

# The Great East-Japan Earthquake

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# Earthquake and Economic Crisis

- They have many similarities.
  - Impacts are huge.
  - Scholars have built sophisticated models to forecast them.
  - But, forecasting them is difficult.
  - Crisis occurs unexpectedly.
  - Government spent huge budgets to support their research in vain.

# The East Japan Earthquake

- On Friday, March 11, 2011, the east coast of Japan was hit by an extra large earthquake.
- The three prefectures, Iwate, Miyagi, and Fukushima, were heavily damaged.
- The largest damage was caused by the great tsunami, which killed more than 20,000 people, including missing victims.

# The Nuclear Power Plant Accident

- The Fukushima #1 nuclear power plant lost electricity supply, failed in cooling down the nuclear reactors and the spent fuel rods, and blew out of the hydrogen explosion.
- The government ordered people to evacuate out of the area within 20 kilometers away from the plant.
- Even other areas are exposed to extraordinarily high radiation.
- They closed local business and evacuated to remote places.

# Damages on Industries

- Many suppliers of key intermediate products are located in the Tohoku area.
- The earthquake and nuke accident destroyed the supply chain.
- The leading export industries such as automobiles are forced to reduce production.

# Agriculture

- Damages are even larger for agriculture.
- Vegetables, meat, and milk are polluted with radiation in Fukushima and the northern Kanto prefectures.
- The pollution is limited to only several items.
- However, consumers in large cities, being afraid of radiation, refrain from purchasing agricultural products (damage by rumors, 風評被害).

# Education

- Pupils and students go back to school in April and May.
- Children are suggested not to play or take physical exercise class in the school grounds, because the soil is still highly radioactivated.
- Most universities and colleges started the spring semester later than usual.

# Low level exposure to radiation

- The government sets 20msv/yr as the threshold radiation level at which it decides on evacuation.
- ICRP (International Committee of Radiation Protection) reports that there is no significant evidence that the radiation exposure less than 100msv/yr harms human health.
- However, there are some leading studies that provide the evidences that even lower level exposure might significantly increase cancer.



# Epidemiological survey

- Even low level exposure to radiation hurts human DNA.
- But all the living creatures are equipped with DNA-repairing mechanism.
- Even at Chernobyl, animals and plants are living healthy after 25 years have passed since the explosion.
- There are few complete epidemiological survey except for Hiroshima, Nagasaki, and Chernobyl.
- It is too early to conclude about nuclear damage on human health.

# Saving Electricity (節電)

- The Tokyo Electric Power Corporation (TEPCO, 東京電力) has stopped the operation of many of its nuclear power plants.
- The government has requested the Mid-Japan Electric Power Co. to stop the operation of the Hamaoka plant in Shizuoka prefecture, which faces the projected high risk of the Great Tokai Earthquake disaster. The request has been accepted.
- All the major nuclear plants have stopped operation.
- The entire Japan was predicted to suffer electric power shortage in the summer.
- People are encouraged to save electric power even before summer.

# Supply constraint on industries

- Economists expect that the recovery will be accelerated in the second half of 2011.
- However, the recovery will be constrained by the projected shortage of electric power in the summer.
- Major industries have introduced some special operation schedule during summer such as:
  - employees work on weekends, and rest on some weekdays.
  - the plants are closed during the hottest periods of this summer.

# How to finance damage recovery and reconstruction

- The government plans to spend taxpayers' money to rebuild the social and production infrastructure of the destroyed area.
- However, the government has not yet found an affordable way to finance the reconstruction project.
- The government considers to raise consumption or income tax, which is unpopular for voters.

# How to finance compensating for the nuclear damage

- The government plans to let TEPCO to compensate for the damage on people and industries caused by the nuclear plant accident.
- However, the sharing rule of the burden has not yet been specified between the company and the government.

