



Disability and occupational projections

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The passage of the Americans with Disabilities Act in 1990 and other policy initiatives was intended to improve employment opportunities for qualified people with disabilities. Although definitions of disability vary, it is clear that, no matter the definition used, employment levels of people with disabilities remain far below those of people without disabilities.¹ According to one estimate, in September 2010 the employment-population ratios among working-age men and women with disabilities were 30.3 percent and 26.8 percent, respectively, less than half the rates of 74.7 percent and 65.0 percent among working-age men and women without disabilities.² The low employment rates of people with disabilities contribute to high rates of poverty³ and to the expansion of government benefit programs. Between two-thirds and four-fifths of nonemployed people with disabilities say that they would prefer to be employed, and their preferences regarding job attributes (for example, job security, income, and opportunities for advancement) are similar to those of nonemployed people without disabilities.⁴ Even among the employed, employees with disabilities face a number of disparities, including lower average pay, less job security, and reduced access to health insurance, pension plans, and training.⁵ They are also less likely than workers without disabilities to be in jobs that are classified as "economically and psychologically rewarding."⁶

One possible explanation for the persistent employment gap between working-age people with and without disabilities is the job-mismatch hypothesis: job demands make employment either impossible or much less productive for people with disabilities, narrowing the range of jobs to which their abilities and interests may be matched. For example, people in wheelchairs may be restricted from a wide range of manufacturing and service jobs that require good mobility, and many of them may not have the educational background for white-collar jobs. Such a mismatch is of particular concern if it occurs in growth occupations, making it harder for people with disabilities to find jobs. If, however, a wide range of people with disabilities can meet the job demands of growth occupations, this piece of information can be useful in focusing efforts on overcoming other employment barriers they may face.

Therefore, a key determinant of the employment opportunities for people with disabilities is the evolving structure of jobs in the U.S. economy, including the changing occupational mix as well as the ability requirements within each occupation. It is well recognized that employed people with disabilities are disproportionately likely to be in relatively low-paying blue-collar and service jobs,⁷ but there has been no attempt to analyze the projected employment of people with disabilities on the basis of their current occupational mix or to analyze their potential for increased employment on the basis of the projected ability requirements of occupations.

Method

Every 2 years, the U.S. Bureau of Labor Statistics (BLS) develops 10-year projections for occupations. The most recent projections are for the 2008–18 period.⁸ The first part of this article provides baseline estimates of how the employment of people with disabilities will change if their prevalence in each occupation remains the same. Toward that end, BLS projections for each occupation are matched with data on the occupational distribution of employed people with disabilities from the 2008 American Community Survey (ACS), conducted by the U.S. Census Bureau. The ACS is a yearly survey based primarily on questionnaires sent to households and mailed back to the Census Bureau, with interview followups for nonresponse. One household member can answer for all members of the household. Each year, approximately 3 million housing units in the United States (including Puerto Rico) are selected for the survey. The 2008 survey sampled both institutional and noninstitutional group quarters, along with housing units.⁹ The Census Bureau calculates weights to adjust for coverage and nonresponse error, and the weights are used for all estimates in this article.

The ACS uses six questions to identify people with disabilities.¹⁰ These questions also have been used in the monthly Current Population Survey since June 2008 to measure the labor force status of people with disabilities. The questions are based on the disability models of the Institute of Medicine and the International Classification of Functioning. Both models view disability as "the restriction in participation that results from a lack of fit between the individual's functional limitations and the characteristics of the physical and social environment."¹¹ Four of the questions were designed to distinguish "four basic areas of functioning (vision, hearing, mobility, and cognitive functioning) that identified the largest component of the population of people with disabilities."¹² These four areas of functioning "could be used individually or combined in order to assess the equalization of opportunities for people with disabilities."¹³ In addition, in order to monitor independent living and the need for services, two questions were designed to measure the "ability to take care of oneself" and the "ability to move around the co

munity without assistance."14

There are 1,434,979 employed people in the 2008 ACS sample, of whom 87,038 are identified by one or more of these six questions as having disabilities. Using the occupational information for all employed respondents, as well as the survey weights, yielded an estimate of the prevalence of people with disabilities within each occupation, and the resulting occupation-level figures were matched to the projections for that occupation, forming the basis of the information presented subsequently in some of the tables.¹⁵ The matching was straightforward for most occupations, because both datasets use the Standard Occupational Classification system. In some cases, the ACS combined several occupations and reported data at a higher level of aggregation than was available in the BLS occupational projections; in these cases, the occupational projections were likewise aggregated to produce a direct match. The matching procedure resulted in 469 matched occupations, exhaustively covering all civilian occupations represented in the BLS projections (though with a number of occupations reported at a higher level of aggregation than in the projections).¹⁶

The second part of this article allows for possible changes in the occupational distribution, looking at the potential for increased employment of people with disabilities, based on ability requirements of occupations. The method employed was to match the BLS occupational projections with information on ability requirements from the O*Net 14.0 database in order to project changes in employer demand for different abilities. For each occupation, the O*Net database provides information on the level and importance of 52 specific abilities, based on the findings of occupational analysts who utilize updated information gathered from job incumbents. O*Net also uses the Standard Occupational Classification coding scheme, so the occupational match was straightforward in most cases; in those cases in which occupations were more highly aggregated in either database, the information in the other database was likewise aggregated to provide an appropriate match. This procedure resulted in 755 matched occupations, again exhaustively covering all civilian occupations represented in the BLS projections (though, again, with several occupations reported at a higher level of aggregation than in the projections).

