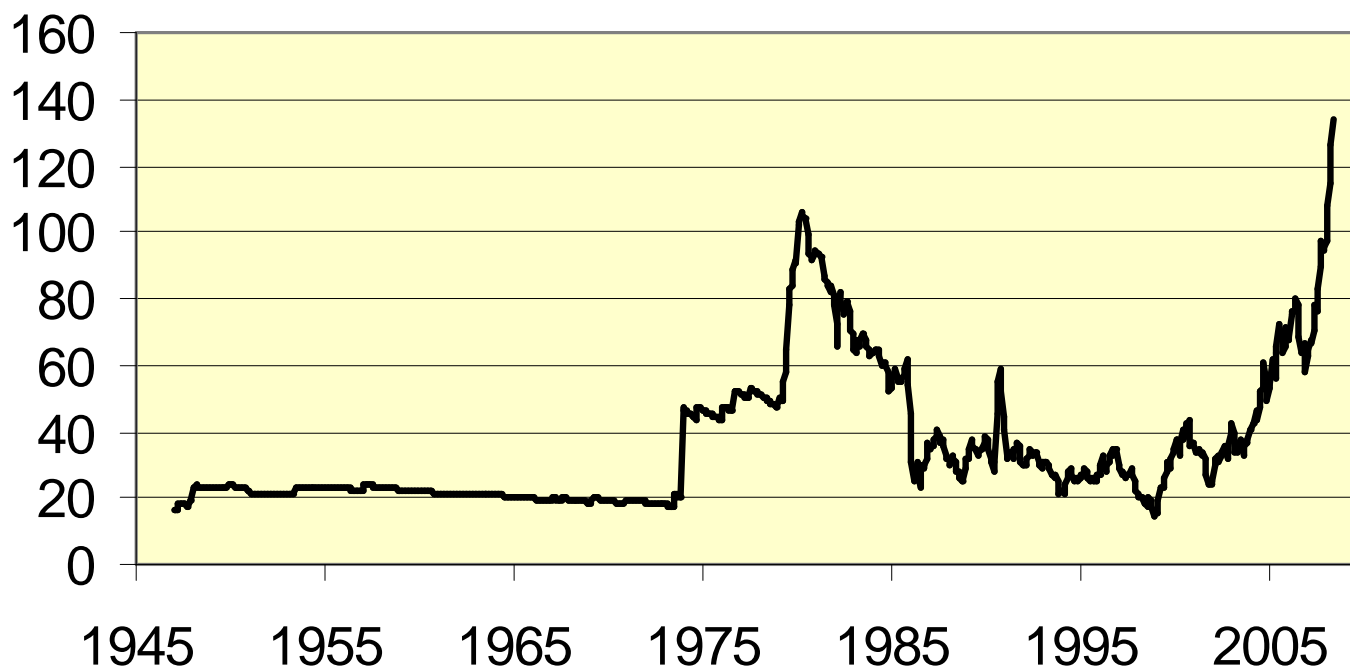




# World Oil Markets: Implications for Consumers, Producers, and the World Economy

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**Dept. of Economics, UCSD**

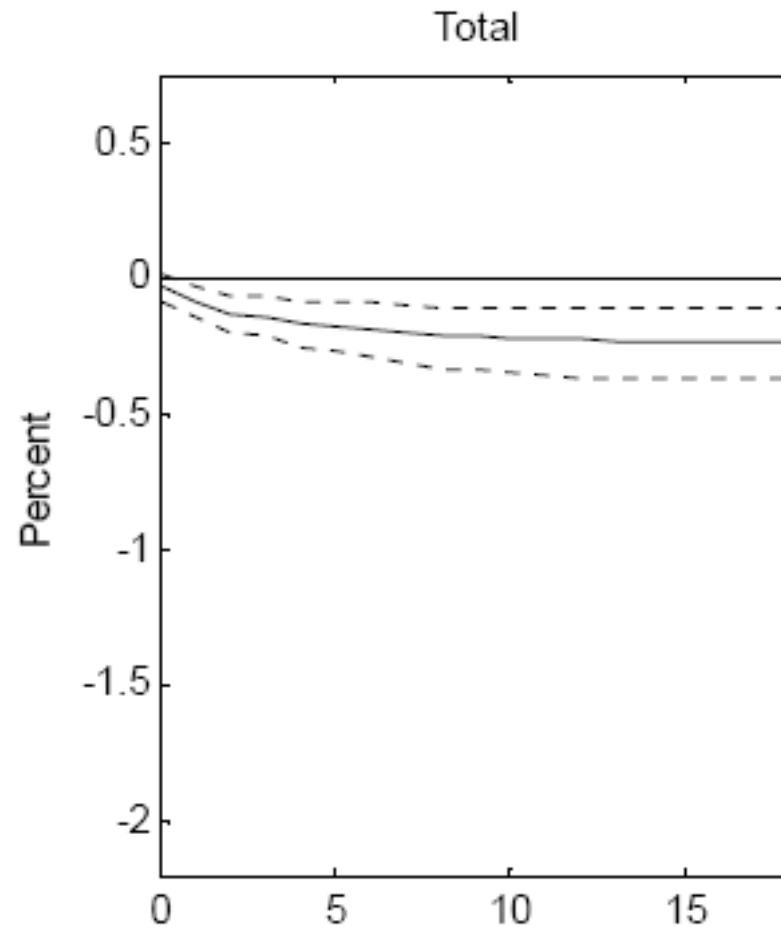
**Inflation-adjusted price of crude oil  
(West Texas Intermediate, 2008 dollars)**



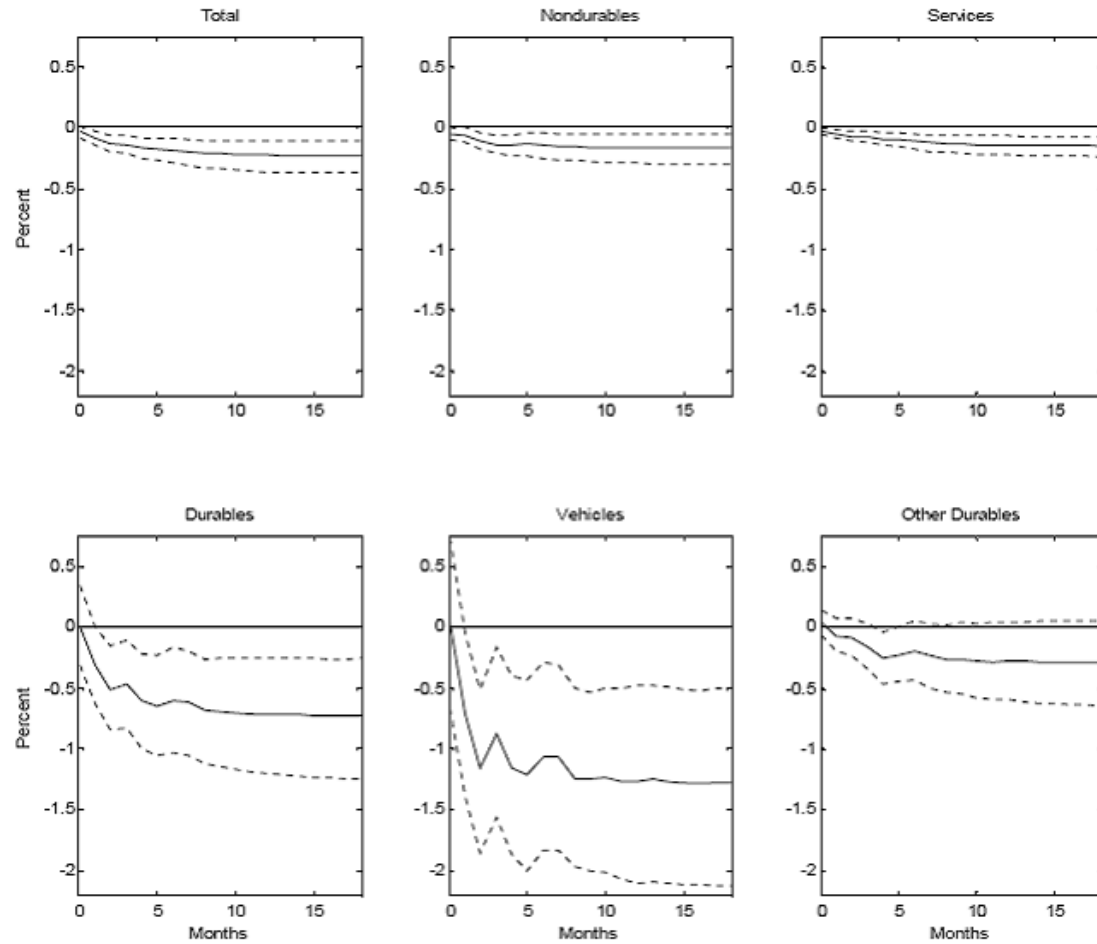
Key parameter in any economic model of oil effects: **value share** = dollar value of expenditures on oil divided by dollar value of total expenditures

Reason: individual consumer has option to keep buying same amount as before, meaning **dollar loss** = quantity purchased times price change

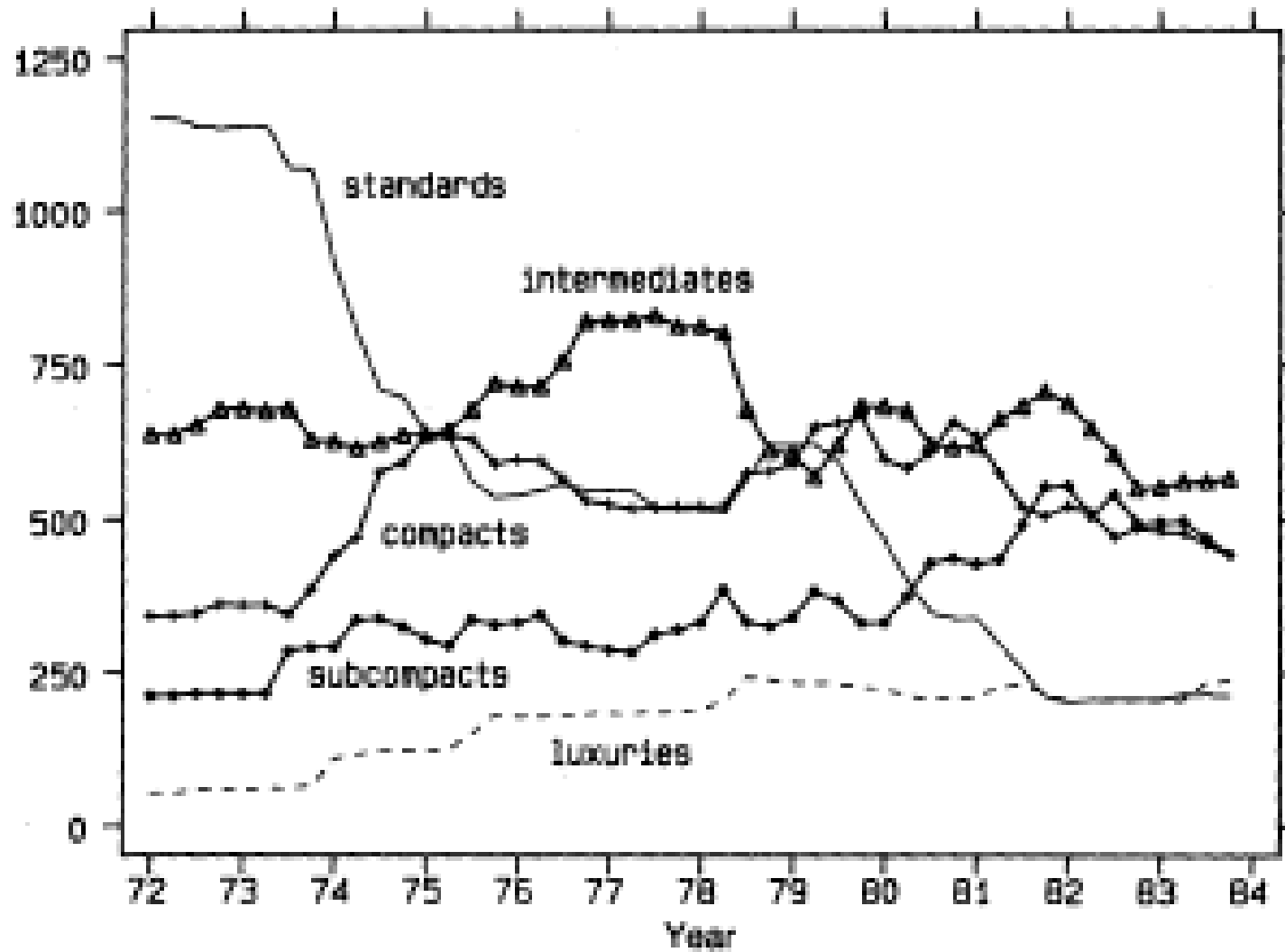
Observed average percent change in total consumption spending  $m$  months following an energy price increase that reduces purchasing power 0.1% (e.g.,  $\% \Delta P = 5$  and share = 0.02). Source: Edelstein and Kilian (2007).



