

Competitiveness of Energy-Intensive Industries in Europe: The Crisis of the Oil Refining Sector during 2008 to 2013

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Executive summary

1. Motivations underlying the research

Oil refining is the process of converting crude oil into products like gasoline, kerosene, etc. The close to 100 refineries located in the European Union constitute an important economic factor, accounting for around 100.000 jobs directly and significantly more that are indirectly linked to the industry. Oil refining plays a strategic role for energy security, given the vital role of oil products in many economic activities (chemical industry, transport sector) and for society at large (residential heating, private transport).

Historically, the United States and Europe were the two leading refining regions in the world, representing 20% and 19%, respectively, of the total global refining capacity in year 2000. In 2014, the US still accounted for almost the same share, whereas the European Union's markedly declined to 14.6%. During this period the US' total refinery capacity grew in absolute terms, while the EU's actually contracted by 9% between 2000 and 2014.

These facts epitomize what was widely perceived as 'the crisis in European refining', which fully unfolded after 2008, and thus directly followed the so-called 'golden age' of refining from 2005 to 2008. This article's objective is to understand why Europe quite suddenly experienced such a crisis and the shut-down of 13 of its refineries.

Various hypotheses have been made on what the reasons for these EU capacity reductions were. Some authors point to structural overcapacity, arisen as the consequence of falling EU domestic demand and strong competition from new refineries in the Middle East and Asia. On the other side, industry itself has highlighted the costs of EU environmental and energy regulation.

2. A short account of the research performed

Despite its prominence in the media, the European 'refining malaise' has so far not been analyzed quantitatively, most probably due to the lack of reliable performance data, such as gross and net refining margins, operating costs, energy costs, etc. Such data is generally confidential and therefore not publically available. Some sources provide estimated refining margins, but these by themselves are still insufficient to analyze the drivers of the observed economic performance.

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In the present study we can make use of otherwise unavailable proprietary data, allowing analyzing the economic performance (in terms of net cash margins) of EU refineries vis-à-vis five important competitor regions: US Gulf Coast, US East Coast, Middle East, Russia, and the aggregate of South Korea & Singapore.

The economics of refining is based on the difference between the costs of crude oil and the aggregate value of the derived petroleum products (gasoline, diesel, kerosene, etc.) – called 'crack spread' in the business jargon. Refineries incur various types of costs when converting crude oil into marketable products, ranging from the purchase of energy feedstock (often natural gas) and chemicals to personnel costs and logistical costs. With the available data we can first identify diverging trends in regional economic performance (i.e. net margin per barrel of process crude oil), and then quantify the different economic components' contribution to the evolution of the overall performance. This allows understanding whether the EU refining sector shows a worsening performance and, if so, to identify the drivers of this trend.

3. Main conclusions and policy implications of the work

Our analysis confirms that between the years 2000 and 2012 average EU net refining margins fell from above to below the average margin of the competitor regions, even though they slightly increased in absolute terms. As the most important result, 90% of this loss of competitiveness is found to be attributable to energy operating costs, which in the EU rose relatively stronger than in the average competitor region. In absolute terms, during 2000 to 2012 energy costs per barrel increased almost four-fold in the EU, while on average less than two-fold in the competitor regions.

Moreover, the evolution of energy efficiency in the EU and in the competitor regions indicates that energy operating costs deteriorated because of the steep rise in unit energy costs in the EU. In fact, along with the spectacular four-fold increase of the crude oil price between 2000 and 2012, all forms of energy used in EU refineries (electricity, natural gas, fuel oil, etc.) experienced a similarly strong cost increase. This is perhaps not surprising given the relative scarcity of domestic energy resources in the EU, whereas Russia and the Middle East were able to resort to their own abundant oil and gas resources as a buffer, and the US to its newly developed non-conventional resources ('shale gas revolution').

Further data analysis suggests that the remaining 10% of the competitiveness deterioration which are not explained by the relative increase of EU energy costs are likely related to the relative decline of EU refineries' capacity utilization rates, a consequence mainly of the drastic 12% drop in domestic demand for oil products during 2000 to 2012, or even 26% if one excludes the mid-distillate products like diesel and jet fuel. Environmental and energy policies have likely contributed to this demand side effect, but its competitiveness impact (max 10%) remains of minor importance compared to the energy cost surge (90% of the total competitiveness loss).

From a broader perspective, our findings provide further support to recent arguments on the limits of energy efficiency improvements: they can alleviate regional energy price disparities only up to certain point, beyond which they cannot prevent a decline of competitiveness.