ESTUDIOS SOBRE LA ECONOMIA ESPAÑOLA

Equating out minimum wages in Spain by age

Inmaculada González Güemes

Carlos Pérez Domínguez

EEE 96

March, 2001

FEDEA

Fundación de Estudios de Economía Aplicada

EQUATING OUT MINIMUM WAGES IN SPAIN BY AGE *

Inmaculada González Güemes **
Carlos Pérez Domínguez

Department of Economics, Universidad de Valladolid, Valladolid, Spain

Abstract

The main aim of this article is to analyse the effects of the minimum wage on the unemployment rate of the teenagers. The subject is especially relevant because over the last ten years, Spain has undergone a process of equating out minimum wages by age which has resulted in some spectacular increases in the minimum wage of workers aged 16 and 17. Overall, our results suggest an important role for the minimum wage in explaining teenage (16 and 17 years old) labour market problems.

JEL classification: J38

Keywords: Unemployment rate, Minimum Wage, Teens, Spain.

** Corresponding author. Dpto. de Fundamentos del Análisis Económico, Facultad de Ciencias Económicas y Empresariales, Avda. Valle Esgueva, 6, 47011- Valladolid (Spain). Tel.: 34-83-423381; fax: 34-83-423299.

E-mail address: gonzalez@eco.uva.es

1.-   Introduction

This paper examines the effect of minimum wages on the unemployment of the teenagers. The subject is of particular relevance for the following reasons. First, because Spain is the OECD country with the highest rate of unemployment (concentrated, in fact, especially in young people). In particular, the unemployment rate in 1999 was 42.7% among 16-17 year olds and 35.8% for the 18-19 year olds.

Second, the subject acquires special relevance if we take into account the process of equating out minimum wages by age group that took place in Spain, in a first stage, in 1990, and then in a second stage between 1996 and 1998. As a consequence of this, Spain is the only country of the OECD in which there is no distinction by age of the minimum wage. As a result of this process, whereby all minimum wages are at the same level by age.

Finally, the topic of this article is interesting because, paradoxically, there has been no research done in Spain into analysing the specific relationship between the minimum wage and the unemployment of the collectives most likely to be affected. In addition, some recent articles point out the advantages of estimating the effects of the minimum wage on unemployment (see, for example, Patridge and Patridge, 1998), instead of analysing, as is usual in the economic literature, the effects of the minimum wage on employment (see, in this respect, for the Spanish case, Pérez Domínguez, 1995; Dolado et al., 1996; Dolado and Felgueroso, 1997; González Güemes, 1997; Dolado et al., 1999).

The structure of the rest of the article is as follows. In Section 2 we present a descriptive view of both, the evolution of the minimum wage by age, and of the unemployment rate in Spain. In Section 3 we offer the econometric specification of our

model, and in Section 4 we give the main results obtained in the estimations. The main conclusions of the paper are pointed out in the last Section.

2.- Empirical evidence

This section gives a purely descriptive view of both the evolution of the minimum wage by age and of the unemployment rate of the teenagers. First of all, we shall refer to the equating out process of minimum wages that took place in Spain over the last decade. Secondly, we shall analyse the unemployment rate of the following collectives: 16-17 year olds and 18-19 year olds. In addition, with the aim of analysing the possible effects of equating out the minimum wage process by age, we shall look at the evolution of the relative unemployment situation of these individuals with respect to the unemployment rate of prime age males (this being a collective not affected by the minimum wage).

a.- The evolution of the statutory minimum wage in Spain

Since 1998 Spain is the only OECD country that does not make distinctions in the minimum wage by age. [1] However, historically, it has not always been so. Indeed, since 1964 in Spain, the minimum wage applies to all workers, irrespective of the sector they belong to or their professional status, although there have been certain exceptions for maids and casual workers.[2] Nevertheless, until 1998, there were different minimum wages according to the age of the workers.

---

[1] In this sense, see, for example, Dolado et al. (1999).

[2] In 1994 apprenticeship contracts for workers under 25 years of age were introduced, which allow remuneration below the minimum wage. These contracts last between six months and three years. Employers are permitted to pay, during this period, 70% of the Legal Minimum Wage during the first year, 80% in the second year and 90% in the third year. However, for employees under 18 years of age the wage cannot be below the minimum wage corresponding to their age.

Between 1980 and 1990 there were three minimum wages: one for 16 year olds, another for 17 year olds and a third for adults aged 18 and over. Then, minimum wages were unified, as can be seen in figure 1, in two stages. In the first stage, carried out in 1990, the minimum wage of both 16 and 17 year olds was brought together. This brought about some very diverse increases in the minimum wage by age. In particular, the minimum wage of 16 year olds that year increased by 83%, that of 17 year olds increased by 15% and that of the over 18 age group increased by 7%. In the second stage, begun in 1996 and ending on January 1st 1998, the minimum wages of all age groups were brought to the same level. This brought about an increase in the minimum wage of the under 18 age group, in the above-mentioned period, at an average annual rate of 21.41%. In conclusion, as a result of these equating out processes of minimum wages by age, the minimum wage of 16 year olds increased in nominal terms over the last 10 years by 284%, that of 17 year olds by 142% and that of the over 18's by 48.4%. Naturally, all these characteristics, specific to Spain, not only determine the elaboration of a minimum wage index, but also the effects the minimum wage will have on unemployment. It is to be expected that such effects will be greater after 1990 and that they will affect especially the youngest collective, that is, the 16 and 17 year olds.

