
An Investigation About Political Budget Cycle in the Electoral Period in American Countries

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Abstract: Considering the new wave of discussion on the expenses made during electoral periods in democratic governments in specialized literature, in which governments stimulate the economy in election years to prospect votes and stay in power, concentrating greater spending on media actions to influence voters in choosing their vote, this study explores the Political Budget Cycles (PBC) and their contributions during the presidential election period, in the governments of the Americas from 1990 to 2019, with the objective of identifying the impact on spending on education (SU), health (HEA), national security (NS), transportation and communication (TC), as well as on the budget deficit (BD), budget surplus (BS), gross domestic product (GDP), human development index (HDI), and unemployment rate (UR). This was done using the random effects statistical method of tobit regression for pooled panel data on expenditures incurred in the 37 American countries. The results are robust and diverge from other studies, as also show that the investigated expenditures do not undergo significant changes in the election period, as suggested by other studies, and that the presence of Political Budget Cycles in democratic countries contributes positively to the economic and human development of these countries located in the Americas.

Keywords: Political Budget Cycles, Panel Data, Presidential Election

1. Introduction

Studies demonstrate that governments stimulate the economy before elections to prospect for votes and remain in power [58, 1], and concentrate greater spending on media actions to influence voters in choosing their vote [14]. This practice is conceptualized in the literature as political budget cycle (PBC), a concept that generally refers to the increase in spending, deficit or reduction of taxes in an election period motivated by the government's desire for reelection [10, 47].

These political budget cycles are most visible in developing countries with a young democratic regime [12, 58], because they are more flexible in maneuvering and dealing with fiscal policies with electoral bias [42, 53], and are made up of weak government institutions, with opportunistic behaviors, clientelism and friendliness [49].

Although the literature is wide in the discussions about the PBC, both in terms of the evolution of public spending and the opportune environments for its occurrence during the election period, it is in fact a process inherent to the economic regime of capitalist democracies [35], as well as the political economic theory explains the rationale and opportune behavior in the maintenance and continuity in the power by the candidates [16].

Considering the new wave of discussion on the PBC reflexes in democratic governments in the electoral period [7, 43, 33, 15, 40, 44, 48, 10, 5, 9, 27, 32, 34], that there are no studies on the contributions of PBCs to well-being social, this study investigated the impact of PBCs on spending on education (EDU), health (HEA), national security (SAV), transportation and communication (TRA), budget deficit (DEF), budget surplus (SUP), Gross Domestic Product

(GDP), human development index (HDI) and unemployment index (UNE) in the governments of the Americas from 1990 to 2019. As well as analyzing the behavior of these expenditures in central governments through Random-effects tobit regression in panel data, it expands literary discussions [1, 5, 9, 31, 34], and presents the contributions of PBCs to the economic and human development indices. The results are robust, diverge from other studies and suggest different GDP, HDI and average UNE in an election year compared to periods that do not take place.

This study is structured in five sections. The first presents the introduction and contextualization of the research objective. In the second, the theoretical foundation that supports this study. In the third, the applied methodology. In the fourth section are the results found. Finally, in the fifth and last section, there are the discussions of the results and the conclusion, limitations, as well as suggestions for future research.

2. Theoretical Foundation

2.1. Political Budget Cycle

It understands how PBC successive budgets that are repeated over time and feed each new cycle, in which spending undergoes significant changes in election year, with or without reflections on budget deficits. It is a political management instrument that provides for tax collection and spending limits in governments since its inception, and is present in the economic regime of capitalist democracies [35]. And the Economic Theory of Democracy, among other contexts, explains the behavior of candidates for reelection who act rationally in conserving their continuity in power and in exposing their political performance in the electoral period [16], despite some empirical studies suggest directly and indirectly the manipulation of spending and the negative influence of PBC in the electoral period [36, 47, 41, 52, 8, 19, 4, 12, 58, 38, 25, 2, 23, 24, 20, 50].

More recently, a new wave of discussion arises about PBC, the specific conditions under which it occurs in federal, central and local governments [26, 62, 63, 17, 1, 43, 33, 15, 40, 44, 48, 10, 5, 9, 21, 39, 31, 34].

Vicente *et al.*, investigated the reflection of financial transparency from the perspective of BPCs in 97 local governments in Spain in the period 1999-2009 [62], and suggest that municipalities with low transparency have PBC in total spending. This result is different from the results presented by [12, 6, 58]. For Akhmedov and Zhuravskaya, the PBC in spending on education [4], health and culture does not depend on the degree of transparency of governments, and yet, transparency does not prevent PBC in municipal financial transfers [56].

Despite the discussions about PBC in governments, regarding the behavior of spending in the electoral period, there is no consensus in the literature, because some studies show positive results [7, 60, 55, 21, 5, 51], other negatives [53, 54]. In this context, this study presents different results

from the studies that suggest an increase in spending in the electoral period in governments.

