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**Tax Rates and Work Incentives in the Social Security Disability Insurance Program:
Current Law and Alternative Reforms**

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ABSTRACT

This paper examines the work incentives in the Social Security Disability Insurance (SSDI) Program under current law and proposed reforms. We begin with a discussion of the expected effect of the program on work effort according to the basic static labor supply model. In addition, we provide a numerical simulation that shows the magnitude of the monetary incentives provided by current law and the reforms for different categories of individuals. We find that the proposed reforms have ambiguous effects on work effort and could, contrary to perceived wisdom, possibly reduce work effort and increase the number of SSDI recipients.

JEL Classification: J3, H2

INTRODUCTION

Both academic and policy interest in the disabled and in disability programs in the U.S. have increased in the last decade. Public support for greater employment of disabled individuals has increased and has resulted in a major piece of legislation, the Americans with Disabilities Act (1990), encouraging employers to accommodate the disabled. At the same time, the caseloads of many disability programs have been growing, most notably that of the Social Security Disability Insurance (SSDI) program. For example, between 1985 and 1995, the number of disabled workers receiving SSDI increased by over 50 percent. The cause of this increase is still only imperfectly understood but it has generated increased interest in the work disincentives of the program. Added to the general societal trend of an increased expectation that recipients of all welfare programs should work, this has led to considerable discussion of methods by which work levels of the disabled and of disability recipients can be increased.

The SSDI program has long been criticized by economists for its work disincentives. The program has traditionally attempted to make a sharp categorical distinction between those who are "disabled" and therefore not expected to work, and those who are "not disabled" and therefore expected to work. But the definition of "disability" is based not only on the presence of a disabling condition but also on the level of earnings itself; for an individual to be deemed "disabled" requires that earnings be below a fixed threshold (called the 'substantial gainful activity' amount of earnings, or SGA, currently set at \$500 per month). Earnings above this threshold are taken to imply the absence of disability and therefore ineligibility for program benefits, thus resulting in a notch in the budget constraint where the tax rate exceeds one hundred percent. Since the program was originally introduced, however, the rules have been relaxed to provide some direct financial incentives; these rules allow recipients to work without penalty for a fixed period of time (i.e., with a tax rate of zero) and permit a second fixed period of time during which tax rates return to 100 percent but recipient eligibility files are kept "open" to allow the recipient to easily come back onto the rolls should their earnings fall. Those rules are still in place

but there continue to be additional proposals for greater reductions in work disincentives, either by further reductions in the tax rate or by other means. For example, in the last two or three years, at least three bills were brought to the floor of the U.S. Congress outlining options for reforming the work incentives of the SSDI program.¹

In this paper we analyze both the rules in the current program that attempt to provide work incentives as well as many features of these recent proposed reforms, both theoretically and empirically. Theoretically, we show the implications for work effort of each rule or reform suggested by the basic economic model of labor supply. Empirically, we report the results of numerical simulations showing how the budget constraint is affected by each of the reforms--that is, how take-home income is affected at different levels of hours of work--for different types of individuals. Although we do not provide simulations of actual changes in work effort, because that would require information on income and substitution elasticities which are not available from the literature, our simulations nevertheless show that, surprisingly, the financial incentives implied by some of the reforms are not as strong as expected and may even be in the wrong direction. However, we also provide simulations of the effects of a different type of reform--earnings subsidies--which have quite different, and more favorable, effects.

The outline of the paper is as follows. In the next section, we discuss the rules of the SSDI program governing eligibility and benefits, with a focus on those related to work incentives. We also describe what is known about work patterns among current SSDI recipients. In the third section, we analyze the expected labor supply effects of the SSDI rules, and what the existing literature has to say about their magnitudes, and also provide numerical simulations of the magnitudes of the financial incentives. In fourth section, we discuss the expected effects of various reforms and show their simulated financial incentives. We draw our conclusions in the last section.

ELIGIBILITY AND BENEFITS OF SSDI

The SSDI (henceforth simply 'DI') program is part of the Old-Age, Survivors, and Disability

Insurance (OASDI), or Social Security, program. Disability benefits were added to the retirement program in 1957 and are designed to provide partial earnings replacement to all workers under 65 who sustain severe, long-term (typically career ending) disabilities.² All workers covered under Social Security (about 95 percent of the U.S. work force) are also covered for DI benefits and financing for the program comes out of employer and employee paid FICA taxes. In 1995, the DI program provided benefits for about 4.2 million disabled, non-aged individuals and their families for a total cost of 40.9 billion dollars (U.S. House of Representatives, 1996).

Throughout the program's history, the determination of an individual's disability status has depended on an assessment of ability to work. Specifically, disability is defined as "the inability to engage in any substantial gainful activity by reason of medically determinable physical or mental impairment which can be expected to result in death or which has lasted or can be expected to last for a continuous period of not less than twelve months" (Social Security Administration, 1992). Therefore a medical definition of disability is not sufficient for benefit receipt. Instead, initial and continuing eligibility is tied to the ability to work. Substantial gainful activity (SGA) is defined as a threshold level of earnings, which is currently set at \$500 per month.³

In addition to meeting the definition of disability, initial eligibility for DI requires having sufficient work history in jobs covered by Social Security.⁴ The DI benefit is equal to 100 percent of the worker's primary insurance amount (PIA), which is a function of the individual's earnings history in Social Security covered employment.⁵ This benefit can be significant in size, and is typically equal to the full value of the worker's potential Social Security retirement benefit. In 1993, DI benefits for disabled workers averaged \$642 per month. The PIA calculation is based on a progressive structure under which high wage workers obtain lower earnings replacement rates than lower wage workers. The replacement rate in 1994 ranges from 78 percent for workers with low average monthly earnings (\$500) to 29 percent among workers with high monthly earnings (\$4500) (U.S. House of Representatives 1994).⁶

Current law allows recipients who wish to work to pass through up to three different phases of

DI receipt. First, there is a five month waiting period after disability begins before benefits can be received (although there is no waiting period if the individual returns to the rolls within five years of leaving). If the recipient never works thereafter, the subsequent phases are never entered. Second, a trial work period (TWP) allows for up to nine months of work over a 60-month calendar period. A month is counted as a trial month (and therefore toward the limit of nine months) if the individual earns over \$200 in the month.⁷ During the TWP, benefits are provided in full regardless of the level of earned or unearned income. This phase, referred to in the Introduction, relaxes the strict application of the SGA rule and was introduced in 1960 in order to let recipients test their ability to work without danger of losing benefits. Third, individuals who accumulate nine months of work in the TWP have their case reviewed; if the work is judged to not be "SGA" (generally meaning that it reflects an ability to earn more than the SGA monthly threshold), they are allowed to continue on the rolls as before with the requirement to stay below SGA to retain eligibility. But if the work in which they have been engaged is "SGA", benefits are provided in full for a subsequent grace period lasting three months and then a 36-month period follows called the extended period of eligibility (EPE).⁸ During this period, benefits are provided in full if earnings (net of allowed deductions) are less than SGA, but are reduced to zero if earnings are over SGA. Thus a strict SGA rule is applied, but the recipient's file is kept open and eligibility does not have to be completely reestablished if earnings fall below SGA. This rule is designed to allow recipients who do not succeed in maintaining a steady flow of above-SGA earnings to receive benefit support quickly and easily when their earnings fall. In the absence of the EPE program, a recipient who had some above-SGA earnings would be considered non-disabled and therefore, should earnings fall, would have to go through the burdensome and costly process of reapplying for the program and reestablishing eligibility before benefits could be resumed.⁹ After the EPE is exhausted, the individual is dropped from the rolls if he has achieved SGA more or less continually. If the individual has achieved SGA only part of the time, he must file a new application to show that he is still disabled. If he has never achieved SGA (despite having exceeded it during the TWP), the EPE is extended

indefinitely but as soon as he achieves SGA, he is dropped from the rolls. The EPE, which is designed to provide insurance to the recipient should he continue to try to establish himself in the private labor market with steady earnings, was introduced in 1980.¹⁰

This structure leads to a complicated sequence of marginal tax rates over time. An increase in earnings will increase income but it may be offset by reductions in transfer benefits and other taxes. During the TWP, for example, the marginal tax rate (MTR) is zero implying that there is no change in benefits in response to a change in earnings or hours. During the EPE, the SGA rule is reintroduced and the MTR is zero for earnings changes below SGA but exceeds 100 percent for earnings increases that exceed SGA, thus creating a "notch." However, the EPE is best thought of as part of the TWP and, as we will show below, the more relevant calculation is the MTR on the combined TWP and EPE periods. In addition, the insurance aspects of the TWP and EPE provide work incentives which must also be considered by examining the combined periods.

The existing evidence on work while on the SSDI rolls suggests that enough work occurs to make these work incentives relevant for a non-trivial fraction of the caseload. Most of what is known comes from survey data on a cohort of new beneficiaries that was begun in the 1980s.¹¹ Overall, although only 12 percent of new recipients initiate some work at some point while receiving benefits, a significant fraction of the nonworkers are recipients who quickly reach retirement age and are transferred from the DI rolls to the Social Security retirement benefits program. If this group (40 percent of new recipients) is excluded, 20 percent of the remaining non-retirement-bound group experienced some work. Several important facts emerge about these workers that will be important for our numerical simulations reported in the next sections. First, conditional on working, most work full-time full-year: 61 percent work more than 35 hours per week and 60 percent work more than 37 weeks per year. Second, "success" is common: 26 percent of beneficiaries who initiate some work are eventually terminated from the rolls because their earnings exceed SGA.¹² Those workers who are ultimately successful at leaving the rolls tend to have continuous employment spells – their TWP period lasts nine months and they have

earnings over SGA for the entire EPE. Among those who succeed in leaving the rolls, the mean time from entitlement to termination is 2.4 years. The length of time until the first post-entitlement job varies considerably across recipients -- 40 percent of workers obtain a job within the first year while more than ten percent initiate the first job after more than five years on the rolls. However, the evidence suggests that the length of time out of the labor force is not a significant determinant of ultimate success in leaving the rolls.

EFFECTS OF DI ON LABOR SUPPLY

Expected Effects of Work Incentive Provisions

The DI program is designed to replace (or supplement) earnings for workers who are unable to engage in "substantial gainful activity." However, as long as individuals with a disabling condition can alter their earnings by exerting different amounts of effort, the program will have work disincentives, just like all income-conditioned transfer programs, because it will induce some individuals to go onto DI rather than work. It is generally thought that these work disincentives can be reduced, though not eliminated, by low tax rates, and hence the high MTR in the DI program may create larger work disincentives than are necessary.

The framework within which work incentives of transfer program tax rates are generally analyzed is the conventional income-leisure model. That model uses the assumption of utility maximization to justify the common-sense presumption that individuals trade off the amount of take-home income they would have for different levels of hours of work with the desire for and difficulty involved in that work. As an empirical matter, the model implies that the choice of how much to work is based partially upon how much take-home income is gained by working various amounts--or by how much is gained by working less, in the case of some transfer programs. The model assumes that the individual knows his wage rate with certainty, and hence insurance considerations are ruled out; we will discuss those separately below.

