



# The 2011 municipal elections in South Africa and new trends since the 2009 national elections

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## Abstract

The CSIR has been involved in South African election night predictions since 1999 using a cluster prediction model based on the segmentation of the electorate according to voting behavior. In this paper these clusters are exploited in another way. Different clusters are related to different demographic groups, and an analysis is made how these different groups change their affiliation between subsequent elections. The changes in affiliation are determined by calculating a trend matrix, a new tool in elections that was introduced by one of the authors a few years ago. By comparing trend matrices between municipal (2006, 2011) and national elections (2004 and 2009) one can establish whether the observed trends are incidental or have a more generic character. It is felt that a better understanding of the voter behavior through such analyses can enhance the value of elections and thereby promote democracy.

## 1 Introduction

This paper aims to provide detailed insights in the voter behavior in South Africa over the last eight years, using a combination of cluster and trend matrix techniques. Clustering techniques have been used extensively by the CSIR election research group since 1999 [3, 2]. This group is involved in electionnight predictions and has demonstrated the accuracy and effectiveness of the cluster segmentation of the South African electorate through its successful election night predictions in all elections since 1999. The clustering is based on prior election results, so that the clusters used in 2000 were based on the 1999 election results, the clusters used in 2004 were based on the 2000 election results, while since then the 2004 results have been used as a basis for the subsequent election analyses in 2006, 2009 and 2011. Using the census results from the 2001 South African census, one can also determine the demographic characteristics of these clusters, and thereby relate voter behavior to demographics. By keeping the clusters the same since 2004 one can compare the election behavior in different sectors of the population. This

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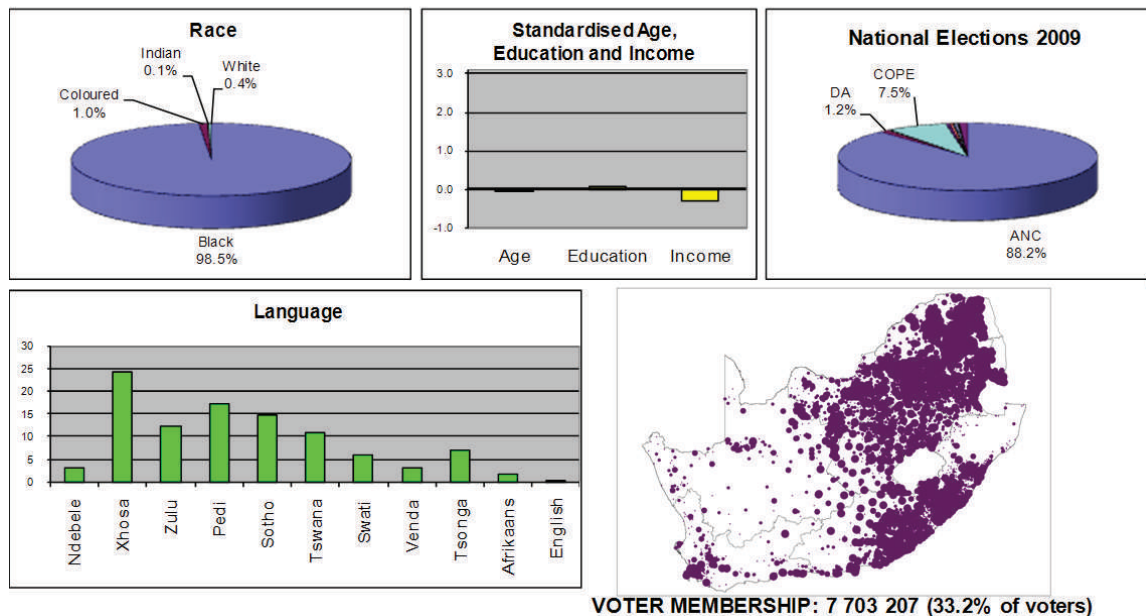
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comparison is greatly facilitated and enhanced by the availability of trend techniques, which were recently developed by one of the authors [1]. In the next section, 4 of the 20 clusters will be described in detail as they represent representative and distinct parts of the South African electorate. After the introduction of the cluster technique in Section 3, the four segments of the electorate are the basis for four case studies using these trend techniques in Section 4. These studies provide interesting insights in the behavior of the South African electorate since the first democratic elections.

