The Great Recession and disability in Spain

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The Great Recession and disability in Spain

We investigate the effect of the Great Recession on two aspects of disability in Spain:

1. **Effect of Great Recession on participation in Disability Insurance (DI) program.**
2. **Effect of Great Recession on labor market outcomes of disabled vs. nondisabled.**

upf. Universitat Pompeu Fabra Barcelona

CRES CENTRE DE RECERCA EN ECONOMIA I SALUT

MOTIVATION

EVIDENCE SHOWS THAT PARTICIPATION IN DI GROWS IN RECESSIONARY PERIODS

"Job loss more than doubles the risk of permanent disability retirement and accounts for one quarter of new disability insurance claims." (Norway)

Bratsberg, Fevang, Røed. - *Labour Economics (2013)*

"(…) early retirement via the disability scheme can be a useful strategy in effective downsizing, providing a way to reduce the workforce in a 'soft' way". (Finland)

Korkeamäki, Kyyrä – *Journal of Population Economics (2012)*

"Disability pensions are being used as an alternative means of leaving the labour market for individuals who find it difficult to get a new job". (Spain)

Jimenez and Vall – *FEDEA (2009*)

"Individuals living in a depressed region, have a significantly higher probability of receiving a disability benefit without deserving it than the rest of individuals". (Spain)

Jimenez, Labeagaz, Vilaplana. - *HEDG Working Paper (2004)*

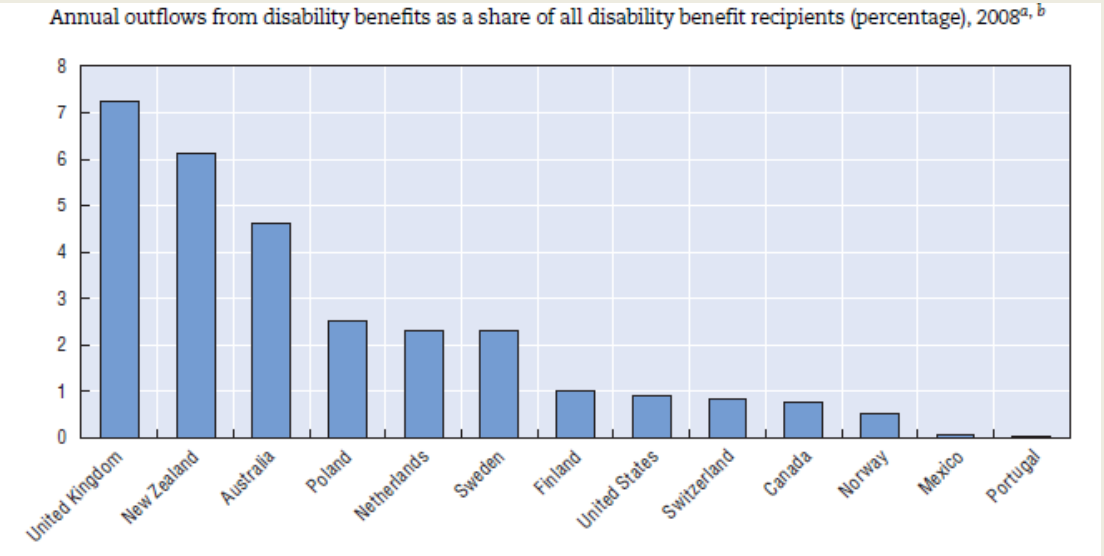
- **The Great Recession has been the worst economic downturn since 1930's Great Depression.**
- **Particularly harsh in Spain, especially in terms of employment destruction.**

RESEARCH QUESTION: EFFECT OF GREAT RECESSION ON DI PARTICIPATION IN SPAIN

WHY DO WE CARE?

- Disability insurance program is the largest insurance program directed to working age individuals
  - In 2007, for the average OECD, it represented **1,2% of GDP**, **10% of public social spending**, and **284% of unemployment benefits**.

- Labor market participation and Social Security imbalances
  - Disability insurance is quite often an **absorbing state**. Very unusual to return to the labor market once in the DI system



MOTIVATION

➢ **It is argued that disabled individuals are particularly more affected by bad economic conditions.**

"El impacto de la crisis económica y de empleo, evidente en toda la sociedad, es mucho mayor en las personas con discapacidad y en sus familias"

Comité Español de Representantes de Personas con Discapacidad (CERMI). *(2012)*

"People with disabilities tend to be the last hired and the first fired"

Rick Diamond, *Disability Network/Lakeshore (2008)*

MOTIVATION

➢ **Large evidence of stronger effects of the business cycle on minority groups. Some examples:**

"Our results suggest larger unemployment responses to economic shocks for immigrants relative to natives within skill groups." (Germany, UK)

Dustmann, Glitz, Vogel. - *European Economic Review (2010)*

"The impacts of the Great Recession have been felt most strongly for men, black and Hispanic workers, youth, and low-education workers"

Hoynes, Miller, Schaller. - *NBER Working Paper Series (2012)*

"Together, the attitude and labour market results imply that non-Whites dispropertionately suffer during recessions".

Johnston and Lordan. - *CEP (2014)*

MOTIVATION

➢ **Scarce evidence on the effect of the business cycle on disabled's labor market outcomes. In general, they fare relatevely worse.**

"Our results suggest that (during the Great Recession) increases in job losses were 30% greater for those with greater underlying risk of disability than for the general HRS population, and decreases in consumption were 20% greater."

Altindag, Schmidt and Sevak. - *MRRC Working Papers (2012)*

"It seems that people with disabilities are the first to be laid off: the upswing in job exit has a larger magnitude and occurs earlier for workers with disabilities than for even African American and Latino workers, and all three groups show a much larger effect than that seen among the nondisabled, nonminority population".

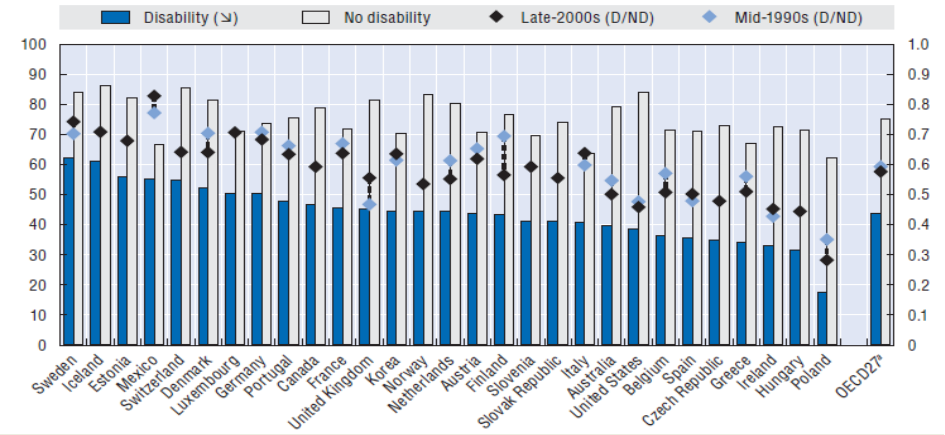
H. Stephen Kaye. - *United States Department of Labor (2010)*

RESEARCH QUESTION: ARE THE DISABLED IN SPAIN RELATIVELY MORE AFFECTED BY THE GREAT RECESSION?

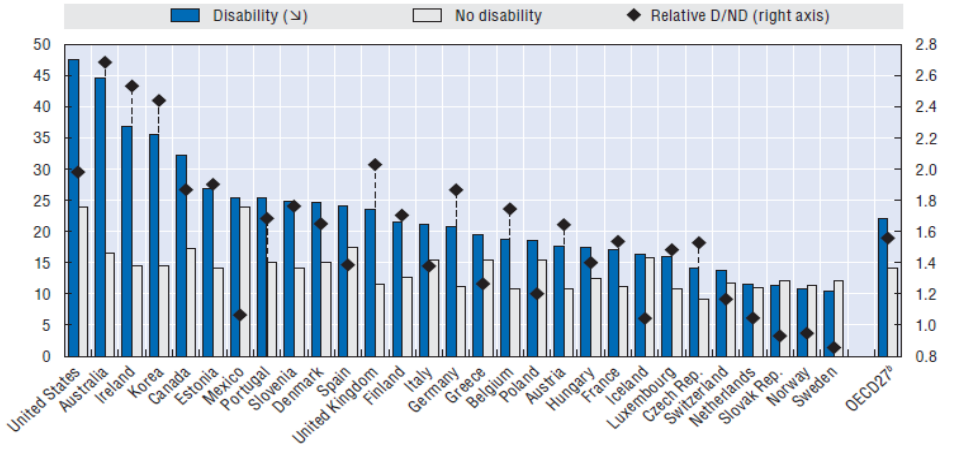
WHY DO WE CARE?

➢ The disabled have very bad labor market outcomes. A worsening of this situation could have serious consequences.

Much lower employment rates



Much higher poverty risk



In Spain:

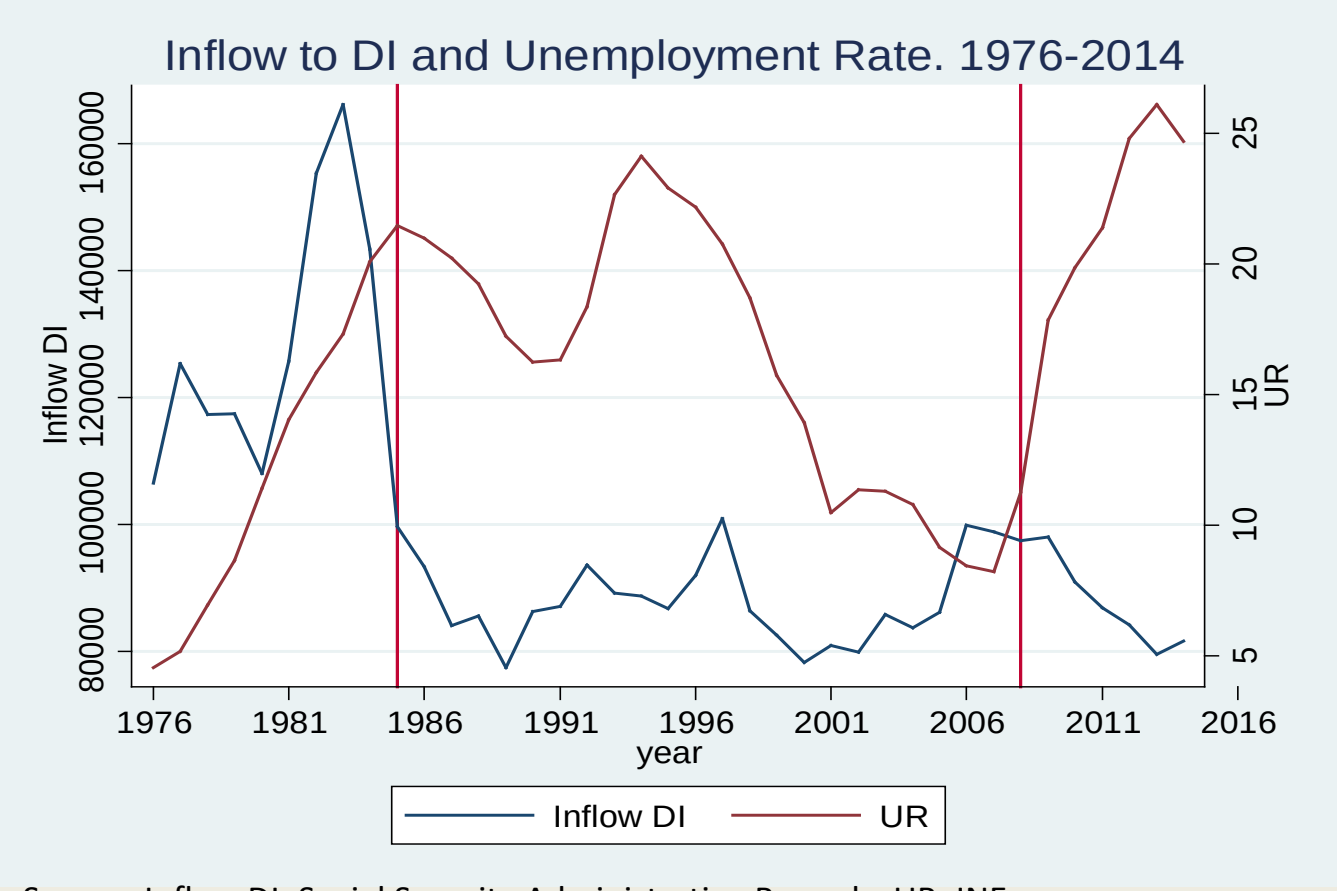
	Tasa de actividad		Tasa de empleo	
	2009	2013	2009	2013
No discapacitados	75.5%	77.2%	62.0%	57.1%
Discapacitados	36.1%	37.4%	28.3%	24.3%

➢ A strong cyclical relationship of employment could desincentivize disabled's willingness to participate in the labor market.

➢ Welfare considerations: work makes people happier; work helps disabled's social integration.

1. GREAT RECESSION AND PARTICIPATION IN DI

HISTORICAL EVOLUTION OF INFLOW TO DI IN SPAIN



Source: Inflow DI: Social Security Administrative Records; UR: INE

Clearly countercyclical before Great Recession. Procyclical during Great Recession

REGIONAL REGRESSIONS OF INFLOW ON UNEMPLOYMENT RATE

INFLOW TO DI TURNS PROCYCLICAL IN THE GREAT RECESSION

$$I_{rt} = UR_{rt} + IC_{rt} + \delta_r + u_{rt}$$

DEPENDENT VARIABLE: LOGARITHM OF NEW DISABILITY PENSIONS			
Covariates:	1992-2008 (Pre crisis)	2009-2014 (Post crisis)	1992-2014
Unemp. Rate	0.00497**	-0.00420	0.00884***
	(0.00232)	(0.00477)	(0.00198)
Weight Industry-Construction	-0.00190	0.03075***	0.01787***
	(0.00780)	(0.00598)	(0.00592)
Unemp. Rate*Post2007			-0.00946**
			(0.00407)
Post2007			0.34889***
			(0.07764)
Constant	8.38760***	8.00881***	7.78205***
	(0.21534)	(0.22655)	(0.18587)
Observations	952	408	1,360
R-squared	0.94769	0.97293	0.95130

Before Great Recession: Counteryclycal
During Great Recession: Procyclical

Significant change in GR

Regressions include region dummies.
Weight: Population 16-64
Source: New disability pensions: SS Administrative Records: Weight IC and UR: INE

MODELS OF TRANSITIONS

- **Sample description**
  - Muestra Continua de Vidas Laborales (MCVL).
  - Balanced panel dataset; quarterly observations from 2007T2 to 2013T4
  - Restrict to working age individuals (aged 16-64)
  - Include individuals from first employment period onwards
  - 10791900 observations / 385425 individuals, from which 208045 are men (5485 disabled) and 177380 are women (2301 disabled)

- **Control for demographic and socioeconomic individual charateristics as well as labor market experience**

- **Differentiate between transitions from employment and nonemployment**

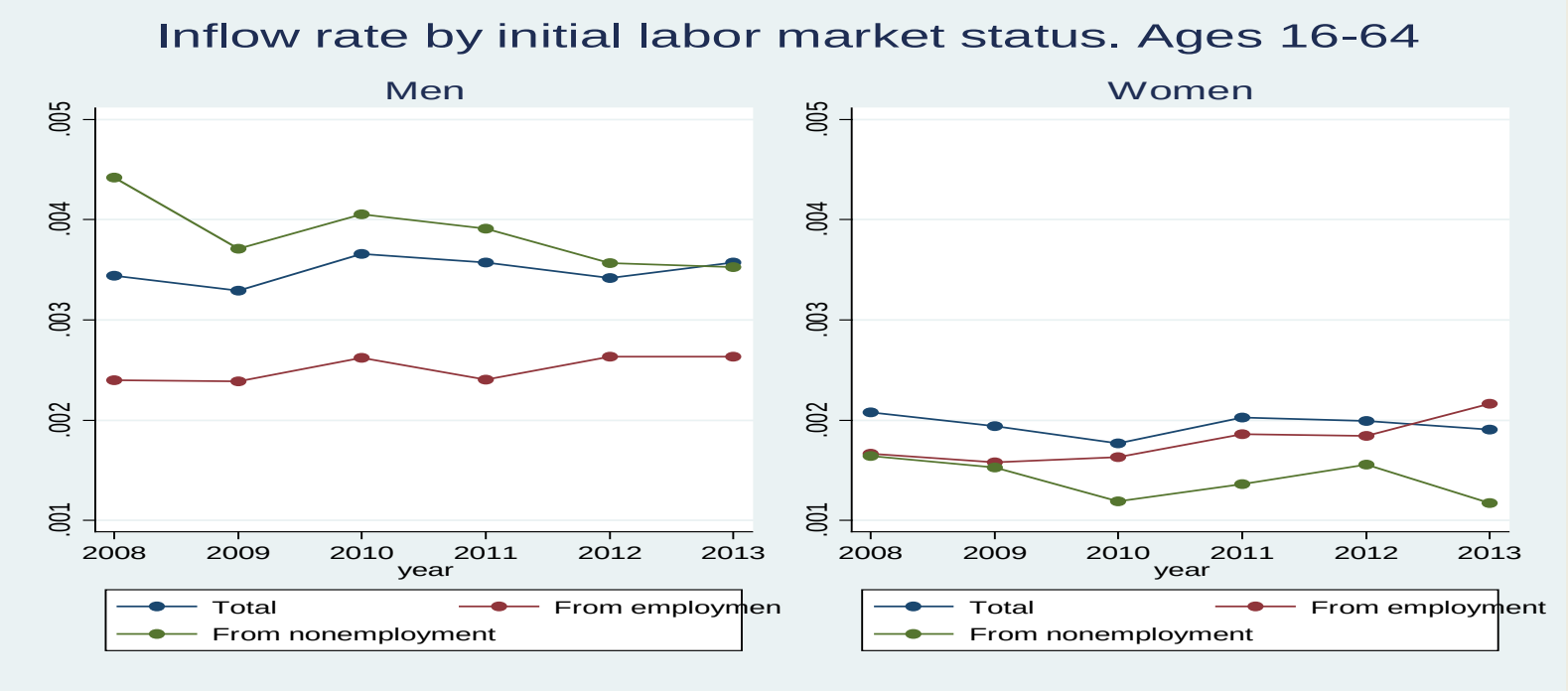
- **Econometric specifications:**

$$h_i^j(t) = F(\theta_o(t) + \theta_1(t) X_{it} + Z_{rt}\theta_2 + \eta_i) \quad j = \{ue, ud\}$$
$$h_i^j(t) = F(\gamma_o(t) + \gamma_1(t) X_{it} + Z_{rt}\gamma_2 + \eta_i) \quad j = \{eu, ed\}$$

$$h_i^u(t) = h_i^{ue}(t) + h_i^{ud}(t)$$
$$h_i^e(t) = h_i^{eu}(t) + h_i^{ed}(t)$$

