DEMOGRAPHIC STUDY OF CUBAN BLUE LODGE MASONS:
A TECHNICAL DISCUSSION

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ABSTRACT

Cuban Blue (or Symbolic) Lodge masons constitute one of the oldest, largest and geographically most widely spread organizations of Cuban civil society. We examine the evolution of such masons, using annual membership data from the confederation of all Blue Lodges (or Grand Lodge). Defining the equivalent of population at risk, a new Masonic indicator is derived. Using such indicator and Immigration and Naturalization Service data, we estimate the number of Cuban Blue Lodge masons that left Cuba in the wake of Castro's revolution. Using United Nations rates, we estimate deceased masons. Using annual membership trends at different epochs, we estimate the number of Communist Party and administration officers that may have joined the Cuban Blue Lodge masons. We thus describe the evolution of the members of the Grand Lodge, through the second half of the XX Century, and through the seven epochs of Cuban sociopolitical developments, that we have identified.

Key Words

Demographic study; statistical models; time series; Freemasons.

RESUMEN

Los masones cubanos de las Logias Azules (o Simbólicas) constituyen una de las organizaciones más antiguas, geográficamente más expandidas y más numerosas de

la sociedad civil cubana. Examinamos la evolución de estos masones, utilizando datos anuales de membresía en la confederación de todas las Logias Azules (o Gran Logia). Definimos el equivalente de población en riesgo, como un nuevo indicador de estos masones. Utilizando este indicador y datos del INS (Servicio de Inmigración y Naturalización de EEUU), estimamos el número de masones de Logias Azules que emigraron tras la revolución de Fidel Castro. Utilizando tasas de Naciones Unidas, estimamos el número de masones fallecidos. Utilizando tasas de crecimiento de la membresía anual, en distintas épocas, estimamos el número de miembros provenientes del Partido Comunista y del gobierno cubano, que ingresaron en sus filas después de 1992. Así, describimos la evolución de los miembros de la Gran Logia, o confederación de Logias Azules, durante la segunda mitad del siglo XX, y a través de siete épocas que hemos identificado en estos años, y que describen los acontecimientos socio-políticos ocurridos en ella.

Palabras Clave

Estudio demográfico; modelos estadísticos; series de tiempo; masonería.

1. Background

We present a technical discussion of the statistical methods used in a demographic study, by Romeu and Pardo (2010a), submitted to the Grand Lodge of Cuba [1].

In our research we analyze data from the Grand Lodge of Cuba (GLC). A Grand Lodge is a confederation of all *Blue Lodges* from a given region, state or nation: that is, of masons of the 1st, 2nd and 3rd degrees, or what is also known as *Symbolic Freemasonry*. In addition, masons attaining the higher degrees (i.e., 4th to 33rd or members of the *Philosophic Freemasonry*), are also required to belong to a Blue (or Symbolic) Lodge [2]. Hence, these are also members of the GLC and, even when not counted separately, they are also included in the GLC membership count.

For a relative proportion of the membership in these two subgroups: in the year 2010, there were approximately 29 thousand members in the GLC. Of these, 4,213 members (or 14.5%) also belonged to Higher Degrees (SCGR33, 2011).

We have analyzed the time series of the membership in the GLC, i.e. in the confederation of all Blue or Symbolic Lodges forming GLC. For readability, we will hereon refer to this confederation, comprising all Cuban freemasons (CF) in the Blue or Symbolic Lodges, which includes 1st to the 33rd degrees, as BL/GLC.

We have not included, in our analysis, data from the two other Cuban fraternal organizations, the *Caballeros de la Luz* (Cuban order), and the *Odd-Fellows* (international). They also operate in Cuba, but their membership traditionally has been much smaller than that of the BL/GLC, and their data was not available.

Masons define themselves as the "*organization of morality*", whose purpose is "*to make some good men, better*". Masons are independent of government, discourage discussions about politics or religion, and admit only adult men of good conduct and health. They claim to be tolerant, to do good works, and to practice brotherhood among their members. Perhaps because of these characteristics, men of the stature of Washington, Juarez, Bolivar and Marti, in the XIX Century, and of Salvador Allende, Lazaro Cardenas and Winston Churchill, in the XX Century, were attracted to, and have joined, the Freemasons.

We will not discuss the origins of Freemasons in this paper. Readers interested in their history are referred to Harwood (2007). For a history of Cuban Freemasons in the XIX Century, readers are referred to Miranda (1933). For contemporary developments, readers are referred to Torres-Cuevas (2003).