## 2 Segmentation of the South African Electorate

In the following the demographics of the individual clusters are illustrated for four of the twenty clusters of the 2004 cluster model. The demographic analysis was carried out on the basis of the 2001 census, but uses the latest information on the number of registered voters in the relevant voting districts. It also shows the equivalent 2009 election results for each cluster, rather than the 2004 results which were used in the construction of the clusters. The biggest cluster (33.2 percent of the electorate in 2009) shown in Fig. 1, is based on a large percentage (88.2 percent) vote for the African National Congress (ANC), which is considerably higher than the national average (66 percent ) in the 2009 elections.

**Black(98.5%), mixed language, medium age group, low income group, male(47.5%), ANC(88.2%), COPE(7.5%), Turnout in 2009 (75.7%)**



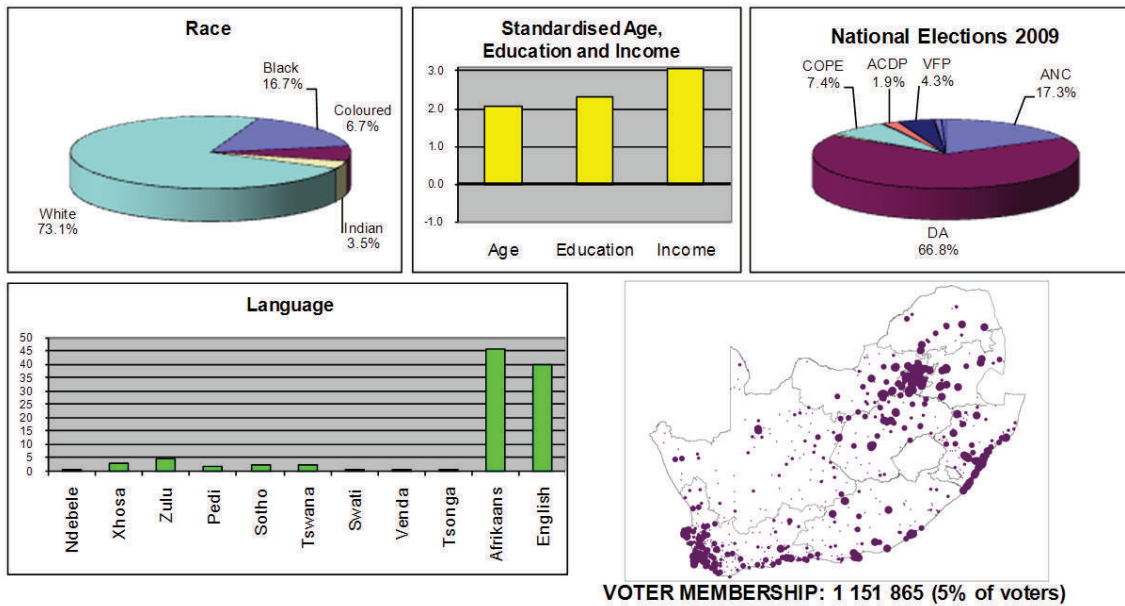
**Figure 1:** Largest cluster characterized by strong ANC support. The turnout in 2011 was 54.8 percent, which is 1.7 percent below the average of 56.5 percent.

The high percentage of Blacks in this first cluster confirms the strong support for the ANC under the black population.

The cluster shown in Fig. 2 is dominated by the white electorate. The main party represented

is the DA (66.8 percent), however the ANC also has a substantial following (17.3 percent). The cluster shown in Fig. 3 is determined by a large IFP vote and has a large Zulu representation concentrated in Kwazulu-Natal. The dynamics of this group is of particular interest as there was a strong historical struggle between the ANC and the IFP in this province for many years. The ANC has made inroads in this IFP stronghold, partly through the rise to presidency of Zuma (ANC), who is of Zulu decent. In the current municipal election the IFP has been split in two parties, the original IFP and the new NFP (National Freedom Party).