To apply the model, consider a population of disabled individuals eligible for the DI program.¹³ Let us also initially consider each of the DI phases as if work choices were made separately within each. Later we consider the combined effects of the phases of program. In the first phase, the individual decides whether to go onto the rolls by applying for DI. Earnings must necessarily be low during the application and waiting periods which will lead to lower work effort.¹⁴ Second, during the TWP, benefits are received in full regardless of earnings and the MTR is zero. DI benefits therefore generate a simple income effect, which reduces labor supply assuming leisure is a normal good. Third, during the EPE, the labor supply effects illustrated in Figure 1 are generated. The budget constraint ADE (slope equal to the hourly wage rate) applies in the absence of the DI program, whereas ABCDE applies during the EPE; the benefit amount is AB, the SGA level of earnings is noted on the vertical axis, and the notch at point C is where eligibility ends. The MTR is over 100 percent at this point. This is also the budget constraint for what might be termed a "strict" SGA program, with no EPE and no TWP—that is, the constraint that applied before those programs were introduced. A negative income effect, illustrated by arrow 1, plus a substitution effect generated by reductions in labor supply to obtain benefits, illustrated by arrow 2, both lower labor supply. Thus the DI program, like all transfer programs, can be expected to reduce labor supply.

A possibly more relevant question is whether the TWP and EPE provisions reduce these work disincentives relative to those present in a "strict SGA" program in which they are absent. As shown in Figure 2, introducing the TWP into a strict SGA program extends the budget constraint BC up to E, as illustrated by the dotted line, during the TWP period. However, while this induces some individuals to work more, as illustrated by arrow 1, it lowers labor supply for others, as illustrated by arrow 2. The latter effect would occur if some individuals come onto DI after the TWP is introduced and thus represents what is sometimes called a program "entry" effect. More accurately, an individual initially working above SGA off the rolls would come onto DI (and reduce labor supply given the pure income effect) to take advantage of the TWP if the advantage of the nine months of TWP benefits outweighs the

loss of earnings during the eligibility and waiting periods; thus it is the relative advantage of the combined period that is relevant (as our calculations below will show). This makes the effect of the TWP on labor supply ambiguous in sign, contrary to the presumption among policy-makers that it would unambiguously increase labor supply. If the work-increasing effect among current recipients was small enough, and the entry effect was large enough, average labor supply could fall. It is also clear from the diagram that the DI caseload would unambiguously rise, at least on average, since the entry effect increases the caseload while the work-increasing effect does not affect it.

The ambiguous effect of the TWP on labor supply is closely analogous to an ambiguous labor-supply effect of lower marginal tax rates in the Aid to Families with Dependent Children (AFDC) program, the negative income tax, and other transfer programs (Levy, 1979; Moffitt, 1992). In those programs, a reduction in the MTR raises the "break-even" level and draws some individuals onto the rolls, thereby partially or fully offsetting whatever labor-supply-increasing effects arise from an increase in work effort among individuals initially on the rolls.

The introduction of the EPE by itself has no effect in the static labor supply model if a strict SGA program is already in place since it is equivalent in that model to a strict SGA—if earnings are above SGA, no benefits are paid and if earnings are below SGA, benefits are paid. To consider the effects of the EPE for which it—and, in fact, the TWP—was designed, it is necessary to consider an alternative model with earnings uncertainty, learning, and fixed costs of reapplying for SSDI benefits. If a recipient is unsure of his earnings capability and chooses to work above SGA for some period to 'test' that capability, eligibility for SSDI would be lost completely in the absence of the TWP and EPE. Should the individual learn that he is not capable of sustaining above-SGA earnings, he would have to reapply for benefits, with an uncertain outcome and with attendant heavy reentry costs (see n.9). In the presence of the EPE, benefits could be automatically resumed without having to reestablish eligibility. Thus the EPE provides insurance against the substantial losses that would follow from an outcome of low earnings, and hence should encourage the recipient to go out to work to test his earnings capability. The TWP, which

is nine months long, can be thought of as the program's initial estimate of how long it would take the recipient to learn whether he is capable of above-SGA earnings, and hence can be thought of in the same terms.

In this model, therefore, the TWP and EPE have potential work-increasing effects, just as the static labor supply model implies the TWP alone to have for individuals who were initially at kink C in Figure 2, and hence some increase in labor supply should result. In addition, some fraction of those who are induced to work by the insurance value of the TWP and EPE will eventually exit the rolls--having learned that they are capable of above-SGA earnings--which will also lower the caseload. This is to be contrasted with the implications of the Figure 2 analysis of the TWP, which implies that the increase in labor supply represented by arrow 1 would not lower the caseload because that work occurs while on the rolls.

However, the addition of the insurance value to the DI program also increases the value of the program, relative to being off the program, and therefore increases the expected income and utility gains from entering the rolls. This can be expected to increase entry onto the program, which should increase the caseload. Just as in the static labor supply model, where the TWP makes the program more attractive because income while working is subsidized on the rolls but not off the rolls, offering an insurance program against income loss which is available for those on DI but not off DI increases the attractiveness of the program. The net effect of the TWP and EPE on the caseload is, therefore, ambiguous in sign and depends on the relative magnitudes of the caseload-decreasing and caseload-increasing effects. Likewise, because entry onto the rolls reduces labor supply, the net effect of the TWP and the EPE on labor supply is ambiguous in sign, just as it is in the static labor supply model.

Finally, it is worth noting that while the ambiguous effects of the TWP and the EPE on average labor supply have been discussed in terms of possible offsetting entry effects, offsetting effects could also show up, statistically, in reduced program exit rates. Exit from the DI rolls occurs naturally over time as individuals' opportunities off the rolls fluctuate and sometimes improve. The TWP and EPE alter

an individual's incentive to take advantage of those opportunities and to leave the rolls. In the static labor supply model, introducing the TWP can be expected to reduce the exit rate during the TWP period because income opportunities are now higher than they were under strict SGA. In the insurance model, the TWP and EPE can be expected to reduce the exit rate prior to beginning the TWP, because exiting at this point would mean foregoing the insurance benefits of testing one's earnings capability. It would also reduce the exit rate during the EPE period as individuals are more reluctant to leave during the rolls because they will have to incur fixed costs of reestablishing eligibility should they wish to come back on.¹⁵ Since labor supply off the rolls is higher than on the rolls, labor supply is reduced in both cases by the fall in the exit rate. Thus the offsetting factors from introducing the TWP and EPE, if they are present, may show up in both increased entry to, and decreased exit from, the program. We shall simulate numerically the amounts by which the TWP and EPE increase the income gains from entry and increase the income losses from exit below.

Evaluating Work Incentive Provisions Using Existing Research

To evaluate the work incentive provisions of the DI program, we need to know the sensitivity of recipient work effort to changes in net wages (or MTRs) and in income opportunities. To estimate the magnitudes of possible entry and exit effects, we also need to know how potentially eligible individuals respond to changes in MTRs and benefit levels and how recipient exit decisions respond to those variables. Unfortunately, the existing empirical research does not provide estimates of the substitution and income effects needed to make these calculations.

Many empirical studies have examined the effect of DI benefits level on program participation (or caseload size).¹⁶ Participation in DI is typically estimated as a function of the potential DI benefit -- imputed for those not on the program-- and individual characteristics such as age and education, and area characteristics. The main parameter of interest, the elasticity of DI participation with respect to the DI benefit, varies widely in the literature, ranging from 0.06 to 1.80, but is almost always positive. This

implies that entry and exit are positively affected by the financial gain to participation.

These results, while important for some applications, fall significantly short of what is needed to estimate the effect of the TWP, the EPE, or proposed changes to these work incentive provisions. In the absence of direct evaluations of the TWP, for example, inferences about its effects could be made only by estimating the number of individuals who would prefer to work above SGA but still receive benefits; and wage elasticities as well as income elasticities are needed for this prediction. The marked absence of attempts at estimated wage elasticities is, in fact, the major defect of this literature for assessing the effectiveness of work incentive provisions.¹⁷ Furthermore, in these studies, participation in DI is considered equivalent to non-participation in the labor market. This rules out examining the sort of responses shown by the arrows on Figures 1 and 2. Nor is there any evidence from demonstration or related research on the elasticities of entry and exit rates with respect to the presence of work incentive provisions.

Income, Earnings and Tax Rates Under Current Law: Simulations

Although the existing DI literature does not permit us to make reliable predictions for the net work effort and caseload effects of the work incentive provisions, we can obtain some notion of the incentives to work and take-up DI benefits by calculating the income gain or loss associated with different work effort levels and program participation statuses, and the implicit tax rates that result. We shall therefore provide numerical simulations of those variables for individuals with different benefit and wage levels. However, the preceding analysis has made clear that individual decisions are no doubt made not within each phase alone, but taking into account all phases together. Therefore we shall be most interested not in the monthly MTRs within, say, the TWP or the EPE, but rather the implicit MTR which applies to an entire sequence of labor supply values over all phases of DI receipt. This will become clearer momentarily.

We set up a simulation model which is as simple as possible to capture the effects we have been

discussing. Whenever possible, we use the available information on the characteristics of DI recipients to choose reasonable values for model parameters. We consider an individual at the time of onset of disability. The disabled individual is assumed to be out of labor force for 12 months-- five months for the waiting period and 7 more months for "recuperation"--before the option of reentering the workforce is possible. We will vary this assumed recuperation period as a sensitivity test.¹⁸ We then consider the consequences of entering the workforce at some specific level of work. We consider five work level alternatives: no work, ten hours per week, 15 hours week, 20 hours per week or 40 hours per week.¹⁹ To simplify the calculations, we assume, for our initial simulations, that the recipient continues with this level of work effort indefinitely. We later simulate different patterns of changing work.

We consider a recipient's time horizon over a period of 57 months, representing the minimum time an individual would need to complete all phases of DI receipt, all the way to the end of the EPE.²⁰ In each month, we calculate a recipient's earnings and DI benefit given the program rules, his wage, work effort, and benefit level. We consider the wage and benefit levels associated with three types of workers. "Low wage" workers are those who worked at the federal minimum wage for their entire work history; "medium wage" workers have earned the average wage over their career; and "high wage" workers have earned 150 percent of the average wage for their career. Each of these three types of workers is assigned the appropriate DI benefit that results from this work history.²¹ Further we assume that the onset of the disability reduces the wage by 25 percent (Bound, 1989), although we vary this amount as well as a sensitivity test.²² Continuing DI eligibility and applicable benefit payments are then calculated each month using the rules outlined in section two. Each period, both wages and benefits are adjusted for nominal wage growth at an average annual rate of five percent. This is the intermediate assumption used for the projections of the Social Security Trust Fund (U.S. House of Representatives, 1994). Finally, we calculate the present discounted value of the income and earnings stream for each of the three benefit-wage scenarios for each of the labor supply choices using a nominal discount rate of seven percent.^{23 24}

Appendix Tables A-1 and A-2 summarize our calculations, and Table 1 and Figure 3 show the

main features. We show calculations both for the current program and for a strict SGA program (that is, without the TWP and EPE). The Appendix tables show the actual discounted present values of earnings, benefits, and net income for the different types of workers, and these are graphically illustrated in Figure 3 for a medium-wage worker. Under current law, the figure shows that as hours of work for the medium wage worker increase from zero to ten per week, the present discounted value (PDV) of net income increases because earnings stay below SGA (the PDV of benefits therefore remains unchanged); but income then drops drastically with further hours of work because the SGA is exceeded and hence benefits drop to zero at the point at which the individual passes from the TWP into the EPE. Additional increases in labor supply increase total income because earnings go up and the PDV of benefits--from the initial 12-month period and the 9-month TWP--are unchanged.

