

Social Support Substitution and the Earnings Rebound:
Evidence from a Regression Discontinuity
in Disability Insurance Reform

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ONLINE APPENDICES

Online Appendix A: Detail about Methodology and Additional Tables and Figures

Methodology to Infer “Complier” Characteristics

The increased stringency of the re-examinations that was applied to the cohorts younger than age 45 did not necessarily affect everyone. Some individuals would have had their disability rating (and thus their benefits) reduced both under the more stringent and under the less stringent re-examination. Following standard IV-terminology, we label this group the “always-takers.” Similarly, other individuals would not experience a reduction in their disability rating under either the more stringent or the less stringent re-examination. We label this group the “never-takers.” The increased stringency at the age cutoff matters, however, for those who would not have experienced a decrease in their disability rating under the less stringent re-examination but would experience such a decrease under the more stringent re-examination. These individuals are affected on the margin by the more stringent re-examination, and they are referred to as “compliers” in the standard IV-terminology.

Because compliers are defined based on a counterfactual (we never simultaneously observe the outcome for any given individual under both the more stringent and the less stringent re-examination), we cannot directly observe the characteristics of compliers. However, it is possible to infer their characteristics by comparing the demographic characteristics of the selected subsample that experienced a reduction in their disability rating to the left and right of the cohort discontinuity. Just to the right of the discontinuity (where the re-examination was more lenient), those who experienced a decrease in their disability rating consist, by definition, only of “always-takers”. Just to the left of the discontinuity (where the re-examination was more stringent), those who experienced a decrease in their disability rating consist, by definition, of “always-takers” and “compliers”. Thus, by taking the subsample that experienced a reduction in the disability rating and comparing the demographic characteristics of this subsample on either side of the discontinuity, we can back out the demographic characteristics of the compliers, because the demographic characteristics of the always-takers are the same in expectation on either side of the discontinuity.

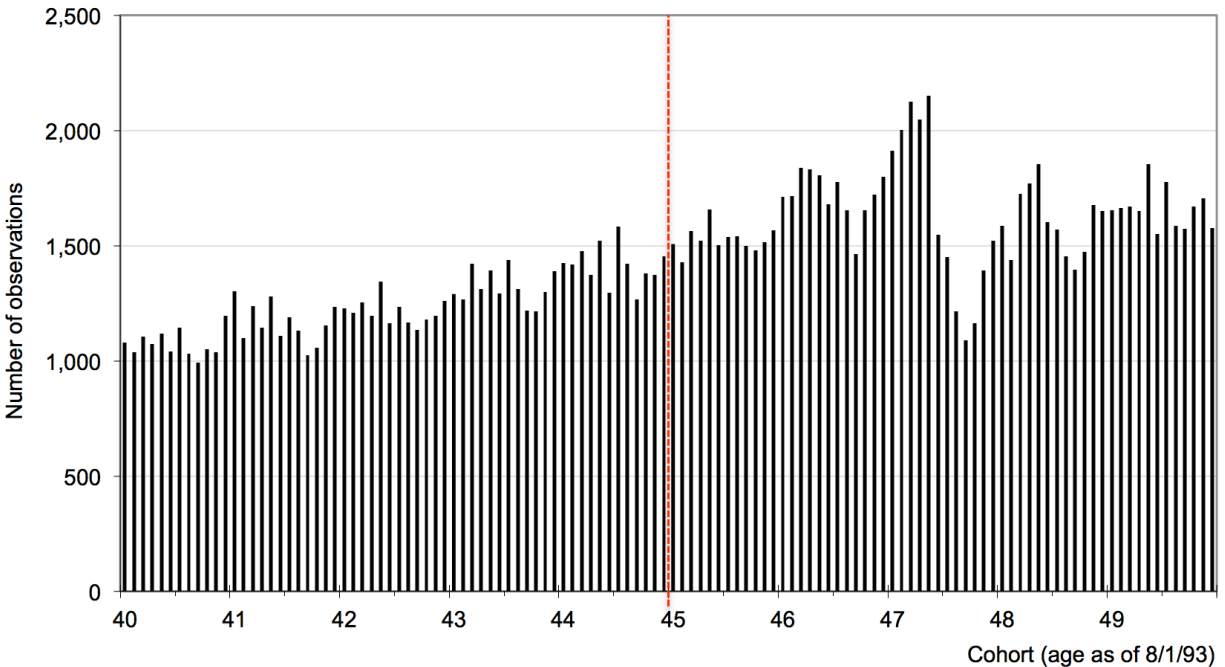
In particular, we first estimate the population fractions of compliers and always-takers. We do this by running our standard, reduced-form RD regression on a dummy for experiencing a reduction in the disability rating. The intercept of the RD regression line just to the right of the discontinuity yields the population fraction of always-takers (denoted by π_{AT}), while the intercept just to the left of the discontinuity yields the population fraction of always-takers and compliers combined (denoted by $\pi_{AT} + \pi_C$).

