

International Comparisons of Transportation and Economic Indicators

Briefing ITED

presented by

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Order of Presentation

- **Recent U.S. trends**
 - » **Transportation**
 - » **Economic**
 - » **Environmental**

- **Comparisons of U.S. and other Western Industrial Nations**
 - » **Transportation**
 - » **Economic**
 - » **Environmental**

U.S. Travel and Economic Growth

- **Vehicle miles traveled (VMT) growth and economic growth have tracked together in the past, but are now inconsistent**
- **No (i.e., zero) growth of U.S. VMT for the last five years**
- **U.S. households below the very top have experienced losses of real income since 2000**
- **Major economic issue for the U.S. is to resume real income growth for all household income groups as happened 1932 to 1980 and from 1992 to 2000**

Average Annual Growth of U.S. Vehicle Miles of Travel by Decade

Decade	Average Growth of U.S. VMT (%)
1960 to 1970	4.44 %
1970 to 1980	3.25 %
1980 to 1990	3.45 %
1990 to 2000	2.51 %
2000 to 2010	0.85 %

Sources: FHWA Highway Statistics, 2008, Table VM-203;
FHWA Traffic Volume Trends, September 2010.

U.S. Real Household Income Growth by Period

Percentage of Growth or Percentage of Decline for Each Household Income Group in Each Period

Time Period	Lowest Quintile	Second Quintile	Third Quintile	Fourth Quintile	Highest Quintile
1980-1992	1.7%	2.4%	4.6%	9.0%	18.4%
1992-2000	16.4%	16.0%	14.7%	16.1%	29.8%
2000-2008	-8.2%	-6.9%	-4.5%	-2.8%	-3.8%
2008-2009	-0.5%	-0.5%	-0.8%	-0.9%	0.3%

Source: United States Bureau of the Census, Historical Income Tables, Table H-3 and Table A-2, Selected Measures of Household Income Dispersion: 1967 to 2009; households as of March of the following year. Income in current and 2009 CPI-U-RS adjusted dollars.

Per Capita Real Disposable Personal Income Changes by Period

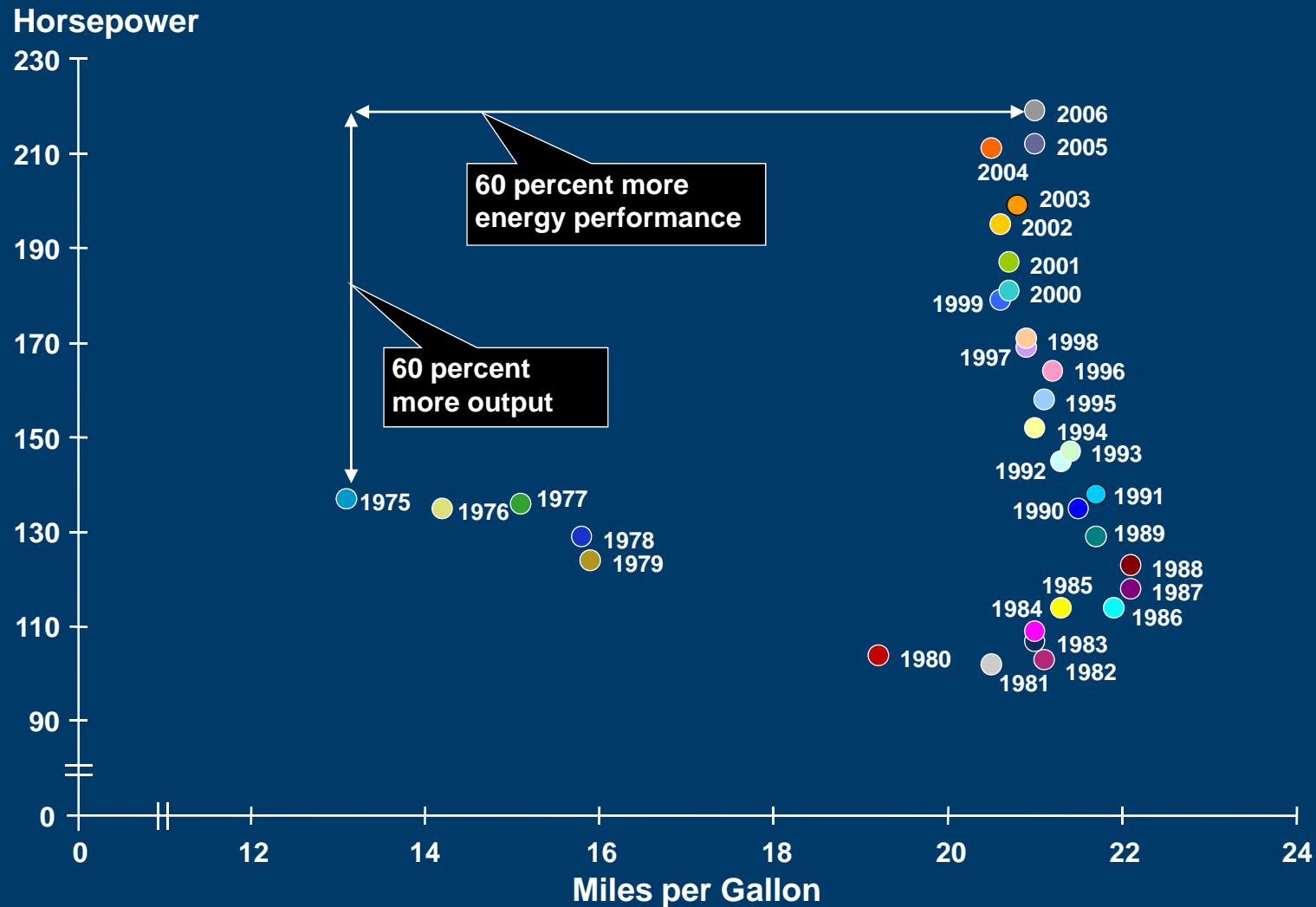
Year	Real DPI Per Capita (\$)	Percent Per Year Gain (Loss)
1929	\$6,498	
1929-1933	\$4,786	-7.4%
1933-1940	\$6,953	+5.5%
1940-1950	\$9,240	+2.9%
1950-1960	\$10,865	+1.6%
1960-1970	\$15,158	+3.4%
1970-1980	\$18,863	+2.2%
1980-1992	\$23,958	+2.0%
1992-2000	\$28,899	+2.4%
2000-2009	\$32,519	+1.3%

