# The Effect of Disability Insurance on Spousal Labor Supply*

Susan Chen†
*Department of Agricultural Economics*
*Purdue University*

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**Abstract**

Current estimates of the work disincentive effects of the Social Security disability insurance (DI) program are much lower than past cohorts. These lower estimates occur despite increases in the generosity of the DI program and decrease in the stringency of the qualification rules for DI. One reason for the apparent decrease in the work disincentive effect may be the ability of husbands (or wives) to insure their spouses in the event of an adverse health shock. Using a new dataset that matches households who apply for DI to administrative data on DI application and award information, we find that the employment rate of husbands of DI applicants is 8 percentage points higher in the case where their wives do not receive benefits compared to the case where they do. Similar results are also found for the wives of DI applicants. Point estimates for a marginal sample of older wives of DI applicants suggests that if rejected applicants are not going back to work it may be because their wives are supporting them. We find that the work disincentives effects of the DI program to be as high as 64% in this sample.

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†Department of Agricultural Economics, Purdue University, 403 W. State Street, West Lafayette, IN 47907-2056, USA. Telephone: 765-494-7545. Fax: 765-494-9176. E-mail: sechen@purdue.edu.

# 1 Introduction

The Disability Insurance program has been credited with causing a significant decline in the labor force participation of prime aged males (Parsons, 1980). However, the estimated impact of the Disability Insurance (DI) program on labor supply in the 1990s is much lower than in previous cohorts (Chen and Van der Klaauw, 2006). One reason for the lower estimates could be the increase in the labor force participation of married women. As workers age, the likelihood of major health difficulties increases, and coping with health problems can have severe economic consequences on workers and their families. For married workers, the family has always been an important informal health production organization as well as source of income insurance. Despite this, most investigations into the impact of disability insurance on labor supply have focused only on the individual and ignored the potential impact of the program on the family. This paper studies this possibility more carefully by quantifying the magnitude of the disincentive effects of the DI program on spousal labor supply.

The spousal work decision is a complex one. Deterioration in the health of a husband affects the allocation of time for wife. She may increase her labor supply in an attempt to maintain household income; or, she may withdraw from the labor force in order to provide care for her frail spouse. Both responses would be conditional on the economic impact of the deterioration in health on the household. The disability insurance program is designed to minimize the impact of lost earnings due to a work limiting disability on the household. The disability insurance program can, therefore, change the incentives for work for both the beneficiary and the beneficiarys spouse. As the composition of the labor market changes and the number of women in the labor force increases, it is essential for policymakers to have quantitative estimates of the effects of income and welfare maintenance programs on not just individuals but also married couples.

This paper is laid out as follows. In Section 2 we provide a brief review of the literature on spousal labor supply and program participation. In Section 3 we provide an overview of the DI program and the household. This is followed by Section 4 were we outline a theoretical model to provide the context for our analysis. Then we move to a description of the empirical method used in this analysis. Finally we end with a discussion of the data and the results.

## 2 Background

There are two relevant strands of literature that relate to this study: the theory of labor supply as insurance against negative shocks and the effect of health on labor supply. The theory of spousal labor supply as insurance against negative shocks is widely developed particularly in the context of unemployment (see Gruber and Cullen, (2000)) for a survey of literature; and more narrowly in the context of health shocks (Coile 2004).

In a simple family life cycle model, which is increasing in combined spousal income and a home produced good, (which can be health), negative shocks to lifetime income (due to unemployment or poor health), will cause the spouse to increase their labor supply, assuming that their leisure is a normal good. This is known as the "Added Worker Effect" (AWE) Lundberg (1985). Empirical work on the AWE and spousal unemployment has found little or no evidence to support the theory. Studies on the AWE and the effect of spousal health shocks finds that the AWE is small for men and non-existent for women.

One reason why these estimates are small or non-existent may be the crowding out caused by government programs such as Social Security Retirement Benefits, Disability Insurance Benefits or Unemployment Benefits (Gruber and Cullen, 2000). When Johnson and Favreault (2001), examine the retirement decisions of older married couples they distinguish between healthy couples; and couples where one spouses retires in response to health problems. This distinction results in evidence that shows that spouses are less likely to leave the labor force in response to their partner leaving due to health problems. This result is strengthened if the sick spouse is not yet eligible for Social Security retirement benefits.

When Coile (2004) includes DI benefits and DI applications in her models on the effect of health shocks on spousal labor supply she finds that the AWE is as theory predicts: larger for the wives of applicants to the DI program; smaller for the wives of DI beneficiaries. These results do not extend to the husbands of DI applicants and beneficiaries. Her results however are based on a difference in difference that may not fully account for endogeneity. For example time varying heterogeneity due to shocks in the local job market may be correlated with self reported health variables or with application to the DI program (Autor and Duggan 2003).

An earlier generation of studies based on data from the 1960s and 1970s examines the effect of spousal health on labor supply in particular, husband's health on wife's labor supply. Haurin (1986), Berger and Fleisher (1984), Berger (1982) and Berger (1983). The results are

remarkably similar despite differences in how health is modelled, whether full income (including transfers) is included, and whether longitudinal data was used to capture the dynamic labor supply adjustment to the health shocks. Wives do not increase their labor force participation in response to their husband's health shock. The notable exceptions are when husband's health shocks are especially severe leading to disability and when family full income (including transfers) decreases. In the first case, wives decrease their labor supply suggesting a nursing effect (Berger (1982)); in the latter case female labor supply increases when family full income (including transfers) decreases (Berger (1982) and (1983)).

The empirical challenge for these studies is how to account for the endogeneity of self-reported health and labor supply outcomes. There has been an extensive literature criticizing their use because individuals make their decision to work and to declare their health at the same time; therefore, health status may not be exogenous to the labor supply decision (Lambrinos, 1981; Stern, 1989; Bound, 1991). The endogeneity of self reported health would therefore exaggerate the estimates of health on outcomes such as labor supply (Bound, 1991). [1].

This paper offers the following contributions relative to the previous literature. We are the first to quantify the effect of DI on spousal labor supply in young and prime-aged couples. [2] Second, as a result of our access to a unique dataset we can more convincingly control for the endogeneity of DI program participation. Chen and van der Klaauw (2006), hereafter referred to as CV(2006), provide a survey of the literature and as well suggest an estimation approach which takes into account the endogeneity of program participation on individual labor supply. We will extend this approach to the estimation of the disincentive effects of DI on spousal labor supply.

## 3 The DI program

Disability Insurance is provided to workers under two programs the Social Security Disability Insurance programs (SSDI) and the Supplemental Security Income Program (SSI). Eligibility for the SSDI program is based on having x quarters of covered work as well as evidence of a

[1] Authors such as Chirikos (1993) and Wolfe (1984) have suggested that objective measures of health status such as indicators of specific illnesses, or clinical diagnoses are considered to better measure health status in labor supply equations however, evidence to date does not provide a convincing rationale for using objective methods instead (Bound 1991), Dwyer and Mitchell (1999), Baker et al (2004)

[2] Coile 2004 estimates the impact of DI on older married couples who may also be eligible for retirement benefits.

work limiting illness. The SSI program also depends on a work limiting illness however it does not require a number of quarters in covered work but there is an earnings criteria.