EVOLUTION OF INFLOW RATE DURING GREAT RECESSION

DESCRIPTIVE EVIDENCE



Source: MCVL

- **Sharp decrease in inflow rate to DI from nonemployment**
- **Constant inflow rate to DI from employment**

TRANSITIONS FROM EMPLOYMENT

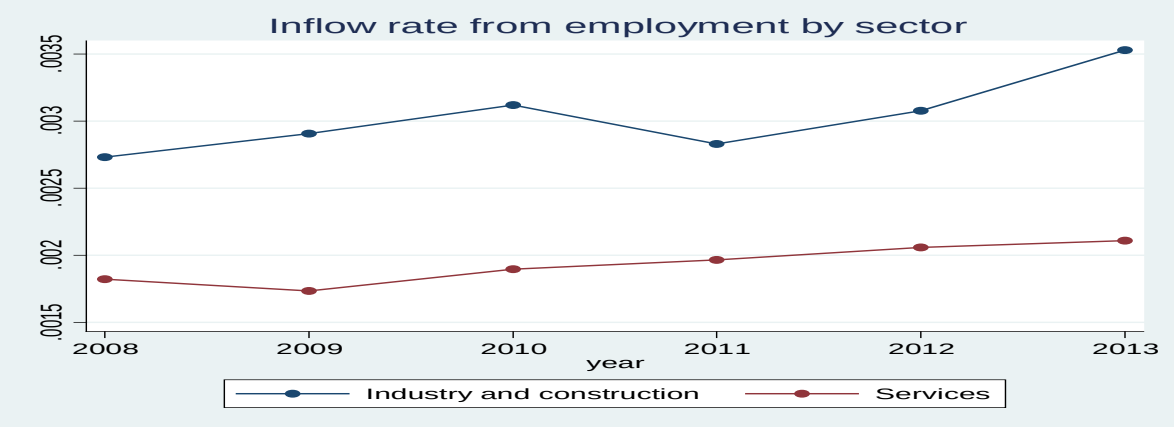
MULTINOMIAL LOGIT MODEL. TRANSITIONS FROM EMPLOYMENT								
	AGES 16-64				AGES 50-64			
	MEN		WOMEN		MEN		WOMEN	
VARIABLES	TO NONEMPLOYMENT	TO DISABILITY	TO NONEMPLOYMENT	TO DISABILITY	TO NONEMPLOYMENT	TO DISABILITY	TO NONEMPLOYMENT	TO DISABILITY
Unemp. Rate	0.00689***	0.01238	0.00294*	-0.00439	0.00313	-0.00069	0.00119	-0.04470*
Year dummies:								
2008	-0.11298***	-0.01762	-0.23618***	-0.05279	0.10334**	0.20927	-0.11463***	-0.12811
2009	0.09661***	-0.16554	-0.09273***	-0.11671	0.31172***	0.04214	-0.01111	0.04852
2010	0.01418	-0.18591	-0.14456***	-0.18888	0.29772***	0.12096	-0.03794	0.08706
2011	0.08722***	-0.38206	-0.10499***	-0.17621	0.38629***	-0.17081	0.00462	0.11923
2012	0.15130***	-0.34479	-0.06330*	-0.20891	0.47832***	-0.02113	0.06697	0.24876
2013	0.12580***	-0.37447	-0.08023**	-0.12605	0.49988***	0.04052	0.03628	0.44567
ln (wage)	-0.52879***	0.23633***	-0.30371***	0.04503	-0.36845***	0.26430***	-0.24205***	0.14952**
Industry and construction	0.05669***	0.07304	-0.03201**	-0.03531	0.08142***	0.04069	0.17049***	-0.09220
50-199 employees	-0.02680**	0.13201*	0.19023***	0.24891***	-0.21177***	0.05857	0.19381***	0.09945
200+ employees	-0.06669***	0.03438	0.23718***	0.34106***	-0.42566***	0.00448	0.17058***	0.20841**
Medium skill	0.20827***	0.89286***	0.22557***	0.78515***	-0.01134	0.69743***	0.40545***	0.74830***
Low skill	0.74944***	1.54120***	0.76823***	1.40712***	0.53362***	1.42109***	0.87628***	1.43388***
Public Sector	-0.18674***	0.16137	0.01868	0.26187***	-0.36060***	0.14269	-0.36020***	0.25484**
Constant	2.32115***	-14.72065***	0.62598***	-13.61584***	2.26270***	-10.01288***	0.40827**	-7.94289***
Observations	2,260,954	2,260,954	2,013,210	2,013,210	517,389	517,389	389,931	389,931

Procyclical (not significant) inflow rate to DI from employment

In general, decreasing (not significant) inflow rate to DI from employment during the GR

REDUCTION IN THE WEIGHT OF INDUSTRY AND CONSTRUCTION IN EMPLOYMENT

➢ **Higher probability of transiting to disability if working in the industry and construction sectors:**



➢ **Strong reduction in the weight of industry and construction sectors in employment:**

By age and gender

Work accidents

=> Contributes to reduction in inflow rate to DI from employment

TRANSITIONS FROM NONEMPLOYMENT

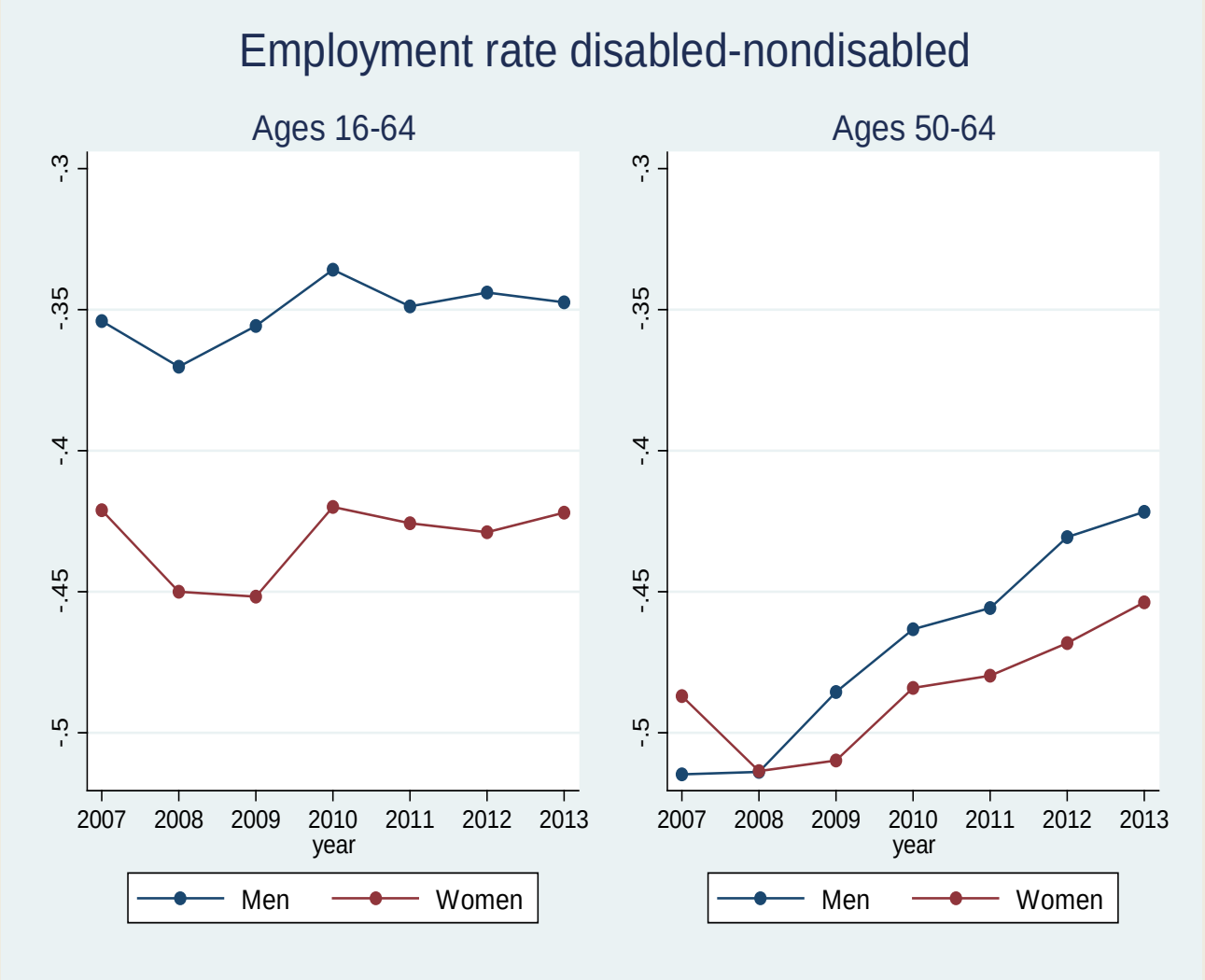
MULTINOMIAL LOGIT MODEL. TRANSITIONS FROM EMPLOYMENT								
	AGES 16-64				AGES 50-64			
	MEN		WOMEN		MEN		WOMEN	
VARIABLES	TO EMPLOYMENT	TO DISABILITY	TO EMPLOYMENT	TO DISABILITY	TO EMPLOYMENT	TO DISABILITY	TO EMPLOYMENT	TO DISABILITY
Unemp. Rate	-0.01445***	-0.00111	0.01345***	-0.00241	-0.01466***	0.00896	0.03411***	-0.01633
Year dummies:								
2008	-0.30456***	-0.14237	-0.70217***	-0.30024	-0.46865***	0.45188	-1.31078***	-0.82025
2009	-1.04653***	-0.54987	-1.36666***	-0.56006	-1.13491***	-0.18788	-2.07874***	-0.87428
2010	-1.20407***	-0.61342	-1.62599***	-0.92146*	-1.31566***	-0.25102	-2.47185***	-1.13962
2011	-1.27499***	-0.82091*	-1.74529***	-1.04561*	-1.47264***	-0.53508	-2.59983***	-1.51500*
2012	-1.44711***	-1.10111**	-1.97467***	-1.03696	-1.73726***	-0.83323	-2.95342***	-1.58359
2013	-1.48598***	-1.21100**	-2.08814***	-1.49860**	-1.76064***	-0.93103	-3.17814***	-1.94063*
ln (last wage)	0.00487	-0.00367	0.04198***	0.32258***	-0.14164***	-0.06308	0.04795*	0.45629***
Industry and construction	-0.08123***	0.02387	-0.26342***	-0.28584**	-0.19333***	-0.10222	-0.48844***	-0.27826
Contributive UB	0.07461***	-0.59896***	0.13757***	-0.58049***	0.21409***	-0.38047***	0.45466***	-0.27630*
Noncontributive UB	-0.03474***	-0.52792***	-0.16169***	-1.09209***	-0.21408***	-0.45304***	-0.36711***	-1.15621***
Medium skill	0.15327***	0.51931***	-0.10409***	0.67687***	0.20384***	0.17445	0.26219***	0.35477
Low skill	0.03637*	0.92428***	-0.13078***	1.03554***	0.48500***	0.73300***	0.45651***	0.83611***
Constant	0.05396	-9.25594***	-0.80102***	-12.91916***	-0.57072***	-6.91797***	-2.27127***	-10.48528***
Observations	1,282,090	1,282,090	1,001,828	1,001,828	219,980	219,980	147,385	147,385

Procyclical (not significant) inflow rate to DI from nonemployment during GR

Decrease in inflow rate to DI from nonemployment during GR

2. GREAT RECESSION AND DISABLED'S LABOR MARKET OUTCOMES

EVOLUTION OF EMPLOYMENT RATES DURING GREAT RECESSION



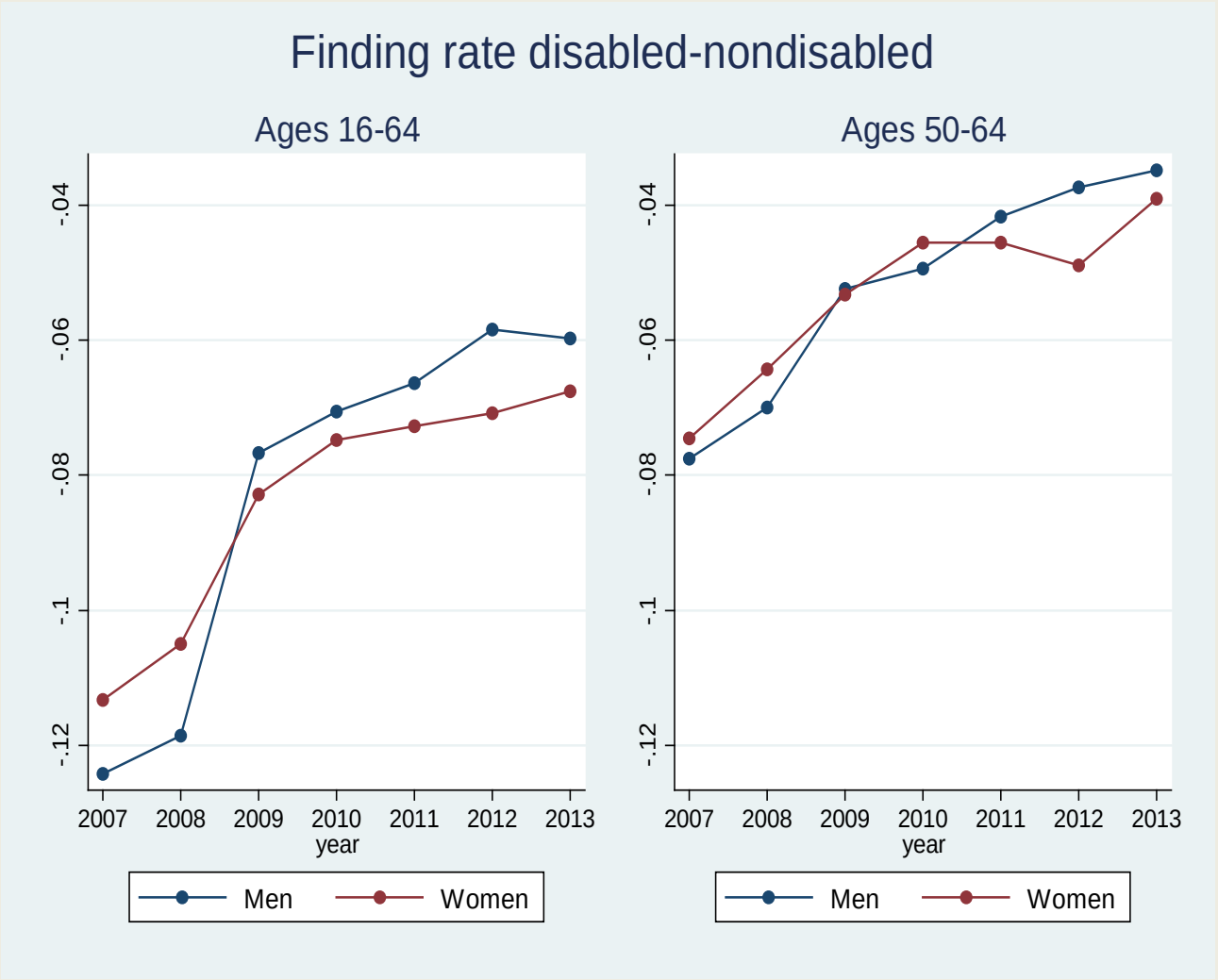
CONVERGENCE IN EMPLOYMENT RATES

Source: MCVL

Levels

Ratios

EVOLUTION OF FINDING RATES DURING GREAT RECESSION



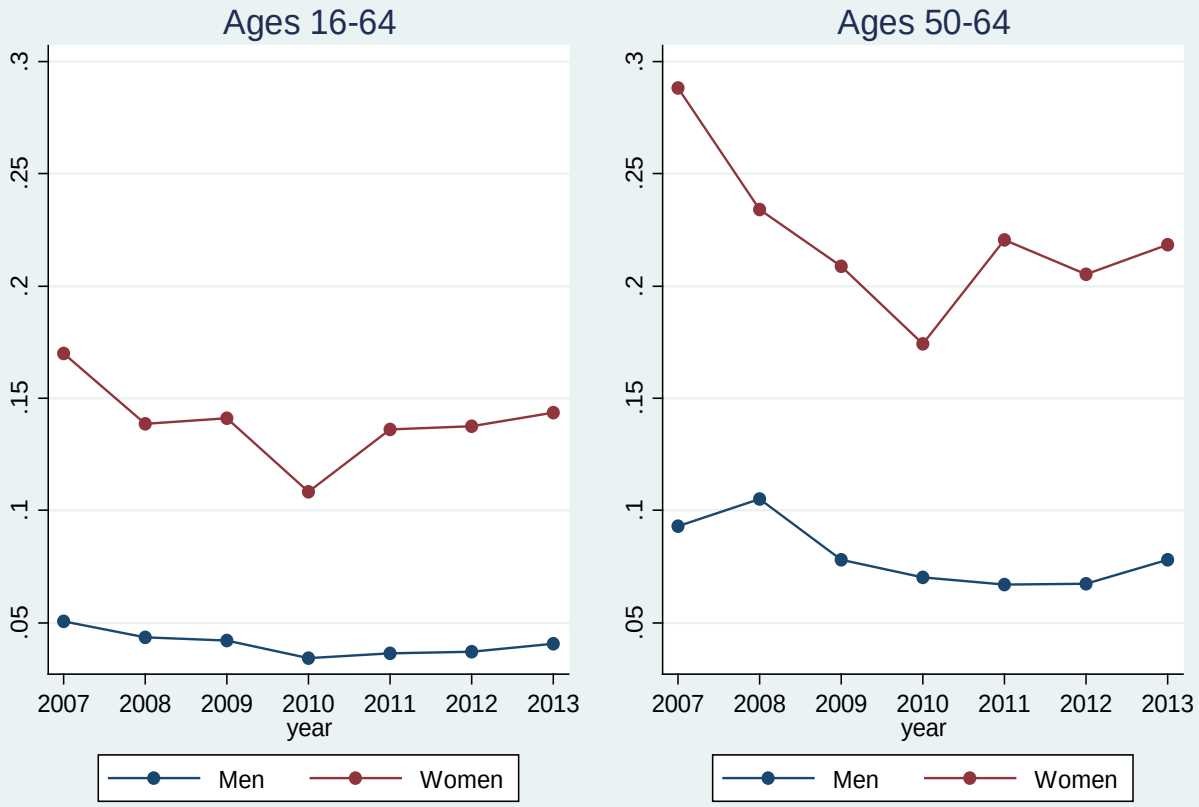
CONVERGENCE IN FINDING RATES

Source: MCVL

Levels

Ratios

EVOLUTION OF SEPARATION RATES DURING GREAT RECESSION



CONVERGENCE IN SEPARATION RATES

Source: MCVL

Levels

Ratios

TRANSITIONS FROM EMPLOYMENT TO NONEMPLOYMENT (SEPARATION RATES)