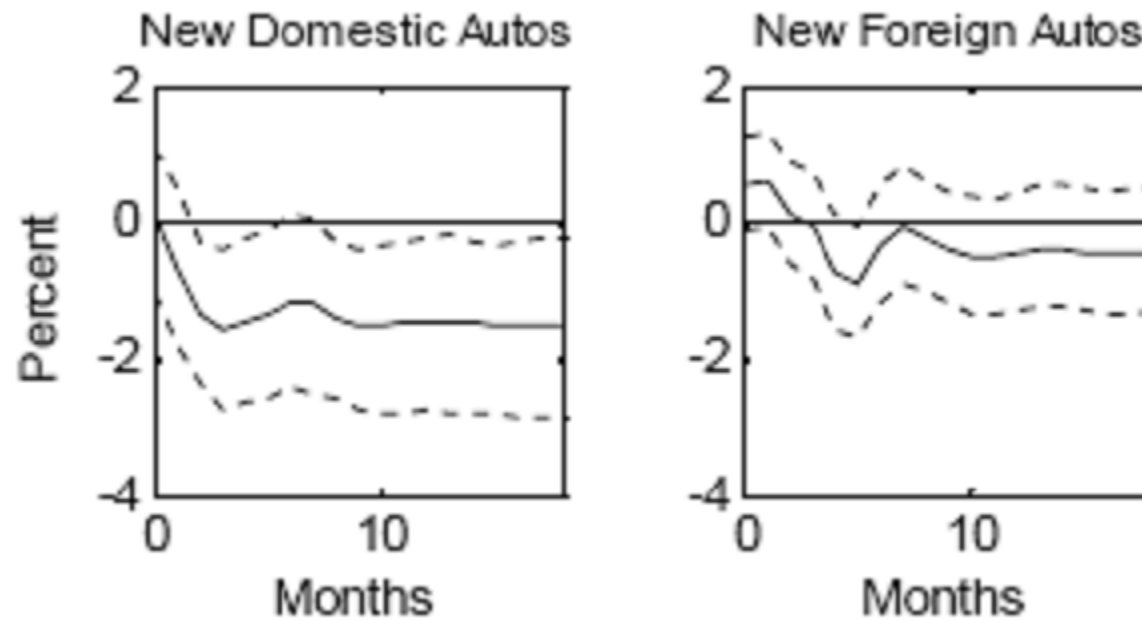
Observed average percent change in indicated category of consumption  $m$  months following an energy price increase that reduces purchasing power 0.1% (e.g.,  $\% \Delta P = 5$  and  $a = 0.02$ ). Source: Edelstein and Kilian (2007).



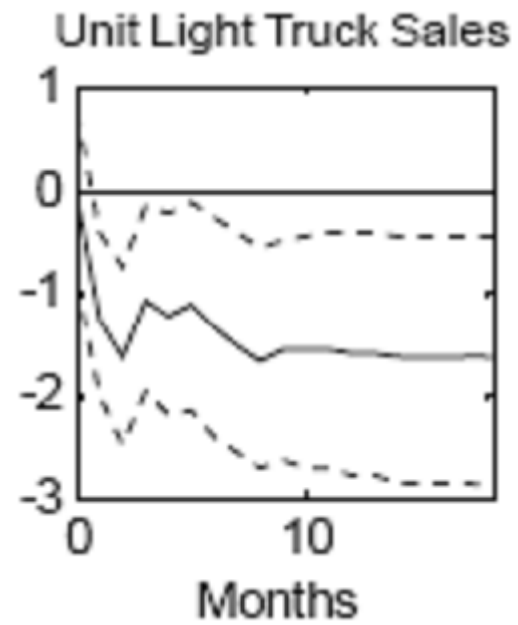
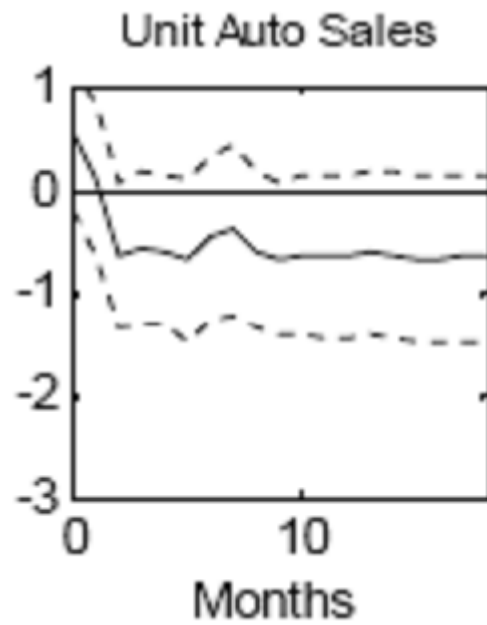
U.S. auto capacity by segment (thousands of units per quarter).  
Source: Bresnahan and Ramey, *American Economic Review*, May 1993.



Shift away from domestically manufactured vehicles.  
Source: Edelstein and Kilian (2007).



Shift away from light trucks (SUVs).  
Source: Edelstein and Kilian (2007).

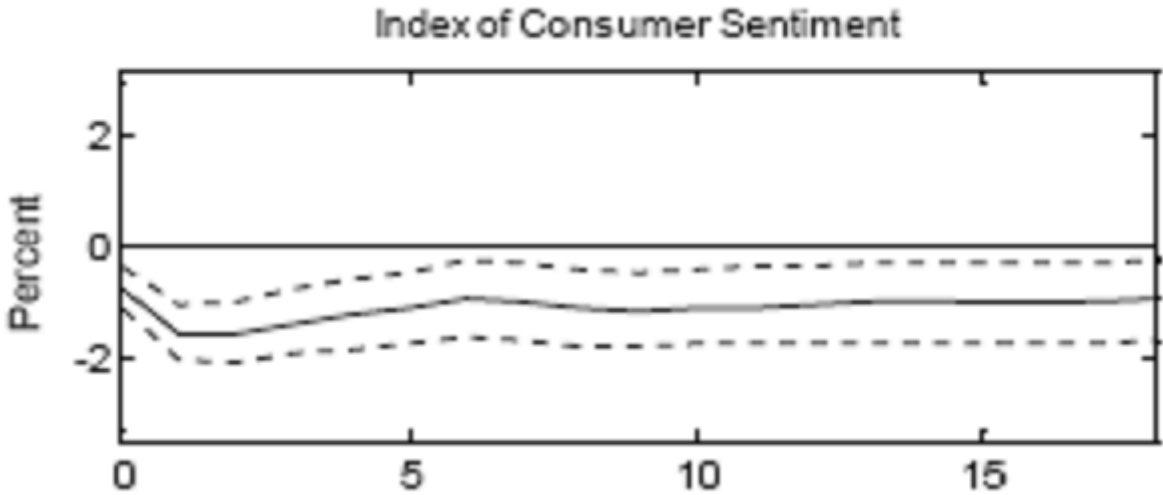




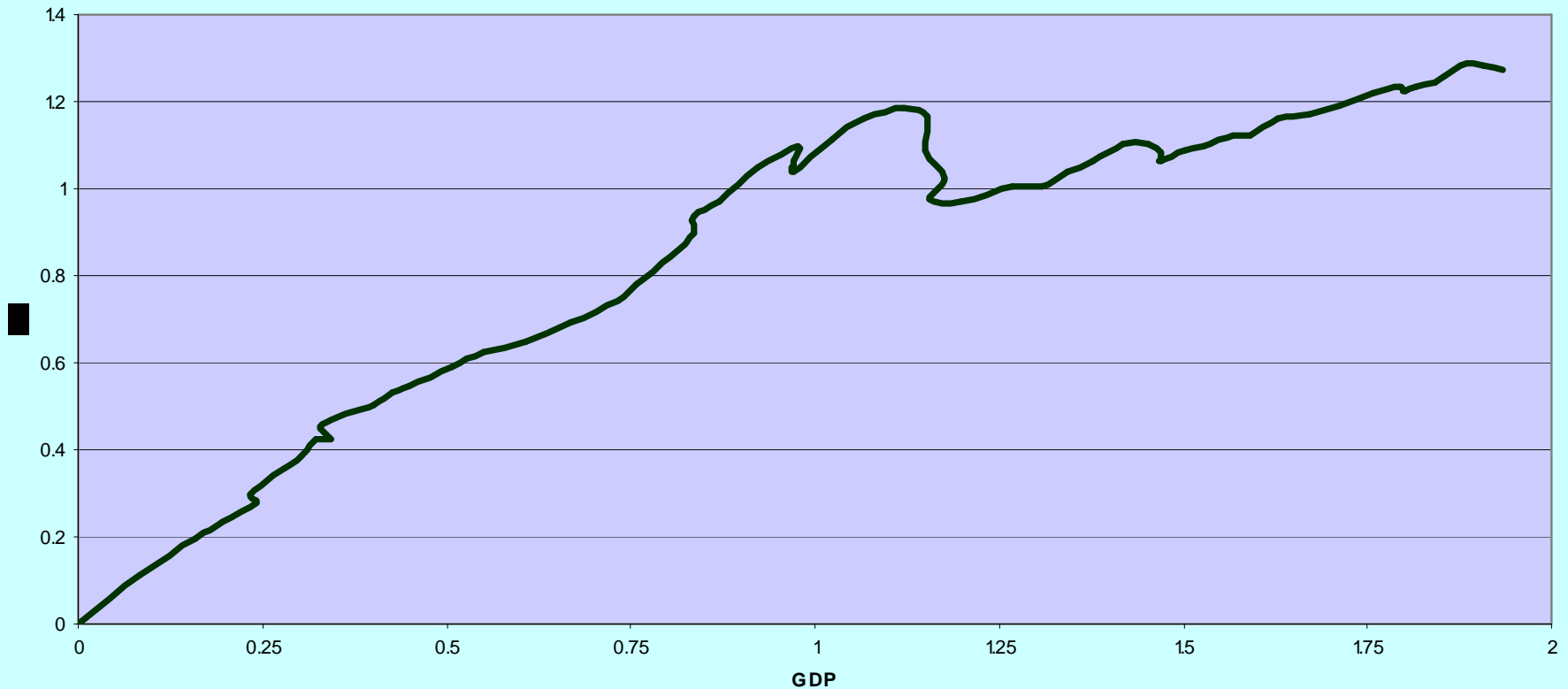
# Average GDP growth in 4 quarters following big oil price increases

Date of oil price spike	Average actual GDP growth following 4 qtrs	GDP growth if motor vehicles had no change
1974:Q1	-1.9%	-1.2%
1979:Q3	-0.6%	+0.1%
1981:Q1	1.3%	1.5%
1990:Q3	-0.6%	-0.1%

Historical oil shocks also often followed by rapid loss of consumer confidence. Source: Edelstein and Kilian (2007).



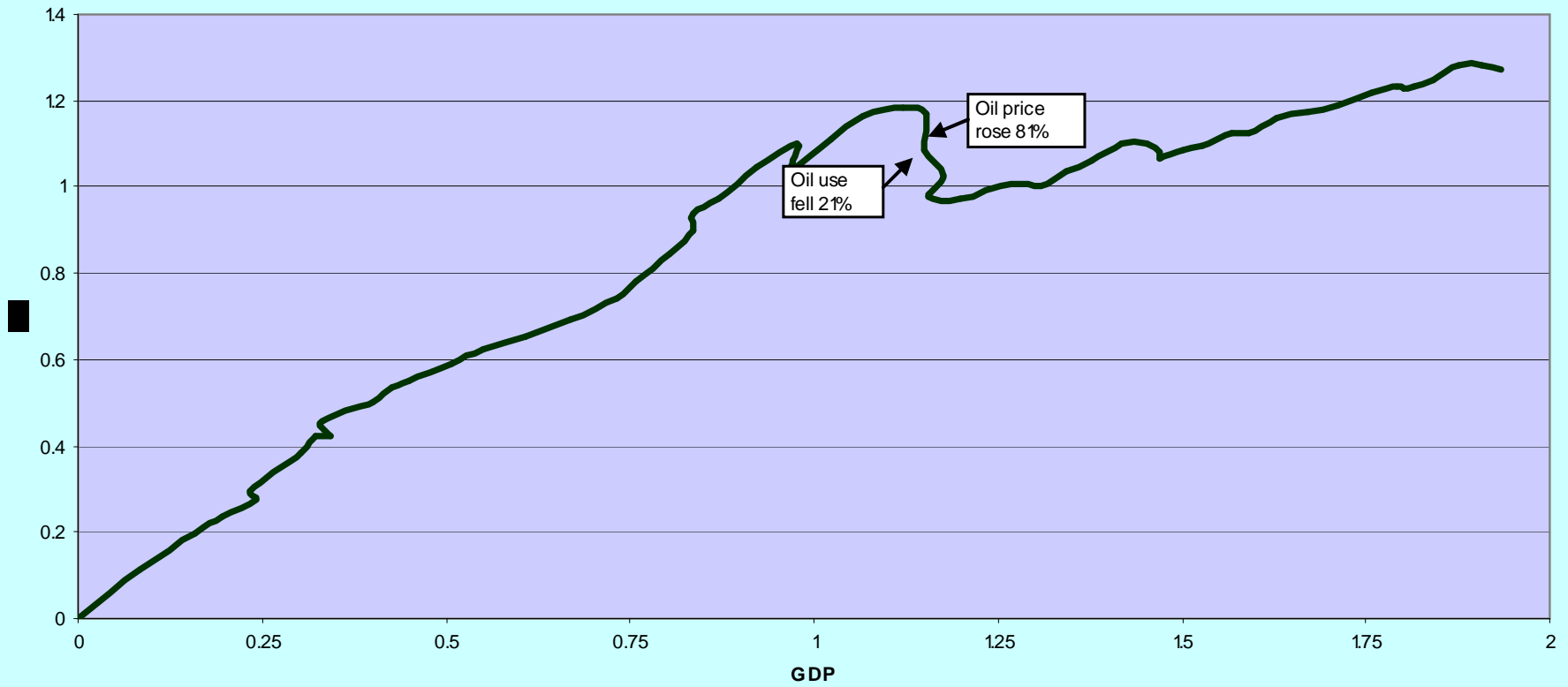
Cumulative logarithmic change in U.S. real GDP since 1949 (horizontal axis)  
and in U.S. oil consumption (vertical axis)