Table 1 shows the marginal and average tax rates corresponding to the figure for all three types of workers. The MTR is zero for both the low-wage and medium wage workers up to ten hours per week, but the SGA is hit between 10 and 20 and hence MTRs exceed 100 percent. The high-wage worker hits the SGA between 0 and 10 hours per week instead. Average tax rates, which are more relevant for the nonworking DI recipient who is considering making a discrete jump to either 10, 20, or 40 hours per week, are often lower because the notch has less of an effect (since a wider range of the budget constraint is considered).²⁵

Under a strict SGA program, a comparison of the two panels in Figure 3 shows that income is lower than under current law for hours of work greater than ten per week because the TWP allows nine months of benefits while working, which is not allowed under a strict SGA program. This has two implications. First, it means that a strict SGA program would have higher MTRs and ATRs than under current law, and this is illustrated in Table 1. The difference is often large--MTRs often exceed 200 percent--and it could be expected that some initially non-working recipients would increase their labor supply as a result of current law (compared to a strict SGA program). Second, however, the higher net income amounts at hours greater than ten implies that the DI program is more attractive under current law

than it would be under a strict SGA program, and this can be expected to increase entry and decrease exit, thereby increasing the caseload and resulting in a net reduction in work effort by those who fail to exit and who newly enter. As shown in Appendix Tables A-1 and A-2, the increase in the PDV of income is often on the order of 15-30 percent at these hours of work. To take one example, under current law a medium-wage worker who leaves a 20-hour-week job to go onto DI to work 15 hours per week during the TWP period and after would experience a 27 percent increase in net income, despite the lower work level; whereas under a strict SGA program he would experience a six percent loss in net income.²⁶ Obviously he would be less likely to go onto DI under a strict SGA. This necessarily implies as well that a DI recipient who has chosen to work 15 hours per week during the TWP and who locates a 20-hour-per-week job off DI would lose income under current law if he leaves the rolls to take that job but would gain income under the strict SGA program.

We conducted several sensitivity tests to this model and found none that affected the qualitative nature of the features that we have highlighted. For example, extending the recuperation period from 12 months to 24 months--which may be more realistic for the existing caseload (Hennessey 1996)--lowers the present value of earnings and raises the present value of benefits in all cases.²⁷ However, the differences across hours of work categories, and hence tax rates, are little affected, nor are comparisons across different types of programs (current and strict SGA) much affected because the longer recuperation period merely means that the TWP and EPE play themselves out at slightly later dates and hence are both slightly more highly discounted. While the relative attractiveness of current law versus a strict SGA program falls when recuperation is extended to 24 months, the TWP-EPE differences across the two panels in Figure 3 are not changed by more than \$200 by this type of alteration. Likewise, changing the real discount rate from two percent to ten percent lowers all present values but has little effect on tax rates or on the comparisons we have made. Finally, altering the percent reduction in the wage due to disability has effects very similar to the differences shown in Table 1 for different wage workers. Greater wage reductions than the 25 percent we have assumed in our base case make the

results look more like lower wage workers, and smaller wage reductions than 25 percent do the opposite.

As we noted earlier, these comparisons between the current program and a strict SGA program ignore the insurance benefits of the former and, because we assume continuous work effort, the EPE plays no role in the comparisons in these tables. To gauge the importance of the insurance aspect of the EPE we conduct simulations in which hours of work are not constant but rather are at a given level during a "test" period and then, at the end of that period, either remain at that level for the indefinite future or fall to some lower level with some probability. In our base case, we assume that the test period is 12 months--the length of the TWP (including the three-month grace period)--and that earnings during that period are at the levels we have been simulating thus far (low, medium, or high). At the end of the TWP we assume that, with 50 percent probability, the individual either maintains potential earnings at the same level or experiences a drop in potential earnings to zero. We then calculate the expected present discounted value of income under different policies. As departures from this base case, we also consider a 24-month test period (i.e., the assumption that it takes that long before the uncertainty is resolved) and, in a different scenario, that earnings fall by only 25 percent in the "bad" outcome at the end of the test period. These parameters reflect program data: initial job spells average 18 months in length and about half of the individuals succeed at keeping the job (Hennessey 1996).

The left panel of Figure 4 shows the expected present value of DI benefits (over the entire 57-month horizon) in our base case earnings uncertainty simulation under three different programs--the current program, the current program without the EPE, and a strict SGA program--for a medium-wage individual who works 20 hours per week during the 12-month test period (and therefore also 20 hours during the rest of the period with 50 percent probability but zero hours with 50 percent probability). The "current program without the EPE" is defined as a program which offers full benefits during the TWP but, if above-SGA work occurs after that, the individual loses eligibility entirely and must go through the reapplication process. Under a strict SGA program, the expected present value of DI benefits is only around \$6,000 because eligibility is completely lost after the first month of work--15 hours per week puts

the individual over SGA--and is never regained, even if the individual has a zero-hours outcome at the end of the test period. The \$6,000 is simply the present value of benefits before work begins. Under the current program, with or without the EPE, the present value of benefits is almost \$14,000 higher because the TWP provides nine months of benefits and, half of the time, another 36 months of benefits if the individual is unsuccessful in his attempt to work. This therefore imparts a sizable incentive to attempt to work and would lead to some exits from the program, namely, for those who are successful. The EPE does not affect expected benefits here since all earnings uncertainty is resolved during the TWP. By the EPE they are either over SGA for all months or under SGA for all months.

The right panel of Figure 4 shows comparable calculations under the assumption that the test period takes 24 months instead of 12. Now the presence of the EPE makes a difference because, under the current program without the EPE, eligibility would be lost since above-SGA work occurred after the end of the TWP, even if earnings dropped to zero after 24 months. With the EPE, if earnings drop below SGA, benefits are re-instated. Thus the present value of benefits rises from the strict SGA program to the current program without EPE, and then again once the EPE is added. The EPE in this case is estimated to provide over \$8,000 in discounted income.²⁸

These estimates are not sensitive to the case of 20 hours per week. For workers with hours less than 15 per week, there are no differences in the value of benefits across the three types of programs because earnings are below SGA for all periods. For hours per week greater than 15, the benefit values are the same as those for 15 because those hours are also above SGA. Simulations showing the effects of less than 100 percent earnings reduction at the end of the test period (if unsuccessful) show, not surprisingly, that the dollar amount of the difference in benefit values across the three programs depends on whether the reduction is sufficient to put the individual below SGA. If it is below SGA, the implication for DI benefits is the same as having complete loss of earning potential, while if it is above SGA, there is no gain from either the TWP or EPE because the unfavorable outcome would not result in positive benefits even in the presence of these provisions. Other alterations in the parameters of the

simulation have effects as expected. For example, increasing the probability of success lowers the gain from the TWP and EPE and decreasing that probability raises it.

These simulations show that the potential for work-incentive features of the insurance view of the TWP and EPE can be considerable. As noted previously, this does not eliminate the ambiguity of the sign of the net effect of the TWP and EPE on caseloads and work effort because Figure 4 necessarily implies that incentives for going onto DI are increased by the TWP and EPE and incentives for leaving it prior to the test period are reduced. Once again, the relative empirical magnitudes of these opposing forces would determine the direction of the overall effect.

REFORMING WORK INCENTIVES IN THE DI PROGRAM

As we noted in the Introduction, methods for increasing work incentives in the DI program continue to be discussed. In this section we will consider several of the reforms that have been proposed, including a simple reduction in the MTR akin to a negative income tax. We will consider both the theoretically expected effects and then conduct numerical simulations for their effects on tax rates and income, using the static labor supply model.

Alternative Work Incentive Provisions

To stick close to reforms actually being proposed, we examine five changes to the DI program:

- (1) index the SGA amount to keep pace with wage growth;
- (2) provide a partial offset (MTR) of 50 percent on earnings above the monthly SGA, to be imposed after the TWP;
- (3) provide a partial offset (MTR) of 50 percent on earnings above \$85 a month, to be imposed after the TWP;
- (4) extend the TWP by 12 months; and
- (5) provide an earnings subsidy for disabled individuals.

The first four proposals were proposed by a panel of experts (National Academy of Social Insurance, 1994) and the fifth was proposed by Burkhauser and Daly (1996). Some of these proposals have made their way into recent congressional bills. In particular, the Jeffords bill (*Work Incentive and Self Sufficiency Act* of 1996) proposes to turn DI program into a strict SGA program enhanced with a MTR of 50 percent over SGA. The *Transition to Work Act* of 1997 includes a refundable tax credit modeled after the EITC which is available to those who lose DI benefits because of increases in earnings. No further congressional action has been taken on these proposals.

The first reform simply increases the SGA and hence has a clear work-incentive rationale. The second and third reforms lower the MTR, as in a negative income tax, below 100 percent, and therefore eliminate the notch in the budget constraint. In one case the lower tax rate begins only above SGA whereas in the other case it begins at \$85 per month, an estimate of average work expenses. Since the SGA is currently \$500 per month, this latter change would actually increase the MTR over some low ranges of hours worked. The fourth reform simply extends the TWP for twelve months on top of the current nine.

The fifth reform differs substantially from the first four in that it is a reform that, in general, operates outside the DI system. We assume that the earnings subsidy is made available to the same population of disabled individuals as is currently eligible for DI. In our simulations, we consider an earnings subsidy equal in magnitude to the 1995 Earned Income Tax Credit (EITC). The Earned Income Tax Credit (EITC) is an earnings subsidy in the form of a refundable tax credit and it typically only available to families with children.²⁹ Our simulation therefore can be thought of as extending the EITC to all disabled workers, regardless of whether they have a child.³⁰ The amount of the EITC depends on whether earnings fall in the subsidy, flat, or phaseout range of the credit. The subsidy range covers earnings up to \$6,160, over which the subsidy equals 34 percent of earnings generating a maximum credit of \$2,094. In the flat range, covering earnings between \$6,160 and \$11,290, the worker receives the maximum credit. In the phaseout range, the subsidy is reduced by 15.98 cents for each additional dollar

in earnings such that the credit is fully phased out at earnings of \$24,396.³¹ Workers earning more than \$24,396 are not eligible.

Expected Effects of Changes to DI Work Incentives

An increase in the SGA increases the notch point in the budget constraint and hence leads to increases in work effort among current recipients. However, it increases the DI caseload by drawing some of the eligible population onto the rolls and hence has ambiguous impacts on average work effort among the disabled. These effects would manifest themselves in both the application phase and the EPE phase. In the application phase, the higher level of SGA would permit workers to work more while waiting for benefits to begin, but would for that same reason lower the costs (or raise the benefits) of going onto DI among disabled individuals who are working off DI. During the EPE, as illustrated in Figure 5, an increase in the notch point encourages additional work among those initially at the notch (arrow 1), but lowers labor supply among those above the initial level of SGA. Some of the latter individuals (arrow 2) are made eligible by the increase in SGA and some (arrow 3) are encouraged to reduce earnings to be at or below the new SGA, but in either case work effort falls and the caseload rises.