Next, we examine discontinuities in demographic characteristics among those who experienced a reduction in their disability rating. Let x denote an indicator for a predetermined demographic characteristic (e.g., x is 1 if and only if the person is married in 1996, so prior to the re-examinations). We run our standard, reduced-form RD regression using x as the dependent variable on the subsample of individuals who had their disability rating reduced. The intercept of the RD regression line just to the right of the discontinuity yields the expectation of x for the always-takers (denoted by $E_{AT}[x]$), while the intercept just to the left of the discontinuity yields the expectation of x for always-takers and compliers combined (denoted by $E_{\{AT+C\}}[x]$). Of course, $E_{\{AT+C\}}[x]$ is simply a weighted average of $E_{AT}[x]$ and $E_C[x]$, weighted with their respective population fractions. Given that we have estimates of π_{AT} , π_C , $E_{AT}[x]$, and $E_{\{AT+C\}}[x]$, we can solve for $E_C[x]$ in the identity:

$$E_{\{AT+C\}}[x] = (\pi_{AT} E_{AT}[x] + \pi_C E_C[x]) / (\pi_{AT} + \pi_C)$$

$E_C[x]$ is the expectation of demographic characteristic x among compliers, i.e., those who are affected by the discontinuity. By definition, these demographic characteristics are measured at the discontinuity, so for the age 45.0 cohort. To compare the characteristics of compliers at age 45.0 to those of the entire sample at that age, we also run our standard, reduced-form RD regression using x as the dependent variable for the entire sample. From this regression, we find the expectation of x for the entire sample (so comprised of always-takers, compliers, and never-takers) both just on the left and just on the right of the discontinuity: $E_{\{AT+C+NT\}}^- [x]$ and $E_{\{AT+C+NT\}}^+ [x]$. As the table with placebo regressions showed, these two expectations are generally not significantly different from each other, and we take their average as our estimate for the expectation of x for the entire population at age 45.0. By repeating this procedure for each predetermined demographic characteristic, we find the distribution of demographic characteristics for compliers and the distribution of demographic characteristics for the entire sample. We calculate standard errors using 5,000 bootstrap replications.

Figure A1: Number of Observations by Cohort



Note: The McCrary density test is insignificant (p-value 0.126). The large trough and spike around ages 47 and 48 are the effect of WWII (the “hunger winter of 1944”) and the subsequent baby boom.

Appendix Table A1: Placebo Regressions

	N	Treatment dummy: age<45	P-value	Sample mean
Panel A: Gender				
Female	84185	0.000 (0.007)	0.958	0.338
Panel B: Degree DI in 1996				
Degree DI in 1996 (scale of 1-8)	84185	0.037 (0.031)	0.231	6.554
Degree DI in [15, 25)% in 1996	84185	-0.001 (0.004)	0.797	0.077
Degree DI in [25, 35)% in 1996	84185	-0.009 (0.004)**	0.039	0.095
Degree DI in [35, 45)% in 1996	84185	0.003 (0.004)	0.327	0.069
Degree DI in [45, 55)% in 1996	84185	-0.001 (0.003)	0.666	0.058
Degree DI in [55, 65)% in 1996	84185	-0.000 (0.002)	0.827	0.020
Degree DI in [65, 80)% in 1996	84185	0.003 (0.002)	0.160	0.020
Degree DI in [80, 100]% in 1996	84185	0.005 (0.007)	0.444	0.661
Panel C: Province				
Province: Groningen	84185	-0.001 (0.003)	0.663	0.041
Province: Friesland	84185	-0.002 (0.003)	0.523	0.040
Province: Drenthe	84185	0.001 (0.003)	0.774	0.034
Province: Overijssel	84185	0.001 (0.004)	0.704	0.073
Province: Flevoland	84185	0.000 (0.002)	0.826	0.018
Province: Gelderland	84185	0.002 (0.004)	0.633	0.111
Province: Utrecht	84185	0.003 (0.003)	0.322	0.066
Province: Noord-Holland	84185	-0.008 (0.006)	0.164	0.192
Province: Zuid-Holland	84185	-0.006 (0.005)	0.258	0.168
Province: Zeeland	84185	-0.000 (0.002)	0.838	0.016
Province: Noord-Brabant	84185	0.002 (0.005)	0.731	0.151
Province: Limburg	84185	0.007 (0.004)*	0.074	0.090
Panel D: Duration in DI in 1993				
Duration on DI (months; as of 8/1993)	84185	-0.601 (1.037)	0.562	96.72
Duration: 5 years or more	84185	-0.007 (0.007)	0.284	0.592
Panel E: Marital status in 1996				
Married	84185	0.007 (0.007)	0.260	0.664
Panel F: Earnings prior to DI				
Earnings prior to DI (euro/yr)	84185	13.0 (123.8)	0.916	16928
Quintile 1	84185	-0.003 (0.006)	0.601	0.200
Quintile 2	84185	0.005 (0.006)	0.413	0.200
Quintile 3	84185	-0.004 (0.006)	0.528	0.200
Quintile 4	84185	0.005 (0.006)	0.351	0.200
Quintile 5	84185	-0.003 (0.006)	0.550	0.200
Panel G: Origin				
Native Dutch	84185	0.003 (0.005)	0.608	0.834
Morocco	84185	-0.001 (0.001)	0.246	0.005
Turkey	84185	0.003 (0.002)	0.143	0.028
Surinam	84185	-0.005 (0.002)***	0.007	0.018
Antilles and Aruba	84185	-0.000 (0.001)	0.654	0.003
Other Non-Western Country	84185	-0.000 (0.001)	0.917	0.008
Netherlands, but born elsewhere	84185	-0.000 (0.003)	0.919	0.059
Other Western Country	84185	0.002 (0.002)	0.298	0.019
East-Europe	84185	0.001 (0.001)	0.330	0.009
Dutch East Indies	84185	-0.002 (0.002)	0.189	0.017

