

## ONLINE APPENDIX:

# Earnings, Disposable Income, and Consumption of Allowed and Rejected Disability Insurance Applicants

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## A.1 Data and sample selection

Our analysis employs several data sources that we can link through unique identifiers for each individual. Information on DI benefits comes from social security registers that contain complete records for all individuals who entered the DI program during the period 1967-2010. The data set includes information on the individual's work history and medical diagnosis, the month when DI was awarded (or denied), and the level of DI benefits received. We merge these data sets with administrative registers provided by Statistics Norway, using a rich longitudinal database that covers every resident from 1967 to 2010. For each year, it contains individual demographic information (such as sex, age, and education).

Since 1993, we have detailed information on virtually all sources of income (such as wages, income from self employment, capital income, cash transfers), most types of assets and durables (such as deposits, securities, liabilities, pension plans, real estate, cars), and asset-specific returns and rates of depreciation at a disaggregate level. We use this information to construct measures of household consumption from the accounting identity that total expenditure in a period is equal to income and the change in wealth across the period. To assess the validity of the method to impute consumption, we have checked our measures of total expenditure against those reported in the Norwegian family expenditure surveys.

Details about the data sources and each of the variables are given in Appendix Table A.1. The coverage and reliability of Norwegian registry data are rated as exceptional in international quality assessments.<sup>1</sup> Importantly, the Norwegian income and asset data has several advantages over those available in most other countries. First, there is no attrition from the original sample because of the need to ask permission from individuals to access their tax records. In Norway, these records are in

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<sup>1</sup>See e.g. Atkinson, Rainwater, and Smeeding (1995): "Income Distributions in OECD countries: evidence from the Luxembourg Income Study", OECD Publications and Information Center.

the public domain. Second, our income data pertains to all individuals, and not only to jobs covered by social security. Third, incomes and assets are recorded without any top or bottom coding.

In Appendix Table A.2, we document the key characteristics of individuals who apply for DI during the period 1998 to 2004. We split the applicants into four groups depending on allowance decision and reapplication: Initially allowed; initially denied, no re-application; initially denied but allowed on re-application; initially denied and denied on re-application.

In our main analysis, we focus on the first two groups of applicants, excluding individuals who reapply within ten years of their denied DI claim. We also exclude individuals who were older than 62 years at the allowance decision (to avoid program substitution between DI and old-age retirement schemes). Appendix Table A.3 displays summary statistics of the economic outcomes for the main estimation sample. Note that in the graphical analysis of the outcomes of allowed and rejected applicants over time, we exclude observations for years in which an individual is dead, has emigrated, is younger than 18 or older than 67 (and thus ineligible for DI).

Table A.1: Data and variable description

<b>Application data</b>	<i>Source: FD-trygd</i>
Decision/application	Year and month of decision/application
Disability/sickness onset	Year and month of disability/sickness onset
DI benefits	Basic and supplemental benefit levels
Disorder	Disorder classification is based on ICD-10 codes.
<b>Individual outcomes</b>	<i>Source: Tax registers</i>
Annual earnings	Wages and income from self-employment
Annual total transfers	Taxable and nontaxable cash transfers from federal and local government
Annual individual income	Sum of earnings and taxable and nontaxable cash transfers.
<b>Individual characteristics</b>	<i>Source: National Education Database and Central Population Register</i>
Age	Age of applicant
Foreign born	Indicator variable for applicant being foreign born
Children	Number of children (aged less than 18) of applicant
Married	Indicator variable for marital status of applicant
Household size	Number of household members (spouse, cohabitant, children) of applicant
Education level	Years of schooling of applicant
<b>Household outcomes</b>	<i>Source: Eika (2014, mimeo)</i>
Disposable income	All sources of recorded income less taxes
Consumption	Total expenditure in a period = Dis. income + change in wealth across the period

*Sources:* More information about data sources can be found at "[Data collections](http://www.ssb.no/a/english/mikrodata_en/)" ([www.ssb.no/a/english/mikrodata\\_en/](http://www.ssb.no/a/english/mikrodata_en/)).

