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IDENTIFYING FRAUD IN DEMOCRATIC ELECTIONS: A CASE STUDY OF THE 2004 PRESIDENTIAL ELECTIONS IN MOZAMBIQUE

Joe Hanlon
Open University
Sean Fox
Crisis States Research Centre

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Identifying Fraud in Democratic Elections: A Case Study of the 2004 Presidential Election in Mozambique

Joe Hanlon
Open University

Sean Fox[1]
Crisis States Research Centre

Abstract:
The 2004 Presidential Election in Mozambique was marred by allegations of fraud. We assess the validity of these allegations by testing whether or not qualitative descriptions of the methods and locations of misconduct are consistent with a series of simple quantitative tests. Most studies of electoral misconduct are based on ecological regression analysis or on comparing a different data set with the electoral data in question – past elections, exit polls, etc. In the case of Mozambique this is impossible due to data restrictions. Instead we use qualitative evidence to inform a quantitative identification strategy. The concordance between specific complaints and the statistical evidence suggests that ballot box stuffing, improper ballot nullification, and (intentional) organisational failure took place. While the overall election result was unaffected by the fraud, our analysis demonstrates a method of assessing allegations of misconduct and points to areas of concern for those managing or observing future elections in Mozambique and elsewhere.

Introduction

Mozambique's 2004 presidential elections were heavily criticised by international observers and the independent press and were challenged by Renamo,[2] the main opposition party. At the time of the election, evidence was published of ballot box stuffing, attempts to prevent opposition voters from casting their ballots, and invalidating opposition ballot papers during

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[1] Joseph Hanlon is a senior lecturer in development and conflict resolution at the Open University, Milton Keynes, England. He is the editor of the *Mozambique Political Process Bulletin*. j.hanlon@open.ac.uk. Sean Fox is a PhD Student Fellow at the Crisis States Research Centre at the London School of Economics. We would like to thank James Putzel, Jean-Paul Faguet, Jouni Kuha, Francisco Gutierrez, Jason Sumich and João Honwana for useful comments and guidance.

[2] Both main parties are now officially known by their acronyms. The ruling party Frelimo was *Frente de Libertação de Moçambique*, Mozambique Liberation Front. The main opposition party Renamo was first *Movimento Nacional de Resistência de Moçambique* (National Resistance Movement of Mozambique, MNR) and later *Resistência Nacional Moçambicana* (Mozambican National Resistance).

the counting process. Because of the size of the landslide victory by the ruling party, Frelimo, it was not suggested that misconduct and maladministration changed the outcome. The Renamo complaint was therefore rejected by the Constitutional Council (CC, Conselho Constitucional), and observer criticisms (MOE-EU 2004; Carter Center 2004) were not followed up by the international community. The CC is the supreme constitutional court but it also validates elections and is the final court of appeal for election complaints.

In its ruling accepting the election, the CC was nonetheless highly critical of the National Elections Commission (CNE, *Comissão Nacional de Eleições*), which it said violated the law in various ways. As international observers had also done, the CC condemned the CNE's secrecy and was especially critical of the CNE's failure to investigate and prosecute apparent violations of the electoral law. This creates the image that election law violations go unpunished. "If violations of the election law remain unpunished, they will multiply and threaten the entire fundamental principals of our state. This is a real threat", the Council said. (CC 2005).

The CNE rejected the Council's criticisms and took no action. Its spokesman said that if the Council had wanted actions, it would have rejected the election results submitted by the CNE; since it did not, nothing need be done (MPPB 32, p7, 2005). Frelimo has never formally responded to the CC declaration, nor to allegations of fraud.

The publication in August 2006 of detailed data on the elections allows a close scrutiny of the results (STAE 2006). The purpose of this paper is to examine whether the data allows us to confirm or refute allegations of fraud and misconduct. Most other studies of electoral misconduct employ ecological regression analysis, or rely on comparing a different data set with the electoral data in question – past elections, exit polls, etc. In the case of Mozambique this is impossible; similar data was not published for the previous election in 1999, there are no exit polls, and there are no reliable opinion polls. This paper is unusual, therefore, in taking advantage of qualitative information concerning the alleged methods and locations of misconduct to create a quantitative identification strategy. As we note below, it is sometimes possible to identify quite blatant irregularities without statistical inference. Here, however, we use simple statistical techniques in an attempt to identify the existence and extent of less obvious fraud and misconduct.

The electoral process and the election

Since the adoption of a new constitution in 1990 establishing a multiparty system and the end of the war of destabilisation in 1992, there have been five multiparty elections in Mozambique – for national parliament and president in 1994, 1999 and 2004, and for mayors and municipal assemblies in 1998 and 2003.

In 2004 Mozambique had a population of 19 million, of whom 9.1 million were of voting age – 18 years old or older. The country is divided into 11 provinces. The president is elected by a majority vote in nation-wide direct elections. Parliament is elected on a party list system, with

a separate list for each province. In 2004, for the first time, Mozambicans outside the country were allowed to vote.

