The Effects of SSI and DI on the Employment of the Disabled

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Abstract

The causal relationship between SSI benefits and employment status is examined, to determine if SSI reduces disabled employment. An econometric approach not previously used to study this question employs bivariate probit models and captures the marginal effects on work status and SSI enrollment. Additionally, state-level explanatory variables are used to capture the inherent differences between states and policy simulations predict changes in the SSI rolls.

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I. Introduction

Disabled Americans are a large group facing economic disadvantages. According to the 1990 Survey of Income and Program Participation (SIPP), over 10 percent of working-aged men (18-64) self-reported a disability; only 59 percent of these men worked while 95 percent of working-aged men without disabilities worked. In addition, people with disabilities earn less, and are more likely to receive public assistance than people without disabilities, according to the SIPP (De Leire, 2000). Furthermore, since 1990 the employment of disabled men has fallen 7.2 percentage points relative to the employment of non-disabled men.

The policies of the American government have historically sought to eliminate discrimination. The Equal Pay Act of 1963 and the Civil Rights Act of 1964 prohibit employment and wage discrimination on the basis of sex and race, respectively. More recently, the Americans with Disabilities Act of 1991 has established these prohibitions for the disabled. However, the decline in disabled employment since the ADA was enacted have led to questions regarding its effectiveness.

The reason for the decrease in disabled employment between 1990 and 1993 can be explained by labor economic theory. The theory of labor demand dictates that the relative demand for disabled workers (and thus relative wages and employment) may decline if their impairment limits their productivity. The ADA was enacted to combat such an occurrence; however, the ADA may impose costs on firms that employ disabled workers, thereby decreasing the relative demand for their labor. Labor supply theory also offers insight into the observed decrease in disabled employment. The Disability Insurance (DI) and Supplemental Security Income (SSI) programs offer payments to eligible disabled workers. In general, the wage rate measures the price that a worker places on leisure because the wage is the amount of money that he gives up to enjoy leisure. Therefore, SSI and DI decrease the price of leisure for disabled workers and their price of leisure becomes the weekly wage rate minus SSI and DI payments per week. Thus, since SSI and DI create adverse substitution effects, increases in benefits or increased use of these programs could contribute to a decline in disabled employment. In addition, labor supply theory states that an income effect occurs when a higher wage rate leads to fewer hours worked. However, a certain wage rate it is possible that SSI recipients will begin to leave the program to earn relatively high wages. This effect is unlikely to occur without a significant increase in wages. Therefore, I expect that the substitution effect is likely to dominate for the labor supply of disabled workers.

The priority of the DI and the SSI programs has been the provision of basic level support for blind or disabled individuals with restricted earnings ability due to their impairments. Moreover, in an effort to return beneficiaries to the labor force, numerous work incentive provisions have been incorporated into the programs. For instance, income and savings for school or return to work training are excluded from eligibility requirements. In addition, extended Medicaid eligibility is offered for people who return to work. However, the Social Security Administration's chief actuary reports that in 1987 only one-half of 1 percent of all DI beneficiaries terminate benefits in order to return to work (Disability Advisory Council, 1988). This statistic supports a growing pool of evidence that suggests after establishing eligibility, beneficiaries face disincentives to returning to work.

The purpose of this paper is to investigate the negative effects of the SSI program on disabled employment. This topic is of particular interest at this time because a great deal of weight in current literature has been placed upon the consequences of the ADA and its effect on disabled unemployment. However, if the increase in entitlement program participation explains a significant amount of disabled unemployment, the results concerning the ADA's effectiveness will be inaccurate. Furthermore, such a finding should shift policy from the antidiscrimination focus of the ADA to the provision of additional work incentives for SSI recipients.

In the following section, the theoretical background is described. The current literature relevant to the DI and SSI programs will be described in section III. Specifically, the DI and SSI programs, and the return to work (for the disabled) will be addressed. In Section IV, the data and econometric model to be employed is presented. The main empirical findings are described in Section V, and Section VI concludes.

II. Theoretical Background

The definition of disability is a fundamental aspect of any disability policy. Section 223(d) of the Social Security Act (SSA) clearly defines "disability" as the inability to engage in any substantial gainful activity by reason of a physical or mental impairment that is expected to end in death or to last at least twelve months. An eligible individual cannot have an income in excess of the current Federal benefit rate (FBR). As of January 1997, the FBR is $484 for an individual and $726 for a couple, although these figures are subject to increases as dictated by cost-of-living adjustments. Nevertheless, workers with disabilities may choose not to enter the work force, thereby relying solely on SSI and DI benefits as a source of income. Such an adverse labor supply effect could result in an unnecessary increase in disabled unemployment.

Federal antidiscrimination legislation recently expanded to include workers with disabilities. The American with Disabilities Act (ADA) was signed into law in July 1990, and came into effect for large firms in July 1992. With passage of this legislation, employers with more than fifteen employees were required to offer "reasonable accommodation" to disabled employees, and not to discriminate against the disabled in their hiring and firing decisions. The purpose of the ADA was to increase the employment of disabled workers by eliminating discrimination and requiring employers to accommodate disabilities.

The need to make the disabled more employable has a theoretical basis. First, in 1972

Grossman introduced the concept of *health capital*. According to the model, health is a durable capital stock that produces healthy work hours (Grossman, 1972). As a worker gets older his health capital will depreciate, an individual who becomes disabled will experience a drop in health capital. Second, a decline in health capital necessarily infers a decline in human capital. The *human capital model* was first introduced by Becker in 1964. He suggested that an individual could increase future earnings by investing in ones human capital today, for instance through schooling (Becker, 1964). Moreover, this suggests that becoming a disabled would have the opposite effect of schooling on human capital. Therefore, it can be argued that a disabled worker will have a lower the marginal product of labor relative to a nondisabled worker. In terms of decision making, the firm can choose not to hire the disabled individual or to offer a lower wage. Additionally, the longer the disabled individual is separated from the labor force undergoing rehabilitation, the greater the decrease in human capital. Second, a firm could have difficulty evaluating disabled workers' productivity. In fact, Burhauser (1990) found that the greatest determinant of a disabled worker's ability to work is the time-of-onset employer's willingness to provide accommodations for the newly disabled worker.