The study of the BL/GLC is of importance because, with over 150 years, it is one of the oldest organizations of Cuban civil society. It is one of the largest, with about 30,000 members nation-wide, gathered in over 300 lodges, in every town and province. BL/GLC has traditionally admitted members of all races, social classes, political persuasions, and religions. Finally, BL/GLC has actively participated in Cuba's struggle for independence, and many of Cuba's founding fathers were freemasons, including Jose Marti.

Therefore, due to its wide and diverse membership, BL/GLC can be considered an important sub-population for studying Cuban socioeconomic and political issues. This is especially important, given that there are few other independent groups of its size and diversity, with a complete membership data set, starting before the 1959 revolution, and up to our days. For, other comparable civil society organizations either have no data or incomplete data, are too small, too regional, too specific or too narrowly defined.

2. Statistical Study Summary and Discussion

The annual BL/GLC membership time series is shown in Figure 1. Part A (left) shows the annual members, in thousands. Part B (right) shows what we call annual *Effective Masons*.

Figure 1. Yearly BL/GLC membership: A) Total Members; B) Effective Masons.
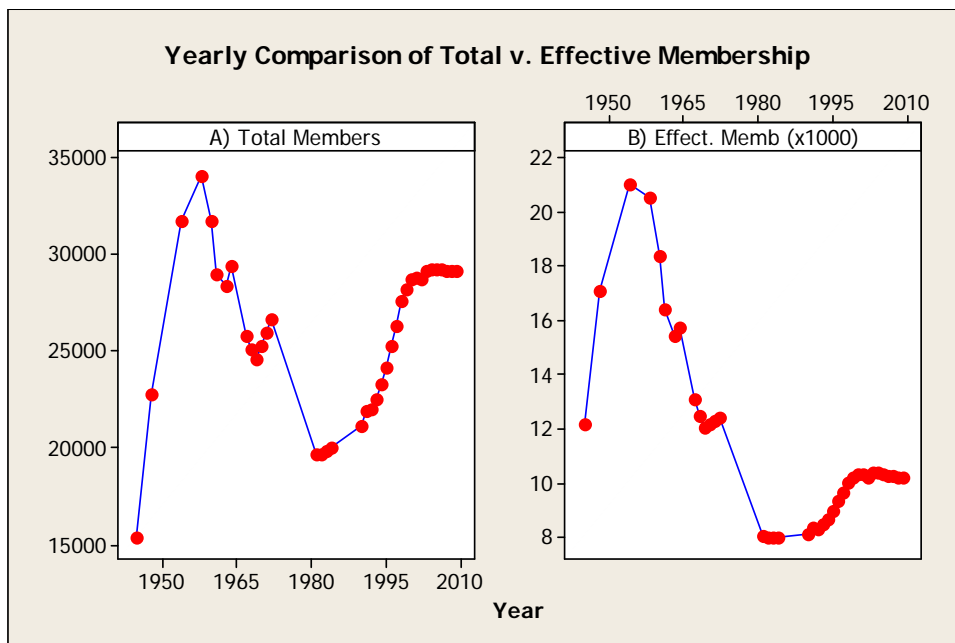
Source: Membership yearly reports from the Grand Secretary of the BL/GLC

Since women cannot join the Freemasons, neither men below the ages of 21, nor the sick, or those with criminal records, or very poor, this reduces the *population at risk* to approximately one-fourth of the total Cuban population (inter-census yearly results were obtained by linear interpolation). Such ratios yield the number of CF, per thousand men, eligible for belonging to the BL/GLC. The *Effective Masons* indicator allows a fair comparison of BL/GLC membership across regions, and across different time periods. For, the *Effective Masons* indicator considers the effect of population size and growth.

Freemasons have lost membership in many countries during the second half of the XX Century. For example (Morris, 2002) in 1960, of 180 million US citizens, there were 4.1 M Freemasons, yielding 91.5 *Effective Masons*. In 2000, such indicator had dropped to 25.6 per 1000 eligible: almost a four-fold reduction.

Table 1. BL/GLC and US Masons, in the 2nd Half of the XX Century

	Year	Population	Masons	/1000s	Effective
USA	1960	179,323,175	4,103,000	22.8	91.5
	2000	281,421,906	1,800,000	6.4	25.6
Cuba	1959	6,000,000	34,000	5.7	22.8
	2000	11,000,000	29,000	2.6	9.6

Source: US Masons: Morris (2002); population: US and Cuban census.

Besides the mentioned paper by Morris, and the two volumes by Ayala (1991, 1993), we have not found much other quantitative information or analysis, regarding Freemasons.