There have been slightly different laws for each of the five elections but the system has remained largely constant. There is an electoral commission (CNE) dominated by nominees of the political parties and a Technical Secretariat for Electoral Administration (STAE, Secretariado Técnico de Administração Eleitoral), which is largely professional but with some party appointees. This structure is replicated at provincial level and, below that, at district level. The Frelimo party has been in power since independence in 1975 and has won all five elections; the "partyisation" of the electoral structures has been promoted by the opposition, Renamo, but Frelimo's electoral victories mean that it necessarily dominates.

Voters are required to register and receive an electoral card with their photograph and there was a new registration for the 1999 election, with updates in 2003 and 2004. Each register book is hand-written and has space for up to one thousand names. There is a separate polling station corresponding to each register book and voters can only cast their ballot at the polling station where they are registered. Under normal circumstances, the polling station is in the same place where the registration took place and wherever possible this is in a school. Thus, in a typical school, each classroom will contain a polling station with its own register book. Each group of polling stations (such as a school) is known as a polling centre.

Each polling station operates autonomously and has a staff of five people, known as the *mesa* (table). Each party can nominate two delegates (poll watchers) who may remain in the polling station at all times. In 2004, polling took place over two days and on the night between the two polling days, ballot boxes were sealed with numbered ties and locked in a secure place if possible (such as the school store room). Members of the *mesa* and party delegates slept with the ballot boxes over night. As soon as voting closed at 6 pm on the second day, each polling station began its own count. The law and regulations specify quite precisely how this is to be done and the full count normally takes 6-10 hours. When the count is completed, a results sheet (*edital*) is completed and copies are given to party delegates. A copy is immediately posted on the polling station door, making the result public immediately. Copies of the results sheets are sent to the provincial and national election commissions. The Provincial Election Commission then compiles and announces results.

Voters can put either an 'X' or a fingerprint on the ballot paper next to the name, picture and party symbol. A vote is considered valid if the intention of the voter is clear and invalid if there are marks indicating more than one candidate. All invalid ballot papers (as well as any that are challenged by the party delegates) are sent to the capital to be reconsidered by the CNE. This is a massive job. In 2004 there were 130,997 presidential ballot papers ruled invalid by polling stations and sent to the CNE, which then accepted 33% of them as valid, and 158,770 invalid parliamentary ballots of which the CNE judged 31% to be valid.

The CNE compiled results from the individual *editais* (polling station results sheets), then added in the re-qualified votes and announced the final national result. The immediate posting of the results allows parallel counts and thus in 2004 there were two parallel counts. One was

done by the national Radio Moçambique, whose reporters went to polling centres all over the country and simply read out the results posted on the polling station doors. By mid-day of the day after the election, the extent of the Frelimo landslide was obvious. The second count was a sample count of every 17th polling station done by a coalition of national non-government organisations known as the Electoral Observatory. Its forecast was very close to the final results. A third check was provided because the National Election Commission set up computer terminals for press and observers and they could access the data base of *editais* (results sheets) as data was entered. This led quickly to articles being distributed by the national news agency, AIM, and to a daily electronic edition of the MPPB highlighting suspiciously high and low turnouts.

Table 1 gives the results of the presidential elections in all three elections. In the first two, Joaquim Chissano was the Frelimo candidate and in the third it was Armando Guebuza. Afonso Dhlakama was the candidate for Renamo in all three elections. There were independent candidates in the 1994 and 2004 elections, but not in 1999. Note that the 1999 election was very close. The collapse of the vote for Dhlakama in 2004 was largely unexpected and has been subject to much analysis (MPPB 2004; Sitoe 2006).

Table 1. Votes (in millions)

Election Year	Chissano/ Guebuza	Dhlakama	Others	Total
1992	2.6	1.7	0.6	4.9
1999	2.3	2.1		4.5
2004	2.0	1.0	0.1	3.1

Problems

The election was dogged by problems caused by poor conditions, sloppy administration, excessive secrecy, and apparent sabotage. In the first group are problems caused by Mozambique being one of the poorest countries in the world. Mozambique still does not have universal primary education, so there are more polling stations than classrooms. Many are in temporary structures constructed for the purpose and many are in areas with very difficult access. Most classrooms and temporary polling stations do not have electricity. This means that the count is done at night, by lamplight, by a *mesa* whose members are very tired after little sleep the previous night. This in turn leads to many errors on the results sheets.

International and national observers repeatedly criticised STAE and CNE for their very high level of secrecy. For example, a full list of polling stations was never published nor was there a list linking register books to polling stations. In confirming the election results, the Constitutional Council said that 699 presidential *editais* (results sheets) were not included, for such reasons as "*editais* not processed because of irresolvable technical errors, *editais* stolen, and those covered in indelible ink" (CC 2004). This represented 5.4% of polling stations but

Mozambique's electoral law has no provision for recounts. The technical errors are typical of tired staff in the small hours of the morning making mistakes in counting or writing up the results sheets. Stealing *editais* and pouring ink on them was clearly a form of sabotage. The law allowed the CNE to refer to copies of *editais* given to party delegates but this was not done. All decisions on the exclusion of *editais* were taken in secret and never explained; no spoiled *editais* were even shown to press or observers. Former US President Jimmy Carter, in a personal statement at a press conference to announce preliminary results of the Carter Center's observation, said that the exclusion of so many polling stations was "extraordinary. It is simply hard to believe that so many results sheets could not be used" (MPPB 31, p2, 2004). Carter also criticised the secrecy of the Mozambican process and the exclusion of observers from key parts of the counting.