# Capital decrease, debt waiver, or raising price?

- The TEPCO stock price declined to less than one-fifth of its pre-disaster level.
- However, the government requested the shareholders' claims to the corporate profit to decline.
- In addition, the government requested the lenders to partially abandon their claim on the debts.
- The government finally owned all the outstanding shares and placed the TEPCO under its full control.
- In addition, consumers would eventually suffer higher electric price to finance compensation.

# Separation of transmission network from power plants

- Major electric power corporations have local monopoly.
- They have strong incentives to exclude competing electric power generators away from their transmission network.
- Some experts suggest that TEPCO should sell its transmission network or electricity-generating plants in order to finance compensation.
- Separation is expected to induce more competition, increase quality, and reduce price.
- Some skeptic views are proposed based on the US experience.

# Political Interests

- The earthquake disaster has created a new excuse to justify large public construction projects in remote areas away from Tokyo.
- Politicians welcome the current situation.

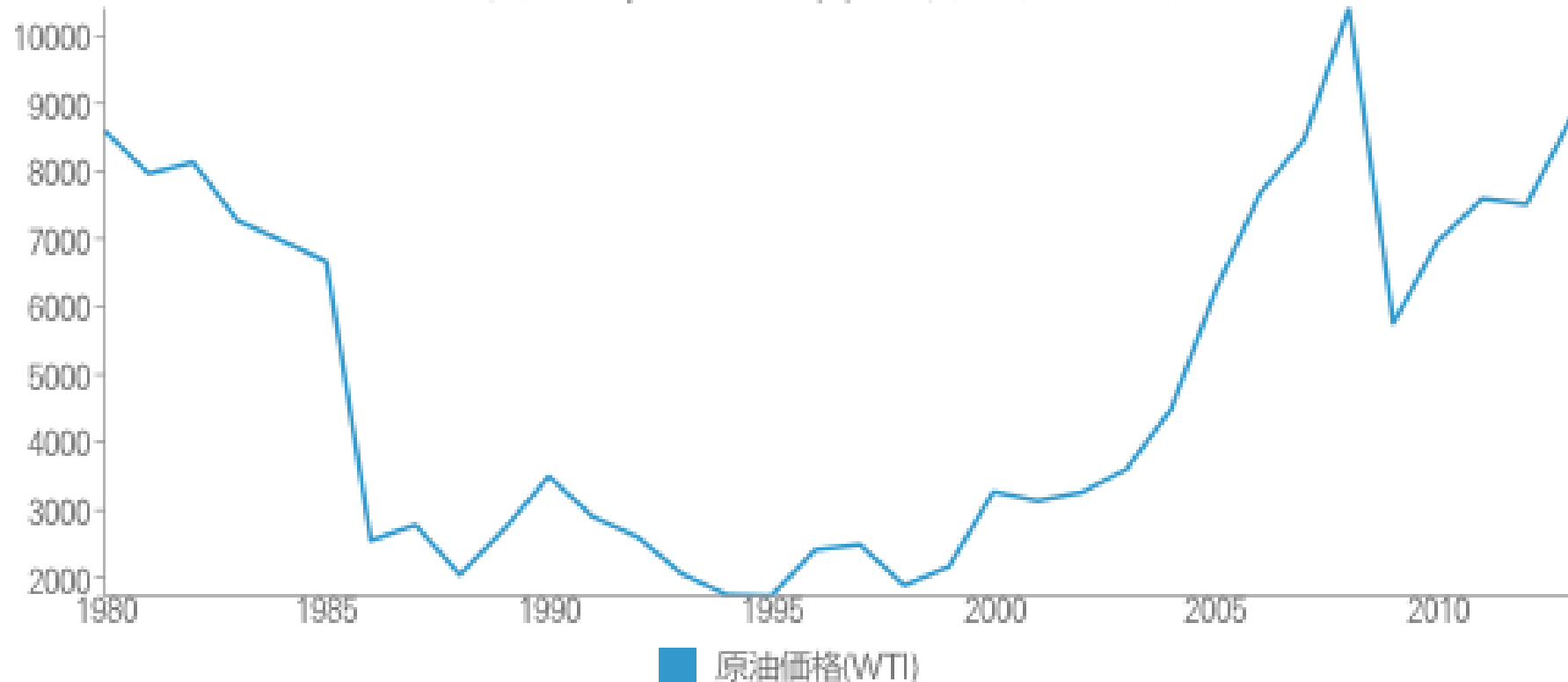


# Alternative Energy

- The Fukushima accident raises criticism about Japan's dependence on nuclear energy.
- Development of photovoltaic (solar), wind, and geothermal power, is considered to be crucial to Japan's sustainable energy use.

