



PREDICTIVE ESTIMATE OF CHANGES IN ELECTORAL PREFERENCES BETWEEN PARTIES TO DEFINE THE ELECTION FOR GOVERNOR IN MICHOACAN IN JUNE 2015 BY INTEGRATING DIFFERENT HISTORICAL AND NATIONAL OPINION POLLS DATA USING THE METHODOLOGY OF THE EXPECTED

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ABSTRACT

The next process of elections for governor in Michoacan is an important event as it is performed after special periods where governments have failed to complete their duties for various reasons, getting to have several officials of the State Government, addition two candidates repeated their aspirations and who participated in 2011 and 2015, making them potential voters have very well identified, PAN and PRD representatives, thereby creating a scene of strife closed and subject to any of them could make a distraction to harness that percentage of voters who still have no decision or some disenchantment within their own teams, traditionally a process is estimated only surveys, but in this research paper are considered data from the last two elections that have occurred in the state of Michoacan (State located in the west of Mexico) in the Governor election 2007 and 2011, thereby creating interesting analysis and why not even debate scenarios, work surely serve as a reference for consulting election campaign of candidates. In later times, by the type of methodology as practical, quick and economically feasible to implement for any electoral political organization.

KEYWORDS: Election, Governor, Michoacan, Probability, Survey

INTRODUCTION

A research for the next election for governor of Michoacan in June 2015. The document shows shows estimates of expected votes to the three main parties in the state, the Institutional Revolutionary Party (PRI), Party of the Democratic Revolution (PRD), National Action Party (PAN).

Derived from multiple opinions of preferences as well as historical data through polling and TV Azteca, Parametría, Reforma and El Universal, where you can follow that on average candidate Party of the Democratic Revolution, Silvano Aureoles Conejo get 35% of the vote, the representative of the Institutional Revolutionary Party, Jose Barcenás Ascension Orihuela have about 30% and the candidate of the National Action Party Luisa María Calderón Hinojosa, would get about 31% of the vote, it is interesting to see how they can impact the results for the event June 2015 electoral combining statistical data obtained during previous elections with the intention of giving strength to the prediction of preferences and anticipate their potential modifications probabilistically between the main parties.

It intends to use probabilistic methodology known as expected value which is handling probabilities assigned to events that may occur based on statistical trends intended to predict future results of events in time periods from recent historical data available.

In particular the votes obtained by each party in the 2007 elections and the most recent, which occurred in 2011 as a way to sense changes in voters preference between parties were considered.

Additionally, the distribution of the final information provided by the Electoral Institute of Michoacan distributed in percentages vote of 5 important cities in the Michoacan state, Zamora, Apatzingan, Lazaro Cardenas, Uruapan and Morelia the state

capital is attached. Which they represented in the process 2011 about 60% of the vote. With which we can infer that the percentage of voters who have historically voted in the election for governor in the state of Michoacan, addition to the latest survey released at a national level is considered to identify trends in the electorate regarding immediate elections in election are a Governor.



Political Parties						
City	PRI 2007	PRI 2011	PAN 2007	PAN 2011	PRD 2007	PRD 2011
Apatzingán	29.4	57.1	35.2	18.5	35.4	24.4
Lázaro Cárdenas	24.8	40.5	26.8	13.2	48.4	46.4
Morelia	47.3	42.5	23.8	41.7	24.4	15.8
Uruapan	23.8	46.0	47.7	28.1	23.8	25.9
Zamora	36.5	38.0	44.8	41.7	18.7	20.2

Table I. Source ; www.numerika.mx

Table I Shows the results that the PAN , PRI and PRD parties won in five municipalities in the state of Michoacan during the 2007 and 2011 elections .

Political Parties	Distribution of Votes Election 2011
PRI	658,667
PAN	606,514
PRD	535,417

Table II ; Source ; www.eswikipedia.org

Table II. Shows the results obtained during the 2011 election campaign .

