

Full Web Appendix: How Financial Incentives Induce Disability Insurance Recipients to Return to Work

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A Tables and Figures

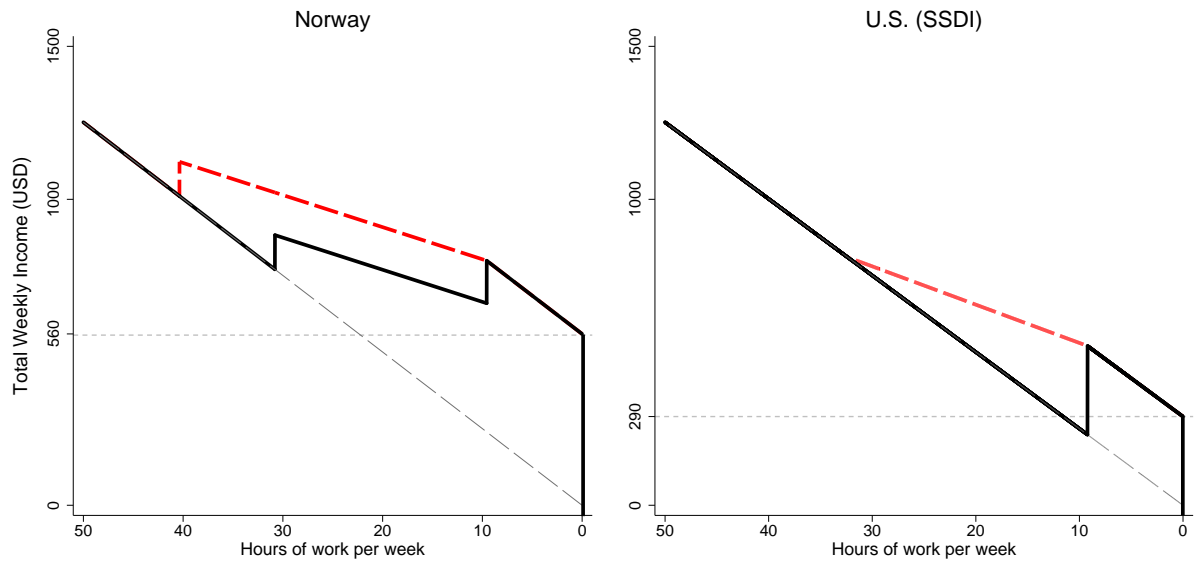
Table A.1: CHARACTERISTICS OF DI RECIPIENTS IN NORWAY AND THE U.S.

Characteristics	Norway	US
Age at award decision	51.69	47.38
Avg. earnings, 3-5 years before (USD)	27 143	25 503
Musculoskeletal diseases (%)	32.8	35.1
Mental disorders (%)	28.6	22.3
Cardiovascular system (%)	9.8	8.9
Other diagnosis (%)	28.8	33.7

Note: The Norwegian statistics cover individuals aged 18-66 (at the date of DI award), who were awarded DI benefits in 2003. The U.S. statistics come from ?, and cover individuals aged 18-64 (at the date of DI award), who applied for and were awarded DI benefits during the period 2005-2006. ? define average earnings in the U.S. as mean earnings over the last 3-5 years before DI award.