Another factor affecting the employment of the disabled occurs if a disabled worker faces a lower post-disability wage or lower wages relative to nondisabled workers. In either scenario, the substitution effect will lead to a decrease in work due to a decrease in the relative price of leisure for the disabled worker. In addition, communication and mobility limitations can make it more difficult for disabled individuals to search for employment.

III. Literature Review

This section begins by describing the DI and SSI programs to the reader and providing relevant trends since these programs were introduced. Next, the factors affecting the employment of beneficiaries will be discussed, according to their prevalence in recent literature. In addition, suggestions for changes to program policies will be outlined.

DI and SSI Programs

Income entitlement benefits have grown since the inception of Social Security Disability Insurance (DI) and the Supplemental Security Income (SSI) programs. The definition of disability provided in the previous section is utilized by both programs. However, the determination of disability is based on three factors: age, nature of disability, and the skills required by one's occupation. Consequently, two individuals with the same physical disability may have different eligibility outcomes (Soule, 1989).

The two programs differ in that the DI program is a social insurance program in which eligibility is dependent upon having worked in jobs covered by social security. Whereas, SSI is a means-tested program, where recipients must qualify based upon income and asset requirements (Rupp and Stapleton, 1998). The Social Security Administration (SSA) is responsible for managing these programs. In 1987, Packard described three determinants of income as a "three-legged stool," upon which the SSA is thought to rest. Specifically, the model assumes that benefits are one of three sources of income, in addition to accumulated assets and pensions (Packard, 1987). This model was developed in 1935 for retired workers, and extended to disabled workers in 1956 with the creation of the DI program.

The original DI legislation was more conservative, providing coverage only to workers who became disabled after the age of 50. However, two areas of this legislation were amended in the early 1960s. First eligibility for DI was expanded to include workers of all ages, and second the waiting period prior to receiving benefits was reduced from one year to six months (Soule, 1989). When beneficiaries reach the age of 65, they switch to the Old Age and Survivors Insurance (OASI) program. The SSI program was established in 1974 to replace the Aid to the Permanently and Totally Disabled and Aid to the Blind programs. Recipients may continue receiving benefits after the age of 65, and the nondisabled elderly also gain eligibility based on assets and income after 65. Additionally, children with disabilities are also eligible for SSI, provided they meet the income and asset requirements (Rupp and Stapleton, 1998).

Growth in the SSI and DI programs has exceeded their design and coincides with an overall decline in employment of the disabled. In 1995, there were 4.2 million recipients of DI, and 4.9 million recipients of SSI. Their benefits totaled $40.9 billion and $19.5 billion, respectively (Rupp and Stapleton, 1998). Each year the number of individuals gaining eligibility increases, while individuals leaving the program after finding "substantial gainful activity" are rare. Periods of strong DI growth have coincided with the recessions of the mid 1970s and 1991. However, enrollment growth did not occur with the 1981-82 recession. The lack of growth during this period is attributed to the tightening of eligibility requirements in the early Reagan years. After a strong backlash, these requirements were eased, thereby permitting the growth in enrollment observed in the 1991 recession (Rupp and Stapleton, 1998). However, if a policy goal is increased disabled employment, the evidence from the Reagan era suggests that more stringent SSI and DI eligibility requirements would be successful. Policy makers hoped that periods of rapid enrollment growth during recessions would be offset by individuals leaving the programs during expansions. Although growth does subside somewhat, expansions do not lead to a substantial increase in individuals exiting the programs. Thus, since DI and SSI seem to create adverse labor supply incentives, the growth of these programs may be a large reason for a decline in disabled employment (Weidenbaum, 1994). Consequently, a policy that lowers benefits for SSI and DI recipients and enacts stringent eligibility requirements could increase disabled employment.

The Return to Work

Incentives that encourage the disabled to return to the labor force is an important facet of the DI and SSI programs. The Social Security Administration reports that leaving these entitlement programs and returning to work is rare. The SSA's chief actuary finds that fewer than one-half of one percent of all beneficiaries terminated benefits to return to work (Leonard, 1991). However, finding patterns associated with those disabled individuals who do return to work could suggest fruitful changes to the programs. This task has proven difficult, as data on individuals leaving the DI and SSI rolls are not readily available. Several studies have taken advantage of SSA administrative data that report work attempts.

In 1992, Muller used detailed information from the SSA on 1,150 individuals with any indication of work. Of these individuals, just over 10 percent had worked, although fewer than 3 percent had been removed from the rolls because of substantial gainful activity. Of those individuals removed, almost one-third have returned to the programs. Consequently, the success of returning disabled workers to the labor force is roughly 2 percent (Muller, 1992). Of the individuals returning to work, the most common factor is age, *ceteris paribus*. The younger disabled are much more likely to work, relative to the older disabled. Therefore, an effective return to work policy should have incentives directed toward the younger disabled.

The DI and SSI programs offer a number of work incentives for recipients. Vocational rehabilitation services are the most common and target both physical and mental impairments to returning to work. Other incentives include allowing recipients to set aside income for education or training without losing eligibility, and extended program eligibility, and health care benefits after returning to work. It seems obvious that these incentives would influence some beneficiaries to return to work. However, of the disabled individuals who returned to work in 1991, only 27 percent reported any rehabilitation services (of these, most were physical therapy). In addition, only 10 to 20 percent were aware of the other work incentives offered by the DI and SSI programs (Hennessey and Muller, 1994). Thus, a successful return to work policy must be transparent and understandable in order for recipients to respond to its incentives.

