

Parliamentary Elections in Greece:
correspondence analysis and ecological inference
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Abstract

In this paper we present a detailed study of the 2007 Parliamentary Elections in Greece. This study includes correspondence analysis on the election results and ecological inference estimates of voter transition rates. Correspondence analysis reveals three dimensions of political competition in Greece. Ecological inference provides estimates of loyalty and defection rates between parties for each of the 56 electoral districts and for the entire country. We are also able to estimate abstention rates for each group of voters. This is a significant outcome that is not easily extracted by exit-polls. Geographical presentation of local estimates reveals patterns. These patterns can serve as the basis for further research on their association with other demographic and socio-economic characteristics.

Introduction

Greek Parliament consists of 300 members who are elected for a period of four consecutive years through direct, universal and secret ballot by the citizens. The last parliamentary elections in Greece were held on September 16 2007. This date was six months before the end of the four-year government term in a period that electoral polls awarded the government the top position in voting preferences. After a short pre-election period which began with forest fires that destroyed a significant part of Greek forests and opposition parties accusing government for incapability, it was common belief the government would win, but it was doubtful if it would get a parliamentary majority.

The elections on 16/9/2007 do not seem to close the circle started after the Greek transition to democracy¹. Comparative analysis of election results show that the current bipolar left-right political system remains in favour of the left parties (51.3% in 2007 from 51.5% in 2004) in comparison with the right parties (47.4% from 47.6%). But in each pole the balance is changing.²

The balance of the right pole is 41.8 (ND) / 4.6 (LAOS 3.8 & Democratic Revival 0.8) from 45.4 (ND) / 2.2 (LAOS) and the balance of the left pole is 38.1 (PASOK) / 13.2 (SYN & KKE) from 40.5 (PASOK) / 11.0 (KKE, SYN, DIKKI). This observation is particularly valuable to understand that the elections maintained the

¹ This observation should not be read in conjunction with that followed, particularly with regard to developments in PASOK, the election of its president on 11/11/2007 and the elections of Tsipras in SYN. The polls in the period after 11/11/2007 show a party scene in question. The evolution of this phenomenon will be reflected in future elections (European 2009, Elections for local authorities 2010).

² In local authorities' elections for the prefectures of Greece in 2006, the candidates supported by ND gained about 42% of votes and the candidates supported by PASOK approximately 38.5%. Although it is dangerous to transfer these figures to the parliamentary elections, this was an indication for the power of the political parties at this period.

relationship between right pole / left pole with relatively balanced redistribution of internal forces in each pole.

Election Day revealed that New Democracy (ND) was the leading party for a second term, achieving a narrow majority. After loosing 13 seats New Democracy ended with only one seat over the threshold required for the formation of government. Panhellenic Socialist Movement (PASOK) saw its vote share dropping to levels similar to those of the general elections held in 1989 when PASOK was experiencing a crisis because of scandals. The parties of the left, the KKE and SYRIZA, enjoyed a significant increase in their votes. The populist Popular Orthodox Rally (LAOS) entered the parliament for the first time mostly due to its performance in areas around the two largest Greek cities, Athens and Thessaloniki increasing the number of Parliament parties from four to five. Finally, the Ecologist Green party, although it failed to reach the vote share threshold of 3% to enter the Parliament, for the first time in Greece its vote share was substantial and in some large urban it exceeded 1.5%. For a detailed presentation of the elections see (Dinas, 2008).

The rest of this paper is constructed as follows: First we present correspondence analysis results which reveal the three dimensions of political competition in Greece, then we present national and local ecological inference estimates of voter transition rates and we conclude with a discussion of these findings.

Correspondence Analysis

Table 1 displays the total vote shares of each significant party in the Greek Parliamentary elections of 2007 and 2004. "Abstention" is included as one of the political parties. The same holds for "non valid and blank votes" which is also considered as political party. Thus, the percentages displayed here are not the usual percentages which are calculated by dividing the votes of each party to the sum of the valid votes.

Table 1 Parliamentary Electoral results in Greece

| | 2007 | 2004 |
|-------------------|--------|--------|
| Abstention | 25.91% | 23.67% |
| Non valid & Blank | 1.98% | 1.68% |
| ND | 30.17% | 33.87% |
| PASOK | 27.46% | 30.26% |
| KKE | 5.89% | 4.40% |
| SYN | 3.63% | 2.42% |
| LAOS | 2.74% | 1.64% |
| DIKKI | 0.00% | 1.34% |
| ECOLOGISTS | 0.76% | 0.00% |
| DA | 0.58% | 0.00% |
| OTHER | 0.88% | 0.71% |

The comparative observation of the results may lead to the assumption that the decrease of 3.6% of ND resulted in an increase of 1.6% LAOS, a voter transition rate of 0.8% towards Democratic Revival and voter transition to other directions. Similarly, the decrease of 2.4% of PASOK can be read as voter transitions to KKE and SYN, which appear to absorb a large part of DIKKI. This is not sufficient to

describe the voter flows between parties in successive elections. An estimate can be derived from exit polls in elections where the loyalty rates are estimated at ND: 86%, PASOK: 87% and SYN: 65%³.

Chadjipadelis (2008) using correspondence analysis (Benzecri, 1992) ends up with three axes (dimensions) of political competition. The first axis refers to the contrast of large-small parties, the second axis refers to the placement of parties in the Left-Right bipolar political system and the third axis refers to organizational characteristics. These axes explain almost 95% of the competition. The first axis appears particularly enhanced in these elections (67%) and it mainly reflects the position of citizens about the question of governance. This axis is formed by ND, PASOK, KKE, SYN and LAOS. The contrast is defined between ND and PASOK on the one side and SYN, KKE and LAOS on the other side. The contribution of the parties to the formation of the axis is KKE: 39%, SYN: 31%, LAOS:12.6%,ND:9.1% and PASOK:8.2%. Also the size indicated in the percentage contribution of the axis is important for the interpretation of each variable. This percentage reflects the proportion of each variable explained if we rely only on this axis for the analysis of a party. These percentages are KKE:86.8%, SYN:83.8%, LAOS:60.7%, ND:40.6% and PASOK:35.1%. As shown above KKE, SYN and LAOS are mainly located on this axis. This contrast reflects the position of smaller parties who are trying to convince the electorate that the two major parties are identical as far as the issue of governance is concerned. This contrast was expressed strongly in the constituencies of Athens and Piraeus.