DISABLED AND NONDISABLED. PROBIT MODEL FOR SEPARATION RATE				
	AGES 16-64		AGES 50-64	
VARIABLES	MEN	WOMEN	MEN	WOMEN
Year dummies:				
2008	-0.03665***	-0.11239***	0.04330**	-0.06502***
2009	0.09320***	-0.03688***	0.15185***	-0.01575
2010	0.06387***	-0.06046***	0.15682***	-0.02690
2011	0.10433***	-0.03694***	0.19981***	-0.00501
2012	0.15248***	-0.00959	0.25448***	0.02719
2013	0.15083***	-0.01232	0.27493***	0.02037
Disabled	0.33468***	0.99262***	0.51353***	1.43062***
2008*Disabled	-0.05262	-0.13365	0.00368	-0.29633**
2009*Disabled	-0.10027*	-0.11544	-0.18420**	-0.30651**
2010*Disabled	-0.10815*	-0.28533***	-0.22601***	-0.50322***
2011*Disabled	-0.17259***	-0.19554*	-0.27240***	-0.32529**
2012*Disabled	-0.19561***	-0.24954**	-0.29349***	-0.42172***
2013*Disabled	-0.13468**	-0.21892**	-0.21456***	-0.42353***
Disability contract	-0.31908***	-0.37143***	-0.10036*	-0.34449***
Disabled*Disability contract	-0.25414***	-0.51845***	-0.52405***	-0.58874***
Constant	1.19212***	0.32730***	-0.42985***	-0.31685***
Observations	2,284,115	2,018,173	528,421	392,192

Significant lower effect of BC on disabled's destruction rate. (convergence in destruction rates)

Disability contract reduces the probability of dismissal (employment protection):
-Clauses of permanence
-Tax reductions

TRANSITIONS FROM NONEMPLOYMENT TO EMPLOYMENT (FINDING RATES)

DISABLED AND NONDISABLED. FINDING RATE				
	AGES 16-64		AGES 50-64	
VARIABLES	MEN	WOMEN	MEN	WOMEN
Year dummies:				
2008	-0.22483***	-0.42937***	-0.30222***	-0.81296***
2009	-0.73125***	-0.77435***	-0.75921***	-1.14490***
2010	-0.85522***	-0.90983***	-0.90476***	-1.33054***
2011	-0.90965***	-0.96660***	-1.00830***	-1.38381***
2012	-1.02938***	-1.06637***	-1.17306***	-1.51577***
2013	-1.06632***	-1.11248***	-1.21093***	-1.59268***
Disabled	-0.54301***	-1.10999***	-0.55492***	-1.79652***
2008*Disabled	0.06285	0.07459	0.00716	0.44581
2009*Disabled	0.21877*	0.17130	0.06743	0.57434
2010*Disabled	0.17447	0.20472	0.01885	0.72584**
2011*Disabled	0.16088	0.26432	0.05519	0.82616**
2012*Disabled	0.17428	0.24015	0.10437	0.82230**
2013*Disabled	0.08589	0.22869	0.02767	0.76913**
Constant	-0.04452	-0.29392***	2.54091***	1.37968***
Observations	1,330,208	1,022,462	249,611	160,015

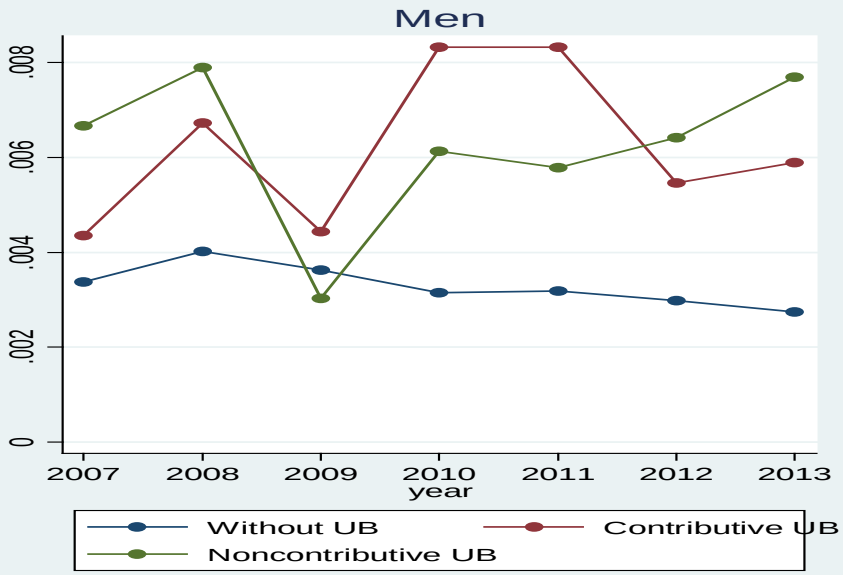
Not significant convergence in finding rates (except for old women)

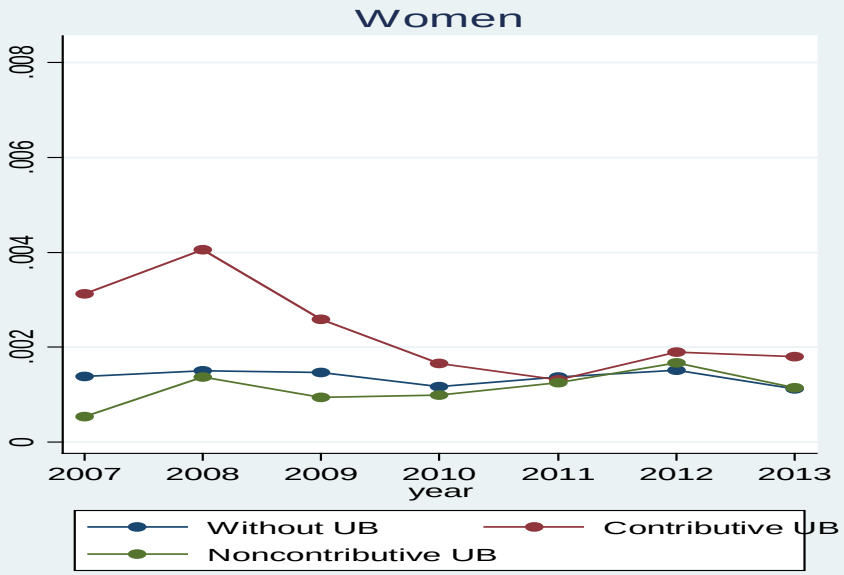
Concluding Remarks

- The Great recession has reduced transitions to disability. Inflow to disability no longer countercyclical.
- Likely causes of the fall in the DI concession rate:
  - Fall of the invalidity rate as a fraction of the working population because of the fall of the weight of the industry + construction sectors.
  - Award changes induced by the fiscal imbalances
- Disabled workers have been relatively more protected than non-disabled ones during the GR
  - Significant convergence in separation rates (employment protection policies seem to work for the disabled).

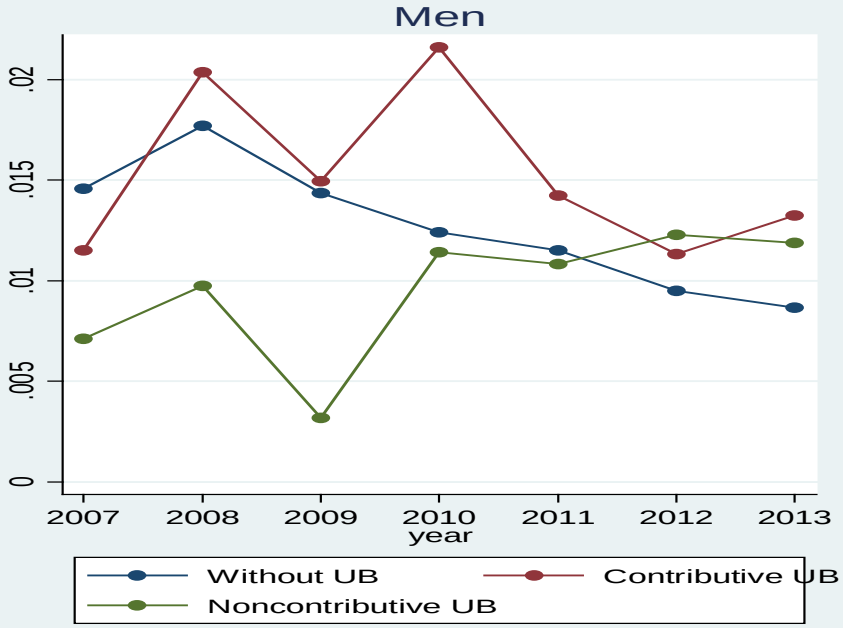
Appendix

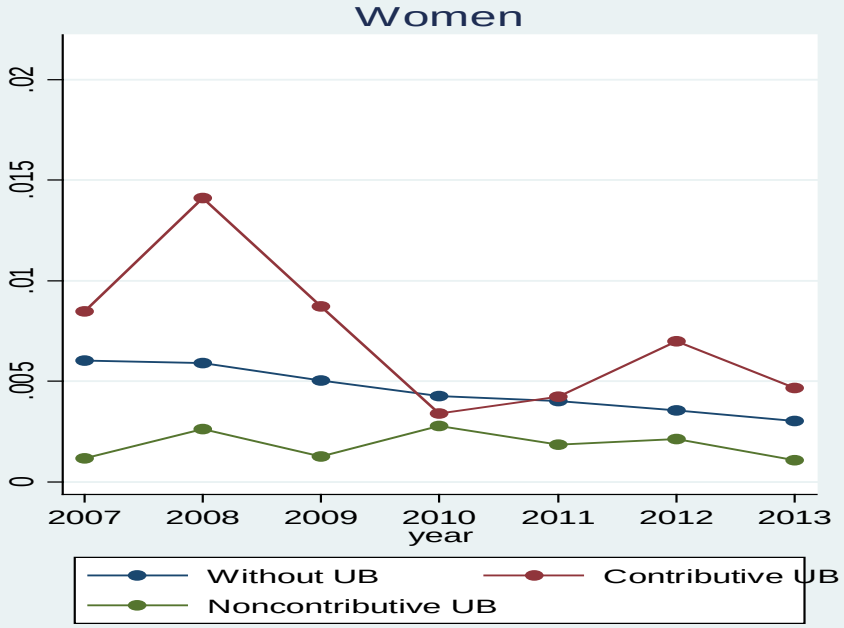
Inflow rate from nonemployment by type of UB. Ages 16-64



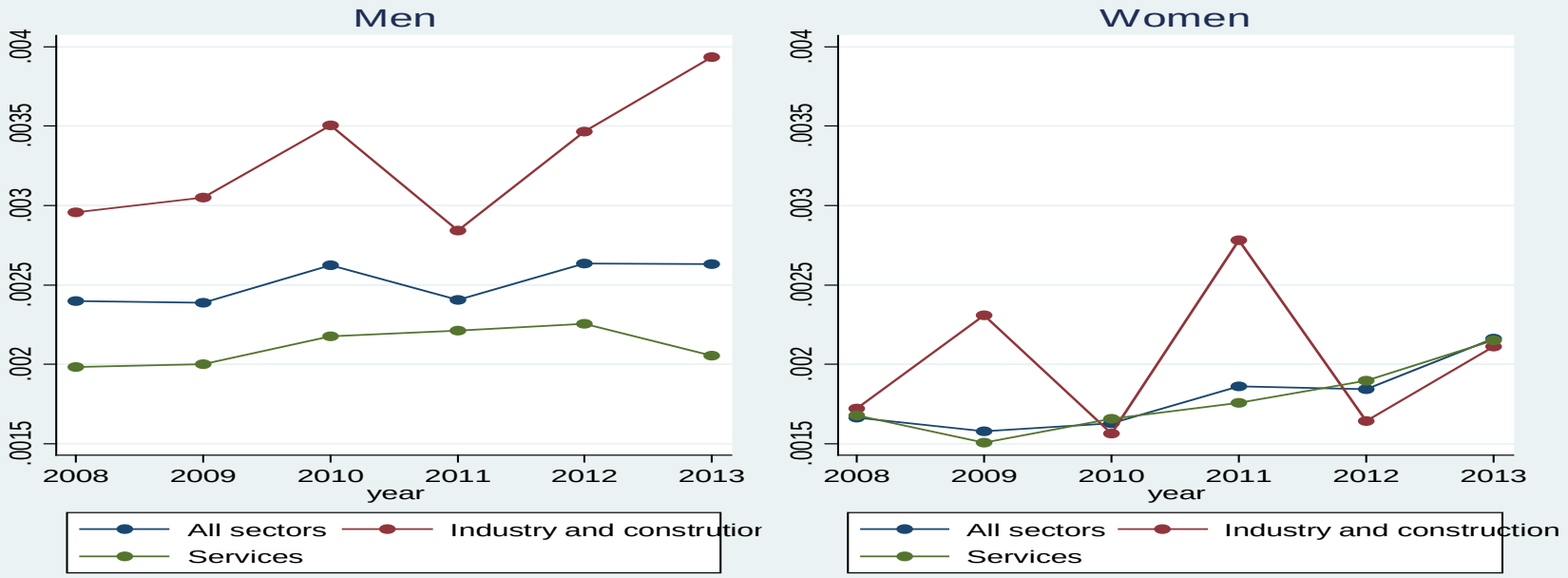


Inflow rate from nonemployment by type of UB. Ages 50-64

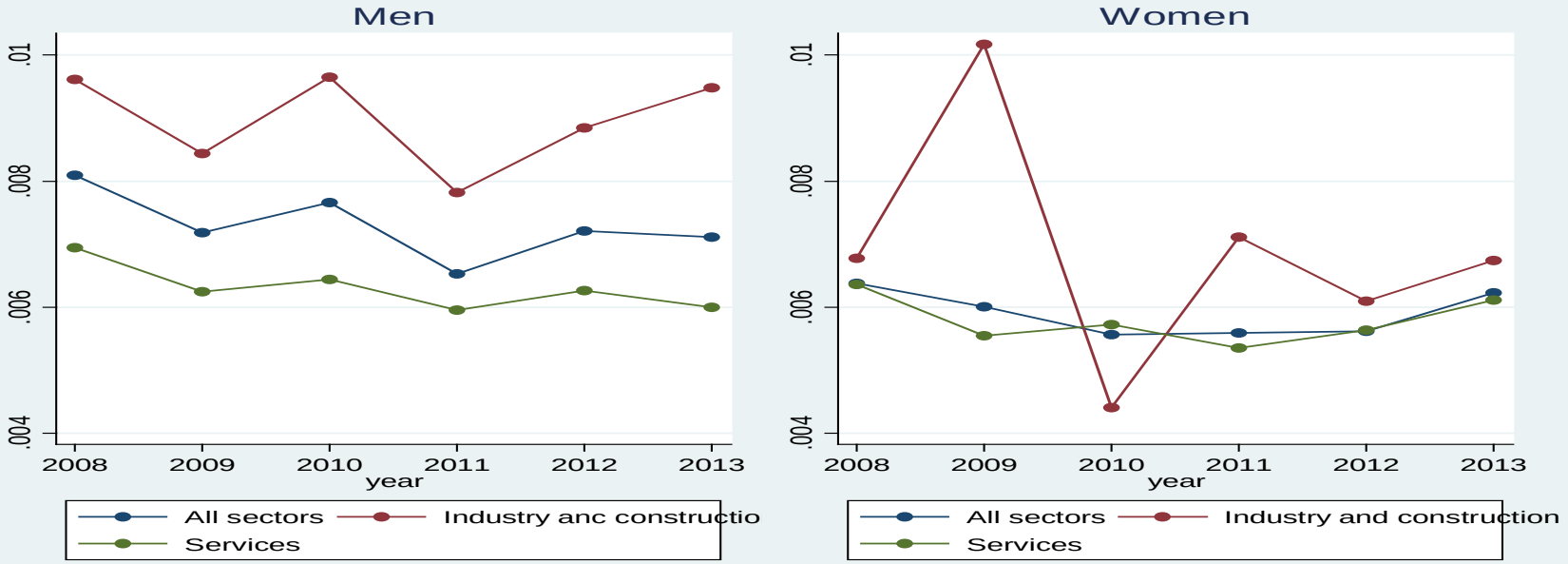




Inflow rate from employment by sector. Ages 16-64

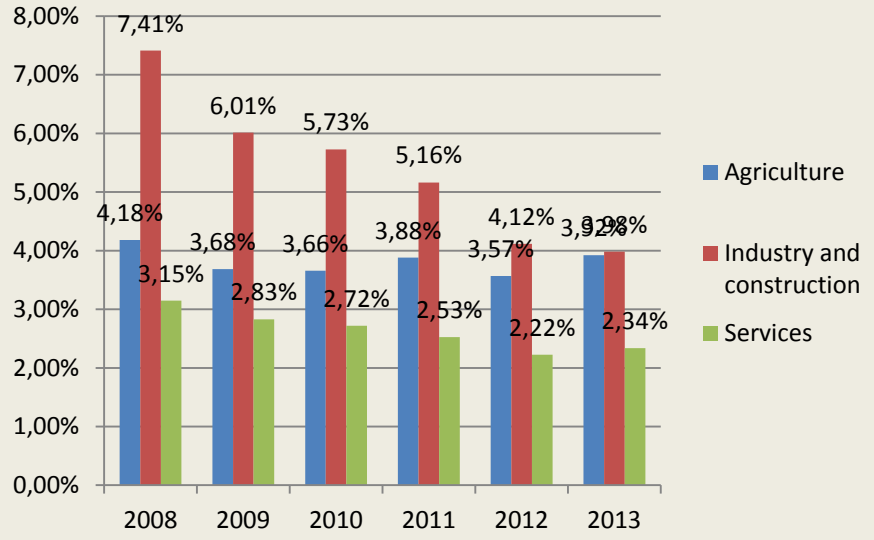


Inflow rate from employment by sector. Ages 50-64

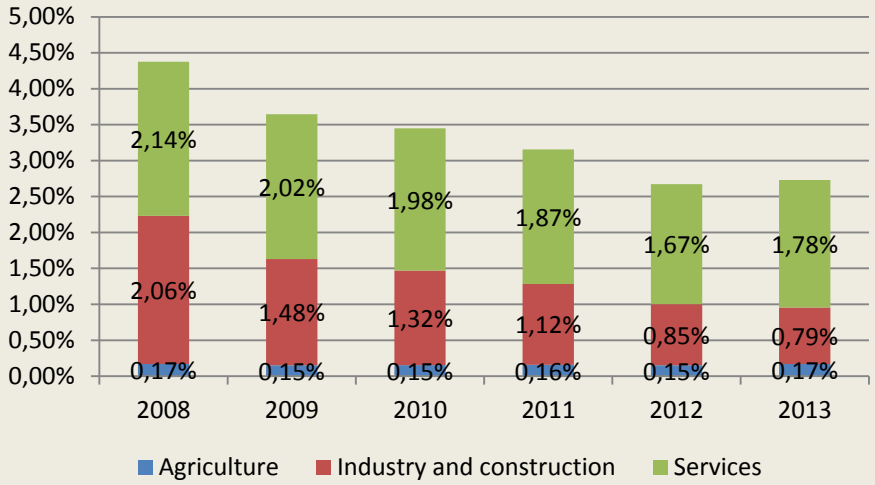


REDUCTION IN THE PROBABILITY OF ACCIDENTS

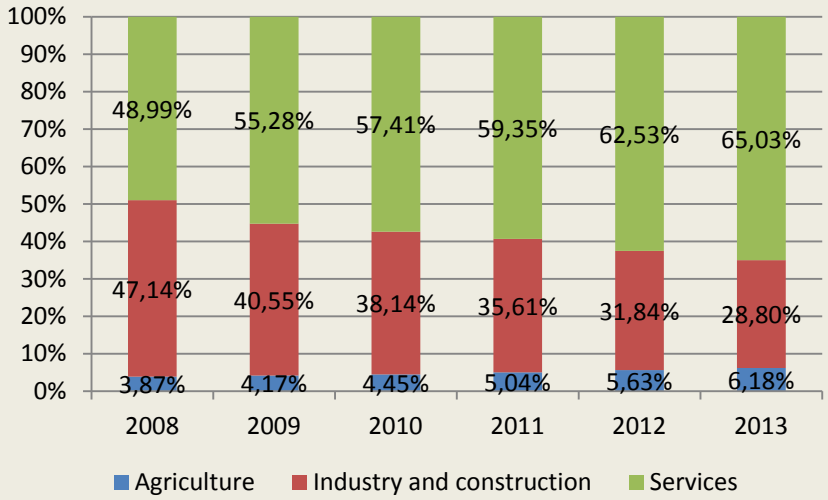
Proportion of job related accidents by sector