2.2. New Wave of Discussions About Political Budget Cycle

In order to analyze the political determinants of budget deviations in Spanish municipalities, Benito *et al* investigated 2,644 municipalities in the period 2002-2010, and concluded that managers manipulate budget forecasts by overestimating revenue and underestimating expenditure during election periods in order to meet voters' demands and guarantee their votes [7]. The spending with expenses on capital corresponding to actions that generate long-term benefits, such as investments, education and infrastructure are recurrent by politicians seeking reelection.

Ademmer and Dreher, investigated how press freedom and tax rules together impact on PBCs in EU Member States from 1996 to 2012, and concluded that in countries where the press is strong, tax rules tend to limit opportunistic tax behavior, and well-informed voters lower PBCs [1]. The opposite scenario makes it possible for governments to become more involved in creative accounting and the creation of PBCs, as well as raising the level of public deficits, before the elections.

In order to find out if there is a difference in spending between direct elections and nomination for mayors in the state of Vorarlberg in Austria, Turyna investigated a set of electoral rules in 96 municipalities in the period 1982-2013 using the difference estimation method and propensity score [60]. She concluded that direct elections are associated with less spending on public administration and public personnel, and higher spending on transportation infrastructure and economic subsidies for companies and private individuals. This last result corroborates with [37]. She further suggests that local governments affiliated with one of the national parties, spending on domestic debt payments are lower, and that mayors-elect affiliated to parties other than the majority of the council, total spending tends to be less, and therefore invested less in health and culture. Finally, elected mayors, regardless of party affiliation, tend to spend less on administration, personnel and public services, and more on infrastructure and subsidies to the private sector.

George *et al.*, replicated the experimental study of Nielsen and Baekgaard in order to examine the relationship between strategic objectives, information on performance, spending preferences and reforms by politicians in 225 Flemish municipalities in the period 2014-2019 [46]. Among other findings, they identified that 76% of respondents say that educational capacity is a relevant indicator for management and policy decision making. And of those, 36% prefer to spend in public schools, as well as are inclined to support higher spending if they receive information on performance results. As well as 41% of the municipalities include the expansion of educational capacity in their strategic plans.

In order to investigate the effects produced by the electoral process on the composition of budget expenditures in governments, Santolini analyzed 19 Italian regions in the period 1986-2009 and found that the distribution of current

transfers decreases substantially when the electoral system changes from proportional to mixed [55]. As well as suggesting that this reduction significantly affects health, safety, transportation and education expenses, since they are manipulated through projects that are geographically oriented to obtain consensus of voters during the election period. Still argues that 87% of these transfers are applied to health care (consumption, durable and non-durable goods), because most of the population (0-15 years and over 65 years) express greater demand for programs that reach this age group. And that transfers to education, on average, serve students between 14 and 18 years of age through scholarships and school services.

Alesina *et al.*, used data from Italian municipalities between 1998 and 2014, referring to spending on education, transportation and waste management, to analyze whether the age of the mayors allows the creation of PBCs in the election period [5]. They found that young mayors tend to be re-elected and respond quickly to the needs of the population; capital expenditures tend to increase in the period close to the elections, as well as investment expenditures; get more involved with PBCs than older mayors; and they are more willing to engage with opportunistic policies to ensure re-election than older mayors. However, the levels of expenditure and income choices during the term of office are independent of the age of the mayors.

Garofalo investigated whether politically aligned American governments increase funding by transfers revenues during the 1982-2002 electoral period [21]. He found that the federal government decreases, on average, 7% the distribution of funds to states that are not politically aligned, whose representatives of the chamber are from the same party, and that for party municipalities in states that are not aligned, there are substantial increases close to the presidential elections. These increases are concentrated on average 49% for housing and community development and 19% for education.

Iddrisu and Godfred, with objective to analyze the influence of PBC on human development in light of government spending, adopted the model used by [45, 31] to investigate expenditures in 38 African countries in election year from 1990 to 2015. They show that these governments increase their general expenses by around 15% during election period. And this increase is concentrated in infrastructure expenses, through concessions and activation of inactive contracts on average 12% in the year of election and 9% in years preceding the election. They also suggest that the appearance of PBC worsens human development in these countries at the aggregate level.

Using the spatial panel data analysis technique, applied to the fiscal results of 48 United States state governments in the period 1970-2012, Leguizamon and Kusevic, found low party ideological influence on fiscal rules between governments, regardless of party affiliation; excessive taxes and total spending during the election period are seen as inefficient by voters and these actions reduce the candidate's popularity [39]; the Democratic Party is associated with

higher levels of taxes and spending compared to the Republican Party, and that these expenditures tend to be higher on health, education and security, on average 12%, 10% and 9% respectively, regardless of party affiliation.

Vergne, using data from 42 developing countries from 1975-2001, exclusively from general budgets, finds evidence of electoral impacts on the allocation of public spending without affecting the budget deficit [61]. Through these findings, it suggests that electoral pressure can lead politicians to manipulate public policies in order to increase their chances of reelection, probably through opportunistic allocations that take the form of infrastructure projects, such as the construction of roads and schools, because they are easy to direct specific groups due to geographical factors. This suggestion corroborates with Eslava, which used data from Colombian municipalities and found pre-election deviations of resources and projects related to infrastructure [18]. As well as, with the results of [57], which analyzed data from 24 developing countries in the 1973-1992 period and concluded that capital expenditures form instruments preferred by governments for re-election to influence election results.

