



Institutions and Public Expenditure on Education in OECD Countries*

AGUSTÍN MOLINA-MORALES
IGNACIO AMATE-FORTES
ALMUDENA GUARNIDO-RUEDA
University of Almería

Received: September, 2012
Accepted: March, 2013

Abstract

The aim of this study is to determine the factors affecting public expenditure on education with regard to OECD countries, with particular emphasis on the relationship between institutional quality and education spending. For this purpose, a data panel model was estimated for 33 countries over a period of 14 years (from 1996 to 2009, both years inclusive). The results obtained enable us to conclude that the greater the economic, social and democratic development of a country, the higher the spending on education undertaken by the government, even more so in the case of left-wing governments.

Keywords: Public expenditure, education, institutionalism, inequality, GDP.

JEL classification: H52, I21, I24.

1. Introduction

How does institutional quality influence public spending on education? Are left-wing governments more committed to greater public intervention in education? This study aims to provide answers to these, and other, questions. Although there is ample economic literature on the factors influencing social spending, there remain, however, many gaps in the analysis of the determining factors involved in public spending on education. It is for this reason that the purpose of the current study is to analyze the influence, not only of economic variables, but also of social, political, religious, demographic and institutional variables on education policy. We have therefore used a data panel model has been with reference to 33 OECD countries over a period of 14 years (from 1996 to 2009 inclusive). This, in our opinion, is a novel aspect in this type of analysis.

* The authors are grateful to the editors and the two anonymous reviewers for their suggestions as they have improved this paper. Any mistakes are, of course, the responsibility of the authors. A preliminary version of this paper was presented at the 19th Meeting of Public Economics, Santiago de Compostela, in January, 2012.

Among the results obtained the fact that greater economic, social and democratic development implies a higher level of public spending on education is noteworthy. In addition, left-wing governments spend more on education than governments of other political colours, using public spending on education as a tool in the fight against income distribution inequality. However, while primary and secondary education requires greater public expenditure, this is not the case with university education.

The study is structured as follows: Firstly the introduction, Section 2 is a review of publications on empirical analysis of determinants of public spending on education. In Section 3, a data panel model based on 33 OECD countries is applied in order to determine the influence of different variables on public expenditure on education and finally, in Section 4, the conclusions.

2. Public Expenditure on Education and its Determinants

Currently, in a globalized economy and in the face of great challenges regarding competitiveness, public spending on education must be an active element within the scope of development, and as such an important tool for State intervention through the efficient, timely and balanced management of public policy in the field of education. In this sense, the quality of education policies, as well as how education spending is allocated, is extremely important. This is because a higher level of spending does not necessarily guarantee a higher quality and coverage of the educational service (Amate, I. & Guarnido, A., 2011), a state of affairs which presents a challenge for the State in driving forward strategic educational planning, and which contributes directly to development. Even so, it is important to point out that, as there are no homogeneous indicators for measuring education quality, proxy variables have been used¹.

In the analysis of the literature on the determinants of public spending on education, these can be grouped according to the impact of their different types: economic and demographic, political and institutional.

- *Economic and Demographic Determinants:*

The impact of changes in the economic environment has been considered as an important variable since the outset of research in the field of public policy analysis, such that the higher the level of economic development, the greater public spending over a given period of time (Wilensky, 1975, 2002). Of course, as one might expect, the economic environment has a relevant impact on education expenditure. As the studies of Nijkamo & Poot (2004) show, investment in education is beneficial for economic development.

There is, in fact, unanimity in appreciating the average educational achievement among the various cohorts which came into existence in the last century. Moreover, taking into account the demographic factors, the degree to which a nation allocates its education spending between the different levels of learning determines to a great ex-

tent the redistributive effect, in favour of the poor, of said investment (Patiño, 2011). Castles (1989, 1998) considers that the level of public investment in higher education largely determines its relative position in total education expenditure. Spending on tertiary or higher education can be an indicator of national resolve to follow the path of higher educational spending. As a consequence, this author expects a positive result between tertiary education enrolment figures and total public education spending. However, Busemeyer (2007) argues that tertiary enrolment alone, per se, does not determine overall educational spending of a country, because the variation in demand for primary and secondary education is too great to be ignored. As a matter of fact, public spending on primary, secondary and post-secondary, non-tertiary education amounts to around 75 per cent of total public spending on education in OECD countries (OECD, 2005). Consequently, Busemeyer concludes that the variation in the percentage of young people, in relation to the population as a whole, is a more important determining factor vis-à-vis total public spending than spending on tertiary education. In any case, Gil, de Pablos and Martinez (2010) argue that parents attaining the highest education level is a strong determinant of their children educational level, and so of the public expenditure on education.

The cultural heritage of a country can be considered as another important element and a determining factor for public education spending. In line with his study on the impact of religion on public policy, Castles (1994) maintains that the Catholic tradition inhibits the establishment of a broad public sector because, according to the principle of subsidiarity, the provision of services is delegated to families, households or private associations (Van Kersbergen, 1995). Besides, both during and after the nineteenth century, the Catholic Church was reluctant to hand over responsibility for the education of children to the State (Castles, 1989). Similar arguments have pointed to the fact that public expenditure on education in a country with a strong Catholic heritage, and a high percentage of Catholics amongst its inhabitants, will be lower than that of other countries (Jorgensen, 1987 and Manow, 2004).

