

Interest Groups and Political Economy of Public Education

Spending

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Abstract

This paper examines the relationship between the lobbying power of different interest groups and public education spending in a panel data estimation during the period 1996-2009 for 132 countries. The resource rents, manufacture exports, and agriculture value added are used as proxy variables for the lobbying power of the natural resource owners, manufacturers, and landowners, respectively, in order to substantiate the definition of the lobbying power of the interest groups more with economic fundamentals. As lobbying power is mediated through political institutions, different governance indicators are used individually and in interaction terms with the proxy variables in the estimations. It is found that when the country is more politically stable and the more the rule of law applies, the negative (positive) effect of the lobbying power of natural resource owners (manufacturers) on public education spending intensifies. The negative effect of landowners' lobbying power diminishes as institutional quality as measured by governance indicators improves.

Keywords: *Public education spending, Human capital, Lobbying power, Interest groups, Governance indicators.*

JEL code: *I25, O13, O15, O43, P16, Q00*

1. Introduction

The Industrial Revolution marked the start of a long series of social and economic transformations leading to substantial divergence across countries in terms of income per capita, economic development, and political and economic institutions. The period of industrialization both intensified social class stratification by creating new classes and increased the demand for human capital, a complementary factor of production to physical capital. Due to credit market imperfections, public education spending has become the primary tool for human capital accumulation to maintain sustainable economic growth (Galor et al., 2009, Lagerlof and Tangeras, 2008). Nonetheless, human capital may not be as beneficial for some sectors in the economy, and the interest groups who operate in these sectors as the owners of primary factors of production would not support human capital accumulation through public education (Acemoglu and Robinson, 2000). For instance, Galor et al. (2009) argue that given the low level of complementarity between human capital and land, increases in human capital reduce the return to land as labor migrates from the agricultural sector to the manufacturing sector. When they have political power, the landowners would choose to invest little, if at all, in public education unless they also earn returns from the industrial sector.

In this paper we examine the relationship between lobbying power of various interest groups and public education spending in a panel data estimation during the period 1996-2009 for 132 countries. Furthermore, as lobbying power is mediated through political institutions, we explore how different governance indicators affect the overall impact of the lobbying power of interest groups on public education spending.

The choice of the production sectors and interest group stratification is based on the multi-sector, multi-class models in Acemoglu and Robinson (2006a, 2006b), and Galor et al. (2009). In this paper, we model three sectors: the natural resource, manufacturing, and agriculture sectors. Hence, the three interest groups whose economic power and relative political influence on public education spending are investigated are the natural resource owners, manufacturers and landowners. In this paper we do not define workers as a separate interest group assuming that the members of the three interest groups; natural resource owners, manufacturers, and landowners; both work and own factors of production in their corresponding sectors.

Different aspects of the link between economic sectors and growth have been analyzed in detail in the literature. Matsuyama (1992) examines the relationship between agricultural productivity and economic growth in a two-sector model, and argues that agricultural productivity has a positive effect on economic growth in a closed economy, but in the case of a small open economy there is a negative relationship between agricultural productivity and economic growth. In his model, he does not differentiate between an agriculture sector and a natural resource sector. Lagerlof and Tangeras (2008) analyze the trade-off between rent seeking activities, such as resource competition or land conquest, and productive activities, such as trade or manufacturing, which use human capital as a factor of production. They show that a rise in the availability of natural resources increases rent seeking activities and reduces human capital productivity, and is harmful for economic growth in the crucial takeoff period. Bourguignon and Verdier (2000) explore in a political economy model the conditions under which the educated oligarchy chooses to invest in the education of the poor, and so initiates a transition to democracy by integrating the educated poor into the political participation process.

Empirical studies on the determinants of public education spending highlight various aspects. Busemeyer (2007) examines the determinants of public education spending in 21 OECD countries in a pooled time-series analysis. The control variables used include the degree of tax revenue decentralization, veto index, and cabinet shares of social democrats, Christian democrats, and conservatives. In a study of the determinants of public education spending in the US states, Poterba (1997) highlights the importance of the effect of demographic composition on the level of per-child education spending.

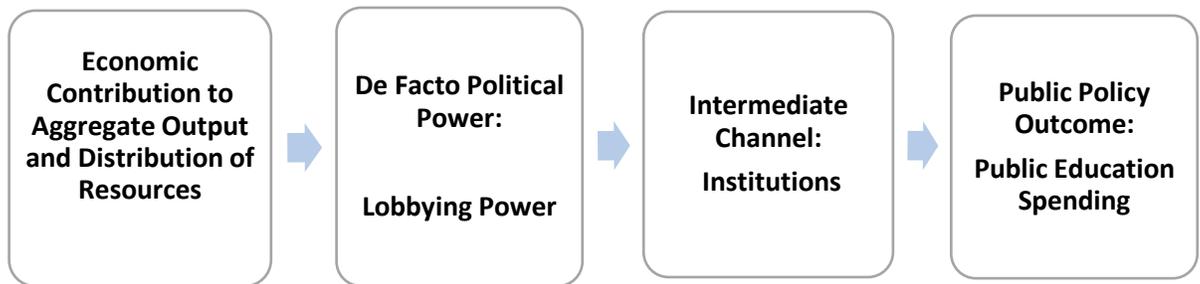
The main results we obtain in what follows are that the lobbying power of natural resource owners and landowners has a direct negative effect on public education spending, whereas the lobbying power of manufacturers exerts a positive one. Moreover, the quality of different dimensions of governance and institutions plays a significant role in determining the overall net effect of the lobbying power of different interest groups on public education spending. The rest of the paper is organized as follows. Section 2 describes the data set and the econometric strategy. Section 3 discusses estimation results, section 4 talks about the robustness check measures of the empirical results, and section 5 presents concluding remarks.

