



## A New Geopolitical Jevons Paradox? A Look at Non-OECD Oil Demand

Posted by [Sam Foucher](#) on November 12, 2009 - 9:29am

Topic: [Supply/Production](#)

Tags: [china](#), [emerging economies](#), [non-oecd](#), [oecd](#) [[list all tags](#)]

This is part 2 of my [post](#) on oil demand. This time I look at the Non-OECD demand and how it may impact global oil demand. Based on data from the [2009 BP Statistical Review](#), the OECD oil consumption in 2008 decreased by -3.2% while demand within emerging economies increased by +3.1%. The report also indicates that oil production from OECD countries has been declining since 1997 and is now below 23% of the world production.

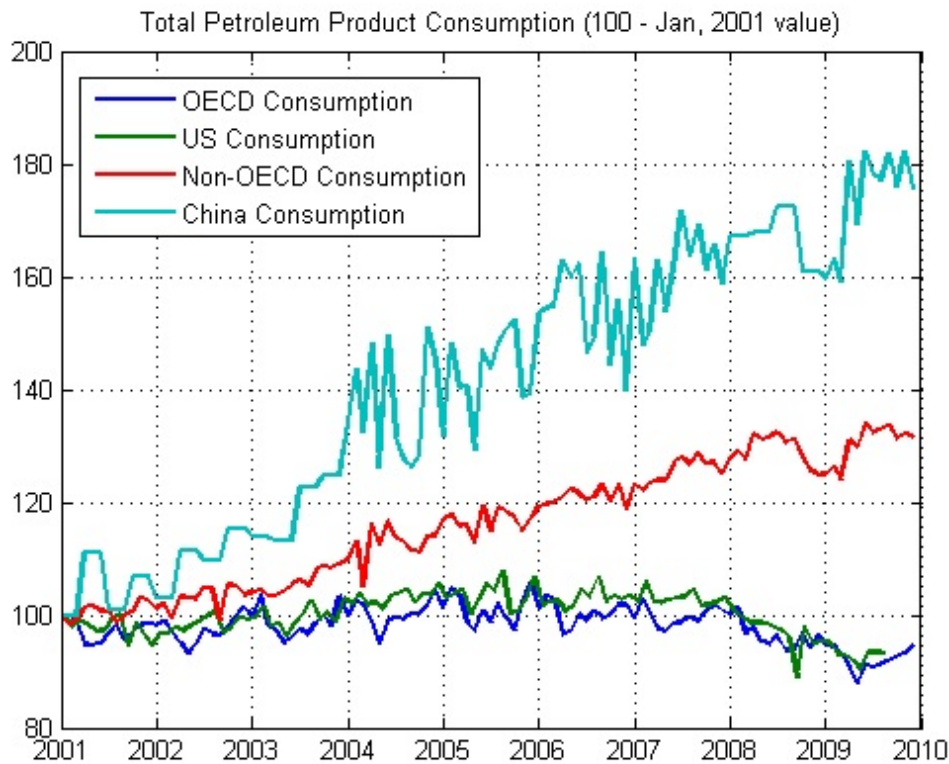


Figure 1. Increase in consumption since Jan, 2001.

### Non-OECD Demand

The Non-OECD consumption is well modeled by an exponential fit as shown on Figure 2. The equivalent growth rate is around 3.2% per year. One amazing observation is that there is no apparent slowdown in consumption growth due to high oil prices. This pattern is very different from what has been observed for the OECD. There are three main factors contributing to this

1. Emerging economies (China, India) with strong population growth, high economic growth, low car ownership and very low oil consumption per capita.
2. Oil resources managed by governments (NOC).
3. Gasoline subsidies (especially in Middle-East oil producers such as Saudi Arabia) making those market unresponsive to prices signals.