- *Political Determinants:*

Political parties have differing preferences with regard to education expenditure, owing to the fact that they represent voters from different income brackets who make up their electoral support bases. Thus, the left-wing parties find their electoral base amongst the lower-income classes, and for this reason are more open to redistribution of wealth by means of social policies and education financed by public funds, while the conservative party base is to be found amongst the middle and upper income classes, whose interest lies in minimizing their tax bill. With regard to education policy, they could be interested in the creation of a larger number of educational institutions, and in the lower classes' participation in these, but not in the creation of a universal system of education for all (Hibbs, 1977). In accordance with this idea, left-wing governments increase public education finance, and right-wingers aim to contain (and even reduce) education expenditure (Castles, 1989; Boix, 1996, 1997; Ansell, 2006; Busemeyer, 2007).

As well as government ideology, the demands of the most decisive voters in elections also influence the shaping of policy. These electoral constraints, formalized in the classic models of party competition for average voter position, induce the parties to adjust their policies to suit the preferences of these voters, in order to improve the probability of electoral success. Their positioning with regard to policy will also influence the determining of the relative levels of expenditure in primary-secondary and in tertiary education. As the average voter benefits to a smaller degree from higher education as equality increases, as a consequence of the worsening of his economic situation, it is to be expected that inequality will have a negative effect on the relative significance of higher education in the make-up of the spending budget (Manzano & Salazar, 2009).

- *Institutional Determinants:*

As for institutional variables, there are some studies which analyze the impact of federalism and fiscal decentralization on public expenditure on education, without reaching at a conclusive result. Obinger & Wagschal (2000) hold that federalism has a strong negative impact on education policy and understand that it is a more decentralized policy than social policy, where levels of local government are even less willing to delegate responsibility. On the other hand, fiscal centralization and centralization of responsibility at national level can be linked with spending on higher education, due to the “education policy growth sectors (research and development, higher education)” which require an international perspective as well as strong financial backing, not usually available at the local or regional level.

However, one could also argue that fiscal decentralization is associated with higher levels of education spending (Busemeyer, 2007). When local governments enjoy a high degree of fiscal autonomy, they tend to provide better public services with the aim of attracting residents. This process of a “race to the top” might also be fuelled by the logic of the “fiscal illusion”. As such, Arze del Granado, Martínez-Vázquez and McNab (2005) hold that higher levels of fiscal decentralization lead individuals to demand the public provision of a greater quantity of private goods.

Finally, we find empirical evidence that progress in the democratization process inevitably leads to higher levels of spending on education (Meltzer & Richard, 1981, and Castles, 1989).

Once we have presented a summary of the empirical evidence concerning the impact of the different types of determinants (both economic and non-economic) on public expenditure on education, we raise the need to clearly identify the contribution made by each determinant towards education policy, in order that greater importance may be attached to those which weigh most significantly on the issue. To this end, the present paper will attempt to contribute to the study of behavior and of the determining factors which influence education expenditure, from the starting point of the knowledge already established by means of theory contrasted with empirical data,

and introducing alongside purely economic factors, each of the following: institutional, political, demographic and social factors. The paper attempts to go to greater depths in the analysis of institutional quality impact on public spending on education.

3. The model

The model used is a linear model with which we intend to explain public expenditure on education through a heterogeneous set of determinants which include economic, social, demographic, political, religious and institutional variables. The sample used focuses on the countries of the OECD, of which we have analyzed 33 cases, in spite of all being developed countries they differ substantially in the importance of the public sector in their economies, and so, there are many differences in education policy, as shown in chart 1, where the governments of the Nordic countries spend more on education than the others, while Asian countries are the ones who spend less. Furthermore, the use this sample of countries is also due to the availability of a homogeneous and reliable database, avoiding possible biases both in the data and in its systematization, which may occur when sources are scattered.

The period of time which we have considered has been limited by the availability of data, mainly with regard to the institutional variables. Nevertheless, we have been able to generate a panel data model for a period of 14 years, from 1996 to 2009. The use of panel data in order to study the institutional determinants of public spending on education is novel,

