Chapter 2

Electoral Systems

As it has already been mentioned in the introduction, the main purpose of this study is to analyze the political effects of the various electoral systems applied in Greece, the last 25 years. For this purpose a detailed description of all these systems is given in the next chapter. Before we study the Greek electoral systems, we give a general description of the various systems applied in Parliamentary elections, in different countries, all over the world. Almost all electoral system experts agree that the two most important features of the electoral systems are a) the electoral formula, which is the method that is used for the translation of vote totals into representative seats in the parliament and b) the district magnitude, which is the total number of seats given to each district (the geographical regions that are used for the distribution of the seats). According to these features the electoral systems can be distinguished into three main types, and of course a large number of subtypes (See, Lijphart (1994), Gallagher (1992)).

1. **Majoritarian formulas**, with main subtypes
   - Plurality
   - Two-ballot majority-plurality systems
   - Alternative vote
2. **Proportional Representation systems (PR systems)**, classified further into
   - Largest Remainders (Quota Systems)

- Highest Averages (Divisor Systems)
- Single Transferable Vote

3. **Intermediate systems**

- Semi-Proportional systems
- Reinforced PR
- Mixture of Majoritarian and PR.

2.1 Majoritarian formulas

The most common system of this category is the **Plurality**. It is also called First-Past-The-Post (FPTP) or relative majority method. According to this method, in each single member district, each voter can cast one vote and the candidate with the most votes wins. In two member districts voters give two votes, and the two candidates with the most votes win, and so on. Countries which have used plurality systems are Canada, India, New Zealand, United Kingdom and the United states.

The French Fifth Republic provides one instance of **Two-Ballot Majority-Plurality** system. According to this system a majority is required for the election in the first ballot (first round of the elections). In that case majority means absolute majority which is more than half of the valid votes. If none wins in the first ballot, a second ballot is conducted and the candidate with the most votes wins even if in the case of plurality of votes. In the second ballot can participate more than two candidates. In fact, what has happened in France is that the weakest candidates were forced to withdraw. We must distinguish this system from the majority-runoff where the second ballot is restricted only to the two top parties. Majority-runoff has been used for presidential elections in France, Portugal and Austria.

The third system in this category is the **Alternative Vote**. According to this system voters are asked to give their preference among all the alternatives. If a political party receives an absolute majority of the first preferences, is elected. If not, the weakest alternative is eliminated and its ballots are given to the rest of the candidates, according to the voters second preferences. The process continues until a majority winner emerges. For example, suppose that there are 4 candidates A, B, C, D receiving 41, 29, 17 and 13 per cent of the voter's first preferences. Since none has received the majority of the first preferences, D is eliminated. Let us further assume that the candidates received 41, 29, 30 per cent of the second voter's preferences. In this case B is eliminated and the third round is a contest between A and C. Thus, one of these two will be the winner.

The most striking characteristic of all these systems is that they usually use single member districts or districts with magnitude close to one. Now, in most counties which use majoritarian systems only single-member districts have survived. For example, single member districts have survived in the United Kingdom after 1945, in India after 1957 and both in Canada and the United States after 1968. All the majoritarian systems make difficult for small parties to gain representation, because they need to win majorities or pluralities of votes in the electoral districts, unless of course in case of geographical concentration. Thus, we understand that majoritarian systems tend to favor the larger parties. District magnitudes larger than one tend to reinforce the above phenomenon.

2.2 Proportional Representation systems

Proportional Representation (PR) systems are the most common electoral systems. The first type of them, the **Largest Remainders** or **Quota System** entails the calculation of a quota based on the number of the available seats and the number of votes cast. Each party is awarded as many seats as it has full quotas. If this leaves some seats unlocated, each party's 'remainder' is calculated as follows: The number of votes that a party has already used to gain the seats is subtracted from the total votes. The unlocated seats are awarded to the parties that present the largest remainders of votes. Different types of quota lead to different Largest Remainders methods, and the most common are the following:

- *Hare or Natural quota*, which is equal to the total number of valid votes cast (v) divided by the number of the available seats (s), in the district. $Hare\ quota = v/s$.
- *Droop quota or Hagenbach-Bischoff*, which is equal to the number of valid votes cast (v) divided by the number of the available seats (s) plus one, in the district. $Droop\ quota = v/(s+1)$.

