

**WORKER SKILLS  
AND  
JOB REQUIREMENTS**

**Is There a Mismatch?**



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## Introduction

There is a widespread belief that U.S. workers' education and skills are not adequate for the demands of jobs in the modern economy. Journalistic reports, employer surveys, popular and policy debates on school quality and education reform, sociological writings on the economy and the underclass, and economic research on the recent growth of wage inequality all suggest a mismatch between the skills workers possess and the skills jobs require, or what economists call an imbalance between supply and demand in the market for human capital. Many believe the imbalance will become even more serious because the pace of change in the labor market is accelerating and because the workplace is increasingly becoming a high-tech, service-oriented arena organized to involve greater employee participation in decision making (see Bresnahan et al 2002 and also Smith 1997).

At an April 11, 2000 "National Skills Summit" sponsored by the Department of Labor, Federal Reserve Board Chairman Alan Greenspan remarked, "I see nothing to suggest that the trends toward increased demand for conceptual skills in our workforce will end....Workers in many occupations are being asked to strengthen their cognitive skills." Such sentiments reflect those held by analysts who are concerned that a skills shortfall will harm the fortunes of those left behind, increase wage inequality, and limit economic growth.

Although many aspects of the skills mismatch issue seem self-evident to casual, and even some informed observers, a closer examination of its complexities reveals considerable ambiguity, requiring better data than are currently available to gain a clearer

understanding of the issues. In fact, the very existence of a skills mismatch or skills shortage may be in doubt and is by no means as obvious as often asserted.

The somewhat limited and not completely consistent data currently available actually suggest that there is no evidence of declining skill levels in the U.S. workforce. Although growth in educational attainment decelerated in recent decades and cognitive test scores are not much higher than 30 years ago, skill demands have risen only gradually over time, with little direct evidence of any recent acceleration in skill demands linked to growth in wage inequality. Employers do complain about the skills of young workers and high-school-educated workers, but it is unclear whether they are dissatisfied mainly with workers' cognitive skills or rather with their effort and attitude. Also unclear is whether the decline in workforce quality is a transitory, life-cycle problem of young adults in general or a problem they will bear for all of their work lives, or whether it applies only to some fraction of disadvantaged minorities. Perhaps surprisingly, a lack of computer and other high-level skills are not oft-cited complaints, despite the frequent focus on computers as a principal source of skills change. Furthermore, the claims of accelerating demand for college graduates also do not seem to reflect employers' expressed needs.

This study aims to improve understanding of the issues involved in the skills mismatch debate. The first chapter provides some background and an overview of the skills mismatch issue. The following chapters review research on levels and trends in the skills workers possess, the skills employers demand, and the evidence for skill shortages or mismatches between the two. This tripartite structure is dictated by the nature of the data, which precludes a unified treatment of the question. There is limited reliable and representative data on workforce competencies, even less on job demands, and the evidence in each area is largely incommensurable. The need for a standard, common set of measures for worker skills and job skill requirements is the one key finding that emerges from this review of the existing data.

## CHAPTER 1

# Skills mismatch as a social problem

The term *skills mismatch* refers to the situation in which workers' skills exceed or fall short of what employers demand. This chapter reviews the various views on which position to the other in a mismatch.

During the 1970s, many economists argued that job demands exceeded the levels that job seekers could supply. This view was supported by sociologists who argued that individuals need to obtain more education to meet the demands of the economy (Collins 1979). Sociologists also cast a skeptical eye on the value of college credentials; econometric studies showed that college- and high-school-educated Americans were overeducated. A government report concluded that job satisfaction was more satisfying when jobs were not short of workers' rising skills (U.S. Department of Labor 1973). Deskilling theory argued that skill requirements were actually declining, and that the economy was in a state of skill surplus (Braverman 1973). Theories of human capital formation mostly socialize students to acquire skills at different levels of the economy, and argue that education plays a more important role in the economy's contribution to human capital.

In the 1980s and 1990s, the focus shifted in the sociology of education to the opposite direction, with

## Skills mismatch as a social problem

The term *skills mismatch* can describe situations in which workers' skills exceed or fall short of those employers seek. Indeed, social scientists' views on which situation applies have shifted from one position to the other in a relatively short time.

During the 1970s, many theorists believed workforce skill levels exceeded the levels that jobs could utilize. Credentialist theories in sociology argued that inflated hiring requirements led U.S. workers to obtain more education than they really needed for their jobs (Berg 1971, Collins 1979). Signaling and queuing theories in economics also cast a skeptical eye toward the meaningfulness of educational credentials; econometric studies of the falling differential between college- and high-school-educated workers led to the conclusion that Americans were overeducated (Freeman 1976). A prominent government report considered the dilemma of how to make work more satisfying when job complexity at all levels seemed to fall short of workers' rising education levels and aspirations for meaningful work (U.S. Department of Health, Education, and Welfare 1973). Deskilling theory claimed that the skill content of most jobs was actually declining, even as educational attainment continued to rise (Braverman 1973). Bowles and Gintis (1976) argued that schools mostly socialize students into the work norms appropriate for jobs at different levels of the class hierarchy, and this function of schooling plays a more important role in wage determination than its contribution to human capital formation.

In the 1980s and 1990s, with the exception of cultural capital theory in the sociology of education, academic and policy thinking shifted in the opposite direction, dramatically in some cases. More sociologists



foundations of our society are presently being eroded by a rising tide of mediocrity that threatens our very future as a nation and a people. If an unfriendly foreign power had attempted to impose on America the mediocre educational performance that exists today, we might well have viewed it as an act of war. As it stands, we have allowed this to happen to ourselves. . . . We have, in effect, been committing an act of unthinking, unilateral educational disarmament. (National Commission on Excellence in Education 1983)

In addition to bemoaning declining high school and college entrance test scores and poor international test score rankings, the report expressed concern over increased use of remedial education, high rates of functional illiteracy, and the increased skill demands resulting from the spread of computers. Citing adult literacy surveys from the mid-1970s, the Secretary of Education testified before Congress that some 50% of adults were not "proficient in meeting the educational requirements of every day adult life" (Stedman and Kaestle 1991, 75 and 98f.), although if this were true it would apply mostly to people who completed their education prior to the ostensible decline in the school system. Poor performance by young adults on a literacy survey (1985) led the president of the Educational Testing Service (ETS) to worry about the large proportion of the population that "doesn't read well enough to cope with this technological society" (Reston 1986).

The concern is not restricted to the United States. Since roughly the early 1980s, Britain has been engaged in an almost identical debate filled with similar urgency and anguish, while Canada has experienced a somewhat muted version of the same (Payne 1999; Keep and Mayhew 1996; Krahn and Lowe 1998).

Interestingly, while education remains pilloried in political and public discourse, many of the economic problems that fueled concern in the 1980s and early 1990s diminished significantly thereafter, though no one attributes the economic improvements to schools, nor has the sense of urgency surrounding school quality and reform abated (Levin 1998a). Nevertheless, the preeminence of the U.S. economy is now unchallenged, economic growth was generally robust prior to the recent cyclical downturn, and the once-fearsome Japanese economy has been in the doldrums for a dozen years or so. Despite fears of a short-

age of high-tech workers, the late 1990s boom was built largely around new computer technologies. Low unemployment in the 1990s boosted wages at the 10th percentile closer to the median, after significant declines in the 1980s, and overall wage inequality largely stopped rising.

The speed of this turnaround suggests that swings in macroeconomic forces had a far greater effect on the nation's fluctuating fortunes in the 1980s and 1990s than the modest trends in school quality or individual educational attainment. Indeed, the role reversal has been so complete that the Japanese are partly blaming their own education system for their recent economic difficulties and seeking to emulate aspects of the U.S. system, though the reforms are controversial in Japan (Ono 2002; French 2001). Recent research also attributes the growth of other newly industrializing East Asian countries more to high levels of investment and labor force growth than to their high test scores (Levin 1998a; Robinson 1998). Any skills mismatch explanation of U.S. wage inequality growth and poor economic performance for the 1980s has to account for the turnaround in the 1990s that seems largely independent of trends in the stock of worker skills. Levin (1998a) suggests that schools are simply scapegoats for poor economic performance, with the real sources laying elsewhere.