One period in which a larger-than-expected number of disabled individuals reported at least some connection with the labor force occurred in the early 1980s (Ycas, 1996). During this period, continuing disability reviews (CDRs) were intensified in an effort to remove those capable of substantial gainful activity from the rolls. Many were critical of the CDRs believing they lacked fairness and compassion. Beginning in 1983, CDRs were decreased and now only occur when evidence of substantial gainful activity exists. Because the proportion of beneficiaries participating in the labor force increased during this period of intensified scrutiny, such a policy may be successful at increasing disabled employment

In sum, the current DI and SSI programs fall short of providing effective work incentives. While it is undeniable that beneficiaries have met eligibility standards and are disabled, evidence suggests that often their disabilities permit returning to work. In order to increase disabled employment, a fruitful policy must fulfill three criteria. First, all else equal the younger disabled tend to return to work with greater frequency, thus policy incentives should be aimed toward younger recipients. Second, incentives must be transparent and comprehensible in order to be attractive to beneficiaries. Finally, an effective policy will carefully review recipients, which in the past has increased their labor force participation.

IV. Data and Model

The general model to be used for this analysis employs the technique used by Acemoglu and Angrist (1998), in Appendix B. However, Acemoglu and Angrist used the CPS from 1988 through 1997 to study this topic. The dual causality or feedback associated with the ability to work and the receipt of DI and SSI for the disabled poses the problem of determining which came first. Therefore, this analysis requires the use of the following simultaneous equation model which describe the causal nature of Social Security Benefits on unemployment:

$$work_i = f(x_i b_{work} + aSSI_i + e_i)$$

eq. 1

$$SSI_i = f(x_i \boldsymbol{b}_{SSI} + \boldsymbol{h}_i)$$

eq. 2

where work status is for individual *I*; x is a vector of controls, dichotomous dummy variables for time and disability status; and s is a dummy for SSI payments. The parameter captures the labor supply consequence of SSI payments. As described above, it is expected to be negative. In addition, because the SSI program is means-tested we expect to be negative. However, it is important to note a feature of this simultaneous equation model that differs from Acemoglu and Angrist's model. Specifically, lagged work is used in eq 2 because SSI is determined by previous month income, not current. This specification has the additional benefit of not being fully recursive, allowing estimation by the bivariate probit model. The model will include additional regressors that are used to predict wages such as age, age squared, dummy variables for gender, race, education, marital status, and MSAs. Both equations take the standard form of latent variable, where discrete dichotomous dependent variables are treated as follows:

$$f(z) = z > 0 --- f(z) = 1$$
$$z \leq 0 --- f(z) = 0$$

In this model, work and SSI payment are jointly determined. However, the nature of the model might violate the classical assumption that the error term and each independent variable be uncorrelated. The OLS estimator will be biased downward because it is reporting the downward movement of the work (dependent) variable that occurs when the error term increases. Thus, an increase in the error term in eq 1 will causes an increase in $work$, which will also increase in eq 2. Consequently, SSI receipt in eq 1 is endogenous and ultimately the econometric model chosen will have to account for this.

However, because ρ is negative, *SSI* will decrease in eq 2 and will decrease in eq 1. Thus, α will be more negative, if the model is fully recursive.

A linear probability model can be used on a dummy for receipt of SSI and/or DI. However, there are two problems associated with this model. First, the predicted probability that a given individual receives SSI and/or DI can be less than zero or greater than one. The magnitudes of these probabilities do not make intuitive sense. Second, the error terms in this model are heteroskedastic, and reported standard errors are incorrect. Heckman and MaCurdy (1984) present corrections for the standard errors of the LPM, but instead I employ the bivariate probit model.

To correct the bias described above, the instrumental variable technique might be employed. If an effective instrumental variable can be used for the program enrollment or employment variables, consistent estimates should be obtained. Possible instrumental variables could be identifying which states supplement SSI and using this as the transfer payment variable to determine the effect on work. If a state supplements SSI, the disabled recipients will receive higher benefits, relative to recipients in states that do not supplement SSI. Additionally, identifying different labor market characteristics could be an instrument for work. For instance, if the unemployment rate is higher in a given area relative to another, this variable should not affect the SSI and DI rolls because they require that an individual not be capable of employment. Thus, the increase in unemployment should not affect SSI and DI and their estimates should be consistent. Additional instrumental variables will be sought and employed before completion of this study.

Two-stage least squares (2SLS) is a method of using our instrumental variables to replace the endogeneous variables where they appear as explanatory variables in the simultaneous equation model. It is important to note that the 2SLS estimates will still be biased, but they will be consistent. The three-stage least squares (3SLS) can produce more efficient estimates than those produced by the 2SLS procedure. Still, we have the problems outlined above with the LPM.

The 2SLS and 3SLS models attempt to account for the endogeneity that exists in the simultaneous equation model. However, neither 2SLS nor 3SLS can fully correct the correlation that exists between the error term and SSI variable in eq 1. One option for this model is a univariate probit model (UVP) run separately for eq 1 and eq 2. If there is no endogeneity, running two separate UVP models will produce consistent estimates. However, UVP estimates are not efficient relative to the bivariate probit model (BVP), even in the absence of endogeneity. With a simultaneous equation model, there is an endogeneity problem if there is correlation in the error terms. I expect that ρ will not equal zero in the model. Specifically, I believe that ρ will be negative, because the unobserved variables will be negatively correlated. This correlation is likely to be negative because the unobserved variables that cause an increase or decrease in work, will likely have an opposite effect on SSI enrollment. Therefore, UVP estimates for eq 1 (the work equation) will be inconsistent and will be consistent but inefficient for eq 2, (the SSI equation).

The bivariate probit model provides both consistent and efficient estimates, when endogeneous variables are present. Hence, BVP is better suited for the simultaneous equation model, when correlation in the error terms is expected ($\rho \neq 0$).

