

# The Economics of Employment

*Thomas N. Chirikos*

## EDITOR'S NOTE

*Thomas N. Chirikos provides an economic analysis of the supply and demand of workers with disabilities and concludes that "low levels of accommodation costs observed at present may be attributable to the low employment levels of persons with disabilities. These variables should be expected to move together in the future." Positing that persons with disabilities who enter the labor force post ADA are likely to be more severely impaired than those currently employed, therefore requiring more expensive accommodations, Chirikos argues that an increase in employment will result in higher accommodation costs.*

*If we accept Chirikos' conclusions, the critical question for accommodation costs becomes the question of who pays. When people with disabilities are working, it clearly benefits the economy; however, the cost to individual businesses may be prohibitive in certain circumstances. Chirikos concludes that "redistributive issues in generating employment for persons with disabilities will have to be faced more squarely. Policy tools beyond the scope of the ADA may have to be used to ensure that persons with disabilities are fully integrated into the American economy, including the expanded use of subsidies and alternative means of sharing the burden between the employer and employee." Clearly Congress recognized this redistributive issue when enacting the small-business tax credit for ADA-related expenditures. The Chirikos logic leads to the conclusion that the more successful the*

*ADA, the more cost-sharing strategies are needed. Monitoring and collecting data about the costs and benefits of accommodation and their distribution are essential as the ADA undergoes implementation.*

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When it is completely phased in, title I of the Americans with Disabilities Act of 1990 (ADA) will extend the prohibition of job-related discrimination against persons with disabilities to all firms in the private sector employing 15 or more workers. The title complements sections 501, 503, and 504 of the 1973 Rehabilitation Act prohibiting discrimination and mandating affirmative action in the employment of individuals with disabilities by agencies of the federal government or private firms with federal contracts over \$2,500. Consistent with the provisions of this earlier legislation, title I requires that reasonable accommodations be provided for persons with disabilities (either already qualified persons, or as a means of enabling them to be qualified) unless the employer can demonstrate that the accommodation will impose an undue hardship in terms of difficulty or expense. Within this framework, title I clearly intends to improve the economic prospects of persons with disabilities by equalizing their opportunities for employment and thereby integrating them more fully into the American economy.

The need for this integration is not only long overdue but is also of special urgency in view of recent data indicating that the economic gap between Americans with disabilities and Americans without disabilities has grown even wider over the decade of the 1980s.<sup>1</sup> Census Bureau data, for example, show that between 1980 and 1988 the proportions of "work-disabled men" aged 16 to 64 years who were in the labor force or working full time fell steadily, while the proportion of these men who were unemployed rose by several percentage points; as a result, the ratio of average earnings between men with disabilities and men without disabilities of working age also fell steadily over this period, from 77 to 64 percent for all workers and from 91 to 81 percent for year-round, full-time workers (Bennefield and McNeil 1989). Similar

changes are observed for working women. Moreover, Haveman and Wolfe (1989) estimate that the real level of income transfers to persons with disabilities who qualified for them also fell over much of this period. Although the reduction in transfer income varied across subgroups of the population of persons with disabilities, it clearly compounded the economic hardship of low labor-market earnings of these persons. After recording substantial relative gains in the 1960s and 1970s, individuals with disabilities find themselves at the end of the 1980s again losing economic ground to those without disabilities.

The extent to which title I may be expected to reverse these trends in the earnings and economic well-being of the population with disabilities is open to question. On the one hand, the long-standing differential between persons with disabilities and persons without disabilities in the factors that correlate highly with labor-market success, especially the amount of job training and formal schooling completed, will not necessarily be affected by the Act, at least in the short run. On the other hand, there is evidence (reviewed later in this article) that the economic disadvantage of persons with disabilities stems in large measure from discriminatory employment practices that title I is designed to eliminate. Yet, even in this latter case, otherwise qualified persons with a disability may still find some jobs inaccessible because reasonable accommodation may be too costly; that is, it may be judged as imposing an undue hardship on the employer. Title I, in other words, may be expected to improve the employment prospects of these individuals only within the limits established by the costs of reasonable accommodation. If these costs are on average low, title I should be expected to augment the relative economic status of persons with disabilities. If, however, the costs are high, the ADA legislation will not necessarily achieve its employment goal and other strategies will have to be implemented to reverse the widening economic gap between persons with disabilities and the rest of the American population.

Despite their pivotal role in the potential success of title I, and despite their equally significant role in the historical impact of related sections of the 1973 Rehabilitation Act, remarkably little is known about the costs of reasonable accommodation. Few data on these costs in terms either of level distribution across sectors of the economy, or variations across the population of persons with disabilities are presently available (cf. Applied Management Sciences 1985; U.S. Commission on Civil Rights 1983; U.S. Government Accounting Office 1989). Furthermore, little empirical or theoretical research has been conducted

on the topic, particularly by professional economists (cf. Collignon 1986). As a result, a review of published findings about the costs associated with the employment of workers with disabilities yields limited information. Economists, however, have an established framework for thinking about such issues, and some useful insights may be obtained by applying this framework to questions about accommodation costs. Economists have also investigated in indirect fashion some relationships suggested by the application of this framework to disability policy issues. Because specialists in the disability field appear at times to be unaware of the relevant economic literature, a review of some of this research may provide useful insight.

The primary objective of this article is to examine the extent to which the costs of reasonable accommodation may be expected to influence the employment opportunities of persons with disabilities. The conventional assumption is that these costs are negligible and in virtually all cases outweighed by the benefits of employing such persons. Fragmentary empirical evidence tends to confirm this assumption. However, there is little reason to suppose that these conditions will necessarily prevail over time as the ADA is implemented. For one thing, the costs of accommodating greater numbers of persons with disabilities may rise because the severity level of disabling impairments or health conditions will increase at the margin as supply grows. For another, wage discrimination against workers with disabilities has afforded the opportunity for some employers to shift the incidence of the costs of accommodation to these workers themselves. If this cost shifting is reduced or eliminated, the demand for workers with disabilities may fall. The costs of reasonable accommodation, in other words, should be expected to vary with the supply of, and demand for, persons with disabilities. In this article, I will review what economists have learned in investigating some of the supply-and-demand characteristics of the labor market for these workers.