In fact, as Table 2 shows, the published results exclude 881 polling stations, or 6.9% of the total. No explanation was ever given for the difference in the numbers; no list of excluded polling stations has even been published; and no reasons have been given for the exclusion of polling stations.

Table 2. Polling stations not included in the final result

Province	**Polling Stations**	**Editais not counted**	**% Not counted**
Cabo Delgado	1391	326	23%
Niassa	725	82	11%
Gaza	993	108	11%
Zambézia	2370	207	9%
Africa	62	4	6%
Maputo Prov.	752	32	4%
Tete	919	38	4%
Sofala	1039	25	2%
Nampula	2282	48	2%
Maputo City	762	5	1%
Manica	723	4	1%
Inhambane	786	2	0%
Europe	3	0	0%
TOTAL	**12,807**	**881**	**7%**

Register books and turnout

There were also serious problems with the electoral registers. Most had been computerised, but there were many mistakes – names left out, misspelled names, and incorrect voter numbers. Moreover, it was never clear how many people were on the electoral role. There were more than 10 million names on the books (and turnouts are based on the number of names in the register books) but STAE estimated that there were only 9.1 million new registrations. Since this is also the estimated number of voting age adults, it is clearly too high. Taking into account deaths and other corrections, the *Mozambique Political Process Bulletin* (MPPB), edited by one of the authors of this paper (JH), estimated the real number of live, registered voters at 7.6 million (MPPB 31, p 14, 2004).

Turnout – the percentage of people on the register who actually vote – is a key issue in this paper. Register book numbers include the year of registration and on average it was predicted that more than 10% of the voters in 1999 register books would have died by the time of the 2004 elections, whilst many others would have moved away. By contrast, the turnout for the 2003 and 2004 registers would be much higher because not only would fewer people have died and moved, but those books contained many people who had become 18 years old and were voting for the first time, and thus were more likely to vote. This turned out to be the case. Nationally, the turnout (as a percentage of the 10 million) was 33%, but for voters in the 1999 books it was only 28%, while for those in 2003 and 2004 books it was 47% - significantly higher.

Allegations of fraud

Allegations of fraud and misconduct came from opposition parties, most notably Renamo, and from observers and the media (mainly AIM and MPPB, which both followed the election closely and transmitted daily reports). An overriding complaint by Renamo was that its delegates had been barred from some polling stations, either by force or by being denied credentials, and this prevented them making detailed complaints about some of the worse violations (GCE 2004).

Renamo, the MPPB, and observers, all identified three kinds of misconduct and these will be tested in this paper.

- ***Ballot Box Stuffing***. Either putting extra ballot papers in the box or simply writing higher numbers on the results sheets. Renamo claimed this was particularly serious in Tete, Gaza and Niassa, usually where delegates had been excluded by polling stations and thus no one was able to watch the counting. Media and observers noted an unusual number of polling stations, particularly in Tete, with suspiciously high turnouts and with nearly everyone voting for Guebuza and Frelimo. Since turnout from the 1999 register books was much lower and more than 10% of the voters in the 1999 register books would have died by the time of the 2004

elections, any result sheet from a 1999 book with a turnout of over 90% is immediately suspect. In this study, we will look for abnormally high turnout rates.

- ***Improper Spoiling of Ballot Papers***. Renamo alleged that many votes for Dhlakama were simply not counted at the polling stations by Frelimo-aligned members of polling station staff. (GCE 2004; GPE 2004). Most commonly, in the poor light late at night during the count, Dhlakama votes were simply called invalid (*nulo*) when they were not, or valid votes were put into piles or sacks of invalid votes. More dramatically, it was alleged that polling station staff put ink fingerprints on votes for Dhlakama, so that the ballots had multiple marks and became invalid (*nulo*). During the reconsideration of *nulos* by the CNE, one of the authors of this paper (JH) did indeed see a stack of ballot papers that had apparently been invalidated with a fingerprint in the same position on each ballot paper. In Angoche, Renamo actually caught a *mesa* president in the act and filed a formal complaint (*ibid*) but no action was taken. As Table 3 shows, 33% of all *nulos* were accepted by the CNE and as table 4 shows, a disproportionate share of these were votes for Dhlakama. Indeed, Dhlakama obtained 15,129 re-qualified votes more than he would have received if the ratio had been the same as for votes in general. This is at least consistent with the Renamo allegation that thousands of valid votes for Dhlakama were put into the wrong piles and treated as invalid during the counting at polling stations. In this study, we look for abnormally high rates of *nulos*.

- **(Intentional) Organisational Failure Meaning Some Voters Unable to Vote**. The election took place at the start of the rainy season, which made access to some polling stations very difficult; many opened late (sometimes only on the second day) because of late arrival of materials, and the CNE reported that 37 polling stations never opened. However, Renamo claimed that many polling stations only opened very late on the second day. Renamo also cited register books that were sent to the wrong polling stations and complained that some polling stations were moved without voters being informed so that many voters were unable to vote (*ibid*). Members of the *mesa*, the police, and journalists are the only people allowed to vote where they are not registered and thus in any polling station where six or less people voted, it seems likely that only staff voted. AIM and the MPPB identified some polling stations with a turnout of 6 or less. An important question is: "Did voters in Renamo-supporting areas have more trouble voting that those in Frelimo areas?" In this study, we look for abnormally low turnout rates.

