



Center for Paper Business and Industry Studies

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Paper Production and GDP Trends

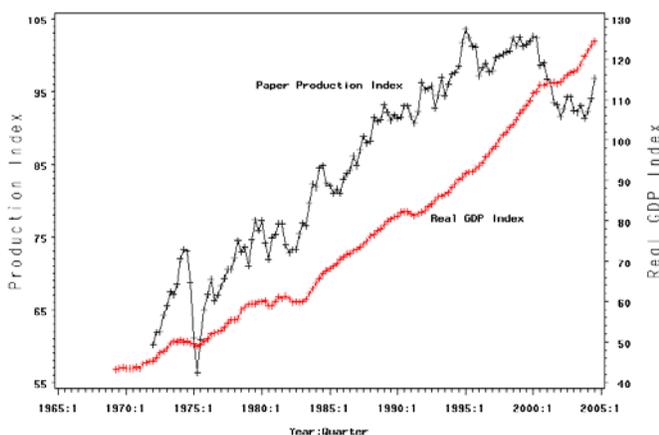
by Patrick McCarthy, Director

In the US economy, output in the manufacturing sector has generally more than kept pace with increases in real GDP. Between 1950 and 2000, for example, average annual growth in manufacturing output averaged 3.8% in comparison with a 3.4% growth rate in real GDP. However, not all manufacturing sectors fared this well. The figure below presents (seasonally adjusted) indices of paper production (left axis) and real GDP (right axis) for the period 1972-2004. Paper production during this

real GDP did not experience wide swings. The standard deviation in real GDP annual growth was 2.1; by comparison, the standard deviation for the paper industry was 4.7, reflecting much larger variations in growth rates, as is seen in the figure. Paper production experienced a significant decrease in the period around 1975 and again during the 2000-2001 period. Conversely, paper production experienced high growth in the mid-1990s, with the index peaking in the first quarter of 1995.

By decade, average annual growth rates in paper production have fallen. For the period 1972-1979, 1980-1989, and 1990-1999, average annual growth averaged 3.02%, 2.15%, and 1.03%, respectively. And from 2000-2004, the index in paper production fell 2.4%. The decrease since 2000 likely reflects declining business investment in equipment and software and a weak demand for exports, factors which also characterized the manufacturing sector's weak performance post-2000. Over the longer period, and of greater concern to the pulp and paper industry, increased global competition and new sources of paper supply, particularly in South America and Asia, are contributing factors to the slower growth rates. It remains to be seen how well the US industry responds to the increased competitive threats.

Paper Production and GDP Trends



Source: Federal Reserve Board
U.S. Dept of Commerce: BFA: National Accounts Data

period grew at an annual rate of 1.4%, much less than the 3.1% annual increase in real GDP, and less than the annual growth in the manufacturing sector as a whole. Although the US economy experienced several contractions during this period (1973:4-1975:1, 1980:1-1980:3, 1981:3-1982:4, 1990:3-1991:1 and 2001:1-2001:4), annual growth rates in

Student Profile:

Chayakrit Charoensiriwath

by Aselia Urmanbetova

In May 2004, Georgia Tech awarded the Ph.D. degree to Chayakrit Charoensiriwath for his work in the School of Industrial and Systems Engineering, a

significant portion of which dealt with his CPBIS research. Chayakrit was well prepared to undertake this work, having received a degree in Electrical Engineering from Northwestern University in 1995 and no fewer than three master's degrees from Stanford and the University of California at Berkeley. At CPBIS, under the direction of Professors Jye-Chyi Lu and Patrick McCarthy, Chayakrit worked on the Trucking Logistics project and completed his dissertation, *Dynamic Learning in Supply Chain Management with Repeated Transactions and Service Contributions*.

The main objective of his research was to build mathematical models to study the role of logistics in paper industry supply chains. He developed a model in which two competitors sell their products through a common channel or retailer. The model showed that retailers tend to control final product prices and manufacturers are likely to serve different markets that are shaped by the quality of their services. The research has resulted in two publications, *Competition Under Retail Price and Manufacturer Service* and *Dynamic Learning in Supply Chain with Repeated Transactions and Service Contributions*, both of which will appear in the European Journal of Operations Research and Management Science.

When asked what he liked most about working with CPBIS, Chayakrit cited the opportunity it afforded to observe the interaction of the academic community and industry, and how this interaction produced new knowledge beneficial to the industry. Interestingly, one of Chayakrit's current responsibilities is to manage a hard disk drive cluster in Thailand, which depends heavily on interaction between industry representatives and academic researchers: "The experience gained through my attendance at CPBIS meetings becomes really valuable to me now."

Having been his office-mate for more than a year, I know that, despite his busy schedule, Chayakrit always finds a way to excel in his numerous hobbies. During the intense months of writing his thesis, he enjoyed taking 6 a.m. weekend photo trips to Atlanta's outskirts, and, while preparing for his defense, he diligently attended ice cream making classes. For good measure, he also indulged his passions for Tai Chi, Shaolin Kung Fu, and practicing the Chinese (Mandarin) and Korean languages with his roommate and fellow students.

It so happened that our correspondence in preparation for this article was interrupted by the Tsunami that hit Thailand and other nations in late December. We were relieved to receive an e-mail from Chayakrit a few days later saying that he was busy launching and

supporting the official Tsunami victim websites: www.thaitsunami.or.th and www.missingpersons.or.th.

CPBIS appreciates Chayakrit's contribution to its research program, and looks forward to opportunities that may arise to work with him in the future.

Learning from the Recovery

On Friday January 28, Distinguished Lecture Series speaker Dr. Erica Groshen of the Federal Reserve Bank of New York delivered a detailed and insightful analysis of recent economic trends and fundamental changes in the economy they signal. The US economy has recently undergone two key changes: in aggregate, the economy has become more stable but, at the same time, individual firms find themselves in a tougher operating environment. Recessions tend to be milder and less frequent, with less volatility between them. At the firm level, however, volatility, competition, and the pace of change have all increased significantly. Post-recession recoveries are different now, evidently because structural changes in the economy increasingly dominate cyclical ones. In the 1980s and previous recessions, employment exhibited the expected patterns: losses during the recession followed by recovery afterwards. The current recession, in contrast, signals structural shrinkage of some industries (e.g., airlines and manufacturing, including paper) accompanied by expansion of others (e.g., health care and educational services). In the latter part of her presentation, Dr. Groshen dug deeper into the underlying causes of these phenomena, and identified lessons for the paper industry. Among her plausible, though counterintuitive, inferences: offshoring is probably not a significant factor, but carries with it several risks, including knee-jerk policy making. The recorded Webcast of Dr. Groshen's talk, with visuals, is available on the CPBIS Web site.

Upcoming Events

CPBIS - PIMA Online Professional Development Course. Mar 9 -11:00am - 12:30pm EST. Webcast; watch the CPBIS and PIMA Web sites for details.

Distinguished Lecture Series. February 25, 11:00-12:30pm., Kress Auditorium, IPST at Georgia Tech. George H. Weyerhaeuser Jr., Senior VP at Weyerhaeuser Corp., will speak on *Technology Deployment in the Forest Products Industry*.

Management Development Course. May 9-13, CPBIS. See <http://www.cpbis.gatech.edu/mgtdev> ■