Public employment and regional redistribution in Spain *

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Abstract

We study the determinants, beyond the process of decentralisation, of the regional allocation of public jobs by the Central Government and the increase in the number of public employees at the Regional Governments in Spain during 1990-1999.

Using standard panel data econometric procedures we show that the Central Government might have been increasing the number of public jobs in those regions with lower levels of GDP per capita. Also we show that the number of public employees is larger in those regions in which there has been a coincidence between the political orientation of the ruling parties in the Regional and Central Governments.

Finally, we find that political variables might explain part of the increase in the number of public employees in the Regional Governments, together with the process of decentralisation and GDPpc.

Key words: Public Employment; Regional Redistribution; Fiscal Policy Instruments.

JEL classification: H0, H1, R7.

1. Introduction

In the last thirteen years there has been a significant increase in the number of public employees in Spain. During the period 1990-2003 aggregate public employment in Spain has increased in a 25,23 percent according to data provided by the *Ministerio de Administraciones Públicas (MAP).* [1] In spite of this increase, in 2003 the ratio public employment over total employment remains slightly below its level in 1990 (13.9 percent in 2003 vs. 14 percent in 1990). However, there are significant differences between regions.

Data on the wage bill of the Public Administrations are even more noticeable [2]: Central Government's wage bill increased by 38 percent (90-99) and Regional Governments' wage

bill increased by 110.37 percent (90-99). The increase in the Regional Governments' wage bill might be due to the increase in the number of public employees as well as an increase in public wages. However, this argument is not valid to what concerns the Central Government's wage bill because during this period there has been a decrease in the number of public employees in that Administration [3] (367.043 employees). Therefore, it seems that this significant reduction in the number of public employees has not been corresponded with a reduction in the Central Government's wage bill.

There are several arguments that may help explaining this path in the number of public employees. The first one is that since the eighties Spain has experienced an important process of socio-economic convergence towards the western economies. This convergence can be observed, among other things, in the fact that the different levels of governments have increased the provision and production of some public services such as education, health, social services, etc. Larger levels in the provision of those public services are usually associated to larger levels of public employment [4]. According to Oliver and Oglietti (2003), 17 percent of new employment from the period 1995-2001 is associated to the provision of public services (regardless of whether the production is public or private).

The second argument is that during the period 1990-2003 there have been several significant changes in the jurisdictional organisation in Spain. Due to the process of decentralisation that started in Spain early in the 80s, 17 Regional Governments have been created and public employment needs have not been entirely covered with employees transferred, together with the new responsibilities, from the Central Government [5]. We can observe (see Figure 1) that while the number of public employees at the Central Gov-
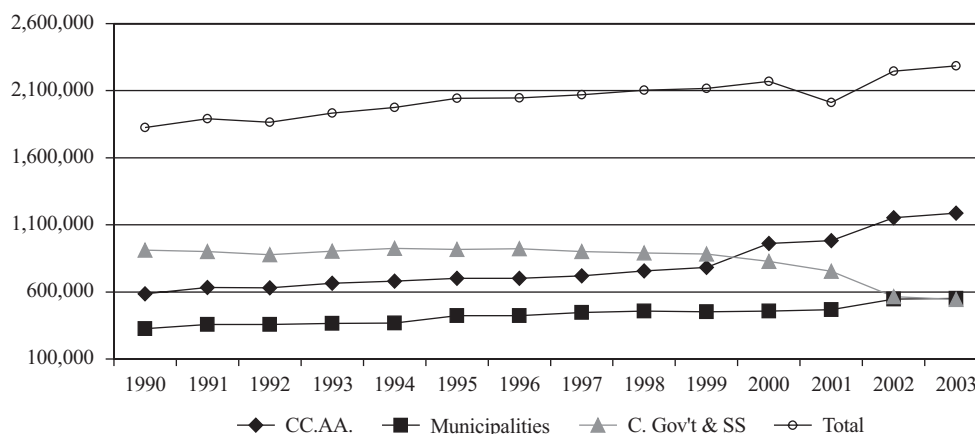

Data in figures 2, 3, 4, 5 does not consider employment in Justice, Armed Forces, National Security, Public Firms and Public Agencies for any jurisdictional level
Source: MAP.

Figure 1.   Public Empoyment by Institution 1990-2003

ernment and Social Security has decreased by 367.043 people (excluding employment in Public Firms), the number of workers at the Regional Governments has increased by 600.681 (excluding employees in Security, Justice and Public Firms), during the period 1990-2003.

Additionally, figures 2 and 3 show that, as expected, there are significant differences between regions that have different levels of responsibilities [6]. However, there are also significant differences among regions that belong to the same group. In the group of regions with larger levels of responsibilities (figure 2) the ratios of public employment over total employment in Andalusia and Canarias are well above the within-group average. In the group of regions with lower levels of responsibilities (Figure 3) we can observe that the ratio in Extremadura twofolds that in Baleares. This data suggests that differences in the level of responsibilities do not explain all differences in the regional levels of public employment.
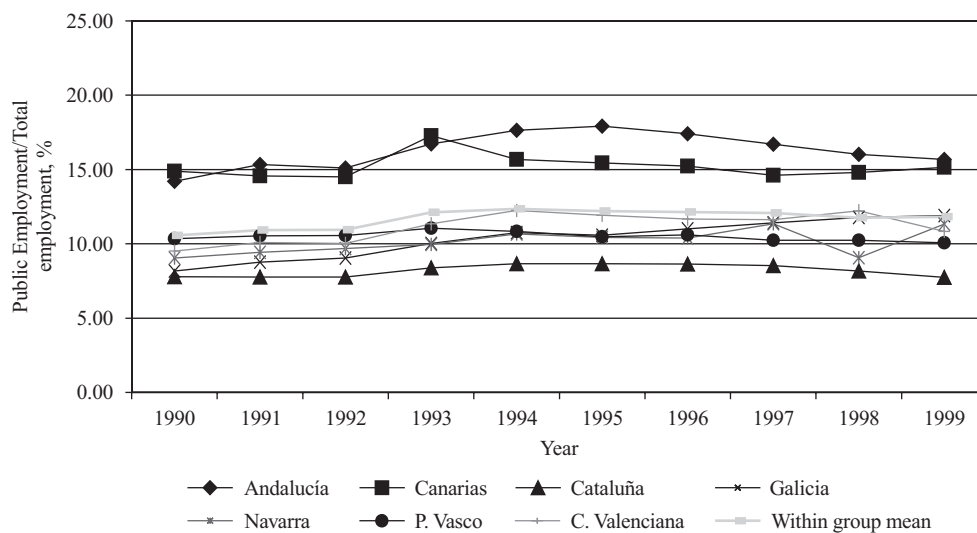
**Figure 2.   Public Employment/Total employment. 1990-1999.
Group of regions with all responsabilities**