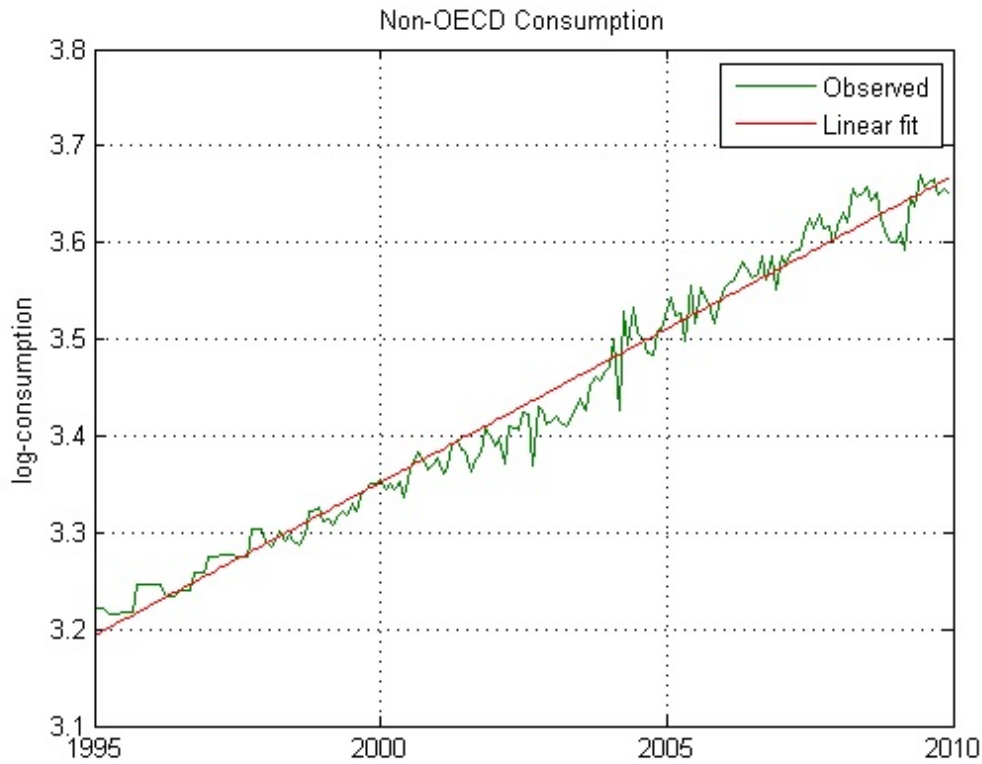


Figure 2. Linear fit in the log-domain for the Non-OECD consumption (monthly, total petroleum products), volumes in million barrels per day (mbpd).

As a result, Non-OECD consumption grew from 40% of the world demand in 2004 to 45% in 2009.

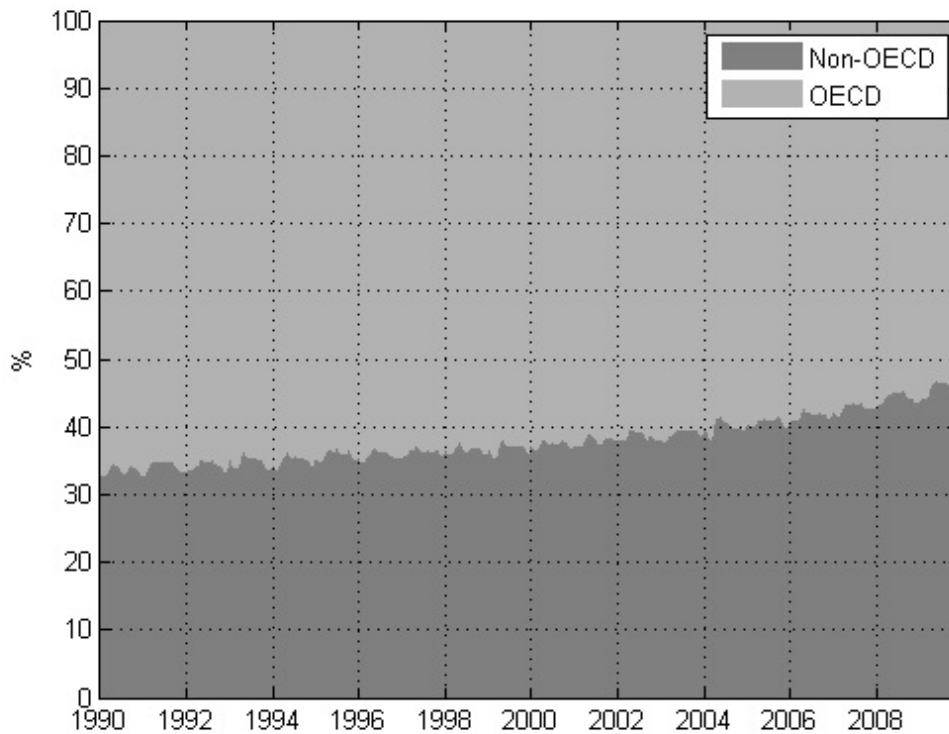


Figure 3. OECD and Non-OECD shares of the world total liquids consumption (EIA data).