b. The evolution of unemployment of the teenagers

In Spain, the rate of unemployment is so high that it has become the main economic problem. Nevertheless, this problem is especially concentrated in young people. In particular, the rate of unemployment is 2.7 times higher than the average for the economy for the 16-17 year old age group, 2.2 times higher for the 18-19 year old collective. Below, we briefly describe the particular characteristics of the evolution of

the unemployment rate for teenagers. We also analyse the evolution of the relative unemployment situation of these collectives (likely to be earning the minimum wage) with respect to the unemployment of prime age males (a collective not sensitive to the minimum wage).

Figure 2 shows the evolution of the rate of unemployment of these collectives from the end of the 1970's up to the present. From this figure we should point out the following: First, the evolution of the unemployment of the youngest group shows pro-cyclical behaviour (each "v" is one cycle). However, this cyclical response by young people shows a difference in phase with respect to the general cycle. This is because these collectives have few qualifications. Consequently, when cuts in the work-force are necessary, the first to be given the sack are the young people whose productivity is low in relation to the wage they receive or hope to receive. Second, another important aspect of the figure is that, in the years prior to the first stage of equating out (before 1990), the unemployment rate among 16-17 year olds was equal to or lower than that for 18-19 year olds. However, from 1992 it is the same or higher, and the difference becoming greater from 1996 (coinciding with the second stage of the equating out process).

In order to establish the relative unemployment situation of these collectives, we have built up the ratio of the unemployment rate for the 16-17 year olds and the 18-19 year olds groups with respect to that of prime age males. This information is shown in figure 3. From this we can see that the rates of unemployment of the youngest groups are systematically higher than that of the adults. As an example, the rate of unemployment among the 16-17 year old group is 4.5 times higher than that of the adults, while that of the 18-19 year olds is almost 4 times higher. Nevertheless, a more detailed analysis of these ratios leads to the following conclusions. First, the ratio of the unemployment rate for 16-17 year olds with respect to that of the adults showed, in

general terms, a clearly upward trend until 1993. After this date, the trend was the opposite, the effect becoming more accentuated from 1996 onwards (coinciding with the second stage of equating out for the minimum wage). This effect, which, initially, could be attributed to the spectacular increase in the minimum wage, must be considered with caution. In fact, since 1994, the Spanish economy has been immersed in an economic expansion. Thus, unequal competition between the young unemployed and the adult unemployed can be expected as the latter's human capital is bigger and the former will therefore be the last to be contracted. Second, the evolution of the ratio of the unemployment rate for 18-19 year olds with respect to that of the adults is more constant. However, this ratio also presents an increasing trend, although it has not been so steep over the last few years, to be precise, since 1996.

Summing up, in light of the above analysis, the following can be deduced. In Spain, over the last decade, the teenagers have found their relative situation in the labour market getting worse. In fact, the unemployment rate of these collectives has increased considerably with respect to that of prime age males. This effect is more intense for the 16-17 year old. Although these facts coincide with the process of equating out minimum wages by age, which took place in Spain over the last ten years, it is doubtful whether the said effects could be attributed solely to the minimum wage. We must therefore wait for the empirical analysis to be able to measure with greater precision the effects of the minimum wage on the unemployment rate of these individuals.

4.-   Econometric specification

In this paper we try to estimate a reduced form of an unemployment equation. To do so, we establish a relationship between the unemployment rate of a particular age group and a variable which can measure the relative influence of the minimum wage.

In addition to this key variable, the equation should include other independent variables. These variables will try to measure the influence of other factors which, apart from the minimum wage, can influence the supply and demand for labour.

The unemployment equation we shall use in this paper tries to explain the following idea: the higher the minimum wage (measured using the Kaitz Index or in direct way) the higher the rate of unemployment will be, *ceteris paribus*. Included in the *ceteris paribus* clause are all those factors that can make the supply or the demand for labour shift exogenously.

The main advantage of employing a regression model with the unemployment rate, rather than the employment rate (which is what is normally done in the economic literature)[3], is that, irrespective of whether the labour market has a basically competitive or monopsonic structure, the rate of unemployment will be determined as much by the demand as by the supply of labour (see Patridge and Patridge, 1998).

Particularly, in its most generic form, the equation adopts the following expression:

$$tu_i = \Phi(w_{min}^i, w_{min}^j, D, O_i, O_j) \tag{1}$$

where tu_i is the rate of unemployment of the "-ith" population group. The w_{min}^i variable represents a specification of the minimum wage that affects the "-ith" collective and w_{min}^j the minimum wage that affects the other age groups. D represents a control vector for labour demand and O_i and O_j represent controls of supply corresponding to the different collectives within the population.