A secondary objective of this article is to sketch some data and research needs for appraising the extent to which the employment opportunities and economic status of persons with disabilities change over time—in other words, the degree to which title I may be judged successful. The discussion is designed not only to identify major deficiencies in the present knowledge base about the costs and benefits of employing such workers, but also to lay some groundwork now for appraising the impact of the legislation. The delays encountered in writing the regulations for various sections of the Rehabilitation Act of

same time and having the same expected work life. Some past expenses should also be accounted for in computing accommodation costs from a social perspective. Employment programs that prepare individuals with disabilities for competitive employment should be included in cost calculations, particularly when these programs relieve the employer's burden in ensuring job readiness; cf. Bellamy, Rhodes, and Albin (1986); Poole (1987); and Wehman (1981).

#### COST DETERMINANTS

Accommodation costs are expected to vary across firms and industries, the population of persons with disabilities, and time. Policy makers must understand the determinants of these variations in order to judge either claims of undue hardship or the aggregate employment effects of title I. In conceptual terms, accommodation costs will be established by the interplay of the demand for, and supply of, workers with disabilities.

*Demand.* Conventional economic theory suggests that the demand for workers with disabilities, like that of other workers, will be derived from the demand for the employer's product and depends fundamentally on the ratio between the benefits they provide to, and the costs they impose on, the employer. In the standard textbook case, benefits to the employer are gauged by the added output (marginal productivity) of the last worker hired, whereas costs reflect the wages paid that worker together with the other costs associated with recruiting and maintaining a labor force, including in this case the costs of accommodation. Because benefits in this sense are expected to decline as more workers are added to the production process, and because profit-maximizing firms are always expected to equalize the benefit/cost ratio in deciding whether to hire an additional worker, the demand for persons with disabilities is expected to vary inversely with both wages and these other costs.<sup>3</sup>

Put simply, more of these workers will be hired at low accommodation costs than at high costs, all things being equal. If accommodation costs are a fixed proportion of the wage rate, proportionately fewer workers with disabilities will be hired than workers without such limitations, even though the productivity or economic benefits to the firm of the two groups may be equal at the margin. If accommodation costs are not simply a fixed percentage of the wage rate, fewer workers with disabilities may be hired than their counterparts without disabilities,

even if their productivity is higher than workers without disabilities. Clearly, the relative demand for workers with disabilities at any wage rate hinges critically on the extent to which their productivity balances or otherwise compensates for the costs of their accommodation.

*Supply.* In contrast to demand, average accommodation costs are expected to rise as the supply of persons with disabilities increases, with a corresponding rise in the extra or marginal cost of hiring an individual with a disability as more such individuals are added to the firm's labor force. It is possible, of course, that a single employer hiring additional persons with identical disabilities may actually be able to lower the average cost of accommodation. For instance, if ramps are built and doorways enlarged at a given cost for the first worker who uses a wheelchair, then the costs of accommodating all additional workers who use wheelchairs should be zero. The cost of this accommodation averaged over all wheelchair-using workers would then decline continuously as more of these employees are hired. However, it seems highly unlikely that the mix of disabilities will remain unchanged as the number of persons with disabilities entering the labor market increases.

As the supply of such workers grows and the mix or composition of their impairments changes, the average cost of accommodation may be expected to rise for at least two reasons. First, the average severity level of specific physical or mental limitations will rise as more persons with those disabilities enter the labor market. Generally speaking, individuals with less severe impairments are more apt to seek work first, in part because of a higher degree of functional capacity, and in part because they are less likely to qualify for disability-related income transfers. As supply grows, however, individuals with increasingly severe levels of impairment are likely to look for work, and average accommodation costs will tend to rise. Second, as more persons with disabilities enter the labor market, it is more likely that the average worker will have more than one impairment. This will also cause average accommodation costs to rise. This reasoning implies, in turn, that the marginal or extra cost of hiring a worker with a disability will increase as the number of such workers increases.

*Cost and Employment.* The foregoing suggests that the employment of workers with disabilities and the level of accommodation costs are jointly determined. In economic terminology, these outcomes are simultaneously determined by the interaction of the demand and supply relationships described above.<sup>4</sup> At the point at which demand and supply are equated, the marginal benefit (the value of added output)

of hiring a person with a disability and the marginal cost of accommodating that person are equal. A major implication is that observed accommodation costs and employment levels will be highly correlated both at various points in time and over time. From this perspective, low levels of accommodation costs observed at present may be attributable to the low employment levels of persons with disabilities. These variables should be expected to move together in the future. Although various patterns are possible, an underlying assumption in the following discussion is that accommodation costs will probably rise as the supply and demand for workers with disabilities increases in response to ADA implementation.

*Economic Aspects of Title I.* The framework sketched above may now be used to clarify further several key provisions of title I from an economic perspective. Consider initially the undue-hardship clause. Any employment level of persons with disabilities that exceeds the level expected by equating the firm's demand and supply for such workers may be interpreted economically as a case for undue hardship.<sup>5</sup> The reason is that the marginal contribution of these additional workers to the value of the firm's output is less than the extra costs of their accommodation. Similarly, note that any actual employment level that falls short of the level expected on the basis of supply-and-demand characteristics represents a corresponding hardship of, or discrimination against, persons with disabilities. In both cases, the operational implication is that claims of undue hardship or discrimination should force comparisons between observed employment levels and those predicted on the basis of the demand-and-supply conditions facing the firm.