The ratio between PASOK and ND in the issue of governance has remained the same, leading to simultaneous disapproval of both major parties that led to a decrease of 3.53% and 2.45% for ND and PASOK respectively. This is mainly caused by the feeling that the two parties cover a common space in the issue of governance. The immediate result is that 6% of the electorate was placed near the ends of the left-right political spectrum.

The contribution of the second axis (right-left) is 21% of the total inertia. This axis is formed by PASOK, ND and LAOS. It is striking that this axis does not involve KKE and SYN. These two parties chose to put the main controversy in the issue of governance. The contribution of each party to the axis is PASOK:48.9%, ND:42.5%, LAOS 7.1%, SYN:1.1% and KKE:0.4%. The contribution of the axis to each party is PASOK:63.8%, ND:57.7%, LAOS:10.4%, SYN:0.9% and KKE:0.3%. In this axis PASOK is in contrast to ND and LAOS. The third axis with 8% contribution refers mainly to oppositions between the smaller parties (KKE versus SYN and LAOS) and refers to their function as structured independent information networks. The placement of variables (parties) in the factorial plane formed by the first and second axis (Diagram 1) leads to the formation of four groups defined in the four quarters of the factorial plane. ND is placed in the upper left quadrant, PASOK in the lower left quadrant, LAOS in the upper right, KKE and SYN at the bottom right. Thus, these parties have defined four distinct groups.

³ Newspaper TA NEA, 17/9/2007

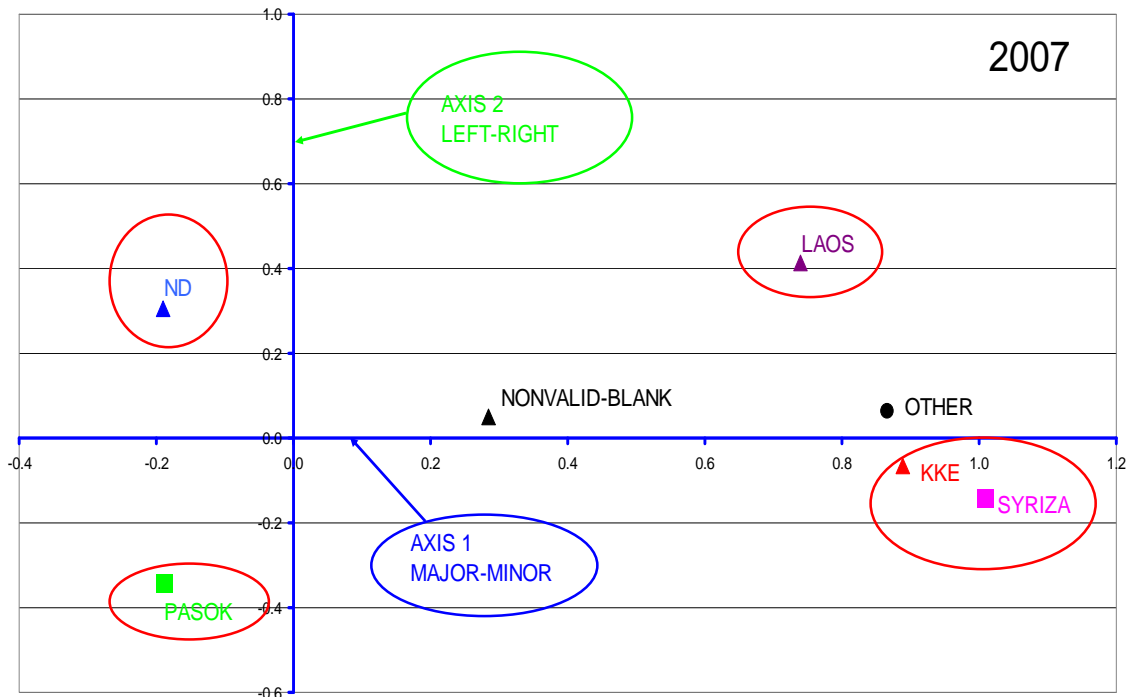


Diagram 1 Factorial plane defined by the first two axes

Ecological inference

Using the results of the parliamentary elections in Greece held on 2004 (with 9 parties) and 2007 (with 10 parties) we wish to estimate the values of p_{ij} for $i=1, 2, \dots, 9$ and $j=1, 2, \dots, 10$ where p_{ij} is the voter transition rate from political party i of 2004 election to political party j of 2007 election. This is usually done by ecological inference methods. For instance, Chadjipadelis and Andreadis (2004) using ecological inference have analyzed the profile of the citizens who have voted for a newly formed right wing party (Popular Orthodox Rally) in the elections for the Greek Parliament that took place in 2004, they have provided estimates of voter transitions towards the Centre Union in the Greek Parliamentary elections of 1963 and 1964 (2007b) and they have presented how Cypriots have voted in the 2004 referendum for the Annan Plan in Cyprus (2007a).