Bostashvilia and Ujhelyib in order to identify PBC in infrastructure spending in bureaucratic organizations, since bureaucrats can facilitate or hinder the involvement of politicians in voter-friendly spending in elections [11], it uses data from public service reforms carried out by the United States in the second half of the 20th (1960-1995) in interstate highway spending in 44 states. It concludes that these expenditures are 12% higher in election years and 9% higher in years before the election year and that bureaucratic organizations are important factors in encouraging PBC.

Conraria *et al.*, examined the role of active transparency in the dissemination of information from Portuguese local governments, with the aim of identifying the interaction with economic and political results in explaining public support during the election period [15]. Among other results, through proxy, the authors identified that in governments with more transparent information, voters are more likely to vote for candidates who present projects that produce long-term benefits, such as improvements in the quality of education in the electoral period. This result suggests that in governments with a greater degree of transparency in spending and public policies, managers tend to get involved with PBCs in actions that require a long time to complete.

Potrafke, with the objective of re-examining the PBC in the composition of the budget of the governments of the left and right, it investigated data from 20 countries of general and central governments that joined the OECD in the 1960s, in the period 1995-2016 [51]. It argues that in both governments, spending on education and security is higher and lower, respectively, for leftist governments in election year; the proportion of expenditure in relation to revenue, in the general government is 12% in education, 14% in health and 7% in security, and in the central government it is 9%, 8% and 9% respectively; politicians motivated for re-election are more likely to increase spending visible to voters, such as

investments and infrastructure.

This study corroborates the discussions on PBC and presents different results from the studies by [17, 21] and [51] on the education variable, by [55] and [5] on health, safety, transport and education, by [60] on transport and health.

3. Applied Methodology

This research used a set of data on financial, economic and social aspects in the period 1990-2019, in order to analyze the impact of PBCs on education, health, national security, transport and communication in the 37 governments of the Americas. The countries and variables investigated are shown in tables 1 and 2. The country French Guiana (ADF) was excluded from the population due to absence of information (data). Thus, we investigated 36 countries.

Table 1. Description of the population sample.

Central American			South American		
Number	Code	Country	Number	Code	Country
5	ATG	Antigua and Barbuda	25	ARG	Argentina
6	BHS	Bahamas	26	BOL	Bolivia (Plurinational State of)
7	BRB	Barbados	27	BRA	Brazil
8	BLZ	Belize	28	CHL	Chile
9	CRI	Costa Rica	29	COL	Colombia
10	CUB	Cuba	30	ECU	Ecuador
11	DMA	Dominica	31	GUY	Guyana
12	DOM	Dominican Republic	32	PRY	Paraguay
13	SLV	El Salvador	33	PER	Peru
14	GRD	Grenada	34	SUR	Suriname
15	GTM	Guatemala	35	URY	Uruguay
16	HTI	Haiti	36	VEN	Venezuela (Bolivarian Republic of)
17	HND	Honduras	37	AFD	French Guiana (<i>excluded from the sample</i>)
18	JAM	Jamaica	North American		
19	NIC	Nicaragua	Number	Code	Country
20	PAN	Panama	1	CAN	Canadá
21	KNA	Saint Kitts and Nevis	2	GRL	Greenland
22	LCA	Saint Lucia	3	MEX	Mexico
23	VCT	Saint Vincent and the Grenadines	4	USA	United States of America
24	TTO	Trinidad and Tobago			

Table 2. Description of the variables.

Classification	Short name	Full name	Application	Source
Dependent	EDU	Expenditure on education x GDP	%	The Unesco Institute of Statistic
Dependent	HEA	Public and private health expenditure x GDP	%	University of Oxford
Dependent	SOC	Public social expenditure x GDP	%	The World Bank
Dependent	TRA	Public transport expenses x GDP	%	University of Oxford
Dependent	SAV	National defense expense x GDP	%	The World Bank
Dependent	DEF	Budget deficit x GDP	%	International Monetary Fund
Dependent	SUP	Budget surplus x GDP	%	International Monetary Fund
Independent	ELEC	Election Year (dammy variable)	1=yes 0=not	Official website of each country
Independent	GDP	Growth GDP (Gross Domestic Product)	%	University of Oxford
Independent	HGI	Human development index	%	University of Oxford
Independent	UNE	Unemployment rate	%	The World Bank
Control	POP	Population	Logarithm ₁₀	Undata Statistes
Control	REG	Americas (North=1; Central=2; South=3)	1, 2, 3	

The data were organized by year, variable, country and region. The values corresponding to each variable were standardized based on the GDP variation to avoid outliers and exchange rate variations. As for the method applied for data analysis

corresponding to each variable, it is classified in two stages.