Table A.2: Descriptive statistic of different types of applicants

	<b>Initial application</b>		<b>Final application</b>	
	No reapplication	Reapplication	No reapplication	Reapplication
Allowed applicant:	✓		✓	
Rejected applicant:		✓		✓
Age (at the time of decision)	50.42 [10.47]	43.44 [10.41]	48.74 [9.46]	44.20 [9.48]
Female	0.55 [0.50]	0.60 [0.49]	0.60 [0.49]	0.58 [0.49]
Married	0.58 [0.49]	0.50 [0.50]	0.53 [0.50]	0.47 [0.50]
Foreign born	0.06 [0.25]	0.18 [0.38]	0.11 [0.31]	0.26 [0.44]
Years of Schooling	10.92 [3.21]	10.23 [4.19]	10.36 [3.49]	9.30 [4.59]
Children below age 18	0.41 [0.85]	0.98 [1.22]	0.60 [1.03]	1.02 [1.30]
Musculoskeletal disorders	0.36 [0.48]	0.42 [0.49]	0.40 [0.49]	0.42 [0.49]
Mental disorders	0.26 [0.44]	0.29 [0.45]	0.31 [0.46]	0.29 [0.45]
Number of observations	127,050	12,802	20,445	2,514

Standard deviations [in square brackets]

*Notes:* This table displays means for applicants and re-applicants. The applicant sample consists of all claims made during the period 1998-2004 by individuals who are at most 62 years of age. The sample of re-applicants (see section A.1) is a subgroup of the initially denied applicant sample. Unless otherwise stated, all characteristics are measured the year before application. Nominal values are deflated to 2005 and represented in US dollars using the average exchange rate \$/NOK = 6.

Table A.3: Summary statistics of economic outcomes for estimation sample

Period:	0-5 years		5-1 years		5-1 year	
	After Decision		Before Onset		Before Decision	
Allowed applicant:	✓		✓		✓	
Rejected applicant:		✓		✓		✓
A: Individual earnings	8.47 [11.31]	22.64 [17.76]	42.85 [23.15]	28.12 [23.57]	35.38 [23.35]	24.97 [21.63]
B: Individual transfers	27.81 [10.85]	17.98 [13.63]	4.49 [7.69]	9.77 [11.08]	9.19 [10.33]	13.00 [11.43]
C: Household income	32.07 [10.55]	25.50 [11.23]	31.57 [12.21]	24.72 [11.46]	31.32 [11.93]	24.92 [11.43]
D: Household consumption	34.71 [15.40]	29.30 [16.03]	32.67 [15.99]	27.20 [15.18]	32.78 [14.96]	27.87 [15.06]
Number of observations	128,386	12,984	116,115	12,450	130,453	13,113

*Note:* This table shows mean outcomes for the groups of allowed and rejected applicant for three periods: 'After decision' is the average 0-5 years after decision; 'before onset' is the average 1-5 years before disability onset; 'before decision' is the average 1-5 years prior to decision. The sample consists of all applicants during the period 1998-2004 who did not re-apply and were at most 62 years at the time of the decision. Household variables are per capita, and nominal values are deflated to 2005, represented in US dollars using the average exchange rate \$/NOK = 6.

## A.2 Additional figures and tables

This appendix provides additional tables and figures.

Figure A.1 shows the trends in individual income for rejected and awarded DI applicants. Annual individual income is the sum of total transfers and earnings (adjusted by household size to be comparable to household disposable income in graph (c) of Figure 1 in the paper). By comparing this figure to graph (c) in Figure 1, we can see the role of the spouse in the changes in disposable income.

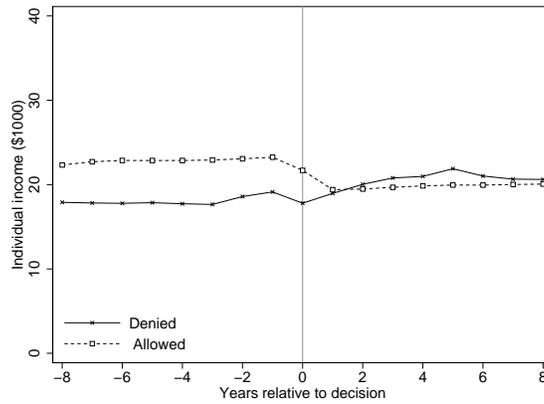
Table A.4 adds controls to the regressions reported in Table 1 of the paper.