---

[3] See, for example, Brown et al (1982), Card and Krueger (1995), Deere et al.(1995), Neumark and Wascher (1997), Williams (1998), Lang and Kahn(1998), Dickens et al.(1999), Baker et al. (1999), Bhaskar (1999) and Metcalf (1999).

In order to estimate the mentioned model it is necessary to specify in more detail some aspects of the variables included. The dependant variable is the unemployment rate of the teenagers. We suppose that the groups with the least qualifications and experience (those who earn the least) have a greater possibility of being affected by the establishment of a minimum wage. This is why the study has concentrated, basically, on the groups of teenagers (16-17 year olds on the one hand and 18-19 year olds on the other). In this sense, we must point out that usually in the economic literature this collective is considered as one inseparable whole between 16 and 19 years of age. However, in Spain, as pointed out by Dolado et al. (1999), it is necessary to divide this collective in two groups: on the one hand, the 16-17 year olds and, on the other, the 18-19 year olds, because the first group is the one that has experienced the greatest changes in the minimum wage over the last few years, as we have seen in the above paragraphs.

As for the key variable, the minimum wage index, we must indicate the following:

The most frequently used relative measurement for the minimum wage in the economic literature is the Kaitz Index defined as the ratio of the minimum wage to the average wage in the economy. However, in this paper we have introduced some modifications to this index for two reasons: to try, on the one hand, to improve the estimations and, on the other, to adapt it to the particular characteristics of the minimum wage in Spain. Among these modifications we should point out the following.

First of all, we have chosen to use the own and crossed wage elasticities in all the estimations. That is, in each estimation we have considered the effect of the minimum wage of the collective being analysed and the effect of the minimum wage of the other

group. The reason for this is to capture the possible substitution effect that can occur between two similar productivity labour inputs.

Secondly, we have tried to build different indices to take into account the possible sensitivity of the Kaitz Index to the average wage used. Thus, we have produced three indices: on the one hand, the Kaitz index for blue collar workers (the ratio of the minimum wage to the average blue-collar's wage), and on the other, the Kaitz index for the white collar workers (the ratio of the minimum wage to the average white-collar's wage) and, finally, the average Kaitz index (the ratio of the minimum wage to the average wage of both categories) [4].

Thirdly, we have also carried out estimations without the restriction imposed by the Kaitz index; that is, introducing, on the one hand, the minimum wages and, on the other, the average economic wage. [5]

Fourthly, we have tested the possible dynamic behaviour of the adjustments, incorporating , in addition to the indices of contemporary minimum wages, their lag values, offering, in this way, the corresponding long term elasticities. [6]

Finally, we have taken into account that the working day has been reduced throughout the periods being considered. That is why an adjustment is carried out according to the number of hours worked. [7]

In addition to the key variable of the minimum wage, as pointed out in the section above, the correct specification of the model requires the inclusion of some more variables. One problem that arises from estimating unemployment by using time series data is that several factors which affect the unemployment rate can arise at the

---

[4] A similar analysis was carried out by Dolado et al.(1999) to estimate employment equations.
[5] A similar analysis was carried out by Partridge and Partridge (1998), for the American economy.
[6] In this respect, see the research of Backer et al. (1999).

same time. Thus, on the one hand, it is difficult to distinguish between the changes in unemployment due to the minimum wage and, on the other hand, the variations that come about as a consequence of changes in the supply and demand for labour. In order to avoid this problem, variables that come close to the possible changes in the supply and demand for labour should be included in the equation to be calculated. Thus, if the controls carried out are adequate, then the variations that arise in the unemployment rate are solely a consequence of variations in the minimum wage index.

Thus, as far as the controls for labour demand are concerned, we have used as proxy, basically, the growth rate of the GDP. In addition, we have also carried out alternative estimations using the unemployment rate for males aged 25 -54. We did this to be able to measure the possible sensitivity of the results to the cyclical type of variable used. On the other hand, to control the exogenous movement of labour supply, we have used the population ratios of 16-17 year olds and 18-19 year olds over the total labour force.

In this sense, we should point out that we have chosen to include the ratios of other population groups in all the estimations. This is because the population ratios are not, in fact, pure supply variables. They are also influenced by the substitution phenomena between factors related to changes in their relative prices.

Besides all the variables we have discussed, we have also included a set of dummy variables to control, first of all, the equating out of the minimum wage of 16 year olds with that of 17 year olds which occurred in 1990 and, secondly, to control the methodological changes that came about in the statistical sources used in the estimation.

---

[7] This adjustment aims to solve one of the criticisms made by Card and Krueger (1995) concerning the

Before concluding this section, it is necessary to point out that the statistical sources used to obtain information about these variables are, basically, the "Encuesta de Población Activa", and the "Encuesta de Salarios en la Industria y los Servicios".

5.- Empirical results

In this section we give the main results obtained in the estimations. The main variables used, as well as their descriptive statistics, are shown in an appendix.

The values shown in tables 2 to 3 are the elasticities of the rate of unemployment of the different collectives analysed when he minimum wages change. The effect of the minimum wages will also be got using other alternative specifications.

a. Teenagers aged 16 and 17

Table 2 presents our estimations of the effect of minimum wages on teenage unemployment (16 and 17 year olds), using alternative specifications of the minimum wage.