Indeed, labor economists in the segmented labor markets tradition argued that the real problem was not disappearing low-to-medium skill jobs *per se*, but rather the decline of unionized manufacturing jobs, which provided middle-class incomes for less-educated workers due to the institutional framework in which these jobs and workers were embedded. The lower-end service jobs that replaced them were less skilled and lower paid. The logic of secondary labor markets also intruded increasingly into the remaining jobs in the subordinate primary sector, as a result of demonization, more competitive product markets, changing wage norms, the declining real value of the minimum wage, increasing use of contingent work, outsourcing, cheaper immigrant labor, and offshore production (Harrison and Bluestone 1988; Harrison 1994; Howell 1997; DiNardo et al. 1996). The highly restrictive macroeconomic policies designed to break inflation in the early 1980s also weakened labor's bargaining power by increasing unemployment to record postwar levels, which some argue was a far

more important source of computer technology or skills

From this point of view of workers' low skills diverse government policies affect product quality, capital investment, training (Levin 1998a; Mismatch the quality of jobs, not a wage inequality growth. Mismatch discourse can be a byproduct of low-road management more extreme forms, this that generates a level of that warranted by sober Ben-Yehuda 1994).

Closer inspection of significant problems or specifically, proponents of clear about the subgroup underlying causes they consequently, they offer diagnoses of these diagnoses is wage mismatch discussion can perceive, or misperceive, I summarizes some of through this study and

### Which groups and characteristics are

Different skills mismatch for concern—cohorts of older workers, disadvantaged school education or learning technical background

Correspondingly, the other labor force characteristics level reading, writing, and

more important source of growing wage inequality than was computer technology or skills mismatch (Galbraith 1998).

From this point of view, identifying the problem as being one of workers' low skills diverted attention from the role of free-market government policies and management's shortcomings in product quality, capital investment, work organization, and worker training (Levin 1998a; Mishel and Teixeira 1991). It is changes in the quality of jobs, not a shortage of human capital, that explains wage inequality growth. From a sociological perspective, the skills mismatch discourse can be seen as blaming those who bear the brunt of low-road management strategies for their straits. In its more extreme forms, this discourse creates a kind of "moral panic" that generates a level of concern over skills disproportionate to that warranted by sober assessment of the evidence (Goode and Ben-Yehuda 1994).

Closer inspection of the skills mismatch thesis confirms it has significant problems or gaps, both conceptual and empirical. Specifically, proponents of the skills mismatch thesis have not been clear about the subgroups, particular skills, precise trends, and underlying causes they consider to be the main problems. Consequently, they offer disparate diagnoses, and the evidence for many of these diagnoses is weak. The different voices in the skills mismatch discussion can appear like the proverbial blind men who perceive, or misperceive, different parts of the same elephant. Table 1 summarizes some of the unresolved issues, which are threaded through this study and explained briefly below.

### **Which groups and what skills or other labor force characteristics are at issue?**

Different skills mismatch theories identify different groups as a cause for concern—cohorts educated since the 1960s, young workers, older workers, disadvantaged minorities, job-seekers with a high school education or less, and even college-educated workers lacking technical backgrounds.

Correspondingly, the different theories identify different skills or other labor force characteristics in short supply—8th or 10th grade-level reading, writing, and math skills; college-level cognitive skills;

**TABLE 1. Unresolved issues in the skills mismatch literature****Who lacks necessary skills?**

- Recent cohorts
- Young workers
- Older workers
- Workers with a high school degree or less
- Disadvantaged minorities
- College-educated workers lacking strong math, science, or other technical training

**What specific skills or qualities are in short supply?**

- Basic or intermediate reading, writing, and math skills
- Advanced cognitive/intellectual skills
- "Problem-solving" skills
- Technology competencies
- Interpersonal ("soft") skills
- Attitudes and work ethic, effort, diligence, commitment, sense of responsibility, respect for authority

**How is any trend best characterized?**

- Absolute decline in the supply of skills
- Decelerating growth in the supply of skills
- Accelerating growth in the demand for skills

**What is responsible for any shortage?**

- Employer changes (technology, organizational change)
- Workforce quality and characteristics:
  - Failing schools
  - Underclass conditions
  - Demographic trends in cohort sizes and college enrollment rates

generally unspecified "problem-solving" abilities; computer skills; social or interpersonal skills, such as teamwork or customer service; or work-related attitudes, such as motivation, effort, and willingness to follow directions, which strictly speaking are not skills at all

One of the most prominent versions of the skills mismatch thesis, emanating from the school failure literature, focuses on basic or intermediate (8th-10th grade) skills deficits among young people and implies the problem lies with those educated since the 1960s, when test scores fell and school quality is believed to have declined. It should be noted that arguing that declining school quality permanently affects student outcomes frames the argument in terms of

educational cohorts; that is, poor characteristics of affected groups. Comparisons between adults educated

However, the literature also concerns personality, some of which are related to include inadequate interpersonal skills, lack of respect for authority and other related problems with work motivation, and low job mobility (Moss and Tilly 2001). A major concern regarding "problem-solving" skills is on both sides of this divide: employers complain about worker dissatisfaction with both workers' skills and their lack of interest in exercising them.

Complaints about social skills deficits among young cohorts is often perceived as a cohort effect. Younger cohorts may pass through a period of underachievement by low effort and weak attachment to work, but by a scarcity of jobs offering opportunities to learn and shoulder more adult responsibilities, they may adopt work attitudes and adjust to the norms of the jobs they consider available. This may compensate for any modest cognitive skills deficits and situated learning.

Casual support for this view regarding younger workers has come from studies showing similar complaints regarding older cohorts as the earlier cohorts aged; comparisons between cohorts. Indeed, Schmidt and others' test scores stopped declining in the late 1970s. The complaints about young workers' skills are not unique to cognitive skills and personality. The *Report of the President 2000, Panel on Skills, Quality, and Risk* are now middle aged and the blanket complaints directed at young workers themselves complain about declining skills even though middle-aged cohorts are the ones who should be the cause for doubt about their cognitive skills rather than workers.

educational cohorts, that is, poorer skills are presumably persistent characteristics of affected groups that should be apparent in comparisons between adults educated before and after the 1960s.

However, the literature also alleges another problem related to personality, some of which are not skills strictly speaking. These include inadequate interpersonal and teamwork skills ("soft skills"), respect for authority and other attitudinal or demeanor issues, and related problems with work motivation, effort, and sense of responsibility (Moss and Tilly 2001, 44f. and p. 60). The usually vague concern regarding "problem-solving" skills seems to fall on both sides of this divide; employers seem to use this term to express dissatisfaction with both workers' cognitive skills and their perceived lack of interest in exercising them.

Complaints about social skills and motivation suggest that what is often perceived as a cohort effect may be an age effect. Recent cohorts may pass through a phase of early adulthood characterized by low effort and weak attachment to career employment, reinforced by a scarcity of jobs offering career opportunities. As workers age and shoulder more adult responsibilities, they grow out of casual work attitudes and adjust to—or are socialized into—the workplace norms of the jobs they consider worth keeping, and they compensate for any modest cognitive skill deficits through on-the-job experience and situated learning (Scribner 1986).

Casual support for this view comes from the fact that complaints regarding younger workers have persisted for more than 20 years, but similar complaints regarding older workers do not seem to have emerged as the earlier cohorts aged; complaints persistently refer to age groups rather than cohorts. Indeed, Scholastic Aptitude/Assessment Test (SAT) and other test scores stopped declining or started rising after 1980, yet the complaints about young workers, usually undifferentiated according to cognitive skills and personality characteristics, persist (*Economic Report of the President* 2000, p. 148). Cohorts cited by *A Nation at Risk* are now middle aged and are not only seldom the subject of the blanket complaints directed at youth but are among those who themselves complain about declining skills among young people, even though middle-aged cohorts scored lower than younger ones. This should be cause for doubt as to whether the problem is really cognitive skills rather than work-related attitudes.