Consider next the concept of reasonable accommodation, which many disability specialists believe is best viewed as a process of removing barriers to a particular individual's equal employment opportunity (U.S. Senate 1989). From the economic viewpoint sketched above, reasonable accommodation may be interpreted as efforts to change the responsiveness of the demand and supply of workers with disabilities to accommodation costs.<sup>6</sup> Even though employment demand is expected in principle always to vary inversely with costs, the degree to which it does may be changed by policy means. To illustrate, a 10 percent decrease in accommodation costs (all other things being equal) may result in an increase in employment of less than, more than, or just 10 percent. Clearly, the employment goals of the ADA will be facilitated in this case by any effort that makes the response in demand more than the proportional drop in costs.

Operationally, the responsiveness of the demand relationship for workers with disabilities depends on the nature of production technology and job requirements, the character of the impairments that impede the functional capacities of workers with disabilities, and the human capital and other job skills that these individuals bring to the job. The responsiveness of supply depends crucially on the distribution of impairments across the population of persons with disabilities, and the extent to which these impairments are acquired on the job or prior to any firm-specific work experience. It is worth pointing out that the responsiveness of both demand and supply can be improved by better preparation of workers with disabilities for the world of work through vocational rehabilitation, transitional employment services, and completion of formal schooling.

Finally, the provisions of title I generally may be interpreted from an economic perspective as intending to raise the level of demand for, and supply of, workers with disabilities in the labor market.<sup>7</sup> Put simply, title I should be evaluated by its ultimate impact on the employment of persons with disabilities. If, as suggested above, title I reduces discriminatory practices and changes attitudes of employers, the demand for workers with disabilities should shift up. Eliminating discriminatory practices may also encourage more persons with disabilities to seek work, thus shifting supply up as well. Progress under title I should ultimately be manifest in higher employment rates for a growing supply of workers with disabilities and, because they are jointly determined, in the observation of higher average accommodation costs. Paradoxically, the observation that costs of accommodation are low and stable over time may reflect only that little meaningful progress has been made recently in putting individuals with disabilities to work. Despite the undue-hardship clause, this should change if the ADA legislation is successful.

## RESEARCH ON THE ECONOMICS OF DISABILITY

The preceding discussion suggests several key focal points for applied economic research on workers with disabilities, including cost and employment trends, the responsiveness of supply and demand relationships to accommodation costs, and the factors that contribute to historical changes in employment and cost levels over time. Although past



research on these topics is not extensive, some findings are available in the published literature. This section reviews some of this literature, beginning with available work that has attempted directly to calculate the costs of accommodating persons with disabilities.

#### COSTS OF ACCOMMODATION

Only a few items were found in a search of the literature that included quantitative estimates of the costs of accommodation. One was the consultant's report prepared under a mandate of the Office of Management and Budget for the Secretary of (HEW) Health and Human Services prior to the implementation of section 504 of the 1973 Rehabilitation Act (O'Neill 1976). This report surveyed several unpublished studies dealing with the restructuring of jobs occasioned by the placement of persons with disabilities and the extent to which insurance costs rose as a result of such placements. As anticipated, these studies showed that most job placements of persons with various kinds of disabilities, including limitations such as complete loss of sight, required no modification or special arrangements at all. Similarly, insurance costs did not rise as a result of hiring additional workers with disabilities. In the aggregate, O'Neill estimated that accommodating workers with disabilities under section 504 would cost in the mid-1970s about \$50 million annually (or the equivalent of roughly \$115 million in 1990 dollars), mostly for building modifications to enhance physical accessibility; he also estimated roughly that the costs of economic discrimination at the time ran annually about ten times that amount (i.e., \$1.2 billion), concluding that the accommodation costs could easily be absorbed by the national economy.<sup>8</sup> These estimates, however, are in the nature of "back-of-the-envelope" computations and therefore are too rough to be credible.

Employer attitude surveys also indicate that the costs of reasonable accommodation are typically inexpensive. However, these results are anecdotal and rarely based on extensive data collection or analysis. The Harris poll conducted for the International Center for the Disabled (Harris 1987), for example, asked a sample of managers simply whether any accommodation had been made for a worker with a disability and, if so, whether the costs of such accommodation were "very, somewhat, not too, or not expensive at all." Because dollar figures were not used and the opinions expressed were not necessarily based on the review of any records of the firm, the finding that a majority of the respondents

felt these costs were "not too expensive" is difficult to interpret. That the group of respondents is self-selected in terms of whether workers with disabilities were actually accommodated further confuses the interpretation because firms that might have refused to make very expensive accommodations are unrepresented in the sample.

Anecdotal evidence is also available in a recently completed evaluation of the Jobs Accommodation Network (JAN) of the President's Committee on Employment of the Handicapped (JAN 1987). Information on accommodation costs in this case was obtained principally from employers who called JAN to facilitate the accommodation of one of their employees with a disability. The results show that about 30 percent of all accommodations are costless and another 47 percent are about \$1,000 or less. These findings, however, are subject to considerable selection bias, particularly because the decision to hire a worker with a disability in most cases preceded the call to the network.

The most extensive study of accommodation costs thus far conducted is the Berkeley Planning Associates (BPA) *Study of Accommodations Provided to Handicapped Employees by Federal Contractors* (Berkeley Planning Associates 1982) prepared for the Employment Standards Administration of the U.S. Labor Department (see Collignon 1986). The salient features of this analysis may be summarized as follows. A national sample of 2,000 private-sector firms with federal contracts stratified by size and industry was sent a questionnaire requesting detailed information on the employment of workers with disabilities, the nature and costs of accommodating these workers, and the impact of such accommodation on the firms and their employees. There were follow-up questionnaires sent to the large fraction of the sample that did not respond to the survey; follow-up telephone interviews with a select subset of firms to obtain more detailed data, including case studies of ten firms that were judged by the investigators to have an exemplary record of hiring persons with disabilities; and a survey of workers in a selected number of these firms to provide an employee perspective of the accommodation issue.