For each of the 52 abilities, O*Net provides data on the importance and required level of the ability, for each occupation. Importance is scaled as a measure ranging from 1 to 5, with 1 designating "not important" and 5 denoting "extremely important"; level is scaled as a measure ranging from 1 to 7, with 1 signifying "very low" and 7 representing the highest level. The anchors for the level measure are tailored to each ability. For example, the anchors for required arm-hand steadiness are 2, designating "light a candle"; 4, meaning "thread a needle"; and 6, indicating "cut facets in a diamond." For this article, the importance measure was divided into three categories: less than 1.5, or "no or low importance"; 1.5 to 2.5, or "some importance," and 2.5 or more, or "important." The level measure was put into two categories: less than 2.5, or "low level"; and 2.5 or more, or "high level." These two recoded measures were combined to create five categories by which abilities are classified for each occupation: "no or low importance"; "some importance, low level"; "some importance, high level"; "important, low level"; and "important, high level." As will be discussed shortly, these figures probably represent a lower bound on the number of jobs that can be done by people with disabilities, because accommodations may allow people with specific impairments to do many of the jobs.

Employment and demographic characteristics

Prior to the analysis of occupational projections, basic information is presented on employment and demographic characteristics from the 2008 ACS. Consistent with past evidence, table 1 shows that working-age people with disabilities were much less likely than people without disabilities to be employed in 2008 (38 percent, compared with 77 percent). Their lower employment could be due in part to demographic characteristics, particularly their lower average educational levels. Table 1 shows that people with disabilities are less likely to have any college degree (associate, bachelor, or graduate degree). This finding explains little of the employment gap, however, given that there are large employment gaps between people with and without disabilities within each of the education categories. Similarly, there are several differences in the distribution of demographic characteristics between people with and without disabilities (in particular, people with disabilities tend to be older and are more likely to be African American), but there are also large employment gaps between people with and without disabilities within each demographic category, and these gaps are similar in size to the overall gap. When a probit regression is used to predict employment while controlling for all of the characteristics listed in table 1, the estimated employment gap between otherwise similar people with and without disabilities is 36.2 percent, close to the unadjusted gap of 39.5 percent shown in table 1.¹⁷

Focusing just on employed people, table 2 examines the occupational and educational distributions for workers with and without disabilities. Consistent with past evidence, people with disabilities are less likely than those without disabilities to be in management, management-related, or professional/technical occupations and more likely to be in service and blue-collar occupations. This difference may be explained in part by the lower average educational levels of employed people with disabilities: like all people with disabilities, those who are employed are less likely than people without disabilities to have associate, bachelor, or graduate degrees. Their lower educational levels do not, however, fully account for the differences in the occupational distribution: within each of the educational categories, people with disabilities are less likely to be in management, management-related, or professional/technical occupations and more likely to be in service and blue-collar occupations. When a multinomial logit regression is used to predict the occupational distribution while controlling for education plus all of the demographic characteristics in table 1, disability remains as a significant positive predictor of the likelihood of being in a blue-collar or service occupation.¹⁸

The key point to be taken away from tables 1 and 2 is that, although people with disabilities tend to have lower educational levels and some differences in demographic characteristics compared with people without disabilities, these dissimilarities cannot account for their lower

r employment probability or higher likelihood of being in service and blue-collar jobs. In other words, disability exerts an independent effect on employment prospects and on the nature of the jobs people with disabilities take.

Baseline projections

What is the projected employment of people with disabilities in 2018, given their current occupational distribution? Table 3 shows the employment levels and projections for the overall workforce, replicating the summary figures presented by Alan Lacey and Benjamin Wright. Table 3 also shows that, on the basis of the matches between the BLS projections and ACS data, and given the current occupational distribution of people with disabilities, their employment is estimated to grow from 9,176,000 to 10,001,000, or an increase of 825,000 jobs. Their growth rate of 9.0 percent is lower than the growth rate of 10.1 percent for all workers, reflecting the fact that people with disabilities are not distributed proportionately across occupations, being underrepresented in faster growing occupations and overrepresented in slower growing occupations. If they were distributed proportionately across occupations so that their growth rate matched the 10.1-percent overall growth rate, there would be an additional 104,000 jobs for people with disabilities in 2018.