METHODOLOGY

In order to estimate predictions using historical data from the last elections in 2007 quarter percentages are identified by each city and statewide average is obtained , then the percentages for the period 2011 are identified and a state average is obtained, an once these values obtained trends for each party are determined to fill the information and estimate the predictions in the initial matrix of preference information between parties to elect Governor. In this way I could know how many voters after two elections , 2007 and 2011 remained in each of the three main parties involved in the nomination for Governor .



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Year Election	Political Parties	Cities				
		Morelia	Uruapan	Lázaro Cárdenas	Apatzingán	Zamora
2007	PRI	47.3	23.8	24.8	29.4	36.5
2011	PRI	42.5	46.0	40.5	57.1	38.0
2007	PRD	24.4	23.8	48.4	35.4	24.4
2011	PRD	15.8	25.9	46.4	24.4	15.8
2007	PAN	23.8	47.7	26.8	35.2	44.8
2011	PAN	41.7	28.1	13.2	18.5	41.7

Table III ,Source ; www.numerika.mx

Table III shows the results that the PAN , PRI and PRD parties won in five municipalities in the state of Michoacan during the 2007 and 2011 elections .

Year Election	Political Parties	% Average
2007	PRI	32.36
2011	PRI	44.88
2007	PRD	30.14
2011	PRD	26.54
2007	PAN	35.66
2011	PAN	28.64

table IV

Table IV shows the average for each match considering the total of the five municipalities separating the period 2007 and 2011 .



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Year Election	Political Parties	% Voters remain in Parties
2007	PRI	100%
2007	PRD	26.54/30.14=0.88
2007	PAN	28.64/35.66=0.80

Table V ;

Table V shows the percentages of voters who remained faithful to their parties.

Summarizing the PRI held 100% of their constituents because was triumphant in the last election so It had positive slope, however PRD and PAN is estimated since they had low percentages of election 2011 compared to 2007 as both lost the election for Governor, the National Action Party Concluding keep 80% of potential voters , but voters should decrease to move to the Institutional Revolutionary Party and later adjusting their probabilities are shown , moreover the Party of the Democratic Revolution also have to adjust the estimates to change their preference for the Institutional Revolutionary Party which is also shown in the following sections .

Potential changes to electors PAN- PRD , PRD -PAN , PRI

The votes for the PRI are obtained as follows vote in 2007 was 32.36% of the total, and in 2011 was 44.88% of the total votes thus held 100% of the votes of its members adding votes of the opposition parties in this case PRD and PAN Moreover in polls broadcast on national media placed their candidate for 2015 by 30% of preferences of the total, the proposed methodology integrates the percentage of preference PRI candidate by 30% if the proportion of 30% on 44% of votes in the last election process generates about 68% of voters who remain with the PRI, as a result you get lost percentages will be distributed on the other parties in the race in a particular way to the PAN and the PRD as the results of the polling.

In the case of the PRD candidate shows an advance that ranges from 26.54 in 2011 to 35% depending on the version of National Pollster in national media poll positive trend is about 8.46%

PAN relative to their values in the 2011 election were of 28.64 now has a positive trend considering the opinion of National Pollster reaching 31%. it improvement is around 2.36%

We are now in a position to distribute the 32% that the PRI has decreased according to the surveys of the National polling why (2.36 / 8.46) we shed 27% of votes from the PRI to the PAN and add 73% of the PRI to the PRD 32% of one PRI 23.36% of voters going to the PRD and 8.64% of voters would the PRI to the PAN.

Change settings in the constituency PRD-PRI and PAN-PRI .. The settings of the Institutional Revolutionary Party National Action Party presented data considering the 2007 election.

