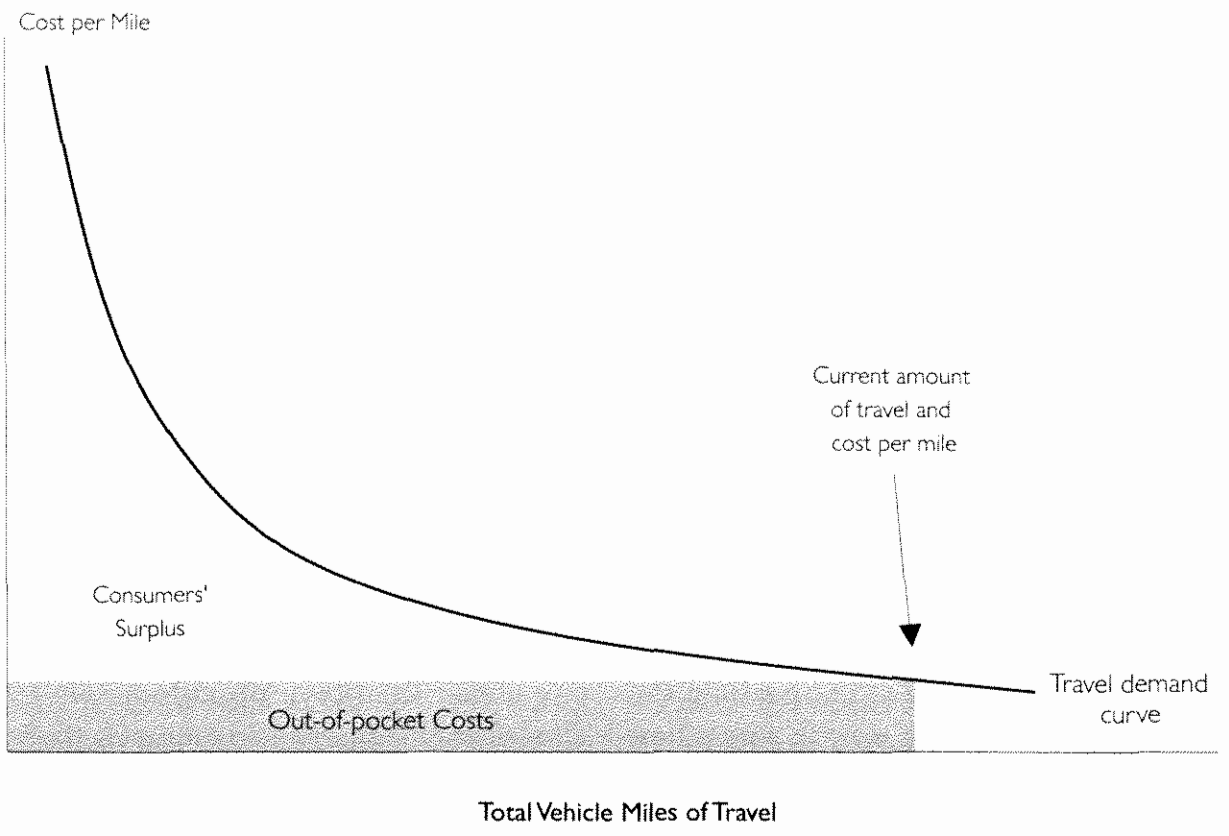
The consumers' surplus may seem abstract, but it represents real value that people derive from the goods and services they purchase. To see this, consider the following thought experiment: Eggs cost about 10 cents each, but imagine we could somehow arrange for the price of eggs to be 20 cents each. At that price, people would, on average, buy fewer eggs. Even so, many people might not change their egg consumption at all, and many eggs would

[36] O'Toole, *The Vanishing Automobile*, p. 87.

[37] See, for example, Steven E. Landsburg, *Price Theory and Applications* (New York: West, 2001).

Figure 5 The Heritage Foundation

Benefits of Automobile Travel = Out-of-Pocket Costs + Consumers' Surplus



Source: Adapted from T. Hogarty, *The Benefits of Road Travel and Transport* (Washington, D.C.: American Petroleum Institute, January 1988).

no doubt continue to be sold. Clearly, people who would be willing to pay 20 cents for eggs they can in reality get for 10 cents are gaining at least 10 cents of consumers' surplus value for each egg they consume.

Now imagine we could arrange for eggs to cost 50 cents each. This would no doubt cause a large decline in total egg consumption, but many people would continue to buy at least a few eggs each month, and people who really enjoy eggs or desserts made with eggs, or people of considerable financial means, might not reduce their egg consumption at all. People who are willing to pay 50 cents for eggs they can get for 10 cents are gaining at least 40 cents of consumers' surplus value for each egg they consume.

In short, the consumers' surplus is real and can represent the lion's share of the value people derive from their purchases.

While dozens of studies have assessed the costs of automobile travel, there appears to be only one study that has attempted to quantify the full benefits of automobile travel.[38] In a 1998 study, Thomas F. Hogarty estimates the average cost of automobile travel to be 48

[38] T. Hogarty, *The Benefits of Road Travel and Transport* (Washington, D.C.: American Petroleum Institute, January 1998).

cents per vehicle-mile.[39] Combining this with total personal vehicle travel estimated at 2.23 trillion miles in 1995, he estimates that consumers spent $1.1 trillion out of pocket in 1995 for personal vehicle travel.[40] This is the portion of benefits represented by the shaded area in FIGURE 5. Once again, these costs are also counted as benefits, because people would not spend the money they spend for automobile travel unless they believed the expenditures provided benefits at least equal to the out-of-pocket costs.[41]

In order to estimate the consumers' surplus benefits, Hogarty reasoned that, because many people are willing to pay taxi fares rather than walk or take public transit, the per-mile cost of a taxi ride represents a lower limit on how much some people are willing to pay for automobile travel in a case where traveling by private car is not an option. In the mid-1990s, an average taxi ride cost about $4.30 per mile. Car rentals represent another way to assess how much people value automobile travel. Based on car rental costs in the mid-1990s, luxury car rentals in New York City cost about $7.60 per mile, given known rental costs and reasonable assumptions about total driving distance. Assuming that people value the first few miles of automobile travel at between $4.30 and $7.60 per mile, Hogarty calculates the consumers' surplus benefits of automobile travel to be $4.3 trillion to $7.9 trillion per year.