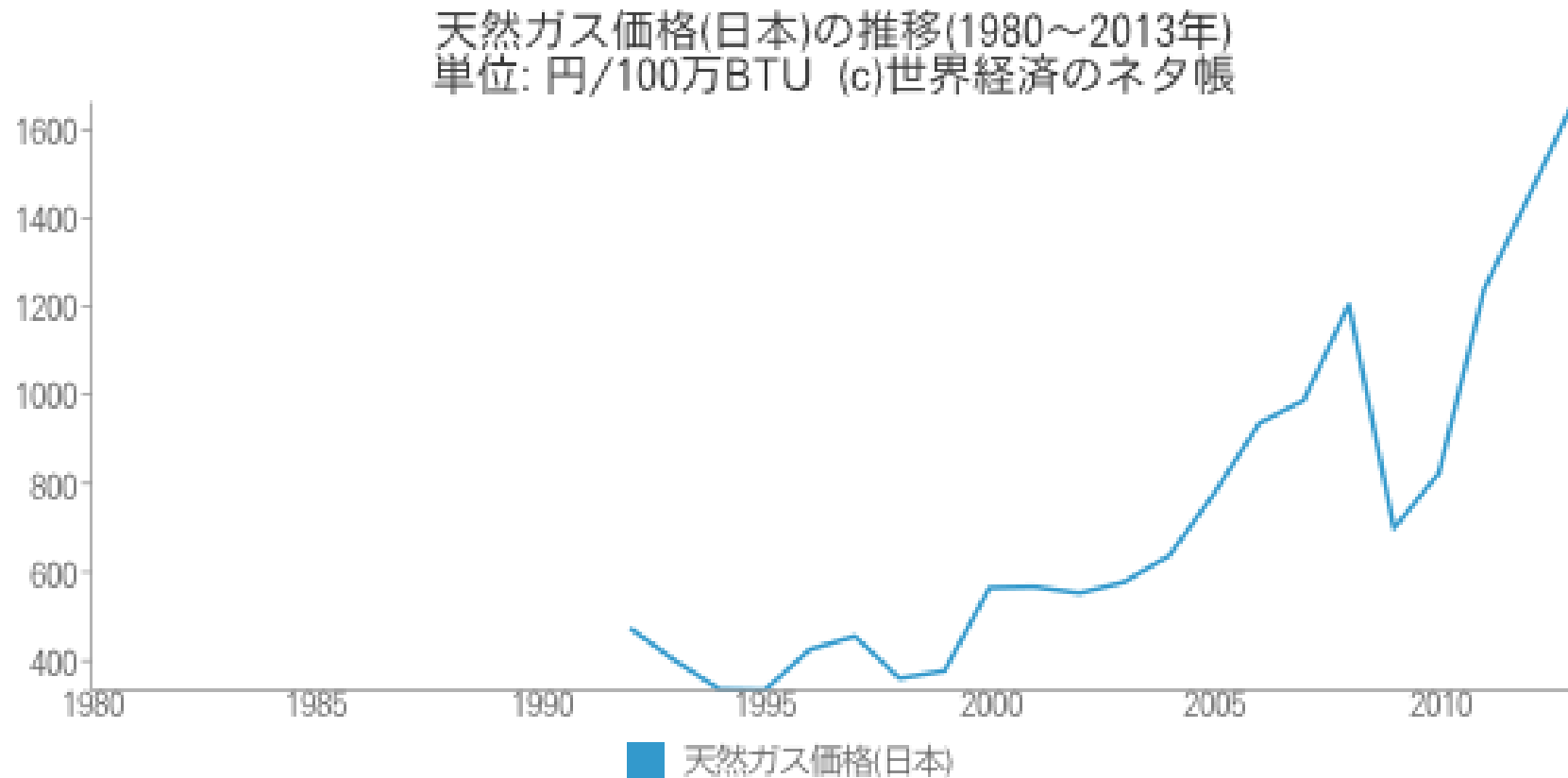
# Oil Price (WTI) in current Yen

原油価格(WTI)の推移(1980~2013年)  
単位: 円/バレル (c)世界経済のネタ帳



