The Effect of Welfare Reform and Technological Change on Unemployment

Jason L. Saving

his article examines the concept of unemployment and, using a model derived from the job-search literature, explores how welfare reform and technological change affect it.

Jason L. Saving is an economist in the Research Department at the Federal Reserve Bank of Dallas. It has become fashionable in some economic circles to suggest that the unemployment rate in America is too low. Reductions routinely trigger stock market declines and are accompanied by baleful warnings that low levels of unemployment are unsustainable. This line of reasoning views low unemployment as the byproduct of an overheated American economic engine whose long-run effects will inevitably hurt the United States through both inflation and a resurgence of unemployment.¹

The U.S. unemployment rate fell to a thirty-year low of 3.9 percent in April 2000 more than two percentage points below the 6 percent that was widely regarded as unsustainable during the 1980s. Moreover, the unemployment rate has remained at supposedly unsustainable levels for each of the past five years, which suggests the remarkable unemployment performance of the American economy cannot be explained solely by short-term overheating. Explanations given in previous work include unusually strong productivity gains, increased global competition, and more skillful businesscycle management by government.²

This article discusses two other factors that have contributed to the low rate of unemployment in America today: welfare reform and technological advancement. Yet these factors are not without controversy. Welfare reform opponents argue that welfare recipients face such formidable problems in their everyday lives that they simply cannot work, with or without a social safety net. On the technology side, interest groups wary of technological change envision a "digital divide" that dooms low-skilled Americans to unemployment while high-skilled Americans prosper.³

It may well be the case that some welfare recipients cannot work, especially those who struggle with physical ailments or addictions to alcohol or drugs. It may also be the case that the ongoing technological revolution will provide disproportionate benefits to those who are intimately familiar with computers. But is there reason to believe at least some welfare recipients are finding work following the American welfare reform law of 1996? Also, is there reason to believe low-skilled and disabled workers are reaping benefits from technological change along with high-skilled workers?

In this article, I examine these questions. First, I present a job-search model that provides a theoretical framework for analyzing the impact welfare reform and technological change have on unemployment. I discuss the empirical evidence surrounding welfare reform and present a model consistent with that evidence. I then analyze the controversial claim that welfare reform can cause unemployment, and I find that seemingly minor changes in how unemployment is measured can produce dramatic differences in its level. Finally, I discuss the extent to which technological change is helping lowskilled or disabled Americans, and I provide a model consistent with that evidence.

The article draws three main conclusions. First, welfare reform can reduce unemployment, and the empirical evidence to date suggests the recent American welfare reform effort has caused hundreds of thousands of Americans to leave the welfare rolls and enter the labor force. Second, welfare reform can increase the official unemployment rate by drawing new people into the pool of job seekers, but it cannot increase the number of people who are out of work. Finally, technological change can help low-skilled or disabled individuals become productive members of the labor force, and there is reason to believe it has done so during the 1990s.

A JOB-SEARCH MODEL

To better understand the relationship between employment and public policy, it is helpful to consider a model in which individuals receive a fixed number of job offers each period and must decide whether to accept or reject the best offer (Stokey and Lucas 1989).⁴ Suppose that an infinitely lived job seeker receives, in each period, a best wage offer *w* drawn from distribution f(w), which itself is derived by receiving *N* offers from distribution r.⁵ The individual has two options: accepting the offer (and ending the job search) or rejecting it and receiving another offer the following period. If the person accepts, lifetime utility is

(1)
$$U(w) = \Sigma \beta^t w = w/(1 - \beta),$$

where β denotes the individual's discount rate and *t* is an index variable that measures time. If the offer is rejected, the individual suffers a (monetized) penalty, *c*, from the job-search process and repeats the search process in the next period.⁶ In this case, lifetime utility is

(2)
$$U(\sim w) = -c + \int V(s) df(s) = -c + V^0$$
,

where V(s) represents lifetime expected utility and *s* represents the individual's next-period best offer (which need not be accepted).

Under these assumptions, the individual will choose to accept offer w when and only when

(3)
$$W > (1 - \beta)(-c + V^0).$$

That is to say, there is a unique reservation

wage, w^* , above which the individual will agree to work but below which the individual will continue to search for a job. Note that this reservation wage is independent of the number of previously rejected offers. An individual who receives an offer after one hundred periods will react identically to an individual who receives the same offer after one period. If the offer is high enough, it is accepted; if not, it is rejected.