Since disability is unquantifiable, applicants to the DI program have to go through a disability determination process administered by the Social Security Agency. This determination process is made up of 5 stages designed to identify the easiest to assess first, (either the most severe or the most able bodied), while leaving the judgement of harder cases (marginal applicants) to later stages. Figure 1 shows a flow-chart of the 5 stage determination process. Of particular relevance to this analysis is the final stage in this process - "Stage 5". At this point, the marginal applicants are assessed on the basis of educational and vocational factor in additional to medical criteria. In order to aid the evaluator, a grid is provided to help award benefits. An outline of grid is listed in Figure 2 and an excerpt which is easier to see is shown in Figure 3. We will exploit this grid in our estimation so we will discuss this group of applicants again later.

Family members are eligible for DI benefits under the SSDI program only. More than 1.5 million individuals received SSDI benefits as dependent family members of disabled workers, of which over 90% were children. Children under 18 are eligible for benefits under the disabled worker's records. The spouses of disabled workers are also eligible for benefits through the disabled worker's record provided they do not earn more than a maximum earnings amount and are taking care of children under the age of 16. On average, a worker with one child receives about $945 per month.

For a worker with one child and a spouse, the average benefit amount is about $1088 per month. The spouses of disabled workers face an income test. In order to receive full benefits they must earn less than $11,640 (in 2002) per year. For every two dollars above this amount, their benefits are reduced by one dollar. As Figure 1.5. shows, the number of SSDI non-worker beneficiaries is small and has not grown at the same pace as worker beneficiaries. Aggregate data on the number of spousal beneficiaries in SSDI program suggests that the number of spouses receiving SSDI benefits has actually decreased over time (Figure 1.6). This conforms with the trend of more women entering the labor force over this time period.

Unlike the SSDI program, in the SSI program spouses and children are not covered under the disabled worker's record. In addition, income from savings, investments or spouse's earnings can disqualify a beneficiary from SSI payments or reduce the SSI benefit amount. In order to receive SSI benefits, individual's (couple's) must have countable resources of less than $2,000 ($3000).

The benefit amount is also affected by the earnings of the non-eligible spouse. Using deeming rules, the SSI recognizes that ineligible spouses have some measure of family responsibility to help pay for the disabled work. The SSI benefit amount will therefore decrease as household income increases.

# 4 Theoretical model

To motivate the empirical work, we depart for the lifetime household labor supply model and consider a simple version of the unitary household labor supply model, the secondary earner model. This model provides a simple framework in which to incorporate program participation and interpret our findings. We assume a sequential secondary earner model in which the disability applicant after learning about the award decisions makes his work decision independently of the secondary earner. The spouse then makes her labor supply decision by maximizing utility, taking into account the applicant's earnings and disability income, as well as her own non-labor income. This model introduces asymmetry and drops the interdependence of the two individuals' utilities: the spouse's labor supply has no effect on the applicant's decision while the applicant's work decision affects the spouse's decision, but only through family income.

$$H_1 = h_1[w_1, DN_1] \tag{1}$$

$$H_2 = h_2[w_2, w_1h_1 + D(N_1 + N_2(w_2h_2))] \tag{2}$$

where, $w_1$ and $w_2$ are the wages of the primary (disabled) and secondary spouse, $h_1$ and $h_2$ are hours of work and $N_1$ and $N_2(w_2h_2)$ are the disability transfers received by each spouse.

The evaluation of the impact of the disability insurance program on the household is complicated by the structure of the DI program. The DI program has two components, the Supplemental Security Income (SSI) and the Social Security Disability Insurance (SSDI) programs and the various parameters of these programs determine spousal eligibility and benefit amount. In order to determine the impact of DI on spousal labor force participation it is instructive to examine how these program impact spousal labor supply. In the analysis outlined below, we assume that decision making is sequential, the disabled worker receives benefits, then the spouse determines their labor supply. We also assume that the disabled worker does not work after

receiving benefits. This is realistic since there are ceilings on how much beneficiaries can earn and still receive benefits. In 2002 this was about $780 per month.[3] The impacts of the SSI and SSDI program on household labor are the same so the explanation below focuses on just one program, the SSDI program.

The household faces three possible scenarios: (1) the disabled worker receives benefits and does not work (2) the disabled worker does not receive benefits and does not work (3) the disabled worker does not receive benefits and works. The primary spouse therefore has two hours of work choices either $h_1 = 0$ or $h_1 = \overline{h}_1$. The benefit award is determined outside the household by the administrator of the DI program. The secondary spouse then makes her labor supply decision conditional on the DI award and labor supply decision of the primary spouse. It is instructive to examine, using a partial analysis framework, how the secondary spouse reacts. In Figures 6 and 7 we consider the three scenarios outlined above for the SSDI program only.[4] Analysis of the SSI program does not lead to different conclusions than those obtained from analyzing the SSDI program. However, as outlined in above, the SSI program does not provide benefits to dependents. The spouse's work decision, however, still affects the total disability benefit amount that is received by the family through an earnings tax.

In figures 6 and 7 we compare the labor supply response of secondary spouses who receive benefits with secondary spouses who do not receive benefits. In figure 6, we compare spouses of DI applicants who receive benefits with spouses of applicants who do not receive benefits **and do not work**. A household which receives worker benefits faces either the budget constraint OAB if only the primary spouse receive benefits or budget constraint ODEFB if the secondary spouse is also collecting benefits under the disabled primary spouse's record.[5]

The spousal SSDI program is structured so that spousal benefits begin to phase out above the **spousal** earnings ceiling located at E. This changes the marginal benefit of work for women with preferences between E and F. For a household that does not receive benefits and has a primary spouse that does not work, the budget constraint is OC. If we compare secondary spouses who do not receive benefits with those that do receive benefits, there is an unambiguous negative effect on hours of work. Regardless of which budget constraint the receiving household faces, there is a pure income effect as the budget constraint shifts out (i.e. households that

[3] Social Security Website.

[4] The budget constraint for the SSI program is also kinked.

[5] A spouse is eligible for DI benefits on the disabled worker's record if they are taking care of children under the age of 18.

receive benefits have secondary spouses that work less). In addition, when eligible for spousal benefits, the earnings tax implies a negative substitution effect on hours of work.

In figure 7 we compare individuals whose spouses receive benefits with those whose spouses do not receive **and work**. For the beneficiary household, the budget constraints are OAB and ODEFB as before. For the non-beneficiary household, the budget constraint is now influenced by the earnings of the primary spouse. The primary spouse can earn less than the benefit amount, OA' or more than the benefit amount OA". Comparing those households which receive benefits with households where the primary spouse earns OA' we note that once again there is an unambiguous negative effect on hours of work. If we compare households with primary spouse earnings of OA" then the effect is ambiguous. For households with preferences which make them choose hours of work greater than E when the primary spouse receives benefits, the effect is ambiguous; there is a positive income effect and negative substitution effect on the spouse's labor supply. For households with preferences which lead to hours levels between E and D the LS effect on the secondary spouses is positive (i.e. households receiving benefits have secondary spouses who work more). The labor supply response with this kinked budget constraint is therefore ambiguous and depends on preferences.