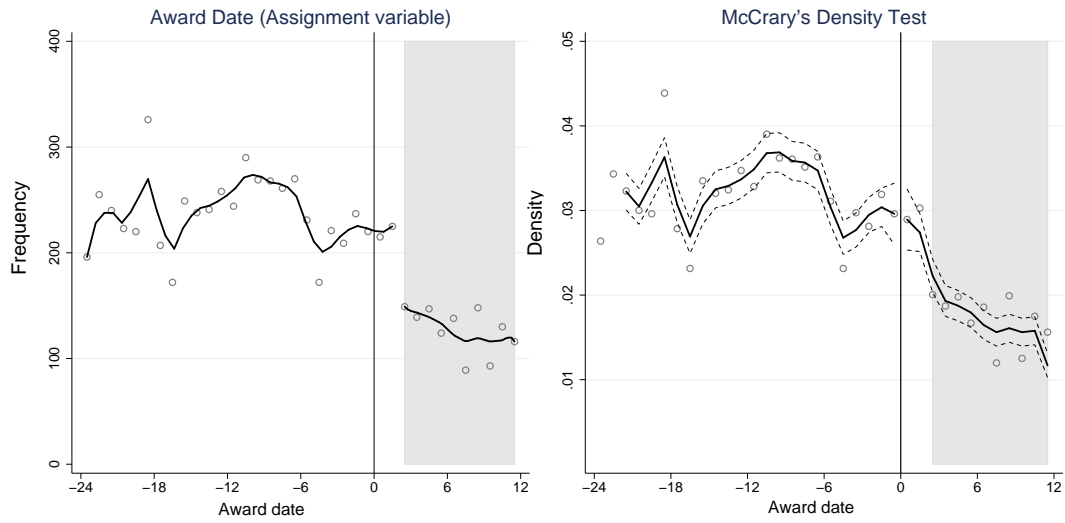
We define average earnings in Norway as mean earnings over the last 4 years before DI award.

Figure A.1: BUDGET SETS IN NORWAY AND THE U.S.



Note: The black solid lines represent the budget set for individuals under current rules in Norway (left graph) and the U.S. (right graph), and the dashed lines represent the change in the budget constraint due to the return-to-work program (left graph) and the '\$1 for \$2 offset' policy (right graph). In each graph, we use the wage and benefit levels associated with a typical Norwegian DI recipient. To compute the benefit levels, we use the average work history of recipients awarded DI during the period July 2003 to February 2004. We further set the hourly wage equal to the average hourly wage in the sample of workers who are not on DI but have similar observable characteristics as the DI recipients. For simplicity, we ignore income taxation, dependent benefits, and health insurance: Total weekly income is thus equal to earnings plus DI benefits. The SSDI budget set under the '\$1 for \$2 offset' policy is constructed by calculating the AIE and subsequently the corresponding PIA-amount, according to the standard SSDI formula.

Figure A.2: DISTRIBUTION OF THE ASSIGNMENT VARIABLE AND THE McCRARY TEST



Note: The sample consists of individuals aged 18-49 (at the date of DI award), who were awarded DI benefits during the period Jan. 2002 to Dec. 2004. The left graph shows the frequency of DI recipients by month of DI award: It plots the unrestricted monthly means, and the estimated monthly means from a local linear regression applied to each side of the cut-off date for eligibility to temporary DI, March 2004. The right graph shows the density of DI recipients by month of DI award: It plots the monthly density, and then smooths the histogram using a local linear regression (with 2 months of bandwidth) applied to each side of the cut-off date for eligibility to the return-to-work program, Jan. 2004. The dashed lines represent the 95 percent confidence interval of the estimated monthly means. In the x-axis, 0 represents Jan. 2004. The gray shaded areas mark the months in which individuals awarded DI were affected by a potentially confounding policy change.