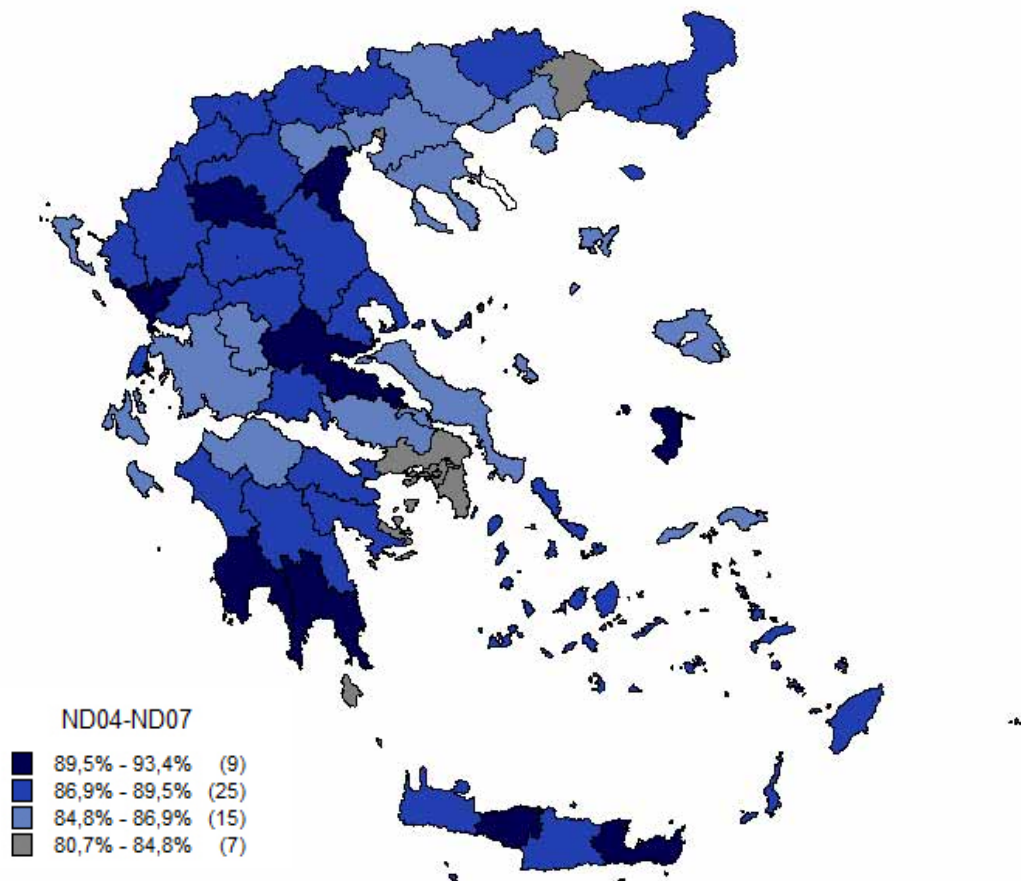
In this paper we apply the VTR algorithm (Andreadis and Chadjipadelis, 2009) to estimate the general voter transition matrix between the 2004 and 2007 Greek Parliamentary elections. From the 300 Members of the Greek Parliament, twelve are elected from nationwide party lists in proportion to the total electoral power of each party throughout the Country. The rest 288 seats are allocated to 56 constituencies. In addition, to the estimation of the national voter transition matrix, we also estimate the values p_{ijk} for $i=1, 2, \dots, 9$, $j=1, 2, \dots, 10$ $k=1, 2, \dots, 56$ where p_{ijk} is the voter transition rate from political party i to political party j in constituency k .

The general transition matrix is presented in Table 2. The national loyalty rate for ND is 86.1%, for PASOK is 86.3%, for KKE is 97.4%, for SYN 79.4% and for LAOS 99.9%. Although members of the Democratic Social Movement (DIKKI) announced its electoral alliance with the Coalition of the Radical Left (SYRIZA or for shorter reference SYN) this was not accepted by all its members and DIKKI has distributed

its power to various parties. Democratic Revival (DA) has gained a small part of ND voters and some of DIKKI voters, but its total vote share remained far away from the 3% threshold required to elect members in the parliament.

