How much does a cow weigh? – (Project 2)

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How much does a cow weights? This question was made in 1883 at a county fair in England, where there was a contest to try to guess the weight of a cow. The winner will be the one with the best guess. The approximations could have been better, some too high and others too low. Still, Sir Francis Galton, notice that if you calculate the average, the result is almost identical to the cow's weight. He named this "mass wisdom." Using this concept, several election systems were raised to replace the monarchy.

Guatemala is a democracy, but at the end of every government period, the president's approval rating has been worst and worst (Mayén, 2019). The problem is that the system is designed to make it impossible for a non-traditional candidate to win. This paradigm can be changed if we implement **Approval Voting** to the election system so all the candidates have the possibility of winning, and people can feel represented and satisfied by the elected president.

Guatemala's actual election system can be called a "double plurality." It has two rounds. In the first round, you can only vote for one of the candidates approved by the Supreme Electoral Tribunal. Then, if a candidate gets 50% + 1 of the votes, he becomes the president. This scenario has only happened once since 1821. If there's no winner in the first round, the two candidates with more votes go to the second round. In the second round, again, you can only vote for one of the two options, and the winner is the one who gets the majority of the votes, it does not matter if the winner gets the 50% +1 or not, this system is also known as plurality. In both rounds, there's an extra alternative, a null vote. It seems like an "efficient" election system because two

rounds are resolute. Still, since you choose only one candidate, the ones with more investment in their campaigns are usually the winners in the first round.

Usually, before the end of the first round, the public has an idea of which candidates will pass to the second round. This is because, months before the elections, the political parties invest millions of dollars in their campaigns. In Guatemala, each political party receives money for its number of votes in the latest election. This creates a cycle because always the same four parties, known as *"Vieja Politica"* are the ones with more votes because of the large amount of money they can invest in their campaigns, which will make them the most voted and so on…. Furthermore, when there's a new strong party, the group of *"Vieja Politica"* creates a phenomenon called *"ensañamiento,"* which consists in joining the most popular parties from the current election to one big party. The big party then relegates the new party to the 2nd place. In the most recent election, this phenomenon occurred against *Sandra Torres* (Vásquez, 2021)*.

In the first round, *Sandra Torres* had 25%, *Alejandro Giammattei had 14%* ("part of Vieja Politica"), Edmond *Mulet* had 11% (also part of "Vieja politica"), and *Thelma Cabrera* had 10% (Marroquín, 2019). A big part of the Guatemalan population was in favor of establishing a woman as president for the first time in Guatemalan History. Most of them approved *Sandra Torres* and *Thelma Cabrera* but decided on *Sandra Torres* because she "had" the most chance of winning, this obligation to choose only one candidate made Thelma Cabrera lose in the first round. In the second round, Alejandro Giammattei and *Edmond Mulet* joined parties to beat *Sandra Torres.* The new Giammattei party scored 57%, and *Sandra Torres* scored 42% (Marroquín, 2019).
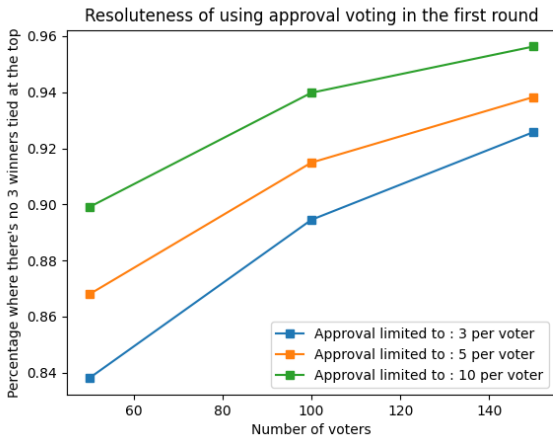
The last Guatemalan election could be different if we leave the second round as plurality but in the **first round**, we use **Approval voting instead of using plurality.** Approval voting consists of voting for all the candidates you approve, and the winner is the one with more approbation scores. If we had used approval voting, *Sandra Torres* and *Thelma Cabrera* would most likely pass to the second round and leave the members of "*Vieja Politica*" out of it.

The majority of Guatemalans do not have extreme political positions, but they tend to choose extreme positions because those are the ones with more chances of winning, which makes new parties, with fresh ideas, new workers, and younger visions, weaker compared to the already established parties. If in the first round we use **Approval voting,** it will select those candidates who the majority will find decent. In feasibility, will be easy to implement because you do not need to ask for an order of preferences (ordinal ballots) just ask for more marks in the ballots. Furthermore, all parties that are seen as "weak" will receives more votes and will get more representation for future elections. As result, candidates who don't split the majority will have more chances, refreshing the spectrum of political positions. Then the second round will be the **plurality,** so we can be resolute with the same number of rounds.
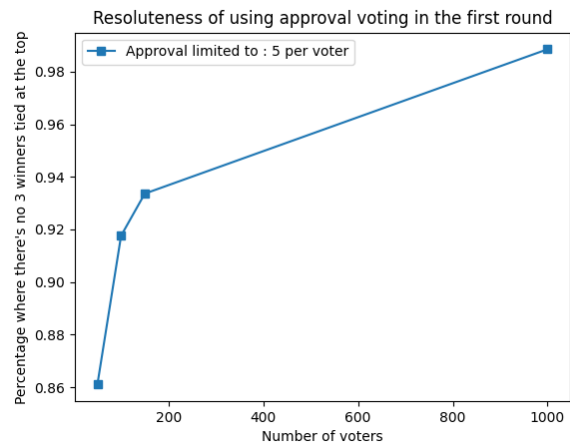
Approval voting has three flaws, the first round is that it gives more influence on those voters who vote for several candidates. There can be a case where 3 winners are tied at the top and reduces the preference of the people only into two levels "approved" and "not-approved."

To solve the first two flaws, we can limit the voter quantity of "approved" up to 5, this quantity has a decent spectrum of choice, is easy to compute and high rate of resoluteness. For the first round, if we make 10,000 simulations with 40 candidates using **approval voting** under an **impartial culture,** which in this case means randomness in the ballots.

Graph 1

Graph 1

Resoluteness of using approval voting in the first round

(Graph 1: x-axis "Number of voters" from 60 to 140; y-axis "Percentage where there's no 3 winners tied at the top" from 0.84 to 0.96. Legend: Approval limited to : 3 per voter; Approval limited to : 5 per voter; Approval limited to : 10 per voter)

Graph 2

Graph 2

Resoluteness of using approval voting in the first round

(Graph 2: x-axis "Number of voters" from 200 to 1000; y-axis "Percentage where there's no 3 winners tied at the top" from 0.86 to 0.98. Legend: Approval limited to : 5 per voter)

In the first graph, as the number of voters increases the rate of 2 clear winners increases for all the lines, we can notice that a limitation of 10 approvals performs better than 5, but in reality, people will vote with less interest as the number of approvals increases, that's why I choose 5 approvals. In the second graph, we can see that with only 1000 voters we can reach a 98.85% of resoluteness using a limitation of 5 approvals per voter and taking in consideration that in Guatemala there are 8 million of voters seems like an effective solution (Mayén, 2019). In real world, the probability of getting a tie of more than 2 at the top is less because people do not vote randomly and those candidates who split majority won't get the same number of votes as in a random voting situation. The last flaw is inherent in the own election system, but I can argue that it's better than the current system because it gives a better way of expressing a preference.

If we implement Approval voting to the first round, we will select the most approved candidates, and then between those two candidates, the population can choose their favorite. In the process, we will create a fairer space where new candidates can be considered as options and smaller parties can scale position for the future elections, changing the status quo of Guatemalan politics.

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