Universität St.Gallen

A Note on Changes in the Wage and Unemployment Structures in Spain Evidence from the Luxembourg Income Study

Patrick A. Puhani

September 2002 Discussion paper no. 2002-27

Department of Economics University of St. Gallen

Editor: Prof. Jörg Baumberger
University of St. Gallen
Department of Economics
Bodanstr. 1
CH-9000 St. Gallen
Phone ++41 71 224 22 41
Fax ++41 71 224 28 85
Email joerg.baumberger@unisg.ch

Publisher: Forschungsgemeinschaft für Nationalökonomie
an der Universität St. Gallen
Dufourstrasse 48
CH-9000 St. Gallen
Phone ++41 71 224 23 00
Fax ++41 71 224 26 46

Electronic Publication: www.fgn.unisg.ch/public/public.htm

A Note on Changes in the Wage and Unemployment Structures in Spain

Evidence from the Luxembourg Income Study

Patrick A. Puhani

Author's address:

Dr. Patrick A. Puhani
SIAW
Dufourstr. 48, Zi. 129
CH-9000 St. Gallen
Tel. ++41 71 224-2342
Fax ++41 71 224-2298
Email Patrick.Puhani@unisg.ch
Website www.siaw.unisg.ch/puhani

Abstract

This note tests whether the extraordinary rise in Spanish unemployment in the 1980s can be traced back to rigidities in the wage structure in the face of relative net demand shocks against the unskilled (this claim is also known as the 'Krugman hypothesis'). I can establish that youth joblessness is key to the Spanish unemployment problem, but sampling procedures in the data set make it impossible to track the youth unemployment problem across time in a satisfactory way. Even though high youth unemployment is consistent with the Krugman hypothesis, substantial skill upgrading of the Spanish labour force in the1980s explains why the low education groups did not experience an increase in relative unemployment.

Keywords

earnings, rigidity

JEL Classification

J21, J31, J64

Acknowledgement

This research was supported by the Volkswagen Foundation. Many thanks also go to IZA, Bonn, for supporting this project and my research visit to IZA. The work on this paper was done during my leave during the 2001/2 academic year in the Economics Department at MIT, whose hospitality and support are gratefully acknowledged.

I am grateful to Daron Acemoglu, Joshua Angrist, David Autor, Thomas Bauer, Hoyt Bleakley, Hielke Buddelmeyer, David Card, Donald Cox, Christopher Foote, Richard B. Freeman, Markus Frölich, Caroline M. Hoxby, Michael Gerfin, Peter Gottschalk, Lawrence F. Katz, Winfried Koeniger, Adriana Kugler, Astrid Kunze, Michael Lechner, Stephen Machin, Gerard Pfann, Steve Pischke, Klaus F. Zimmermann, and seminar participants at Boston College, Harvard University, the Institute for the Study of Labor (IZA), MIT, and the 10th International Conference on Panel Data in Berlin 2002, for helpful comments on my research project *A Microeconometric View of Wage and Unemployment Dynamics*. Juan D. Vargas provided excellent research assistance. All remaining errors are my own.

1 Introduction

Spain holds the unemployment record among the major European countries in the 1980s and the 1990s. Emerging from fascism al late as 1975, Spain was the major European transition economy before the breakdown of the Berlin Wall in 1989. Figure 1 demonstrates how the OECD standardised (!) unemployment rate skyrocketed during this transition period to levels above 20 percent. This is a number otherwise just mentioned in Europe in connection with eastern Germany. Indeed, neither Poland, Hungary, the Czech Republic, nor Slovakia have exhibited unemployment levels of this magnitude.

Apart from macroeconomic explanations for this development (*cf.* Bentolila and Blanchard, 1990), several 'structural' factors making Spain special have been raised: First, Spain emerged from fascist dictatorship with an extremely low-skilled labour force, with a much higher share of workers with at most primary education than Poland shortly after the beginning of transition (*cf.* Saint-Paul, 2000; Puhani, 2002). Second, trade union power was re-established in Spain during the 1980s, a period where union power was largely dismantled in the UK, for example (Bover, Bentolila, and Arellano, 2002). Third, employment protection was high, although the reforms of 1984 and 1997 introduced more flexibility in this respect (Kugler, Jimeno, and Hernanz, 2002).

Hence, during a decade when wage inequality exploded in the US and the UK, most probably due to skill-biased technological change (see Acemoglu, 2002, for a survey), the low-skilled Spanish economy introduced labour market institutions that may be viewed hostile to wage flexibility. This makes Spain a number one candidate to test the hypothesis of Krugman (1994), which states that the rise in US wage inequality and the increase in continental European unemployment are 'two sides of the same coin', namely a fall in the relative demand for unskilled workers. In a flexible labour market like the US, such a shock

should increase wage inequality. In a labour market with wage rigidities, especially if the workforce is very low skilled, this shock should raise unemployment.

This note attempts to test the 'Krugman hypothesis' for Spain using data from the Luxembourg Income Study (LIS). I have found no paper in the literature that carries out such a test, although there is probably hardly any other country that provides a nicer natural experiment of introducing wage floors through union power in a period of skill-biased technical change. Instead, there has been more research focus on temporary versus permanent employment in Spain (Bentolila and Dolado, 1994; Kugler, Jimeno, and Hernanz, 2002). I show that data availability is a key constraint to study the interesting Spanish case. The data available to me (the Luxembourg Income Study version of the 1980 and 1990 Family Expenditure Surveys, *Encuestas de Presupuestos Familiares*, EPF) suggest a potential rigidity in the Spanish wage structures associated with younger workers. However, persons with a low level of education were not even affected by a negative net demand shock, which can be explained by the massive skill upgrading of the Spanish labour force in the 1980s.

The note is structured as follows. Section 2 discusses the data set. Estimates of changes in the wage and unemployment structures are provided in Section 3, to be followed by the conclusions in Section 4.

2 Data

Spain is known for lack of good wage information in its generally available data sets for the 1980s and 1990s. The Labour Force Survey does not contain wage data. Administrative data as used in Bover, Bentolilam and Arellano (2002) are hard to obtain and also have their conceptual drawbacks. However, the Family Expenditure Survey (*Encuesta de Presupuestos Familiares*, EPF) contains income information and can readily be accessed remotely through the Luxembourg Income Study (LIS, see the internet page http://www.lisproject.org/).

According to Goerlich and Mas (2001) there are three waves of this survey: 1973, 1980, and 1990. The LIS offers access to the latter two years. For the purposes of this note, I need at least two years of consistent data structure across time. Unfortunately, there is only information on total net income, no separate indication of pure labour income, nor on gross income. Moreover, no hours information is given. Worst of all, only household heads and their spouses report the relevant information (income, labour force status), but in 1980, education and income is only reported for the household head, who is in almost all cases male. For these reasons, consistent information for the purposes of this study is only available for household heads, which factually leads to an exclusion of females from the analysis.

Table 2 displays the first set of sample means for the wage and unemployment regressions to be discussed in the following section. These samples are restricted to *male household heads*, for the reasons just mentioned. The table clearly reveals that male household heads are a selected group. First, the unemployed rate did not change in between the 1980 and 1990 samples (it stayed constant at 3.9 percent, whereas the OECD Survey based unemployment rate rose from 11 to 16 percent during the same period). Indeed, if one includes women and non-household heads with valid information on the variables of interest, the sample unemployment rate rises from 3.8 to 10.3 percent (*cf.* Table 3 on the *all observations sample*). This might be a hint that women may have borne the brunt of Spanish unemployment. However, the 1980 survey also heavily under-represents young persons (as Table 3 demonstrates), because they are rarely household heads and hence are often excluded from the 1980 sample due to non-response. Therefore comparisons across time using all persons with valid information in both the 1980 and 1990 waves have to be taken with a fist rather than a grain of salt, as the 1980 sample represents a different population than the 1990 one. On the other hand, only comparing male household heads across time does not seem to be representative for the Spanish labour market. Table 4 illustrates this point by comparing the unemployment rate structure in 1990 between male household heads and all observations.