Similarly, adding a partial benefit or MTR on earnings during the EPE will tend to increase work levels among current DI recipients, but the impact on overall work effort among the disabled is indeterminate in direction. Figure 6 shows this change. The budget constraint under current law during the EPE is ABCDE. Adding a MTR of 50 percent above SGA gets rid of the notch and phases out benefits at a rate of 50 cents for each dollar earned over SGA, shown by the segment CE with a slope of one half the wage. This reform has some positive work incentives for those initially at the notch (arrow 1) but work disincentives for those who come onto the rolls (arrows 2 and 3). The caseload unambiguously rises. The potential increase in the caseload is quite large under this expansion: using the average benefit in 1993 of \$642, the break-even earnings level increases from \$500 per month (current SGA) to about \$1800 per month or \$22,000 per year.³²

Imposing a 50 percent MTR on earnings over an \$85 exclusion during the EPE differs from the other reforms because benefits would be lower than they are under current law for some ranges of earnings, for the \$85 exclusion is below the SGA level of \$500. By increasing the tax rate (from 0 to 50 percent) in ranges less than \$500, we may see a reduction in work effort for current recipients. However, by eliminating the notch (and its high MTR) and extending benefits past the SGA, we may see an increase in work levels among some recipients. For this program change, the caseload as well as the net work effects are ambiguous. The direction of the change in entry and exit rates is not determinant since for some hours ranges the program has been expanded while for others, the program is less generous.

Increasing the length of the TWP allows recipients to work for more months before being taxed (e.g. before entering the EPE); hence the effective MTR (in present value terms) decreases. This can be expected to increase work levels, and to increase the length of time spent on the program for current participants. However, it can also be expected to attract new participants and to reduce exit rates, both of which will reduce work effort levels and increase the size of the caseload. But under the insurance perspective, different work incentives are also present of the type we discussed earlier. If the test period for learning about one's earnings capability is longer than the length of the current TWP, extending its length would increase the expected return to testing one's work capability. Of course, extending the TWP indefinitely would also have direct work incentives simply because work is subsidized for a longer period while one is on the rolls. Setting the length of the TWP to be long enough to provide enough recipients to learn, but not so long as to provide subsidies beyond the learning point, involves a balance between different types of recipients and therefore would require knowledge of the distribution of different recipient types.

The earnings subsidy differs from the other policy changes because it affects income off the DI program instead of on it. For this reason, we call it a "non-DI" reform. Unlike the other policy simulations, the introduction of a pure earnings subsidy unambiguously increases labor supply and reduces the size of the DI caseload. Labor supply increases because the return to an hour of work

increases at all levels of hours of work. Program participation decreases, at minimum, because increases in labor supply will often lead individuals off the DI rolls. For those who stay on the DI rolls, the effect of an earnings subsidy on labor supply depends on how the subsidy is treated by the program. If it is ignored by the program altogether, labor supply will increase while on DI; but if it is included as earnings for purpose of SGA calculation, it will imply that the SGA is hit at an earlier hours point and this will have separate effects. In our simulations below, we assume the latter treatment. However, the EITC, upon which we model our earnings subsidy, has a 'flat' and 'phaseout' range which are well-known to induce reductions in labor supply for those already working (Eissa and Liebman 1996). Therefore, on net, the effect of this type of earnings subsidy on labor supply is ambiguous as well.³³

Income, Earnings, and Tax Rates Under Alternative Work Incentives

In this section we apply the same simulation model we used previously to simulate the effects of the five reforms under discussion. For the four DI reforms, Appendix Tables A-3 to A-6 present the PDVs of earnings, benefits, and net income at different hours of work for the three wage levels. The results are summarized in Table 2.

The first reform, indexing the SGA, pushes the SGA up to a higher hours level. This affects MTRs and ATRs at the hours points we show only for the low-wage worker, who now does not hit the notch until 40 hours per week. The medium-wage and high-wage workers hit the notch at the same discrete hours point as before. Therefore, at least for the low-wage recipient, there is reason to expect increased work incentives from this reform.

Reducing the MTR eliminates the notch entirely during the EPE and hence there are no more excessively high MTRs facing DI recipients (simulations 3 and 4). The MTRs fall from their current-law levels of as high as 174 percent, for the medium-wage worker, to 23 or 36 percent, for example. However, the magnitude of this decline is somewhat exaggerated because, while the high MTR at the notch point is eliminated, the MTR over hours of work beyond that is increased. Thus, for example, for

both medium-wage and high-wage workers, the MTR above the (old) SGA level rises from 0 to 36 percent. This is a necessary consequence of having to phase out benefits, and illustrates the general principle that the elimination of a notch is akin to taking a very high MTR at one point and spreading it out over other points, raising the MTRs at many of those other points. This can also be seen in Table 2 inasmuch as the reduction in ATRs is considerably less than the reduction in MTRs (see also Figure 6). The labor supply effects of the change are therefore ambiguous.³⁴

Extending the TWP by twelve months generally lowers MTRs and ATRs because a larger fraction of the simulation period the individual faces a tax rate of zero. This has little effect on the high-wage worker but lowers tax rates for the low-wage worker by a considerable amount, suggesting that positive effects on labor supply could result. We do not include the earnings uncertainty simulations for this case here but, as we noted before, the extension would have a favorable impact on work incentives if the learning period is longer than 12 months.

Table 3 and Figure 7 illustrate the effects of an earnings subsidy on tax rates and income. The first earnings subsidy we illustrate assumes that the DI program ignores the subsidy amount entirely except when comparing earnings to SGA ("earnings subsidy for all disabled workers"). The second earnings subsidy we examine is one that does not allow the subsidy to be received by workers who are on the DI rolls. Much of the employment obtained by DI recipients come from sheltered work environments outside the regular labor market, and it is not clear that the earnings from those jobs would be treated as available for subsidy. Alternatively, the DI program could treat the earnings subsidy as a form of nonlabor income and subject it to 100-percent tax, which would also effectively make it unavailable to DI recipients. A earnings subsidy not available to DI recipients should give the individual a somewhat larger incentive to increase labor supply and to leave the DI rolls than the universal earnings subsidy available to both recipients and non-recipients.

Figure 7 shows that, under the earnings subsidy for all disabled workers, net income levels monotonically rise (except for the initial SGA point). This is reflected in Table 3, which shows the

MTR to change from positive to negative for the low-wage worker at two of the hours points. The inclusion of the earnings subsidy in the SGA determination implies a higher MTR when going from 10 to 20 hours, but the more relevant ATRs show a reduction throughout the entire range from the reform. MTRs and ATRs generally fall at the 20 and 40 hours points for the medium-wage and high-wage workers, although little for the latter, who receives only a small subsidy.

Under the earnings subsidy available only to non-DI recipients, Figure 7 shows that income amounts are the same as in Figure 1 except for the addition of the earnings subsidy at hours of work of 15 or more, when the individual is off DI. In Table 3 it can be seen that this earnings subsidy has a mixed set of effects on the MTRs and ATRs relative to the universal subsidy, sometimes increasing them and sometimes decreasing them depending on the hours point and the individual wage level.³⁵

The results presented thus far show, for the most part, the possible labor supply increases and caseload reductions from many of the reforms. They do not show, at least directly, the offsetting changes in incentives for entry and exit that would be associated with many of those reforms. Tables 4 and 5 illustrate those effects by showing the percent gains and losses in net income that would result from movements off, or onto, the rolls at different hours points under current law and under the reforms for a medium-wage individual. Thus, Table 4 shows exit-rate incentives by illustrating the changes in net income that would result from being initially on the rolls (when net income includes the PDV of benefits) but then moving off the rolls (when net income only includes the PDV of earnings) at the end of the TWP. Under current law and the strict SGA, for example, the medium wage worker is above SGA at 20 hours per week and at 40 hours per week; hence leaving the rolls and continuing to work at these hours would not affect net income. Column three shows that increasing hours of work from 0 to 20 when going off would result in net-income losses because earnings would not be enough to make up for the benefit loss (implying presumably that this action would never be taken) but increasing hours from 20 to 40 would result in earnings increases exceeding benefit losses and hence increases in net income (and therefore would be undertaken if the value of lost leisure were exceeded by the value of the additional

income).

As for the reforms, an indexation of the SGA would have no effect on the monetary incentives or disincentives to leave the rolls because it would not affect income at the particular hours points we have chosen. However, the other three DI reforms significantly reduce the financial incentive to leave the rolls. Reducing the MTR would imply net income losses of 7 to 33 percent among workers who did not increase their work effort when exiting. In addition, individuals who, in the absence of the MTR reduction would have experienced a 48 percent increase in net income by working 40 hours off the rolls instead of 20 while on, would experience either much smaller increases (nine percent) or actual reductions (-1 percent) in net income. It is in this range that the MTR reduction has the largest impact on increasing income while on the rolls and thus reduces the incentives to exit. Extending the TWP by 12 months also reduces incentives to leave, because benefits are higher while on the rolls, but not by as large an amount as the MTR reductions. The effects of the earnings subsidies on exit incentives are rather small because the largest effect of those subsidies are in hours-worked ranges where the individual is already effectively off DI and working above the SGA. However, while the earnings subsidies do not greatly increase the leaving incentives for medium wage workers, they at least do not reduce them significantly, unlike the DI reforms.

Tables 5 shows the percent change in income from moving from off the rolls (only earnings) to the rolls (earnings plus benefits), and by either working the same amount or reducing work effort in the process. Under current law, a medium wage recipient has large income gains of 52 or 26 percent, depending on whether he works part-time or full-time, if he goes onto DI (benefits are always received during the application period and the TWP). If the individual quits a part-time job to go onto the rolls and not work, income still increases by a large amount (39 percent) although not by as much as it would if he were to continue working while on the rolls; this would therefore seem to be a utility-maximizing move. However, going onto the rolls and reducing hours from 40 to 20 does not increase benefits by very much and therefore results in a net income loss (to be balanced against the increased value of

leisure). As we discussed earlier, to quantify the effects on program entry these gains from entering DI would have to be compared to the costs of applying to the program. We estimate that lost labor earnings for a medium wage worker with the average application waiting time could be about \$12,000, while those who are initially denied benefits which are overturned upon appeal could experience earnings losses of about \$22,000.³⁶ These estimates may be adjusted to reflect the uncertainty associated with obtaining benefits given the high denial rates. The income gains of from 26 to 52 percent shown in Table 5 correspond to absolute gains ranging from \$12,273 to \$16,310, and hence likely dominate the foregone earnings from application for many recipients.