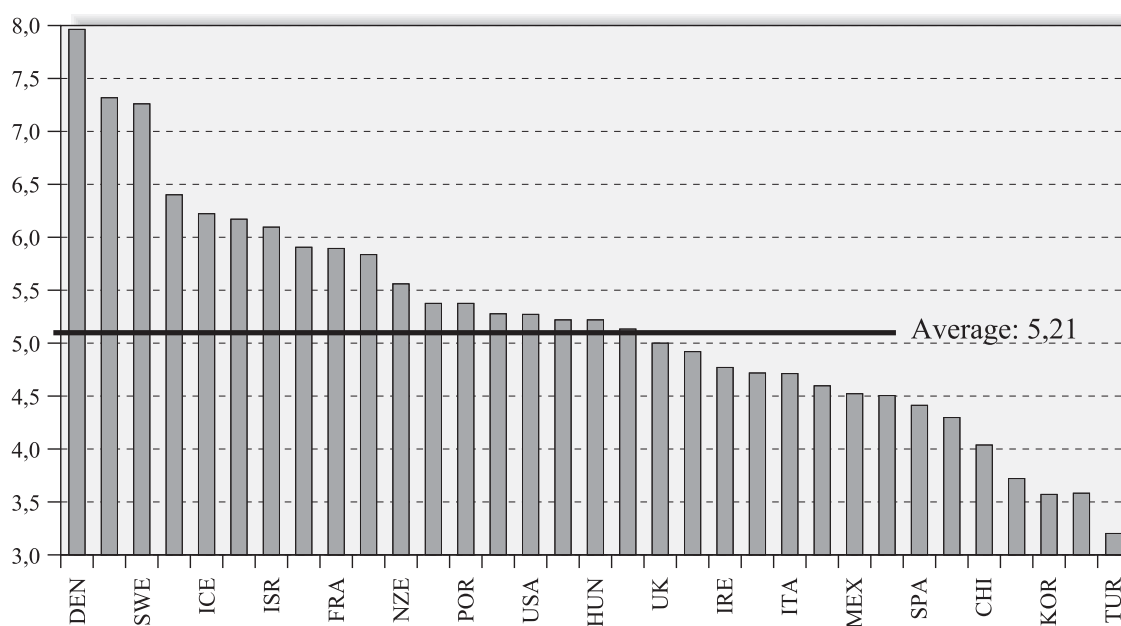


Figure 1. Public expenditure on education (average 1996-2009)

Source: Compiled by authors using OCDE data.

given that the most empirical studies use cross-sectional data derived from institutional indices created relatively recently and it has not been possible until now to access a series of more than 10 years for some of these indicators. We have been able to analyze 462 observations for each of the variables used. Despite the low variability in time of some of the variables used, the use of panel data allows us to analyze those slight differences which occur from year to year and country to country that, in our opinion, greatly enrich the analysis.

3.1. Data

The variables used are summarized as follows, in Table 1:

Table 1
TAXONOMY OF THE MODELIZED VARIABLES

Nature	Name	Description
Economic	GDP per capita	Measured in US dollars. It is a <i>proxy</i> variable of the level of economic development of a country. GDP is one of the variables used. Source: OECD
	Importance of Agriculture	We measure the importance represented by the Gross Value Added (GVA) generated by the agricultural sector, over the total economy. It is a proxy variable of the level of development of a country, in that in countries which reach the highest levels of development, the agricultural sector diminishes in importance for the economy. Source: <i>World Bank</i>
	Fiscal Pressure	This is defined as tax revenues (taxes and Social Security contributions) in relation to GDP. Source: <i>Governments' Finance Statistics, IMF</i>
	Public Expenditure	This is defined as the total non-financial spending undertaken by the public sector in relation to the GDP. Source: <i>Governments' Finance Statistics, IMF</i>
	Social Expenditure	Measures the social spending undertaken by each country in relation to its GDP. Source: OECD
	Income Distribution	Measured by the Gini Index. Source: World Bank
Education	Public Expenditure on Education	A percentage which represents education expenditure (current and capital) undertaken by the State, over GDP. It includes government spending on educational institutions (both public and private), education administration, and subsidies for private entities (students/households and other private entities). Source: <i>World Development Indicators, World Bank</i>

Table 1 (continued)
TAXONOMY OF THE MODELIZED VARIABLES

Nature	Name	Description
Education	Private spending on Education	Spending on education undertaken by the private sector, measured in national currency. Source: OECD (By means of this variable, we try to test whether private and public spending on education are substitutive or complementary)
	Average years of schooling	The number of years of schooling. Proxy variable of the quality of the educational level, in as much as the more years a person spends studying, the better, we assume, is his education level. Source: <i>Report on Human Development</i> , UN Development Programme
	University Graduates	The number of university graduates. Source: OECD
Demographic, Political & Religious	Children	The percentage which represents the proportion of the population under 15 years of age, over the total population. Source: <i>World Development Indicators</i> , World Bank
	Governing Political party	Its value is one if the government is left wing or left-centre, otherwise it is zero. Through this variable, we intend to verify whether the left-wing governments spend a greater percentage of the public budget on education.
	Catholic Religion	Dummy variable whose value is one if the Catholic Religion is predominant in the country, otherwise it is zero. This variable allows us to analyze whether or not the Catholic Religion has favoured public spending on education in a sample in which half of the countries studied are predominantly Catholic.
Institutional	Economic Freedom Index	<i>Index of Economic Freedom</i> : An index prepared by the <i>Heritage Foundation Research Institute/Wall Street Journal</i> which includes assessments on commercial policy, Government tax load, Government intervention on economy, monetary policy, foreign investment and capital flow, foreign activity, financial activity, salary and price control, property rights, and black market regulation and activity.
	Globalization Index	An indicator prepared by the Swiss Economic Institute KOF, which measures the connectivity, integration and global interdependence of nations in the cultural, ecological, economic, political, social and technological spheres. Source: KOF, ETH Zurich.
	Civil Liberties	<i>Index of Civil Liberties</i> : This is an index prepared by the NGO <i>Freedom House</i> . It includes evaluations of religious liberty and freedom of the press, the Rule of Law, human and association rights. It is an index widely used in empirical studies.

