Using Public Policies to Promote Walking, Cycling, and Public Transport

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Worldwide Travel Trends

- Increasing daily travel distances
- Increasing car ownership and use
- Increased public transport use, but falling mode share
- Less walking almost everywhere
- Low or falling cycling levels except in northern Europe

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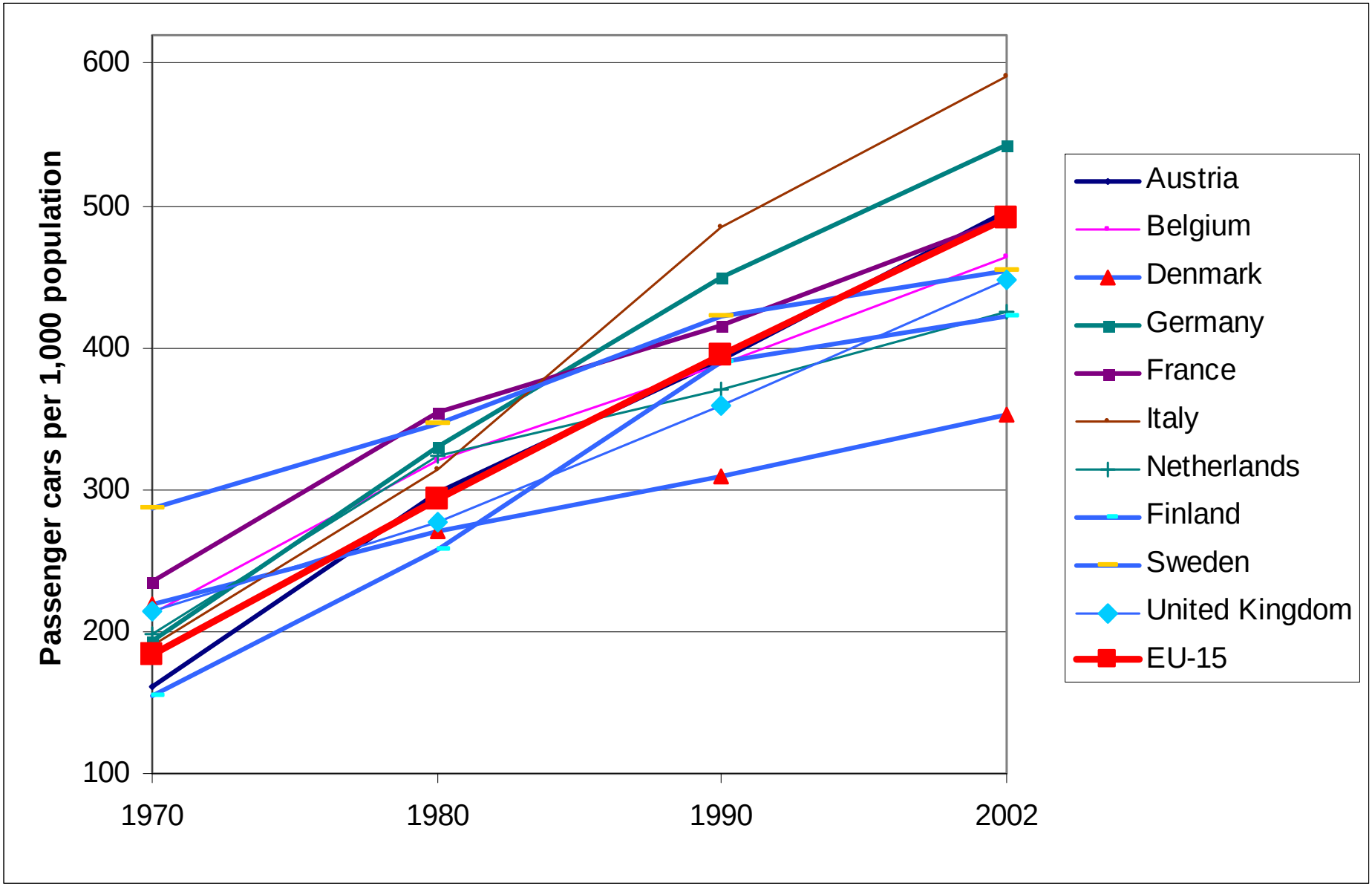
Growth in Passenger Car Ownership in Europe, 1970-2002

(cars per 1,000 population)



Source: European Commission, Energy and Transport in Figures, 2004

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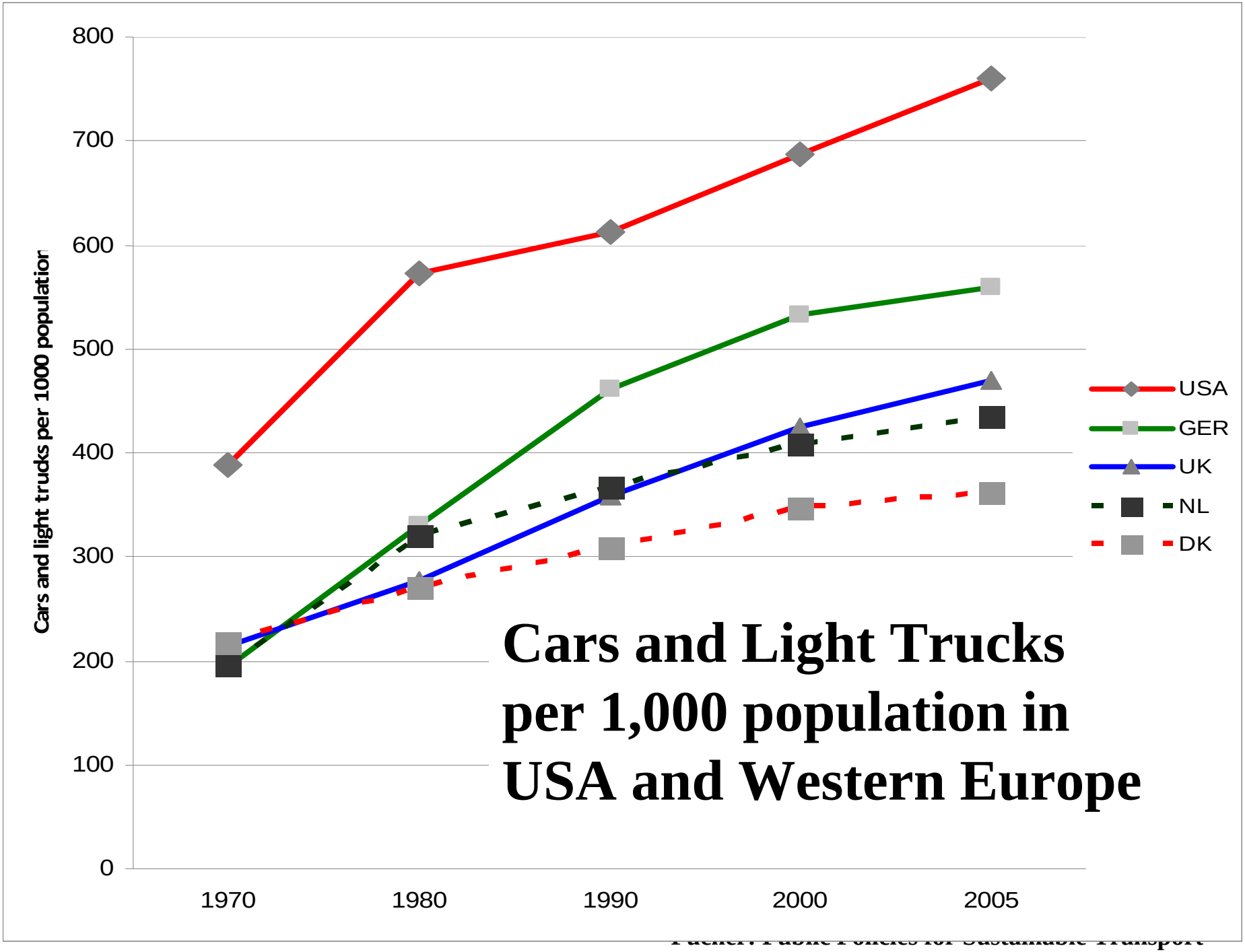
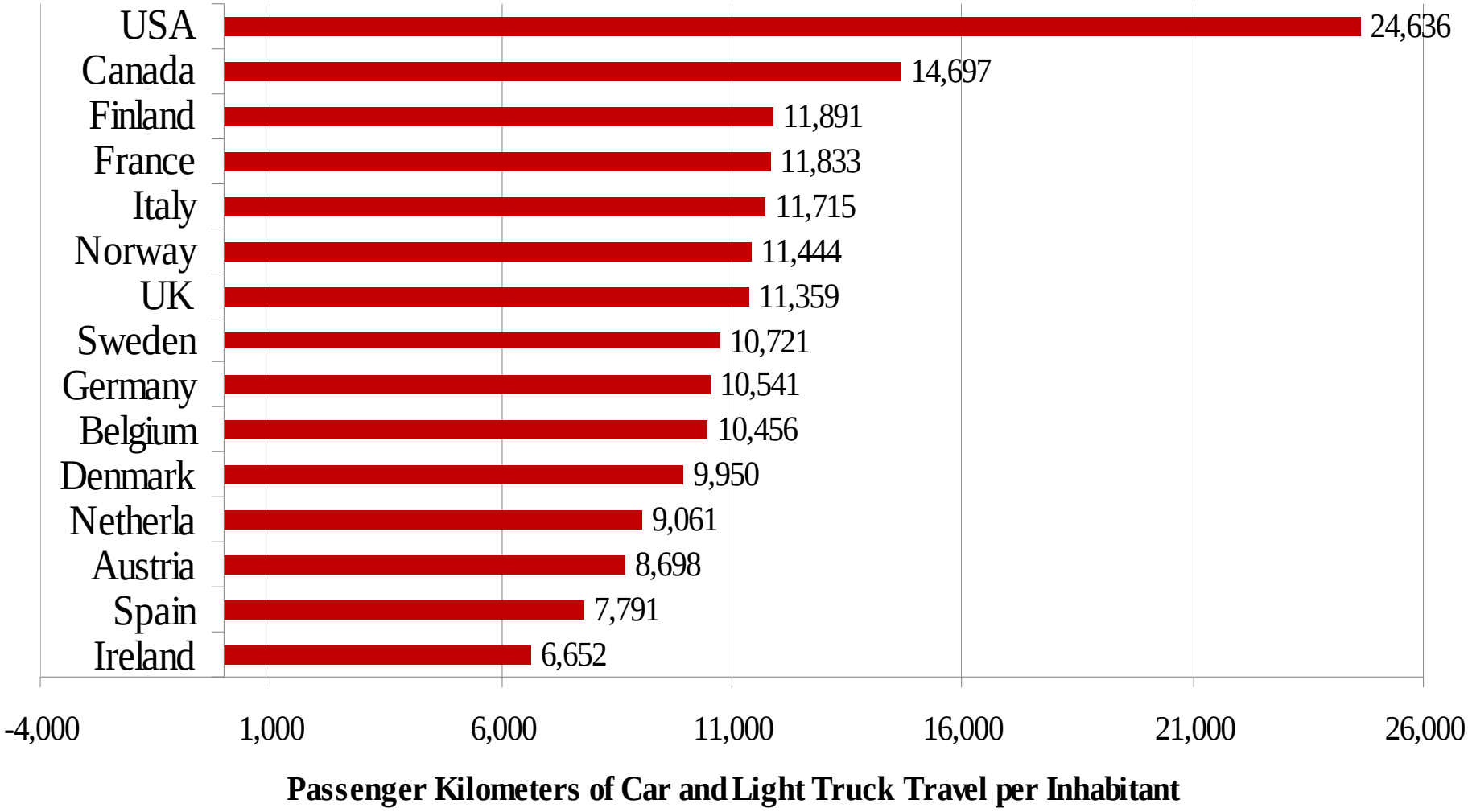
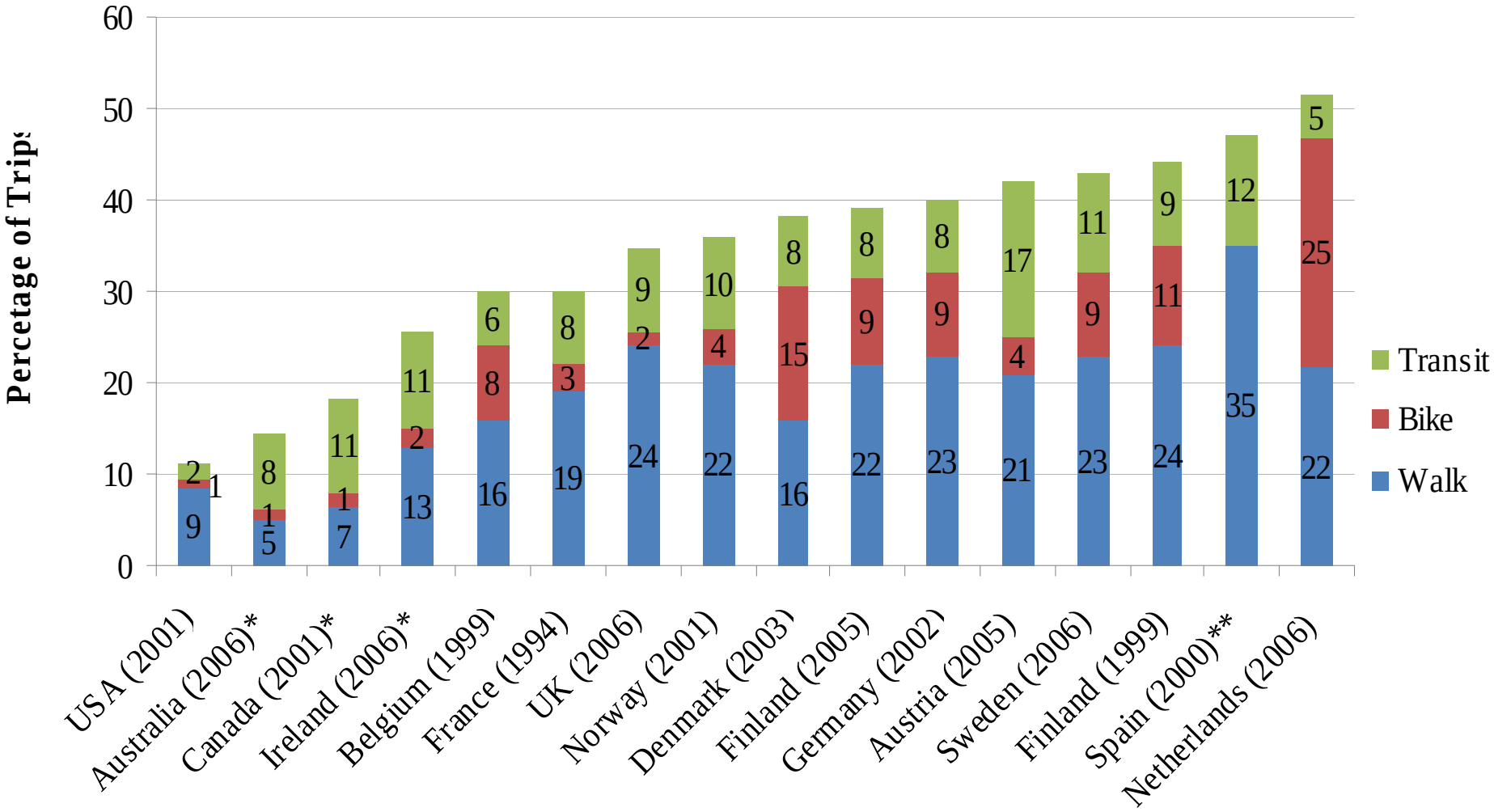