Year Election	Political Parties	% Votes obtained in 2007 Election
2007	PRI	24.30
2007	PRD	37.38
2007	PAN	33.38
2007	Otros	4.34

Table VI ; Source . www.es.wikipedia.org



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Year Election	Voters Changes Parties	% Expected votes election 2015
2007	PRI al PAN	$(95.06-33.38) = 61.68$ % sin PAN $\% \text{PAN} / \% \text{Total} = 33.38/95.06 = 0.3511$ $\% \text{PAN al PRI} = 24.3/61.68 = 0.3939 * 35.11 = \mathbf{13.83\%}$
2007	PRD al PRI	$(95.06-37.38) = 57.68$ sin PRD $(\% \text{PRD} / \% \text{Total}) = 37.38/95.06 = 39.32$ $\% \text{PRD al PRI} = 24.30/57.68 = 0.4212 * 39.32 = \mathbf{16.56\%}$

Table VII

Now it can be estimated voter changes to National Action Party 13.83 % Revolutionary Party and Party of the Democratic Revolution At 16.56 % Institutional Revolutionary Party .
 You can identify the advantage of updating the estimates of changes in electoral preference PAN- PRI and PRD- PRI considering election data relating to 2007 and the PRI -PAN and PRI -PRD using the most recent 2011 because the methodology involves mixing recent elections in Michoacan state in the election for Governor .

Distribution of expected voters percentages			
Political Parties	Political Parties		
	PRI	PAN	PRD
PRI	0.68	0.0864	0.2336
PAN	0.1383	0.6754	0.1863
PRD	0.1656	0.11	0.7244

Table VIII

It is shown in Table VIII associated probabilities for change between parties and who remain faithful to their political parties using the tool of the expected value .
 The value can be obtained from a statistical experiment is called the expected value . Also called " expectation " .



For the discrete case we can apply the following formula .

$$E (x) = \sum S_{xi} * P (xi) (1)$$

Political Parties	Political Parties			Total Voters 2011
	PRI	PAN	PRD	
PRI	447,893.56	56,908.8288	153,864.611	658,667
PAN	838,80.8862	409,639.556	112,993.558	606,514
PRD	886;65.0552	58,895.87	387,856.075	535,417
	PRI	PAN	PRD	
Total % per Party	34.45	29.18	36.36	
Total Votes per Party	620,439.501	525,444.254	654,714.244	

Table IX

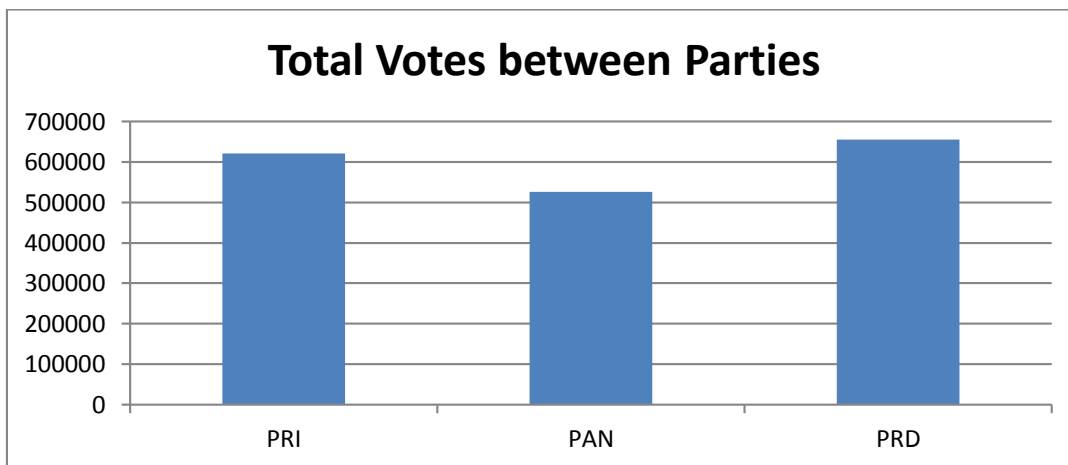


Table IX

In table IX trends shown to other parties and voters who remain is his matches.

