Appendix: Measuring Labor Force Skills

Small-area (e.g., county) measures of job skills usually rely on broad measures of human capital or economic characteristics. Social scientists have most often used the mean or distribution of educational attainment among the adult population as an indicator of general skill levels, despite a significant body of criticism. Critics charge that while education levels provide a reliable guide to formal academic skills, they are too broad to correspond to specific job skills, and thus are limited in their skill information (McGranahan and Ghelfi, 1998; Teixeira and Swaim, 1991).

Small-area industry mix has been used as a measure of skill requirements in a number of studies, nearly always assuming constant skill requirements within a given industry (Colclough, 1988). In fact, the skills mix differs widely by location for many industries. For each industry, this variation can be decomposed into a varying occupation mix and a varying skill content within occupations. While we have demonstrated the first factor, we can only guess at the second. We are fairly confident, however, that the first factor alone casts doubt on these measures as sufficiently reliable to capture geographic skills differences.

A third set of skill measures can be derived from small-area occupational structure, and this is the metric we have chosen for this report. Occupational categories hold an advantage over education levels in that they are more directly related to the requirements of specific jobs and thus can be identified with a well-defined set of skills. Although their specific skill content is likely to vary somewhat from place to place, the use of detailed occupational categories available from the U.S. Census Bureau limits the measurement error caused by assuming constant skill content regardless of place.

Unlike education levels, for example, occupational classifications generally do not follow a strict rank ordering in terms of skills, a fact implied by their descriptive coding. Thus, in order to be useful for the purpose of assigning skill levels, occupations must be linked to a set of descriptors that more or less quantify the skill content of each occupation. The U.S. Department of Labor has developed a number of occupational-skill classification systems, at least two of which have been used in recent years in analyses of workforce quality and economic change. The Dictionary of Occupational Titles (DOT) was developed after World War II as a means of placing unemployed workers and targeting training efforts by matching worker skills and job requirements. The DOT uses a set of 30 scores to describe the skill requirements of each detailed occupation, although there is no explicit division into low and high skill categories.

The DOT has recently been replaced by a new set of occupational descriptions known as O*NET, which (among other things) describes an occupation according to the minimal training and/or education requirements of most jobs held by workers in that occupation. Closely associated with O*NET descriptions is an 11-code system used by the Bureau of Labor Statistics to describe the skill content of occupations and occupational groups.

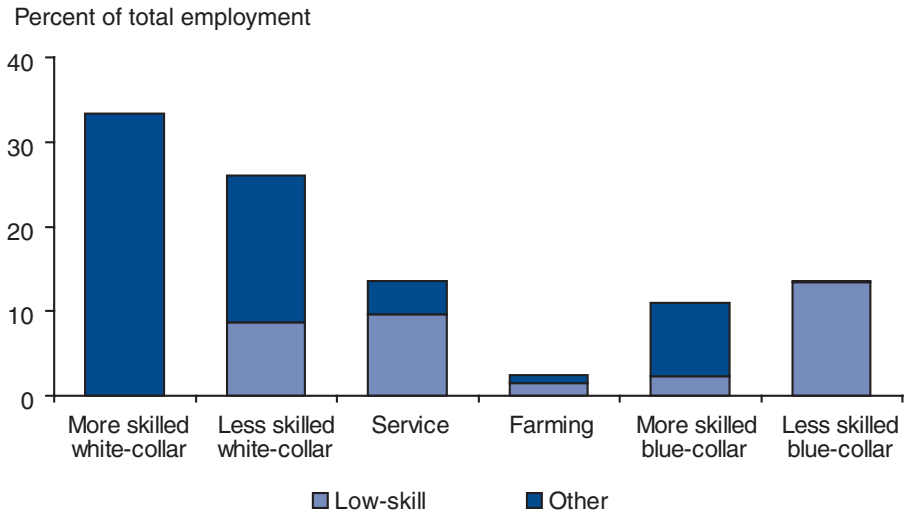
We use a simplified version of the DOT skill indices in this report due to its closer relationship to occupational tasks rather than formal education and on-the-job training requirements. Seven of the 30 skill dimensions were chosen to represent the "substantive complexity" of each occupation, with a mean composite skill index of 22. We defined low-skill occupations as those with below-average skill indices. However, we excluded 22 occupations from the low-skill designation whose proportion of workers with college experience exceeded the national average of 48 percent.

To provide a better sense of the kinds of occupations that qualify as "low-skill" in this study, we compared our categories against the major occupational groupings in the Standard Occupational Classification system produced in 1987 (SOC). For instance, we identified low-skill occupations in the SOC groupings once commonly labeled "white-collar," and computed their share of total employment in these groupings. We performed a similar computation for six broad categories: managers, professional, and technical workers (more skilled white-collar); sales, clerical, and administrative support workers (less skilled white-collar); farmers, forestry workers, and fishermen (resource-related); service workers; precision production, craft, and repair workers (more skilled blue-collar); and operators, fabricators, transportation and material movers, helpers, and laborers (less skilled blue-collar).

As would be expected with jobs conducted primarily in offices, classrooms, and laboratories, the more skilled white-collar group includes no occupations that qualify as low-skill by our measure (appendix fig. 1). The group with the next lowest share of workers in low-skill occupations, 21 percent, is the more skilled blue-collar occupations. Although these occupations are held by workers with lower average education than those in the less skilled white-collar group, they score relatively high on task complexity. Low-skill occupations in this group are typically found in manufacturing, mining,

Appendix figure 1

Nonmetro employment by occupation group, 2000



Source: Economic Research Service/USDA, using data from the 2000 Current Population Survey.

construction and business services, and include such occupations as machine maintenance workers, painters, roofers, pavers, and brickmasons.

The less-skilled white-collar and farming groups are intermediate in terms of their share of low-skill occupations. About a third of employment among sales, clerical and administrative support occupations is low-skill. Cashiering is the most common low-skill occupation in this group, but also counted as low-skill are most clerical jobs and many occupations in wholesale and retail sales. Sixty percent of resource-related jobs are low-skill, including most occupations in forestry, fishing, and mining. Farming is distinctive in that its employment is divided between high-skill farm owners, operators and managers (the majority of farming employment), and low-skill farm laborers.

Service and less skilled blue-collar occupations are overwhelmingly low skill, employing over half of all workers in low-skill jobs and including many of the most common individual low-skill occupations. Among them are janitors and house cleaners, garbage collectors, security and prison guards, waiters, nursing aides and orderlies, truck drivers, helpers and laborers, and most machine operators.