According to Greene's notation, the bivariate normal cdf is:

$$\Phi_2(x_1, x_2, r) = \int_{-\infty}^{x_1}\int_{-\infty}^{x_2} f_2(x_1, x_2, r)\, dx_1 dx_2$$

eq 3

The density is given by the following formula:

$$f_2(x_1, x_2, r) = \frac{e^{-(1/2)(x_1^2 + x_2^2 - 2rx_1x_2)/(1-r^2)}}{2p(1-r^2)^{1/2}}$$

eq 4

The subscript 2 is indicative of the bivariate normal density ϕ_2 and the cdf, Φ_2 . The parameter estimates obtained from the bivariate model will be similar to those obtained from the univariate, but the standard errors will be smaller. The instruments used in eq 2 will be subject to exclusion restrictions, and not be included in eq 1 because they identify SSI. A likelihood ratio test led to a failure to reject the null hypothesis of equal slope parameters when the instruments are included.

The data used in this paper is from the 1990 and 1993 panels of the *Survey of Income and Program Participation* (SIPP). The data for 1990 and 1993 will be pooled for the bivariate probit model. Performing a likelihood ratio test elicited a failure to reject the null hypothesis of the slope parameters for 1990 equaling the slope parameters for 1993.

V. Results

The individuals included in the data self-reported a disability in reference month four of the 1990 and 1993 SIPP. Table 1 reports the mean characteristics for these individuals. The sample has 13,992 individuals, 7,206 from 1990 and 6,786 from 1993. Approximately, 41% of the sample were employed at the time of their interview. In terms of transfer payments, roughly 10% received SSI payments and fewer than 1% received DI payments. This leads to a problem with respect to the original goal of this paper. Initially, the goal was to study the impact of the SSI and DI programs, using enrollment in both programs as the dependent variable in eq 2. However, the fact that the data are limited to such a small number of DI recipients suggests that reaching conclusions in regard to the DI program is not realistic. Therefore, the focus of the models to follow will be on SSI, rather than DI.

Table 2 provides descriptive statistics for the different states. The SIPP groups the nine smallest states into 3 regional groups, they are Maine and Vermont; Iowa, North Dakota, and South Dakota;

and Alaska, Idaho, Montana, and Wyoming. Consequently, the state variables for these groups are simply averages of the states. The variables described in Table 2 were drawn from MSA and state-level variables in the Panel Survey of Income Dynamics (PSID) and from the Urban Institute's Assessing the New Federalism database. These variables are useful instruments in that they identify differences in demographic characteristics, and proxy for unobserved differences between states. For instance, the state unemployment rate will be used in the BVP model because this should have a strong negative effect on work. Consequently, an individual in a state with a high unemployment rate, such as West Virginia, may be more likely apply for SSI. By including the state unemployment rate, we capture the effect of differences between states. The 1,000$/SSI recipient variable was included because a wide array of differences across states could lead to different proportions of recipients and/or different SSI benefit payments. In addition, fluctuations in the value of SSI are likely to cause direct fluctuations in the SSI rolls. Therefore, simulating increases in SSI transfers should offer insight into how individuals respond to the incentive to join the SSI program. Simulations will also be run with the family earnings variable. This variable is drawn from the SIPP, and is coded to represent the family earnings (in thousands of dollars) of family members, excluding the survey respondent. Thus, this variable stresses the impact of other family earnings on the respondent's decision to work. Additionally, this variable includes earnings from government transfer programs. It is expected that simulating an increase in this variable will likely lead to a decrease in the marginal probability of work, and possibly an increase in the marginal probability of SSI. However, by increasing the 1000$/SSI recipient variable, and decreasing the family earnings variable, it is possible to simulate a change in policy that transfers funds from one government entitlement program to the SSI program. The results of such a simulation could have a strong impact on the decisions of policy makers. I will investigate this simulations later.

The proportion of democratic state senators is an interesting variable in that it attempts to capture the different attitudes that exist between states. Specifically, the assertion is that a state that elects a democratic majority in its state senate is relatively more likely to be socialist in nature. Thus, it is assumed that a more socialist state is more likely to have a greater proportion of individuals receiving transfers, including SSI. Thus, by including the proportion of state democratic senators in the BVP it is hoped that the attitudinal differences across states will be captured.

The 1990 unemployment rate varied from 3.00% for Hawaii to 11.41% for West Virginia. However, most states were tightly grouped about the mean of 6.72%. The 1000$/SSI recipient variable is the dollar amount (in thousands) of SSI divided by the number of SSI recipients for that state. Most states varied between $3,000 to $5,000 per recipient, however Connecticut had a much higher average payment of $6,480 per recipient. The variable reporting the proportion of democratic state senators is reported for each state with the exception Nebraska and the District of Columbia. The state government of Nebraska is unicameral, and thus does not have a state senate. The District of Columbia not being a state, does not have a state government. The mean proportion of democratic state senators is nearly 58%, with 30 states having democratic majorities. Of the democratic majorities, 13 states had majorities exceeding 70%. It is these states that the assumption of socialist attitudes is most likely.

The first column of table 3 presents the univariate probit (UVP) results. Because I expect that SSI in endogeneous in eq 1 (the work equation), I perform the UVP on this equation. The UVP reports the same directional effects on the coefficients for all but two of the variables. The SSI coefficient is negative and the negatively significant. This result suggests that SSI recipients are less likely to work, relative to non-recipients. However, column 2 on Table presents the BVP coefficient for SSI. The coefficient is positive, but not significantly different from zero. Consequently, this result suggests that when you account for the unobserved heterogeneity in individuals, placing an individual on SSI increases or has no effect on their work status. The coefficient for SSI in the UVP was negative because of the unobserved variable bias. The BVP has the advantage of accounting for unobserved variable bias, that the UVP cannot. The results of this paper would be vastly different depending upon which model the econometrician chose.

In the UVP and BVP results, the female variable changes from positive and insignificant, to negative and insignificant. Although this result would not have as large an impact on this paper as the difference in the SSI variable, it still demonstrates that the BVP is more appropriate for this study.