In the first stage, descriptive statistics is applied to analyze the contributions of PBCs to health, education, national security, transport and communication (see Table 3).

Table 3. Descriptive analysis.

Variable	Mean	Std. Dev.	Min	Max
COUNTRIES	18.5	10.39311	1	36
YEAR	2004.5	8.659451	1990	2019

Variable	Mean	Std. Dev.	Min	Max
ELEC	.2305556	.4213836	0	1
EDU	4.298174	3.18585	0	23.82
HEA	3.376113	2.275847	0	14.471
SAV	1.454088	1.206808	0	6.562895
SOC	5.886069	6.516472	0	32.8
TRA	3.167028	4.244533	0	24.12
DEF	2.377788	2.980335	0	29.9
SUP	.45425	1.380894	0	14.77
GDP	2.859911	3.926505	-35	18.28661
HDI	.6820093	.1461466	0	.926
UNE	8.935605	4.980514	1.58	28
POP	6.481085	1.043404	4.603469	8.51477
REG	2.222222	.6288306	1	3

In the second stage, we apply the tobit regression method for panel data grouped by america (see Tables 4-10). The estimated models are represented in equations 1-7 for each dependent variable investigated (see their descriptions in Table 2).

$$EDU_i = a + b_1 \cdot ELEC_i + b_2 \cdot GDP_i + b_3 \cdot HDI_i + b_4 \cdot UNE_i + b_5 \cdot POP_i + b_6 \cdot REG_i + (a_i - a + \varepsilon_i) \quad (1)$$

$$HEA_i = a + b_1 \cdot ELEC_i + b_2 \cdot GDP_i + b_3 \cdot HDI_i + b_4 \cdot UNE_i + b_5 \cdot POP_i + b_6 \cdot REG_i + (a_i - a + \varepsilon_i) \quad (2)$$

$$SAV_i = a + b_1 \cdot ELEC_i + b_2 \cdot GDP_i + b_3 \cdot HDI_i + b_4 \cdot UNE_i + b_5 \cdot POP_i + b_6 \cdot REG_i + (a_i - a + \varepsilon_i) \quad (3)$$

$$SOC_i = a + b_1 \cdot ELEC_i + b_2 \cdot GDP_i + b_3 \cdot HDI_i + b_4 \cdot UNE_i + b_5 \cdot POP_i + b_6 \cdot REG_i + (a_i - a + \varepsilon_i) \quad (4)$$

$$TRA_i = a + b_1 \cdot ELEC_i + b_2 \cdot GDP_i + b_3 \cdot HDI_i + b_4 \cdot UNE_i + b_5 \cdot POP_i + b_6 \cdot REG_i + (a_i - a + \varepsilon_i) \quad (5)$$

$$DEF_i = a + b_1 \cdot ELEC_i + b_2 \cdot GDP_i + b_3 \cdot HDI_i + b_4 \cdot UNE_i + b_5 \cdot POP_i + b_6 \cdot REG_i + (a_i - a + \varepsilon_i) \quad (6)$$

$$SUP_i = a + b_1 \cdot ELEC_i + b_2 \cdot GDP_i + b_3 \cdot HDI_i + b_4 \cdot UNE_i + b_5 \cdot POP_i + b_6 \cdot REG_i + (a_i - a + \varepsilon_i) \quad (7)$$

The tobit regression method for panel data allows greater precision of the differences existing in a given phenomenon between individuals (countries) in various cross-sections (years), in addition to allowing a greater amount of information, greater variability of data, less multicollinearity between variables, greater degree of freedom and greater efficiency when estimating their parameters [59].

To identify the degree of reliability of the results, tests with standard errors were used through the comparison technique between POLS estimation - between effects, fixed effect, robust fixed effect, random effect and robust random effect. In order to identify possible multicollinearity between the variables, Breusch-Pagan's LM (Lagrange multiplier) statistical tests, Chow's F test, Hausman's test, and Hausman's robust test were applied [30, 13, 17].

The Hausman and Breusch-Pagan Lagrange tests also show the estimation models with the best statistical significance, since the first test investigates whether the individual effects of individuals have a statistically equal correlation zero between parameters by fixed and random effect; and the second, if the variance between individuals is equal to zero there are no significant differences between the variables. The Tobit regression model describes the relationship between a non-negative dependent variable (y) and an independent variable (vector), and is more appropriate, complete and robust for analyze variables in decomposed in GDP variation [28].

Table 2 describes the dependent and independent variables with their respective units of values and source in which they

were collected. The values of the variables EDU, HEA, SOC, TRA, SAV, DEF and SUP correspond to the percentage in relation to the GDP of each country. We adopted this criterion to eliminate possible exchange rate variations between countries. For GDP, HGI and UNE variables, we adopt the percentage change in each year. For the variable ELEC, we adopted the dammy concept where 1 (yes) represents the election year and 0 (not) the year in which there was no election. Finally, regarding the values of the POP variable, we apply the base 10 logarithm criterion to avoid discrepancies between the most populous countries.

