

**ELECTORAL ENGINEERING AND ALTERNATIVE  
ELECTORAL SYSTEMS**

Emre Erdoğan

Boğaziçi University  
1998

## Introduction

Third wave of democracies led to increasing importance of public engineering or institutional engineering since most of new democracies lack of required political institutions including customary and informal institutions in addition to formal and legal ones such as laws that regulate competition between different candidates to government, namely electoral laws, political parties laws and so on.

One of the most discussed institutions that supposed to directly effect democratic and political practices is electoral system. Which electoral systems lead which outputs? Are proportional representation systems more efficient than other? What kind of electoral system leads representativeness, and which other leads to stability? These are examples of questions posed by political engineers including lawyers, politicians, journalists and often political scientists, of new democracies. Answers given to questions above are innumerable and far away from being in consensus.

Nevertheless, the major aim of this paper is not to try answer that kind of normative questions. Rather, I will try to answer a much more empirical question: Is this possible to observe effects of electoral systems on general election results? In the first part of my paper, I will elaborate some theoretical arguments about the relationship between electoral systems and election results and try to expose different dimensions in which the electoral system effects election results. Second part, the empirical one is composed of three different sections. In the first section, I will make a review of different empirical works from comparative politics literature and exhibits their findings. This part will be followed a short analysis of Turkish electoral laws and their effects on general election results by specifically emphasizing on two important dimensions: disproportionality and party fragmentation. Third part is not within the boundaries of my research question, since it is limited with results of general

elections. However, I added third part, since it allows us to test an important theoretical argument, the psychological law of Duverger.

### Theory

In order to understand how rules of the game affect results, first we have to define dimensions and characteristics of rules, and later to discuss about results of possible changes of these rules. In this theoretical part of my short paper, I will try to elaborate possible dimensions of an “electoral system” and to exhibit results of changes of rules of this electoral system.

Although that the concept of “electoral system” seems far away from being complicated, it is required to make a clear definition of this concept. According to Lijphart, an electoral system is “the set of methods for translating the citizens’ votes into representatives’ seats” (Lijphart, 1994: 1). Although that some normative restrictions may be imposed upon this definition, this simple and basic definition of electoral systems is functionally sufficient for our purpose since it does not limit electoral systems with electoral laws and gives us the opportunity to discuss both of informal and formal rules.

It is generally accepted that electoral systems are composed of different components. Most important and well discussed component of an electoral system is its **electoral formulae**. An electoral formulae may be defined as rules of distributing seats to parties considering distribution of votes across parties. Although that it is possible to make a list of different electoral formulas, these formulas may be categorized under a limited number of categories. Blais categorizes electoral formulas as “plurality” and “proportional representations (PR)” by citing Lijphart and Grofman as “the debate over electoral choice has often defined as a choice and between plurality on the one hand and list PR on the other” and later on adds up a third category, majority systems

(Blais, 210). Lijphart classifies electoral formulas under three broad categories: majoritarian formulas (plurality, two ballot systems, and the alternative vote), PR (classified as largest remainders, highest averages, and single transferable vote formulas) and semi-proportional systems (such as the cumulative vote and the limited vote) (Lijphart: 10). Since most popular electoral formulas are majoritarian and PR electoral formulas, I prefer to emphasis on effects of these two broad categories instead of discussing effects of every alternative electoral formulas in details.

Effects of electoral formulas may be classified as **mechanical effects** and **psychological effects**. The mechanical effect has been defined by Duverger as “electoral systems’ systematic underrepresentation of ‘third parties” (cited in Blais and Carty: 79). Lijphart defines this mechanical effect as “te immediate effects of translation of votes into seats in a particular election”. (Lijphart: 70). In other words, if an electoral formulae systematically favors small or major parties, this bias is the mechanical effect of this electoral formulae. Most famous of this mechanical effect is elimination third or minor parties in majoritarian formulas including simple plurality and first past the post alternatives. This statement is labeled as “the mechanical law of Duverger”. Although that it is argued that this bias is valid for almost all electoral formulas: “because electoral systems tend to favour the larger and to discriminate against the smaller...” (Lijphart: 70), most well-known examples of this bias are majoritarian systems: Duverger says that “the simple majority single ballot system encourages the two-party system; on the contrary both the simple majority system with second ballot and proportional representation favour multi partism” (Duverger: 239).