Table 3. Nulos and re-qualified votes, by province

Province	Votes in ballot box	*Nulos* at polling station level	% *nulos*	*Nulos* re-qualified by the CNE	% of *nulos* re-qualified
Cidade Maputo	261,706	4,854	1.9%	1,152	23.7%
Cabo Delgado	302,974	11,804	3.9%	6,356	53.8%
Gaza	330,639	8,604	2.6%	1,925	22.4%
Inhambane	182,025	7,037	3.9%	1,838	26.1%
Manica	206,455	7,543	3.7%	2,298	30.5%
Maputo	216,171	6,272	2.9%	1,328	21.2%

Nampula	493,333	23,699	4.8%	8,405	35.5%
Niassa	149,649	6,889	4.6%	2,290	33.2%
Sofala	308,960	11,542	3.7%	3,896	33.8%
Tete	371,667	19,034	5.1%	3,727	19.6%
Zambézia	477,718	23,293	4.9%	9,368	40.2%
África	27,138	417	1.5%	99	23.7%
Europa	732	9	1.2%	0	0.0%
TOTALS	**3,329,167**	**130,997**	**3.9%**	**42,682**	**32.6%**

Table 4. Re-qualified *nulos*, 2004, by candidate

	Guebuza	Dhlakama	G/D
Votes given in polling stations	1,990,612	976,256	
Ratio G/D			2.04
Re-qualified by CNE	13,614	21,803	
Ration G/D of re-qualified			0.62

The quantitative data

In August 2006, STAE published detailed results of the 2004 election on a CD-rom in both PDF and Excel formats (STAE 2004). For the presidential election, data is included for 11,926 out of 12,807 polling stations. For each polling station, the following information is given: province, district, administrative post, locality, polling centre, register book number (which includes the registration year: 1999, 2003 or 2004), number of registered voters, votes for each of the five candidates, total valid votes (sum of the previous five), blank votes, invalid votes (*nulos*), and votes in the ballot box (which should be the sum of valid, blank and invalid votes). The data is organised by district and we merged the data into a single national Excel table.

One district was included twice and this was removed. In addition, we did not consider the polling stations outside Mozambique. We also excluded 8 polling stations where the turnout percentage was above 120%. The exclusion of these outliers is based on the assumption that these figures (as high as 350%) are the consequence of an initial coding error. This could bias our results toward underestimating the degree of fraud. This leaves us with 11,857 polling stations.

From this we have further calculated the percentage of votes for each of the two major candidates (number of votes cast for each candidate divided by the number of valid votes); the turnout rate (the total number of votes cast divided by the number of registered voters at each polling station); and the percentage invalid votes for each polling station (the number of *nulos* divided by the total number of votes cast). The three minor candidates combined received approximately 5% of the vote, so we exclude them from the analysis.

Reviewing the data (i.e. non-statistical tests)

A cursory review of the electoral data reveals some dramatic irregularities and several cases of suspicious inconsistencies. For example, a possible case of ballot box stuffing comes from primary school EP1 Chicualacuala B in Gaza. The school had two polling stations side by side and had the 1999 registers. About 10% of people on a 1999 register are expected to have died and many others will have moved away. Yet one of the two polling stations had a remarkable 99% turnout with no votes for anyone except Guebuza, while the other had a 57% turnout and included a handful of votes for Dhlakama. This raises suspicions of ballot box stuffing in the first polling station. In all, there were 140 polling stations with turnouts over 95% and a further 54 polling stations with 1999 register books and a turnout of between 85% and 95%. Of the 194, 114 were in Tete. The most serious problems appear to have been in the districts of Changara, Tsangano, Mogoe and Chifunde in Tete, and Chicualacuala and Bilene in Gaza – nearly all places where Renamo complained of delegates being excluded.

Similarly, a likely example of improperly counting votes as invalid can be seen by comparing neighbouring polling stations in Nauela in Alto Molócuè, Zambézia. Two neighbouring polling stations, 02D988-99 and 02D989-99, both had 1,000 registered voters and an almost identical turnout (42% and 41%). Both had 63 votes for Guebuza. But the first had 135 votes for Dhlakama and 212 spoiled ballot papers, while the neighbouring station had 318 votes for Dhlakama and 11 spoiled ballot papers. It looks suspiciously like votes for Dhlakama were invalidated in the first of these two polling stations. Throughout the country there were 93 polling stations with *nulos* over 25% and a further 160 polling stations with *nulos* between 15% and 25%.