- *Imperiali quota*, which divides the total number of votes by the number of seats plus two, in the district. $Imperiali\ quota = v/(s+2)$.

The following example clarify the application of the Largest Remainders method (see, Gallagher (1992)). Suppose that the total number of votes is 100000 and that there are 5 seats to be allocated to 3 parties A, B and C. Each one of these parties receives 60000, 28000, 12000 votes. Droop quota is equal to $100000/(5+1) = 16667$. The allocation of seats using this quota is shown in the Table 1.

Table 1: Allocation of seats by Largest Remainders method using Droop Quota.

Party	*Votes*	*seats by quota*	*remainder*	*seats by remainder*	*Total seats*
A	60000	3	10000	0	3
B	28000	1	11333	0	1
C	12000	0	12000	1	1
Total	100000	4	33333	1	5

Hare quota is equal to $100000/5 = 20000$, and the allocation of seats remains the same because the seats obtained by each party using this quota is 3, 1 and 0 respectively and the remainders of votes are 0, 8000 and 12000 respectively. Thus, the last seat would be obtained again by the third party. In this example, the two methods give the same results, but in general the results are different. This will be studied extensively in later chapters, because both Droop and Hare quota have been used by the Greek electoral systems we analyse. If the Imperiali method was used, the quota would be $100000/(5+2) = 14286$. In this case, the seats gained by each party using the quota are 4, 1, and 0 respectively. Hence, all seats are allocated without the need to consider the remainders of votes. Sometimes, the number of seats obtained by the quota is larger than the number of the available seats. In Italy, Imperiali is replaced by Droop quota when the above phenomenon occurs. It is obvious that a large number of LR methods can be invented, as a large number of different quotas can be found. For example, one might use the ratio $v/(s+3)$ or $v/(s+0.5)$. However, most of them can not be used for the allocation of the seat because some of them award too many seats and other too few seats. Suppose, that in the example described above, we use a quota which is equal to 15000 or lower. Then, all seats would be awarded without the use of the remainders of votes. If, however we use a quota of more than 30000, only one seat would be awarded in the initial distribution of the seats.

Highest Averages Methods operate on a different principle from that of Largest Remainders. A party receives a seat according to its original number of votes and the number of seats it has already won. Each time a party receives a seat, progressively larger numbers divide its original vote total. Seats are successively allocated to the party with the 'highest average' at each step. The variation between the methods lies in the sequence of numbers employed as divisors. One allocation rule which uses divisors is the **Sainte-Lague**, introduced by the French mathematician Sainte-Lague. This method employs the sequence of 1, 3, 5, 7, etc.; the nth divisor equals $2n-1$. For the first seat each party bids its total number of votes, because the first divisor is 1. For the second seat the party which obtained the first seat bids the one third (1/3) of its total number of votes, because the second divisor is 3 and the other parties bid their total number of votes. In order to clarify this method we use the same example with the Largest Remainders method. Suppose that the total number of votes is 100000 and that there are 5 seats to be allocated to 3 parties A, B and C. Each party receives 60000, 28000 and 12000 votes respectively. The first seat is allocated to party A as it has the highest number of total votes. Its 'average' is then reduced by dividing its vote total with 3, so it bids 20000 votes while B and C bid 28000 and 12000 respectively. The second seat is allocated to B, and its 'average' is then reduced by dividing its vote total with 3, so it bids 9333 votes. Party A receives the third seat because it bids 20000 votes, while B bids 9333 and C bids 12000 votes. The fourth and the fifth seats are allocated to parties A and C, because their bids are 12000, and thus each one of these parties obtain one seat. The results are summarized in Table 2.

Table 2: Allocation of seats by Saint-Lague Highest Average method

Party	*Votes* (v)	*Votes divided by 1st divisor*	*Votes divided by 2nd divisor*	*Votes divided by 3rd divisor*	*Total Seats*
A	60000	60000(1)	20000(3)	12000(5)	3
B	28000	28000(2)	9333		1
C	12000	12000 (4)			1
Total	100000				5

Note: The numbers in brackets after the parties' vote totals indicate the award of a seat; Thus party A gains the first seat, party B the second, party A the third and parties A and C gain the fourth and the fifth seat.