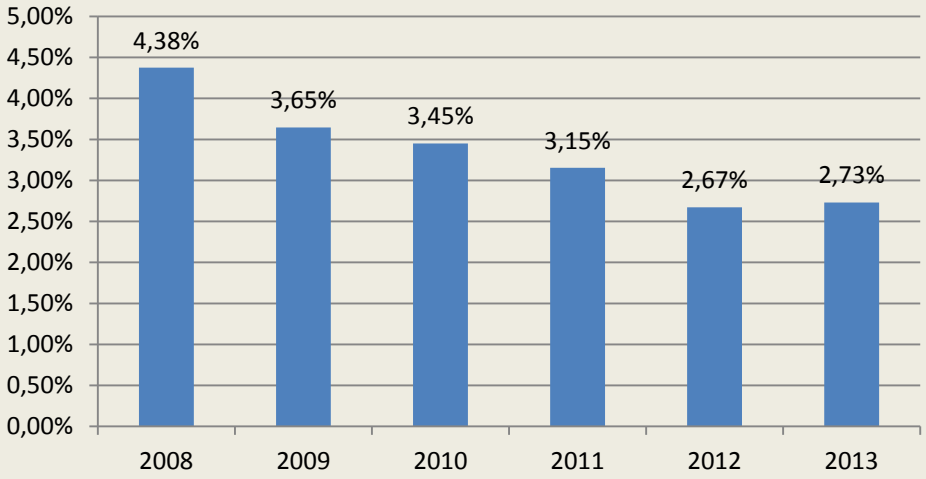
Proportion of job related accidents of each sector in total employed individuals



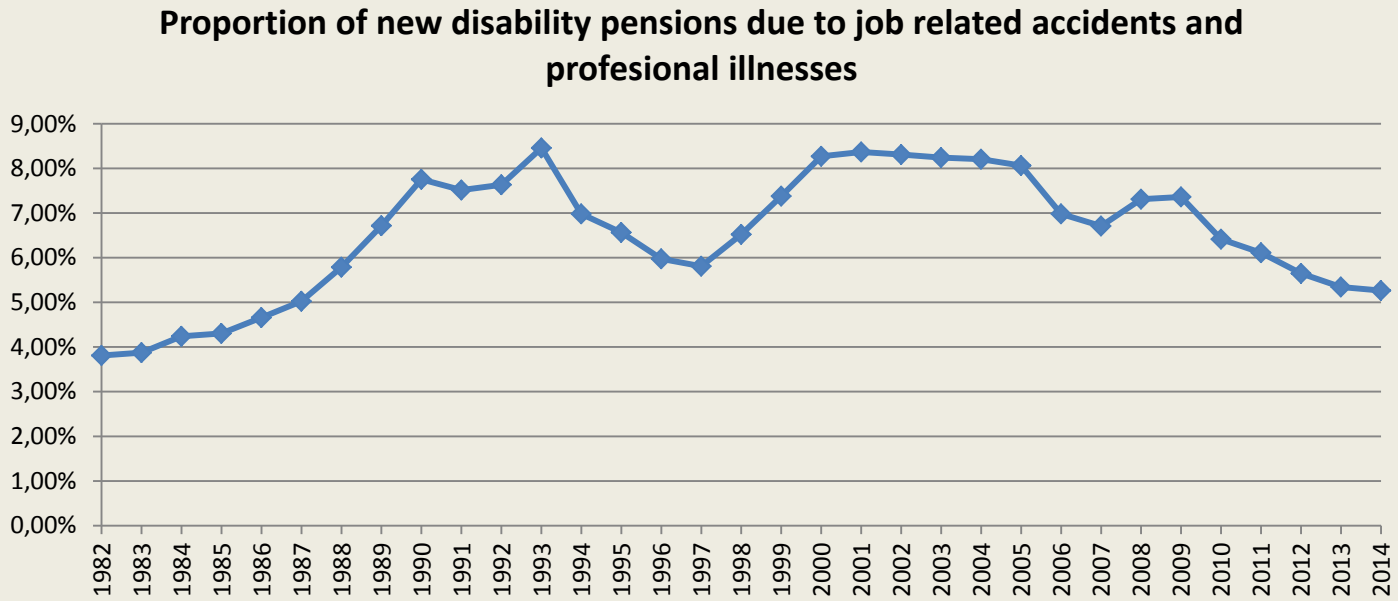
Proportion of job related accidents of each sector in total accidents

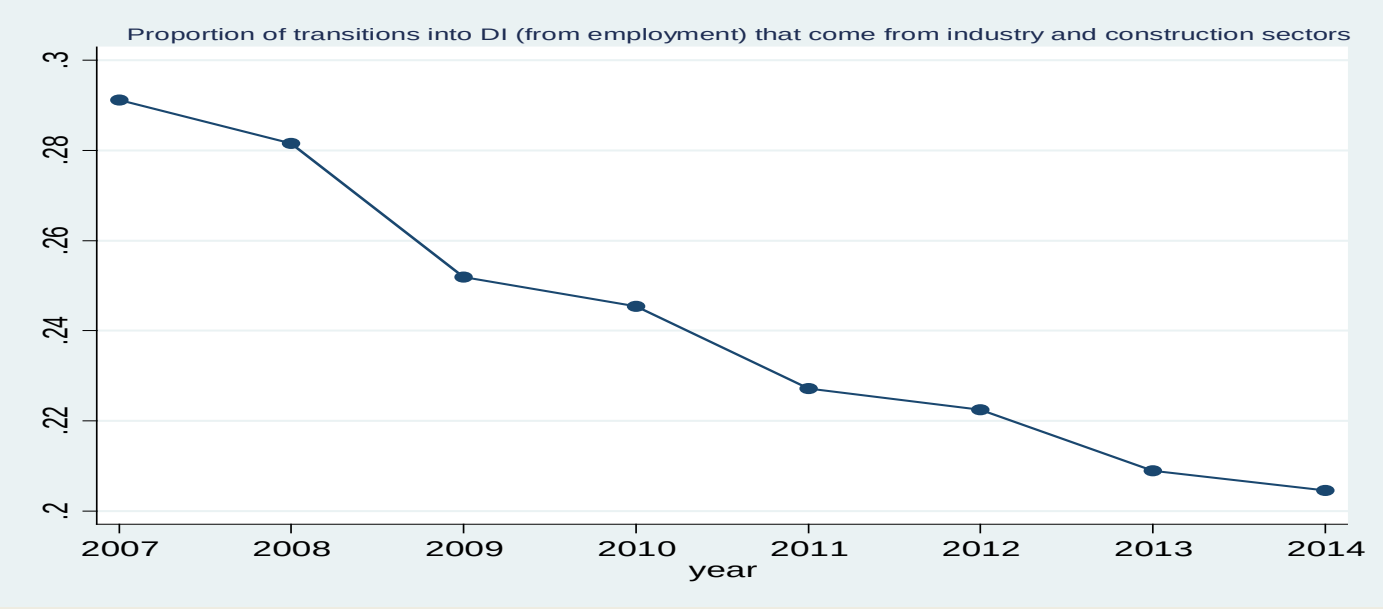


Percentage of total accidents in employment

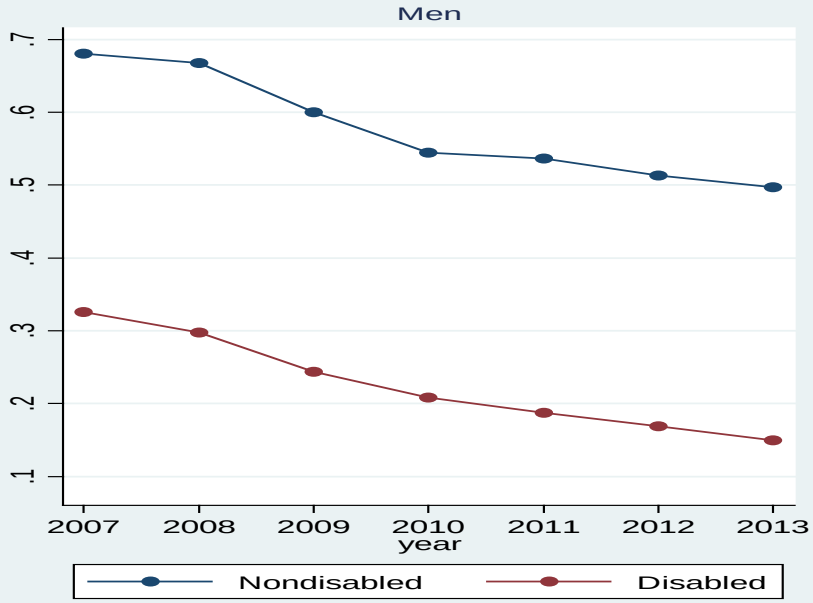


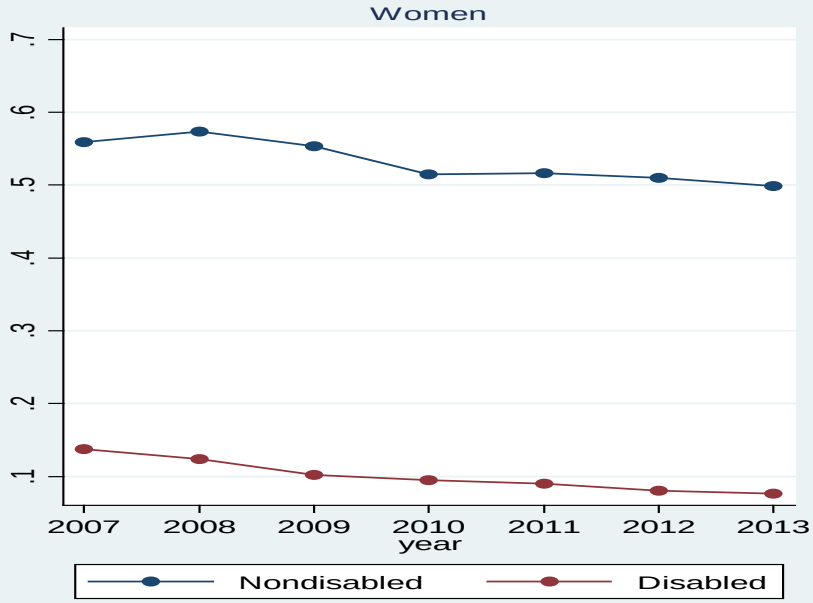
REDUCTION IN THE PROBABILITY OF ACCIDENTS



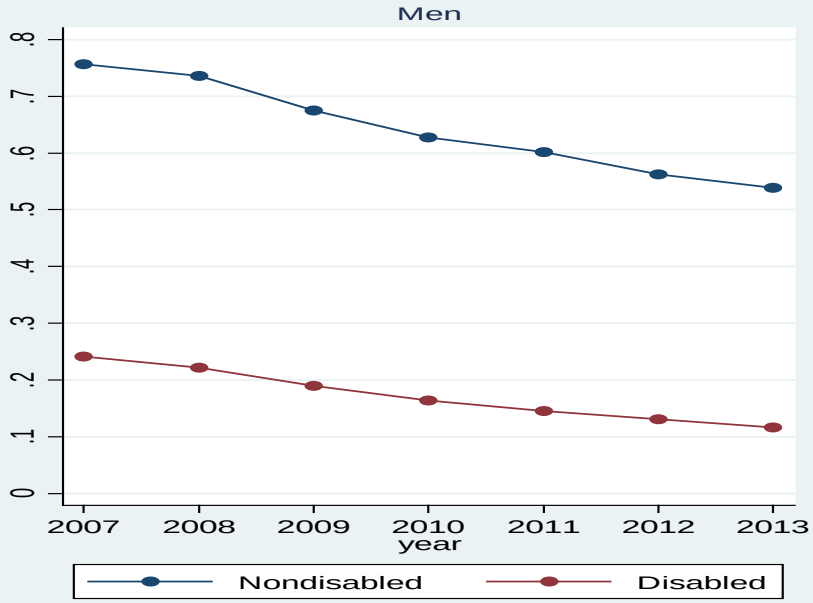


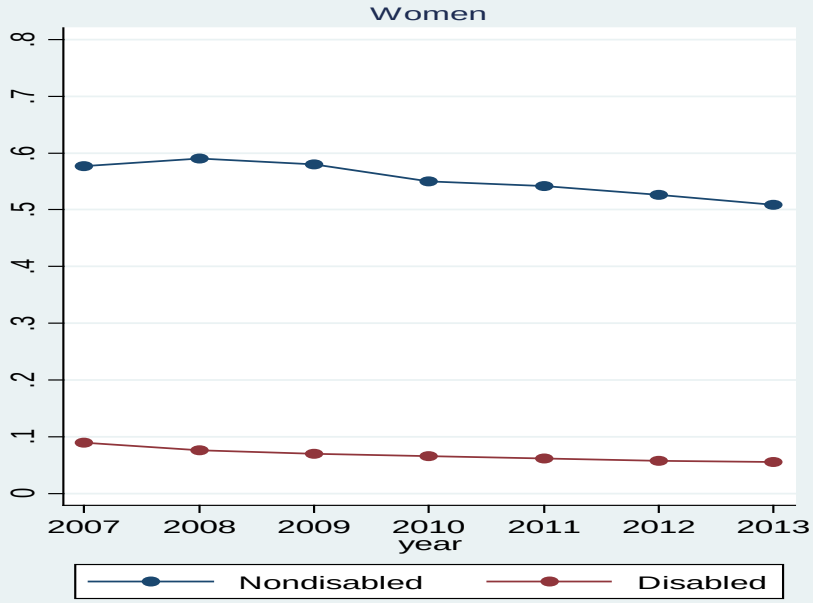
Employment rate by disability status and gender. Ages 16-64



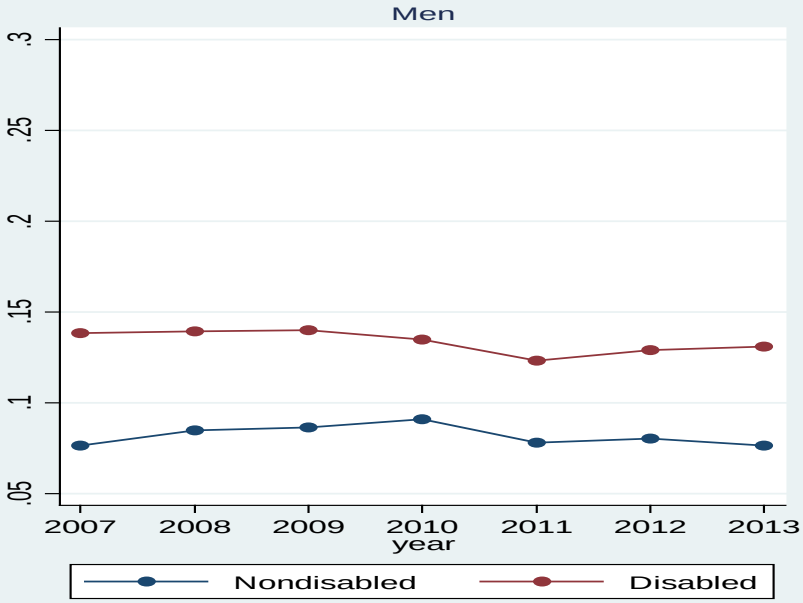


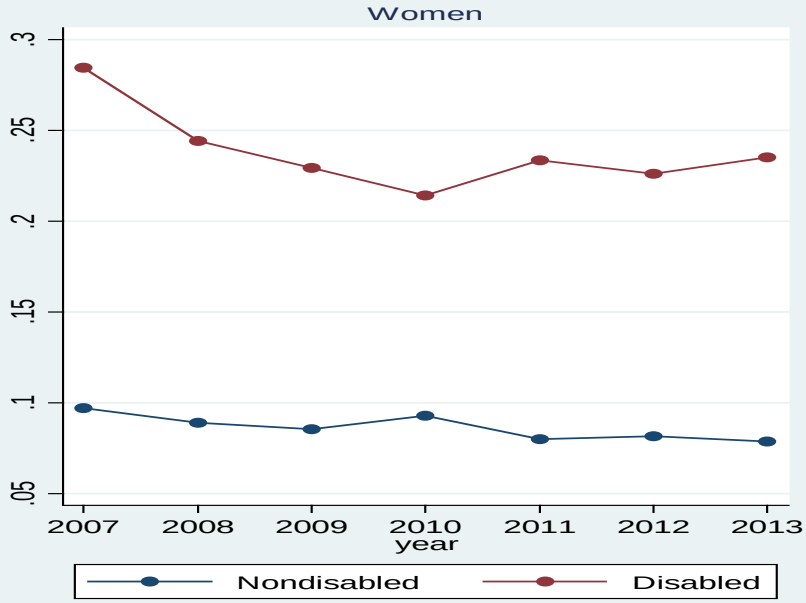
Employment rate by disability status and gender. Ages 50-64