The results from the bivariate probit model (BVP) are presented in Table 3. The results from eq 1 for the assistance variables offer some unexpected results. First, as previously described the SSI variable is positive, but statistically not different from zero. Therefore, placing someone in the SSI program either increases or has no effect on their work status. Theory states that placing someone on SSI should have a strongly negative effect on their work status. Similarly, the DI variable is also positive, but not significantly different from zero. This indicates that DI enrollment increases or has no effect on work status, opposing previous findings. The state level SSI variable behaves in the same unexpected manner. The remaining assistance variables behave as previous literature would predict. The food stamp variable indicates that recipients of this transfer are less likely to work, relative to non-recipients. The significance of this result is negative. In addition, individuals covered by Medicare are also not as likely work, relative to those not covered by Medicare. Once again, the statistical significance of this result is negative. Hence, the BVP model suggests that neither federal SSI, nor state SSI, nor DI will decrease the likelihood that a recipient will work. Whereas, recipients of food stamps, and individuals covered by Medicare are relatively less likely to work.

Continuing with eq 1, the BVP results indicate as individuals get older they are less likely to work. Females are less likely to work than males, but this effect is not statistically different from zero. In regard to race, Black and American Indian people are less likely to work, and Hispanic people are more likely to work relative to white people. Individuals without a high school diploma are less likely to work than those who have graduated. The marital status variables are not statistically different from zero, with the exception of those individuals who have never married. This group is less likely to work, relative to married individuals. As expected, an individual with children is more likely to work, relative to an individual without children. Individuals living in rural and urban communities have roughly an equal likelihood of working. The family earnings variable suggests that as family earnings increase the respondent is more likely to work, however this result is not statistically different from zero. The unemployment rate had a predictably negative impact on an individuals likelihood to work. In regard to the lagged work variable, those workers who were unemployed, and those absent from their job the previous period were less likely to work, relative to those who were employed and present the previous period. Finally, the binary variable for year indicates that individuals were less likely to work in 1993, relative to 1990. However, this variable was not significantly different from zero.

Computing the mean marginal effects for the BVP allow magnitudes to be applied to the directional coefficients described above. It is important to note that if =0, the marginal effects will be the same as those for the UVP. The description of ρ will come later in this section; however, it is notable that the marginal effects for the BVP differ from those for the UVP. The marginal effect for the SSI variable will be described later using conditional probabilities. However, the marginal effects of the other assistance variables offer interesting results. First, the likelihood that DI recipients will work is 2 percentage points higher than non-recipients. Similarly, State SSI recipients are more likely to work than non-recipients by 2.3 percentage points. Recipients of food stamps and those covered by Medicare are less likely to work by roughly 3 percentage points, relative to non-recipients and those lacking coverage. The year dummy variable for 1993 indicates that people were less likely to work in 1993 by 0.4 percentage points, relative to 1990.

The results from the BVP model for eq 2 are also presented in Table 3. The variables of most interest are the state-level variables that were created to proxy for the unobserved differences between states. First, an increase in the unemployment rate has a positive effect on SSI enrollment, but this effect is not statistically different form zero. However, the 1000$/SSI recipient variable has a positive coefficient, and is statistically significant. Thus, as expected increases in the funds allocated to the SSI program by policy makers, and received by beneficiaries will increase the rolls of SSI. It follows, that this variable should capture the differences in benefits across states. The proportion of democratic state senators also increased the likelihood that an individual would be on SSI. Thus, this adds weight to the hypothesis that the proportion of democratic state senators is a good proxy for socialist attitudes within a state. The result suggests that the more socialist in nature the residents of state, the greater the proportion of individuals receiving SSI.

In regard to the impact of the assistance variables on the likelihood of receiving SSI, the results are as expected. First, food stamp recipients and those covered by Medicare are relatively more likely to receive SSI. Conversely, DI recipients are less likely to receive SSI. This is likely because eligibility for DI requires a work history, and recipients rely on this transfer until retirement at which point the switch to the SSI program. Interestingly, the state SSI recipients are less likely to receive federal SSI payments, but this effect is not significantly different from zero. In sum, the assistance variables behave as expected with respect to SSI.

Table 3 indicates that as individuals age, they are less likely to receive SSI, however this effect is not statistically significant. In addition, females are more likely to receive SSI, relative to males. In regard to race, black, Indian, Asian, and Hispanic people are more relatively more likely to receive SSI, than white people. Non-high school graduates are more likely, and college graduates are less likely to receive SSI than high school graduates. Widowed, divorced, and those who have never married are more likely to receive SSI than married individuals, and individuals with children are less likely to be SSI recipients. The family earnings variable is negative and significant, so as family earnings increase respondents are less likely to receive SSI. Rural and urban residents have an equal likelihood of being on SSI. The lagged work variables have a predictable effect. Those individuals who were unemployed in the previous month are more likely to receive SSI this month, relative to those who were employed in the previous month. Being absent from a job in the previous month did not have a statistically significant impact on SSI.

The marginal effects for the SSI equation are also presented in Table 3. The marginal effect for DI indicates that individuals enrolled in DI are less likely to receive SSI by nearly 13 percentage points, relative to those not enrolled. People receiving food stamps have almost a 9 percentage point greater likelihood of being on SSI, than those not receiving food stamps. In addition, individuals covered by Medicare are more likely to receive SSI by roughly 3 percentage points, relative to those not covered. As the proportion of state democratic senators increases by 10 percent points the likelihood of that states residents being on SSI increases by more than 0.3 percentage points. This suggests that this variable is a good proxy for the attitudes of the residents of a particular state. Finally, individuals in 1993 are more likely to be enrolled in SSI by 0.5 a percentage point, relative to individuals in 1990. The marginal effects of the family earnings and 1000$/SSI recipient variables will be described with conditional probabilities, as these variables are relevant to policy issues.