Renamo made a number of complaints about polling stations opening very late, register books being sent to the wrong polling station and sometimes never transferred to the right one, and of polling stations that had been moved so people did not know where to vote. Observers also noted these problems. Officially, only 37 polling stations failed to open, but the results show another 69 polling stations where 6 or fewer people voted. The law specifies that only people on the electoral register may vote, plus members of the *mesa* (polling station staff, 5 members), police, and journalists. Thus when only six people vote, we can assume that only people not on the register voted, and therefore there was no register or the wrong register. We find another 176 polling stations where the turnout was 7-25 (inclusive), which suggests that most voters were unable to cast their ballots. In all, 241 polling stations had turnouts of less than 4%, and a further 396 polling stations had turn-outs of more than 4% but less than 8%. These very low turnout rates may be a consequence of administrative failures, such as those described above. While these observations are provocative, they do not prove that misconduct was widespread. To assess the scale of misconduct we now turn to a more systematic statistical analysis.

Statistical analysis

Our statistical analysis attempts to determine the extent to which observed turnout and ballot nullification rates deviate from expected rates and if deviations exist, whether they are biased in favour on one of the parties. The first challenge in designing an identification strategy for our statistical tests is establishing what “expected” turnout rates and ballot nullification rates

are in Mozambique, so that we can compare actual rates in areas where allegations of misconduct were made with the expected rates. In the absence of a comparison set of data (such as data from a previous election or exit polling data), or data which could be used for an ecological regression analysis (see Powell [1989] and Baum [1991]), we divide the sample into a control group and a series of "treatment" groups based on the volume of official complaints filed and allegations published in the press at the district and provincial levels – a strategy similar to that used by Oberst and Weilages (1990) in their study of the 1982 referendum in Sri Lanka.

The provinces with the largest volume of official complaints were Nampula, Niassa, Tete and Zambezia (GCE 2004). There were also a sizable number of complaints made in Cabo Delgado, Gaza and Manica (*ibid*). Cabo Delgado, as we noted, had nearly a quarter of polling stations excluded in the count. On the other hand, very few allegations of fraud were made in Inhambane, and no complaints were registered in Maputo Province, Maputo City and Sofala. We therefore use the 3,272 polling stations in Inhambane, Maputo Province, Maputo City and Sofala as our control group. However, if electoral misconduct occurred, it is possible that it affected all provinces and hence our control group may be tainted. If so, our identification strategy would tend to underestimate the degree of fraud.

For the treatment groups, we focus first on the five provinces where the highest number of official complaints were filed and published allegations made, and second on particular districts within three of these provinces where specific formal complaints were made. These are meant to be representative and certainly do not reflect the extent of the allegations or formally filed complaints. However, we feel that robust evidence from a subset of cases should suffice to either confirm or cast doubt on general allegations of fraud.

The treatment provinces include Gaza, Nampula, Niassa, Tete and Zambezia. In Nampula, Niassa and Zambezia multiple complaints were filed concerning improper ballot nullification and organisational failure, allegedly leading to very low turnout, while in Tete the primary allegations revolved around ballot box stuffing; there were also allegations of ballot box stuffing in some districts of Niassa and Gaza.

Subsequently, we look at five districts – Angoche and Murrupula (in Nampula), Changara and Tsangano (in Tete), and Milange (in Zambezia). In Angoche, allegations were made of improper invalidation of ballot papers. In Murrupula and Milange, there were reports of many polling stations failing to open and in the two districts in Tete, the claim was of ballot box stuffing.

Table 5 shows the presidential election results for these five districts in 1999 and in 2004. In 1999, four of the districts were pro-Renamo areas, while Frelimo won the fifth, Changara. The changes in 2004 are worth noting. In Angoche, only Dhlakama's vote fell (in keeping with the national pattern, it was halved). In Murrupula the vote for both sides fell, but the balance shifted to Frelimo. In Milange, the vote was only one-third of the 1999 levels, but remained predominantly Renamo. In Changara and Tsangano, Tete, the turnout increased substantially (against the national trend). In Changara the vote for Dhlakama was only 10% of

what it had been in 1999, while in Tsangano the vote for Frelimo increased 6-fold while the vote for Dhlakama decreased significantly.

Table 5. Votes in the five districts to be tested

	1999			2004		
	Chissano	Dhaklama	C/D	Guebuza	Dhaklama	G/D
Angoche	27,707	43,429	0.64	28,239	21,212	1.33
Murrupula	10,151	14,337	0.71	6,919	5,898	1.17
Milange	11,966	86,886	0.14	7,181	29,471	0.24
Changara	25,878	9,065	2.85	55,480	940	59.02
Tsangano	5,343	19,095	0.28	33,928	5,892	5.76

Comparison of turnout rates

We begin by comparing the mean turnout rates in our control group and treatment areas. Table 6 presents summary statistics for turnout rates at the provincial level and for our control group. Figure 1 presents a frequency histogram of turnout for our control group; Figure 2 presents histograms of turnout distribution by province. A cursory inspection of these tables and diagrams raises suspicions in particular areas. In Table 1 (and Figure 1), we see that the lowest turnout rates in the country occurred in Nampula, with 26.62% turnout, and Zambezia, with 27.17% turnout. Tete is the highest with 52.60% turnout. These numbers appear to be significant deviations from the norm (represented at the bottom of the tables as "Control Group"), and correspond with the allegations made and complaints filed in these provinces. But are these statistically significant deviations?