2. Econometric Strategy and Data Details

The main hypothesis proposed in this paper follows from the multi-social class theoretical models of Acemoglu (2008), Acemoglu and Robinson (2006a). Interest groups are classified according to the type of economic activity from which they generate their income, their wealth composition, and their ownership of factors of production in distinguished sectors. As a result, economic interests and preferences of different interest groups diverge. When one interest group's economic contribution to the aggregate output increases, that group gains in political power relative to other groups, and social and economic policy decisions increasingly reflect that group's economic interests. We identify interest groups' political power as de facto political power. De facto political power can emerge as an outcome of the ability of solving collective action problem, or having resources to hire own armies and supporters, or using financial resources for lobbying and bribing activities (Acemoglu, 2008). In this paper, we adopt the third outcome, and so define the de facto political power as lobbying power.

Therefore, relative economic contribution to the aggregate output maps into relative political influence and lobbying power in the society. The differences in economic and social policy choices generate variations in public education spending levels. Economic contribution to aggregate output and distribution of resources determine distribution of de facto political power. Since institutions mediate as the intermediate channel between lobbying power and policy outcomes we examine how different governance indicators affect the overall impact of social classes' lobbying power on public education spending. Figure 1 explains these theoretical foundations in the following:

Figure 1:



One important question for empirical work is the choice of a metric to measure the lobbying power of a given interest group. Some studies in the literature that try to proxy the lobbying power of interest groups use the political party left-right spectrum variables from the Database of Political Institutions (DPI 2009) (Beck et al., 2009). However, as the authors of DPI 2009 codebook state, the data sources reveal very little information on party platforms, interest groups supporting these parties, and agendas regarding their economic policies. In what follows, I use instead a number of macroeconomic indicators to proxy the influence interest groups may bring to bear in the political arena. Specifically, natural resource rents, manufacture exports and agriculture value added (as shares of GDP) are adopted as proxy variables to measure the lobbying power of the natural resource owners, manufacturers, and landowners, respectively. The motivation behind this choice of the metric is to use the mapping from economic contribution to aggregate output and distribution of resources to de facto political power, and to substantiate the definition of the interest groups' lobbying power with economic fundamentals.

Further, as institutions mediate between political power and political outcomes, in what follows different governance indicators are interacted with the proxies of lobbying power to examine the effect of the latter on public education spending. A similar method is followed in the literature on natural resources and economic growth. For instance, Mehlum et al. (2006), Boschini et al. (2007) and Brunnschweiler (2008) use in their empirical models the interactions between various natural resource measures and institutional quality indicators to estimate the total effect of natural resource abundance on economic development.

The natural resource rents (as percentage of GDP), which is assumed to be the proxy variable to measure the level of lobbying power of natural resource owners, is calculated as a composite variable of oil rents, natural gas rents, coal rents, forest rents, and mineral rents. For all the five components, rents are the difference between the value of production of the natural resource at world prices and the total cost of its production. Another possible proxy variable that may be used for the lobbying power of natural resource owners is the fuel-ore-metals exports, calculated as a summation of fuel, ores and metals exports. Although the estimation results of these two composite proxy variables are similar, natural resource rents (resource rent in the estimation equations and regression tables) is a better proxy variable in terms of identifying the three sectors; natural resources, manufacturing and agriculture separate from each other, for the coverage of fuel-ore-metals exports includes some manufactured natural resource products used in metallurgy and cermet industries.

Manufacture exports are used to proxy the lobbying power that the manufacturers possess. Another possible macroeconomic indicator for this purpose is manufacturing value added. Manufacture exports broadly cover chemicals, basic manufactures, machinery and transport equipment, and miscellaneous manufactured goods, while manufacturing value added includes manufactures of agricultural products, hence if manufacturing value added was used as the proxy variable there would be an overlap between the manufacturing sector and agriculture sector. Therefore, manufacture exports provide a better representation of the manufacturing sector.

Agriculture value added, the assumed proxy variable to measure the lobbying power that the landowners possess, includes the value added amounts of hunting, fishing, cultivation of agricultural crops, and livestock production. Another possible indicator that could have potentially been used as a proxy would have been agricultural raw materials exports, but this variable only includes crude materials, so its coverage is not as good as the coverage of agriculture value added in terms of representing the agriculture sector production in an accurate and comprehensive way.