In Cuba, however, and due to the political and economic changes brought in by the 1959 revolution, the situation developed differently. Membership first follows a stronger decay than abroad. Then, after 1990, the BL/GLC recovers strongly (Figure 1). Highlights of such membership figures, by decade, for Total and *Effective Masons*, are in Table 2. They include Total and Effective members; percent of total and effective membership increase both, per the entire time period and its average per year. Bold types are two extreme figures in the membership series, occurring in 1958 (maximum) and in 1981 (minimum).

Table 2: Selected BL/GLC membership, with growth rate averages, per period.

Selected Year	Total Members	Effective Members	Period	Tot. Memb Average	Effect. Mbr Average
1945	15,361	12.17	*	*	*
1958	34,025	20.5	1945-58	9.00%	5.00%
1968	25,824	12.47	1959-68	-2.50%	-4.00%
1971	26,659	12.28	1969-71	0.00%	0.00%
1981	19,690	7.98	1972-81	-2.40%	-3.20%
1991	21,962	8.35	1982-91	1.30%	0.50%
2000	29,225	10.3	1992-00	3.60%	2.60%
2008	29,110	10.2	2001-09	0.00%	0.00%

Source: Yearly reports from the Grand Secretary of the BL/GLC

There is an accelerated membership growth (9%) between 1945 and 1958, followed by an accelerated decay (-2.5%) between 1959 and 1968. There is a second pronounced decay (-2.4%) from 1972 to 1981. Some growth occurs in the 1980s. Then, we observe a strong growth in the 1990s, followed by a period of stabilization, at about 30 thousand, from 2000 onwards.

To answer the research question "what happened" during these years, we paired the BL/GLC time series with simultaneous Cuban historical events. Then, we used the series change-points to determine the start and end dates of specific epochs. Then, we obtained linear regressions on time, for the seven periods identified. Growth and decay segments were statistically significant. Trends for the short periods of transition were non significant. As a result of all this work, seven historical periods (Table 3), consistent with historical epochs, were established.

The *historical events*, in each of the seven epochs of Table 3, correspond to the most important political, economic, and social activities occurring in Cuba, at the time. The implications and meaning of such events on their periods lie outside the present technical discussion. The interested reader is directed to papers by Romeu and Pardo (2010a), and Romeu (2010b, 2011a, 2011b, and 2011c). These papers were presented at conferences in Association for the Study of the Cuban Economy), UNAM, and the Bildner Center/CUNY, in 2010 and 2011. Their importance lie in that we were able to (1) establish coherent historical periods, based on the BL/GLC time series, (2) to flag candidate events, that characterized each of these periods, as possible factors in their corresponding epochs, and (3) to validate the BL/GLC data analyzed.

We will return to the BL/GLC time series, when we discuss the derivation of statistical models that help explain such time series behavior.

Table 3. Historical periods derived from BL/GLC annual membership data.

Historical Epoch	Years	Membership Trend	Relevant Events
Before the revolution	1945-1958	Accelerated growth	Grau, Prío and the struggle against Batista
First Years after the revolution	1959-1969	Accelerated reduction	Emigration; Bay Pigs; October Crisis; Revol. Ofensive; UMAP
Second Revolutionary Period	1970-1976	Slower reduction Missing Data.	Zafra de los 10 Millones; End of Legal Emigration
Third Revolutionary Period	1977-1980	Accelerated reduction	State Economy; Visits from "Community"; Mariel Boatlift
Fourth Revolutionary Period	1981-1990	Slower growth Missing Data	Gorbachev;Disolution of USSR; Economic Liberalization after the Mariel Boatlift
Fifth Revolutionary Period	1991-2000	Accelerated growth	IV Congress of PCC; Special Period; Rise of Tourism
Sixth Revolutionary Period	2001 to date	Stability	New Millenium; Tourism; Support from Venezuela

Slow reduction (1970-76) and slow growth (1981-90) periods can be appreciated better through the *Effective Masons* time series (Part B of Figure 1).

Another research question of interest deals with the nature and extent of the BL/GLC membership. The Cuban territory is not homogeneous. The western part of the island is more urban, richer and more densely populated than the eastern part. To analyze such effect, we looked at the BL/GLC *Effective Masons* data by provinces, circa 2007 (Table 4). For such indicator allows fair comparisons across regions. We noticed how the number of lodges and of CF, in the metropolitan area of Havana was 1/3 of the total. And for the combined western provinces (bold type), this result was over 70% of the total.