Table 7 presents the results of our comparison of means tests.[3] Our null hypothesis is that average voter turnout in each of the non-control provinces is the same as that of the control group. We present results for both treatment and non-treatment provinces in order to ascertain whether or not the treatment provinces (where the most complaints were filed and allegations made) are any further from the mean of our control group than the other provinces. We take a strict 99% significance level for rejecting the null hypothesis in order to err on the side of underestimating the degree of fraud.

Table 6. Turnout Rate by Province

Province	N	Mean	Std. Dev.
Cabo Delgado	1065	37.25	18.22
Cidade de Maputo	757	40.19	14.25

[3] All tests were conducted with variances not assumed to be equal.

Gaza	883	51.19	21.81
Inhambane	784	30.22	17.49
Manica	719	38.52	17.81
Maputo (Province)	718	37.51	15.43
Nampula	2233	26.62	14.47
Niassa	643	33.13	21.06
Sofala	1013	38.32	18.58
Tete	879	52.60	24.90
Zambezia	2161	27.17	16.00
Control Group	3272	36.64	17.12

Figure 1 - Turnout Distribution for Control Group

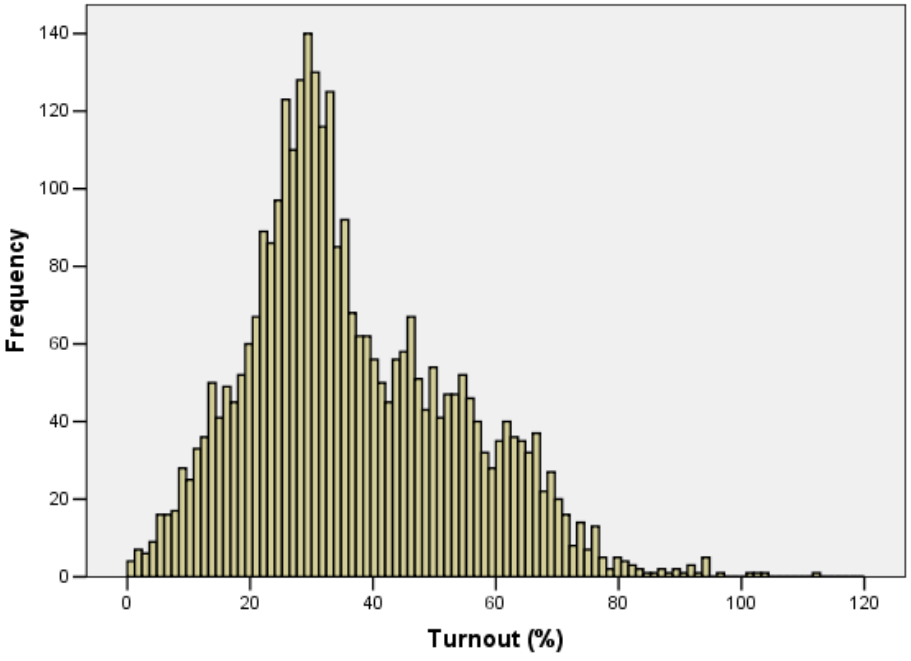


Figure 2 - Turnout Distribution by Province

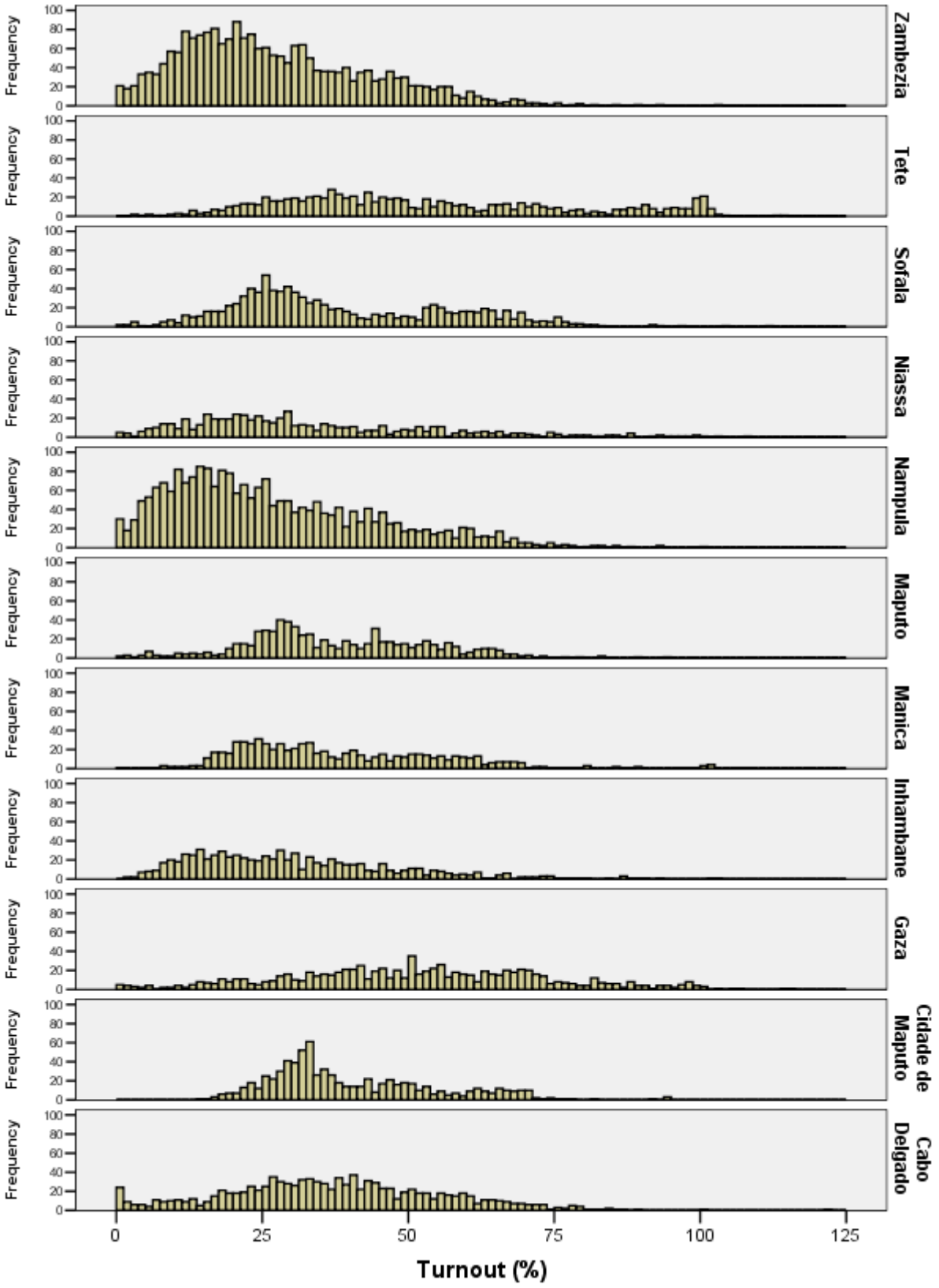


Table 7. Comparison of Means for Turnout – Non-Control Provinces vs. Control Group

Province	Mean Difference	Std. Error of Difference	T-test	P-value	95% Confidence Interval
Nampula	10.02	0.48	21.05	<.001	(9.08; 10.95)
Niassa	3.50	0.88	3.97	<.001	(1.77; 5.24)
Tete	-15.97	0.89	-17.91	<.001	(-17.72; -14.22)
Zambezia	9.46	0.46	20.75	<.001	(8.57; 10.36)
Gaza	-14.56	0.79	-18.37	<.001	(-16.11; -13.00)
Cabo Delgado	-0.62	0.63	-.98	0.33	(-1.86; 0.62)
Manica	-1.88	0.73	-2.59	0.01	(-3.32; -0.45)

The P-values indicate that the high turnout rates of Tete and Gaza and the low turnout rates of Nampula, Niassa and Zambezia are statistically significant deviations from our assumed normal mean (i.e. we reject the null hypothesis in these cases). The turnout rate for Cabo Delgado is not significantly different than that of the control group and Manica falls exactly on the 99% level of significance, which suggests that the turnout rate may have been higher than average.