Though the theoretical predictions are ambiguous, Chen and van der Klaauw (2006) has shown that in the 1990s the majority of rejected applicants do not work. Moreover, those who do have very small earnings.[6] Therefore, we are more likely to see non-beneficiary households with secondary workers facing budget constraints like OC or OA'B'. If this is the case then secondary spouses of households who do not receive benefits will work more than secondary spouses of those households who do receive benefits.

The model outlined above abstracts from some important considerations that should be discussed. First, this model does not take into account the caregiving that occurs in households. The presence of a disabled spouse may change the preferences of the secondary spouse. With the increased demand for care by the primary spouse, the secondary may have a higher disutility for market work. The secondary spouse must also determine whether to provide care for their disabled partner or work to be able to purchase care and maintain the household's income level. The spouse's time spent taking care of her husband will then depend on her ability to maintain their income, costs of entry into the market or increased labor supply in the job market, and

[6]Bound (2002) notes that rejected SSDI and SSI applicants have lower levels of earnings substantially below their pre-application levels.

the substitutability of the spouse's time spent producing their partner's health. The spouse's decision will therefore rest on whether they are more efficient at home or in the market.

If rejected applicants on average are of better health than beneficiaries, this would imply that the demand for the secondary spouse's time of providing home care is higher for beneficiary households. This would therefore reinforce the negative effect of disability benefit receipt on the spouse's labor supply. If rejected applicants and beneficiaries are on average of similar health, as is the case in the RD analysis of individuals whose disability status at the margin is determined by vocational factors, spouses of both groups of applicants face similar demands on their time as care givers. In that case the spouse's labor supply decision is similar to that described in Figures 6 and 7, except that the decision to work is now also influenced by the productivity of the spouse's time in providing home care, and the price of formal care provision.

# 5 Data And Empirical Strategy

As outlined above, the challenge is to estimate the work disincentive effects of spousal DI benefits while convincingly accounting for the endogeneity of program participation and labor supply. The estimation approach used in this study is taken from CV and consists of a comparison group approach, which gives an upper bound on spousal labor supply, and a semi-parametric approach which gives a point estimate.

The comparison group approach was introduced in Bound (1989) and used more recently by CV to estimate the disincentive effects of DI on own labor supply. The basic idea extended to spousal labor supply is as follows: What we are missing in the evaluation of the DI program on spouses is information on what the spouse of a beneficiary would have done if the program did not exist. Since rejected applicants are on average healthier, they require less care by their spouse. All else equal the average spousal labor supply of rejected applicants represents an upper bound on what the spousal labor supply of beneficiaries would have been in absence of DI benefits. That is, couples with a rejected applicant may be able to supply more labor because the rejected applicant is on average healthier and better able to care for themselves.

The second estimation approach makes no assumptions about comparability of rejected and beneficiary households. Instead it exploits a particular feature of the DI program  the medical vocational grid. CV shows that for applicants that reach stage five of the DI award assessment

their probability of disability receipt does indeed vary discontinuously with age. They show that the discontinuities occur at ages 45, 50 and 55, exactly the ages outlined in the medical vocational grid used by the Social Security Agency Disability Determination Process. Since applicants are in general unaware of this grid, these data conform to the fuzzy regression discontinuity design outlined in Van der Klaauw (2002).

These discontinuities are also present for the subsample of married applicants that we use in this analysis (see Figures 1 and 2). These figures show that there is a discontinuity in the probability of acceptance into the DI program at age 55. As in CV, we exploit this discontinuity in the award rate of applicants to estimate the effect of the DI program on spousal labor supply. We use the same two estimations techniques as CV(2006) to determine the impact of DI on spousal labor supply: a two stage control function estimator and a non-parametric Wald estimator.

CV(2006) has shown that the labor supply effect

$$\frac{\lim_{A\downarrow\bar{A}} E[y|A] - \lim_{A\uparrow\bar{A}} E[y|A]}{\lim_{A\downarrow\bar{A}} E[t|A] - \lim_{A\uparrow\bar{A}} E[t|A]} = \lim e \downarrow 0 E[\alpha_i | t_i(\overline{A}+e) - t_i(\overline{A}-e) = 1] \tag{3}$$

is identified for the subgroup of applicants at the age cutoffs of 45,50 and 55. This local average treatment effect can be estimated using a local Wald estimator. In this case we use a one sided uniform kernel estimator which simply amounts to taking the average labor supply of the spouse and the average probability of the applicant receiving benefits on either side of each age cutoff (within a specified bandwidth) and then dividing them as specified in equation 3 above.

The two-stage estimation procedure proposed by Van der Klaauw (2002) involves the estimation of a control function augmented labor force participation equation in which the treatment variable is replaced by an estimated propensity score. More formally, in the first stage, the propensity score is estimated as,

$$E[t_i|A_i] = Pr(t_i = 1|A_i) = g(A_i) + \sum_{j=1}^{3} \gamma_j \cdot 1\{A_i \geq \bar{A}_j\} \tag{4}$$

where $g(A_i)$ is a flexible continuous function in $A_i$, and the $\gamma_j$ represent the discontinuities in the award rate due to the rules of the DI program. In the empirical implementation of this approach we experimented with various specifications of $g(A)$, including polynomials and

continuous piecewise polynomials (with kinks at the three cutoff points).[7] Similar to finding reported in previous RD research (van der Klaauw, 2002; Angrist and Lavy 1999), we generally found the resulting estimates to be insensitive to the specification of $g(A)$. See the appendix for the estimates for the award equation for the sample of married male applicants. Similar results were found for the rest of our samples.

The estimated propensity score is used in the second stage to estimate the effect of DI on spousal labor supply. As in CV(2006) we use a control function specification $k(A_i)$ for the conditional mean $E[u_i|A_i]$ to control for the potential association between age and labor force participation. The second stage equation is given by

$$y_i = \beta + \delta E[t_i|A_i] + k(A_i) + w_i. \tag{5}$$

# 6 The Data And Results

The data for our analysis are drawn from a newly constructed data set that merges the 1990-1996 panels of the SIPP with restricted Social Security data containing detailed SSDI and SSI application and award information hereafter referred to as the 831 file.[8] The two datasets were exact matched for SIPP sample members who applied for disability benefits and whose applications were adjudicated between 1989 and 2000.

The matched dataset contains information on labor force participation, and sources of income including transfer programs from the SIPP and detailed administrative information on each transaction that is made at each stage of the disability determination process excluding adjudications made above the State level from the 831 file. These data are unique because they contain the characteristics of both beneficiaries and rejected applicants to the DI program.