Growing and declining occupations. How likely are people with disabilities to be in the fastest growing occupations? Table 4 shows the top 20 occupations, ranked by percentage growth over the 2008–18 period, as well as the prevalence of people with disabilities in each occupation. People with disabilities represent 6.1 percent of all employed people. They are overrepresented in the first- and third-fastest growing occupations—biomedical and agricultural engineers and personal and home care aides—representing 7.2 percent and 12.3 percent of workers, respectively, in 2008, but are underrepresented in the second-fastest growing occupation, accounting for only 3.6 percent of network systems and data communications analysts. The substantial growth in personal and home care aides is driven in large part by the aging of the population and the increased number of people with disabling conditions who require help from aides, so it is striking that the growth in this occupation also represents a growth in employment opportunities for people with disabilities. The occupational growth is due as well in part to the increased availability of long-term care services in the home, which Medicaid programs are increasingly likely to support as an alternative to institutionalization. The median pay of personal and home care aides is in the lowest quarter of occupations, as table 4 shows. Overall, people with disabilities are underrepresented in 17 of the top 20 fastest growing occupations. (The exceptions are biomedical and agricultural engineers; personal and home care aides; and nursing, psychiatric, and home health aides.) A similar pattern prevails for people with specific disabilities, such as vision, hearing, mobility, and cognitive impairments. (See table 4.)

Not only are people with disabilities underrepresented in most of the fastest growing occupations, but also they are overrepresented in the fastest declining occupations. Table 5 shows that the fastest declining occupation is textile winding, twisting, and drawing out machine setters, operators, and tenders, in which workers with disabilities represent 7.9 percent of workers, compared with the economywide average of 6.1 percent. Workers with disabilities are overrepresented in 19 of the top 20 declining occupations. (The lone exception is meter readers working for utilities.) Most of those 19 occupations are manufacturing jobs that require only short-term or moderate-term on-the-job training (see table 5), so workers in those occupations have not invested extensively in training and may be able to move easily to other jobs.

Growing and declining occupations for people with disabilities. What are the job growth rates in the occupations with the highest prevalence of disability? Table 6 takes an approach different from that of tables 4 and 5, ranking the occupations by prevalence of disability instead of overall job growth rates. The occupation with the highest prevalence of disability, 24.7 percent, is setters, operators, and tenders of metal and plastic drilling and boring machine tools, an occupation that is projected to have an employment decline of 26.9 percent. Interestingly, although tables 4 and 5 show that people with disabilities tend to be in slower growing occupations overall, the top 20 occupations in prevalence of disability are evenly split between growing and declining occupations, with 10 of each. (See table 6.) Most of these are low-paying occupations.

Table 7 breaks out the top 10 occupations in prevalence of disability for people with vision, hearing, mobility, and cognitive impairments. The highest prevalence of people with vision impairments (9.7 percent) and mobility impairments (9.8 percent) is among shoe and leather workers and repairers, an occupation that is predicted to decline by 14.3 percent by 2018. The highest prevalence of people with hearing impairments (19.2 percent) is among setters, operators, and tenders of metal and plastic drilling and boring machine tools, projected to decline by 26.9 percent by 2018. Finally, the highest prevalence of people with cognitive impairments is among cutting workers, an occupation that is predicted to decline by 6.9 percent by 2018.

Where will the greatest number of jobs for people with disabilities come from? Table 8 presents the top 20 occupations, ranked this time by the absolute growth in the number of jobs held by people with disabilities (still under the assumption that prevalence of disability stays constant in each occupation). The top occupation is nursing, psychiatric, and home health aides, which is predicted to create 63,900 jobs for people with disabilities, followed by the closely related occupation of personal and home care aides, predicted to create 46,100 jobs for people with disabilities. Most of these top 20 occupations in job growth of people with disabilities are low paying. The exceptions are five high-paying occupations: 23,300 more jobs for secretaries and administrative assistants; 21,700 more for registered nurses; 12,300 more for bookkeeping, accounting, and audit clerks; 12,200 more for teachers and instructors other than elementary and middle school teachers and instructors; and 11,800 more for elementary and middle school teachers. Broken down by type of major impairment, table 9 shows that the greatest increase in jobs within each of the impairment categories is projected to be among nursing, psychiatric, and home health aides.

Where will people with disabilities lose the greatest number of jobs? Table 10 presents the bottom 20 occupations in job growth, all decli

ning occupations. The most jobs lost by people with disabilities will be among farmers and ranchers (8,000), followed by sewing machine operators (6,000). Most of these 20 occupations are low paying, with the exception of farmers and ranchers; postal service mail sorters, processors, and processing machine operators (5,000 lost jobs); paper goods machine setters, operators, and tenders (3,000); first-line supervisors or managers of production and operating workers (2,000); and information and record clerks other than correspondence clerks and order clerks (2,000). Broken down by type of major impairment, table 11 shows that the greatest losses in jobs for people with vision and mobility impairments are projected to be among sewing machine operators (2,000 and 2,800 lost jobs, respectively) while the greatest loss in jobs for people with hearing impairments is expected to be among farmers and ranchers (4,400 lost jobs) and the greatest loss in jobs for people with cognitive impairments is anticipated to be among hand packers and packagers (2,100).

Projecting potential demand

The previous section assumed that the prevalence of people with disabilities stays constant within each occupation; this section allows for that prevalence to change. Here, the focus is the potential of people with disabilities to fill new jobs, based on the ability requirements of growing occupations.