The Non-OECD group is a net exporter (see Figure 4), and to date production has grown at the same rate as consumption. In contrast, total production from the OECD countries peaked in 1997 and has been declining at an accelerating rate ever since (see Figure 5). The situation is somewhat similar to the [Export Land Model](#). It is unlikely that growth in oil production from Non-OECD countries can match consumption growth for very long (+3.2% / year), therefore their ability to export will diminish in the next few years.

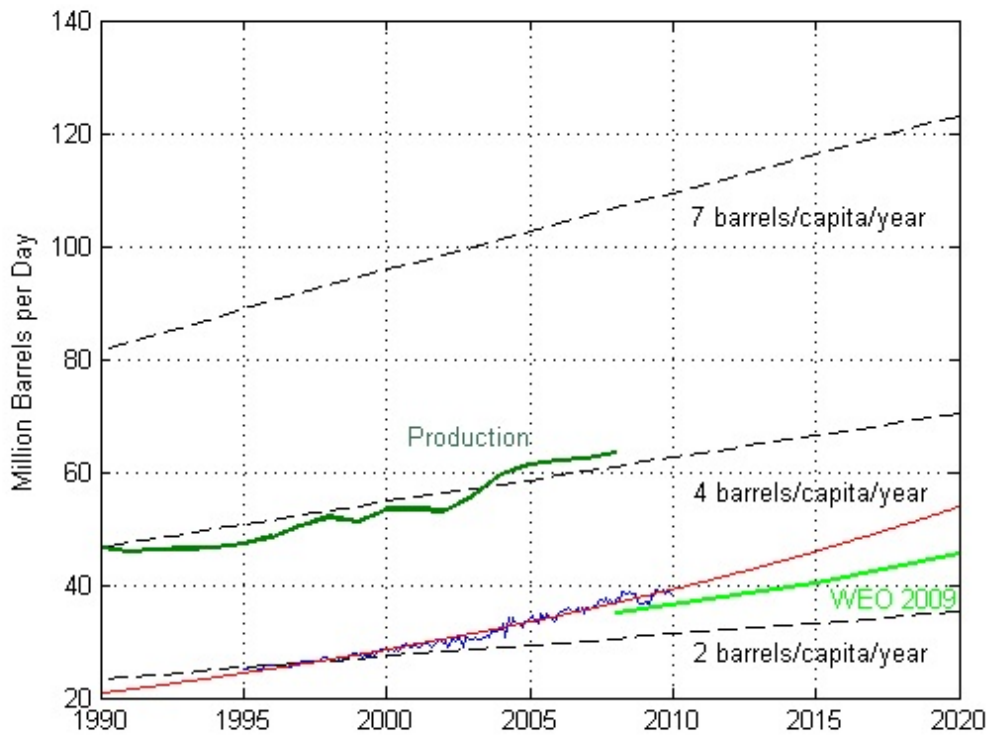


Figure 4. Observed Non-OECD consumption in blue (monthly, total petroleum products) and exponential model projection in red (see Figure 1). The light green curve is the WEO 2009 forecast (primary oil demand, excluding biofuel demand). Production data from BP.