GNP Yearly Changes

1930s

Year	Real GNP (\$B)	Percent Gain (Loss)	Net Gain (Loss)
1929	\$977		
1930	\$893	-8.6%	-84
1931	\$835	-6.5%	-58
1932	\$726	-13.1%	-109
1933	\$716	-1.4%	-10
1934	\$794	+10.9%	+78
1935	\$865	+8.9%	+71
1936	\$978	+13.1%	+113
1937	\$1,028	+5.1%	+50
1938	\$993	-3.4%	-35
1939	\$1,073	+8.1%	+80
1940	\$1,167	+8.8%	+94

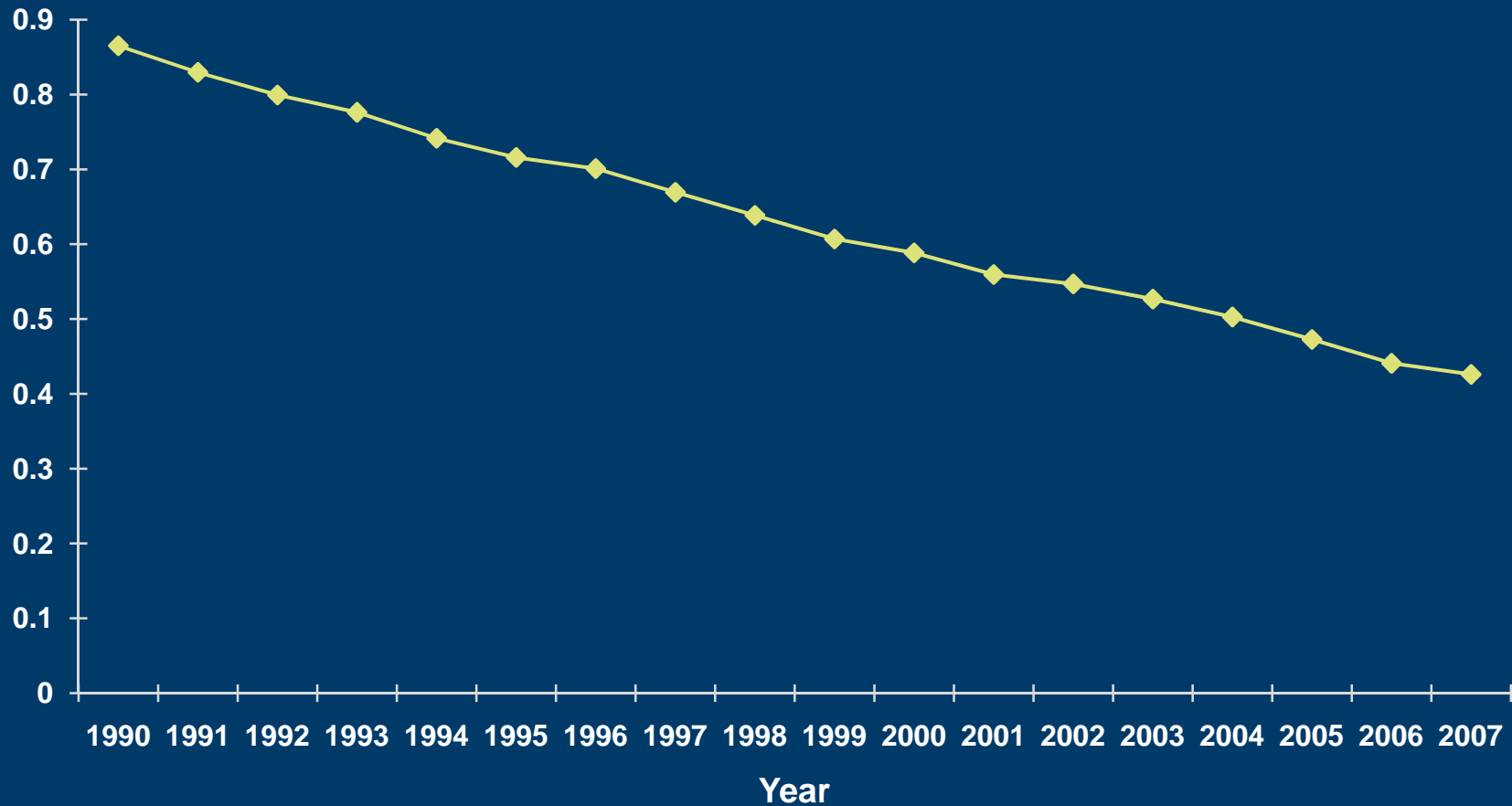
On-Road Fuel Economy for New Light-Duty Vehicles 1975-2006 Model Years Sales-Weighted Horsepower and MPG



Source: Environmental Protection Agency, Light Duty Automotive Technology and Fuel Economy Trends: 1975-2006, July 2006.

U.S. CO₂ Intensity Relative to GDP 1990-2007

CO₂ Intensity (Million Metric Tons per \$1 Billion)



U.S. Compared to Other Western Nations

- Lower use of other modes, but autos dominate for all
- Higher historical U.S. Gross Domestic Product (GDP) per person
- Lowest life expectancy of major western industrial nations, nearly 120,000 excess deaths per year because of lower life expectancies, traffic fatalities are perhaps a factor for 14% of excess
- High relative VMT and transportation Greenhouse Gas (GHG) per capita
- High U.S. income inequality has many consequences

Europe and U.S. Percent of Surface Passenger Miles

	Cars	Buses	Urban Rail	Passenger Rail
France	83.9%	5.2%	1.5%	9.1%
Germany	79.5%	11.0%	0.3%	9.0%
Italy	80.7%	12.0%	0.7%	5.4%
United Kingdom	86.5%	6.3%	1.1%	5.9%
U.S.	96.2%	3.2%	0.3%	0.3%