Married applicants from these data are matched with their spouses from the SIPP. The resulting dataset has post-award labor supply information for both the DI applicant and their spouse as well as the administrative information discussed earlier. We keep only those couples where the non-applicant spouse is less than age 61 to prevent confounding with retirement benefits. There are 1883 couples in our sample. Table 1 provides descriptive statistics for the husbands and wives of applicants separately.

[7] For example, the piecewise linear specification is given by $g(A) = \psi_{00} + \psi_{01}A + \sum_{j=1}^{3} \psi_{1j}(A - \overline{A}_j)1\{A \geq \overline{A}_j\}$.

[8] see Chen and van der Klaauw (2006) for an extensive explanation of these data

More than half of our sample is made up of wives of applicants. The descriptive statistics for both samples are remarkably similar. The mean age of the wives (husbands) in our sample is 47 (49). Both samples are at most 18 % non-white. The major differences are in the education and labor supply variables. Approximately 50 % (60 %) of the wives (husbands) of DI applicants in our sample work. For those who do work, most work full-time with husbands working 7 hour more than wives who work on average 38 hours per week. Our sample has a high average level of education with over 48 % of the husbands and wives having a high school diploma.[9]. For wives (husbands), the labor supply information is measured approximately 3.4 (3) years since their spouses award decision.

As well, table 1 provides descriptive statistics for a "stage 5" subsample. This subsample contains applicants to the DI program who are assessed on the basis of medical-vocational criteria. See figure 1 for a flowchart of the 5 stage Disability Determination Process. These stage 5 applicants represent an important subsample who represent the most difficult to assess group of DI applicants. For this group, DI is awarded on the basis of both medical and vocational criteria such as age, education and ability to perform past work. Moreover, the award at this stage is based on a medical vocational grid (see table 2) which is used to guide the assessor in these cases. [10] When we compare stage 5 applicants with all applicants we find that there are very few differences between the two samples for both husbands and wives.

In order to assess the appropriateness of applying Bound's comparison approach we compare the characteristics of rejected spouses with accepted spouses in Table 2. In terms of age and education the spouses of rejected applicants tend to be younger and more educated than the spouses of accepted applicants. Both differences would make them more likely to be working, which is consistent with our interpretation of these effects being an upper bound on the spousal labor supply of beneficiaries had they not received DI benefits.

We consider wives first and find find that at most 52% of wives work an average of about 38 hours per week. In Table 2 we report the effects on labor supply between the two groups. DI receipt by the husband decreases the wife's labor force participation by approximately 4% .

[9]CV(2006) found that the applicants to the DI program had a pretty low level of education with only 35 % having a high school diploma. This is at odds with what we found for the spouses given assortative mating. The discrepancy may be due to measurement error in the education variable. For the spouses education is based on SIPP data while for the applicants it is based on administrative data from the 831 file

[10]The grid is laid out in Appendix 2 Subpart P in the Medical Vocational Guidelines in the Social Security Disability Determination Process.

In terms of hours of work, the estimated decrease in hours per month is 0.5.

The labor force participation of husbands of rejected applicants is higher at approximately 62%. With this proportion working approximately 45 hours per week. The effect of the DI program on husband's labor supply is about the same as for wives. There is a 4% decrease in the labor force participation of husbands with wife's benefit receipt. In terms of hours, the number of hours supplied per month decreases by 1.

The negative effects are even greater for the sample of stage 5 applicants and represent the largest reported spousal labor supply responses for our sample. The estimates with standard errors in parentheses are 11 % for wives and 8 % for husbands. In terms of hours, husbands and wives who work decrease their labor supply by less than 2 hour per week.

These estimates are small suggesting that the DI program does not have large work disincentive effects on spousal labor supply. Alternatively, we can interpret this as saying that the DI program does not seem to dampen the AWE. Spouses do not appear to change their labor supply in response to DI benefit receipt.

When we examine two joint labor force participation outcomes - the participation of either member of the couple and the participation of both members, we find larger effects. For all applicants, benefit receipt decreases the employment of either member by 12 % and both members by 11 %. For the sample of stage 5 applicants, we find much larger effects with a 21% decrease in labor force participation for either member and a 13% decrease for both members of the couple.

## 7 Estimates Using An RD Approach

Estimates of the effect of DI on spousal labor supply using a regression discontinuity approach are presented in Table 4 for husbands and wives. The first column shows estimates using a two stage control function approach. For both hours of work and labor force participation the optimal order of the series was determined to be 1 for all samples.

There is a differential impact for husbands and wives for both hours of work and labor force participation. The effect of DI on the labor force participation of wives is estimated to be -33% (21) which does not fall within the estimated bounds of 11% from the comparison group approach. For husbands the effects are positive and small with an 8% (18) increase in labor

force participation in response to wife's DI benefit receipt. Both these effects are imprecisely estimated and the standard error are large so that the estimated upper bound is still within a 95 % confidence interval for both of these estimates.

The effect on hours mirrors labor force participation. Husbands increase their hours worked by 4 hours per month while wives significantly reduce their hours worked by 69 hours per month. For wives this estimate is significant at the 95 % confidence interval. Again, the bounds from the previous section fall within the 95 % confidence interval.

In Table 4 the local Wald estimates are the average effect on employment and hours for the spouses of applicants whose age at award is close to the cutoff ages of 55. Only the estimates for the largest bandwidth +/- 4 years are reported here. The relatively modest sample sizes for the smaller bandwidths made the results very unstable.

For husbands, the results are positive and insignificant so we will focus on wives. Similar to to the CFE estimates, the effect on labor force participation and hours for wives is large. There is an approximately 64 % (28) decrease in labor force participation with DI benefit receipt of the husband. In terms of hours, there is a 106 (46) hours per month decrease with DI receipt. Standard errors are in parentheses.

It should be noted that there is a significant difference between the RD estimates and the comparison group approach. The upper bound estimated in the previous section is an upper bound on the average treatment effect on applicants, while the RD estimates apply to the subpopulation of applicants approximately 55 years old, whose disability determination is influenced by the applicant's age relative to the age 55 cutoff. So the difference between the comparison group estimates and the RD estimates may be a result of the fact that sample of wives is in general older and may have lower labor force attachment which could lead to higher impact estimates.

The analysis so far has focused on the labor market outcomes of husbands and wives separately. We will now consider the impact on two joint outcomes of labor supply for the household: both members of the household working and either member of the household working. RD estimates on the effect of DI on the labor supply of the household suggest that DI receipt by either member of the couple causes at most an approximately 33 % (18.44) decrease in the labor force participation of the spouse.

# 8 Conclusion

We found that the DI program does create disincentive effects for the spouses of applicants. Using a comparison group approach we found effects on the magnitude of 5 to 10%. Using this approach the effects for husbands was at most 8% and for wives 11 %. Point estimates of the effect of DI on labor force participation for a marginal group of applicants around age 55 much larger. For wives they were 33% and 64% depending on the estimation method. The estimates for males are unreliable because of the loss in efficiency as a result of the small sample sizes.

