The impact of the minimum wage on low-wage earners: Employment and match evidence

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Dynamics of Low Wage, Low Pay and Transfer Receipt
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Synopsis

Employment-to-minimum-wage elasticity is negative for workers whose initial wage is between the old and the new minimum wage.

The results are closer to the U.S. than to France.

Match-to-minimum-wage elasticity is also negative.

But matches are more elastic than total employment.

Counterpart to these results is typical of a labor demand schedule:

wages increase more in surviving matches than in employment.

Outline

1 Minimum wage and employment

Stigler (1946): In a **monopsonic** labor market, an increase in the minimum wage increases employment; otherwise, it has a negative impact.

Empirical literature:

U.S.: Card & Krueger (1994), Neumark & Wascher (2000)

Portugal: Pereira (2003), Dias & Cardoso (2006)

France: Abowd, Kramarz, Margolis & Philippon (2000)

Freeman (1996): The impact on employment is a **debate around zero**.

2 Data

Social Security Records: 2002 – 2010

- Unique source: All mandatory social security contributions.

- **Matched employer-employee** longitudinal data.

- Mostly private sector.

- We consider only salaried workers in October of each year.

- Gross monthly wage.

- **25 million observations** (year $\times$ worker $\times$ firm);
 an average of **2.7 million workers each year**.

3 The minimum wage in Portugal

Minimum wage earners
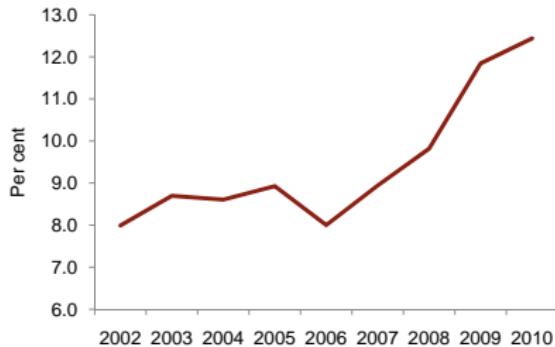

Education levels

Private sector
college degree holders:
1982: 3%
1995: 6%
2010: 15%

Minimum wage growth rate
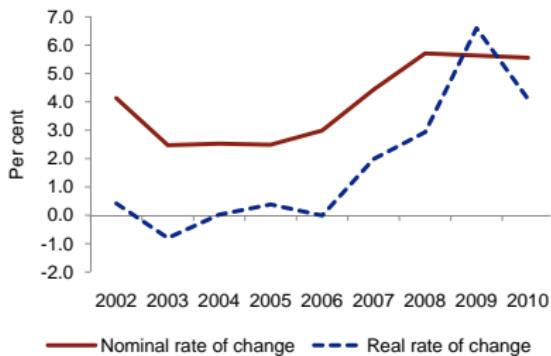
Mean and median rates of wage growth
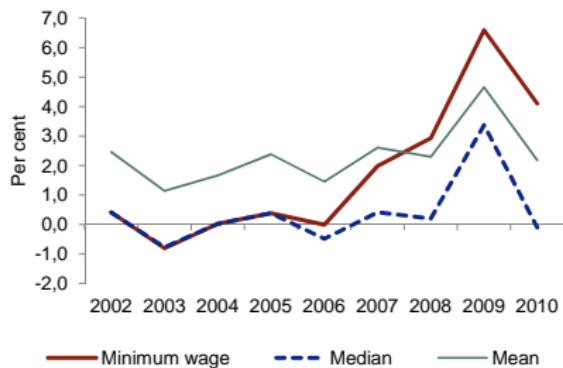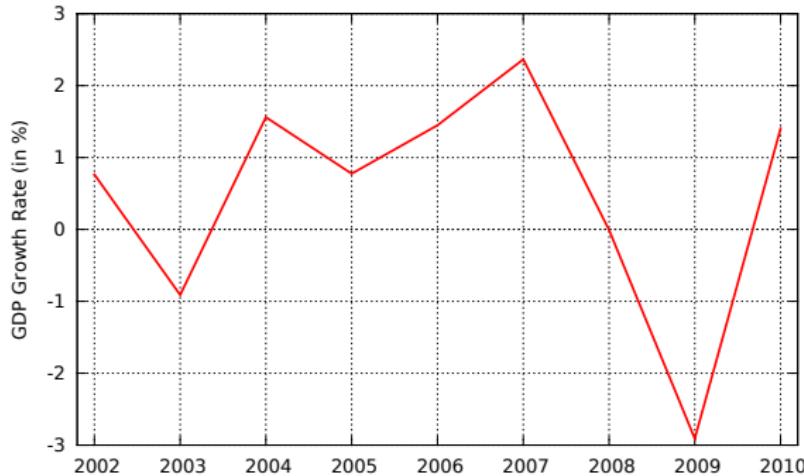
The large minimum wage increases occurred in an economic environment of lack luster growth performance.