There are five governance quality indicators, political stability-absence of violence (politicalstability in regression tables), regulatory quality (regquality in regression tables), rule of law (ruleoflaw in regression tables), corruption control (corruption in regression tables), and government effectiveness (govteffectiveness in regression tables), used in regressions as control variables individually and as a component of interaction terms with the proxy variables. Political stability-absence of violence measures the probability that the government will be destabilized or overthrown by unconstitutional or violent means. Regulatory quality captures perceptions of the ability of the government to formulate and implement policies and regulations which favor private sector development. Rule of law covers issues such as the nature of contract enforcement, property rights, quality of law enforcement through security and courts. Corruption control measures the probability that public power is exercised for private gain for elites. Government effectiveness captures perceptions of the quality of public services, and credibility of the government's commitment to policies (Kaufmann et al., 2011). In the regressions, the lobbying power of the interest groups is allowed to affect public education spending both directly and through the channel of governance indicators. In the related literature the rule of law is often used to capture institutional quality (Brunnschweiler, 2008 and Bulte et al., 2005). The main purpose in these studies is to explore the effect of natural resource abundance on development and economic growth in countries with differing institutional quality levels. On the other hand, the five governance indicators identify different dimensions of the governance rules and institutions through which the authority and policies are exercised in a country. Therefore, the lobbying power of each of the three interest groups may interact with each of the governance indicators, and so affect public education spending in a different way. Thus, for the purposes of this paper it is useful to employ different governance indicators in the regressions.

Table 1 presents the descriptive statistics. The primary data sources are the World Development Indicators (WDI), Global Development Finance (GDF), and Worldwide Governance Indicators (WGI) from the World Bank. Public education spending (as a share of GDP) is the dependent variable for the subsequent estimations throughout the paper. The proxy variables, natural resources rents, manufacture exports, and agriculture value added, indicate the economic contribution of the natural resource owners, manufacturers and landowners, and are assumed to represent the relative lobbying power they possess respectively within a country. Therefore, the main assumption here is that as an interest group's economic contribution to the aggregate output and portion of its resources increase, its political influence and lobbying power in the society also increases as explained in Figure 1.

The data for the governance indicators are collected from the Worldwide Governance Indicators. The numerical values of the indicators change between -3.5 and +3.5 during the period 1996-2009. If the value of an indicator

increases this refers to an improvement in that governance quality category. The log value of GDP per capita (gdp per capita in regression tables), school-age population share in total population, old population (age 65 and over) share in total population (Busemeyer, 2007, Fernandez and Rogerson, 1997, and Poterba, 1997), GDP per capita growth rate (gdpgrowth in regression tables) (Busemeyer, 2007), government size, population, and trade openness degree (Heston et al., 2009) are other explanatory variables that are found to be correlated with public education spending in the related literature. School-age population share is the population of the age-group theoretically corresponding to a given level of education as indicated by the theoretical entrance age and duration divided by total population.

Table 1 Descriptive Statistics

Variable		Mean	Std. Dev.	Min	Max	Observations
public education	overall	0.0465773	0.0178768	2.20E-08	0.1605884	N = 1142
	between		0.0166878	0.0107698	0.1345486	n = 132
	within		0.0065282	0.0116075	0.080467	T = 8.65152
resource rent	overall	0.069023	0.1206953	0	0.7124102	N = 1847
	between		0.1134383	0	0.4881426	n = 132
	within		0.0422454	-0.1934626	0.3296232	T = 13.9924
manufacture	overall	0.150221	0.1799946	1.66E-06	1.545786	N = 1651
	between		0.176313	0.0002292	1.250382	n = 132
	within		0.0420577	-0.1074521	0.4456247	T = 12.5076
agriculture	overall	0.1427335	0.1309526	0	0.6196861	N = 1783
	between		0.1296638	0	0.5412981	n = 132
	within		0.0285795	-0.0018374	0.2912675	T = 13.5076
gdp per capita	overall	8.687819	1.288765	5.846806	11.16942	N = 1846
	between		1.285605	5.876393	11.06253	n = 132
	within		0.1489319	8.032617	9.563109	T = 13.9848
schoolage population	overall	0.5152618	0.1283044	0.0877251	0.7828103	N = 1838
	between		0.1244458	0.2857989	0.7320508	n = 132
	within		0.0328315	0.1558916	0.8809171	T = 13.9242
old population	overall	0.0764213	0.0502971	0.0044591	0.2204764	N = 1848
	between		0.0501886	0.0086851	0.1883664	n = 132
	within		0.0053506	0.0407663	0.1118534	T = 14
gdp growth	overall	0.025331	0.0421752	-0.1754528	0.3303049	N = 1846

	between		0.0207922	-0.0273782	0.1188897	n = 132
	within		0.0367301	-0.2070456	0.2367462	T = 13.9848
openness	overall	0.8476624	0.4384633	0.1493284	4.146187	N = 1813
	between		0.4242345	0.2315079	3.264811	n = 132
	within		0.1230053	0.0676905	1.729038	T = 13.7348
government size	overall	0.1595538	0.0612065	0.0267528	0.6954283	N = 1813
	between		0.0582259	0.0501348	0.4544871	n = 132
	within		0.0215432	0.0042983	0.400495	T = 13.7348
political stability	overall	0.0342752	0.8924227	-2.756399	1.576872	N = 1447
	between		0.8445778	-1.923149	1.412548	n = 132
	within		0.2942668	-1.273218	1.608206	T = 10.9621
regulatory quality	overall	0.1751986	0.8746884	-2.272891	3.345251	N = 1442
	between		0.8439908	-1.630469	1.816379	n = 132
	within		0.2450257	-1.150496	2.31369	T = 10.9242
corruption control	overall	0.1054975	0.9787444	-1.674297	2.466556	N = 1432
	between		0.9523878	-1.216346	2.327177	n = 132
	within		0.2253616	-1.063686	1.485673	T = 10.8485
govt effectiveness	overall	0.1402996	0.9489774	-1.819337	2.236914	N = 1432
	between		0.9299627	-1.547977	2.094359	n = 132
	within		0.2015914	-1.02989	1.295874	T = 10.8485
rule of law	overall	0.0872166	0.9292883	-1.741681	1.964045	N = 1445
	between		0.9109179	-1.384658	1.889363	n = 132
	within		0.1924041	-1.404147	1.474483	T = 10.947