Except for the indexed SGA, which again has no effect, the DI reforms always increase the net income gain from going onto the rolls without changes in hours worked, often by large amounts (107 percent and 128 percent, for example, in the part-time range where the MTR reduction has its biggest effect). More important, while the incentives for quitting work entirely are unaffected by the reforms, since none of them alter benefits at zero hours, the income losses attendant upon reducing from full-time to part-time work are either greatly attenuated (for the TWP extension) or reversed in sign (MTR reductions). In the latter case, therefore, net income can be increased by reducing hours and going onto the rolls, which again would appear to be a utility-maximizing choice.

The earnings subsidies have the opposite effects as the reforms if hours are unchanged, for they reduce the financial incentives to go onto the rolls, even though those net income gains are still positive (23 to 42 percent in the table). Net income gains from quitting work from a part-time job are also lower under the earnings subsidies, for those subsidies increase net income for workers off the rolls but not nonworkers. However, income losses from leaving a full-time job to work part-time on the rolls entail slightly smaller income penalties than under current law, but this is because net income losses and gains from changes in earnings in the phaseout range of an earnings subsidy are reduced even for those who are off the rolls. In the 20-to-40 hours range for medium-wage workers, earnings are above SGA regardless and hence there is no additional benefit gain from going onto the rolls.

CONCLUSIONS AND POLICY IMPLICATIONS

As the issue of increasing work incentives in the DI program becomes of greater policy interest, it is important to understand the implications of changing financial inducements through changes in benefit formulas. Our discussion of the expected effects of such changes suggest that they may not be as effective as they first appear. Lying behind this potential ineffectiveness are a set of possible explanations which involve new entry onto the programs as well as decreased exit. Changes in labor supply for these groups may offset the increase in labor supply among those that stay on the program. Unfortunately, the available empirical research on DI does not allow us to reach any conclusions on the magnitude of the response. But the direction of the different types of responses that result from financial inducements, both the intended increases in work effort and the unintended reductions, should be present. This leads us to urge caution in using financial inducements as a means of work-incentive reform in DI without further, concrete evidence of their effectiveness.

As an alternative, increasing work effort among the disabled may be achieved by the use of work, employment and training programs and/or wage subsidies. Both of these policies have been advanced in recent years for the AFDC program, in part due to the perceived failure of within-program financial inducements. This shift also reflects a society-wide change in attitudes toward work among women with children, as it becomes increasingly the norm for such women to work rather than stay at home. A similar change in attitudes toward the disabled appears to have occurred, with many arguing that all recipients should work to the degree they can. However, the use of program based financial inducements is still more favorably viewed in policy discussions of DI (and SSI) than in the AFDC and other welfare programs, which is not necessarily justified by the evidence.

The attractiveness of an earnings subsidy such as the EITC is that it has the potential to increase work and earnings and to reduce the DI caseload at the same time. The philosophy behind the EITC and similar private-sector earnings subsidy programs is diametrically opposite to that lying behind the use of within-program financial inducements to work more while on DI, for the latter has the potentially

deleterious consequences of increasing the caseload and possibly reducing work effort which we have discussed at length in our paper. These deleterious effects would not be present if financial inducements were offered only for off-DI (or both on- and off-DI) work. Policy discussions of disability programs might fruitfully turn to such programs, perhaps by investigating special private-sector earnings subsidy programs for the disabled or modifications in the EITC to make more disabled individuals eligible for its benefits.

To determine the effectiveness of any of these policies in increasing work effort and reducing caseloads in the DI program, major research gaps need to be filled. Secondary analysis of existing data sets using econometric techniques must be pursued with more of an eye toward estimating wage and substitution elasticities, for example, although we recognize the difficulties in doing so. Alternatively, microsimulation models either large-scale or small-scale could be constructed and the effects of different work-incentive provisions could be predicted based upon a range of assumed responsiveness levels and elasticities; this would provide at least some indication of how large or small responsiveness needs to be for work-incentive provisions to have a genuine positive effect. Finally, direct experiments or demonstrations on the caseload would be helpful in obtaining estimates of the response to specific program initiatives, although it needs to be emphasized that program evaluations need to be designed to capture both the exit and entry effects of financial inducements as well.

ENDNOTES

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1. These bills include the *Work Incentive and Self Sufficiency Act* of 1996 (Senator Jeffords), the *Rehabilitation and Return to Work Opportunity Act* of 1996 (Representative Bunning) and the *Transition to Work Act* of 1997 (Representative Kennelly).
2. Other programs for the disabled include the Supplemental Security Income (SSI) program, several veteran's compensation programs, worker's compensation, and state-provided temporary disability benefits.
3. The SGA is not indexed for price changes and has been increased nine times in the program's 35 years. The SGA started in 1957 at \$100, and was \$300 from 1980-1990 before the latest increase to \$500. A deduction is allowed for impairment-related work expenses.
4. Applicants must have worked 20 of the last 40 quarters preceding the quarter of application, although the rules differ somewhat for younger workers. The work history required for DI is virtually the same as that required for social security retirement benefits.
5. The benefit can be as large as 150 percent of PIA for disabled workers with families.
6. The earnings figures refer to the worker's average indexed monthly earnings (AIME) in social security employment. The DI benefit, equal to the worker's PIA, is a function of the AIME. Benefits are adjusted for changes in the cost of living. The PIA and AIME are calculated in roughly the same way as they are for social security retirement benefits.
7. The earnings limit was set at \$50 for much of the history of the program until it was recently increased to \$200. It is intentionally set at a low level in order to trigger review of recipients who enter work at any level.

8. The three month grace period is considered part of the 36 month EPE.
9. The uncertainty and costs surrounding the application process are significant. Rejection rates are estimated to be between 50 and 60 percent and the individual must often stay out of the labor force for an average of eight months while waiting for eligibility decisions to be made. Many applicants who are initially denied are ultimately awarded benefits through a lengthy appeal process. This group, on average, waits about 15 months for an award. For detailed studies of the appeal process see Lahiri et al 1995 and Benitez-Silva et al 1997.
10. Medicare benefits are provided to DI recipients after a two year waiting period. Once the individual enters the EPE, Medicare benefits are available for the next 39 months. Thus Medicare is provided for a three months past the end of EPE. The availability of Medicare benefits may add substantially to the “insurance” value of DI which is discussed in the text. Once a worker reaches age 65, the DI case is automatically transferred to the social security retirement system.
11. The New Beneficiaries Survey, when augmented with the New Beneficiary Followup Survey , provides information for a ten year period for a cohort of recipients who began receiving benefits in 1980-1981. The statistics mentioned in this paragraph appear in papers by Muller (1992) and Hennessey (1996, 1997) using these data.
12. This is a lower bound estimate of the percent who leave the program through earnings exits as a significant portion of the sample had censored employment spells-- they were still in EPE -- at the ten year followup interview.
13. We assume that the individuals know with complete certainty whether they would qualify were they to apply and hence we ignore the uncertainty about eligibility which has been heavily discussed in the literature (e.g., Bound (1989); Halpern and Hausman, (1986)). As we will discuss, some of our calculations of financial incentives can be adjusted for estimated entry costs.
14. We of course are implicitly referring to averages in the population. Some portion of the eligible population would not work even in the absence of DI, and for them there is no reduction in labor supply.
15. Of course, during the EPE there should be no incentive to formally leave the rolls while working,

since benefits are not being received anyway.

16. This literature is critically reviewed in Leonard (1986) and Hoynes and Moffitt (1996), and the exchanges between Parsons (1984) and Haveman and Wolfe (1984) and Parsons (1991) and Bound (1991).

17. Some of the studies (e.g., Parsons 1980a and 1980b) do include wages but only their pre-disability level, and only in the form of a replacement rate, which results in neither an income nor a wage elasticity. Obtaining estimates of wage and income elasticities for DI recipients is difficult. For example, the DI benefit itself is endogenous due to its relationship to previous work experience. Furthermore, DI receipt is uncertain, and it is difficult to impute

DI benefits for non-recipients. These issues and their relevance for the empirical literature are discussed in Leonard (1986), Haveman and Wolfe (1984), and Bound (1991).

18. Twelve months may seem short as the average length of time between DI entitlement and the first job is 3.4 years (Hennessey 1996). However, those who eventually leave DI through earnings exits are, on average, terminated from the rolls in 2.4 years. For this group, the recuperation time is much shorter.

19. Particular attention should be paid to the simulations for full-time work. Less than one quarter of working recipients have hours less than or equal to 20 hours per week, while more than 60 percent work 35 hours or more per week (Hennessey 1996).

20. The 57 month horizon is the sum of the five month waiting period, 7 months of recuperation, nine months of TWP, and 36 months of EPE. This time horizon could be extended but would not change the nature of the tradeoffs we illustrate. Because we assume that individuals enter the work force after 12 months of recuperation, our DI recipients receive benefits for a minimum of 19 months (seven months of recuperation, nine months of TWP, three month grace period) and are out of the labor force for a minimum of 12 months (includes five month waiting period before benefit receipt).

21. These wage/benefit scenarios are used by Social Security Administration (SSA) to illustrate benefits for typical workers (see Social Security Administration 1995, Table 2.A26). The "average" worker is the average for the labor force covered by social security, which may be higher than average among DI

recipients (Bound, 1989).

22. Schechter (1997) reports that 21 percent of recipients experience wage increases while 44 percent experience wage declines. We should note that the low (minimum wage) worker does not incur the 25 percent decrease in wages. The post-disability wage levels used are \$4.90 for low wage, \$8.34 for average wage, and \$12.51 for high wage workers. Benefits equal \$557, \$880, and \$1134, respectively.

23. Since we assume nominal wage growth of five percent per year, this implies a real interest rate of approximately 2 percent.

24. We do not include deductions for federal, state, or payroll taxes and hence net income includes earnings plus DI benefits. Including these taxes would lead to higher MTR but would not change the substantive points on the effects of DI on earnings possibilities.

25. The low-wage worker experiences a non-zero MTR going from 20 to 40 hours per week because we assume nominal wage rates grow at five percent per year but the SGA stays fixed in nominal terms. At 20 hours per week, the individual hits the SGA partway through the EPE period; at 40 hours per week, he hits it at the beginning of the EPE period. We choose to conduct the simulation in this way because it reflects actual, current law--the SGA is not indexed and is typically held fixed for many years.

26. In Table A-1, $.27 = (\$39,688 - \$31,171) / \$31,171$ and in Table A-2, $.06 = (\$31,171 - \$29,447) / \$31,171$.

27. When the recuperation period is increased to 24 months, we also begin the TWP at 24 months rather than at 12 months.

28. The present value of benefits is lower in the 24-month-test period case in the current program because the extra work during the second 12 months reduces the benefit to zero, whereas with 50 percent probability in the 12-month-test-period case, earnings would have been zero and benefits would have been positive.

29. The credit was introduced in 1975 to offset the social security tax but has been expanded significantly since the mid 1980s. Starting in 1994, a small EITC was made available to childless workers with earnings up to \$9,000.

30. In particular, we provide the EITC which is extended to families with one child. Since 1991, a more

generous EITC has been made available to families with two or more children.

31. We use the parameters of the current EITC program for convenience. In practice, an earnings subsidy for disabled workers could also take the form of subsidies to the employer. At the level of generality of our simulation program, these are equivalent.