The **psychological factor** that is often labeled as “the elusive factor”, is described by Lijphart as follows: “to the extent that this translation discriminates against the

smaller parties, voters...not wanting to waste their votes, energies and money, will tend to favour the larger parties (Lijphart: 72). Although that a clearer definition is not made by Duverger, it is possible to argue that the **psychological factor** is a function of voter reactions and strategy that leads voters to make a strategic calculation in order to prevent wasting their votes. Logical consequence of this definition of the **psychological factor**, leads us to conclude that under majoritarian systems, voters will prefer larger parties in order to minimize probability of wasting their votes.

Second important component of electoral systems is district magnitude that is defined as the number of representatives elected in a district. Lijphart cites Rae as follows: “the decisive point in PR is the size of the constituencies, the larger the constituency, that is the greater the number of members which it elects, the more closely will the result approximate to proportionality” (Lijphart: 11). If the magnitude of district is small (but higher than 1), every subtype of PR will approximate to plurality system and if the magnitude is larger for example considering all country as only one district, it will be more representative. Consequently, under PR, small districts favor large parties and larger districts favor smaller parties.

The electoral threshold that is a minimum level of support which a party needs in order to gain representation, is the third important component of an electoral system. Electoral threshold may be imposed at the national level or at the district level. This threshold may be defined as a percentage or a minimum number of votes. However, both of national level and district level electoral threshold aims to restrict number of parliamentary political parties. Consequently as the level of electoral threshold increases, it favors larger and national parties (if it is a national level threshold) and discriminates smaller and regional parties (Lijphart: 12).

In addition to these major components, a number of other dimensions such as the assembly size, apportionment methods and so on, may be used to characterize and compare electoral systems. Nevertheless, I prefer to emphasize on these three dimensions in order to answer our question of how electoral laws effect distribution of votes.

Some hypotheses are possible to be drawn from this short theoretical discussion above.

- majoritarian systems tend to favor larger parties
- under proportional representation larger district magnitudes favor smaller parties and leads multiparties
- higher national electoral thresholds discriminate smaller and regional parties
- higher district level thresholds discriminate smaller parties.

### **Empirical Findings**

#### **Findings from the literature:**

In this part of this short paper, I will try to elaborate some findings of previous works about our hypotheses listed above.

Norris states that the effective number of political parties (this measure will be discussed below in details) is 3.1 in majoritarian systems, 3.9 in mixed and 4.0 in proportional systems (Norris: 307). Lijphart shows that there is strong correlation between effective number of elective and parliamentary parties and PR and variants of PR. While average number of effective number of elective parties is 3.09 for plurality and 3.58 for majoritarian systems, this number is 4.35 for D'Hondt and its variants. This difference is much more exciting for effective number of parliamentary parties. Average number of effective parliamentary parties is 2.04 for plurality and 2.77 other majoritarian systems, while this number is 3.70 for D'Hondt and its

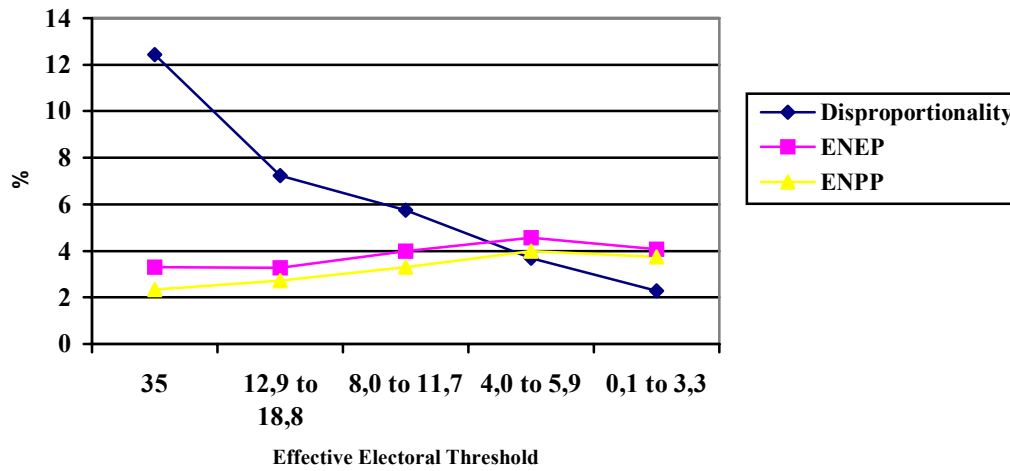
variants (Lijphart, 97). These two findings do not falsify our hypotheses about the relationship between the electoral formula and number of parties.