Before turning to specific policy issues, it is useful to examine how the reservation wage changes as the cost associated with rejecting a job offer changes. From Equation 3, the reservation wage is a function of three things: a time discount rate, the job-search cost, and the utility an individual could expect to obtain by turning down an initial job offer. Differentiating Equation 3 with respect to *c* yields

(4)
$$dW^*/dc = (1 - \beta)(-1 + dV^0/dc).$$

From Equation 4, the direction in which the reservation wage changes is based on the discount rate and the change in turn-down utility, dV^0/dc . By definition, $0 < \beta < 1$. Moreover, dV^0/dc must be less than zero because higher search costs provide (other things equal) a greater incentive for job seekers to accept the best offer they are given in a current period rather than forgoing that offer and paying additional search costs in the future. Therefore, higher search costs unambiguously reduce an individual's reservation wage. In other words, individuals whose search costs rise will settle for a lower wage than they would have insisted upon if their job-search costs were lower.

Suppose the world changes in such a way that individuals are able to receive a greater number of job offers in any given period. Before this change occurs, an individual receives N job offers from distribution r and has to choose whether to accept or reject the highest offer. Assuming the additional job offers are drawn from r, the expected best offer in any period must rise because more offers are received. More formally, the new best-offer function, f_N , stochastically dominates the best-offer function that existed previously.⁷

From Equation 2, the utility V^0 of rejecting any given wage is determined by an integration with respect to the function *f*. Since *f* is stochastically dominated by f_N , such an integral must be larger with f_N than with *f*, which implies V^0 is unambiguously larger under f_N . From Equation 3, the reservation wage is also larger under f_N , so the individual will demand a higher wage before accepting an offer if more offers per period are received. This model permits an examination of the employment-related aspects of welfare reform and technological change.

WELFARE REFORM

The United States has had a governmentrun social safety net for more than sixty years to provide aid to needy citizens.⁸ The system began in 1936, when President Franklin Roosevelt responded to the Great Depression by implementing the set of federal policies commonly known as the New Deal. The federal social safety net expanded during the 1960s Great Society to the point that over one hundred welfare programs were available to the needy (Dobelstein 1986).⁹

As the system became more generous and more expansive, the number of families receiving welfare benefits grew. Between 1966 and 1972, welfare recipiency increased from 1.09 million families to 3.05 million families. The figure then rose as high as 5 million families in 1994, the year in which the first draft of the welfare reform law was unveiled to the American public.

Believing the system discouraged work, President Clinton signed legislation in 1996 that dramatically reformed welfare. The law, known as the Personal Responsibility and Work Opportunity Reconciliation Act, limits the number of months individuals can receive checks. The law also requires recipients (with some exceptions) to perform some sort of work-related service, though this service does not have to take the form of a private-sector job.

Modeling Welfare Reform

Welfare programs are designed to make unemployment more bearable. This has many laudable effects, but it necessarily tilts the individual decision-making calculus away from work and toward welfare. In simplest terms, some people will choose not to work if the choice provides tangible benefits.

To capture the effects of a change in welfare policy using the job-search framework presented above, suppose the government institutes a cash welfare benefit, *b*, that is paid only to individuals who do not work. Lifetime utility associated with accepting an offer in this case remains

(5)
$$U(w) = \Sigma \beta^t w = w/(1 - \beta),$$

but the lifetime utility associated with rejecting an offer becomes

(6)
$$U(\sim w) = b - c + \int V(s) df(s) = b - c + V^0$$
,

which is unambiguously higher than the quantity in Equation 2. And under these assumptions, the individual will accept an offer only when

(7)
$$W > (1 - \beta)(b - c + V^0).$$

The wage at which an individual will work is unambiguously higher in Equation 7 than in Equation 3, which suggests two things. First, welfare benefits cause individuals to spend more time searching for a high-wage job than they otherwise would because the costs of that search are partially borne by the taxpayer. Second, welfare benefits cause employment to be lower than it would otherwise be because individuals spend more time searching for work and less time working.