800
700
600
500
400
300
200
100
0
Cars and light trucks per 1000 population
1970
1980
1990
2000
2005
USA
GER
UK
NL
DK
Cars and Light Trucks per 1,000 population in USA and Western Europe

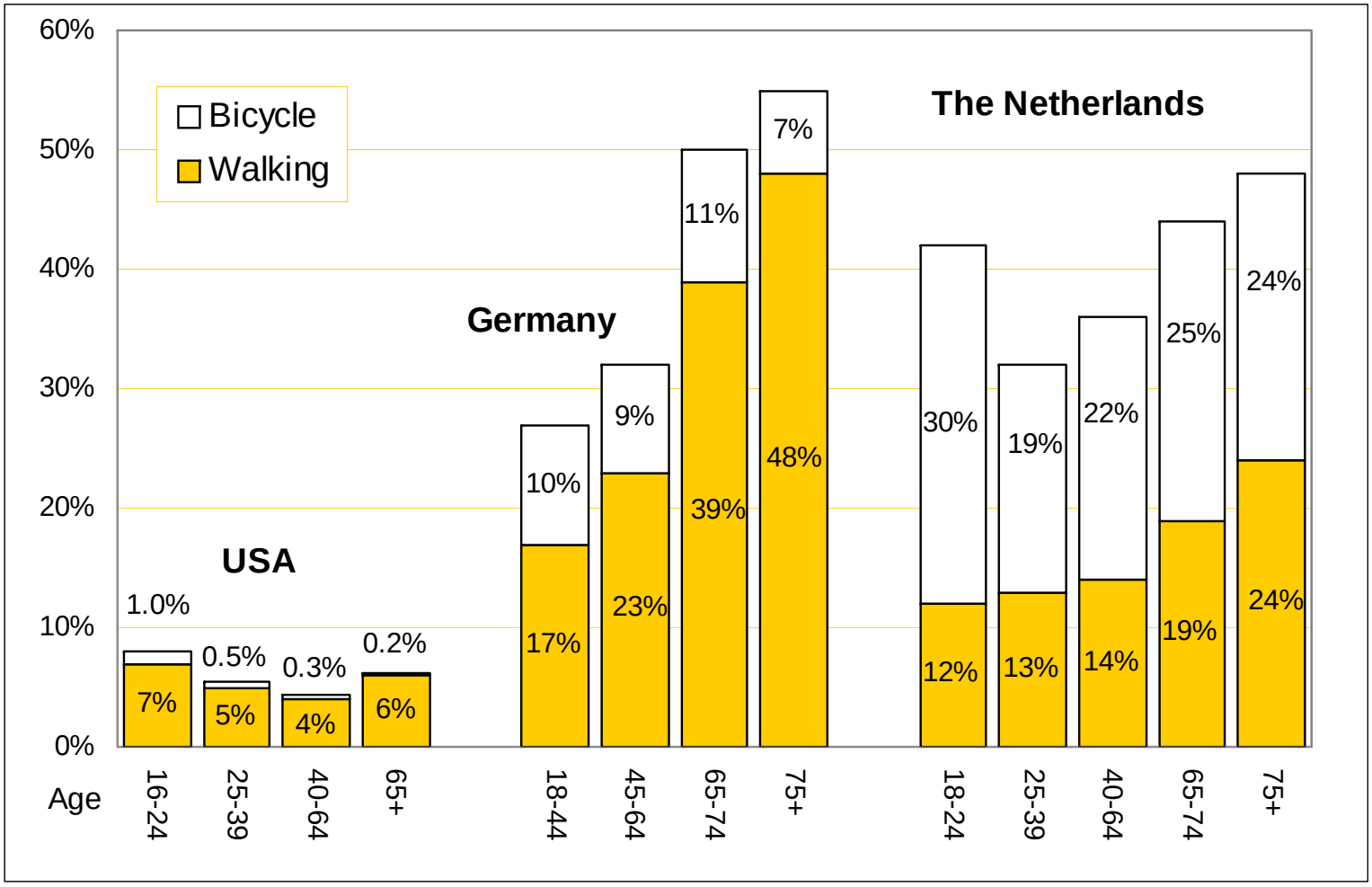
Passenger Kilometers of Car and Light Truck Use per Inhabitant in Western Europe and North America, 2006



Percentage of Trips by Public Transport, Bicycle, and Walking in Selected OECD Countries

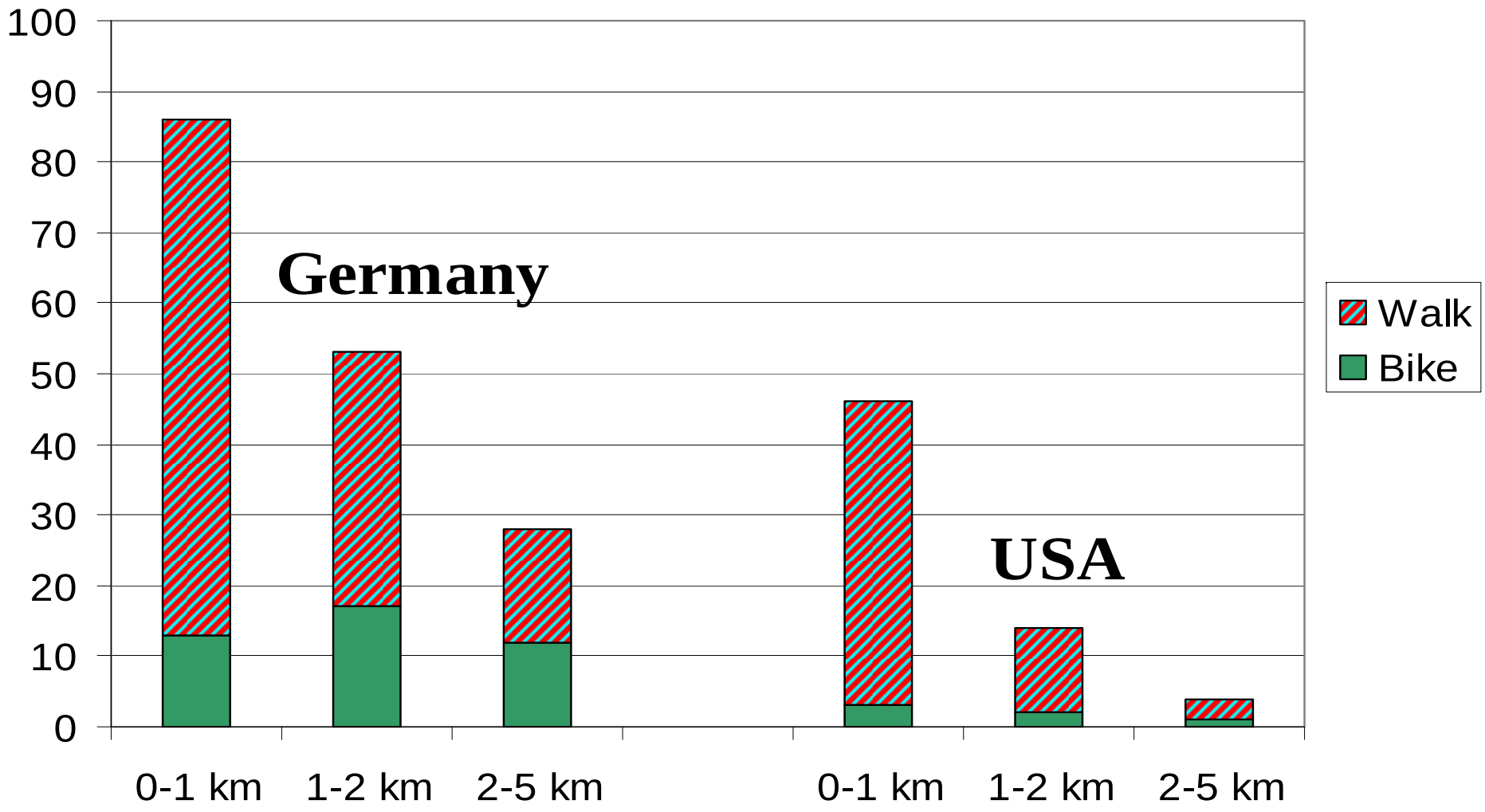


Walking and Bicycling Shares of Urban Travel by Age Group in the USA, Germany and The Netherlands



Source: Pucher and Dijkstra, "Promoting Safe Walking and Cycling to Improve Public Health: Lessons from the Netherlands and Germany," American Journal of Public Health, September 2003, Vol. 93, No. 9, pp. 1509-1516.

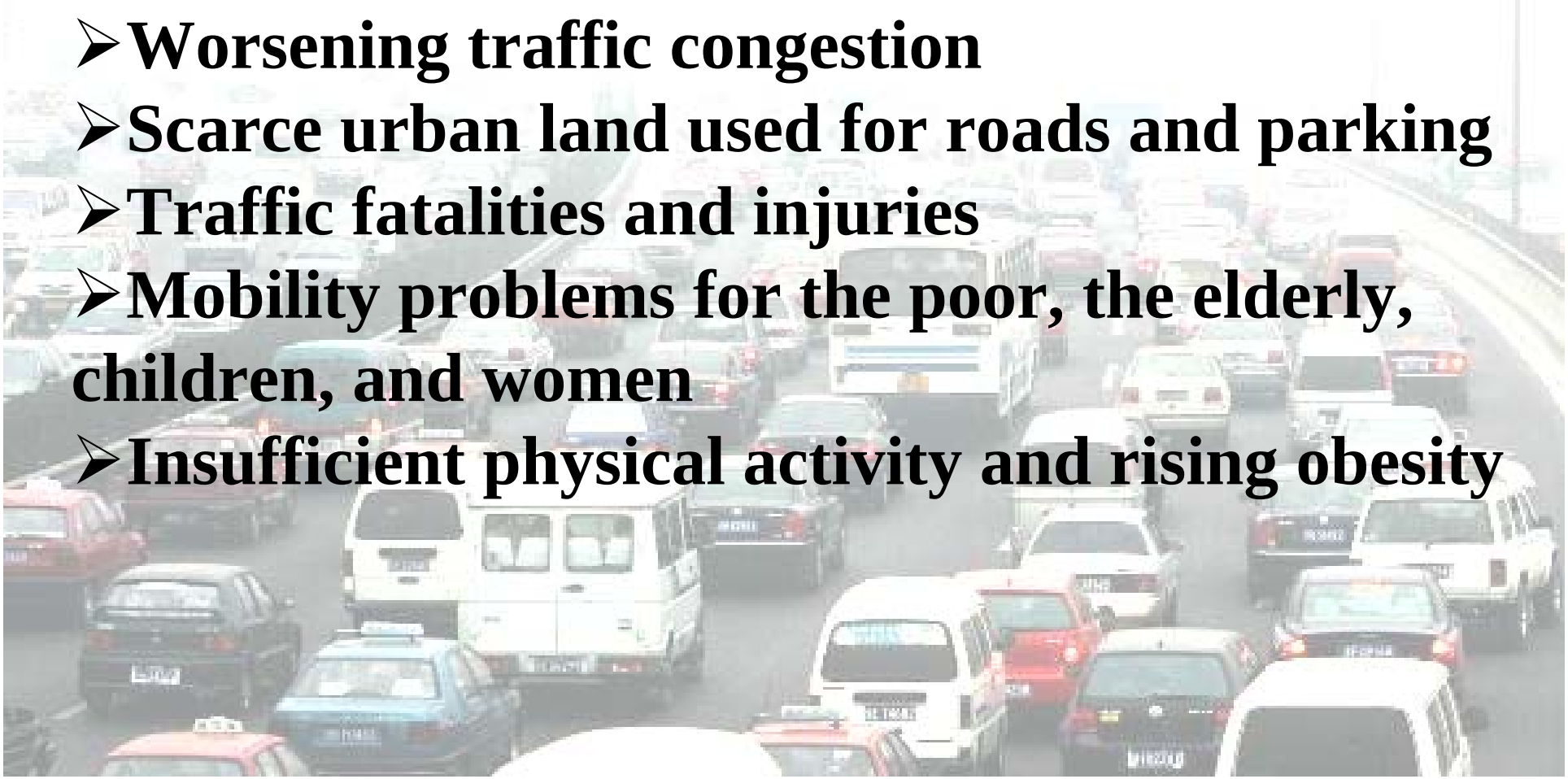
Percentage of Short Trips Made by Walking and Cycling in Germany (2002) and the USA (2001)



Source: Ralph Buehler, "Travel Behavior in Germany and the USA"

Consequences of Car Dependence

- Increasing energy use and Greenhouse Gases
- Noise, air and water pollution
- Worsening traffic congestion
- Scarce urban land used for roads and parking
- Traffic fatalities and injuries
- Mobility problems for the poor, the elderly, children, and women
- Insufficient physical activity and rising obesity