Note: Standard errors are in parentheses. Significance levels: * 10 percent; ** 5 percent; *** 1 percent. Each coefficient is estimated using our standard reduced-form RD regression without demographic controls. Previous earnings are capped at the maximum amount covered by DI (about €36,000/year in 1999). We use SUR to test the hypothesis that all coefficients on the treatment dummy are jointly zero, and we cannot reject this hypothesis (p-value: 0.4990).

Appendix Table A2: Characteristics of “Compliers”

	“Complier” characteristics	Average characteristics of the age 45.0 cohort	Difference between compliers and the rest of the sample for the age 45.0 cohort
Female	0.201 (0.024) ^{***}	0.329 (0.003) ^{***}	-0.128 (0.024) ^{***}
Degree DI in 1996 (scale of 1-8)	4.925 (0.128) ^{***}	5.617 (0.015) ^{***}	-0.692 (0.126) ^{***}
Degree DI in [15, 25)% in 1996	0.091 (0.017) ^{***}	0.067 (0.002) ^{**}	0.024 (0.017)
Degree DI in [25, 35)% in 1996	0.099 (0.018) ^{***}	0.091 (0.002) ^{***}	0.008 (0.018)
Degree DI in [35, 45)% in 1996	0.164 (0.016) ^{***}	0.072 (0.002) ^{***}	0.091 (0.016) ^{***}
Degree DI in [45, 55)% in 1996	0.091 (0.014) ^{***}	0.059 (0.002) ^{***}	0.032 (0.013) ^{**}
Degree DI in [55, 65)% in 1996	0.033 (0.009) ^{***}	0.020 (0.001) ^{***}	0.012 (0.009)
Degree DI in [65, 80)% in 1996	0.042 (0.008) ^{***}	0.018 (0.001) ^{***}	0.024 (0.008) ^{***}
Degree DI in [80, 100)% in 1996	0.481 (0.027) ^{***}	0.672 (0.003) ^{***}	-0.191 (0.026) ^{***}
Province: Groningen	0.033 (0.010) ^{***}	0.040 (0.001) ^{***}	-0.007 (0.010)
Province: Friesland	0.053 (0.011) ^{***}	0.041 (0.001) ^{***}	0.012 (0.011)
Province: Drenthe	0.023 (0.009) ^{**}	0.036 (0.001) ^{***}	-0.013 (0.009)
Province: Overijssel	0.088 (0.014) ^{***}	0.077 (0.002) ^{***}	0.011 (0.014)
Province: Flevoland	0.016 (0.007) ^{**}	0.017 (0.001) ^{***}	-0.001 (0.007)
Province: Gelderland	0.111 (0.016) ^{***}	0.111 (0.002) ^{***}	0.000 (0.016)
Province: Utrecht	0.034 (0.012) ^{***}	0.063 (0.002) ^{***}	-0.029 (0.012) ^{**}
Province: Noord-Holland	0.152 (0.020) ^{***}	0.184 (0.003) ^{***}	-0.033 (0.020) [*]
Province: Zuid-Holland	0.192 (0.021) ^{***}	0.163 (0.003) ^{***}	0.029 (0.021)
Province: Zeeland	0.028 (0.007) ^{***}	0.017 (0.001) ^{***}	0.012 (0.007)
Province: Noord-Brabant	0.164 (0.019) ^{***}	0.157 (0.003) ^{***}	0.007 (0.019)
Province: Limburg	0.107 (0.015) ^{***}	0.094 (0.002) ^{***}	0.013 (0.015)
Duration on DI (months; as of 8/1993)	96.945 (3.853) ^{***}	97.358 (0.514) ^{**}	-0.413 (3.812)
Married	0.798 (0.025) ^{***}	0.665 (0.003) ^{***}	0.134 (0.025) ^{***}
Earnings prior to DI (Euro/yr)	17506 (441) ^{***}	16901 (60) ^{***}	605 (435)
Native Dutch	0.794 (0.020) ^{***}	0.828 (0.003) ^{***}	-0.034 (0.020) [*]
Morocco	0.007 (0.004) [*]	0.005 (0.000) ^{***}	0.002 (0.004)
Turkey	0.045 (0.009) ^{***}	0.029 (0.001) ^{***}	0.016 (0.009) [*]
Surinam	0.006 (0.007)	0.019 (0.001) ^{***}	-0.013 (0.007) [*]
Antilles and Aruba	0.003 (0.003)	0.002 (0.000) ^{***}	0.001 (0.003)
Other Non-Western Country	0.012 (0.005) ^{**}	0.009 (0.001) ^{***}	0.003 (0.005)
Netherlands, but born elsewhere	0.064 (0.013) ^{***}	0.057 (0.002) ^{***}	0.007 (0.012)
Other Western Country	0.027 (0.007) ^{***}	0.019 (0.001) ^{***}	0.009 (0.007)
East-Europe	0.019 (0.005) ^{***}	0.011 (0.001) ^{***}	0.009 (0.005)
Dutch East Indies	0.023 (0.008) ^{***}	0.022 (0.001) ^{***}	0.001 (0.007)

Note: Standard errors are in parentheses. Significance levels: * 10 percent; ** 5 percent; *** 1 percent.