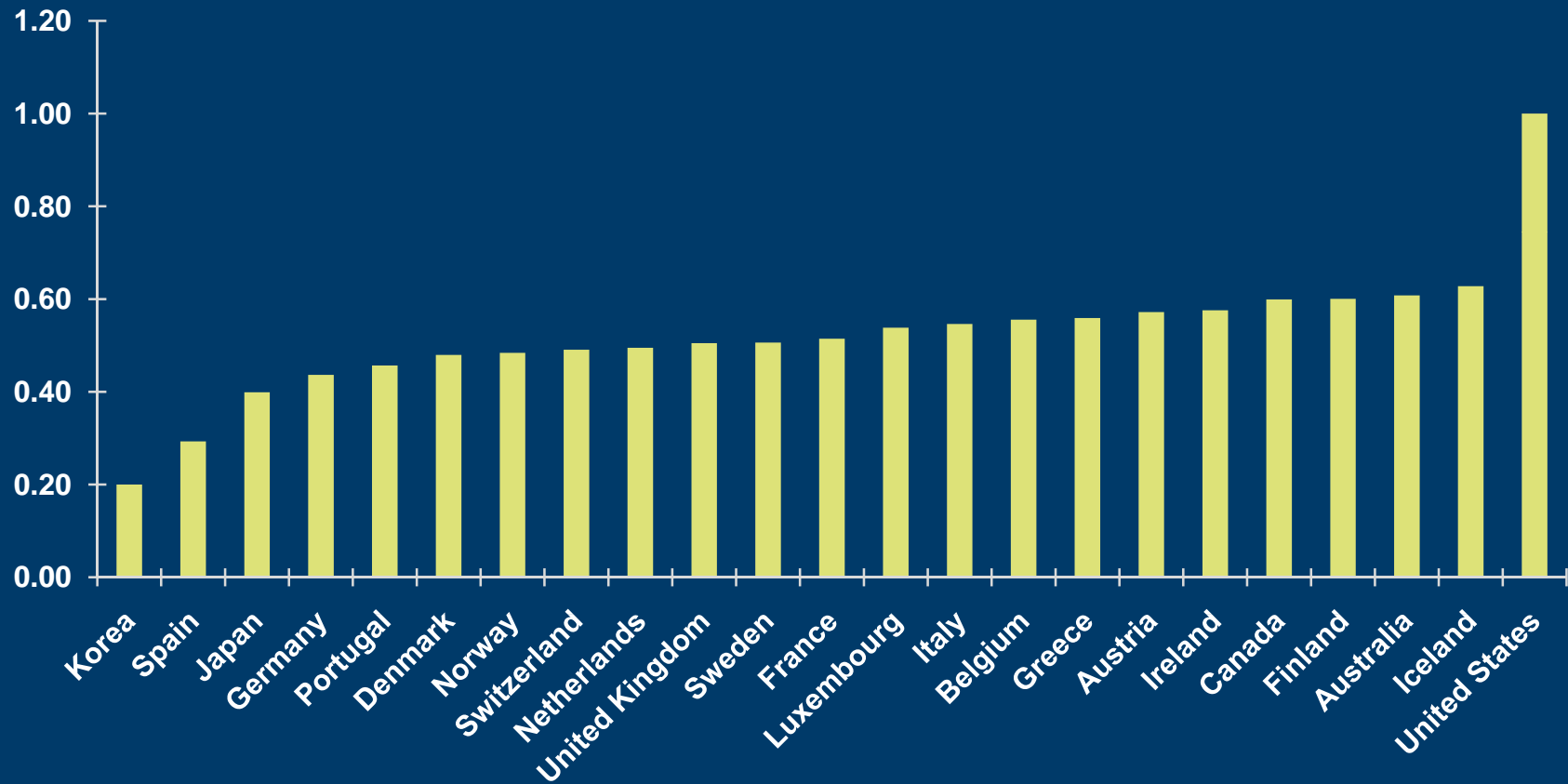
Sources: European Commission, for 2006-7; National Surface Transportation Policy and Revenue Study Commission, for 2005.

U.S. Bus: Includes 0.5% urban transit; 0.4% intercity bus; 2.3% school/other.

U.S. Passenger Rail: Includes 0.1% intercity rail; 0.2% commuter rail.

Vehicle Kilometers Traveled Per Capita Relative to the U.S., 2004*

Vehicle Kilometers Traveled Per Capita Ratio (U.S.=1.0)



* VKT Source: OECD Environmental Data Compendium 2006/2007.
Table 3A Road Traffic Volumes: Motor Vehicles.

Population Source: Statistical Abstract of the United States.
Table 1331 Population by Country.

Per Capita GDP Growth by Nation

Average Percentage Per Year

Nation	1979-2008	2000-2008
United States	1.8	1.2
Australia	1.9	1.7
Austria	1.9	1.6
Belgium	1.8	1.3
Canada	1.6	1.3
Denmark	1.7	0.9
France	1.5	1.0
Germany	1.6	1.2
Italy	1.5	0.2
Japan	1.9	1.2
Netherlands	1.9	1.5
Norway	2.4	1.6
Spain	2.1	1.4
Sweden	1.8	1.9
United Kingdom	2.1	1.9
U.S. Rank among the 15 nations	8.0	10.0
Number Below the U.S.	5.0	3.0

Source: OECD.

Real Gross Domestic Product Per Capita by Country

Country	Real GDP per Capita (2005 U.S. \$)			Growth	Growth
	1960	1980	2008	48 yrs.	28 yrs.
United States	15,644	25,621	43,250	276%	169%
Canada	13,016	23,190	36,123	278%	156%
Australia	13,268	20,341	34,254	258%	168%
Japan	5,698	18,606	31,446	552%	169%
Korea, South	1,877	5,551	25,498	1,358%	459%
Singapore	2,870	10,977	33,978	1,184%	310%
Austria	10,020	21,154	35,868	358%	170%
Belgium	10,094	20,878	33,616	333%	161%
Denmark	11,799	20,784	34,013	288%	164%
France	9,531	20,253	30,624	321%	151%
Germany ¹	11,702	21,262	33,663	288%	158%
Italy	8,369	18,837	28,245	337%	150%
Netherlands	12,344	22,274	38,035	308%	171%
Norway	12,488	26,007	49,416	396%	190%
Sweden	11,871	20,429	33,744	284%	165%
United Kingdom	12,382	18,453	34,356	277%	186%
Number below U.S. (of 15)	15	14	14	1	8

Life Expectancy At Birth, By Nation

19 Nations

	Females		Males	
	1980	2007	1980	2007
United States	77.4	80.4	70.0	75.4
Australia	78.1	83.7	71.0	79.0
Austria	76.1	82.9	69.0	77.3
Belgium	76.7	82.6	69.9	77.1
Denmark	77.3	80.6	71.2	76.2
Finland	77.6	83.1	69.2	76.0
Germany	76.2	82.7	69.6	77.4
Greece	76.8	82.0	72.2	77.0
Iceland	79.7	82.9	73.7	79.4
Ireland	75.6	82.1	70.1	77.4
Japan	78.8	86.0	73.4	79.2
Luxembourg	75.9	82.2	69.1	76.7