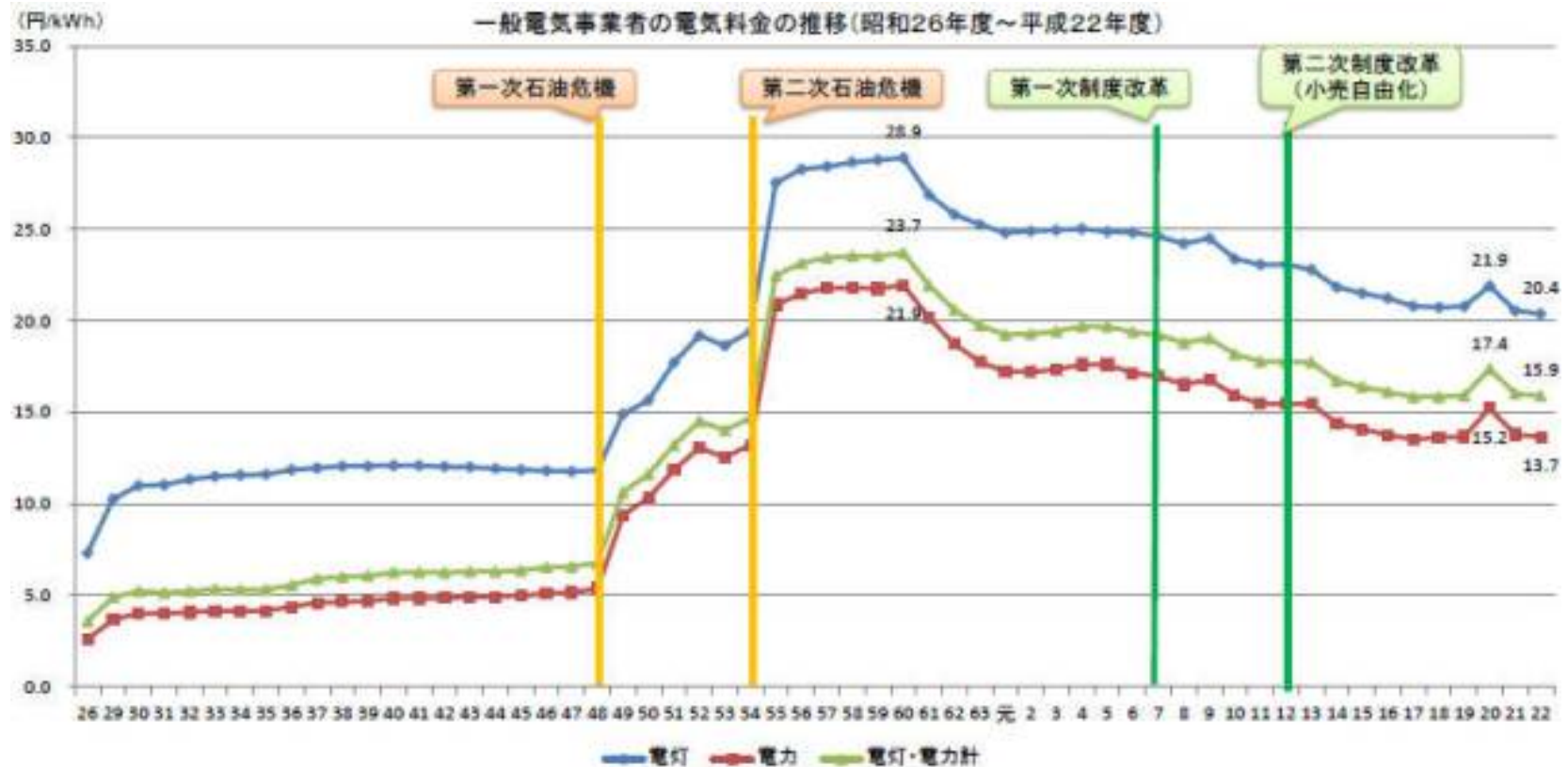
[http://ecodb.net/pcp/imf\\_usd\\_poilwti.html#index04](http://ecodb.net/pcp/imf_usd_poilwti.html#index04)