32. The benefit formula becomes $DIBEN - 0.5*(EARNINGS - 500)$, which using a DIBEN of \$642 equals zero when earnings equal $2*642+500$ or \$1784.

33. Because the EITC is available to workers only, it unambiguously leads to higher rates of labor force participation. Empirical studies have shown that the added worker effect seems to dominate the potential reduction in labor supply among current workers to lead to a net increase in labor effort for single mothers (Eissa and Liebman 1996).

34. The BRR reduction over \$85 also increases the MTR at very low-hours ranges, as noted previously in the text.

35. Earnings subsidies are most effective for encouraging work among low wage workers. The subsidy could easily be expanded to provide greater incentives for higher wage workers.

36. As cited earlier, average waiting times are eight months overall and 15 months for those appeal an initial denial (Benitez-Silva 1997). Assuming full-time full-year work \$8.34 per hour generates the figures in the text. These may be upper bounds of the costs if work is not possible even in the absence of DI.

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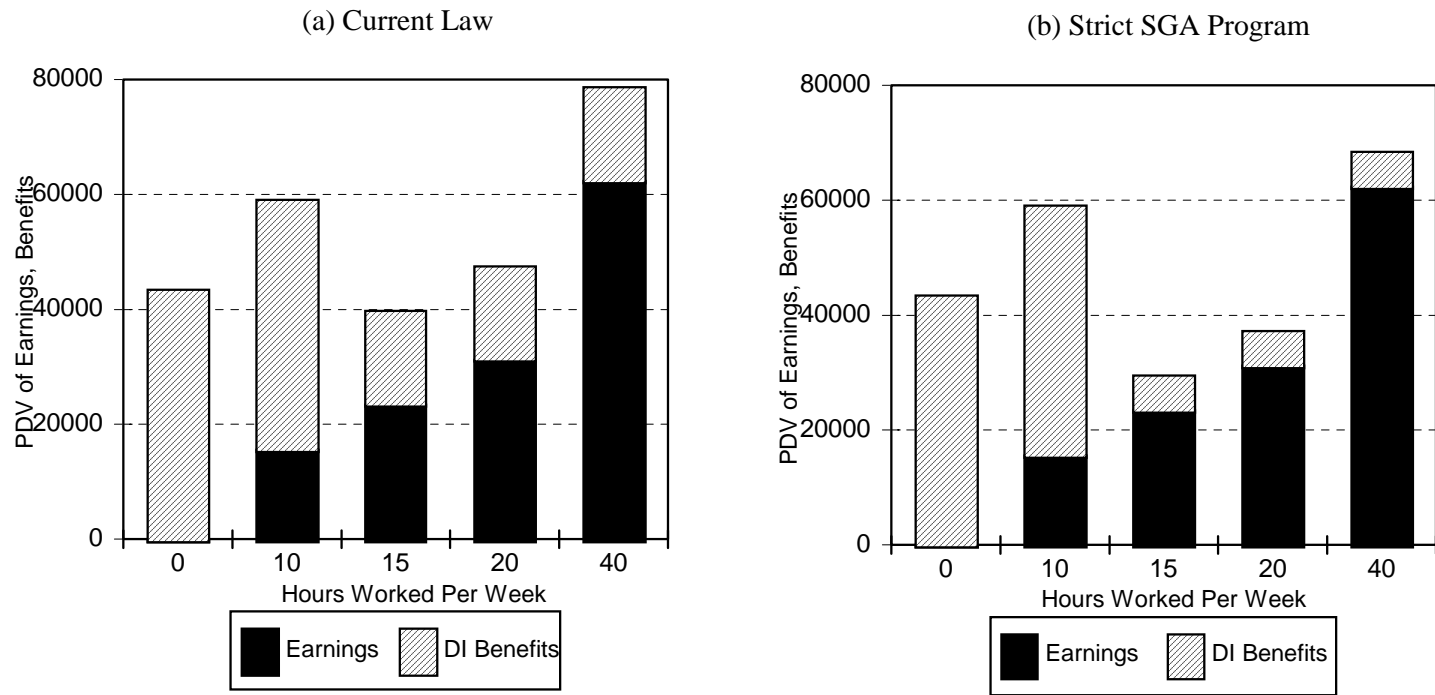
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Figure 3

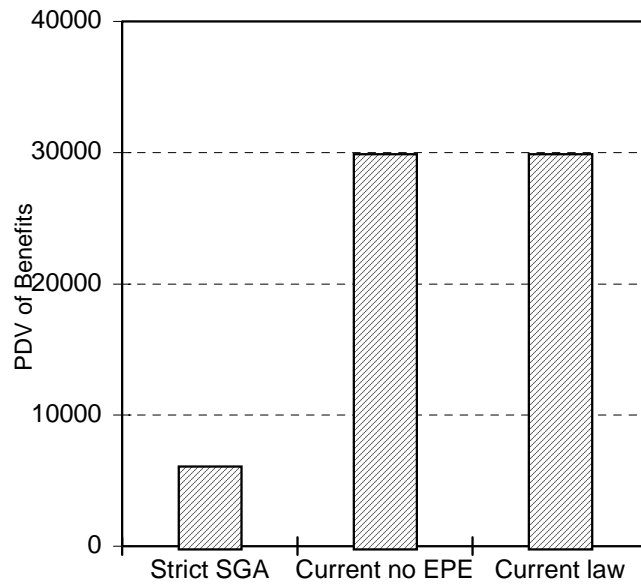


Income Opportunities for DI Participants, Medium Wage Worker

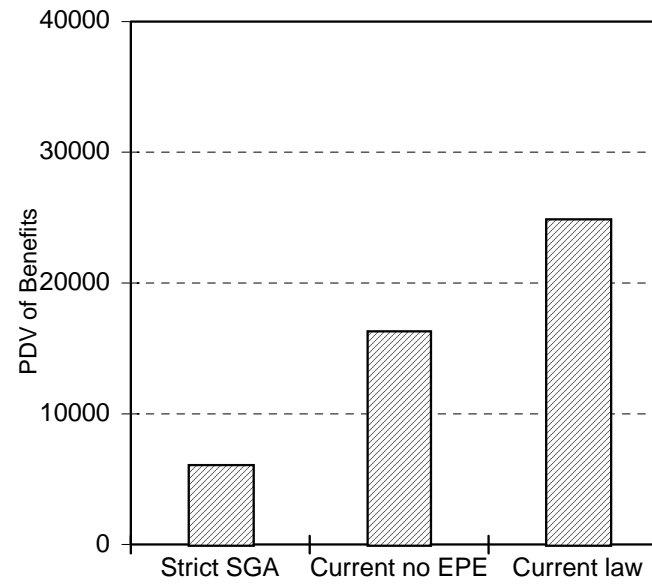
Figure 4

Expected Present Value of DI Benefits with Earnings Uncertainty

(a) 12 month test work period



(b) 24 month test work period



Medium Wage Worker, Working 20 hours/week

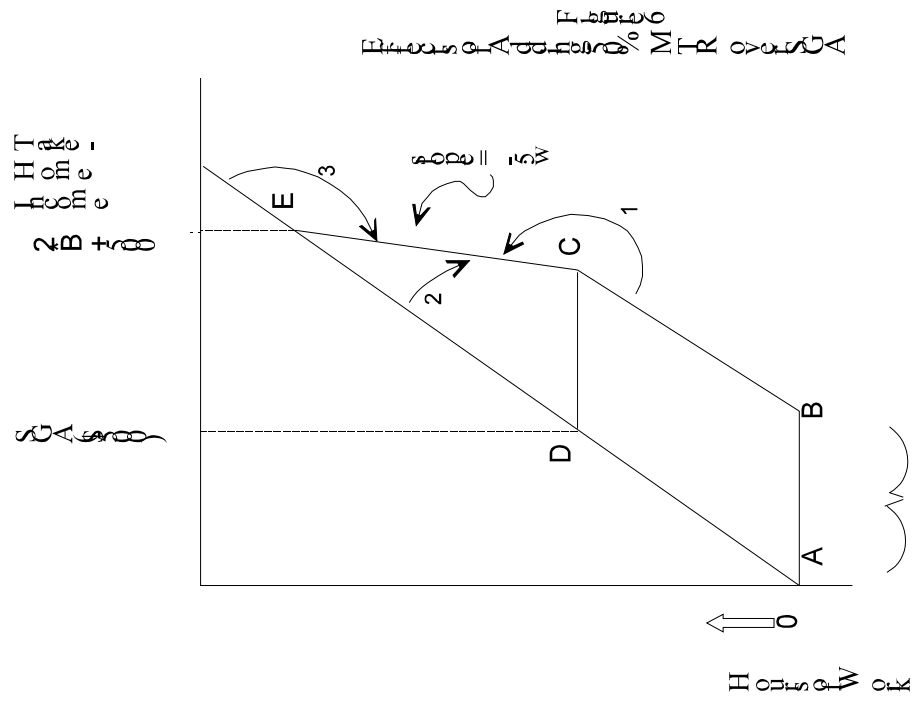
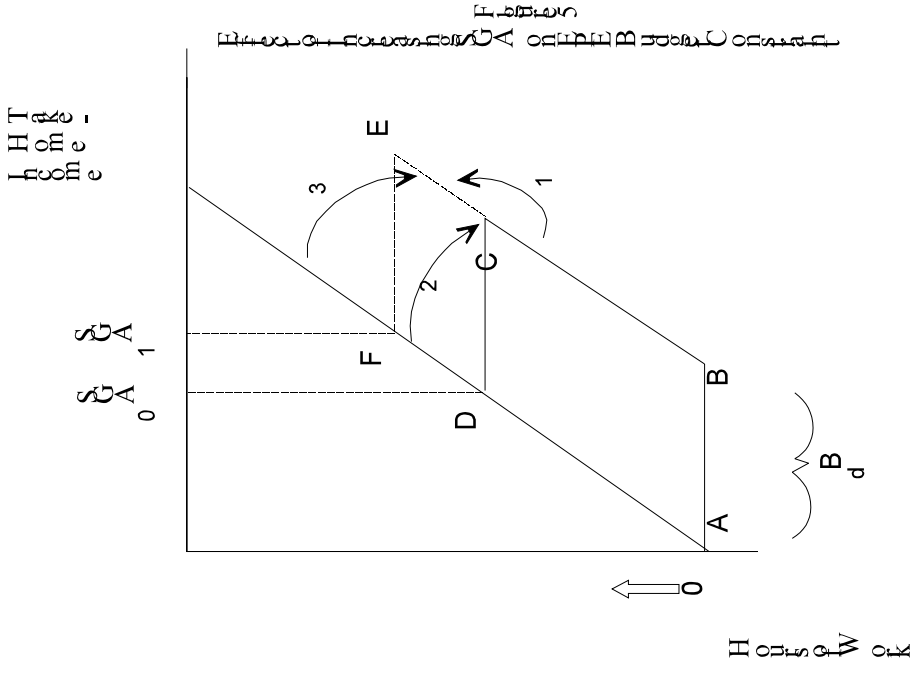
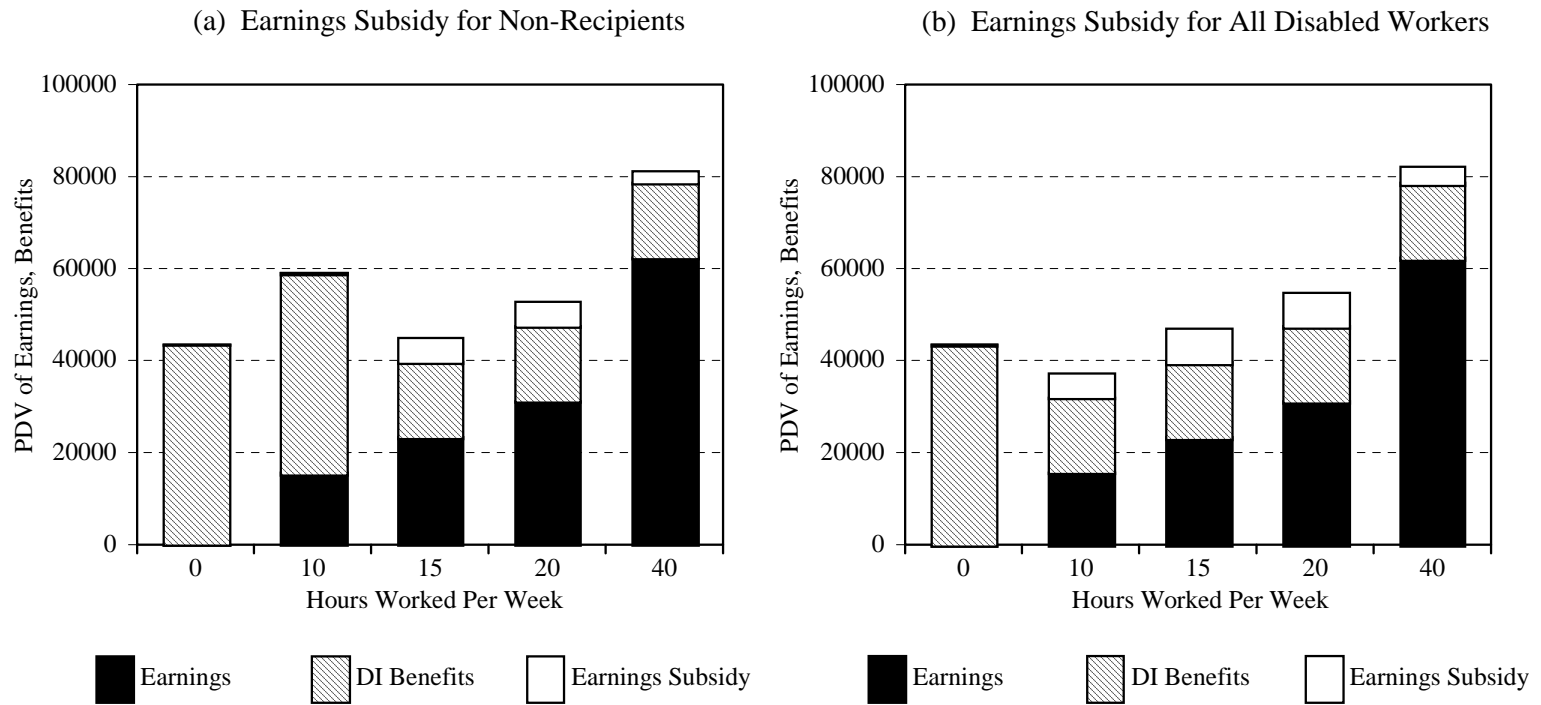


