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# **Greendex 2009: Consumer Choice and the Environment— Market Basket Report**

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- Overview
- World Population
- Indicators of Consumer Behavior—The Market Basket
  - Energy consumption
  - New car registrations
  - Number of aircraft passengers
  - Expenditure on hotels and restaurants
  - Purchasing Power Parity

- The “Market Basket” is a set of independently collected macroeconomic indicators that reflect, in part, the consumer behavior measured by the Greendex.
- The purpose of the Market Basket is to provide an external estimate of the results of changes in consumer behavior over time, and to establish a framework for comparing the relative environmental impact of each country’s size and rate of growth, all while acknowledging that industry and government also play critical roles.
- While the Greendex measures things consumers are doing to save energy in a country, for example, the Market Basket measures whether total energy consumption in the country is actually going up or down.

## Market Basket: Overview, Cont'd



- Market Basket indicators include the following variables:
  - Population size and rate of growth
  - GDP per capita based on Purchasing Power Parity (PPP)
  - Per capita energy consumption
  - Passenger car registrations
  - Number of domestic and international aircraft passengers per 1,000 people
  - Expenditure by households on hotels and restaurants
- In sum, the Market Basket data confirm that the Greendex ranking of average consumers in 17 countries reflects actual consumption patterns in those countries.
- All Market Basket data has been sourced from the Economist Intelligence Unit (EIU), except for the number of domestic and international aircraft passengers per 1,000 people, sourced from OAG Worldwide.\*

\*OAG (Official Airline Guide) is a global flight information and data solutions company. It provides a complete suite of data solutions supporting mission critical systems and projects spanning the global aviation marketplace. Available data covers all areas of commercial aviation including fleet, schedules, traffic and airline financial information.

# World Population



- The world's population reached a total of 6.7 billion in 2008, and is growing at an average annual rate of 1.19 percent.
- The 11 largest countries represent over 60 percent of the world's population.
- China is home to one fifth of the people on earth.
- Five of the eleven largest countries—India, Brazil, Pakistan, Bangladesh and Nigeria—are growing at a faster rate than the world average.

# Greendex Countries Population



- The 17 Greendex countries represent 57 percent of the world's population and include seven of the world's top eleven.
- They represent a wider mix of consumers in, and include a greater representation of, developed countries than of developing countries.
- In 2008, these 17 countries accounted for 80 percent of the energy consumed in the world that year.

# Population Distribution and Growth Rate by Country



60% of World's Population in Top 11 Countries, 2008

Rank	Country	Millions		Annual growth		Percentage of world		Cumulative percentage
		2007	2008	2007	2008	2007	2008	2008
1	China	1,329.8	1,338.6	0.61%	0.66%	20.1%	20.0%	20.0%
2	India	1,148.3	1,166.1	1.61%	1.55%	17.4%	17.4%	37.3%
3	USA	304.2	307.2	0.89%	0.98%	4.6%	4.6%	41.9%
4	Indonesia	237.6	240.3	1.21%	1.14%	3.6%	3.6%	45.5%
5	Brazil	196.4	198.7	1.01%	1.20%	3.0%	3.0%	48.5%
6	Pakistan	172.9	176.2	1.83%	1.95%	2.6%	2.6%	51.1%
7	Bangladesh	154.1	156.1	2.06%	1.29%	2.3%	2.3%	53.4%
8	Nigeria	146.3	149.2	2.38%	2.00%	2.2%	2.2%	55.6%
9	Russia	140.7	140.0	-0.48%	-0.47%	2.1%	2.1%	57.7%
10	Japan	127.3	127.1	-0.09%	-0.19%	1.9%	1.9%	59.6%
11	Mexico	110.0	111.2	1.15%	1.13%	1.7%	1.7%	61.3%
	World	6,602.2	6,706.99	1.17%	1.19%			

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# Population Distribution and Growth Rate by Country



## Greendex Sample, 2008

Rank	Country	Millions		Annual growth		Percentage of world		Cumulative percentage
		2007	2008	2007	2008	2007	2008	2008
1	China	1,329.8	1,338.6	0.61%	0.66%	20.1%	20.0%	20.0%
2	India	1,148.3	1,166.1	1.61%	1.55%	17.4%	17.4%	37.3%
3	USA	304.2	307.2	0.89%	0.98%	4.6%	4.6%	41.9%
5	Brazil	196.4	198.7	1.01%	1.20%	3.0%	3.0%	44.9%
9	Russia	140.7	140.0	-0.48%	-0.47%	2.1%	2.1%	47.0%
10	Japan	127.3	127.1	-0.09%	-0.19%	1.9%	1.9%	48.9%
11	Mexico	110.0	111.2	1.15%	1.13%	1.7%	1.7%	50.5%
16	Germany	82.4	82.3	-0.03%	-0.05%	1.2%	1.2%	51.8%
21	France	63.7	64.1	0.59%	0.55%	1.0%	1.0%	52.7%
22	United Kingdom	60.9	61.1	0.28%	0.28%	0.9%	0.9%	53.6%
25	South Korea	48.4	48.5	0.39%	0.27%	0.7%	0.7%	54.3%
31	Argentina	40.5	40.9	0.94%	1.05%	0.6%	0.6%	55.0%
32	Spain	40.5	40.5	0.12%	0.07%	0.6%	0.6%	55.6%
38	Canada	33.2	33.5	0.87%	0.82%	0.5%	0.5%	56.1%
54	Australia	21.0	21.3	0.82%	1.20%	0.3%	0.3%	56.4%
82	Hungary	9.9	9.9	-0.25%	-0.26%	0.2%	0.1%	56.5%
87	Sweden	9.0	9.1	0.16%	0.16%	0.1%	0.1%	56.7%
	World	6,602.2	6,706.99	1.17%	1.19			