Table A.2: DIFFERENCE-IN-DIFFERENCE SPECIFICATION OF FD AND RD MODEL

<i>Outcome variables:</i>	DiD	RD-DiD	Comparison means [st. dev]	
			Jan. & Feb. 04	Rejected applicants
LFP(2005)	0.020 (0.021)	0.025 (0.032)	0.018 [0.134]	0.26 [0.440]
LFP(2006)	0.029 (0.022)	0.03 (0.035)	0.02 [0.142]	0.316 [0.466]
LFP(2007)	0.056** (0.026)	0.08** (0.041)	0.034 [0.182]	0.316 [0.466]
Avg. earnings (2005-2007)	1195* (669)	1832* (1080)	1551 [5033]	13223 [21314]
<i>Characteristics:</i>	DiD	RD-DiD	Comparison means	
			Jan. & Feb. 04	Rejected applicants
Age at DI award	0.89 (1.27)	1.52 (2.00)	38.4 [9.7]	38.6 [7.5]
Male	-0.003 (0.06)	-0.01 (0.10)	0.50 [0.50]	0.515 [0.50]
Years of Schooling	0.41 (0.38)	0.22 (0.60)	10.5 [3.1]	9.9 [3.8]
Experience	2.0 (1.30)	2.79 (2.00)	13.9 [10.0]	11.3 [9.0]
AIE	1726 (2178)	1810 (3435)	38013 [17686]	34558 [15118]
Local unemployment rate	0.000 (0.001)	-0.0004 (0.0014)	0.024 [0.008]	0.024 [0.009]
Local DI rate	0.006* (0.003)	0.0079 (0.005)	0.098 [0.024]	0.098 [0.024]
Number of Children	-0.028 (0.15)	-0.020 (0.23)	0.90 [1.13]	0.954 [1.23]
Musculoskeletal system	-0.015 (0.054)	-0.001 (0.084)	0.22 [0.415]	0.332 [0.472]
Mental disorders	-0.03 (0.065)	-0.116 (0.102)	0.386 [0.487]	0.321 [0.468]
Obs	937	1930	440	196

*** significant at 1% level, ** significant at 5% level, *significant at 10% level.
Standard errors (in parentheses) are robust to heteroscedasticity. RD-DiD reports bootstrap standard errors with 1,000 replications.

Note: This table displays estimates from difference-in-differences specification of the first difference model (DiD) and the regression discontinuity model (RD-DiD). Labor force participation (LFP) is equal to one if annual earnings exceed the SGA threshold. Average earnings (in USD) are the mean annual earnings over the period 2005-2007 (NOK/USD ≈6). DiD uses the sample of individuals aged 18-49 (at the date of DI award) who were awarded DI between Dec 2002 - Jan. 2003 or between Dec. 2003 - Jan. 2004. RD-DiD uses the sample of individuals aged 18-49 (at the date of DI award) who were awarded DI between Nov. 2003 - Feb. 2004 or between Nov. 2002 - Feb. 2003. The third column shows mean and standard deviation (in square brackets) of the outcomes and characteristics for individuals aged 18-49 (at the date of DI award), who were awarded DI in Jan. and Feb. 2004. The last column shows mean and standard deviation (in square brackets) of the outcomes and characteristics for individuals aged 18-49 (at the date of DI rejection), whose DI application was rejected in Dec. 2003 and Jan. 2004 (excluding those who successfully re-apply/appeal during the next five years).

Table A.3: PLACEBO TESTS

	FD	DiD	RD	RD-DiD
<i>Sample:</i>	<i>Dec. 02 - Jan. 03</i>	<i>Dec. 02 - Jan. 03</i> <i>Dec. 01 - Jan. 02</i>	<i>Nov. 02 - Feb. 03</i>	<i>Nov. 02 - Feb. 03</i> <i>Nov. 01 - Feb. 02</i>
LFP(2005)	0.003 (0.014)	0.0052 (0.0221)	0.003 (0.022)	0.011 (0.035)
LFP(2006)	0.003 (0.013)	0.0103 (0.0257)	0.009 (0.022)	0.012 (0.042)
LFP(2007)	-0.002 (0.017)	-0.007 (0.028)	0.006 (0.026)	0.006 (0.044)
Avg. Earnings (2005-2007)	-68 (440)	-167 (770)	-202 (727)	-354 (1268)
Obs	502	970	1033	1968

*** significant at 1% level, ** significant at 5% level, *significant at 10% level.

Standard errors (in parentheses) are robust to heteroscedasticity; RD-DiD reports bootstrap standard errors with 1,000 replications.