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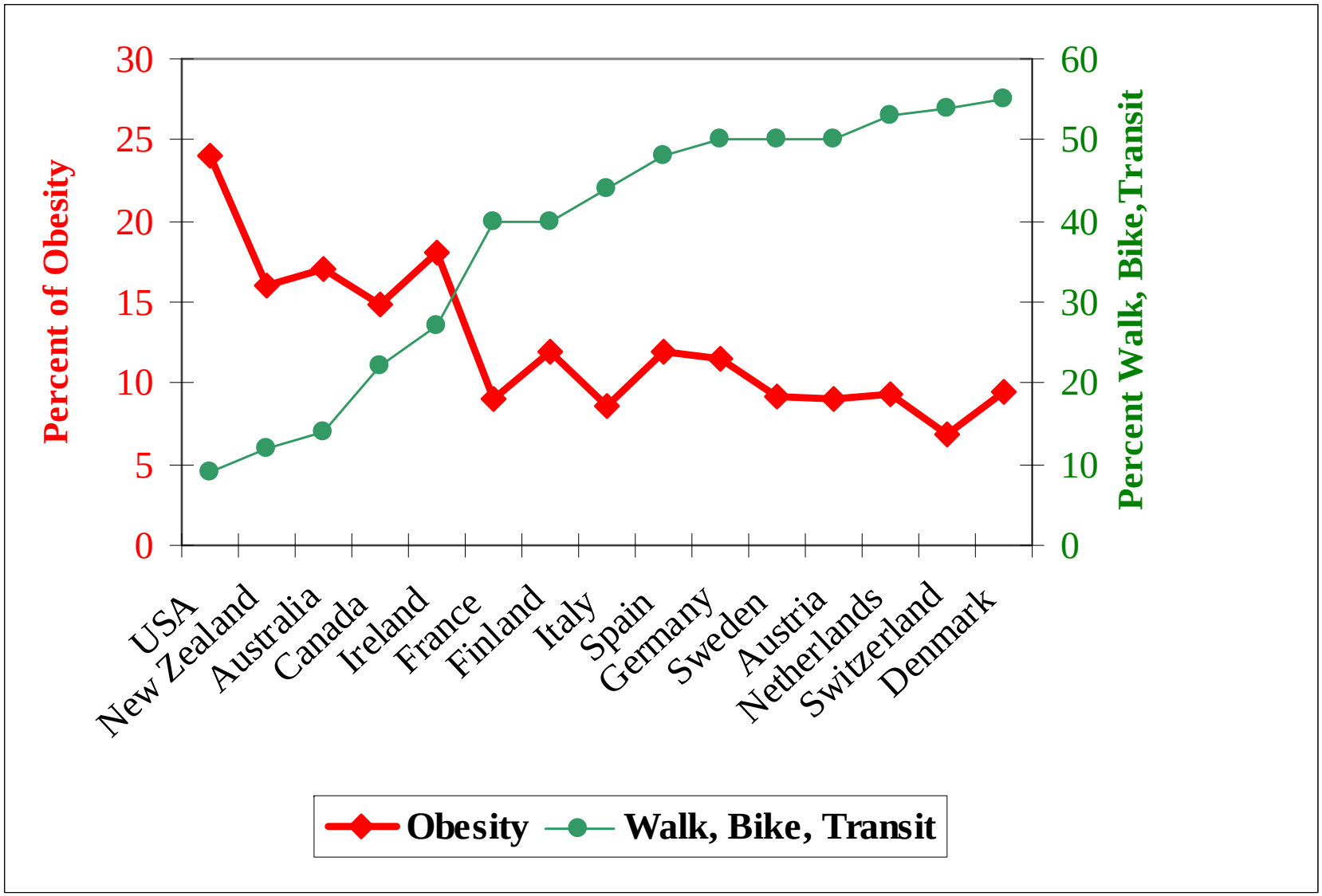
Does auto-dependency make us fat? Obesity falls sharply with increased walking, cycling, and transit use!



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If car-dependence is the problem, then we should improve alternatives to the car:

PUBLIC TRANSPORT
WALKING CYCLING

Walking and Cycling:
the *MOST* sustainable transport modes

- **MOST environmentally friendly:**
  - **>Virtually no pollution at all**
  - **>Almost no nonrenewable resources used**
- **MOST equitable:**
  - **>Financially affordable by virtually everyone**
  - **>Physically possible by all but the severely disabled**
- **MOST economical:**
  - **>Minimal private and public costs**
  - **>Although they take more time, they provide exercise that reduces medical costs and greatly extends our healthy life expectancy**

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Photo: Susan Handy

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Public Policies *Crucial* to Transit, Walking, and Cycling

- **Pro-car policies in European cities in 1950s and 1960s caused huge decline in walking and cycling**
- **Dramatic policy turn-around since 1970s to limit car use and promote cycling, walking, and public transport in Dutch, Danish, and German cities**

Bridge in Freiburg BEFORE and AFTER reforms

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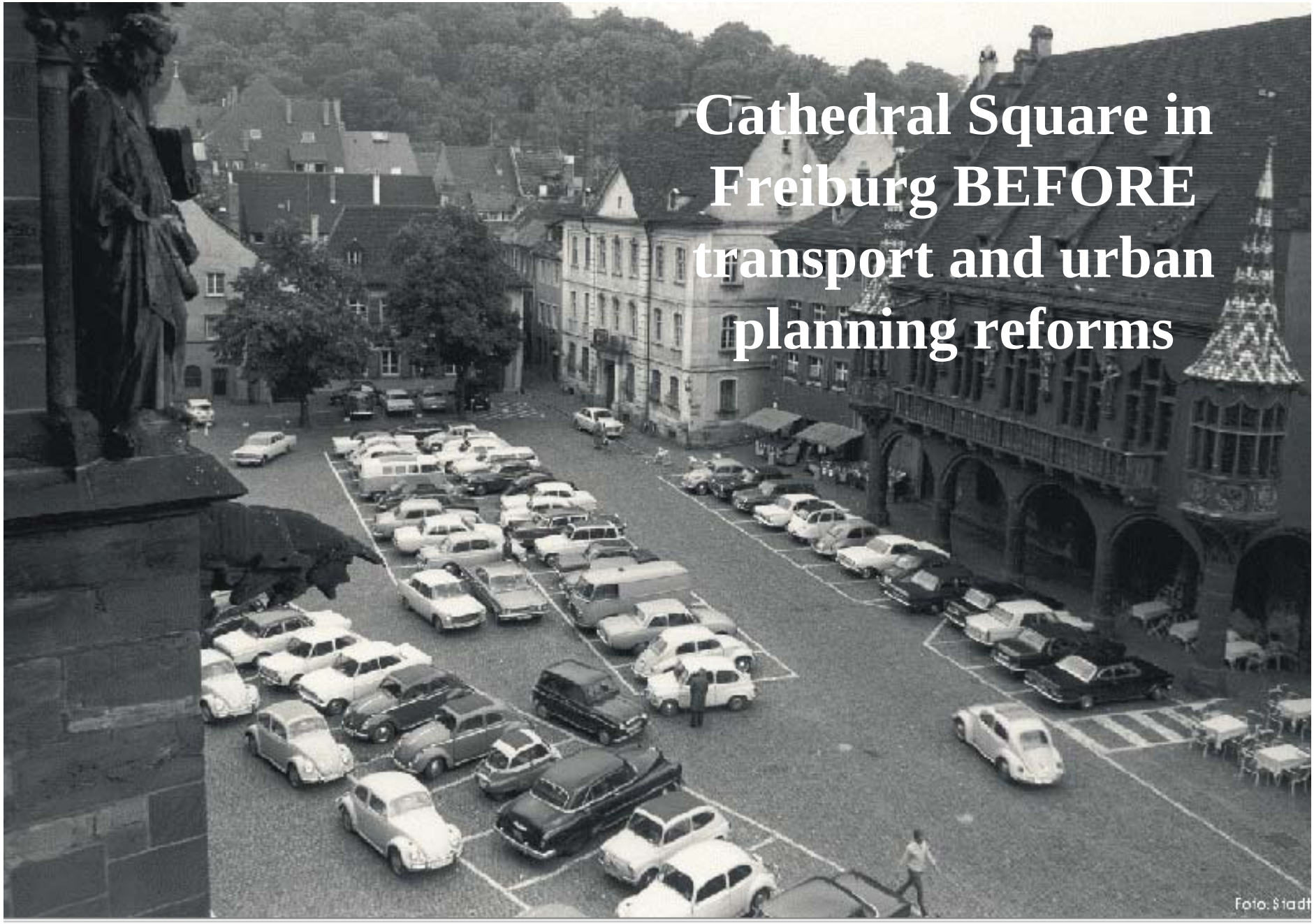
Typical residential street in Freiburg BEFORE and AFTER traffic calming reforms

heute



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German Cycling Boom Engineered by Explicit Shifts in Transport Policy in 1970s

City	Time Period	Change in Bicycle Modal Split Share	Percentage Increase in Bicycle Share
Munich	1976 to 1996	6% to 13%	+117%
Nuremberg	1976 to 2001	4% to 9%	+125%
Cologne	1976 to 1998	6% to 12%	+100%
Freiburg	1976 to 1998	12% to 19%	+58%
Stuttgart	1976 to 2000	2% to 6%	+200%
Bremen	1976 to 1997	16% to 21%	+31%
Muenster	1976 to 2001	29% to 35%	+21%
Average for all urban areas in Western Germany	1972 to 2002	8% to 10%	+25%

Sources: Broeg and Erl, *Mobilitaet und Verkehrsmittelwahl.* Muenchen: Socialdata, 2003; Deutsches Institut fuer Wirtschaftswissenschaften, *Mobilitaet in Deutschland, 2002*. Berlin: Bundesministerium fuer Verkehr, 2004.

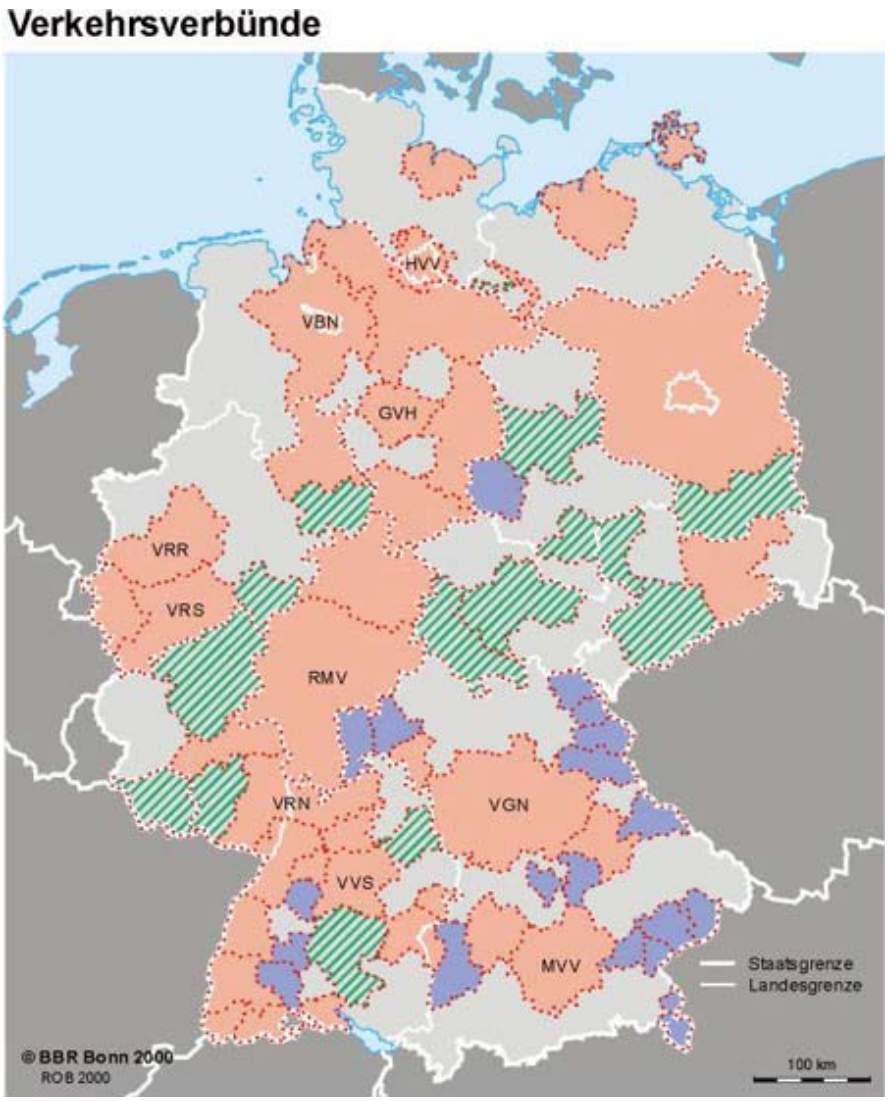
Overview of Coordinated Policies that Encourage Transit Use, Walking, and Cycling in Europe

- **Expansion and modernization of public transport systems**
- **Continual improvement of pedestrian and cyclist facilities**
- **Full integration of walk, bike, transit modes**
- **Sharp restrictions on car use in central cities**
- **High cost of car ownership and use**
- **Land-use policies that discourage suburban sprawl**

Expansion and Upgrading of Public Transport Systems

- More metro and light rail service
- Upgrading of bus services, including some BRT
- Modernization of transit vehicles and stations
- Reserved bus/tram lanes and signal priority
- Coordination of all transit services through a unified regional transit agency (Verkehrsverbund)
- Attractive monthly and annual passes
- Expanded bike-and-ride and park-and-ride facilities

Complete Coordination and Integration of Public Transport in Germany



- **Verkehrsverbünde** (regional transit authorities)
- Allocate operating assistance over operators (public and private)
- **Fully integrate** all transit services, all modes, all fares, schedules, routes in entire region

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Quick and easy transfer between suburban rail, long-distance rail, and light rail transit modes in Germany

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Bike and Ride

Radstation: Bike parking facility in Muenster, Germany (3,500 bikes) immediately adjacent to main train station and bus terminal

Real Time Information at Light Rail Stops in Freiburg

Continual Improvement of Pedestrian and Bicyclist Facilities

- **Traffic-calmed residential neighborhoods**
- **Massive increase in bikeways, bike lanes, intersection modifications for cyclists, priority signals**
- **Extensive car-free zones, speed reductions, and other restrictions on thru motor vehicle traffic**
- **Improvements in crosswalks, lighting, sidewalks, signals**
- **Vast increase in bike parking, including parking garages, especially at transit stations**
- **Extensive cycling education and training in all primary schools**
- **Full integration of walk/bike facilities with bus and rail transit stops and bike transport on transit vehicles**

Most European cities have extensive car-free districts ideal for walking and cycling

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Lively, safe, pleasant car-free zone in central Copenhagen

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Typical intersection in Copenhagen, with separate crossings for pedestrians and cyclists

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Bike-walk Promenade in Muenster, Germany

Note exclusive cycle path in middle and completely separate pedestrian walkways on both sides

This 6 km beltway encircles central city and connects 16 major bike paths radiating outward toward the suburbs and 26 bike paths and lanes leading to Cathedral Square.