If the problem is attitudes, then employers may face a chronic problem with young workers, but the problem for each cohort is likely to be transient. The overall labor force does not face a progressive problem in this case because each cohort can be expected to age out of its phase of weak attachment to career goals.

Insofar as one believes the new economy places a premium on computer or similar technology-related competencies, one might expect that premium to favor younger workers over older ones, who have greater potential difficulty assimilating new skills and face issues of skill obsolescence and retraining (Friedberg 2001, U.S. Congress Office of Technology Assessment 1990, p. 254; Kelley and Charness 1995, Westerman et al. 1995).

Until this point, this discussion of the skills mismatch thesis has been framed in terms of the workforce overall, but much of the mismatch theory focuses on workers with a high school degree or less or—an even narrower group—less-educated, disadvantaged minorities. If a skills mismatch exists, but only for these groups, this clearly affects the magnitude of the problem and should be distinguished from the idea that schools are failing to impart sufficient skills more generally.

Likewise, debates over alleged declines in the quality of higher education or inadequate numbers of college graduates are very different from concerns that not enough high school graduates have 10th-grade reading and math skills (Murnane and Levy 1996). Public controversy over recentering SAT scores (Winerip 1994), grade inflation in higher education (Rothstein 2001), stagnation or decline in the number of students receiving bachelor's degrees in math, science, and engineering (National Research Council 2001), and the attention given by labor economists to the declining rates of college attendance in general (Card and Lemieux 2001) are all quite distinct from concerns over skills at the lower end of the distribution. But these disparate issues are often folded into the same discussion of skills adequacy.

In sum, existing notions of a skills mismatch are a confused jumble of different ideas, "sketchy, vague, and diverse if not internally conflicting," to borrow a phrase (Cain 1976, p. 1221). A satisfying skills mismatch argument ultimately must specify whether the problem is a shortage of cognitive skills or a surplus of youthful

attitudes, not enough workers with skills or too few high-powered workers, and it must specify whether the problem is with school students generally or with disadvantaged groups.

### What is the nature of skills mismatch?

A final ambiguity in the skills mismatch thesis concerns trends. Different proponents of the thesis are concerned with an *absolute decline* in skills, a *relative decline* or *slowing growth* in the supply of skills, or a *decline in demand* for human capital. Schools are more likely to be blamed for the first two, while economists researching inequality are more likely to focus on the third (see, for example, Autor and Murphy 1992; Autor et al. 2000; Card and Lemieux 2001).

The differences have clear implications for how one considers and one's understanding of the causes of declines or slower growth in skills. It is a point to problems with the demand for skills, with root causes such as falling rates of college enrollment, or a decline in demand for human capital supply. The spread of computer technology is often cited as responsible for the skills mismatch, but the kind of explanation is quite different.

As it happens, there is little evidence on workers' skills or employers' demand for skills in ways that would support the skills mismatch thesis. With the preceding considerations in mind, we turn to the evidence on workers' skills and job matches.

attitudes, not enough workers with 10th-grade reading and math skills or too few high-powered "symbolic analysts" (Reich 1991), and it must specify whether the problem is the quality of public school students generally or just high school dropouts and certain disadvantaged groups.

### What is the nature of skill trends?

A final ambiguity in the skills mismatch literature is the nature of skill trends. Different proponents of the skills mismatch thesis argue there is an *absolute decline* in skills across cohorts or other large subgroups, *slowing growth* in the supply of human capital, or *accelerating growth* in demand for human capital. Those concerned with education and schools are more likely to speak in terms of absolute decline. Labor economists researching inequality are still undecided as to whether slowing growth in supply or acceleration in demand is more significant (Katz and Murphy 1992; Autor et al. 1998; Gottschalk and Smeeding 1997; Card and Lemieux 2001).

The differences have clear implications for the evidence that one considers and one's understanding of the problem. Absolute declines or slower growth in the supply of workers' human capital point to problems with the education system and worker behavior, with root causes such as failing schools, underclass conditions, and falling rates of college enrollment. In contrast, accelerating demand for human capital suggests employer-side changes, such as the spread of computer technology or employee participation, are responsible for the skills mismatch. The evidence relating to each kind of explanation is quite distinct.

As it happens, there is little compelling evidence that either workers' skills or employers' demands for human capital have changed in ways that would support simple notions of a skills mismatch. With the preceding considerations in mind, the next chapter reviews the evidence on workers' skills, employers' needs, and possible mismatches.

## Evidence for skills mismatch

### Background

Reviewing research on workers' skills and employers' requirements separately—and separate from the question of any mismatch between them—reflects the fact that the different studies examining these issues use incommensurate measures of skills. Consequently, the evidence on the question of mismatch is even more indirect and fragmentary than what is available for discussion of either side of this equation taken individually. This situation indicates the need for a better framework for subsequent data collection that will permit researchers to compare the skills of workers and the requirements of jobs using a common yardstick.

Additional considerations and problems arise in trying to examine the notion of a skills mismatch.

The concept of skills mismatch or skills shortage requires clarification. One can define skills mismatch or skills shortage as a situation in which some workers want employment or more work hours and employers have unmet labor needs but will not draw from the underemployed group at existing wages because those workers' skills are inadequate.

In neoclassical economics, fully flexible wages equilibrate supply and demand efficiently, so any imbalance should be temporary. Skilled workers' wages are bid up until enough employers no longer want to hire more workers of this type and the number of positions equals the number of job-seekers. Likewise, less-skilled workers' wages fall until the surplus labor force disappears, either because the unemployed are absorbed into employment or because workers facing unacceptably low wages exit the labor market. Thus, mismatches or shortages are

temporary in the neoclassical perspective, though one could define mismatch as any significant departure from traditional wage differentials across skill groups induced by demand and supply shifts.

As this suggests, economic approaches focus mostly on wage differences by skill as measures of mismatch or shortage, while non-economic conceptions look for more direct or non-wage indications of a discrepancy between the skills workers possess and those employers demand.

The main problem with relying exclusively on wage movements within a supply and demand framework for inferring skills shortages is that wage differentials reflect institutional as well as market forces—variations in rent sharing, for example—rather than skill differences alone, as even some who interpret recent inequality growth in neoclassical terms recognize (Katz and Summers 1989; Katz and Murphy 1992).

The temporal dimension of the skills mismatch issue also generates multiple concepts of mismatch. One can examine how well the skills of the incoming workforce matches the *current* distribution of job skill demands by comparing the personal characteristics of younger cohorts and older cohorts, using educational attainment or test scores, for example. Alternatively, one could accomplish the same thing by comparing young workers' personal characteristics with measures of occupational characteristics of jobs held by older workers, such as DOT ratings—assuming the measures of workers' skills and job skill requirements have comparable metrics.

By extension, performing this exercise using projections of the occupational distribution 10 years from now would indicate whether there is a mismatch between younger workers and the projected future distribution of job skill requirements, an exercise subject to additional uncertainties that surround occupational projections.

It is still another task to compare the skills of the existing or entering workforce with a more ideal job structure relative to the current or projected one. Some argue that the current workforce may be well matched to current and projected skill demands, but that this state of affairs tends to entail more low-skill and low-wage jobs than is socially desirable. Models of low-skill equilibria argue that this depressed level of attainment results from negative and self-reinforcing expectations whereby employers offer mostly low-skill jobs because workers'

skills are limited and job-seekers doing because the available jobs are a low-skill trap can be overcome by policy, such as the adoption of higher wages and employee involvement programs and government-sponsored training to fill the gap (Katz and Murphy 1996; Katz and Murphy 1996; Katz and Murphy 1996). The onus for higher attainment is on the increased supply of human capital at the bottom. Either way, it is difficult to compare the skills of the current workforce to the requirements of an improved job structure not specified further.

These three different concepts of mismatch—the skills of workers and jobs compared to the current, future, or ideal structure—still be a question as to which structure is the most relevant.

Compounding these difficulties is the fact that the skills possessed by individual workers and individual employers are somewhat flexible in response to labor market conditions, making it difficult to compare a given job's "requirements" or the skills of workers to the requirements of the job.

