

Oil Consumption and GDP Impacts for Europe

Prepared by Steven Kopits, for the Walloon Parliament, December 15, 2013

Summary

European oil consumption has been declining in recent years. This is a function of oil markets developments, the effects of the financial crisis, and the impacts of fixed exchange rates from Euro membership on southern tier Eurozone countries. While the impacts of the financial crisis and Euro effects will likely ease over time, economic pressures from continued high oil prices are likely for many years to come.

Overview

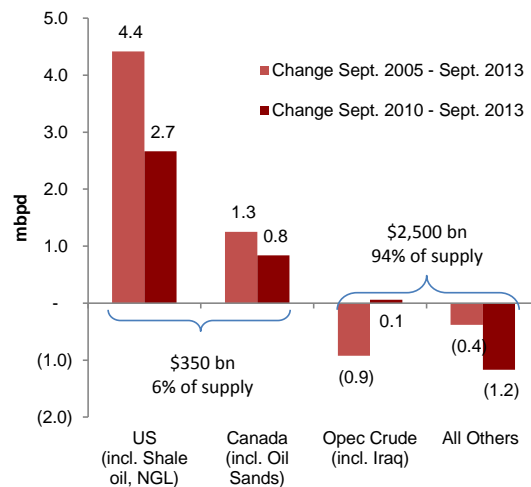
Europe's oil consumption possibilities are ultimately determined by wider developments in global oil supply and demand. Since 2005, the oil supply has struggled, with rapidly deteriorating productivity of upstream spend in oil and gas exploration and production. Meanwhile, China and other emerging economies have seen soaring GDP growth, leading to rapidly increasing oil demand. Between these two forces, Europe finds itself under pressure to reduce oil consumption.

We look at these forces in greater detail below.

The Oil Supply

Between 2005 and 2012, the *BP Statistical Review* reports that the oil supply grew at only 0.9% per year. This is a historically poor performance, especially given that some \$3.5 trillion in upstream spend in global oil and gas exploration and production. By contrast, the oil supply grew at an annual 3.4% pace between 1998 and 2005 on only \$1.5 trillion of spend.

Moreover, all the recent net increase in production has come from only two sources: North American unconventionals—US shale oil and Canadian oil sands—and natural gas liquids, which are principally by-products of natural gas, and not crude oil, production.



World Crude Oil Production Growth, 2005-2013, July-Sept. averages

Source: EIA STEO (excludes NGLs)

Approximately \$350 bn was spent on North American unconventional exploration and production (E&P) in the seven years to 2012. By contrast, roughly \$2.5 trillion was spent during this period on the legacy oil system which existed in 2005. (The GDP of Italy is \$2.0 trillion.) The legacy system includes North American conventional production, offshore and deepwater production (including the North Sea), Brazil, Mexico, Russia and all of OPEC, among others. Nevertheless, despite vast spend on the conventional oil system, production was lower in 2012 than it had been in 2005, vindicating those who had earlier called for 2005 as the peak oil year.

By contrast, unconventional production has been strong in recent years. US oil production is up 2.9 mbpd (million barrels per day) since 2010, and Canadian production has grown by 1.1 mbpd, each up about 30% over the last three years. Global oil production, by contrast, is up 2.8 mbpd—less than US oil production growth—since 2010.

In the last twelve months, US and Canadian oil production is up 2.0 mbpd, leading global oil production 1.5% higher. Unfortunately, North American unconvensionals are the *entire* story. At present, the whole of global oil production growth is leveraged to US shale oils and Canada's oil sands.

Demand Growth

Were the advanced economies the only ones which matter, supply growth of 1.5% would be more than adequate. Indeed, the advanced economies could probably make due with a flat supply. However, since 2003 or so, the emerging economies have become a key source of demand. Within this, China is key.

Oil demand proceeds on an “S” curve as countries develop. At first demand grows slowly. Then, as countries become middle class, demand grows very quickly as consumers acquire automobiles. After a period of about twenty years, most of those who want a vehicle have bought one, and demand stabilizes on a per capita basis. In East Asia, for those countries which have reached stable consumption, including Japan, South Korea and Taiwan, per capita consumption falls within a narrow range of 50-60% of US per capita levels.