3. Estimation Results

Our aim here is to estimate the effect of various interest groups' lobbying power on public education spending working through the political institutions. In order to eliminate the possible omitted variable bias and other causality problems observed in cross-country studies a two-way fixed effects (FE) model is used. Country and year fixed effects are controlled in a panel data estimation covering the period 1996-2009 for 132 countries. For all regressions the results of an F test indicate that there are significant country level effects, so the fixed effects panel data estimation is a better model specification than the pooled OLS. Moreover, panel data estimation provides more data variation and less collinearity, and it better examines the dynamics of changes. The benchmark estimation is written in equation (1) as the following,

$$\begin{aligned} \text{public education spending}_{it} = & \beta_0 + \beta_1 \text{resource rent}_{it} + \beta_2 \text{manufacture}_{it} + \beta_3 \text{agriculture}_{it} + \\ & \beta_4 (\text{resource rent} * \text{governance indicator})_{it} + \beta_5 (\text{manufacture} * \text{governance indicator})_{it} + \\ & \beta_6 (\text{agriculture} * \text{governance indicator})_{it} + \beta_7 \text{governance indicator}_{it} + \beta_8' Z'_{it} + \sigma_i + \mu_t + \varepsilon_{it} \end{aligned} \quad (1)$$

where public education spending is the dependent variable, σ represents country fixed effects, μ captures time fixed effects, and ε_{it} is the error term. The proxy variables, natural resource rents (resource rent), manufacture exports (manufacture), and agriculture value-added (agriculture), are used to proxy the lobbying power of the natural resource owners, manufacturers, and landowners, respectively. Governance indicator refers to one of the five institutional quality indicators discussed in the previous section. The interaction terms of the proxy variables and the governance indicator demonstrate how the proxy variables interact with each of the governance indicators.

In equation (1), Z is a vector of explanatory variables which includes the log value of GDP per capita, school-age population share in total population, old population share in total population, GDP per capita growth rate, government size, population, and openness degree. The use of these variables is standard in the literature on the political economy of institutions and public education spending.

All the estimations in the tables report the point estimates and standard errors in parentheses. The advantage of reporting point estimates is that they show the effects of marginal changes in the explanatory variables on public education spending. In all regressions in Table 2 the coefficients of log GDP per capita and GDP growth rate are negative and significant. This may be due to the situation that when countries become richer private education options may be more widespread and preferred compared to public education. As the government size increases it is indicated that public education spending also increases within a country. Table 2 reports the estimation results for the comprehensive sample and without the governance indicators. Column (1) shows the results of the estimation without any interaction term.

In all estimations in Tables 2, 3 and 4 resource rent shows a direct negative and statistically significant effect on public education spending. Controlling for the lobbying power of the manufacturers and landowners using the proxy variables, manufacture export and agriculture value added, respectively, the total impact of natural resource owners' lobbying power, proxied by resource rent, on public education spending is measured by its direct effect as well as through its indirect effect via institutions.

The estimations in Tables 3 and 4 focus on the regressions including the governance indicators. The coefficients of governance indicators appear negative and statistically significant. This can be due to the situation that institutional quality may be perceived as a substitute for human capital within countries (Glaeser et al., 2004). When institutional quality improves this negatively affects public education spending. The interactions of resource rent with political stability-absence of violence, with corruption control, with government effectiveness, and with rule of law are statistically significant. The total effect of a marginal increase in resource rent implied by equation (1) is

$$\frac{\partial \text{public education spending}}{\partial \text{resource rent}} = \beta_1 + \beta_4 \text{governance indicator} \quad (2)$$

Hence, when interacted with political stability-absence of violence the effect of a marginal increase in natural resource rent on public education spending can be computed as

$$-0.0335 + (-0.00782 * 0.0343) \cong -0.034 \quad (3)$$

where 0.0343 is the sample mean of political stability-absence of violence. Working through the channel of rule of law the total impact of a marginal increase in natural resource rents on public education spending can be computed as,

$$-0.0361 + (-0.0165 * 0.0872) \cong -0.038 \quad (4)$$

where 0.0872 is the sample mean of rule of law.

Political stability-absence of violence measures the possibility that a government is destabilized or even completely changed by unconstitutional and illegal activities. Rule of law identifies the structure of contract

enforcement rules, property rights, actions of the police and courts. Based on the numerical results obtained above, on average the lobbying power of natural resource owners exerts a negative effect on public education spending. As the levels of political stability-absence of violence and rule of law improve this negative effect intensifies. A possible explanation for this result can be that, when lobbying power of natural resource owners increases within a country with high degrees of political stability-absence of violence as well as the rule of law, politically powerful natural resource owners may prefer to engage in more rent-seeking and kleptocracy activities instead of supporting more public education for human capital accumulation. On the other hand, within a country where political stability is weak and there is a high risk of illegal activities, when natural resource owners' lobbying power increases, if they face a threat from opposing groups, for example with a demand for a more educated labor force, natural resource owners, facing the possibility of losing their political influence and lobbying power, may prefer to support more public education as a concession.