**White(73.1%), high age group, high income group, male(47.4%), DA(66.8%), ANC(17.3%), COPE(7.4%), Turnout in 2009 (81.7%)**



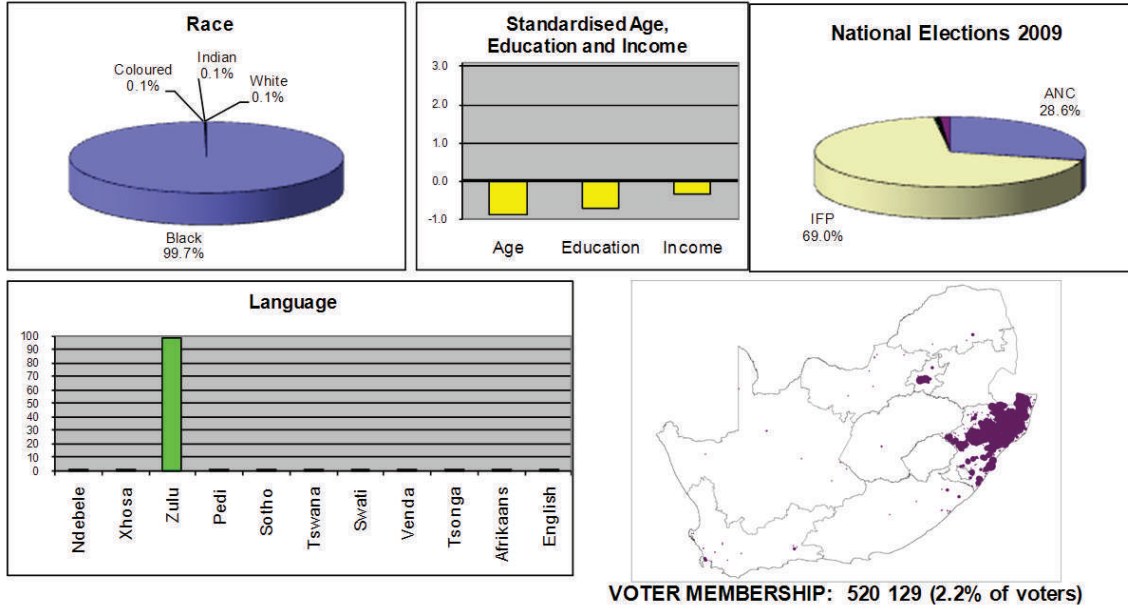
**Figure 2:** 4th cluster (in size of the electorate) dominated by the white population. The turnout in 2011 was 64.2 percent, which is 7.8 percent above the average of 56.5 percent.

Finally Fig.4 shows a cluster which is representative of the colored population in the Western Cape. This province is the only province where the DA has successfully challenged the ANC, and the 2006 demise of the NP and the more recent demise of the ID (Independent party) has contributed to the increased support for the DA. This cluster was characterized in 2004 by a considerable DA following of 34.8 percent, which in 2011 has increased to 64.6 percent, partly by absorbing the NP support of 12 percent in 2004 and by absorbing the ID following, which was 16 percent in 2004. The latter party had increased to 20 percent in 2006 (within this part of the electorate), but suffered a considerable loss in 2009 (reduced to 5.8 percent). The party has now combined with the DA.

### 3 Trend matrices in elections

A trend matrix relates the election results of an “old” and a “new” election by counting how voters for a particular old party voted in the new election. If there are  $P_{old}$  parties in

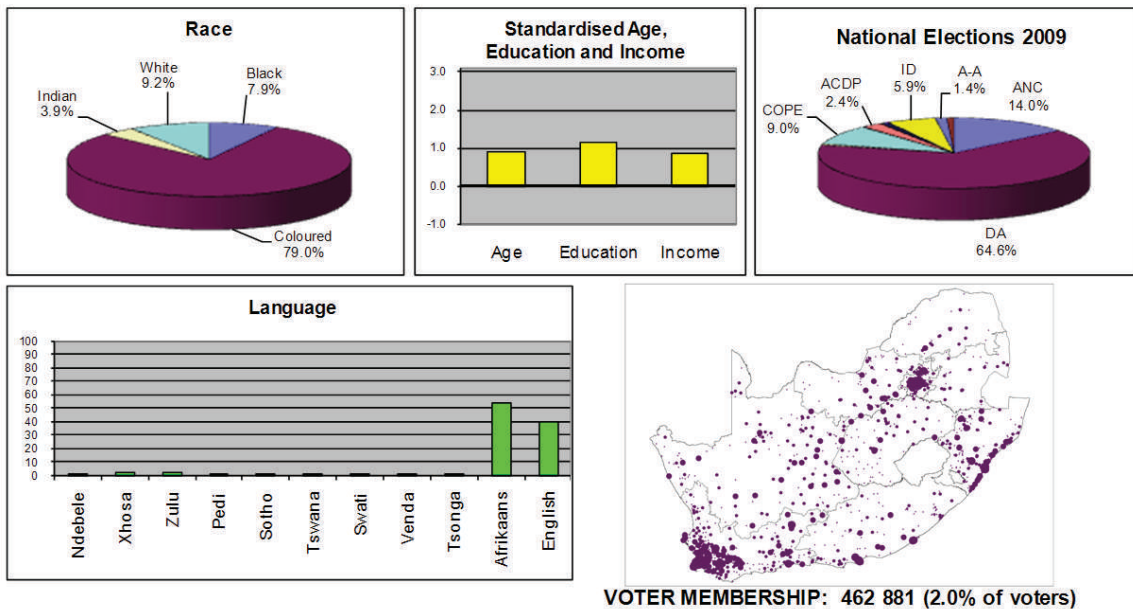
**Zulu(98.1%), younger age group, very low income group, male(45.8%), IFP(69.0%), ANC(28.6%), Turnout in 2009 (76.0%)**