Therefore, the increase in the number of public employees in Spain might be associated to the process of decentralisation in Spain as well as to the convergence of the Spanish Public Sector towards the levels of provision of public services in OECD countries. However, even though the previous arguments seem to be rather plausible, in this paper we argue that some public jobs might have been created on a basis of policy-oriented arguments. There are two perspectives to be considered.
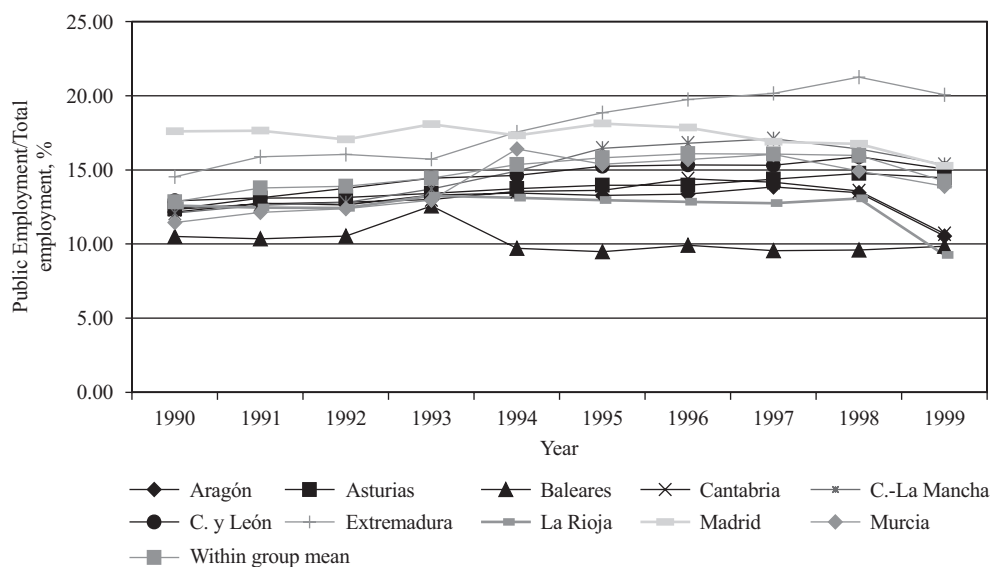
Source: MAP.

Figure 3.   Public Employment/Total employment. 1990-1999.
Group of regions with lower levels of responsabilities

On the one hand, the argument of public employment as a redistributive [7] device is related to the fact that the European Union fixes some constraints to the Regional and Central Governments on the fiscal policy instruments [8] that can be implemented in order to foster economic growth and employment. Those constraints imply that the fiscal policy instruments that the Central Government can use in order to reduce regional disparities in output levels are rather limited. Additionally, although Regional Governments hold responsibilities on some issues that may have an impact on growth in the long run, there is a lack of instruments to fight unemployment in the short-middle run because the EU limits apply also to the Regional Governments. In this framework, both Central and Regional Governments might have an incentive to use public employment as an alternative device to foster regional economic growth and employment [9].

In Figure 4 we present the regional ratios of public employment over total employment and the unemployment rates for each region. It seems that there is a positive relationship [10] between these two variables. This suggests that those regions with higher unemployment rates are precisely those in which public employment represent larger shares of total employment.

More evidence is provided in Figure 5, where we show the relationship between the level of regional GDP *per capita* in 1998 and the increase in the number of public employees during the period 1990-1998. We can observe that those regions with lower GDP *per capita*

Public Employment vs Unemployment Rates. 1999
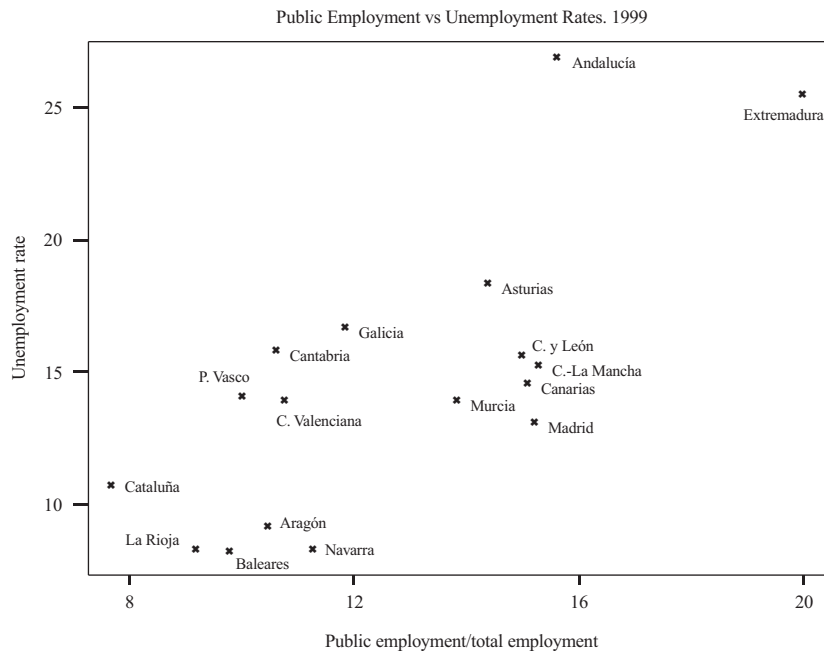
Source: BBVA and MAP.

Figure 4.   Public Employment *vs* Unemployment Rates. 1999

in 1998 are precisely those in which public employment levels have increased largely during this period. Although we should control for the level of responsibilities that have been transferred to the Regional Governments, it seems that data shows that in those regions with lower levels of GDP *per capita* the number of public employees has increased at higher rates. Needless to say that regions have received more or less responsibilities regardless of their GPD *per capita* or any other measure of wealth but as a result of a process of political bargaining instead [11].

The previous data may not be providing strong empirical evidence in order to prove that unemployment rates and low GDP *per capita* levels cause public employment. However, it denotes the possibility that public employment could have been used as a policy device.

On the other hand, Alesina *et al.* (2001) have pointed out that, from the political point of view, public employment as a redistribution instrument presents some advantages. They argue that using public employment has lower costs in political terms compared to the costs of redistributing through personal-transfer schemes because these instruments are easy to monitor through the budgetary process [12]. Additionally, public employment could be used as a instrument for political clientelism.