Table 1 (continued)
TAXONOMY OF THE MODELIZED VARIABLES

Nature	Name	Description
	Political Rights	<i>Index of Political Rights</i> : This is an index prepared by the NGO <i>Freedom House</i> . It includes evaluations of free and impartial elections, multiple political parties, a significant opposition, military dominance, and self-determination of minority groups. The degree of use of this index in empirical studies is very high ^a .
	Perception of Corruption Index	<i>Index of the Perception of Corruption</i> : This is an index prepared by the NGO <i>Transparency International</i> . It includes the perceptions of businessmen, academics and analysts about the level of corruption in civil servants and politicians. It is the index most widely used within this group of indices, given that it contains evaluations of 150 nations.
	Voice & Responsibility	This index is one of the <i>Governance Aggregate Indicators</i> and measures the level to which citizens of a country can participate in the election of their government, as well as freedom of expression, freedom of association and press freedom. Source: World Bank
	Political Stability	This index is one of the <i>Governance Aggregate Indicators</i> and measures the perception of the probability for the government to be subject to actions of destabilization or to be overthrown by unconstitutional or violent means, including terrorism. Source: World Bank
Institutional	Government Effectiveness	This index is one of the <i>Governance Aggregate Indicators</i> and measures the quality of public services, the quality of public administration and the level to which government is independent from political pressures, the quality of the formulation and implementation of policies, and the credibility of government's commitment to those policies. Source: World Bank
	Regulatory Quality	This index is one of the <i>Governance Aggregate Indicators</i> and measures the capacity of the government to formulate and apply appropriate policies and regulations allowing for and promoting private sector development. Source: World Bank
	Rule of Law	This index is one of the <i>Governance Aggregate Indicators</i> and measures the degree to which the agents trust and obey social rules and, in particular, the quality of the implementation of contracts, police and courts, as well as the probability of crimes and violent acts being committed. Source: World Bank
	Control of Corruption	This index is one of the <i>Governance Aggregate Indicators</i> and measures the level to which public power is used for private benefit, as well as small and large scale corruption, and the control of the State by select minorities and private interests. Source: World Bank

Source: Compiled by authors.

^a We have continued to use both indices jointly (the index of civil liberties and the index of political rights) as an indicator of democracy or political liberty. However, as Aixalá & Fabro (2007) indicate, both variables should be used separately, given that they deal with distinct concepts and, accordingly, offer different implications for income distribution.

3.2. The Model

We have estimated a linear model, through the estimators of *Feasible Generalized Least Squares* (FGLS), *Panel Corrected Standard Errors* (PCSE) and *Robust Generalized Method of Moments* (RGMM) for dynamic panel data. At the time of choosing these estimators a series of tests was carried out in order to determine the most efficient, in accordance with the variables used.

In first place, we applied the *Lagrange Multiplier Test* for random effects. The value obtained for chi squared (χ^2) led to rejection of the null hypothesis, making the use of Ordinary Least Squares (OLS) for random effects model preferable to the pooled model (pooled OLS) –that is to say, the usual OLS estimator.

Secondly, we carried out a similar test in order to determine whether the estimator for fixed effects was also better than the pooled model. The F test for the significance of fixed effects showed that, effectively, it is preferable to use the fixed effects estimator.

In the third place, the Hausman test was used to decide between random and fixed effects. The value of “ χ^2 ” obtained allows us to reject the null hypothesis, which is to say, the difference between the coefficients of random and fixed effects is clearly systemic, making it convenient to use fixed effects.

In the fourth place, the Wooldridge test was carried out. This test demonstrated that the model did not have any autocorrelation problems. Finally, the modified Wald test proved that the model is heterocedastic. In order to solve this, the two best estimators are *Feasible Generalized Least Squares* (FGLS) and *Panel Corrected Standard Errors* (PCSE). Although, Beck & Katz (1995) demonstrated that the standard errors of PCSE are more precise than those of FGLS, as the authors showed that when $N > T$ (as is the case where $N = 33$ and $T = 14$), and that FGLS should not be used, we decided however to use both models, in order to check the robustness of the model.

Also, regarding the possible existence of an endogeneity problem in the fiscal variables and the variables which measure the education quality, we decided to use the GMM estimator (Arellano & Bond, 1991) for dynamic panel data in its robust version due to the presence of heterocedasticity. We used the lagged fiscal and education quality variables as instruments, and the exogenous variables. The Arellano-Bond test to check for autocorrelation gives a result that cannot reject the null hypothesis and, therefore, once again we find that the model does not have an autocorrelation problem. The comparison of the results obtained through this estimator with those obtained with FGLS and PCSE once again allows the analysis of the model’s robustness.

We have used a data panel to jointly evaluate all the economic, institutional, social, demographic, political and religious variables. The use of panel data instead of cross-section analysis, traditionally the most widely-used method among researchers using institutional

variables due to availability problems of the above mentioned data, enables us to check individual heterogeneity, produce data with a higher degree of variability and a lower level of collinearity among the regressors, study dynamic adjustment processes, identify and measure effects which are not detectable with pure cross-section or time series data, and build and contrast models of more complex behavior than would be possible using simpler data.

We have undertaken 6 different estimates depending on:

- *The estimator used.* As before, three different estimators were used in order to correct the problems of heterocedasticity and endogeneity which our model had.
- *The two groups of institutional variables used.* On the one hand, we used the indexes of civil liberties and political rights of Freedom House, as well as the Perception of Corruption index of Transparency International. On the other hand, we used the governance aggregate indicators devised by the World Bank. In this way, we can test if the model is robust and if the effects of institutional variables differ substantially from each other depending on who produces the mentioned indicators.