**Figure 3:** 10th cluster (in size of the electorate), dominated by the IFP. The turnout in 2011 was 62.6 percent, which is 6.1 percent above the national average of 56.5 percent.

the old election and  $P_{new}$  parties in the new election then a matrix with  $P_{new} \times P_{old}$  elements is necessary to characterize this behavior. To calculate such a matrix exactly, one needs all individual election results of the two elections. Clearly this information is not available, and one has to derive an approximate trend matrix from the information available on the finest level (i.e. voting districts). One possibility is to replace individual results by the average voting district results. However, this eliminates important correlations between old and new results within the individual voting districts. Instead one can derive a correlation matrix by minimizing an objective function which relates the old and new election results via a correlation matrix [1]. This leads to a “trend” matrix that has many negative elements, and therefore is also not acceptable. Formal mathematical methods, such as the Kuhn-Tucker approach, can be used to eliminate these negative elements. However, this results in a large proportion of zero matrix elements, which are implausible and are not supported by studies using questionnaires of individual voters [1]. In Ref. [1] a heuristic “positivization” method is introduced which yields more acceptable results and can be implemented fairly easily. However, it is still a heuristic, whose validity is hard to verify. In this paper we use a new simulation method to mimic each individual voter, subject to the knowledge of the individual voting district results and guided by a global trend matrix (which could initially be one of the options discussed above). After constructing a new global trend matrix from the simulated results, one can redo the simulation with the new global matrix, until convergence is reached. Since the matrix constructed in this way is insensitive to the choice for the initial global matrix, its results look superior to the heuristic and formal methods. Hence, we will present results using this method, leaving a detailed discussion of this method to a future publication.

Coloured(79.0%), Afrikaans(53.9%), high age group, middle income group, male(47.9%), DA(64.6%), ANC(14%), COPE(9%), Turnout in 2009 (75.6%)



**Figure 4:** 15th cluster (in size of the electorate) dominated by the DA and a 9 percent COPE vote in the 2009 elections. The turnout in 2011 was 62.6 percent, which is 6.1 percent above the national average of 56.5 percent.

Since the trend matrix only captures the electorate common to both elections it ignores new voters entering the system and old voters leaving the system. This component is captured by the difference between the (common) trend results and the actual result in the columns (new results) and rows (old results) in the tables shown in the next section. We explain the first trend matrix shown in detail so that the reader gets further insight in the usefulness of this new tool in election analysis.

#### 4 Trend results for the four sectors of the electorate

To explain the use of the trend matrix, the trend matrix for cluster 1 is displayed in Table 1. The nature of this segment of the electorate was already explained through Fig.1.

**Table 1:** Relative trend matrix for cluster 1, which covers 33% of the electorate. Diagonal entries are highlighted.

Cluster 1	33.0%	2009	ANC	Cope	DA	UDM	ACDP	PAC	IFP
		5824275	88.2	7.5	1.2	0.5	0.4	0.4	0.3
2011	4265231	4113653	88.2	7.6	1.2	0.5	0.4	0.4	0.3
ANC	88.2	88.4	91.8	68.1	19.1	68.7	48.1	72.6	54.0
DA	4.5	4.5	2.7	13.1	71.9	2.2	34.7	2.9	2.8
COPE	2.9	2.9	1.8	15.4	2.2	4.7	2.3	2.6	0.2
PAC	0.6	0.6	0.6	0.6	0.3	0.4	0.3	18.7	0.1
APC	0.6	0.6	0.6	0.4	0.3	0.4	0.5	0.6	0.1
ACDP	0.4	0.4	0.3	0.4	1.8	0.1	11.2	0.2	0.2
UDM	0.3	0.3	0.2	0.5	0.1	21.2	0.2	0.4	0.0
NFP	0.3	0.3	0.3	0.0	0.1	0.1	0.2	0.0	18.7