Manufacture export, proxy variable for the lobbying power of manufacturers, exerts a direct positive and significant effect on public education spending. The economic intuition works in the way that since skilled workers are needed in the industrial sectors, when the manufacturers have more lobbying power they prefer to support more human capital accumulation through public education spending. The total effect of a marginal increase in resource rent implied by equation (1) is

$$\frac{\partial \text{public education spending}}{\partial \text{resource rent}} = \hat{\beta}_1 + \hat{\beta}_5 \text{governance indicator} \quad (5)$$

Working through the channel of political stability-absence of violence the total impact of a marginal increase in manufacture exports on public education spending can be computed as,

$$0.0134 + (0.0105 * 0.0343) \cong 0.014 \quad (6)$$

where 0.0343 is the sample mean of political stability-absence of violence.

The lobbying power of landowners, proxied by agriculture value added, exerts a direct negative and statistically significant at the 5 percent level effect on public education spending. This result is consistent with the argument that since agricultural production does not require any skilled labor, and educated workers migrate from agriculture sector to industrial sectors, when the landowners obtain a stronger lobbying power this negatively affects public education spending levels within countries. The coefficients of the interaction terms of agriculture value added with governance indicators appear statistically significant at 5 percent level (except for the interaction with political stability-absence of violence) and positive. This suggests that the negative effect of the lobbying power of landowners on public education spending diminishes as the levels of governance indicators improve within a country. Nevertheless, the magnitudes of these effects are not big enough to completely eliminate the negative direct effect of landowners' lobbying power on public education spending, even for countries experiencing higher levels of the above mentioned governance indicators. As a similar numerical exercise done above, the total effect of a marginal increase in agriculture value added implied by equation (1) is

$$\frac{\partial \text{public education spending}}{\partial \text{resource rent}} = \hat{\beta}_1 + \hat{\beta}_6 \text{governance indicator} \quad (7)$$

Working through the channel of government effectiveness the total impact of a marginal increase in agriculture value added on public education spending can be computed as,

$$-0.081 + (0.0239 * 0.14) \cong -0.078 \quad (8)$$

where 0.14 is approximately the sample mean of government effectiveness.

Table 2 Regression Results – No Governance Indicators

	(1)	(2)	(3)	(4)	(5)	(6)
	pubedu	pubedu	pubedu	pubedu	pubedu	pubedu
resourcerent	-0.0270** (0.00617)	-0.0356** (0.00757)	-0.0341** (0.00721)	-0.0335** (0.00745)	-0.0311** (0.00703)	-0.0361** (0.00735)
manufacture	0.0149** (0.00616)	0.0152** (0.00708)	0.0170** (0.00717)	0.0134* (0.00731)	0.0163** (0.00737)	0.0160** (0.00703)
agriculture	-0.0999** (0.0115)	-0.0793** (0.0143)	-0.0810** (0.0139)	-0.0934** (0.0136)	-0.0858** (0.0138)	-0.0826** (0.0145)
Gdp percapita	-0.00824** (0.00278)	-0.00867** (0.00317)	-0.00647** (0.00316)	-0.00648** (0.00320)	-0.00700** (0.00319)	-0.00756** (0.00314)
population	0.0136* (0.00769)	0.0138 (0.00895)	0.0128 (0.00896)	0.0181** (0.00900)	0.0136 (0.00908)	0.0139 (0.00905)
old population	0.0819 (0.0629)	0.0692 (0.0704)	0.0765 (0.0700)	0.0855 (0.0708)	0.0816 (0.0703)	0.0630 (0.0706)
Gdp growth	-0.0114* (0.00677)	-0.0147* (0.00765)	-0.0152** (0.00760)	-0.0153** (0.00768)	-0.0169** (0.00767)	-0.0174** (0.00765)
govtsize	0.0611** (0.0121)	0.0487** (0.0136)	0.0497** (0.0133)	0.0543** (0.0135)	0.0506** (0.0136)	0.0485** (0.0134)
openness	-0.00490* (0.00253)	-0.00688** (0.00292)	-0.00661** (0.00289)	-0.00762** (0.00290)	-0.00662** (0.00289)	-0.00733** (0.00291)
schoolage	0.0109 (0.00904)	0.0142 (0.00967)	0.0107 (0.00963)	0.0127 (0.00968)	0.0124 (0.00965)	0.0139 (0.00967)
Observations	1012	826	826	824	826	826
R ²	0.188	0.198	0.206	0.194	0.198	0.201

Note: Public education spending is the dependent variable. Fixed effects model is used in all estimations. Point estimates are reported. Standard errors are shown in parentheses. * Significant at 10%; ** significant at 5%. All regressions include a constant term and year fixed effects (not reported).