Adding together out-of-pocket costs and consumers' surplus gives a total annual benefit of $5.4 trillion to $9.0 trillion for personal automobile travel in 1995. As a further refinement, Hogarty includes the inferred value of time spent traveling to arrive at a total benefit of $5.8 trillion to $9.5 trillion. This may be an underestimate of the true benefits because the use of taxi and rental car costs likely understates how much people would be willing to pay rather than give up automobile travel altogether.[42] Hogarty also estimates the bene-

[39] This is likely an overestimate. Based on estimates of actual consumer expenditures on all things related to owning and operating automobiles, the direct cost of driving was about 29 cents per vehicle-mile in 1995. This result was calculated by Wendell Cox, based on data in U.S. Bureau of Economic Analysis National Accounts of consumer expenditures. Cox's calculation gives the cost per passenger-mile in 2002 dollars. This was converted to a cost per vehicle-mile by multiplying by an average vehicle occupancy of 1.6 people, as given by the 1995 National Personal Transportation Survey. The value was then converted to 1995 dollars using the Consumer Price Index. Hogarty's figure is high because he uses automobile ownership cost estimates from the American Automobile Association. The AAA assumes that the cost of a new automobile is amortized over a much shorter period than the actual average life of an automobile, resulting in spuriously high average automobile ownership costs. The National Accounts data are more representative because they track actual expenditures. See *www.publicpurpose.com/ut-drvg1960.htm*; *www.publicpurpose.com/ut-drvg1960.htm*; and *www.bea.doc.gov/bea/dn/nipaweb/selecttable.asp?selected=N#S2* for Cox's calculations and the National Accounts data, respectively.

[40] Based on the National Accounts data, the actual out-of-pocket cost of automobile travel in 1995 was about $650 billion. Accounting for this difference would increase the fraction of benefits attributed to consumers' surplus, but it has little effect on the overall benefit estimate. Thus, for simplicity, Hogarty's estimates are used in the main text.

[41] To see this, consider another example: If Jane buys an apple for 25 cents, she must expect that the apple will provide her with at least 25 cents worth of benefits. If Jane felt the benefits of eating the apple would be less than 25 cents, she would not buy the apple.

[42] As Hogarty also notes, another reason his estimate is biased low is that he used the average per-mile cost rather than the marginal per-mile cost when calculating the consumers' surplus. The marginal cost is lower, which would make the consumers' surplus larger.

fits of road freight transport, which he tallies at $1.1 trillion per year, for a total benefit range for all on-road motor vehicle transport of $6.9 trillion to $10.6 trillion per year in 1995.

Costs of Automobile Travel. Automobile travel includes a number of very concrete private and public costs such as the cost of automobiles and their maintenance, fuel, insurance, roads, and parking. Driving also includes a cost in terms of the time it takes to get from one place to another. Some of this cost can be attributed to the irreducible amount of time it takes to get from one place to another on uncongested roads, with additional time costs due to congestion. Driving also includes the harm from air pollution and may include more speculative costs such as the potential costs of future human-induced climate change. A portion of U.S. military expenditures might also be plausibly related to keeping oil supplies secure.

The most detailed and comprehensive estimate of these costs to date was performed by Mark DeLucchi of the University of California at Davis in a series of reports published in the late 1990s and recently updated.[43] Accounting for all of the costs listed above and many more, DeLucchi estimates that the full social cost of all on-road motor vehicle transportation ranged from $1.7 trillion to $3.3 trillion in 1991. This estimate is in 1991 dollars. Assuming that all of these costs are proportional to the total amount of vehicle travel and adjusting to 1995 dollars gives an estimated cost range of $2 trillion to $4 trillion per year in 1995. Even the high end of this range is more than 40 percent below the lower-bound estimate of the benefits of motor vehicles discussed above. If these estimates are reasonable, we can conclude that the total benefits of motor vehicle travel are far greater than the total costs.

Subsidies and Externalities. Critics of automobile travel are most concerned about explicit and implicit subsidies that they believe are encouraging people to drive more than they otherwise might.[44] For example, drivers pollute the air without having to take account of the costs this imposes on others. Getting on the freeway during rush hour is also free, but this causes delay for other people, who are then forced to spend extra time getting to their destination. Some portion of U.S. defense expenditures might be attributable to maintaining access to oil in politically unstable areas of the world, but these costs are paid out of general tax revenues rather than through, say, user fees on petroleum from the Middle East.

These subsidies are often referred to as "externalities" because they are not reflected in, and are therefore external to, the market transactions involved in driving. Additional subsidies include costs of road building and maintenance that are paid out of general revenues rather than gasoline taxes, registration fees, or other revenues directly related to automobile use. Some analysts also include employer-paid parking at work as a subsidy to the automobile because this benefit is a federally tax-deductible business expense.

A detailed discussion of the reality and magnitude of all claimed subsidies and externalities is beyond the scope of this chapter. Note, however, that some of these costs are, at least arguably, not really subsidies. As discussed earlier, employer-provided parking at work can be viewed as just another employee

[43] For the text of these reports, see *www.its.ucdavis.edu/people/faculty/delucchi/* (May 17, 2005).

[44] See, for example, MacKenzie, Dower, and Chen, *The Going Rate: What It Really Costs to Drive*, and Sierra Club, "America's Autos on Welfare," undated, at *www.sierraclub.org/sprawl/articles/subsidies.asp* (May 17, 2005).

benefit, similar to other tax-deductible business expenses such as employer-provided health care or subsidized office cafeterias. Indeed, many employers similarly offer employees free or reduced-price transit passes, which transit advocates normally do not include on the ledger of transit costs.

Some studies also consider the portion of road maintenance and services not covered by gas taxes as subsidies to drivers, yet some portion of these expenditures would be necessary regardless of whether people used automobiles to get around. Even if we could imagine a world in which people did not drive, they would nevertheless insist on having the rapid response to fires, crimes, and medical emergencies that is uniquely afforded by road vehicles. Furthermore, some roads would be necessary for goods deliveries to supermarkets and other retail stores. A street and road network would be necessary to provide all of these services and might reasonably be funded by property and sales taxes.

While the reality and magnitude of the above subsidies are open to reasoned debate, some of the automobile subsidy claims made by anti-automobile activists are not credible. For example, the Sierra Club includes "property taxes lost from land cleared for freeways" and the negative economic effects of the nation's trade deficit in its tally of purported subsidies for automobile travel.[45]

Costs of Alternatives to the Automobile. Debates over the societal effects of the automobile often seem to proceed on the implicit assumption that transit is a cheaper alternative. In fact, transit costs about four times as much per passenger-mile when compared with the direct costs of driving. In 2002, driving cost about 20 cents per passenger-mile, while transit cost 82 cents.[46] The estimated costs of driving include all direct costs of owning and operating automobiles as well as road building and maintenance, including government expenditures not covered by gas taxes and other user fees. The estimated costs of transit include all capital and operating costs.

Transit costs about four times as much per passenger-mile when compared with the direct costs of driving.