# LNG Price in current Yen



[http://ecodb.net/pcp/imf\\_usd\\_pngasjp.html#index04](http://ecodb.net/pcp/imf_usd_pngasjp.html#index04)

# Electricity Price in current Yen



※電灯料金は、主に一般家庭部門における電気料金の平均単価で、電力料金は、自由化対象需要分を含み、主に工場、オフィスビル等に対する電気料金の平均単価。  
 ※平均単価の算定方法は、電灯料収入、電力料収入をそれぞれ電灯、電力(自由化対象需要分を含む)の販売電力量(kWh)で除したもの。

# Increasing Energy Cost and Electricity Price

- In Japan, the electricity charge rate has been declining, while the energy cost (oil and LNG prices) have been rising.
- Japan's electricity suppliers have steadily reduced the electricity prices,
  - partly because the government deregulated the industry, but
  - Mainly because the energy resource has shifted from fossil fuels (oil and natural gas) to nuclear power.

James Hamilton

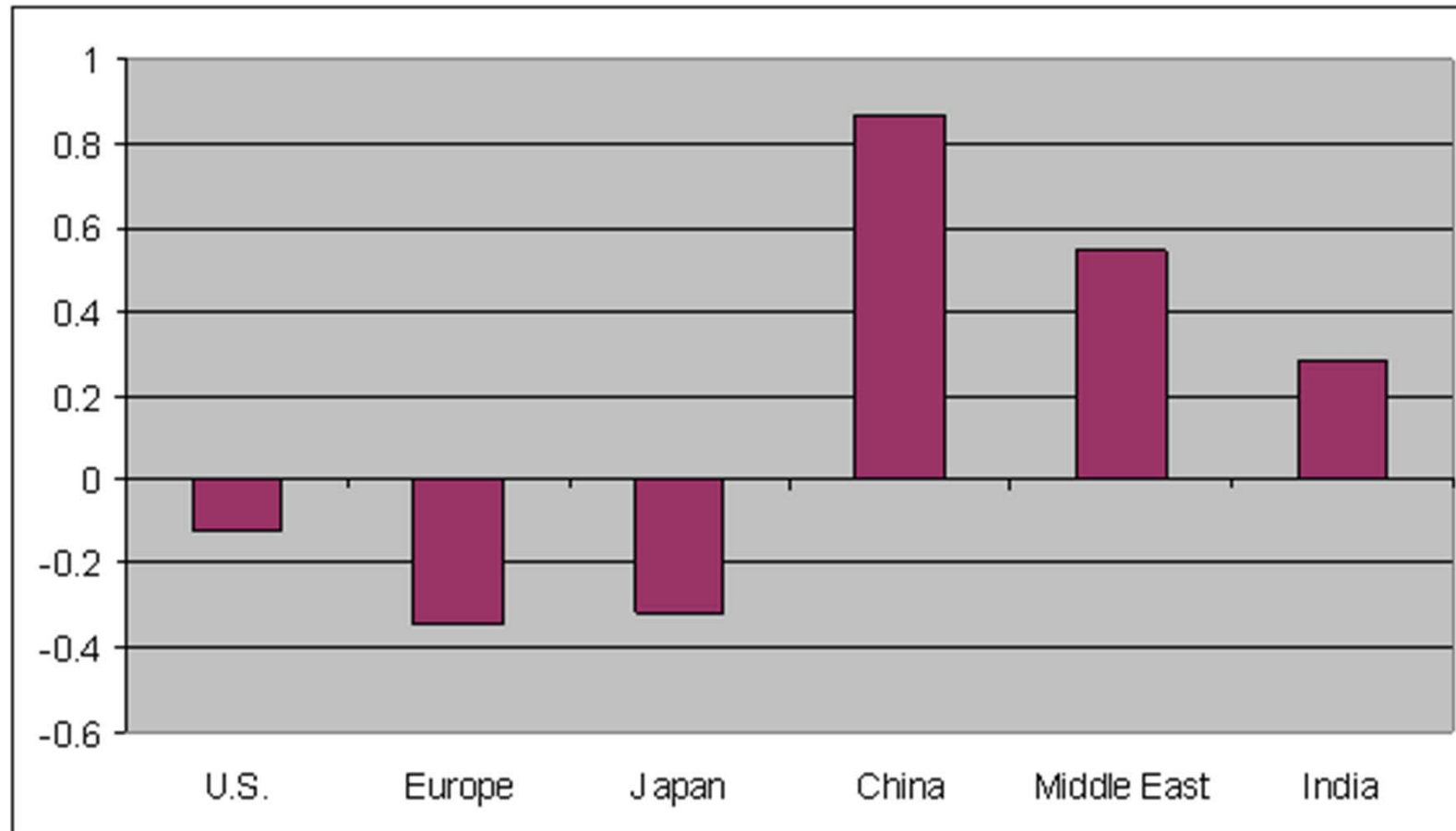
# **THE OIL SHOCK CAUSED THE LEHMAN SHOCK**

Do recently rising oil prices signal a resurgence of economic growth?

- *The recovery people are talking about isn't necessarily in the U.S., Europe, or Japan. These regions reduced their consumption of oil by almost 800,000 barrels per day between 2005 and 2007.*
- *The increases in demand over that period came instead from places like China, India, and the Middle East.*

Change in petroleum consumption  
(in million barrels per day) between 2005 and 2007.

Data source: [EIA](#).