Table 12 breaks down job growth by the level and importance of 52 specific abilities. (See the earlier section "Method" for a description of how level and importance were categorized, and exhibit A-1 for a description of the abilities.) For example, a decline of 5,500 jobs is projected for occupations in which oral comprehension of instructions has only some importance at a low level, whereas very high growth (15,216,700 jobs) is projected for occupations in which a high level of oral comprehension is important. Two of the column heads specify that the ability in question has only some importance, indicating that it may not be essential for doing the job, so, conceivably, the job could be restructured or other accommodations could be made such that the ability would not be required. (Accommodations also may be available for jobs in which the ability is important at either a low or a high level.)

For most of the cognitive abilities listed in the table, most job growth is occurring in occupations in which at least a low level of the specific cognitive ability is important. For several cognitive abilities, however, job growth will be substantial in occupations in which only a low level of the ability is used and the ability has only some importance for the job, so it may not be crucial to the performance of the job. In particular, for each of the specific quantitative, memory, perceptual, and spatial cognitive abilities (except flexibility of closure), there will be growth of 5 million or more jobs in occupations in which the specific ability has no or low importance or in which only some importance is attached to a low level of the ability.

The psychomotor and physical abilities are not very important for many of the growing occupations, which is promising news for people with mobility impairments. The bulk of the job growth for each of the specific psychomotor and physical abilities is projected to occur in occupations in which the ability has no or low importance or in which a low level of the ability has only some importance. For example, manual dexterity has low or no importance in 3,348,000 of the new jobs and only some importance at a low level in 5,016,000 of the new jobs, two projections that offer promise to many people with quadriplegia, cerebral palsy, or other conditions that limit their manual dexterity. As another example, gross body coordination has low or no importance in 5,612,000 of the new jobs and only some importance at a low level in 5,200,000 of the new jobs. These projections offer promise to people using wheelchairs or crutches and who generally lack the ability to coordinate all of their limbs easily.

Table 12 also shows that many of the specific visual abilities are not important for the bulk of the new jobs. For example, night vision and peripheral vision have low or no importance in most new jobs. The one major exception is near vision, which is rated as having at least some importance in all occupations and importance at a high level in almost all occupations. People with significant visual impairments are employed in a wide array of occupations, so accommodations such as screen readers may enable them to be employed even in occupations in which near vision is considered important.²¹ The O*Net Web site contains a useful set of links to information on accommodation for people with disabilities.²² Given the potential for accommodations to minimize or eliminate the need for many abilities in particular jobs, the figures shown in table 12 can be seen as providing a lower bound on the jobs that may be available, while the potential for jobs with appropriate accommodations may be much higher.

Which specific occupations can provide the most jobs for those who have specific disabilities? Table 13 provides, for each of the 52 abilities, the top three occupations in total job growth in which the ability has no or low importance. For example, for those with limited manual dexterity, the three fastest growing occupations in which this ability is not important are accountants and auditors (279,400 new jobs), postsecondary teachers (256,900 new jobs), and elementary school teachers except teachers of special education (244,200 new jobs). For those in wheelchairs who lack gross body coordination, the three fastest growing occupations in which this ability is not important are customer service representatives (399,500 new jobs), general office clerks (358,700 new jobs), and accountants and auditors (279,400 new jobs). Also shown in the table are, among other things, the total job openings due to growth and net replacements for each occupation. The data presented in the table can provide a useful guide for people with disabilities, their families, educators, and vocational counselors in determining the best job opportunities.

Quality and fit of jobs

Pay and education and training levels. What do the occupational trends imply for the quality of jobs and their fit for many people with disabilities? As noted earlier, Tables 8 and 9 show that the occupations with the highest prevalence and job growth for people with disabilities a

re mostly low-paying occupations. Table 14, breaks down occupational job growth by level of pay and by major source of education and training, both for all workers and for workers with disabilities. Consistent with past evidence on their lower earnings in general, people with disabilities in 2008 were disproportionately more likely to be in the lowest paying occupations (26.7 percent, compared with 20.7 percent for all workers) and less likely to be in the highest paying occupations (13.8 percent and 21.4 percent, respectively). Their job growth is likewise disproportionately in the lowest paying occupations (39.5 percent, compared with 21.5 percent for all workers). An encouraging finding for workers with disabilities, however, is that their share of job growth in the highest paying occupations (28.3 percent) will exceed their current share of jobs in the highest paying occupations (13.8 percent), so the proportion of workers with disabilities in high-paying jobs is projected to increase by 2018.

Table 14 also presents a breakdown of job growth by the level of education and training required²³ for an occupation. For all workers, close to one-third (32.5 percent) of current jobs are in occupations in which short-term on-the-job training is the major source of education and training, and 22.2 percent of the job growth is projected to be in these occupations. The figures are higher for people with disabilities, among whom 40.2 percent are currently in jobs requiring short-term on-the-job training, and 30.9 percent of their projected job growth is in such jobs. The next-largest category of job growth for people with disabilities is occupations requiring moderate-term on-the-job training (18.6 percent of job growth), followed by occupations requiring a bachelor's degree (15.8 percent). Although only 16.4 percent of employed people with disabilities are currently in jobs requiring some type of college degree, 27.7 percent of their job growth is projected to be in these occupations.