“Compliers” are those affected on the margin by the stricter re-examination, i.e., those who experience a decrease in their disability rating under the stricter re-examination but would not have experienced a decrease in their disability rating under the more lenient examination. The characteristics of compliers are by definition measured for the age 45.0 cohort because the treatment (the discontinuity) occurs then. The average sample characteristics for the age 45.0 cohort is the average of “compliers”, “always-takers” (those who would experience a decrease in their disability rating both under the stricter re-examination and the more lenient re-examination), and “never-takers” (those who would not experience a decrease in their disability rating under either the stricter or the more lenient re-examination). The procedure to infer the demographic characteristics of “compliers” is described at the start of this appendix. Age is measured as of 8/1/93, so age is a measure for cohort. Standard errors are calculated by bootstrapping (5000 draws). N=84,185.

Table A3: Replacement Rates and Re-examinations**Panel A: Joint distribution of the 1996 and 1999 replacement rates at age 45.0 under the less stringent re-examination**

Replacement rate in 1996	Replacement rate in 1999								Total
	0%	14%	21%	28%	35%	42%	50.75%	70%	
14%	1.65	2.43	0.74	0.23	0.13	0.04	0.02	1.54	6.79
21%	1.43	0.72	3.64	1.07	0.33	0.10	0.11	2.11	9.49
28%	0.59	0.15	0.60	3.10	0.65	0.18	0.08	1.72	7.06
35%	0.55	0.05	0.18	0.40	2.93	0.36	0.21	1.26	5.94
42%	0.22	0.00	0.04	0.07	0.15	0.92	0.14	0.51	2.07
50.75%	0.11	0.00	0.02	0.03	0.07	0.10	0.83	0.55	1.71
70%	6.14	0.35	0.62	0.52	0.38	0.28	0.32	58.33	66.93
Total	10.68	3.70	5.85	5.42	4.64	1.98	1.70	66.02	100.00

Panel B: Treatment effect of the more stringent re-examination on the joint distribution of 1996 and 1999 replacement rates

Replacement rate in 1996	Replacement rate in 1999								Total
	0%	14%	21%	28%	35%	42%	50.75%	70%	
14%	1.36	0.21	-0.52	-0.12	-0.11	-0.02	-0.01	-0.89	-0.10
	(0.21)	(0.28)	(0.08)	(0.05)	(0.03)	(0.03)	(0.02)	(0.12)	(0.37)
21%	0.33	1.07	-0.11	-0.59	-0.25	0.01	-0.04	-1.27	-0.85
	(0.18)	(0.11)	(0.32)	(0.10)	(0.05)	(0.04)	(0.04)	(0.15)	(0.41)
28%	0.31	0.42	1.38	-0.37	-0.44	-0.10	0.04	-0.89	0.35
	(0.12)	(0.06)	(0.11)	(0.28)	(0.07)	(0.04)	(0.04)	(0.13)	(0.36)
35%	0.14	0.16	0.36	0.53	-0.47	-0.19	-0.06	-0.61	-0.14
	(0.10)	(0.04)	(0.06)	(0.08)	(0.26)	(0.06)	(0.05)	(0.13)	(0.33)
42%	0.02	0.09	0.10	0.08	0.13	-0.16	-0.05	-0.25	-0.04
	(0.06)	(0.02)	(0.03)	(0.03)	(0.05)	(0.15)	(0.04)	(0.08)	(0.20)
50.75%	0.11	0.08	0.10	0.14	0.03	0.08	0.07	-0.33	0.27
	(0.05)	(0.02)	(0.03)	(0.03)	(0.03)	(0.04)	(0.16)	(0.09)	(0.20)
70%	1.75	0.98	1.46	0.83	0.49	0.30	0.51	-5.82	0.51
	(0.35)	(0.09)	(0.11)	(0.10)	(0.09)	(0.07)	(0.08)	(0.69)	(0.66)
Total	4.01	3.01	2.78	0.50	-0.61	-0.09	0.46	-10.06	0.00
	(0.45)	(0.32)	(0.36)	(0.32)	(0.29)	(0.19)	(0.19)	(0.68)	(0.00)

Note: Standard errors are in parentheses. Panel A shows the predicted joint probability of replacement rates in 1996 and 1999 at exactly age 45. Each entry is estimated as the intercept at age 45.0 of the regression line to the right of the discontinuity (i.e., for those who underwent the less stringent re-examination). Panel B shows the treatment effect of the more stringent re-examination on each joint probability of replacement rates. Each entry is estimated using our standard reduced-form RD regression without demographic controls, where the outcome variable is a dummy for combination of replacement rates in 1996 and 1999 that corresponds to that cell. Those who exit DI before the post-examination replacement rate is recorded are assigned a replacement rate of 0. N=84,185.