Public Employment and GDP per capita
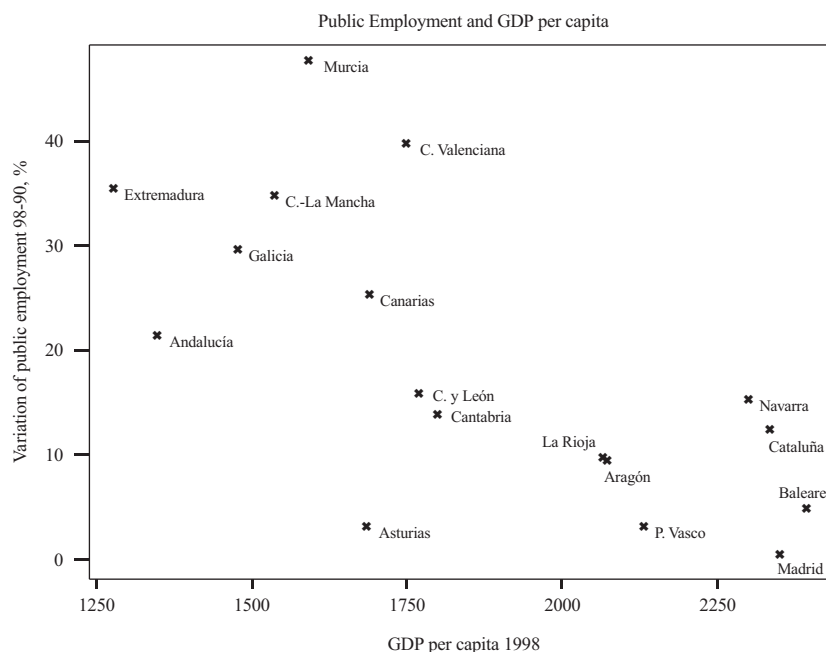
Source: BBVA and MAP.

Figure 5.　Employment and GDP *per capita*

In this paper we try to estimate to what extent the amount of public employment at the regional level can be explained according to political rather than economic arguments exclusively. The problem, from an empirical point of view, is that the political behaviour is very difficult to capture [13] in the short run. Unfortunately, MAP does not provide information on political appointees. Additionally, data from MAP does not allow to deal with temporary and permanent workers (except for those employees that are registered in the *Registro Central de Personal*, that account for less that 40 percent of total public employment) separately. This lack of data for instance does not allow us to test the countercyclicality of public employment or whether public employment is used as a instrument for political clientelism [14].

The paper is organized as follows. In section II we analyse briefly the current literature on public employment. In section III we present the model to be estimated and we try to differentiate between public employment as being motivated by an increase in social necessities to that motivated by political interest. In section IV we provide the main results of our estimations and in section V we conclude. Sections VI, VII and VIII contain the references, the data sources and the figures, respectively.

2.   The Literature

The topic of this article is related to a subject that was widely studied in the Public Choice literature: the size of the public sector. In spite of the significant contributions, both from a theoretical as well as an empirical perspective, that intended to find the determinants of the size of the public sector, we must note that from the empirical point of view results are not conclusive. Empirical contributions have provided an enormous number of variables, which try to capture different theoretical arguments, that have been considered as determinants of the public sector size [15].

In this paper we restrict ourselves to the analysis of an issue that was not particularly analysed in the previous literature (with the exception of Musgrave (82)): the determinants of public employment. From an empirical perspective we will use some of the variables that were used in the previous literature.

However, from a theoretical perspective the recent contributions from authors that follow the approach contained in the so-called New Political Economy provide a new framework of analysis. They study the economic decisions of agents that are policy-motivated. We must notice that these models take individuals as a reference while in our paper we focus our analysis from a regional perspective. We think there is no problem in doing so because those models are based on the representative agent hypothesis.

Although most of the contributions are empirically oriented, Robinson and Verdier (2002) argue, from a theoretical perspective, that public employment is very attractive politically, even that it might be socially highly inefficient, because it is a good commitment device between politicians and voters. They find that inefficient redistribution and clientelism become a relatively attractive political strategy in situations with high inequality and low productivity. However, in spite of those interesting results we think that the main hypothesis of their model, the one that considers that public employment is reversible, is too restrictive.

Alesina, Baqir and Easterly (2000) present a theoretical model in which politicians use public employment as a means for redistribution in order to circumvent political opposition to explicit tax-transfer schemes. They provide empirical evidence that in US cities politicians use public employment as a redistributive device. They find that city public employment is significantly higher in cities where income inequality and ethnic fragmentation are higher.

Finally, Alesina, Danninger and Rostagno (2001) show that the number of public employees in the poorer regions in Italy is significantly larger than in the richer regions. They compute the amount of expenditure on public employment due to redistribution by estimating the excess of public employees in the poorer regions compared to a benchmark economy. They calculate that about half of the public wage bill in the South of Italy can be identified as a subsidy. They conclude that both the size of public employment and the level of public wages are used as a redistributive device. However, even that the results of the paper and the methodology are quite interesting, we think that although it is based on political arguments, the authors do not introduce any variable to test their relevance (political orientation of the party in power, political turnovers, income inequality, unemployment rates, etc.).

In Spain, although there are several studies [16] that estimate the impact of public expenditure and taxation on redistribution, public employment has never been the object of study in any of those papers. In this paper we try to fill this gap. We cannot avoid mentioning a paper by Oliver and Oglietti (2003) that stresses: i) the process of absolute convergence of public employment over total population to the OECD average, ii) the non convergence in relative terms to the OECD average due to the fact that private employment has increased at higher rates, iii) the potential increase of public employment due to the expected increase in the provision of social services (including health services) in Spain, iv) a significant portion of the increase in public employment has been financed based on a strict control on public employees' labour costs.

Unfortunately, we cannot run the same exercise as that in Alesina et al. (2001) due to the lack of micro data available concerning Spanish public employees. Instead we will use aggregate regional data on public employment and we will introduce several variables that intend to capture the political component of public employment, also controlling for the likely economic determinants of public employment. As we mentioned already, the lack of data available on the regional allocation of temporary workers and on political appointees does not allow us to capture the arguments of political clientelism. However, we will use several variables that might allow us to suggest that public employment has been used as a policy device, always at the regional level: i) the political orientation of the ruling parties in the Executives, and ii) the competition or the coincidence between the ruling parties in different levels of government, etc.

3.   The econometric specification

We are interested in analysing the variables that may explain the number of public employees in the Spanish regions. Our dependent variable will be the number of public employees over total employment in a region. We estimate three equations. On the one hand, we gather Central Government and Social Security workers. On the other, we consider workers at the Regional Government and the Municipalities. Additionally, we estimate an equation based on the aggregate number of public employees for each region.