Figure A.2 plots economic outcomes of awarded and rejected DI applicants, before disability onset (year -8 to 1) and after the allowance decision (year 1 to 8). In year 0, we report the mean outcome over the period from disability onset to allowance decision.

In Figure A.3, we redo Figure 1 in the paper, except that we now look at the sample of applicants who are initially denied, reapply and are either awarded or rejected upon reapplication. In this figure, year 0 refers to the time of the decision on the reapplication.

In Table A.5, we redo Table 1 in the paper, except that we now look at the sample of applicants who are initially denied, reapply and are either awarded or rejected upon reapplication. In this table, decision refers to the outcome of the reapplication.

Figure A.1: Individual income of awarded and rejected applicants, before and after DI decision (\$1,000)



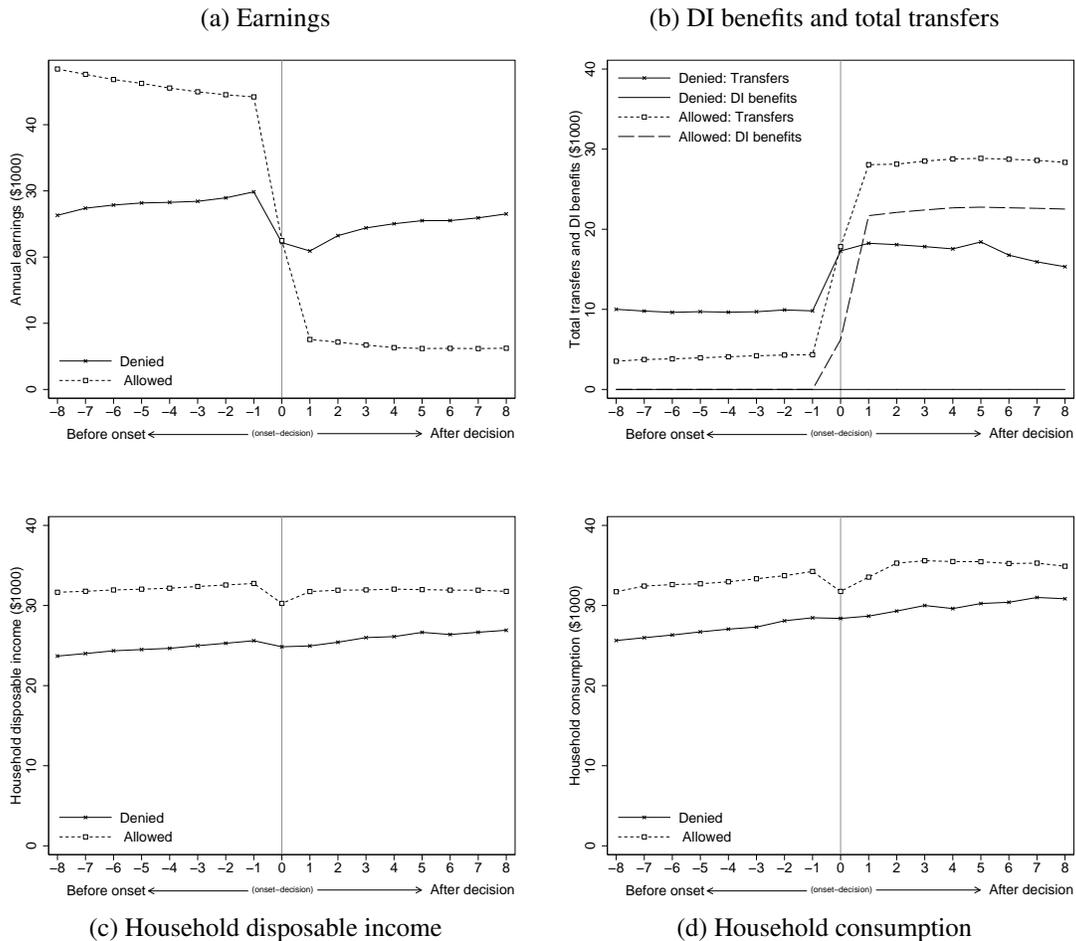
Note: Individual income (earnings and total transfers) are adjusted for household size. Nominal values are deflated to 2005, represented in US dollars using the average exchange rate \$/NOK = 6.