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GIVE EMPLOYEES FREE BIKES INSTEAD OF FREE PARKING!

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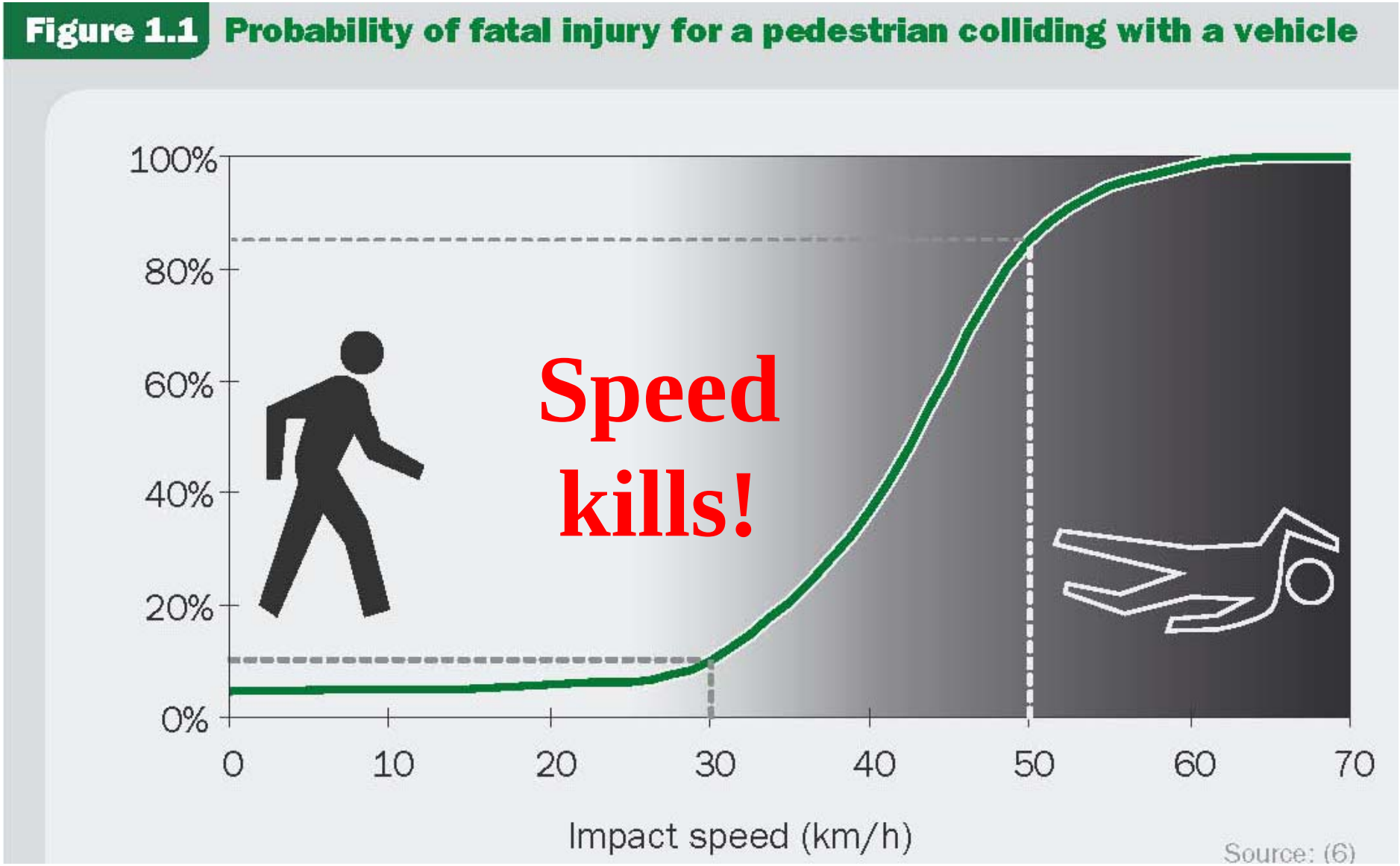
Sharp Restrictions and High Taxes on Auto Use, Ownership, Licensing

- High taxes on petrol and new car purchases
- Expensive and limited car parking
- High cost and difficulty of obtaining driver's license
- Slowdowns in roadway expansion and exclusion of limited-access motorways from city centers
- Tempo 30km/hr (or 7km/hr) in residential neighborhoods
- Turn restrictions, artificial dead-ends, thru traffic restrictions for cars and trucks
- Strict enforcement of traffic regulations favoring pedestrians and cyclists, with motorists usually assumed guilty of any crash, especially with elderly or children

Why Traffic Calming Saves Lives



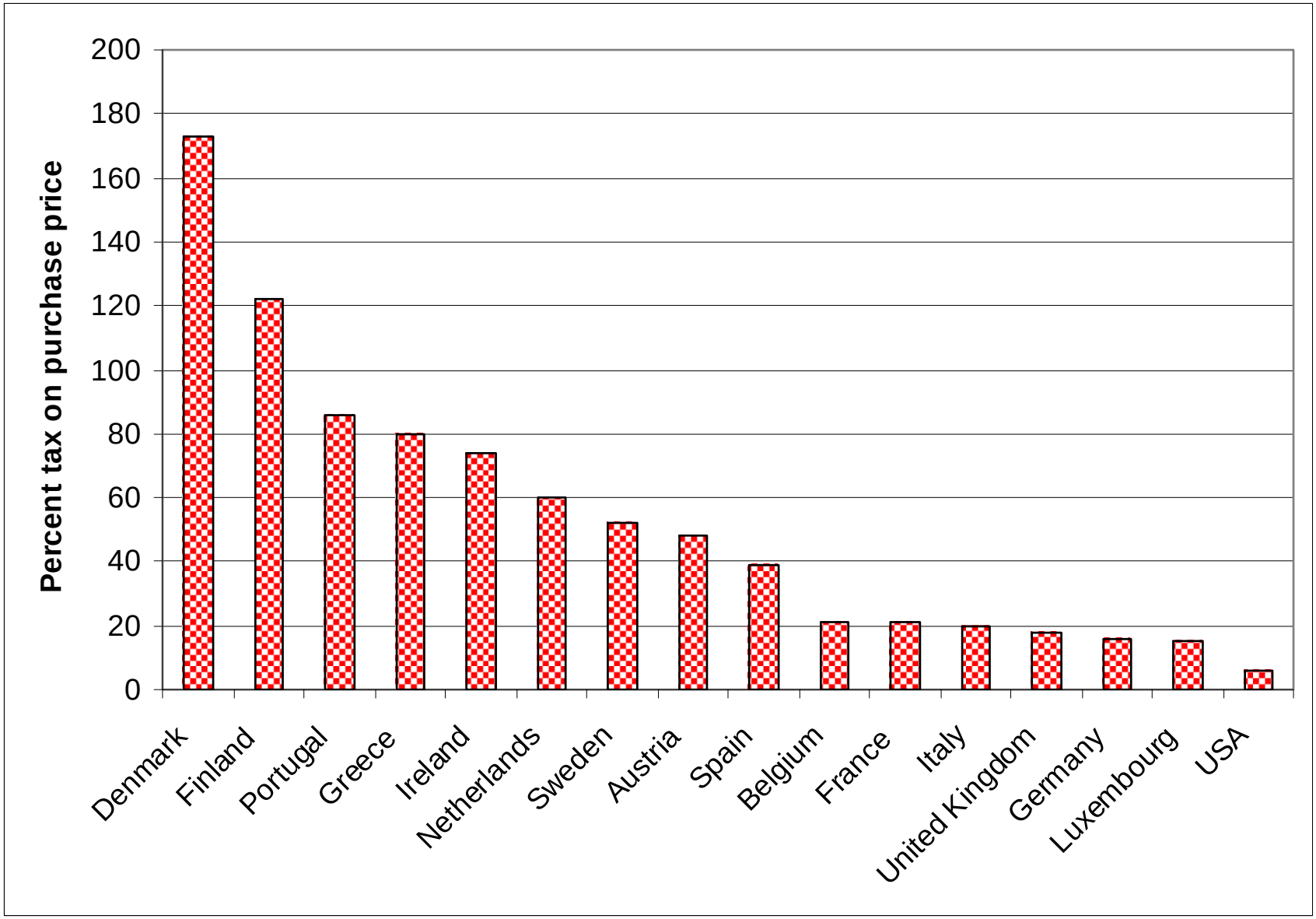
Source: World Health Organization (2008) and OECD Transport Research Centre (2006)

Many residential neighborhoods in German, Dutch, and Danish cities are traffic calmed

Reduced car speeds increase traffic safety and encourage walking and cycling

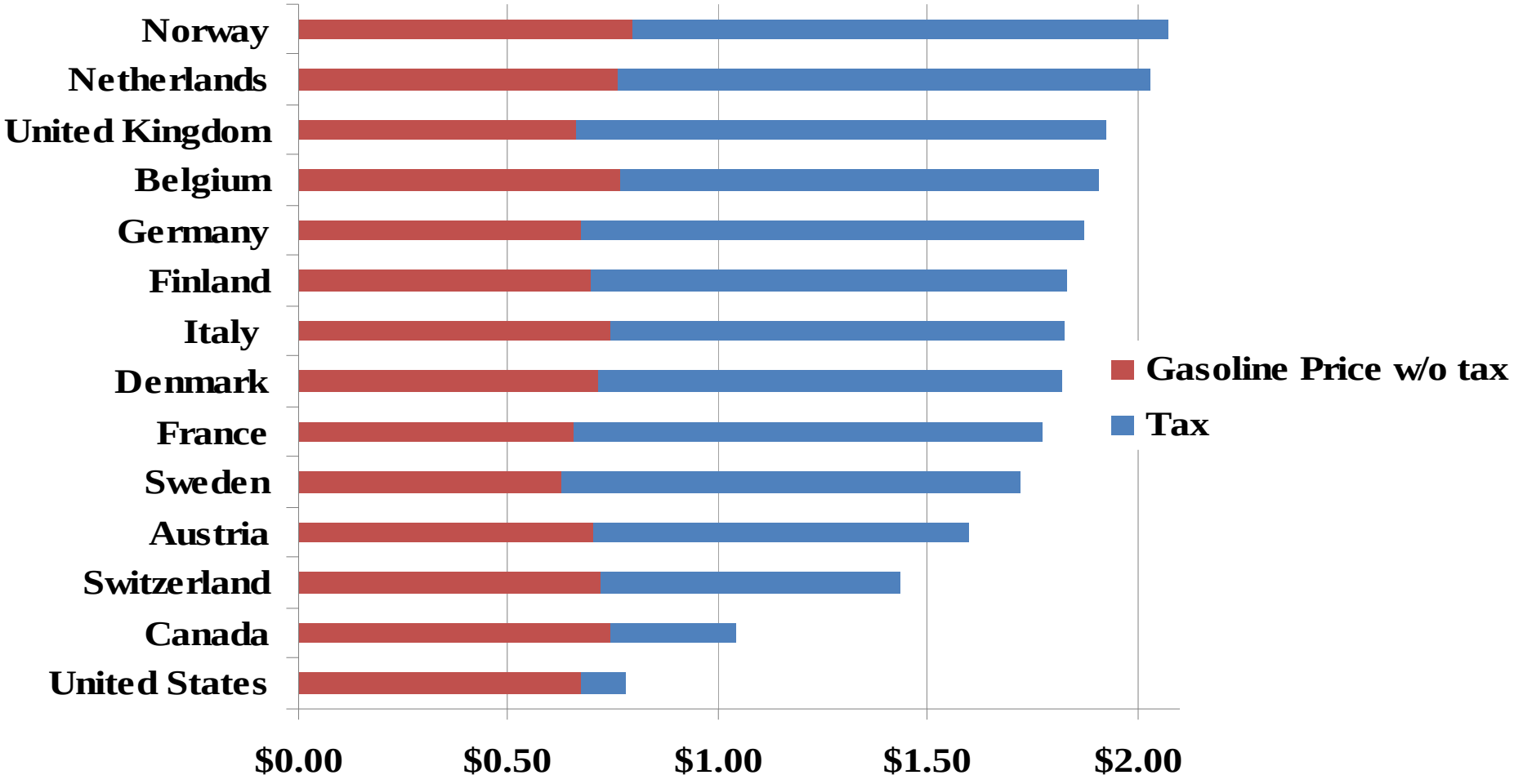
Taxes on New Car Purchases in Europe and the USA

(percent tax on purchase price in 2005, average car)