How do educational requirements for occupations match up with the educational qualifications of currently nonemployed people with disabilities? Can people with disabilities fill many of these jobs? Table 15 uses the 2008 ACS to compare projected job growth by occupational education level with the education levels of working-age nonemployed people with disabilities. A key finding from the table is that nonemployed people with disabilities could fill a large number of the projected new jobs for the economy as a whole. For example, the number of nonemployed people with disabilities who have associate degrees (622,000) would fill 63 percent of the projected 980,000 new jobs in occupations requiring that degree, and the number of nonemployed people with disabilities who have bachelor's degrees (671,000) would fill more than one-sixth of the projected 3,777,000 new jobs in occupations requiring that degree. This is not to suggest that all of the nonemployed people with disabilities could easily fill all of those jobs, because, of course, the type of education a particular individual with a disability has may not be the type that is required in a particular job, and other qualifications will matter for many of the new jobs. What the table does indicate, however, is that there is a large number of well-educated nonemployed people with disabilities who can help fill projected job growth and alleviate labor shortages. This pool of educated people with disabilities also appears to be growing, as indicated by Christine Jolls, who found that "individuals with disabilities who were not employed in the years following legal innovation in the form of the ADA [Americans with Disabilities Act] were more likely than their pre-ADA counterparts to give educational participation as their reason for not being employed."²⁴ Although there will be substantial growth in jobs that do not require college degrees (see table 14), higher education clearly increases employment opportunities. Education in fact appears to have a bigger effect on the likelihood of employment for people with disabilities than for people without disabilities. Indeed, data from the 2008 ACS suggest that having a bachelor's degree, relative to having a high school degree, raises the employment-population ratio by 18 percentage points among people with disabilities, compared with 9 percentage points among people without disabilities.²⁵ Still, while education appears to help close the employment gap, these figures show that even people with disabilities who have college or advanced degrees have lower employment-population ratios than their nondisabled counterparts, indicating that they continue to face other barriers.

Where will high-paying jobs come from for people with disabilities? Table 16 focuses on occupations with high or very high pay, considered separately for occupations that do and do not require a college degree. The table presents the top 10 occupations in each category, ranked by the size of the projected job growth for people with disabilities. For people with disabilities who do not have college degrees, the high-paying occupation with the greatest job growth is secretaries and administrative assistants (23,000 new jobs), followed by bookkeeping, accounting, and audit clerks (12,000) and then what is essentially a three-way tie among maintenance and repair workers, carpenters, and licensed practical and licensed vocational nurses (10,000 each). For people with disabilities who have college degrees, the high-paying occupation with the greatest job growth is registered nurses (22,000 new jobs), followed by teachers and instructors other than elementary and middle school teachers (12,000) and elementary and middle school teachers (12,000).

Part-time and home-based jobs. People with disabilities are especially likely to be in part-time and home-based work arrangements, in part because these jobs provide flexibility that some people with disabilities need in order to deal with transportation difficulties and medical concerns.²⁶ Table 17 shows projections of the growth in part-time and home-based work, using 2008 data on these arrangements, wherein the occupation-level data averages were matched to the BLS occupational projections.²⁷ Growing occupations are somewhat more likely to have high levels of part-time and home-based work, as shown by the finding that the projected 10.6-percent growth in part-time jobs and 10.7-percent growth in home-based jobs are each greater than the 10.1-percent growth in all jobs. Overall, there will be 3,595,000 new part-time jobs and 632,000 new home-based jobs (assuming that the proportion of these jobs stays constant within each occupation). Note that the measure of home-based work is conservative, covering those who said that they work at home in response to a question on commuting, and excludes jobs in which some, but not all, of the work may be done at home.²⁸

Which occupations are most amenable to part-time and home-based work, and may therefore be attractive to some people with disabilities? Table 18 lists the top 10 occupations in prevalence of each of the two types of job. The highest rate of part-time work in 2008 was among ushers, lobby attendants, and ticket takers (82.8 percent), followed by hosts and hostesses (82.0 percent); counter attendants (75.5 percent); and models, demonstrators, and product promoters (73.2 percent). The highest rate of home-based work was in the declining occupation of farmers and ranchers (40.7 percent), but that was followed by the growing occupations of writers and authors (38.3 percent), artists and related workers (30.3 percent), child care workers (26.8 percent), and residential advisors (25.6 percent).

Computer-using jobs. Finally, what will be the growth in computer-using jobs? Computer technologies may be especially valuable for people with disabilities, both because computer use can raise the productivity and pay of people who face limited job opportunities (for example, allowing people in wheelchairs to be just as productive as other workers) and because special technologies can help compensate for the limitations of many disabilities (for example, screen readers aid people with visual impairments). Previous research has found that computer skills help speed the return to work after the onset of disability and that computer use at work closes the earnings gap between people with and without disabilities.²⁹ As table 17 shows, in 2008 there were 83.9 million jobs, or more than half of all jobs, in occupations for which O*Net analysts rated a high level of computer use as important. The projected growth rate in these occupations is 11.4 percent. Jobs in which computer use has low or no importance (11.2 percent) also have a high growth rate, but the number of such jobs is low, so only 8.0 percent of new jobs are projected to be in occupations in which computer use has low or no importance. (Almost one-third of the growth in these jobs will be among personal and home care aides.) More than half (62.7 percent) of new job growth is expected to be in occupations in which computer use is both high level and important. This growth may represent opportunities for people with disabilities, given the benefits that computer use can provide to them. Although previous research indicates that people with disabilities are less likely to receive computer training,³⁰ data from the U.S. Census Bureau's Survey of Income and Program Participation show that 45 percent of nonemployed people with disabilities in 1999 either were regular computer users or said that they could use computers without difficulty.³¹ It is likely that this percentage has grown, given that computer use has expanded generally since 1999. Therefore, many people with disabilities may be able to take advantage of the projected growth in computer-using jobs.