Another finding of Lijphart is the negative relationship between plurality systems and representation. According to Lijphart average disproportionality that defines as “the deviation of parties’ seat shares from their vote shares” of plurality systems is much more higher than PR and its variants. Disproportionality for plurality system is 13.56 per cent, for other majoritarian systems is 10.88; while this number is 5.22 per cent for D’Hondt systems(Lijphart: 97). This also may be considered as a clear evidence for argument that majoritarian parties favor larger parties and underrepresents smaller parties.

Relationship between district magnitudes and number of parties is supported by evidence provided by Taagepera and Shugart. According to them, relationship between these two variables may be formulated as  $N=M^x$ , where N= effective number of political parties, M= district magnitude and x= size of exponential relationship meaning that when district magnitude increases, effective number of political parties increases (Taagepera and Shugart: 458).

Lijphart also provides some empirical findings about relationship between number of political parties, representation and electoral threshold. It is clearly observable that there is a negative relationship between electoral threshold and effective number of elective and parliamentary parties and a positive one between electoral threshold and disproportionality. These findings are represented in table 1, which is reproduced by using Table 5.2. of Lijphart (Lijphart: 98)

Chart 1. Effects of Electoral Thresholds



### Electoral History of Turkey

In this part of paper, I will try to test hypotheses about the relationship between electoral system and party system, specified above. First of all, I want to exhibit changes in electoral system of Turkey:

**Table 1. Summary of Major changes in Turkish Electoral System**

Date of Change	Electoral Formulae	Threshold	District Magnitude
1961	Plurality to PR with National Remainder	No threshold	-
1965	PR with National Remainder to PR without National Remainder	-	-
1983	-	National threshold	-
1987	-	National and District level thresholds	Smaller districts
1991	-	National and lower District level thresholds	Larger districts -
1995	-	Only National level thresholds	Larger districts -

In order to understand effects of changes in Turkish electoral system, some indicators of party fragmentation and representation will be introduced below.

First set of these indicators are indicators of “disproportionality” that is defined as “deviation of parties’ seat shares from their vote shares (Lijphart, 57). In otherwords,



disproportionality is the measure of how electoral system favors or discriminates political parties. Formulae of these indicators are:

**Rae's I:** 
$$I = \frac{1}{n} \sum |v_i - s_i|$$

**Loosemore-Hanby Index:** 
$$D = \frac{1}{2} \sum |v_i - s_i|$$

**Gallagher "Least Squares Index":** 
$$LSq = \sqrt{\left(\frac{1}{2} \sum (v_i - s_i)^2\right)}$$

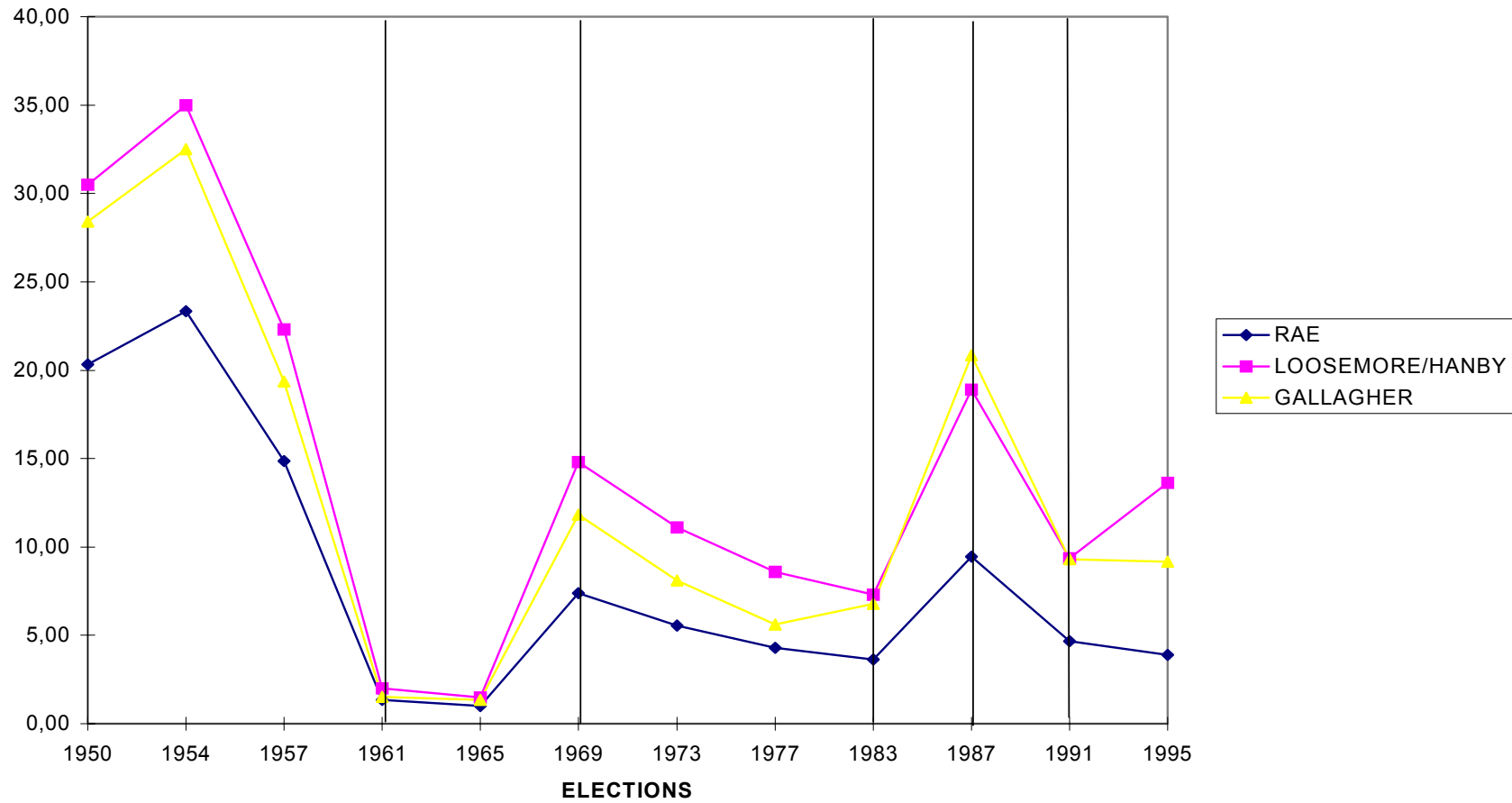
Where,  $v_i$ = percentage of votes obtained by  $i$ th party;

$s_i$ = percentage of seats obtained by  $i$ th party

$n$ = number of parties

Although that many differences among these formulae have been exhibited by various authors and discussed in details by Lijphart (Lijphart: 56-60); I prefer to employ all of these three indicators in order to understand effects of changes in electoral system of Turkish party system. Fluctuation of these indicators over time are presented below, at chart 2. In this chart, vertical lines represent major changes in electoral laws. At this point, I want to talk about a normative choice: I preferred to draw line at the election which it effects. For example, change in electoral formula made in 1965, but since this modification made after 1965 elections, its effects were observed by 1969 elections.