4 Wage inequality: Ratio 50th/10th percentiles

Inequality (50th/10th) decrease since 2006; larger minimum wage increases.
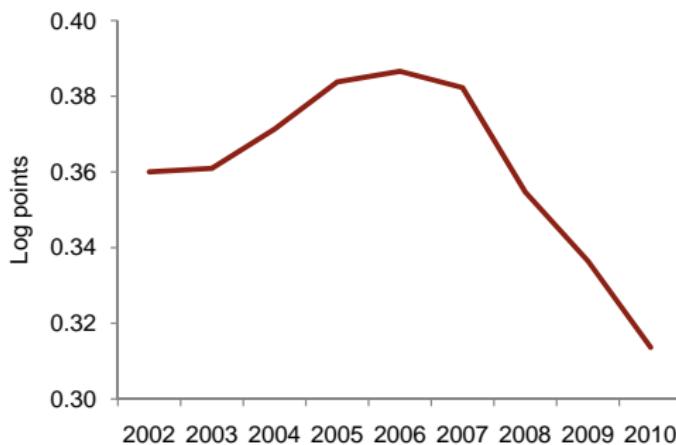
Inequality, relative supply and minimum wage

	Male		Female	
	90/50	50/10	90/50	50/10
College/Noncollege relative supply	-0.040	-0.305	-0.261	-0.006
	(0.036)	(0.059)	(0.069)	(0.027)
Log real minimum wage	-0.137	-0.239	-0.278	**-0.559**
	(0.106)	(0.172)	(0.203)	**(0.080)**
Unemployment rate	-0.012	-0.014	0.011	0.008
	(0.003)	(0.004)	(0.005)	(0.002)
Time	0.019	0.036	0.034	0.009
	(0.003)	(0.004)	(0.005)	(0.002)
Constant	0.990	0.460	0.910	2.263
	(0.374)	(0.606)	(0.716)	(0.281)
No. of observations	24	24	24	24
R^2	0.992	0.820	0.971	0.921

5 Wave effect

Left-tail real wage growth spillovers negatively over neighboring percentiles.

n^{th}-tile	Wages		
	$t-1$	t	$\Delta\%$
1st	400	440	10%
$\vdots$	$\vdots$	$\vdots$	$\vdots$
40th	600	606	1%
$\vdots$	$\vdots$	$\vdots$	$\vdots$
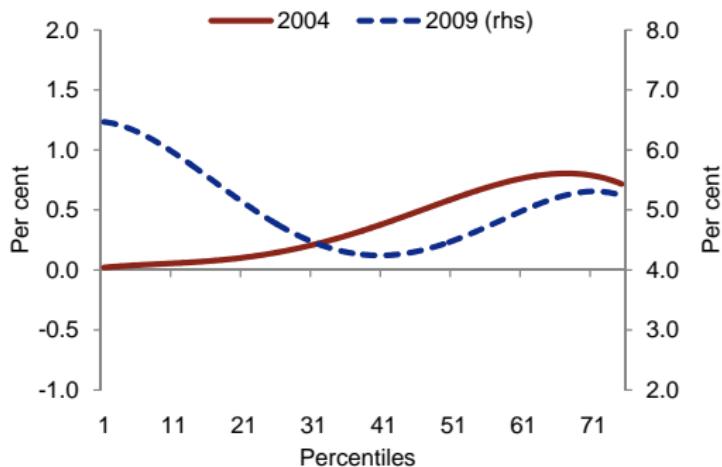
6 Results

Research question:

What's the **impact of the minimum wage on employment and match** survival?

More specifically, how does the **interaction** between the **real minimum wage increases** and the worker **position in the distribution of wages** determine the probability the worker remains: (i) **employed** or (ii) **same match**.

$$y_{it} = X_{it}\lambda + \sum_{k=1}^{6} \left(\beta_k + \gamma_k \Delta W_t^{min}\right) D_{i,t-1}^k + \varepsilon_{it}, \qquad (1)$$

y_{it} equals 1 if still employed (match) next year; 0 otherwise. And $D_{i,t-1}^k$:

1. $W_{t-1} = W_{t-1}^{min}$ $t-1$ **minimum-wage earners; "Treatment group"**

2. $W_{t-1} < W_t^{min}$ **"Next" minimum-wage earners; "Treatment group"**

3. $W_t^{min} < W_{t-1} < Q_{0.25}(W_{t-1})$ **Still in 1st quartile**

4. $W_{t-1} \in Q_{0.50}(W_{t-1})$ **2nd quartile**

5. $W_{t-1} \in Q_{0.75}(W_{t-1})$ **3rd quartile**

6. $W_{t-1} \in Q_{1.00}(W_{t-1})$ **4th quartile; "Control group"**

X_{it}: gender, age, tenure, nationality, firm size, sector, region.