Life Expectancy At Birth, By Nation

19 Nations (continued)

	Females		Males	
	1980	2007	1980	2007
United States	77.4	80.4	70.0	75.4
Netherlands	79.2	82.3	72.5	78.0
New Zealand	76.2	82.2	70.1	78.2
Norway	79.3	82.9	72.4	78.3
Portugal	74.9	82.2	67.9	75.9
Spain	78.4	84.3	72.3	77.8
Sweden	78.8	83.0	72.8	78.9
Switzerland	79.0	84.4	72.3	79.5
U.S. Rank	9 th	Last	13 th	Last
Average Others	77.5	82.9	71.0	77.7
Differential for U.S.	-0.1	-2.5	-1.0	-2.3

Traffic Fatalities Per 100,000 of Population by Nation 2009 and 1990

	Traffic Fatalities per 100,000 2009	Traffic Fatalities per 100,000 1990
United States	11.01	17.9
Australia	6.80	13.7
Austria	7.58	20.3
Belgium (2008)	8.00	19.9
Canada	6.36	14.9
Denmark	5.50	12.4
Finland	5.24	13.1
France	6.84	19.8
Germany	5.06	14.0
Greece	12.93	20.2
Iceland	5.33	9.5
Ireland	5.42	13.6
Italy	6.74	12.4
Japan	4.53	11.8
Luxembourg	9.51	18.8

Traffic Fatalities Per 100,000 of Population by Nation 2009 and 1990 (continued)

	Traffic Fatalities per 100,000 2009	Traffic Fatalities per 100,000 1990
U.S.	11.01	17.9
Netherlands	3.91	9.2
New Zealand	8.90	21.4
Norway	4.42	7.8
Portugal	7.90	28.3
Spain	5.92	23.2
Sweden	3.87	9.1
Switzerland	4.53	13.9
United Kingdom	3.78	9.4
Average Non-U.S.	6.32	15.3
U.S. Excess	4.69	2.6

Comparison of Transport CO₂ Emissions Per Capita to United States 2008*

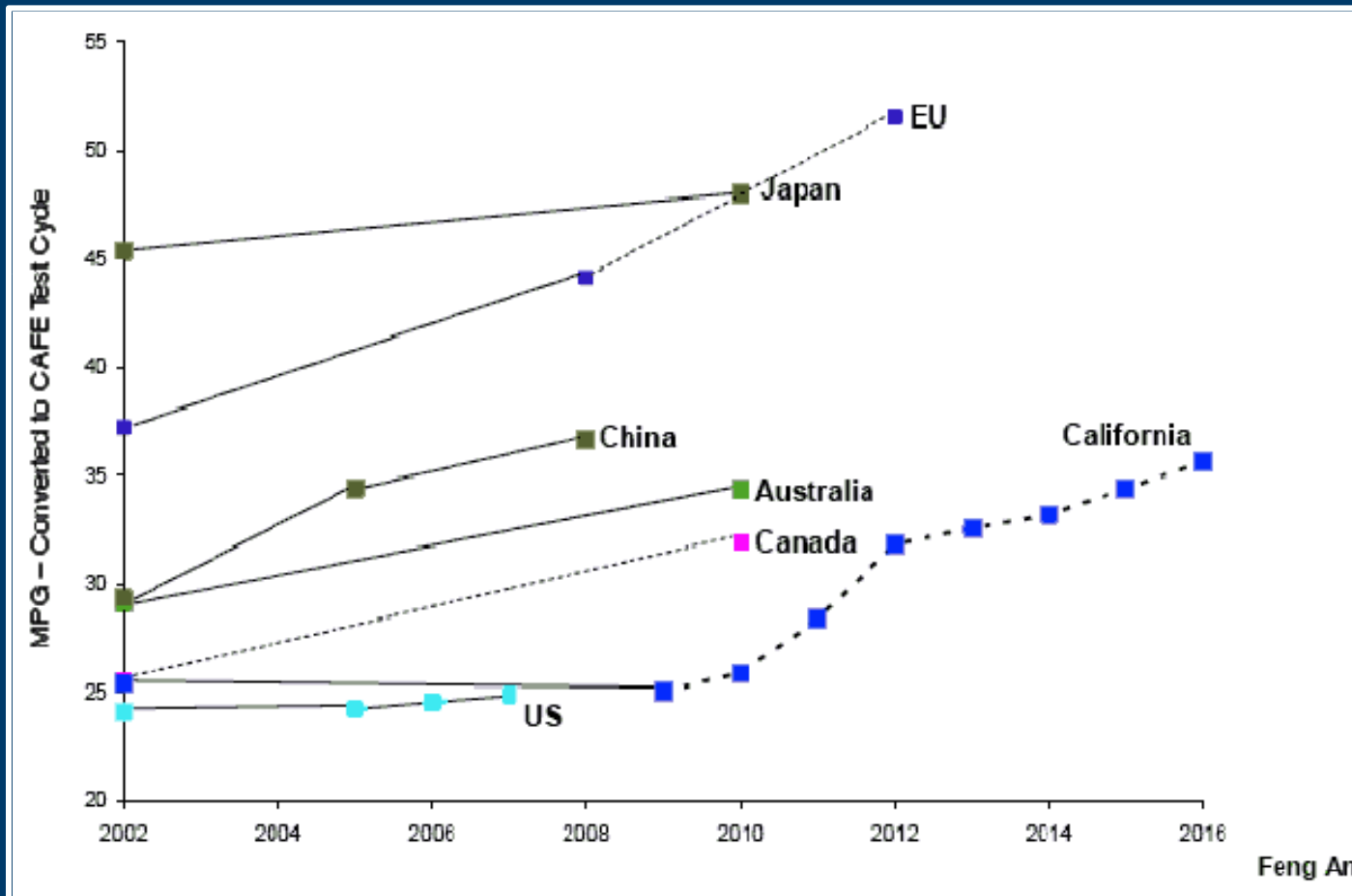
Transport CO2 Emissions Per Capita Ratio (1.0=U.S.)



* International Energy Agency. Highlights.
Excel sheet at <http://www.iea.org/co2highlights/co2highlights.xls>.