Not only is the average unemployment rate for the full sample much higher. It is also apparent that youth unemployment is by far the highest among all age groups in the whole sample, whereas older workers are more affected by unemployment than younger ones in the population of male household heads. (This is not surprising as predominantly economically successful – and hence employed – males will form their own household and thus select themselves into the sample by becoming a household head.)

Despite of all these problems, I present some exploratory work on the changes in the Spanish wage and unemployment structures in the following section.

3 Changes in the Wage and Unemployment Structures

To describe changes in the wage and unemployment structures, I estimate standard log-linear wage and probit unemployment regressions on the samples described in the previous section. The models are

$$\mathrm{E}\left[\ln \mathrm{W}_t \middle| \mathbf{x}\right] = \mathbf{x}\boldsymbol{\beta}_t$$

$$\mathrm{E}\left[\mathrm{U}_t \middle| \mathbf{x}\right] = \Phi\left(\mathbf{x}\boldsymbol{\gamma}_t\right)$$

where *W* is the hourly wage rate, *U* an unemployment indicator, **x** is a vector of dummy variables containing *age*, *education*, and *region*. $\Phi(\cdot)$ is the cumulate distribution function of the standard normal distribution. Cross-sectional regressions are estimated for each year *t* (1980 and 1990). Tests on the changes in the $\boldsymbol{\beta}$ and $\boldsymbol{\gamma}$ coefficients over time are then carried out to describe *ceteris paribus* changes in the wage and unemployment structures. By a change in the wage structure I mean, for example, a decrease in *ceteris paribus* youth wages in relation to some average wage. The 'average wage' or 'average unemployment likelihood' will in this note be defined as the estimated wage or unemployment likelihood for the *1980 sample mean* of the labour force. In Puhani (2001), I have shown that due to the non-

linearities of these regression models, a transformation of the coefficients as in Haisken-New and Schmidt (1997) is required before differences across time in the coefficients can be interpreted as changes in wage or unemployment structures. The transformations are carried out such that dummy variable coefficients do not state the difference in the outcome variable with respect to a base category, but instead with respect to the *1980 sample mean*. Therefore, my reported regression results below do not state a base category but show the transformed coefficients for all dummy variables. Table 1 summarises the classification of labour market characteristics k (*e.g.* age, education), based on the changes of their transformed coefficients (indicated by an asterisk). Depending on the change of its regression coefficients over time, each labour market characteristic is contributing to a decreasing, constant, or increasing wage (or unemployment likelihood) relative to the reference market. By observing wage and unemployment changes jointly, each labour market characteristic can be classified into one of nine different cases. These are distinguished by increasing or decreasing relative demand (net of supply) and by whether the relative wage reacted to this relative net demand shock (see Puhani, 2001; for a further discussion of this methodology).

Table 1: Relative Wage and Unemployment Behaviour and Labour Market Classification

	Contributing to a relative unemployment decrease $\left(\gamma^*_{t+\tau,k} - \gamma^*_{t,k}\right) < 0$	Contributing to a constant relative unemployment $\left(\gamma^*_{t+\tau,k} - \gamma^*_{t,k}\right) = 0$	Contributing to a relative unemployment increase $\left(\gamma^*_{t+\tau,k} - \gamma^*_{t,k}\right) > 0$
Contributing to a relative wage increase $\left(\beta^*_{t+\tau,k} - \beta^*_{t,k}\right) > 0$	*(7): weakly adjusting in increasing market relative to the reference market*	*(6): strongly adjusting in increasing market relative to the reference market*	*(1): strongly rigid (wage push) relative to the reference market*
Contributing to a constant relative wage $\left(\beta^*_{t+\tau,k} - \beta^*_{t,k}\right) = 0$	*(8): weakly rigid in increasing market relative to the reference market*	*(5): stable in stable market relative to the reference market*	*(2): weakly rigid in decreasing market relative to the reference market*
Contributing to a relative wage decrease $\left(\beta^*_{t+\tau,k} - \beta^*_{t,k}\right) < 0$	*(9): converging (wage pull) relative to the reference market*	*(4): strongly adjusting in decreasing market relative to the reference market*	*(3): weakly adjusting in decreasing market relative to the reference market*

Table 5 and Table 6 provide the regression results for the *male household head* and the *all observations* sample, respectively. Note that I do not control for gender in the *all observations* sample, as females in 1980 are a selected group, so that comparing the 1980 and the 1990 coefficients on female would give no valuable information. I also display the results for the regional control variables, but my discussion will focus exclusively on the age and education coefficients. A comparison between Table 5 and Table 6 does not exhibit striking differences in the wage hierarchies between the two samples. However, comparing the unemployment regressions for 1990 clearly confirms the result from the raw unemployment data in Table 4: among male household heads, the young have an unemployment rate either equal or below (although not statistically significant) average. In the full sample, though, the increased unemployment likelihood of workers aged between 16 and 25 is highly significant with a t-value of 21.5. The fact that the selected sample matters is also illustrated by

comparing changes in the wage and unemployment structures. Changes in coefficients with their *t*-values are displayed in Table 7 (note that for the sample with *all observations*, the *t*-values for the changes in the coefficients are hard to interpret, as the sample population changes between 1980 and 1990; all my following interpretations in this respect thus have to be understood with this *caveat*). Graphical illustrations of the skill (age and education) coefficient changes are provided in Figure 2 to Figure 5. The classification results corresponding to Table 1 from all these regressions are summarised in Table 8. If the Krugman (1994) hypothesis were true for Spain, one would expect either classification (1): 'strongly rigid', (2): 'weakly rigid in a decreasing market' or (3): 'weakly adjusting in a decreasing market', for the low skill groups. The low skill groups are young workers and those with a low level of education. If only *male household heads* are considered, I find a wage rigidity (classification 1) for older instead of younger workers. However, in the *all observation* sample, the opposite is true: insufficiently flexible wages are now found for younger workers (classification 3). Surprisingly, no wage rigidities for any low education group can be found in either model. A glimpse at Table 2 and Table 3 suggests an explanation for this finding, which seems at odds with the Krugman hypothesis: Spain has experienced substantial skill upgrading between 1980 and 1990. This might have counteracted the relative demand shock against the unskilled in the same period.

4 Conclusions

With unemployment skyrocketing to European record levels in the 1980s, Spain seems to be an ideal candidate to test a widely accepted view amongst economists and the general public, namely that continental European unemployment is a result of wage rigidities in the face of negative relative demand shocks against the unskilled (also called the 'Krugman (1994) hypothesis'). Using Spanish data provided in the Luxembourg Income Study (LIS), I have

attempted to test this hypothesis using data from 1980 and 1990, two years before and after a significant rise in Spanish unemployment.

Well-known problems with Spanish income data affected my analysis. Although I could establish that *ceteris paribus* youth joblessness is key to the Spanish unemployment problem, sampling procedures in the data set make it impossible to track the youth unemployment problem across time in a satisfactory way. Although the (probable) rise in youth unemployment is consistent with the Krugman hypothesis, it is astonishing that the low education groups in Spain were not affected by rising unemployment through the 1980s. This demands a qualification of the Krugman hypothesis: supply matters, too. This is demonstrated by the substantial skill upgrading of the Spanish workforce between 1980 and 1990.