It is important to stress that this is an empirical paper and that it is not our goal testing any theoretical model derived from the formal representation of the behaviour of a government [17]. We just try to provide some hints on the determinants of public employment in a regional framework in which different levels of governments may use public employment to fight unemployment or as an instrument to favour (penalise) political partners (opponents).

Our benchmark equation is

$$y_{it} = \beta\, x_{it} + \delta\, z_i + \eta_i + \lambda_t + \varepsilon_{it} \qquad [1]$$

where x_{it} represents time and individual-variant variables, z_i denotes time-invariant variables [18], while η_i and λ_t refer to fixed individual and fixed time effects, respectively. Our estimates are based on a panel of i regions ($i = 1...17$) and t periods available ($t = 1990...1999$) [19].

We will work with the following variables [20]:

a) Variables that could be associated to the economic determinants of public employment. These variables are similar to those that are regularly used to estimate the Wagner's law [21]:

- Income per capita,

- Number of Jurisdictional Units —local and provincial—

- Level of responsibilities of Regional Governments on public expenditure [22]

- Dependency rate of the population, that is defined as: (65 < Population < 16)/Total employment [23].

b) Variables that may explain the political component of public employment [24]

- Unemployment rate,

- Political Coincidence. This variable indicates whether or not the ruling parties in the Regional and Central Executives are the same (we use a dummy variable that takes the value 1 when the same party —or a coalition— is simultaneously in the Central and Regional Executives and 0 otherwise). This variable changes over time.

- Political Orientation of the ruling parties at the Regional Governments [25].

From a methodological point of view we pay attention to two problems that may appear in our estimates: i) an endogeneity problem between the variables Public Employment and GDP, ii) non-stationarity of the dependent variable.

Endogeneity

One may argue that public employment may have a positive impact on GDP. Two considerations should be made to this respect. First, this relationship is not obvious. Alesina et al (2002) argue that excessive public employment levels could introduce: i) low motivation for entrepreneurs to develop market activities, ii) high differentials between public and private wages, among others, and that this may negatively affect GDP. In fact, we do not know any empirical study that provides strong empirical evidence on a relationship of causality between public employment and GDP. Second, in our analysis we are not using public employment in levels but the ratio public employment over total employment and GDP *per capita*.

Non-stationarity of the dependent variable

According to data in Figure 1 one could argue that public employment is a trendy variable. In fact, the number of civil servants, not even the number of temporary workers, does not fluctuate according to the needs of the Administration. Bureaucracy imposes a noticeable degree of rigidity when a reduction in the number of public employees is needed. Additionally, Regional Governments have been receiving new responsibilities during the period 1981-2003 and they have been increasing the number of public employees continuously.

As a consequence we might have introduced the endogenous variable with a one period lag as an explanatory variable. However, a dynamic panel data with autocorrelation in the er-

ror term introduces inconsistency in the estimates. We should use Instrumental Variables, for instance using the explanatory variable lagged two periods. However, this reduces the number of observations significantly.

In order to control for the likely non-stationarity of the dependent variable: i) we work with public employment measured as a fraction of total employment, ii) we control for the process of decentralisation by introducing a variable that takes into account the level of responsibilities of each region, iii) we control for autocorrelation in the disturbances

In order to control for autocorrelation we decided to follow the procedure: i) We estimate equation (1) using the OLS procedure, we test the presence of autocorrelation in the disturbances by estimating ρ and by checking whether the covariance of the residuals in differences is close to zero, ii) If we detect autocorrelation we estimate equation (1) using OLS assuming an auto correlated error term, $\varepsilon_{it} = \rho\varepsilon_{it-1} + u_{it}$, where ρ denotes the autocorrelation coefficient and u_{it} is i.i.d iii) when the estimated coefficient for ρ is very large we estimate equation (1) using variables in first-differences.

4. Results

4.1. The regional distribution of public employment by the Central Government

In this section we study the variables that might be considered by the Central Government (and Social Security) when deciding the distribution of public jobs across the different regions. We estimate a model in which we introduce several explanatory variables: i) the dependency ratio, ii) the unemployment rate, iii) GDP *per capita* (GDPpc), iv) the level of decentralisation, and v) the coincidence between the political orientation of the ruling parties in the Central and Regional Executives.

On the one hand, we expect to find a positive relationship between the number of public employees and the dependency ratio, the unemployment rate and the variable of political coincidence. On the other hand, we expect a negative sign for the variable that measures the level of decentralisation of the regions [26] and the variable GDPpc (we argued that the Central Government could favour those regions with lower GDPpc).

We must emphasise that in all the regressions that we run there are two variables that are always significant and they have the expected sign. First, not surprisingly, we observe that the Central Government allocates a lower number of public jobs in those regions whose Regional Governments have received more responsibilities. Second, and more interesting, our regressions show that the Central Government has allocated a larger number of public jobs in those regions in which there is a coincidence between the political orientation of the ruling parties in the Regional Government and that in the Central Government. This result suggests that politicians at the Central Government may have favoured those regions in which the political orientation of the ruling party was the same. We present these results in Table I.

Table 1
Dependent Variable: log of Central Gov't Employees per worker

Explanatory Variables	(1) OLSQ		(2) AR(1)		(3) AR(1)		(4) AR(1)	
	Coeff.	T-Student	Coeff.	T-Student	Coeff.	T-Student	Coeff.	T-Student
Constant	21.7	1.19	26.17	2.45	0.912	0.638	6.92	8.21
Dependency ratio	0.797	1.51	0.484	1.09	1.24	3.97	0.354	0.861
Unemployment	0.612	3.03	0.48	2.56	–0.038	–0.297	0.199	1.36
GDP per capita	–2.57	–1.03	–3.11	–2.15	0.436	2.47	–0.402	–3.18
Decental. Middle	–0.912	–1.84	–1.08	–3.79	–0.313	–3.3	–0.51	–3.35
Decental. High	–2.24	–6.71	–2.4	–9.83	–1.29	–17.79	–1.98	–7.97
Political Coincidence	0.231	2.07 r	0.297	5.16	0.222	4.15	0.236	4.48
Fixed Time effects	yes		yes		yes		CTE	
Fixed individual effects	yes		yes		CIE		yes	
Rho	0.217		0.688		0.832		0.805	
Covar($\Delta u_{it}, \Delta u_{it-1}$) ≈ 0	yes							
Ad. R-Squared	0.969		0.896		0.819		0.87	
F-Statistic					F(16,108) = 4.53		F(7,108) = 2.26	

Column (1) presents the results of the OLS estimation considering fixed time and individual effects as well as heteroskedastic consistent errors. We use this estimation in order to show the existence of autocorrelation in the disturbances. Our results show that disturbances are auto correlated because we find ρ > 0 [27] and Covar ($\Delta u_{it}, \Delta u_{it-1}$) ≈ 0. Therefore, this implies that we cannot test the signification of the coefficients according to the regular T-S and F tests.