Figure 7



Income Opportunities for DI Participants, Medium Wage Worker

Table 1
Tax Rates in the DI Program Under Current Law and Strict SGA programs,
By Wage Level and Hours of Work ¹
(Percent)

	<i>Marginal Tax Rate (%)</i> ²			<i>Average Tax Rate (%)</i> ³		
	10 hrs	20 hrs	40 hrs	10 hrs	20 hrs	40 hrs
<u>Low Wage Worker</u>						
Current Law	0	124	32	0	62	47
Strict SGA	0	124	67	0	62	65
<u>Medium Wage Worker</u>						
Current Law	0	174	0	0	87	44
Strict SGA	0	240	0	0	120	60
<u>High Wage Worker</u>						
Current Law	150	0	0	150	75	37
Strict SGA	206	0	0	206	103	52

Notes:

1. Results of simulation over 57 month period. See text for details.
2. Marginal tax rates are calculated as one minus the change in income over the change in earnings resulting from increasing hours of work from the prior level.
3. Average tax rates are calculated as one minus the change in income over the change in earnings resulting from increasing hours of work from the no work choice.

Table 2**Tax Rates in the DI Program Under Current Law and Proposed DI Reforms,*****By Wage Level and Hours of Work***¹**(Percent)**

	<i>Marginal Tax Rate (%)</i> ²			<i>Average Tax Rate (%)</i> ³		
	10 hrs	20 hrs	40 hrs	10 hrs	20 hrs	40 hrs
<u>Low Wage Worker</u>						
1. Current Law	0	124	32	0	62	47
2. Index SGA	0	0	94	0	0	47
3. 50% MTR over SGA	0	0	31	0	0	15
4. 50% MTR over \$85	24	36	36	24	30	33
5. Extend TWP 12 months	0	118	0	0	59	30
<u>Medium Wage Worker</u>						
1. Current Law	0	174	0	0	87	44
2. Index SGA	0	174	0	0	87	44
3. 50% MTR over SGA	0	23	36	0	12	24
4. 50% MTR over \$85	29	36	36	29	33	35
5. Extend TWP 12 months	0	110	0	0	55	27
<u>High Wage Worker</u>						
1. Current Law	150	0	0	150	75	37
2. Index SGA	150	0	0	150	75	37
3. 50% MTR over SGA	3	36	36	3	20	28
4. 50% MTR over \$85	32	36	36	32	34	35
5. Extend TWP 12 months	94	0	0	94	47	24

Notes:

1. Results of simulation over 57 month period. See text for details.
2. Marginal tax rates are calculated as one minus the change in income over the change in earnings resulting from increasing hours of work from the prior level.
3. Average tax rates are calculated as one minus the change in income over the change in earnings resulting from increasing hours of work from the no work choice.

Table 3
Tax Rates in the DI Program Under Current Law and Non-DI Reforms,
*By Wage Level and Hours of Work*¹
(Percent)

	<i>Marginal Tax Rate (%)</i> ²			<i>Average Tax Rate (%)</i> ³		
	10 hrs	20 hrs	40 hrs	10 hrs	20 hrs	40 hrs
<u>Low Wage Worker</u>						
1. Current Law	0	124	32	0	62	47
2. Earnings Subsidy for All	-34	154	-5	-34	60	27
3. Earnings Subsidy for Non-DI	0	91	20	0	46	33
Recipients Only						
<u>Medium Wage Worker</u>						
1. Current Law	0	174	0	0	87	44
2. Earnings Subsidy for All	140	-12	12	140	64	38
3. Earnings Subsidy for Non-DI	0	140	9	0	70	39
Recipients Only						
<u>High Wage Worker</u>						
1. Current Law	150	0	0	150	75	37
2. Earnings Subsidy for All	119	5	13	119	62	37
3. Earnings Subsidy for Non-DI	127	4	9	127	66	37
Recipients Only						

Notes:

1. Results of simulation over 57 month period. See text for details.
2. Marginal tax rates are calculated as one minus the change in income over the change in earnings resulting from increasing hours of work from the prior level.
3. Average tax rates are calculated as one minus the change in income over the change in earnings resulting from increasing hours of work from the no work choice.

Table 4**Percent Change in Income from Leaving DI under Current Law and Alternative Policies***Medium Wage Recipient*¹

	<i>Percent Change in Income by hours worked:</i> ²			
	20 hrs.	40 hrs.	0-20 hrs.	20-40 hrs.
Current Law	0	0	-10	48
Strict SGA	0	0	-10	61
<u>DI Reforms:</u>				
Index SGA	0	0	-10	48
50% MTR over SGA	-33	-13	-10	-1
50% MTR over \$85	-26	-7	-10	9
Extend TWP by 12 months	-17	-11	-10	22
<u>Reforms outside DI:</u>				
Earnings Subsidy	0	0	2	36
Earnings Subsidy, non-DI	0	0	2	38
Recipients Only				

Notes:

1. The recipient is assumed to leave DI after two years on the program. Under current law (and given our one year recuperation period) this occurs at the end of the trial work period (TWP). For comparability, when we simulated extending the TWP we still consider an exit from the program after two years. All simulations cover a 57 month period.
2. The scenarios in the first two columns assume that the worker does not change their hours of work when they leave DI. In the last two columns, the worker is assumed to increase hours worked when they leave the program, to the levels given.

Table 5

Percent Change in Income from Entering DI under Current Law and Alternative Policies

*Medium Wage Recipient*¹

	<i>Percent Change in Income by hours worked:</i> ²			
	20 hrs.	40 hrs.	20-0 hrs.	40-20 hrs.
Current Law	52	26	39	-24
Strict SGA	19	10	39	-40
<u>DI Reforms:</u>				
Index SGA	52	26	39	-24
50% MTR over SGA	128	46	39	14
50% MTR over \$85	107	35	39	3
Extend TWP by 12 months	85	42	39	-8
<u>Reforms outside DI:</u>				
Earnings Subsidy	42	25	13	-17
Earnings Subsidy, non-DI	37	23	13	-20
Recipients Only				

Notes:

1. These calculations compare total income over the five year simulation period with and without DI benefits. The DI reforms only affect income opportunities on DI, but the non-DI reforms may affect both income on and off DI.
2. The scenarios in the first two columns assume that the worker does not change their hours of work when they enter DI. In the last two columns, the worker is assumed to decrease hours worked when they enter the program, to the levels given.

Table A-1
Earnings, Income and Tax Rates in the DI Program ¹

Current Law

	Earnings	Benefits	Net Income	Marginal Tax Rate (%)	Average Tax rate (%)
<i>Low Wage Worker</i>					
0 hours	\$0	\$27,498	\$27,498		
10 hours	\$9,157	\$27,498	\$36,655	0%	0%
15 hours	\$13,736	\$27,498	\$41,234	0%	0%
20 hours	\$18,314	\$16,153	\$34,467	248%	62%
40 hours	\$36,628	\$10,323	\$46,951	32%	47%
<i>Medium Wage Worker</i>					
0 hours	\$0	\$43,444	\$43,444		
10 hours	\$15,586	\$43,444	\$59,030	0%	0%
15 hours	\$23,378	\$16,310	\$39,688	348%	116%
20 hours	\$31,171	\$16,310	\$47,481	0%	87%
40 hours	\$62,342	\$16,310	\$78,652	0%	44%
<i>High Wage Worker</i>					
0 hours	\$0	\$55,984	\$55,984		
10 hours	\$23,378	\$21,018	\$44,396	150%	150%
15 hours	\$35,068	\$21,018	\$56,085	0%	100%
20 hours	\$46,757	\$21,018	\$67,774	0%	75%
40 hours	\$93,514	\$21,018	\$114,531	0%	37%

Notes:

1. Results of simulation over 57 month period starting in 1994. Earnings, income and benefits are the present discounted value of the stream over the simulation period. See text for details.