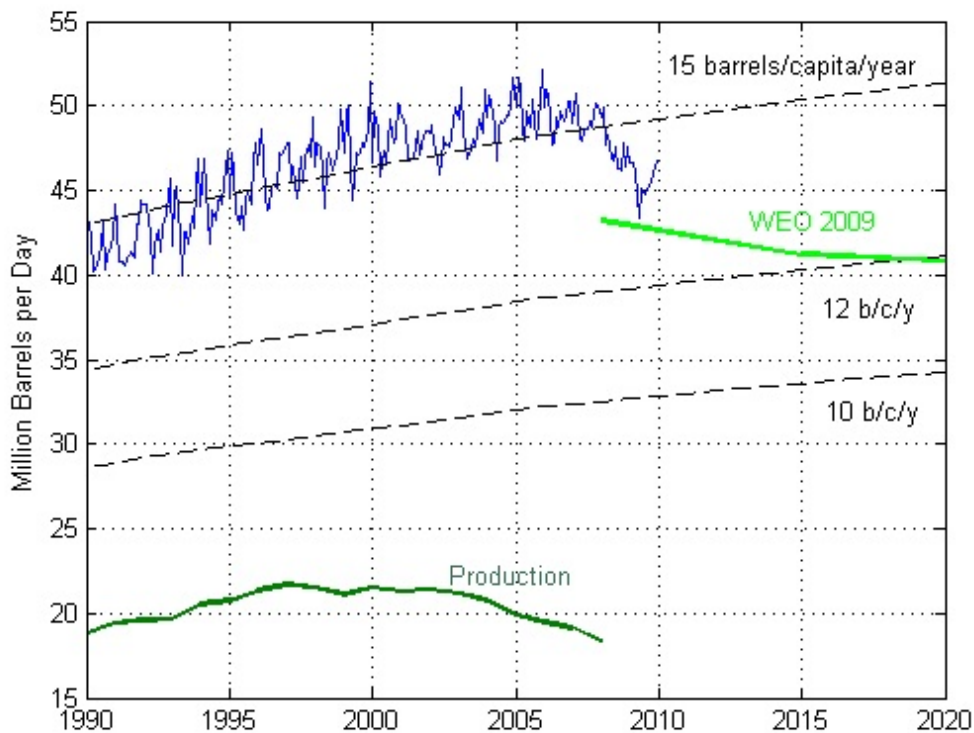


Figure 5. Observed OECD consumption in blue (monthly, total petroleum products). The light green curve is the WEO 2009 forecast (primary oil demand, excluding biofuel demand). Production data from BP.

Interestingly, the OECD is now producing less than 22.4% of world production, its lowest value since 1976.

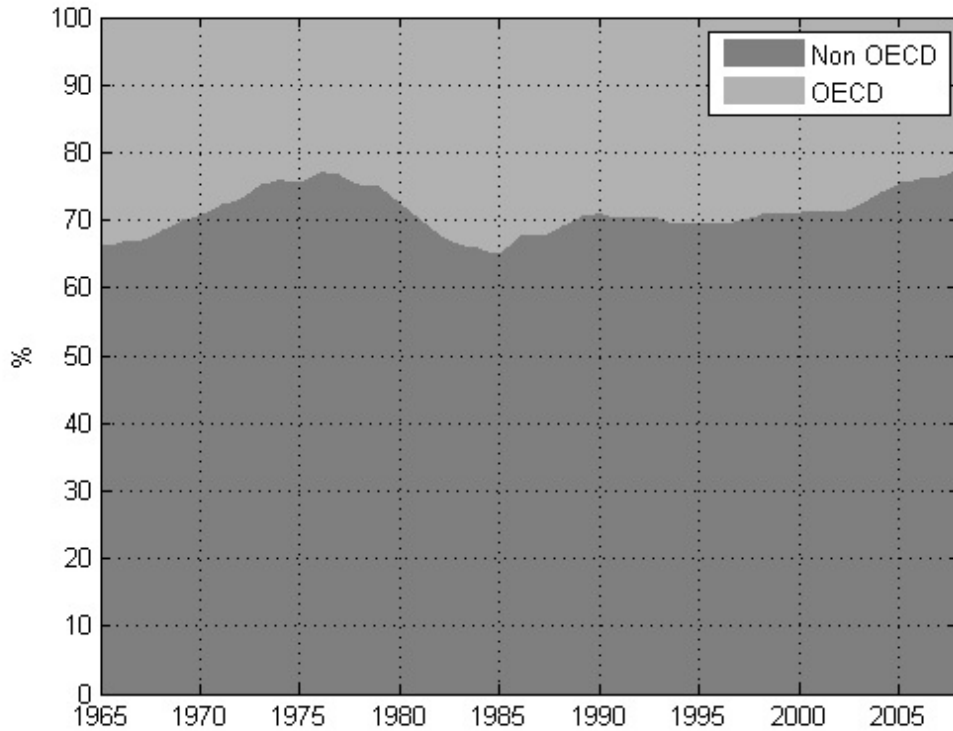


Figure 6. OECD and Non-OECD shares of the world total liquids production (crude oil + NGL). Production data from BP.