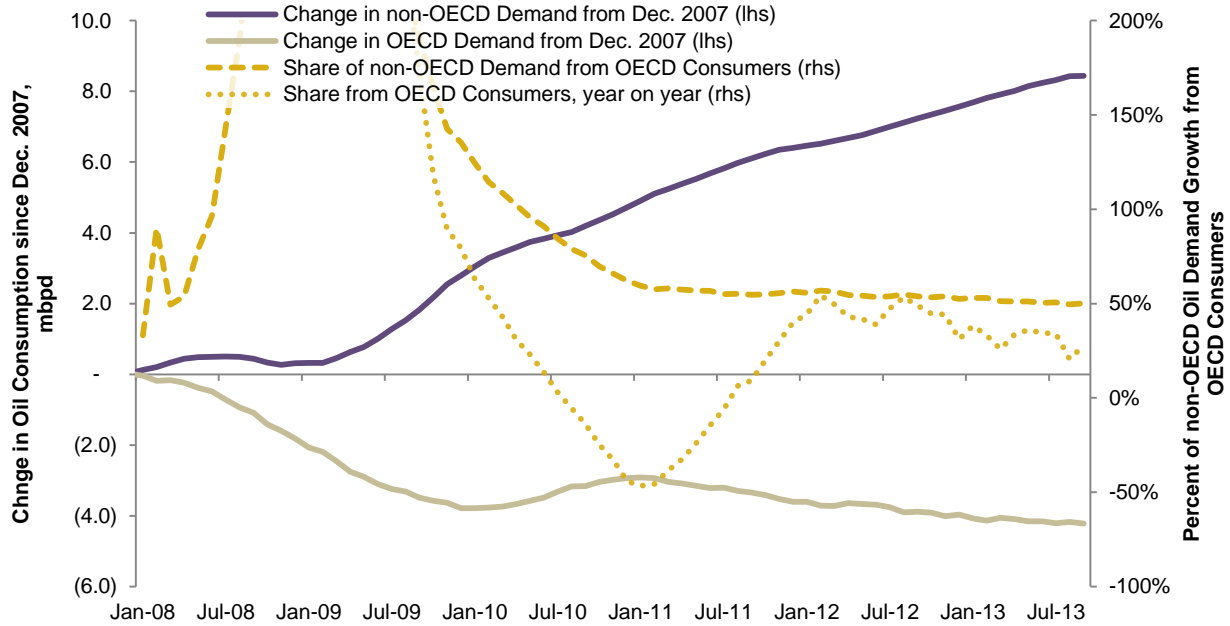
If we apply this model to China, then we would expect China to reach stable oil consumption at 2.0-2.5x US consumption around 2030. Given that the US consumes 19 mbpd, this would imply Chinese consumption of 40-45 mbpd at that time. China has represented about half of incremental global consumption growth, thus global demand growth to 2030 could be nearly twice current global consumption levels.

No one believes that the oil supply could double to 2030. Estimates for 2030 production range from 95 mbpd, from TOTAL SA of France, to 103-107 mbpd from ExxonMobil, Shell, the US Department of Energy's EIA and the OECD's IEA. Current production is around 90 mbpd, thus the major forecasting agencies see supply increasing around 15% to 2030—nowhere near the 60-100% which historical precedent would suggest is necessary.

To meet all growing sources of demand, supply would have to grow 2.7-3.2% per year, rather than the 0.9% seen since 2005 and the 1.5% seen in the last two years. Even with surging shale oil supplies, supply is lagging demand.