By introducing time limits and work requirements, the 1996 welfare reform legislation in effect reduced the welfare benefit level. In the model given here, welfare reform accomplishes the stated goal of its proponents: the individual is more likely to accept work in any given period, which reduces unemployment.¹⁰

The Evidence

The social science literature of the last twenty years provides a moderate amount of support for the hypothesis that welfare benefit levels affect welfare recipiency. Previous work has found links between generosity and recipiency in a wide variety of government programs, including Aid to Families with Dependent Children (AFDC) (Robins 1986), AFDC-Unemployed Fathers Program (Hosek 1980), Medicaid (Blank 1989), and food stamps (Fraker and Moffitt 1988). More recent work (Shroder 1995, Peterson and Rom 1990) indicates this link may not be as strong as had been previously thought. However, the relatively broad scope of the welfare reform law and the relatively narrow year-toyear changes with which most of these studies are concerned suggest that previous work may not be a good guide to the success or failure of the current welfare reform effort. Instead, given the relatively recent passage of the welfare reform law and the degree to which that law changed the system, perhaps the best way to determine whether it has affected welfare recipiency is to look beyond past studies and examine present empirical evidence.

The evidence to date indicates welfare reform has significantly affected welfare recipiency and that a large number of displaced welfare recipients have responded by moving into the labor market. Recipiency is down in every state (*Table 1*), and the average decline in the United States as a whole is over 40 percent. The

Table 1 Number of Welfare Recipients Declines

| | August 1996 | September 1999 | Percent change |
|----------------------|-------------|----------------|----------------|
| Alabama | 100,662 | 46,086 | -54 |
| Alaska | 35,544 | 22,546 | -37 |
| Arizona | 169,442 | 88,485 | -48 |
| Arkansas | 56,343 | 29,707 | -47 |
| California | 2,581,948 | 1,668,173 | -35 |
| Colorado | 95,788 | 32,507 | -66 |
| Connecticut | 159,246 | 79,071 | -50 |
| Delaware | 23,654 | 15,515 | -34 |
| District of Columbia | 69,292 | 48,576 | -30 |
| Florida | 533,801 | 174,588 | -67 |
| Georgia | 330,302 | 140,558 | -57 |
| Guam | 8,314 | 9,497 | 14 |
| Hawaii | 66,482 | 42,713 | -36 |
| Idaho | 21,780 | 2,222 | -90 |
| Illinois | 642,644 | 321,999 | -50 |
| Indiana | 142,604 | 111,842 | -22 |
| Iowa | 86,146 | 56,302 | -35 |
| Kansas | 63,783 | 32,199 | -50 |
| Kentucky | 172,193 | 92,415 | -46 |
| Louisiana | 228,115 | 86,470 | -62 |
| Maine | 53,873 | 33,474 | -38 |
| Maryland | 194,127 | 76,504 | -61 |
| Massachusetts | 226,030 | 121,586 | -46 |
| Michigan | 502,354 | 234,262 | -53 |
| Minnesota | 169,744 | 116,623 | -31 |
| Mississippi | 123,828 | 33,911 | -73 |
| Missouri | 222,820 | 124,519 | -44 |
| Montana | 29,130 | 13,191 | -55 |
| Nebraska | 38,592 | 29,378 | -24 |
| Nevada | 34,261 | 17,032 | -50 |
| New Hampshire | 22,937 | 14,677 | -36 |
| New Jersey | 275,637 | 152,535 | -45 |
| New Mexico | 99,661 | 76,300 | -23 |
| New York | 1,143,962 | 763,648 | -33 |
| North Carolina | 267,326 | 108,179 | -60 |
| North Dakota | 13,146 | 8,064 | -39 |
| Ohio | 549,312 | 247,798 | -55 |
| Oklahoma | 96,201 | 39,200 | -59 |
| Oregon | 78,419 | 43,204 | -45 |
| Pennsylvania | 531,059 | 269,515 | -49 |
| Puerto Rico | 151,023 | 99,022 | -34 |
| Rhode Island | 56,560 | 47,942 | -15 |
| South Carolina | 114,273 | 39,847 | -65 |
| South Dakota | 15,896 | 6,932 | -56 |
| Tennessee | 254,818 | 149,005 | -42 |
| Texas | 649,018 | 287,296 | -56 |
| Utah | 39,073 | 23,427 | -40 |
| Vermont | 24,331 | 17,403 | -28 |
| Virgin Islands | 4,898 | 3,387 | -31 |
| Virginia | 152,845 | 86,279 | -44 |
| Washington | 268,927 | 160,471 | -40 |
| West Virginia | 89,039 | 32,238 | -64 |
| Wisconsin | 148,888 | 23,892 | -84 |
| Wyoming | 11,398 | 1,395 | -88 |
| U.S. Total | 12,241,489 | 6,603,607 | -46 |
| | , , | -,, | |

SOURCE: U.S. Department of Health and Human Services.