Given these results we proceed to run our estimations considering an auto correlated error term. Columns two, three and four contain the estimations considering time and individual fixed effects, time fixed effects and common individual effects (CIE), and individual fixed effects and common time effects (CTE) respectively.

The different tests show that the preferred specification is the one that considers fixed individual effects and common fixed time effects [28]. The results of this specification are those in column (4). In addition to the aforementioned results concerning the variables Political Coincidence and Decentralisation (Middle, High), in column 4 results show: i) regional public employment is negatively related to regional GDPpc, therefore suggesting that those regions with lower levels of GDPpc are the ones to which the Central Government has assigned a larger number of public jobs (in relative terms), ii) neither the dependency ratio nor the unemployment rate are significant. We must stress also that the estimated coefficient for ρ is not very high (.8) so that we considered that it was not necessary to run the estimations in first differences [the procedure AR(1) is already correcting for autocorrelation].

Even that results in column (3) do not correspond to the preferred specification, one might be surprised by the positive sign of GDPpc. We must remind that the restriction of a common individual effect does not allow us to compare columns (2) and (3) because they es-

timate different things. In column (2) we estimate a regression for each of the regions (although we impose common slopes we allow for different intercepts), while in column (3) the results correspond to a specification in which we do not take into account regional differences of any kind. The positive sign of GDPpc in column (3) might be due to the fact that the demand of services such as Education and Health are positively related to GDPpc and during this period there has been as significant increase in the level of GDPpc in all regions (even that regional differences are rather important).

Therefore, the previous results indicate that, beyond the argument of decentralisation, the Central Government might have been using public employment as a mechanism to favour those regions with lower GDPpc. Also we conclude that the Central Government might have been favouring those regions whose Regional Government's ruling parties are the same to that of the Central Government. Additionally, it seems that GDPpc instead of unemployment rates and dependency ratios is considered as the most relevant variable when deciding the regional allocation of public jobs. This might be explained by the fact that the fight against unemployment is often addressed with alternative instruments such as personal transfers schemes instead of public employment.

4.2.   Public employment at the Regional Governments

In this section we try to determine the variables that might be considered by the Regional Governments when deciding the number of public employees in their jurisdiction.

As expected, the number of public employees in the Regional Governments depends largely on the level of responsibilities received from the Central Government. As a consequence, in those regions with lower levels of responsibilities the number of public employees depends largely on the Central Government's decision to transfer more responsibilities [29]. Again, in this section there may be still a problem of autocorrelation that we try to avoid by running OLS estimations considering an auto correlated error term.

In Table II, results in column (1) correspond to OLS estimation with heteroskedastic consistent errors and both individual and time fixed effects. The results show that the coefficient for ρ is > 0 and Covar(Δu_{it}, Δu_{it-1}) ≈ 0, therefore suggesting that we should run the estimations controlling for autocorrelation. As in the previous section, in column (2) we present the estimation considering both fixed time and individual effects, while in columns (3) and (4) we test the null hypothesis of a common individual fixed effects (CIE) and common fixed time effects (CTE), respectively.

According to the F-Test, the preferred specification is that in column (4), therefore the one that considers a common fixed-time effect and individual fixed effects. We must note that the rho coefficient is not very high, 0.59.

On the one hand, those variables that are related to the provision of public services are significant (see column 4) and present the expected positive sign: i) those regions with higher dependency ratios present larger levels of regional public employment over total employment; it is important to stress that high dependency ratios are associated to higher levels

Table 2
Dependent Variable: log of Regional Gov't Employees per worker

Explanatory Variables	(1) OLSQ		(2) AR(1)		(3) AR(1)		(4) AR(1)	
	Coeff.	T-Student	Coeff.	T-Student	Coeff.	T-Student	Coeff.	T-Student
Constant	18.94	0.689	59.55	2.34	4.98	4.22	−8.42	−1.55
Dependency ratio	0.805	2.83	0.364	1.44	−0.132	−0.529	0.68	2.74
Unemployment	−0.042	−0.4	0.053	0.463	0.453	4	−0.012	−0.136
GDP per capita	−0.411	−3.78	−1.87	−1.98	−0.032	−2.24	0.589	7.36
Decentral. Middle	−4.27	−0.624	−14.5	−2.23	−0.06	−0.89	2.66	1.46
Decentral. High	0.156	0.156	−1.36	−1.4	0.34	5.49	1.16	4.93
Left–wing party	0.748	10.9	0.741	5.84	0.265	1.93	0.75	6.55
Regional Party	0.712	12.84	0.748	7.78	0.196	2.46	0.768	8.2
Political Coincidence	−0.731	−11.16	−0.72	−5.76	−0.172	−1.16	−0.739	−6.56
Number of local govt's	−1.84	−0.618	−6.35	−2.24	0.021	0.794	1.178	1.48
Fixed Time effects	yes		yes		yes		CTE	
Fixed individual effects	yes		yes		CIE		yes	
Rho	0.507		.951		.674		59	
Covar($\Delta u_{it}, \Delta u_{it-1}) \approx 0$	yes							
Ad. R-Squared	0.932		0.898		0.797		0.919	
F-Statistic					$F(16,105) = 12.74$		$F(7,105) = 1.765$	

in the provision of public health and public education; ii) those regions with larger GDPpc present larger ratios of regional public employment probably because increasing levels of GDPpc are associated to increasing levels of public education as well as public health services; iii) the variable that refers to decentralisation is only significant for those regions that have all responsibilities; those regions that have not received the responsibility on public health do not show significant differences as compared to those without neither public education nor public health. There is only a significant difference in the ratio of regional public employment over total employment between those regions with all responsibilities and the rest of the regions [30].

On the other hand, the estimates show that those regions with left-wing oriented or regional ruling parties present larger levels of public employment as compared to those ruled by right-wing oriented parties. However, we cannot provide any intuition for the negative sign, and signification, of the variable Political Coincidence. In fact, there might be a problem of multicolinearity between this variable and the dummy variable that refers to those regions with left-wing oriented ruling parties [31]. This multicolinearity is 0.9. However, we must note also that the variables that refer to left-wing oriented Regional Governments and political coincidence have similar coefficients with opposed signs, so that they almost cancel out. In spite of this fact, when we run the estimations without the variable Political Coincidence none of the coefficients is significant, therefore suggesting that it is a relevant variable.