We use of percentage (%) values for the variables in this study is because they are able to remove distortions produced by country sizes, as well as eliminates the divergences generated by the exchange variation in each country.

Values absent in some years in the databases cited as a source in Table 2 were found in the budget statements available on the official website of each country, and requested by e-mail, as an example, the variables TRA and SOC. In some specific countries, Colombia (COL) and Ecuador (ECO), information was requested by e-mail. In the country Paraguay (PRY), the data referring to the TRA variable for the period 200-2009 were found in the public budget report, specifically in "ministry of works and communication".

4. Analysis and Results

The collected data were analyzed using Stata Statistic 15.

To evaluate standard errors we applied the comparison technique between POLS estimation (POLSrob), between effect (BE), fixed effect (EF), robust fixed effect (EFrob), random effect (EA) and robust random effect (EARob) and to identify the degree of reliability of the results. To evaluate the multicollinearity of the variables, we applied the LM tests LM tests (Lagrange multiplier) from Breusch-Pagan, F test from Chow, Hausman test, and robust test from Hausman [30, 13, 17, 3]. Therefore, the test results showed $Prob > \chi^2 = 0.0000$ with 95% statistical significance. To estimate the model by fixed effect, we considered the explanatory variables in addition to the variables GPD, HDI, UNE, POP ($n-1 = 35$) dummies corresponding to the n (36) countries, estimated by LSM (Least Squares Method).

In accordance with the outputs, coming from a strongly balanced panel, we found that the countries (id) are invariant over time, which is why it presents within variation equal to zero. Likewise, the time variable (t) varies between equal to zero. The variation between is greater than the variation within for the dependent variables EDU, HEA, SAV, SOC,

TRA, DEF and SUP. This fact is due to the differences in data between countries grouped by regions over time.

The comparative estimation results for panel data (POLSrob, BE, EF, EFrob, EA, EARob) did not identify any significant difference, as well as multicollinearity between the variables was not identified. Therefore, the results confirmed that spending on education, health, national security, social assistance, transportation and communication, and surplus are not positively impacted in the electoral period [53].

In order to make the results more robust, we evaluated the data collected using the Tobit regression method in panel data [59]. We investigated the behavior of the dependent variables, individually, grouped by countries, and found that there were no significant changes ($P > |z|$) in the election period, using the estimation method (see Tables 4-10). The results presented in Table 4 show the behavior of spending on education (dependent variable EDU), through the model (see equation 1) with an explanation of 88.5% between the variables.

Table 4. Analysis of spending on education during election periods using the tobit estimate effect.

Equacion: $EDU_i = a + b_1.ELEC_i + b_2.GDP_i + b_3.HDI_i + b_4.UNE_i + b_5.POP_i + b_6.REG_i + (a_i - a + \epsilon_i)$						
Random-effects tobit regression			Number of obs = 1080			
Group variable: Countries			Number of groups = 36			
Random effects $u_i \sim$ Gaussian			Obs per group: min = 30			
			avg = 30.0			
			max = 30			
Integration method: mvaghermite			Integration points = 12			
			Wald $\chi^2(6) = 88.52$			
Log likelihood = 2307.0431			Prob > $\chi^2 = 0.0000$			
EDU	Coef.	Std. Err.	z	P> z 	[95% Conf.	Interval]
ELEC	-.0344566	.1380904	-0.25	0.803	-.3051088	.2361956
GDP	-.0375993	.0158213	-2.38	0.017	-.0686084	-.0065902
HDI	11.05863	1.698229	6.51	0.000	7.73016	14.3871
UNE	.0423267	.0204694	2.07	0.039	.0022075	.0824459
POP	.0171384	.4910271	0.03	0.972	-.945257	.9795339
REG	-1.579085	.8366289	-1.89	0.059	-3.218848	.0606773
_cons	-.1086505	3.097095	-0.03	0.975	-6.787963	6.570662
/sigma_u	3.097095	.4073507	7.60	0.000	2.298702	3.895488
/sigma_e	1.904282	.041828	45.53	0.000	1.822301	1.986263
rho	.7256611	.0534209			.6123998	.8196169

These results indicate that there is no positive behavior of the EDU variable in the year of election, and that the independent variables HDI and UNE influence the behavior of the EDU variable, with a 95% confidence interval, at approximately 11% and 4% respectively for each unit statistic. However, the GDP variable negatively influences an average of 3.7%. This means that the increase of one unit in the result of GDP in the electoral period impacts 3.7% in the reduction of spending on education. Perhaps this result is related to the lack of information from school managers to candidates for reelection [22, 29].

Table 5 shows the results for the HEA variable (health expenditure), estimated using equation 2, with an explanation

of 87% of the independent variables in relation to the dependent variable.

The results shown in the column ($P > |z|$) demonstrate that there is no statistical significance in the behavior of the dependent variable HEA in the year of election, with the exception of the independent variable HDI, which indicates a positive influence on the HEA variable by an average of 11%, that is, the increase in one statistical unit in the HDI variable impacts 11% in the HEA variable in the electoral period. This result differs from the study by [32], who suggest that the existence of COP in the electoral period worsens the HDI.