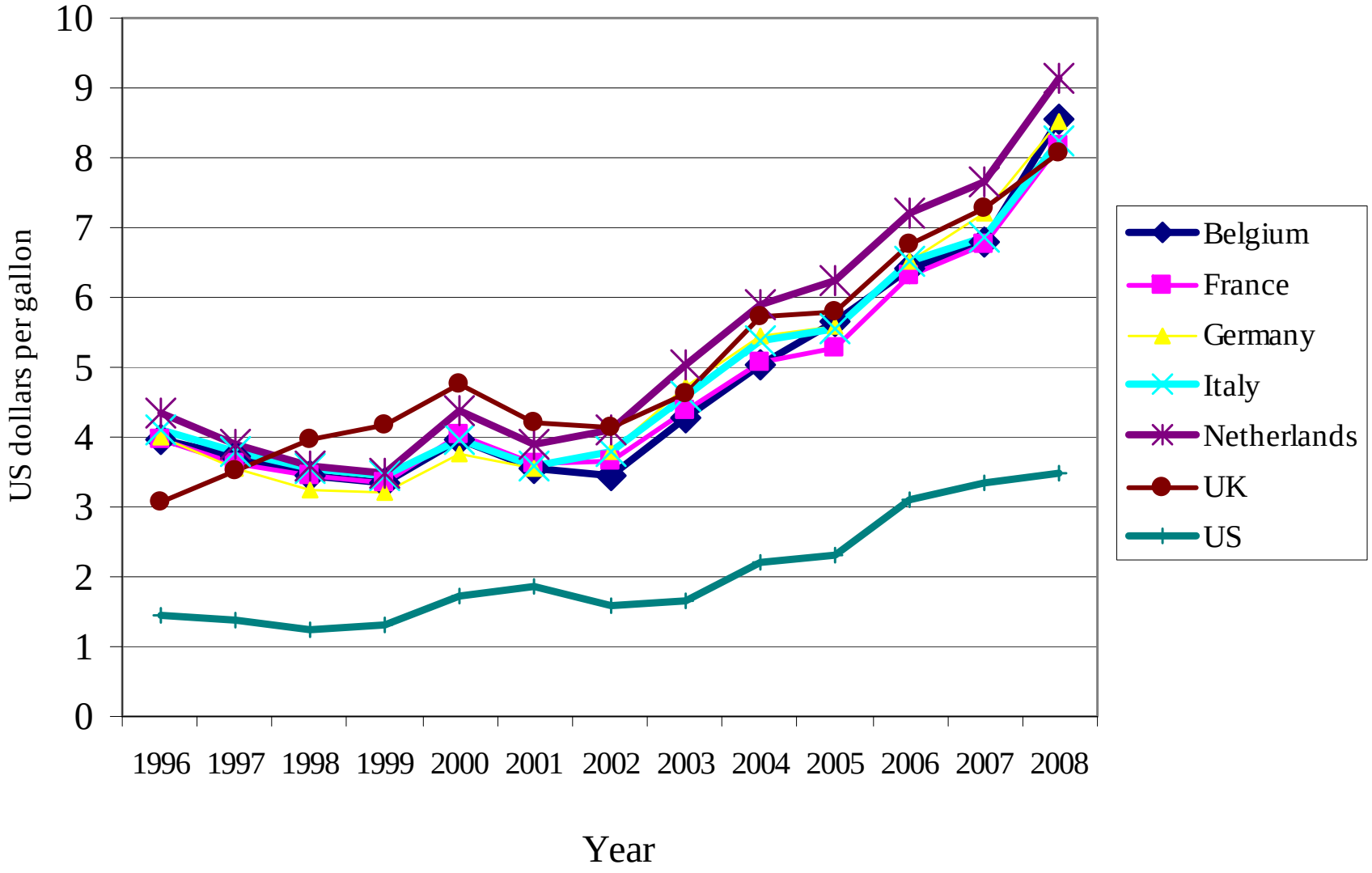
Source: European Commission, Energy and Transport in Figures, 2006

Premium Unleaded Gasoline Prices and Share of Taxes in Selected OECD Countries in 2007 (U.S. $ per Liter)



Source: OECD: Energy Prices and Taxes 4th Quarter 2007.

Trends in Gasoline Prices in 7 OECD Countries (in US dollars), 1996-2008



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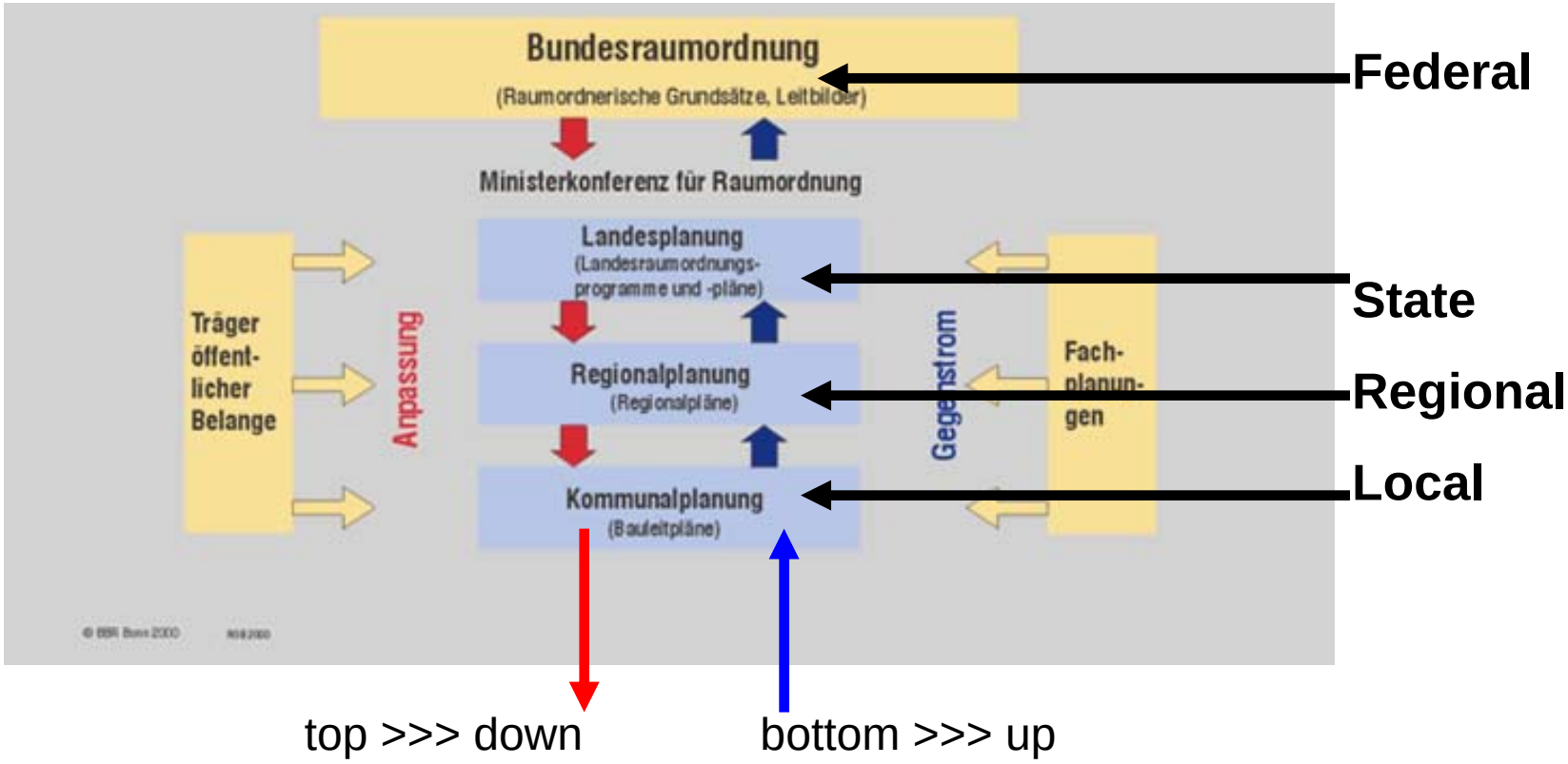
Land-Use Policies that Discourage Suburban Sprawl

- ***Strict land use zoning*** **to preserve open space, agricultural areas, forests in immediate proximity to cities**
- **Explicit federal, state, regional, and local land use plans that ensure *mixed-use, compact development* and coordination of land use with transportation**
- ***Tax preferences*** **for land used for agriculture, open space, nature preserves, in addition to strict prohibitions on commercial and residential use of such land**
- ***Higher price*** **of legally developable land forces higher development densities in metropolitan areas**

Land Use Planning in Germany

- **Top-down, bottom-up coordination of land use planning among all four levels of government in Germany**

- **Coordination of land use, transportation, and environment at each level**



Source: German Federal Office of Construction and Land Use Planning, 2000

Keys to Success in Europe:

1) ***Improving all forms of public transport*, fully integrating and coordinating them with each other, and offering attractive fares**

2) ***Improving cycling and walking conditions* and integrating them with public transport services, so that these three modes together can provide a feasible alternative to the car**

3) ***Making car use as resistible as possible* by imposing high taxes, fees, and other user charges, restricting car use, limiting parking, and making it both difficult and expensive to get a license**

4) ***Strict land-use policies* to keep metropolitan areas compact and trip distances short so that public transport, walking, and cycling remain feasible ways to get around**

For any questions or further information, please contact:

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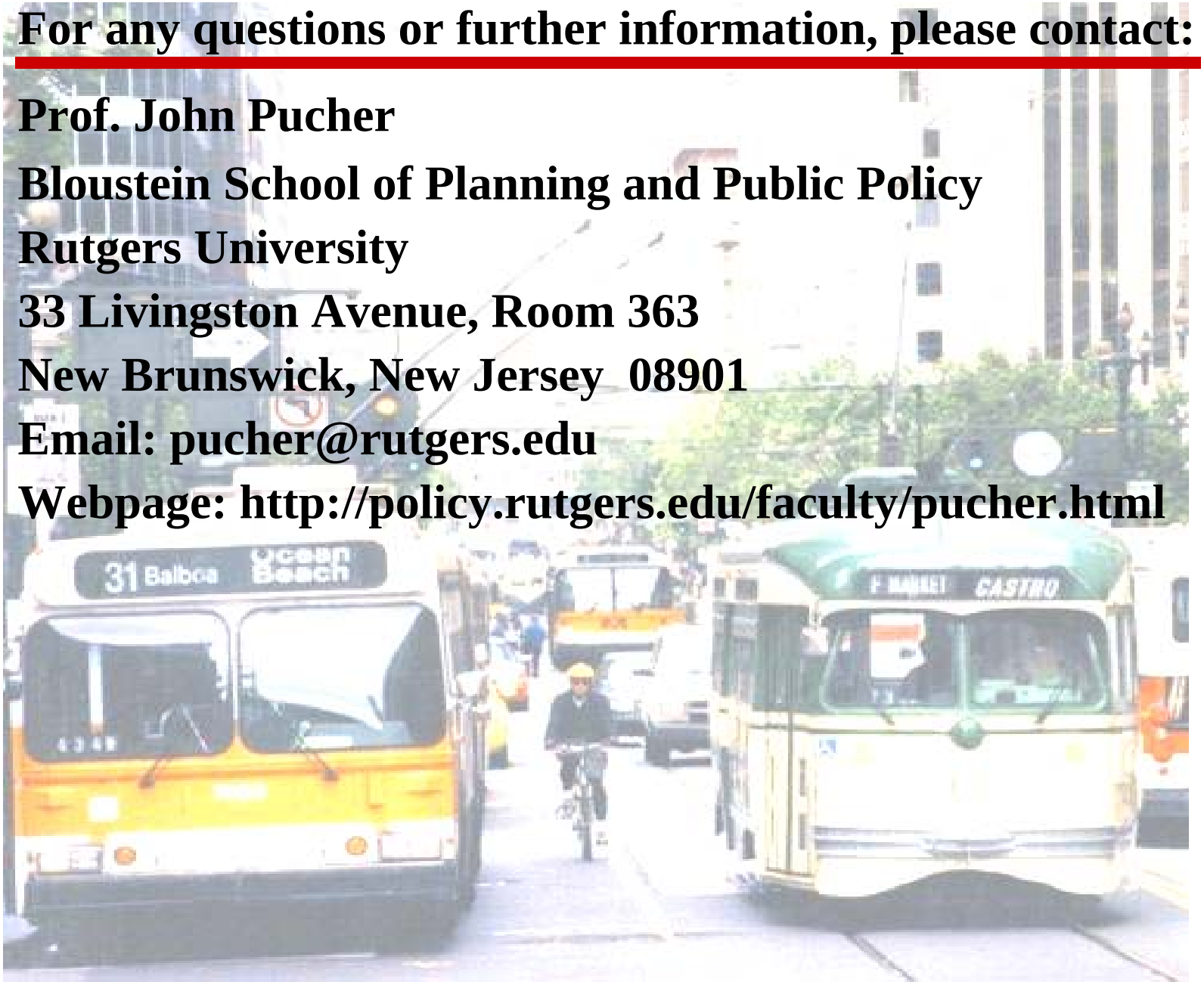


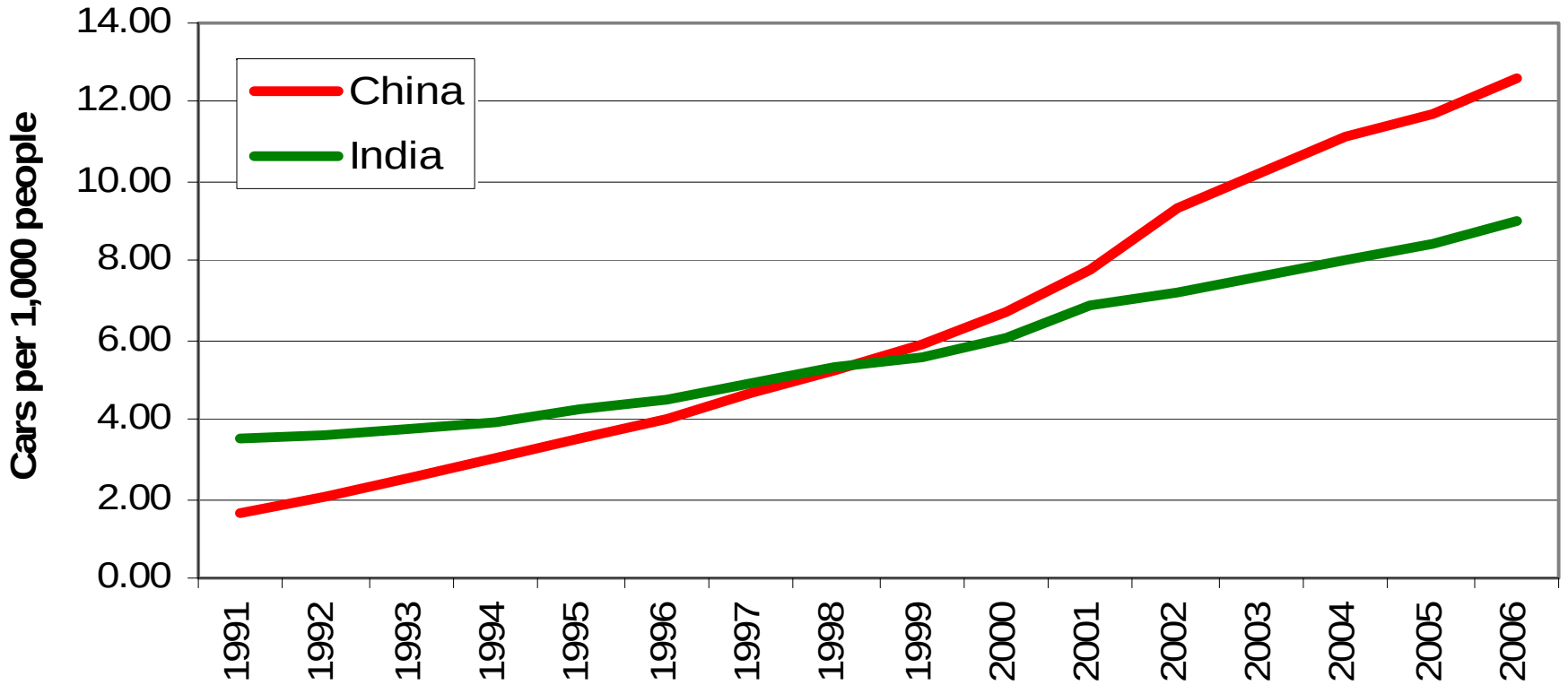
Suggested readings and additional slides on travel trends and problems in Asia, Europe, and North America