The costs of automobile use do not include externalities, such as air pollution and congestion; but based on even the highest costs claimed by anti-automobile activists, these external costs would add about 23 cents per passenger-mile, for a total cost of driving of 43 cents per passenger-mile.[47] Thus, even if we add an implausibly huge value for the implicit subsidies to motorists, the real cost of driving would still be well below the real cost of transit.[48]

[45] Sierra Club, "America's Autos on Welfare."

[46] Wendell Cox, "U.S. Cost of Automobiles/SUVs and Public Transport per Passenger Mile from 1960," The Public Purpose, 2004, at *www.publicpurpose.com/ut-drvg1960.htm* (May 17, 2005).

[47] Calculated by assuming external costs of the automobile equal to $7.50 per gallon of gasoline, an average fuel economy of 20 miles per gallon, and an average vehicle occupancy of 1.6 people.

[48] Transit also imposes external costs not included here, such as air pollution from buses, diesel trains, and power plants that generate electricity for electric trains. Assuming the high-end damage estimates from air pollution used by activists, these costs would add several cents per passenger-mile to the cost of transit.

These cost comparisons also ignore the fact that travel by transit is of lower quality than travel by car. Transit is slower, serves only a fraction of the destinations accessible by automobile, is available only during certain hours of the day, and does not provide any privacy to passengers. Thus, transit not only costs more, but also provides less value per dollar.

In short, not only does automobile travel confer large net benefits on Americans, but replacing automobile travel with transit would actually be more expensive.

Reducing the Undesirable Side Effects of Automobile Travel

Are the negative aspects of automobile travel inevitable? No—just the opposite. With few exceptions, the history of automobile travel has been a story of increasing the benefits of automobile travel while reducing the unwanted negative side effects.

Air Pollution: Going Down. Air pollution has been declining for decades throughout the United States. Contrary to popular mythology, these declines began long before 1970 when the federal Clean Air Act was adopted. For example, data from Pittsburgh, once America's smokiest city, show that airborne soot levels declined 75 percent between the early 1900s and the 1960s.[49] Ozone smog was first recognized as a problem in Los Angeles in the late 1940s, driven by rapid growth in population and driving during the preceding two decades, but ozone was already in decline by the mid-1950s as a result of local efforts to reduce automobile and industrial pollution.[50]

In reports such as the Public Interest Research Group's *More Highways, More Pollution*, environmental and land-use activists claim that increasing air pollution is an inevitable result of increasing automobile use.[51] The director of Smart Growth America, an anti-suburb, anti-automobile group, contends that "[s]prawl and higher-emitting SUVs are proliferating faster than technological fixes can keep up."[52] These claims are mistaken and are contradicted by real-world data on ambient air pollution levels and motor vehicle emission trends.

Due to population growth and increasing affluence, Americans have more than doubled their total annual miles of driving during the past 30 years, yet air pollution has fallen dramatically. FIGURE 6 displays trends in driving and ambient air pollution levels from 1975 to 2003. All variables are set to an index value of 1.0 in 1975, and the graph shows annual changes from the 1975 base level. If more driving causes more air pollution, we should have seen a huge increase in air pollution during the past few decades. But as FIGURE 6 shows, just the opposite occurred: As driving increased, air pollution declined.

While 60 percent of the nation's ozone monitors violated EPA's one-hour ozone standard in the late 1970s, only about 10 percent do so today, and average annual days exceeding the standard have dropped more than 95 percent.[53] The nation has likewise made great progress on airborne particulate matter, or PM (soot, dust, and so forth). Only a few percent of the nation's monitoring locations still vio-

[49] Indur M. Goklany, *Clearing the Air: The Real Story of the War on Air Pollution* (Washington, D.C.: Cato Institute, 1999).

[50] *Ibid.*

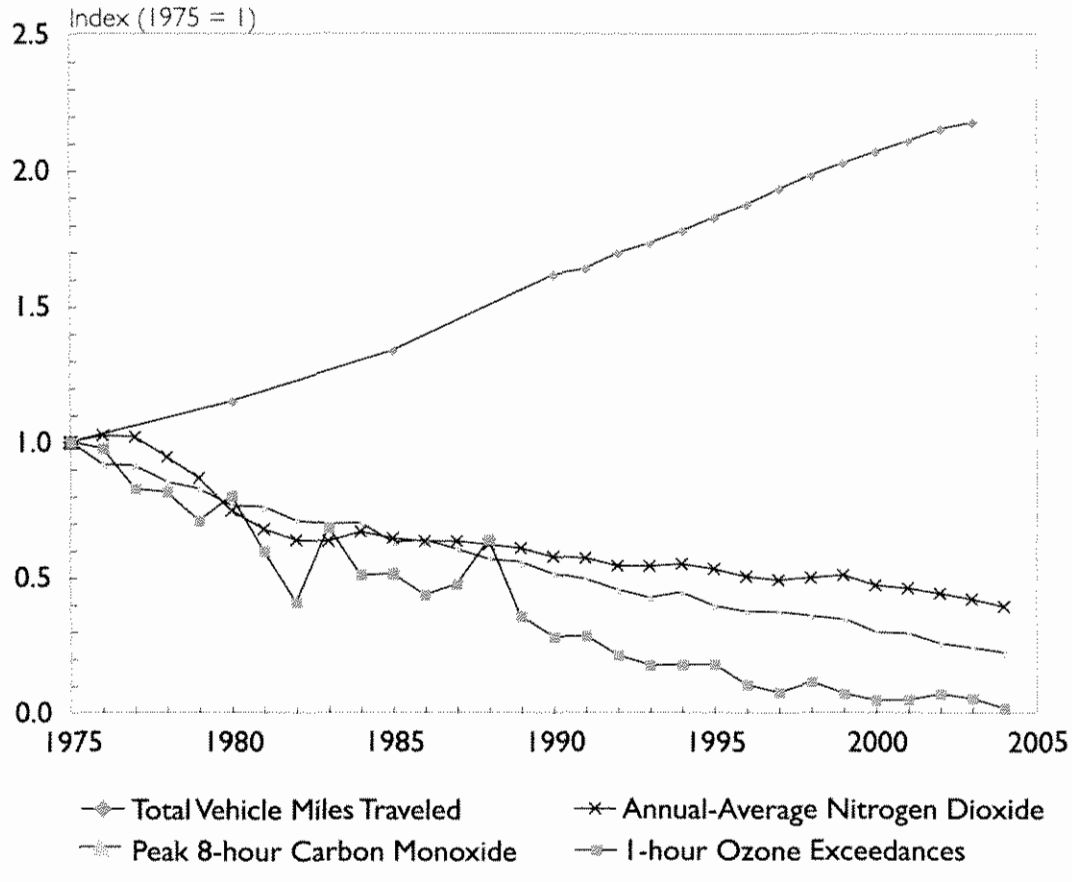
[51] Public Interest Research group, *More Highways, More Pollution.*

[52] David Goldberg, "If Smog Isn't Routed, It Returns," *Atlanta Journal–Constitution*, September 1, 2003, p. A13.