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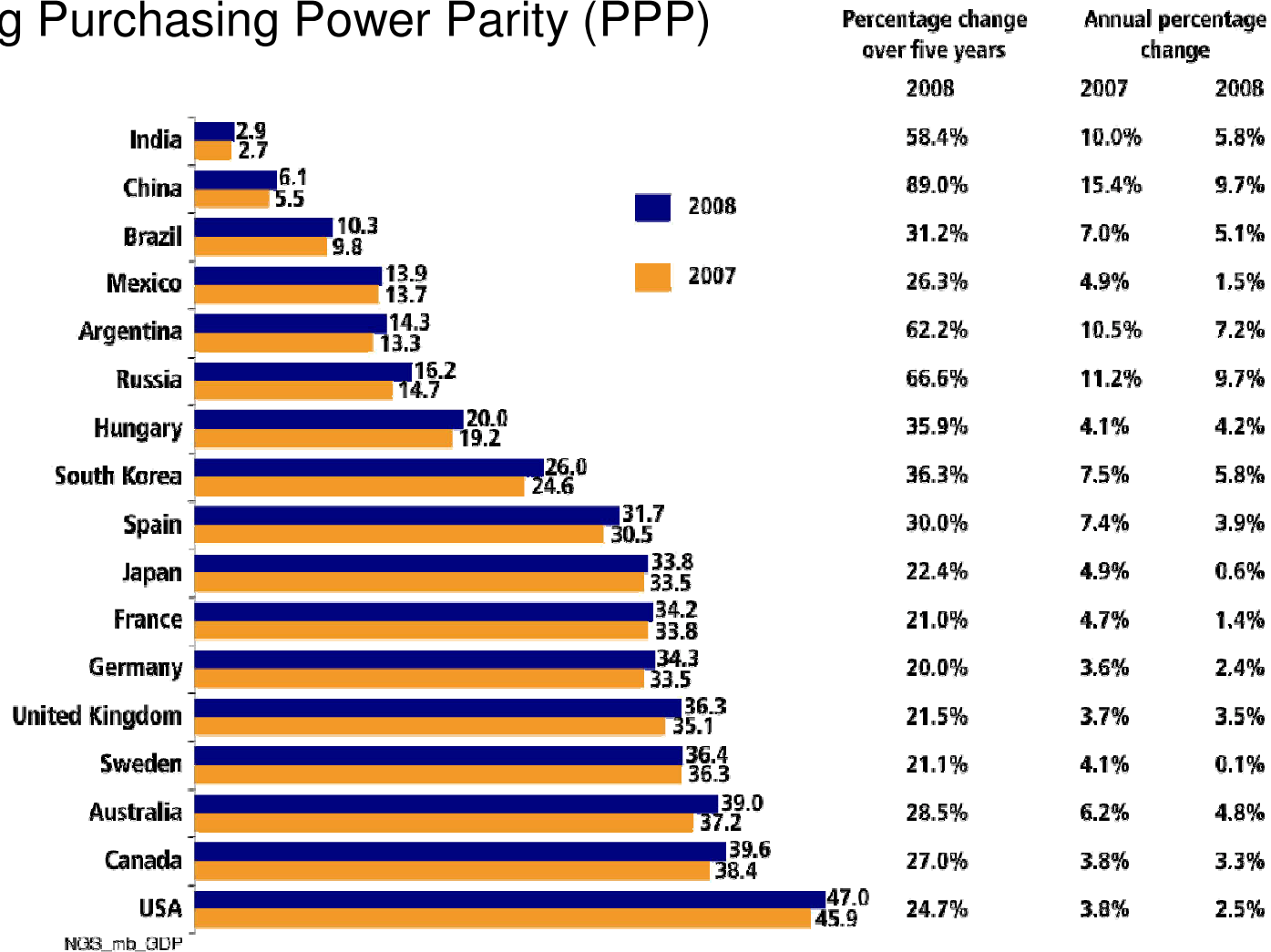
# Gross Domestic Product per Capita at Purchasing Power Parity (US\$)



- On the basis of purchasing power parity (PPP), the Gross Domestic Product per capita in the USA was 16 times that of the average GDP per capita in India, and almost eight times that of China in 2008.
- Nevertheless, GDP per capita has almost doubled in China over the past five years and has grown by almost 60 percent in India and 67 percent in Russia.
- The five year growth in GDP per capita has averaged around 25 percent across most developed countries, less than half the average of the three leading economies by growth.
- But in all countries, excepting Hungary where economic growth remained constant, the annual growth rate in GDP per capita slowed considerably from 2007 to 2008, reflecting the beginning of the global recession.