For details, please consult these overview articles:

- **Pucher et al, "Urban Transport Trends and Policies in China and India", *Transport Reviews*, July 2007.**
- **Pucher and Buehler, "Making Cycling Irresistible: Lessons from the Netherlands, Denmark, and Germany", *Transport Reviews*, July 2008.**
- **Pucher, "Urban Transport in Germany: How to Provide Feasible Alternatives to Auto Use," *Transport Reviews*, July 1998.**

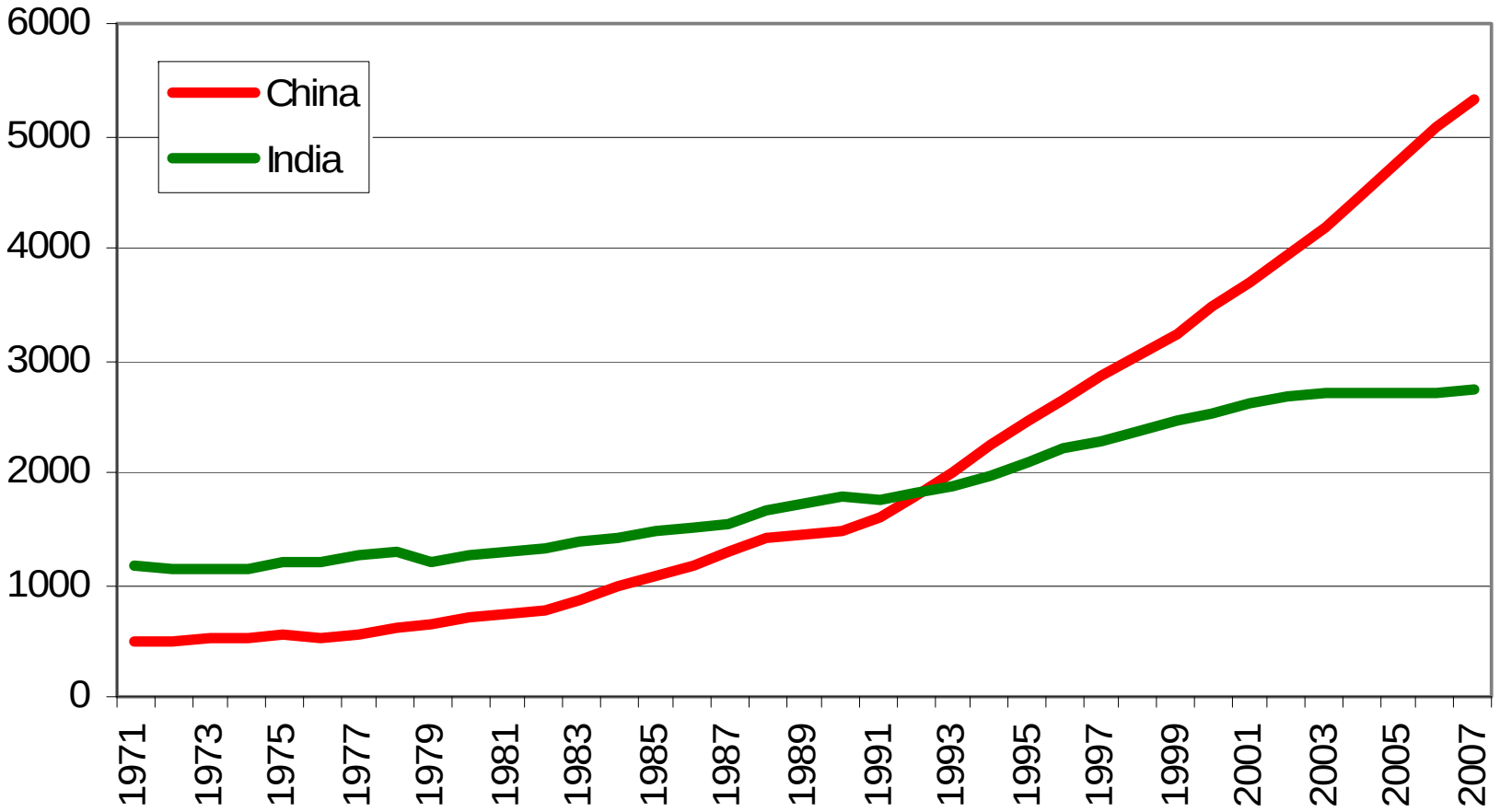
Additional slides follow

Passenger Cars per 1,000 People in China and India, (1991-2006)



Source: National Bureau of Statistics of China, Year Book of China 2008; Indian Ministry of Road Transport and Highways (2008)

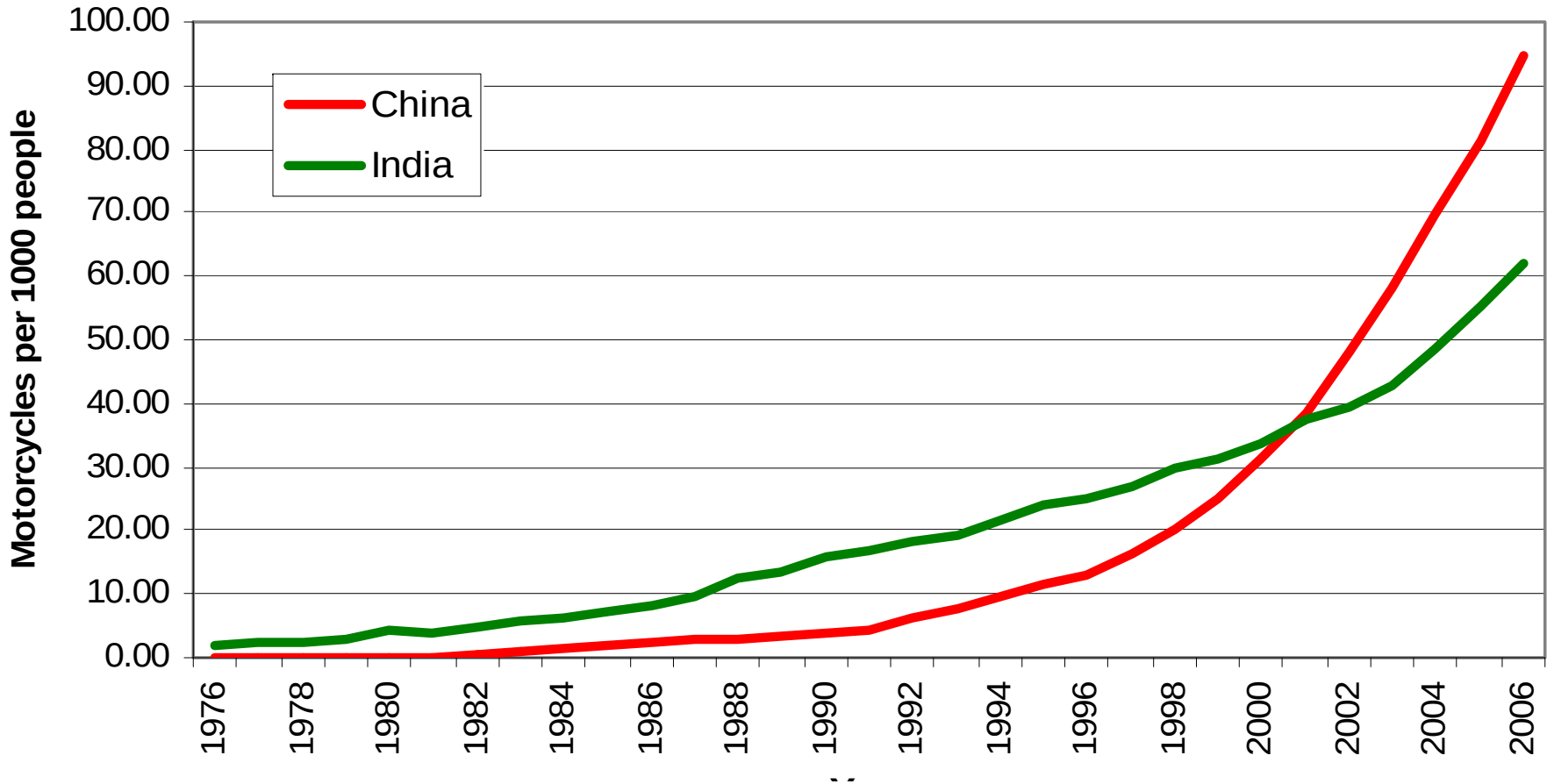
Per Capita Income Trends in China and India (1972 – 2007)



Source: Organization for Economic Cooperation and Development (OECD)

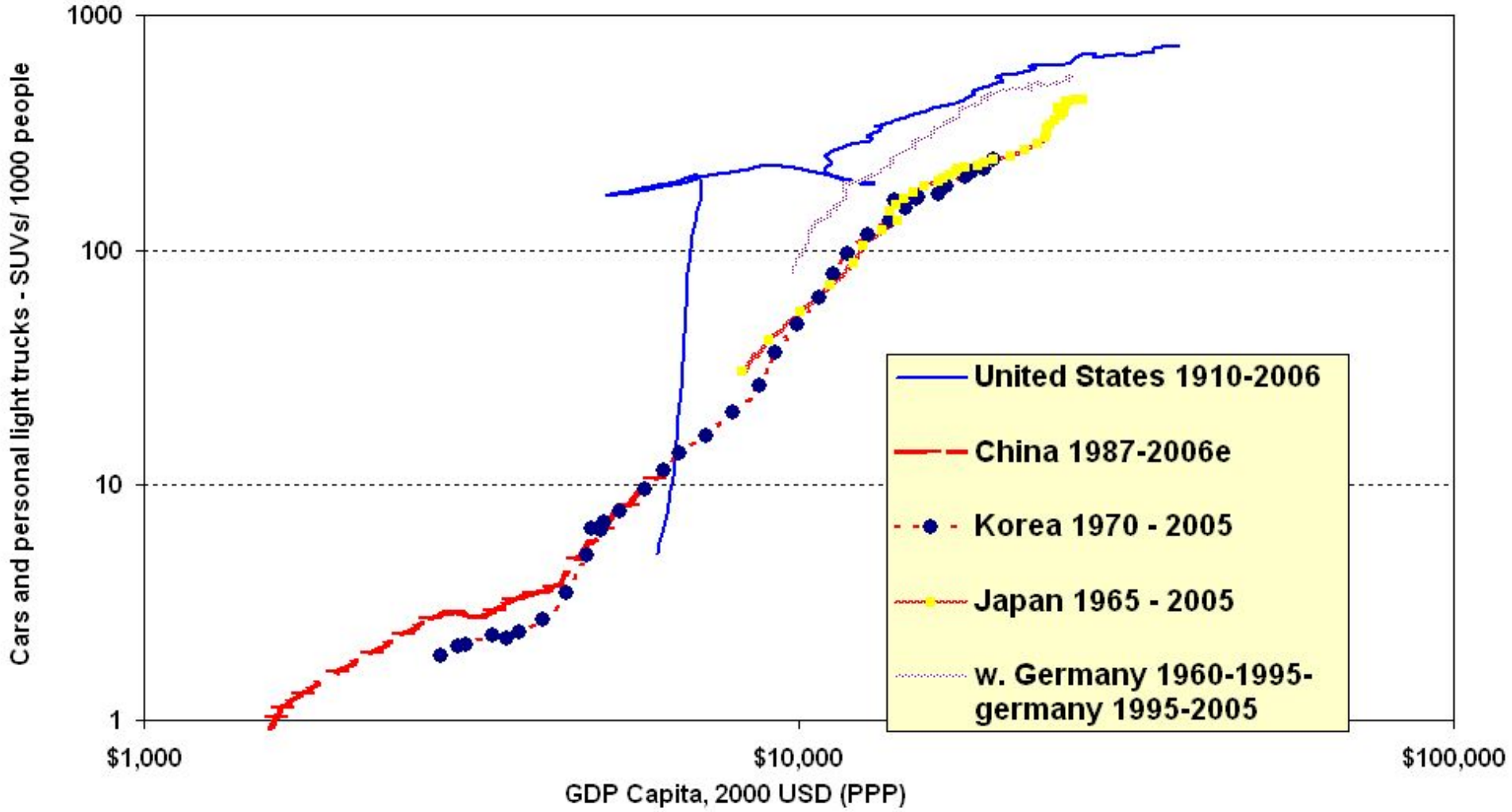
Note: Per Capita Incomes for both China and India are expressed here in constant, inflation-adjusted 1996 US dollars, using purchasing power parity for currency conversion

Motorcycles per 1,000 People in China & India (1976 – 2006)



Source: National Bureau of Statistics of China, Year Book of China 2008; Indian Ministry of Road Transport and Highways (2008)

Car Ownership and Economic Growth: Is China just following the trend?