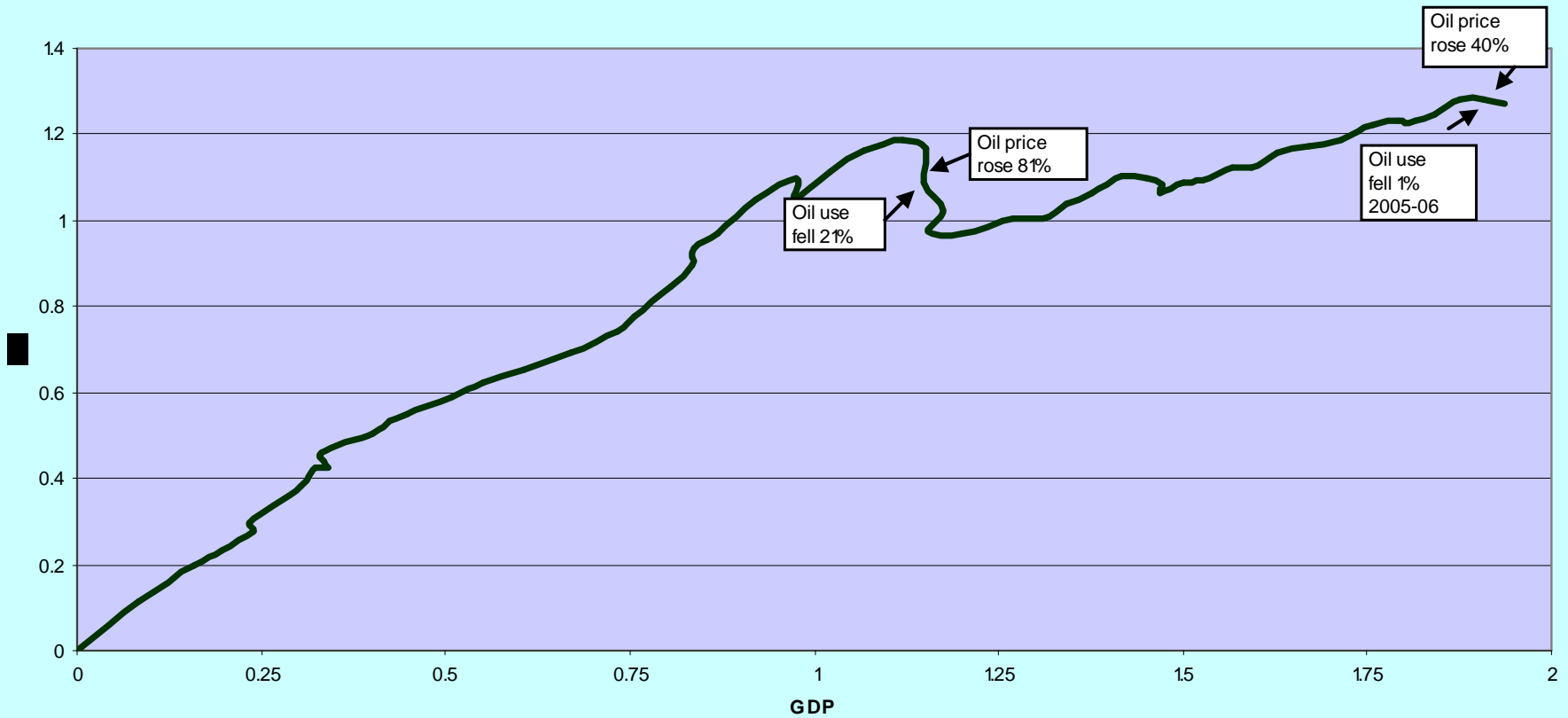
$$e^{1.94} = 7 \rightarrow (2006 \text{ GDP}) / (1949 \text{ GDP}) = 7$$

$$e^{1.27} = 3.6 \rightarrow (2006 \text{ oil}) / (1949 \text{ oil}) = 3.6$$

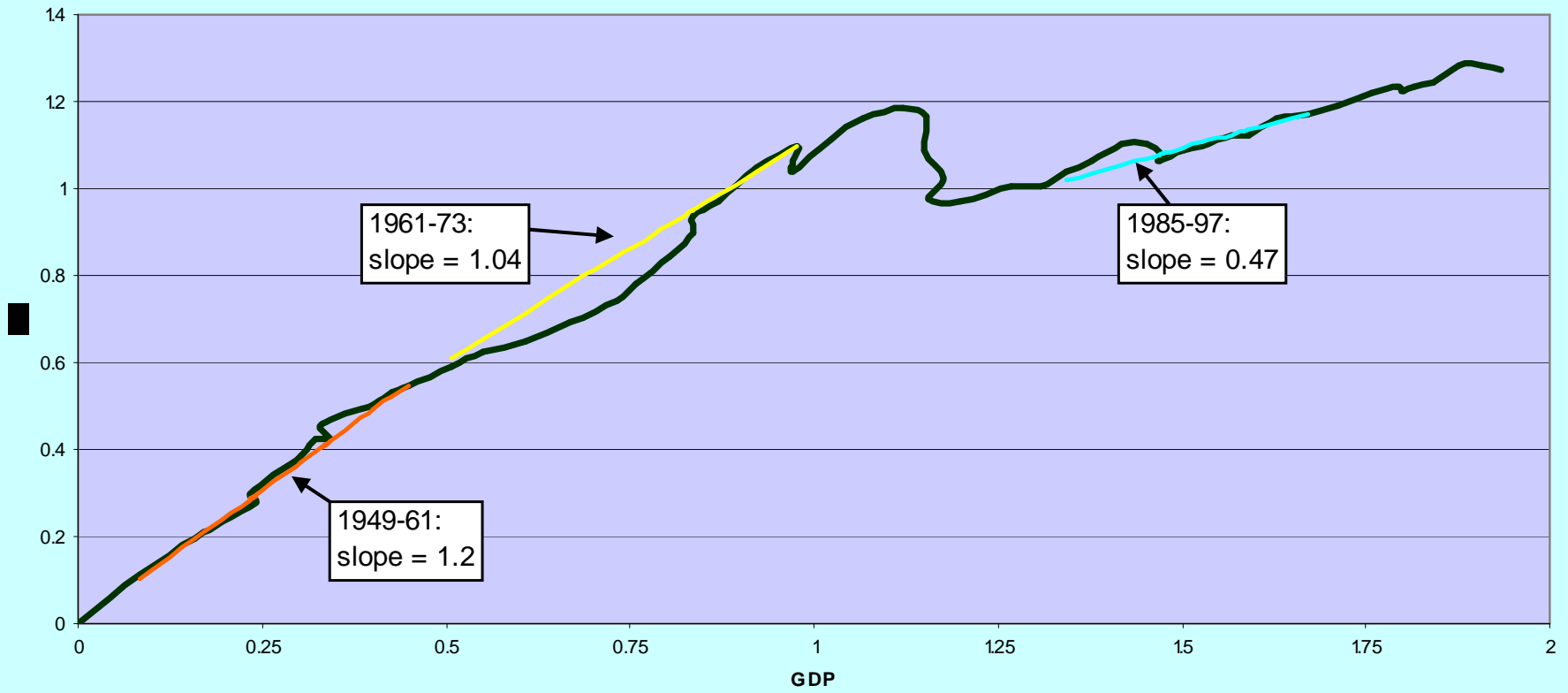
Cumulative logarithmic change in U.S. real GDP since 1949 (horizontal axis)  
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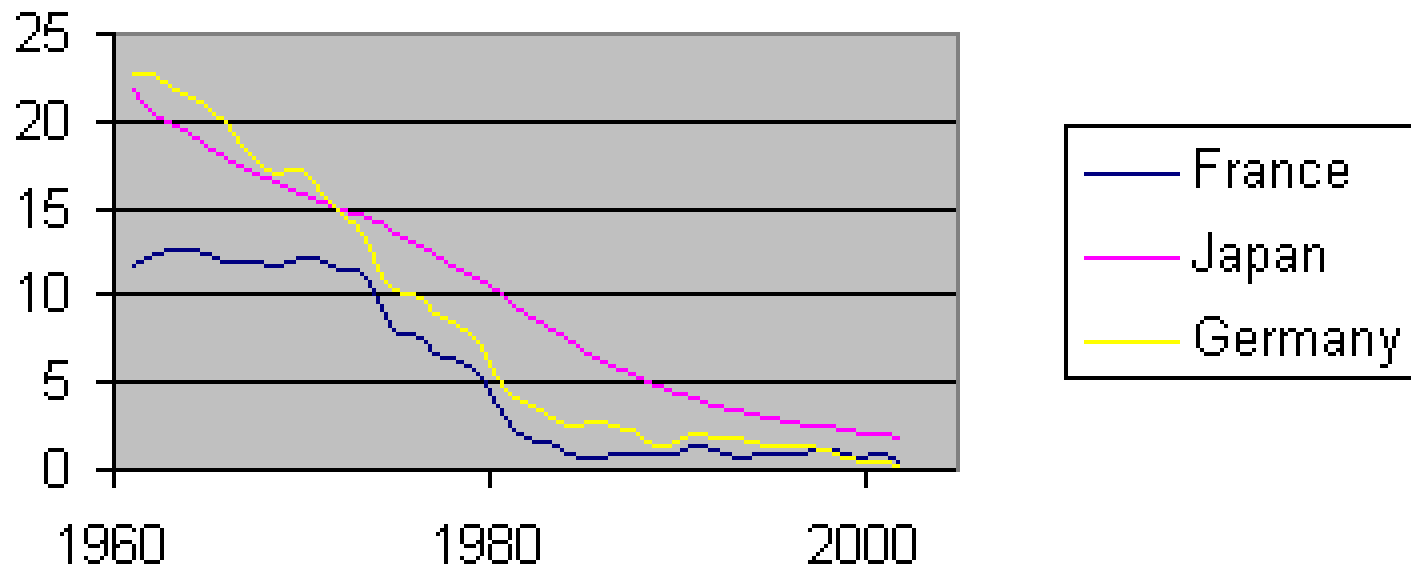
Cumulative logarithmic change in U.S. real GDP since 1949 (horizontal axis)  
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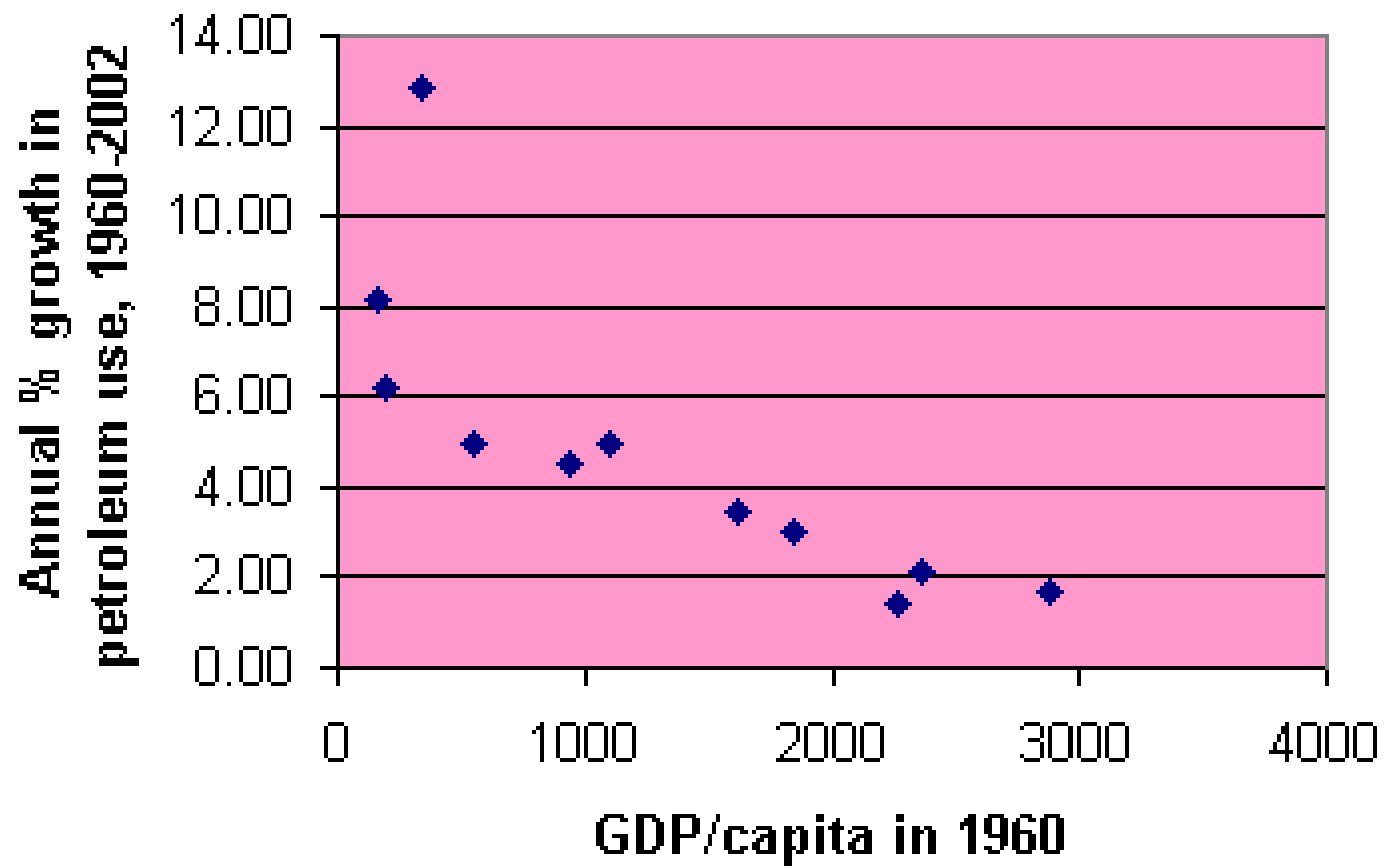
Cumulative logarithmic change in U.S. real GDP since 1949 (horizontal axis)  
and in U.S. oil consumption (vertical axis)