6.1 Employment

Employment: Year-by-year

$I(Employment_t)$	Linear probability model							
	2003	2004	2005	2006	2007	2008	2009	2010
Wage level indicator:								
$W_{t-1} = W_{t-1}^{min}$	-8.32	-7.81	-9.00	-8.40	-7.96	-8.98	-8.61	-7.24
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$W_{t-1} < W_t^{min}$	-6.53	-7.08	-7.72	-7.56	-7.47	-7.71	-7.78	-6.72
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
⋮				⋮				

$I(Employment_t)$	Probit model							
	2003	2004	2005	2006	2007	2008	2009	2010
Wage level indicator:								
$W_{t-1} = W_{t-1}^{min}$	-8.92	-8.31	-9.70	-8.90	-8.81	-9.99	-9.48	-7.77
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$W_{t-1} < W_t^{min}$	-7.30	-7.90	-8.72	-8.61	-8.40	-9.08	-9.11	-7.77
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
⋮				⋮				
No of observations	2.1m	2.1m	2.1m	2.1m	2.2m	2,3m	2.3m	2.2m

Notes: Coefficients in percentage points relatively to top quartile. p-values in parentheses.

Employment status and wages: Firm fixed effects

	Employment	$\Delta \log$ Wages
Wage level indicator:		
$W_{t-1} = W_{t-1}^{min}$	-7.21	15.80
	(0.000)	(0.000)
$W_{t-1} < W_t^{min}$	-5.88	14.69
	(0.000)	(0.000)
$W_t^{min} < W_{t-1} < Q_{.25}(W_{t-1})$	-4.42	12.05
	(0.000)	(0.000)
$W_{t-1} \in Q_{.5}(W_{t-1})$	-2.56	9.22
	(0.000)	(0.000)
$W_{t-1} \in Q_{.75}(W_{t-1})$	-1.11	5.35
	(0.000)	(0.000)
$\mathbf{\Delta W_t^{min,real}} \times$**Wage level indicator:**		
$\mathbf{W_{t-1} = W_{t-1}^{min}}$	**-0.56**	**0.52**
	(0.000)	(0.000)
$\mathbf{W_{t-1} < W_t^{min}}$	**-0.45**	**0.09**
	(0.000)	(0.000)
$W_t^{min} < W_{t-1} < Q_{.25}(W_{t-1})$	-0.26	-0.16
	(0.000)	(0.000)
$W_{t-1} \in Q_{.5}(W_{t-1})$	-0.31	-0.06
	(0.000)	(0.000)
$W_{t-1} \in Q_{.75}(W_{t-1})$	-0.17	-0.22
	(0.000)	(0.000)
No of observations	17,377,525	14,721,929

Notes: p-values in parentheses.

1. Employment : More stable for higher wage levels.

2. Employment $\times$ Min wage : Low wages less stable. For each p.p. $\Uparrow$ min. wage $\Rightarrow$ $\Downarrow$ 0.6 p.p. Pr[Employment].

3. $\Delta \log$ Wages $\times$ Min wage : Only low wages gain; pattern of a (conditional) wave effect.

Conditional wave effect
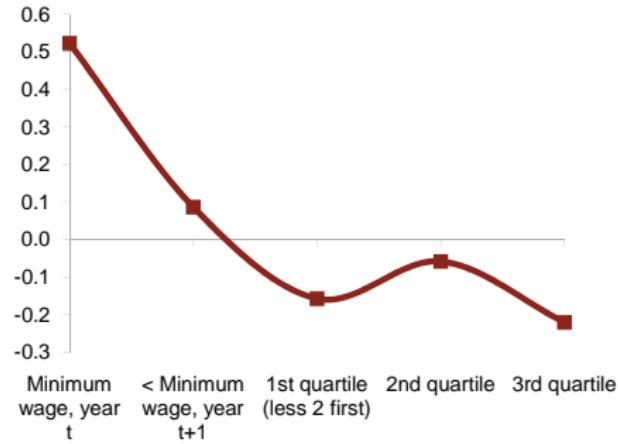
Employment status and wages: Firm fixed effects (nested)