We must stress that in this framework the variable GDPpc has a different interpretation to that in the previous section. In the previous section we argued that the Central Govern-

ment was using GDPpc to discriminate in favour of the poorer regions, regardless of their demand of public services according to their GDPpc. In this section GDPpc is associated to larger demands of public services: the larger the GDPpc the larger the demand on public services such as education and health.

4.3. The aggregate level of public employment

In this section we study the variables that may explain the aggregate level of public employment in each of the regions.

Results in Column (1) in Table III again show the existence of autocorrelation in the disturbances. Therefore, in columns (2), (3) and (4) the results correspond to estimations considering an auto correlated error term. In this section the preferred specification, that considering both fixed time and individual effects, is characterised by an autocorrelation coefficient that is close to 1 (.967).

Therefore, results in Column (2) suggest that we should test for unit roots in the errors in order to check whether we should work with variables in first-differences instead. However, when we differentiate we eliminate all those variables that are time invariant, which means that we run our estimations without any of the individual-specific variables. When we do so we observe that although we control for autocorrelation, the problem with heteroskedasticity arises and the estimations with heteroskedastic-consistent errors change significantly.

Although results in Column (2) should be taken with some care due to the high rho coefficient, they are rather interesting. First, we must note that none of the political variables are significant. Second, decentralisation is rather significant, however with a negative sign: those regions with larger levels of decentralisation present lower levels of aggregate public employment over total employment. This result might seem contradictory, but it might suggest that those public employees that were working in those regions that have accepted larger responsibilities and have not been transferred to the Regional Governments might have been reallocated in those regions with lower levels of responsibilities (in those, which are just a few, where the Central Administration is still predominant).

To what concerns GDPpc, the estimated coefficient is significant and takes the negative sign therefore suggesting that aggregate public employment is larger in the poorer regions. Again, the dependency ratio is significant and positive.

Given that the estimated coefficient for autocorrelation is very close to 1, this result indicates that we should take variables in first differences. This implies that we cannot use time-invariant variables such as the number of municipalities, the political orientation of the ruling parties, the individual fixed effects and the coincidence between the political orientation of the different ruling parties in the Central and Regional Governments. We also miss the variable that controls for the level of decentralisation because during the period of analysis none of the regions has moved from one group to the other.

Table 3
Dependent Variable: log of Total public employees per worker

Explanatory Variables	(1) OLSQ		(2) AR(1)		(3) AR(1)		(4) AR(1)	
	Coeff.	T-Student	Coeff.	T-Student	Coeff.	T-Student	Coeff.	T-Student
Constant	20.97	1.21	39.64	3.21	3.23	4.64	–0.226	–0.076
Dependency ratio	0.746	5.23	0.35	2.87	0.309	2.1	0.462	3.65
Unemployment	0.044	0.76	0.091	1.64	0.3299	4.97	0.081	1.8
GDP per capita	–0.478	–0.71	–1.2	–2.62	0.086	1.01	0.232	5.84
Decentral. Middle	–4.59	–1.06	–0.917	–2.9	–0.12	–2.81	0.953	0.961
Decentral. High	–0.78	–1.23	–1.48	–3.04	–0.23	–6.18	0.004	0.031
Number of local govt's	–1.94	–1.03	–3.98	–2.88	0.015	0.899	0.459	1.05
Left–wing party	0.164	3.3	0.111	1.8	0.042	0.516	0.122	1.97
Regional Party	0.08	2.32	0.084	1.82	–0.064	–1.31	0.09	1.86
Political Coincidence	–0.131	–2.72	–0.08	–1.32	0.054	0.623	–0.097	–1.61
Fixed Time effects	yes		yes		yes		CTE	
Fixed individual effects	yes		yes		CIE		yes	
Rho	0.581		0.967		0.765		0.795	
Covar($\Delta u_{it}, \Delta u_{it-1}$)≈ 0	yes							
Ad. R-Squared	0.946		9.47		0.884		0.96	
F-Statistic					F(16,105) = 12.74		F(7,105) = 1.765	

Nevertheless, in order to retain the information contained in the political variables we introduce several variables that capture such information. On the one hand we introduce a variable that we call Political Turnover that takes the value 0 if there has not been a change in the ruling party in the regional government and 1 otherwise [32].

On the other hand we introduce a variable that tries to capture whether there has been a change in the coincidence between the ideology of the ruling parties in the Central and Regional Governments. We use two different specifications. First, in column (1) the variable Political Coincidence captures whether or not there has been a change in coincidence (0 for no change and 1 otherwise). Second, in column (2) we distinguish three situations i) No change in coincidence, ii) a change from coincidence to non-coincidence, iii) a change from non-coincidence to coincidence.

In Table IV all estimations are run considering heteroskedastic consistent errors. The results in columns (1) and (2) show that only the dependency ratio is significant and it has a positive sign therefore suggesting that changes in the dependency ratio of any region could motivate changes with the same sign in the ratio public employment over total employment in that region. Nevertheless, variations in GDPpc and unemployment rates are not significant. We must note also that the variable Political Turnover is not significant in any of the specifications.

However, the variable that collects the change in the political coincidence is significant. In column (1) we observe that the variable is significant and it takes a negative sign. This result suggests that those regions in which there have been changes in the coincidence of the

Table 4
First differences of Total public employees per worker

Explanatory Variables	(1)		(2)	
	Coeff.	T-Student	Coeff.	T-Student
Constant	0.146	2.39	0.147	2.39
Dependency ratio	0.371	3.29	0.369	3.26
Unemployment	0.061	1.38	0.058	1.27
GDP per capita	−1.17	−1.78	−1.18	−1.78
Change in Political coincidence	−0.047	−2.61		
Coincidence to non coincidence		−0.048	−2.52	
Non coincidence to coincidence		−0.03	−1.53	
Political Turnover	0.012r	1.51	0.011	1.35
Fixed Time effects		yes		yes
Fixed individual effects		yes		yes
Ad. R-Squared		0.374		0.369

political ideology of the ruling parties in the Central and Regional Administrations present lower levels of public employment in comparison to those regions in which there have not been changes in the political coincidence. More interestingly, in column (2) we show that the change in political coincidence that matters is the one that goes from coincidence to non-coincidence.

The intuition behind this result is that bureaucratic procedures introduce rigidity in the process of hiring new public employees so that public employment cannot be modified in the short run (it takes one or two years at least). Therefore, when there are continuous changes in that coincidence it is more difficult to increase the number of public employees (the process is somehow controlled by the Central Government also).

Therefore, we showed that together with the economic variables, the political variables play a role when we try to explain the aggregate level of public employment across regions.