## Smoothed annual growth rate of petroleum demand

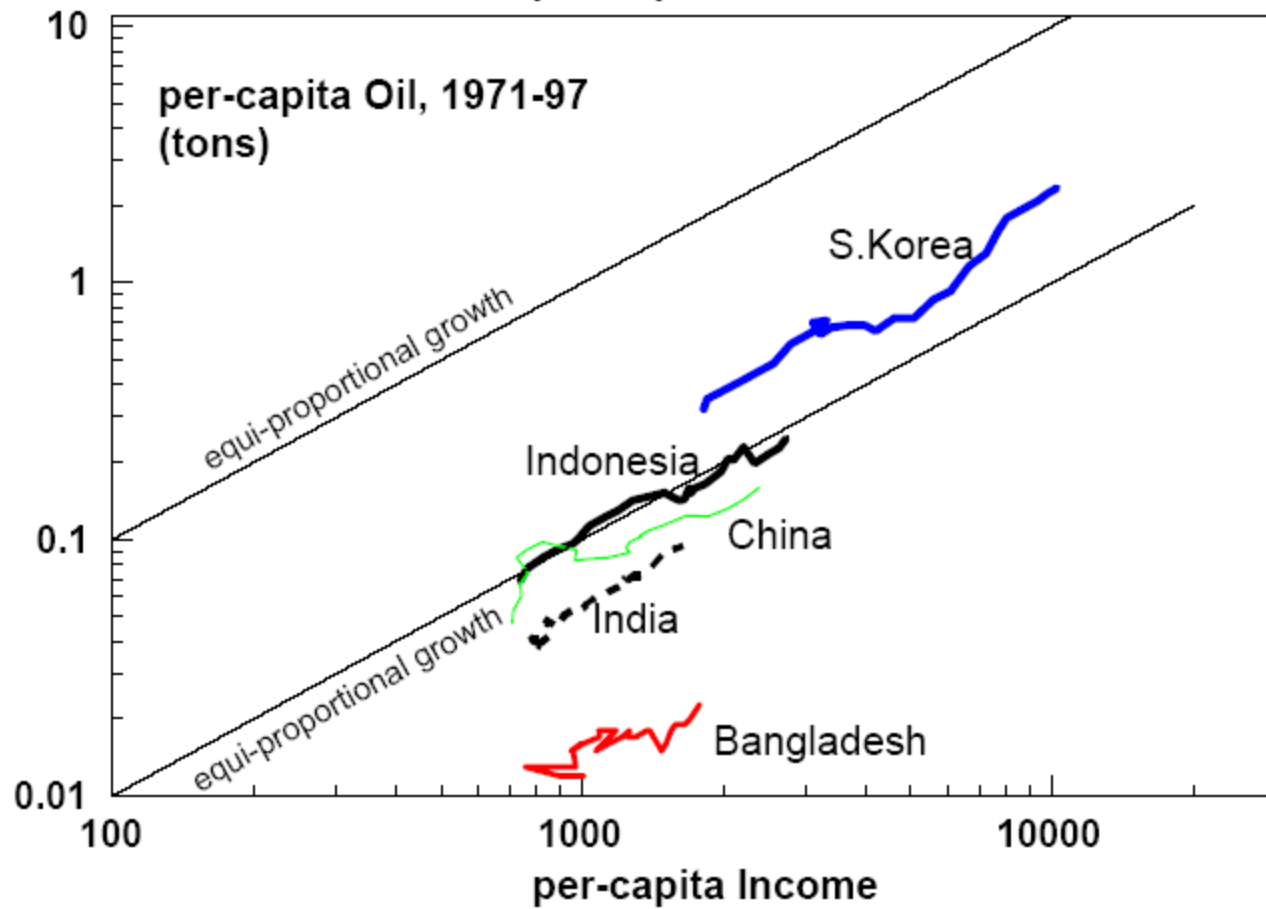


## GDP per capita and growth in petroleum demand





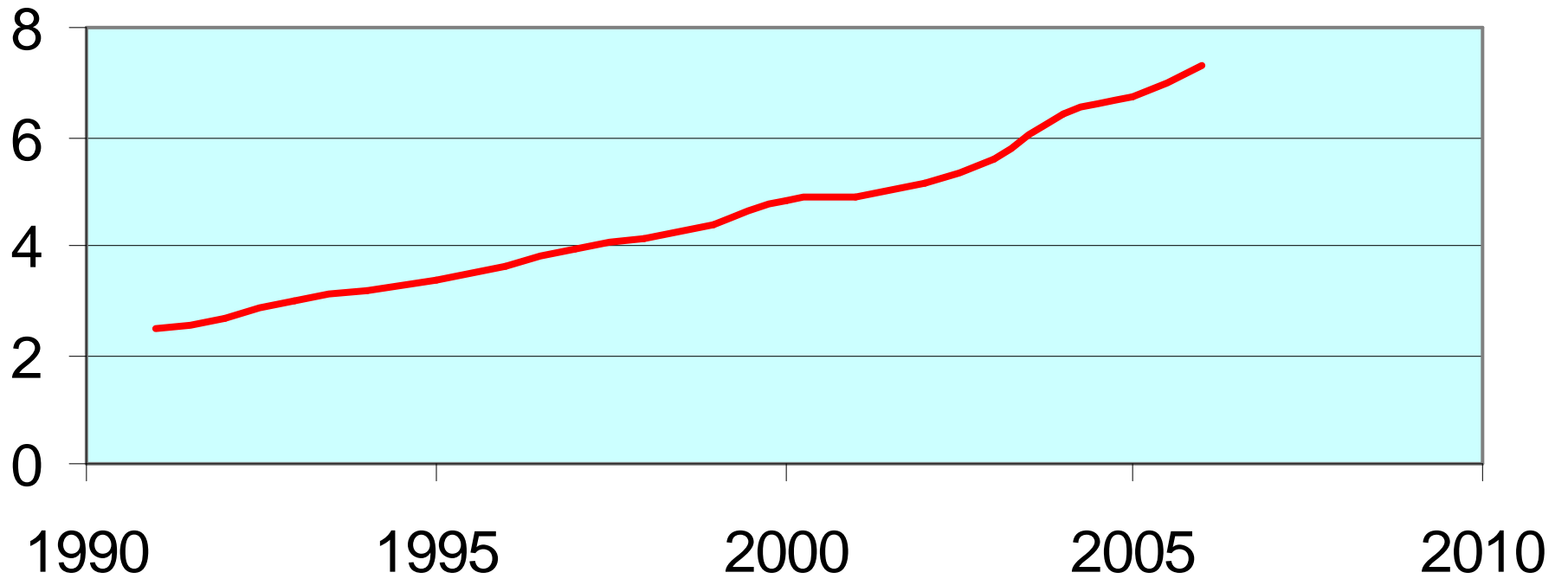
Income elasticity for developing countries is closer to 1



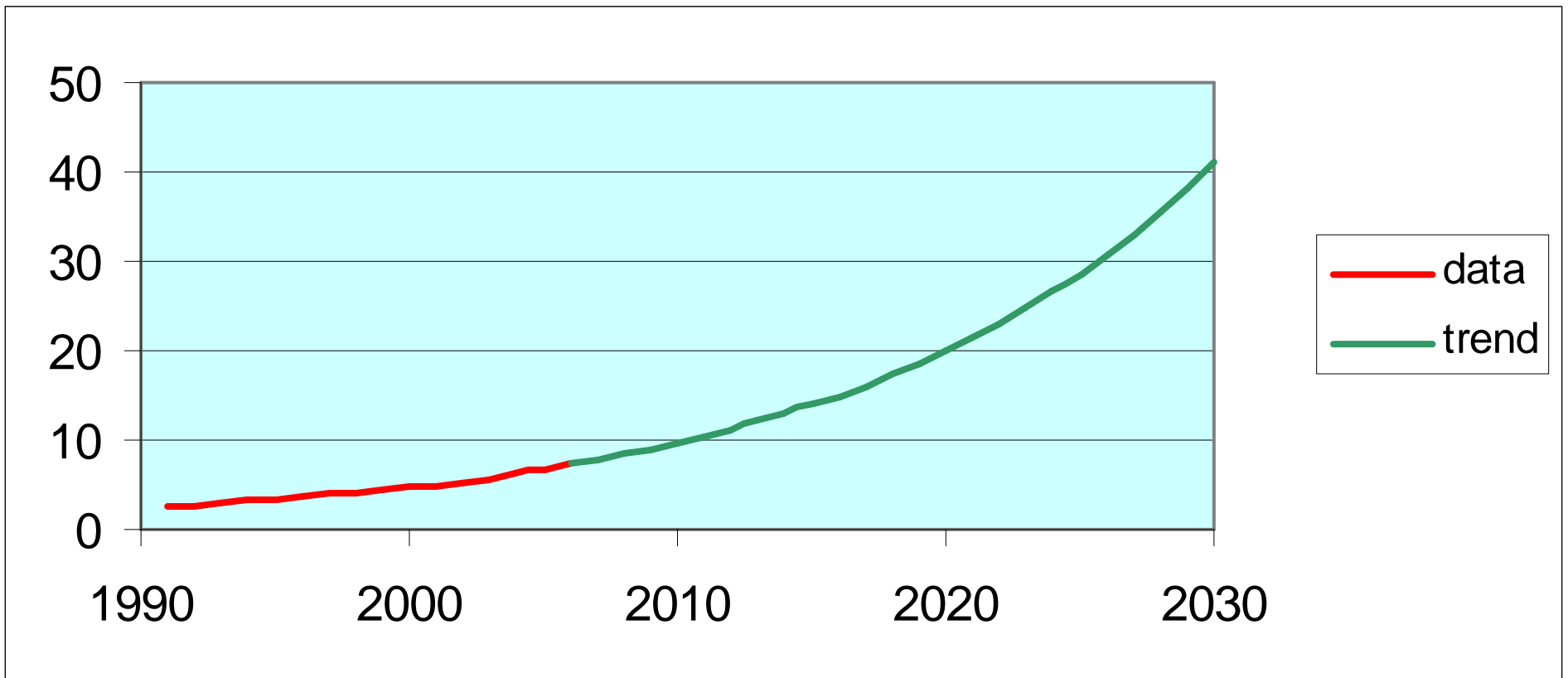
Source: Gately and Huntington, 2001

7.2% per year!