The is reported to be -0.5998 in Table 3. The large negative value for ρ indicates that the error terms in eq 1 are negatively correlated with the error terms in eq 2. Consequently, the unobserved variables in the two equations are negatively correlated, and lead to bias in the coefficients that are estimated by separate UVP models. The BVP model captures the correlation of the error terms in and reports consistent, and efficient coefficients, relative to the UVP. The Likelihood Ratio test (LR) indicates that the ρ is significant, and supporting the previous assertion that there was endogeneity in the work equation. Moreover, the ρ term suggests there is a difference between the negative labor supply effect and the eligibility criteria of the SSI program. Specifically, the negative term for ρ indicates that the unobserved characteristics of individuals in the sample have opposing effects on SSI and work. Thus, the unobserved characteristics, such as severity of disability, that generally cause individuals to be on SSI will not allow individuals to work. Furthermore, the ρ seems to indicate that those people deemed eligible for SSI cannot work, and the SSI program does not cause negative labor supply effects.

Table 4 reports the various probabilities related to enrolling in SSI and working, prior to performing simulations. First, the average joint probability of working and being enrolled on SSI is 0.8%. The mean probability of working, and not receiving SSI is roughly 41%, whereas the mean probability of not working and receiving SSI is approximately 9%. Finally, the average probability of neither working, nor receiving SSI is nearly 49%. The minima and maxima for these mean probabilities demonstrate the diversity of the individuals within the sample.

To compute the mean marginal effect of SSI enrollment on the probability of work I used conditional probabilities. This is accomplished by predicting the probability of work, given that everyone is enrolled in SSI, and predicting the probability of work, given that no one is enrolled in SSI. The difference between the two probabilities is the mean effect on SSI on the probability of work, as is presented in Table 5. The mean marginal effect of SSI on the probability of work is 0.0999. Therefore, if everyone in the sample were enrolled in SSI, 9.99% more of the sample would work, relative to having no one enrolled in SSI. The range of values for this probability is quite large, suggesting that there is a great deal of heterogeneity among individuals in the sample.

Simulations

When considering policy-related decisions, a useful tool is simulating the effects of the options being considered. In this study, the most relevant simulation would involve changes in the amount of benefits offered to SSI recipients. By simulating such a change, it is possible to determine the number of people who would respond to such a change and what the cost would be to taxpayers. Table 6 presents simulated increases in SSI benefits. When benefits are increased by $1,000 per year for each recipient, there is a 0.98 percentage point increase in SSI enrollment. Thus, with my sample of 13,992 individuals, 137 would respond to the increase in benefits by joining the SSI rolls. The cost for this sample of an increase in benefits to taxpayers would be $1,366,000 for those currently in SSI, and an additional $727,470 for new enrollees responding to the increase in benefits. The cost of new enrollees is calculated by multiplying the number of new enrollees by the mean annual current cost per recipient and adding it to the number of enrollees multiplied by the increase in benefits. Many policy makers overlook the second additional cost when calculating the expected to cost of a new policy. A $1,000 increase, would be slightly more than a 23% increase in benefits. However, the change in policy had a positive impact on work status. Specifically, the employment of the sample increased by 0.11

percentage points. This represents an increase of 15 workers in the sample. I also consider the scenario of roughly doubling SSI benefits. For simplicity I will use a $5,000 increase in SSI benefits, which would represent roughly a 116% increase, based on average annual SSI benefits/recipient. A policy that increases annual SSI benefits by $5,000 per year for each recipient increases SSI enrollment by 5.61 percentage point. In my sample, that represents an increase of 785 individuals, which represents approximately a 50% increase in the SSI rolls. In terms of cost for taxpayers, the $5,000 increase in benefits would increase costs by $6.83 million for current recipients, and the cost of new individuals enrolling is $7,308,350. Additionally, an increase of 86 people or 0.62 percentage points in employed workers occurred in the sample as a result of the policy. Thus, this supports the positive coefficient on SSI in the BVP. Hence, the increase in costs described above demonstrate the importance of careful consideration of policy decisions.

Another variable that could be used for some interesting simulations is the family earnings variable. This variable includes government transfer payments received by the family, and therefore, is likely to respond to policy changes. As Table 3 illustrates, an increase in family earnings of $1000 per year leads to 0.63 percentage point average decrease in SSI recipients. This decrease is likely the result of SSI recipients moving from SSI to another government program that has had an increase in benefits. Another interesting policy simulation is demonstrated in the final row of Table 6. Here, SSI benefits are increased by $1,000, but taxpayers do not bear the full burden of this increase. Instead, policy makers choose to reduce payments in another transfer program to reduce the cost to taxpayers. This is represented by the $500 decrease in Family Earnings. This policy change results in a 1.33 percentage point increase in SSI recipients. Thus, I predict about 186 people from my sample move to the SSI rolls. Note that the decrease in the SSI rolls led to a 0.09 percentage point increase in employed individuals in the sample. Thus, 12 people chose to work, as a response to a decrease in SSI benefits. However, it is important to note that these individuals are not necessarily the people who left the SSI rolls. This policy can be compared to the policy that increased SSI benefits by $1,000 without changing family earnings, described previously. In that case only there was an increase of only 137 people or 0.98%. Hence, there is an increase in new enrollees in SSI of 49 people when the policy that reduces the cost to taxpayers is implemented. Although it cannot be calculated, it is likely that the increase in SSI enrolles offset any decrease in costs that this policy intended. In addition, the policy change led to a 0.06 percentage point increase in employment. Therefore, 9 people from the sample returned to work in response to the policy change.