Table A-2

Earnings, Income and Tax Rates in the DI Program ¹

Strict SGA Program

	Earnings	Benefits	Net Income	Marginal Tax Rate (%)	Average Tax rate (%)
<i>Low Wage Worker</i>					
0 hours	\$0	\$27,498	\$27,498		
10 hours	\$9,157	\$27,498	\$36,655	0%	0%
15 hours	\$13,736	\$27,498	\$41,234	0%	0%
20 hours	\$18,314	\$16,153	\$34,467	248%	62%
40 hours	\$36,628	\$3,841	\$40,469	67%	65%
<i>Medium Wage Worker</i>					
0 hours	\$0	\$43,444	\$43,444		
10 hours	\$15,586	\$43,444	\$59,030	0%	0%
15 hours	\$23,378	\$6,069	\$29,447	480%	160%
20 hours	\$31,171	\$6,069	\$37,240	0%	120%
40 hours	\$62,342	\$6,069	\$68,411	0%	60%
<i>High Wage Worker</i>					
0 hours	\$0	\$55,984	\$55,984		
10 hours	\$23,378	\$7,820	\$31,199	206%	206%
15 hours	\$35,068	\$7,820	\$42,888	0%	137%
20 hours	\$46,757	\$7,820	\$54,577	0%	103%
40 hours	\$93,514	\$7,820	\$101,334	0%	52%

Notes:

1. Results of simulation over 57 month period starting in 1994. Earnings, income and benefits are the present discounted value of the stream over the simulation period. See text for details.

Table A-3

Earnings, Income and Tax Rates in the DI Program ¹

DI Reform: Index SGA

	Earnings	Benefits	Net Income	Marginal Tax Rate (%)	Average Tax rate (%)
<i>Low Wage Worker</i>					
0 hours	\$0	\$27,498	\$27,498		
10 hours	\$9,157	\$27,498	\$36,655	0%	0%
15 hours	\$13,736	\$27,498	\$41,234	0%	0%
20 hours	\$18,314	\$27,498	\$45,812	0%	0%
40 hours	\$36,628	\$10,323	\$46,951	94%	47%
<i>Medium Wage Worker</i>					
0 hours	\$0	\$43,444	\$43,444		
10 hours	\$15,586	\$43,444	\$59,030	0%	0%
15 hours	\$23,378	\$16,310	\$39,688	348%	116%
20 hours	\$31,171	\$16,310	\$47,481	0%	87%
40 hours	\$62,342	\$16,310	\$78,652	0%	44%
<i>High Wage Worker</i>					
0 hours	\$0	\$55,984	\$55,984		
10 hours	\$23,378	\$21,018	\$44,396	150%	150%
15 hours	\$35,068	\$21,018	\$56,085	0%	100%
20 hours	\$46,757	\$21,018	\$67,774	0%	75%
40 hours	\$93,514	\$21,018	\$114,531	0%	37%

Notes:

1. Results of simulation over 57 month period starting in 1994. Earnings, income and benefits are the present discounted value of the stream over the simulation period. See text for details.

Table A-4

Earnings, Income and Tax Rates in the DI Program ¹

DI Reform: 50% MTR over SGA

	Earnings	Benefits	Net Income	Marginal Tax Rate (%)	Average Tax rate (%)
<i>Low Wage Worker</i>					
0 hours	\$0	\$27,498	\$27,498		
10 hours	\$9,157	\$27,498	\$36,655	0%	0%
15 hours	\$13,736	\$27,498	\$41,234	0%	0%
20 hours	\$18,314	\$27,498	\$45,812	0%	0%
40 hours	\$36,628	\$21,911	\$58,539	31%	15%
<i>Medium Wage Worker</i>					
0 hours	\$0	\$43,444	\$43,444		
10 hours	\$15,586	\$43,444	\$59,030	0%	0%
15 hours	\$23,378	\$42,667	\$66,045	10%	3%
20 hours	\$31,171	\$39,838	\$71,009	36%	12%
40 hours	\$62,342	\$28,523	\$90,865	36%	24%
<i>High Wage Worker</i>					
0 hours	\$0	\$55,984	\$55,984		
10 hours	\$23,378	\$55,206	\$78,585	3%	3%
15 hours	\$35,068	\$50,963	\$86,031	36%	14%
20 hours	\$46,757	\$46,720	\$93,477	36%	20%
40 hours	\$93,514	\$29,747	\$123,261	36%	28%

Notes:

1. Results of simulation over 57 month period starting in 1994. Earnings, income and benefits are the present discounted value of the stream over the simulation period. See text for details.

Table A-5

Earnings, Income and Tax Rates in the DI Program ¹

DI Reform: 50% MTR over \$85

	Earnings	Benefits	Net Income	Marginal Tax Rate (%)	Average Tax rate (%)
<i>Low Wage Worker</i>					
0 hours	\$0	\$27,498	\$27,498		
10 hours	\$9,157	\$25,281	\$34,438	24%	24%
15 hours	\$13,736	\$23,619	\$37,355	36%	28%
20 hours	\$18,314	\$21,957	\$40,271	36%	30%
40 hours	\$36,628	\$15,309	\$51,937	36%	33%
<i>Medium Wage Worker</i>					
0 hours	\$0	\$43,444	\$43,444		
10 hours	\$15,586	\$38,893	\$54,479	29%	29%
15 hours	\$23,378	\$36,065	\$59,443	36%	32%
20 hours	\$31,171	\$33,236	\$64,407	36%	33%
40 hours	\$62,342	\$21,921	\$84,263	36%	35%
<i>High Wage Worker</i>					
0 hours	\$0	\$55,984	\$55,984		
10 hours	\$23,378	\$48,604	\$71,983	32%	32%
15 hours	\$35,068	\$44,361	\$79,429	36%	33%
20 hours	\$46,757	\$40,118	\$86,875	36%	34%
40 hours	\$93,514	\$23,145	\$116,659	36%	35%

Notes:

1. Results of simulation over 57 month period starting in 1994. Earnings, income and benefits are the present discounted value of the stream over the simulation period. See text for details.

Table A-6

Earnings, Income and Tax Rates in the DI Program ¹

DI Reform: Extend TWP

	Earnings	Benefits	Net Income	Marginal Tax Rate (%)	Average Tax rate (%)
<i>Low Wage Worker</i>					
0 hours	\$0	\$27,498	\$27,498		
10 hours	\$9,157	\$27,498	\$36,655	0%	0%
15 hours	\$13,736	\$27,498	\$41,234	0%	0%
20 hours	\$18,314	\$16,678	\$34,992	236%	59%
40 hours	\$36,628	\$16,678	\$53,306	0%	30%
<i>Medium Wage Worker</i>					
0 hours	\$0	\$43,444	\$43,444		
10 hours	\$15,586	\$43,444	\$59,030	0%	0%
15 hours	\$23,378	\$26,349	\$49,728	219%	73%
20 hours	\$31,171	\$26,349	\$57,520	0%	55%
40 hours	\$62,342	\$26,349	\$88,692	0%	27%
<i>High Wage Worker</i>					
0 hours	\$0	\$55,984	\$55,984		
10 hours	\$23,378	\$33,955	\$57,333	94%	94%
15 hours	\$35,068	\$33,955	\$69,022	0%	63%
20 hours	\$46,757	\$33,955	\$80,711	0%	47%
40 hours	\$93,514	\$33,955	\$127,468	0%	24%

Notes:

1. Results of simulation over 57 month period starting in 1994. Earnings, income and benefits are the present discounted value of the stream over the simulation period. See text for details.

Table A-7

Earnings, Income and Tax Rates in the DI Program ¹

Non-DI Reform: Earnings Subsidy for All Disabled Workers

	Earnings	Benefits	Earnings Subsidy	Net Income	Marginal Tax Rate	Average Tax rate
					(%)	(%)
<i>Low Wage Worker</i>						
0 hours	\$0	\$27,498	\$0	\$27,498		
10 hours	\$9,157	\$27,498	\$3,113	\$39,769	-34%	-34%
15 hours	\$13,736	\$15,628	\$4,670	\$34,033	225%	52%
20 hours	\$18,314	\$10,323	\$6,227	\$34,864	82%	60%
40 hours	\$36,628	\$10,323	\$7,220	\$54,172	-5%	27%
<i>Medium Wage Worker</i>						
0 hours	\$0	\$43,444	\$0	\$43,444		
10 hours	\$15,586	\$16,310	\$5,299	\$37,195	140%	140%
15 hours	\$23,378	\$16,310	\$7,220	\$46,909	-25%	85%
20 hours	\$31,171	\$16,310	\$7,220	\$54,701	0%	64%
40 hours	\$62,342	\$16,310	\$3,479	\$82,132	12%	38%
<i>High Wage Worker</i>						
0 hours	\$0	\$55,984	\$0	\$55,984		
10 hours	\$23,378	\$21,018	\$7,220	\$51,616	119%	119%
15 hours	\$35,068	\$21,018	\$7,220	\$63,305	0%	79%
20 hours	\$46,757	\$21,018	\$5,970	\$73,744	11%	62%
40 hours	\$93,514	\$21,018	\$0	\$114,531	13%	37%

Notes:

1. Results of simulation over 57 month period starting in 1994. Earnings, income and benefits are the present discounted value of the stream over the simulation period. See text for details.

Table A-8

Earnings, Income and Tax Rates in the DI Program ¹

Non-DI Reform: Earnings Subsidy for non-DI Recipients

	Earnings	Benefits	Earnings Subsidy	Net Income	Marginal Tax Rate	Average Tax rate
					(%)	(%)
<i>Low Wage Worker</i>						
0 hours	\$0	\$27,498	\$0	\$27,498		
10 hours	\$9,157	\$27,498	\$0	\$36,655	0%	0%
15 hours	\$13,736	\$27,498	\$0	\$41,234	0%	0%
20 hours	\$18,314	\$16,153	\$2,986	\$37,453	183%	46%
40 hours	\$36,628	\$10,323	\$5,242	\$52,193	20%	33%
<i>Medium Wage Worker</i>						
0 hours	\$0	\$43,444	\$0	\$43,444		
10 hours	\$15,586	\$43,444	\$0	\$59,030	0%	0%
15 hours	\$23,378	\$16,310	\$5,242	\$44,930	281%	94%
20 hours	\$31,171	\$16,310	\$5,242	\$52,723	0%	70%
40 hours	\$62,342	\$16,310	\$2,526	\$81,178	9%	39%
<i>High Wage Worker</i>						
0 hours	\$0	\$55,984	\$0	\$55,984		
10 hours	\$23,378	\$21,018	\$5,242	\$49,638	127%	127%
15 hours	\$35,068	\$21,018	\$5,242	\$61,327	0%	85%
20 hours	\$46,757	\$21,018	\$4,334	\$72,109	8%	66%
40 hours	\$93,514	\$21,018	\$0	\$114,531	9%	37%

Notes:

1. Results of simulation over 57 month period starting in 1994. Earnings, income and benefits are the present discounted value of the stream over the simulation period. See text for details.