Figure 1 Percentage of Labor Force Unemployed and Population Not in Labor Force



* 2000 data are calculated by averaging the values for January–May. SOURCE: Bureau of Labor Statistics.

drops are most dramatic in states in which welfare reform efforts have been greatest, with declines of more than 80 percent in Wisconsin (which pioneered welfare reform at the state level) but less than half this amount in Hawaii and the District of Columbia, which have done little (beyond the requirements of the welfare reform law) to change their welfare systems. Moreover, a recent study by the General Accounting Office (1999) finds that a majority of these individuals left welfare for work and continue to work today.

In summary, there is strong empirical evidence that welfare reform has encouraged work. It should be noted that moving people into the labor force is not the welfare system's only purpose. So the fact that welfare reform has facilitated such movement does not address the issue of whether welfare reform is desirable. At a minimum, however, the evidence demonstrates that welfare reform has affected the behavior of welfare recipients.

LABOR FORCE PARTICIPATION

One of the most important reasons welfare reform was signed into law was its expected effect on employment. Passage of the bill, claimed proponents, would cause a substantial rise in employment and ever-lower levels of unemployment. In this section, I show that welfare reform need not decrease the unemployment rate and may actually raise it. However, welfare reform will increase the number of workers because of its impact on labor force participation. To examine the effect of welfare reform on unemployment, it is important to understand the relationship between unemployment and labor force participation. The federal government defines the employment rate as the number of workers divided by the number of people who wish to work. The labor force participation rate, in contrast, is the number of workers divided by the size of the working-age population. While conceptually similar, these definitions differ in the way they treat people who are unemployed and do not seek work either because they are discouraged or because they prefer to receive welfare benefits. These differences have important implications for the unemployment rate.

As long as most people are either working or searching for work, the employment and labor force participation rates will not differ substantially. When a significant number of people cease searching for work, however, the difference can be considerable. For example, suppose that every American but one decided to permanently exit the labor force. The employment rate would be 100 percent if that one individual had a job and zero percent if that one individual did not. However, the labor force participation rate would be negligible in either case because no more than one person would be working.

Figure 1 shows the U.S. unemployment rate and the percentage of the population neither working nor seeking work. As can be seen, there is little correlation between these two measures of joblessness. It is therefore important to consider labor force participation.

Integrating labor force participation into the job-search framework outlined above permits a more comprehensive examination of welfare reform. For expositional simplicity and to demonstrate the robustness of the result, I make two assumptions that exaggerate the effectiveness of welfare reform and then examine the period immediately after its implementation. First, consistent with a recent study that suggests welfare benefits are considerably more generous than is typically thought (Tanner, Moore, and Hartman 1995), suppose no recipient in the prereform world searched for work.¹¹ Second, consistent with the intent of welfare reform, suppose every recipient in the postreform world searches for work.

Even in this extreme example, welfare reform cannot be expected to eliminate recipiency because those who do not accept their best-wage offer in any given period still receive benefits. Calculating w^* from Equation 7, a proportion of former recipients, $F(w^*)$, will be offered a wage less than w^* and decline to work, while $1 - F(w^*)$ will be offered a wage greater than w^* and will accept a job. If the number of prereform workers is Q, the number of prereform recipients is R, and the number of prereform nonrecipients seeking work is S, the change in the labor force participation rate is

(8)
$$\Delta L = (R) [1 - F(W^*)] > 0,$$

the change in the number of employees is

(9)
$$\Delta E = (R + S)[1 - F(W^*)] > 0,$$

and the change in the unemployment rate is

(10)
$$\Delta U = [(QS)F(W^*) - (QR + R^2 + RS) \\ (1 - F(W^*))] \div [(Q + R)(Q + R + S)].$$

These equations reveal two interesting aspects of welfare reform. First, Equations 8 and 9 show that reform necessarily increases the size of the labor force and raises the number of workers in the economy. Second, however, Equation 10 demonstrates that the unemployment rate will not necessarily fall because the increased number of workers is accompanied by an increased number of people who seek work but do not immediately find it.