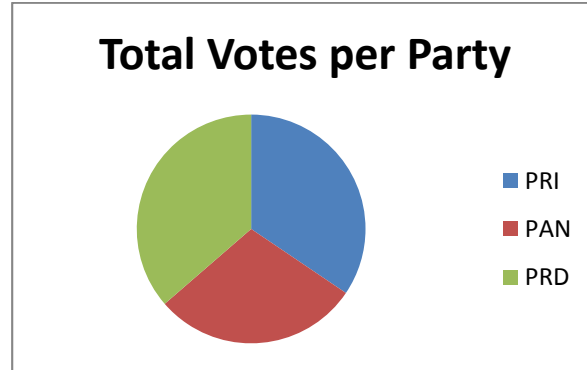


Table X

This table shows the expected vote totals for each political party PRI , PAN and PRD are shown

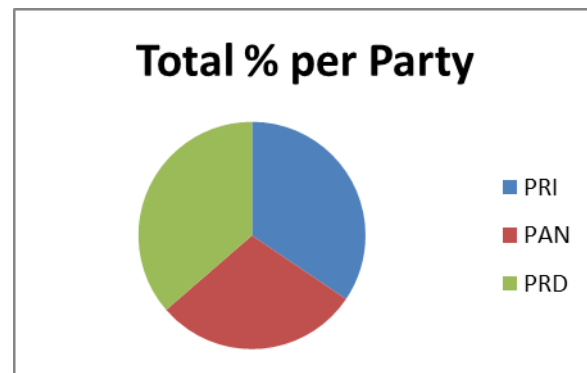


Table XI

It is shown in a pie chart of the distribution of expected voters for each party, in amount and percentage

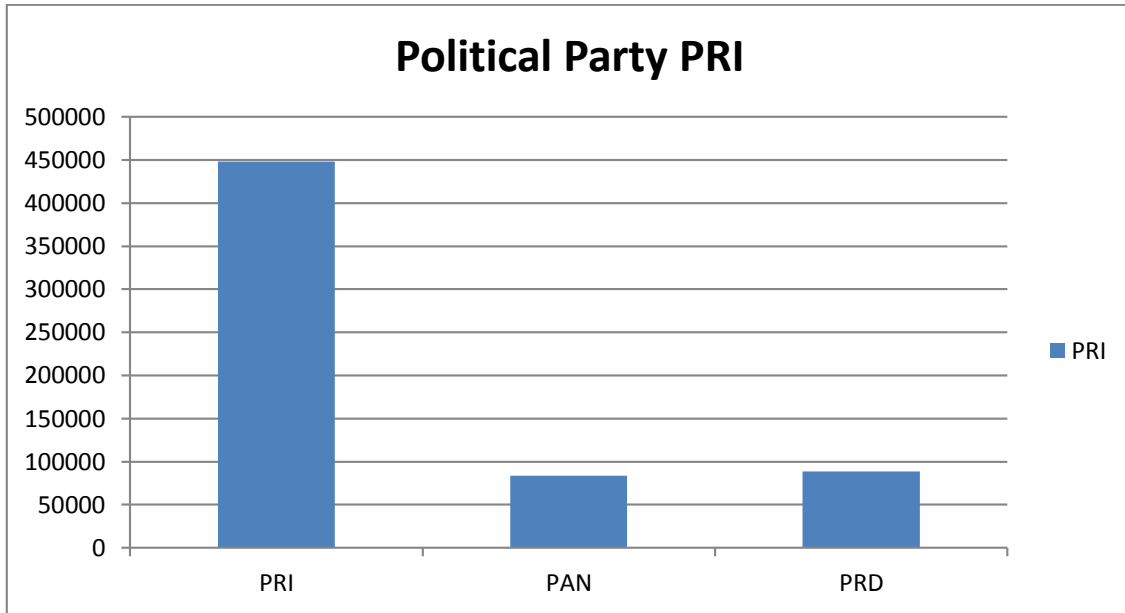


Table XII

Table XII shows the expected number of votes that the Institutional Revolutionary Party lost to the National Action Party and by the Party of the Democratic Revolution and the potential votes that remain in it political party.