Re-allocating Existing Supply

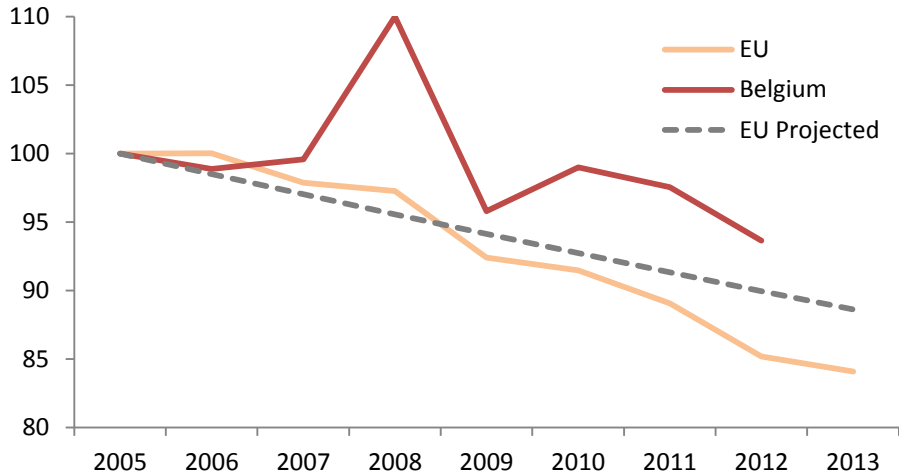
If supply will lag demand, how will the existing supply be allocated? Clearly, China and other economies will demand more as they grow. If supply growth is inadequate, then the emerging economies could bid away the consumption of the advanced economies. And this is exactly what the historical record shows. Since Dec. 2007 (the beginning of the Great Recession), OECD consumers have provided half of the incremental consumption of the emerging (non-OECD) economies. In the last year, the advanced countries have provided more than a quarter of increased non-OECD consumption, despite the rapid growth of the unconventional oil supply.



Change in OECD and non-OECD Oil Consumption since Start of the Great Recession

Source: EIA

Thus, the rise of China has been—and likely will be—associated with declining oil consumption in the advanced economies. Assuming the supply reach 100 mbpd in 2030, the require pace of decline will be approximately 1.5% per year. The graph below shows the pace of anticipated EU and Belgium oil consumption declines from the point at which the conventional oil supply stalls in 2005.



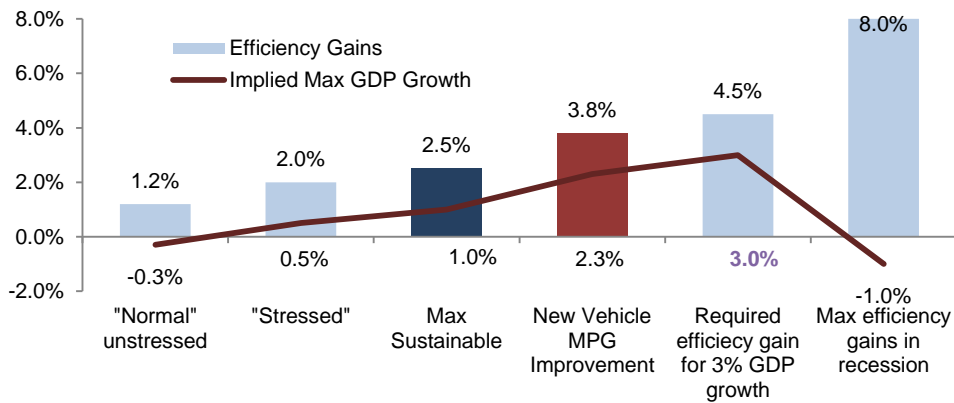
Index of EU and Belgium Oil Consumption – Actual and Forecast (2005=100)

Source: BP Statistical Review, EIA

Compared to our forecast, EU consumption has declined by a greater amount, by 2.1% per year compared to 1.5% anticipated. Oil consumption in Belgium, by contrast, has held up better than expectations. Assuming that the oil supply is no more resilient than it has been recently, and that China and other emerging markets continue to develop as they have for the last decade, then demand will continue to outstrip supply and European oil consumption, including that of Belgium, will continue to decline.