From Equation 10, the extent to which the unemployment rate rises or falls after welfare reform is determined primarily by the extent to which former welfare recipients' work behavior mirrors that of the population at large. If the proportion of former welfare recipients who find work is relatively high, welfare reform will cause the unemployment rate to fall. If the proportion is relatively low, welfare reform will cause the unemployment rate to rise. In all cases, however, welfare reform causes more people to work—it is simply the standard unemploymentrate definition whose sign is uncertain.

Given the popularity of the standard unemployment rate as a measure of economic health, can anything be said about whether, as an empirical matter, welfare reform is likely to raise or lower the unemployment rate? According to the best available data, approximately two-thirds of those leaving the welfare rolls in response to American welfare reform found jobs and were still working a year later (General Accounting Office 1999), which is almost equal to the labor force participation rate of the population as a whole. Moreover, the demographic characteristics of former welfare recipientsprimarily single female heads of householdwould generally be associated with lower labor force participation rates. While it is too early to draw any firm conclusions, it seems reasonable to infer that welfare reform has exerted a modest

downward effect on unemployment in the United States.

TECHNOLOGICAL ADVANCES

Technological advancement has been a defining feature of the modern industrial economy. While such advancement is often portrayed as a process in which tech-savvy individuals prosper while low-skilled people are left behind in a "digital divide," some innovations provide disproportionate benefits to low-skilled people and others help everyone. This section discusses the effects of each of these types of technological advances on workers.

Low-Skilled Workers

As the current economic expansion continues, a growing number of people previously considered unemployable (such as those who cannot add or cannot read) have entered the U.S. labor force.¹² Technological advancements have played a key role in helping people overcome their disadvantages. Those who lack strength or mobility can use machines to lift objects or move from one location to another. Those who lack dexterity can operate machines that perform manual labor. Even people who cannot read can perform tasks by touching pictures on a computer screen rather than typing. There are many other examples of how technology has helped reduce the need for physical skills, and in each case, people who previously lacked the requisite qualifications to work became employable.

But why is anyone "unemployable" in a market economy where employers base pay on a worker's contribution to company output? The answer is found in the minimum wage. It is often argued that the minimum wage raises wages for everyone who works, and there is evidence to suggest this is true for people who can produce at a level equal to or greater than the minimum wage. However, people who, for whatever reason, find it difficult to produce at that level will also find it difficult to find or retain a job because hiring them at the minimum wage may be unprofitable for an employer. In an age of heightened sensitivity toward the less fortunate and the disabled, it is especially important to examine this issue and find ways these individuals can use their talents to benefit both themselves and society.

Returning to the job-search model of the previous section, suppose a subset of individuals lacks the skills or abilities needed to perform certain jobs.¹³ These differences can be reflected

either by a reduction in the number of offers, N, received in any given period relative to an ordinary worker or by a shift in the offer distribution, r, that reduces the average amount of money offered relative to an ordinary worker. In either case, the best-offer function, f_D , for these individuals is stochastically dominated by the standard best-offer distribution, f. From Equation 3, the reservation wage for these individuals will be lower than that for ordinary workers. Importantly, lower skilled and disabled individuals will suffer disproportionately from any minimum wage W_M —that is, they will have a higher probability of unemployment in any given period—because they are less likely to receive an offer above it.

Now, suppose technological change increases the proportion of jobs these individuals can perform. This change boosts the number of offers they receive in any given period, which in turn shifts their best-offer function, f_D , toward the best-offer function, f, for other workers. As a result, the probability that a low-skilled or disabled person will receive a best offer, w, greater than the minimum wage, W_M , in any given period rises. To the extent that this model captures the essential features of technological advances, such advances can be expected to increase labor force participation by low-skilled and disabled individuals. In a very real senseas Federal Reserve Chairman Alan Greenspan and others have said-firms are now able to "employ the unemployable."

High-Skilled Workers

The job-search model can also be used to examine ways in which technological change can benefit high-skilled individuals. Despite increasing attempts to make computer hardware and software user-friendly, many technological advances simply cannot be readily understood or utilized by those with insufficient skills.

Suppose individuals differ only with respect to a productivity attribute, p_i , normally distributed across the population. If firms adjust their wage offerings based on the productivity of potential hires, individuals with higher productivity should have a relatively favorable wage distribution from which to draw. To model this in the job-search framework, let the best-offer function be conditioned on worker productivity, so that it becomes $f(w;p_i)$. Then the reservation wage equation becomes

(11)
$$W_i > (1 - \beta)(-c + V_i^0).$$

By Equation 11, reservation wages will be an increasing function of productivity.