[53] All ambient pollution trend statistics are based on analysis of national air pollution monitoring data downloaded from EPA at *www.epa.gov/ttn/airs/airsaqs/detaildata/downloadaqsdata.htm*. For detailed charts showing

Figure 6 The Heritage Foundation

Trend in Total Vehicle Miles vs. Trends in Air Pollution, 1975-2004



Note: Pollution data are national averages of all monitoring stations in the U.S. Nitrogen dioxide is the annual-average level, carbon monoxide is the peak daily 8-hour level, and ozone is the average number of days per year exceeding the federal 1-hour ozone standard.

Sources: Vehicle miles, Bureau of Transportation Statistics, *National Transportation Statistics* 2005; Population, Census Bureau; Air pollution, Environmental Protection Agency's AirData pollution monitoring database, at *www.epa.gov/ttn/airs/airsaqs/detaildata/downloadaqsdata.htm* (March 15, 2004).

late the Environmental Protection Agency's standard for particulate matter under 10 microns in diameter (PM^{10}). About 15 percent violate the EPA's new and much more stringent standard for particulate matter up to 2.5 microns in diameter ($PM^{2.5}$), but $PM^{2.5}$ levels have steadily declined, dropping nearly 50 percent during the past 25 years and 14 percent in just the past five years. During the 1970s, the EPA initially considered carbon monoxide to be the worst air pollution problem, but all monitoring locations in the country now attain the federal health standard, and monitored levels in air continue to decline.

Air pollution continues to decline because cars—including SUVs and pickup trucks—have

ambient air pollution trends, see Joel Schwartz and Steven Hayward, *Air Quality in America: A Dose of Reality on Air Pollution Levels, Trends and Health Risks*, American Enterprise Institute, April 28, 2004, at *www.aei.org/docLib/20040301_schwartzhayward.pdf* (May 17, 2005).

been getting cleaner much more quickly than driving has been increasing. For example, on-road trend measurements show that the average car's pollution emissions are dropping about 10 percent per year as the fleet turns over to more recent models that start out and stay cleaner than their predecessors.[54] Yet driving is increasing about 2 percent per year, for a net emissions decline of 8 percent per year.[55] These trends will continue, because old high polluters continue to be scrapped and new cars' emissions and durability continue to improve. The same goes for SUVs and pickup trucks as for regular cars. Data from vehicle emissions inspection programs show that SUVs and pickup trucks have had about the same emissions as cars since at least the 2001 model year.[56] EPA standards require them to have the same low emissions as cars for the 2004 model year and beyond.[57] The automobile fleet that will be on the road in 15 to 20 years will emit at least 90 percent less air pollution per mile of travel even if we do nothing new to reduce automobile emissions.

FIGURE 7 shows recent trends in automobile emissions (including SUVs and pickup trucks) as measured in a tunnel in the San Francisco Bay Area from 1994 to 2001. Emissions of all three of the major automobile air pollutants—carbon monoxide, volatile organic compounds (VOCs), and nitrogen oxides—are declining rapidly. The rates of decline are about 9 percent, 13 percent, and 15 percent per year, respectively, for nitrogen oxide, carbon monoxide, and volatile organic compounds.

Old high-polluting cars continue to be scrapped and new cars' emissions and durability continue to improve. The same goes for SUVs and pickup trucks. Data from vehicle emissions inspection programs show that SUVs and pickup trucks have had about the same emissions as cars since at least the 2001 model year.

Emissions are reported here in terms of grams of pollutant emitted per gallon of fuel burned for the average automobile. This rate of change in emissions per vehicle can be converted into a rate of change in total vehicle emissions by taking account of increases in gasoline consumption over time. According to the California Department of Transportation, gasoline use increased about 1.3 percent per year from 1994 to 2001. Thus, for example, while VOC emissions per vehicle declined 15 percent per year, total VOC emissions

[54] Sajal J. Pokharel *et al.*, "Emissions Reductions as a Result of Automobile Improvement," *Environmental Science and Technology*, Vol. 37 (2003), pp. 5097–5101, and Joel Schwartz, *No Way Back: Why Air Pollution Will Continue to Decline*, American Enterprise Institute, July 2003, at *www.aei.org/docLib/20030804_4.pdf* (May 17, 2005).

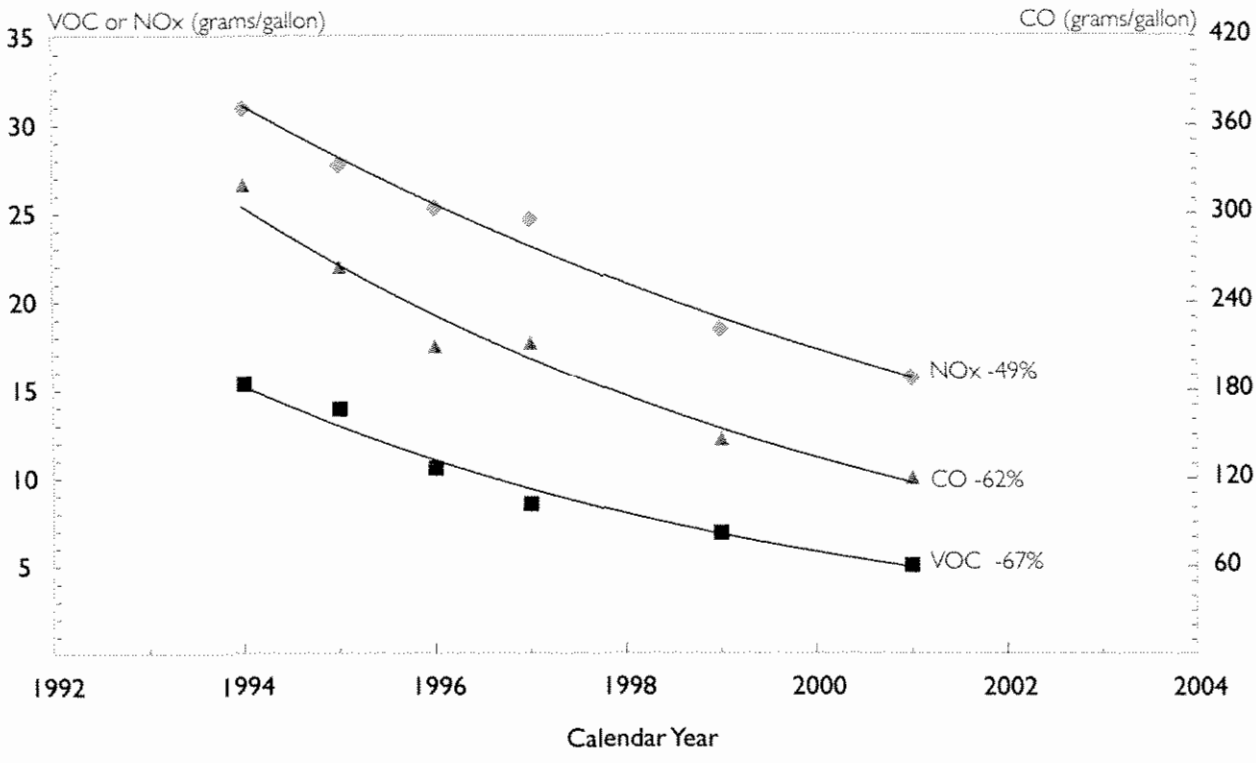
[55] "Congestion Data for Your City," Texas Transportation Institute, at *http://mobility.tamu.edu/ums/congestion_data/* (May 17, 2005).