References

Acemoglu, D. (2002): Technical Change, Inequality, and the Labor Market, forthcoming in: *Journal of Economic Literature*.

Bentolila, S. and O.J. Blanchard (1990): Spanish Unemployment, *Economic Policy* 10: 233-281.

Bentolila, S. and J.J Dolado (1994): Spanish Labour Markets, *Economic Policy* 18: 53-99.

Bover, O., S. Bentolila, and M. Arellano (2002): The Distribution of Earnings in Spain During the 1980s: The Effects of Skill, Unemployment, and Union Power, in D. Cohen, T. Piketty, and G. Saint-Paul (eds.): *The New Economics of Rising Inequalities*, London: CEPR and Oxford University Press, forthcoming.

Goerlich, F.J. and M. Mas (2001): Inequality in Spain, 1973-91: Contribution to a Regional Datbase, *Review of Income and Wealth* 47: 361-378.

Haisken-DeNew, J.P. and C.M. Schmidt (1997): Interindustry and Interregion Differentials: Mechanics and Interpretation, *Review of Economics and Statistics* 79: 516-521.

Krugman, P. (1994): Past and Prospective Causes of High Unemployment, *Economic Review*, Federal Reserve Bank of Kansas City, 23-43.

Kugler, A., J.F. Jimeno, and V. Hernanz (2002): *Employment Consequences of Restrictive Permanent Contracts: Evidence from Spanish labor Market Reforms*, paper presented at the NBER Summer Institute, 30th July 2002.

Puhani, P.A. (2001): *Wage Rigidities in Western Germany? Microeconometric Evidence from the 1990s*, CEPR Discussion Paper No. 3009, London.

Puhani, P.A. (2002): Relative Wage and Unemployment Changes in Poland, Microeconometric Evidence, *Economic Systems* 26: 99-126.

Saint-Paul, G. (2000): *Flexibility vs. Rigidity: Does Spain have the Worst of Both Worlds?*, UPF Working Paper No. 450, downloadable from http://www.econ.upf.es/cgi-bin/wpauthor?author=Saint-Paul.

Table 2: Weighted Sample Means for LIS Wage and Unemployment Regressions (Percent for Dummy Variables) – Only Male Household Heads

	Wage		Unemployment	
Variable	**1980**	**1990**	**1980**	**1990**
Log wage / Unemployed	14.09	14.12	3.9	3.9
Age				
16-25	4	3	4	3
26-35	25	24	23	23
36-45	29	32	28	31
46-55	28	25	29	26
56-65	14	15	16	17
Education				
Degree	5	14	4	12
Higher - No Degree	5	4	4	3
Secondary Educ.	9	15	8	14
Basic Education	60	55	60	57
No Formal Education	22	12	24	14
Region of Residence				
Andalucia	15	15	15	15
Aragon	3	3	4	3
Asturias	3	3	3	3
Baleares	2	2	2	2
Canarias	3	4	3	3
Cantabria	1	1	1	1
Castilla y Leon	6	5	7	7
Castilla - La Mancha	3	4	3	4
Cataluna	18	18	18	17
Comunidad Valenciana	10	11	10	11
Extremadura	2	2	3	3
Galicia	7	5	8	6
Madrid	14	16	13	14
Murcia	2	2	2	2
Navarra	1	1	1	1
Pais Vasco (Euskadi)	7	6	6	6
Rioja	1	1	1	1
Ceuta y Melilla	0	0	0	0
# observations	11,286	8,501	15,466	11,764

Source: Luxembourg Income Study (LIS); own calculations.

Table 3: Weighted Sample Means for LIS Wage and Unemployment Regressions (Percent for Dummy Variables) – All Observation with Valid Information

	Wage		Unemployment	
Variable	**1980**	**1990**	**1980**	**1990**
Log wage / Unemployed	14.06	13.81	3.8	10.3
Age				
16-25	5	21	4	22
26-35	24	29	22	27
36-45	29	24	28	23
46-55	28	16	29	17
56-65	14	10	16	11
Education				
Degree	5	15	4	13
Higher - No Degree	5	5	4	4
Secondary Educ.	9	19	8	17
Basic Education	59	52	59	55
No Formal Education	22	9	25	11
Region of Residence				
Andalucia	15	15	15	16
Aragon	3	3	3	3
Asturias	3	2	3	3
Baleares	2	2	2	2
Canarias	3	4	3	4
Cantabria	1	1	1	1
Castilla y Leon	5	5	7	6
Castilla - La Mancha	3	4	3	4
Cataluna	19	18	18	17
Comunidad Valenciana	10	11	10	11
Extremadura	2	2	3	2
Galicia	7	6	8	7
Madrid	15	16	14	13
Murcia	2	3	2	2
Navarra	1	1	1	1
Pais Vasco (Euskadi)	7	6	6	6
Rioja	1	1	1	1
Ceuta y Melilla	0	0	0	0
# observations	12,137	16,714	16,543	24,068

Source: Luxembourg Income Study (LIS); own calculations.

Table 4: Weighted Sample Unemployment Rates by Subgroup (Percent)

	Male HH Heads		All Observations	
Variable	**1980**	**1990**	**1980**	**1990**
Log wage	3.9	3.9	3.8	10.3
Age				
16-25	4.8	2.1	4.2	20.9
26-35	3.6	3.3	3.6	10.7
36-45	3.2	2.2	3.1	4.6
46-55	4.4	4.1	4.2	5.4
56-65	4.2	7.5	4.2	8.3
Education				
Degree	0.8	0.7	0.7	5.3
Higher - No Degree	0.8	1.3	0.7	10.7
Secondary Educ.	2.1	2.4	1.9	10.2
Basic Education	3.4	3.8	3.4	11.2
No Formal Education	6.6	9.0	6.3	12.1
Region of Residence				
Andalucia	5.6	6.3	5.3	17.4
Aragon	1.7	0.9	1.9	6.2
Asturias	2.0	2.3	1.9	9.6
Baleares	0.7	0.4	1.1	4.0
Canarias	6.8	5.8	6.6	14.1
Cantabria	1.8	4.0	1.7	10.8
Castilla y Leon	1.9	3.5	1.9	8.5
Castilla - La Mancha	3.4	3.4	3.3	10.1
Cataluna	4.2	3.7	4.0	7.3
Comunidad	2.9	3.6	2.9	9.7
Extremadura	4.0	5.6	3.7	14.9
Galicia	3.3	5.2	3.2	10.6
Madrid	4.8	2.9	4.6	7.1
Murcia	3.0	1.8	3.5	6.0
Navarra	1.3	1.0	1.2	8.0
Pais Vasco (Euskadi)	4.7	3.3	4.7	12.6
Rioja	2.2	3.6	2.1	7.8
Ceuta y Melilla	1.2	9.4	2.3	22.7
# observations	15,466	11,764	16,543	24,068

Source: Luxembourg Income Study (LIS); own calculations.