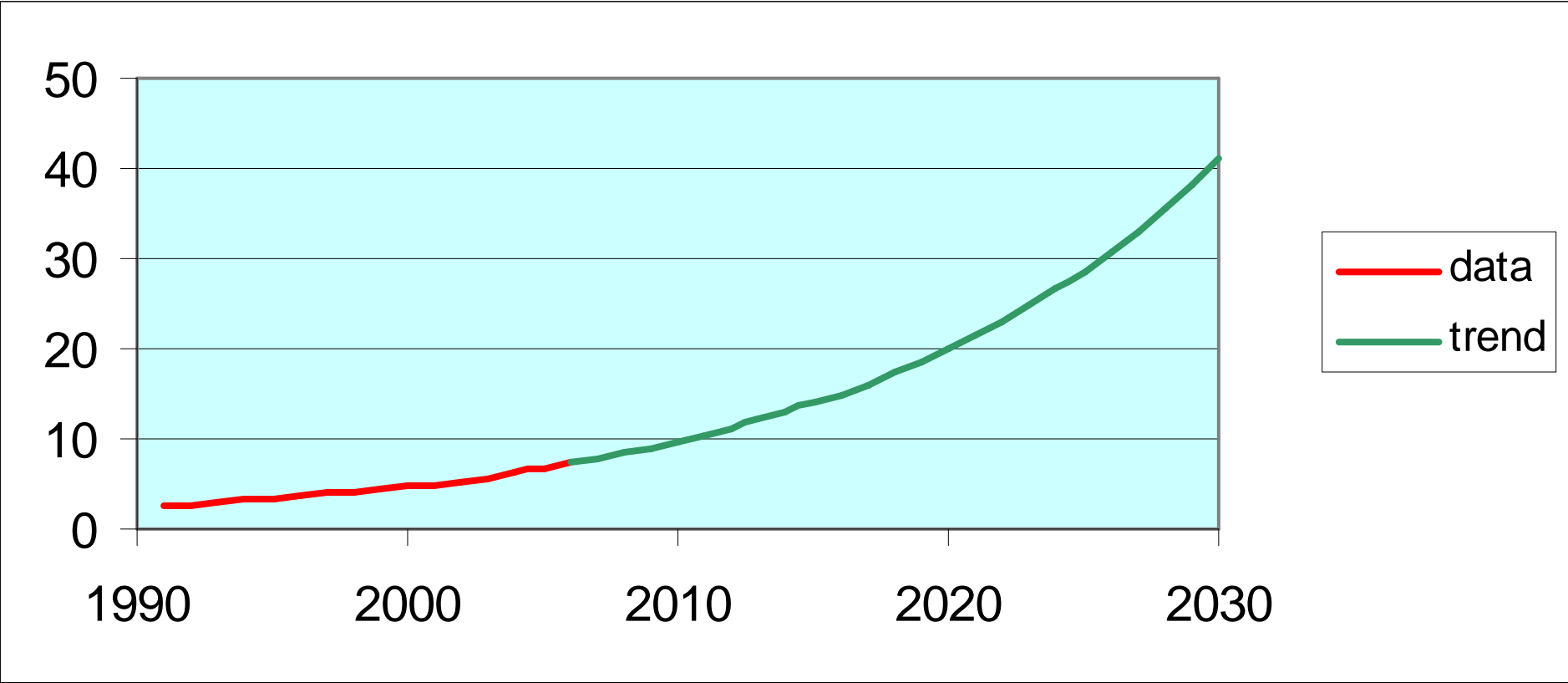
## Chinese oil consumption (mb/d)



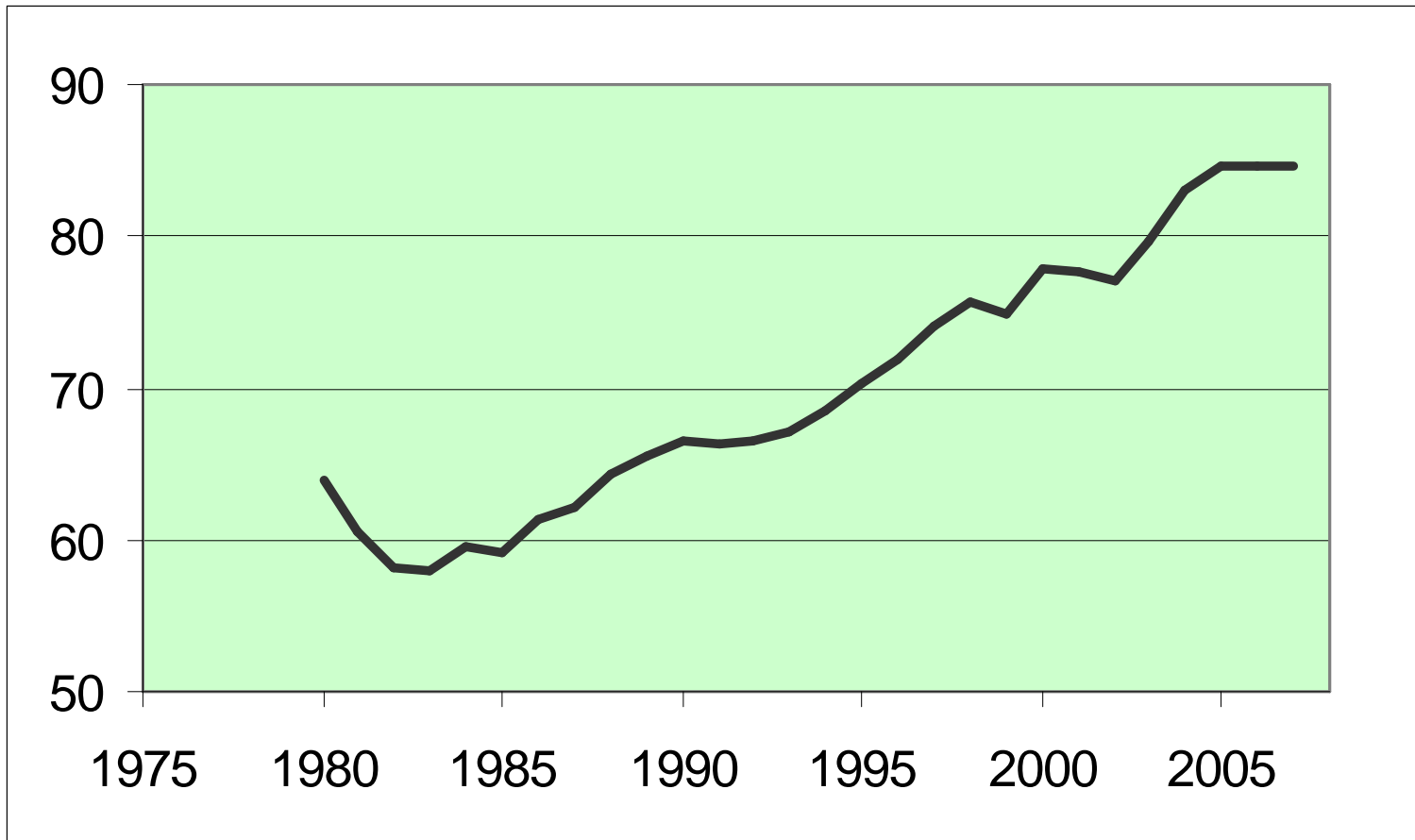
By 2020, China would be using 20 mb/d (= current U.S.)  
By 2030, China would be using 40 mb/d

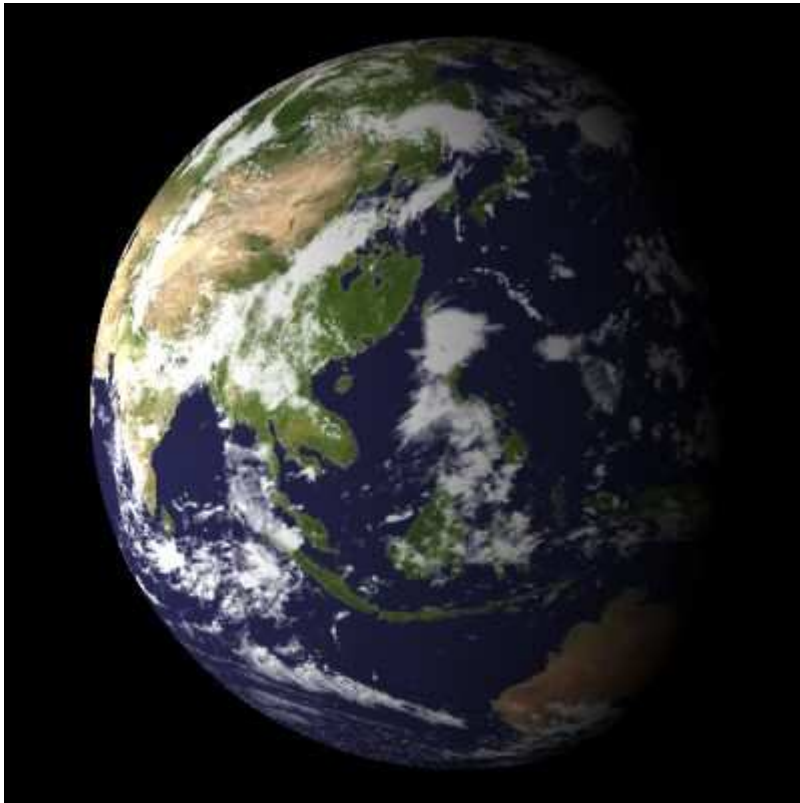


Oil use per person in China is less than 1/3 current value for Mexico.  
China has 3.3 vehicles per 100 residents, compared with 77 in U.S.



# World crude oil production (million barrels per day)

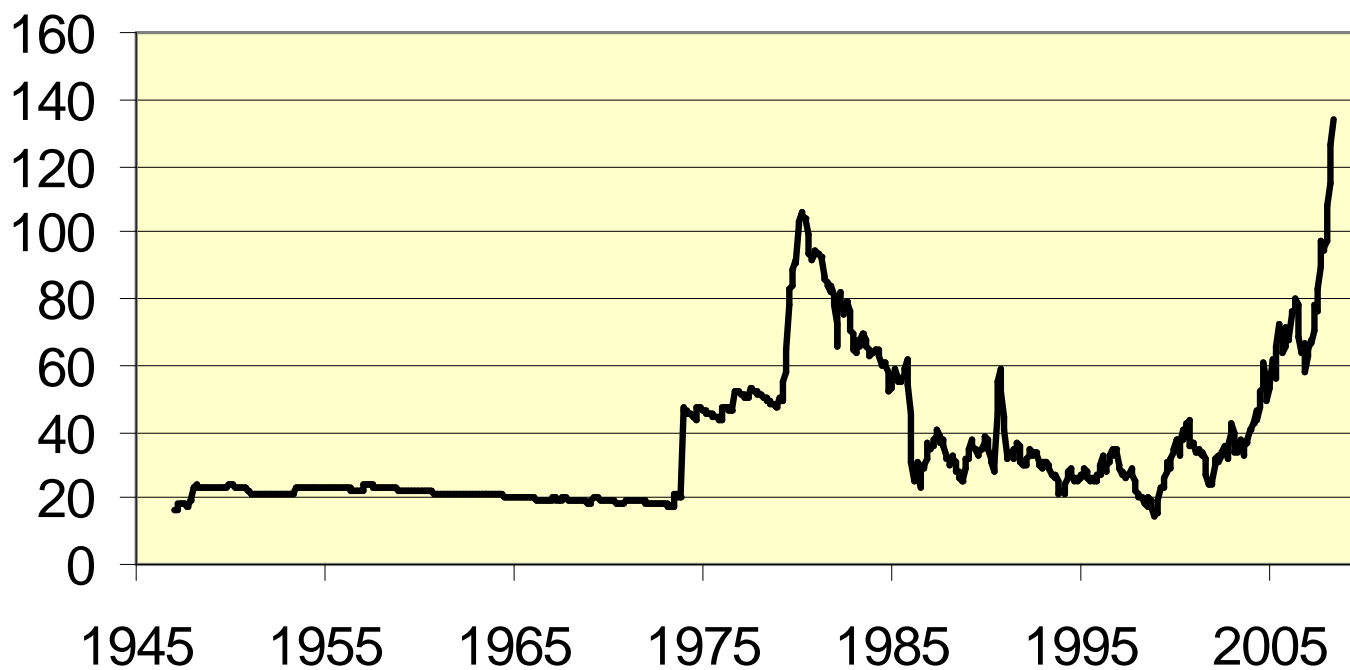




2005-2007:

- China increased consumption by 860,000 b/d
- World production actually fell slightly
- OECD countries decreased consumption by 720,000 b/d

**Inflation-adjusted price of crude oil  
(West Texas Intermediate, 2008 dollars)**



Income elasticity of oil demand for U.S. is less than 1 (% change oil < % change GDP)