In the first specification (A), we have included in the regression, the Kaitz indices corresponding to the minimum wages of 16 year olds (own-minimum wage) [8] and of the over 18's (crossed-minimum wage), weighted by the average wage of blue collar workers. The two elasticities obtained turned out to be very significant. In particular, an increase of 10% in the own Kaitz index increases the unemployment rate of 16 and

---

research based on time series data. According to these authors, in the majority of time series studies, no distinction is made between part time and full time work.

[8] In this sense, it is necessary to point out that until 1990 in Spain, there were two different minimum wages for workers under 18: one for those aged 16 and another for those aged 17. From 1990, as already mentioned, both minimum wages were unified. In the estimations we have used the minimum wage for 16 year old workers (which until 1990 grew at the same rate as the minimum wage for 17 year olds) and we have incorporated a dummy variable to control the equating out process that took place in that year.

17 year olds by 1.5%. On the other hand, an identical increase in the crossed Kaitz index reduces it by 3.2%. [9]

In accordance with the above, the spectacular relative increase in the minimum wage of the under 18's that occurred in the 1990's, during the equating out, has necessarily had greatly negative effects on the unemployment of teenagers. Nevertheless, we must also point out, in accordance with the above estimations, that if the minimum wage of the under 18's and the over 18's had increased in identical proportions, the net result would have been a reduction in the unemployment rate of the under 18's.

In the specification (B), we have included both the own Kaitz index and the crossed Kaitz index at the present time (actual), as well as from one year ago (one year lagged), in order to analyse the dynamics produced in the adjustments. The introduction of this time lag reduces the value of the actual elasticity corresponding to the index for workers aged 16, while, given that the adjustment lasts a further year, the long term elasticity reaches a value slightly higher than that obtained in specification (A). On the other hand, the crossed long term elasticity (that is, that obtained from the actual and lagged minimum wage of the over 18's) maintains a value very similar to that obtained in specification (A). In this latter case, most of the adjustment is produced in the present, while the time lag part is of little significance.

The results given in specifications (C) and (D) were obtained taking the white-collar-workers's wage as the weighting in the Kaitz indices; on the other hand, the specifications (E) and (F) were made by weighting for the average wage of both blue

---

[9] It would seem right to say that the different collectives susceptible to being affected by the minimum wage make up a highly unskilled labour category and that, consequently, the jobs they perform are perfectly interchangeable. We could also assume that, with equal minimum wage, firms will always prefer a worker who is over 18, as opposed to one who is under 18, possibly because of their higher level of maturity and responsibility. However, as the minimum wage of the under 18's is reduced, in relation to that of the over 18's, then firms will begin to replace adults with under 18's. This could be the theoretical

and white collar workers. It can be seen how the elasticities obtained do not vary to any great extent whatever the wage considered in the weighting.

Finally, the specifications (G) and (H) were carried out ignoring the restriction that the Kaitz index imposes; that is, the minimum wages on the one hand and the global average wage on the other were included as separate regressors. In this case, table 2 shows the elasticities (own and crossed) of the unemployment rate of 16 and 17 year olds faced with changes in the minimum wage. It can be seen how the own elasticities obtained are very similar to those got when using the Kaitz restriction; as for the crossed elasticities, we now obtain slightly higher values, especially in the long term. In any case, the results obtained seem to demonstrate that the elasticities estimated using the Kaitz index show more or less faithfully the effects of the variable that most interests us, that is, the minimum wage. [10]

b. Teenagers aged 18 and 19

Table 3 shows the elasticities of the unemployment rate for 18 and 19 year olds with respect to the same specifications for the minimum wage as in the previous case.

The most important result is that the elasticities estimated (both own and crossed) are not significant in any of the specifications. This fact may demonstrate, as pointed out by Dolado et al. (1999), that the relevant minimum wage for this age group is, rather than the legal minimum, the wages agreed on in the particular sector. [11]

---

justification of why the unemployment rate of 16 and 17 year olds increases in line with the increases of their own minimum wage and decreases when the minimum wage of the over 18's increases.

[10] As Dolado and Felgueroso (1997) point out, it is fundamental "to make sure that the variability in the Kaitz index proceeds mainly from the numerator (the minimum wage) and not the denominator (the average wage)".

[11] In fact, these authors get a similar result when they calculate the effects of the minimum wages (own and crossed) on the employment rate of young workers over 18.

Thus, in light of the above results, the following can be deduced: when analysing the effects of the changes in the minimum wage on the main variables of the youth labour market in Spain, it is necessary to distinguish between the members of this collective that are under and over 18. In the case of the 16 and 17 year olds, the minimum wages (own and crossed) exercise a strong influence on the unemployment rate; while, in the case of the 18 and 19 year olds, any minimum wage does not seem to have an important effect on their unemployment rate.

6.-   Conclusions

In this paper we have estimated the effects that minimum wages have on the rate of unemployment of the teenagers (distinguishing between the under and over 18's).