The Current U.S. Fleet Fuel Economy (Miles Per Gallon) is About One-Half EU and Japan Levels

Comparison of fleet average fuel economy standards for new-sale light-duty vehicles



Source: UC Berkeley.

European Highway Fees Per Capita are High Compared to U.S. Highway Fees Per Capita

- EU Road Federation estimates 381 billion Euros of total fuel and vehicle fees in 2006 for the EU-15 countries with a population of 380 million – equal to \$1,400 per person in U.S. dollars (1 Euro then equaled \$1.40)
- Highway Statistics 2007 identifies \$120 billion in total U.S. highway user fees, equal to \$400 per person
- BUT – Europe already has much greater income equality, more mobility options, and much higher levels of social services for all persons, including lower income persons

This PowerPoint file contains 35 of the more important graphs shown on The Equality Trust web site and/or published in the book by Richard Wilkinson and Kate Pickett, *The Spirit Level: Why More Equal Societies Almost Always Do Better* (Penguin, 2009). We hope you will use them in talks, lectures or discussion groups to help increase people's understanding of the effects of inequality.

These slides are provided on condition that you acknowledge their source. We strongly recommend that you use them in conjunction with the book, which explains the relationships shown in the graphs.

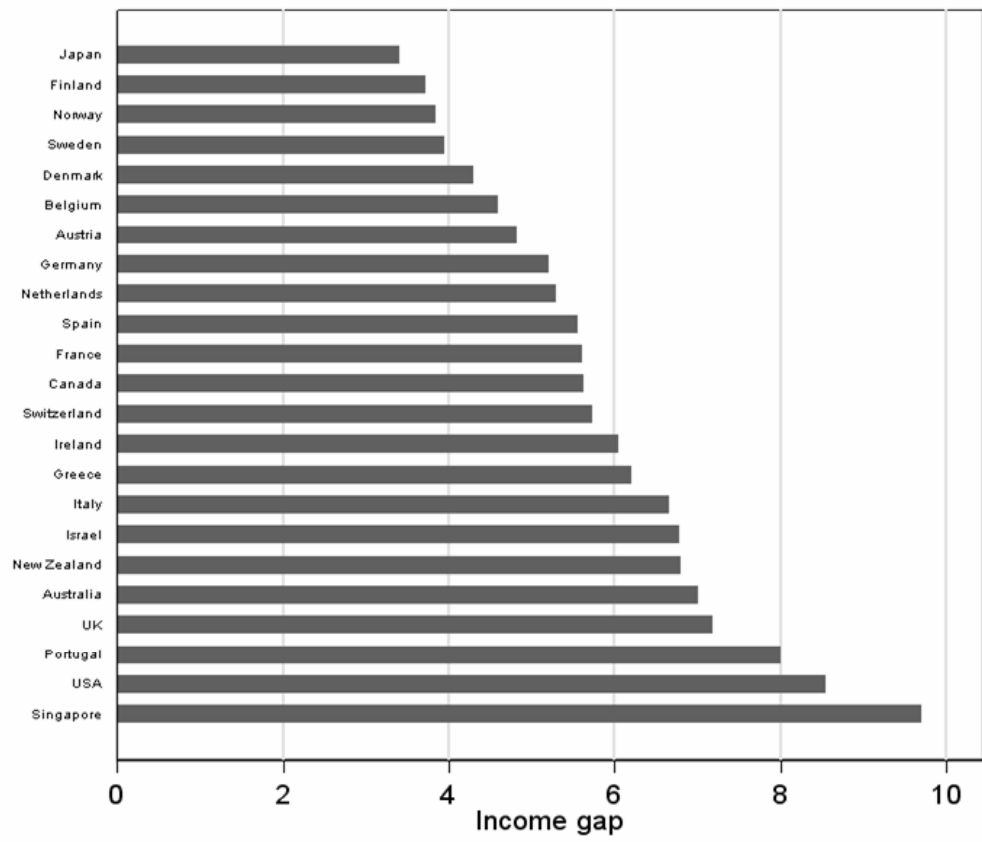
As these slides represent many years of work and thought, we would be very grateful for donations to help The Equality Trust continue its work.

The Equality Trust is working to build a better society. By gaining a wider public understanding of the damaging effects of large inequalities of income and wealth, we can build support for policies to reduce them. As an independent, not-for-profit organisation, our work depends on generous donations from individuals and trusts which share our vision. You can **donate online** at www.equalitytrust.org.uk, using PayPal to make a secure credit or debit card payment.

Or you can send a cheque payable to The Equality Trust to us at 32-36 Loman Street, London SE1 0EH, UK.

Inequality Of Incomes for Various Nations

How much richer are the richest 20% than the poorest 20%?