The estimated model has the following specifications:

$$PEE_{it} = \alpha + \beta_1 Y_{it} + \beta_2 AGRICULTURE_{it} + \beta_3 TAX_{it} + \beta_4 PE_{it} + \beta_5 SOCIAL_{it} + \beta_6 GINI_{it} + \delta_1 PRIVATE_{it} + \delta_2 SCHOOL_{it} + \delta_3 UNIVERSITY_t + \lambda_1 CHILDREN_{it} + \lambda_2 PARTY_{it} + \lambda_3 CATHOLIC_{it} + \gamma_1 IEF_{it} + \gamma_2 IG_{it} + \gamma_3 ICL_{it} + \gamma_4 IPR_{it} + \gamma_5 PCI_{it} + \eta_i + \delta_t + \mu_{it} \quad (1)$$

where,

PEE, dependent variable, measures the public expenditure on education as a percentage of GDP: *Y* is income per capita, measured by GDP: *AGRICULTURE* measures the “weight” of the agricultural sector within the economy and is used as a proxy variable of the economic development of a country: *TAX* is fiscal pressure: *PE* measures public expenditure over GDP: *SOCIAL* considers the social spending undertaken by the State; *GINI* is the Gini index: *PRIVATE* measures private spending on education: *SCHOOL* represents the average years of schooling: *UNIVERSITY* measures the number of university students graduating each year: *CHILDREN* is the percentage of the total population represented by those under 15 years of age: *PARTY* is a dummy variable which takes the value 1 if the governing party is left wing or left-centre; *CATHOLIC* is a dummy variable which takes the value 1 if the Catholic religion is predominant in the country in question; *IEF* is the Index of Economic Freedom: *IG* is the Index of Globalization: *ICL* is the Index of Civil Liberties: *IPR* is the Index of Political Rights; *PCI* is the Perception of Corruption Index: η_i gives non observed individual effects to each country but constant in time; and δ_t measures non observed temporal effects which variable in time but identical to all countries.

In the same way, we estimate the same model, substituting the Index of Civil Liberties, the Index of Political Rights and the Perception of Corruption Index for the indicators devised by the World Bank:

$$\begin{aligned}
PEE_{it} = & \alpha + \beta_1 Y_{it} + \beta_2 AGRICULTURE_{it} + \beta_3 TAX_{it} + \beta_4 PE_{it} + \beta_5 SOCIAL_{it} + \beta_6 GINI_{it} \\
& + \delta_1 PRIVATE_{it} + \delta_2 SCHOOL_{it} + \delta_3 UNIVERSITY_{it} + \lambda_1 CHILDREN_{it} + \lambda_2 PARTY_{it} + \\
& \lambda_3 CATHOLIC_{it} + \gamma_1 IEF_{it} + \gamma_2 IG_{it} + \gamma_3 IVR_{it} + \gamma_4 IPS_{it} + \gamma_5 IGE_{it} + \gamma_6 IRQ_{it} + \gamma_7 IRL_{it} + \gamma_8 ICC_{it} \\
& + \eta_i + \delta_t + \mu_{it}
\end{aligned} \tag{2}$$

where,

IVR is the Index of the Voice of Responsibility; *IPS* is the Index of Political Stability; *IGE* is the Index of Government Effectiveness; *IRQ* is the Index of Regulatory Quality; *IRL* is the Index of the Rule of Law; and *ICC* is the Index of the Control of Corruption.

3.3. Results

After estimating the model explained by FGLS, PCSE and robust GMM, verifying the global significance of the models used and, in the case of the GMM estimator, checking that the instruments are valid through Hansen Test, we obtained the following results, as set out in Table 2.

The first conclusion that one finds on observing the mentioned table is that the results do not vary substantially, whichever estimator is used (FGLS, PCSE or robust GMM), nor do they vary with the institutional variables employed. This enables us to affirm that the model used is robust. In addition, the R2 is close 0.70, so the quality of adjustment is good, and Hansen Test gives a value greater than 0.05, so that the instruments used in the dynamic model are valid.

As for the values we have obtained, most cases coincide with what was expected a priori. Thus, the estimated parameter for GDP per capita is negative and significant, in as much as the higher the income of the population, the lower the level of public expenditure on education. Even so, the value obtained in the estimation is very small and the significance is lost when using robust GMM to extract strong conclusions. This result agrees with that expressed by Busemeyer (2007), about the relationship between public expenditure on education and the evolution of income per capita, it is not as direct as it is with social expenditure. However, the negative sign of the regressor of the importance of agriculture in the economy suggests that the greater the importance of the agricultural sector, the lower the level of public expenditure on education. If we take into account that the economic and social development of countries translates into a reduction in the importance of this sector, it can be asserted that the more developed countries are, the higher their level of public spending on education. On the other hand, inequality of income distribution implies an incentive towards public expenditure on education. In this way, the greater the inequality in income distribution, the higher public spending on education will be, which leads us to conclude that governments attempt to combat inequality by means of improvement in education.