Source: Lee Schipper and Embarq, World Resources Institute (2008)

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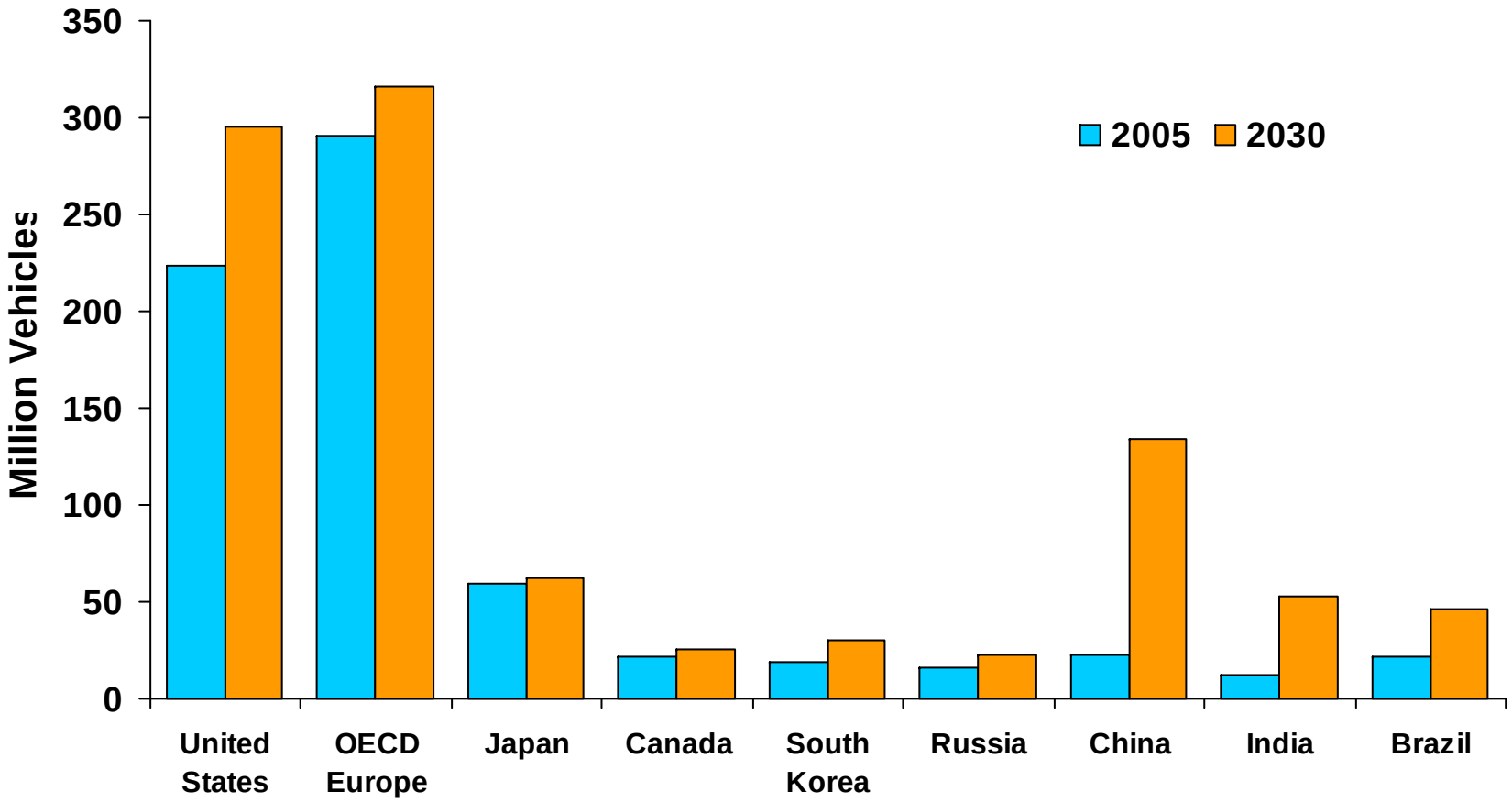
Motor Vehicle Ownership by Selected Region



Source: EIA, IEO2008

Roadway congestion and air pollution are increasingly serious problems in large Chinese cities (Beijing shown here)

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Peak hour traffic congestion in Delhi

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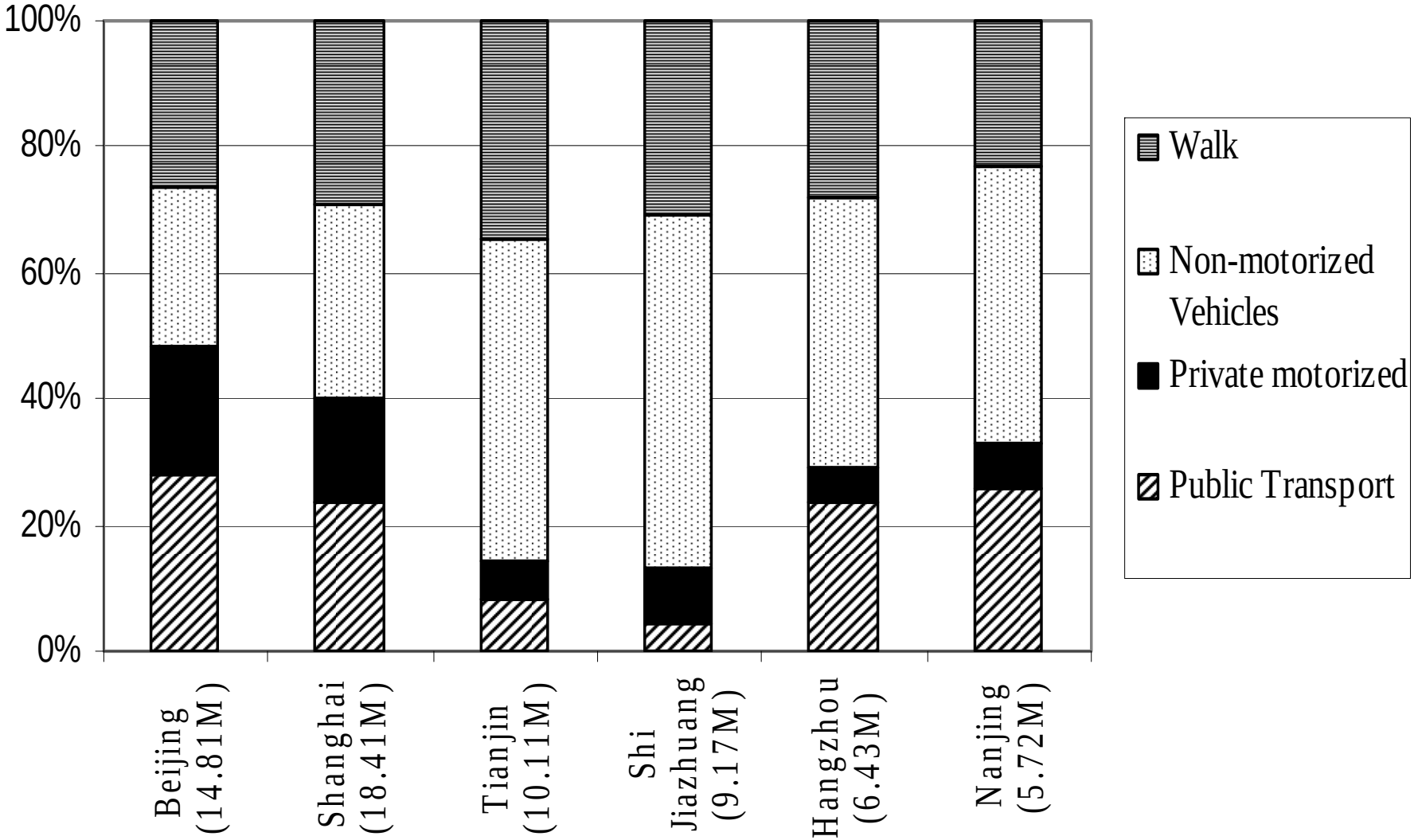
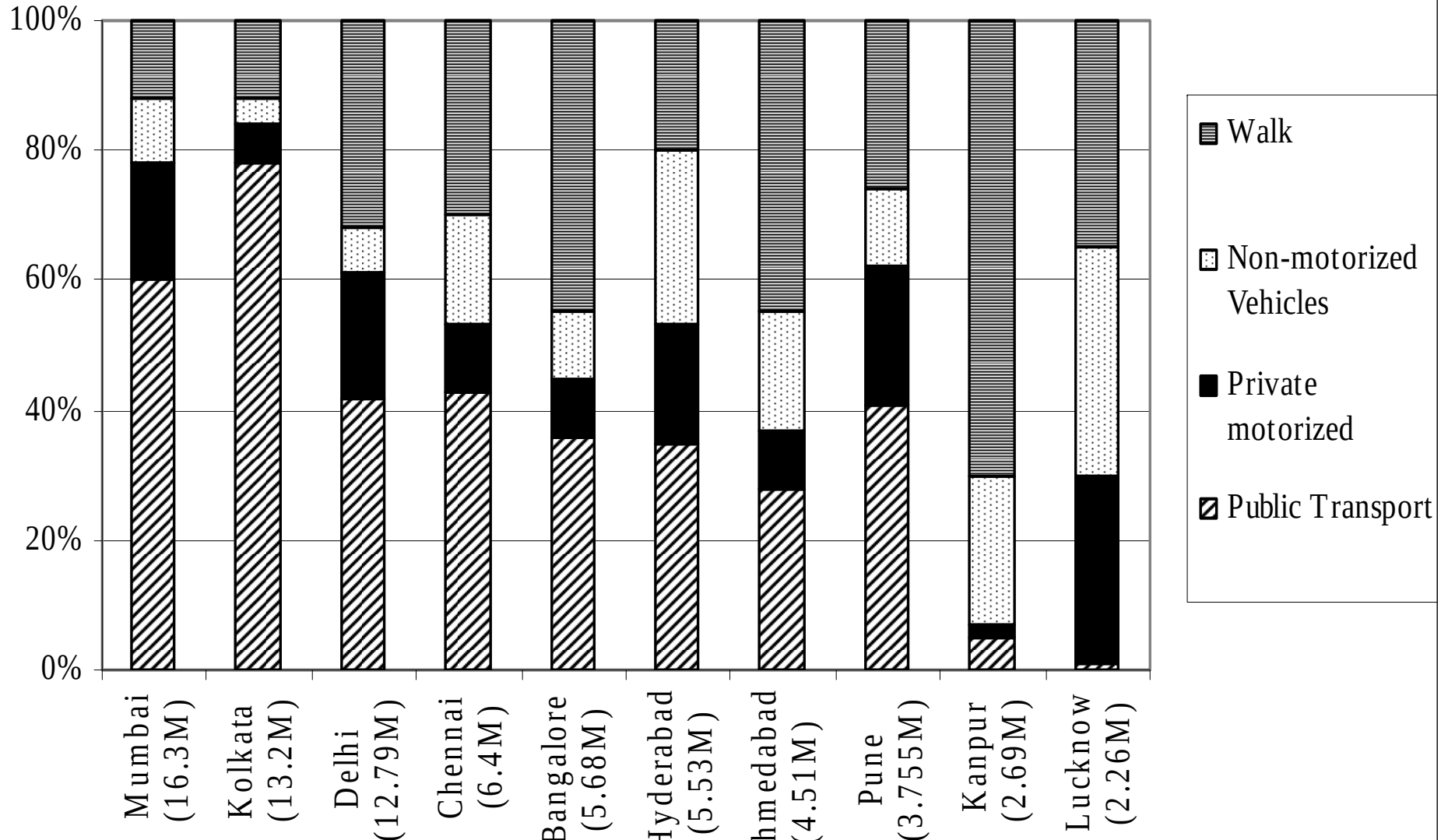
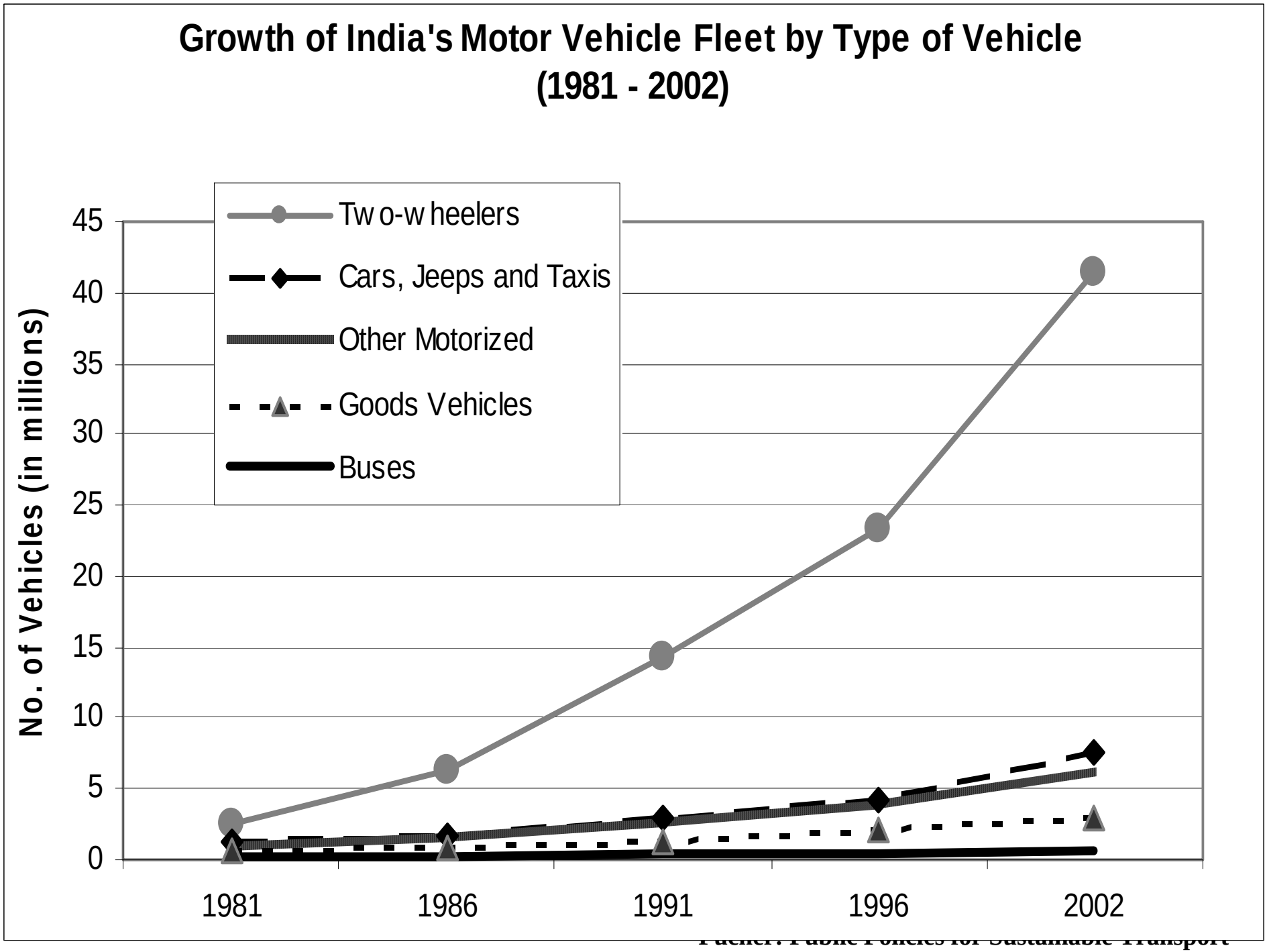
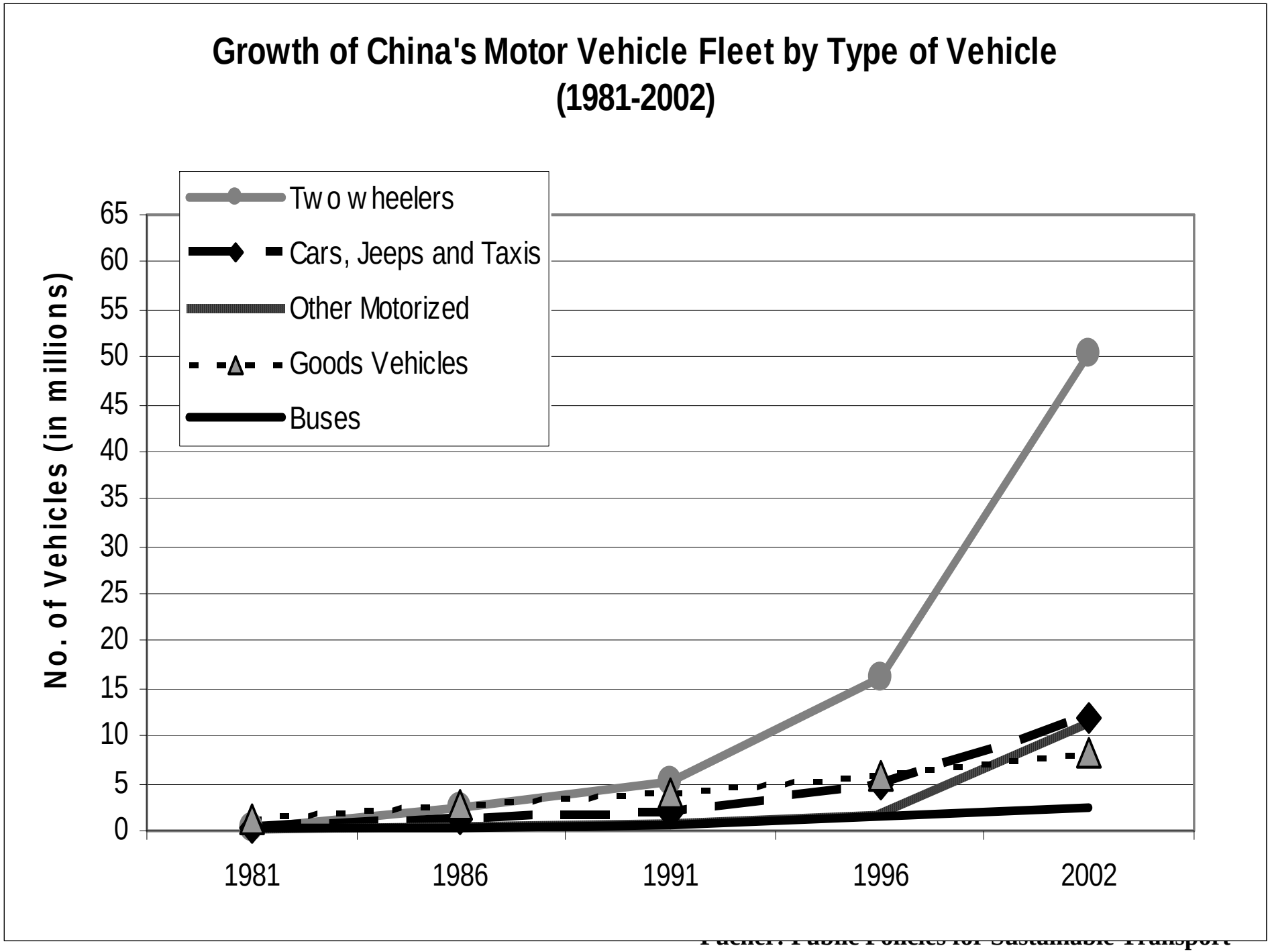
Percent Distribution of Urban Trips by Means of Travel for Selected Chinese Cities, 2000