Table 3 Regression Results with Governance Indicators

	(1)	(2)	(3)
	pubedu	pubedu	pubedu
resourcerent	-0.0270** (0.00617)	-0.0356** (0.00757)	-0.0341** (0.00721)
manufacture	0.0149** (0.00616)	0.0152** (0.00708)	0.0170** (0.00717)
agriculture	-0.0999** (0.0115)	-0.0793** (0.0143)	-0.0810** (0.0139)
corruption		-0.00477** (0.00189)	
resourcerent*corruption		-0.0131* (0.00790)	
manufacture*corruption		0.00518 (0.00460)	
agriculture*corruption		0.0287** (0.0102)	
govteffectiveness			-0.00600** (0.00177)
resourcerent*govteffectiveness			-0.0127* (0.00751)
manufacture*govteffectiveness			0.00131 (0.00413)
agriculture*govteffectiveness			0.0239** (0.00877)
Observations	1012	826	826
R ²	0.188	0.198	0.206

Note: Public education spending is the dependent variable. Fixed effects model is used in all estimations. Point estimates are reported. Standard errors are shown in parentheses. * Significant at 10%; ** significant at 5%. All regressions include a constant term and year fixed effects (not reported).

Table 4 Regression Results with Governance Indicators

	(1)	(2)	(3)	(4)
resourcerent	-0.0270** (0.00617)	-0.0335** (0.00745)	-0.0311** (0.00703)	-0.0361** (0.00735)
manufacture	0.0149** (0.00616)	0.0134* (0.00731)	0.0163** (0.00737)	0.0160** (0.00703)
agriculture	-0.0999** (0.0115)	-0.0934** (0.0136)	-0.0858** (0.0138)	-0.0826** (0.0145)
politicalstability		-0.00228 (0.00167)		
resourcerent*politicalstability		-0.00782* (0.00576)		
manufacture*politicalstability		0.0105** (0.00448)		
agriculture*politicalstability		0.00441 (0.00571)		
regquality			-0.0120** (0.00340)	
resourcerent*regquality			-0.00788 (0.00706)	
manufacture*regquality			0.00215 (0.00472)	
agriculture*regquality			0.0266** (0.00973)	
ruleoflaw				-0.0164** (0.00386)
resourcerent*ruleoflaw				-0.0165** (0.00727)
manufacture*ruleoflaw				0.00508 (0.00458)
agriculture*ruleoflaw				0.0224** (0.00942)
Observations	1012	824	826	826
R ²	0.188	0.194	0.198	0.201

Note: Public education spending is the dependent variable. Fixed effects model is used in all estimations. Point estimates are reported. Standard errors are shown in parentheses. * Significant at 10%; ** significant at 5%. All regressions include a constant term and year fixed effects (not reported).

4. Robustness Check

In order to check further the strength of the proxy variables estimated in previous regressions the baseline fixed effects regression shown in equation (1) is performed with a sub-sample consisting of 69 middle-income countries. The results are reported in Tables 5, 6 and 7. The coefficients of the log value of GDP per capita and old population share are statistically significant at the 5 percent level. The negative coefficient of GDP per capita indicates that as countries get richer; this negatively affects public education spending because private education options may be favored over public education. The positive coefficient of old population share suggests that within middle income countries as the population gets older, in order to replace the lost workforce public education spending increases.

In all estimations, the proxy variables, natural resource rent, manufacture export, and agriculture value added preserve their previously found effects on public education spending at the statistically significant 5 and 10 percent levels. Natural resource owners' lobbying power exerts a direct negative effect on public education spending. However, the coefficients of interaction terms of resource rent and governance indicators are no longer statistically significant (except for the interaction with rule of law).

Corruption control, political stability-absence of violence, and rule of law appear to be important channels to determine the total effect of manufacturers' lobbying power, proxied by manufacture exports, on public education spending. As the levels of corruption control, political stability-absence of violence, and rule of law improve the positive effect of manufacturers' lobbying power on public education spending becomes stronger. Compared to the estimation results obtained using the comprehensive sample, now with the sample of middle income countries the magnitude of the positive effect of a marginal increase in manufacture export on public education spending is greater. Consistent with the previously found results, the improvements in institutional quality diminish the negative effect of landowners' lobbying power on public education spending.

Moreover two governance indicators and their interactions with resource rent, manufacture export, and agriculture value added are simultaneously included into the unbalanced panel data regressions (the comprehensive sample is used for the estimations) in order to investigate the validity of initial results at a further level. The estimation results are not reported in the paper due to space limitations. Resource rent and agriculture value added retain their direct negative and statistically significant effect on public education spending. There is a slight loss of significance in the manufacture export's positive impact on public education spending. Regarding the effects of governance indicators working through the interaction terms, an increase in the degree of rule of law intensifies the negative effect of natural resource owners' lobbying power on public education spending. Improvements in political stability-absence of violence, as in the estimation results with the comprehensive sample, reinforce the positive impact of manufacturers' lobbying power. An increase in the level of regulatory quality diminishes the negative effect of landowners' lobbying power.