# Gross Domestic Product

## US\$ per Capita, in Thousands, by Country, 2008 Using Purchasing Power Parity (PPP)



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# Total Energy Consumption



- Total world energy consumption per capita, as measured in kilograms of equivalent oil, grew at almost half the rate in 2008 (1.1%) compared to 2007(1.9%).
- Developing countries – Brazil, China, India, Russia , and Argentina – all registered similar positive growth rates in use of energy compared to previous year. The average growth rate of energy use among this group of countries ranged from 3.0% to 5.8% in 2008.
- On the other hand, many developed countries experienced a decline in energy consumption – Sweden (-2.9%), USA (-2.2%), UK (-2.5%) and Japan (-2.1%), reflecting a combination of rapid price increases and the economic downturn.

# Total Energy Consumption



## By Country, 2008

	Energy consumption (metric tons oil equivalent)		Percentage of world		Kilograms per capita		Annual percentage change	
	2007	2008	2007	2008	2007	2008	2007	2008
	India	422.3	447.2	4.1%	4.3%	374.0	390.0	4.5%
Brazil	212.4	221.8	2.1%	2.1%	1,122.0	1,156.0	3.3%	3.0%
China	1,853.0	1,972.0	18.0%	18.8%	1,402.0	1,484.0	7.3%	5.8%
Mexico	188.2	194.6	1.8%	1.9%	1,731.0	1,770.0	4.1%	2.3%
Argentina	81.0	86.1	0.8%	0.8%	2,058.9	2,165.4	5.4%	5.2%
Hungary	30.0	30.1	0.3%	0.3%	3,010.0	3,028.0	2.0%	0.6%
Spain	154.5	155.2	1.5%	1.5%	3,417.0	3,408.0	1.5%	-0.3%
United Kingdom	226.0	221.9	2.2%	2.1%	3,706.4	3,614.0	-3.3%	-2.5%
Japan	521.8	510.3	5.1%	4.9%	4,095.0	4,009.0	-1.0%	-2.1%
Germany	351.9	351.0	3.4%	3.3%	4,261.0	4,243.0	0.6%	-0.4%
France	269.6	268.5	2.6%	2.6%	4,373.0	4,333.0	-0.1%	-0.9%
South Korea	231.6	237.7	2.3%	2.3%	4,726.0	4,830.0	3.0%	2.2%
Russia	748.9	778.4	7.3%	7.4%	5,261.0	5,488.0	4.3%	4.3%
Sweden	58.0	56.7	0.6%	0.5%	6,331.0	6,145.0	0.3%	-2.9%
Australia	127.6	131.1	1.2%	1.3%	6,246.0	6,359.0	2.4%	1.8%
USA	2,334.0	2,303.0	22.7%	22.0%	7,752.0	7,579.0	-1.2%	-2.2%
Canada	340.6	344.2	3.3%	3.3%	10,341.0	10,365.0	0.9%	0.2%
World	10,266.0	10,478.0	100.0%	100.0%	2,048.0	2,070.0	1.9%	1.1%

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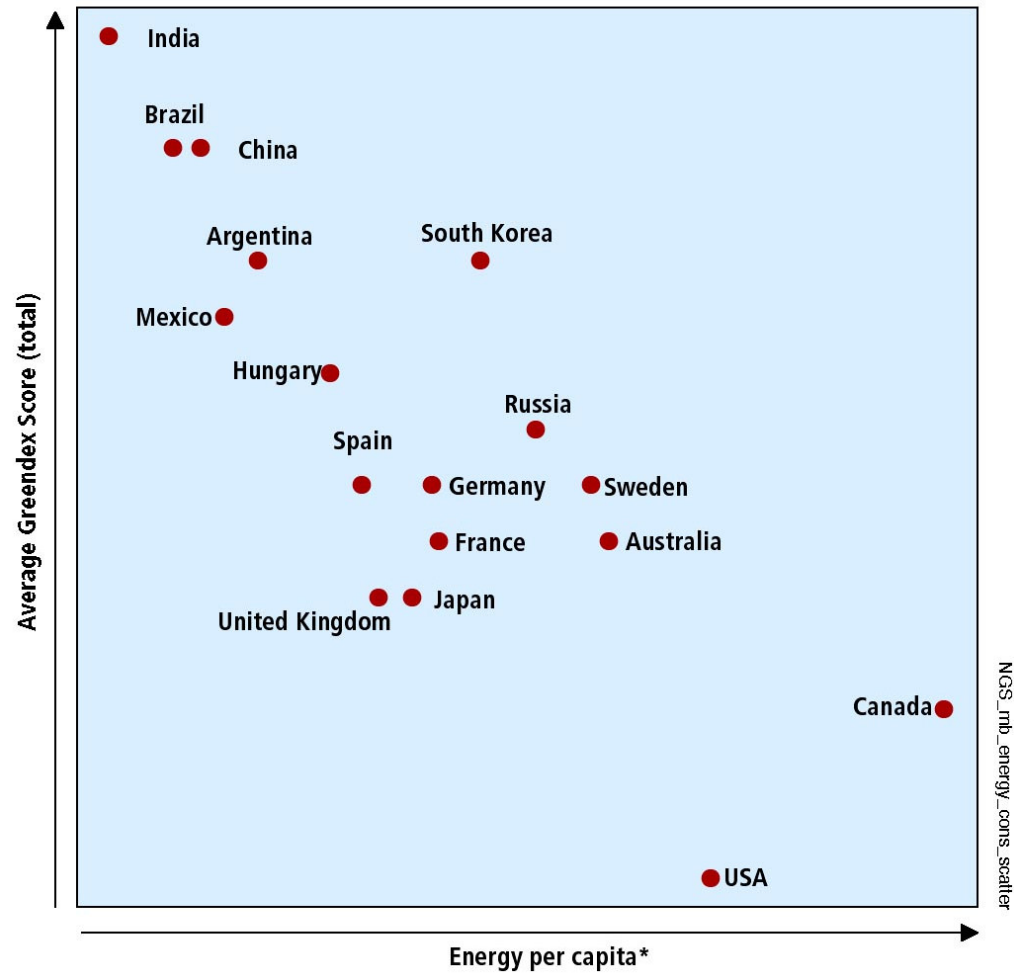
# Energy Consumption per Capita vs Consumers' Average Greendex Score