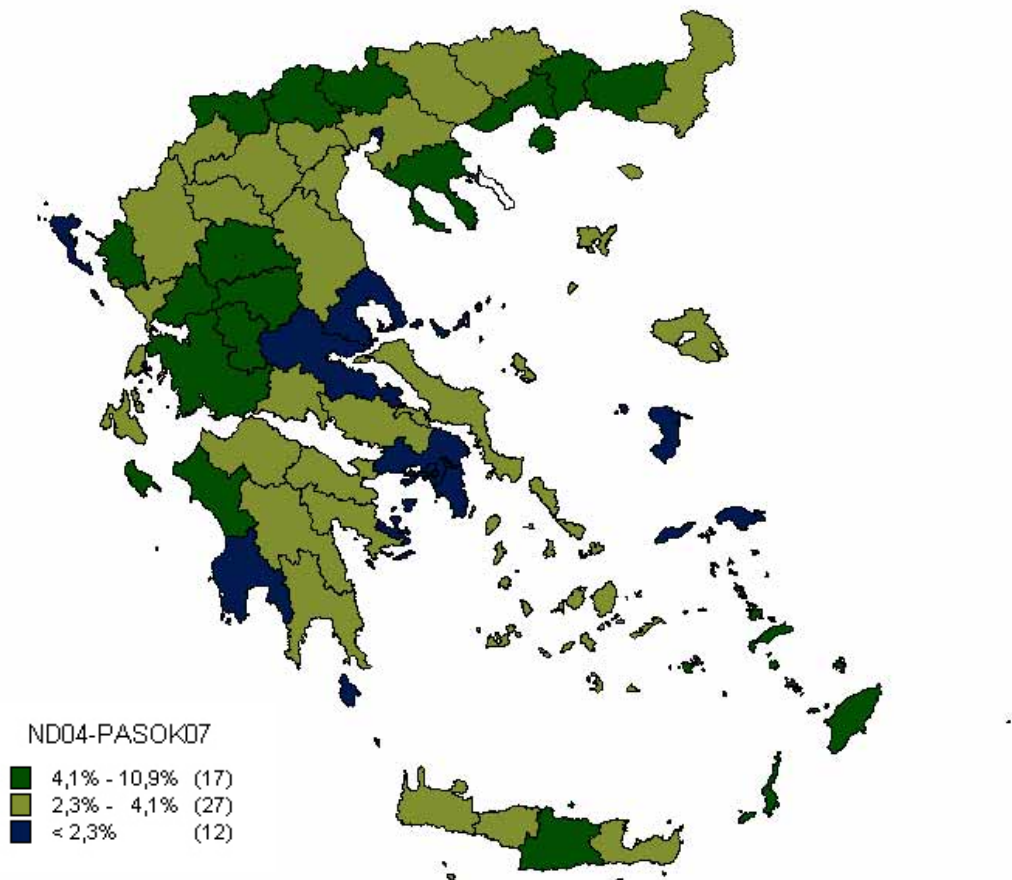
Table 2 General voter transition matrix

| | Abst. | NV&B | ND | PASOK | KKE | SYN | LAOS | DA | ECOL | OTHER |
|------------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|
| Abstention | 95.1% | 0.5% | 1.8% | 1.1% | 0.6% | 0.2% | 0.3% | 0.0% | 0.2% | 0.1% |
| NV&B | 4.3% | 78.8% | 1.9% | 3.0% | 3.1% | 2.2% | 1.1% | 0.6% | 3.4% | 0.9% |
| ND | 2.2% | 1.3% | 86.1% | 2.7% | 2.1% | 1.8% | 2.0% | 1.3% | 0.4% | 0.1% |
| PASOK | 7.0% | 0.3% | 1.4% | 86.3% | 1.3% | 2.0% | 0.7% | 0.1% | 0.7% | 0.2% |
| KKE | 0.7% | 0.0% | 0.3% | 0.3% | 97.4% | 0.5% | 0.2% | 0.1% | 0.1% | 0.1% |
| SYN | 7.5% | 0.1% | 1.7% | 0.8% | 2.7% | 79.4% | 0.7% | 0.0% | 5.2% | 1.3% |
| LAOS | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 99.9% | 0.0% | 0.0% | 0.0% |
| DIKKI | 17.8% | 0.9% | 3.0% | 5.5% | 16.6% | 29.0% | 6.9% | 5.3% | 13.5% | 0.8% |
| OTHER | 0.1% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.2% | 0.0% | 0.3% | 98.6% |



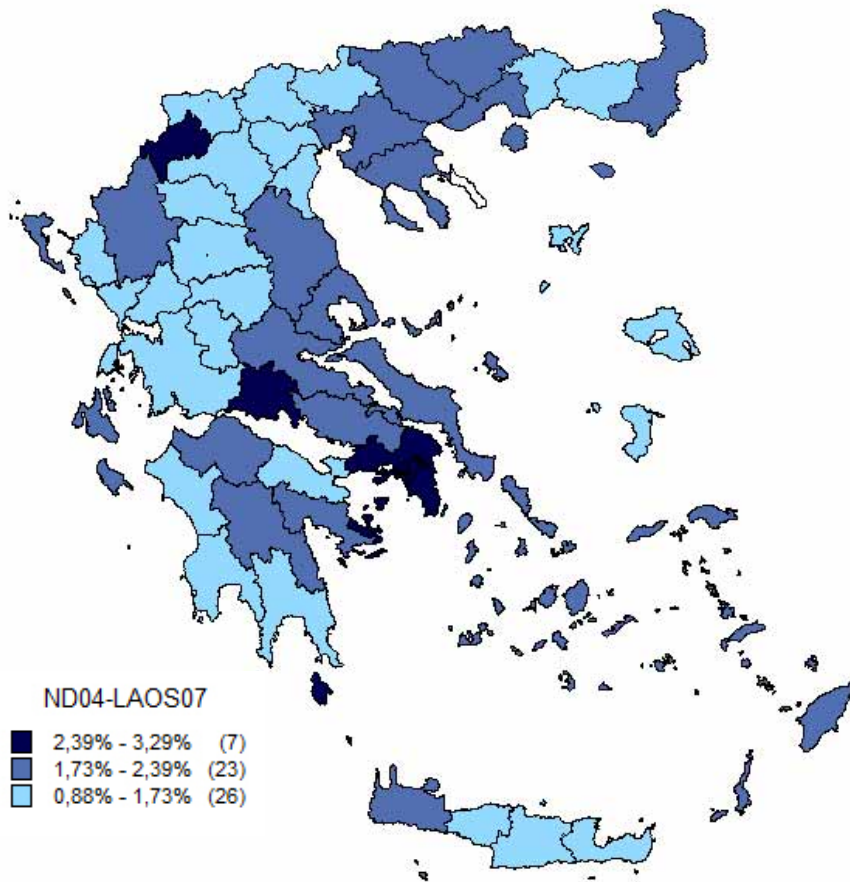
Map 1 ND Loyalty rates

The worst loyalty rate for ND appears in constituency Thessaloniki A (80.76%). In the same group we meet all five constituencies in the periphery of Attica and the constituencies of Xanthi (81.28%), Chalkidiki (84.83%) and Corfu (85.43%)