[56] Schwartz, *No Way Back*.

[57] Environmental Protection Agency, "Control of Air Pollution from New Motor Vehicles: Tier 2 Motor Vehicle Emissions Standards and Gasoline Sulfur Control Requirements; Final Rule," *Federal Register*, February 10, 2000, pp. 6698–6870.

Figure 7 The Heritage Foundation

Trend in Automobile Emissions Measured in a San Francisco Bay Area Tunnel



Notes: NOx = nitrogen oxides; VOC = volatile organic compounds; CO = carbon monoxide. Emissions were measured as grams of pollutant emitted per gallon of gasoline burned. Lines through the data points are based on fitting the data to an exponential function.

Source: A. Kean et al., "Trends in Exhaust Emissions from In-Use California Light-Duty Vehicles, 1994–2001," Society of Automotive Engineers, Warrendale, Pennsylvania, 2002, at *www.uctc.net/papers/584.pdf* (May 17, 2005).

declined a little over 13 percent per year. This shows that, contrary to activists' claims, growth in driving and growth in the popularity of SUVs—both of which are accounted for by adjusting for increases in gasoline consumption—are doing little to offset the benefits of inherently cleaner automobiles.

Soot emissions from diesel trucks have also declined a great deal. On-road measurements show that the average truck's soot emissions declined more than 80 percent between 1975 and 1999 and 50 percent between 1997 and 2004.[58] EPA regulations require a further 90 percent reduction in soot and other pollutants from diesel trucks starting with the 2007 model year.[59] Based on cur-

[58] Alan W. Gertler *et al.*, *Real-World Particulate Matter and Gaseous Emissions from Motor Vehicles in a Highway Tunnel*, Research Report, Health Effects Institute, 2002, at *www.healtheffects.org/Pubs/GertGros.pdf* (May 17, 2005); Thomas Kirchstetter *et al.*, "Characterization of Particle and Gas Phase Pollutant Emissions from Heavy- and Light-Duty Vehicles in a California Roadway Tunnel," American Geophysical Union Fall Meeting, San Francisco, 2004.

[59] Environmental Protection Agency, "Regulatory Impact Analysis: Heavy-Duty Engine and Vehicle Stan-

rent trends and upcoming requirements, air pollution from motor vehicles has been essentially solved as a long-term problem. Because motor vehicles are becoming so clean, suburbanization and other trends toward increasing driving will have little impact on future air pollution levels.

Although air pollution has greatly improved and will be even lower in the future, automobiles still contribute a substantial fraction of remaining air pollution. However, a small fraction of all automobiles account for most of the problem. On-road pollution measurements show, for example, that the worst 10 percent of automobiles contribute about 70 percent of volatile organic compound emissions, which help form ozone and particulate matter air pollution.[60] The worst 5 percent of cars contribute 50 percent of VOC emissions. These high polluters tend to be middle-aged and older cars that are in poor repair. In other words, the typical car is so clean that driving per se is not a major source of air pollution. Rather, a few high-polluting cars are causing by far the largest portion of the problem.

The distribution of air pollution emissions from the automobile fleet has stark policy implications. The most successful motor vehicle air pollution policies have involved changes in vehicles—new designs and new technologies—that have resulted in progressively more effective and more durable automobile pollution control systems. Yet much policy effort is geared toward changing motorists' behavior—getting them to drive less by encouraging carpooling, making driving less convenient by restricting freeway expansion, or providing alternatives such as transit.

Policymakers and environmental activists have mistakenly defined the motor vehicle air pollution problem as, "all cars pollute, so reducing driving is an effective way to reduce air pollution." In fact, most cars pollute hardly at all, while a few cars pollute a lot. Even as far back as the early 1980s, researchers realized that a small percentage of automobiles accounted for most emissions.[61] Thus, even if they could be effective in principle, policies aimed at reducing how much people drive are guaranteed to put most of their effort into reducing vehicle-miles driven by cars that emit hardly any air pollution. Technology has greatly weakened the link between driving and air pollution and will virtually eliminate it over the next two decades.

Policies that try to affect how much people drive in the name of reducing air pollution have been notably unsuccessful in influencing how much people drive, but they have caused a great deal of collateral damage by increasing road congestion and diverting hundreds of billions in transportation funds over the past few decades to transportation modes that hardly anyone chooses to use.

Safer Cars, Safer Roads. More than 42,000 Americans were killed in motor vehicle accidents in 2003, and millions were injured.[62] Yet the toll would be far higher without the continuous improvements in road and vehicle safety implemented over the past few decades. Per vehicle-mile of travel, the death

dards and Highway Diesel Fuel Sulfur Control Requirements," December 2000, at *www.epa.gov/otaq/diesel.htm* (May 17, 2005).

[60] Schwartz, *No Way Back*. See also reports on various on-road emissions measurement studies at Fuel Efficiency Automobile Test, at *www.feat.biochem.du.edu/light_duty_vehicles.html* (May 17, 2005).

[61] Lowell G. Wayne and Yuji Horie, *Evaluation of ARBs In-Use Vehicle Surveillance Program, Final Report* (Sacramento: California Air Resources Board, October 1983).

[62] Bureau of Transportation Statistics, *National Transportation Statistics 2004*.

rate for automobile occupants declined 75 percent between 1960 and 2003, while the rate for pedestrians declined 84 percent. In other words, 40 years ago, the risk of dying in a car accident was four times higher if you were driving and seven times higher if you were walking. In addition, injuries per vehicle-mile declined 32 percent from 1990 to 2002.[63] For the past decade, the risk of injury has been dropping faster than the risk of death.

Critics of the automobile claim that suburbanization decreases road safety, particularly for pedestrians. For example, *Mean Streets*, an annual report by the Surface Transportation Policy Project (STPP), an anti-automobile group, decries the supposedly great and increasing danger that automobiles pose for pedestrians.[64] Yet per vehicle-mile, the fatality rate for pedestrians has dropped faster than the rate for vehicle occupants. Furthermore, not only has the rate declined, but the total annual number of pedestrians killed has also declined 27 percent since 1990 even as total miles of driving increased 31 percent over the same period.