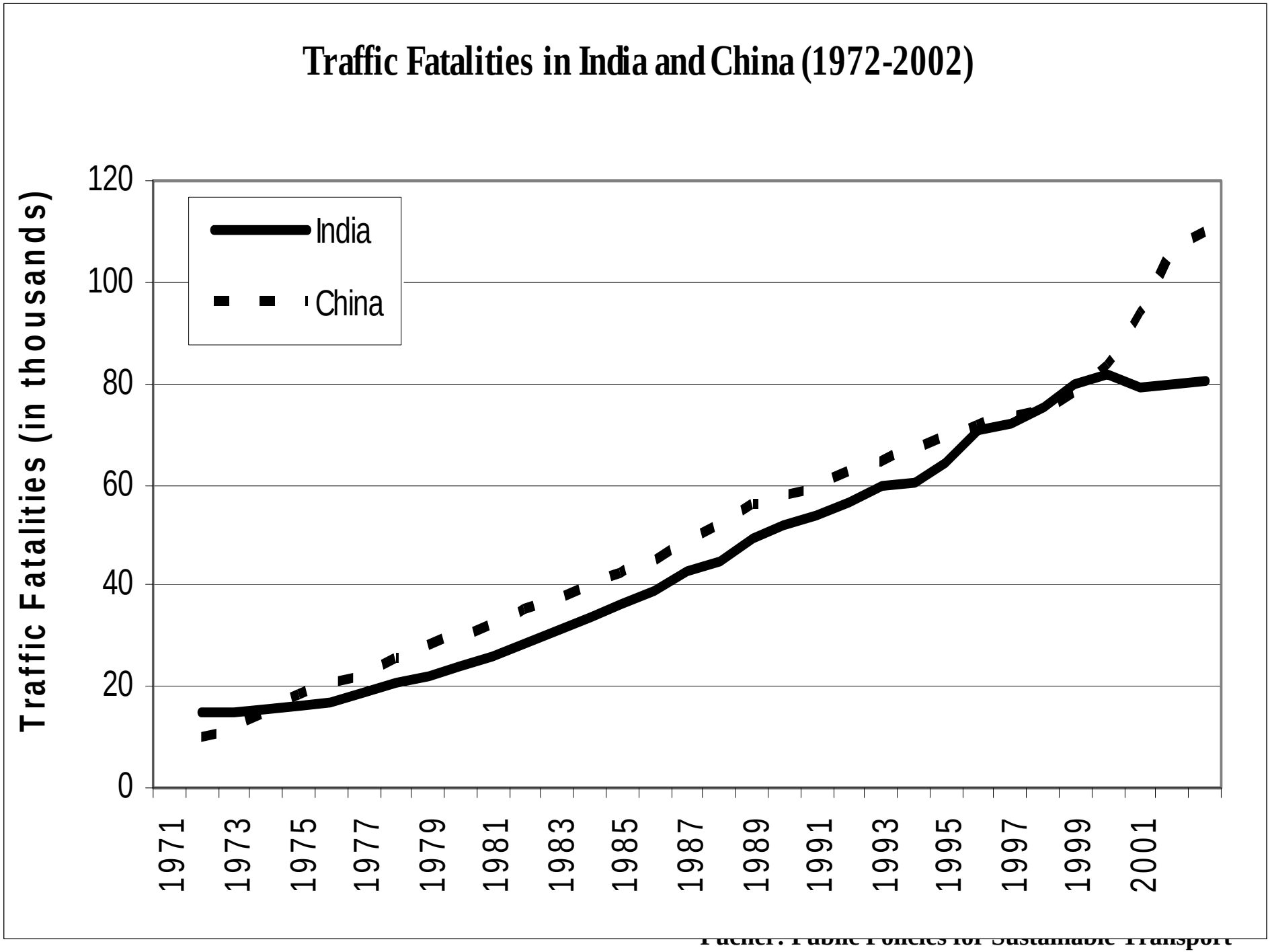


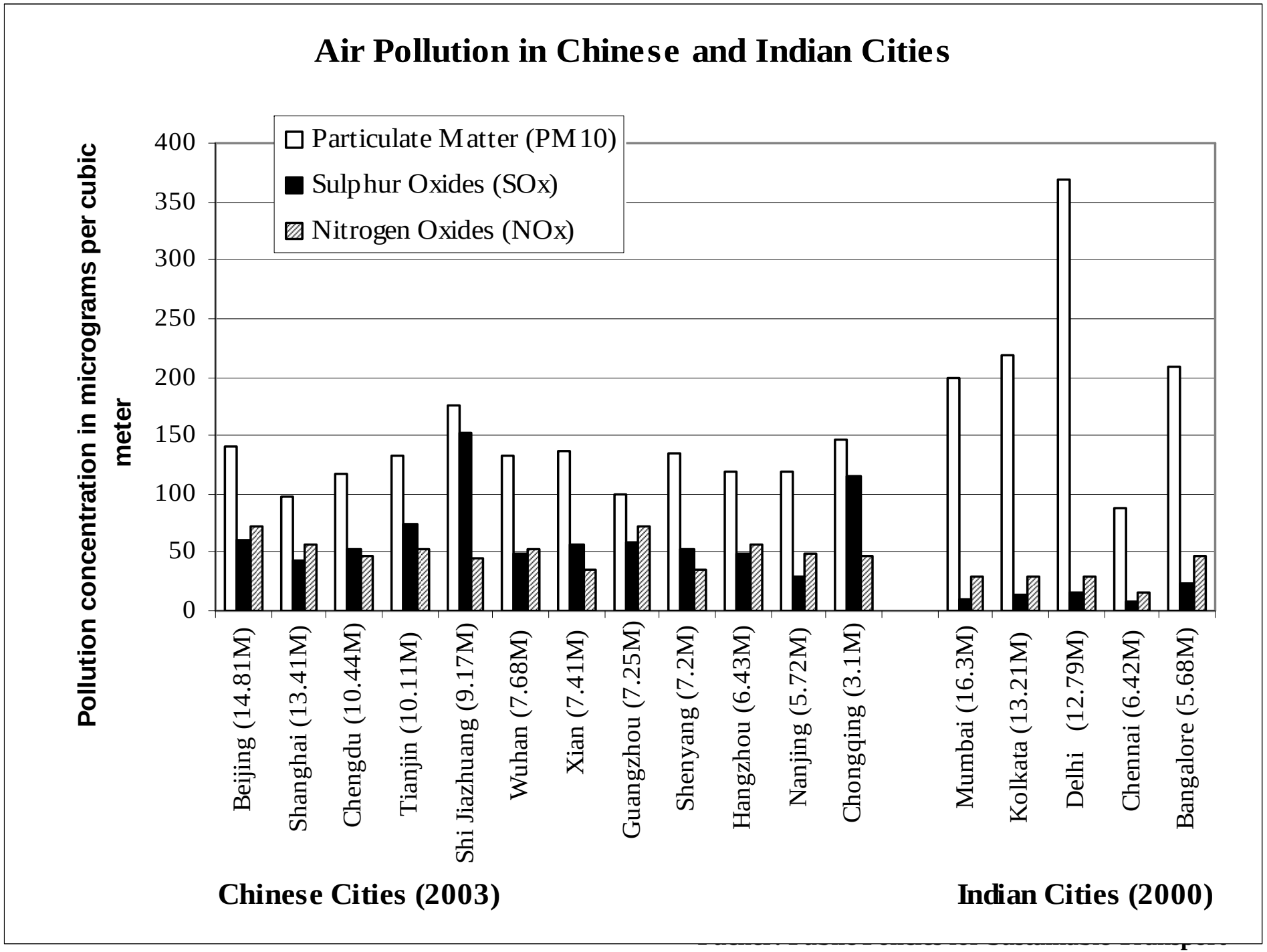
Percent Distribution of Urban Trips by Means of Travel for Selected Indian Cities, 2002




Growth of India's Motor Vehicle Fleet by Type of Vehicle
(1981 - 2002)
No. of Vehicles (in millions)
0
5
10
15
20
25
30
35
40
45
1981
1986
1991
1996
2002
Two-wheelers
Cars, Jeeps and Taxis
Other Motorized
Goods Vehicles
Buses


Growth of China's Motor Vehicle Fleet by Type of Vehicle
(1981-2002)
Two wheelers
Cars, Jeeps and Taxis
Other Motorized
Goods Vehicles
Buses
No. of Vehicles (in millions)
65
60
55
50
45
40
35
30
25
20
15
10
5
0
1981
1986
1991
1996
2002


Traffic Fatalities in India and China (1972-2002)
Traffic Fatalities (in thousands)
120
100
80
60
40
20
0
India
China
1971
1973
1975
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001


Air Pollution in Chinese and Indian Cities
Particulate Matter (PM10)
Sulphur Oxides (SOx)
Nitrogen Oxides (NOx)
Pollution concentration in micrograms per cubic meter
400
350
300
250
200
150
100
50
0
Beijing (14.81M)
Shanghai (13.41M)
Chengdu (10.44M)
Tianjin (10.11M)
Shi Jiazhuang (9.17M)
Wuhan (7.68M)
Xian (7.41M)
Guangzhou (7.25M)
Shenyang (7.2M)
Hangzhou (6.43M)
Nanjing (5.72M)
Chongqing (3.1M)
Mumbai (16.3M)
Kolkata (13.21M)
Delhi (12.79M)
Chennai (6.42M)
Bangalore (5.68M)
Chinese Cities (2003)
Indian Cities (2000)

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Traffic Congestion in Beijing

Severe roadway congestion in large Indian cities

- **Traffic levels exceed road capacity**
- **Rapid growth in motorized vehicles**
- **Very mixed traffic on roads**

Improvements in infrastructure have not kept up with sharply rising demand

- Rickshaw operation: uncontrolled & poor
- Road space: minimum for bus
- Reduce bus speed and increase cost

Congestion in Dhaka, Bangladesh

Congestion worsened by mixing of motorized and non-motorized modes