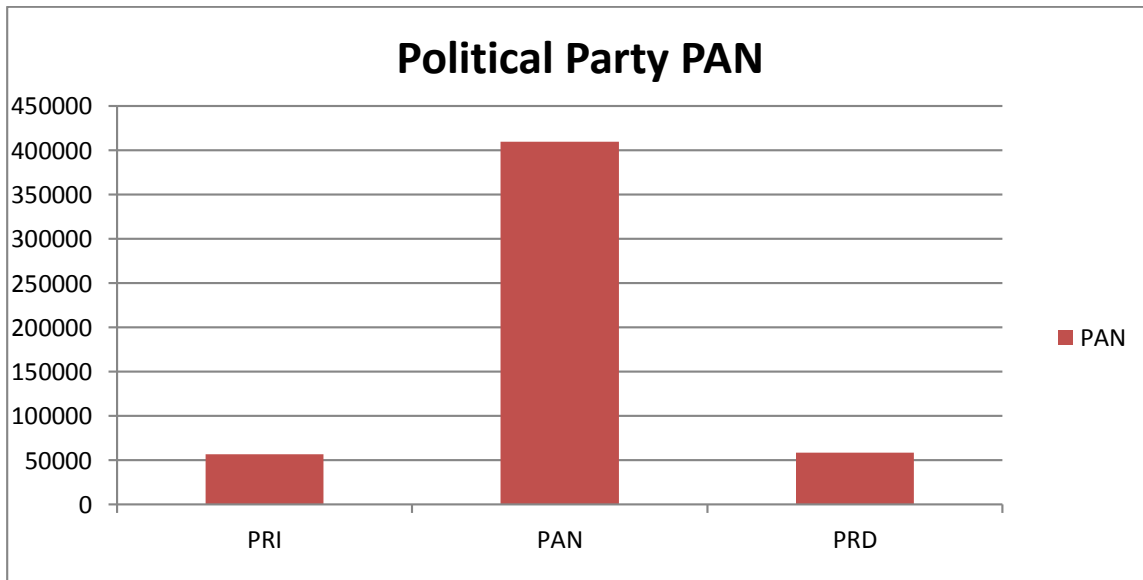


Table XIII



Table XIII shows the expected votes to the National Action Party and the Institutional Revolutionary Party to the Party of the Democratic Revolution and the votes of their constituents that they would remain with their hard vote .