Table 5: Wage and Unemployment Regressions (Transformed Coefficients – t-values in Parentheses) – Male Household Heads

	Wage Regressions		Unemployment Regressions	
	1980	1990	1980	1990
1991 sample mean	14.06	14.00	-1.85	-1.80
	(2665.4)	(1788.2)	-(73.4)	-(57.8)
Age				
16-25	-0.24	-0.31	0.16	-0.19
	-(9.8)	-(8.2)	(1.4)	-(1.1)
26-35	0.00	-0.11	0.04	0.05
	-(0.1)	-(9.3)	(0.9)	(0.8)
36-45	0.06	0.04	-0.09	-0.19
	(7.9)	(3.5)	-(2.4)	-(4.3)
46-55	0.01	0.08	0.03	0.01
	(1.6)	(7.2)	(0.8)	(0.3)
56-65	-0.08	0.02	0.02	0.29
	-(6.0)	(1.0)	(0.3)	(5.2)
Education				
Degree	0.67	0.59	-0.66	-0.69
	(28.2)	(29.7)	-(3.8)	-(5.0)
Higher - No Degree	0.53	0.30	-0.64	-0.44
	(24.9)	(9.7)	-(3.3)	-(2.8)
Secondary Education	0.35	0.30	-0.28	-0.20
	(22.4)	(16.2)	-(2.5)	-(1.9)
Basic Education	0.00	0.01	-0.01	-0.02
	-(0.1)	(1.7)	-(0.5)	-(0.9)
No Formal Education	-0.31	-0.27	0.33	0.31
	-(27.2)	-(13.8)	(7.7)	(5.5)
Region of Residence				
Andalucia	-0.13	-0.11	0.13	0.21
	-(10.3)	-(7.5)	(2.8)	(3.9)
Aragon	0.01	0.02	-0.30	-0.63
	(0.4)	(0.9)	-(2.5)	-(3.6)
Asturias	0.13	0.04	-0.18	-0.13
	(6.0)	(1.1)	-(1.2)	-(0.7)
Baleares	-0.06	0.01	-0.61	-0.87
	-(2.0)	(0.2)	-(2.3)	-(2.6)
Canarias	0.00	-0.10	0.22	0.25
	(0.1)	-(3.1)	(2.3)	(2.4)
Cantabria	-0.01	0.03	-0.22	0.12
	-(0.3)	(1.0)	-(1.4)	(0.7)
Castilla y Leon	-0.06	0.00	-0.25	-0.01
	-(3.3)	-(0.1)	-(3.4)	-(0.1)
Castilla - La Mancha	-0.22	-0.11	-0.17	-0.15
	-(6.7)	-(4.4)	-(1.4)	-(1.6)
Cataluna	0.14	0.16	0.13	0.05
	(12.6)	(9.5)	(2.2)	(0.5)
Comunidad Valenciana	-0.05	-0.06	-0.14	-0.02
	-(3.1)	-(3.0)	-(1.9)	-(0.3)
Extremadura	-0.36	-0.27	-0.09	0.14
	-(9.8)	-(6.1)	-(0.8)	(1.0)
Galicia	-0.10	-0.08	-0.11	0.16
	-(5.1)	-(4.1)	-(1.5)	(2.1)
Madrid	0.12	0.04	0.22	-0.05
	(7.8)	(2.1)	(3.0)	-(0.4)
Murcia	-0.06	-0.03	-0.16	-0.36
	-(2.3)	-(0.9)	-(1.1)	-(1.9)
Navarra	0.11	0.13	-0.37	-0.50
	(3.2)	(5.4)	-(1.6)	-(2.3)
Pais Vasco (Euskadi)	0.18	0.09	0.19	0.05
	13.31	5.31	2.10	0.50
Rioja	-(0.1)	(0.0)	-(0.1)	(0.0)
	-(3.5)	-(1.2)	-(0.6)	(0.1)
Ceuta y Melilla	0.14	0.17	-0.36	0.55
	(3.8)	(4.8)	-(1.3)	(3.3)
R^2	0.32	0.26	-2420.28	-1789.45
# observations	11,286	8,501	15,466	11,764

Source: Luxembourg Income Study (LIS); own calculations.

Table 6: Wage and Unemployment Regressions (Transformed Coefficients – t-values in Parentheses) – All Observation with Valid Information

	Wage Regressions		Unemployment Regressions	
	1980	1990	1980	1990
1991 sample mean	14.04	13.80	-1.85	-1.46
	(2632.4)	(1706.3)	-(75.7)	-(65.4)
Age				
16-25	-0.26	-0.66	0.11	0.71
	-(11.2)	-(39.4)	(1.0)	(21.5)
26-35	0.02	-0.18	0.05	0.31
	(2.0)	-(17.5)	(1.2)	(9.9)
36-45	0.07	0.04	-0.10	-0.19
	(8.3)	(4.0)	-(2.5)	-(5.6)
46-55	0.01	0.14	0.02	-0.18
	(1.6)	(11.4)	(0.6)	-(4.7)
56-65	-0.10	0.11	0.03	0.03
	-(7.0)	(6.1)	(0.5)	(0.6)
Education				
Degree	0.67	0.63	-0.67	-0.40
	(27.9)	(37.8)	-(3.8)	-(8.0)
Higher - No Degree	0.51	0.34	-0.67	-0.17
	(24.6)	(11.9)	-(3.5)	-(2.5)
Secondary Education	0.36	0.31	-0.30	-0.17
	(23.7)	(20.2)	-(2.8)	-(4.2)
Basic Education	0.00	0.03	0.00	-0.02
	(1.0)	(4.8)	(0.1)	-(1.6)
No Formal Education	-0.33	-0.34	0.31	0.21
	-(28.1)	-(17.6)	(7.6)	(5.6)
Region of Residence				
Andalucia	-0.12	-0.11	0.11	0.29
	-(9.7)	-(8.1)	(2.5)	(10.9)
Aragon	0.01	0.05	-0.25	-0.25
	(0.6)	(2.0)	-(2.3)	-(3.5)
Asturias	0.11	0.00	-0.20	0.04
	(4.4)	(0.1)	-(1.3)	(0.6)
Baleares	-0.06	0.01	-0.46	-0.52
	-(1.9)	(0.2)	-(2.1)	-(5.0)
Canarias	0.02	-0.05	0.22	0.19
	(0.8)	-(1.7)	(2.4)	(3.5)
Cantabria	-0.01	0.05	-0.25	0.11
	-(0.4)	(1.7)	-(1.6)	(1.3)
Castilla y Leon	-0.05	-0.03	-0.25	-0.03
	-(2.7)	-(2.0)	-(3.4)	-(0.8)
Castilla - La Mancha	-0.21	-0.04	-0.17	-0.06
	-(6.1)	-(1.9)	-(1.4)	-(1.2)
Cataluna	0.13	0.15	0.11	-0.12
	(11.2)	(9.5)	(1.9)	-(2.3)
Comunidad Valenciana	-0.05	-0.08	-0.13	-0.04
	-(3.2)	-(4.5)	-(1.8)	-(1.0)
Extremadura	-0.35	-0.23	-0.11	0.17
	-(8.6)	-(6.3)	-(1.0)	(2.7)
Galicia	-0.09	-0.09	-0.10	0.07
	-(4.7)	-(4.5)	-(1.4)	(1.6)
Madrid	0.10	0.09	0.19	-0.14
	(6.6)	(5.1)	(2.8)	-(2.4)
Murcia	-0.06	-0.08	-0.09	-0.36
	-(2.1)	-(2.3)	-(0.6)	-(4.2)
Navarra	0.11	0.12	-0.40	-0.06
	(3.3)	(4.2)	-(1.7)	-(0.7)
Pais Vasco (Euskadi)	0.18	0.03	0.19	0.20
	12.60	1.48	2.18	4.66
Rioja	-(0.1)	(0.0)	-(0.1)	-(0.1)
	-(3.2)	-(0.4)	-(0.7)	-(0.9)
Ceuta y Melilla	0.11	0.22	-0.13	0.56
	(2.3)	(5.8)	-(0.6)	(6.0)
R^2	0.30	0.28	-2547.48	-7324.66
# observations	12,137	16,714	16,543	24,068

Source: Luxembourg Income Study (LIS); own calculations.