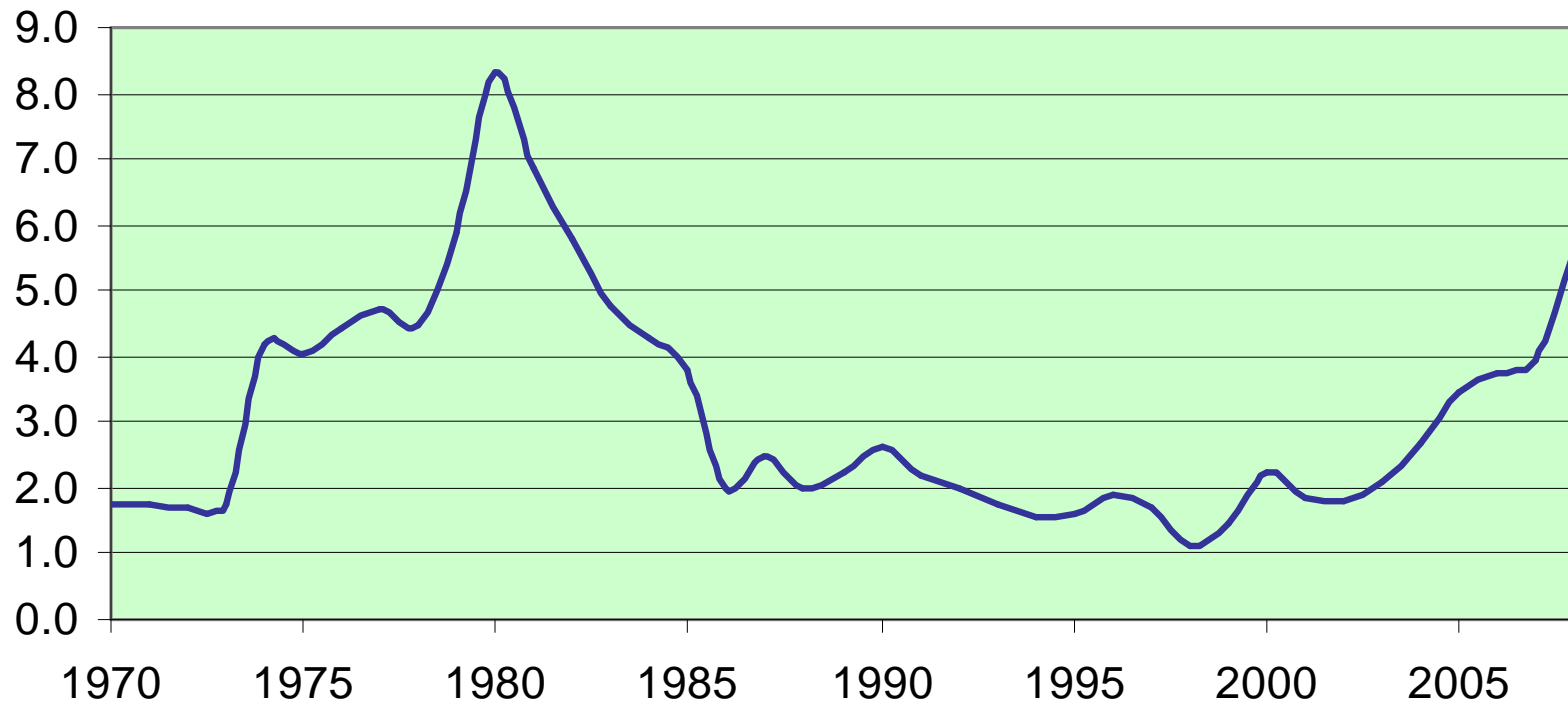
Implies dollar share of oil in GDP would fall over time

Price elasticity of oil demand is less than 1 (% change oil < % change price)

Implies dollar share of oil in GDP rises when price of oil rises

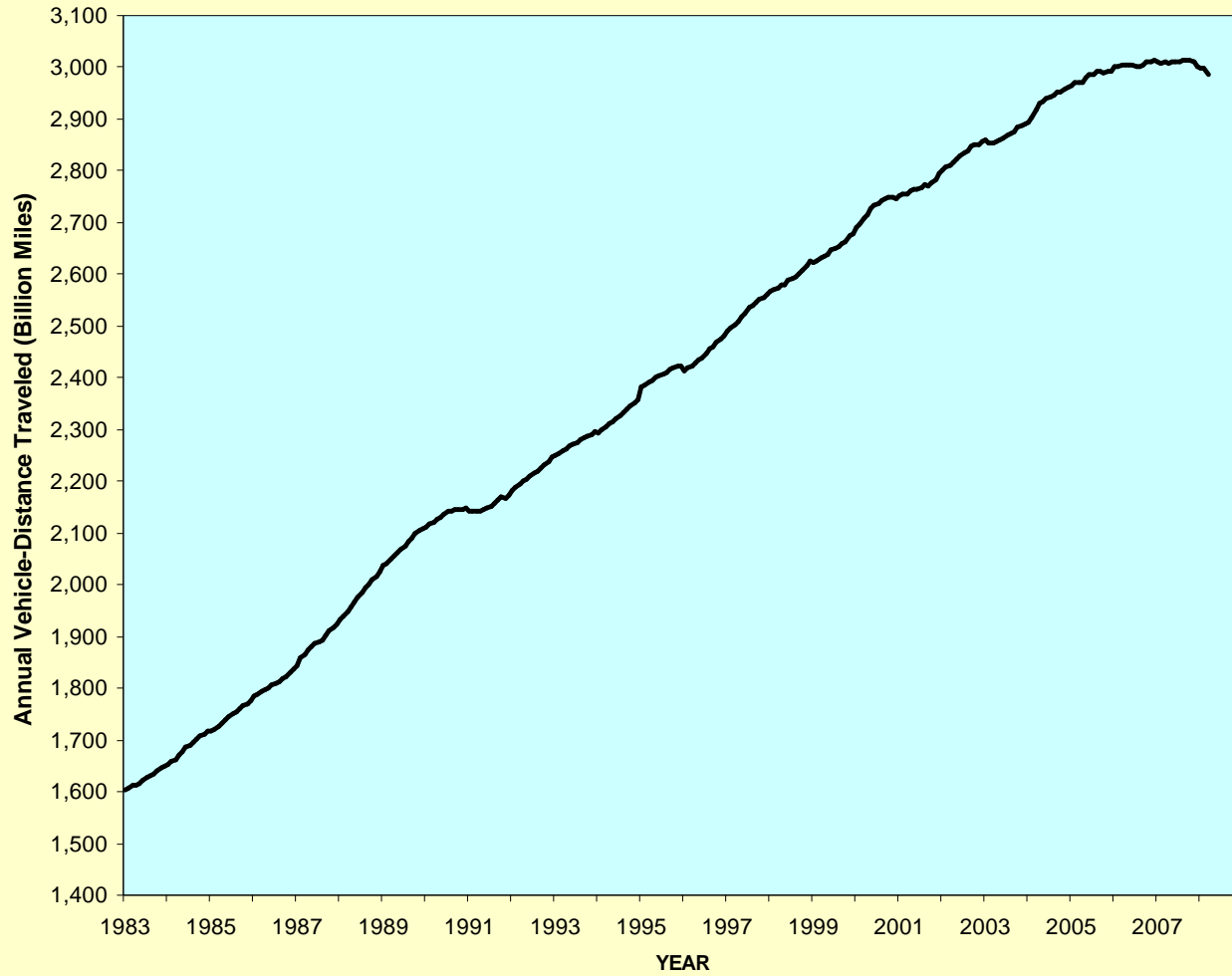


## Dollar value of crude oil as percentage of U.S. GDP, 1970-2007 annually and 2008:H1 estimate

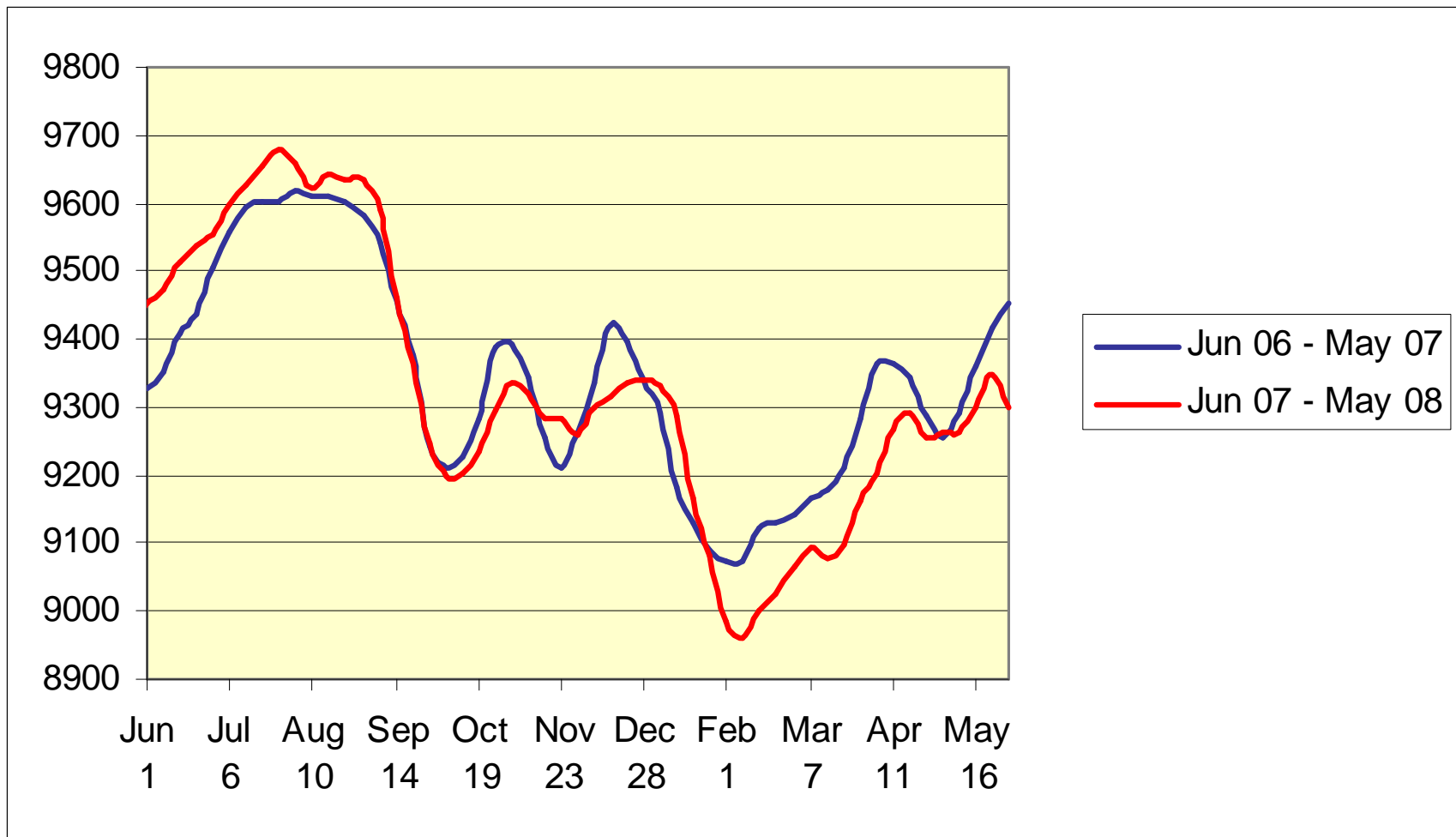


2008:H1 calculation used crude oil price of \$111/barrel.

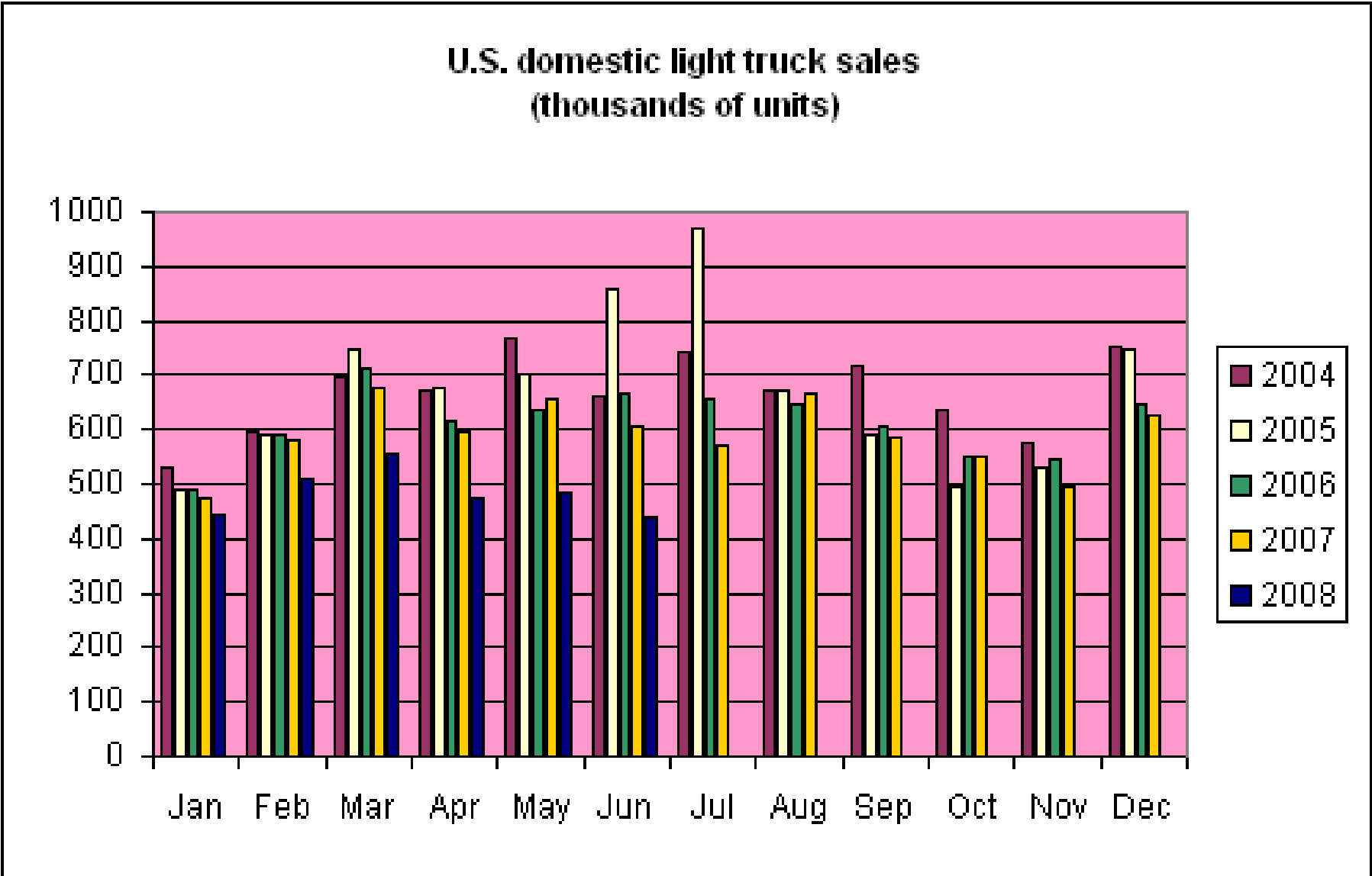
Figure 1 - Moving 12-Month Total on ALL Roads