Note: This table displays estimates from the FD and the RD model when we move the cut-off date from Jan. 2004 to Jan. 2003. Labor force participation (LFP) is equal to one if annual earnings exceed the SGA threshold. Average earnings (in USD) are the mean annual earnings over the period 2005-2007 (NOK/USD ≈6). The FD model uses the sample of individuals aged 18-49 (at the date of DI award), who were awarded DI in Dec. 2002 and Jan. 2003. DiD uses the sample of individuals aged 18-49 (at the date of DI award) who were awarded DI in Dec. 2001, Jan. 2002, Dec. 2002 and Jan. 2003. The RD model uses the sample of individuals aged 18-49 (at the date of DI award), who were awarded DI between Nov. 2002 and Feb. 2003. RD-DiD uses the sample of individuals aged 18-49 (at the date of DI award) who were awarded DI between Nov. 2002 and Feb. 2003 or between Nov. 2001 and Feb. 2002.

Table A.4: SPECIFICATION CHECKS OF RD MODEL

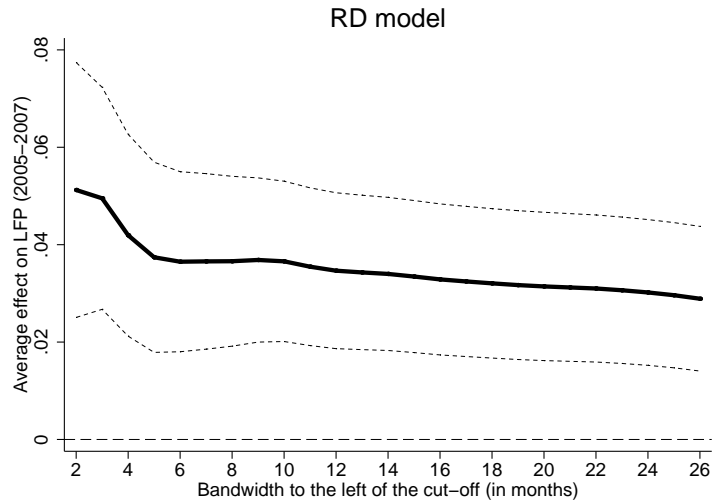
PANEL (A)	Local linear regressions		Separate linear parametric trends			
	Oct. 2003-Feb. 2004		Nov. 2003-Feb. 2004		Oct. 2003-Feb. 2004	
	LFP(2005)	0.031 (0.021)	0.035 (0.021)	0.028 (0.024)	0.043* (0.025)	0.033 (0.021)
LFP(2006)	0.039 (0.024)	0.037* (0.022)	0.039 (0.027)	0.042 (0.027)	0.038 (0.024)	0.042* (0.024)
LFP(2007)	0.079*** (0.027)	0.071*** (0.026)	0.087*** (0.031)	0.079** (0.032)	0.074*** (0.027)	0.064** (0.028)
Avg. earnings (2005-2007)	1551** (712)	1372** (676)	1630** (814)	1728** (828)	1494** (745)	1466* (755)
Controls	NO	YES	NO	YES	NO	YES
Obs	1106	1106	897	897	1106	1106

PANEL (B)	Common parametric trends (Oct. 2003 - Feb. 2004)					
	Linear		Quadratic		Cubic	
	LFP(2005)	0.033* (0.019)	0.039** (0.020)	0.032 (0.022)	0.041* (0.023)	0.023 (0.029)
LFP(2006)	0.042* (0.022)	0.040* (0.022)	0.037 (0.025)	0.043* (0.025)	0.042 (0.033)	0.04 (0.033)
LFP(2007)	0.069*** (0.025)	0.058** (0.025)	0.079*** (0.029)	0.069** (0.029)	0.097*** (0.038)	0.085** (0.039)
Avg. earnings (2005-2007)	1310* (683)	1218* (691)	1575** (783)	1586** (795)	1704* (1033)	1814* (1049)
Controls	NO	YES	NO	YES	NO	YES
Obs	1106	1106	1106	1106	1106	1106

*** significant at 1% level, ** significant at 5% level, *significant at 10% level.
Standard errors (in parentheses) are robust to heteroscedasticity.