Mikulecky (1982) is the only study that compares the skills of students and workers with a common metric—grade-level reading ability. Mikulecky (1982) found that the reading skills of school juniors, adult technical school workers (clerical, sales, service) and high school graduates was a response to widespread concern about the skills of the workforce that were coming on line in the 1970s. The *Risk* appeared.

Mikulecky asked study participants to read material from school or work and to estimate the difficulty of the school and job reading material using readability formulas. Mikulecky (1982) found that reading ability using their performance on a newspaper-like text was a good predictor of the study.

skills are limited and job-seekers do not seek more education and training because the available jobs are not structured to utilize them. This low-skill trap can be overcome only through changes in employer policy, such as the adoption of higher-value-added production strategies and employee involvement programs, and through more government-sponsored training to fill the gaps left by employers (Finegold 1996; Keep and Mayhew 1996). Mainstream economists place more of the onus for higher attainment on workers, assuming that an increased supply of human capital will create its own demand and raise wages at the bottom. Either way, these conceptions of mismatch implicitly compare the skills of the current or entering workforce with the requirements of an improved or ideal job structure, which is usually not specified further.

These three different conceptions of mismatch imply that even if the skills of workers and jobs could be compared easily, there would still be a question as to which set of jobs should serve as the reference point: those in the current, future, or normatively desirable occupational structure.

Compounding these difficulties, as previous chapters showed, both the skills possessed by individual workers and those required by individual employers are somewhat flexible in response to differing job and labor market conditions, making it difficult to specify precisely either a given job's "requirements" or the workers suitable to hold it.

Mikulecky (1982) is the only study that compares the cognitive abilities of students and workers with workplace skill demands using a common metric—grade-level reading. The sample consisted of urban high school juniors, adult technical school students, professionals, "mid-level" workers (clerical, sales, service), and blue-collar workers. The study was a response to widespread complaints about basic skills deficiencies in the workforce that were common around the same time *A Nation at Risk* appeared.

Mikulecky asked study participants to bring in representative reading material from school or work, and he assessed the grade-level difficulty of the school and job reading samples using well-established readability formulas. Mikulecky also assessed the respondents' own reading ability using their performance reading both the sample texts and a newspaper-like text the participants had not seen prior to the study.

**TABLE 6 Comparison of grade-level measures for school and job reading samples and students' and workers' reading performance**

|  | Students    |           | Workers      |        |             |
|--|-------------|-----------|--------------|--------|-------------|
|  | High school | Technical | Professional | Middle | Blue collar |
| A. Difficulty of school or job sample text | 10.6        | 11.4      | 11.2         | 10.9   | 10.5        |
| Participant reading ability                |             |           |              |        |             |
| B. School or job text                      | 10.5        | 11.3      | 12.6         | 11.0   | 11.5        |
| C. New material                            | 10.1        | 10.8      | 11.7         | 10.7   | 10.8        |

Source: Mikulecky 1982: 417. Sample drawn from the Indianapolis metropolitan area. Sample size is roughly 50 for all groups. Both groups of students are evenly divided by gender and race (whites and blacks). The employee sample was 63% male, 82% white, 16% black, 2% other race (Mikulecky 1982: 405f.)

The results in **Table 6** show that the average grade-level difficulty of school and job texts are very close to one another (approximately grades 10.5-11) (see **Table 6**, row A) and the average student and employee in all groups is able to read at or close to that level, whether the text is familiar (row B) or new (row C). Participants' reading performance was also moderately higher (approximately 0.6 grade levels) when the material was more familiar (row B versus row C), as a situated cognition perspective would predict.

In addition, high school students' reading performance on familiar school texts (10.5) was close to the grade-level difficulty of the job samples of the mid-level jobs they were likely to enter (10.9); the reading ability of technical school students (11.3) was higher than the level required by sample materials brought by blue-collar workers (10.5).

Although readability formulae have their methodological limitations, this data provides little evidence of a skills mismatch between either students or current job-holders on the one hand, and job skill requirements on the other. Other studies use either more subjective or indirect measures of mismatch.

## Employer surveys

If increased wage inequality since the 1980s, one might expect employers' Journalistic accounts and employer have substantial difficulty finding routine entry-level positions, at least in the U.S. Journalistic accounts reflect the popular theme of school graduates' low basic cognitive readiness for the world of work (Hollenbeck 1990; *Economic Report of the President* 1990; *Economic Report of the President* 1990; one employer complained, "It's not multiply and divide" (Hollenbeck 1990).

However, difficulties in finding workers are also due to changing attitudes, and motivation frequently cited by employers' concerns than dissatisfaction with pay (Hollenbeck 1994; Teixeira 1998; National Association of Manufacturers 1999; for Britain, see Hollenbeck 1990).

A recent National Association of Manufacturers survey found that most NAM members said that the quality of applicants for hourly jobs was poor. The survey also found that 34% of applicants had insufficient work experience (34%), 20% had cognitive skills deficits—such as poor math skills (20%), and poor computer skills (11%)—were mentioned as serious problems (National Association of Manufacturers 2001, p. 8). Employers also noted that their own production workers complained that work habits and motivation were a "major deficiency" of current employees. The survey also noted employees' failure to update their skills, particularly computer skills as serious problems (National Association of Manufacturers 2001, p. 11). Judging from the survey, work seems to be the main "deficiency" of current employees. The survey also noted that a 1997 NAM survey found that 34% of respondents regarding cognitive skill shortfalls.

In recent years, surveys of the American Management Association found that member firms test applicants

## Employer surveys

If increased wage inequality since the 1980s does reflect a skills shortage, one might expect employers would show some awareness of it. Journalistic accounts and employer poll and survey data do suggest firms have substantial difficulty finding qualified young workers for relatively routine entry-level positions, at least in urban areas. Most of these accounts reflect the popular themes of public school failure, recent high school graduates' low basic cognitive skills, and their general lack of readiness for the world of work (Hull 1991; Hollenbeck 1994; Barton 1990; *Economic Report of the President* 2000, p. 134). For example, one employer complained, "It's amazing to me how many people can't multiply and divide" (Hollenbeck 1994, 13f.).

However, difficulties in finding workers with desired social skills, attitudes, and motivation frequently ranked as high or higher in employers' concerns than dissatisfaction with cognitive skill levels (Hollenbeck 1994; Teixeira 1998; National Association of Manufacturers 2001; Public Agenda 1999; for Britain, see Robinson 1998).

A recent National Association of Manufacturers (NAM) survey found that most NAM members said the most common reason for rejecting applicants for hourly jobs was poor motivation and work habits (70%), insufficient work experience (34%), and failed drug tests (27%), while cognitive skills deficits—such as poor reading and writing skills (32%), poor math skills (20%), and poor problem-solving (11%) or technical/computer skills (11%)—were mentioned less often (National Association of Manufacturers 2001, p. 8). Employers' assessments of the quality of their own production workers were similar, except that only 60% complained that work habits and motivation were the most serious "skill deficiency" of current employees; less than 15% cited current production employees' failure to update their skills and education and poor technical/computer skills as serious problems (National Association of Manufacturers 2001, p. 11). Judging from this survey, an appropriate attitude to work seems to be the main "skill" in short supply, though it should be noted that a 1997 NAM survey apparently showed far more complaints regarding cognitive skill shortfalls.

In recent years, surveys of human resource managers conducted by the American Management Association (AMA) found that 40% of AMA member firms test applicants for basic skills, and the average failure

## Scores for school and job reading performance

|      | Workers      |        |             |
|------|--------------|--------|-------------|
|      | Professional | Middle | Blue collar |
| 11.2 | 10.9         | 10.5   |             |
| 12.6 | 11.0         | 11.5   |             |
| 11.7 | 10.7         | 10.8   |             |

Indianapolis metropolitan area. Sample sizes are evenly divided by gender and 82% male, 82% white, 16% black, 2%

average grade-level difficulty of the job to enter (approximately 10.9); the readability (10.3) was higher than the level of the blue-collar workers (10.5).

methodological limitations, the mismatch between either side, and job skill requirements more subjective or indirect

rate is roughly 35%. Approximately 85% of the firms that test do not hire those who fail ("2001 AMA Survey on Workplace Testing: Basic Skills, Job Skills, Psychological Measurement," press release). These findings support the skills mismatch position, but, unlike the NAM survey, the AMA did not ask about motivation and work habits. The AMA says its member firms are larger than average and account for 25% of total national employment, but like all trade association surveys, the sample is not representative of any known population.