## How Low Can the OECD Consumption go?

Since to date the OECD has taken the brunt of the high oil prices, the question can be asked: how low can the OECD consumption go? One interesting perspective is to look at various per capita consumption levels combined with population growth forecasts. Presently, consumption for the OECD excluding the US is hovering around 12 barrels per capita per year. In the WEO 2009, the IEA is predicting by 2015 a further consumption decrease toward 10 barrels/capita/year for the OECD excluding the US and toward 20 b/c/year for the US.

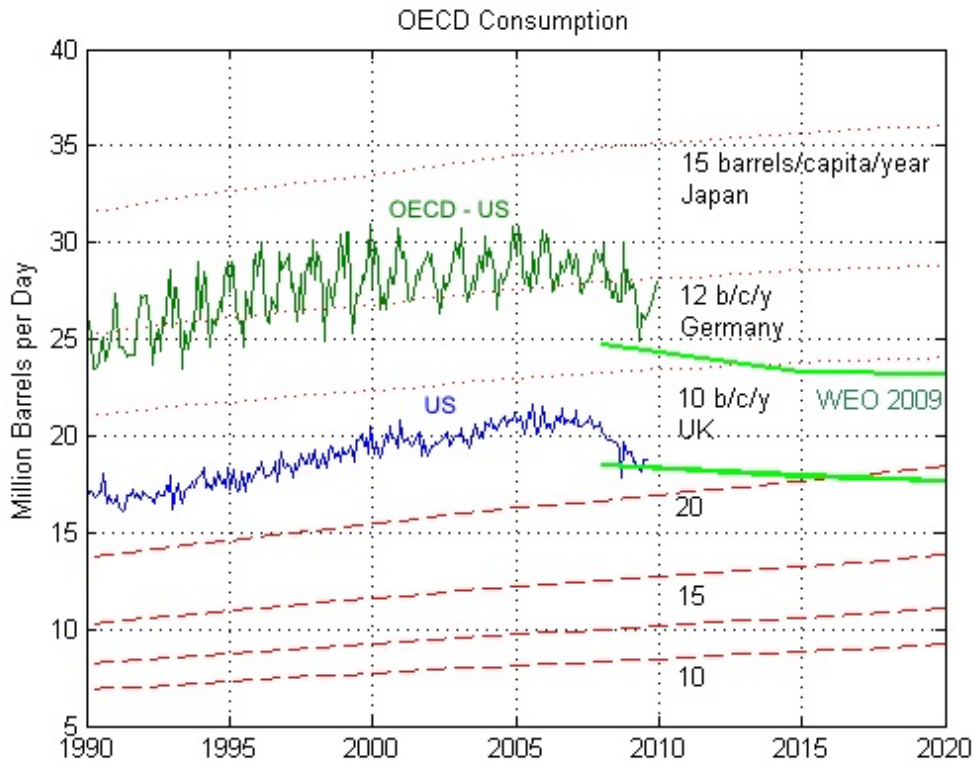


Figure 7. OECD-US and US consumption and various forecasts curves assuming different per capita consumption levels. The green curves are the WEO 2009 forecasts (primary oil demand, excluding biofuel demand).

## Where Oil Prices are Heading?

The following scenario is set forth to illustrate how an asymmetric demand destruction could occur between the OECD and the Non-OECD. I don't assume a peak oil scenario for now. Instead, I simply assume that the growth in production capacity within a high oil price environment observed between 2007 and 2009 will remain the same until 2020 (see Figure 7). This is equivalent to a net addition of 0.610 million barrels per day as shown on Figure 8 below.

