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ABSTRACT

Recent recruiting experiences of firms that employ scientific and engineering (S/E) personnel were determined in a followup to a 1981 survey. The following industries, which employ almost three-fourths of the scientists and engineers in private industry, were included in the survey: mining, construction, petroleum refining and extraction, chemicals, primary and fabricated metals, office machines, nonelectric and electric machinery and equipment, aircraft, transportation equipment (other than aircraft), electric/gas services, and engineering/architectural and other business services. Of the 255 firms contacted in the 1982 survey, 197 (77 percent) responded, representing the employment of about 8 percent of industrial scientists and engineers. Findings include the following: over 50 percent of the firms indicated that it was easier in August 1982 to hire new entrant scientists and engineers than it had been 10 months earlier; only electronic engineers with master's degrees were generally in short supply in 1982; the proportion of employers reporting shortages of petroleum engineers fell from about 65 percent in 1981 to 13 percent in 1982; and employers attribute the slackening market to the general state of the economy. (SW)

SCIENCE RESOURCES STUDIES HIGHLIGHTS

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LABOR MARKET SLACKENS FOR NEW SCIENCE AND ENGINEERING GRADUATES

Firms that responded to an October 1981 survey of labor-market conditions for scientific and engineering (S/E) personnel were queried again in August 1982 concerning their recent recruiting experience. The following industries, which employ almost three-fourths of the scientists and engineers in private industry, were included in the survey: mining, construction, petroleum refining and extraction, chemicals, primary and fabricated metals, office machines, nonelectric and electric machinery and equipment, aircraft, transportation equipment (other than aircraft), electric/gas services, and engineering/architectural and other business services. Of the 255 firms contacted in the second survey, 197 (77 percent) responded. These 197 firms employ approximately 8 percent of industrial scientists and engineers.

Highlights

- Over 50 percent of the firms queried indicated that it was easier in August 1982 to hire new entrant scientists and engineers than it had been 10 months earlier.
- Only electronic engineers with master's degrees were generally in short supply in 1982, with 43 percent of the firms reporting fewer qualified applicants than vacancies. For all other field/degree levels, fewer than 30 percent of the firms reported shortages.
- The most dramatic change involved petroleum engineers. The proportion of employers reporting shortages fell from about 65 percent in 1981 to 13 percent in 1982.
- Only in the office-machines [including computers] and utilities industries did a significant number of firms (67 percent and 57 percent, respectively) still report difficulties in finding qualified S/E applicants.
- The number of vacancies for scientists and engineers listed with the State Employment Services dropped 26 percent between July 1981 and July 1982. Similarly, by the middle of 1982, the number of job offers to recent graduates with bachelor's degrees in science and engineering had fallen by 25 percent from the July 1981 level.
- Employers overwhelmingly attribute the slackening market to the general state of the economy.

Introduction

In spite of an economic slowdown in 1981, demand in that year was strong for new graduates in engineering, systems analysis, computer science, and earth science. In fact, there were substantial personnel shortages reported as late as October 1981 for most engineering fields and computer science. (See *Science Resources Studies Highlights*, NSF 82-310). These shortages raised concerns as to the adequacy of the supply of new graduates to satisfy future industry needs generated by economic recovery and increased defense spending. By the turn of the year, however, there were indications that the demand for scientists and engineers was not only slackening, but possibly was exceeded by supply.

To appraise the situation, a survey of industrial employers of large numbers of scientists and engineers was conducted in August 1982. Since the survey coincided with a drop in the leading economic indicators, it is not surprising that employers reported substantial improvement in the supply/demand balance for almost all S/E field/degree levels.

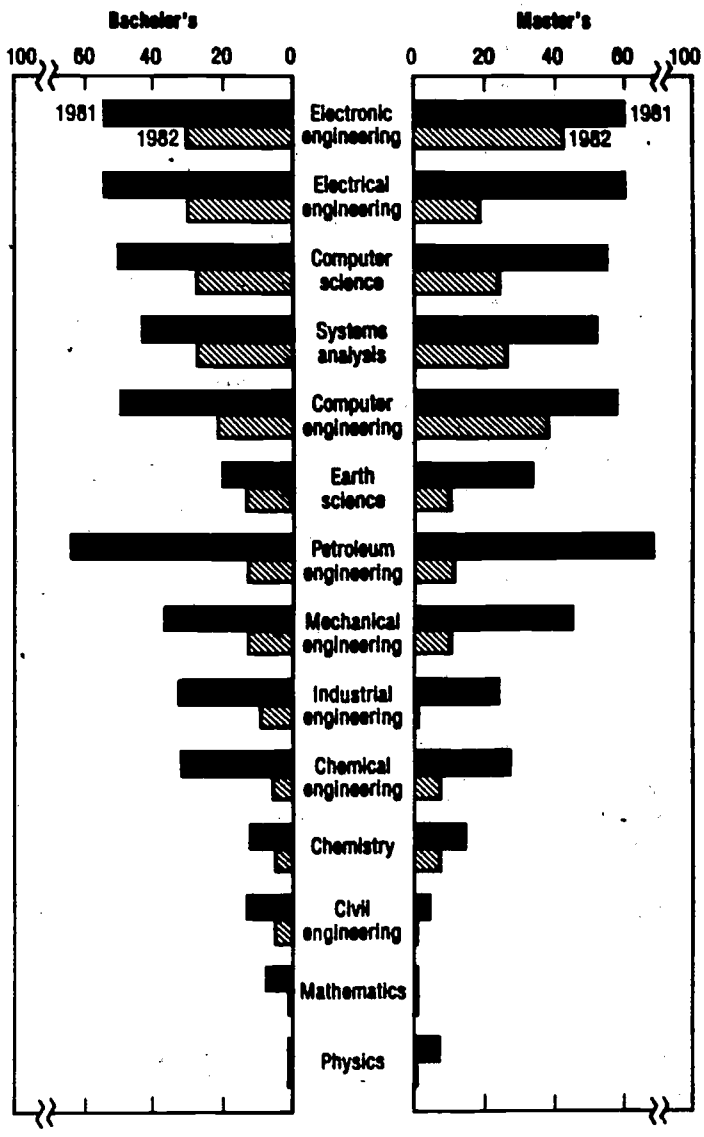
In addition to employer reports on the adequacy of new S/E graduate supply, the three other indicators examined—job offers to S/E graduates at college placement offices, employer listings of job vacancies at State Employment Service offices, and the unemployment rate for engineers—also pointed toward a substantial decline in demand.