- Despite the higher growth rate of energy consumption among people in developing countries, people in developed countries still consume significantly more energy per capita. Countries where consumers score higher on the Greendex also consume less energy per capita, while countries where consumers score lower tend to consume more energy.
- Even though macroeconomic energy consumption statistics include both consumer and industrial consumption, the pattern of consumer environmental impact represented by the Greendex is mirrored in each country's overall energy consumption per capita.
- This is an expected finding given that higher levels of consuming behavior across all subcategories of the index naturally lead to greater use of energy, both in the consumption and provision of goods and services.

# Energy Consumption per Capita vs Consumers' Average Greendex Score

2008



# Passenger Cars (New Car Registrations)



- New passenger car registrations per capita have declined in many developed countries from five years ago, and have dropped precipitously over the past year in the USA, Sweden, UK and Spain.
- The decline in registrations in developed countries may be reflective of reduced driving due to higher fuel prices; Greendex data indicate that increased fuel prices may have caused a temporary change in transportation behavior, e.g., reduced driving, increased walking/biking, and increased carpooling. The current economic crisis will also likely further reduce driving. It remains to be seen if this behavioral change is permanent or temporary.
- New car registrations over the past few years have strongly increased in Argentina, Brazil, China, India, and Russia; however, the rate of growth has decreased since 2007, perhaps reflecting deteriorating economic conditions.
- The exception is Brazil, where growth in new car registrations has remained strong in contrast to most other developing countries. Brazilian consumers also recorded the largest drop among those surveyed in both 2008 and 2009 on the Greendex Transportation sub-index.



# Passenger Cars (New Car Registrations)



## By Country, 2008

	New car registrations (000's)		New cars per 1000 population		Annual percentage change	
	2007	2008	2007	2008	2007	2008
India	1,548.0	1,532.0	1.4	1.3	10.4%	-2.6%
China	6,300.0	6,760.0	4.8	5.1	23.5%	6.7%
Mexico	630.1	590.3	5.8	5.4	-8.1%	-7.4%
Argentina	405.0	446.2	10.3	11.2	27.4%	9.1%
Brazil	1,975.5	2,545.0	10.4	13.3	25.2%	27.1%
Hungary	177.0	163.8	17.8	16.5	-5.6%	-7.2%
South Korea	986.4	939.2	20.1	19.1	4.9%	-5.2%
Russia	2,754.0	3,256.0	19.3	23.0	34.4%	18.7%
Spain	1,614.8	1,087.0	35.7	23.9	-2.3%	-33.2%
Sweden	306.8	230.6	33.5	25.0	7.9%	-25.3%
Canada	858.7	841.4	26.1	25.3	-3.3%	-2.8%
Australia	638.0	625.6	31.2	30.3	5.2%	-2.8%
Japan	4,400.3	4,292.0	34.5	33.7	-5.1%	-2.4%
France	2,064.5	2,108.0	33.5	34.0	2.7%	1.6%
United Kingdom	2,404.0	2,131.8	39.4	34.7	1.9%	-12.0%
Germany	3,148.2	3,081.0	38.1	37.2	-9.3%	-2.3%
USA	16,089.0	13,127.0	53.4	43.2	-3.4%	-19.1%

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# Passenger Cars (New Car Registrations) vs Consumers' Average Transportation Sub-Index Score