THE DATA PRESENTED IN THIS ARTICLE provide a portrait of the projected job growth of people with disabilities, given their current occupational distribution, and of the potential for greater job growth, given the ability requirements of growing occupations. People with disabilities currently tend to be underrepresented in growing occupations and overrepresented in declining occupations, so their projected job growth of 9.0 percent is lower than the overall projected job growth of 10.1 percent if the percentage of workers with a disability stays constant in each occupation. If these projections hold true, then the percentage of people with disabilities who are employed is unlikely to increase and may even decline, given the growing percentage of people with disabilities as the population ages.³²

There are, however, several indicators of the potential for significant job growth among people with disabilities. First, an analysis of the importance of 52 abilities in each occupation shows that substantial job growth is likely in occupations in which several of the cognitive abilities—quantitative abilities, memory, perceptual abilities, and spatial abilities—either have low importance or only some importance for a low level of the ability. In addition, substantial growth is likely in occupations in which many of the psychomotor and physical abilities have low or no importance, so these occupations represent good opportunities for people with mobility impairments. The estimates of potential jobs in those occupations for people with disabilities probably reflect lower bounds on the number of jobs that can be done by people with disabilities, because many accommodations can open up further opportunities for people with specific impairments. Further research into how specific accommodations can help people with impairments in different occupations would likely lead to better estimates of the potential for job growth.

Employment of people with disabilities also may be increased by stronger growth in occupations with high rates of part-time and home-based jobs. By providing flexibility to deal with transportation and medical concerns, these types of jobs can be especially appropriate for some people with disabilities, although they can also have disadvantages, such as lower average pay levels. Further, most of the new jobs that will be created between 2008 and 2018 will be in occupations in which computer skills are important, so these jobs also can represent good opportunities for people with disabilities, given that computer skills can help overcome, and even erase, some of the disadvantages associated with many disabilities. Finally, the employment of people with disabilities may be helped by employers' efforts to tap underutilized sources of workers as baby boomers retire. Among these efforts are diversity initiatives and best practices in recruitment, employee development, and work-life balance.³³ Research suggests that, to the extent that there is increased employment of people with disabilities in a variety of jobs, greater exposure to these people may change supervisors' and coworkers' attitudes in ways that improve the performance and opportunities for people with disabilities.³⁴

The preceding factors affect the potential for people with disabilities not just to fill new jobs resulting from occupational growth, but also to fill job openings due to replacement needs from worker turnover. The projected number of job openings due to occupational growth and replacement needs is 50.9 million,³⁵ offering many employment opportunities for people with disabilities who receive the appropriate education, computer skills, accommodations, and other employment supports.

In sum, although the generally slower growth of occupations with a high prevalence of disability would appear to limit the employment prospects of people with disabilities, data on ability requirements and other job characteristics of growing occupations indicate that there is t

he potential for increased employment of people with disabilities in the coming decade.

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Notes

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1 See Douglas Kruse and Lisa Schur, "Employment of People with Disabilities Following the ADA," *Industrial Relations*, January 2003, pp. 31–6; David C. Stapleton, and Richard Burkhauser (eds.), *The Decline in the Employment of People with Disabilities: A Policy Puzzle* (Kalamazoo, MI, W. E. Upjohn Institute for Employment Research, 2003); Edward H. Yelin and Laura Trupin, "Disability and the characteristics of employment," *Monthly Labor Review*, May 2003, pp. 20–31; and StatsRRTC, *Annual Disability Statistics Compendium, 2009* (New York, Hunter College, Rehabilitation Research and Training Center on Disability Demographics and Statistics 2009), on the Internet at www.disabilitycompendium.org (visited Oct. 21, 2010).

2 Economic News Release: Table A–6, "Employment Status of the Civilian Population by sex, age, and disability status, not seasonally adjusted" (U.S. Bureau of Labor Statistics, Oct. 8, 2010), on the Internet at www.bls.gov/news.release/empsit.t06.htm (visited Oct. 19, 2010). Working age is defined as 16 to 64 years.

3 See Douglas Kruse, "Persons with disabilities: Demographic, income, and health care characteristics, 1993," *Monthly Labor Review*, September 1998, pp. 13–22; Lisa Schur, "Dead-end Jobs or a Path to Economic Well-being? The Consequences of Non-standard Work among People with Disabilities," *Behavioral Sciences and the Law*, December 2002, pp. 601–20; Phoebe Ball, Michael Morris, Jhonette Hartnett, and Peter Blanck, "Breaking the Cycle of Poverty: Asset Accumulation by People with Disabilities," *Disability Studies Quarterly*, winter 2006, on the Internet at www.dsqsds.org/article/view/652/829 (visited Oct. 21, 2010); and StatsRRTC, *Annual Disability Statistics Compendium, 2009*.