Table 4: Provincial annual BL/GLC membership data, circa 2007

PROVINCE	Lodges	Mmbrs	PctLodgs	PctMmb	Efective	Efec/000
TOTAL	316	29,127	100	100	10.42	0.01042
PINAR del RIO	**17**	**2,706**	**5.38**	**9.29**	**14.9**	**0.0149**
PROV. HABANA	**29**	**2,494**	**9.18**	**8.56**	**14.03**	**0.01403**
CIUDAD HABANA	**111**	**9,329**	**35.13**	**32.03**	**16.95**	**0.01695**
MATANZAS	**28**	**2,370**	**8.86**	**8.14**	**14.14**	**0.01414**
VILLACLARA	**29**	**2,667**	**9.18**	**9.16**	**13.05**	**0.01305**
CIENFUEGOS	**14**	**1,387**	**4.43**	**4.76**	**14.04**	**0.01404**
SANCTI SPIRITU	11	991	3.48	3.4	8.61	0.00861
CIEGO DE AVILA	8	449	2.53	1.54	4.36	0.00436
CAMAGUEY	14	709	4.43	2.43	3.62	0.00362
LAS TUNAS	6	604	1.9	2.07	4.6	0.0046
HOLGUIN	12	1,138	3.8	3.91	4.46	0.00446
GRANMA	10	1,104	3.16	3.79	5.37	0.00537
STGO DE CUBA	19	1,992	6.01	6.84	7.69	0.00769
GUANTANA-MO	7	1,187	2.22	4.08	9.36	0.00936

Source: Reports from the Grand Secretary of the BL/GLC

Comparing *Effective Masons* indicators per province (Figure 2) with their Total National Average (=10.42), we immediately verified the presence of two groups.

The western provinces of Pinar del Rio, Havana, Havana Metro, Matanzas, Cienfuegos and Villaclara, with larger urban populations and stronger economic developments, have larger *Effective Masons* indicators and more lodges, in their more numerous urban centers.

A much lower percentage of members and lodges, can be found in the largely rural, and more sparsely populated provinces of Cuba's Eastern provinces: Ciego de Avila, Sancti Spiritus, Camaguey, Las Tunas, Holguin y Granma.

Santiago and Guantanamo are two large provincial capitals within a small region; thence their higher *Effective Masons* indicator.

Figure 2: Effective Masons indicator (x1000), per province, circa 2007.
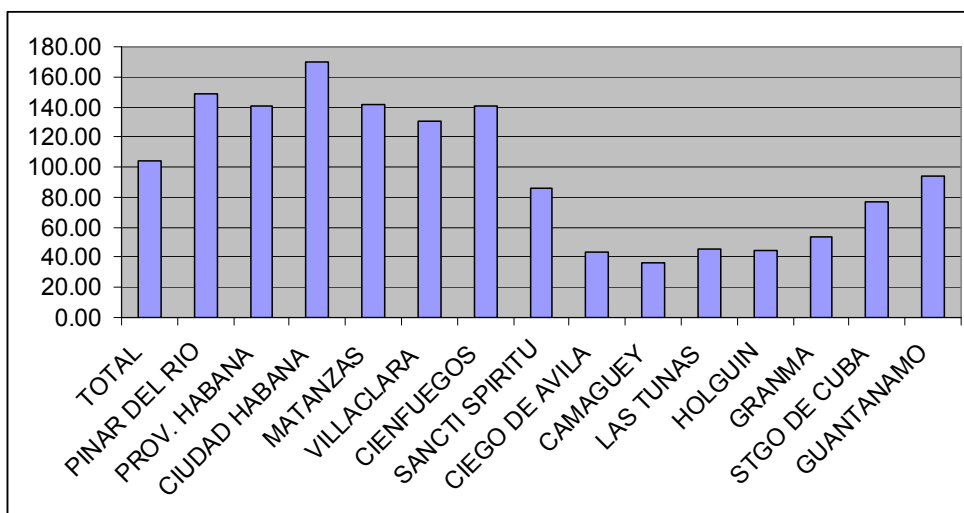
Source: Yearly reports from the Grand Secretary of the BL/GLC

The Contingency Table (Table 5) implemented, shows how Cuba's geographical areas are indeed associated with *Effective Masons*.

Table 5: Contingency table assessing geographical areas and Effective Masons.

	Western / Exp	Eastern / Exp	Totals
EffMasons < 10.4	0 / 3.43	8 / 4.57	8
EffMasons > 10.4	6 / 2.57	0 / 3.43	6
Totals	6	8	14

Such contingency analysis results suggest that freemasons tend to be an urban phenomenon. For, BL/GLC numbers are stronger in Eastern urban provinces, where a higher educational and socioeconomic level prevails. Never-the-less, in almost every town or village in Cuba, there is at least one Masonic lodge.