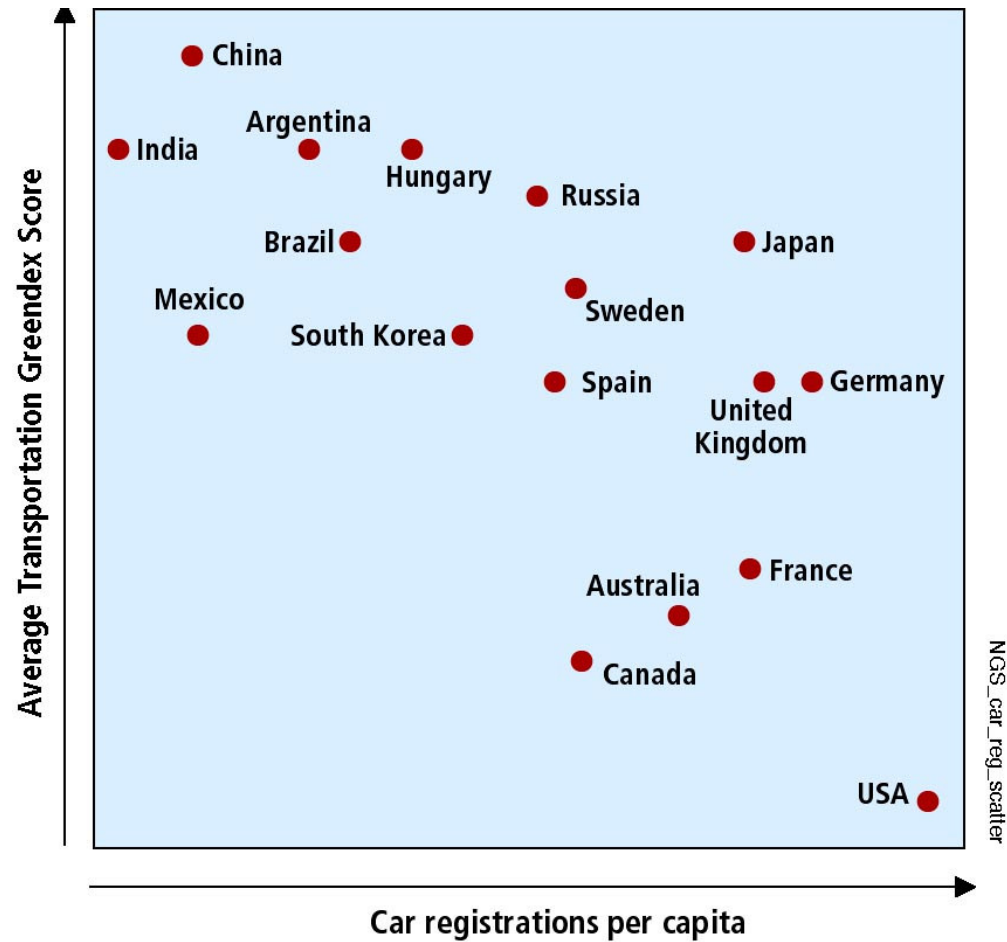


- There is an inverse correlation between the incidence of new car registrations per capita in a given country and its consumers' Transportation sub-index score. The higher the prevalence of new car registrations, the lower the Greendex score on Transportation.
- This inverse correlation will likely strengthen as the growth of economies in developing countries enables the emerging middle class to take advantage of new opportunities for increased personal mobility, though the slowdown in the global economy has likely put the brakes on this trend at least in the short term.
- Of particular note has been the growth of vehicle registrations in Russia. In 2006, there were 14.4 registrations per 1,000 Russian citizens, half the rate of 27.0 recorded in Canada. In 2008, registrations in Russia have risen to 23.0, almost equal to Canada's 25.3.