To this end, we have estimated several equations of unemployment in a reduced form in which we have incorporated the statutory minimum wage of under 18's on the one hand, and, on the other, that of adults. This is justified by the relatively irregular evolution that the minimum wages have had in the Spanish economy during the 90's.

The main results can be summarised as follows.

The unemployment rate for 16 and 17 year olds has shown itself to be extremely sensitive to both minimum wages. In particular, a relative increase in the minimum wage for under 18's increases their rate of unemployment, while a relative increase of similar magnitude in the minimum wage of adults results in a reduction in the rate of unemployment for under 18's, to even a greater degree than in the other case. Nevertheless, and given that the minimum wage of the under 18's has risen over the last decade nearly six times faster than that of adults, some extremely negative effects on the unemployment of the youngest workers have been produced.

As for the 18 and 19 year olds, we have not detected any important effect of the minimum wages (neither the own nor that corresponding to the under 18's) on their rate of unemployment. In this sense, it is possible that the relevant minimum wage for this age group is, rather than the legal minimum wage, the wage agreed on in each sector by employers and trade unions.

References

Baker, M., Benjamin, D. and Stanger, S. (1999): "The Highs and Lows of the Minimum Wage Effect: A Time-Series Cross-Section Study of the Canadian Law"; Journal of Labor Economics, 17(2), pp. 318-50

Bhaskar, V. (1999): "Minimum Wages for Ronal McDonald Monopsonies: A Theory of Monopsonistic Competition"; Economic Journal, 109(455), pp.190-203.

Brown, Ch., Gilroy, C. and Kohen, A. (1982): "The Effect of the Minimum Wage on Employment and Unemployment"; Journal of Economic Literature, 20, pp. 487-528.

Card, D. and Krueger, A. B. (1995): Myth and Measurement: The New Economics of the Minimum Wages; Princeton, Princeton University Press.

Deere, D., Murphy, K, and Welch, F. (1995): "Re-examining Methods of Estimating Minimum-Wage Effects"; AEA Papers and Proceedings, 85, pp. 232-237.

Dickens, R., Machin, S. and Manning, A. (1999): "The Effects Minimum Wages on Employment: Theory and Evidence from Britain"; Journal of Labor Economics, 17(2), pp.1-22.

Dolado, J. and Felgueroso, F. (1997): "Los Efectos del Salario Mínimo: Evidencia Empírica para el Caso Español"; Moneda y Crédito; 204, pp.213-263.

Dolado, J., Kramarz, F., Machin, S., Manning, A. and C. Teulings (1996): "The economic impact of minimum wages in Europe"; Economic Policy, 23, pp.317-372.

Dolado, J., Felgueroso F. and Jimeno J.F. (1999): "Los Problemas del Mercado de Trabajo Juvenil en España: Empleo, Formación y Salarios Mínimos"; Ekonomiaz; 43, pp.136-157

González Güemes, I. (1997): "Los Efectos del Salario Mínimo sobre el Empleo de Adolescentes, Jóvenes y Mujeres: Evidencia Empírica para el Caso Español"; Cuadernos Económicos de ICE, 63, pp.31-48.

Lang, K. and Kahn, S. (1998): "The Effect Minimum Wage Laws on the Distribution of Employment: Theory and Evidence"; Journal of Public Economics, 69(1), pp.67-82.

Metcalf, D. (1999): "The Low Pay Commission and National Minimum Wage". The Economic Journal,109, F46-F66.

Partridge, M. and Partridge, J. (1998): "Are Teen Unemployment Rates Influenced by State Minimum Wage Laws?"; Growth and Change; 29 (4), pp. 359-82.

Pérez Domínguez, C. (1995): "Los Efectos del Salario Mínimo sobre el Empleo y el Desempleo: Evidencia Empírica para España"; Actas de las I Jornadas de Economía Laboral, Alcalá de Henares.

Williams, N. and Mills, J. (1998): "Minimum Wages Effects by Gender"; Journal of Labor Research;19(2), pp.397-414.

Williams, N. (1993): "Regional Effects of the Minimum Wage on Teenage Employment"; Applied Economics; 25, pp.1525-1528.

Wellington, A. J. (1991): "Effects of the Minimum Wage on the Employment Status of Youths: An Update"; The Journal of Human Resources, XXVI, pp. 27-46.

Table 1: Elasticities of 16-17 year-olds unemployment rate

Dependent variable: 16-17 year-olds unemployment rate		Actual (i)	One year Lagged (ii)	Long Run Elasticity (i)+(ii)
A	min. wage 16 / blue collar wage	0,15 (5,08)		
	min. wage 18 / blue collar wage	−0,32 (−4,55)		
B	min. wage 16 / blue collar wage	0,10 (2,70)	0,08 (2,44)	0,18 ***
	min. wage 18 / blue collar wage	−0,55 (−3,60)	0,22 (−1,49)	−0,33 ***
C	min. wage 16 / white collar wage	0,16 (5,12)		
	min. wage 18 / white collar wage	−0,32 (−4,65)		
D	min. wage 16 / white collar wage	0,10 (2,73)	0,08 (2,49)	0,18 ***
	min. wage 18 / white collar wage	−0,43 (−2,93)	0,09 (0,65)	−0,34 ***
E	min. wage 16 / Weighting average wage	0,15 (5,12)		
	min. wage 18 / Weighting average wage	−0,33 (−4,72)		
F	min. wage 16 / Weighting average wage	0,12 (3,01)	0,08 (2,41)	0,20 ***
	min. wage 18 / Weighting average wage	−0,65 (−3,48)	0,28 (1,60)	−0,37 ***
G	min. wage 16	0,16 (5,07)		
	min. wage 18	−0,37 (−4,91)		
H	min. wage 16	0,14 (3,36)	0,09 (2,57)	0,23 ***
	min. wage 18	−0,80 (−3,57)	0,26 (1,54)	−0,54 ***