To help explain the annual membership development of the BL/GLC, we developed a time series model that describes the membership flow in any organization:

Members CurrentYear = Members PreviousYear – Losses + Gains

In the case of the BL/GLC we break down such Losses and Gains into:

Gains = New members (affiliations) + Re-affiliations
Losses = Withdrawals + Deaths + Politically_Motivated

Withdrawals refer to those members who become disillusioned with, and leave, their organization. *Politically motivated* losses include: (1) emigration due to the revolution; (2) left (or never joined) the BL/GLC due to adverse government policies toward CF; (3) left (or never joined) the BL/GLC because the revolutionary ideology was more attractive to them, than Freemasonry.

Our Forecast is based on Equation (1) below:

$$x_t = x_{t-1} - \alpha_{1;t-1} y_{t-1} / 4 - \alpha_2 x_{t-1} - \alpha_3 x_{t-1} + \alpha_4 x_{t-1} + \varepsilon_t \ (1)$$

Where x_t represents *membership* in the BL/GLC for Year t, $\alpha_{1;t}$ represents *Effective Masons coefficient* for year t, y_t represents the yearly *immigrants* to the USA for year t (divided by four because half are women, and of the remaining half, still one half is composed of males who are either too young, too old, have criminal records, physical, or mental problems, to become masons). The remaining coefficients are: α_2 *deaths*; α_3 *politically-related* (adverse and positive) withdrawals; α_4 and *new affiliations*. Finally, ε_t is the model *white noise*, distributed normally.

Using statistical model (1) we obtained the numerical results in Table 6, where x_t is represented by (TotMason) and y_t is represented by (TotEmig).

The model's annual E*ffective Masons* coefficient $\alpha_{1;t} = 1.5$ is 50% higher than the corresponding average annual E*ffective Masons* coefficient. We use such value because a majority of those who emigrated, in the 1960s, were mainly from the middle class and from Cuba's *urban western provinces*. Recall, from Table 4, how Western provinces have a 50% larger E*ffective Masons* coefficient than the national average. The annual coefficient of mortality used (α_2) is 1%, which is also 50% larger than the mortality reported by the United Nations (UN) for Cuba in the year

2000. We use this value because freemasons tend to be older men, and UN mortality rates reported, are for the general population.

Membership drops ($\alpha_{3,1}$) result from the sum of: 0.67% membership drops due to preferring the new ideology, and another 0.67% ($\alpha_{3,2}$) membership drops due to concerns about government (political or economic) reprisals against CF. We use another 0.67% for defections ($\alpha_{3,3}$) due to finding that the organization is not of their liking. Hence, $\alpha_3 = 0.2 = 3*0.0067$. Finally, $\alpha_4 = 0.007$ are new affiliations.

The (α_i) coefficient values are based on the following mathematical relation:

For an established time series growth or decay rate K, we have: $\sum_{j=1,4} \alpha_j = K$ (2)

Mortality and emigration values are established from hard data. However, coefficients α_3 and α_4 need to be established by judgment and experience. Hence, other values α_3, α_4 could also have been used, as long as they fulfill equation (2).

Model (1) appears reasonably acceptable. Anderson Darling test for its residuals (Figure 3) yields a p-value = 0.62 (maybe some serial correlation still remains). Therefore, we assume that the four factors identified are also reasonable and help better explain the problem at hand.

Table 6: BL/GLC 1959-1969 yearly estimations, using time series model (1).

	Initial	Members:	34,025	In 1958
Year	TotEmig	TotMason	Effective	Eq. (1)
1959	62,800	32,889	0.02051	33,780
1960	60,781	31,753	0.01836	31,714
1961	50,857	28,992	0.01643	30,709
1962	73,632	28,663	0.01643	27,872
1963	15,535	28,335	0.01544	27,914
1964	15,045	29,446	0.01575	27,594
1965	25,366	27,635	0.01575	28,619
1966	55,422	26,353	0.01575	26,672
1967	49,756	25,824	0.01308	25,503
1968	50,182	25,072	0.01247	24,995
1969	49,415	24,589	0.01202	24,273

Sources: Emigration: INS; Total Masons: reports from Grand Secretary BL/GLC

We then studied the time series and historical events in the decade of the 1970s, where for several years there are no membership data available. This provides yet another measure of the difficult times through which the BL/GLC went through. Such missing data had to be estimated (bold type). Results are given in Table 7.