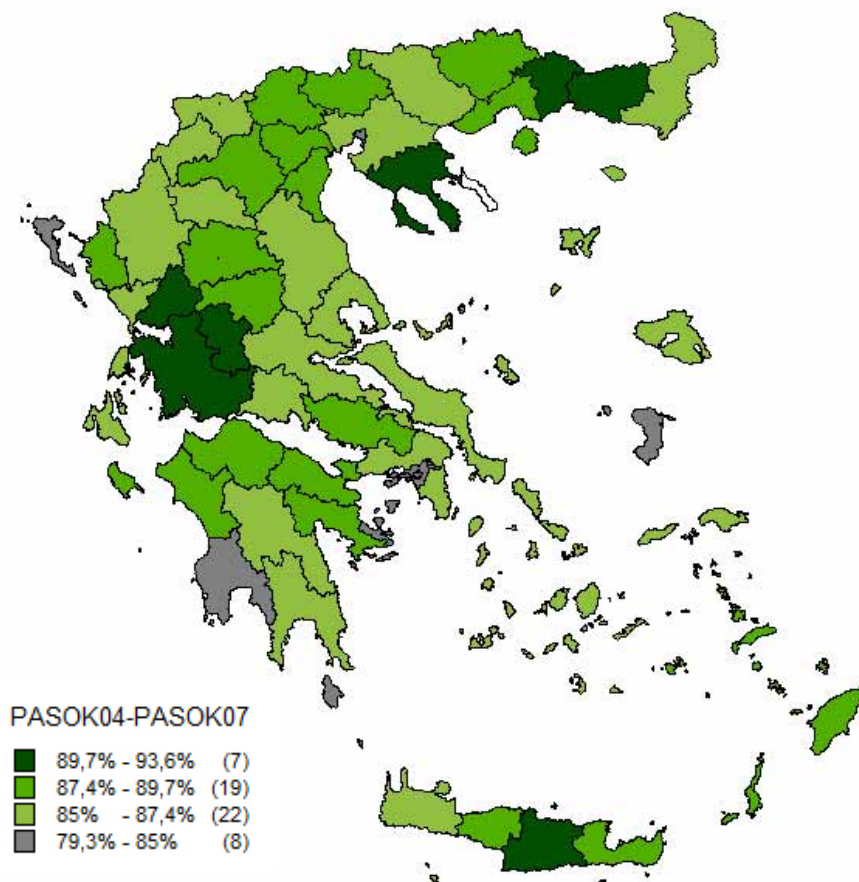
Map 2 Defection rates from ND to PASOK

The comparison of Map 2 with Map 1 shows one of the reasons PASOK could not win the elections. Although there are constituencies in which ND appears with loyalty rates under 85%, PASOK was not able to gain these voter leaving ND. Only in Xanthi (10.89%) and Chalkidiki (4.33%) PASOK has managed to earn a substantial share from these voters but in the critical, overcrowded constituencies of Attica and Thessaloniki A PASOK earned of a very small fraction (< 1.6%) of dissatisfied ND voters. There are zones of constituencies where PASOK displays significant earnings. The north-east area includes Xanthi, Rhodope (6.07%) and Kavala (4.85%). The north-west continuous area covers Pella (4.15%), Kilkis (5.18%) and Florina (4.80%). Finally there is a central area consisting of Karditsa (4.31%), Trikala (4.22%), Evrytania (7.60%), (Aetolia-Acarnania 5.96%), and Arta 5.13%.



Map 3 Defection rates from ND to LAOS

In contrast to PASOK that failed to compensate from the dissatisfaction of ND voters in the periphery of Attica, LAOS was able to enjoy substantial earnings in the five constituencies of the periphery. From the group of citizens who have votes ND in the 2004 elections LAOS earned in Athens A 2.68%, in Piraeus A 2.70%, in Piraeus B 2.72%, in Athens B 2.82%, and in the constituency of Attica 3.29%. These figures explain how LAOS almost doubled its power in these constituencies; for instance in the constituency of Attica LAOS had gained 10304 votes (3.24 %) in 2004 and it jumped to 19248 votes (5.82 %) in 2007.

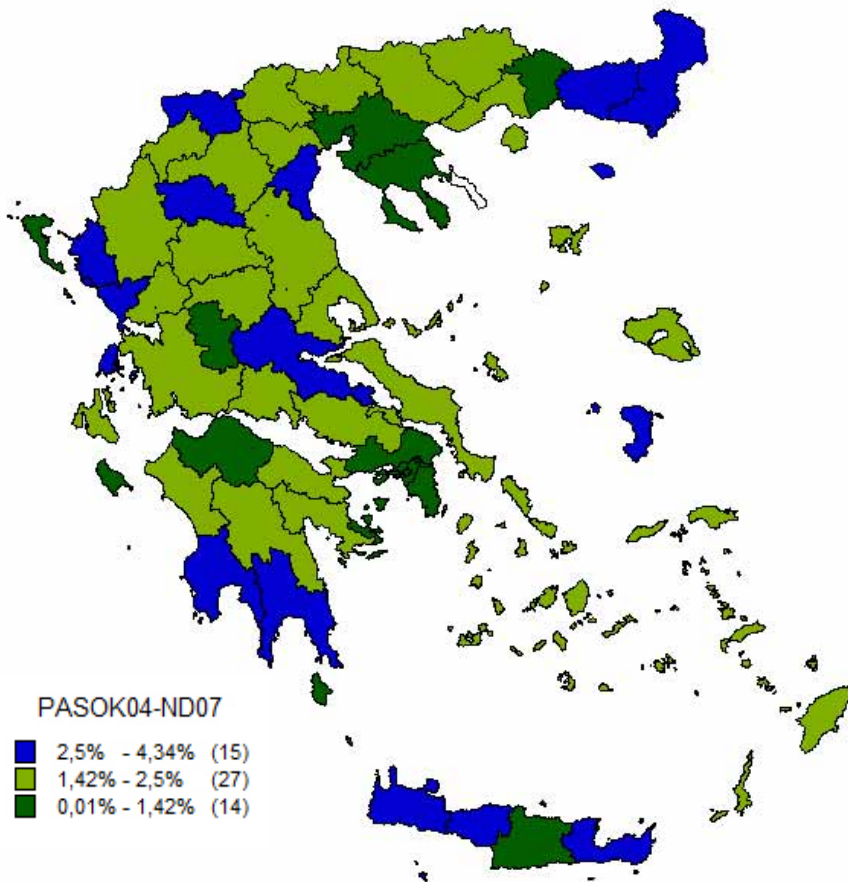


Map 4 PASOK Loyalty rates

Another reason that explains why PASOK could not win the elections is that its loyalty rate in areas around the two largest Greek cities, Athens and Thessaloniki follows a declining path similar to the ND declining path which had served as the government for the past three and a half years. The worst loyalty rate for PASOK appears in constituency Athens A (79.31%) followed by Piraeus A 81.54%, Athens B 82.89% and Piraeus B 83.95%. In Thessaloniki A the loyalty rate for PASOK was 84.71%. It also loses power in Corfu (84.20%) just like ND. As a result, in Corfu both major parties suffer from serious loss of power which was transferred to minor parties. The comparison of Corfu electoral results between 2004 and 2007 presented in Table 3 support this finding

