**Associations between Government Electoral System and Public Goods Expenditure**

Swaraj Rai

December 17, 2023

**Abstract**

Education expenditure is an important public good. To better understand a nation’s level of investment into development of infrastructure through public goods, we can analyze the government voting mechanisms by which policy is passed through. Through analysis, we can better assert whether a specific electoral system is associated with certain outcomes in the International Political Economy related to trade and migration. In this paper, a spectrum of electoral systems and their associations with education expenditures in a respective nation is analyzed to better understand the associations between public goods and electoral systems. This paper defines a spectrum of electoral systems; with one end representing Presidential systems, often representative of Majoritarian (M/P) electoral rule, and the other end of the spectrum being Parliamentary electoral systems, often reflective of the Proportional Representation (PR) electoral rule framework. Regression analysis determines that there is a statistically significant association between Parliamentary electoral system and greater education expenditures than for Presidential electoral systems, which is in line with the hypothesis.

**Introduction**

Education outcomes are a key driver of a nation's economic growth and are considered a targeted approach to increase productivity and skill attainment to increase per capita income[[1]](#footnote-1). Through this targeted approach, a developing nation can in theory adjust its comparative advantages through the production of specialized goods that surpass the benefits of natural good extraction[[2]](#footnote-2). As it so happens, education expenditure by a government is also considered a public good. The politics that go into increasing education expenditure start with the agents in power. To begin understanding the outcomes that arise from a government’s policy decisions, an important starting point can be to first investigate through what electoral system a government comes about. The first prominent type of electoral system, the Presidential electoral system, is represented by unilateral representatives representing the leading party at the time of occurrence of election. This is best characterized by the United States electoral system in which one representative is elected to represent the entire nation. On the other hand, Parliamentary electoral systems are best characterized by all parties being represented proportionally to their influence and size. This is much like the UK, in which 650 Members of Parliament are voted for representing various parties. Another key concept to this research paper is presented in PIPE ch.3 in which Majoritarian and Proportional Representation electoral rules are first introduced. The first, Majoritarian (M/P), is characterized to be a plurality system in which the highest vote-share candidate/party wins representation for the region contended for. Proportional Representation (PR), on the other hand, is the electoral rule of attempting to account for the weight of each district and party and awarding seats representative of vote share[[3]](#footnote-3). In real-world outcomes, Majoritarian and Proportional Representation electoral rule have been shown to present varying outcomes of policy implementation and the actors that benefit from said policy[[4]](#footnote-4). Proportional Representation electoral systems are to have greater redistributive economic policies than the Majoritarian system. Here are a few key reasons for this:

1. Majoritarian systems are less likely to represent public interest than Proportional Representation[[5]](#footnote-5). Presidents are exposed to the pressures of reelection and because of this may chase goals that appeal to a small set of actors to best set themselves up for reelection. Political performance and reelection are not exclusive, and in many cases, can delineate from one another. When connecting this to the fact that greater education expenditure tends to increase human capital and is in line with public interests, leading to real income for citizens increasing, it makes sense why greater education expenditure is hypothesized to be in line with Parliamentary-style systems.
2. As stated in PIPE ch.3, “personal appeal is less important in parliamentary systems than party performance”, leading to the connection to human capital improvements being an indicator of party performance.
3. Party discipline, which is defined as how well-coordinated party members vote with one another on policy[[6]](#footnote-6), is greater in parliamentary systems than presidential, potentially explaining why expenditure on public goods like education is higher in parliament.

When bringing the electoral rules and electoral systems brought forth in this introduction together, it is observed that Presidential electoral systems are more reflective of M/P electoral rules, whilst Parliamentary systems are reflective of the PR electoral rule framework, this is an important point going into the analysis. In studying the outcomes of these electoral systems and rules, we can develop a more sophisticated framework to understand whether a country is more likely to pursue trade barriers, migration, and financial flows depending on the electoral system and how much of an effect it may have on policy outcomes. This paper will ideally provide a greater understanding of electoral systems and the balance to which they either bring the greatest benefit to society or to smaller but more proactive actors that can collectively unify to lobby for outcomes that support their tailored policy interests. This can help to begin to better understand the actions of governments when engaging in the international political economy. This paper seeks to address whether there is an association between the expenditure on education by a nation and the chosen electoral style in place in said nation.