	Employment	$\Delta \log$ Wages
Wage level indicator:		
$W_{t-1} = W_{t-1}^{min}$	-4.44	6.76
	(0.000)	(0.000)
$W_{t-1} < W_t^{min}$	-3.09	5.68
	(0.000)	(0.000)
$W_t^{min} < W_{t-1} < Q_{.25}(W_{t-1})$		
$W_{t-1} \in Q_{.5}(W_{t-1})$		
$W_{t-1} \in Q_{.75}(W_{t-1})$		
$\mathbf{\Delta W_t^{min,real} \times}$**Wage level indicator:**		
$\mathbf{W_{t-1} = W_{t-1}^{min}}$	**-0.40**	**0.65**
	(0.000)	(0.000)
$\mathbf{W_{t-1} < W_t^{min}}$	**-0.30**	**0.23**
	(0.000)	(0.000)
$W_t^{min} < W_{t-1} < Q_{.25}(W_{t-1})$		
$W_{t-1} \in Q_{.5}(W_{t-1})$		
$W_{t-1} \in Q_{.75}(W_{t-1})$		
No of observations	17,377,525	14,721,929

Notes: p-values in parentheses.

Hypothesis: minimum wage increase affects only workers earning less than "next year's" minimum wage.

1. Qualitatively the results are the same.

2. **Likelihood ratio test**: Both for employment probability and wages the restricted model is rejected.

3. There is evidence in favor of the **wave effect**.

Heterogeneity: Worker age and sector

	Young workers (< 25 years)		Manufacturing		Construction		Services	
	Employ (1)	Wages (2)	Employ (3)	Wages (4)	Employ (5)	Wages (6)	Employ (7)	Wages (8)
$\Delta W_t^{min,real} \times$ Wage level indicator:								
$W_{t-1} = W_{t-1}^{min}$	-0.74	0.55	-0.71	0.70	-0.61	0.64	-0.46	0.46
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$W_{t-1} < W_t^{min}$	-0.38	0.09	-0.44	0.37	-0.51	0.35	-0.27	-0.09
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$W_t^{min} < W_{t-1} < Q_{.25}(W_{t-1})$	-0.22	-0.36	-0.54	0.23	-0.27	0.15	-0.15	-0.32
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$W_{t-1} \in Q_{.5}(W_{t-1})$	-0.27	-0.08	-0.28	0.12	-0.45	0.30	-0.26	-0.16
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$W_{t-1} \in Q_{.75}(W_{t-1})$	-0.24	-0.01	-0.12	-0.06	-0.33	-0.04	-0.14	-0.24
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.043)	(0.000)	(0.000)
No of observations	2,184,150	1,720,885	4,456,811	3,878,574	2,120,848	1,698,736	10,799,866	9,144,619

6.2 Matches

Match status and wages: Firm fixed effects

	Match	$\Delta \log$Wages
Wage level indicator:		
$W_{t-1} = W_{t-1}^{min}$	-7.22	12.53
	(0.000)	(0.000)
$W_{t-1} < W_t^{min}$	-6.26	11.43
	(0.000)	(0.000)
$W_t^{min} < W_{t-1} < Q_{.25}(W_{t-1})$	-4.65	9.42
	(0.000)	(0.000)
$W_{t-1} \in Q_{.5}(W_{t-1})$	-2.52	7.50
	(0.000)	(0.000)
$W_{t-1} \in Q_{.75}(W_{t-1})$	-0.79	4.58
	(0.000)	(0.000)
$\Delta W_t^{min,real} \times$ **Wage level indicator:**		
$W_{t-1} = W_{t-1}^{min}$	**-0.74**	**0.63**
	(0.000)	(0.000)
$W_{t-1} < W_t^{min}$	**-0.47**	**0.24**
	(0.000)	(0.000)
$W_t^{min} < W_{t-1} < Q_{.25}(W_{t-1})$	-0.27	0.00
	(0.000)	(0.891)
$W_{t-1} \in Q_{.5}(W_{t-1})$	-0.30	0.00
	(0.000)	(0.675)
$W_{t-1} \in Q_{.75}(W_{t-1})$	-0.09	-0.17
	(0.000)	(0.000)
Number of observations	17,733,720	13,239,530

Notes: p-values in parentheses.

1. Match : More stable for higher wage levels.

2. Match $\times$ Min wage : Low wages less stable. For each p.p. $\Uparrow$ minimum wage $\Rightarrow \Downarrow$ 0.7 p.p. Pr[Match].

3. $\Delta \log$ Wages $\times$ Min wage : Only low wages gain; pattern of (conditional) wave effect.

Employment *versus* Matches

The impact of the minimum wage:

- Largest increases on **wages of surviving matches** (lower in total employment);

- The counterpart is that the **probability of ending a match is larger** than the probability of destroying an employment position.

This result is typical of a **labor demand** schedule: (larger) wage increases lead to (larger) demand decreases.

Questions?

Thank you.

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