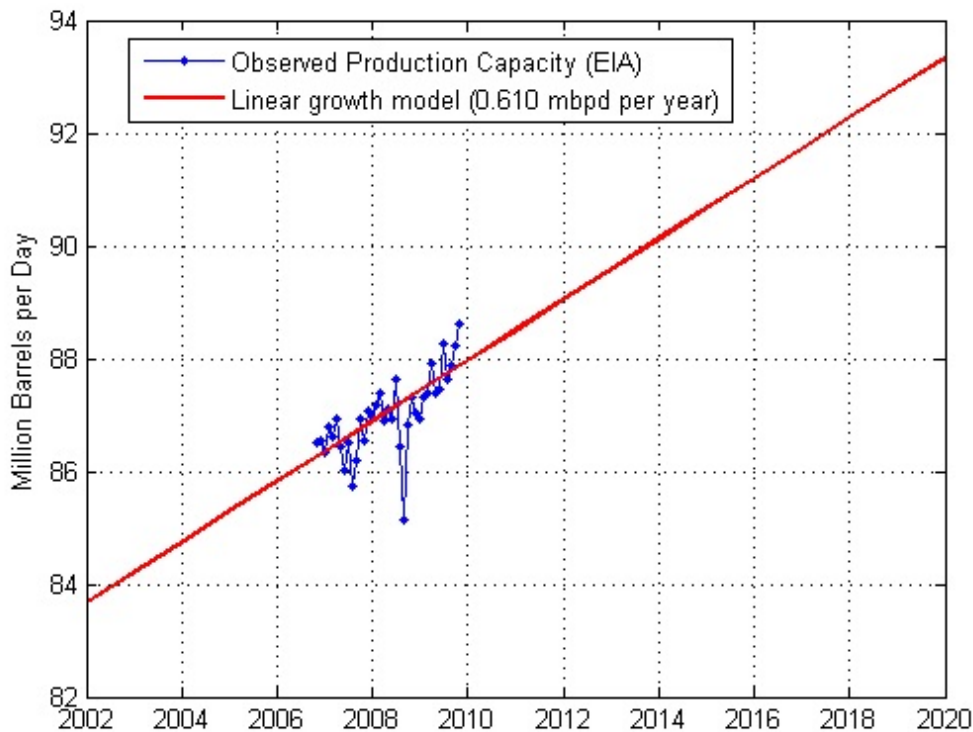


Figure 8. Linear fit on the production capacity (total liquid production + OPEC spare capacity) from 2007 to 2010. EIA data.

This scenario is optimistic on the supply side and pessimistic on the demand side. It is based on the assumption that the conditions observed since 2002 continue to remain the same in the future, namely:

1. Long term structural changes in OECD demand are triggered mainly through economic recessions (i.e. high unemployment, etc.).
2. OECD countries go into periodic economic slowdown and recessions triggered by oil prices increasing beyond \$150 a barrel.
3. The excess demand model and its relationship to oil prices are the one established in my previous [post](#) and corresponds to \$20 per 1 mbpd of excess demand. The Non-OECD demand exceed that of follows the exponential model described above.
4. There are no long term structural changes in demand within the Non-OECD.
5. The world total liquid production growth is anemic, amounting to 0.610 million barrels per day per year of additional supply and is not influenced by oil prices.

The simulation result is shown on Figure 9. The simulation indicates periodic oil price superspikes will occur and will trigger periodic recessions within the OECD. The OECD consumption is reduced each time, then briefly recovers once oil prices go below \$40. In this model, the Non-OECD demand exceeds that of the OECD around 2015.