A recent national poll of employers by The Public Agenda (1999) found that some two-thirds thought public high school graduates did not have the basic skills needed to succeed, though fewer parents (33%) and students (22%) in parallel surveys felt the same way. A third of employers rated both the writing abilities and work habits of young workers as poor, and a quarter rated math skills as poor, but computer skills ranked close to the bottom of the list of problems (11%). This points to one potential difficulty with the commonplace view that young people are increasingly less prepared for work and that computers are driving the increase in skill requirements; namely, young people are more likely to be computer literate than older workers.

The National Employers Survey (1994) and Rural Manufacturing Survey (RMS) (1996) found the average employer judged 20-25% of its current production or front-line workers not fully proficient at their jobs (National Center on the Educational Quality of the Workforce 1994; Teixeira 1998). This might seem high since the figures refer to workers already matched to jobs and presumably more qualified than the general applicant pool, but the figures also do not control for tenure or age, and there are no historical figures against which to benchmark them. The surveys also contain no information on the size of the applicant pool from which workers were drawn or the percentage of applicants deemed qualified for the positions for which they applied. As noted previously, far fewer employers in the RMS reported major problems finding workers with necessary skills (5-15%) than reported increases in cognitive, computer, and interpersonal skills (Teixeira 1998).

A survey of management and union representatives found only 5% on either side said "pressure to upgrade skills" or the need to negotiate "adjustments to new technology" had a significant role in contracts negotiated between 1993 and 1996. By comparison, roughly 25% of managers mentioned increased domestic competition and pressures on fringe

benefits and 15% mentioned fact while 35-45% of union representatives (Cutcher-Gershenfeld, Kochan,

In their Chicago employer reported a substantial skills mismatch. Employers complained about the mismatch could not read or perform math. Employers said they had to explain closely supervise workers because to simplify job tasks to match employees' skills or supervise them (Rosenbaum and Binder 1997, p. 10) that the prevalence of low-skilled workers for more skilled and autonomous comings or preferred labor strategies.

However, these employers' cognitive skills have declined over time. As noted earlier, there are data on ring workers' long-term job abilities and Binder argue that even if you address deficits through situated learning, it is bound and inadequate for promoting promotion opportunities requiring

Cran's study of employers and employers reported that they do not have the reading and math skills provided basic skills training to results mentioned previously. In findings, only 2% of employers reported to redesign or simplify the reason cause of weaknesses of our work

### Econometric studies

Most economists infer an increasing fact that the relative wages of o

benefits and 15% mentioned falling real wages as significant issues, while 35-45% of union representatives mentioned wages and benefits (Cutcher-Gershenfeld, Kochan, Wells 1998, p. 25)

In their Chicago employer study, Rosenbaum and Binder (1997) reported a substantial skills mismatch between jobs and applicants. Employers complained about the number of young high school grads who could not read or perform math at 8th-grade levels. Roughly 20% of employers said they had to explain tasks in minute detail and assist or closely supervise workers because of their low skills; 45% said they had to simplify job tasks to match employees' low skills. Employers also believed the cognitive skills of recent high school graduates had declined over time and reported they had to simplify tasks to match employees' skills or supervise them more closely than they desired (Rosenbaum and Binder 1997, p. 73). Rosenbaum and Binder conclude that the prevalence of low-skilled jobs reflects a workforce unprepared for more skilled and autonomous work rather than management shortcomings or preferred labor strategies.

However, these employers' judgments that young people's cognitive skills have declined over time are not consistent with national NAEP data. As noted earlier, there are also reasons to be cautious about inferring workers' long-term job abilities from young adults. But Rosenbaum and Binder argue that even if young people compensate for formal skills deficits through situated learning on the job, the skills will be context-bound and inadequate for promotion, though this assumes the jobs have promotion opportunities requiring more formally acquired skills.

Crain's study of employers of NI.S72 respondents finds that 48% of employers reported that they sometimes find high school graduates do not have the reading and math skills needed to be hired, but only 6% provided basic skills training to fill this gap, consistent with the CPS results mentioned previously. In contrast to Rosenbaum and Binder's findings, only 2% of employers said they have "often found it necessary to redesign or simplify the reading or math requirements of jobs because of weaknesses of our workers in these areas" (Crain 1984, p. 25).

### Econometric studies

Most economists infer an increased scarcity of human capital from the fact that the relative wages of college graduates increased in the 1980s.

even as their relative supply increased, though there is no consensus on whether the cause was an acceleration of demand for skills—perhaps as a result of the spread of computers—or a deceleration in the growth of the supply of skills as a result of the post-Vietnam drop in college attendance (Katz and Murphy 1992; Autor et al. 1998; Danziger and Gottschalk 1995; Gottschalk and Smeeding 1997; Levy and Murnane 1996; Card and Lemieux 2001).

Based mostly on analyses of data from the 1980s, this view has not developed a consensus account of the general stability of wage inequality in the 1990s, when macroeconomic conditions improved considerably but the growth in educational attainment moderated and investment in computers and other information technology remained strong. Several studies of job loss in the 1990s found that more educated white-collar workers experienced the greatest increase in job displacement and insecurity, contrary to the notion that such workers are increasingly scarce (Farber 1997; Aaronson and Sullivan 1998; Schmidt 1999). It is possible that this white-collar job loss signifies that some of the growth of managerial and professional employment in the 1980s represented overhiring that was subject to later correction or perhaps indicates an extension of the same lean-staffing and work-intensification principles from blue-collar to white-collar workers.

Some researchers even believe that the oversupply of college graduates detected in the 1970s persisted into the 1980s, a decade when most economists believe an acute shortage of college graduates raised the college/high-school wage differential. Hecker (1992, p. 4) found that the percentage of college grads either in occupations not requiring a college degree or unemployed rose from 12% (1967) to 18.6% (1980) and continued to rise modestly to 19.9% during the years of ostensible shortage (1990).<sup>3</sup> Furthermore, the supply of college graduates grew 62% between 1979 and 1990, while total employment in managerial, professional, technical, and other high-skilled occupations grew only 57% (Hecker 1992, p. 7).

Hecker noted that wage inequality during the 1980s resulted more from declining real wages for males with high school degrees (or less) than from increases in real wages for college graduates, and he concluded that sectoral shifts from manufacturing to services was a more likely cause of inequality growth than a shortage of college-educated workers. BLS research also did not uncover evidence that employers

wanted to hire more college graduates than were actually hired. Hecker concluded that the oversupply of college graduates in the 1980s was not the cause of underutilized college-educated workers. Hecker found that college graduates in occupations that require college degrees receive higher wages than high school graduates (Hecker 1992, p. 11).

In response to Hecker's research, some have advanced the stream skills shortage view by showing that college-educated workers in non-college jobs were in shorter supply than problem for older males compared to restructuring and downsizing in employment prospects even of well-educated workers.

However, it is notable that the wage differential between workers employed in traditionally non-college occupations fell out the 1980s, despite the ostensible shortage of college graduates. Balancing this somewhat is the fact that the school-college wage differential in the 1990s. The rise in computers may have raised the wage differential from non-college to college level.

Another problem with most research is that it fails to identify the specific skills believed to be in short supply. A general view seems to be that it is a shortage of college graduates that is the cause of the wage differential. The other literature reviewed here suggests that the shortage of college-educated workers is not even concern with computer skills. The literature is almost exclusively about the shortage of college workers.

Using test scores rather than wages, Murnane et al. (1995) delved into the issue of specific skills in short supply. They found that the variance of test scores increased with a standard deviation in test scores. The variance rose from roughly 2.5% to 6.9% for males and 3.5% for females between 1978 and 1986. The increase in test scores is not explainable (calculated from Murnane et al. 1995). The occupation indicates that most of the increase in test scores is due to the changing occupations.

wanted to hire more college graduates at current wages than they actually hired. Hecker concluded that even greater increases in the supply of college graduates in the 1980s would have only increased the number of underutilized college-educated workers, though he recognizes that college graduates in occupations that do not require college degrees receive higher wages than high school graduates in those occupations (Hecker 1992, p. 11).