Table A.4: Awarded and rejected applicants: Differences and changes in economic outcomes, with controls (\$1,000)

	Difference	Changes in outcomes				Difference-in-differences	
	Post decision	Post decision - pre decision		Post decision - pre onset		Post decision - pre decision	pre onset
Estimation sample:							
Allowed applicant:	✓	✓		✓		✓	✓
Rejected applicant:	✓		✓		✓	✓	✓
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Individual:							
A: Earnings	-14.55 (0.16)	-26.84 (0.06)	-2.31 (0.16)	-35.58 (0.07)	-4.60 (0.19)	-24.54 (0.17)	-31.00 (0.20)
B: Transfers	10.23 (0.12)	18.63 (0.04)	4.98 (0.12)	24.00 (0.04)	8.22 (0.14)	13.64 (0.12)	15.70 (0.15)
Household (per capita):							
C: Disposable income	2.43 (0.09)	0.77 (0.02)	0.61 (0.07)	0.91 (0.03)	1.13 (0.09)	0.17 (0.07)	-0.23 (0.09)
D: Consumption	1.22 (0.14)	1.96 (0.04)	1.46 (0.14)	2.95 (0.05)	2.41 (0.15)	0.50 (0.14)	0.53 (0.16)
Observations	141,370	258,839	26,097	242,130	25,253	284,936	267,383

Note: In this table, we add controls to the regression results reported in Table 1 of the paper. We control for all background characteristics, listed in Table A.2. We allow for a flexible functional form by including a large set of dummies for different values of the covariates. Standard errors (in parenthesis) are robust to heteroscedasticity and clustered at the individual level. Household variables are per capita, and nominal values are deflated to 2005, represented in US dollars using the average exchange rate \$/NOK = 6.

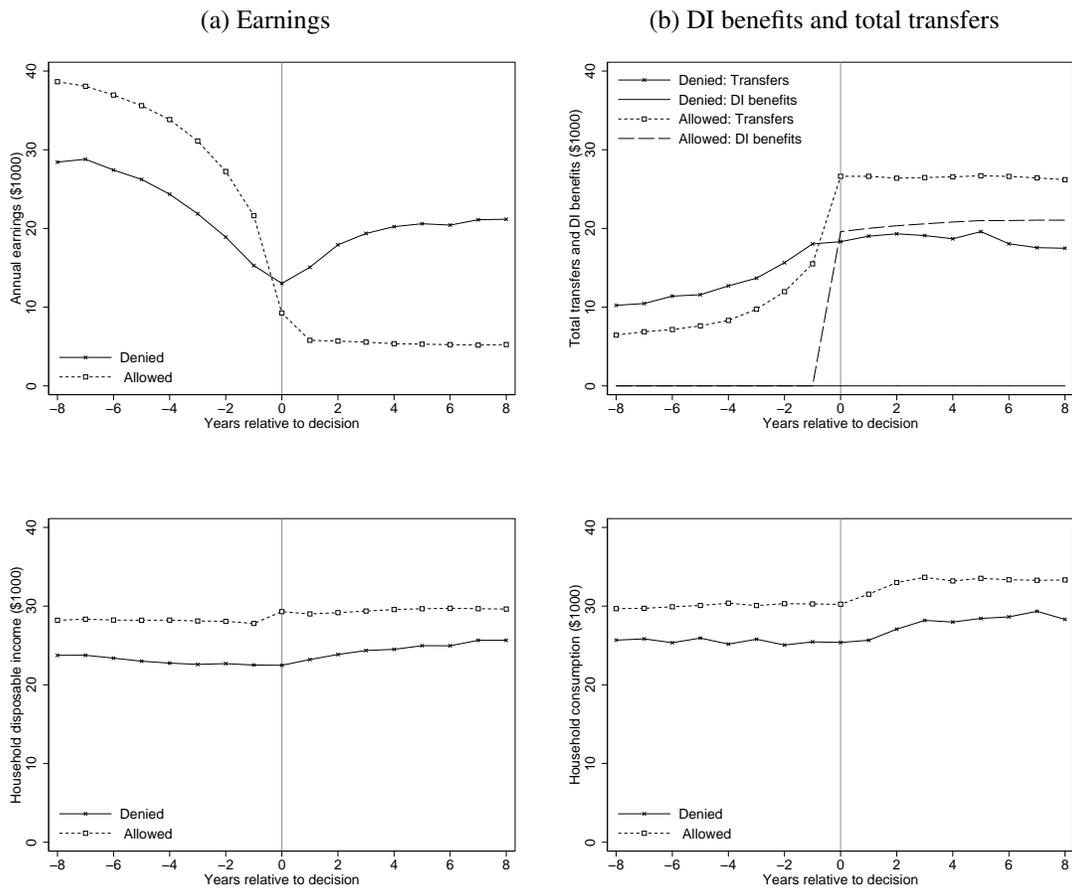
Figure A.2: Economic outcomes of awarded and rejected applicants, before disability onset and after DI decision (\$1,000)