Now, suppose a technological advancement occurs that complements existing skills, thus widening the disparity between the bestoffer distributions for low- and high-skilled workers in much the same way that technological change in the previous subsection lessened the disparity. Because the minimum wage is not binding for high-skilled workers, it is impossible to say whether the combination of higher demand from employers and higher salary demands from high-skilled people would increase or decrease the number of high-skilled workers. However, it does have one important real-world implication: the income distribution would be increasingly unequal, which suggests that technological advancement can exacerbate as well as mitigate the digital divide.

The extent to which technological advancement increases the disparity between rich and poor has been a matter of considerable debate in recent years. While a full treatment of this issue is beyond the scope of this article, it should be noted that many aspects of the American economy increase income inequality yet are regarded as socially desirable. For example, recent gains in the number of collegeeducated Americans have "worsened" the distribution of income as the newly educated pull farther away from those at the bottom of the income ladder, yet no one is advocating that people be discouraged from attending college. Moreover, while conventional wisdom paints an admittedly depressing picture of eternal havenots forgotten by the rest of society, low-income individuals show a remarkable ability to better themselves and move up the income distribution into the middle class and even the upper class (Cox and Alm 1995).

Search Costs

In at least one respect, workers of all skill levels have benefited from the computer revolution: the technology-driven evolution of the job-search process. Until the latter part of the twentieth century, job hunting was often cumbersome and time-consuming. Those in search of work often traveled from city to city or spent days in libraries poring over copies of major newspapers. Finding work could take months or even years.

With the Internet, however, the job-search process has become much faster for workers and companies alike. It has been estimated that several million resumes are now online and available to employers across the nation. And with the Internet now available to about half the U.S. population, job seekers can sort through job listings from across the country in a matter of seconds. Clearly, the job-search process has been revolutionized by the technological advances of the 1990s.

As with the technological advancement model given at the beginning of this section, the Internet can be modeled as an expansion of the number of job offers an individual can consider in any given period. This expansion shifts the best-offer function f in a direction beneficial to the worker. Thus, every potential worker—not just those on the favorable end of the so-called digital divide and not just those whose skills or abilities once rendered them unemployable—can benefit from technological change.

CONCLUSION

Unemployment is one of the most closely watched measures of economic health in America. Strong opinions exist regarding both its desirability and its inevitability, with high unemployment cursed for the misery it inflicts on the unemployed but low unemployment feared as an omen of an overheated economy.

This article examines the concept of unemployment and, using a model derived from the job-search literature, explores how welfare reform and technological change affect it. The article presents several findings. First, unemployment is inevitable in a market economy, but not everyone who is unemployed is so because of historical inevitability. Second, welfare reform and technological advances can boost employment, with a potentially disproportionate impact on groups such as the low-skilled and the disabled. Finally, when a large number of individuals begin to look for work due to factors such as welfare reform, the unemployment rate need not fall but the number of workers in the economy will certainly rise.

In the real world, it can be difficult to determine why people do not work. Even so, changes to government policy or the broader economy can mitigate unemployment. Laws such as welfare reform can encourage people previously outside the labor force to enter it. Technological change can speed the job-search process and make it possible for those with low skills or disabilities to work as efficiently as other workers. To the extent that current unemployment figures are driven by the removal of governmental and technological inhibitions on work rather than by an overheated economy, the remarkably low unemployment rate in America today should be cause for celebration rather than trepidation.

NOTES

- See Kudlow (1998) and Herbert (1997) for commentary on this issue.
- ² See Koenig (1998) for a discussion of these and other factors.
- ³ A recent study from the U.S. Department of Commerce (1999) discusses the digital divide and some of its implications.
- ⁴ Other work in the job-search literature includes Mortensen and Pissarides (1994) and Pissarides (1994).
- ⁵ In this framework, the wage includes the monetized values of all amenities or other job differences, so that an individual always prefers a higher wage job to a lower wage job.
- ⁶ See Saving (1998) for a discussion of factors that affect this cost.
- ⁷ Stochastic dominance is discussed further in Rothschild and Stiglitz (1970) and Hadar and Russell (1969).
- ⁸ Katz (1986) has an enlightening history of public and private welfare provision in the United States. For a more critical look at this history, see Olasky (1992).
- Other forms of welfare, such as food stamps and Medicaid, were in-kind programs whose eligibility requirements were less strict.
- ¹⁰ The model given here does not consider the welfare system's effect on taxation. If a balanced-budget assumption were made, reductions in welfare benefits would also raise after-tax wages and thereby make welfare reform considerably more effective than is the case in the model given here.
- ¹¹ In the real world, a significant but unknown number of recipients work but do not report their income to the Internal Revenue Service.
- ¹² Though disabled individuals received relatively little attention in the past, at least one in eight members of the U.S. population is officially categorized as disabled (U.S. Census Bureau 1998).
- ¹³ Of course, many things commonly thought of as disabilities have no impact on worker productivity. For the purposes of this section, individuals with these types of disabilities are not considered disabled.