NOTES:

NOTES: The econometric adjustments were carried out using series of quarterly data between the first quarter of 1981 and the fourth quarter of 1999. The functional form adopted for the estimation is the logarithmic. The equation has been estimated in first differences as a consequence of the results obtained from the pertinent co-integration tests carried out. The dependent variables are the unemployment rates of the 16 and 17 year olds and the 18 and 19 year olds respectively. The minimum wages were introduced in the form of Kaitz indices (in specification A and B) and directly (in C and D). The control variables used were the GNP growth rate and the population ratios of 16-17 year olds and 18-19 year olds with respect to the total population. The values in parentheses correspond to the T-statistics of the estimated coefficients. In the long-run elasticities column: significant at *** 1% level, ** 5% level, ** 1% level (White tests).

Table 2: Elasticities of 18-19 year-olds unemployment rate

	Dependent variable: *18-19 year-olds unemployment rate*	Actual (i)	One year Lagged (ii)	Long Run Elasticity (i)+(ii)
A	min. wage 16 / blue collar wage	−0,17 (−1,15)		
	min. wage 18 / blue collar wage	0,23 (1,33)		
B	min. wage 16 / blue collar wage	−0,16 (−1,08)	−0,04 (−0,64)	−0,20
	min. wage 18 / blue collar wage	0,13 (0,71)	0,13 (1,03)	0,26
C	min. wage 16 / white collar wage	−0,17 (−1,13)		
	min. wage 18 / white collar wage	0,22 (1,34)		
D	min. wage 16 / white collar wage	−0,17 (−1,14)	−0,03 (−0,60)	−0,20
	min. wage 18 / white collar wage	0,14 (0,77)	0,14 (1,29)	0,28
E	min. wage 16 / Weighting average wage	−0,19 (−1,34)		
	min. wage 18 / Weighting average wage	0,25 (1,50)		
F	min. wage 16 / Weighting average wage	−0,20 (−1,43)	−0,03 (−0,48)	−0,23
	min. wage 18 / Weighting average wage	0,24 (1,27)	0,06 (0,48)	0,30
G	min. wage 16	−0,18 (−1,14)		
	min. wage 18	0,22 (1,28)		
H	min. wage 16	−0,22 (−1,42)	−0,05 (−0,85)	−0,27
	min. wage 18	0,27 (1,34)	0,11 (0,81)	0,38