The BPA researchers also found that accommodation of persons with disabilities in the firms providing survey responses was neither difficult nor costly, with more than one-half of all accommodations reckoned at "zero" cost, and an additional 30 percent at less than the equivalent of \$675 in 1990 dollars. The median outlay for more costly accommodations over this level was less than \$2,700, with only 2 percent spending over \$27,000, again in inflation-adjusted 1990 dollars. The researchers

found, however, that the likelihood of such accommodation and its cost level were systematically related to the skill level of the workers, with highly skilled individuals receiving more, and more expensive, accommodations than less skilled workers. Accommodation costs were also likely to occur in large firms rather than small ones. Finally, the cost of accommodations varied by type of impaired function, as the earlier discussion of the rising supply costs of accommodation suggests. Accommodations were most extensive and expensive for workers with blindness and those using wheelchairs, and least expensive generally for individuals with mental limitations. Nonetheless, a sizable proportion of the work force with disabilities had more than one type of impairment and frequently received more than one type of accommodation. The primary finding that the costs of accommodation were generally negligible is even more remarkable in light of these facts.

However, some doubt may be expressed about the validity of the accommodation cost data yielded by the BPA study. One reason is that employers responding to the survey tended to count only the capital costs of changes in the physical environment as the relevant costs of accommodation, choosing either to ignore or minimize the time costs of other personnel, such as managerial workers, in setting up jobs for persons with a disabilities. Furthermore, only the costs covered by the firm were counted: the cost of equipment or work aids purchased either by the person with a disability or from a public-sector program such as vocational rehabilitation was excluded from the computations. The study results would have been more convincing had the opportunity costs of all resources deployed for the accommodation been added up, distributed among the employer, the employee, and other parties, and then compared with the costs of accommodating workers without disabilities.

Another concern is the selection bias in the results attributable both to the low response rate of returned questionnaires and to the restricted focus only on workers with disabilities who were already employed. Although the BPA study's 18 percent response rate compares favorably with other sample surveys of private-sector firms, it nonetheless casts uncertainty about the extent to which the results reflect self-selected responses of firms with the best records for hiring persons with disabilities. The investigators, of course, were clearly concerned about the low response rate, and they examined the pattern of nonresponses in some detail. They found no significant differences in the nonresponse pattern by firm size or industry, but there were differentials in respect

both to the amount of government-contract business and the extent to which the industry was regulated. What could not be compared, however was the degree to which respondents and nonrespondents differed in the number or proportion of persons with disabilities in the total work force. The gaps are understandable: a sizable number of respondents refused to participate in the study because they had no data on the disability status of their employees. Yet, it is easy to imagine that many of the firms without recorded data employed fewer workers with disabilities than firms that kept them, and that the results were accordingly biased by differential response patterns of firms in each category.

Although the potential problem of nonresponse bias was recognized by the BPA investigators, less concern was expressed for the possible confounding influence of restricting the analysis only to employed persons with disabilities. This is an especially serious problem in view of the likelihood that those persons who can be accommodated at negligible cost will be the first to be accommodated. Indeed, given the low levels of employment of persons with disabilities and the discrimination practiced against them, finding that those who acquired jobs had essentially costless accommodations may paradoxically confirm the proposition that accommodation costs rise with the size of the labor force with disabilities. It is, of course, impossible to reject this hypothesis with the BPA data because persons with disabilities who did not acquire jobs were excluded from the survey and the costs of their accommodations are unknown. Clearly, we need to learn more about the costs of accommodating persons who are presently out of the labor force.

#### LABOR SUPPLY OF PERSONS WITH DISABILITIES

The ADA's definition of disability is three pronged: physical or mental impairments that substantially limit one or more major life activities; a record of such an impairment(s); or being regarded as having such an impairment. The latter two elements are crucial, of course, in combating discrimination, but they complicate any appraisal of the labor-market behavior of individuals with disabilities and, correspondingly, recent economic research examining that behavior. The difficulty is that persons with a record of an impairment or regarded as having one who are nonetheless gainfully employed are typically not enumerated as disabled nor are they necessarily eligible for the major social-insurance programs designed to cushion the adverse economic conse-

quences of disability. Most disability programs, indeed, restrict eligibility only to those individuals with impairments that actually limit major role responsibilities—the ability to hold any job at all. Yet, similar impairments do not always produce similar degrees of limitation in role functioning. In fact, the probability that a given impairment will disable is mediated by a complex set of demographic, socioeconomic, and medical factors. These mediating factors are central to understanding the labor-market behavior of persons with disabilities, and have thus been the primary focal point of much research by economists working in the disability field. In reviewing some of this work here, the narrower definition of disability as inability to fulfill role functioning (work) is taken as a given.

In this context, considerable interest in econometric studies has centered on the relative importance of health-impairment factors and transfer payments from public and private pension programs in explaining the dramatic decline over the past 25 years in the labor-force participation rates of American men; see, for example, Chirikos and Nestel (1981; 1985), Leonard (1986), Sammartino (1987), and Yelin (1986). Generally speaking, the literature since the late 1970s has highlighted the inducements or disincentive effects of social-insurance programs, particularly the Social Security Disability Insurance (SSDI) program, in the reduced participation rates of men. However, some of these studies have probably underestimated the impact of health conditions relative to economic variables, according to more recent analyses. Haveman and Wolfe (1984) show that Parsons' (1982; 1984) earlier estimates of the effects of the replacement rate on the labor-force participation of men were too high and, by implication, that his estimates of the impact of poor health were too low (see also Bound 1989). Nevertheless, virtually all economists who have studied the issue take as given the likelihood that disability transfers will impel individuals to leave the work force; where they differ is in regard to the magnitude of the disincentive effect. Most of these specialists also believe that there are various second-order effects of significance on disability policy. Berkowitz (1981), for instance, has argued that the availability of transfer income also deters individuals with disabilities from seeking the services of rehabilitation agencies or of completing rehabilitation programs once started (cf. Better et al. 1979; Conley, Noble, and Elder 1986; and Walls, Zawlocki, and Dowler 1986).