Next we consider turnout at the district level. Table 8 summarises the descriptive statistics for turnout for our five treatment districts; Figure 3 illustrates the frequency distributions for turnout. While the turnout ratio for Angoche is very close to the control group mean, the two districts in Tete (where allegations of ballot box stuffing were greatest) show significantly higher turnout rates and the districts of Milange and Murrupula (where allegations of organisational incompetence were made) appear significantly lower than the control group mean.

The results of a means test for these districts (Table 9) confirm what is apparent from the summary statistics: the high turnout rates for the districts in Tete are statistically significantly different from the control group mean, and the low turnout rates in Nampula and Milange are also statistically significant. However, the difference is not significant in the case of Angoche.

Accusations of ballot box stuffing in Tete and Gaza cannot be confirmed by these results, however they are consistent with our expectations if such misconduct took place. The low turnout rate in Nampula is significant at the provincial level – consistent with allegations that organisational failure prevented people from voting there – although it appears that the problem was not consistent across districts. Zambezia also displays suspiciously low turnout rates at the provincial and district level. While the low turnout in Niassa is statistically significant, the difference in means is relatively small compared to the other treatment

provinces, which corresponds to Renamo complaints concerning a failure to deliver the correct register books to a large number of polling stations in only two of the 16 districts in the province (GCE 2004).

Table 8. Turnout Rates for Treatment Districts

Group	N	Mean	Std. Dev.
Angoche (Nampula)	189	35.90	19.82
Murrupula (Nampula)	80	25.02	20.33
Changara (Tete)	82	88.40	15.73
Tsangano (Tete)	70	73.84	19.93
Milange (Zambezia)	229	23.95	16.58
Control Group	3272	36.64	17.12