Theory suggests that the spouses of rejected applicants work more in an attempt to mitigate the economic impact that the disability has on the household and this is what we find. There is however a differential impact on hours of work between husbands and wives. Husbands decrease their hours of work with benefit receipt. This is not the case, however, for wives. For wives that work, the actual number of hours supplied per week increases by 1 hours per week on benefit receipt. There are three reasons why beneficiary wives may increase their labor supply the first is that these women who continue to work (after their husband is deemed disabled and receives benefits) have very strong labor force attachment. They have worked full-time and they continue to do so even after their spouse become disabled. Second, those women that choose to work or remain at work have easy access to the labor market and this is reflected in the higher hours of work. Finally, because DI beneficiaries receive health insurance along with their monthly transfer payments, they are better able to afford home care for their spouse and therefore engage in market work.

To put these results in context, Berger (1983) found that wives with disabled husbands (who they assumed received DI benefits) decreased their labor supply and participation in response to a disability. Husbands, however, did not appear to alter their participation or hours in response to their wives disability. In a further study of wives only, Berger and Fleisher (1984) found that if no transfer payments are given to the disabled husband, the wife increases her market work by 5 weeks per year. If transfers replace pre-disability wages then the wife reduces her market work by 13 weeks per year. Our estimated upper bound is lower than those found in the literature while our RD estimates are much higher than those reported in the literature. While these effects are large, it is important to note that we are unable to unravel to what extent the decrease in labor supply is caused by an increased need for caregiving by the disabled spouse versus generous benefits provided by the DI program.

When we examine the effect of DI on the couple, we find that DI receipt has at most a 33 % decrease in the probability of either member of the couple working. This estimate suggest that DI has a large impact on household labor supply. DI benefits affect not only the recipient but also the spouse. These estimates are a preliminary investigation into the effect of DI on household labor supply and the role that the family plays in insuring (maintaining) income. Future work will develop and estimate a structural model of household labor supply DI program participation.

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Table 1: Descriptive Statistics for the Spouses of Applicants to the DI Program

| | **All Applicants** | **Stage 5 Applicants** |
|---|---|---|
| **Wives** | | |
| Age | 47.35 | 47.45 |
| High school | 42.09 | 45.74 |
| More than a High School Diploma | 48.40 | 48.91 |
| Non-white | 16.77 | 15.45 |
| Labor Force Participation | 49.52 | 50.50 |
| Monthly Hours of Work | 75.10 | 73.80 |
| Either Member Works | 55.57 | 56.83 |
| Both Members Work | 9.08 | 8.91 |
| Months Since Award Date | 3.39 | 3.24 |
| Number of Observations | 1157 | 505 |
| **Husbands** | | |
| Age | 48.67 | 48.22 |
| High school | 32.92 | 35.69 |
| More than a High School Diploma | 50.83 | 51.76 |
| Non-white | 17.63 | 17.25 |
| Labor Force Participation | 60.33 | 61.57 |
| Monthly Hours of Work | 108.05 | 107.63 |
| Either Member of Couple Works | 67.08 | 67.84 |
| Both Members Work | 11.29 | 10.20 |
| Months Since Award Date | 2.99 | 3.15 |
| Number of Observations | 726 | 255 |

Table 2: Characteristics by Award Status

| | All Applicants | | Stage 5 Applicants | |
|---|---|---|---|---|
| **Wives** | T=0 | T=1 | T=0 | T=1 |
| Age | 45.52 | 49.25 | 44.26 | 50.94 |
| High school | 42.37 | 41.80 | 46.97 | 44.40 |
| Greater than High School | 47.80 | 49.03 | 49.24 | 48.55 |
| Non-white | 18.14 | 15.34 | 16.29 | 14.52 |
| Labor Force Participation | 51.69 | 47.27 | 55.68 | 44.81 |
| Monthly Hours of Work | 77.88 | 72.21 | 80.92 | 66 |
| Weekly Hours of Work | 37.66 | 38.19 | 36.33 | 37 |
| Either Member Works | 61.53 | 49.38 | 66.67 | 46.06 |
| Both Members Work | 14.41 | 3.53 | 15.15 | 2.07 |
| Years Since Award Date | 3.48 | 3.30 | 3.26 | 3.22 |
| Number of Observations | 590 | 567 | 264 | 241 |
| **Husbands** | | | | |
| Age | 47.70 | 50.11 | 45.80 | 51.30 |
| High school | 36.18 | 28.08 | 42.66 | 26.79 |
| Greater than High School | 55.99 | 43.15 | 60.14 | 41.07 |
| Non-white | 20.74 | 13.01 | 18.18 | 16.07 |
| Labor Force Participation | 61.98 | 57.88 | 65.03 | 57.14 |
| Monthly Hours of Work | 111.91 | 102.31 | 115.34 | 97.79 |
| Weekly Hours of Work | 45.14 | 44.19 | 44.34 | 42.78 |
| Either Member Works | 70.51 | 61.99 | 74.13 | 59.82 |
| Both Members Work | 13.59 | 7.88 | 11.89 | 8.04 |
| Years Since Award Date | 3.05 | 2.90 | 3.41 | 2.81 |
| Number of Observations | 434 | 292 | 143 | 112 |

Table 3: Labor Supply Effects of DI on Spouses

| | All Applicants | Stage 5 Applicants |
|---|---|---|
| **Wives** | | |
| Labor Force Participation | -4.43 | -10.87 |
| Weekly Hours of Work | 0.53 | 0.49 |
| Either Member Works | -12.14 | -20.61 |
| Both Members Work | -10.88 | -13.08 |
| | | |
| **Husbands** | | |
| Labor Force Participation | -4.10 | -7.89 |
| Weekly Hours of Work | -0.95 | -1.55 |
| Either Member Works | -8.52 | -14.30 |
| Both Members Work | -5.72 | -3.85 |

Table 4. RD Estimates of Spousal Labor Supply Effects of DI

| | Labor Force Participation | |
|---|---|---|
| | CFE | Local Wald at 55 |
| Wives | -32.98 | -64.23 |
| | 20.80 | 27.70 |
| No. of obs. | 505 | 178 |
| Husbands | 7.98 | 23.33 |
| | 18.14 | 24.14 |
| No. of obs. | 255 | 70 |
| Either | -27.71 | -32.78 |
| | 12.92 | 18.44 |
| | 684 | 371 |
| Both | 9.11 | -0.76 |
| | 8.12 | 7.53 |
| No. of obs. | 684 | 241 |
| | Hours of Work | |
| | CFE | Local Wald at 55 |
| Wives | -68.53 | -106.84 |
| | 33.31 | 46.16 |
| No. of obs. | 505 | 178 |
| Husbands | 3.72 | 25.35 |
| | 34.59 | 44.52 |
| No. of obs. | 255 | 70 |