Note: This table displays results from specification checks of the RD model. Labor force participation (LFP) is equal to one if annual earnings exceed the SGA threshold. Average earnings (in USD) are the mean annual earnings over the period 2005-2007 (NOK/USD ≈6). All covariates are measured prior to disability award, and described in Table 1. When including covariates, we allow for a flexible functional form by including a large set of dummies for different values of the covariates. The sample is restricted to individuals aged 18-49 at the date of DI award, during the period described in the columns. Panel (A) allows for separate trends on each side of the cut-off date: The first two columns use local linear regressions with a triangular kernel density function; the four next columns use linear trends in the assignment variable. Panel (B) restricts the trends to be the same on both sides of the cut-off date: The first two columns use a linear trend in the assignment variable; the two next columns use a quadratic trend in the assignment variable; the last two columns use a cubic trend in the assignment variable.

Figure A.3: INCREASING THE BANDWIDTH



Note: This figure displays estimates from 25 separate RD regressions, where each specification increases the the bandwidth to the left of the cut-off date by one month. The y-axis represents the estimated effect of the return-to-work on average labor force participation over the period 2005-2007; the x-axis represents the bandwidth to the left of the cut-off date in months; the minimum bandwidth is 2 months (individuals awarded DI between Nov. 2003-Dec. 2003) and the maximum bandwidth is 26 months (individuals awarded DI between Nov. 2001-Dec. 2003). In each RD regression, we use a local linear regression with a triangular kernel density and 2 months of bandwidth to the right of the cut-off date.

Table A.5: SUBSAMPLE ANALYSIS

PANEL (A)		Age groups			
Dependent variable:	Aged 18-49		Aged 50-61		
	FD model	RD model	FD model	RD model	
LFP(2005)	0.033** (0.016)	0.038 (0.025)	-0.0004 (0.011)	-0.007 (0.016)	
LFP(2006)	0.033* (0.018)	0.042* (0.026)	-0.003 (0.010)	-0.004 (0.015)	
LFP(2007)	0.053** (0.022)	0.085*** (0.031)	-0.016 (0.011)	-0.031* (0.017)	
Obs	435	897	972	2131	

PANEL (B)		Gender		Diagnosis groups				
Dependent variable:	Males		Females		Mental disorders		Other disorders	
	FD	RD	FD	RD	FD	RD	FD	RD
LFP(2005)	0.055* (0.031)	0.073* (0.039)	0.0003 (0.013)	-0.011 (0.026)	0.028 (0.031)	0.058 (0.047)	0.034* (0.020)	0.027 (0.027)
LFP(2006)	0.054* (0.032)	0.072* (0.042)	0.014 (0.021)	0.025 (0.028)	0.035 (0.030)	0.036 (0.033)	0.043 (0.030)	0.051 (0.038)
LFP(2007)	0.074** (0.033)	0.095** (0.044)	0.038 (0.030)	0.063* (0.038)	0.035 (0.037)	0.022 (0.045)	0.083*** (0.031)	0.122*** (0.042)
Obs	205	439	230	458	185	364	250	533

PANEL (C)		Experience		Average Indexed Earnings				
Dependent variable:	Low Experience		High Experience		Low AIE		High AIE	
	FD	RD	FD	RD	FD	RD	FD	RD
LFP(2005)	-0.012 (0.018)	-0.014 (0.023)	0.043 (0.026)	0.042 (0.032)	-0.009 (0.015)	0.004 (0.017)	0.049* (0.029)	0.038 (0.038)
LFP(2006)	-0.007 (0.018)	0.004 (0.026)	0.068** (0.032)	0.086** (0.038)	0.014 (0.020)	0.016 (0.022)	0.068* (0.035)	0.109*** (0.042)
LFP(2007)	0.017 (0.024)	0.04 (0.034)	0.072** (0.033)	0.110*** (0.042)	0.043 (0.032)	0.063* (0.035)	0.084*** (0.033)	0.131*** (0.043)
Obs	217	420	218	477	218	442	217	455