The STPP blames pedestrian deaths on urban "sprawl." Yet the extraordinary increases in pedestrian safety over the past few decades occurred at the same time that Americans chose suburbs by the tens of millions. The STPP also fails to note that in 45 percent of accidents in which a pedestrian is killed by a motor vehicle, the driver and/or the pedestrian have alcohol in their blood.[65] One-third of pedestrians killed in car accidents have blood alcohol levels greater than 0.08 percent, as do 6 percent of drivers involved in those accidents. Thus, while suburbanization appears at worst to have no effect on automobile risks to pedestrians, alcohol-impaired judgment on the part of pedestrians and/or drivers may be a major factor.

It has become fashionable among public health experts and advocates to claim that suburbs discourage walking and physical activity.[66] Could it be that suburbs are safer for pedestrians because suburbanites simply spend less time walking? Probably not. The Centers for Disease Control and university researchers report that suburbanites are actually more physically active than people in cities or rural areas and less likely to be obese.[67]

Congestion. Because getting on the road is free, congestion is the default system for rationing road space. However, it should be noted that motorists have adjusted to congestion in their housing choices. Families choose where to live based on a range of factors. For example, families with children rate access to good schools near the top.[68] However, commuting time to work must surely be a factor as well. Total vehicle-miles driven in urban areas grew at 2.5 times the rate of growth in urban road capacity during the 1990s, yet average commut-

[63] 1990 is the earliest year for which national injury data are available.

[64] Ernst, *Mean Streets 2004: How Far Have We Come? Pedestrian Safety, 1994–2003*.

[65] U.S. Department of Transportation, National Highway Traffic Safety Administration, *Pedestrian Roadway Fatalities*, April 2003, at *www-nrd.nhtsa.dot.gov/pdf/nrd-30/NCSA/Rpts/2003/809-456.pdf* (May 17, 2005).

[66] See, for example, Ewing, Pendall, and Chen, *Measuring Sprawl and Its Impact*, and Jackson and Kochtitzky, *Creating a Healthy Environment*.

[67] J. S. House *et al.*, "Excess Mortality Among Urban Residents: How Much, for Whom, and Why?" *American Journal of Public Health*, Vol. 90 (2000), pp. 1898–1904; Centers for Disease Control, National Center for Health Statistics, *Health United States, 2001*, at *www.cdc.gov/nchs/data/hus/hus01.pdf* (May 17, 2005).

[68] Peter Gordon and Harry Richardson, "Critiquing Sprawl's Critics," Cato Institute *Policy Analysis* No. 365, January 24, 2000, at *www-rcf.usc.edu/~pgordon/pdf/pa365.pdf* (May 17, 2005).

ing time rose only a few minutes between 1990 and 2001.[69] People adjusted their housing and work choices to keep commuting times relatively constant even as congestion increased. Jobs followed people to the suburbs, facilitating the maintenance of relatively short commute times in spite of increasing road congestion.[70]

When surveyed, a majority of people say they favor building more transit to reduce congestion. However, the ability of new transit facilities to reduce congestion is limited because transit accounts for only about 4.6 percent of all work-commute trips and the rush hour commute is when congestion is at its worst. Even a 50 percent increase in transit's share of commute trips would still leave transit accounting for only 6.9 percent of all commute trips. A recent study concluded that a 50 percent increase in transit's commute share would reduce average commute times by 22 seconds, or about 1.5 percent.[71]

It is not clear that such a large increase in transit use could even be accomplished. From 1990 to 2000, inflation-adjusted spending on transit increased 29 percent and transit ridership increased 14 percent, but driving increased faster, resulting in an 11 percent decline in transit's share of work-commute trips.[72] Transit's share of all transportation is at an all-time low. Only 1.6 percent of all person-trips and 1.2 percent of all person-miles are traveled via public transit.[73] Transit's decline occurred despite $360 billion in taxpayer subsidies for transit between the mid-1960s and the late 1990s.[74] While automobiles also receive taxpayer subsidies, transit receives about 57 times as much in subsidies per passenger-mile as automobiles receive.[75] Public transit received more than 15 percent of all tax dollars spent on transportation between 1977 and 1995 despite accounting for less than 2 percent of actual travel during this period.[76]

Per vehicle-mile, the fatality rate for pedestrians has dropped faster than the rate for vehicle occupants. Not only has the rate declined, but, since 1990, the total annual number of pedestrians killed has also declined even as total miles of driving have increased.

[69] *Ibid.*; U.S. Department of Transportation, *Summary of Travel Trends*, 2001 National Household Travel Survey.

[70] Randall Crane and Daniel G. Chatman, "Traffic and Sprawl: Evidence from U.S. Commuting, 1985 to 1997," *Planning and Markets*, Vol. 6 (2001), pp. 14–22; Gordon and Richardson, "Critiquing Sprawl's Critics."

[71] Wendell Cox and Randal O'Toole, "The Contribution of Highways and Transit to Congestion Relief: A Realistic View," Heritage Foundation *Backgrounder* 1721, January 27, 2004, at *www.heritage.org/Research/UrbanIssues/bg1721.cfm*.

[72] *Ibid.*

[73] U.S. Department of Transportation, *Summary of Travel Trends*, 2001 National Household Travel Survey. Transit's share of person trips and person miles is calculated with the inclusion of walking and bicyling in addition to motorized modes.

[74] Gordon and Richardson, "Critiquing Sprawl's Critics."

[75] Wendell Cox, "Highway and Mass Transit Subsidies in the United States: 2002," The Public Purpose, 2004, at *www.publicpurpose.com/ut-mthwy$2002.htm* (May 17, 2005).

[76] Pietro S. Nivola, *Laws of the Landscape: How Policies Shape Cities in Europe and America* (Washington, D.C.: Brookings Institution, 1999).

Although most people like the idea of building transit, it is clear that the vast majority will never actually use these transit services themselves. *The Onion*, a satirical weekly newspaper, accurately captured people's real views of public transit with the tongue-in-cheek headline, "98 Percent of U.S. Commuters Favor Public Transportation for Others."[77]

Road congestion has worsened largely because policymakers, supported by anti-automobile activists, have prevented road infrastructure from expanding to meet new demand for automobile travel. Between 1980 and 2003, total miles driven in the United States increased 89 percent, but total urban roadway lane-miles increased only 51 percent.[78] Indeed, a key goal of many urban planners and activists is to make driving slower and less convenient in order to encourage people to switch to other modes of travel.[79] For example, the regional planning authorities in Portland, Oregon, and Minneapolis, Minnesota, seek to increase congestion in order to make driving less attractive and to increase the use of alternative transportation modes.[80]

Other than deciding to live with road congestion, there are probably only two approaches that have a decent chance of making a dent in the problem: Provide more road capacity and/or charge for road space during peak travel hours. Metropolitan areas with more highway and arterial lane-miles per capita also have lower traffic densities, so more road space per person is associated with less congestion.[81] But existing road space also is not used efficiently. Congestion charges can encourage people to move discretionary travel away from peak travel periods.[82]

---

[77] "Report: 98 Percent of U.S. Commuters Favor Public Transportation for Others," *The Onion*, November 29, 2000, at *www.theonion.com/auto/news_3643.php* (May 17, 2005).