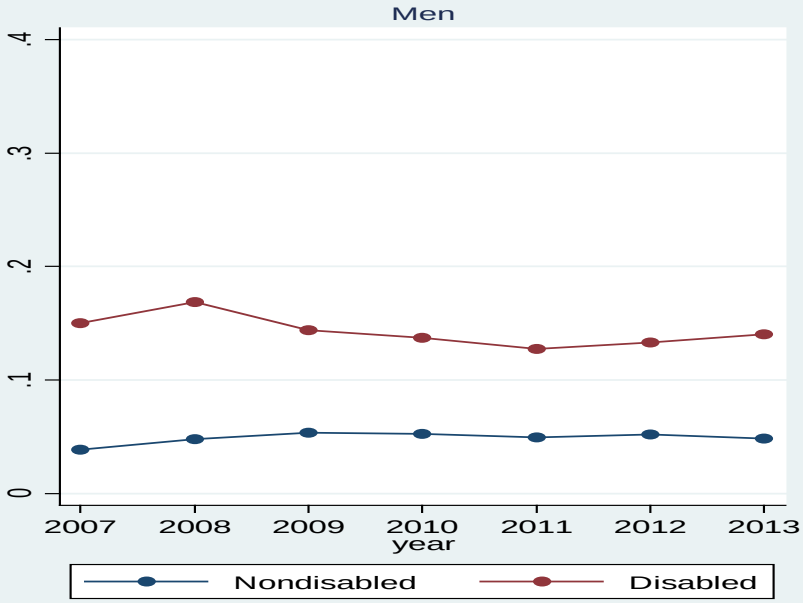


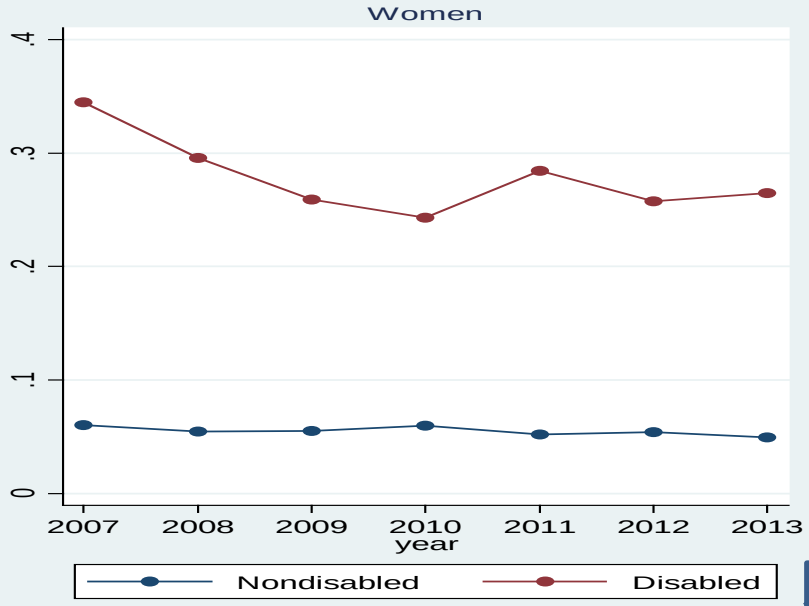
Destruction rate by disability status and gender. Ages 16-64



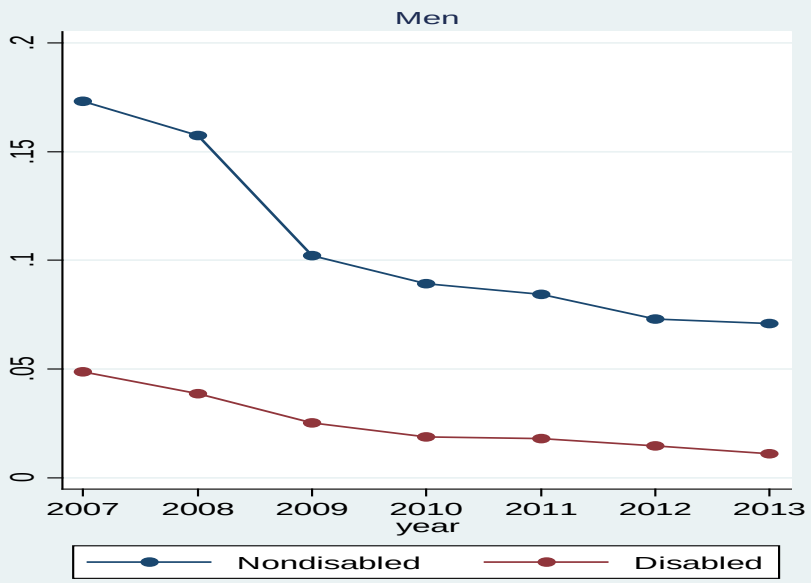


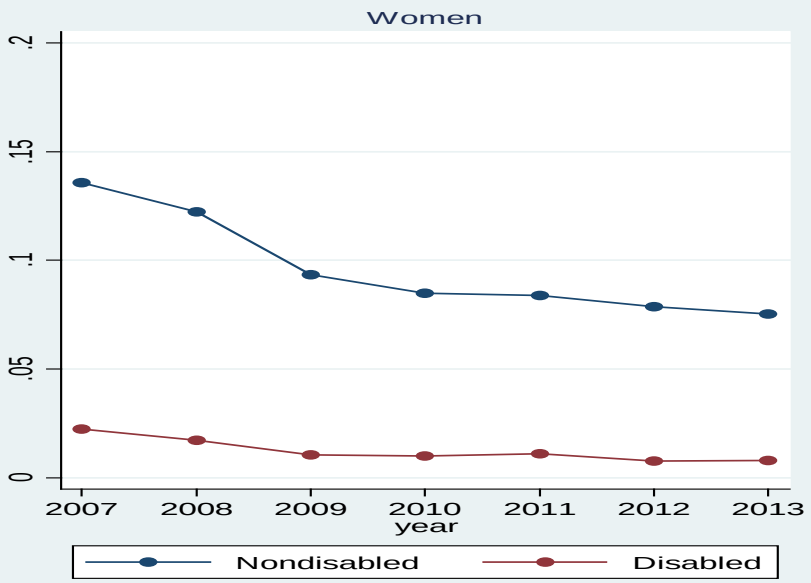
Destruction rate by disability status and gender. Ages 50-64



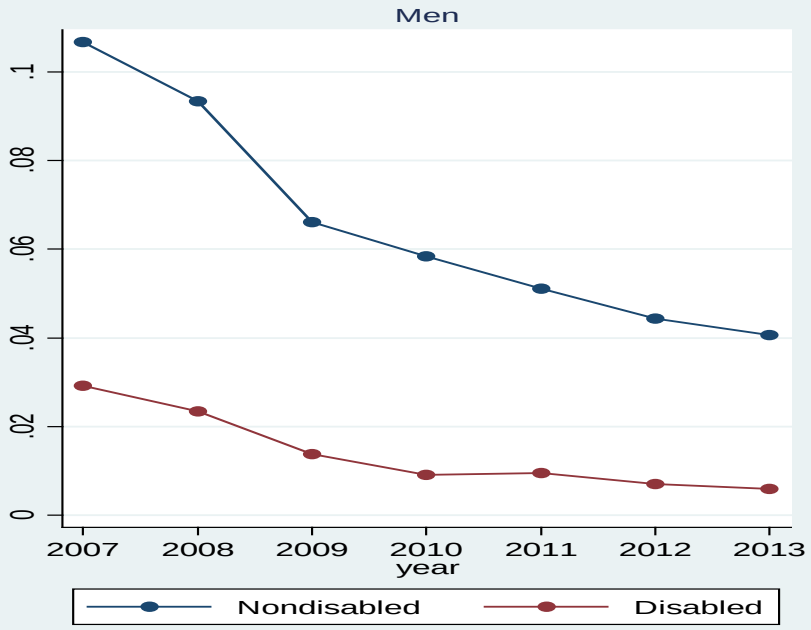


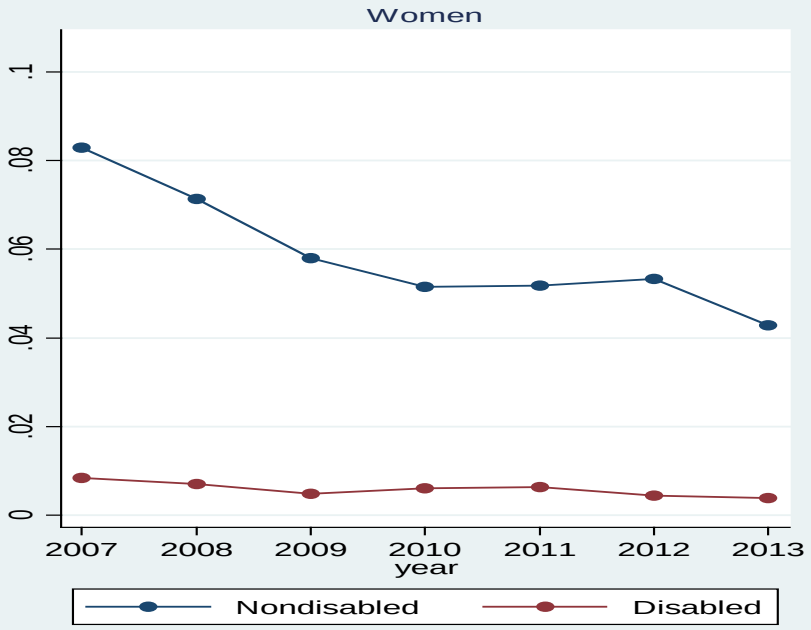
Finding rate by disability status and gender. Ages 16-64