The estimated signs for the variables which represent the activity in the public sector are those which were expected. Fiscal pressure exercises a positive effect on public spending on

education, such that the higher the fiscal pressure, the greater the public expenditure on education. In fact, as many researchers hold (Murillo and Pedraja, 2009; Creedy and Moslehi, 2010), education creates a feedback process because the higher the educational level the greater the labor earnings, the higher the income tax revenue and the higher the public expenditure on education. Also, total public expenditure and social expenditure have a positive effect on public spending on education, although, in the case of social expenditure, the degree of significance is very low. Thus, the more governments spend in general terms, the more they also spend on education. It is also true that the greater the level of social spending undertaken by the State, the higher the level of education spending. If we take into account that in many official statistics, such as the ones used, public expenditure on education is not included in social expenditure, it can be concluded that those countries whose governments are more sensitive towards maintaining and increasing the welfare of society are also those which spend a greater part of the public budget on improving education. In this sense, the positive sign and high significance of the dummy variable which represents whether the government is left wing or the left-centre suggests that in those countries governed by left-wing parties public expenditure on education increases. This result concurs with the study of Castles (1982), who concludes that there is a negative relationship between public expenditure on education and conservative governments. Busemeyer (2007) arrives at the same conclusion.

The results obtained for the influence of private spending on education over the dependent variable does not allow us to draw any clear conclusion. The sign changes depending on the estimator used and, moreover, is not significant for any of the six estimates carried out. Thus, we cannot determine whether public and private spending on education complement or substitute each another.

Table 2
RESULTS OF THE ESTIMATIONS

	Institutional Variables 1			Institutional Variables 2		
	FGLS	PCSE	ROBUST GMM	FGLS	PCSE	ROBUST GMM
Constant	-0.52 (-0.47)	-0.72 (-0.52)	-0.22 (-0.10)	-4.85*** (-4.77)	-5.85*** (-4.66)	-6.22*** (-3.53)
GDP per capita	-0.00001*** (-2.70)	-0.00002*** (-2.73)	-0.00002 (-1.48)	-0.00001*** (-3.07)	-0.00001** (-1.98)	-0.00001 (-0.84)
Importance of agriculture	-0.13*** (-5.02)	-0.13*** (-4.21)	-0.13** (-2.34)	-0.10*** (-4.30)	-0.11*** (-3.92)	-0.11** (-2.07)
Fiscal pressure	0.03*** (5.99)	0.04*** (5.78)	0.04** (2.48)	0.04*** (6.61)	0.04*** (6.20)	0.05*** (2.81)
Public expenditure	0.04*** (4.47)	0.05*** (4.10)	0.05** (2.25)	0.04*** (4.80)	0.05*** (4.67)	0.06*** (2.86)
Social expenditure	0.04*** (2.92)	0.02 (0.90)	0.04 (0.11)	0.03** (2.34)	0.01 (0.84)	0.006 (0.16)
Income inequality (Gini index)	0.02** (2.03)	0.009 (0.72)	0.002 (0.10)	0.02*** (2.71)	0.02* (1.81)	0.03* (1.74)

Table 2 (continued)
RESULTS OF THE ESTIMATIONS

	Institutional Variables 1			Institutional Variables 2		
	FGLS	PCSE	ROBUST GMM	FGLS	PCSE	ROBUST GMM
Private spending on education	-0.00008 (-0.01)	0.00007 (0.61)	0.000006 (0.23)	0.00001 (1.16)	0.00002 (1.17)	0.000001 (0.48)
Average years of schooling	0.03 (0.99)	0.04 (1.20)	0.01 (0.13)	0.07*** (2.76)	0.09*** (2.82)	0.09* (1.66)
University graduates	-0.00007 (-0.63)	0.00009 (0.07)	0.000001 (0.54)	0.00004 (0.32)	0.00001 (0.83)	0.000002 (0.96)
Percentage of children (people under 15)	0.18*** (15.77)	0.18*** (13.18)	0.19*** (6.98)	0.15*** (14.33)	0.16*** (11.61)	0.16*** (6.17)
Left-wing government	0.23*** (3.97)	0.21*** (2.66)	0.24* (1.74)	0.12** (2.25)	0.18** (2.38)	0.19 (1.51)
Catholic religion	-0.19** (-2.38)	-0.21** (-2.22)	-0.23 (-1.09)	-0.10 (-1.34)	-0.05 (-0.55)	-0.06 (-0.31)
Economic Freedom Index	-0.007 (-0.85)	-0.006 (-0.59)	-0.004 (-0.21)	0.006 (0.63)	0.02** (2.11)	0.02 (1.17)
Globalization Index	-0.003 (-0.48)	-0.003 (-0.42)	-0.002 (-0.14)	0.02** (2.57)	0.009 (1.09)	0.01 (0.61)
Civil Liberties Index	-0.54*** (-7.45)	-0.53*** (-6.16)	-0.56*** (-3.74)			
Political Rights Index	-0.39*** (-2.73)	-0.34** (-2.13)	-0.41* (-1.78)			
Perception of Corruption Index	-0.54*** (-7.45)	0.09*** (2.73)	0.08 (1.46)			
Index of Voice & Responsibility				1.02*** (4.25)	1.18*** (3.87)	1.18*** (2.82)
Political Stability Index				0.04 (0.52)	0.13 (1.22)	0.12 (0.96)
Gouvernement Effectiveness Index				0.16 (0.94)	0.39* (1.64)	0.32 (0.99)
Regulatory Quality Index				-0.55*** (-3.31)	-1.07*** (-4.65)	-0.95*** (-3.81)
Rule of Law Index				-0.61** (-2.43)	-1.18*** (-3.49)	-1.16* (-1.85)
Corruption Control Index				0.70*** (3.69)	0.98*** (3.86)	0.96*** (2.89)
Number of observations	462	462	462	462	462	462
R²		0.67				0.69
Hansen Test		0.71				0.72

* Significant to 10%. ** Significant to 5%. *** Significant to 1%.