(c) Household disposable income (d) Household consumption

Note: The years -8 to -1 are relative to the year of disability onset. In year 0, we report the mean outcome over the period from disability onset to allowance decision. The years from 1 to 8 are relative to decision. Household variables are per capita, and nominal values are deflated to 2005, represented in US dollars using the average exchange rate \$/NOK = 6.

Figure A.3: Economic outcomes of awarded and rejected re-applicants, before and after DI decision (\$1,000)



(c) Household disposable income

(d) Household consumption

Notes: The sample consist of applicants who are initially denied, reapply and are either awarded or rejected upon reapplication during the period 1998-2004 who were at most 62 years at the time of the decision. Household variables are per capita, and nominal values are deflated to 2005, represented in US dollars using the average exchange rate \$/NOK = 6.

Table A.5: Awarded and rejected re-applicants: Differences and changes in economic outcomes (\$1,000)

	Difference	Changes in outcomes				Difference-in-differences	
	Post decision	Post decision - pre decision		Post decision - pre onset		Post decision - pre decision	pre onset
Estimation sample:							
Allowed re-applicant:	✓	✓		✓		✓	✓
Rejected re-applicant:	✓		✓		✓	✓	✓
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Individual:							
A: Earnings	-11.05 (0.34)	-20.98 (0.15)	-1.97 (0.40)	-27.16 (0.18)	1.47 (0.39)	-19.01 (0.43)	-28.63 (0.43)
B: Transfers	7.68 (0.27)	14.99 (0.10)	4.08 (0.30)	18.63 (0.10)	3.20 (0.28)	10.91 (0.32)	15.43 (0.30)
Household (per capita):							
C: Disposable income	5.61 (0.22)	1.86 (0.06)	1.48 (0.18)	1.40 (0.08)	1.70 (0.17)	0.38 (0.19)	-0.29 (0.19)
D: Consumption	5.52 (0.31)	2.91 (0.12)	1.88 (0.34)	3.08 (0.14)	2.41 (0.29)	1.03 (0.36)	0.68 (0.32)
Observations	23,205	39,944	4,975	37,571	5,097	44,919	42,668

*Note:* This table shows differences in mean outcomes across the groups of allowed and rejected re-applicants; within group changes in outcomes before and after decision, and difference-in-difference across groups and time. The sample consist of applicants who are initially denied, reapply and are either awarded or rejected upon reapplication during the period 1998-2004. We restrict the sample to applicants who were at most 62 years at the time of the decision on the reapplication. Standard errors (in parenthesis) are robust to heteroscedasticity and clustered at the individual level. Household variables are per capita, and nominal values are deflated to 2005, represented in US dollars using the average exchange rate \$/NOK = 6.