Appendix Table A4: Baseline Estimates Without Controls Variables

	Effect of reform per 1000 €/year decrease in amount of original DI					
	Full Sample		Males		Females	
Panel A: New DI benefit in 1999						
Income from a new DI spell	0.008	(0.008)	0.001	(0.008)	0.051	(0.030)*
Participation dummy	0.001	(0.001)***	0.001	(0.001)**	0.004	(0.002)
Panel B: Other social assistance in 1999						
Income from other social assistance	0.284	(0.052)***	0.248	(0.051)***	0.460	(0.186)***
Participation dummy	0.043	(0.006)***	0.036	(0.006)***	0.078	(0.023)***
Panel C: Labor market outcomes in 1999						
Earnings	0.580	(0.135)***	0.659	(0.144)***	0.254	(0.285)***
Employment dummy	0.027	(0.006)***	0.026	(0.006)***	0.036	(0.017)**
Panel D: Total						
Income except from original DI spell	0.872	(0.142)***	0.906	(0.147)***	0.765	(0.343)**
Dummy for work or other soc. asst.	0.054	(0.007)***	0.045	(0.006)***	0.094	(0.027)***

Note: Standard errors are in parentheses. Significance levels: * 10 percent; ** 5 percent; *** 1 percent. The estimates in this table come from regressions that are identical to those used in Tables 4 and 5 except that the regressions for this table do not include demographic controls (except, of course, age as of 8/1/93 and the interaction of [age-45] with the treatment dummy).

Appendix Table A5: Heterogeneity in Effects on Income Changes

Ratio of total income in 1999 to earnings prior to DI	Sample Mean	RD estimate of effect of more stringent re-examination
Less than 1.50	87.7	0.17 (0.42)
Less than 1.25	79.0	0.00 (0.50)
Less than 1.10	72.2	-0.88 (0.54)
Less than 1.00	65.9	-1.35 (0.57)**
Less than 0.90	58.3	-1.18 (0.60)*
Less than 0.75	20.3	1.84 (0.55)***
Less than 0.50	9.9	1.57 (0.41)***

Note: Standard errors are in parentheses. Significance levels: * 10 percent; ** 5 percent; *** 1 percent. Each entry comes from our standard RD regression in which the outcome variable is an indicator variable for the statement in the first column being true. Earnings prior to DI are the earnings to which the DI replacement rate is applied. Total income in 1999 includes personal income from all sources, including earnings, DI, and other social assistance.

Appendix Table A6: Sensitivity of Baseline Estimates to Bandwidth and Functional Form

		First stage:	Effect scaled by decrease in amount of original DI (in 1000 €/yr)					
		DI amount in 1999 (in 1000 €/year)	Income sources in 1999			Participation in 1999		
	N		Earnings	Income from new DI spell	Income from other social assistance	Work	New DI spell	Other social assistance
Panel A: Linear Specifications								
+/- 5 years	160207	-1.047 (0.049)***	0.330 (0.088)***	0.010 (0.006)	0.402 (0.036)***	0.020 (0.003)***	0.001 (0.000)***	0.049 (0.004)***
+/- 4 years	129557	-1.074 (0.055)***	0.417 (0.097)***	0.009 (0.007)	0.337 (0.038)***	0.023 (0.004)***	0.002 (0.001)***	0.043 (0.004)***
+/- 3 years	98668	-1.112 (0.065)***	0.596 (0.097)***	0.007 (0.008)	0.259 (0.041)***	0.028 (0.004)***	0.001 (0.001)***	0.040 (0.005)***
Baseline (+/- 2.5 years)	84185	-1.086 (0.071)***	0.618 (0.108)***	0.008 (0.008)	0.297 (0.047)***	0.029 (0.005)***	0.001 (0.001)**	0.044 (0.005)***
+/- 2 years	66818	-1.101 (0.080)***	0.825 (0.119)***	0.009 (0.010)	0.296 (0.052)***	0.034 (0.005)***	0.001 (0.001)**	0.043 (0.006)***
+/- 1 year	32772	-1.010 (0.116)***	0.778 (0.183)***	0.016 (0.016)	0.379 (0.082)***	0.036 (0.008)***	0.002 (0.001)	0.054 (0.009)***
Panel B: Polynomials with +/- 2.5 year bandwidth								
2 nd order	84185	-1.126 (0.108)***	1.053 (0.166)***	0.008 (0.012)	0.292 (0.068)***	0.043 (0.007)***	0.001 (0.001)	0.047 (0.008)***
3 rd order	84185	-0.963 (0.137)***	0.883 (0.238)***	-0.001 (0.018)	0.346 (0.103)***	0.048 (0.011)***	-0.000 (0.001)	0.054 (0.012)***
4 th order	84185	-0.789 (0.182)***	0.946 (0.390)**	0.024 (0.030)	0.392 (0.171)**	0.050 (0.018)***	0.001 (0.002)	0.046 (0.019)**
5 th order	84185	-0.870 (0.230)***	1.268 (0.476)***	0.012 (0.034)	0.285 (0.187)	0.062 (0.022)***	-0.002 (0.003)	0.023 (0.019)
Panel C: Polynomials with +/- 5 year bandwidth								
2 nd order	160207	-1.121 (0.074)***	0.652 (0.124)***	0.006 (0.009)	0.248 (0.048)***	0.031 (0.005)***	0.001 (0.001)**	0.039 (0.005)***
3 rd order	160207	-1.138 (0.099)***	0.998 (0.169)***	0.008 (0.012)	0.263 (0.064)***	0.042 (0.007)***	0.001 (0.001)	0.046 (0.007)***
4 th order	160207	-1.157 (0.117)***	0.992 (0.197)***	-0.001 (0.014)	0.273 (0.075)***	0.041 (0.008)***	-0.000 (0.001)	0.046 (0.008)***
5 th order	160207	-1.015 (0.139)***	0.936 (0.265)***	0.001 (0.019)	0.240 (0.100)**	0.054 (0.011)***	-0.001 (0.001)	0.042 (0.011)***