Table 7: Wage and Unemployment Regressions (Changes in Transformed Coefficients with Respect to 1986 – Corresponding t-values in Parentheses)

	Male HH Heads		All Observations	
	Wage Regressions	Unemployment Regressions	Wage Regressions	Unemployment Regressions
	1980-1990	1980-1990	1980-1990	1980-1990
1991 sample mean	-0.06	0.05	-0.23	0.39
	-(6.2)	(1.3)	-(24.0)	(11.8)
Age				
16-25	-0.06	-0.35	-0.40	0.60
	-(1.4)	-(1.7)	-(14.2)	(5.2)
26-35	-0.11	0.01	-0.20	0.25
	-(7.6)	(0.1)	-(14.8)	(4.7)
36-45	-0.03	-0.10	-0.03	-0.09
	-(2.2)	-(1.7)	-(2.0)	-(1.8)
46-55	0.07	-0.02	0.12	-0.20
	(4.7)	-(0.2)	(8.2)	-(3.9)
56-65	0.10	0.28	0.20	0.00
	(4.5)	(3.6)	(9.1)	(0.0)
Education				
Degree	-0.08	-0.03	-0.04	0.27
	-(2.6)	-(0.1)	-(1.5)	(1.5)
Higher - No Degree	-0.22	0.20	-0.17	0.50
	-(5.9)	(0.8)	-(4.9)	(2.5)
Secondary Education	-0.05	0.08	-0.05	0.13
	-(2.3)	(0.5)	-(2.1)	(1.1)
Basic Education	0.01	-0.01	0.03	-0.03
	(1.5)	-(0.3)	(3.4)	-(1.0)
No Formal Education	0.03	-0.02	-0.02	-0.11
	(1.5)	-(0.3)	-(0.9)	-(1.9)
Region of Residence				
Andalucia	0.02	0.08	0.02	0.18
	(1.1)	(1.2)	(0.8)	(3.6)
Aragon	0.01	-0.33	0.03	0.00
	(0.4)	-(1.6)	(1.0)	(0.0)
Asturias	-0.09	0.06	-0.10	0.24
	-(2.1)	(0.2)	-(2.4)	(1.4)
Baleares	0.07	-0.26	0.07	-0.06
	(1.5)	-(0.6)	(1.5)	-(0.2)
Canarias	-0.10	0.03	-0.06	-0.03
	-(2.7)	(0.2)	-(1.9)	-(0.3)
Cantabria	0.04	0.34	0.06	0.35
	(1.0)	(1.5)	(1.5)	(2.0)
Castilla y Leon	0.05	0.24	0.01	0.22
	(2.3)	(2.3)	(0.5)	(2.6)
Castilla - La Mancha	0.10	0.02	0.17	0.11
	(2.5)	(0.1)	(4.1)	(0.9)
Cataluna	0.02	-0.08	0.02	-0.23
	(1.0)	-(0.8)	(0.9)	-(3.0)
Comunidad Valenciana	0.00	0.12	-0.03	0.09
	-(0.2)	(1.1)	-(1.2)	(1.1)
Extremadura	0.08	0.23	0.12	0.28
	(1.4)	(1.3)	(2.2)	(2.2)
Galicia	0.02	0.27	0.01	0.17
	(0.7)	(2.6)	(0.3)	(2.0)
Madrid	-0.08	-0.26	-0.01	-0.33
	-(3.1)	-(2.0)	-(0.6)	-(3.7)
Murcia	0.04	-0.20	-0.02	-0.27
	(0.9)	-(0.8)	-(0.5)	-(1.7)
Navarra	0.02	-0.14	0.01	0.33
	(0.5)	-(0.4)	(0.3)	(1.4)
Pais Vasco (Euskadi)	-0.09	-0.14	-0.15	0.01
	-3.89	-1.10	-6.23	0.13
Rioja	(0.1)	(0.1)	(0.1)	(0.0)
	(1.6)	(0.5)	(2.0)	(0.2)
Ceuta y Melilla	0.03	0.90	0.11	0.69
	(0.6)	(2.8)	(1.8)	(3.0)
# observations	19,787	27,230	28,851	40,611

Source: Luxembourg Income Study (LIS); own calculations.

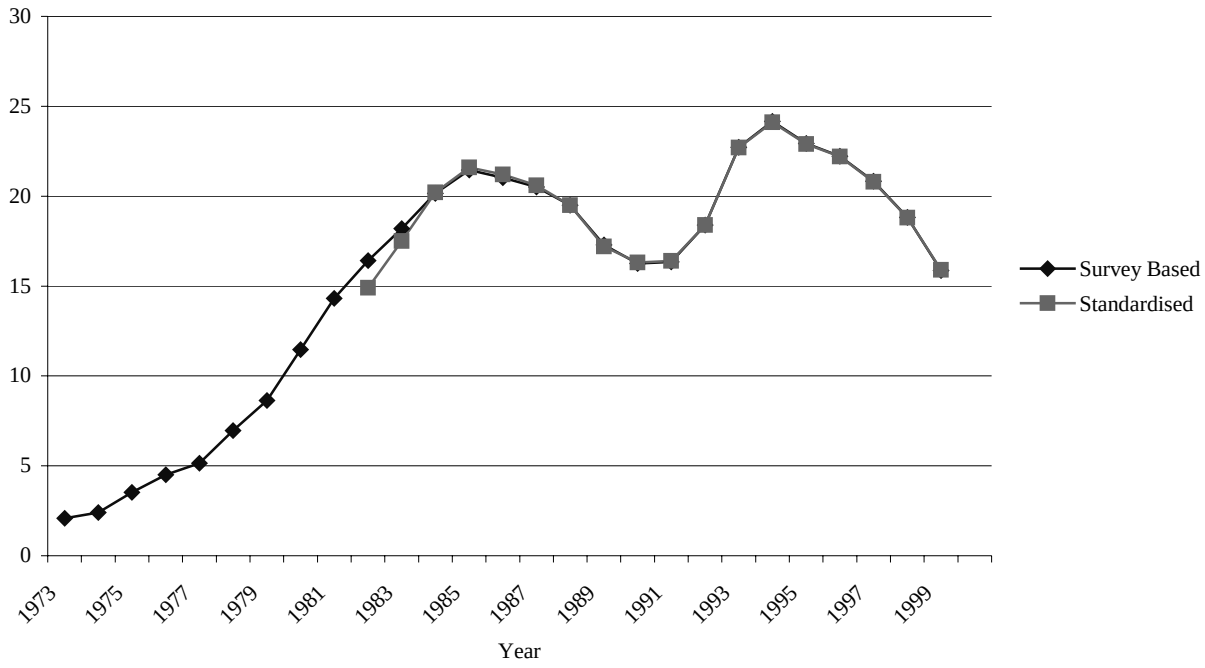
Table 8: Classification Summary (with Unemployment Regressions)

	Male HH Heads	All Observ.
Variable	**1980-1990**	**1980-1990**
Log wage	4	3
Age		
16-25	○	3
26-35	4	3
36-45	4	4
46-55	6	7
56-65	1	6
Education		
Degree	4	○
Higher - No Degree	4	3
Secondary Educ.	4	4
Basic Education	○	6
No Formal Education	○	○
Region of Residence		
Andalucia	○	2
Aragon	○	○
Asturias	4	4
Baleares	○	○
Canarias	4	○
Cantabria	○	2
Castilla y Leon	1	2
Castilla - La Mancha	6	6
Cataluna	○	8
Comunidad	○	○
Extremadura	○	1
Galicia	2	2
Madrid	9	8
Murcia	○	○
Navarra	○	○
Pais Vasco (Euskadi)	4	4
Rioja	○	○
Ceuta y Melilla	2	2

Note: The classification codes are as follows:
(1): strongly rigid (rising relative wage and rising relative unemployment);
(2): weakly rigid in a decreasing market (constant relative wage and rising relative unemployment);
(3): weakly adjusting in a decreasing market (falling relative wage and rising relative unemployment);
(4): strongly adjusting in a decreasing market (falling relative wage and constant relative unemployment);
(○ = 5): stable in a stable market (constant relative wage and constant relative unemployment);
(6): strongly adjusting in an increasing market (rising relative wage and constant relative unemployment);
(7): weakly adjusting in an increasing market (rising relative wage and falling relative unemployment);
(8): weakly rigid in an increasing market (constant relative wage and falling relative unemployment);
(9): converging (falling relative wage and falling relative unemployment);
note that for the *1980 sample mean*, the classification refers to absolute, not relative wage and unemployment changes, for the other characteristics, the relative wage and unemployment changes refer to the *1980 sample mean*.

