

Networked Computer Use in U.S. Manufacturing

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Abstract

The strong economic performance of the United States in the late 1990s economy generates vigorous interest in role of computers. Many studies took up the challenge of Solow's 1987 paradox that "you can see the computer age everywhere except in the productivity statistics." Linkages between computers and economic performance are found at least for some sectors of the U.S. economy, particularly the surge of productivity growth in the late 1990s. However, it remains unclear just how computers affect productivity. Official statistics provided scant information about how computers are used. The U.S. Census Bureau initiated a measurement strategy to begin addressing these data gaps. The Computer Network Use Supplement (CNUS) the Annual Survey of Manufactures (ASM) surveyed some 50,000 manufacturing plants about their use of on-line purchasing and ordering, the presence of computer networks, the kind of network (EDI, Internet, both), about 25 business processes (such as procurement, payroll, inventory, etc., conducted over computer networks; "e-business processes"), and whether those networked processes are used to interact internally, or with the manufacturing plant's customers or suppliers. The first official statistics, based on the responses of over 38,000 U.S. manufacturing plants, were released in June 2001.

A recent paper (Atrostic and Gates 2001) used these new data to model two new indicators of the use of e-business processes in U.S. manufacturing: the use of computer networks, and of fully integrated enterprise resource planning software (FIERP). FIERP is present when enterprise resource planning software that is applied to separate business processes such as payroll and procurements is integrated into a single system. Those estimates suggested that the thresholds represented by the presence of computers and the use of a computer network are unlikely to be significant factors in explaining differences in productivity growth among subsectors of U.S. manufacturing. Those estimates also indicate that the Transportation equipment subsector (as classified in the North American Industrial Classification System (NAICS)) is one of the most intense users of fully integrated enterprise software, second only to the NAICS Electrical Equipment subsector. Yet existing studies have not found high productivity growth in the Transportation equipment industry group (as classified in the Standard Industrial Classification system).

The estimates presented in that paper are based on plant-level responses, but are presented at the subsector level, and do not include estimates of the joint effect of other electronic business processes, or other inputs to the production process. This paper links the CNUS supplement data to current and previous information for the same plant collected in the Annual Survey of Manufactures and the Census of Manufactures. It continues the initial research using these data by modeling indicators of how computers are used in selected electronic business processes and exploring how those indicators affect input mix and plant-level productivity.