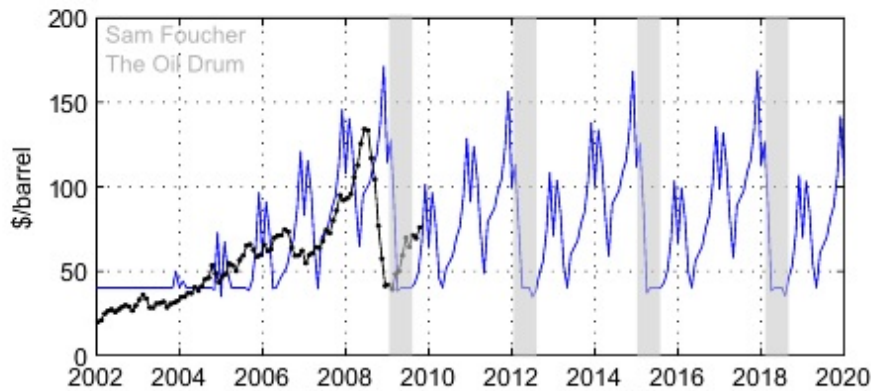
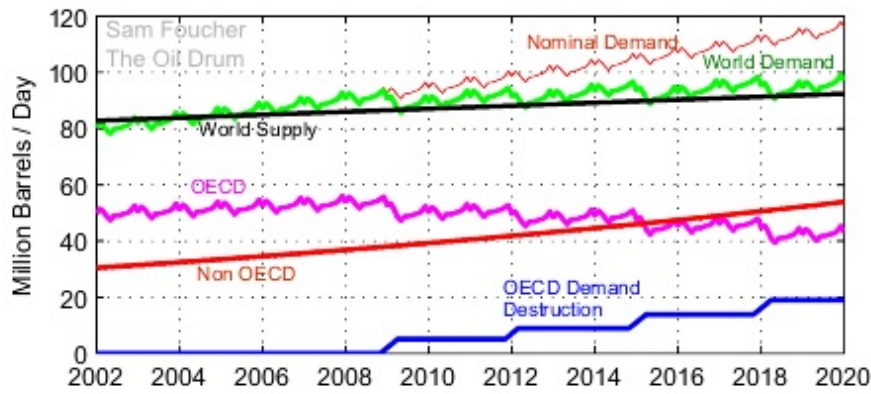
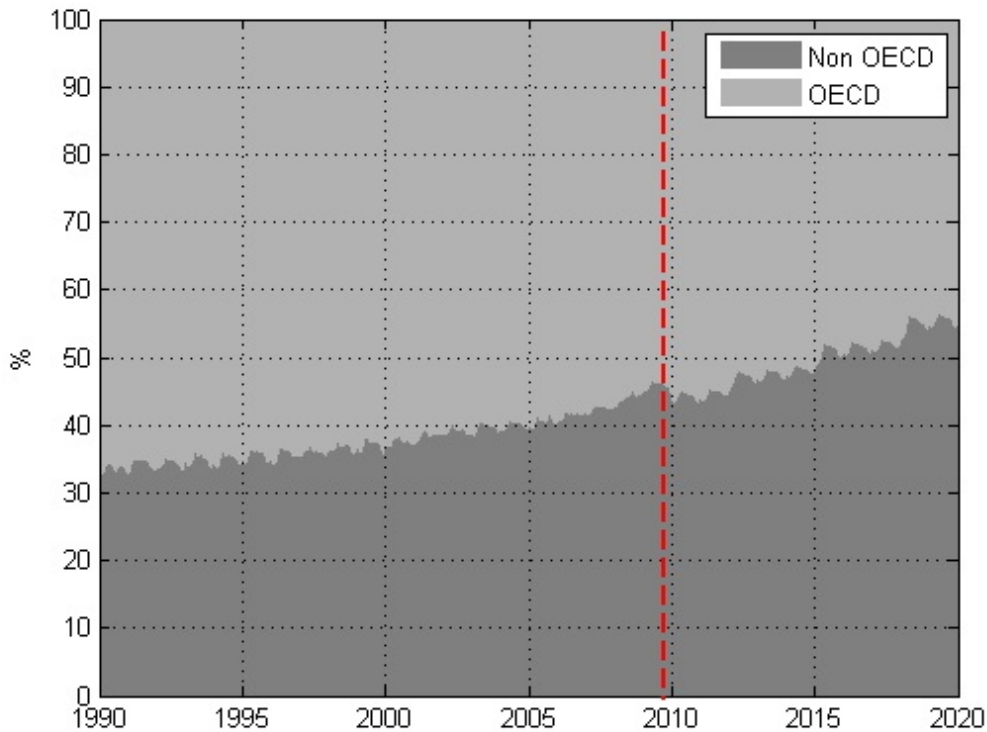


Figure 9. Hypothetical scenario where the world supply growth remains weak but constant until 2020. Light gray areas indicate recession periods.





## Conclusions

In conclusion, I think there is no end in sight for high oil prices and in particular for high volatility even assuming a somewhat optimistic supply growth scenario. The Non-OECD consumption will continue to grow, partially shielded by gasoline subsidies and an increasing share of the world oil production. The void created by a rapid contraction of the OECD consumption will be filled by Non-OECD demand. In summary:

1. OECD oil consumption is very reactive to oil prices.
2. OECD oil production has peaked in 1997 and will be increasingly dependent on oil imports from Non-OECD countries.
3. Non-OECD oil consumption is quite unresponsive to oil prices.
4. Non-OECD consumption will likely be the main driver behind high oil prices, but the OECD will be the first to reduce consumption (and demand).
5. Are we witnessing a kind of geopolitical Jevons paradox? Structural changes in demand are very likely for the OECD, but the oil then made available will be absorbed by the relentless growth of Non-OECD.



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