

### ***The Globalization of R&D: Implications for S&E Labor Markets***

The postwar period has witnessed a substantial increase in the international trade of goods and services. Since the mid-1980s, foreign direct investment has grown even faster than world trade. Even as multinational firms have shifted production and distribution activities outside their home country, however, they have tended to keep research and development activity concentrated there. This pattern is now beginning to change.

Increasingly, multinational firms are relying on overseas R&D subsidiaries, alliances with foreign technology-intensive firms, and linkages with foreign universities to provide significant contributions to their total R&D effort. If these trends continue to grow in importance, they will sever the hitherto strong linkage that has existed in advanced countries between domestic *demand* for R&D services and the domestic *supply* of scientists and engineers. Recent empirical research and articles in the business press suggest that we are gradually moving to a world in which multinational firms “outsource” research and product development to those regions of the world that are best endowed with the appropriate mix of skilled scientists and engineers, much as they now outsource labor-intensive manufacturing activities to nations abundantly endowed with low-wage labor.

Because of the technological lead held by the U.S. in many commercially relevant branches of science and technology, the globalization of R&D is likely to *increase* demand for the services of many groups of U.S.-based scientists and engineers. Many leading European and Japanese firms have deliberately established research subsidiaries in U.S. research centers such as Silicon Valley in order to “tap into” the pools of specialized engineering talent. As a group, Japanese firms have arguably been the most aggressive in this endeavor. Even as the Japanese economy slowed in the 1990s, Japanese efforts to obtain access to American-generated technology remained strong. This project will build on recent research by the principal investigator on these efforts by Japanese firms to attempt to quantify the net impact of investment by advanced country multinationals on demand for the services of U.S.-based scientists and engineers.

At the same time, however, certain kinds of lower-level product development and research activities have been outsourced by U.S.-based multinationals to teams of scientists and engineers abroad. The example of the Indian software industry is well known. To the extent that these trends develop further, it is possible that some groups of U.S.-based scientists and engineers could see demand for their services drop as these activities are increasingly outsourced to foreign research sites – some of which may be located in developing countries with large concentrations of scientists and engineers. Outside the software industry, legal restrictions imposed by the U.S. government on certain kinds of biotechnology research, and the explicit attempt by foreign governments to establish a base of scientific expertise in these areas, raise the possibility that some categories of biotechnology research could also be outsourced.

This project will use new data to address these issues. Through prior research, the principal investigator has built up a comprehensive data base of research/product development facilities established by Japanese multinationals in the U.S. To this data base will be added information on R&D subsidiaries established by European firms and by firms based in “advanced” developing countries, such as Taiwan and South Korea. These data will provide the basis for a quantitative assessment of the scale of foreign-supported private-sector research activity in the United States. Is this activity large enough to have a substantive impact on demand for S&E labor? I will be able to provide at least a preliminary answer.