[78] "Urban" means all non-rural roadways. The change in urban roadway lane-miles includes all freeways, arterials, collectors, and local streets. Freeway and arterial lane-miles alone increased 48 percent. Bureau of Transportation Statistics, *National Transportation Statistics 2004*, Table 1-6.

[79] For general examples, see Steve Inskeep, "Commuting IV," *All Things Considered*, National Public Radio, May 30, 1997, at *www.npr.org/templates/story/story.php?storyId=1039432*, and O'Toole, *The Vanishing Automobile*, pp. 260–261. See also Dom Nozzi, "Traffic Congestion: Friend or Foe?" *Walkable Streets*, undated, at *www.walkablestreets.com/congest.htm* ("It is a serious strategic blunder for sprawl-busters and other community and environmental advocates to oppose traffic congestion"); "Fewer Marylanders Using Mass Transit," *Montgomery Journal*, June 4, 2002 ("My hope is that it will get so congested that people will want to invest in public transit," Marie Howland, Professor of Urban Studies, University of Maryland); "The Automobile and the Environment: MIT Conference Addresses the Costs of Congestion and Looks for Solutions," MIT Center for Environmental Initiatives *Newsletter*, June 1999, p. 7, at *http://lfee.mit.edu/public/CEI_Newsletter_V1N4.pdf* ("Mr. Michael Replogle of the Environmental Defense Fund argued that from an environmental point of view, reducing traffic congestion can be counterproductive"); and Michael A. Replogle, "Minority Statement of Michael A. Replogle" in Transportation Research Board, *Expanding Metropolitan Highways: Implications for Air Quality and Energy Use* (Washington, D.C.: National Academies Press, 1995), p. 358, at *www.nap.edu/books/0309061075/html* ("Limiting further highway capacity expansion, reducing highway capacity, and calming traffic (especially in central areas) can be effective strategies for reducing energy use, air pollution, and other environmental problems").

[80] Metro, *Regional Transportation Plan Update* (Portland, Ore.: March 1996), and Metropolitan Council, *Transportation Policy Plan* (St. Paul, Minn.: 1996).

[81] Wendell Cox, "Traffic Volumes & Highway Capacity," The Public Purpose, 2000, at *www.publicpurpose.com/hwy-charts99_files/frame.htm* (May 17, 2005).

[82] For a detailed discussion of how urban areas can deal effectively with road congestion, see Chapter 4.

While increasing congestion might be expected to make driving less pleasant, other trends are improving the driving experience. Automakers have added progressively more amenities to cars over time: for example, more comfortable seating, more spacious passenger cabins, better stereos, and better soundproofing. Drivers who want intellectual stimulation can listen to books or college courses on tape or CD, while cell phones and headsets allow commuters to conduct business or talk to friends or family while they are on the road. Many restaurants and cafés cater to morning commuters by providing drive-through windows where motorists can quickly purchase a bagel or their morning coffee. Some even try to place their stores on the same side of the street as the morning commute flow so that drivers can avoid wasting time making a left turn.[83] All of these improvements and innovations have afforded motorists greater control over their commuting experience, giving the personal automobile an additional advantage over mass transit, which does not offer privacy and does not have the flexibility to cater to individual tastes.

Drivers can listen to books on tape or CD, while cell phones and headsets allow them to conduct business or talk to family on the road. Many restaurants cater to morning commuters by providing drive-through windows. These innovations give the auto an advantage over mass transit, which does not cater to individual tastes.

Using Pricing to Mitigate the Negative Side Effects of Driving. The appropriate policy instrument for dealing with various subsidies and externalities related to driving depends on the nature of the cost. For example, road congestion would be addressed most by charging for road space during periods of peak usage; air pollution, by levying pollution charges on motorists based on their vehicles' actual emissions; carbon dioxide emissions, by taxing gasoline; and accidents, by charging more to the riskiest drivers. However, realizing that gasoline taxes are administratively simple and comparatively well-accepted, two researchers from Resources for the Future (RFF), an environmental and energy think tank, recently set out to estimate the optimal level of gasoline taxation that would account for all of the estimated external costs imposed by drivers on society at large.[84] They concluded that the U.S. gasoline tax should be about $1 per gallon to account for these costs, or about 60 cents per gallon more than current U.S. gasoline taxes.

The largest components of this tax are due to congestion (29 cents per gallon) and accidents (24 cents per gallon), followed by regional air pollution (14 cents per gallon), with the assumed climate change impacts of carbon

[83] K. Shaver, "Pursuit of a Grande Latte May Be Stirring up Gridlock," *The Washington Post*, April 18, 2005, p. A1.

[84] Ian W. H. Parry and Ken A. Small, "Does Britain or the United States Have the Right Gasoline Tax?" *American Economic Review*, forthcoming 2005.

dioxide emissions adding 5 cents per gallon. At current rates of gasoline consumption, adding 60 cents per gallon to the gasoline tax would add about $79 billion to the total annual cost of driving. This works out to about 3 cents per vehicle-mile, 2 cents per passenger-mile, and $330 per year for the average automobile.[85]

Although the reality and magnitude of these costs are uncertain and matters of both scientific and political controversy, charging drivers for real costs they may be imposing makes sense. But even assuming that the RFF analysis correctly estimates these costs, charging drivers for these costs would have only a small effect on how much people actually drive. The direct costs of driving to U.S. motorists are about $850 billion per year. An additional $80 billion, while obviously not a trivial increase, is too small to have a noticeable impact on the overall amount of driving, especially given that Americans likely derive trillions of dollars per year in net benefits from driving.

In any case, as the RFF analysis itself notes, much of the external cost imposed by automobiles is due not to total miles driven per se, but to driving at certain times of the day (congestion), to a few high-polluting cars (air pollution), or to particularly risky drivers (accidents). Only greenhouse gas emissions closely track total miles driven. Thus, more targeted approaches would address many of the costs imposed by driving without substantially affecting total miles driven.