5.   Conclusions

In this paper we tried to provide some arguments to explain the significant increase in the number of public employees in the Spanish economy during the period 1990-1999 from a regional perspective. We argued that this increase could be explained according to economic variables (the process of decentralisation, GPDpc, dependency ratio, etc.) as well as those variables that explain public employment as a policy device (public employment being used to favour —penalise— political partners —opponents—). Given that in Spain there are three different levels of governments, and that during this period there has been a transfer of responsibilities from one level to the other, we considered that we should separately deal with the evolution of public employment in the Regional and Central Governments.

Although the process of decentralisation has been one of the main determinants of the evolution of public employment we did not focus our analysis on this process. However, we must note that, from the empirical point of view, we introduced this variable in our analysis.

Additionally, our analysis is based on a regional framework, therefore we are not referring to public employment as an instrument for redistribution from individual to individual but from a regional perspective.

Some interesting results derived from our analysis.

First, we tried to shed some light on the determinants of the regional allocation of public jobs by the Central Government. Our results confirm the role played by the decentralisation process and we observe that those regions that have received larger levels of responsibilities have a small number of public employees that are subordinate to the Central Government. Likewise, we show that there is some evidence that the regional allocation of public jobs by the Central Government is positively related to the coincidence in the political orientation of the ruling parties in both executives.

Although the results concerning the previous variables were quite robust, the remaining variables present some variation in both the signification and the signs, depending on the final specification of the model. However, after running some tests, the results of the preferred specification (the one including individual fixed effects and a common fixed-time effect) seem to indicate that the Central Government might have allocated public jobs across regions favouring those regions with lower levels in GDPpc.

Second, we devoted our attention to study the variables that might have been considered by the Regional Governments when deciding the level of public employment in their jurisdictions. As expected, the variable that explains most of the increase in public employment at the Regional Governments, in any of the specifications, is the one that controls for the process of decentralisation: the regions that have received larger levels of responsibilities are the ones that have larger levels of public employees. We obtained: a) the variable that controls for the process of decentralisation is significant and has the expected sign, b) the variable GDPpc is significant, with a positive sign, suggesting that those regions with higher GDPpc have larger levels of public employment, probably because GDP is associated to a larger demand in public services such as education and health, c) we also found some evidence that public employment was larger in those regions with higher dependency ratios; d) we concluded also that regional public employment was larger in those regions with left-wing and region-wide oriented parties as opposed to right-wing oriented parties. Surprisingly, the estimations showed that those regions in which the ruling party was the same to that in the Central Executive presented lower levels of public employment (this result might be due to the high correlation between the variables Political Coincidence and the one that represents left-wing oriented regional ruling parties). We could not avoid using both variables because of their high individual signification.

Finally, we estimated a third regression with total public employment at the regional level as the dependent variable. The results of the estimation in first differences, controlling for heteroskedasticity, showed that the aggregate level of public employment was positively related

to the dependency ratio and that the shift in the coincidence of the political orientation of the ruling parties in both executives favoured lower levels of aggregate public employment.

Therefore, in the previous lines we provided empirical evidence that suggests that the decision on public employment is not taken considering economic arguments exclusively and that public employment might have been used by both Regional and Central Governments as a policy device.

Although we derived some interesting results from our estimations, we think that in the near future the estimations will be improved because: i) the data will include employees in Justice and Security, ii) the process of decentralisation was completed in 2002 when Education and Health were transferred to all regions, so that the decision on public employment will be entirely endogenous to Regional Governments. Given these conditions, we should be able to distinguish the variations in the number of public employees at the Regional Governments that are due to the necessities of the Regional Governments to those that are due to policy-makers interest.

Additionally, we think that our results should be contrasted with the estimates obtained from the Labour Force Survey.

6.   Data

Data on the number of **Public Employees** is available at the *Boletín Estadístico del Personal al Servicio de las Administraciones Públicas. Registro Central de Personal* (Source: *Ministerio de Administraciones Públicas* for the period 1990-2003 for all regions).

Data includes all public servants that hold a position in the Public Administrations (at any jurisdictional level). Data includes workers that hold a permanent or a temporary position at the Administration. However, the distinction between these two groups is only available for those workers included in the *Registro Central de Personal* (that account for less than 40 percent of the total employees in the Public Administration)

Data also includes public servants that are not registered in the *Registro de Personal* (Data is provided by different public institutions among which there is the Social Security Service). Data does not include neither civil temporary workers with hiring contracts with duration inferior to 6 months in the Ministry of Defense nor political appointees.

Our variable *Public Jobs at the Central Administration* (information available for each of the regions), includes all public jobs except those related to:

- Justice.
- Armed Forces (except civil employees at the Ministry of Defense and those in this Ministry with hiring contracts with duration inferior to six months).
- National Security (Police).
- Employees in Public Firms and Public Agencies.

Although the regional distribution of these jobs is available from 2000 we decided not to use these years it in order to maintain homogeneity of the data during the period.

Regarding our variable *Public Jobs in the Regional Administrations,* we must notice that public jobs related to Security Forces, Justice and employees in Public Firms and Public Agencies are not included. Even though the information is available from 2000 we decided no to use it in order to maintain homogeneity of data during the period. For some regions this data was not available because they did not have the responsibility yet, but the information was not available for those regions that already had it.

Additionally MAP data provides regional information on *Public Jobs in the Local Administration* and public employment at the *Universities.*

There is another source of data available, that of the Labour Force Survey (EPA in Spanish), which provides detailed microdata information on the labour force. We think that both sources have several shortcomings:

- The information from the MAP has the shortcoming that there might be a delay in registering public employees. Additionally, MAP data is the one used in *Contabilidad Regional* (which elaborates series on regional accounts).

- Data from EPA is very detailed and is available since the second half of the eighties. Estimates are based on a survey. On aggregate there are systematic differences between EPA and MAP data. However, it seems that bias does not follow a uniform distribution across regions. We already checked that the number of public employees provided by the MAP is lower to the one provided by the EPA, but this is not surprising given that, as we mention, MAP is excluding several types of public employees.

Nevertheless, we did not have enough information that helped us deciding which one is better. We decided to use data from the MAP because of its availability.

Expenditure in Public Employment (this corresponds to Chapter I in the Budget of each Administration): this data was collected from the Executed Budget considering all agents at any level of Administration. This means that data includes wages and salaries of all Public Employees, including those in Justice and Police but excluding Public Firms and Public Agencies. Data is obtained from BADESPE. We do not use this data in our estimates but in the motivation of the paper.

Regarding the other variables:

- **Population.** Source FBBVA: Goerlich, F.J, and M. Mas (2002).

- **Dependency rate of the population.** Elaborated based on employment and population data published by the FBBVA: Goerlich, F.J, and M. Mas (2002).

