Falling through the crack

Contrary to the expectations of the political cognoscenti, the upcoming presidential election seems to be focused on domestic issues rather than international and security matters. The domestic concerns seem to revolve around three troubled sectors of the economy: obtaining affordable health care, unwinding the housing bubble, and dealing with the rapidly rising costs of raw materials — especially those that are petroleum-based. All three issues have adversely affected the transportation industry over the past year or so.

Transportation is a derived demand. The need for movement is derived from the demand for goods and services in other sectors. For this reason, transportation has traditionally been viewed as a cyclical industry.

Our nation is the world’s largest consumer of oil, and 70 percent of that is used for transportation. Once you “drill down” on those figures, however, an interesting dichotomy emerges. While personal mobility is based on gasoline, the freight transportation industry is not. Railroads and motor carriers rely on diesel, airfreight on kerosene, and ocean carriers on bunker.

Petroleum, or crude oil, is an unprocessed raw material. It is a complicated cocktail of hydrocarbons. Oil refining separates crude into distinct end products that vary from “distillate” — or “light” — easily vaporized, clear liquids, to “residual” — or “heavy” — viscous liquids that do not vaporize easily.

The distillate-to-residual spectrum starts with liquefied petroleum gas and runs through gasoline, kerosene, diesel, lubrication products, fuel oil (including bunker), and residuals (i.e., coke, asphalt and tar). In the United States, fuel products are classified into six categories according to boiling temperature, composition and purpose.

Petroleum outputs are fixed by the type of crude oil and the configuration of the refinery. “Sweet” crude oil contains less than 0.5 percent sulfur, compared with “sour” crude oil’s higher sulfur levels, and is preferred in this country for processing into gasoline, kerosene and high-quality diesel.

The profit for an oil refinery between what it pays for crude oil and the products extracted (by “cracking” the complex hydrocarbons) is known as the “crack spread.” Integrated oil companies that are multinational and control the supply chain from oil extraction to retail distribution of refined products are not exposed to economic risk. In contrast, oil refiners, which purchase crude oil and sell refined products in the wholesale market, are exposed to significant market risk from adverse price movements. (Consider that the price of crude oil rose much faster than the price of gasoline.) The crack spread is actually negative for many refiners, and those who did not hedge their risks face an uncertain future.

How does all this impact the freight transportation industry? Although gasoline is not a significant fuel source, it is the major output from U.S. refineries. (The Department of Energy estimates that a 42-gallon barrel of crude oil yields 19.4 gallons of gasoline.) The demand for gasoline is dropping. The DOE anticipates demand will drop by nearly 1 percent in 2008 from 2007. As of July 18, gasoline inventories were 13 million barrels, 6 percent higher than at the same time last year.

The story is different with diesel. A barrel of crude oil produces 7.8 gallons of diesel. There is little incentive for refineries to produce more diesel if they simultaneously create two gallons of surplus gasoline for every gallon of diesel. Also, the diesel refined in this country does not necessarily remain here. East Coast refineries have found that it is very profitable to export diesel to Europe. Not only is demand higher in Europe — a greater percentage of European passenger cars use diesel — but the weak dollar makes exporting diesel even more attractive.

Other modes face similar fuel challenges. Airlines, like trucking companies, also are impacted by the crack spread in kerosene. Their response has been to reduce demand for fuel by lowering capacity. Ocean carriers face the challenge imposed by environmental demands of moving to replace bunker with lighter, more expensive petroleum products.

As fuel exceeds labor as the leading production expense for transportation carriers, the future is murky. Will more fuel-efficient modes gain share at the expense of others? Or will production and distribution move closer to consumers and shorten existing supply chains? Not only do these questions require examination along the lines of globalization and the traditional business cycle, but they also must be considered in the new context of sustainability and carbon footprints. One thing is certain: Business as usual does not appear to be an option.

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