Source: United Nations Development Program

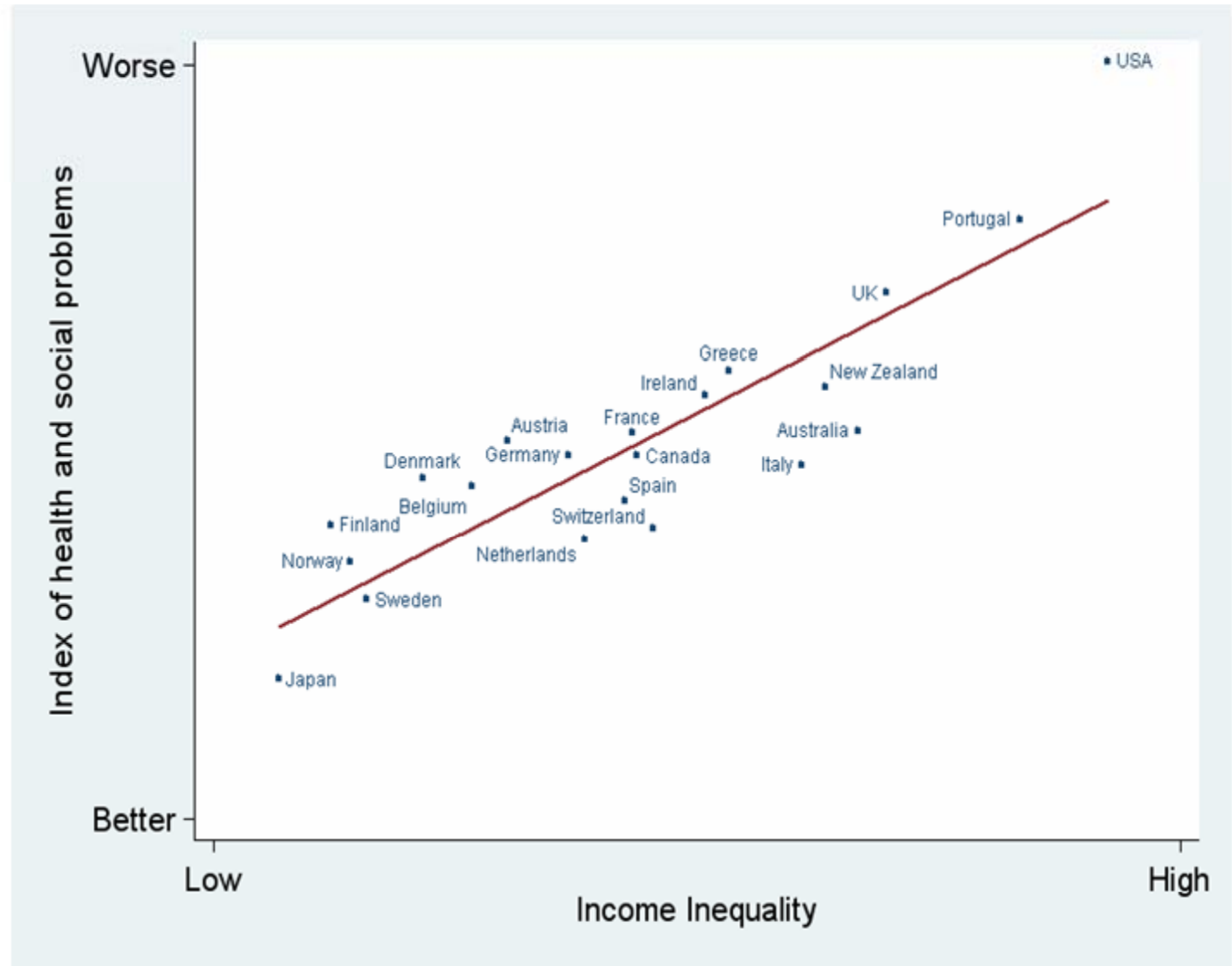
Source: Wilkinson & Pickett, *The Spirit Level* (2009)

www.equalitytrust.org.uk 

Health and Social Problems are Worse in More Unequal Countries

Index of:

- Life expectancy
- Math & Literacy
- Infant mortality
- Homicides
- Imprisonment
- Teenage births
- Trust
- Obesity
- Mental illness – incl. drug & alcohol addiction
- Social mobility



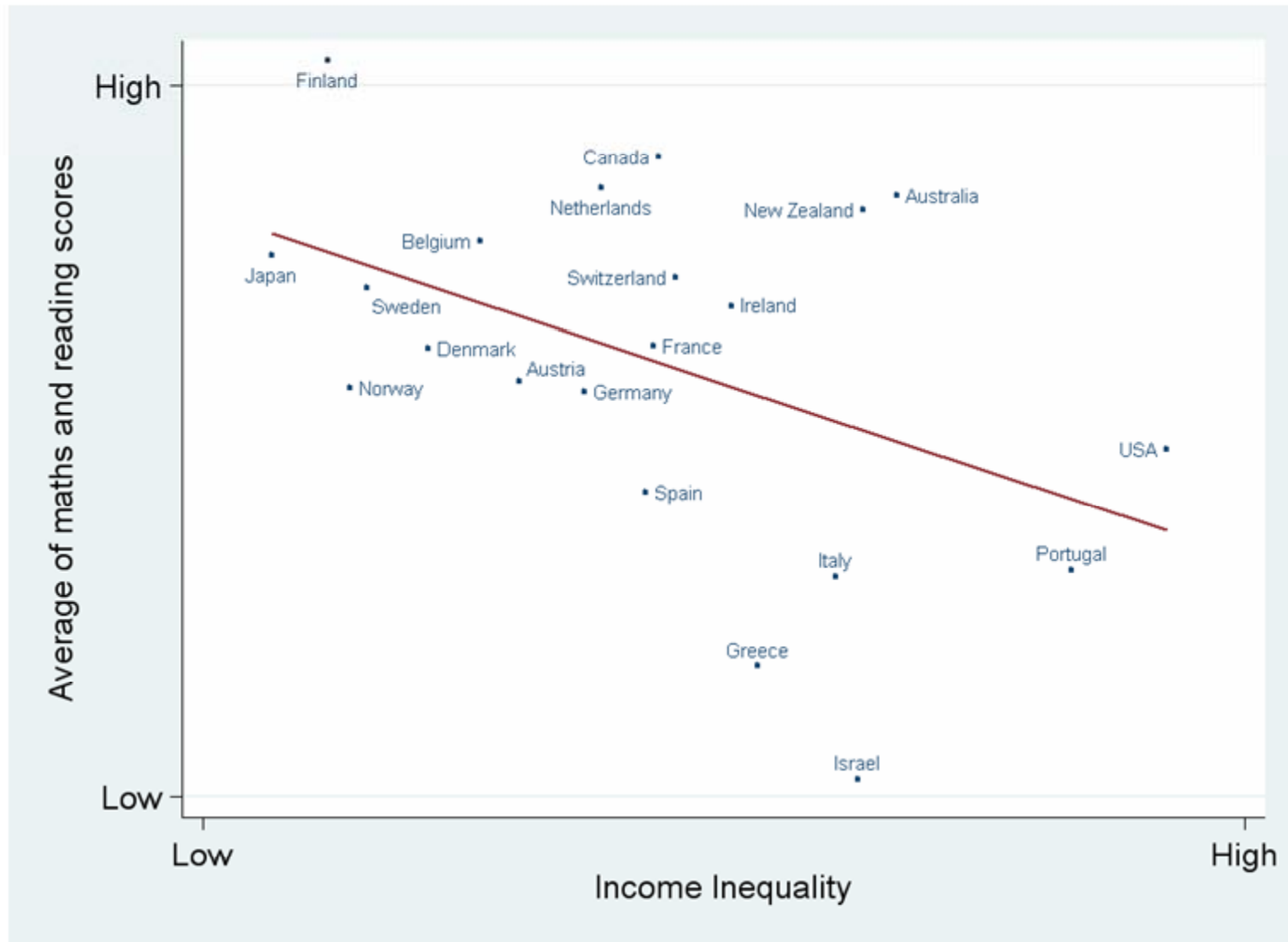
Source: Wilkinson & Pickett, *The Spirit Level* (2009)