A host of complex methodological issues has been raised by research on the relative effects of poor health and economic incentives on the

labor-market behavior of persons with disabilities, most of which are beyond the scope of the present discussion (cf. Stern 1989). Yet, two of these issues warrant brief mention here because they bear significantly on the economics of title I.

One is the degree to which economic incentives condition the self-perception of disability or the likelihood that individuals will declare themselves disabled in sample surveys. Chirikos and Nestel (1984) produced convincing evidence that the probability of middle-aged men and women reporting themselves as work disabled is affected by their potential earnings, controlling for impairment status, job requirements, and other sociodemographic characteristics. Individuals with more to lose from time spent out of the work force are significantly less likely to report themselves disabled. Chirikos (1986) estimated that approximately one-third of the annual growth rate in the prevalence of work disability in the postwar period is attributable to changes in economic circumstances that determine whether individuals with impairments declare themselves disabled. Among others, these results are consistent with earlier research demonstrating that application rates for disability benefits rise and fall countercyclically, with periods of recession witnessing substantial relative increases in application rates (Berkowitz, Johnson, and Murphy 1976). The findings also underscore the frequent observation of disability specialists that many impairments are "invisible" and that many persons with disabilities choose not to identify themselves either as disabled or even in need of certain accommodations for fear of possible discriminatory responses (Spiegel and Podair 1981; Rusch, Mithaug, and Flexer 1986). These effects do not bode well for enumerating the supply of persons with disabilities or measuring progress toward their employment goals.

The other issue is the degree to which the emphasis in the economics literature on the replacement rate of predisability income per se adequately accounts for the disincentive effects of disability-transfer programs. Perhaps of greater significance in this regard is eligibility for medical-care insurance benefits such as Medicare or Medicaid, particularly in view of the accommodations that have been made in recent years to increase the probabilities that persons with disabilities return to work. For example, after a six-year demonstration project, section 1619 was made a permanent part of the Social Security Act (PL99-643) in 1986. The provisions encourage individuals with disabilities who are eligible for SSI benefits to make efforts to return to the labor market by, among other things, continuing Medicaid coverage when they do

so. Impact analysis of the section 1619 demonstration suggests that the continuation of medical-care insurance benefits increases the likelihood that SSI beneficiaries return to work (Andrews et al. 1988).<sup>9</sup> The countervailing influence of these provisions on the measured effect of the replacement rate on labor-force participation has thus far been ignored in econometric studies on this topic. When they are taken into account, the magnitude of disincentive effects of transfer programs should be lower than the estimates published thus far.

Despite the emphasis on disincentive effects, we should not lose sight of the fact that the economic literature on the labor supply of persons with disabilities also provides compelling empirical evidence that impaired health causes involuntary exits from the job market. The primary determinants of early withdrawal from the work force are impairments due to chronic diseases, particularly coronary heart disease. Studies show consistently that the probability of involuntary departures rises significantly with the severity level of those impairments. As a result, many individuals who have withdrawn cannot be expected to work nor, by implication, can they be accommodated even with great difficulty or expense. Others have sufficiently severe impairments to raise the cost of accommodation well beyond the commensurate level of economic benefits, even when accommodation is possible. Projections of the potential labor supply of persons with disabilities must account realistically for the segment of the population that is severely impaired (cf. Vachon 1987). The widely reported ICD/Harris poll results (Harris 1986) that two-thirds of all persons with disabilities wish to work must be interpreted cautiously from this vantage point. Ignoring the fact that health conditions rule out work for some severely impaired persons runs the risk of creating a new "myth" about persons with disabilities akin to the old "myth" that few, if any, of these persons are capable of work (Daniels 1985).

Labor-supply research also indicates that impaired health compounds other factors associated with lower probabilities of labor-force participation like formal schooling. Thus, persons with disabilities and low levels of educational attainment are proportionately even less likely to work than their less-educated but nondisabled counterparts. Interestingly, little economic research has been conducted on the impact of early onset of disability on schooling or other factors that correlate with increased labor-force participation. Yet, such research is important because improvements in life expectancy at younger ages have been substantial in recent years, and a growing proportion of the population

with disabilities represents individuals in their twenties who were chronically impaired at birth or as young children (Lubitz and Pine 1986). Recall, nonetheless, that the highest rates of disability prevalence and work withdrawal are in the age group 45 to 64 years (Chirikos 1989). This group is most often disabled after a significant period of time spent in gainful employment, thus mitigating somewhat the influence of formal schooling and job skills on the prospects of returning to the work force.

#### DISCRIMINATION IN THE DEMAND FOR WORKERS WITH DISABILITIES

There has been even less economic research on the demand for workers with disabilities than on supply. Published studies have focused naturally enough on the effects of discrimination on the demand for workers with disabilities. Several small-scale investigations concluded that persons with disabilities obtain employment only in secondary labor markets where jobs are characterized by low pay and dead-end career opportunities (Barnartt and Christiansen 1985; Craft, Benecki, and Shkop 1980); this occupational segregation is frequently compounded by other kinds of job discrimination as well (Angel 1984). Several other studies have examined wage discrimination against persons with disabilities.<sup>10</sup> The most careful and recent of these is the analysis carried out by Johnson and Lambrinos (1985).