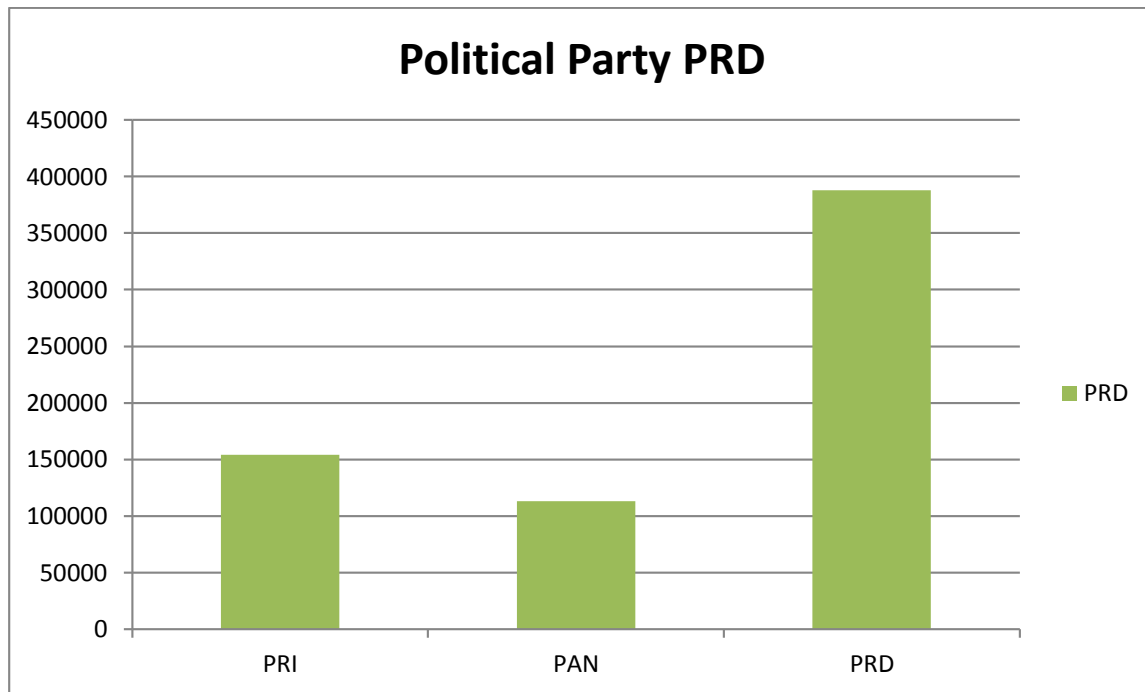


Table XIV shows the potential of the Party of the Democratic Revolution to the National Action Party and the Institutional Revolutionary Party to distribution and the votes that are expected to remain faithful to his party.

ANALYSIS OF RESULTS AND FINAL COMMENTS.

To aspire to win the June election 2015, which is important to mention the following.

- A tie between the Party of the Democratic Revolution (PRD) and the Institutional Revolutionary Party (PRI) since only there about 2% difference that could give the victory to either of the two in question is as deemed the percentages of other smaller parties and even undecided participants ,, the number of potential voters to increase by the day of the election.
- Statistically higher occurs when votes are expected the PRI to the PRD with 23.36% and the PRD high is about 72%.
- Candidate in terms of votes required as one of the main factors in the allocation of visits.be easuring the work and effort of the campaign.them
- You can see how many votes are changing from the PRI and PAN to the PRD.
- In this statistical simulation it is considered only 60% of potential voters so there is a 40% margin of voters who could vote and change this forecast. Additionally, 2007 results are not considered earned 4% by other parties and that only it is working with the three major parties based on the number of votes and percentages obtained in previous elections.
- The surveys consider a national level allows to perceive coincidences that might reflect significant results at the time of the 2015 election



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- Each party what is called hard vote, so must be analyzed in the draft campaign special processes for these voters, since it is they could represent the basis for success in the project of the candidate.
- This is a creative, innovative and practical methodology based on probabilities that simulate the results after using the expected value as a form of decision-making on potential voters. On efficiency only election day be possible to compare the present research, however it is a useful tool in managing the expected results possible.

REFERENCES

Ø Spiegel, M. (1970), Theory and problems of statistics. McGraw Hill, Mexico.
Ø Devore, Jay L; Probability and Statistics for Engineering and Sciences; 7th ed; Cengage Learning; Mexico 2008.
Ø Freund, John E. Miller, Irwin Miller and Marylees; Mathematical statistics with applications; Pearson Education; 6th Ed; Mexico 2000.
Ø Canavos, GC (1988), Probability and Statistics, applications and methods. McGraw Hill, Mexico
Ø Freund, John E. Miller, Irwin Miller and Marylees; Probability and statistics for engineers; PrenticeHall; 4th ed; 1992 Mexico.
Ø Kreyszig, Erwin; Introduction to mathematical statistics, rules and methods; Limusa; Reprint Old 10th; Mexico 1989.
Ø Larson, Harold J; Introduction to probability theory and statistical inference; Limusa-Noriega; Mexico 1995.
Ø Mendenhall III, William Schaeffer, Richard L. and Wackerly Dennis D; Mathematical statistics with applications; Thomson; 6th Ed; Mexico 2002.
Ø Mendenhall, William; Introduction to probability and statistics; 13th Ed; Thomson Thomson Learning; Mexico 2008.
Ø Montgomery, Douglas C; Probability and statistics applied to engineering; Limusa; 2nd Ed; Mexico 2008.
Ø Spiegel, Murray R; Statistics; McGraw-Hill, Schaum's Outlines; 4th Ed; Madrid 2009.
Ø Spiegel, Murray R; Theory and problems of probability and statistics; McGraw-Hill, Schaum's Outlines; 3rd Ed; Mexico 2010.
Ø Walpole, Ronald; Probability and Statistics for Engineers; Pearson; 6th Ed; Mexico 1999.