Source: Luxembourg Income Study (LIS); own calculations.

Figure 1: Spanish Unemployment Rate



Source: OECD.

Figure 2a: Wage Regression - Age Coefficients over Time – Male Household Heads

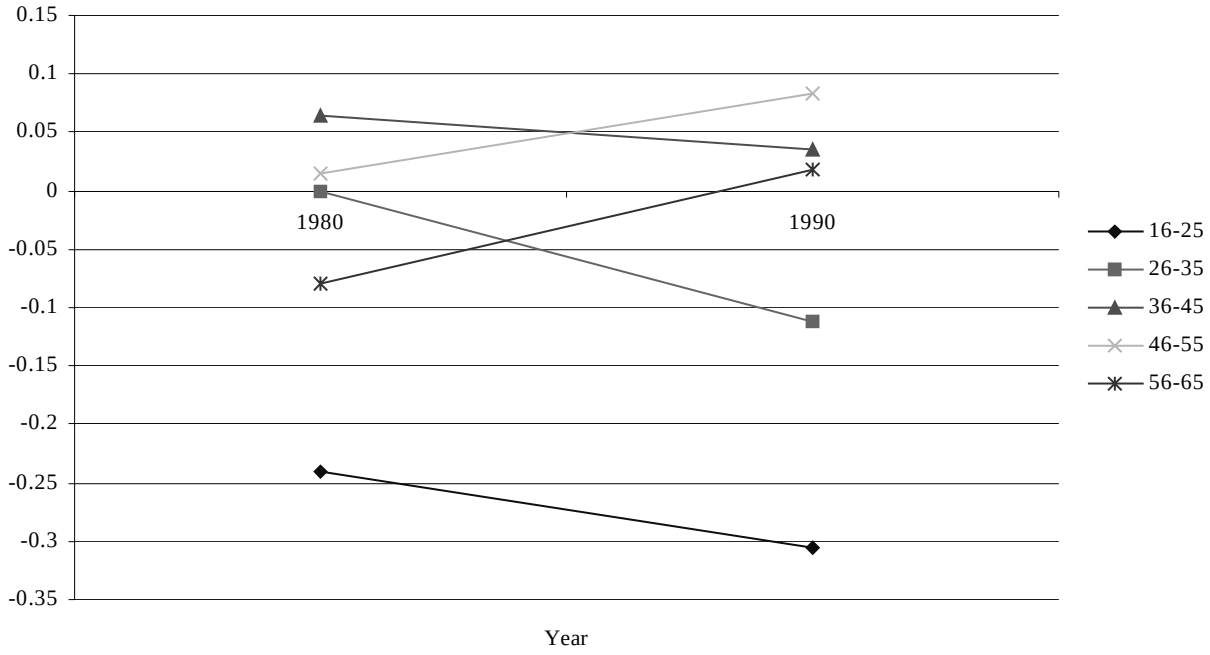
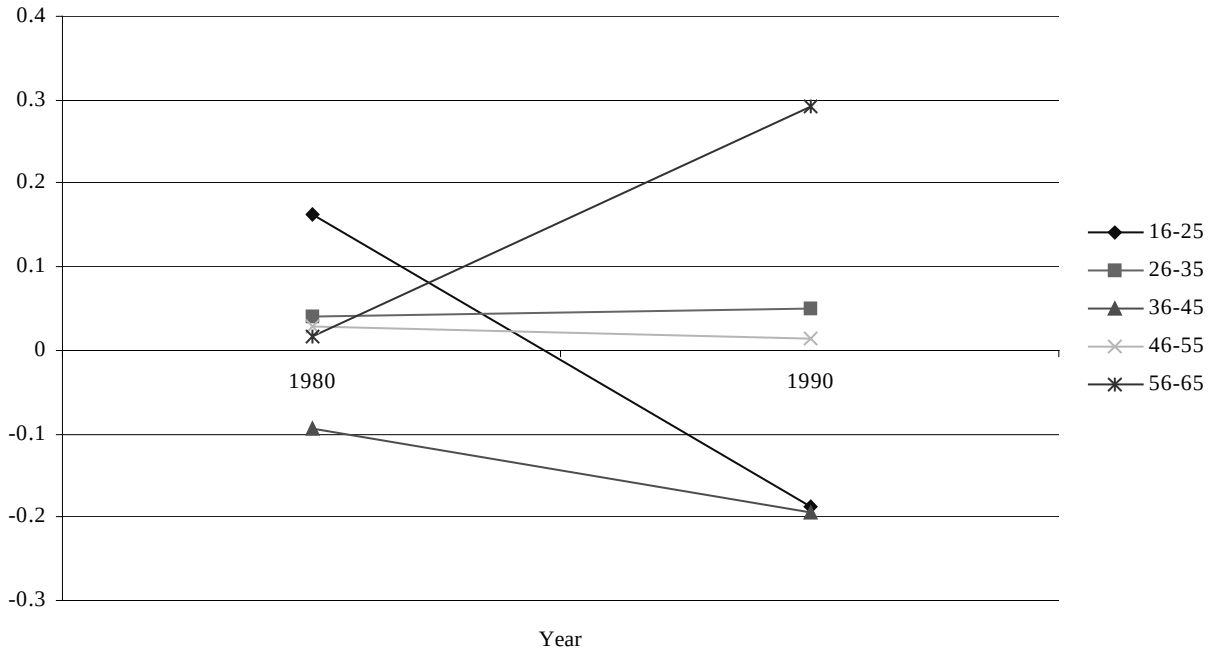


Figure 2b: Unemployment Regression - Age Coefficients over Time – Male Household Heads



Source: Luxembourg Income Study (LIS); own calculations.

Figure 3a: Wage Regression - Education Coefficients over Time – Male Household Heads