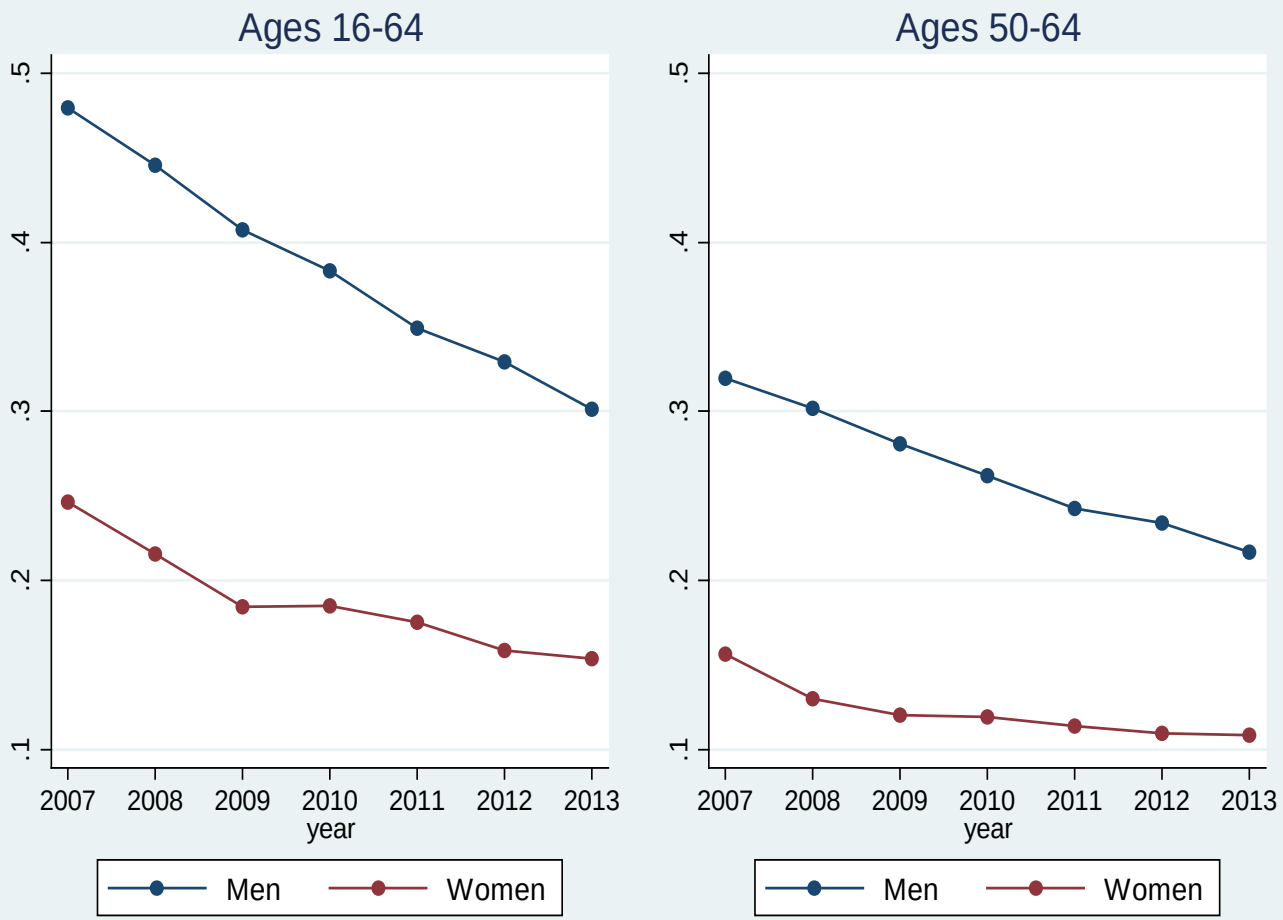


Finding rate by disability status and gender. Ages 50-64

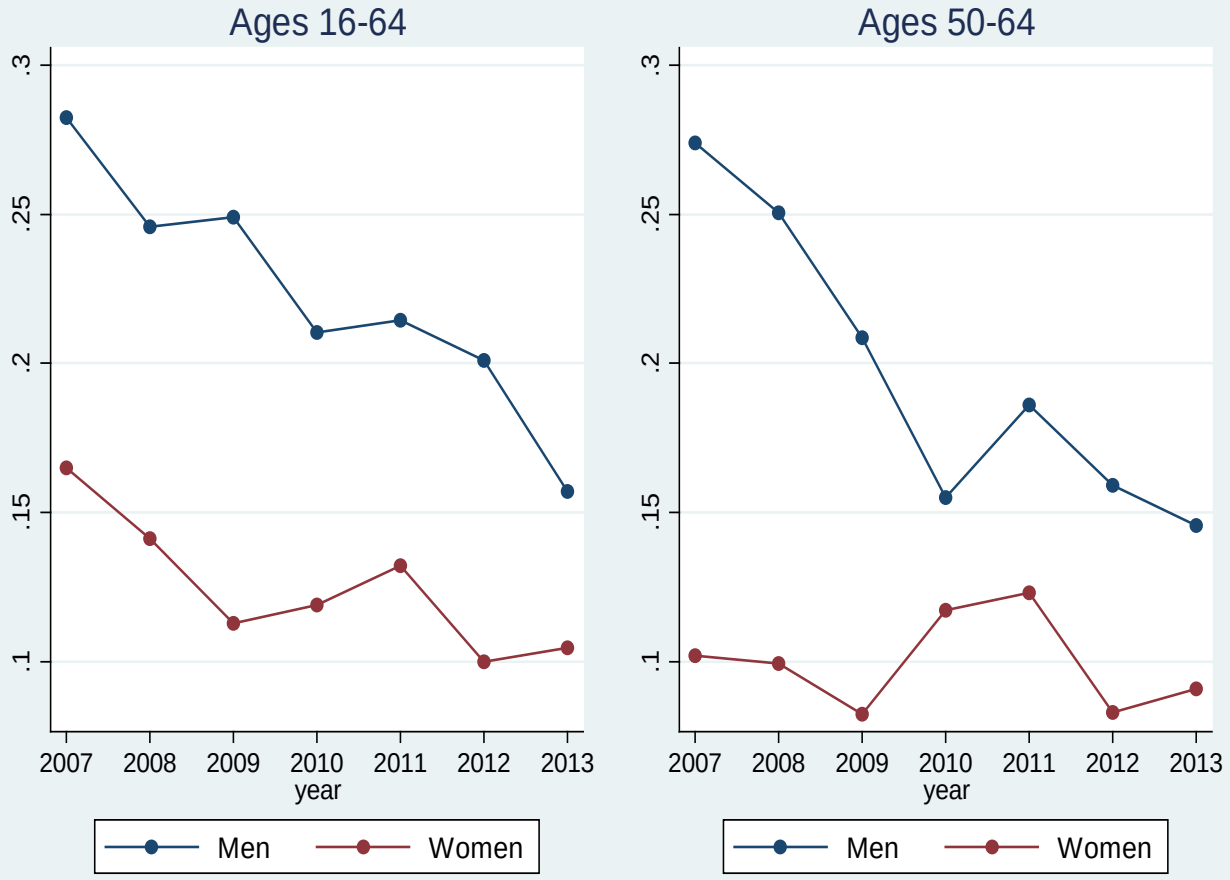




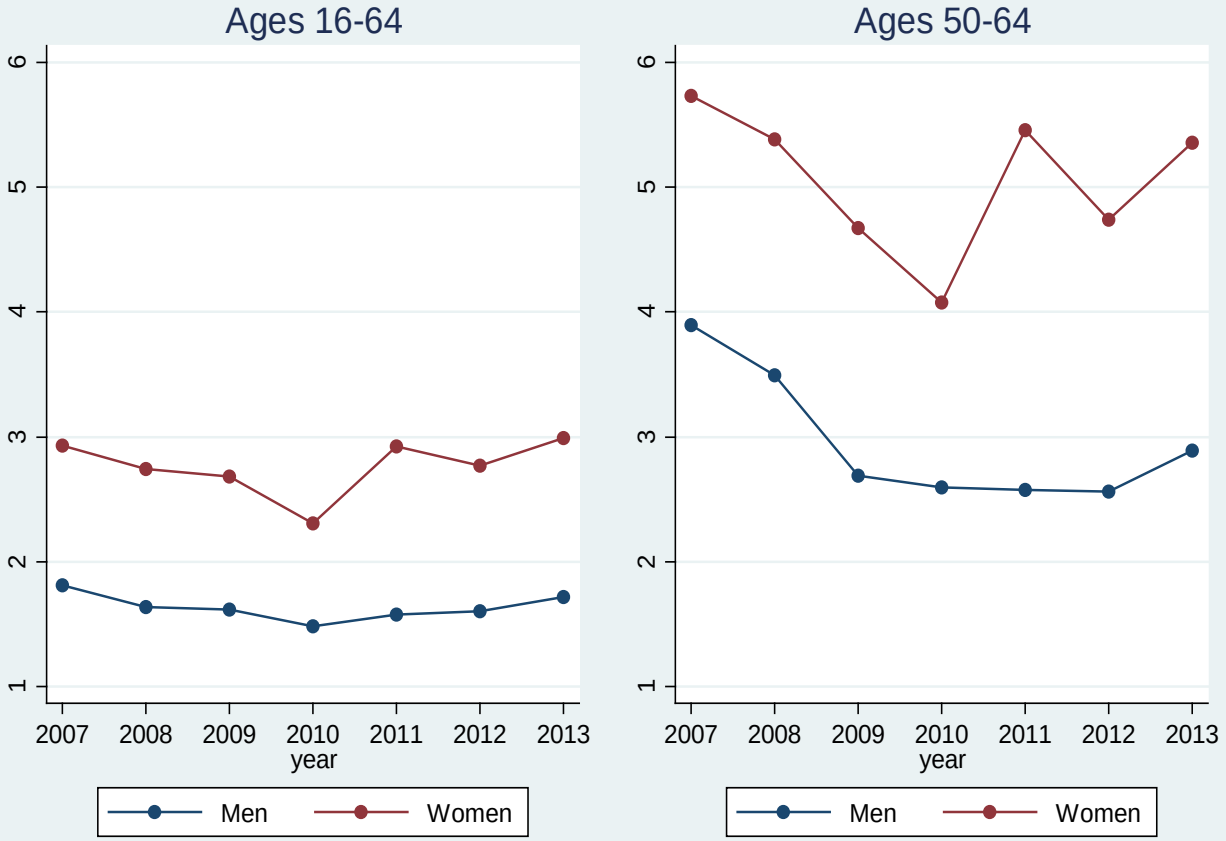
Employment rate disabled/nondisabled



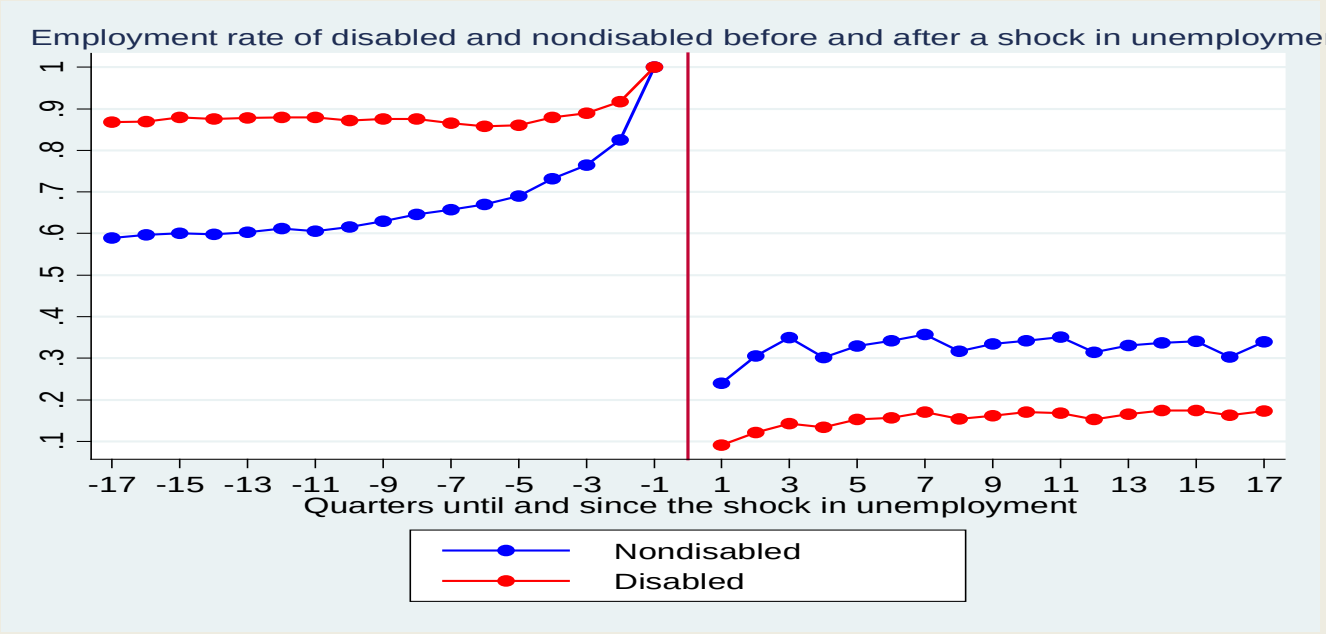
Finding rate disabled/nondisabled



Destruction rate disabled/nondisabled



NONEMPLOYMENT AND DISABILITY SHOCKS

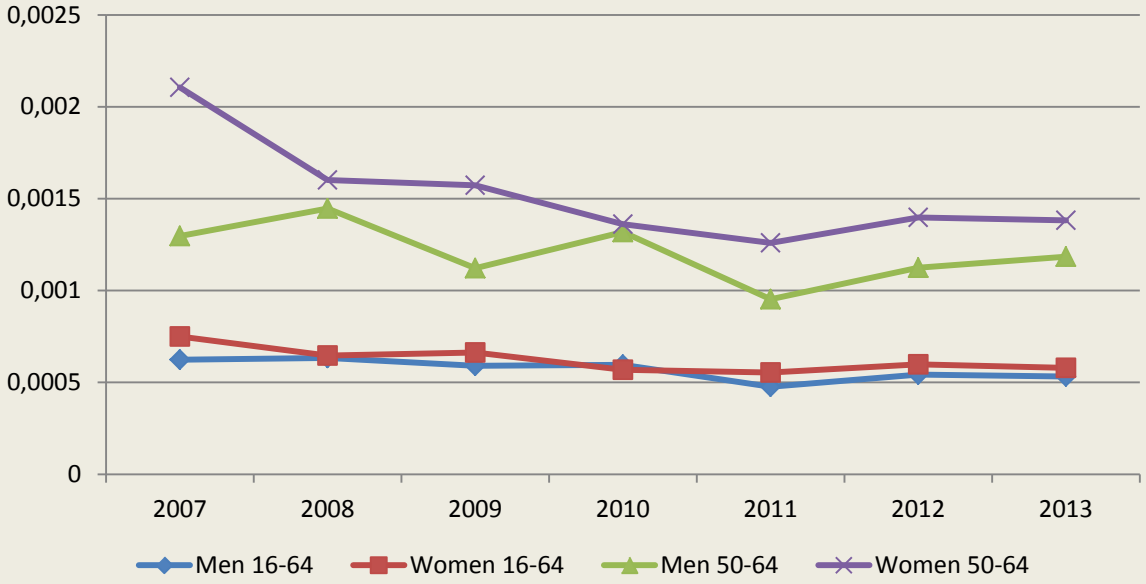


Trends in expenditure on disability and sickness programmes, in percentage of GDP, 1990, 2000 and 2007, and in percentage of unemployment benefit spending and total public social spending, 2007

	Disability			Sickness			Disability and sickness				
	% GDP			% GDP			% GDP			% unemployment	% public social spending
	1990	2000	2007	1990	2000	2007	1990	2000	2007	2007	2007
Australia[a]	1.1	1.2	1.2	0.4	1.7	1.2	1.5	2.9	2.4	450	15
Austria	2.0	1.3	1.4	1.3	1.1	1.0	3.3	2.5	2.4	278	9
Belgium	1.4	1.2	1.3	1.4	0.7	0.8	2.8	1.9	2.1	77	8
Canada[b]	0.4	0.4	0.4	0.1	0.1	0.1	0.5	0.5	0.5	81	3
Czech Republic	1.2	1.1	1.2	1.0	1.2	0.9	2.3	2.3	2.2	371	12
Denmark	1.6	1.5	1.8	1.4	1.1	1.4	2.9	2.6	3.1	455	12
Finland	2.1	1.9	1.8	1.5	1.2	1.2	3.7	3.0	2.9	250	12
France	0.9	0.8	0.7	0.6	0.7	0.7	1.6	1.5	1.4	109	5
Germany	0.7	0.1	0.1	1.7	1.6	1.3	2.5	1.7	1.4	103	5
Greece	1.0	0.7	0.7	0.8	0.7	0.5	1.9	1.4	1.2	272	6
Hungary	..	0.2	1.3	..	0.7	0.6	..	1.0	1.9	315	8
Iceland	0.9	1.7	2.1	1.5	1.4	1.5	2.3	3.1	3.6	1 895	24
Ireland	0.5	0.6	0.8	0.8	0.6	0.8	1.3	1.1	1.6	163	10
Italy	1.2	0.9	0.7	0.9	0.7	0.5	2.1	1.6	1.2	351	5
Japan	0.3	0.3	0.4	0.1	0.1	0.1	0.4	0.4	0.4	141	2
Korea	0.1	0.2	0.2	0.1	0.1	0.1	0.2	0.3	0.3	101	3
Luxembourg	2.0	1.7	1.0	0.6	0.6	0.8	2.6	2.3	1.8	269	9
Mexico	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	..	..
Netherlands	4.7	2.7	2.1	2.9	2.2	1.6	7.6	4.9	3.7	324	18
New Zealand	0.6	0.9	0.9	0.3	0.3	0.3	0.9	1.2	1.3	553	7
Norway	2.5	2.3	2.5	2.6	2.7	2.3	5.1	5.1	4.8	2 403	23
Poland	2.1	2.0	1.2	0.7	0.7	0.6	2.8	2.7	1.8	993	9
Portugal	1.7	1.7	1.7	0.0	0.0	0.0	1.7	1.7	1.7	172	8
Slovak Republic	..	0.9	0.8	..	1.0	0.3	..	1.9	1.2	1 087	7
Spain	1.2	1.2	1.2	1.0	1.0	1.1	2.2	2.2	2.3	107	10
Sweden	1.9	2.0	2.2	3.1	2.0	1.4	5.0	4.1	3.6	545	13
Switzerland	1.0	1.8	1.9	1.2	1.1	1.0	2.2	2.8	2.9	462	16
Turkey	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.2	0.1	..	1
United Kingdom	1.6	2.0	1.9	0.6	0.7	0.4	2.2	2.8	2.3	1 126	11
United States	0.7	0.9	1.0	0.8	0.6	0.7	1.5	1.5	1.7	516	385
OECD	1.3	1.2	1.2	1.0	0.9	0.8	2.3	2.0	1.9	284	10

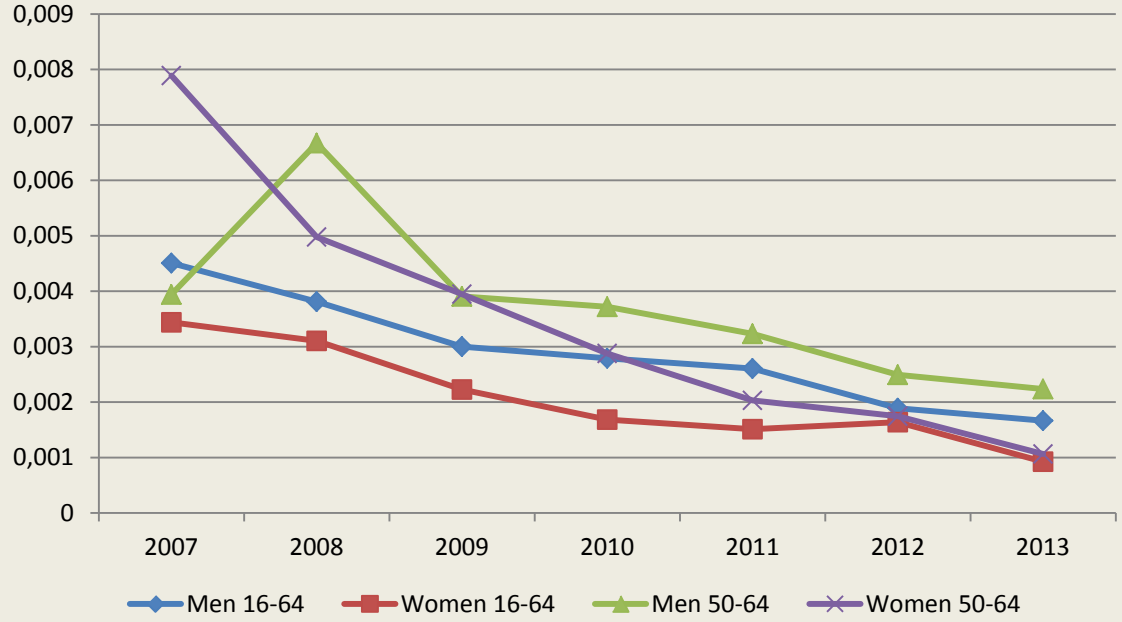
MODEL PREDICTED PROBABILITIES

FROM EMPLOYMENT TO DISABILITY



Mild (not significant) decrase from employment.
More pronounced (significant) for old women

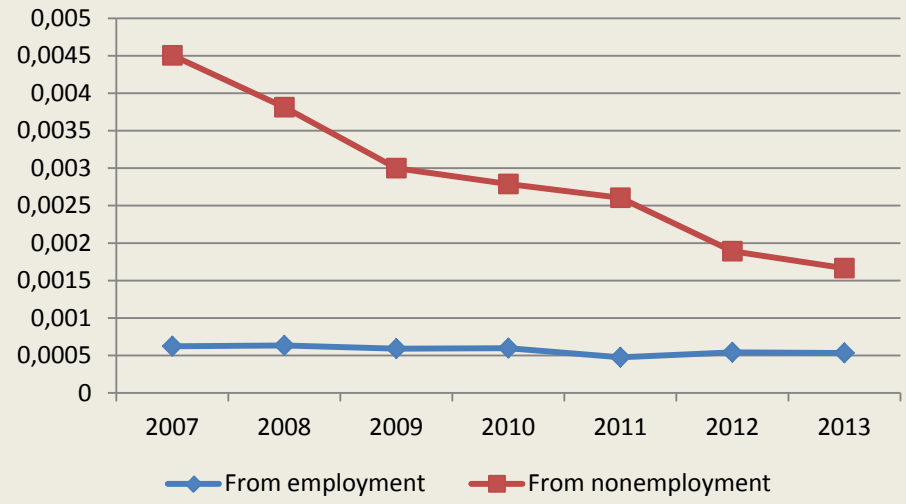
FROM NONEMPLOYMENT TO DISABILITY



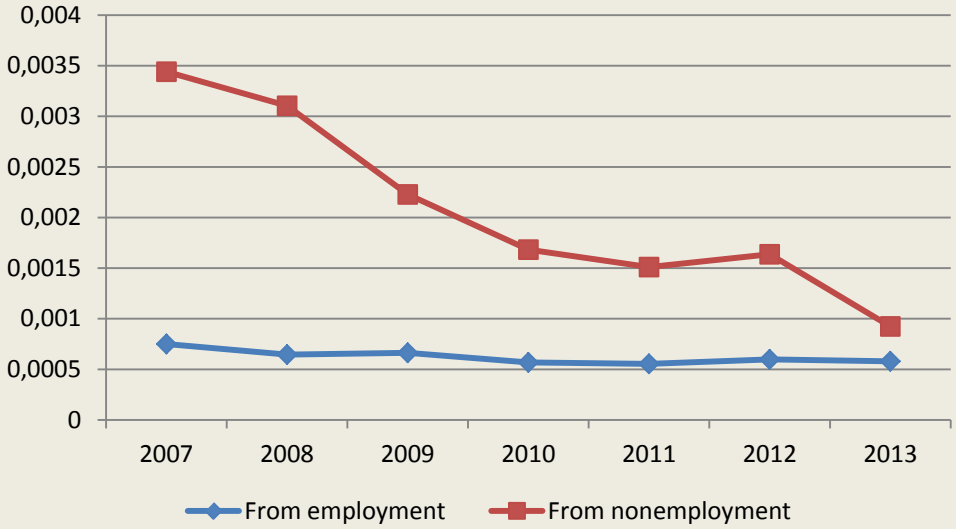
Strong (significant) decrease from nonemployment
Still more pronounced for old women

