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The Slippery Effect of Rising Oil Prices on Energy Use in the Pulp and Paper Industry

by Patrick McCarthy, Director

Increasingly, we hear expressions of concern about the recent sharp increases in oil prices and their impacts on the economy, especially on those sectors that are particularly sensitive to higher energy prices, not the least of which is the manufacturing sector. The average annual US spot price (weighted by estimated import volume) of a barrel of oil was $16.03 in 1995, rising to $26.68 in 2000 and $34.25 in 2004. More recently, the April spot price increased further to $43.96 per barrel and light sweet crude for May delivery was $50.92, more than 30% higher than at this time last year (NY Times, May 2, 2005). Expectations for the near term are that oil prices will hover in the $50 - $60 range.

Higher energy costs directly affect pulp and paper production costs by increasing the industry's energy and transportation expenditures, which together may account for 30-35% of pulp and paper industry costs. Faced with this threat, pulp and paper firms will seek to economize on the use of energy and will attempt to substitute away from the more costly energy input and towards those inputs whose prices have not risen. How successfully a firm economizes on energy and employs more of those inputs whose prices haven't risen depends on, among other factors, technology and the demand for pulp and paper products. A firm's production technology summarizes how its inputs can be combined to produce alternative levels of output. In some cases, the technology is rigid and allows for little, if any, substitution. For example, a truck trip that delivers containerboard to a box plant requires one truck and one driver, a production technology that represents a fixed capital-to-labor ratio equal to 1. Alternatively, if diesel fuel prices rise and the company sells its old fuel-inefficient truck for a newer truck that gets higher mileage, then the firm has substituted towards capital (a more fuel efficient truck) and away from energy (less diesel fuel) in producing trips.

Past analyses of the manufacturing sector find that energy and labor are slight substitutes in production, indicating that a 1% increase in the price of energy will lead to a .1% increase in the demand for labor. More importantly, some studies have found that energy and capital are *complements* in production, meaning that a rise in energy prices will decrease the demand for capital. One well-known study estimated that a 1% rise in the price of energy would lead to a decrease in the demand for capital of approximately 1.5% [Berndt, E. and Wood, D. (1975). "Technology, Prices, and the Derived Demand for Energy", *Review of Economics and Statistics* LVII, 259-268]. Although firms will substitute towards capital when energy prices rise if output is held constant, the contracting effect on output from higher energy prices decreases the demands for all inputs, which produces a net decrease in the demand for capital. If these relationships held true in the existing environment then a sustained increase in energy prices could signal a retrenchment in capital investment expenditures for the manufacturing sector.

In addition, if the demand for paper and paperboard products is highly sensitive to price, then a small change in the price of these products will lead to a

large change in demand and, accordingly, to a large change in the demand for inputs needed to produce paper and paperboard. Further, the change in input demand (e.g. energy) will be directly related to its share in the total costs of production. For example, if a 1% increase in the price of paper and paperboard reduces demand by 1.5% and energy comprises 10% of total costs, then, in the near term, a 1% increase in energy prices will force a 0.1% increase in the price of paper, a consequent 0.15% decrease in demand for paper and a corresponding 0.15% decrease in the demand for energy used in paper production.

Quantifying the effects of energy price increases on the demand for energy in the pulp and paper industry is slippery business. But prior research can provide clues to the types and magnitudes of changes one might expect from recent oil price increases.

Stay Updated on the State of the Industry

CPBIS has access to industry-related reports that will be of interest to Center researchers and affiliates, industry practitioners and others interested in where the industry stands now and its future prospects. Some of these can be found on our Web site via the link under "Industry Reports" on the home page. Alternatively, you may go directly to the reports at http://www.cpbis.org/ind_reports/index.htm Since the collection of reports is updated frequently, we suggest you visit this Web page often to get the most current information.

Among the reports available are CIBC Reports from CIBC World Markets, an investment banking and brokerage subsidiary of the Canadian Imperial Bank of Commerce. Other reports are listed by title and may be requested by contacting Jim McNutt of CPBIS.

Also accessible via the above link, and periodically updated, are PowerPoint presentations entitled "The State of the North American Pulp & Paper Industry," by Jim McNutt of CPBIS and Dan Cenatempo of Value Resolution Group. These contain a wealth of information on the performance of, and outlook for, the industry as a whole, as well as on specific grades.

Education and Training Providers to Convene in Atlanta

On May 18th and 19th in Atlanta, CPBIS will host and facilitate a discussion among associations and universities that provide continuing education and training to our industry. The retirement of many workers in the near future, limited availability of qualified new hires to replace this workforce, higher skill sets required to operate more advanced equipment, and the business acumen, leadership and interpersonal skills needed to perform well in all functions have placed a great emphasis on quality and cost-effective training.

This group will seek to identify, in general, the education, training and human resource issues of the industry. The group, which will include all of the associations supporting the forest products industry, will also discuss potential collaborative paths forward to meet the needs identified. The ultimate goal is to develop and sustain an industry workforce that will enhance the competitiveness and overall performance of the industry.

CPBIS Industry Advisory Board Meeting to Focus on Education

The CPBIS Industry Advisory Board (IAB) is a body of industry representatives whose purpose is to facilitate CPBIS programs. Led by Chairman Ray Heuchling (Irving Forest Products) and Vice Chairman Phil Jones (Imerys), it performs two main functions:

- It works broadly with counterparts in the paper industry to provide input and guidance to CPBIS on its strategic direction and operating plans.
- It helps to generate industry awareness of the Center, soliciting industrial sponsorship and collaborative support of CPBIS research projects and educational programs.

The IAB will convene in Atlanta on May 19 for a meeting that will focus on joint CPBIS-PIMA educational activities. On the agenda are discussions of the status and direction of existing offerings (*Management Development for Enhanced Performance* and the Webcast courses) as well as plans for developing new offerings.

The Fall IAB meeting, on Sept. 23, will focus on the Center's research program.

Upcoming Events

Forest Products Industry Education and Training Roundtable Discussion. May 18, 5:30–9:30 p.m., and May 19, 8:00–10:00 a.m., CPBIS, Atlanta.

CPBIS Industry Advisory Board Meeting. May 19, 10:00 a.m.–3:30 p.m., CPBIS, Atlanta.

CPBIS Board of Executives Meeting. June 26, 2:30–6:30 p.m., Renaissance Nashville Hotel, Nashville, TN.

IPST/CPBIS TechnoBusiness Forum 2005. Sept. 19-20, Atlanta. Details forthcoming.■