ภาคผนวกและบรรณานุกรม
The Linkage of Manufacturing Subsector and Energy Requirement
*(From Thailand Economic Monitor, November 2006)*

Structural energy requirement of some manufacturing subsectors can explain sectoral impacts from the rising energy cost. The continuous rise in the world price of crude oil over the last few years has put more pressure to the rising domestic prices and to the slow down growth in output. Manufacturing sector can also have repercussion impact on capital investment. However, among the manufacturing subsectors, some rely more on energy input than others. The different degree of energy reliance can help identifying these vulnerable subsectors and, consequently, a clearer picture of energy price impact on manufacturing.

The oil price has increased sharply over the last three years *(2002-2005).* Historical data has shown that the average annual crude oil price has surged from around $20/barrel (which has been more-or-less steady since 1960s) to around $50/barrel in 2005, and it has hit the $60/barrel level in early 2006. Although the oil price in “real” term (adjusted to base-year 2000 price) has not reach the level of 1980’s surge, the magnitude is not negligible. Thailand’s domestic price of diesel and ULG has also surged for about three folds, similar to the world price.

*Figure 1: Average Annual Crude Oil Prices (1960 – 2005)*
Figure II: Diesel, ULG, and LPG Prices (monthly)

Figure III: Relationship between manufacturing PPI and crude oil price (January 1995 – June 2006)
While the oil-price impact is economy-wide, some sectors are affected more than others. Particularly in manufacturing, energy is inevitably a necessary part of production. A time-series plot shows that, historically, there is a relatively strong positive relationship between the crude oil price and the manufacturing producer’s price index (PPI) over the period of January 1995 – June 2006.

Manufacturing subsectors are affected at different magnitudes as they have different degree of energy dependency. The increase in manufacturing PPI for each of the subsectors somewhat reflects the impact of the oil price surge, but at different degrees. Metals, chemicals, rubber, and plastic related products show relatively larger price surges than others. The different degrees of impact can be explained partly through the difference in structural dependency on energy inputs for each subsector. According to the Input-Output data in 2000, the energy cost share for each manufacturing subsector can be summarized and ranked in Table A. For example, Cement and Concrete Products are expected to be structurally more vulnerable to the oil price surge than Leather Products.
For manufacturing subsectors with higher the degree of energy dependency, larger impact from oil price is likely the case. There is some evidence of positive correlation between the total energy cost shares and the producer’s price of corresponding manufacturing subsectors. This implies that higher energy cost share will lead to a larger price response. It should also be noted that the analysis looks at the production structure from the supply side – how a sector would react to higher energy cost through a supply shift – while assuming the demand and everything else doesn’t change. Although the analysis is partial, the linkage of interest appears to be significant enough.
The hardest-hit sectors relate to Basic Chemicals, Iron & Steel, and Rubber & Plastics. These sectors show relatively high degree of energy dependency and high price impact. The un-absorbable energy cost burden is reflected in increasing prices through supply-side contraction. Cement and Concrete Products also have high level of energy dependency, in fact, the highest among the subsectors. But, the price of Cement and Concrete Products hasn’t increased as much. This is due to other factors, which include the fact that Cement and Concrete Products is in the price-control list. Therefore, the market has limited influence on price.

Output impact corresponds to the price impact. While output almost always rises, output growth were explored and compared. Some output growths accelerate; some decelerate. The vulnerable sectors mentioned shows above-average output growth deceleration rate – a contraction along the demand. This, with prior analysis from the supply-side, confirms the identification of manufacturing subsectors that are vulnerable to the rise in energy price.
In sum, the rising cost of energy likely has a higher impact on those (manufacturing subsectors) who are less flexible in their production’s energy requirement. Although there are many factors affecting manufacturing prices, higher share of energy requirement often translates into higher impact from oil price rise. Other factors may involve abilities to pass on or steer away from higher cost, such as high market power or elasticity of substituting energy inputs. One can take time to explore these factors in details for each individual subsector in order to see how exactly energy cost affects them. However, the simple analysis mentioned can give a sense of where things are in manufacturing subsectors regarding the issue of energy price.


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