Table 5. Analysis of health expenditures during election periods using the tobit estimation effect.

Equacion: $HEA_i = a + b_1 \cdot ELEC_i + b_2 \cdot GDP_i + b_3 \cdot HDI_i + b_4 \cdot UNE_i + b_5 \cdot POP_i + b_6 \cdot REG_i + (a_i - a + \epsilon_i)$						
Random-effects tobit regression			Number of obs = 1080			
Group variable: Countries			Number of groups = 36			
Random effects $u_i \sim$ Gaussian			Obs per group: min = 30			
			avg = 30.0			
			max = 30			
Integration method: mvaghermite			Integration points = 12			
			Wald chi2(6) = 87.45			
Log likelihood = 2307.0431			Prob > chi2 = 0.0000			
HEA	Coef.	Std. Err.	z	P> z 	[95% Conf.	Interval]
ELEC	.0555964	.0889219	0.63	0.532	-.1186873	.2298801
GDP	-.0095155	.0101925	-0.93	0.351	-.0294924	.0104614
HDI	17.22904	1.261573	13.66	0.000	14.7564	19.70168
UNE	.0036181	.0133367	0.27	0.786	-.0225214	.0297576
POP	-.5022572	.4585859	-1.10	0.273	-1.401069	.3965547
REG	-1.624109	.8076855	-2.01	0.044	-3.207144	-.041075
_cons	-1.527.882	3.022716	-0.51	0.613	-7.452296	4.396532
/sigma_u	3.008586	.3991588	7.54	0.000	2.22625	3.790923
/sigma_e	1.226204	.0269517	45.50	0.000	1.17338	1.279029
rho	.8575507	.0330816			.7827385	.9126545

In the Table 6 shows the behavior of the variable SAV (expenditure on national security), represented by equation 3, with approximately 74% of statistical explanation between the variables.

Not different the results of the EDU and HEA variables, the results corresponding to the SAV variable also confirm that there is no positive behavior in an election year (see column "P>|z|"). However, the HDI and POP variables

demonstrate antagonistic influences on the SAV variable. The results show that the increase in one statistical unit in these two variables (HDI and POP), reflects negative and positive respectively in the variable SAV in the year of election (see column "Coef"). These results indicate that the more developed the population the less spending on national security, and the larger the population the more spent on national security.

Table 6. Analysis of national security expenditures during election periods using the tobit estimation effect.

Equacion: $SAV_i = a + b_1 \cdot ELEC_i + b_2 \cdot GDP_i + b_3 \cdot HDI_i + b_4 \cdot UNE_i + b_5 \cdot POP_i + b_6 \cdot REG_i + (a_i - a + \epsilon_i)$						
Random-effects tobit regression			Number of obs = 1080			
Group variable: Countries			Number of groups = 36			
Random effects $u_i \sim$ Gaussian			Obs per group: min = 30			
			avg = 30.0			
			max = 30			
Integration method: mvaghermite			Integration points = 12			
			Wald chi2(6) = 73.77			
Log likelihood = -966.59381			Prob > chi2 = 0.0000			
SAV	Coef.	Std. Err.	z	P> z 	[95% Conf.	Interval]
ELEC	-.0327194	.0398457	-0.82	0.412	-.1108155	.0453766
GDP	-.0027298	.0045613	-0.60	0.550	-.0116697	.0062101
HDI	-2.79353	.4706567	-5.94	0.000	-3.716	-1.871059
UNE	.0088231	.0059031	1.49	0.135	-.0027468	.020393
POP	.3055207	.145732	2.10	0.036	.0198912	.5911502
REG	-.0266628	.2538477	-0.11	0.916	-.5241951	.4708695
_cons	1.374.957	.9926296	1.39	0.166	-.5705612	3.320475
/sigma_u	.9416045	.1124134	8.38	0.000	.7212783	1.161931
/sigma_e	.5494858	.0120259	45.69	0.000	.5259155	.573056
rho	.7459647	.0460232			.6481661	.8272403

The result of spending on social assistance (SOC) in the election period, shown in Table 7, estimated by equation 4, with 92% of statistical explanation between the dependent and independent variables.

Table 7. Analysis of spending on social assistance during the election period using the tobit estimation effect.