4 See 2004 Survey of Americans with Disabilities (New York, National Organization on Disability/Louis Harris and Associates, 2004), p. 43; and Mohammad Ali, Lisa Schur, and Peter Blanck, "What Types of Jobs Do People with Disabilities Want?" *Journal of Occupational Rehabilitation*, forthcoming, March 2011, on the Internet as of Oct. 5, 2010, at www.springerlink.com/content/105365/?Content+Status=Accepted (visited Oct. 24, 2010).

5 See Thomas Hale, Howard Hayghe, and John McNeil, "Persons with disabilities: Labor market activity, 1994," *Monthly Labor Review*, September 1998, pp. 3–12; Kruse, "Persons with disabilities"; Yelin and Trupin, "Disability and the characteristics of employment"; Schur, "Dead-end Jobs"; Marjorie L. Baldwin and Edward J. Schumacher, "A Note on Job Mobility among Workers with Disabilities," *Industrial Relations*, July 2002, pp. 430–41; Marjorie L. Baldwin and William G. Johnson, "A Critical Review of Studies of Discrimination against Workers with Disabilities," in William M. Rodgers III (ed.), *Handbook on the Economics of Discrimination* (Northampton, MA, Edgar Elgar Publishing, 2006), pp. 119–60; Lisa Schur, Douglas Kruse, Joseph Blasi, and Peter Blanck, "Is Disability Disabling in All Workplaces? Workplace Disparities and Corporate Culture," *Industrial Relations*, July 2009, pp. 381–410; and StatsRRTC, *Annual Disability Statistics Compendium, 2009*.

6 Yelin and Trupin, "Disability and the characteristics of employment," p. 28.

7 See Hale, Hayghe, and McNeil, "Persons with disabilities"; and Yelin and Trupin, "Disability and the characteristics of employment."

8 T. Alan Lacey and Benjamin Wright, "Occupational employment projections to 2018," *Monthly Labor Review*, November 2009, pp. 82–123.

9 For further information on the ACS, see "American Community Survey" (U.S. Census Bureau, 2009), on the Internet at www.census.gov/acs/www (visited Oct. 21, 2010).

10 The six questions are as follows: 1. "Is this person deaf or does he/she have serious difficulty hearing?" 2. "Is this person blind or does he/she have serious difficulty seeing even when wearing glasses?" 3. "Because of a physical, mental, or emotional condition, does this person have serious difficulty concentrating, remembering, or making decisions?" 4. "Does this person have serious difficulty walking or climbing stairs?" 5. "Does this person have difficulty dressing or bathing?" 6. "Because of a physical, mental, or emotional condition, does this person have difficulty doing errands alone such as visiting a doctor's office or shopping?" The design and testing of the questions are described in Matthew Brault, Sharon Stern, and David Raglin, *Evaluation Report Covering Disability, 2006 American Community Survey Content Test Report P.4* (U.S. Census Bureau, Jan. 3, 2007), on the Internet at www.census.gov/acs/www/AdvMeth/content_test/P4_Disability.pdf (visited Oct. 21, 2010). For further documentation, see *Labor Force Statistics from the Current Population Survey: Demographics* (U.S. Bureau of Labor Statistics, Sept. 10, 2010), on the Internet at www.bls.gov/cps/demographics.htm#disability (visited Oct. 21, 2010). For the current article, a positive answer to any question indicates a disability, a positive answer to question 1 indicates a hearing impairment, a positive answer to question 2 indicates a vision impairment, a positive answer to question 3 indicates a cognitive impairment, and a positive answer to question 4 indicates a mobility impairment.

11 See Brault, Stern, and Raglin, *Evaluation Report Covering Disability*, p. 4.

12 *Ibid.*

13 *Ibid.*

14 *Ibid.*

15 Of the 469 occupations in the ACS, 13 had sample sizes less than 100. Those occupations are identified in footnotes when they appear in the tables.

16 The data on specific occupations include median earnings as reported in the BLS occupational projections. Where the occupations were aggregated to match those of the ACS, no median could be calculated, so footnotes report the median earnings for each of the occupations forming the aggregated occupation.

17 The probit regression predicted employment with the independent variables of disability, age, and age squared, and with dummies for the education, race, and ethnicity categories presented in table 1.

18 Using the 10 occupational categories in table 2, the multinomial logit regression predicted occupational distribution with the independent variables of disability, age, and age squared, and with dummies for the education, race, and ethnicity categories presented in table 1.

19 Lacey and Wright, "Occupational employment projections."

20 The 20 fastest growing occupations shown in the table are slightly different from those presented in Lacey and Wright, because of the different aggregation of some occupations in the ACS. For example, the third-fastest growing occupation presented by Lacey and Wright is home health aides, but the ACS combines data on that occupation with data on nursing and psychiatric aides, who have a lower growth rate, so the combined occupation ranks number 15 in table 4.