Note: Standard errors are in parentheses. Significance levels: * 10 percent; ** 5 percent; *** 1 percent. The table shows our key estimates of the effect of the more stringent re-examination on the DI amount, the benefit-substitution ratio, and the earnings crowd-out ratio for different choices of bandwidth and for different orders of the polynomial in age as of 8/1/1993. Our baseline choice of bandwidth (+/- 2.5 years) was guided by the Imbens-Kalyanaraman (2012) criterion. The bin-dummy test suggest that the optimal polynomial for the +/- 2.5 year window is a linear specification for all outcome variables except earnings (optimal is 4th order) and DI amount in 1999 (optimal is 5th order).

Appendix Table A7: Heterogeneity of Effect

	N	Effect of reform per 1000 €/yr decrease in amount of original DI		
		Earnings	Income from new DI spell	Income from other social assistance
Panel A: By marital status				
Married	55913	0.551 (0.110)***	0.001 (0.008)	0.252 (0.042)***
Single	28272	0.879 (0.326)***	0.043 (0.027)	0.453 (0.178)***
p-value on difference		0.341	0.137	0.273
Panel B: By earnings prior to DI				
Below median	42095	0.563 (0.156)***	0.017 (0.016)	0.352 (0.068)***
Above median	42090	0.676 (0.144)***	0.001 (0.009)	0.254 (0.062)***
p-value on difference		0.597	0.375	0.287
Panel C: By origin				
Native Dutch	70205	0.658 (0.128)***	0.017 (0.010)	0.269 (0.054)***
Other origin	13980	0.495 (0.186)***	0.024 (0.017)	0.384 (0.092)***
p-value on difference		0.470	0.340	0.280
Panel D: By duration on DI as of 8/1/1993				
≤ 5 years	34378	0.897 (0.272)***	0.004 (0.019)	0.231 (0.125)*
> 5 years	49807	0.512 (0.109)***	0.009 (0.009)	0.317 (0.043)***
p-value on difference		0.189	0.830	0.520
Panel E: By degree of disability in 1996				
Partially disabled	28509	0.682 (0.166)***	0.005 (0.008)	0.117 (0.047)**
Fully disabled	55676	0.520 (0.128)***	0.010 (0.015)	0.491 (0.086)***
p-value on difference		0.441	0.770	<0.001

Note: Standard errors are in parentheses. Significance levels: * 10 percent; ** 5 percent; *** 1 percent. Each entry comes from our standard fuzzy RD regression with the outcome variable indicated in the column header and the sample indicated in the row header. Earnings prior to DI are the earnings to which the DI replacement rate is applied.

Appendix Table A8: Inferred Distribution of Medical Conditions Among Those Induced to Exit DI

Medical condition	Stayers with condition as a percentage of stayers		Stayers with condition as percentage of total population		Marginal leavers with condition as percentage of total population	Marginal leavers with condition as percentage of marginal leavers	Odds ratio of prevalence of condition among marginal leavers relative to untreated stayers	
	At left border of age 45 (treated) (1)	At right border of age 45 (untreated) (2)	Difference, (1)-(2): (3)	At left border of age 45 (treated) (4)	At right border of age 45 (untreated) (5)	Difference, (5)-(4): (6)	(6)/0.038: (7)	(7)/(2): (8)
Musculoskeletal	37.4	38.0	-0.62 (0.69)	33.4	35.4	2.0	52.5	1.38
Psychiatric	31.8	32.8	-0.98 (0.67)	28.4	30.5	2.1	55.7	1.70
General	12.6	10.6	1.96 (0.46) ^{***}	11.3	9.9	-1.3	-35.5	-3.33
Neurological	4.1	4.7	-0.60 (0.32) [*]	3.6	4.3	0.7	18.7	4.00
Cardiovascular	4.3	4.4	-0.07 (0.32)	3.9	4.1	0.2	6.0	1.36
Digestive system	2.1	2.3	-0.13 (0.22)	1.9	2.1	0.2	5.2	2.31
Respiratory system	2.2	2.1	0.09 (0.22)	2.0	2.0	0.0	0.0	-0.02
Urological	1.5	1.3	0.14 (0.18)	1.3	1.2	-0.1	-1.9	-1.43
Visual impairment	1.0	0.9	0.04 (0.14)	0.9	0.9	0.0	0.1	0.10
Endocrinology	0.9	0.9	0.01 (0.15)	0.8	0.8	0.0	0.6	0.65
Hearing impairment	0.8	0.8	0.01 (0.14)	0.7	0.8	0.0	0.6	0.67
Dermatological	0.9	0.7	0.15 (0.14)	0.8	0.7	-0.1	-2.8	-3.80
Hematological	0.4	0.3	0.02 (0.09)	0.3	0.3	0.0	-0.2	-0.49
Pregnancy related	0.0	0.1	-0.04 (0.04)	0.0	0.1	0.0	0.9	11.64
Total	100.0	100.0	0.00	89.4	93.2	3.8	100.0	