PANEL (D)		Education groups		Local labor market conditions				
Dependent variable:	Low Education		High Education		Low Unemployment		High Unemployment	
	FD	RD	FD	RD	FD	RD	FD	RD
LFP(2005)	0.031 (0.019)	0.021 (0.034)	0.045 (0.029)	0.086** (0.041)	0.059** (0.027)	0.097** (0.038)	0.003 (0.021)	-0.011 (0.023)
LFP(2006)	0.018 (0.027)	0.021 (0.039)	0.050* (0.028)	0.067** (0.030)	0.062** (0.031)	0.087** (0.038)	0.002 (0.023)	-0.011 (0.024)
LFP(2007)	0.057** (0.029)	0.081** (0.039)	0.076** (0.037)	0.100** (0.042)	0.100*** (0.033)	0.153*** (0.046)	0.032 (0.032)	0.040 (0.035)
Obs	248	502	187	395	221	448	214	449

*** significant at 1% level, ** significant at 5% level, *significant at 10% level. Standard errors (in parentheses) are robust to heteroscedasticity.

Note: This table displays the effect of the return-to-work program on labor force participation (LFP) for different subgroups. LFP is equal to one if annual earnings exceed the SGA threshold. Except for DI recipients aged 50-61, the subgroups are based on the sample of individuals aged 18-49 at the date of DI award. The estimates are based on the baseline FD and RD model. All covariates are measured prior to disability award and are described in Table A. In the FD model (described in Table 1), the sample is restricted to individuals awarded DI benefits during the period Dec. 2003 - Jan. 2004. In the RD model (described in Table 1), the sample is restricted to individuals awarded DI benefits during the period Nov. 2003 - Feb. 2004. Low (high) experience is defined as years of experience below (above) the sample median. Low (high) AIE is defined as average indexed earnings below (above) the sample median. Low (high) unemployment rate is defined as living in a municipality in which the unemployment rate is below (above) the sample median. High (low) education is defined as (not) having completed high school.

Table A.6: AWARDED AND REJECTED APPLICANTS: LABOR FORCE PARTICIPATION AND CHARACTERISTICS

Rejected/Awarded DI:	LFP:	Mean difference in LFP:			
	Rejected Applicants	Rejected Applicants - Awarded Applicants)			
	Dec. 03 & Jan. 04	Dec. 03		Jan. 04	
LFP(2005)	0.26 [0.440]	0.224*** (0.033)	0.258*** (0.035)	0.246*** (0.031)	0.264*** (0.034)
LFP(2006)	0.316 [0.466]	0.266*** (0.035)	0.305*** (0.038)	0.298*** (0.033)	0.318*** (0.036)
LFP(2007)	0.316 [0.466]	0.244*** (0.037)	0.288*** (0.040)	0.298*** (0.033)	0.334*** (0.037)
Controls		NO	YES	NO	YES

Rejected/Awarded DI:	Characteristics:	Mean difference in characteristics:	
	Rejected Applicants	Rejected Applicants - Awarded Applicants	
	Dec. 03 & Jan. 04	Dec. 03	Jan. 04
Age at DI award	38.6 [7.5]	0.402 (0.833)	0.100 (0.863)
Male	0.515 [0.50]	0.070 (0.049)	0.018 (0.049)
Years of Schooling	9.9 [3.8]	-0.830*** (0.299)	-0.513 (0.359)
Experience	11.3 [9.0]	-2.6*** (0.883)	-2.8*** (0.944)
AIE	34558 [15118]	-3720** (1465)	-4010** (1637)
Local unemployment rate	0.024 [0.009]	0.001** (0.001)	0.001 (0.001)
Local DI rate	0.098 [0.024]	-0.005** (0.002)	-0.001 (0.002)
Number of Children	0.954 [1.23]	0.018 (0.114)	-0.013 (0.117)
Musculoskeletal system	0.332 [0.472]	0.109** (0.044)	0.122*** (0.043)
Mental disorders	0.321 [0.468]	-0.124*** (0.048)	-0.083* (0.047)
Obs	196	416	411

*** significant at 1% level, ** significant at 5% level, *significant at 10% level. Standard errors (in parentheses) are robust to heteroscedasticity.