Chart 2. Disproportionality Indicators



A closer analysis of this chart 2. provides us some clear evidence of the relationship between electoral system and the party system. First of all, all of these three indicators expose similar patterns except some little differences that is beyond the scope of this paper. Secondly changes in electoral formula results on change in disproportionality. New electoral law of 1961, that switched to PR system from plurality clearly resulted on a rapid decrease in disproportionality. Similarly, abolishment of national remainder system after 1965 elections resulted an increase in all of three indicators. Changes in electoral thresholds also effected disproportionality. Employment of district level thresholds in 1987 increased disproportionality, with lowering in 1991 and abolishment in 1995, disproportionality significantly decreased. However, effects of district magnitude changes in 1987, 1991 and 1995 have possibly also effected this change in disproportionality in Turkish electoral system.

Second set of indicators aim to measure level of fractionalization of party system that is defined as number of parties that are relevant both in elections and the parliament.

Formulaes of these indicators are as follows:

**Rae's "Fractionalization Index":**

$$F_v = 1 - \sum v_i^2 \text{ (election)}$$

$$F_s = 1 - \sum s_i^2 \text{ (parliament)}$$

**Laakso and Taagepera's "Effective Number of Parties":**

$$N_v = \frac{1}{\sum v_i^2}$$

$$N_s = \frac{1}{\sum s_i^2}$$

Where,  $v_i$ = percentage of votes obtained by  $i$ th party;

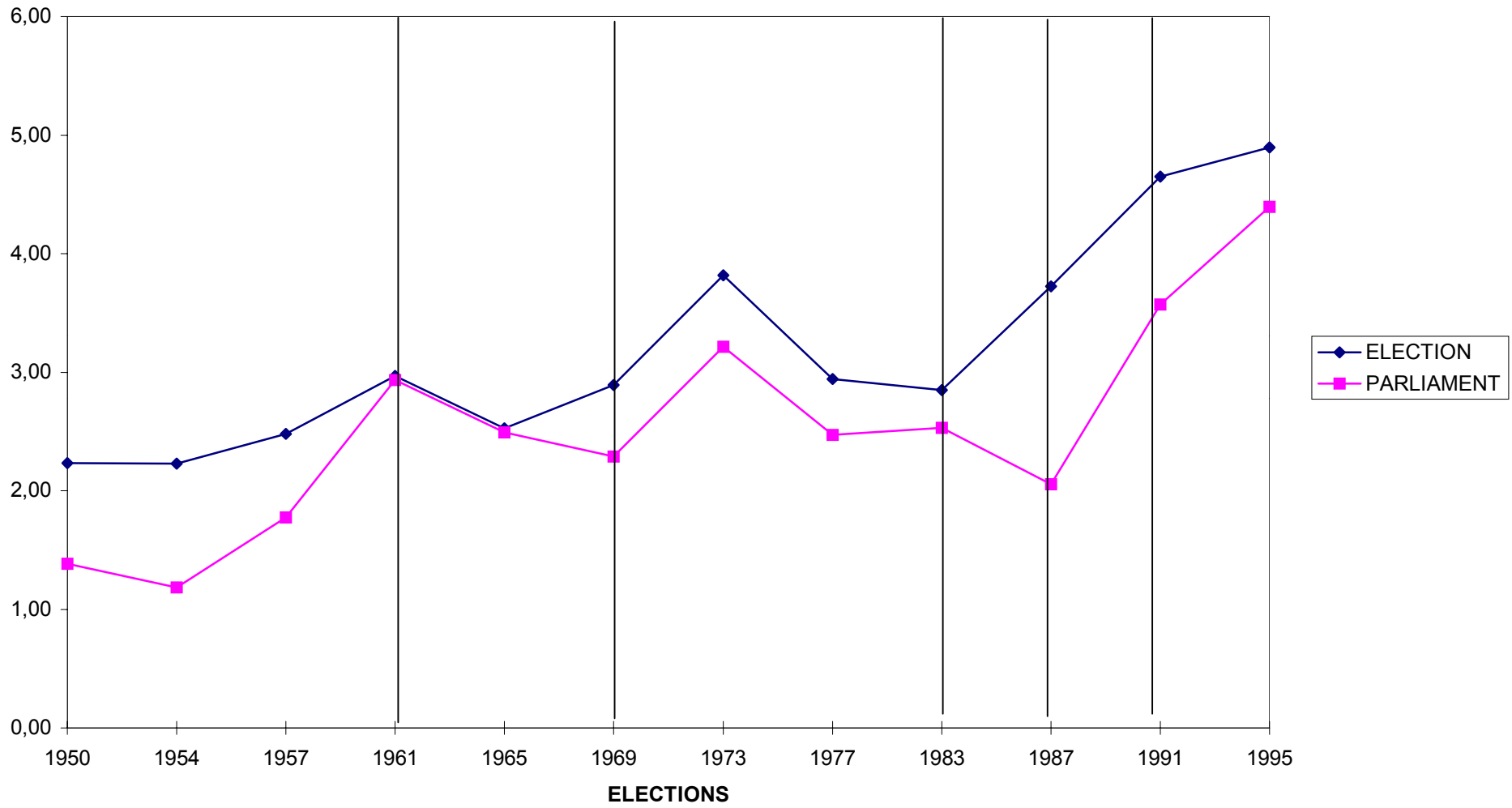
$s_i$ = percentage of seats obtained by  $i$ th party