Life Expectancy is Longer in More Equal Rich Countries



Source: Wilkinson & Pickett, *The Spirit Level* (2009)

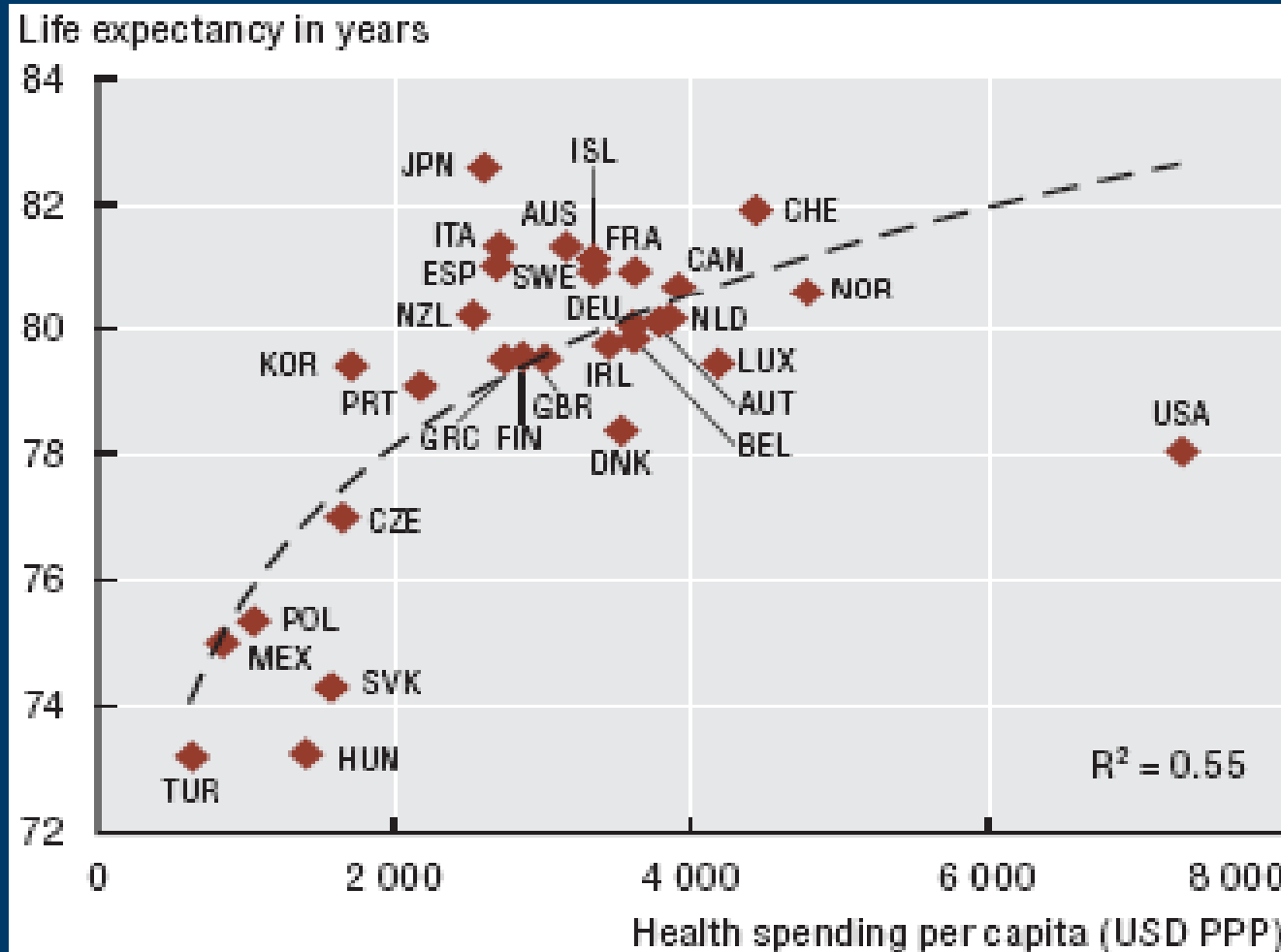
Educational Scores are Higher in More Equal Rich Countries



Source: Wilkinson & Pickett, *The Spirit Level* (2009)

Higher Health Spending Per Capita is Generally Associated with Higher Life Expectancy, Except for....

2007 (or latest year available)



Source: OECD Health Data 2009, OECD (<http://www.oecd.org/health/healthdata>).

Transportation Supply Side Actions

- **Enormous returns on higher levels of highway and public transportation investments**
- **Higher levels of investment drive economic growth**
- **But now we are instead disinvesting – is this a significant factor in the decline of incomes since 2000 for 95 percent of Americans?**
- **Must look at specific investments comprehensively**
- **Given extreme income inequality, the impacts of pricing and investments on equity must be considered**

Annual Rates of Return On Capital Investment

Annual Rate of Return by Type of Investment				
Type	1960-1969	1970-1979	1980-1989	1950-1989
<i>All Highways</i>	35%	16%	10%	28%
<i>State Highways</i>	47%	24%	16%	34%
All Private	14%	12%	11%	13%

Source: Nadiri and Mamuneas "Highway Capital and Productivity Growth," 1996.

Example

Current Interstate System National Needs – Costs and Benefits (NCHRP)

- Capital needs of \$1.3 trillion over thirty years – \$43B per year (constant \$) for full needs on existing system (versus \$17B per year current level of IS capital investment)
- Serves 80% increase in VMT with less than a 40% increase in lane miles (existing Interstate system only)
- User costs – saves user costs of \$220B per year by 2035 (five times greater than the annual capital costs)
- Both capital and user costs subject to inflation in future years