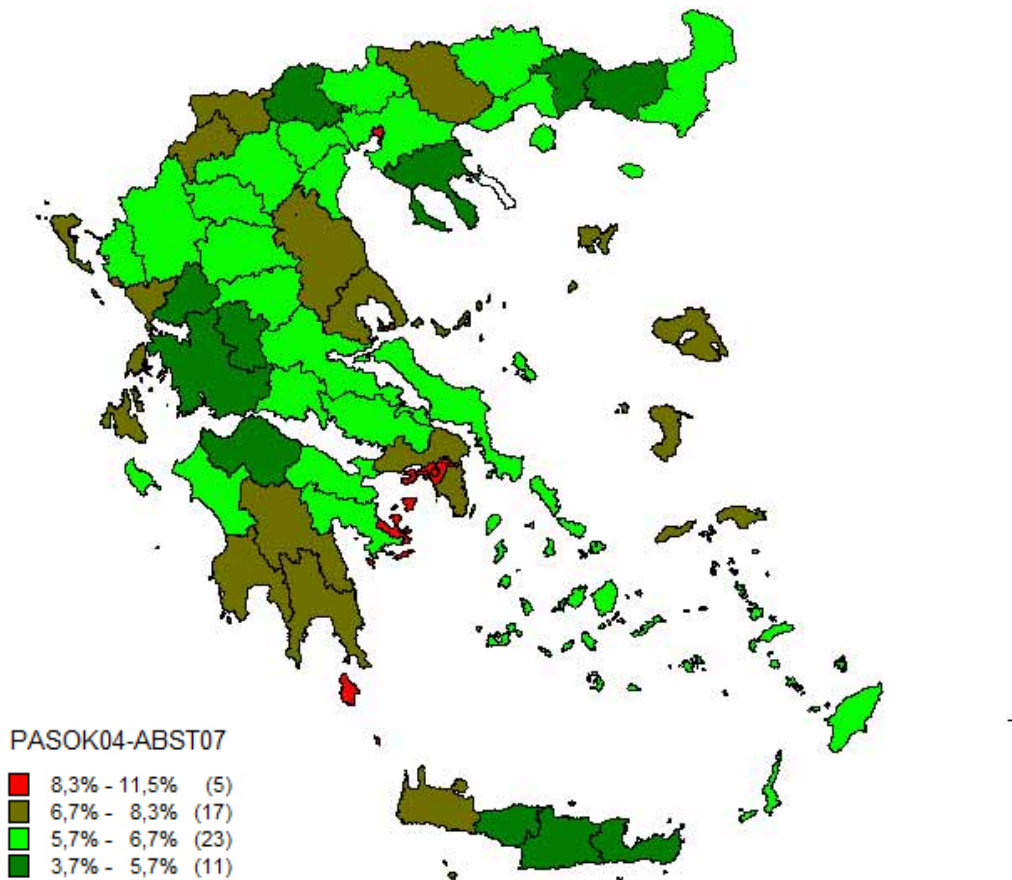
Table 3 Electoral results in Corfu

| | 2007 | | 2004 | |
|------------|---------|--------|---------|--------|
| ND | 40.06 % | 29,477 | 44.04 % | 33,866 |
| PASOK | 36.44 % | 26,812 | 41.19 % | 31,673 |
| KKE | 14.89 % | 10,954 | 8.16 % | 6,275 |
| SYN | 4.04 % | 2,971 | 3.27 % | 2,513 |
| LAOS | 2.08 % | 1,529 | 0.83 % | 636 |
| ECOLOGISTS | 1.06 % | 777 | | |



Map 5 Defection rates from PASOK to ND

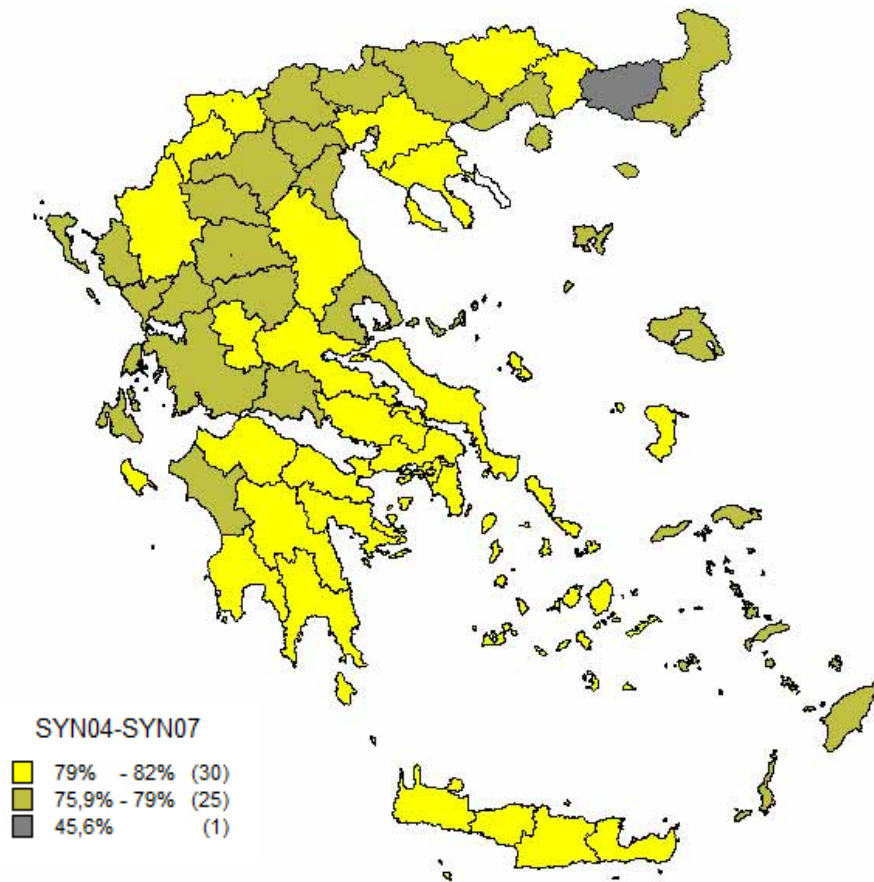
In 15 constituencies PASOK suffered from defection rates towards ND in a range between 2.5% and 4.34% of its voters. Among these constituencies we can observe three of the four constituencies of the Crete Island. In fact the largest defection rate is observed in Rethymno (4.34%). The sorted list continues with Chios 3.84%, Messenia 3.73%, Grevena 3.63%, Phthiotis 3.17%, Chania 3.07%, and Preveza 3.02%. Another interesting constituency is Rhodope in which there are strong bidirectional movements between the two major parties; from ND to PASOK (6.07%) and from PASOK to ND (2.5%). In the constituency of Rhodope there are often abrupt shifts of party choices mostly because of the strong presence of Muslim minority. PASOK has included in its list of candidates Chatziosman Ahmed, (until recently chairman of a local party founded by Sadik Ahmed) who has strong influence on the Muslim minority. On the other hand ND included in its list of candidates the former mayor S. Erdogan who was associated with PASOK in the past.