Prepared in the Utilization Studies Group, Division of Science Resources Studies

Employer Reports by Field

Over 50 percent of the 197 firms that answered both the August 1981 and October 1982 surveys said that it had become easier to hire new entrant scientists and engineers during that period; only 12 percent reported that it had become more difficult (chart 1).

Chart 1. Percent of firms reporting shortages: 1981 and 1982



SOURCE: National Science Foundation

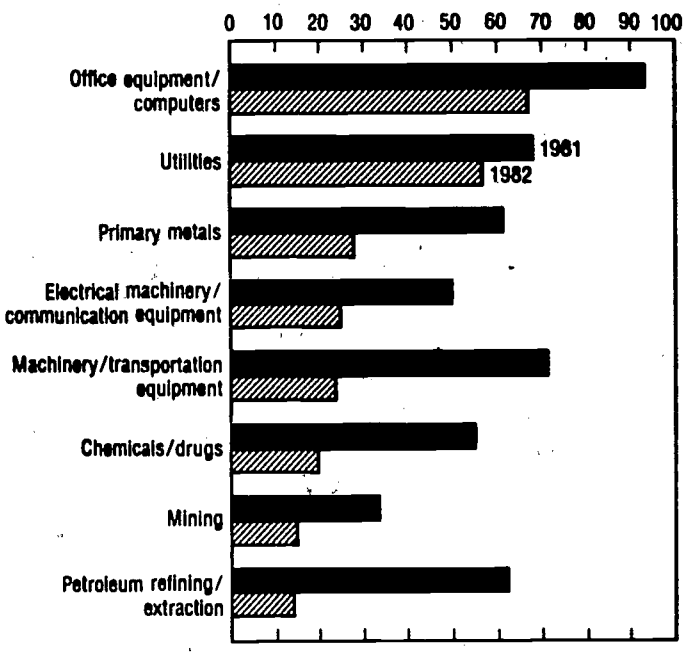
In 1981, 40 percent or more of the employers of bachelor's- and master's-level scientists and engineers reported shortages in the fields of petroleum, computer, electrical, and electronic engineering; computer science; and systems analysis; in 1982 the only shortage reported by more than 40 percent of employers was for electronic engineers at the master's level (43 percent). The largest drop in reported shortages was for petroleum engineers. At the bachelor's- and master's-levels, an insufficient supply was perceived by slightly more than 10 percent of all the firms hiring petroleum engineers, compared to over 60 percent 10 months earlier.

The situation was similar for applicants with Ph. D. degrees. About half as many firms reported shortages for Ph. D. chemical engineers in 1982 (22 percent) as in 1981 (42 percent). The number of firms indicating a lack of Ph. D. computer-scientist applicants dropped from 31 percent to 8 percent, electrical engineers from 30 percent to 21 percent, mechanical engineers from 19 percent to 14 percent, and chemists from 19 percent to 10 percent. Data for other Ph. D. fields are not available.

Employer Reports by Industry

Hiring recent graduates was easier in 1982 than in 1981 regardless of the industry represented by the respondents. Whereas 55 percent of the employers in the chemicals/drug industry reported shortages of bachelor graduates in one or more S/E fields in 1981, only 25 percent reported this situation in 1982. Similar declines have occurred in other industries (chart 2).

Chart 2. Percent of firms reporting shortages (for one or more fields) of new graduates in science and engineering by industry: 1981 and 1982



NOTE: Data not separately available for industries not shown.
SOURCE: National Science Foundation

Despite this general decline, a majority of firms in the office-machine industry (67 percent) continued to report shortages of qualified new graduates—primarily in computer, electrical, and electronic engineering, computer science, and systems analysis. The only other industry with a majority of firms reporting shortages was utilities (57 percent), primarily of electrical and electronic engineers and computer scientists.