# U.S. gasoline consumption: this year (red) versus last (blue)



**Down 28% June 07 to June 08**



	GDP from autos (2000 \$)		
1990:Q3- 1991:Q1	-\$49 B		
2007:Q3- 2008:Q1			

	GDP from autos (2000 \$)		
1990:Q3- 1991:Q1	-\$49 B		
2007:Q3- 2008:Q1	-\$43 B		

	GDP from autos (2000 \$)	(as % of GDP)	
1990:Q3- 1991:Q1	-\$49 B	0.7%	
2007:Q3- 2008:Q1	-\$43 B	0.4%	

	GDP from autos (2000 \$)	(as % of GDP)	jobs in autos (April year-to year)
1990:Q3- 1991:Q1	-\$49 B	0.7%	-88,000
2007:Q3- 2008:Q1	-\$43 B	0.4%	-107,000



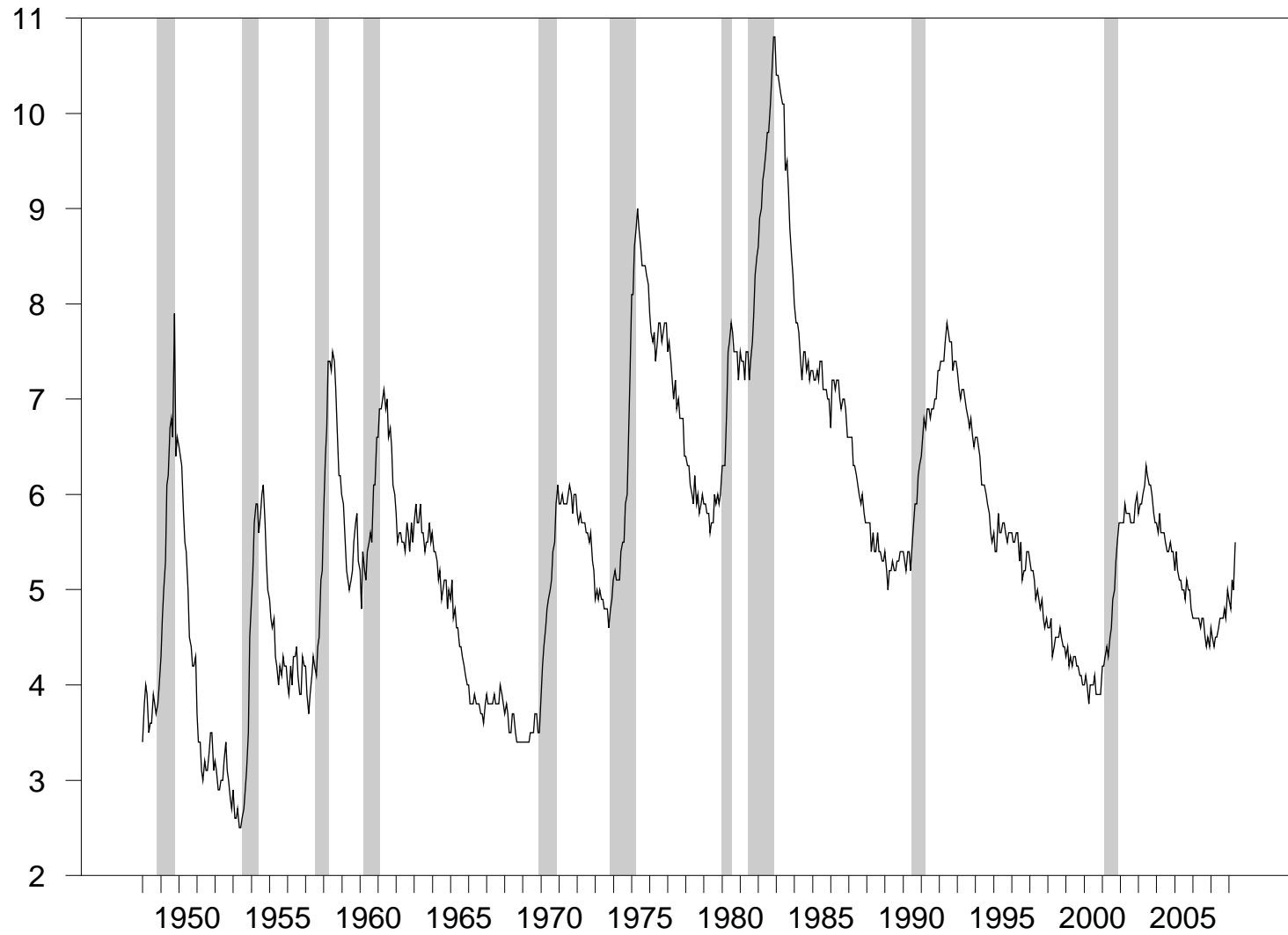
- GM announced it will close 4 plants
- Ford will eliminate 15% of salaried positions
- Continental, United, Delta, and American Airlines all announced significant flight eliminations and employment cuts in the thousands

## Temecula, CA

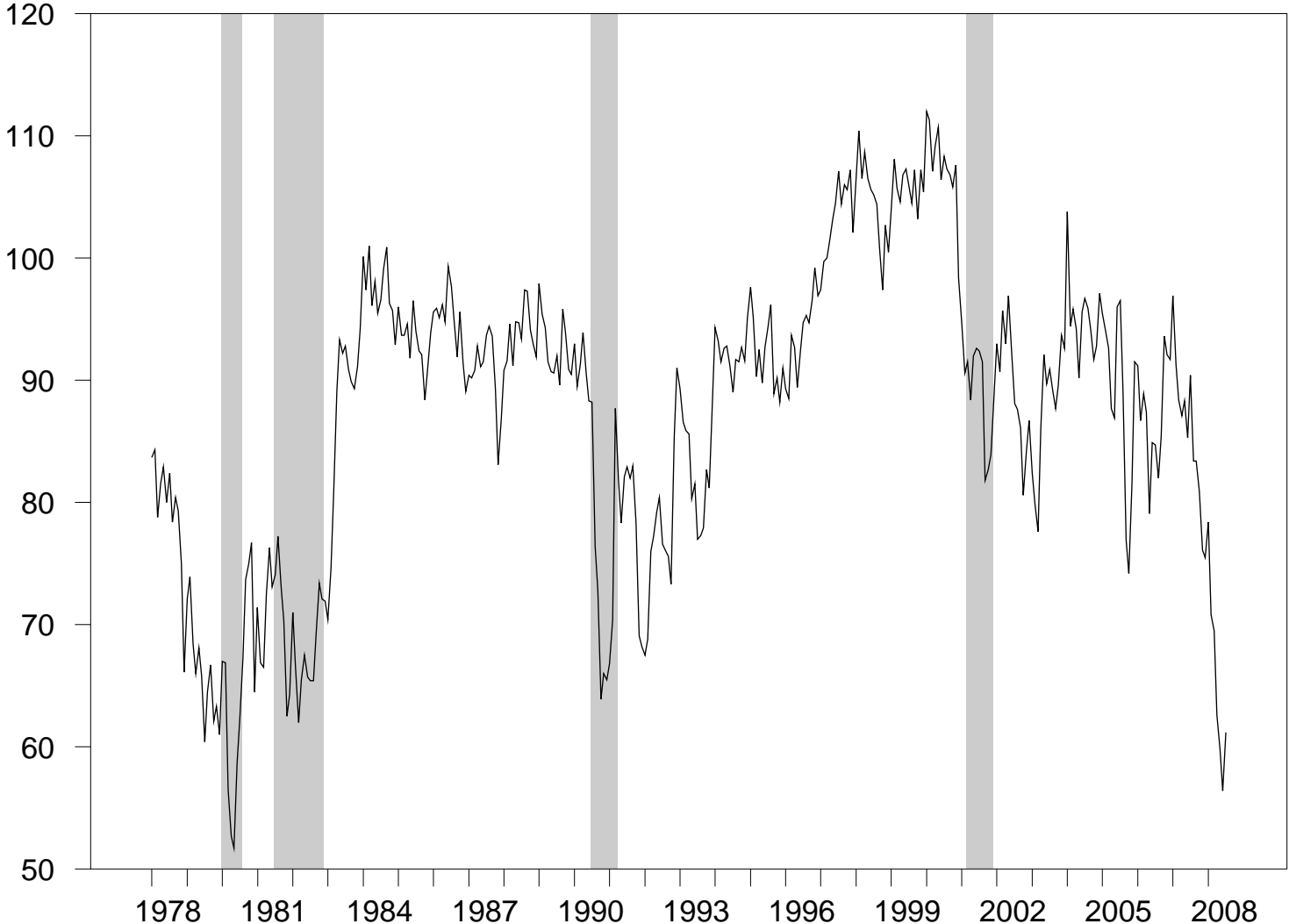
- 60 miles from downtown San Diego
- population doubled last decade
- 15% homes now in foreclosure