**Hypothesis**

Presidential electoral systems are less serving of the public interest than Parliamentary electoral systems[[7]](#footnote-7), which is why I believe that Parliamentary electoral systems will have better education expenditure than Presidential electoral systems.

**Data/Methodology**

The data used comes from the *Princeton World Economics and Politics Dataverse* in which datasets from the World Bank “World Development Indicator” from 2021[[8]](#footnote-8), IDB Database of Political Institutions in 2015[[9]](#footnote-9), and World Bank Education statistics from 2021 have been pulled for easy merging into one dataset ready for data analysis. The data spans from 1975-2020 and uses data from 179 countries in which their respective electoral system (0 = Presidential, 1 = Parliamentary elected President, 2 = Parliament) (*system\_DPI)*  is reported alongside education expenditure as a % of GDP in a given year (*edu\_gdp\_ES)*. It is important to note that autocracies and dictatorships are represented under the Presidential category of the *system\_DPI* variable. After removing NA’s from the dataset, the total number of observations in the dataset comes out to 2,576 observations.

Table 1.

|  |  |  |
| --- | --- | --- |
| ***Control Name*** | ***What it measures*** | ***Why it was included*** |
| *yrsoffc\_DPI* | Number of years the chief executive has served in office at the recording of the observation | Help achieve better simulation of the political environment of nations in the dataset. |
| *finittrm\_DPI* | Whether the chief executive serves a finite term of office or not (1 = yes, 0 = no) | Help achieve better simulation of the political environment of nations in the dataset. |
| *yrcurnt\_DPI* | Years left in Chief Executive’s current term | Help achieve better simulation of the political environment of nations in the dataset. |
| *multpl\_DPI* | Whether Chief Executive can serve multiple terms (1 = yes, 0 = no) | Help achieve better simulation of the political environment of nations in the dataset. |
| *prtyin\_DPI* | Number of years the Chief Executive’s respective party has been in office | Help achieve better simulation of the political environment of nations in the dataset. |
| *tensys\_strict\_DPI* | How many years has the respective country been autocratic or democratic | Help achieve better simulation of the socio-political environment of nations in the dataset. |
| *gdp\_WDI\_PW* | GDP (in 2005 $) | Control for the DV in-case of outliers (education expenditure as a % of GDP) |

*Note: This table includes the controls used in the Multivariate Linear Regression ran.*

**Results**

Figure 1

**A graph of a graph showing the average education expenditure across time

Description automatically generated**

*In Figure 1, the Dependent variable of average education expenditure expressed as a % of GDP is shown across time. From a simple eye-test, average education expenditure rates across time appear to remain stagnant.*

Figure 2

**A graph showing the distribution of electoral system

Description automatically generated**

*In Figure 2, the independent variable of electoral system in a nation is reported as a bar graph showing the distributions of electoral system across time. It’s apparent that there is a lot of missing data up to about 1993 onwards. Through eye-test, it does appear that Presidential systems gained prevalence after approximately 1995. The proportion share between Parliamentary and Presidential appears to even out from that point on. In addition, Parliamentary-elected President seems to have gained a greater share of the dataset from approximately 1993 onwards, exclusive of outliers. However, these trends coincide with when more country data was beginning to be added, so it is unclear whether this is a representation of simply better reflecting the electoral system landscape across the world or actual trends towards increased Parliamentary-elected President and Presidential systems.*

Figure 3

**A graph showing the results of a political system

Description automatically generated with medium confidence**

*In Figure 3 it is visible that as the electoral system goes from Presidential to Parliamentary-elected President, to Parliamentary, the median education expenditure goes up, granted, with varying distributions. The distributions for Presidential and Parliamentary are much more uniform than for Parliamentary-elected President. If the outlier present in the Presidential box plot were omitted, the differences between the three electoral systems would be more pronounced, luckily, Table 2 distinguishes the average differences in education expenditures between all three electoral systems.*

Table 2

A table of numbers and symbols

Description automatically generated with medium confidence

As seen in the results, statistically significant findings are reported in Table 2. Model 1 presents an intercept coefficient of 3.99 which is the coefficient for the Presidential electoral system on education expenditure. The coefficient in the *system\_DPI[1]* row of 0.46 is statistically significant and indicates that as the electoral system goes from Presidential to Parliamentary-elected President that the education expenditure goes up to 4.45%. When going from Parliamentary-elected President to Parliamentary, there is an observed statistically significant increase in education expenditure to 4.98%.