Simply, each seat is given to the party with the highest value of $v_i/(2s_i+1)$, where v_i is the total number of votes for the i^{th} party and s_i is the number of seats received *so far* by the i^{th} party. In fact the effect of this method is to help small parties, see Gallagher (1991).

There is also the modified Sainte-Lague which uses the divisors 1.4, 3, 5, etc. The replacement of the first divisor by 1.4 reduces the opportunity the small parties to receive a seat, which Sainte-Lague method gives to small parties. The modified method tends to help middle-sized parties.

One frequently used highest averages procedure is the **d' Hont** rule introduced by Victor d' Hont. According to this rule, each seat is given to the party with the highest value of $v_i/(s_i+1)$, where v_i is the total number of votes for the i^{th} party and s_i is the number of seats received *so far* by the i^{th} party. Thus, the sequence of divisors it uses is 1, 2, 3, 4, ... and it is the least proportional among the highest average methods as it favors the larger parties, see, for example Taagepera and Shugart (1989). Its operation is illustrated in Table 3, which relates to the case where the total number of votes is 100000, the total number of seats to be allocated is 5 and 3 parties A, B and C share these seats, each of them received 60000, 28000 and 12000 votes respectively.

Table 3: Allocation of seats by d' Hont Highest Average method.

$Party$	$Votes\ (v)$	$Votes$ $divided$ $by\ 1st$ $divisor$	$Votes$ $divided$ $by\ 2nd$ $divisor$	$Votes$ $divided$ $by\ 3rd$ $divisor$	$Votes$ $divided$ $by\ 4th$ $divisor$	$Total$ $seats$
A	60000	60000(1)	30000(2)	20000(4)	15000(5)	4
B	28000	28000(3)	14000			1
C	12000	12000				0
$Total$	100000					5

Note: The numbers in brackets after the parties' vote totals indicate the award of a seat. Thus, the first and the second seat is obtained by A, the third by B, and so on.

Given that A has won 60 percent of the votes, the d'Hont formula gives to this party 4 seats. One might think that 3 seats must be awarded, if a 'fair' formula is applied. The reason is that since some disproportionality is unavoidable, one (or more) party (ies) must be overrepresented and one (or more) party (ies) must be underrepresented. This formula tries to minimize the overrepresentation of the most overrepresented party. Thus, A's index of representation (%seats divided by %votes) is 80%/60% = 1.33, and 0.71 and 0, for the second and the third party respectively. If, instead, B was awarded the fifth seat, its index of representation would be 40%/28%=1.48 and 1 and 0 for the first and the third party respectively. If C received the fifth seat, its index of representation would be 20%/12%=1.67 and 1 and 0.71 for the first and the second party respectively. For d' Hont formula is less undesirable overrepresenting A than overrepresenting either B or C.

Under **Single Transferable Vote** (STV), the voter is faced with a ballot paper containing the names of all candidates and ranks them in order of preference. Candidates whose first preference votes amount to or exceed the quota (usually the Droop quota) are elected at once. If there are unfilled seats they are distributed to the other candidates using the following procedure. The 'surplus' votes of elected candidates, i.e. the number of votes that the elected candidates have in excess of the quota, are distributed to the other candidates in proportion to the second preferences marked on them. If there are still vacancies, the lowest placed candidate is eliminated and the votes are transferred to the other candidates, again according the second preferences marked on them. If the candidate awarded the second preference on a transferred ballot paper can not receive it, by having already been either elected or eliminated, the paper is transferred according to the third preference, or the fourth if the third ranked candidate is unable to receive it, and so on.

2.3 Intermediate categories

These are systems that do not fit either the majoritarian or the PR categories, like for example the Semi-Proportional systems applied in Japan. The rule is the **Limited Vote** (LV); according to it, voters cast their votes for individual candidates, as in the plurality systems, and the candidate with the highest number of votes wins. However, unlike plurality systems voters vote for fewer candidates than there are seats to be filled in the district. This is the reason why the formula is called limited vote. The more 'limited' votes each voter has, the more LV deviates from plurality and the more it resembles PR. **Reinforced PR systems**, also do not fit either the majoritarian or the PR categories perfectly. Greek electoral systems (1974-1985) belong to this category and will be described in detail in the next chapter. Finally, in some countries we meet a mixture of the majoritarian and the PR categories, like the French system of 1951 and 1956.