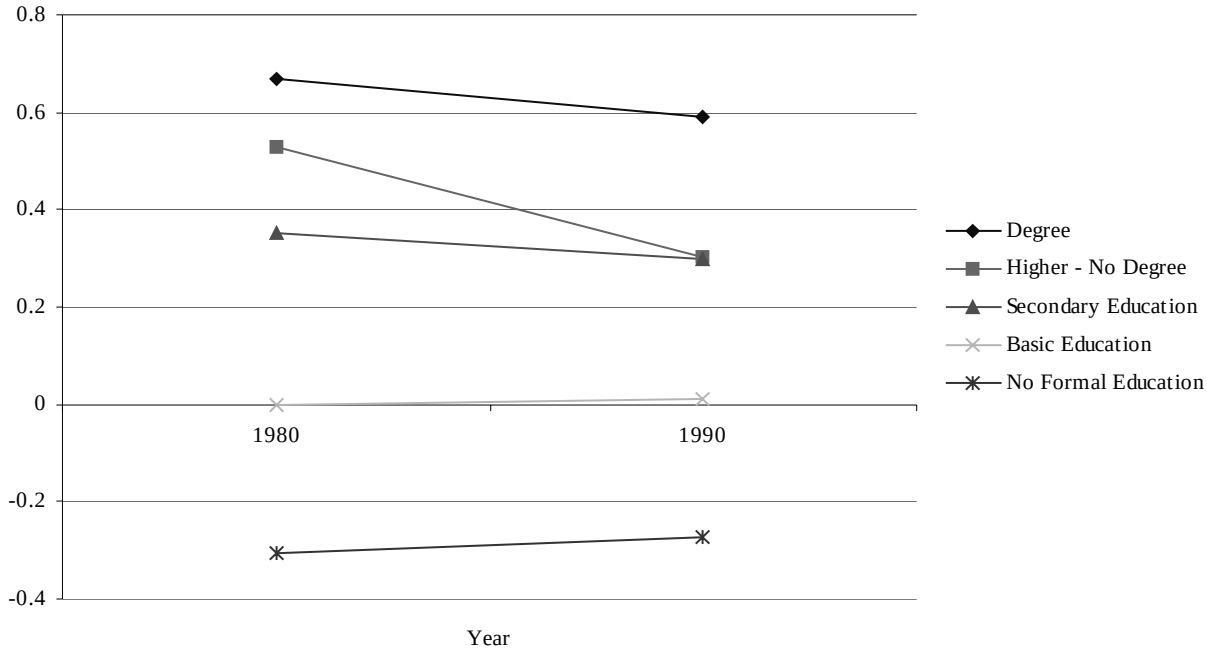
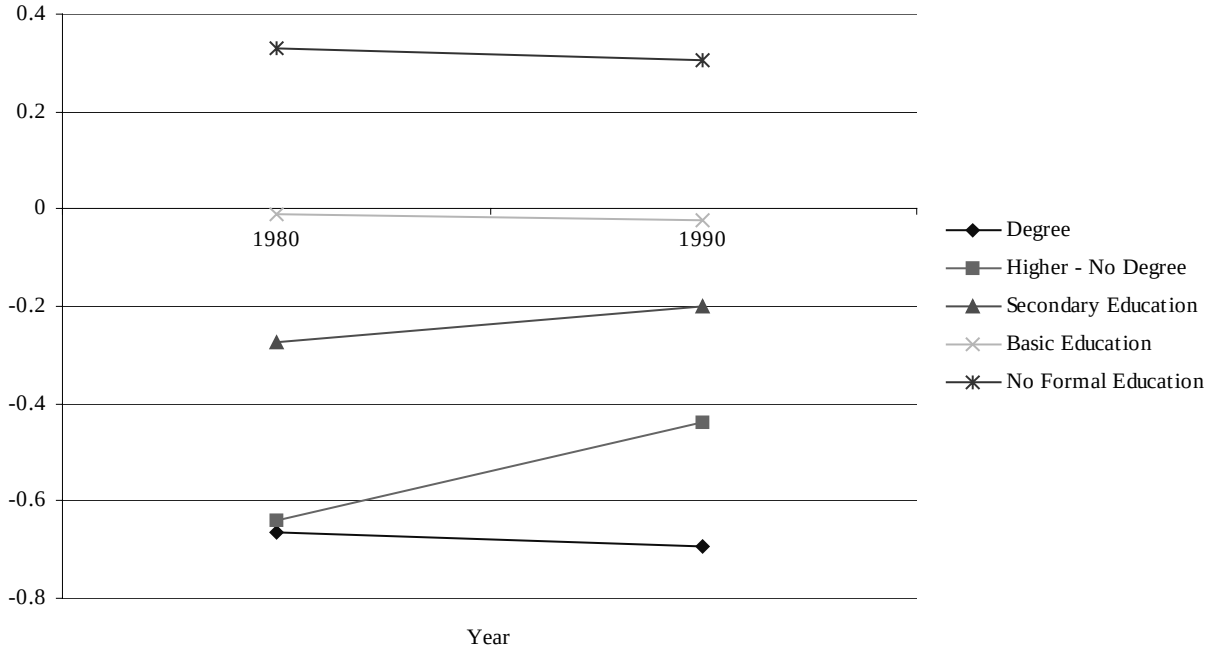


Figure 3b: Unemployment Regression - Education Coefficients over Time – Male Household Heads



Source: Luxembourg Income Study (LIS); own calculations.

Figure 4a: Wage Regression - Age Coefficients over Time – All Observations with Valid Information

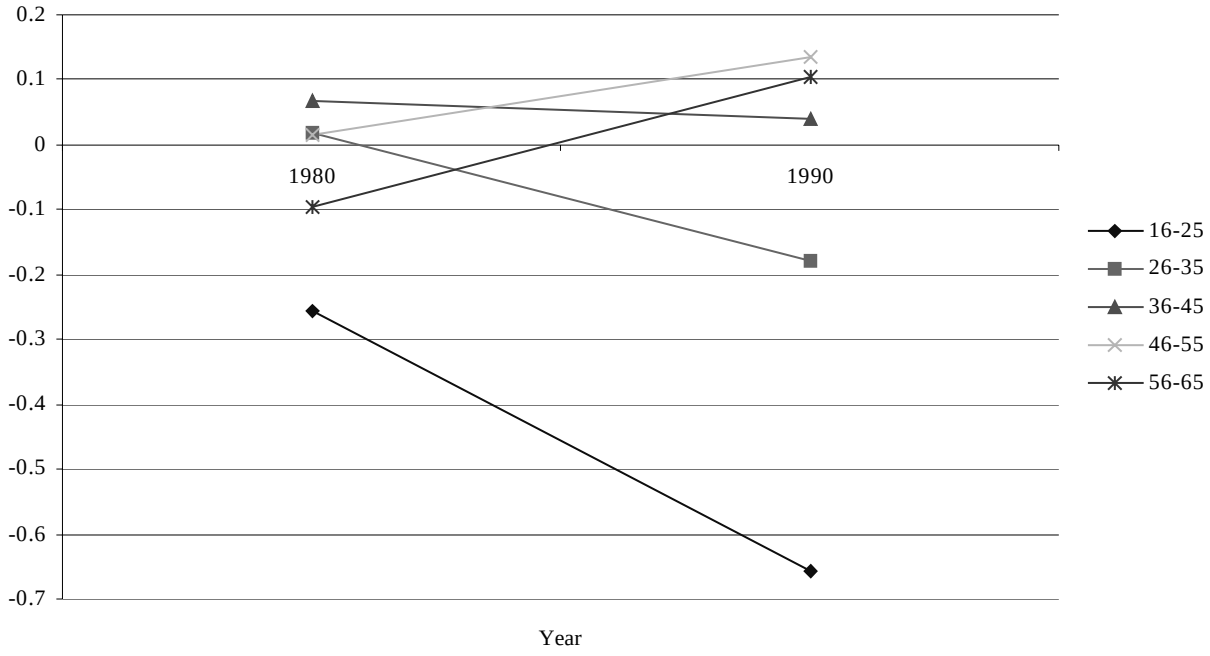
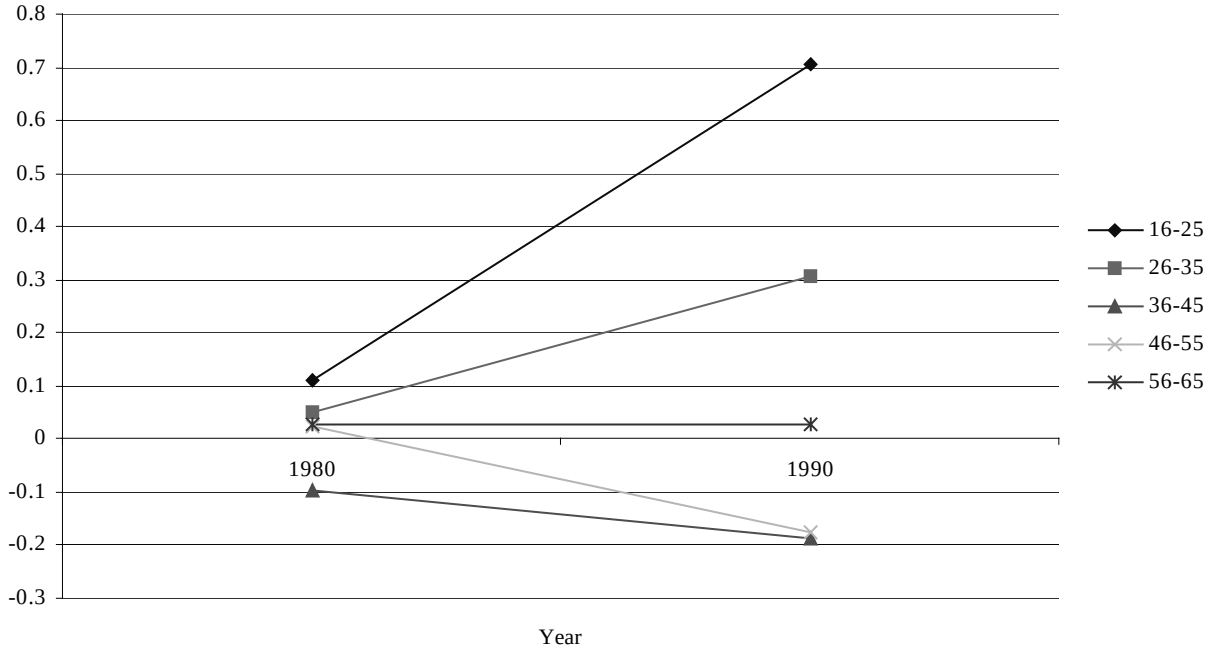