Map 6 PASOK 2004 to Abstention 2007

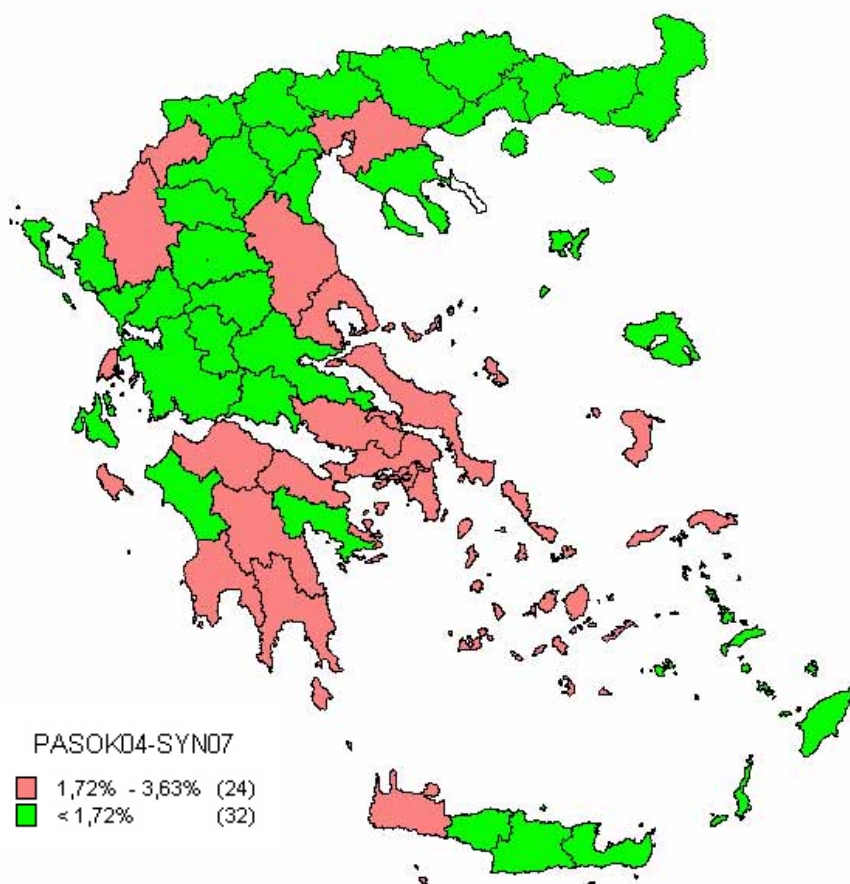
In the European elections of 2004 in Greece we have observed a significant abstention increase not only in relation to the parliamentary elections of that year, but compared with European elections in previous years. Comparing the number of votes cast in parliamentary elections held on 7 March 2004 with the number of those who participated in the elections of 13 June 2004 for the European Parliament, we can observe that, although nearly 7.5 million citizens voted in parliamentary elections, about 1.3 million abstained from the 2004 European elections. Andreadis (2005) has demonstrated that the largest percentage of people who abstained from the 2004 European elections had voted PASOK in the previous Parliamentary elections. In particular, from those who had voted in the parliamentary elections for PASOK a large share (about 26%) abstained from the European elections. The corresponding figure for ND was 10%.

The parliamentary election of 2007 was the second election in which a significant part of PASOK 2004 voters has chosen to abstain from an electoral procedure. The largest abstention rates of PASOK voters are observed in Athens A 11.51%, Piraeus A 9.94%, Athens B 8.77%, Piraeus B 8.57% and Thessaloniki A 8.28%.



Map 7 SYN Loyalty rates

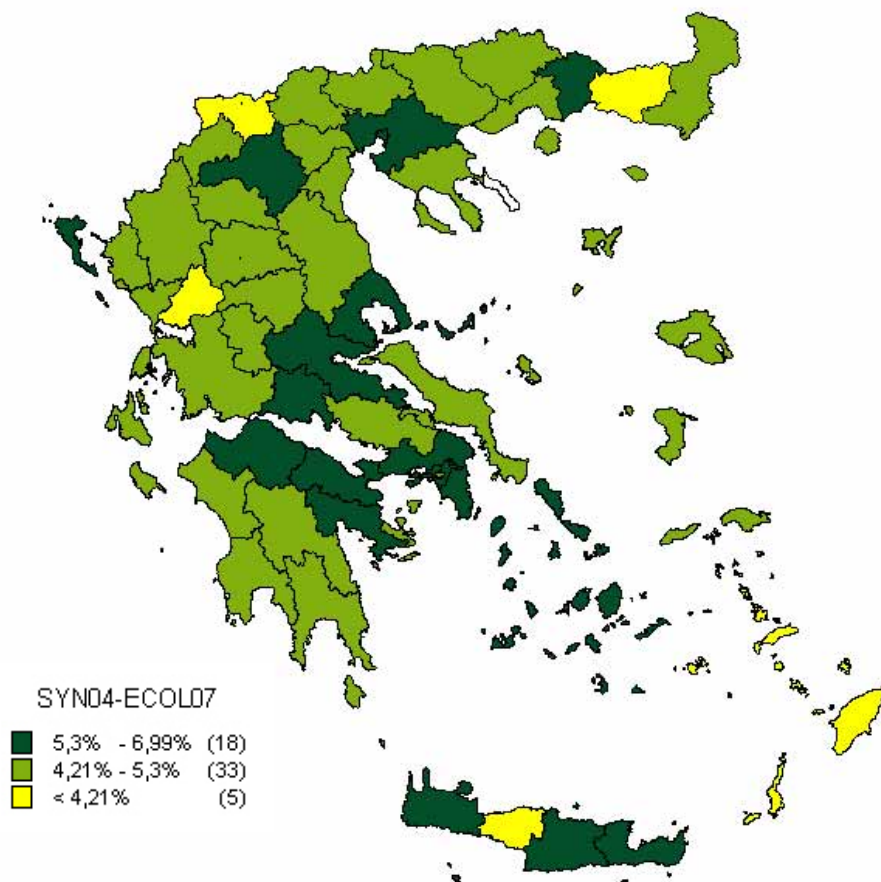
SYN is known for demonstrating the lower loyalty rates among the four political parties which have been constantly electing parliament members since 1996. There is a strong bidirectional flow of voters between PASOK and SYN and between SYN and other parties of the left area of the political spectrum and as a result significant shifts observed in the local electoral power of SYN do not surprise electoral analysts. Map 7 reveals an outlier in the estimated loyalty rates of SYN. In addition to the unusual characteristics of the constituency of Rhodope, the former MP of SYN, in the period 1996-2000, Mustafa Mustafa, who was again a candidate in the last two elections, has resigned for personal reasons, and the list of candidates of SYN in this constituency for 2007 included only one former candidate who was fourth in the 2004 elections.