Table 5 Regression Results Middle Income Countries – No Governance Indicators

	(1)	(2)	(3)	(4)	(5)	(6)
	pubedu	pubedu	pubedu	pubedu	pubedu	pubedu
resourcerent	-0.0162* (0.00913)	-0.0276** (0.0129)	-0.0349** (0.0124)	-0.0222* (0.0113)	-0.0273** (0.0116)	-0.0325** (0.0129)
manufacture	0.0291** (0.0102)	0.0357** (0.0118)	0.0379** (0.0118)	0.0300** (0.0118)	0.0356** (0.0119)	0.0472** (0.0120)
agriculture	-0.105** (0.0177)	-0.0720** (0.0229)	-0.0876** (0.0227)	-0.0851** (0.0207)	-0.0991** (0.0216)	-0.0809** (0.0236)
Gdp percapita	-0.0185** (0.00419)	-0.0195** (0.00489)	-0.0146** (0.00488)	-0.0159** (0.00502)	-0.0157** (0.00500)	-0.0181** (0.00474)
population	-0.0156 (0.0110)	-0.0270** (0.0132)	-0.0153 (0.0129)	-0.0245* (0.0129)	-0.0176 (0.0130)	-0.0249* (0.0128)
oldpopulation	0.524** (0.125)	0.425** (0.145)	0.375** (0.144)	0.510** (0.149)	0.398** (0.147)	0.436** (0.146)
Gdp growth	-0.0156 (0.0101)	-0.0153 (0.0114)	-0.0198* (0.0113)	-0.0176 (0.0113)	-0.0208* (0.0114)	-0.0195* (0.0113)
government size	0.0476** (0.0182)	0.0417** (0.0206)	0.0443** (0.0206)	0.0487** (0.0206)	0.0419** (0.0207)	0.0403** (0.0203)
openness	-0.0118** (0.00407)	-0.0118** (0.00469)	-0.0135** (0.00471)	-0.0127** (0.00469)	-0.0125** (0.00474)	-0.0152** (0.00471)
schoolage	0.0120 (0.0127)	0.0138 (0.0137)	0.0136 (0.0136)	0.0126 (0.0136)	0.0159 (0.0137)	0.0188 (0.0135)
Observations	524	434	434	432	434	434
R^2	0.203	0.233	0.233	0.238	0.220	0.248

Note: Public education spending is the dependent variable. Fixed effects model is used in all estimations. Point estimates are reported. Standard errors are shown in parentheses. * Significant at 10%; ** significant at 5%. All regressions include a constant term and year fixed effects (not reported).

Table 6 Regression Results with Governance Indicators – Middle Income Countries

	(1)	(2)	(3)
	pubedu	pubedu	pubedu
resourcerent	-0.0162* (0.00913)	-0.0276** (0.0129)	-0.0349** (0.0124)
manufacture	0.0291** (0.0102)	0.0357** (0.0118)	0.0379** (0.0118)
agriculture	-0.105** (0.0177)	-0.0720** (0.0229)	-0.0876** (0.0227)
corruption		-0.0130** (0.00345)	
resourcerent*corruption		-0.00738 (0.0132)	
manufacture*corruption		0.0418** (0.0121)	
agriculture*corruption		0.0585** (0.0225)	
govteffectiveness			-0.0127** (0.00353)
resourcerent*govteffectiveness			-0.0122 (0.0124)
manufacture*govteffectiveness			0.0105 (0.0122)
agriculture*govteffectiveness			0.0450* (0.0259)
Observations	524	434	434
R ²	0.203	0.233	0.233

Note: Public education spending is the dependent variable. Fixed effects model is used in all estimations. Point estimates are reported. Standard errors are shown in parentheses. * Significant at 10%; ** significant at 5%. All regressions include a constant term and year fixed effects (not reported).

Table 7 Regression Results with Governance Indicators – Middle Income Countries

	(1)	(2)	(3)	(4)
resourcerent	-0.0162* (0.00913)	-0.0222* (0.0113)	-0.0273** (0.0116)	-0.0325** (0.0129)
manufacture	0.0291** (0.0102)	0.0300** (0.0118)	0.0356** (0.0119)	0.0472** (0.0120)
agriculture	-0.105** (0.0177)	-0.0851** (0.0207)	-0.0991** (0.0216)	-0.0809** (0.0236)
politicalstability		-0.00822** (0.00294)		
resourcerent*politicalstability		-0.0000491 (0.00855)		
manufacture*politicalstability		0.0367** (0.00788)		
agriculture*politicalstability		0.0233 (0.0146)		
regquality			-0.0120** (0.00340)	
resourcerent*regquality			-0.00536 (0.0107)	
manufacture*regquality			0.0158 (0.0116)	
agriculture*regquality			0.0602** (0.0227)	
ruleoflaw				-0.0164** (0.00386)
resourcerent*ruleoflaw				-0.00892 (0.0121)
manufacture*ruleoflaw				0.0439** (0.0116)
agriculture*ruleoflaw				0.0667** (0.0239)
Observations	524	432	434	434
R ²	0.203	0.238	0.220	0.248

Note: Public education spending is the dependent variable. Fixed effects model is used in all estimations. Point estimates are reported. Standard errors are shown in parentheses. * Significant at 10%; ** significant at 5%. All regressions include a constant term and year fixed effects (not reported).

5. Concluding Remarks

This paper presents empirical results about the effect of lobbying power of different interest groups on public education spending in a panel data estimation during the period 1996-2009 for 132 countries. Macroeconomic indicators are used as proxy variables to define the lobbying power of the interest groups in order to substantiate the definition of lobbying power with economic fundamentals, and so generate a mapping from the economic contribution to aggregate output and portion of resources to lobbying power. The governance indicators, corruption control, government effectiveness, political stability-absence of violence, regulatory quality, and rule of law, are used to explore how the political power of interest group interacts with the different aspects of institutions, and how these interactions affect the overall relationship between the interest groups' lobbying power and public education spending.