Figure 3: Anderson-Darling GoF Test Result for model (1):
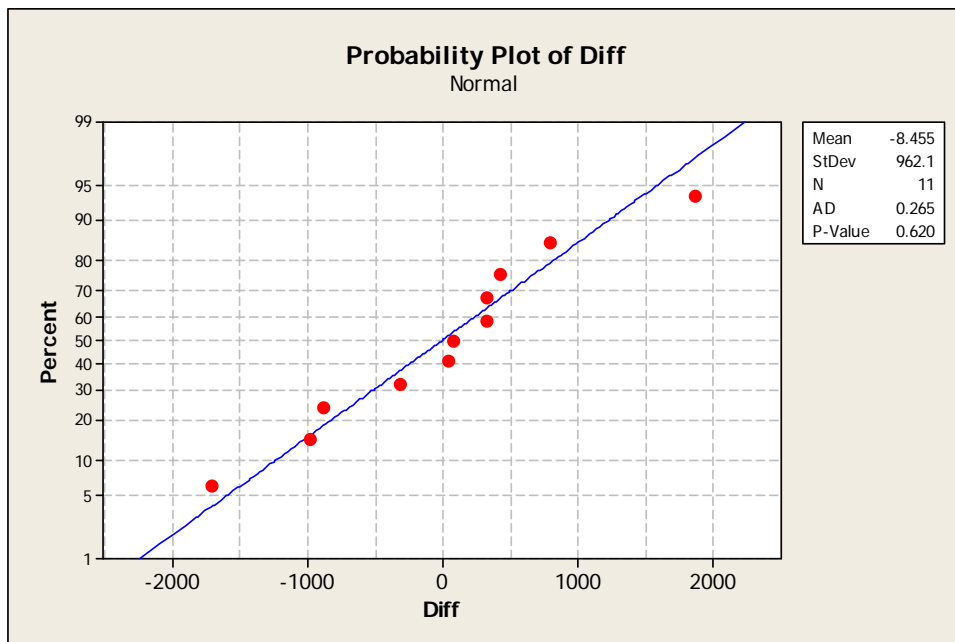
Source: data: from BL/GLC yearly reports; estimations: from model (1)

In 1971 *Freedom Flights* ended. As Portes (1987) says: *by the early 1970s, the middle-class emigration from Cuba had ceased.* The Cuban government had taken over almost all the country's economic activity. Hence, during that decade the BL/GLC membership decline came mostly from attrition and deaths, which were uncompensated –due to political concerns- by new affiliations.

In 1977, relationships between Cuba and the USA improved following the new Human Rights policy introduced by American President Jimmy Carter. Meetings between the Cuban government and a Committee of Cuban immigrants to the USA were held in Havana, and some agreements were obtained.

As a result, hundreds of political prisoners were freed, and allowed to leave with their families. The reunification of families was also permitted, whereby several thousand others left the country. Finally, Cubans living in the United States were allowed to visit Cuba and tens of thousand of them poured into the island.

The commotion of these events revived the desires of many to leave the country, leading to the entrance of ten thousand into the Peruvian Embassy, and to the exodus of over 120 thousand more, during the Mariel Boatlift, in 1970. The result of all this activity, on the BL/GLC membership, is reported in Table 7.

Tabla 7: BL/GLC real and estimated membership in the decade of 1971-1980

Year	Members	Population	Emigration	Effective	Eq. (1)
1970	25,295	8,321,400	49,220	0.0122	22,828
1971	25,968	8,461,670	43,323	0.0122	24,288
1972	26,659	8,601,940	11,489	0.0122	25,085
1973	**25,885**	8,742,210	0	0.012	25,806
1974	**25,110**	8,882,480	0	0.0115	24,980
1975	**24,336**	9,022,750	0	0.011	24,181
1976	**23,562**	9,163,020	0	0.0105	23,407
1977	**22,787**	9,303,290	0	0.01	22,658
1978	**22,013**	9,443,560	15,000	0.0095	21,879
1979	**21,239**	9,583,830	15,000	0.009	21,129
1980	**20,464**	9,724,100	145,000	0.0085	19,990
1981	19,690	9,864,370	0	0.008	19,351

Source: members: from BL/GLC yearly reports; population: derived from Cuban Censuses; emigration: from INS data; Eq.(1): membership from model (1)

The 1970s are analyzed using equation (1), in Table 7. Since there are no BL/GLC membership reports from 1973 to 1980, decreasing *Effective Masons* coefficients were obtained by judgment. Due to the decade intense political environment, $\alpha_{3,1}$ and $\alpha_{3,2}$ were increased to 0.1, and α_4 decreased to 0.5. For completion, we also obtained linear estimations for the BL/GLC missing annual membership (bold type). The real and estimated data, for the period 1960 to 1980, are plotted in Figure 4.