In response to Hecker's research, Tyler et al. (1995) uphold the mainstream skills shortage view by showing that the problem of college-educated workers in non-college jobs in the 1980s was increasingly a problem for older males compared to other groups. They attributed this to restructuring and downsizing in the 1980s, which harmed the employment prospects even of well-educated older workers.

However, it is notable that the numbers of college-educated workers employed in traditionally non-college jobs remained high throughout the 1980s, despite the ostensible shortage of college-educated workers. Balancing this somewhat is the argument that because the high school-college wage differential increased even within non-college jobs, computers may have raised the skill demands of some of these jobs from non-college to college level (Boesel and Fredland 1999, 22ff.).

Another problem with most economic studies is that they do not identify the specific skills believed to be in short supply, though the general view seems to be that it is higher-level cognitive skills associated with college graduates that are most scarce. By contrast, none of the other literature reviewed here found employers complaining much about a shortage of college-educated workers or their high wages, and even concern with computer skills was limited. Employers complain almost exclusively about the work attitudes and basic skills of non-college workers.

Using test scores rather than education as the measure of skills, Murnane et al. (1995) delved somewhat deeper into the issue of the specific skills in short supply. They found that the wage differential associated with a standard deviation in math test scores for 24-year old workers rose from roughly 2.5% to 6.9% for males and from 5.6% to 10.6% for females between 1978 and 1986, controlling for education and other variables (calculated from Murnane et al. 1995, 257ff.). Controlling for occupation indicates that most of the effect is within occupations, rather than due to the changing occupational composition of the workforce.

However, in their interpretation of the results, the authors are somewhat inconsistent as to whether it is math skills *per se* that are increasingly rewarded, or cognitive skills more generally, for which the math scores are simply good proxies (Murnane et al. 1995, 259f.). They cite the NAEP data using performance categories to suggest that only about half the nation's high school seniors have 8th-grade math skills, such as the ability to understand decimals, fractions, and line graphs. The implication seems to be that employers value these basic skills specifically, though this differs from much of the economic literature, which emphasizes growing demand for college graduates. Though plausible, there really is no evidence on the specific math skills demanded by employers other than Smith (1999), and work reviewed above suggests that the descriptions of NAEP performance levels have validity problems and cannot be taken at face value. In addition, NAEP reading scores for a sample of 21 to 25 year olds show that 80% read above the 8th-grade average in 1985 (Kirsch and Jungeblut 1986, p. 40).

Even Murnane et al.'s study showed that the highest-scoring males in 1986 earned less than the lowest-scoring males in 1978, and the situation was nearly the same for females, suggesting that more is at work than just changing returns to skills. The whole structure of wages seems to have shifted downward and this effect appears to be larger than the changing returns to test scores. Murnane et al. acknowledge that "helping a male graduating from high school in 1980 to improve his math skills would contribute only modestly to the goal of increasing his wage level at age 24 to the level enjoyed by males graduating eight years earlier" (1995, p. 260).

In addition, Bowles and Gintis contest Murnane et al.'s basic finding. Reviewing 65 estimates from different periods across numerous studies, they find no trend in tests scores' effects on earnings, in the proportion of the returns to education they explain, or in their increment to  $R^2$  (Bowles and Gintis 2002).

Cross-sectional comparative studies using the International Adult Literacy Survey cast more serious doubt on test scores and inequality in cognitive skills as the explanation for the high levels of U.S. wage inequality. They find that greater inequality of cognitive skills in the United States does not explain much of the higher U.S. earnings inequality relative to European countries (Devroye and Freeman 2001, Blau and Kahn 2001).

Devroye and Freeman (2001) earnings inequality and greater in European countries with similar data. However, if the United States had countries, earnings inequality in inequality between the United States only marginally. Two-thirds between the U.S. and the other fact, the standard deviation of earnings test scores is greater than the standard in the European countries. But conclusions from analyses of the Canada, Switzerland, the Netherlands.

This research suggests some inequality based on variation in cognitive within the United States over the States and other countries are in U.S. inequality. Observed wage human capital that result from

### Studies of welfare-to-work and other disadvantaged groups

Another unexpected finding in arguments is the remarkable of women exiting the welfare. ers did not foresee this development in this group would be a much

Holzer found in his first study (1992-94) that even most low cognitive skills, and he worries probable that the imbalance between people with low skills and creating city areas will worsen over the

Even a recent review of the peak of the late 1990s boom in skills that employers demand. The review cited the low NAEP

Devroye and Freeman (2001) find that the United States has greater earnings inequality and greater adult test score inequality than three European countries with similar data (Germany, Netherlands, and Sweden). However, if the United States had the same distribution of scores as those countries, earnings inequality in the United States and the difference in inequality between the United States and the other countries would decline only marginally. Two-thirds of the difference in earnings inequality between the U.S. and the other countries is within test score groups. In fact, the standard deviation of earnings among U.S. workers with the same test scores is greater than the standard deviation of earnings for all workers in the European countries. Blau and Kahn (2001, p. 20) draw similar conclusions from analyses of the IALS that compare the United States to Canada, Switzerland, the Netherlands, and Sweden.

This research suggests some of the limits of explaining wage inequality based on variation in cognitive skills. Clearly, institutional changes within the United States over time and differences between the United States and other countries are important in explaining the high levels of U.S. inequality. Observed wage differentials are not simply the returns to human capital that result from the operation of universal market forces.

### Studies of welfare-to-work and other disadvantaged groups

Another unexpected finding that casts doubt on some skills mismatch arguments is the remarkable employment rate among the large number of women exiting the welfare rolls since the mid-1990s. Most observers did not foresee this development and many believed that low skills in this group would be a much more serious barrier to employment.

Holzer found in his first survey of employers for the MCSU1 project (1992-94) that even most low-skill jobs required reading, math, and other cognitive skills, and he worried that with welfare reform, "it seems highly probable that the imbalance between job availability and the number of people with low skills and credentials that already exists in many central-city areas will worsen over the next few years" (Holzer 1996, p. 70).

Even a recent review of the welfare-to-work literature written at the peak of the late 1990s boom asserted, "There is a large gap between the skills that employers demand and those welfare recipients can offer." The review cited the low NALS scores of welfare recipients as support-

ing evidence, including the familiar claim that those scoring at Level 2 are unable to use a bus schedule (Corcoran et al. 2000, 255f.).

The actual employment record of former welfare recipients does not support these dire predictions. Recent research indicates that roughly 75% of former recipients work at some point in the year after leaving welfare, usually full-time, and roughly 30% of current welfare recipients are employed, despite their low levels of education (Moffitt 2002). In the 20 largest metropolitan areas, the employment-to-population ratio of all single mothers rose from 59% in 1995-96, the year before national welfare reform, to 73% three years later in 1998-99, a large jump that presumably reflects changes in welfare programs to a significant degree. There also appears to be no association between the increasing labor force participation of single mothers and the employment or wage rates of other less-educated workers, suggesting that the increased employment of former welfare recipients did not represent simply substitution of these workers for others who were displaced (Lerman and Ratcliffe 2001).

Holzer's subsequent four-city survey (1998) found that the percentage of former welfare recipients in jobs requiring daily reading, writing, math, and computer use was only somewhat below that observed for all non-college workers in his first survey (see Table 7) (Holzer and Stoll 2001). What is remarkable is not how cognitively demanding most less-skilled jobs are, but how easily those presumably ranking low in the skills distribution can fill them. Either the skills of welfare recipients were underestimated, the demands of jobs overestimated, or the method for comparing the two has problems (such as the coarseness of skill categories, for example).

It is possible that the tight labor market of the late 1990s forced employers to take on lower-quality workers than they would otherwise hire, while at the same time welfare reform forced many women into the labor market. However, Holzer's recent survey provides little support for this conclusion, at least with respect to cognitive skills. Only about 10% of employers reported that former welfare recipients had problems with basic and job-related skills, and only 10-20% rated them worse overall than their other employees in similar jobs. Employers most frequently cited problems with absenteeism related to child care (63%), transportation difficulties (44%), and physical health problems (32%) (Holzer and Stoll 2001).