Equacion: $SOC_i = a + b_1.ELEC_i + b_2.GDP_i + b_3.HDI_i + b_4.UNE_i + b_5.POP_i + b_6.REG_i + (a_i - a + \epsilon_i)$						
Random-effects tobit regression			Number of obs = 1080			
Group variable: Countries			Number of groups = 36			
Random effects $u_i \sim$ Gaussian			Obs per group: min = 30			
			avg = 30.0			
			max = 30			
Integration method: mvaghermite			Integration points = 12			
			Wald chi2(6) = 92.14			
Log likelihood = -2921.9474			Prob > chi2 = 0.0000			
SOC	Coef.	Std. Err.	z	P> z 	[95% Conf.	Interval]
ELEC	-.0490547	.2430781	-0.20	0.840	-.5254791	.4273697
GDP	-.0621771	.0278462	-2.23	0.026	-.1167547	-.0075995
HDI	-35.02175	3.101345	-11.29	0.000	-41.10027	-28.94322
UNE	.1805573	.0361587	4.99	0.000	.1096875	.2514271
POP	3.520.199	.9410856	374	0.000	1.675705	5.364692
REG	-1.66322	1.652164	-1.01	0.314	-4.901403	1.574962
_cons	9.228.307	6.399212	1.44	0.149	-3.313917	21.77053
/sigma_u	6.134557	.777692	7.89	0.000	4.610308	7.658805
/sigma_e	3.352047	.0735273	45.59	0.000	3.207936	3.496157
rho	.7700748	.0457512			.6713804	.849539

The results in the column (P> | z |) indicate that spending on social assistance (SOC) does not suffer positive influences in election year, and that the GDP, HDI, UNE and POP variables statistically influence the behavior of SOC variable, whether positive or negative. They also indicate that the increase of a statistical unit in the gross domestic product

(GDP) during the election period negatively impacts social assistance spending by 6%.

In the Table 8 contains the results referring to expenses with transportation and communication (TRA), estimated by equation 5, with 89.7% of statistical explanation between the dependent and independent variables.

Table 8. Analysis of expenses with transport and communication during the election period using the tobit estimation effect.

Equacion: $TRA_i = a + b_1.ELEC_i + b_2.GDP_i + b_3.HDI_i + b_4.UNE_i + b_5.POP_i + b_6.REG_i + (a_i - a + \epsilon_i)$						
Random-effects tobit regression			Number of obs = 1080			
Group variable: Countries			Number of groups = 36			
Random effects $u_i \sim$ Gaussian			Obs per group: min = 30			
			avg = 30.0			
			max = 30			
Integration method: mvaghermite			Integration points = 12			
			Wald chi2(6) = 89.74			
Log likelihood = -2700.7442			Prob > chi2 = 0.0000			
TRA	Coef.	Std. Err.	z	P> z 	[95% Conf.	Interval]
ELEC	.3212921	.2002049	1.60	0.109	-.0711024	.7136865
GDP	-.0329282	.022917	-1.44	0.151	-.0778446	.0119882
HDI	17.73774	2.463779	7.20	0.000	12.90882	22.56666
UNE	-.0499172	.0295459	-1.69	0.091	-.1078262	.0079918
POP	-1.695.829	.5840241	-2.90	0.004	-2.840495	-.5511627
REG	1.152162	.9864139	1.17	0.243	-.7811735	3.085498
_cons	-.0336876	4.035329	-0.01	0.993	-7.942787	7.875412
/sigma_u	3.639485	.4880936	7.46	0.000	2.68284	4.596131
/sigma_e	2.760846	.0606755	45.50	0.000	2.641924	2.879768
rho	.634741	.0634555			.505439	.7502381

These results suggest that there is no positive impact on the TRA variable in the year of election (see column “P>|z|”) statistically at the 95% confidence interval. However, when considering the degree of confidence at 90%, we find that this variable suffers positive influences in the electoral period, an average of 32%. These results confirm that transportation and communication expenses are voter

expenses, that is, they are visible to the population and capable of changing the voter's voting decision [55, 32].

Still, considering 90% confidence interval, statistically, the results are robust and confirm that the HDI, UNE and POP variables positively and negatively influence the TRA variable in the election year (see column “Coef”).

As for the results shown in Tables 9 and 10, corresponding

to the variables DEF (deficit) and SUP (surplus), with a degree of statistical explanation between the variables in approximately 98.5% and 71.7% respectively, represented by equations 6 and 7, suggest that the DEF variable increases by an average of 56% in election year. Regarding the SUP variable, the results state that there is no statistically

significant influence in an election year, although few countries in the sample show a surplus over the analyzed period. These results corroborate the studies by Bohn and Veiga when they state that there is an increase in deficit in election year [9].

Table 9. Analysis of decits during election periods using the tobit estimation effect.

Equacion: $DEF_i = a + b_1.ELEC_i + b_2.GDP_i + b_3.HDI_i + b_4.UNE_i + b_5.POP_i + b_6.REG_i + (a_i - a + \epsilon_i)$						
Random-effects tobit regression			Number of obs = 1080			
Group variable: Countries			Number of groups = 36			
Random effects $u_i \sim$ Gaussian			Obs per group: min = 30			
			avg = 30.0			
			max = 30			
Integration method: mvaghermite			Integration points = 12			
			Wald chi2(6) = 98.54			
Log likelihood = -2539.6125			Prob > chi2 = 0.0000			
DEF	Coef.	Std. Err.	z	P> z 	[95% Conf.	Interval]
ELEC	.5572327	.1774864	3.14	0.002	.2093658	.9050997
GDP	-.256604	.0202	-12.70	0.000	-.2961954	-.2170127
HDI	7.889589	1.567663	5.03	0.000	4.817026	10.96215
UNE	-.0216176	.024351	-0.89	0.375	-.0693448	.0261095
POP	-.1655256	.2291388	-0.72	0.470	-.6146293	.2835781
REG	.3287632	.3688264	0.89	0.373	-.3941234	1.05165
_cons	-1.862.225	1.771308	-1.05	0.293	-5.333925	1.609474
/sigma_u	1.290081	.2023357	6.38	0.000	.8935104	1.686652
/sigma_e	2.44815	.0539522	45.38	0.000	2.342406	2.553895
rho	.2173366	.0544739			.1262409	.3379378