21 The combined 2002–08 National Health Interview Surveys, conducted by the Centers for Disease Control, show that 40.7 percent of working-age people who are "blind or unable to see at all" are employed, holding jobs in a wide range of occupations. (The top five are administrative support, management, sales, business and financial operations, and production). Thanks go to Steve Kaye for these calculations.

22 The site is on the Internet at online.onetcenter.org/help/online/accom (visited Oct. 21, 2010).

23 In what follows, the term "required" is used somewhat loosely. Although many employers do in fact require certain levels of education or training for numerous occupations, many others do not, but still look favorably on those who attain such levels or receive such training, tending to hire or promote these workers more often. The use of the term "required" in this article is intended to capture both situations.

24 Christine Jolls, "Identifying the Effects of the Americans with Disabilities Act Using State-Law Variation: Preliminary Evidence on Educational Participation Effects," *American Economic Review*, May 2004, pp. 447–53.

25 Authors' calculations.

26 See Lisa Schur, "Barriers or Opportunities? The Causes of Contingent and Part-time Work among People with Disabilities," *Industrial Relations*, October 2003, pp. 589–622; Lisa Schur and Douglas Kruse, *Non-standard Work Arrangements and Disability Income*, Report to the Disability Research Institute (Urbana-Champaign, IL, University of Illinois, 2002); and *Empowerment of Americans with Disabilities: Breaking Barriers to Careers and Full Employment* (Washington, DC, National Council on Disability, 2007), on the Internet at www.ncd.gov/newsroom/publications/2007/pdf/ncd94_Employment_20071001.pdf (see especially pp. 105–18; visited Oct. 21, 2010).

27 Figures for part-time workers by occupation were calculated from the 2008 ACS, based on those who usually work less than 35 hours per week. The percentages of home-based workers by occupation also were calculated from the 2008 ACS, in which respondents were a

sked "How did this person usually get to work last week?" and the answer was "Worked at home." This is clearly a restrictive measure of home-based work, not counting the workers who do some, but not all, of their work at home. The estimates obtained assume that the percentage of jobs that are part time or home based stays constant within each occupation over the next decade.

28 The overall percentage of workers responding "Work at home" to the ACS question about commuting was 4.1 percent, less than the 14.9 percent reporting that they did at least some home-based work in 2004, among whom about half (47 percent) said that they were doing paid work at home. (See "Work at Home in 2004," news release USDOL 05-1768 (U.S. Bureau of Labor Statistics, Sept. 22, 2005).)

29 Alan Krueger and Douglas Kruse, Labor Market Effects of Spinal Cord Injuries in the Dawn of the Computer Age, Working Paper No. 5302 (National Bureau of Economic Research, October 1995).

30 Douglas Kruse, Alan Krueger, and Susan Drastal, "Computer Use, Computer Training, and Employment Outcomes among People with Spinal Cord Injuries," *Spine*, April 1996, pp. 891-96.

31 Schur and Kruse, Non-standard Work Arrangements.

32 Applying the prevalence of disability by sex and age category in the 2008 ACS to the projected population distribution by sex and age in 2018 (see Mitra Toossi, "Labor force projections to 2018: older workers staying more active," *Monthly Labor Review*, November 2009, pp. 30-51, especially p. 35) indicates that the population 16 years and older with disabilities will increase by 5.8 million, or 16.6 percent, and the working-age (16 to 64 years) population with disabilities will increase by 1.8 million, or 8.9 percent. As shown in table 3, the baseline projection of the current article is that the number of jobs for people with disabilities will increase by 825,000 million, or 9.0 percent. If the number of people 16 years and older with disabilities increases by 16.6 percent, then the percentage of all these people who are employed would clearly decline, but it is not obvious how the employment rate for working-age people with disabilities would be affected, because it is not known how many new jobs would be held by people of working age. If the age distribution among all workers with disabilities stays constant, then the percentage of working-age people with disabilities who are employed will stay constant. BLS projections, however, indicate that the workforce will be aging by 2018, with greater shares of workers in the 55-to-64-years and 65-years-and-older age categories. (See Toossi, "Labor force projections to 2018," especially p. 44.) In that case, to the extent that job growth among people with disabilities is concentrated among those 65 years and older, the percentage of working-age people with disabilities who are employed will decrease, but this reduction is at least partly counterbalanced by the increased share of workers ages 55-64 years, who have a higher disability rate than younger workers and will therefore contribute to an increase in the percentage of working-age people with disabilities who are employed (implying that the disability rate may not stay constant within occupations, as is assumed in the analysis presented herein).

33 Empowerment of Americans, especially pp. 73-118.

34 See Adrienne Colella, "Organizational Socialization of Newcomers with Disabilities: A Framework for Future Research," *Research in Personnel and Human Resources Management*, vol. 14, 1996, pp. 351-417; Dianna Stone and Adrienne Colella, "A Model of Factors Affecting the Treatment of Disabled Individuals in Organizations," *Academy of Management Review*, April 1996, pp. 352-401; and Lisa Schur, Douglas Kruse, and Peter Blanck, "Corporate Culture and the Employment of People with Disabilities," *Behavioral Sciences and the Law*, January/February 2005, pp. 3-20.

35 Lacey and Wright, "Occupational employment projections to 2018," especially p. 88.

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