Shifting to Model 2, when including all the controls that were outlined in the Data/Methodology section, the goodness of fit (R^2) between different electoral systems and education expenditure is increased from ~6% to 13.8%. This means that the second model does better in explaining variation in education expenditure (not by much, as an R^2 value of 80% is the general benchmark for a healthy predictor). Additionally, the intercept of education expenditure in a Presidential electoral system is dropped down to 3.65% from a previous 3.99%. This means that when accounting for the controls, the plots across electoral systems on education expenditures, although still statistically significant, is much less than in Model 1. This is further supported by decreased coefficient size in *system\_DPI[1]* which indicates a statistically significant education expenditure rate of 3.95% for Parliamentary-elected Presidents. Looking at *system\_DPI[2]*, the trend continues with Parliamentary systems displaying a statistically significant education expenditure rate of 4.23%. These tighter numbers mean that when accounting for controls that help capture the political landscape of a nation, the electoral systems and education expenditure rates are tighter than was assumed to have been the case in Model 1, and additionally, the aggregate education expenditure rates for all three electoral systems in this dataset are brought down by the decrease in the intercept.

In looking at the controls in Model 2, almost all are statistically significant except for whether a Chief Executive serves a finite term in office and how long the respective country has been democratic or autocratic for (*finittrm\_DPI and prtyin\_DPI)*. The years the Chief executive has served in office (*yrsoffc\_DPI)* presents a statistically significant coefficient of -0.02, which indicates that as you increase the number of years a Chief Executive has served in office, the education expenditure appears to decrease. The years left in the Chief Executive’s current term *(yrcurnt\_DPI)* is statistically significant and has a coefficient of -0.05, which means that a chief executive with greater time left in tenure is associated with less education expenditure. Whether a chief executive can serve multiple terms *(multpl\_DPI)* (1 = yes, 0 = no), indicates statistical significance and the coefficient of 0.8 means that when a chief executive can serve multiple terms, their education expenditure rates are associated with a 0.8% increase. How long the country has been autocratic or democratic *(tensys\_strict\_DPI)* is statistically significant and has a coefficient of 0.03, which means that an additional year spent in a respective form of government leads to greater education expenditure by 0.3%. This may cause some confusion, but a simple way to interpret this is to think of it as longer reigning democracies or autocracies are more associated with greater education expenditure outcomes. The last control, GDP *(gdp\_WDI\_PW*), does pose statistical significance to this model but has an insignificant coefficient of 0.

Looking at the Adjusted R^2 and AIC values of both models, Model 2 collectively has better values than Model 1 as the variables is shown to predict 8% more of the variation in education expenditure rates from a nation. The AIC values, which are a measure of the quality of the statistical models, of 10,586 (Model 1) and 10,363 (Model 2) indicate that the models aren’t doing a great job of predicting education expenditure rates, however, improve when going from the bivariate to multivariate format.

**Conclusions**

The main independent variable, political electoral system in a nation *(system\_DPI)*, is shown to have a statistically significant positive association with the dependent variable of education expenditure rates as a percentage of GDP *(edu\_gdp\_ES).* This means that education expenditures are shown to go up when going from Presidential to Parliamentary-elected President to Parliamentary electoral systems. Additionally, this indicates that when going from being reflective of more Majoritarian/Plurality electoral rule to Proportional Representation there is a positive increase in education expenditures by a nation.

These findings are in line with the hypothesis stated at the beginning of this research paper. In connecting the point made prior that education expenditures are a form of public good, these findings show that in electoral systems that are shown to be reflective of greater representation of smaller parties and vote shares, it appears public goods are better endowed in a nation through the governments that are instilled by these electoral systems and rules. While it is not the case that education expenditures are the only form of public goods, this is a start to better investigate the motivations that arise from a chosen electoral system and how a government interacts with its nation and other nations.