Table 10. Analysis of decits during election periods using the tobit estimation effect.

Equacion: $SUP_i = a + b_1.ELEC_i + b_2.GDP_i + b_3.HDI_i + b_4.UNE_i + b_5.POP_i + b_6.REG_i + (a_i - a + \epsilon_i)$						
Random-effects tobit regression			Number of obs = 1080			
Group variable: Countries			Number of groups = 36			
Random effects $u_i \sim$ Gaussian			Obs per group: min = 30			
			avg = 30.0			
			max = 30			
Integration method: mvaghermite			Integration points = 12			
			Wald chi2(6) = 71.72			
Log likelihood = -1818.7968			Prob > chi2 = 0.0000			
SUP	Coef.	Std. Err.	z	P> z 	[95% Conf.	Interval]
ELEC	-.1021679	.0916425	-1.11	0.265	-.281784	.0774481
GDP	.0501409	.0103955	4.82	0.000	.029766	.0705158
HDI	.0562149	.6053333	0.09	0.926	-1.130217	1.242646
UNE	.0339512	.0123952	2.74	0.006	.0096571	.0582454
POP	-.0413775	.0984682	-0.42	0.674	-.2343715	.1516166
REG	.1804051	.1565282	1.15	0.249	-.1263846	.4871948
_cons	-1.1400362	.742521	-0.19	0.850	-1.595351	1.315278
/sigma_u	.5319162	.07771	6.84	0.000	.796074	.6842249
/sigma_e	1.264185	.0277072	45.63	0.000	1.20988	1.31849
rho	.1504094	.0379965			.0879476	.2370403

5. Discussion

Studies investigate PBC as a political instrument capable of generating beneficial mechanisms for reelection candidates to remain in power [38], because the decision to vote is based on recent actions [36, 58, 1, 14], and that this

instrument occurs in young democracies and in emerging countries because their institutions and bodies are weak [12, 49]. However, PBCs are inherent in economic regimes in capitalist democracies and that rational behaviors of candidates to remain in power are present in democratic policies [16, 35].

In this sense, this study investigated the behavior of

spending on education, health, national security, social services, transportation and communication, as well as the budget deficit and surplus in an election year. These expenses are common to all democratic governments and essential to the population [1].

The results are robust with a level of explanation between the dependent and independent variables averaging 86% in the estimation models (see Tables 4-10 and equations 1-7), and are antagonistic to the results presented by some studies [19, 4, 25, 17, 23, 2, 24, 15], because they suggest that these expenses did not increase in election year in American countries [52]. As for the behavior of budget deficits in the electoral period, the study suggests that federal governments are more likely to spend without the coverage of financial resources in election years, on average, 55.7% more than in other years. This result on deficit corroborates the studies by [9, 1], and diverges from the study by [61].

Since PBCs are inherent in democratic countries [35], they contribute to positive behavior in the economy (GDP), human development (HDI) and unemployment (UNE). The results suggest that the presence of PBCs in the investigated governments contributes to GDP growth by an average of 1.4% in an election year compared to other years, as well as 2.9% in HDI and 0.9% reduction in unemployment, and present divergent behavior in relation to other countries [39, 61].

Is possible to identify that the presence of PBCs in the electoral period in democratic governments positively contribute to a greater concentration of financial resources in actions that provide for the construction and maintenance of social welfare for the population. As an example: (i) health, education and transportation systems receive more financial resources in an election year [55]; (ii) republican parties increase financial transfers in an election year for health, education and security systems [39]; (iii) highways and transport expenses increase on average 12% in the electoral period [11]; (iv) left-wing governments increase spending on education and infrastructure in election year [51]; (v) party similarity leads to a 19% increase in financial transfers to education in election year [21].

6. Conclusion

Thus, this study concludes that the presence of PBCs in democratic American countries contributes to the positive performance in the economy, to population development and reduction in the number of unemployment, as well as, it does not statistically verify the growth of expenses with education, health, security national and social services in election period.

A limitation of this study is that it focuses only on seven variables that capture spending in an election year. The effects between these variables, which were confirmed in this study, need further investigation in public management. In the empirical context, this study is limited to public spending in an election year in American countries. Future research can explore alternative variables, as well as test the models proposed in other countries and compare the results. Studies

on the impact of PBC in relation to environmental and social development indexes are timely.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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