Chart 3. FRACTIONALIZATION INDICES (RAE)



Chart 4. EFFECTIVE NUMBER OF PARTIES



In charts 3 and 4 above, fluctuation of these indicators of party fractionalization have presented. Despite calculational differences between these two different indicators that is discussed in details by Lijphart (pp: 68-69); both indicators present similar patterns. Change of the electoral formulae in 1961 led to increase of party fragmentation, namely effective number of both parliamentary and electoral parties increased to 3. With the removal of the national remainder system, number of electoral parties remained same while number of parliamentary parties decreased. These changes are clear evidence for the effect of electoral formulae on the party system. Changes in electoral thresholds also effected the party system. After establishment of district level thresholds in 1987, number of parliamentary parties decreased despite increase of number of electoral parties. With the changes in 1991, this gap between numbers of parliamentary and electoral parties declined. Changes in district magnitudes also positively effected both of effective number of parties and party fractionalization. In 1995 elections which introduced larger districts party fractionalization in parliamentary and electoral levels converged and gap between effective number of parliamentary and electoral parties declined.

This short analysis leads us to not to falsify hypotheses argued above. In the following part of paper, I will try to make a more preliminary complicated test of Duverger's second law: Psychological or elusive factor.

#### **An Attempt to Test Duverger's Elusive Factor**

Although that my main research question does not include analyses of local elections, I prefer to emphasize on results of '94 local elections that allows me to make an empirical test of Duverger's Psychological Law. Since it is composed of two different types of electoral formulas, plurality for the mayor and proportional representation for the municipal council; local elections of Turkey provide a good opportunity for this

empirical test. If, in plurality systems voters make a strategic choice and shift their votes to larger parties whose probabilities of winning are higher in order to not to waste their votes; it is expected that there are differences between shares of vote of minor parties in these two different elections and their shares in municipal council elections are higher than their shares in mayor elections.

In order to test this hypothesis, I used data provided by the State Institute of Statistics about results of 1994 local elections, including election results of 2696 municipalities. First of all, I ran a series of regressions, composed of a basic effect of vote received in municipal council elections and a interaction effect of size of municipality and vote received on vote received in mayor elections.

Regression formulaes are as follows:

$$y_i = \beta_1 x_i + \beta_2 D_i x_i + u$$

where  $y$ = dependent variable

$x$ = independent variable

$D$ = dummy variable, (if number of registered voters < 3000, 1; else 0)

I preferred to ignore constant effect in order to be able to measure relationship between variables. Results of regression equations are as follows:



**Table 2. Regression Results**

	I	II	III	IV	V	VI	VII
X	0,97	0,97	1,01	0,99	0,97	0,95	0,96
Interaction	-0,06	-0,01	-0,02				0,01
R-square	0,96	0,959	0,96	0,96	0,96	0,96	0,99