Note: Standard errors are in parentheses. Significance levels: * 10 percent; ** 5 percent; *** 1 percent. We run a reduced-form RD regression with our standard controls (see note to Table 4) on the sample of those who remain on DI, where the outcome variable is a dummy for the individual having as the main diagnosis the condition indicated in the row header. Column 1 shows the intercept at the cutoff age (exactly 45 on 8/1/93) from the regression line to the left of the discontinuity (i.e., for those who underwent the more stringent re-examination), column 2 shows the intercept at the cutoff age from the regression line to the right of the discontinuity (i.e., for those who underwent the less stringent re-examination), and column 3 shows the “treatment effect” (i.e., the difference between columns 1 and 2) among the selected sample of those who remain on DI. Under the (reasonable) assumption that there is no difference between the more stringent and less stringent re-examination on the main diagnosis for a given individual, the “treatment effect” is due to differential exit by medical condition. The composition of medical conditions of those induced to exit by the more stringent re-examination is listed in columns (6) and (7). N=74,028 for the regressions that generate the estimates in columns (1) through (3).

Appendix Table A9: Effect on Replacement Rate in the Longer Run (between 1996 and 2005)

Change in the replacement rate	(1)	(2)	(3)	
	Predicted probability at age 45.0 for the less stringent re-examination	Predicted probability at age 45.0 for the more stringent re-examination	Treatment effect of the more stringent examination on the probability of the specified change in replacement rate	
7 "steps" less generous	11.17	13.12	1.95	(0.45)
6 "steps" less generous	0.60	1.18	0.58	(0.11)
5 "steps" less generous	0.74	1.70	0.96	(0.13)
4 "steps" less generous	1.48	2.59	1.11	(0.18)
3 "steps" less generous	1.77	2.72	0.95	(0.20)
2 "steps" less generous	3.09	4.21	1.11	(0.26)
1 "step" less generous	4.77	7.85	3.07	(0.32)
Same generosity	62.46	57.77	-4.69	(0.68)
1 "step" more generous	2.71	1.62	-1.10	(0.23)
2 "steps" more generous	1.56	1.17	-0.39	(0.16)
3 "steps" more generous	2.44	1.70	-0.74	(0.20)
4 "steps" more generous	2.50	1.89	-0.62	(0.20)
5 "steps" more generous	2.79	1.65	-1.14	(0.21)
6 "steps" more generous	1.90	0.84	-1.06	(0.17)

Note: Standard errors are in parentheses. Each row is estimated using our standard reduced-form RD regression without demographic controls, where the outcome variable is a dummy for the change in the replacement rate between 1996 and 2005 that corresponds to row header. There are eight possible replacement rates: 0%, 14%, 21%, 28%, 35%, 42%, 50.75%, and 70%, where we assign 0% to those who exit from DI before the post-examination replacement rate is recorded. The number of “steps” counts by how many distinct levels the replacement rate changed. For example, going to the next higher replacement rate (e.g., from 28% to 35%) is called a “1 step” increase in the generosity of the replacement rate. Column 1 shows the intercept at age 45.0 from the regression line to the right of the discontinuity (i.e., for those who underwent the less stringent re-examination), column 2 shows the intercept at age 45.0 from the regression line to the left of the discontinuity (i.e., for those who underwent the more stringent re-examination), and column 3 shows the treatment effect (i.e., the difference between columns 1 and 2). N=84,185.

Online Appendix B: Variable Definitions

Variables come from the datasets described below. The datasets are merged based on an individual identifier that is a scrambled version of the Dutch equivalent of a Social Security Number (“burgerservicenummer”).

Earnings and other sources of income

Information on income by source comes from various administrative datasets. Employment earnings (from the jobs database, “SSB-Banen”) and self-employment earnings (from the self-employed database, “SSB-Zelfst”) are obtained from yearly tax files, and hence comprise annual gross earnings measured in euros. Gross benefit payments are registered monthly by the respective benefit administration offices. From these monthly payments we construct the income flow for each source of benefits in euros per year. Benefits are gross; they are subject to income taxation and social insurance contributions. All amounts are nominal but inflation was low (around 3%/yr) in the time period of our data.