REFERENCES

Blank, Rebecca (1989), "The Effect of Medical Need and Medicaid on AFDC Participation," *Journal of Human Resources* 24 (Winter): 54–87.

Cox, W. Michael, and Richard Alm (1995), "By Our Own Bootstraps: Economic Opportunity and the Dynamics of Income Distribution," Federal Reserve Bank of Dallas 1995 Annual Report.

Dobelstein, Andrew W. (1986), *Politics, Economics, and Public Welfare* (Englewood Cliffs, N.J.: Prentice Hall).

Fraker, Thomas, and Robert Moffitt (1988), "The Effect of Food Stamps on Labor Supply: A Bivariate Selection Model," *Journal of Public Economics* 35 (February): 25–56.

General Accounting Office (1999), *Welfare Reform: Information on Former Recipients' Status*, GAO/HEHS Report no. 99-48 (Washington, D.C.: U.S. Government Printing Office).

Hadar, Josef, and William R. Russell (1969), "Rules for Ordering Uncertain Prospects," *American Economic Review* 59 (March): 25–34.

Herbert, Bob (1997), "Bogeyman Economics," *New York Times*, April 4, A35.

Hosek, James R. (1980), "Determinants of Family Participation in the AFDC-Unemployed Fathers Program," *Review of Economics and Statistics* 62 (August): 466–70.

Katz, Michael B. (1986), *In the Shadow of the Poorhouse: A Social History of Welfare in America* (New York: Basic Books).

Koenig, Evan (1998), "What's New About the New Economy? Some Lessons from the Current Expansion," Federal Reserve Bank of Dallas *Southwest Economy*, Issue 4, July/August, 7–11.

Kudlow, Lawrence (1998), "Why the Saber-Rattling?" Washington Times, May 14, A20.

Mortensen, Dale T., and Christopher A. Pissarides (1994), "Job Creation and Job Destruction in the Theory of Unemployment," *Review of Economic Studies* 61 (July): 397–415.

Olasky, Marvin (1992), *The Tragedy of American Compassion* (Washington, D.C.: Regnery Publishing).

Peterson, Paul E., and Mark C. Rom (1990), *Welfare Magnets: A New Case for a National Standard* (Washington, D.C.: Brookings Institution).

Pissarides, Christopher A. (1994), "Search Unemployment with On-the-Job Search," *Review of Economic Studies* 61 (July): 457–75.

Robins, Philip (1986), "Child Support, Welfare Dependency, and Poverty," *American Economic Review* 76 (September): 768–88.

Rothschild, Michael, and Joseph E. Stiglitz (1970), "Increasing Risk: I. A Definition," *Journal of Economic Theory* 2 (September): 225–43.

Saving, Jason L. (1998), "Is Unemployment Too Low?" Federal Reserve Bank of Dallas *Southwest Economy*, Issue 6, November/December, 5–8.

Shroder, Mark (1995), "Games the States Don't Play: Welfare Benefits and the Theory of Fiscal Federalism," *Review of Economics and Statistics* 77 (February): 183–91.

Stokey, Nancy L., and Robert E. Lucas (1989), *Recursive Methods in Economic Dynamics* (Cambridge: Harvard University Press).

Tanner, Michael, Stephen Moore, and David Hartman (1995), "The Work vs. Welfare Trade-Off," CATO Institute Policy Analysis no. 240.

U.S. Census Bureau (1998), *Statistical Abstract of the United States* (Washington, D.C.: U.S. Government Printing Office).

U.S. Department of Commerce (1999), "Falling Through the Net: Defining the Digital Divide" (Washington, D.C.: U.S. Government Printing Office).