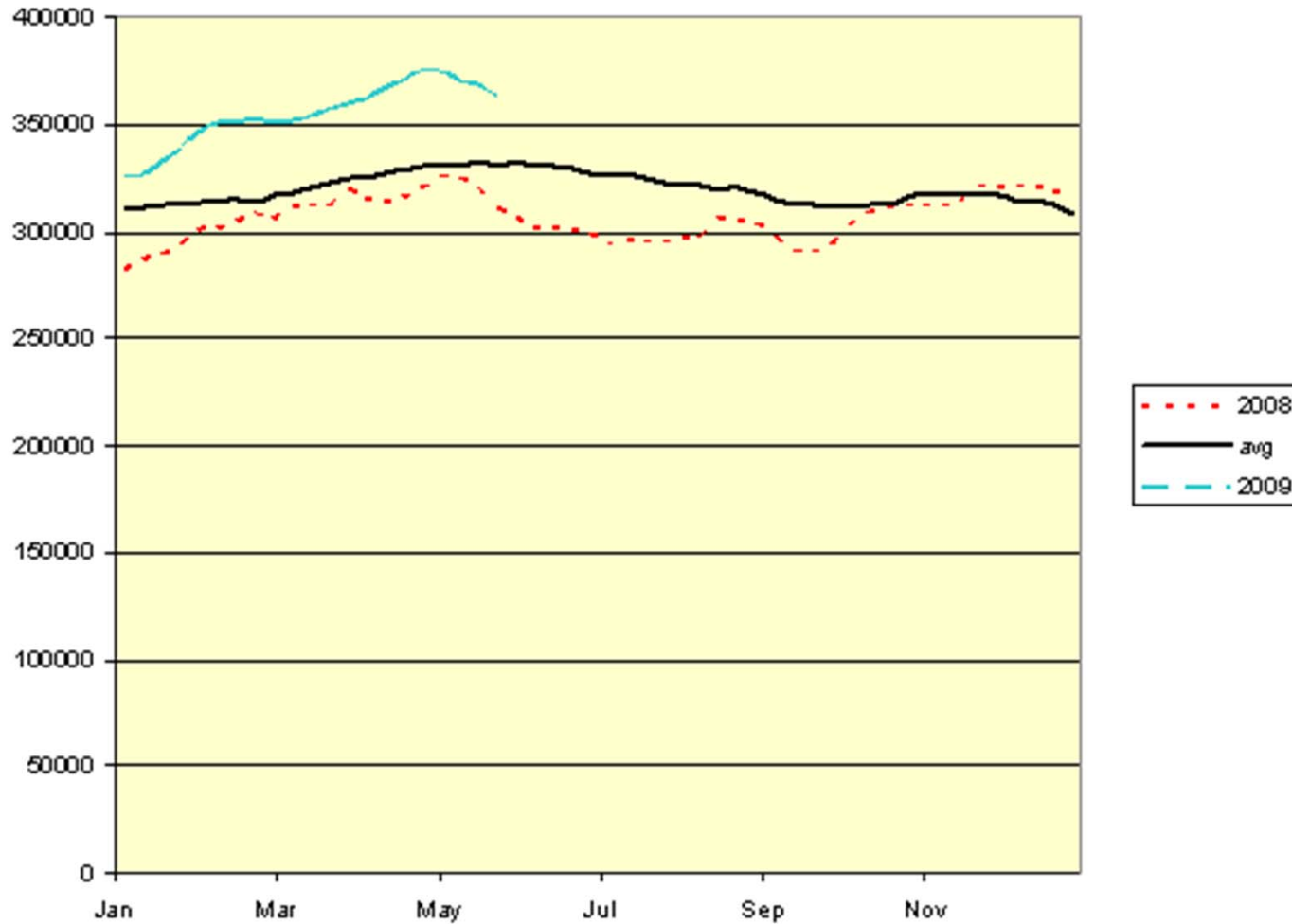




# The Oil Price Boom is not a Speculation!

- U.S. crude oil inventories were significantly below average in the first half of 2008.
- This fact indicates that we can't attribute the whole oil price boom at the time to speculation.

# U.S. crude oil stocks, excluding SPR, in thousands of barrels



# The Oil Shock was a Major Cause for the Current Recession

- The sales of light trucks including SUV declined by 23% between 2007:Q2 and 2008:Q2, while foreign car imports rose by 9% in the same period.
- The domestic manufacturers were more heavily reliant on sales of the less fuel-efficient vehicles.

# The Deterioration of the US consumers' sentiment

- Americans buy about 140 billion gallons of gasoline each year, meaning that a dollar per gallon increase in the price takes away \$140 billion from their annual purchasing power.
- The recent rise of oil prices would further deprive consumers of purchasing powers.

# No Policy could have eventually Avoided the Crisis!

- Booming world petroleum demand in the face of stagnant world oil production is very much a long-run challenge.
- The reality is that no policy could have prevented a substantial increase in the price of oil between 2005 and the first part of 2008.