Variable	Dataset	Definition	Timing & Units
<i>I. Labor market earnings</i>			
Employment	SSB-Banen	<u>Employment participation</u> : having positive annual income from paid employment in a given year	Measured by year; 0/1 dummy
		<u>Employment earnings</u> : gross annual earnings from paid employment (0 if not employed)	Measured by year; euros/year
Self-employment	SSB-Zelfst	<u>Self-employment participation</u> : having positive annual income (profits) from self-employment in a given year	Measured by year; 0/1 dummy
		<u>Self-employment earnings</u> : gross annual earnings (profits) from self-employment (0 if not self-employed)	Measured by year; euros/year
<i>II. New DI benefits</i>			
Re-entry into disability insurance	AO	<u>Re-entry in DI</u> : having positive annual income from DI in a given year coming from a new DI-spell	Measured by year; 0/1 dummy
		<u>New DI income</u> : gross annual income from DI (0 if not enrolled in DI) coming from a new DI-spell	Measured by year; euros/year

III. Other social support benefits

Unemployment insurance	WW	<u>Unemployment insurance participation</u> : having positive annual income from UI in a given year	Measured by year; 0/1 dummy
		<u>Unemployment income</u> : gross annual income from UI (0 if not unemployed)	Measured by year; euros/year
General assistance	SSB-ABW	<u>General assistance participation</u> : having positive annual income from GA in a given year	Measured by year; 0/1 dummy
		<u>General assistance income</u> : gross annual income from GA (0 if not enrolled in GA)	Measured by year; euros/year
Other sources of benefits	OUITK	<u>Participation in other benefit programs</u> : having positive annual income from other programs in a given year	Measured by year; 0/1 dummy
		<u>Income from other benefit programs</u> : gross annual income from other programs (0 if not enrolled in scheme)	Measured by year; euros/year

DI administrative data

The disability offices in The Netherlands register many details for each DI claimant. From 1996 onwards, there is monthly information about all DI claimants in the Netherlands. Information includes start and end dates of DI-spells, degree of disability, amount of benefits paid, and previous earnings, which is used as a reference to calculate the benefit level.

Variable	Dataset	Definition	Timing & Units
Disability	AO	<u>Participation in DI</u> : The original DI spell (i.e. the one that the individual was on when the reform was enacted on 8/1/93) continues into at least part of the current year	Measured by year; 0/1 dummy
		<u>Income from DI</u> : gross annual income from disability insurance benefits stemming from the original DI spell (0 if not enrolled in DI)	Measured by year; euros/year
Degree of Disability	AO	The degree of disability before the re-examination started. Categorical variable, based on percentage income loss due to DI (0-15%, 15-25%, 25-35%, 35-45%, 45-55%, 55-65%, 65-80%, 80-100%).	Measured as of January 1996; 1-8 scale, increasing in the degree-of-disability categories.

Earnings prior to DI	AO	Gross annual earnings (including vacation allowance, yearly bonus, extra pay for shift work, etc.) in the year before entry in DI. This amount was capped at a certain maximum level of earnings (€35,754 per year in 1999).	Taken from the 1996 database, but refers to whichever was the last year of work prior to DI; euros/year.
Duration in DI	AO	Duration in DI at the time of the reform (August 1 st , 1993)	Measured on August 1 st , 1993; measured in months

Demographic characteristics

Each city (or aggregation of small villages) in The Netherlands keeps a registry (“GBA”) of all its native and foreign inhabitants. When an individual moves within the Netherlands, the person has to register in the new city (and unregister in the old city). Whenever there is a demographic change (e.g., child born, marriage), this is registered by the city administration. In this paper, we use the following demographics from the municipal registries: date of birth, gender, place of residence, origin, and marital status.

Variable	Dataset	Definition	Timing & Units
Age	GBA	Age in months at the time of the reform, calculated from year and month of birth	In months, measured on August 1 st , 1993
Married (dummy)	GBA	Dummy calculated from marital status information.	Measured as of January 1996; Dummy equals 1 if married
Gender	GBA	Dummy if person is female	Measured as of January 1996; Dummy equals 1 if female
Origin	GBA	Origin based on someone’s country of birth and that of his/her parents. Native Dutch are those (i) born in The Netherlands just as their parents, and those (ii) born in another country whose parents were both born in The Netherlands. Non-native Dutch are all others for whom at least one parent was not born in The Netherlands. Within the group of non-native Dutch we distinguish between countries of origin. For those born abroad, the country of birth is taken as the country of origin. When born in the Netherlands, the country of birth of the mother is taken as the	Measured as of January 1996; 10 dummy (0/1) variables

country of origin. When both the individual and the mother are born in the Netherlands, the country of origin is based on the country of birth of the father. We create 10 original dummies for the following categories:

Native Dutch, Morocco, Turkey, Surinam, Dutch Antilles and Aruba, Other Non-Western Country, Dutch but born elsewhere, Other Western Country, East-European Country, and Dutch East Indies.

Region

GBA

Based on the place of residence (i.e., the city where someone is registered), we create 40 regional dummies that correspond to the COROP regions as defined by the Coordination Commission Regional Research Programme (see <http://en.wikipedia.org/wiki/COROP> for more information).

Measured as of January 1996; 40 dummy (0/1) variables