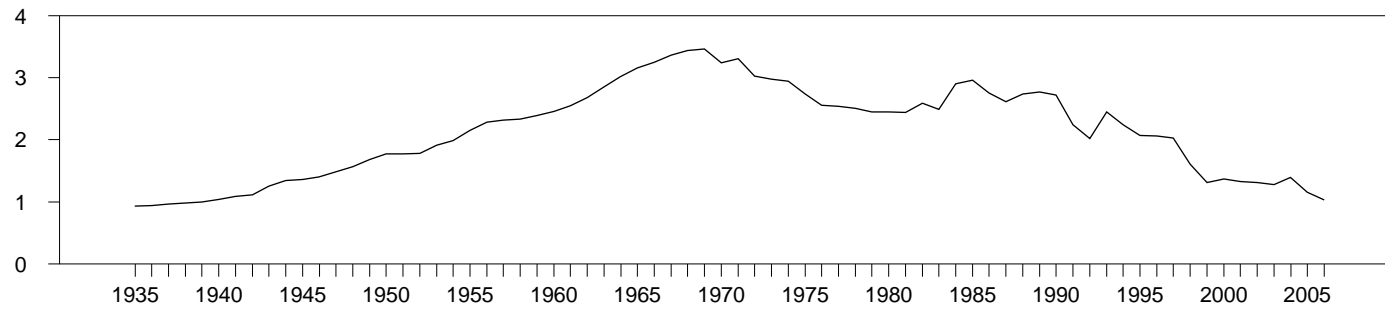
**Figure 1. Unemployment**



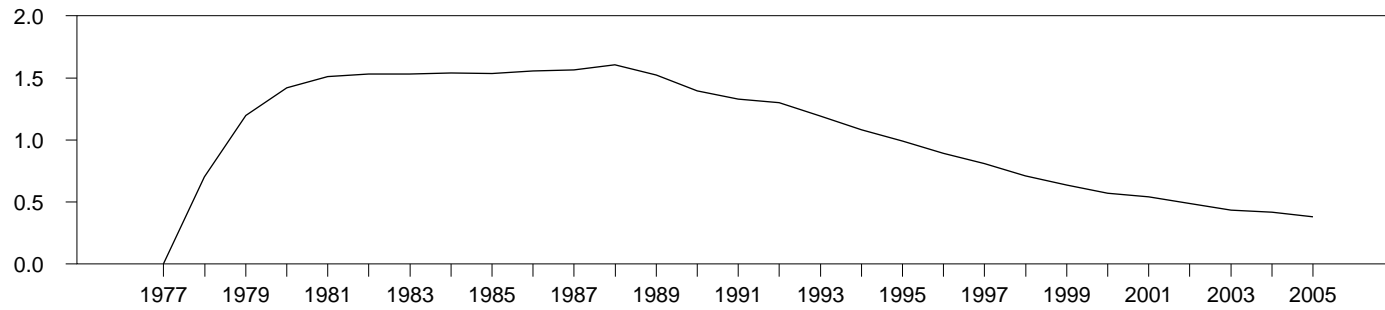
# Index of consumer sentiment



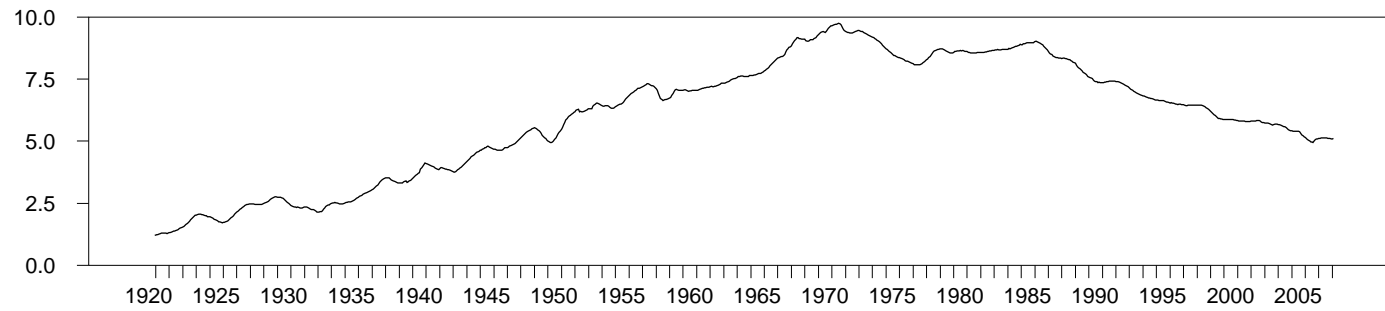
**Texas**



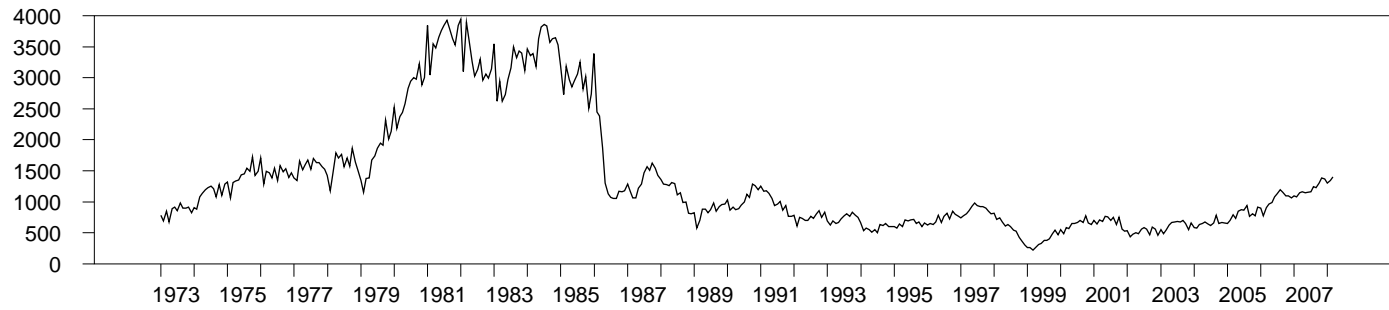
**Prudhoe Bay Alaska**



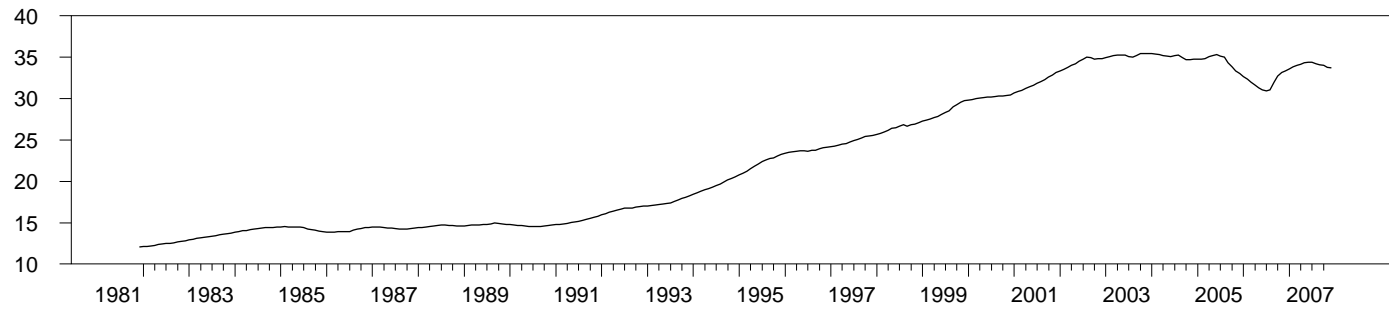
**US total**



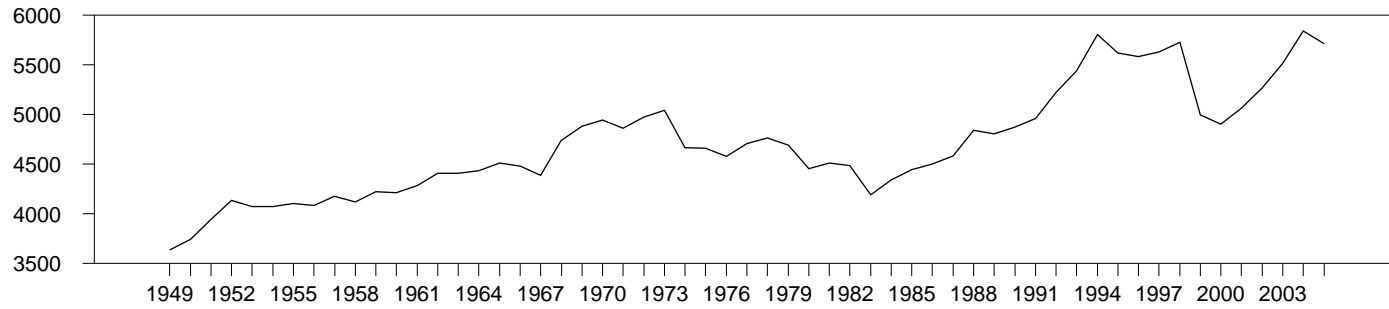
**Number of wells**



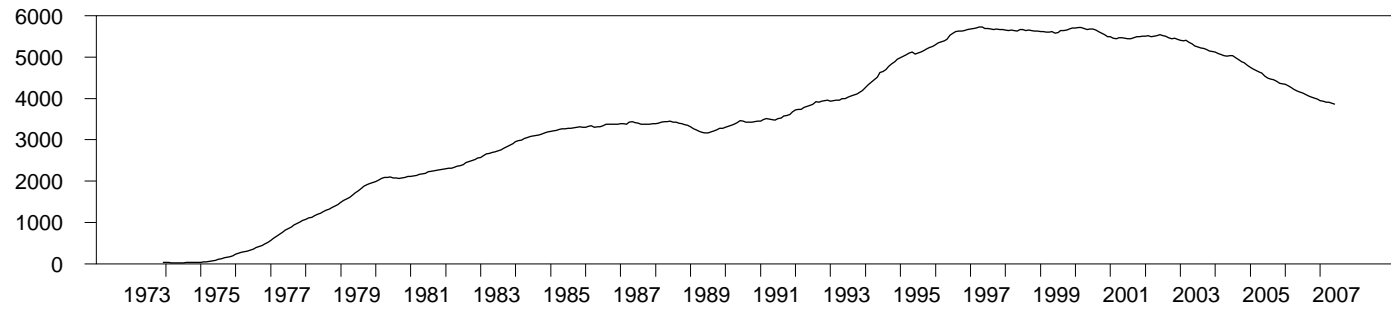
**Fraction offshore**



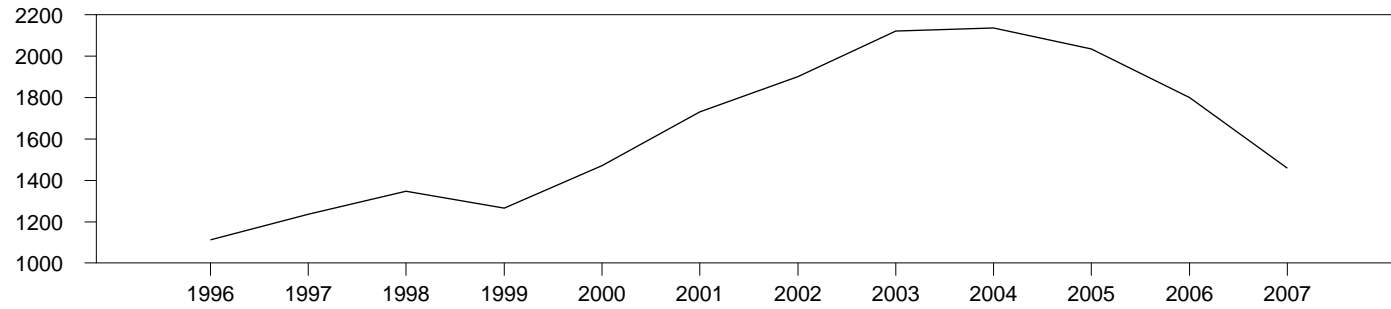
**Depth of wells**



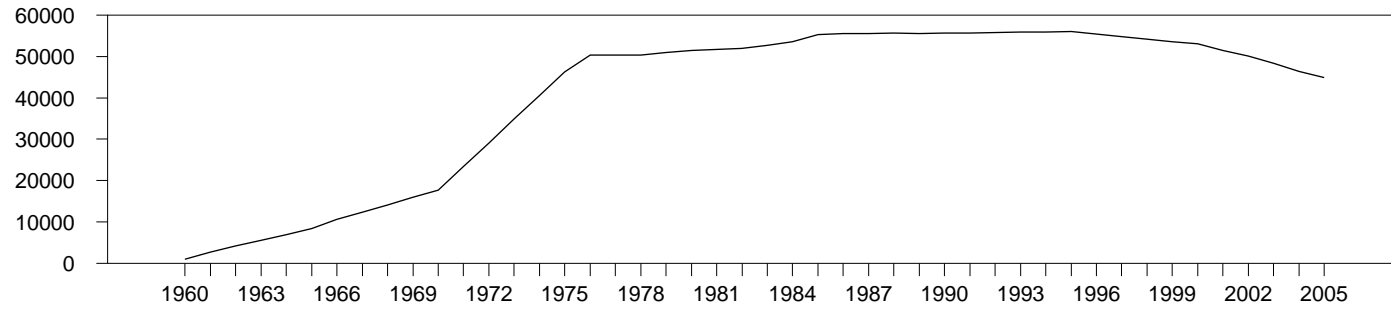
**North Sea**



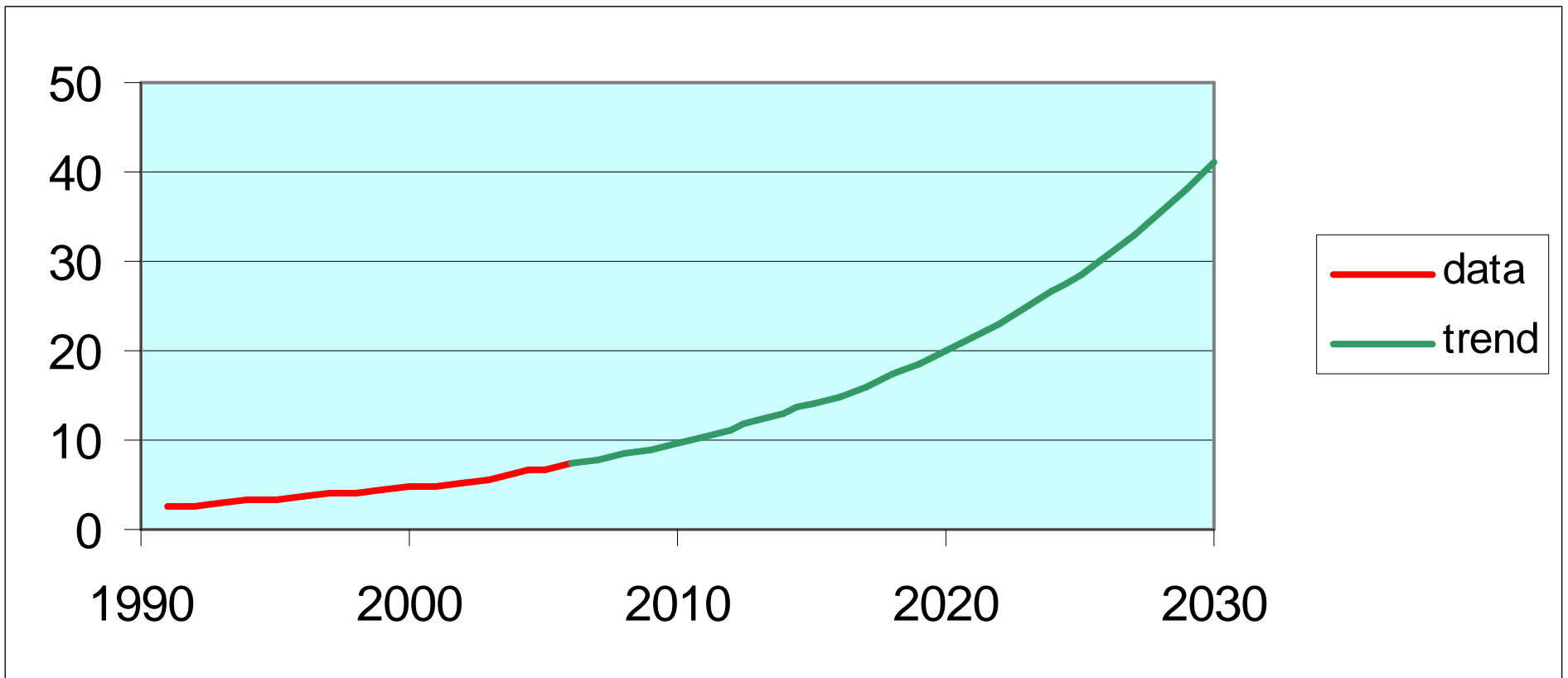
**Cantarell Mexico**



**Daqing China**



By 2020, China would be using 20 mb/d (= current U.S.)  
By 2030, China would be using 40 mb/d





### Dollar value of crude oil as percentage of U.S. GDP, 1970-2007 annually and 2008:H1 estimate