On the other hand, the positive value for the estimated coefficient for the variable which measures the average years of schooling shows that the longer the time in school, the greater the public spending on education. In this sense, the proportion of the population under 15 years of age also exercises a positive effect on public expenditure on education, in that the greater the size of this population stratum over the total population, the greater is the budgetary share apportioned to education. However, the results do not bear out this direct relationship in the case of university education. Thus, the negative sign and the non-significance of the regressor for the number of university graduates does not allow us to reach conclusive affirmations with regard to the effect which university education has on public education expenditure, probably due to the fact that private spending is more important in university education than in primary and secondary. This contradicts the theory expounded by Castles (1990), who argues that there exists a direct relationship between the number of university students and the level of public expenditure on education. However, our results concur with those obtained by Bussemeyer (2007), for whom the percentage of the population under the age of 15 carries more importance on public expenditure on education than the number of students graduating from the universities.

Despite the presence of the Catholic religion in education in many countries, its effect on public spending on education is negative and not significant, so that the governments of countries where the Catholic religion is predominant spend less on education. Castles (1994) comes to this same conclusion: he argues that the Catholic tradition inhibits the establishment of a broad public service sector because, in accordance with the principle of subsidiarity, the provision of services is delegated to families, households or private associations (Van Kersbergen, 1995).

Finally and as main objective of this paper, we would like to stress that we have estimated the effect on public expenditure on education of two sets of institutional variables: on one side, the indicators prepared by the Freedom House organization (the Index of Civil Liberties and the Index of Political Rights), and the indicators developed by the Heritage Foundation (the Perception of Corruption Index), and on the other hand the indicators prepared by the World Bank (Governance Aggregate Indicators). Alongside both estimates, we have included the Index of Globalization and the Index of Economic Freedom.

The results obtained for the regressors of the Index of Economic Freedom and the Index of Globalization are not conclusive. In both cases, the sign for the coefficient varies according to the group of institutional variables used. In addition, they are significant in only one of the estimates. To this effect, the processes of economic liberalization and globalization which all the countries in this study are experiencing have not contributed to encouraging major spending by the State on education.

With regard to the Index of Civil Liberties, the coefficient obtained is negative. Given that this indicator is defined in such a way that those countries with greater civil liberties have a lower index, we can affirm that greater religious freedom, and greater freedom of

press and association, mean higher levels of public expenditure on education. Also, the negative sign obtained for the Index of Political Rights allows us to state that there is a direct relationship between democracy and public spending on education. Therefore, as the degree of democracy increases in those countries so does the government's interest in education. In this way, the positive sign for the regressor of the Index for Voice and Responsibility, with a value greater than unit confirms the conclusion. These results agree with those obtained by Meltzer & Richard (1981) and Castles (1998).

Regarding the Perception of Corruption Index, the sign of the coefficient varies with the estimator used, so we cannot come to any firm conclusions regarding the influence of corruption on public expenditure on education with this variable. However, the positive sign and significant value close to unit for the regressor of the Corruption Control Index suggests that the greater the extent to which corruption is controlled by governments, and therefore the lower it is, the greater the degree of investment in education achieved.

With regard to the influence which the remaining indicators (those provided by the World Bank which measure the quality of the institutional infrastructure) have on public expenditure on education, we have established that the significance of some of them is very low. Though it is not significant, the positive sign for the regressor of the Index of Political Stability shows that the more stable the country, the more the government invests in education. However, we note that the Index of Regulatory Quality has a negative effect on public expenditure on education, such that the more countries design and implement policies which promote the development of the private sector, the less the effort they put into improving education. On the other hand, the negative sign for the regressor of the Index of the Rule of Law suggests that a higher level of fulfillment of social rules by stakeholders does not necessarily imply greater public expenditure on education. Finally, it has been proved that there is a direct relationship between public spending on education and the Index of Government Effectiveness, so that the higher the quality of public administration, the greater the effort the government dedicates to raising the level of education.

4. Conclusions

For the purpose of this paper, which is to determine the factors influencing greater public expenditure on education, the most noteworthy conclusion reached through empirical analysis is that those countries which are most highly developed, which have achieved a higher level of democracy, and where left-wing parties govern, are those in which greater levels of public expenditure on education are undertaken. Moreover, expenditure on education is a means which governments use to fight against inequality in income distribution, because the higher it is, the greater the public effort dedicated to education.

On the other hand, the higher the percentage of children, as a part of the total population, and the longer those under 15 years of age spend in school, the greater the public spend-

ing on education. Therefore, primary and secondary education require greater public investment. However, a greater degree of university education does not necessarily imply higher public investment in education.

Notes

1. In most of the economic growth analysis average years of schooling is used as a proxy of educational quality. In the case of EU countries PISA database is used to analyze the efficiency of the educational systems, as de Jorge and Santin carry out (2010).