Figure 4: Graphical comparison of real/estimated BL/GLC membership 1960-80.
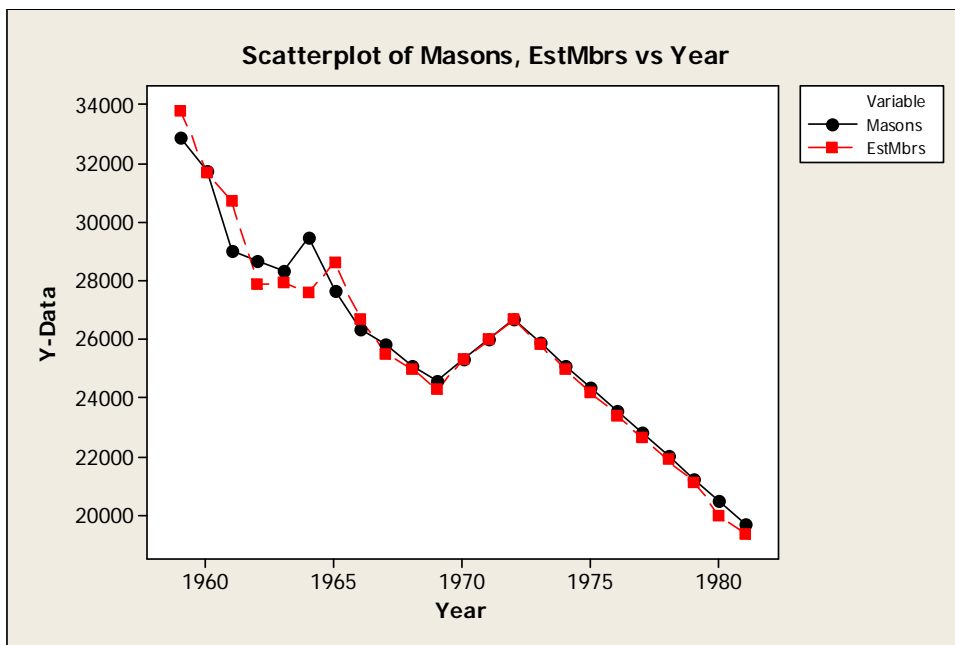
Source: data from BL/GLC yearly reports; estimations from Table 7, model (1)

The graphs for the BL/GLC reported membership, and its estimation via (1), for the period 1960-80, are close. This shows how Equation (1) fits. Also notice how, after 1972, there are six consecutive years without reported data. Finally, in 1981, BL/GLC membership reported is 19,690; the lowest for the entire period analyzed.

We summarize the regression analysis results of the growth, decay and stable trends of these seven epochs, in Table 8. Coef/Reg denotes the regression coefficients, for annual BL/GLC total membership data on corresponding year, with their statistical significance (p-values and R^2). The regression trends agree with our qualitative analysis and interpretations.

Table 8: Regression analysis summary, for the seven historical epochs

Year	Trend	Coef/Reg	p-val	R^2
1945-58	Growth	1430.6	0.025	0.95
1959-69	Decay	-712.1	0.001	0.89
1970-76*	SlowDecay	-389.9	0.048	0.57
1977-80*	Decay	-782.5	0.001	0.98
1981-91	SlowGrowth	184.3	0.001	0.99
1992-00	Growth	907.9	0.001	0.97
2001-08	Stable	58.3	0.078	0.42

Source: membership: yearly reports from Grand Secretary of the BL/GLC;
Note: Periods 1970-76 and 1977-80 (marked "*") had no data reported; the total yearly membership was estimated via model (1).

Another research question of interest consisted in exploring the extraordinary growth that the BL/GLC experimented during the 1990s, and in determining possible reasons for such growth. Estimations for this decade (Table 9) were obtained via two different growth rates: before (0.021) and after (0.03) 1992.

Table 9: Cuban population, BL/GLC members, and growth rates in the 1990s

Year	Population	Members	Effective	IV.PCC	Before.92	Diff.
1990	10,433,000	21,153	8.11	0.03	0.021	*
1991	10,574,800	21,918	8.3466	21,788	21,597	190
1992	10,645,700	21,962	8.3073	22,441	22,051	390
1993	10,716,600	22,539	8.4688	23,114	22,514	601
1994	10,787,500	23,321	8.7046	23,808	22,987	821
1995	10,858,400	24,169	8.9619	24,522	23,469	1,053
1996	10,929,300	25,301	9.3203	25,258	23,962	1,296
1997	11,000,200	26,344	9.6416	26,016	24,465	1,550
1998	11,071,100	27,635	10.0489	26,796	24,979	1,817
1999	11,142,000	28,173	10.1789	27,600	25,504	2,096
2000	11,176,406	28,689	10.2994	28,428	26,039	2,389

Source: population derived from Cuban Censuses; members from BL/GLC yearly reports; estimations: obtained using the two growth rates discussed above.