Map 8 Defecation rates from PASOK to SYN

In 24 constituencies PASOK suffered from defecation rates towards SYN in a range between 1.72% and 3.63% of its voters. At the top of the list we can observe the constituencies of Athens A: 3.62%, Athens B: 3.43%, Piraeus A: 2.97%, Piraeus B: 2.54%, Attica: 2.32% and Messenia: 2.32% (Map 8)

As Map 9 indicates SYN gained voters from PASOK but it lost about 1 of 20 of its voters towards the party of Ecologists. In 18 constituencies PASOK suffered from defecation rates towards Ecologists in a range between 5.3% and 7% of its voters. At the top of the list there are the constituencies of Cyclades:6.99%, Kozani:6.14%, Attica:5.88%, Thessaloniki A:5.87%, Chania:5.81%, Corinthia:5.77%, Thessaloniki B:5.75%, Xanthi:5.67% and Athens B:5.66%



Map 9 Defection rates from SYN to Ecologists

Discussion

The results by the method of ecological inference are identical to the results by correspondence analysis. The constituency maps presented in this paper show that the voter transition rates in each constituency present small deviations from the general (national) voter transition matrix for the critical sizes (loyalty rates, movements between parties on the same pole and between the two major parties). This substantiates the conclusion of the nationalized vote.

If we try to describe the findings in terms of political competition we should note that there are two main theoretical lines which define the electoral strategy of political parties. The first refers to the formulation of ideological principles. Each party provides a central policy proposal for the future of society. The second refers to proposals for the management and direction of the State. The management is a matter of policy through a system of priorities and weights a party gives to the solution of questions of polarization. Important polarizing questions are: How social goods will be produced and distributed, what is the scope of the regulatory role of the state in controlling the economy, how will be the state built and operated, what is the weight

and characteristics of institutional citizenship. The responses of the parties to the above questions are very important⁴.

PASOK in these elections seems to be unable to define the ideological terms of partisan conflict, overestimating the importance of managing conflicts. PASOK remained in this sort of conflict with ND, claiming an intermediate with ND political area (of voters) giving special focus on applied policy. With this shift in attention to management policies PASOK was withdrawn from the political area (of voters) claimed in the vision and the proposal for the social organization by KKE and SYN.

ND remained in this dispute of management type with PASOK in the same intermediate space of management policies, leaving empty the area of conflict at the level of vision and proposal for the social organization which is claimed by LAOS. ND won in the management space and lost in the ideas space. This may prove crucial for the future but it was enough to win these elections.

It should be noted that especially voters of PASOK and SYN seem to contribute to the dynamic part of abstention⁵. Although due to the establishment of electoral lists, which contain about 2 million citizens who reside abroad and do not usually vote in elections, it is difficult to draw conclusions about abstention, the flow from PASOK to abstention is estimated at 7% and from SYN to abstention is estimated at 7.5% . For both PASOK and SYN these findings refer to a measurable part of their voters who probably do not agree with the central policy focus of their party. Geographically, the movement towards abstention from PASOK is strong where the other parties are more powerful (Map 6). The position of PASOK on both axes of confrontation (with ND in governance and SYN, KKE on ideological placement) is less strong.

The analysis of election results in each constituency reveals interesting features. The constituencies of Athens, Piraeus, Messenia, Samos, Corfu and Chios are those where PASOK suffers from greatest reduction of vote shares. Similarly, the greater reductions for ND are observed in the constituencies of Athens, Piraeus, in Xanthi, Zakyntos, Evritania, the constituencies of Thessaloniki and Chalkidiki.

The reduction of the power of PASOK in Messenia, Samos, Corfu and the island is due to local coincidental reasons. Similarly the reduction of the power of ND in Xanthi, Zakyntos and Evritania is due to local reasons, in Thessaloniki and Chalkidiki is due to the strong presence of Democratic Revival. Four constituencies have similar characteristics for PASOK and ND. These are the constituencies of Athens and Piraeus. In these constituencies competition develops mainly in the central scene, through the general information networks (especially television), reducing the role of individuals in political competition.

⁴ Baltolini (2002) raises the question of the structure of competition between the parties. Also Quinn (2004) refers to the incentives for citizens to participate in a party and the incentives for parties to participate in political competition.

⁵ Of course the 95% flow from abstention 2004 to abstention 2007 is documenting that the overwhelmingly large proportion of abstention 2007 is from abstention 2004. The rest part of abstention can be called dynamic part of abstention in the sense that it refers to the people who voted 2004 and did not vote in 2007.

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