# New Car Registrations per Capita vs Consumers' Average Transportation Sub-Index Score



2008



# Number of Domestic and International Aircraft Passengers per 1,000 People

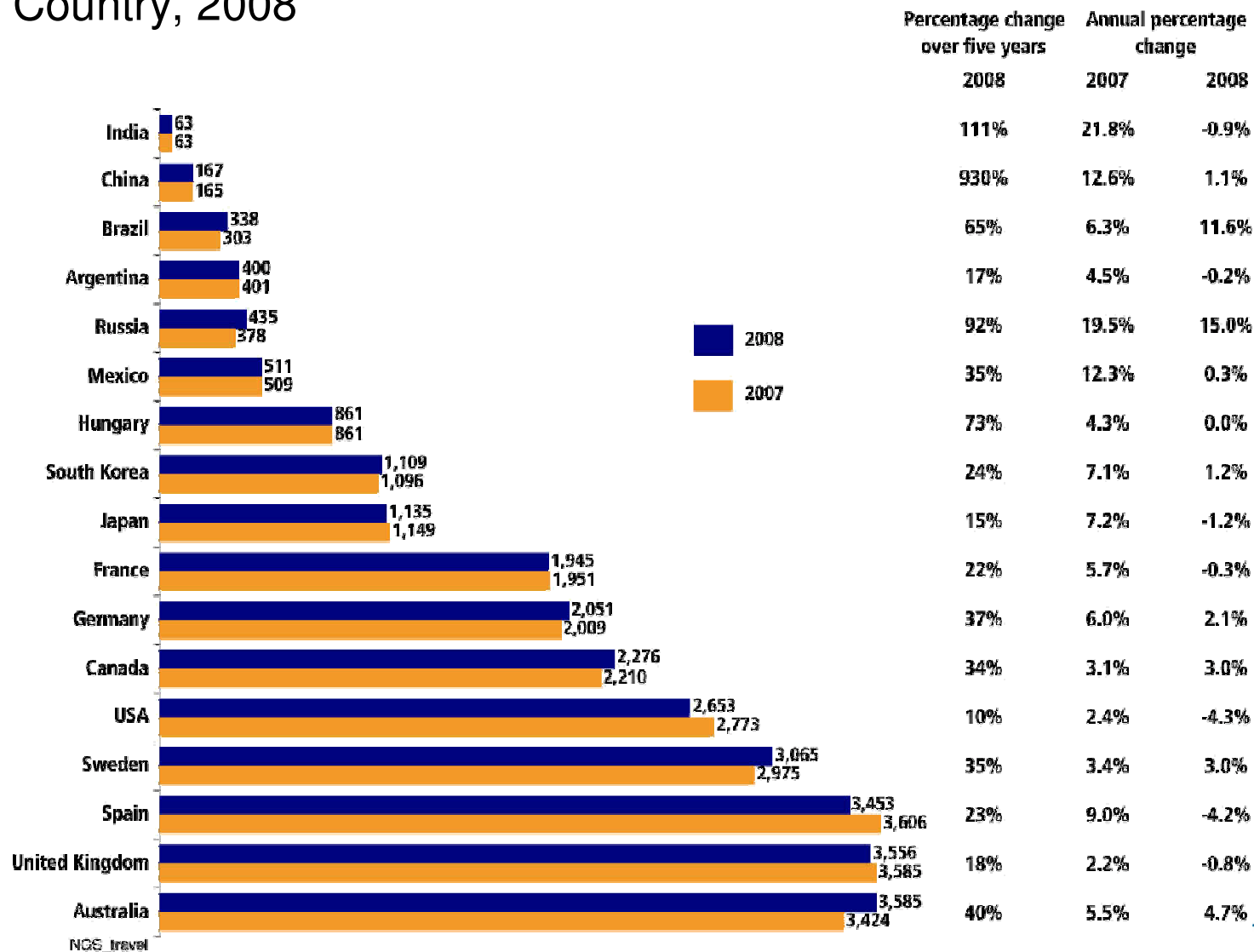


- People in the top three air traveling countries—Australia, UK and Spain—travel by air more than 50 times more frequently than consumers in India, and more than 20 times more frequently than consumers in China. While the incidence of air travel has increased significantly in China and India over the past 5 years, this growth has halted completely over the past year.
- While frequency of air travel increased substantially in Australia, it decreased slightly in the UK and by several percentage points in Spain between 2007 and 2008. While the frequency of air travel remained fairly stable between 2007 and 2008 in most of the remaining countries, the rate of growth has clearly slowed substantially in most of them compared to the previous year. If this trend continues we may expect to see decreased air travel in these markets.
- Frequency of air travel in the United States decreased by several percentage points between 2007 and 2008, most likely as a result of the economic crisis.