The RFF analysis is based on pollution emissions estimated for 2000, but whatever the costs of automobile air pollution were in 2000, they are substantially lower now because automobile per-mile emissions have been dropping by about 10 percent per year. The air pollution costs of driving will continue to decline.[86]

It is also worth noting that estimates of subsidies to drivers ignore the fact that some of the costs drivers pay might actually be too high. For example, researchers from RAND estimated that changes in public policies regarding automobile liability insurance could cause substantial reductions in the cost of auto insurance by reducing the costs of personal injury litigation and that the savings could be achieved without reducing compensation for economic losses to injured drivers.[87] According to one estimate, the total savings could be as high as $50 billion per year.[88]

While we have not eliminated all of the undesirable side effects of driving, we have made great strides in making driving safer, less polluting, and more comfortable. A range of untapped policy approaches could further increase the net benefits people derive from automobile travel.

Critics of the automobile and suburban lifestyles believe that charging motorists the full costs that driving imposes on society would decrease driving and increase transit use. What they fail to appreciate is that applying this principle across all transportation

[85] Calculated based on national data on gasoline consumption and total vehicle-miles traveled by automobiles, and assuming that the average automobile gets 20 miles to the gallon and is driven about 11,000 miles per year. The actual increase in costs would be somewhat smaller than this because the extra tax would cause a small decrease in gasoline consumption through a combination of greater fuel economy and fewer miles driven. Bureau of Transportation Statistics, *National Transportation Statistics* 2004.

[86] Pokharel *et al.*, "Emissions Reductions as a Result of Automobile Improvement," and Schwartz, *No Way Back.*

[87] Stephen J. Carroll and Alan F. Abrahamse, *The Effects of a Choice Automobile Insurance Plan on Insurance Costs and Compensation: An Analysis Based on 1997 Data* (Santa Monica, Cal.: RAND, 1999), at *www.rand.org/publications/MR/MR1134/* (May 17, 2005).

[88] Nivola, *Laws of the Landscape.*

modes would actually *increase* driving and *decrease* transit use because public transit is both more expensive and more heavily subsidized than driving.[89] Transit costs about 82 cents per passenger-mile, and 52 cents, or 64 percent, of this cost is paid through taxpayer subsidies rather than by transit users. Thus, removing these subsidies would raise fares to transit users by nearly a factor of three. On the other hand, adding both direct and implicit subsidies to motorists would add about 13 percent to the per-passenger-mile cost of driving, for a total driving cost of about 23 cents per passenger-mile.[90] Even if one could justify imposing substantially larger costs on motorists, driving would still remain far cheaper than transit.

Clearly, increasing the costs of automobile travel to address explicit and implicit subsidies will have little effect on the dominance of the automobile. This is confirmed by experience in Europe, where even imposing costs on drivers well in excess of any harms caused by driving has at most delayed Europeans' adoption of American-style transportation choices.

What Is the Alternative?

Americans have chosen automobile-based suburban lifestyles, but driving, as with most things in life, involves trade-offs. We all would prefer to do away with air pollution and car accidents, and although we all like the freedom to drive where we want when we want, most of us would prefer that other people not use that freedom to drive down our streets or congest our roads. Over the years, we have figured out ways to progressively mitigate many of the negative effects of driving while maintaining or augmenting the benefits.

Most people's needs, desires, goals, and plans are too diverse and ever-changing to satisfy with travel mainly by foot and transit.

To be sure, there is still plenty of room for improvement; but to listen to the automobile's critics, you would think not only that driving is making people worse off overall, but also that we are irrationally ignoring an alternative transportation and land-use Nirvana that is sitting there, ripe for adoption—a world where work, shopping, school, restaurants, piano lessons, soccer practice, cafés, and more are all just a short walk or transit ride away.

In reality, most people's needs, desires, goals, and plans are too diverse and ever-changing to satisfy with travel mainly by foot and transit, while most people's lifestyle preferences are incompatible with the residential densities necessary to make walking and transit practical. As one researcher recently put it:

> [O]ne can imagine how nice it would be to be able to walk to local shops instead

[89] Mark DeLucchi, "Should We Try to Get the Prices Right?" *Access*, Vol. 16 (2000), pp. 10–14, at *www.its.ucdavis.edu/publications/2000/RP-00-*08.pdf* (May 17, 2005).

[90] The 13 percent increase assumes that motorists currently pay 20 cents per passenger-mile (see note 46) and that this cost would be increased by 2.6 cents per passenger-mile. This includes 1.9 cents based on Parry and Small (see note 84) to account for externalities and an additional 0.7 cents per passenger-mile to account for $28.6 billion per year in taxpayer subsidies for automobile travel (see note 75; the per passenger-mile cost based on this total subsidy was calculated based on total automobile passenger-miles from Bureau of Transportation Statistics, *National Transportation Statistics 2004*).

of driving to Wal-Mart, but the reason people drive to Wal-Mart is that the selection is better and the prices are lower. One can imagine how nice it would be to walk to the corner grocery rather than drive to the supermarket, but again, supermarkets put the corner groceries out of business because they have lower prices and a better selection.... Bicycles seem like a good alternative to driving, unless the weather is too hot or too cold, or it is raining.[91]

What is the alternative to the automobile and the suburban home? Nobody likes road congestion, but travel by transit is far slower and offers a far more restricted range of destinations. Higher residential densities might increase opportunities to walk and would make transit more viable, but trip times by both transit and automobile are slowest in cities with the highest densities and the greatest transit use. The New York metropolitan area has the longest average commute time in the U.S.[92] Meanwhile, sprawling metropolitan areas such as Phoenix, Las Vegas, Denver, and Austin have commute times around the national average. Furthermore, most people prefer to have more living space and more privacy than high-density living can provide.

There is no realistic alternative to automobile-based transportation that would not require large reductions in people's autonomy, prosperity, and quality of life. Around the world, and in a wide range of cultural, economic, and policy environments, people adopt automobile-based travel and suburban living when they become wealthy enough to afford them. The dominance of automobile-based travel is not just an American phenomenon, and is not the result of public policies favoring the automobile, but is instead the manifestation of deep-seated human desires for opportunity, privacy, space, convenience, and autonomy.

There is no realistic alternative to automobile-based transportation that would not require large reductions in people's autonomy, prosperity, and quality of life. People adopt automobile-based travel and suburban living when they become wealthy enough to afford them.

Nevertheless, for the past few decades, policymakers and activists have focused their efforts on finding ways to override people's individual preferences and choices and impose their own plans for how they believe people ought to live and travel. The time has come for policymakers to respect people's choices and adopt public policies that work in concert with people's aspirations rather than against them.

[91] Randall Crane, "Policy Implications," in Holcombe and Staley, eds., *Smarter Growth:Market-Based Planning Strategies for Land-Use Plannning in the 21st Century.*

[92] Wendell Cox, "US Metropolitan Area Journey to Work Time," The Public Purpose, 2000, at *www.publicpurpose.com/ut-jtw2000msaltime.htm* (May 17, 2005).