# Appendix

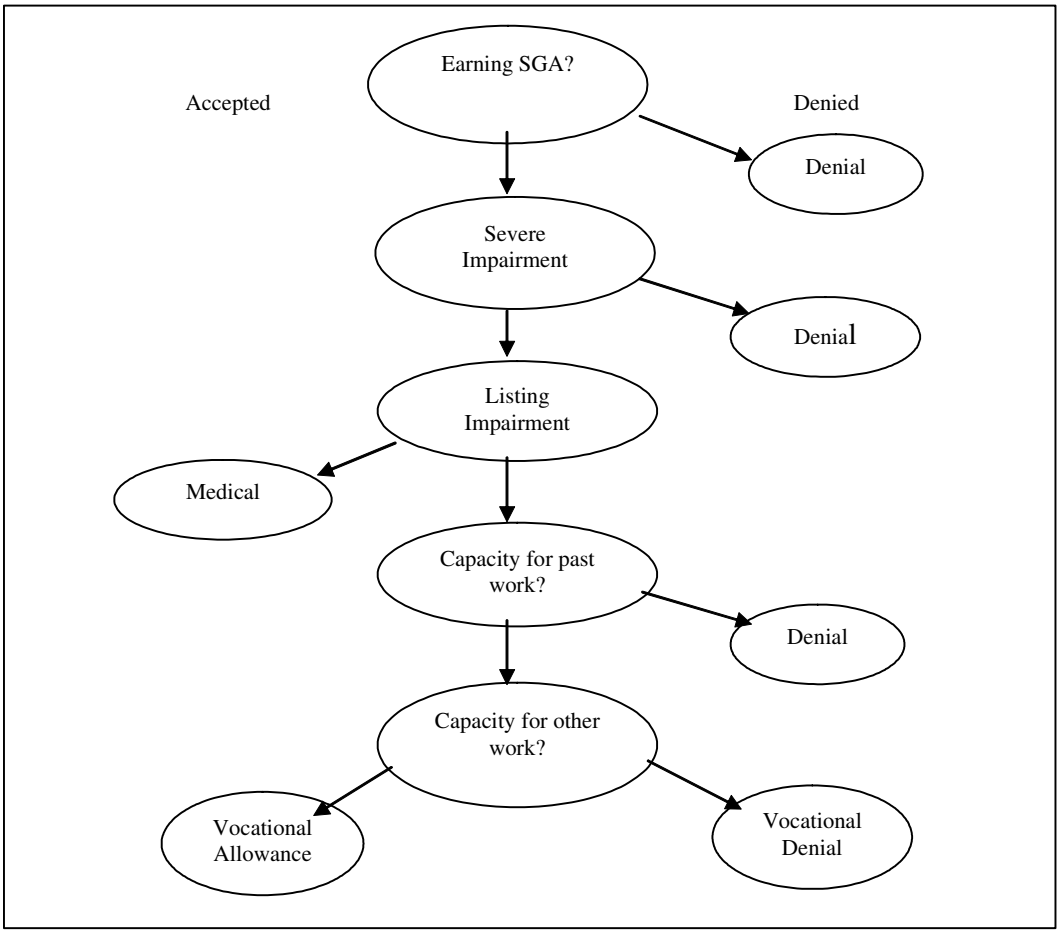


**Figure 1: The 5 Stages of the Social Security Disability Determination Process**

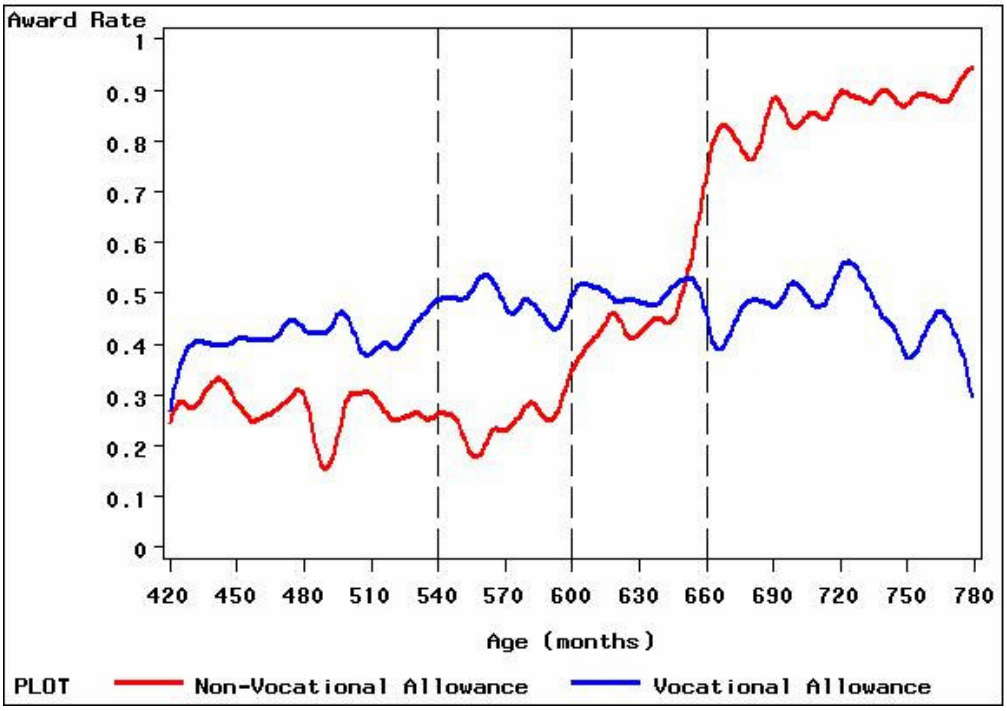


**Figure 2: Award Rate For Vocational and Non-vocational samples**

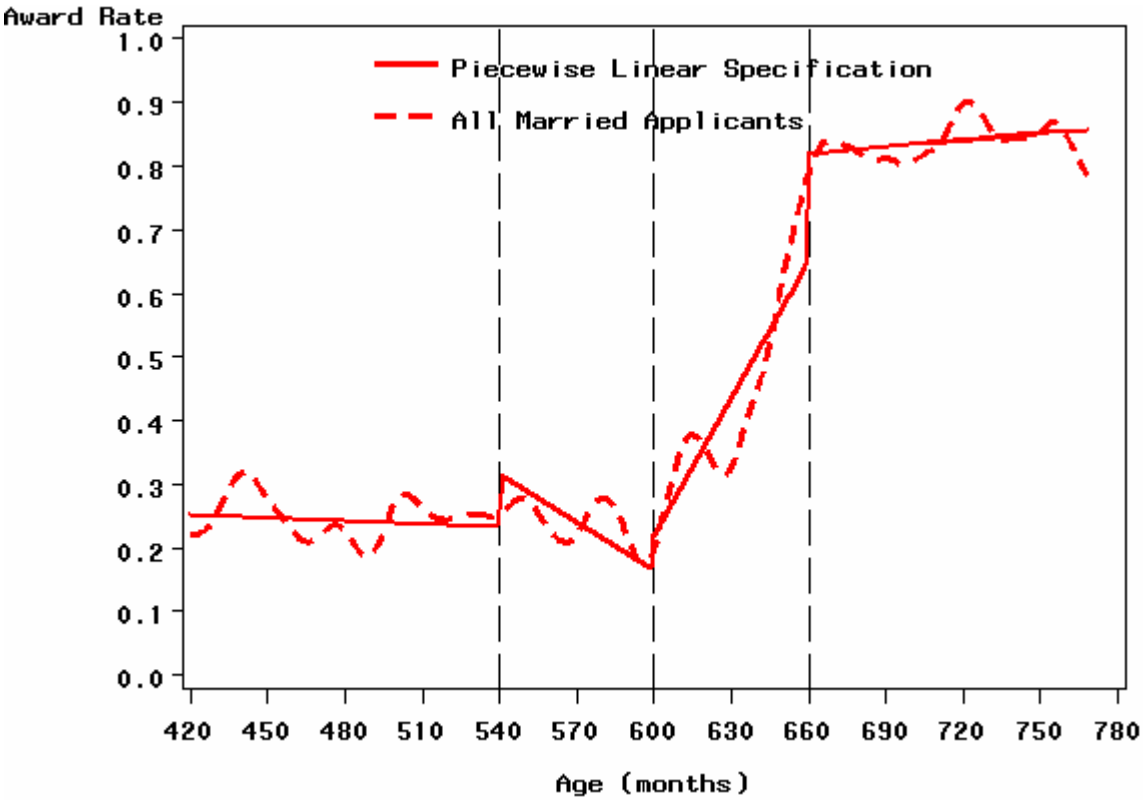


**Figure 3: Award Rate for All Married Applicants – Long Run Sample**

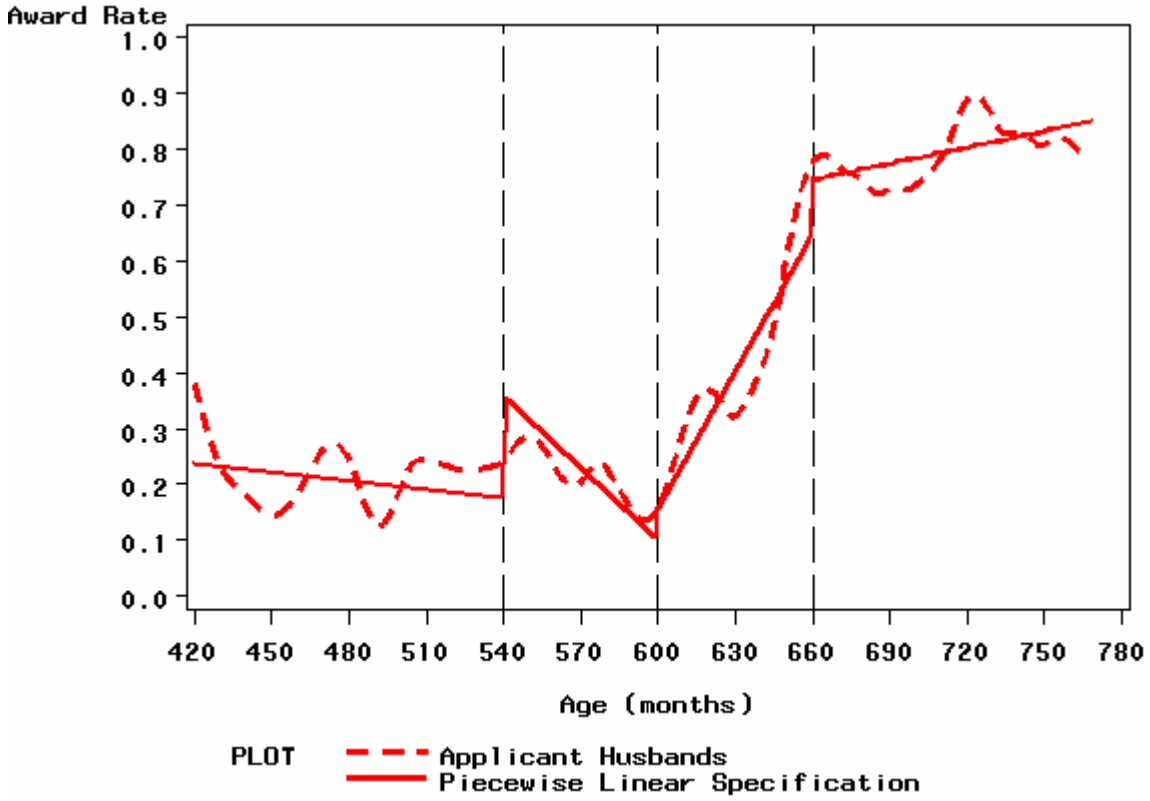


**Figure 4: Award Rate for Married Husbands – Long Run Sample**

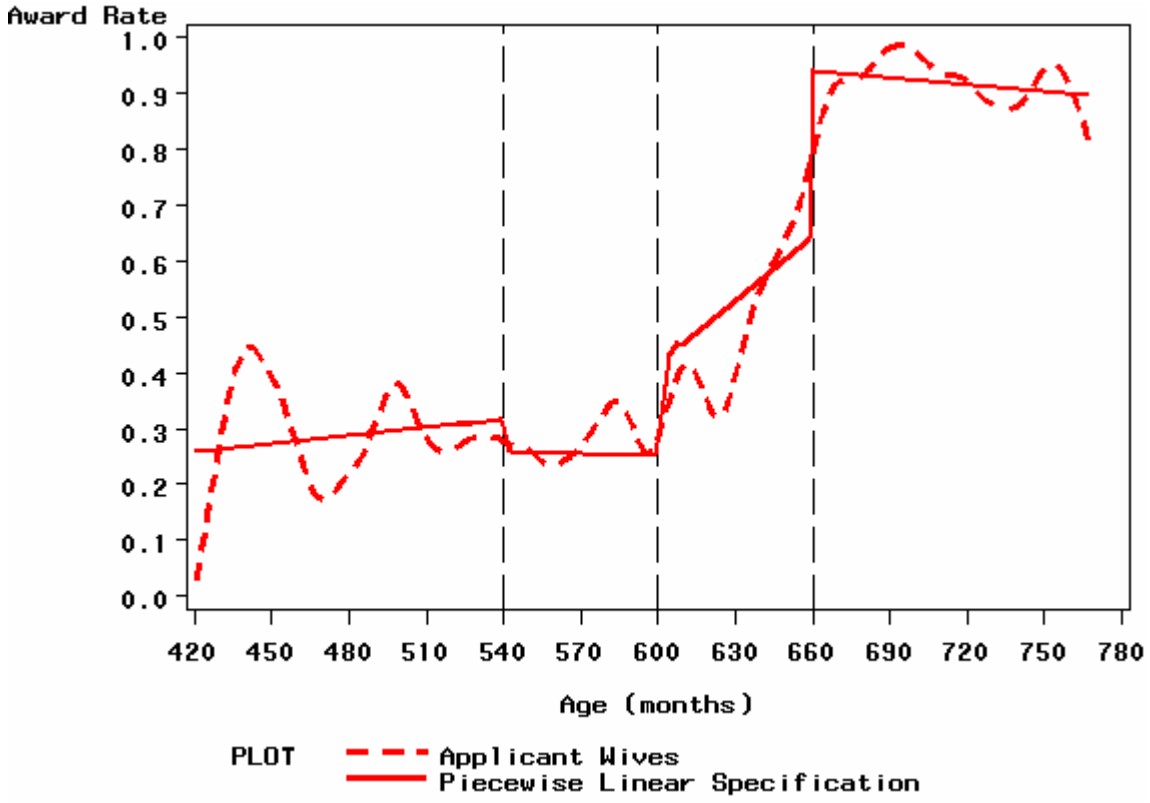


**Figure 5: Award Rate for Married Wives – Long Run Sample**

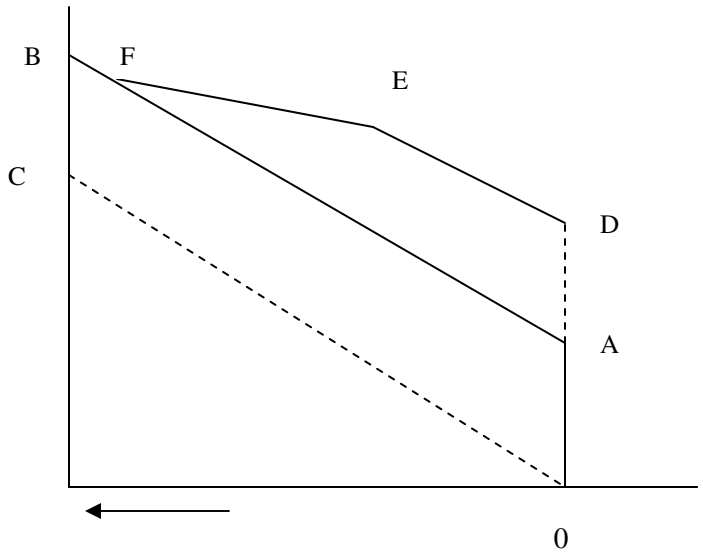


**Figure 6.: Primary Spouse Does Not Work**

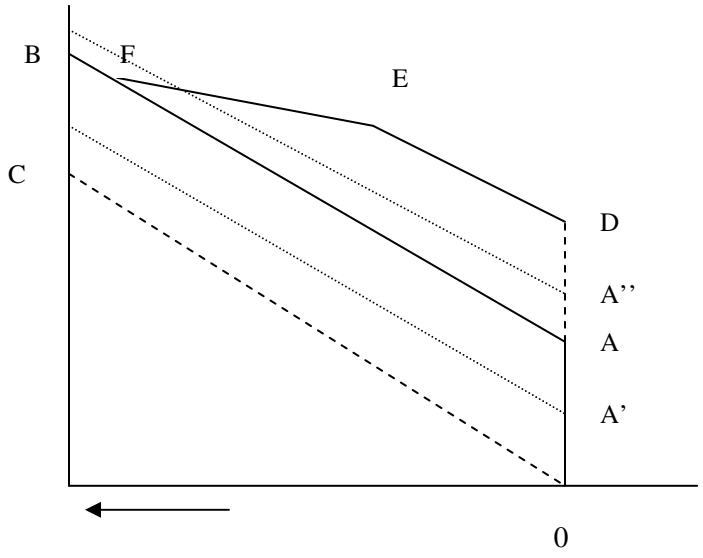


**Figure 7: Primary Spouse Works**

| 7th Through 11th Grade | | | | | |
|---|---|---|---|---|---|
| **Residual Functional Capacity** | **Age** | **Unskilled/None** | | **(Semi) Skilled/Non-transferable** | |
| | **60-64** | **D** | | **D** | |
| | **55-59** | **D** | | **D** | |
| **SEDENTARY** | **50-54** | **D** | * | **D** | * |
| | **45-49** | **N** | | **N** | |
| | **18-45** | **N** | | **N** | |
| | | | | | |