I. Discussion

This study has emphasized the importance of using the appropriate econometric model to describe a sample. The simultaneous equation model employed to describe the causal relationship between SSI benefits and employment was shown to have endogeneity. The 2SLS and 3SLS are limited by the explanatory power of the instrumental variables and ultimately will likely face the limitations of the linear probability model. Consequently, many would choose to employ the univariate probit models to estimate the work and SSI equations separately. However, the UVP model fails to account for correlation between unobserved variables. In this sample, there was a strong negative correlation between unobserved variables, exhibited by the ρ=-0.59. Therefore, the bivariate probit model is preferred because it captures the correlation of the error terms and provides consistent and relatively more efficient estimates. Furthermore, the BVP captures the endogeneity in the work equation. This was demonstrated by the strong change in SSI coefficient when estimated with UVP and BVP. The UVP indicated that SSI recipients would be less likely to work, relative to non-recipients. Conversely, the BVP suggests that receiving SSI increases the likelihood that an individual will be employed. Thus, in this study vastly different conclusions would be drawn from the sample depending upon the econometric model used.

The state-level explanatory variables created from the PSID and urban data sets were effective proxies for unobserved state differences. The unemployment rate was shown to have a range of 3.00 to 11.41% between states, and including this variable captures the different effects between states. The annual SSI benefits per recipient variable was included because a wide array of differences across states could lead to different proportions of recipients and/or different SSI benefit payments. The proportion of democratic state senators was able to capture the difference in attitudes that occur between states. Specifically, those states that elect a democratic majority in their state senate are more likely to be socialist in nature. Including these explanatory variables effectively captured the effect of unobserved differences in demographic characteristics.

The effect of SSI on the probability of work was effectively demonstrated using mean conditional probabilities. Specifically, if everyone in the sample were enrolled in SSI the sample would be 9.99% more likely to work. This finding opposes much of the current literature, previously described. However, the Acemoglu and Angrist's paper (1998), whose general was used in this paper, reached this same conclusion using the CPS data set. Hence, the findings of this study support their assertion that SSI does not cause a decrease in disabled employment.

The conclusion reached by this paper was emphasized in the policy simulations that were tested. These simulations demonstrated that increasing SSI benefits will cause many people to enroll in the SSI program; however, the work status of the sample does not change. The findings demonstrate, that increasing the SSI benefits by as much as 116% does not lead to a change in employment status for the sample. Consequently, this study suggests that SSI does not lead to a decrease in disabled employment.

Table 1: Descriptive Statistics (N=13,992)

Individual Characteristic	Mean	Standard Deviation
Employed	0.4140	0.4925
Age	46.6057	15.5970
Male	0.4860	0.4998
White	0.8243	0.3805
Black	0.1428	0.3498
Indian	0.0096	0.0974
Asian	0.0233	0.1508
Hispanic	0.0928	0.2901
Married-spouse present	0.5169	0.4997
Married-spouse absent	0.0081	0.0898
Widowed	0.0803	0.2718
Divorced	0.1337	0.3404
Separated	0.0417	0.2000
Never Married	0.2192	0.4137
12th grade or less	0.3543	0.4783
High School Graduate	0.3444	0.4752
Some College	0.1959	0.3969
College Graduate	0.1147	0.3186
Rural	0.4200	0.4935
Have Children	0.3447	0.4753
SSI recipient	0.0976	0.2968
DI recipient	0.0061	0.0782
Food stamps recipient	0.1389	0.1389
Medicaid recipient	0.1918	0.3458
Medicare recipient	0.2286	0.4199

Table 1: Descriptive Statistics (N=13,992)		
Individual Characteristic	Mean	Standard Deviation
SOURCE: SIPP, 1990 & 1993		

Table 2: State Level Descriptive Statistics				
State	N	State Unemployment Rate (%)	Annual SSI benefits per recipient (1000$)	Proportion of Democratic State Senators (%)
Alabama	187	7.52	3.61	80.00
Arizona	242	8.26	4.03	40.00
Arkansas	147	7.40	3.49	85.71
California	1,683	6.81	5.30	63.89
Colorado	182	5.57	5.04	45.71
Connecticut	141	5.22	6.48	55.56
Delaware	54	4.40	3.64	71.43
District of Columbia	43	7.00	3.97	-----
Florida	723	5.91	3.90	50.00
Georgia	445	5.84	3.44	73.21
Hawaii	51	3.00	4.40	88.00
Illinois	448	6.85	4.89	45.76
Indiana	269	6.11	4.08	44.00
Kansas	141	4.56	3.80	35.00
Kentucky	179	8.60	4.12	65.79
Louisiana	319	10.71	4.40	87.18
Maryland	236	4.42	4.11	80.85
Massachusetts	310	7.28	4.22	77.50
Michigan	531	8.68	4.47	47.37
Minnesota	395	5.49	4.83	67.16

Table 2: State Level Descriptive Statistics				
State	N	State Unemployment Rate (%)	Annual SSI benefits per recipient (1000$)	Proportion of Democratic State Senators (%)
Mississippi	221	9.13	3.76	75.00
Missouri	347	6.79	3.98	60.60
Nebraska	50	3.42	3.97	----
Nevada	58	5.89	3.93	47.62
New Hampshire	29	6.25	4.66	45.83
New Jersey	391	5.44	4.19	32.50
New Mexico	28	7.19	3.72	64.29
New York	907	6.95	4.82	44.26
North Carolina	394	5.30	3.89	78.00
Ohio	572	6.70	4.42	39.39
Oklahoma	210	6.97	3.99	77.08
Oregon	247	6.59	4.43	53.33
Pennsylvania	651	6.42	4.46	50.00
Rhode Island	63	6.00	3.91	78.00
South Carolina	211	6.11	3.56	65.22
Tennessee	355	6.76	3.53	60.61
Texas	937	7.88	3.54	58.06
Utah	58	5.55	4.15	37.93
Virginia	236	5.08	3.65	55.00
Washington	351	5.83	4.32	57.14
West Virginia	167	11.41	4.25	94.12
Wisconsin	263	5.41	4.70	54.55
Maine, Vermont	98	6.39	3.29	52.31
Iowa, N. Dakota, S. Dakota	214	4.68	3.49	52.99
Alaska, Idaho,				