TABLE 7 Percentage of all non-college workers in welfare recipients that required

|                  | All jobs |         |
|------------------|----------|---------|
|                  | 4 cities | Average |
| Read paragraphs  | 55       |         |
| Write paragraphs | 30       |         |
| Read/write       |          | 56      |
| Arithmetic       | 65       | 54      |
| Use computers    | 51       | 44      |
| Serve customers  | 58       | 78      |

Note: Figures for four-city survey are average (1992-94). Figures for other cities are from Holzer and Stoll (2001).

Source: Holzer (1996: 49) and Holzer and Stoll (2001).

Of course, these employers' selection effects. The workers of all former welfare recipients exiting the rolls and finding employment are likely to explain all of Holzer's

This inference is confirmed from selection problems. Johnson sample of people receiving welfare in early 1997 and re-surveyed those who had left the welfare rolls. Johnson followed a random sample of welfare recipients remaining on the welfare rolls. The study also differentiated between good jobs, with good jobs defined as providing health benefits. Consistent with other studies, 70% of the people in their welfare rolls in their first survey, with roughly the same bottom row).

**TABLE 7 Percentage of all non-college jobs and jobs filled by former welfare recipients that required performing different tasks daily**

|                  | All jobs | Jobs held by former welfare recipients |    |         |           |           |
|------------------|----------|--|----|---------|-----------|-----------|
|                  | 4 cities | Average                                | LA | Chicago | Cleveland | Milwaukee |
| Read paragraphs  | 55       |  |    |         |           |           |
| Write paragraphs | 30       |  |    |         |           |           |
| Read/write       |          | 56                                     | 62 | 50      | 56        | 52        |
| Arithmetic       | 65       | 54                                     | 58 | 50      | 51        | 58        |
| Use computers    | 51       | 44                                     | 52 | 36      | 40        | 41        |
| Serve customers  | 58       | 78                                     | 83 | 70      | 68        | 99        |

Note: Figures for four-city survey are averages for Los Angeles, Detroit, Boston, and Atlanta (1992-94). Figures for other cities are from 1998. Average is weighted by population (Holzer and Stoll 2001).

Source: Holzer (1996: 49) and Holzer and Stoll (2001: Table 4.2)

Of course, these employers were referring to job incumbents, not the overall pool of former welfare recipients, so there is the possibility of selection effects. The workers they hired were not a random sample of all former welfare recipients. However, the large number of women exiting the rolls and finding employment suggests that creaming is unlikely to explain all of Holzer's results.

This inference is confirmed by another survey that does not suffer from selection problems. Johnson and Corcoran (2002) surveyed a random sample of people receiving welfare in an urban Michigan county in early 1997 and re-surveyed them in 1998 and again in 1999, when many had left the welfare rolls. Unlike Holzer and Stoll (2001), this study followed a random sample of people initially receiving welfare, including those remaining on the welfare rolls or unemployed in later years. The study also differentiated employment into "good" jobs and "bad" jobs, with good jobs defined as full-time and either paying \$7 per hour and providing health benefits or paying \$8.50 without health benefits. Consistent with other studies, Johnson and Corcoran found that roughly 70% of the people in their welfare sample were employed shortly after their first survey, with roughly 50% in bad jobs (Table 8, right panel, bottom row).



Required non-college jobs in  
welfare in 1997 by  
of jobs requiring or people

possessed by job-holders  
unemployed in 1998-99  
of 1997 welfare recipients)

| Good job | Bad job | Unemployed |
|----------|---------|------------|
| 70.3%    | 51.0%   | 40.5%      |
| 65.9     | 66.8    | 45.2       |
| 42.2     | 24.7    | 17.0       |
| 69.5     | 82.7    | 57.4       |
| 8.4      | 9.4     | 27.7       |
| 21%      | 50%     | 29%        |

Michigan, survey of former welfare  
defined as full-time and either  
earning at least \$8.50 per hour and not

and performed five tasks  
reading and writing of  
computer use, and customer  
can be compared to job  
independent survey of local  
the same five tasks for  
Lecky (1982), this is one  
workers' skills and job

column 4) indicate that the  
roughly in line with the  
good jobs (column 1) and  
bad jobs (column 2), with  
For example, 41.6% of  
2.0% of welfare recipi-  
job requiring daily read-

Remarkably, even those in bad jobs (column 6) seem to have cognitive skills in roughly the same proportions as required by good jobs, except for computer experience. Not surprisingly, the job skills reportedly used by those who remained unemployed when re-surveyed (column 7) are the lowest of the three groups, though the percentage of the sample in this category (29%) was not large enough to depress the overall averages below the levels required by employers, except in the case of computer use.

As a caveat to the preceding, one should note that it is a little misleading to simply compare percentages across the employer and worker surveys because they are calculated on different base populations. Without further information on absolute population magnitudes, there is no real way to know if there is an imbalance between job requirements and workers' skills.

For example, suppose the percentages in the left panel of Table 8 refer to a population of, say, 100,000 jobs and the percentages in the right panel refer to a population of, say, 30,000 welfare recipients. In this case the large percentage of job seekers without computer skills (75%) relative to the smaller percentage of jobs not requiring such skills (56%) implies only 22,500 job seekers without computer experience compared to 56,000 jobs that do not require computer skills. Whether or not there is actually a mismatch of worker skills and job requirements with respect to computer skills depends on both the absolute number of job seekers and jobs, as well as the percentage of each having or requiring the skill.

Of course, former welfare recipients also have to compete with other low-skilled job seekers for these positions, which further complicates the issue of whether a mismatch exists. Nevertheless, Johnson and Corcoran (2002) is the only study that compares the skills of a representative sample of welfare recipients with the skills required by low-skill jobs and finds remarkably few differences between the two.

A further limitation of both Holzer's studies (1996; Holzer and Stoll 2001) and Johnson and Corcoran's study (2002) is that the skill measures are fairly coarse. Consequently, there is no way to know whether the level of complexity of the different tasks performed by welfare recipients in prior jobs was comparable to the levels employers said they require. However, the high employment rates among former welfare recipients at prevailing wages and the high levels of employers' reported

satisfaction with their cognitive skills suggest that job seekers were successfully matched with jobs at high rates.

This is not to say that skills do not matter. The right panel of Table 8 shows clearly that employment and job quality is positively associated with experience using different job-related skills. Analyses by Danziger et al. (1999) confirm that both education and previous use of the job skills in Table 8 affect the probability of employment among former welfare recipients, as do non-cognitive problems, such as physical and mental health, transportation difficulties, and perceived discrimination in prior jobs. In fact, all have roughly comparable effects.<sup>6</sup>

In addition, employment alone is not the only important outcome measure. Holzer and Stoll (2001) report a median wage of \$7 per hour in 1998 for those with jobs. This was about \$2 above the minimum wage, indicating that employers were willing to pay these workers more than what was legally required, but clearly the wages were low and health insurance was also uncommon. This partly explains workers' weak attachment to these jobs and the job churning that is often observed in welfare-to-work studies. In fact, resignations outnumber dismissals by two to one as a cause of job churning among former welfare recipients, suggesting that employees' dissatisfaction and personal problems are the more pertinent factors in employment instability, rather than employer dissatisfaction with cognitive skill deficits, though low education and skills are also associated with unstable employment (Campbell et al. 2002).

The low pay and probable dependence of many such jobs on a strong business cycle (Holzer, Raphael, and Stoll 2003, 30ff.) confirm that these low-skilled workers are found disproportionately at the bottom of the job hierarchy and remain vulnerable. Former welfare recipients usually fill jobs in the secondary labor market. However, it is not accurate to say that their low skills shut them out of the labor market. Their recent experience in the job market is no better than many other less-skilled workers, but in many respects does not seem worse. Given favorable conditions, most can be integrated into the existing job skill structure. The absence of better-paid employment partly reflects structural shifts in the kinds of jobs the economy generates, as well as possible limits to the kinds of jobs these workers can perform. The experience of former welfare recipients in the late 1990s underscores the importance of a strong macroeconomy and the avail-

ability of jobs in determining individuals' skills alone (Galbraith).