| | **60-64** | **D** | | **D** | |
| | **55-59** | **D** | * | **D** | * |
| **LIGHT** | **50-54** | **N** | | **N** | |
| | **45-49** | **N** | | **N** | |
| | **18-45** | **N** | | **N** | |
| | | | | | |
| | **60-64** | **D** | | **N** | |
| | **55-59** | **N(D)** | | **N** | |
| **MEDIUM** | **50-54** | **N** | | **N** | |
| | **45-49** | **N** | | **N** | |
| | **18-45** | **N** | | **N** | |

**Figure 8: Excerpt from the Medical Vocational Grid (D=Disabled, N=Not Disabled)**

| Illiterate or No Fluency in English | | | | | | 1-6th Grade | | | | 7th Through 11th Grade | | | | High School or Above | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Residual Functional Capacity | Age | Unskilled/None | | (Semi) Skilled/Non-transferable | | Unskilled/ None | | (Semi) Skilled/Non-transferable | | Unskilled/None | | (Semi) Skilled/Non-transferable | | Unskilled/None | | (Semi) Skilled/Non-transferable | |
| | 60-64 | D | | D | | D | | D | | D | | D | | D | | D | |
| | 55-59 | D | | D | | D | | D | | D | | D | | D | | D | |
| SEDENTARY | 50-54 | D | | D | * | D | * | D | * | D | * | D | * | D | * | D | * |