\* all coefficients are statically significant at 0.05 level

**Table 3. Definition of Variables**

	I	II	III	IV	V	VI	VII
Dependent	% Vote Minor Parties (Mayor Elections)	% Vote Minor Right Parties (Mayor Elections)	% Vote Minor Left Parties (Mayor Elections)	% Vote Minor Left Parties (Mayor Elections)	% Vote Minor Parties (Mayor Elections)	% Vote Minor Right Parties (Mayor Elections)	% Vote Effective Number of Parties (Mayor Elections)
Independent	% Vote Minor Parties (Municipal Council Elections)	% Vote Minor Right Parties (Municipal Council Elections)	% Vote Minor Left Parties (Municipal Council Elections)	% Vote Minor Left Parties (Municipal Council Elections)	% Vote Minor Parties (Municipal Council Elections)	% Vote Minor Right Parties (Municipal Council Elections)	% Vote Effective Number of Parties (Municipal Council Elections)

- Minor right parties: BBP, DP, MP, MHP, RP, YDP
- Minor left parties: CHP, IP, SBP

Findings of regression analysis do not falsify our theoretical expectations. If we consider all of minor parties regardless their positions in left-right spectrum, coefficient of interaction effect is negative and statistically significant, meaning that in smaller municipalities the relationship between vote in municipal council elections and mayor elections is weaker than larger municipalities. It is possible to evaluate this finding as in smaller municipalities, voters shift their votes to larger parties or strategically vote. This findings are valid for other regression equations, however coefficients are smaller. This disparity is important to discuss, however, it does not decrease explanatory power of our previous findings. Results of first equation are graphized in the following chart 5.

## Conclusion

I have so far argued that my research question is to look for effects of electoral systems on election results by specifically emphasizing on general election results. In the first part of my paper, I have derived four hypotheses to test:

- majoritarian systems tend to favor larger parties
- under proportional representation larger district magnitudes favor smaller parties and leads multiparties
- higher national electoral thresholds discriminate smaller and regional parties
- higher district level thresholds discriminate smaller parties.

Findings of comparative politics literature exposed in the first section of the empirical part do not falsify these hypotheses. PR systems and its variants lead to increased number of effective political parties and low levels of disproportionality while majoritarian systems resulted on smaller numbers of effective parties and increased disproportionality. Higher district magnitudes result on higher numbers of political parties and higher electoral districts precede lower number of political parties.

Turkish experiment of democracy exhibits similar findings. Switch to PR systems from majoritarian systems led to increased number of political parties and decreased disproportionality while shift to less representative variants of PR increased number of parties. Moreover, changes in electoral thresholds led to less proportionality and smaller number of political parties.

Last part of the paper presented an empirical support to Duverger's psychological law. Regression analyses showed that in smaller municipalities, relationship between vote of minor parties in mayor and municipal council elections is lesser meaning that supporters of minor parties shift their votes in mayor elections to candidates whose

possibility of winning is higher and they vote for their parties in municipal elections.

Despite limitations of data (this relationship may be considered as spurious, effected of unknown variable), these findings do not falsify theoretical expectations.

After these three different analyses, it is possible to answer our major question: Is this possible to observe effects of electoral systems on general election results? The answer is a “qualified yes”.

**Bibliography:**

**Blais** André and R.K. Carty, 1995, “The Psychological Impact of Electoral Laws: Measuring Duverger’s Elusive Factor”; **British Journal of Political Science**, V:21, 79-97

**Blais** André, 1991, “The Debate Over Electoral Systems”, **International Political Science Review**, Vol:12, No:4, 239-260

**Duverger** Maurice, 1955, **Political Parties**, (Methuen & Co. Ltd.)

**Lijphart** Arendt, 1994, **Electoral Systems and Party Systems**, (Oxford University Press)

**Norris** Pippa, 1997, “Choosing Electoral Systems: Proportional, Majoritarian and Mixed Systems”, **International Political Science Review**, Vol:18, No:3, 297-312

**Taagepera** Rein and M. S. Shugart, 1993, “Predicting The Number of Parties: A Quantitative Model of Duverger’s Mechanical Effect”, **American Political Science Review**, V:87, No:2, 455-465