MODEL PREDICTED PROBABILITIES

MEN 16-64

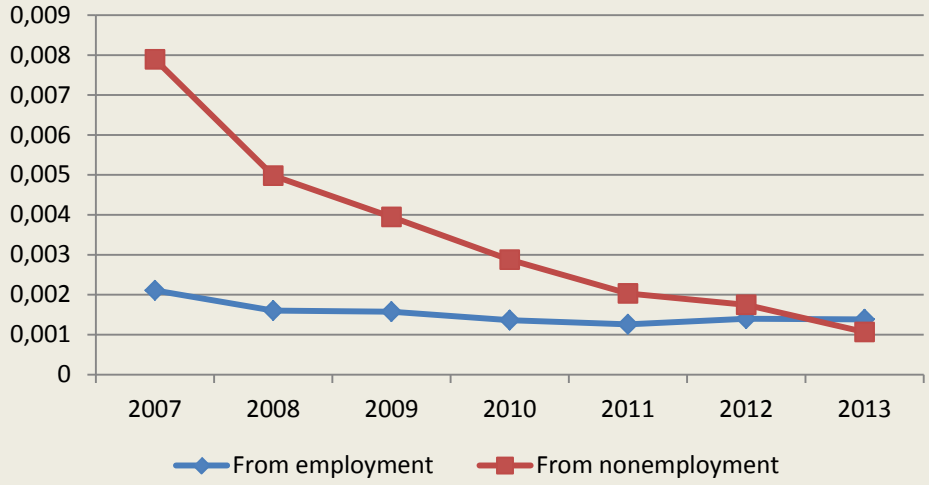


WOMEN 16-64



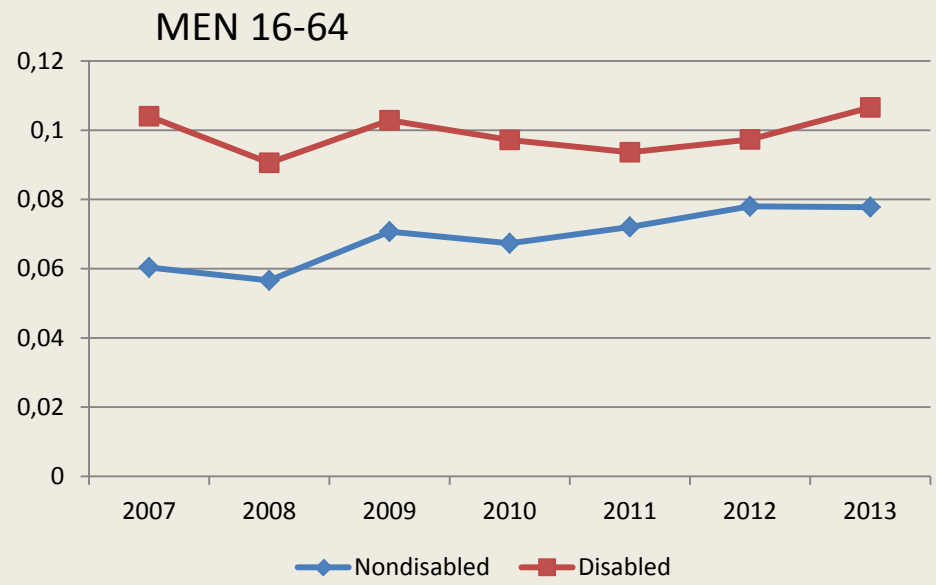
MEN 50-64

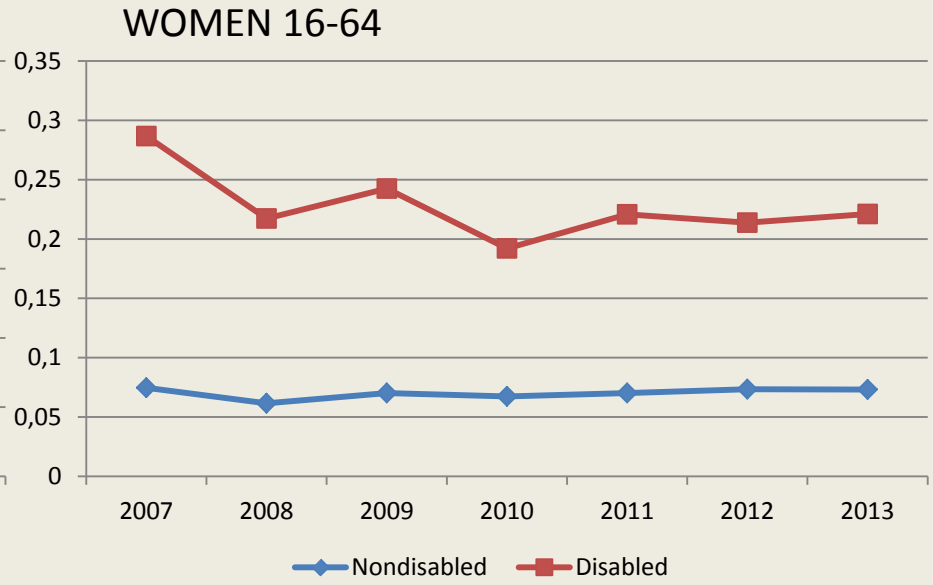
WOMEN 50-64

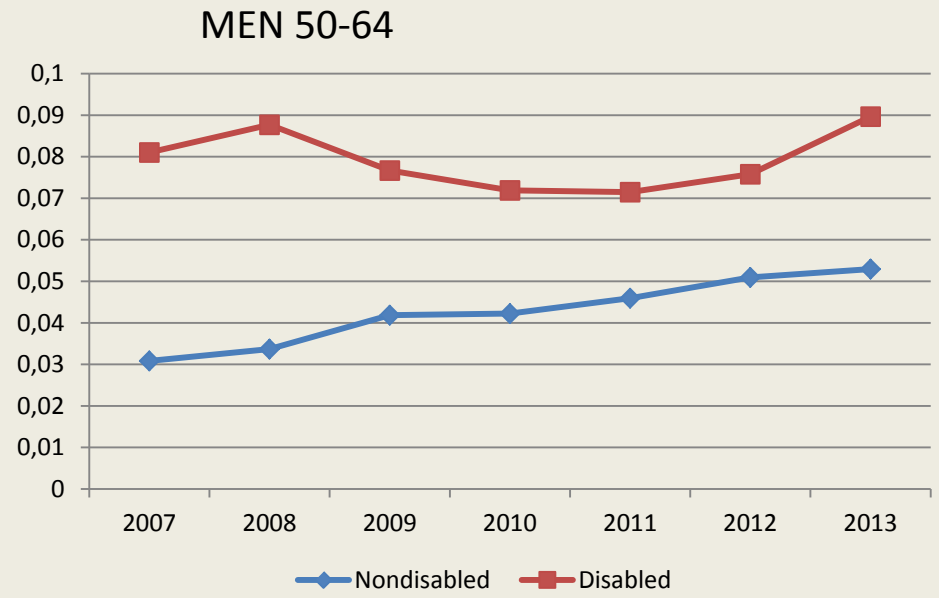


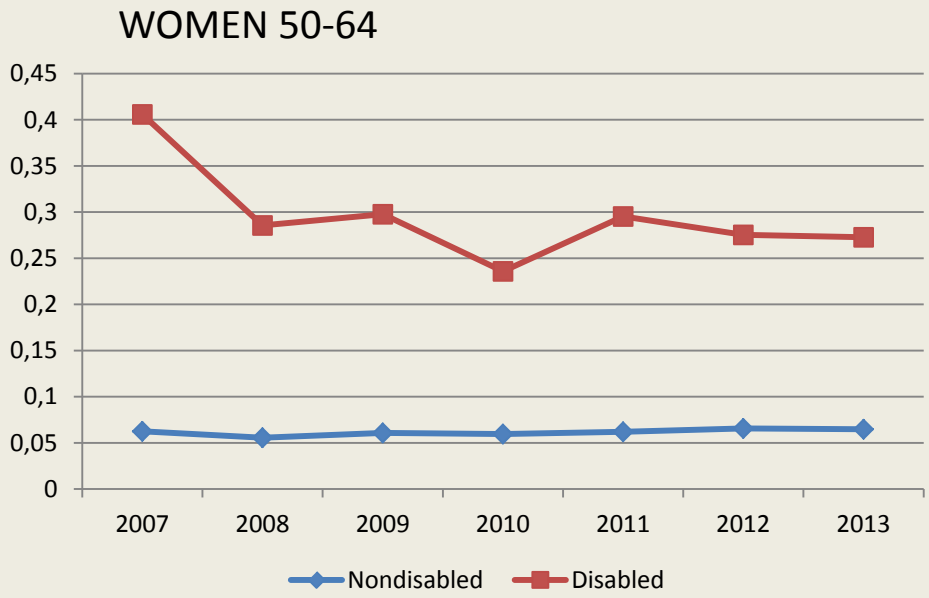
REDUCTION OF INFLOW RATE COMES FROM NONEMPLOYMENT

MODEL PREDICTED PROBABILITIES. DESTRUCTION RATE



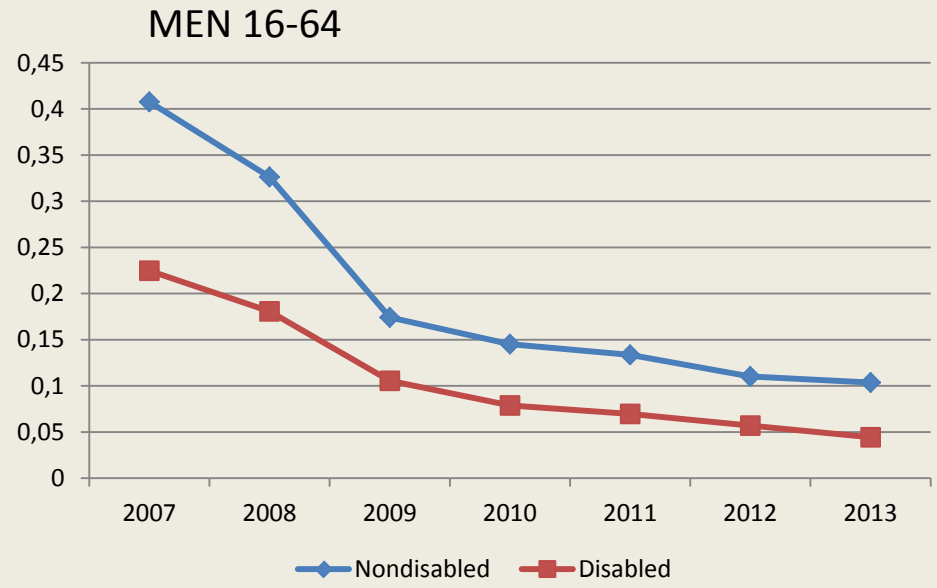


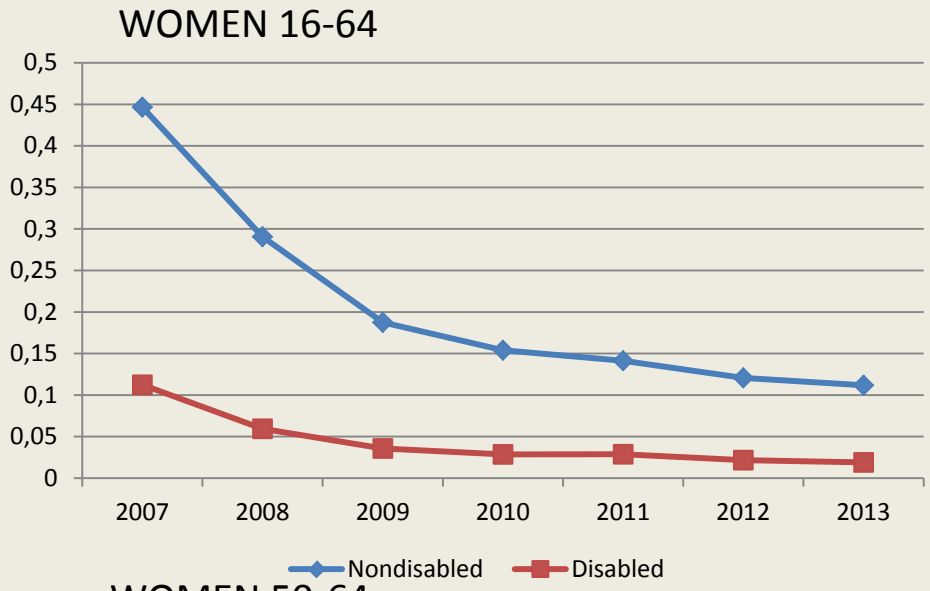


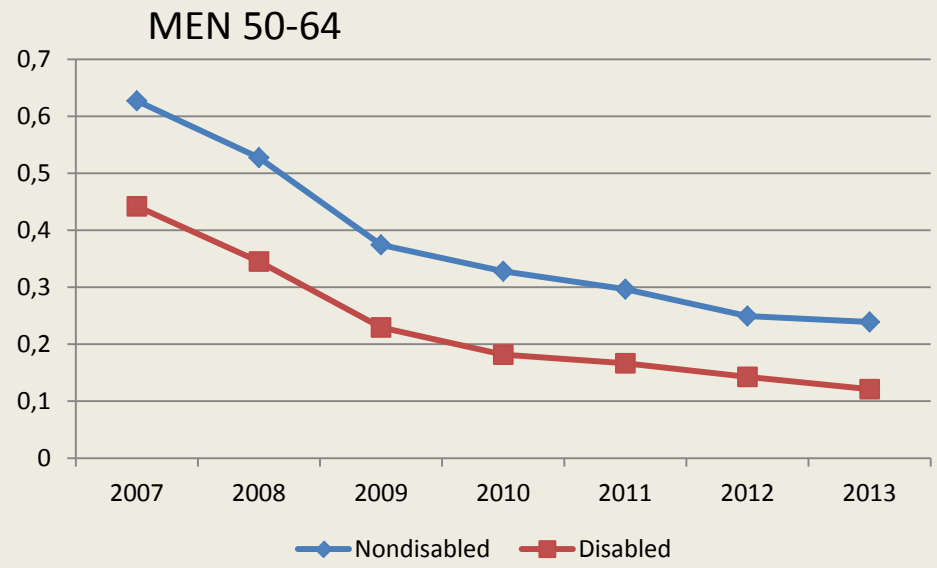


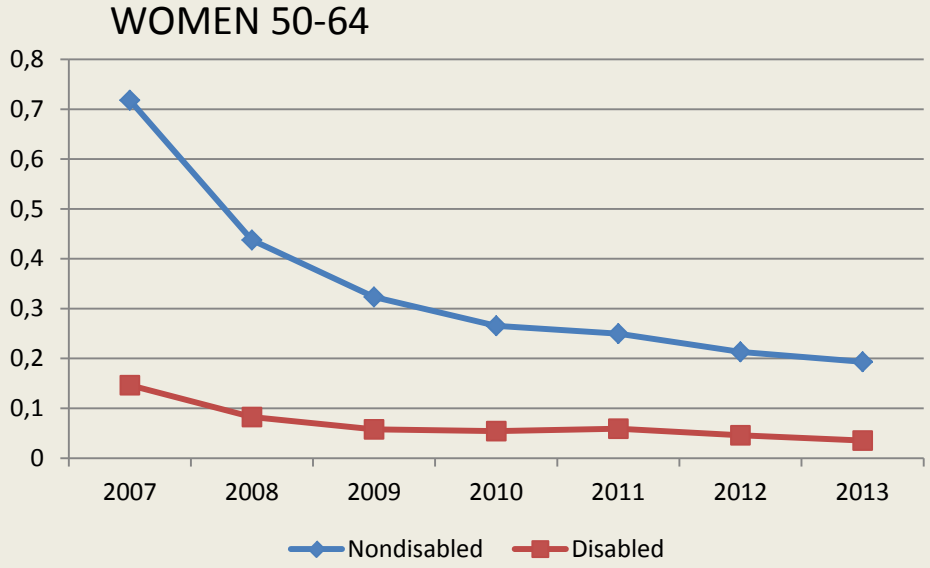
CONVERGENCE IN DESTRUCTION RATES (SIGNIFICANT)

MODEL PREDICTED PROBABILITIES. FINDING RATE









CONVERGENCE IN FINDING RATES (NOT SIGNIFICANT)
BUT DISABLED'S FINDING RATE TENDS TO 0

LITERATURE

EFFECT OF BUSINESS CYCLE ON PARTICIPATION IN DI

- UNITED STATES

  - ❑ Autor and Duggan (2003):

  - ❑ Black, Daniel and Sanders (2002): Use the coal boom of the 1970's and the coal bust of the 1980's to estimate the effect of local economic conditions on DI participation. Find significant countercyclical effects.

  - ❑ Duggan and Imberman (2009): Estimate annual time-series regressions of DI participation on unemployment rate in the period 1984-2003. Find sizeable and significant countercyclical effects.

  - ❑ Mueller, Rothstein and Wachter (2013): Estimate the effect of exhausting UI on DI participation in the Great Recession. Find no effect.

  - ❑ Disability Insurance and the Great Recession, *By Nicole Maestas, Kathleen J. Mullen, and Alexander Strand*

LITERATURE

- SPAIN

  - Boldrin et. al. (1997): DI was extensively used during the late 1970's and early 1980's as an early retirement mechanism for workers in restructuring industries or as substitutes for long term unemployment subsidies.

  - Jiménez et al (2007): Construct a "deserving indicator" for DI. Find that the probability of being awarded DI benefits "without deserving it" is higher in regions where the early retirement option is not available and among people that approaches the minimum early retirement age.

  - Jiménez and Vall (2009): Construct a competing risk model for transitions from employment to unemployment, inactivity and disability and estimate it using panel data for the period XX. Find significant countercyclical effects on disability inflow rate.

  - Disney et. al. (2010): Perform regressions of DI participation on the business cycle for several countries at cross-country and at individual country level and find significant countercyclical effects. For Spain, they perform regressions of the inflow rate on the regional unemployment rate and the growth of regional GDP using administrative data from 1992 to 2008. Find significant countercyclical impact.

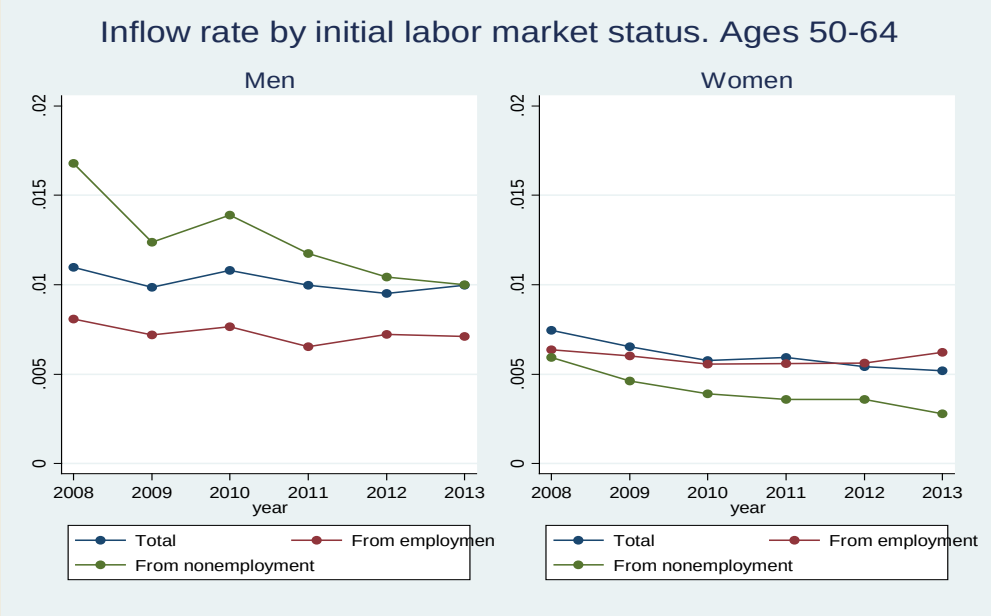
LITERATURE

EFFECT OF BUSINESS CYCLE ON DISABLED'S LABOUR MARKET OUTCOMES

- Burkhauser et. al. (2001): Similar effect of the 1980's cycle on employment and income of disabled and nondisabled. Divergence in the employment and income of disabled vs. nondisabled during the 1990's expansion.

GREAT RECESSION AND PARTICIPATION IN DI IN SPAIN

MUESTRA CONTINUA DE VIDAS LABORALES. TRANSITIONS WITH INDIVIDUAL DATA



- INFLOW RATE DECREASING DURING GRATE RECESSION
- CONSTANT FROM EMPLOYMENT
- STRONGLY DECREASING FROM NONEMPLOYMENT

By age and gender

*We estimate models of transitions from employment and nonemployment to disability. The results are confirmated.

Link to transition models

What are the causes of the decrease in DI participation during the Great Recession?

Great Recession and participation in DI in Spain

CAUSES OF THE DECREASE IN PARTICIPATION:

2. REDUCTION IN THE NUMBER OF

PARTICIPATION IN DI BEFORE GREAT RECESSION

Before Great Recession, evidence clearly suggests a countercyclical response of DI participation.