These investigators used data from the 1972 Social Security Survey of Disabled and Nondisabled Adults to estimate the determinants of the earnings of "handicapped and nonhandicapped" workers and, by so doing, compute the degree to which employers practice wage discrimination against the "handicapped." Their methodology allowed them to calculate the extent to which wage differentials between the disabled and nondisabled arise from differences in the correlates of economic performance (say, schooling) and then how much can be attributed to discriminatory job practices. Johnson and Lambrinos define the "handicapped" as individuals with "visible" impairments that "affect the ability to communicate. . . , alter bodily movements. . . , or are in some way deforming"; nonhandicapped persons are either unimpaired or nonvisibly impaired. Earnings data are carefully controlled for impaired functional capacities, work experience, education, and other factors affecting labor demand such as the capital intensity of the industry; in contrast to other studies, the researchers also made allowances methodologically for the lower probability that persons with disabilities will be



at work. The results demonstrated that “handicapped” workers received lower wages than the comparison group, and that only a fraction of this differential is attributable to differences in the correlates of higher earnings. Approximately one-third of the observed wage differential of men, and about 40 percent of the differential for women, can be traced to discriminatory behavior. Furthermore, significant interaction effects of disability status were detected, including a lower relative pay-off to the amount of formal schooling that “handicapped” persons obtain and, in the case of females, an exacerbation of gender-related discrimination.

Perhaps the most important result of the Johnson and Lambrinos study was evidence that wage differentials do not narrow as the length of time “handicapped” persons are employed by the same firm increases. This is important because it reduces the likelihood that the gap in earnings resulted simply from what economists call “statistical discrimination,” and simultaneously increases the likelihood that employers either exploited workers with disabilities and/or exacted some of the costs of accommodation from them.

The “statistical” theory of discrimination posits that employers can obtain only imperfect information about the potential productivity of any given job applicant, so they rely on various indicators of success of the average applicant and offer a wage commensurate with the average level of productivity of the applicant pool (Aigner and Cain 1977; Stiglitz 1987). Because the variation of persons with disabilities on most commonly used job screens (for example, the amount of job experience) is likely to be greater, their mean value is likely to be lower and they are paid correspondingly less. Given this logic, however, workers with disabilities who have been employed for a long period of time with the same employer, and whose actual productivity levels are accordingly better known to that employer, should have higher relative wages than newly hired workers, all else being equal. However, Johnson and Lambrinos find no evidence of such narrowing of the wage differential as these workers gain more firm-specific work experience. In fact, they find that the wage gap actually widens as the length of time “handicapped” workers are on the job increases.

This result casts doubt not only on the application of “statistical” discrimination theory to the issue of the earnings differential between persons with disabilities and persons without disabilities, but also on the effectiveness of disseminating information on the productivity and work virtues of persons with disabilities to employers as a means of

increasing employment opportunities (Kokaska and Maslow 1986; Parent and Everson 1986; Rabby 1985; Schroedel and Jacobsen 1978). Yet, conclusions about this issue should be drawn cautiously, and the hypothesis should be tested in other studies and data sets in order to rule out the possibility that it is simply an artifact of the Johnson and Lambrinos analysis. A more detailed examination of wage profiles by firm-specific experience and disability status is also needed to ascertain whether employers attempt to recoup expenses associated with hiring and accommodation through the amount they pay workers with disabilities. Such knowledge is crucial in judging whether the employment of these workers would be substantially increased if the employer and employee shared in the costs of hiring and accommodation (Johnson 1986).

## MONITORING THE PROGRESS OF TITLE I

Clearly, more research on labor demand-and-supply conditions of persons with disabilities is needed to gauge the impact of title I on the economic well-being of this target population. Efforts to obtain the data needed to support priority research should be initiated as soon as possible. This section sketches some of what is needed.

### DEMAND

More detailed information on the current level and distribution of the employment of persons with disabilities by industry group and occupation is vitally needed to provide a benchmark against which to judge the future employment effects of the ADA. Empirical studies of variations in accommodation costs, wages, and employment by disability status must be carried out to estimate the responsiveness of demand to accommodation costs. Factors that shift the demand for workers with disabilities also must be studied in more detail.

The literature reviewed above suggests generally that this data-collection effort will not be an easy task. Unlike race and gender groups subjected to job discrimination, members of the population with disabilities are not easily identified nor do they always comply with requests for self-identification. The reliability of disability data, as a result, is a matter of serious concern. The ability and willingness of employers to provide relevant data is also a major stumbling block. As

Collignon (1986) observes, the imposition of heavy data demands on employers could be counterproductive because it may reduce the general good will in the private sector toward hiring persons with disabilities. Moreover, what in principle can be learned from employers who have hired such workers is limited because of the problem of selection bias discussed in an earlier section.

#### SUPPLY

Additional and more detailed information on the sociodemographic, health/impairment, and economic characteristics of persons with disabilities must be acquired. To do so, an especially important hurdle must be overcome: to generate consistency and comparability in the definitions of disability and the population with disabilities in ongoing compilations of population statistics. At the moment, each of the available sources of data on households in the United States uses somewhat different definitions or criteria of disability and thus enumerates different populations of persons with disabilities. Incorporating the three-prong ADA disability definition in the data sets regularly maintained by the federal government should be established now as a goal to be fulfilled by the end of the decade. Of primary importance is to incorporate comparable disability definitions in the ongoing Current Population Survey (CPS) and the National Health Interview Survey (NHIS).<sup>11</sup> These design modifications can be effected at minimal cost and will pay handsome dividends in the form of empirical analyses of the labor-market behavior, health-care utilization, and economic status of persons with disabilities.