**Bottom Line:
Costs are large and benefits are much larger**

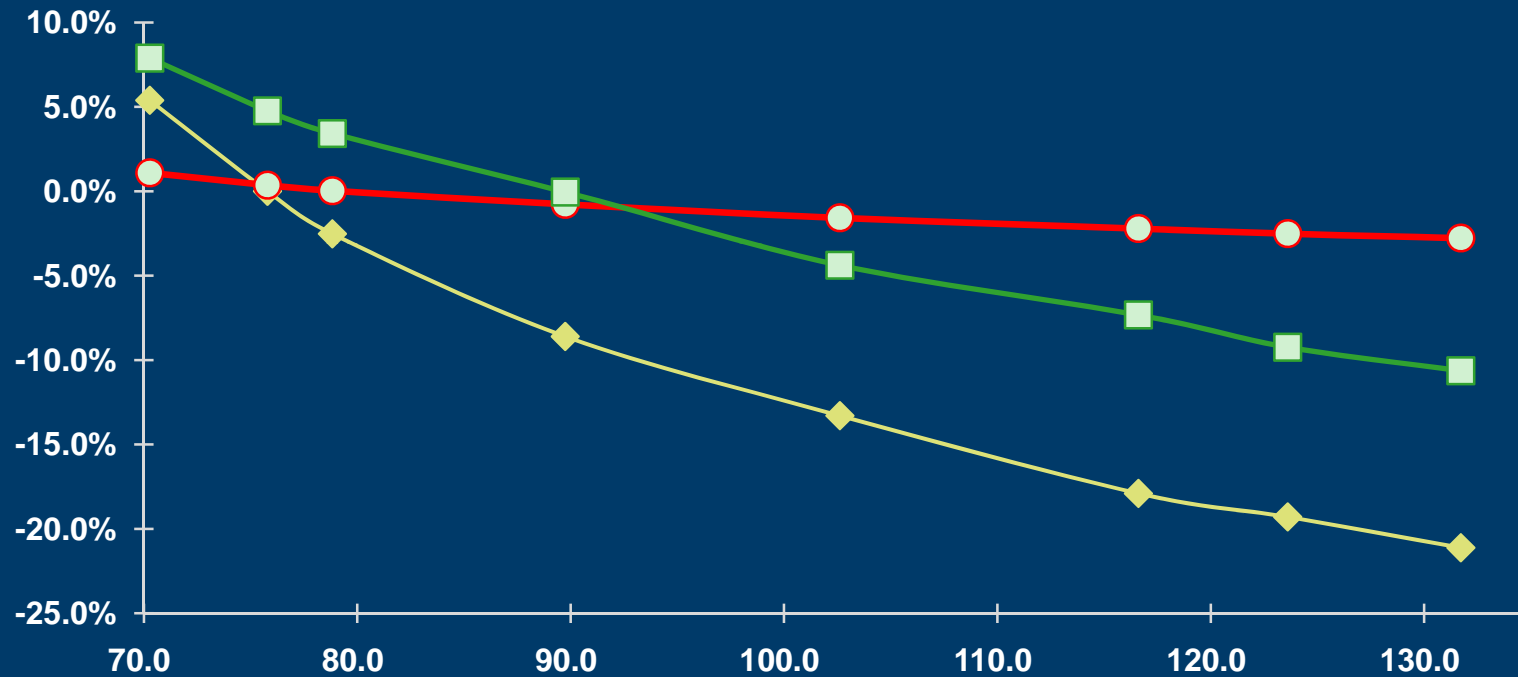
Example

Returns on Investment In Public Transportation Renewal

- CS conducted four comprehensive investment analyses of public transportation in major urban areas (Chicago, New York, Philadelphia, Los Angeles)
- Estimated costs of investments versus benefits to public transportation users, autos and trucks, and businesses
- Benefit-cost ratios range from 9 to 1 to 2 to 1 depending on level of investment (highest returns from preserving existing services)
- Comparable to Nadiri, Mamuneas Highway Results

Investment and Performance

Percent Change Relative to 2004



Average Annual Investment in Billions of 2004 Dollars



The UK Has Significant Experience in Project Benefit-Cost Analysis

- The UK's "Eddington Report" outlines relevant results of multimodal economic impact analysis
 - » "Urban network projects" have benefit-cost ratios averaging over 3.0
 - » "International gateways projects" have benefit-cost ratios averaging about 6.0
 - » "Inter-urban corridor projects" have benefit-cost ratios averaging just below 2.0
- While these very promising results are for the UK, they may indicate the likely returns on investment

Steve Polzin CUTR FHWA VMT Spreadsheet Model (with average annual 0.81 percent per year population growth)

- 1.4 percent annual VMT growth to 2035 occurs at 1.5 percent real annual per capita income growth
- 1.0 percent annual VMT growth to 2035 occurs at 0.6 percent real annual per capita income growth
- Both high (1992 to 2000) and low (1980 to 1992) and negative (2000 to 2009) periods of growth in most households' real income have occurred recently

Pricing Impacts on VMT and Income

- Preliminary estimate – if personal income growth is 1.5 percent per year, reducing VMT growth through price alone from 1.4 percent to 1.0 percent per year requires net travel price increases of 40 percent by 2050 (\$600B/yr. or \$1,400/person/yr.) (assumes \$.45 per VMT)
- This is much more than needed for transportation
- For context – total net U.S. Federal personal income taxes were less than \$1 trillion in 2009
- Personal income losses PER YEAR would be at least 4 percent in 2050, and more if elasticities are lower

Return on Investment by User Group

From Pricing, from Reinvestment and Combined

User Group	Pricing: \$ of Benefit Per Dollar of Tolls Paid	Reinvestment: \$ of Benefit Per Dollar Reinvested	Combined: \$ of Benefit Per Dollar Combined
Low Income SOV Work Trips	\$.02	\$1.95	\$1.97
Low Middle Income SOV Work Trips	\$.14	\$1.95	\$2.09
High Middle Income SOV Work Trips	\$.33	\$1.95	\$2.28
High Income	\$.56	\$1.95	\$2.51
Drive Alone Non Work	\$.19	\$1.95	\$2.14
Carpool and Vanpool	\$.23	\$1.95	\$2.18
Heavy Trucks	\$.89	\$1.95	\$2.84
All Vehicle Classes Combined	\$.46	\$1.95	\$2.41

Sources: PSRC Traffic Choices Study and CS Analysis for Bottom Line Report.

Income Group Impacts of a Carbon Tax and Lump Sum Rebates

Income Decile	Carbon Tax as Percent of Income (Income Loss)	Lump Sum Rebate as Percent of Income (Income Gain)	Net Impact on Income (Gain or Loss)
1	-3.7	5.6	1.9
2	-3.0	4.0	1.0
3	-2.3	3.1	0.8
4	-2.0	2.4	0.4
5	-1.7	2.1	0.4
6	-1.5	1.6	0.1
7	-1.3	1.3	0.0
8	-1.2	1.2	0.0
9	-1.0	0.9	-0.1
10	-0.8	0.6	-0.2

Source: MIT.