References

- Aixalá, J. and Fabro, G. (2007), "Institutional Indicators & Economic Growth: An Overview", *Hacienda Pública Española*, 182 (3): 115-162.
- Amate, I. and Guarnido, A. (2011), *Determining Factors in Economic & Social Development*, Málaga: Analistas Económicos de Andalucía.
- Ansell, B. (2006), *From the Ballot to the Blackboard. The Redistributive Political Economy of Education*, Departamento de Gobierno, Universidad de Harvard: tesis doctoral.
- Arellano, M. and Bond, S. (1991), "Some Test of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations", *The Review of Economics Studies*, 58 (2): 277-297.
- Arze del Granado, F. J., Martínez-Vázquez, J. and McNab, R. (2005), "Fiscal Decentralization and the Functional Composition of Public Expenditures", *International Center for Public Policy, Working Paper Series* 0501.
- Beck, N. and Katz, J. N. (1995), "What to Do (and not to Do) with Time-Series Cross-Section Data", *American Political Science Review*, 89 (3): 634-647.
- Boix, C. (1996), *Political Parties, Growth & Equality: Conservative & Social Democratic Economic Strategies in a World Economy*, Madrid: Alianza Universidad.
- Boix, C. (1997), "Political Parties and the Supply Side of the Economy: the Provision of Physical and Human Capital in Advanced Economies, 1960-1990", *American Journal of Political Science*, 41(3): 814-845.
- Busemeyer, M. R. (2007), "Determinants of Public Education Spending in 21 OECD Democracies, 1980-2001", *Journal of European Public Policy*, 14 (4): 582-610.
- Castles, F. G. (1982), "The Impact of Parties on Public Expenditures", in F.G. Castles (ed.) *The Impact of Parties: Politics and Policies in Democratic Capitalist States*, Londres: Sage, 21-96.
- Castles, F. G. (1989), "Explaining Public Education Expenditure in OECD Nations", *European Journal of Political Research*, 17: 431-448.
- Castles, F. G. (1994), "On Religion and Public Policy: Does Catholicism Make a Difference?", *European Journal of Political Research*, 25: 19-40.

- Castles, F. G. (1998), *Comparative Public Policy: Patterns of Post-War Transformation*, Cheltenham: Edward Elgar.
- Creedy, J. and Moslehi, S. (2010), "The Optimal Composition of Government Expenditure among Transfers, Education and Public Goods", *Hacienda Pública Española*, 194 (3): 41-64.
- De Jorge, J. and Santin, D. (2010), "Determinantes de la Eficiencia Educativa en la Unión Europea", *Hacienda Pública Española*, 193 (2): 131-156.
- Gil, M., de Pablos, L. and Martínez, M. (2010), "Los Determinantes Socioeconómicos de la Demanda de Educación Superior en España y la Movilidad Educativa Intergeneracional", *Hacienda Pública Española*, 193 (2): 75-108.
- Hibbs, D. A. (1977), "Political Parties and Macroeconomic Policy", *American Political Science Review*, 71: 1467-1487.
- Jorgenson, L. P. (1987), *The State and the Non-Public School, 1825-1925*, Columbia: University of Missouri Press.
- Manow, P. (2004), "The Good, the Bad, and the Ugly- Esping-Andersen's Regime Typology and the Religious Roots of the Western Welfare State", *MPIfG Working Paper 04/3*, Köln.
- Manzano, D. and Salazar, L. (2009), "Is Public Investment in Education a Policy for Redistribution? An Analysis of the Composition of Spending by Educational Level", *Revista Internacional de Sociología (RIS)*, 67 (3): 655-679.
- Meltzer, A. H. y Richard, S. F. (1981), "A Rational Theory of the Size of Government", *Journal of Political Economy*, 89: 914-927.
- Murillo, I. and Pedraja, F. (2009), "¿Es Rentable para el Sector Público Invertir en Educación?", *Hacienda Pública Española*, 188 (1): 9-29.
- Nijkamp, P. and Poot, J. (2004), "Meta-analysis of the Effect of Fiscal Policies on Longrun Growth", *European Journal of Political Economy*, 20: 91-124.
- OECD (2005), *Education at a Glance: OECD Indicators*, Paris: OECD Publishing.
- Obinger, H. and Wagschal, U. (2000), "Ökonomie, Institutionen und Politik: Determinanten der gebremsten Sozialstaatlichkeit im Überblick", in H. Obinger and U. Wagschal (eds), *Der gezuögelte Wohlfahrtsstaat: Sozialpolitik in reichen Industrienationen*, Frankfurt a. M: Campus.
- Patiño, D. (2011), "La Incidencia del Gasto Público en Educación sobre la Distribución del Bienestar Económico en España", *Hacienda Pública Española*, 199 (4): 114-148.
- Van Kersbergen, K. (1995), *Social Capitalism: a Study of Christian Democracy and the Welfare State*, Londres y Nueva York: Routledge.
- Wilensky, H. L. (1975), *The Welfare State and Equality: Structural and Ideological Roots of Public Expenditures*, Berkeley, CA: University of California Press.
- Wilensky, H. L. (2002), *Rich Democracies: Political Economy, Public Policy, and Performance*, Berkeley, CA: University of California Press.

Resumen

El objetivo de este trabajo es determinar cuáles son los factores que inciden en el gasto público en educación aplicado a los países de la OCDE. De esta forma, hemos estimado un modelo de datos de panel para 33países y un periodo de 14 años (desde 1996 hasta 2009, ambos inclusive). Los resultados obtenidos permiten concluir que conforme aumenta el desarrollo económico, social y democrático en un país mayor es el gasto en educación que realiza su gobierno, especialmente, si el gobierno es de izquierdas.

Palabras clave: gasto público, educación, institucionalismo, desigualdad, PIB.

Clasificación JEL: H52, I21, I24.