For example: Disney et al. (2009) find a strong positive relationship between regional unemployment rates and DI participation for several countries. Also for Spain.

Table 2: Pooled panel estimates of Disability Benefit receipt (DB) and unemployment rates

1. ECHP (1994-2001)		
Dependent Variable	*country dummies*	*year & country dummies*
DB Stock	0.0017***	0.0017***
d(lny)/d(lnx)	0.1688	0.1645
p-value	0.000	0.000
N	620,952	620,952
R^2	0.10	0.11
DB Inflow	−0.0003	0.0001
d(lny)/d(lnx)	-	-
p-value	0.270	0.184
N	419,943	419,943
R^2	0.03	0.03
DB Outflow	−0.0014*	−0.0025***
d(lny)/d(lnx)	-0.0403	-0.0704
p-value	0.067	0.001
N	38,090	38,090
R^2	0.15	0.15

Table 5: New disability retirement pension to employment, GDP growth and regional unemployment rates, Spanish administrative data 1992-2008

Panel A: All ages

Variable	*(1)*	*(2)*	*(3)*
% growth of regional GDP d(lny)/d(lnx)	−0.067** (−5.94) −0.7074	-	−0.024 (−1.26) −0.2481
% regional unemployment rate d(lny)/d(lnx)	-	0.027** (6.56) 0.3500	0.020** (2.89) 0.2594
Constant	*0.02*** *(16.78)*	*0.073*** *(11.38)*	*0.011*** *(3.59)*
N	272	272	272
R^2	0.1220	0.1477	0.1501
F	35.28	43.00	22.34

PARTICIPATION IN DI DURING GREAT RECESSION

Scarce evidence of busines cycle effects on DI participation during Great Recession (GR):

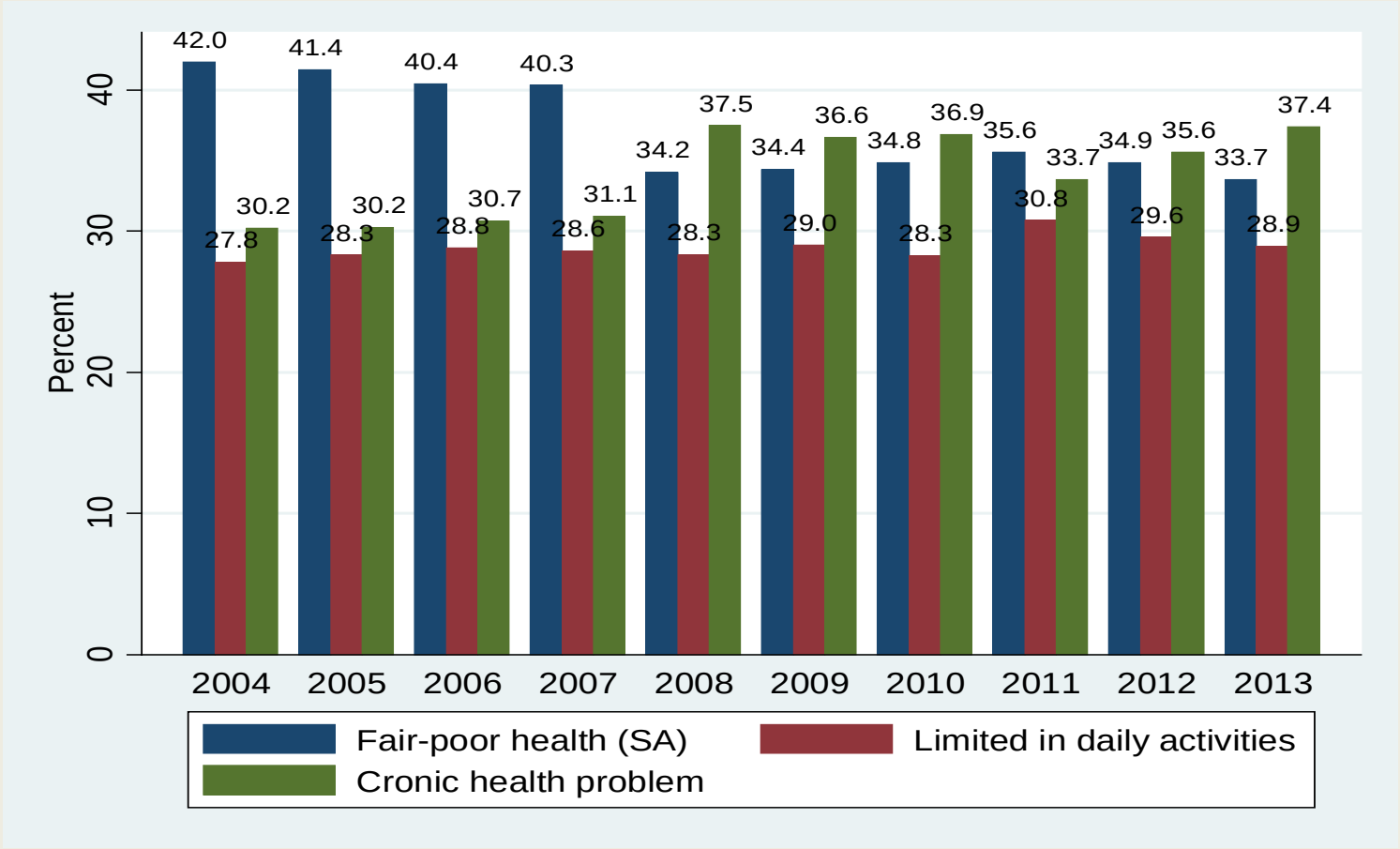
Evidence from the US: *Nicole Maestas, Kathleen J. Mullen, and Alexander Strand (AERP&P, 2015)*

TABLE 1— EFFECT OF UNEMPLOYMENT RATE ON LOG SSDI APPLICATIONS, OVERALL AND BY BASIS OF INITIAL DETERMINATION

Dependent variable	1992–2012	2006–2012
All SSDI claims, excluding technical denials	0.0309*** (0.0095)	0.0134* (0.0075)
By basis of initial determination		
Denied claims	0.0661*** (0.0090)	0.0270*** (0.0080)
Denied, not severe	0.0411 (0.0296)	0.0421*** (0.0137)
Denied, duration < 12 months	0.0190 (0.0155)	0.0115 (0.0216)
Denied, capable of past work	0.0772*** (0.0237)	0.0538*** (0.0164)
Denied, capable of any work	0.0664*** (0.0150)	0.0186** (0.0087)
Allowed claims	−0.0341** (0.0160)	−0.0058 (0.0161)
Allowed, meets/equals listings	−0.0148 (0.0128)	−0.0002 (0.0089)
Allowed, vocational allowances	−0.0484* (0.0252)	−0.0053 (0.0256)
Observations	12,852	3,825

- ❑ Applications turn less countercyclical during GR.
- ❑ Awards turns not significant during GR.

=> The relationship between UR and DI participation looses strentgh during GR



Source: Encuesta de Condiciones de Vida (ECV), INE

SAMPLE OF NONDISABLED:
TRANSITIONS FROM EMPLOYMENT (ALTERNATIVE SPECIFICATION)

MULTINOMIAL LOGIT. TRANSITIONS FROM EMPLOYMENT TO EMPLOYMENT, NONEMPLOYMENT AND DISABILITY								
	AGES 16-64				AGES 50-64			
	MEN		WOMEN		MEN		WOMEN	
	FROM EMPLOYMENT		FROM EMPLOYMENT		FROM EMPLOYMENT		FROM EMPLOYMENT	
VARIABLES	TO UNEMPLOYMENT	TO DISABILITY	TO UNEMPLOYMENT	TO DISABILITY	TO UNEMPLOYMENT	TO DISABILITY	TO UNEMPLOYMENT	TO DISABILITY
UR	2.45126***	0.98914***	1.39868***	1.41385***	3.24318***	1.04799**	1.39800***	1.99046***
ln (wage)	-0.52710***	0.23357***	-0.29616***	0.05001	-0.36355***	0.26675***	-0.22980***	0.15464**
Industry and construction	0.03770***	0.09318	-0.05720***	0.00145	0.05646**	0.05131	0.10302**	-0.06273
50-199 employees	-0.02948***	0.12703*	0.18526***	0.23816**	-0.21505***	0.05486	0.18718***	0.07977
200+ employees	-0.07805***	0.01654	0.21875***	0.32681***	-0.43515***	-0.01337	0.16251***	0.17803*
Age	0.01723***	0.08574***	0.00959***	0.09883***				
Medium skill	0.20714***	0.90149***	0.22449***	0.80045***	-0.01465	0.70133***	0.38719***	0.76029***
Low skill	0.74974***	1.54906***	0.77758***	1.40223***	0.53202***	1.42108***	0.86735***	1.42087***
Public Sector	-0.17976***	0.18026	0.00512	0.25955***	-0.34960***	0.16995	-0.41546***	0.24555**
Constant	2.00340***	-14.96501***	0.31361***	-14.35569***	1.90722***	-10.40284***	0.19405	-9.69885***
Observations	2,260,954	2,260,954	2,013,210	2,013,210	517,389	517,389	389,931	389,931

Regresions include quarter dummies, labor market expierence, a variable measuring market rigidity and a variable measuring education mismatch

SAMPLE OF NONDISABLED:
TRANSITIONS FROM NONEMPLOYMENT (ALTERNATIVE SPECIFICATION)

MULTINOMIAL LOGIT. TRANSITIONS FROM NONEMPLOYMENT TO NONEMPLOYMENT, EMPLOYMENT AND DISABILITY								
	AGES 16-64				AGES 50-64			
	MEN		WOMEN		MEN		WOMEN	
	FROM NONEMPLOYMENT		FROM NONEMPLOYMENT		FROM NONEMPLOYMENT		FROM NONEMPLOYMENT	
VARIABLES	TO EMPLOYMENT	TO DISABILITY	TO EMPLOYMENT	TO DISABILITY	TO EMPLOYMENT	TO DISABILITY	TO EMPLOYMENT	TO DISABILITY
UR	-3.29763***	-1.23614***	-2.53200***	-1.71873***	-2.98660***	-0.96105*	-2.59064***	-1.46978
ln (las wage)	-0.03206***	-0.04495	0.02519***	0.29002***	-0.19642***	-0.11097*	0.05704**	0.40987***
Industry and construction	-0.10769***	0.01430	-0.29928***	-0.28284**	-0.24554***	-0.11913	-0.60178***	-0.27153
Age	-0.05257***	0.01391***	-0.03082***	0.03476***				
Contributive UB	0.10557***	-0.54278***	0.17463***	-0.53665***	0.25937***	-0.31802***	0.49112***	-0.22781
Noncontributive UB	-0.02250*	-0.50699***	-0.15160***	-1.07871***	-0.21788***	-0.44181***	-0.38317***	-1.17538***
Medium skill	0.12647***	0.53180***	-0.12633***	0.66379***	0.19450***	0.20734	0.21790***	0.32659
Low skill	0.02265	0.95563***	-0.12797***	1.04219***	0.47503***	0.77511***	0.45679***	0.82872***
Constant	-0.28779***	-9.28743***	-0.99352***	-12.70781***	-1.03780***	-6.47762***	-2.70379***	-10.81309***
Observations	1,282,090	1,282,090	1,001,828	1,001,828	219,980	219,980	147,385	147,385

Regresions include quarter dummies, labor market expierence, a variable measuring market rigidity and a variable measuring education mismatch

SAMPLE OF NONDISABLED:
TRANSITIONS FROM EMPLOYMENT (ALTERNATIVE SPECIFICATION)

MULTINOMIAL LOGIT. TRANSITIONS FROM EMPLOYMENT TO EMPLOYMENT, NONEMPLOYMENT AND DISABILITY								
	AGES 16-64				AGES 50-64			
	MEN		WOMEN		MEN		WOMEN	
	FROM EMPLOYMENT		FROM EMPLOYMENT		FROM EMPLOYMENT		FROM EMPLOYMENT	
VARIABLES	TO NONEMPLOYMENT	TO DISABILITY	TO NONEMPLOYMENT	TO DISABILITY	TO NONEMPLOYMENT	TO DISABILITY	TO NONEMPLOYMENT	TO DISABILITY
UR	1.56477***	-0.38016	0.66627***	-1.02812	2.18725***	-0.64222	0.73441***	-1.97263*
ln (wage)	-0.52936***	0.23567***	-0.30419***	0.04345	-0.36807***	0.26500***	-0.24224***	0.14622*
Industry and construction	0.05558***	0.07326	-0.03371**	-0.03511	0.08118***	0.04230	0.16943***	-0.09174
50-199 employees	-0.02666**	0.13230*	0.18951***	0.24915***	-0.21240***	0.05823	0.19354***	0.09920
200+ employees	-0.06678***	0.03625	0.23640***	0.34161***	-0.42695***	0.00539	0.16993***	0.20778**
Age	0.01722***	0.08559***	0.00968***	0.09956***				
Medium skill	0.20822***	0.89255***	0.22501***	0.78435***	-0.01051	0.69773***	0.40502***	0.74643***
Low skill	0.74879***	1.54078***	0.76801***	1.40557***	0.53412***	1.42148***	0.87630***	1.43129***
Public Sector	-0.18693***	0.16138	0.02107	0.26125**	-0.36107***	0.14170	-0.35945***	0.25551**
Constant	2.16800***	-14.52213***	0.41775***	-13.56261***	2.09973***	-9.83773***	0.21902	-8.52908***
Observations	2,260,954	2,260,954	2,013,210	2,013,210	517,389	517,389	389,931	389,931

Regresions include region dummies, quarter dummies, labor market expierence, a variable measuring market rigidity and a variable measuring education mismatch

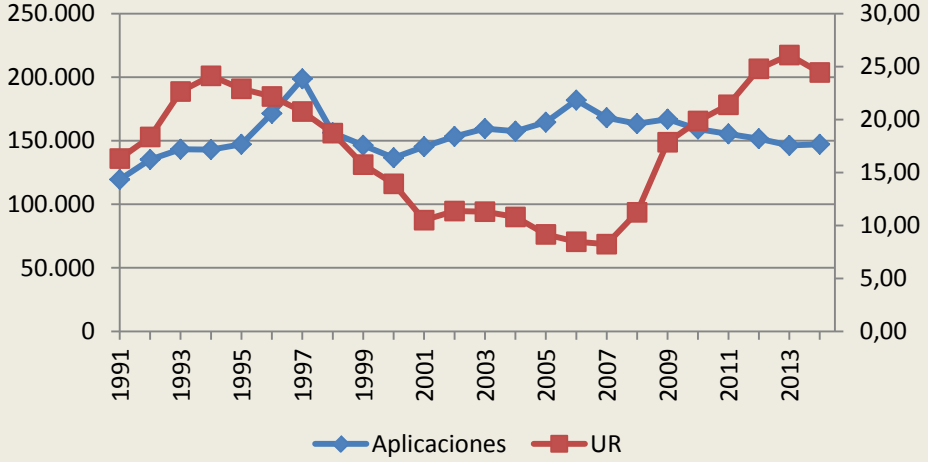
SAMPLE OF NONDISABLED:
TRANSITIONS FROM NONEMPLOYMENT (ALTERNATIVE SPECIFICATION)

MULTINOMIAL LOGIT. TRANSITIONS FROM NONEMPLOYMENT TO NONEMPLOYMENT, EMPLOYMENT AND DISABILITY								
	AGES 16-64				AGES 50-64			
	MEN		WOMEN		MEN		WOMEN	
	FROM NONEMPLOYMENT		FROM NONEMPLOYMENT		FROM NONEMPLOYMENT		FROM NONEMPLOYMENT	
VARIABLES	TO EMPLOYMENT	TO DISABILITY	TO EMPLOYMENT	TO DISABILITY	TO EMPLOYMENT	TO DISABILITY	TO EMPLOYMENT	TO DISABILITY
UR	-7.05306***	-5.09811***	-6.10963***	-6.22153***	-7.74044***	-5.41691***	-6.86711***	-8.09211***
ln (last wage)	0.00137	-0.00486	0.03378***	0.32021***	-0.14400***	-0.06620	0.03589	0.45155***
Industry and construction	-0.08088***	0.01582	-0.27348***	-0.29524**	-0.19602***	-0.10755	-0.51225***	-0.28214
Age	-0.05073***	0.01578***	-0.03038***	0.03555***				
Contributive UB	0.07165***	-0.57365***	0.14740***	-0.56562***	0.22575***	-0.35368***	0.48715***	-0.24508
Noncontributive UB	-0.04226***	-0.52218***	-0.17224***	-1.09286***	-0.21569***	-0.45195***	-0.37076***	-1.15653***
Medium skill	0.15221***	0.51777***	-0.11086***	0.67111***	0.20019***	0.17436	0.24980***	0.35203
Low skill	0.03542*	0.92059***	-0.13393***	1.03290***	0.47703***	0.73017***	0.45873***	0.83692***
Constant	0.40400***	-8.60825***	-0.05218	-11.93320***	-0.19880	-5.58561***	-1.43979***	-9.71291***
Observations	1,282,090	1,282,090	1,001,828	1,001,828	219,980	219,980	147,385	147,385

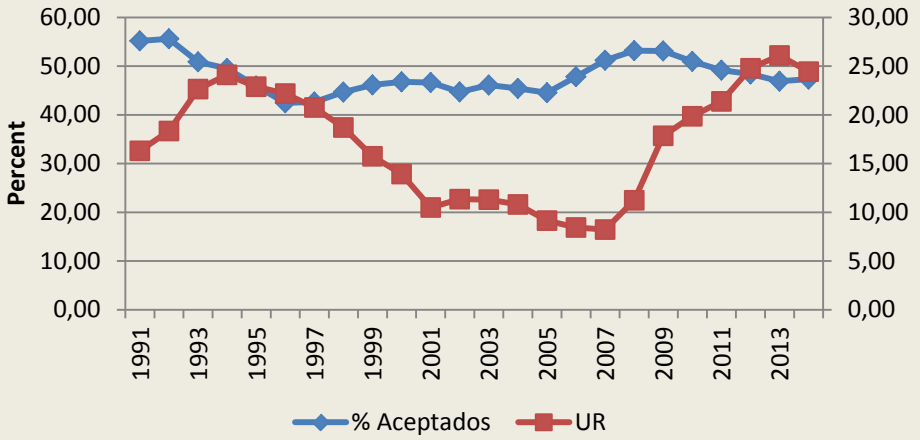
Regresions include region dummies, quarter dummies, labor market expierence, a variable measuring market rigidity and a variable measuring education mismatch

EVOLUTION OF APPLICATIONS TO DI

Number of applications to DI. 1991-2014



Percentage of applications to DI accepted. 1991-2014



Distribution of accepted aplications by severity assigned