During the 1990s, two important national events took place. First, the 1992 Communist Party Congress allowed its members, as well as government officials, to join churches and the BL/GLC, and vice versa. Second, the dissolution of the

Soviet Union caused the worse economic crisis in contemporary Cuba. The government, to alleviate the crisis, promoted international tourism. New joint ventures with international hotel consortia were formed. The new economic activity made working independent of the government -up to then practically the sole national employer- again possible. This created a larger degree of individual freedom.

As a result, three new groups of people became interested in joining the BL/GLC: communist party *members*, government *officials*, and ordinary Cuban *citizens*, up to then *concerned* with enduring governmental economic or political reprisals, due to their membership in the BL/GLC.

We estimated *new members*, due to the above stated new national conditions, using the difference between the growth rates of the 1980's (0.021**),** before the PCC Congress and the beginning of international tourism, and the 1990s (0.03), after these events occurred. Both estimates, as well as their Difference (a point estimate of such *new* affiliations for the year) appear in Table 8.

For example, in the year 2000, of a total of n = 28689 members of the BL/GLC, there were $\sum X$ = 2389 such *new members*. Hence, a point estimator of such proportion in the total membership is p = $\sum X/n$ =0.083. A crude 95% confidence interval for such proportion is: (0.0801, 0.0865). Hence, we can state with 95% confidence that, out of the 28428 BL/GLC members in year 2000, anywhere from 2297 to 2481 were new members from the three groups mentioned.

3. Conclusions

This is an on-going research; and we have just described, due to lack of space, a small part of it. Therefore, in subsequent papers we will continue with these analysis and pursue additional avenues. These will include estimations of current growth and attrition rates, and the extension of model (1) beyond 1980.

However, comparing relevant historical events with trends detected we identify some factors that appear to have impacted the BL/GLC membership throughout these times, and that are discussed in detail in the papers mentioned in the Introduction. We summarize these *factors*, below:

1. A *free economy* that allows independent employment (from government), enhances BL/GLC membership. Such occurs in the epochs of (1945-1958) and (1990s onward).

2. Less dependence from government *political supervision* enhances BL/GLC membership. Such occurs in the epochs of (1945-1958) and (1990s onward).
3. When *emigration* is an option, the BL/GLC membership decreases. Such occurs in the epochs of (1959-1970) and (1977-1980).

Statistical considerations in model (1) include the following. First, our use of the *Effective Masons* indicator, in lieu of Total Members, is a relevant result. It has allowed us to compare, on fair grounds, BL/GLC membership data from over half a century, as well as between very different provinces, and even between Cuba and the USA. This is possible because *Effective Masons* considers total population effect. Clearly, it is not the same to have ten thousand masons in a population of one million, than in a population of ten million.

The total and provincial Cuban population obtained from Census data, has been interpolated linearly, to account for yearly data. Death rates have been taken from UN tables, adjusted using judgment, to reflect the larger number of older members in the BL/GLC. Emigration data was taken from the Immigration and Naturalization Service (INS). These are hard data.

Our estimation of Effective Masons as 1.5 times the average *Effective Masons* is based on two facts. First, most CF are in the Western, more urban and developed provinces. Then, not all Cubans immigrate to the USA. Many have emigrated to Latin America, Spain, and other European countries. Hence, even when taken as 1.5 times the average yearly *Effective Masons,* CF abroad is still a Lower Bound for emigration figures. The coefficients for BL/GLC politically motivated desertions and affiliations have been assigned by judgment and experience.

Finally, model (1), developed to describe the time series of BL/GLC membership, shows a good fit for the 1960-1970 decade. In addition, it is able to rationally recuperate missing data from the 1971-1980 decade. Finally, our use of the *Differential* to estimate the proportion and number of new elements that joined the BL/GLC in the 1990-2000 decade is also rationally justified.

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Note

[1] Romeu is a Chartered Statistician Fellow of the Royal Statistical Society, and has taught statistics at Syracuse University and SUNY for 30 years. He is responsible for the statistical analysis and the conclusions parts of this demographic research. Pardo Valdés is a 33rd Degree Mason, and President of the Academy of Higher Masonic Studies of the Grand Lodge, in Havana. He contributed the data used, taken from the annual reports of the Grand Secretary of the Grand Lodge of Cuba.

[2] Symbolic lodges (1st to 3rd degrees) usually work in either the York, or the Scottish rites. The York lodges are decorated in Blue, thence their name Blue Lodges. The Scottish lodges are in Red. Most Cuban lodges work in the Scottish rite and are decorated in Red.

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