Table 2: State Level Descriptive Statistics				
State	N	State Unemployment Rate (%)	Annual SSI benefits per recipient (1000$)	Proportion of Democratic State Senators (%)
Montana, Wyoming	168	7.42	4.22	45.42
Mean	**----**	**6.72**	**4.31**	**57.68**

**Source PSID and Urban database.

Table 3: Univariate and Bivariate Probit Results

Variable	UVP Work	BVP Work	BVP SSI
age	-0.0109** (0.0023) [-.0007]	-0.0108** (0.0022) [-.0008]	-0.0016 (0.0015) [-.0002]
female	0.0099 (0.0502) [.0006]	-0.0005 (0.0489) [.0000]	0.0929** (0.0349) [.0129]
Black	-0.2577** (0.0731) [-.0166]	-0.3003** (0.0711) [-.0226]	0.3562** (0.0413) [.0496]
Indian	-0.8175* (0.3247) [-.0528]	-0.8181* (0.3117) [-.0616]	0.3360* (0.1441) [.0468]
Asian	-0.1749 (0.1630) [-.0113]	-0.2141 (0.1561) [-.0161]	0.4064** (0.1002) [.0566]
Hispanic	0.2221** (0.0759) [.0143]	0.1905* (0.0739) [.0143]	0.2062** (0.0516) [.0287]
12th grade or less	-0.1387* (0.0576) [-.0090]	-0.1612** (0.0563) [-.0121]	0.2140** (0.0389) [.0298]
some college	0.0983	0.0926	-0.0002

Variable	UVP Work	BVP Work	BVP SSI
	(0.0649) [.0063]	(0.0637) [.0070]	(0.0518) [.0000]
college graduate	0.1484 (0.0861) [.0096]	0.1554 (0.0851) [.0117]	-0.2878** (0.0785) [-.0401]
SSI	-0.3363** (0.1035) [-.0217]	0.9905 (0.7849) [.0745]	
DI	0.2487 (0.2230) [.0161]	0.2664 (0.2241) [.0200]	-0.9236* (0.4581) [-.1285]
food stamps	-0.4143** (0.0724) [-.0268]	-0.4933** (0.0716) [-.0371]	0.6260** (0.0412) [.0871]
state SSI	0.3298* (0.1620) [.0213]	0.3069 (0.1589) [.0231]	-0.0450 (0.1423) [-.0063]
Medicare	-0.4900** (0.0810) [-.0316]	-0.4897** (0.0785) [-.0368]	0.2004** (0.0425) [.0279]
widowed	-0.0728 (0.1133) [-.0047]	-0.0888 (0.1099) [-.0067]	0.3020** (0.0574) [.0420]
divorced	0.1530* (0.0702) [.0099]	0.1067 (0.0694) [.0080]	0.4305** (0.0493) [.0599]
never married	-0.2232** (0.0739) [-.0144]	-0.2931** (0.0746) [-.0220]	0.6514** (0.0487) [.0907]
have children	0.0861 (0.0580) [.0056]	0.1116 (0.0575) [.0084]	-0.2312** (0.0417) [-.0322]
rural	0.0446 (0.0508) [.0029]	0.0438 (0.0494) [.0033]	0.0093 (0.0377) [.0013]
family earnings	0.0186	0.0212	-0.0467**

Variable	UVP Work	BVP Work	BVP SSI
	(0.0139) [.0012]	(0.0136) [0.0016]	(0.0120) [-.0065]
unemployment rate	-0.0319* (0.0148) [-.0021]	-0.0335* (0.0143) [-.0025]	0.0172 (0.0100) [.0024]
no job last month	-5.1842** (0.2159) [-.3348]	-5.0049** (0.3289) [-.3765]	0.7332** (0.0495) [.1021]

absent from job last month	-3.4752** (0.2179) [-.2245]	-3.2609** (0.3260) [-.2453]	-0.0556 (0.0880) [-.0077]
proportion of state democratic senators			0.2395* (0.1180) [.0333]
Annual SSI per recipient (1000$)			0.0681* (0.0286) [.0095]
1993	-0.0649 (0.0478) [-.0042]	-0.0618 (0.0467) [-.0046]	0.0361 (0.0332) [.0050]
constant	4.2696** (0.2725) -	4.0799** (0.3615) -	-2.9061** (0.1834) -

Rho (unrestricted) -0.5998 (0.2908)

Log Likelihood (System) -5259.776 -5257.0646

LR Test of Rho=0: chi2(1)=5.42355
Pr>chi2=0.0199

(standard error) [marginal effect]

**: Significant at 99%. *: Significant at 95%.

Table 4: Sample Mean Joint Probabilities of Work Status and SSI Enrollment				
Work/SSI	Mean Probability	Std. Dev.	Minimum	Maximum
Work=1/SSI=1	0.0083	0.0204	3.93e-09	0.3196
Work=1/SSI=0	0.4137	0.4422	1.17e-04	0.9999
Work=0/SSI=1	0.0891	0.1187	3.51e-07	0.7421
Work=0/SSI=0	0.4888	0.3900	1.11e-07	0.9766
If employed work=1,	If enrolled SSI=1,	0 otherwise.	(n=13,992)	

Table 5: Marginal Effect of SSI Enrollment on the Probability of Work					
	n	Mean Probability	Standard Deviation	Minimum	Maximum
SSI Effect	13,992	0.0999	0.1058	1.67e-05	0.3796

Table 6: Effects of Simulated Policy Changes		
Policy Change	Change in Mean Probability of SSI Enrollment	Change in work status
SSI benefits + $1,000/yr	0.98 [137]	0.11 [15]
SSI benefits + $5,000/yr	5.61 [785]	0.62 [86]
Family Earnings + $1,000/yr	-0.63 [-89]	0.09 [12]
SSI benefits + $1000/yr & Family Earnings - $500/yr	1.33 [186]	0.06 [9]
[change in number of people]	n=13,992	

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