NOTES: See Table 1

FIGURE 1: The evolution of the legal minimum wage in Spain by age (1977-2000)
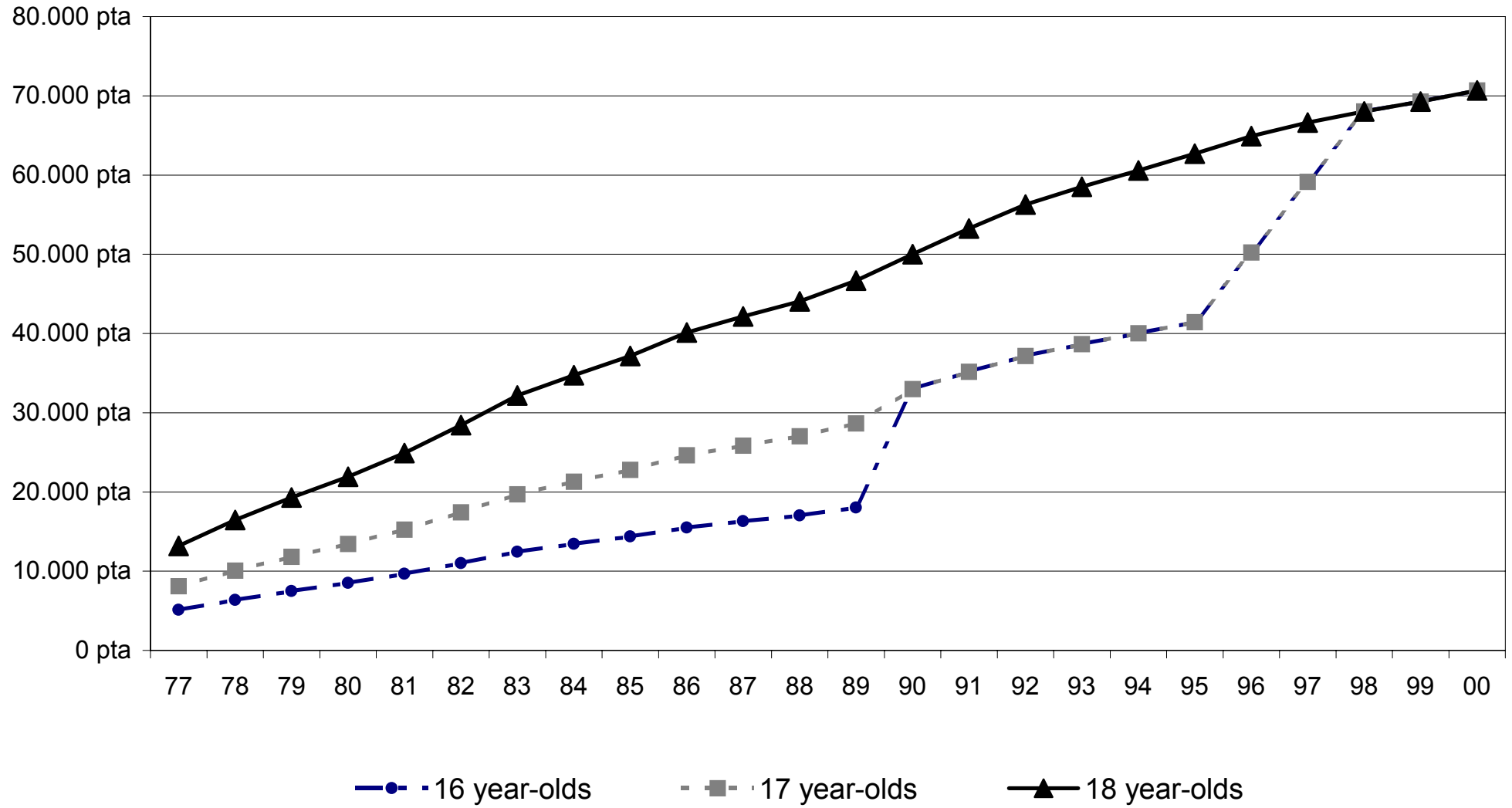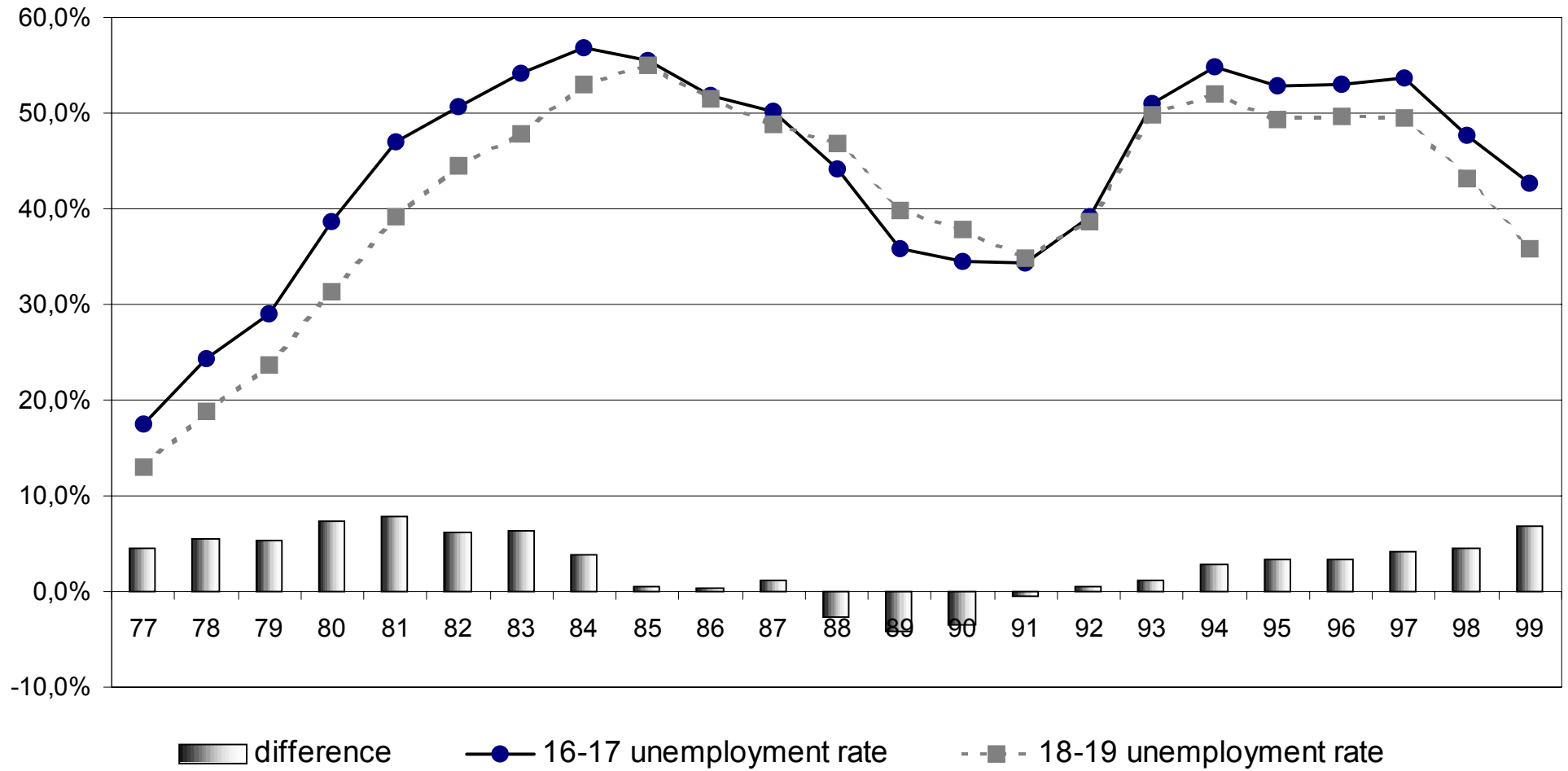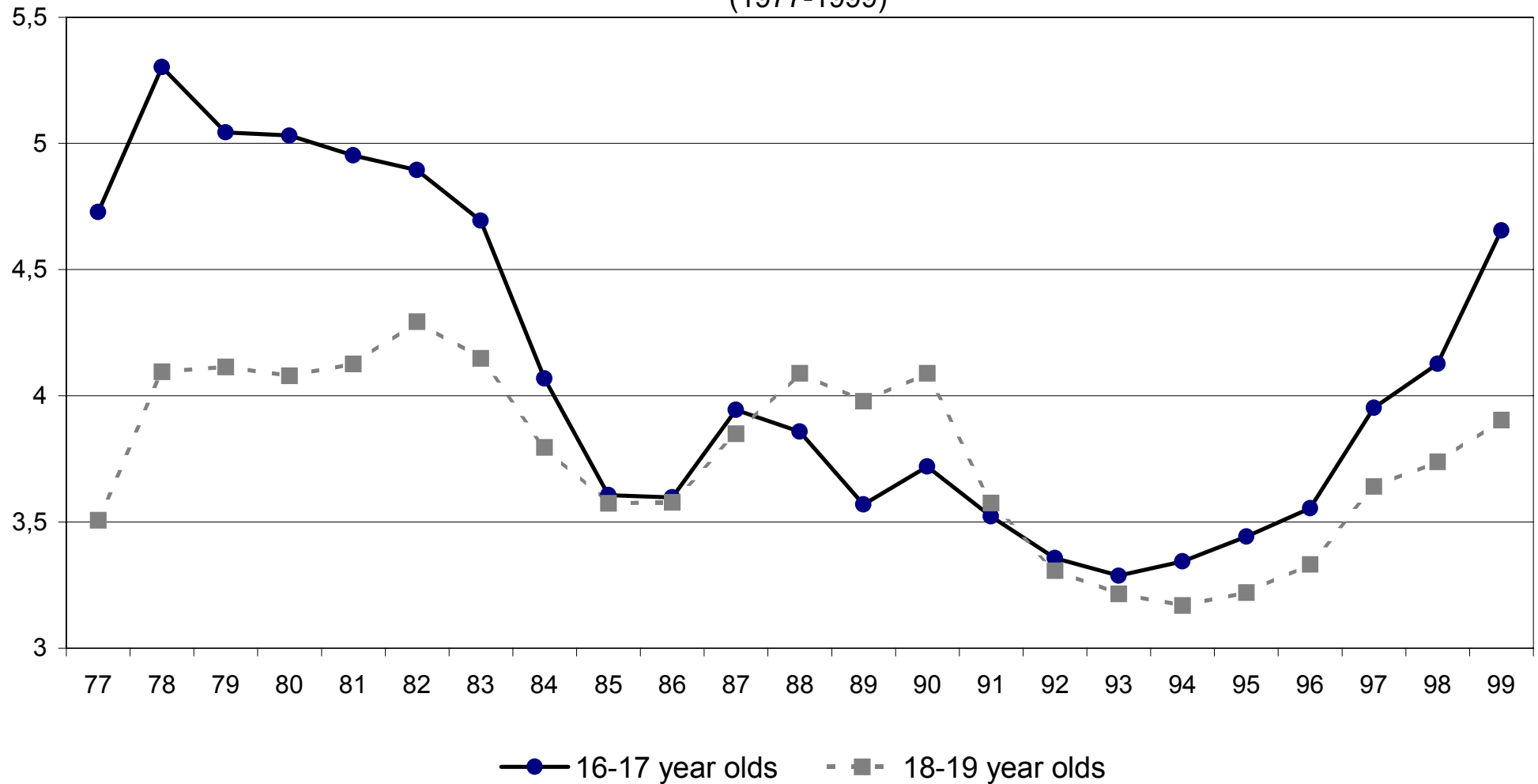
FIGURE 2: The evolution of the unemployment rate of teenagers aged 16 -17 and 18-19 (1977-1999)

SOURCE: Encuesta de Población Activa (Instituto Nacional de Estadística)

FIGURE 3: The evolution of the ratio of the unemployment rates for the 16-17 year olds and the 18-19 year olds groups with respect to that of prime age males (1977-1999)

SOURCE: Encuesta de Población Activa (Instituto Nacional de Estadística)