On the top row are the main parties for cluster 1 in 2009, while on the leftmost column are the main parties in 2011. The cluster results for these parties are shown below/next to the party names in the respective years. These numbers add up to nearly 100 percent, the defect being due to smaller parties which have not been shown. The trend matrix is shown in the marked box. The number 91.8 on the top left means that of the ANC voters in 2009, 91.8 percent voted again for the ANC in 2011 (the party shown in the relevant row), while 2.7 percent of those voters voted for the DA in 2011. Of the 2009 COPE voters 15.4 percent voted again for COPE. By multiplying the old (2009) election results in Table 1 by the percentages in one row corresponding to a specific new party, and adding them up over all columns, one obtains the 2011 trend result shown in one of the left-hand columns. This result is different from the full (actual) election result, as the trend result is based on voters common to the old and new election. The difference between actual and trend results which is due to added or removed voters is virtually negligible in the current case. However, in forthcoming cases considerable shifts due to added or removed voters can be observed. In addition to trend matrices between 2009 and 2011 (such as shown in Table 1), trend matrices between 2006 and 2011 and between 2004 and 2009 will be used. Although results are quoted from the relevant trend matrices in the following sections, only one further trend matrix is shown for space limitations.



#### **4.1 Cluster 1 dominated by the ANC**

The loyalty of the ANC electorate for cluster 1 is very high ( $\approx 92$  percent) whether we consider the transition from 2006 or 2009 to 2011. Compared to 2006 the remainder went in equal numbers to COPE (a breakaway from the ANC prior to the 2009 election) and the DA (namely 2.6 percent). However, compared to 2009 only 1.8 percent of the 2009 ANC voters voted for COPE, while 68 percent of the 2009 COPE voters went back to the ANC in 2011, so that COPE was reduced from 7.5 percent to 2.9 percent. For the whole country the defection of COPE voters back to the ANC was less, namely 55 percent. Despite this return of COPE voters, the ANC did not register a net percentage gain for cluster 1, as this increase cancelled by ANC voters that went to the DA (2.7 percent). Overall, the behavior of the electorate in this cluster shows that the loyalty of the black population in black areas remains high and that the defection to the DA is not (yet) significant. Despite many service protests against the sitting ANC dominated councils, which would relate to this cluster, the loyalty of ANC voters has not suffered. Also the percentage of spoilt votes (a possible vehicle for voicing protest) in this cluster (1.15 percent) is not significantly higher than the national average (0.99 percent). However, the turnout (54.8 percent) is 3 percent lower in relative terms than the national average of 56.5 percent, so this may indicate a protest vote. For the second cluster, which is also dominated by the ANC (84.3 percent), the turnout is even down to 52.6 percent, which is 7 percent lower than the norm. An in depth discussion of the effect of turnout in the 2009 election is given in [4].

#### **4.2 Cluster 4 dominated by the DA**

This cluster is dominated by the white population (73 percent) and its characteristics were displayed in Fig.2. It will be analyzed together with the 5th cluster (not shown), which is also dominated by the white population (83 percent) and features similar behavior. The main difference between these two clusters is that the 2009 ANC vote in cluster 5 is less (8 percent) than that in cluster 4 (17 percent). The turnout in 2009 for cluster 4 (5) was 82 (83) percent, while the 2011 municipal elections featured turnouts of 64 (69) percent. While the municipal turnout in 2011 is considerably less than the 2009 turnout, these turnouts for cluster 4 and 5 are still substantially larger than the average over the whole electorate (56 percent). In fact, the reduction between national and municipal election turnout is considerably less for clusters 4 and 5 than for the main cluster 1, confirming the tendency that the ANC electorate voters abstain more easily in the municipal election(s). In Table 2 the relative trend matrix is shown for this cluster between 2009 and 2011. Showing this comparison is more insightful than the transition from 2006 and 2001, as many developments took place after 2006 (in particular the creation of COPE).