| | 45-49 | D | * | N | | N | | N | | N | | N | | N | | N | |
| | 18-45 | N | | N | | N | | N | | N | | N | | N | | N | |
| | | | | | | | | | | | | | | | | | |
| | 60-64 | D | | D | | D | | D | | D | | D | | D | | D | |
| | 55-59 | D | | D | | D | * | D | * | D | * | D | * | D | * | D | * |
| LIGHT | 50-54 | D | * | D | * | N | | N | | N | | N | | N | | N | |
| | 45-49 | N | | N | | N | | N | | N | | N | | N | | N | |
| | 18-45 | N | | N | | N | | N | | N | | N | | N | | N | |
| | | | | | | | | | | | | | | | | | |
| | 60-64 | D | | N | | D | | N | | D | | N | | N | | N | |
| | 55-59 | D | * | N | | N(D) | | N | | N(D) | | N | | N | | N | |
| MEDIUM | 50-54 | N | | N | | N | | N | | N | | N | | N | | N | |
| | 45-49 | N | | N | | N | | N | | N | | N | | N | | N | |
| | 18-45 | N | | N | | N | | N | | N | | N | | N | | N | |

**Figure 9: The Medical Vocational Grid (D=Disabled, N=Not Disabled)**

## Table A1: Award Rates for Married Female Applicants

| | |
|---|---|
| Cutoff at 45 | -0.013 |
| | 0.145 |
| Cutoff at 50 | -0.034 |
| | 0.191 |
| Cutoff at 55 | 0.4 |
| | 0.155 |
| Constant | 0.501 |
| | 0.558 |
| Age | -0.005 |
| | 0.012 |
| N | 255 |