#### SPECIAL SURVEYS

Although comparable definitions of disability in ongoing surveys will expand the database about the population with disabilities, other needs remain. One reason is that the sample size of persons with disabilities in the CPS or the NHIS is too small to draw reliable inferences about subgroups of this population. Special surveys linked to the sampling schemes of either of these major data sources and using a longitudinal design are needed to provide the requisite detail or disaggregation. I have in mind a special survey linked to the overall sampling frame of the CPS or NHIS but utilizing complex, multistage sampling techniques to ensure appropriate representation of persons with life-long and recently acquired disabilities; with various types of disabilities

and in different degrees of severity; with various patterns of work and labor-market experience; and with various patterns of rehabilitation, among others. The survey design, in other words, should reflect the characteristics common to all persons with disabilities, while simultaneously gauging the considerable heterogeneity within this population. Drawing this sample of persons with disabilities within the framework of a larger, representative sample of Americans allows the socioeconomic differentials of the two groups to be measured with greater precision.

The design of the proposed survey should be longitudinal to permit, among other things, changes in the severity and course of disability episodes as well as the socioeconomic consequences of these episodes to be charted in detail. It must be noted in this context that not all episodes of disability or functional impairment are permanent, and the status of some persons will change over time. Similarly, not all disabilities yield the same employment outcomes over time: some impairments may be rehabilitated or ameliorated by reasonable accommodation on the job; others may grow more severe as chronic conditions or the aging process interact and work activity becomes more difficult or impossible. Single cross-sectional surveys such as the ICD/Harris Survey (Harris 1986) are clearly limited in these terms because they provide only the equivalent of a "snapshot" whereas what is required is a "moving picture" of the economic behavior and outcomes of persons with disabilities over time. In my judgment, implementing a longitudinal or panel survey of a representative sample of persons with disabilities should be accorded very high priority for research and evaluation funds in the disability field over the next few years.

Such a panel survey should focus on priority areas of required data about the demand and supply of workers with disabilities: First, data on the behavior of these persons who are at work must be acquired, including detailed information on job requirements, performance, accommodations, and mobility. For those not at work, information on job-search behavior, employment barriers, and potential accommodation costs must be collected. Attitudinal probes about the "desire" to work should be minimized in favor of more detailed behavioral descriptions of what persons with disabilities actually did to look for work during a defined reference period and/or the factors that may have discouraged them from doing so.

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be questioned about temporal changes in pathology or residual functional impairment and improvements in their ability to carry out role functions attributable to health-care and rehabilitative interventions. Their answers should clarify the picture we now have of the impact of impairments on the duration of departures from work roles and, thereby, the health-related determinants of accommodation costs.

Finally, the panel survey should obtain information on the indirect costs of accommodation to the families of persons with disabilities. How families respond to the economic losses arising from the disability of one of its members is unclear (Berger 1982; Chirikos 1989; Parsons 1977). Family members sometimes substitute their own market time for the lost time of the person with a disability, but not always. Exceptions occur when family members stay at home in order to care for the person with a disability or when they themselves have a disability. The panel survey proposed here would be an appropriate vehicle for obtaining additional information about the economic and health status of family members of persons with disabilities.

## CONCLUSIONS

Despite the pivotal role that accommodation costs will play in the future success of title I, not much is known at the moment about their level or distribution across the economy or population of persons with disabilities. Available evidence suggests that many workers have been accommodated in the past at little or no expense. Extrapolation of these data leads straightforwardly to the conclusion that accommodation costs will neither impede the employment of workers with disabilities nor run the risk of imposing an unfair burden on some employers as the ADA is implemented over time. Such extrapolation, however, may not be entirely warranted. Available estimates are based on definitions that tend to minimize cost levels. More important, these estimates fail to adjust for the likelihood that persons with disabilities who have been successful in finding jobs can be accommodated more readily and inexpensively than persons with disabilities who have attempted unsuccessfully to find work. Put differently, evidence of negligible accommodation costs would be more compelling if a very large fraction of the population of persons with disabilities was already employed and/or if

a plausible case could be made for constancy in the level of costs across the distribution of disabilities in the population.

In fact, however, employment levels of these persons are low, and various indicators suggest both that accommodation costs vary directly with the severity of impairment and that persons with more severe impairment are less likely to be working. Although these matters do not completely vitiate the results of past studies, they do argue for the need for additional information related to the costs of accommodation, which could be used by regulation writers for title I.

Three main inferences follow from the analysis in this article:

1. Average accommodation costs should be expected to increase as more persons with disabilities enter the market. Although this may not happen immediately because of the slack attributable to past job discrimination experienced by this group of persons, it should take place in the future if title I is successful. Indeed, not unlike the "no pain, no gain" credo of body builders, rising supply cost may be used as an indicator of the impact of the ADA legislation.
2. The mix and severity level of disabilities in the population of persons with disabilities must be carefully quantified and monitored. Additional research on their functional capacities and willingness to work must be carried out as soon as possible.
3. Even though the benefits of employing more persons with disabilities are expected to outweigh the added costs of accommodation, this too must be carefully monitored. If benefit-cost ratios prove to be lower than what is now expected, redistributive issues in generating employment for persons with disabilities will have to be faced more squarely. Policy tools beyond the scope of the ADA may have to be used to ensure that persons with disabilities are fully integrated into the American economy, including the expanded use of subsidies and alternative means of sharing the burden between the employer and employee.