Nevertheless, even a strong correlation of everyone at the lower end of the wage distribution and employment rate for less-educated young people is not the rate for similar whites (Holzer and Stoll 2001). This reflects human capital differences that adding Armed Forces Qualification Test scores to the standard human capital model greatly improves in the cross-section (Neal and Johnson 2001). Others contend that the test is not a good measure. However, even adjusted, evidence of greater employment for blacks in 1996; Moss and Tilly 2001, 70) for differences in employment rates across cross-sectional claims can account for the tight labor market of the late 1990s.

Moss and Tilly's interview-based study addresses the question of the extent to which the experience reflects lack of motivation. They found that many black males have little more than reliability and often about motivation and interactional styles (Moss and Tilly 2001, 70) males to other groups, employment rates for Hispanics and Asians moving the latter groups' immigration (Moss and Tilly 2001, 70) perceptions are some combination of true differences between native-born and immigrant wages and working conditions. What employers praised was that they work hard in the least desirable jobs, both to whites and to natives. Natives accepted more readily poorer jobs in their communities.

ability of jobs in determining labor market outcomes, rather than individuals' skills alone (Galbraith 1998)

Nevertheless, even a strong macroeconomy did not lift the fortunes of everyone at the lower end of the skill distribution. The unemployment rate for less-educated young black males remained stubbornly above the rate for similar whites (Holzer and Offner 2002), but whether this reflects human capital differences is much debated. Several studies show that adding Armed Forces Qualification Test (AFQT) scores to a standard human capital model greatly reduces black-white wage differences in the cross-section (Neal and Johnson 1996; Farkas and Vicknair 1996). Others contend that the test is racially biased and that after scores are adjusted, evidence of greater discrimination reemerges (Maume et al. 1996; Moss and Tilly 2001, 76f.). Even assuming the same results hold for differences in employment rates, it is not clear how either of these cross-sectional claims can account for the flat employment trend in the tight labor market of the late 1990s.

Moss and Tilly's interviews with employers shed further light on the question of the extent to which black males' recent labor market experience reflects lack of human capital or the effects of discrimination. They found that many employers did complain of cognitive skill deficits among black males, but many also indicated the jobs required little more than reliability and common courtesy and complained more often about motivation and attitude problems, and almost as much about interactional styles (Moss and Tilly 2001, 59f.). When comparing black males to other groups, employers viewed black women and especially Hispanics and Asians more positively on these "soft skills," often citing the latter groups' immigrant work ethic (Moss and Tilly 2001, Chapter 4). Moss and Tilly (2001, 142ff., p. 154) conclude that employers' perceptions are some combination of false stereotypes, cultural gaps, and true differences between black males and other groups, the latter partly reflecting native-born black males' dissatisfaction with the poor wages and working conditions of the jobs available to them relative to other native-born Americans, which comprise their reference group. What employers praised in other groups was often a willingness to work hard in the least desirable jobs, many of which were unattractive both to whites and to native-born blacks, but which immigrant minorities accepted more readily because their reference points were even poorer jobs in their country of origin (Moss and Tilly 2001, 117ff.).

Although Moss and Tilly's study cannot assign proportions to the different forces they identify, it is clear that the employment difficulties of black males are more complex than simply an issue of cognitive skills.

### Summary

Employers do complain about the difficulty of meeting their labor needs with the workforce available to them, but it is not clear if those concerns focus more on workers' attitudes than on their cognitive skills, nor whether that concern applies to many groups beyond young workers, for whom many of the problems may in any case be transitory. Employers have few complaints regarding the scarcity, expense, or skill levels of workers with more than a high school education, contrary to the preoccupation of most of the labor economics literature on wage inequality growth. There is no consistent historical data against which to benchmark the current levels of expressed dissatisfaction among employers.

The increased rewards associated with education and test scores suggest human capital shortages, but they may also be a proxy for other institutional shifts. Test scores do not explain much of the unusually high levels of wage inequality in the United States compared to continental Europe. The stability of U.S. inequality and education differentials in the 1990s is also hard to reconcile with a simple supply and demand story, given the absence of large increases in the supply of human capital and the presumably steady increase in demand as information technology diffused further in the workplace.

Despite the increased returns to education in the last 20 years, the experience of former welfare recipients shows there is room in the labor market for large numbers of even very low-skilled workers, at least under favorable macroeconomic conditions, though the low wages in these secondary-sector jobs remain a problem.

## Conclusion

Firm conclusions about the three problems, difficulties workers possess, an even more of their jobs require, and problems one another. Both workers the skills they can develop means that flexible ranges-ible ranges of jobs in actual results do not speak with a reasonable

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## Conclusion

Firm conclusions about the alleged skills mismatch are hampered by three problems: difficulties in ascertaining the job-relevant skills workers possess, an even more striking scarcity of information on the skills their jobs require, and problems relating the two kinds of evidence to one another. Both workers and employers have a certain flexibility in the skills they can develop on the job or require for a given job, which means that flexible ranges of worker abilities can be matched to flexible ranges of jobs in actual labor markets. The available research results do not speak with one voice, but certain conclusions seem reasonable.

There is little evidence of absolute declines in cognitive or hard skills in the United States, nor of generally poor performance relative to other advanced industrialized countries, despite frequent extreme statements to the contrary in popular and policy circles. Test score differences between the United States and other industrialized countries are related to different patterns of immigration and assimilation, which often reflect U.S. employer preferences for low-skill, low-wage workers, rather than a significant skills gap. However, there is also evidence of decelerating growth of human capital and of stability in cognitive test scores. Since skill demands appear to be gradually rising, lack of stronger growth in the supply of human capital may be a problem, but this cannot be known without better information than is currently available on the actual level of job skill requirements and whether they really push more jobs out of reach for different subgroups at current wage rates. It is even unclear how much of the purported skills mismatch problem is a shortage of cognitive skills rather than an expression of employer dissatisfaction with effort levels or work-related attitudes, and whether any such problem extends

beyond a transitory stage of young adulthood and/or some fraction of disadvantaged minorities.

As for computer skills, research findings in the skills mismatch literature do not suggest these skills are in particularly short supply, despite the technology focus of much of this debate, nor is there evidence of a general shortage of other technical or high-level skills. Even claims of accelerating demand for college graduates more generally do not resonate with employers.

And in many cases, the lack of historical data makes it impossible to know whether recent levels of expressed dissatisfaction are higher than in the past.

A key question is whether policies to increase human capital are the solution to the problem of high wage inequality and low wages for some groups. The goals of increasing achievement in elementary and secondary schools and raising postsecondary enrollment are worthy, but the pursuit of those goals has tended to generate heated debate over methods (vouchers, for example, or high-stakes testing) and exaggerated claims regarding the problems with public schools and the expected outcomes of proposed reforms.

Raising everyone's absolute cognitive skills and work readiness will not increase wages and decrease inequality if wages are determined by the structure of jobs and one's relative position in the worker queue (Thurow 1975). An implicit view holds that increasing the supply of skill will satisfy pent-up demand or perhaps create its own demand. However, education levels grew at an exceptional rate in the late 1960s-70s and merely depressed the college premium. At exactly the time when unprecedented numbers of highly educated workers entered the workforce, the overall wage level entered a 25-year period of stagnation, ending an equally long period of unprecedented growth between 1948 and 1972. Increasing levels of human capital at the bottom is desirable for many reasons, but recent changes in the wage structure may not reflect human capital scarcities as much as management strategies. Wages may be more responsive to institutional reforms that more directly affect compensation or economic activity—measures such as maintaining the value of the minimum wage, union protections, and strong macroeconomic growth—than to changes in education or skill levels.

Finally, one way to answer some of the many questions raised by the skills mismatch debate is to develop more detailed and standardized

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measures for tracking trends in job skill requirements, and to apply these measures consistently to representative samples of workers over time in order to understand exactly how work is changing, rather than trying to infer changes from the very limited information currently available.