- **Unemployment Rates.** Source FBBVA: Goerlich, F.J, and M. Mas (2002).

- **Income levels.** Source: *Instituto Nacional de Estadística, Contabilidad Regional de España,* several years.

- **Political turnover and political idiosyncrasy of governments.** Elaborated based on the electoral results provided by the *Ministerio del Interior.* Available in the webpage of this Ministry.

Notes

1. MAP's data does not include all kind of public employees (see section VII for additional information). These variations are calculated excluding only employment in Public Firms at the Central Government from 1990-1994 because this informacion is not reported from 1994. We also excluded employment in Justice, Security and Public Firms in Regional Governments because this information is only reported from 1998.

2. Data is obtained from BADESPE *(Instituto de Estudios Fiscales)* that offers homogeneous data for all regions and all chapters on Expenditure Budget. This data includes expenditure on all public employees except those in public and semipublic enterprises. Unfortunately data from 2000 for Regional Governments is not updated in BADESPE yet.

3. We must note that public wages have been increasing at an average of 3% per year, below inflation rates and below the increase of wages in the manufacturing and private sector services, during this period. Altogether this would represent an increase of as muchas a 30,4 percent for all the period 1990-1999.

4. However, we must stress that there are significant differences in the size of public employment on OECD countries. See OECD (2001) to check the disparities.

5. In spite of the relevance of the process of decentralization it is not the goal of this paper to offer an accurate description of this process. See Monasterio and Suárez (1998) for an accurate description of the Spanish process of political decentralization. We must note that all empirical estimates are run controlling for the process of decentralization.

6. We clustered regions according to the articles 143 and 151 contained in the Carta Magna, which established a different process of transfer of responsibilities to the different regions. One group received all responsibilities since the very beginning (1981-1982) and regions in the other group have received all major responsibilities in 2002.

7. In these lines we refer to redistribution from a regional perspective rather than a personal one.

8. We refer to subsidies or tax credits to public or private firms.

9. We agree that any Administration cannot solve the problem of high unemployment rates with public employment exclusively. However, in some regions public employment —or migration— are the only choices for those who are searching for a job.

10. Obviously from this graph we cannot derive a causality relationship, we just mean that data suggests there is a negative relationship. In any case, we test this argument in the empirical analysis.

11. GDP *per capita* is one of the variables that is considered when deciding the amount of transfers that regions will receive from the Central Government, and this may indirectly affect public employment levels. Nevertheless, the most relevant variable is population, not GDP *per capita.*

12. Both personal transfer schemes and public employment are subject to bureaucratic control. However, public employment is difficult to monitor in the Parliament given that in order to do so its Members should know the real necessities of public jobs.

13. Additionally, politicians can also hire public employees through public firms instead because in those firms bureaucratic procedures are rather flexible. During the period of our analysis the number of public firms that depend on the Central Government has decreased while the number of public firms that depend on the Regional Governments has increased significantly.

14. Data from the Labour Force Statistics (EPA) show that temporary workers in all levels of government represent 21.5 percent of aggregate public employment. However, there are significant differences between levels of government: while in the Central Administration they account for just a 15 percent in the local and regional administration their participation in total employment is higher, 30 percent and 20 percent respectively.

15. See Larkey, Stolp and Winer (1986) for an excellent survey on this literature.

16. See Argimón *et al.* (1999) for a good survey on this literature.

17. Obviously, we are testing implicitly some of the hypothesis that are contained in the theoretical models.

18. Variables considered in x_{it} and z_i change with the specification of the model.

19. We chose this period of analysis because: i) data provided by MAP starts in 1990, ii) in 2000 regional data contains public employment in Security Forces, Police, Justice and public firms, and we cannot distinguish them from the rest. Therefore, in order to maintain homogeneity of data we did not use data from 2000 on.

20. See section 6 for detailed information on the sources of the data. Data are available upon request to the authors.

21. Other variables that might be considered but which will not be used in our analysis: Crime, Tax Evasion, Urbanization rate, etc. We also used regional land area and regional population density. However, these variables were dropped due to their lack of signification.

22. We grouped the regions according to whether they have received or not Education and Health. We differentiate three groups: i) those with both responsibilities, ii) those with Education only, iii) those with none of them. We create a dummy variable that represents these three situations. During the period of analysis some regions moved from group iii) to group ii). However, there are no new entrants to group i).

23. Usually this variable is defined considering population instead of total employment. With our definition the concept of dependency is reinforced because we are considering people that are not in the job market over total employed. This variable might be associated to the demand of education and health, but it also indicates the effort of the employed population in sustaining the whole population. In fact the demands of health and education services are generally associated to the GDP levels.

24. We would like to have introduced within-region inequality measures. However, they were not available for all regions for all periods.

25. We distinguish three types of parties: left-wing and right-wing oriented parties as well as regional parties. We introduce a dummy variable for each party.

26. The transfer of responsibilities from the Central to the Regional Governments reduces the number of public employees depending on the Central Government because some of them are transferred to the Regional Governments.

27. Even that the value of the rho coefficient is relatively small we must remind that it is downward biased, because it is computed based on a OLS regression of disturbances on past period disturbances.

28. The F-Test is computed based on the Sum of Squared Residuals from the AR(1) estimation.

29. The transfer of some responsibilities may represent that the Regional Government's number of employees two or threefolds.

30. It is very likely that the impact of education is not captured because the transfer occurred in 1998.

31. The Socialist Party was governing Spain until 1996, therefore, coincidence during this period basically refers to coincidence between left-wing oriented Regional and Central governments.

32. We do not distinguish whether the Political Turnover is from right-wing to left-wing or to region-wide oriented parties or whether it is from left-wing to right-wing or region-wide oriented parties.

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Resumen

En este artículo analizamos cuáles son las variables que explican la localización territorial de los empleados públicos por parte de la Administración Central asi como el incremento en el número de trabajadores públicos en la en las Comunidades Autónomas en los 90-99.

Los resultados basados en estimaciones con procedimientos de datos de panel sugieren que la localización territorial de los empleados públicos por la Administración Central se explica por el proceso de descentralización y por la concidencia del color político de los Gobiernos Regionales y el Central. También mostramos que la localización ha favorecido a aquellas regiones con menores niveles de renta.

En cuanto a los Gobiernos Regionales, los resultados vienen determinados por el proceso de descentralización, la ideología de los partidos gobernantes, el nivel de renta y la coincidencia de colores políticos de las administraciones.

Palabras clave: Empleo Público, Redistribución Regional, Instrumentos de Política Fiscal.

Clasificación JEL: H0, H1, R7.