Natural resource rent is assumed as the proxy variable to represent the lobbying power of the natural resource owners. It shows a direct negative effect on public education spending. The interaction terms of resource rent with governance indicators also contribute significantly to the overall impact of natural resource owners' lobbying power. When institutional quality increases the direct negative effect of natural resource owners' economic and lobbying power get stronger.

In most regressions manufacture export, the proxy variable assumed to define the lobbying power of the manufacturers, exerts a direct positive and statistically significant effect on public education spending. Therefore as the lobbying power of manufacturers increases this positively affects public education spending level. Considering estimations done with the middle income countries sample, the statistically significant and positive coefficients of the interaction terms of manufacture export with political stability-absence of violence, corruption control and rule of law indicate that improvements in these governance indicators reinforce the positive influence of the lobbying power of manufacturers on public education spending within a country.

Agriculture value added is assumed to be the proxy for the lobbying power of landowners. It shows a direct negative effect on public education spending indicating that when the lobbying power of landowners increases this negatively affects the level of public education spending. Improvements in institutional quality diminish this direct negative effect, but they are not sufficient to completely crowd it out.

In the cases of controlling multiple interaction terms simultaneously and repeating the benchmark regressions with a sample of middle income countries as robustness checks, resource rent, manufacture export, and agriculture value added preserve the nature and significance of their effects on public education spending in most of the estimations.

Regarding how this paper is related to the natural resources, institutional quality and economic growth literature, Mehlum et al. (2006) argue that resource abundance is beneficial for economic growth when the institutions are producer friendly and harmful for economic growth when the institutions are grabber friendly. They use the share of primary exports in GNP in 1970 from Sachs and Warner (1995) as resource abundance indicator and a composite index for institutional quality. Other studies draw attention to the interactions between institutional quality and different types of resources, and their varying effects on economic growth (Boschini et al., 2007 and Stijns, 2006). Brunnschweiler (2008) uses subsoil wealth per capita as resource abundance indicator, and rule of law and government effectiveness from the Worldwide Governance Indicators to define institutional quality. She finds that resource abundance has a direct positive effect on economic growth although the negative coefficients of the interaction terms suggest that this positive effect diminishes as the quality of institutions improves. In all these studies, the dependent variable is an economic growth indicator. Aslaksen (2007) uses panel data specification controlling for country and time fixed effects to estimate the impact of resource abundance on corruption. In this respect, this paper provides a contribution to the natural resources and economic development literature from a political economy perspective.

In order to explore different aspects of the interaction between institutional quality and political influences of the interest groups, five governance indicators are used in the regressions. The estimation results examining the effects of proxy variables show that through the interaction terms the governance indicators play significant roles in determining the total impacts of natural resource owners', manufacturers', and landowners' political influence on public education spending, referring to the argument that the quality of political institutions is an important factor in determining economic development (Glaeser et al., 2004) which is discussed in detail in economic growth and political economy literature.

Future research prospects include single country case studies to find out how country-specific political party platforms and interest group structure affect economic development; country-group studies to explore how similar geographical, regional or economic conditions, potential political conflicts between countries affect economic growth. Moreover, the integration of political coalition structure into the empirical framework would be useful.

Country List

Argentina	Gambia, The	Nicaragua
Armenia	Georgia	Niger
Australia	Germany	Norway
Austria	Ghana	Oman
Azerbaijan	Guatemala	Pakistan
Bangladesh	Guinea	Panama
Barbados	Guyana	Paraguay
Belarus	Hong Kong SAR, China	Peru
Belgium	Hungary	Philippines
Belize	Iceland	Poland
Bhutan	India	Portugal
Bolivia	Indonesia	Romania
Botswana	Iran, Islamic Rep.	Russian Federation
Brazil	Ireland	Rwanda
Brunei Darussalam	Italy	Saudi Arabia
Bulgaria	Jamaica	Senegal
Burkina Faso	Japan	Sierra Leone
Burundi	Kazakhstan	Slovak Republic
Cambodia	Kenya	Slovenia
Cameroon	Korea, Rep.	South Africa
Canada	Kuwait	Spain
Cape Verde	Kyrgyz Republic	Sri Lanka
Central African Republic	Latvia	St. Lucia
Chile	Lebanon	St. Vincent and the Grenadines
China	Lesotho	Swaziland
Colombia	Lithuania	Sweden
Comoros	Macao SAR, China	Switzerland
Costa Rica	Madagascar	Syrian Arab Republic
Cote d'Ivoire	Malawi	Tanzania
Croatia	Malaysia	Thailand
Cyprus	Maldives	Togo
Czech Republic	Mali	Tonga
Denmark	Malta	Trinidad and Tobago
Dominican Republic	Mauritania	Tunisia
Ecuador	Mauritius	Turkey
Egypt, Arab Rep.	Mexico	Uganda
El Salvador	Moldova	Ukraine
Eritrea	Mongolia	United Arab Emirates

Estonia
Ethiopia
Fiji
Finland
France
Gabon

Morocco
Mozambique
Namibia
Nepal
Netherlands
New Zealand

United Kingdom
United States
Uruguay
Vanuatu
Venezuela, RB
Zambia

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