# Number of Domestic and International Aircraft Passengers per 1,000 People



## By Country, 2008



# Number of Domestic and International Aircraft Passengers per 1,000 People

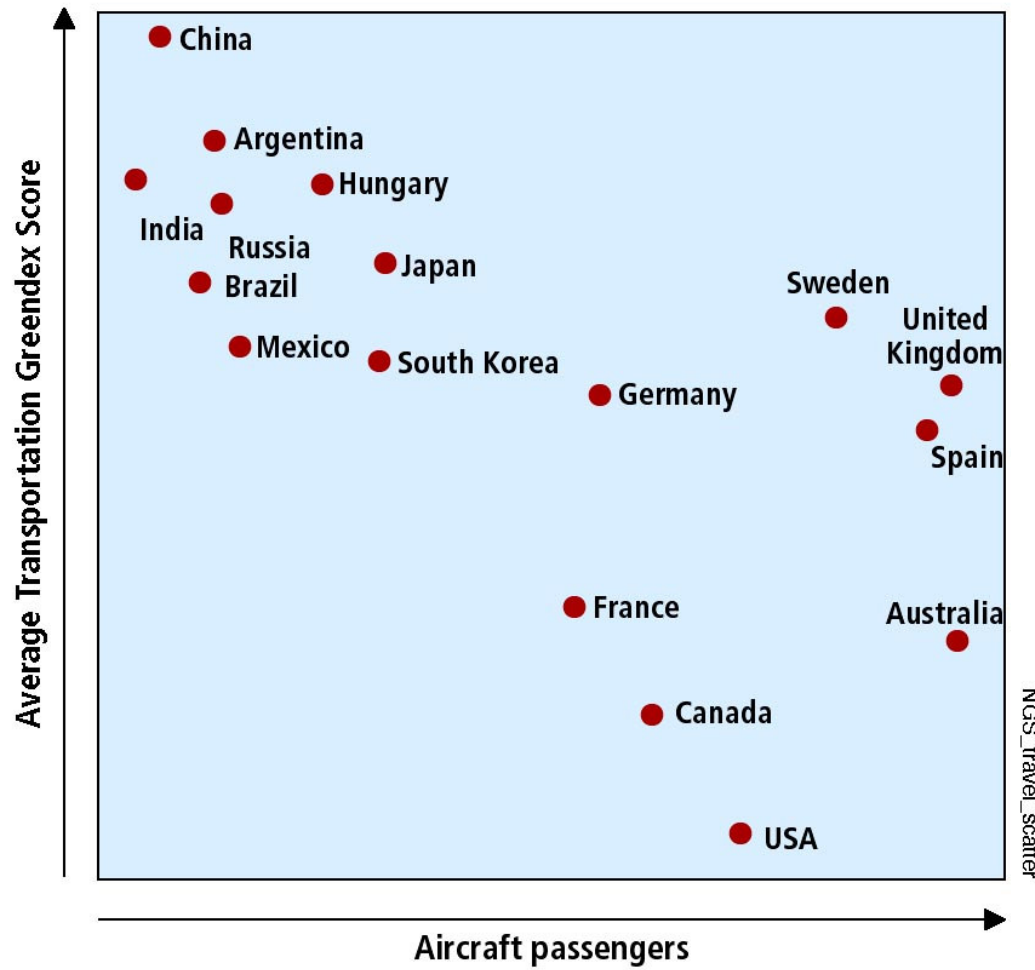


- There is a correlation between the frequency of air travel per capita and the Greendex Transportation score, although in Sweden, the United Kingdom, and Spain, consumers score relatively well on the Transportation sub-index despite very high incidence of flying. Generally, however, the higher the incidence of flying, the greater the environmental impact as reflected in a lower index score.
- This also highlights the strong relationship between wealth, size, and isolation of country, and the propensity to travel by air. Countries such as the USA, Australia, and Canada, are large land masses populated by relatively high proportions of wealthy citizens, whereas Spain, Sweden, and the United Kingdom are geographically removed from continental Europe.
- China, Brazil, India, and Russia may be expected to adopt the same attraction to air travel if not constrained by lower per capita incomes. Growing per capita incomes in these countries have led to an increased frequency of air travel, which is mirrored in a decrease in consumers' Transportation Greendex index scores.

# Number of Aircraft Passengers per 1,000 People vs Consumers' Average Transportation Sub-Index Score



2008



# Final Consumption Expenditure by Household on Hotels and Restaurants



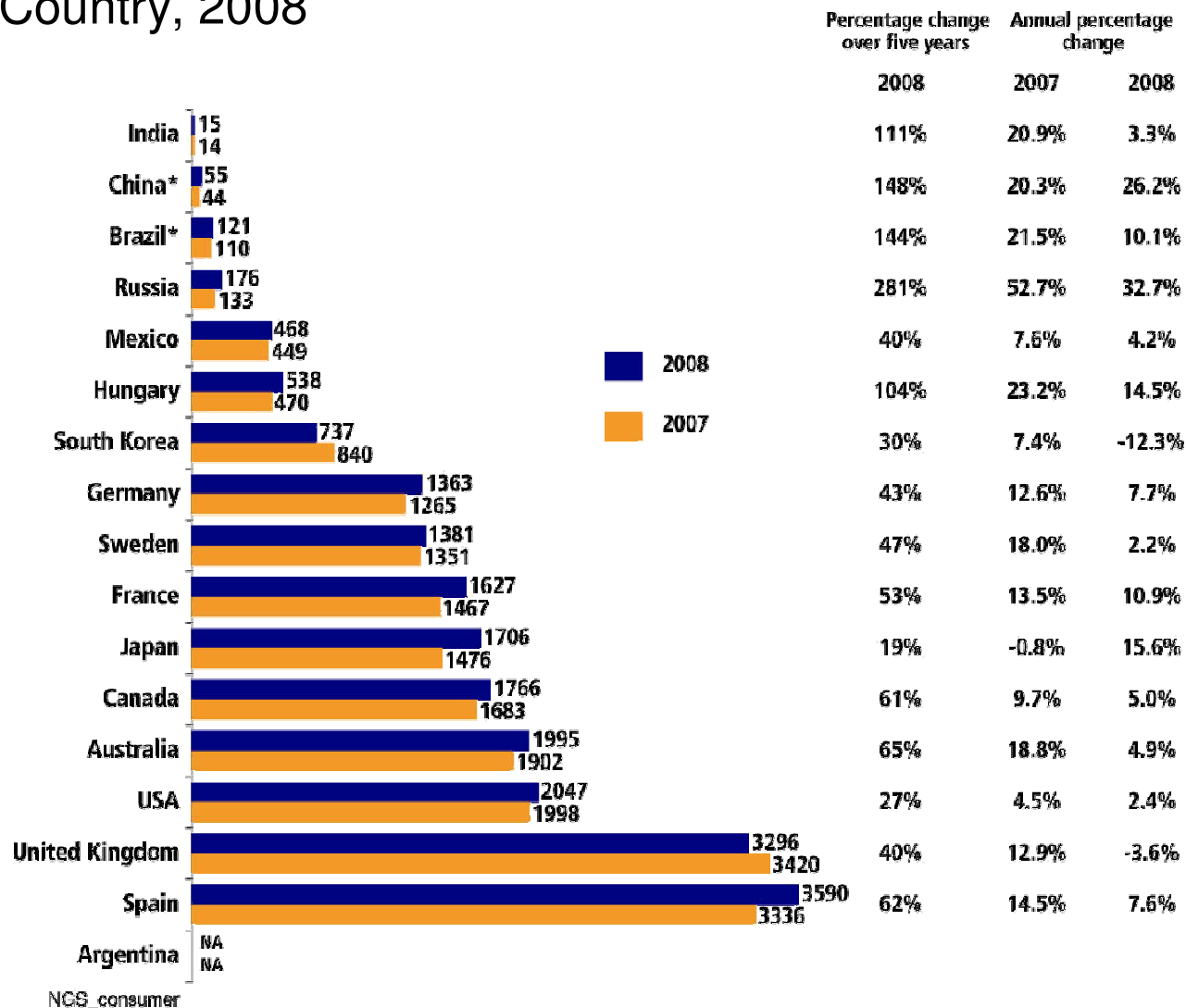
- The spending on restaurants and hotels represents a combination of two of the Greendex sub-indices—Food and Transportation.
- A vast difference in per capita expenditures on hotels and restaurants between developed and developing countries remains, although spending is increasing at a fast rate in some emerging economies as incomes grow.
- Russia has experienced an explosion in per capita expenditure over five years, while Brazil, China, Hungary, and India all have more than doubled their per capita expenditure during the same period. These countries currently have among the lowest per capita spending rates, but are clearly moving towards a pattern of higher consumer expenditure, presenting a challenge in terms of their future environmental footprint.