Note: This table displays differences in labor force participation (LFP) and characteristics between rejected and awarded applicants (see Table 1 for definitions). The sample consists of individuals aged 18-49 at the time they were awarded/rejected DI. The first column shows mean and standard deviation (in square brackets) of LFP and characteristics for individuals whose DI application was rejected in Dec. 2003 & Jan. 2004; rejected applicants who successfully reapply during the next five years are excluded. The second column shows the mean difference in LFP and characteristics between the rejected applicants and individuals awarded DI in Dec. 2003 (treatment group). The third third column shows the mean differences in LFP between the two groups, conditional on the observable characteristics. The fourth column shows the mean difference in LFP and characteristics between the rejected applicants and individuals awarded DI in Jan. 2003 (control group). When computing the conditional mean differences, we allow for a flexible functional form by including a large set of dummies for different values of the covariates .

B Induced Entry

In this appendix, we make a calculation for the size of the induced entry that would have to be generated by the return-to-work policy to lead to an increase in program costs.

Consider first our baseline RD estimate, suggesting that the return-to-work policy reduces the program costs by 5 percent per existing recipient. However, some individuals may be induced to apply for DI because of the program. We assume that any induced entrants are earning more than the substantial gainful activity level (otherwise, the program gives no incentive to enter DI). We further assume that induced entrants have the same distribution of earnings (and thus the same program costs) as DI recipients in the treatment group who work.¹ Under these assumptions, the return-to-work policy may finance 15 new entrants per 100 existing recipients without increasing the program costs.

We define the elasticity of entry response as the percentage increase in the the number of DI recipients relative to the percentage change in the disposable income (I) as a DI recipient. This elasticity can be expressed as

$$\varepsilon = \frac{0.15}{Pr(Award = 1) \cdot E(\Delta I | Award = 1)}$$

where²

$$E(\Delta I | Award = 1) = \frac{E(I | return - to - work, W > SGA) - E(I | current rules, W > SGA)}{E(I | current rules, W > SGA)}.$$

To calculate ε , we need to measure $Pr(Award = 1)$ and $E(\Delta I | Award = 1)$. Under the above assumptions, $E(I | return - to - work, W > SGA)$ equals $E(I | treatment, W > SGA)$; we observe

¹This assumption may generate a downward bias in the implied elasticity of entry response. The reason is that the induced entrants are likely to be of better health; thus, the earnings of existing recipients may be viewed as a lower bound for the earnings of induced entrants (see Bound, 1989).

²Because the return-to-work-policy does not change the disposable income of non-recipients, $E(\Delta I | Award = 0) = 0$.

the latter in the data. To obtain $E(I \mid \text{current rules}, W > SGA)$, we use the observed distribution of earnings for DI recipients in the treatment group who work and compute what their disposable income would have been under current rules. As individuals induced to apply for DI because of the return-to-work policy are likely to be of better health than the applicants under current rules, we take the DI award rate of applicants under current rules in 2003 (i.e. 65 percent) as an upper bound of $Pr(\text{Award} = 1)$. This gives a lower bound of 1.5 on the elasticity of induced entry that lead the return-to-work policy to increase program costs. If we instead use the estimate from baseline FD model, we get a lower bound of 1.1.³

The lower bound estimates far exceed the elasticities of induced entry reported in previous studies. Gruber (2000) reports elasticity estimates in the range of 0.28-0.36, whereas ? finds little, if any, effect on entry rates from an increase in benefit levels. There is also a sizeable literature that has estimated elasticities of entry response by modeling labor force participation or DI reciprocity as a function of potential DI benefit levels. Using cross-sectional variation in DI benefits, these studies tend to find elasticities in the range of 0.1-0.2 (see Gruber (2000) for a review of this evidence).

³Specifically, the baseline RD model gives

$$\varepsilon \geq \frac{0.1526}{0.65 \cdot 0.161} = 1.5,$$

while the baseline FD model gives

$$\varepsilon \geq \frac{0.119}{0.65 \cdot 0.165} = 1.1.$$