Instead in systems reflecting Majoritarianism, government expenditure appears to be falling elsewhere. Here are a few theories for where:

1) Inefficient allocations towards policies that benefit actors who are known to have efforts of lobbying better recognized under M/P systems.

2) Another unrecognized association between government expenditure into other avenues of public goods in more Majoritarianism systems.

3) Government expenditure is more limited in Majoritarianism electoral system countries than in Proportional Representation countries.

These theories make for opportunities of further study. Until then, in connecting these findings to the International Political Economy, this research paper may support claims that systems reflecting Majoritarianism are more vulnerable to pursuing protectionist policy to support small yet influential actors in the domestic economy. The connection to Majoritarian rules and lobbyist efforts are reflected here in the argument for protectionist trade policy. Additionally, when making the connection that firms are the sole proprietor for driving migration openness and that trade openness and migration openness are inversely correlated, it is theorized that more Majoritarian reflecting electoral systems are more open to migration whilst being more closed to trade.[[10]](#footnote-10)

Years left in current term *(yrcurnt\_DPI)* and Chief Executive’s number of years in office *(yrsoffc\_DPI)* also reflect that greater turnover rates are related to greater expenditure rates in a nation. This reflects that government compositions that are better reflective of the demographic’s up-to-date voting patterns are more responsive to implementation of public goods. This is an implication that can inform the way we think of governments that are better reflective of societal gain.

In looking at broader implications, developing nations may find that their best interests are reflected in Proportional Representation systems, as a vital public good like education expenditures has been proven to be a valuable form of human capital improvement to advance away from the specialization in natural goods extraction, shown to not provide high-paying jobs, into a more services incorporating economy[[11]](#footnote-11). Through implementing electoral systems that are better reflective of societal benefit, greater human capital can arise and combat the Marxist theories of developed economies locking developing economies to comparative advantages in the most polluting and worst-paying jobs for its’ citizens.

**References**

1. Cruz, Cesi, Philip Keefer and Carlos Scartascini (2016).

"Database of Political Institutions Codebook, 2015 Update (DPI2015)."

Inter-American Development Bank. Updated version of Thorsten Beck,

George Clarke, Alberto Groff, Philip Keefer, and Patrick Walsh, 2001.

"New tools in comparative political economy: The Database of Political

Institutions." 15:1, 165-176 (September), World Bank Economic Review.

1. Data Catalog. World Development Indicators. (n.d.). <https://datacatalog.worldbank.org/search/dataset/0037712/World-Development-Indicators>

Dolan, Lindsay. GOV333 ML#10: The New International Economic Order

1. Dolan, Lindsay. GOV329 ML#14: Trade and Immigration Policy
2. Education statistics - all indicators. DataBank. (n.d.). <https://databank.worldbank.org/reports.aspx?source=Education+Statistics&preview=off>
3. Graham, Benjamin and Jacob Tucker. 2019. “The International Political Economy Data Resource.” Review of International Organizations 14. 10.1007/s11558-017-9285-0.
4. Hallerberg, M., Kucik, J., & Mukherjee, B. (2021). Principles of International Political Economy. Oxford University Press.
5. Jamison, Eliot and Jamison, Dean T. and Hanushek, Eric A., The Effects of Education Quality on Income Growth and Mortality Decline (October 2006). NBER Working Paper No. w12652, <https://ssrn.com/abstract=940601>

1. Jamison, Jamison, and Hanushek [↑](#footnote-ref-1)
2. Dolan, ML#10 [↑](#footnote-ref-2)
3. Hallerberg, Kucik, & Mukherjee (p.49) [↑](#footnote-ref-3)
4. Ibid (p.49) [↑](#footnote-ref-4)
5. Ibid (p. 50) [↑](#footnote-ref-5)
6. Ibid (p.53) [↑](#footnote-ref-6)
7. Ibid (p. 50) [↑](#footnote-ref-7)
8. [↑](#footnote-ref-8)
9. 8 Cruz, Cesi, Keefer and Scartascini (2016). [↑](#footnote-ref-9)
10. Dolan, ML#14 [↑](#footnote-ref-10)
11. Dolan, ML#10 [↑](#footnote-ref-11)