Figure 4b: Unemployment Regression - Age Coefficients over Time – All Observations with Valid Information



Source: Luxembourg Income Study (LIS); own calculations.

Figure 5a: Wage Regression - Education Coefficients over Time – All Observations with Valid Information

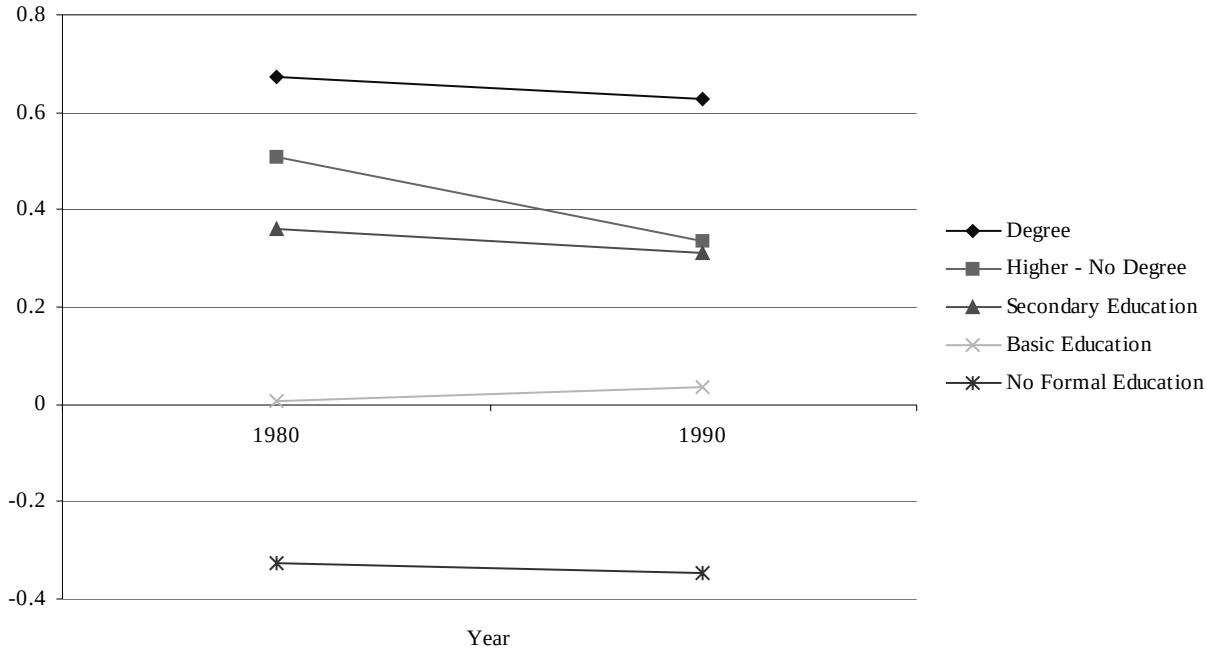
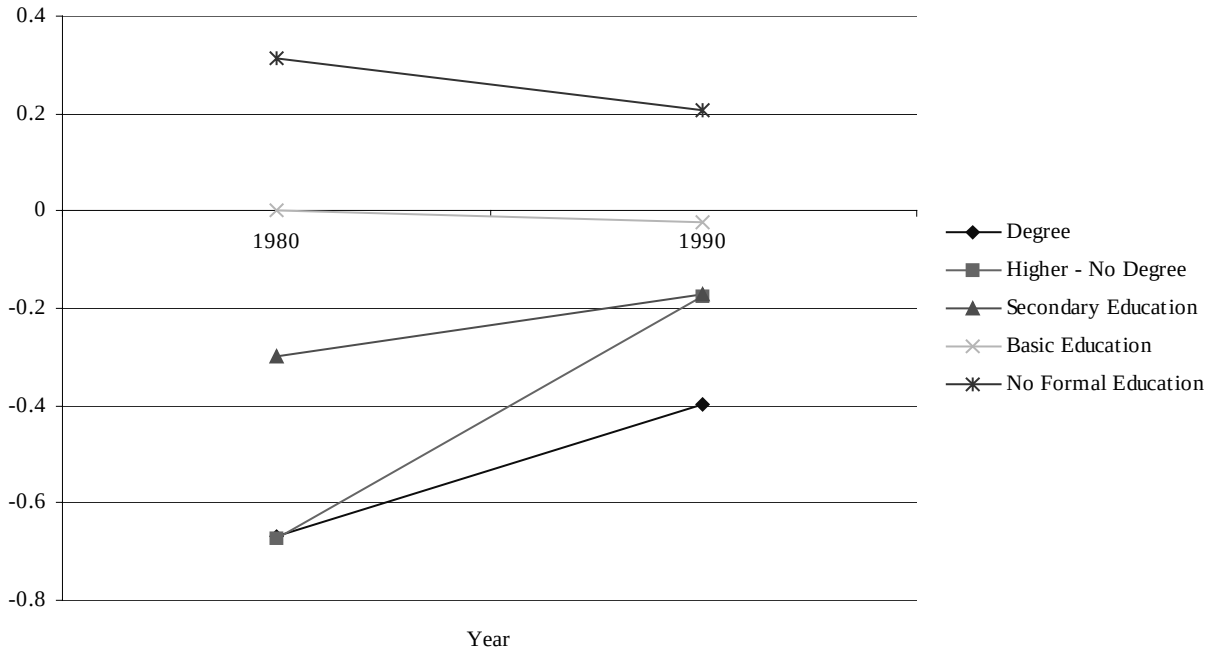


Figure 5b: Unemployment Regression - Education Coefficients over Time – All Observations with Valid Information



Source: Luxembourg Income Study (LIS); own calculations.