Impact of Oil Consumption on GDP

Does declining oil consumption matter? Very rarely has declining oil consumption occurred outside a recessionary environment. For example, Europe’s recently declining oil consumption has been accompanied by its second recession in last six years.



Efficiency Gains in Oil Consumption under Various Scenarios

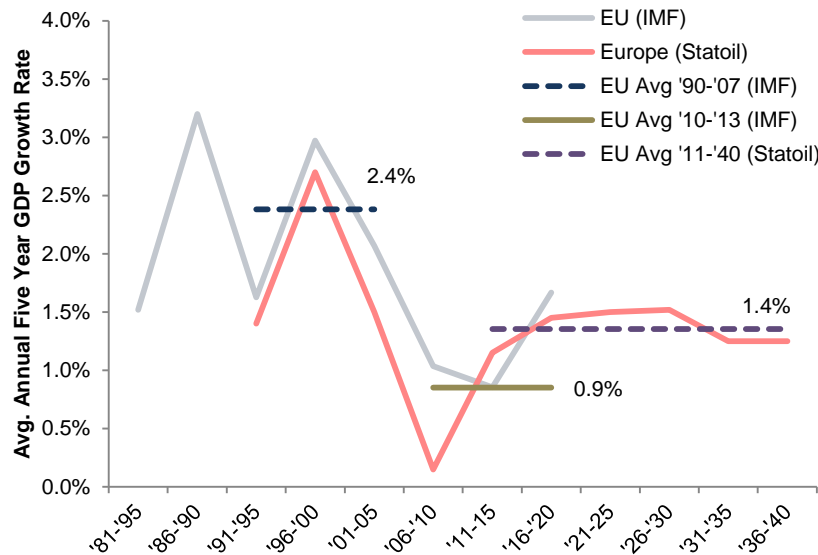
Source: BP Statistical Review, EIA

However, under typical circumstances of economic growth with no serious oil prices pressures, oil efficiency improves by 1.2% per year. That is, any given level of GDP can be produced with 1.2% less oil in the following year. With modest oil price pressure, efficiency gains can rise to 2%. The US

managed 3.8% efficiency gains for six quarters in 2011-2013 under very stiff oil price pressure. Nevertheless, the maximum sustainable, non-recessionary efficiency gain rate probably does not exceed 2.5-3.0% per year.

If we allow that oil consumption in the OECD, including the EU, must fall by 1.5% per year, and that efficiency gains are unlikely to exceed 2.5-3.0% for the entire business cycle, then long-term GDP growth will be maximized in the 1.0-1.5% range purely as a matter of math.

And indeed, many forecasters have now taken such a grim view of the European future. For example, Norwegian oil company Statoil forecasts EU GDP growth at only 1.4% per year to 2040, a full percentage point lower than the growth rate prior to the Great Recession.



EU / Europe GDP Growth Rates

Source: IMF WEO 2013, Statoil Energy Perspectives 2013

Conclusion

The oil supply lost its resiliency after 2005, just as oil demand from China and other emerging economies was surging. As a result, emerging economies are sourcing their increased consumption in large part from advanced country consumers, forcing those consumers to reduce their use of oil. EU oil consumption, for example, is 16% below its 2005 level.

These trends are likely to continue, in turn implying that EU countries will be starved for oil, resulting in decreased GDP growth. The reduction in GDP growth is projected at 0.7-1.2% per year, with GDP growth being capped in the 1.0-1.5% range for the indefinite future.

This in turn implies constraints on regional and national budgets. If GDP growth will be less than 1.5%, then Maastricht budget criteria establishing 3% budget deficits as acceptable thresholds are in fact too high. Repayment of loans from heavily indebted European countries will prove more difficult and protracted than hoped.

On the other hand, Europe is already suffering the effects of a lack of oil. While the future may not be as good as the past, it should be no worse than the present, and Europe can in fact grow at a modest pace even while reducing oil consumption year after year.

However, if Europe aspires to a higher growth rate, to 2.5% for example, then it will require either more oil, fuel substitution, or alternative transportation modes.

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