# Final Consumption Expenditure by Household on Hotels and Restaurants



US\$, by Country, 2008



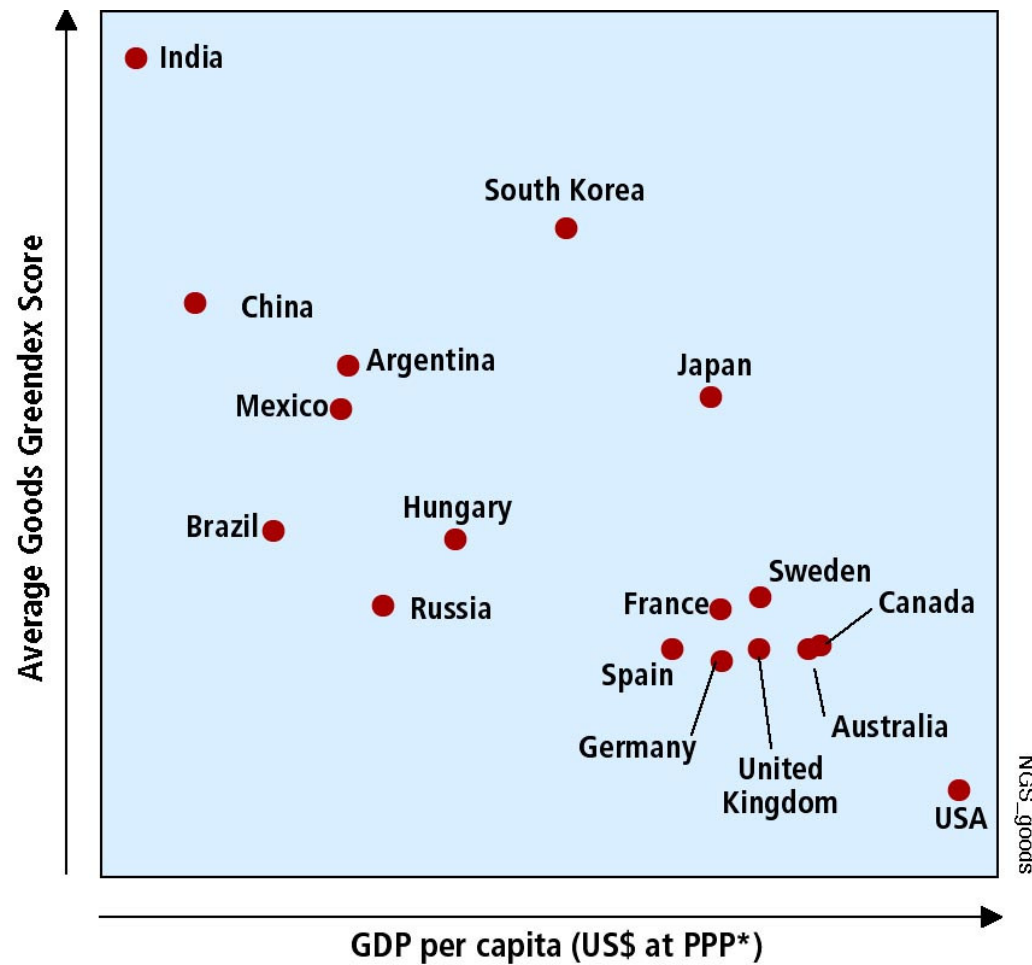
# Purchasing Power and Consumption of Goods



- There is a correlation between per capita wealth—as measured by the Purchasing Power Parity of Gross Domestic Product—and the propensity to acquire goods. Generally, consumers in countries with higher per capita wealth tend to score lower on the Greendex Goods sub-index, reflecting their relatively larger environmental footprints.
- South Korean and Japanese consumers, however, tend to score relatively highly on the Goods sub-index despite being relatively wealthy. Smaller environmental footprints of consumers in these two countries are a result of some positive purchasing behaviors (such as Koreans avoiding environmentally unfriendly products and excess packaging) and consumers being less likely to own certain major appliances than consumers in other wealthy countries.
- This shows that as developing countries become more wealthy, it does not necessarily have to result in a greater negative impact on the environment, provided consumers are given legitimate purchasing options.

# GDP per Capita vs Consumers' Average Goods Sub-Index Score

2008



- From country to country, the Market Basket data correlate well with consumers' Greendex scores. That is, the Greendex scores are generally indicative of actual consumption patterns in the countries studied.
- Although strong momentum toward increased energy and resource consumption in the categories measured by the Market Basket remains in the large developing countries, energy and resource consumption is stable or declining in most developed countries—resulting in a smaller environmental footprint as measured by the Greendex.
- It remains to be seen how the current economic crisis will continue to affect consumers' environmental footprint, although we may expect stagnant or decreasing energy and resource consumption to at least temporarily slow the pace of environmental damage. The challenge is how to make these changes permanent.