Defense Firms

Although defense spending increased during the last 12 months, the proportion of defense industry employers (23 percent of the respondents) reporting shortages declined by at least a factor of two in most fields. The only field in which more than 30 percent of employers reported shortage conditions in 1982 was electronic engineering (50 percent). On balance, defense contractors were more successful than other firms in filling job vacancies, with the exceptions of electronic and mechanical engineering in which larger proportions reported shortages than other respondents.

Other Indicators of Moderating Demand

Other indicators of market conditions confirm that shortages have moderated in the market for S/E personnel. College Placement Council data reveal that between July 1981 and July 1982, job offers to bachelor's degree graduates dropped for all S/E disciplines, except computer science (chart 3). On average, job offers to engineering graduates decreased by 28 percent and to science graduates (excluding computer sciences) by 16 percent. The decline can be attributed either to an increased acceptance rate or to decreased vacancies. Either condition indicates that shortages have moderated or disappeared.

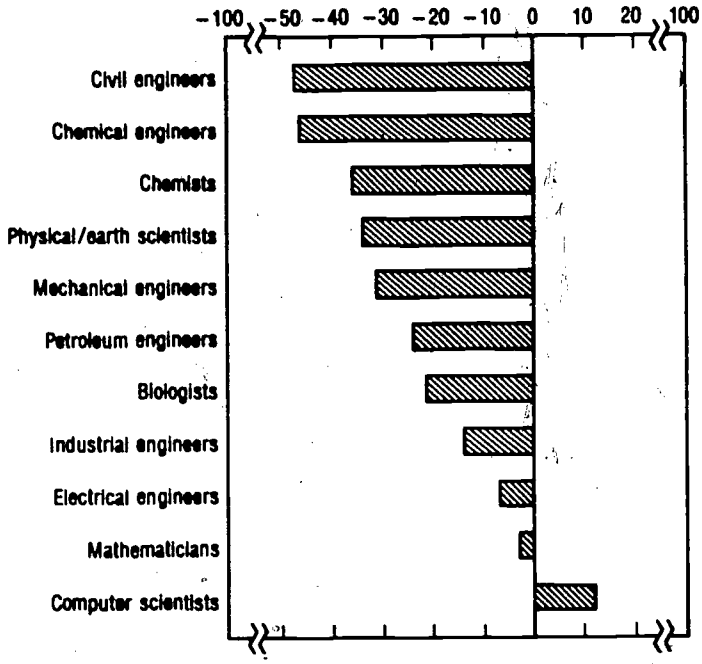
A substantial drop in the number of job vacancies listed with State Employment Services between July 1981 and July 1982 serves as additional evidence that the demand for scientists and engineers has moderated (chart 4).

Unemployment statistics also indicate changes in demand. Over the 10-year period of 1972-81, the average unemployment rate for engineers—the only S/E group for which such data are available—was 1.6 percent. In the second quarter of 1982, the rate stood at 2.2 percent, exceeded only by the 2.6-percent rate reached during the 1974-75 recession.

Causes of Labor-Market Changes

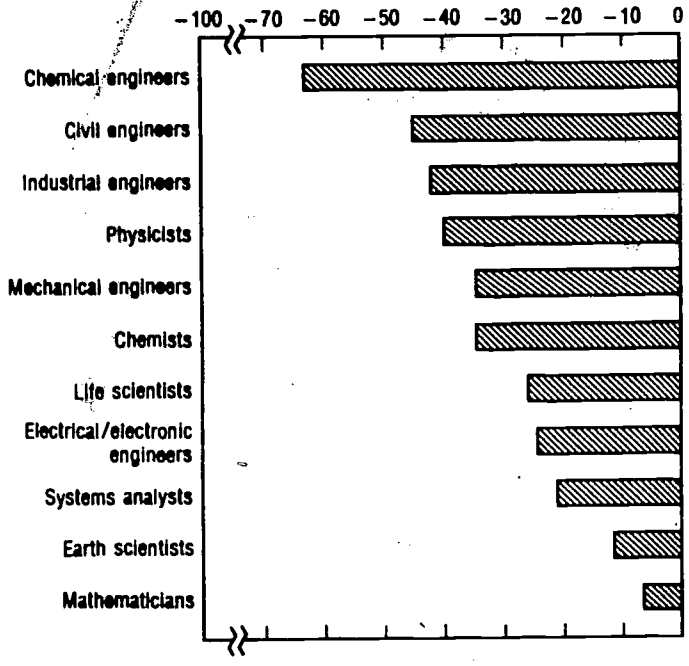
Of the firms reporting that finding new S/E entrants had become easier, fully 90 percent cited general economic conditions, rather than specific industry-related problems or increases in the supply of new workers, as the reason for the change in labor-market conditions.

Chart 3. Percent changes in job offers to bachelor's-level science and engineering graduates between July 1981 and July 1982



SOURCE: College Placement Council

Chart 4. Percent changes in job-vacancy listings at State employment services between July 1981 and July 1982



SOURCES: Department of Labor and National Science Foundation