Within this cluster 37 percent of the ANC voters crossed over to the DA, while 65 percent of the COPE voters crossed over to the DA. In addition to this clear trend the DA profited from added new voters and leaving old voters by adding 1 percent in total. This increase seems to go fully at the expense of the ANC. Cluster 5 shows a similar picture as cluster 4, with the ANC even less loyal (50 percent instead of 57 percent in the upper case). Clearly, there is a reluctance of COPE voters in DA dominated areas to vote for the ANC (only 29 percent of its original support voted for the ANC). In ANC dominated areas (e.g. cluster 1) the situation is exactly opposite. For that cluster 68 percent of COPE voters went back to the ANC, while

**Table 2:** Relative trend matrix for cluster 4, which covers 5.3% of the electorate Diagonal entries are highlighted.

Cluster 4	5.3%	2009	DA	ANC	Cope	VF+	ACDP	ID	IFP
		941823	66.5	17.5	7.4	4.3	1.9	0.8	0.6
2011	758560	724457	67.2	16.9	7.4	4.2	1.9	0.8	0.6
DA	82.3	82.0	97.0	37.5	64.6	70.2	77.1	82.7	28.8
ANC	12.9	13.3	1.2	57.0	28.6	1.5	10.3	8.2	18.6
VF+	1.9	1.8	0.6	1.0	0.4	27.8	0.5	0.1	0.2
ACDP	0.8	0.8	0.5	1.1	0.6	0.1	10.7	1.1	0.7
COPE	0.5	0.5	0.1	0.7	4.5	0.2	0.3	1.7	0.0
IFP	0.3	0.3	0.1	0.5	0.0	0.0	0.1	0.0	31.7

only 13 percent made the transition to the DA. Further insights in the voting behavior can be obtained from studying the matrix in Table 2 in detail.

### 4.3 Cluster 10 dominated by the IFP

This cluster was dominated by the IFP in 2004, but has since undergone some significant changes. In 2004 and 2006 the IFP support was 87.4 percent and very stable. The only competing party was the ANC with 8.2 percent in 2004 and 9.4 percent in 2006. Then in 2009 the IFP lost considerable support and was reduced to 68.7 percent, nearly the whole loss due to the ANC which increased to 28.9 percent. For this cluster the election in 2011 was also dramatic as the NFP split off from the IFP. As a result the IFP lost further support (reducing to 49 percent) while the NFP scored 24 percent, attaining half the strength of the IFP. The increase of the ANC came to a stop in this sector as they only scored 25 percent in 2011. Other parties hardly feature in this sector. In particular, the DA has not managed to obtain any significant amount of the disgruntled IFP voters, although it has doubled in size from 0.4 percent to 0.9 percent in 2011.

### 4.4 Cluster 15 dominated by the colored voters in the Western Cape

In subsequent election years 2004, 2006, 2009 and 2011 the DA support in this cluster has steadily increased from 33.5, 46.3, 64.5 to 77.8 percent in 2011. The increase from the 2004 to the 2009 national elections was mainly due to the demise of the NNP (76 percent of the NNP votes went to the DA), and the reduced support for the ID, which decreased from 16.0 to 5.8 percent in this period. The trend matrix between 2009 and 2011 shows that the support for smaller parties like the ACDP and the VF+ also has diminished, again benefitting the DA in the Western Cape. At the same time the support for the ANC has eroded over the years, going from 26.9 percent in 2004 to 22.1 percent in 2006, 14.1 percent in 2009, and 13.5 percent in 2011.



## 5 Conclusions and summary

The new tool of trend matrices gives detailed insight in the movement of voters between parties. This is illustrated by comparing the 4 last elections in South Africa. The turnout in the municipal elections is on average only 74 percent of that of the national elections, although this reduction is more prominent for ANC dominated clusters (72 percent for cluster 1) than for DA dominated clusters (83 percent for cluster 5). Since the provision of services plays an important role in municipal elections one could interpret the refusal to vote as a protest tool of the electorate in ANC dominated regions. Nonetheless the loyalty of ANC voters in these regions is still very high (92 percent in cluster 1 between 2009 and 2011). However, in this same cluster the small DA support has increased threefold, from 1.2 percent in 2009 to 4.5 percent in 2011, so that the traditional voting patterns along racial lines may show some cracks.

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