## NOTES

1. Adopting the "persons with disabilities" terminology of the ADA, as this article does, presents several challenges. One is that it is a cumbersome construction grammatically, and it admits to few, if any, acceptable synonyms. Another is that it leads frequently to imprecision in the exposition. The difficulty in this latter and more important case is that the three-prong ADA definition of disability (an impairment that limits major life activities, a record of such an impairment, or being regarded as having such an impairment) encompasses a somewhat different population from the ones enumerated in statistical compilations as "the disabled" or even "disabled persons." In the context of the present paragraph, for example, "disabled" Americans refer essentially to individuals who are limited in work activity. Persons with an impairment who are either gainfully employed and/or choose not to report themselves as work disabled are *not* counted as "disabled" in these data. Because the number of such persons is quite large, and because the likelihood of reporting a work disability is itself related to economic status, the issue here is more than semantic quibbling. The article considers later on the need to obtain data comparing "persons with and without disabilities" in the ADA sense that are equivalent to available data comparing the "disabled and nondisabled."

In order to avoid confusion in the remainder of the article, I adopt the convention of using "persons with disabilities" in the three-prong ADA sense in all circumstances except where the original data source or citation to the literature employs alternative terminology or disability definition. In a few cases where this terminology fails to conform to the current mode of acceptable practice, such as references to "handicapped persons," I have put the source material in quotation marks.

2. Present-value computations are required if streams of costs (or benefits) are to be compared at a point in time. Present-value costs (PVC) are calculated as the sum of all discounted annual cost values, that is,

$$PVC = \sum_t c(t) / (1 + r)^t$$

where  $c(t)$  = costs in year  $t$ ,  $r$  = the discount rate, and  $t$  indexes each year of the continuing stream of costs over the work life of the employee.

3. Economists define marginal productivity as the addition to total output brought about by hiring the last unit of any factor of production such as labor, all other factors being constant. In simple terms, this marginal contribution is expected to fall as more units are hired because of the law of diminishing returns, that is, the technical conditions governing the production process. Assuming that all units of this extra output can be sold in competitive markets at the same price, profit maximization requires that the dollar value of the marginal product be equated to the wage rate and other hiring costs to the employer; the ratios of these two variables for all factors of production are thus equalized. This results in the downward-sloping demand curve for factor inputs presented in most elementary economics textbooks.

Economists will recognize that the matter is a bit more complicated than this, particularly in the case of delineating demand functions for workers with or without disabilities. I assume in the following that the demand for particular categories of labor are efficiency adjusted over the expected years of work life in that category at constant wage rates. If workers with and without disabilities are equally productive at the margin at all time points in their (assignment-specific) work lives, workers with disabilities will be hired at the same rate as workers without disabilities if accommodation costs are zero (or negligible) or at a lower rate corresponding to the difference in accommodation costs between the two groups. However, if persons with disabilities are more efficient over time than persons without disabilities (e.g., because their turnover rates are lower), their employment rate may be higher than persons without disabilities if accommodation costs are zero or proportionately higher if accommodation costs are positive but nonetheless offset by the value of the additional output.

4. This could be portrayed as the intersection of supply and demand curves akin to those commonly found in elementary economic textbooks. If accommodation costs (or efficiency-adjusted costs) are measured on the vertical axis and employment of persons with disabilities is measured on the horizontal axis, the demand curve will slope downward to the right and the supply (marginal cost) curve will slope upward to the right. Cost and employment levels will be jointly determined at the point at which the two curves intersect. Clearly, any policy that affects either the slopes of these curves or their respective positions in the plane of costs and employment will result in some change in costs and the number of workers with disabilities who are hired.
5. However, this may not necessarily be the way undue hardship will be interpreted by the courts. The reason is that the legislation mandates due consideration of the size and financial resources of the covered entity in judging undue hardship. If employment of persons with disabilities is expanded beyond the intersection of supply and demand, the ADA will become redistributive in nature. It will expand the employment of persons with disabilities at the expense of those without disabilities, and it will impose unfair burdens on some firms by requiring them alone to pay for that expansion. Generally speaking, economists oppose such implicit redistributive schemes, recommending instead that efforts to redistribute resources be acknowledged explicitly and be financed in some equitable fashion through the tax system. In the case of title I, this means that the costs of accommodation exceeding the value of the marginal product of workers with disabilities be defrayed through public budgets and that the "displacement effect" of workers without disabilities be accounted for in any estimate of the benefits of the legislation. From a practical point of view, moreover, significant variations in the incidence of accommodation costs across firms and industries will afford a competitive advantage for noncompliance and, accordingly, will raise the costs of surveillance and regulation.
6. In economic parlance, reasonable accommodation attempts to change the elasticities of the demand and supply functions. Elasticities, in this case, gauge the proportional change in either the demand for, or supply of, workers with

disabilities stemming from some given proportional change in accommodation costs, all other things being constant.

7. In economic terminology, the ADA is designed to shift the demand and supply curves of workers with disabilities in addition to changing the elasticities at relevant points along these functions.
8. For purposes of comparability and exposition, I used the Consumer Price Index to update the cost estimates reported here and elsewhere in the article in terms of current purchasing power.
9. Changes with similar goals have also been made in Medicare coverage for SSDI beneficiaries. Some propose that the current 24-month waiting period also be eliminated for these beneficiaries on the assumption that early receipt of medical care may reduce the duration of disability episodes. See, for example, Bye and Riley (1989).
10. A number of economic studies have investigated wage differentials between persons with disabilities and persons without disabilities, although not all necessarily attempt to gauge the impact of discrimination on those differentials. See, for example, Luft (1975). Many of the early studies are flawed methodologically by the selection biases arising from the problem of observing a wage for persons with disabilities who are out of the labor force. More recent studies use newer techniques that eliminate these biases. See, for instance, Burkhauser et al. (1986). These difficulties also arise in cost-benefit evaluations of vocational-rehabilitation programs (see Hall-Kane and Gibbs 1988).
11. Each survey has different strengths. The CPS provides more detailed labor market and economic data for persons of working age. The NHIS provides detailed data on health status and role functioning for all age groups. Comparable definitions would, of course, facilitate comparisons between the two data sets.

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