Figure 3 - Turnout Distribution for Treatment Districts

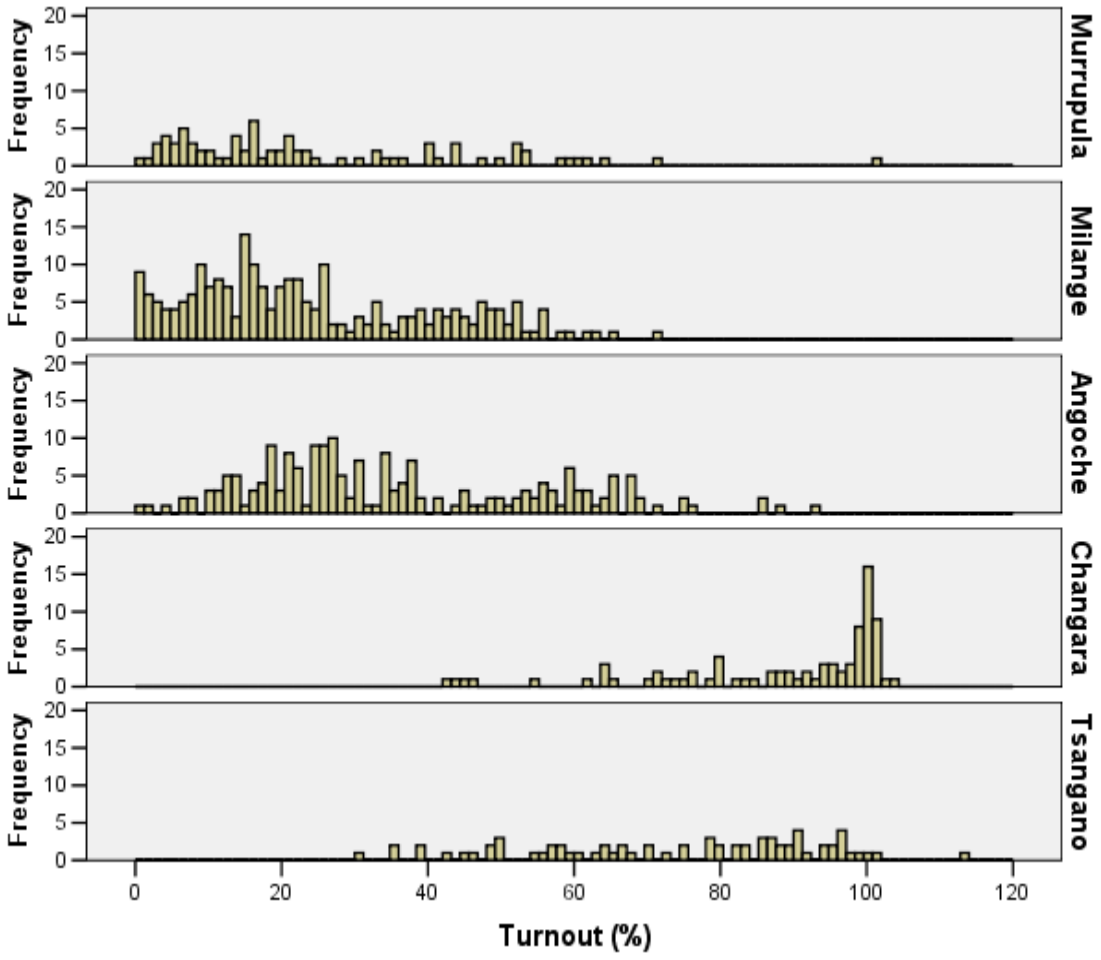


Table 9. Comparison of Means for Turnout – Treatment Districts vs. Control Group

District	Mean Difference	Std. Error of Difference	T-test	P-value	95% Confidence Interval
Angoche (Nampula)	0.74	1.47	0.50	.616	(-2.13; 3.64)
Murrupula (Nampula)	11.62	2.29	5.07	<.001	(7.06; 16.18)
Changara (Tete)	-51.76	1.76	-29.37	<.001	(-55.26; -48.26)
Tsangano (Tete)	-37.21	2.40	-15.50	<.001	(-41.99; -32.42)
Milange (Zambezia)	12.69	1.14	11.17	<.001	(10.45; 14.93)

Next, we turn our attention of the issue of improper ballot nullification. Table 10 shows that the highest percentage of null votes occurred in our treatment provinces. This accords with our expectations if improper ballot nullification took place. But are these apparent deviations from the norm statistically significant? Table 11 presents our results from the comparison of means tests. The null hypothesis that there is no difference between the treatment groups and the control group in the average percentage of nullified ballots can be soundly rejected.

The results indicate that Tete, Zambezia and Nampula deviated furthest from the control group mean. Again, although the difference is significant in the case of Niassa, it appears to have been the least affected treatment province. Cabo Delgado may have been marginally affected, but there is no evidence that suspicious levels of ballot nullification took place in Gaza or Manica provinces.

Table 12 summarises the descriptive statistics for null ballot percentage for our five treatment districts. Note that Tsangano district in Tete had the highest percentage of null ballots, while Changara district (also in Tete) had a *below* average null ballot percentage. This may reflect the fact that Changara was pro-Frelimo in 1999 but Tsangano was pro-Renamo.

The result of the means test is presented in Table 13. We find that the higher-than-average percentages of null ballots in Angoche, Tsangano and Milange are statistically significant. Given our strict standards for rejecting the null hypothesis (99% significance level) that there is no difference in means, we do not reject the null hypothesis in the case of Murrupula. While the *lower* than average rate of null ballots in Changara is statistically significant, the absolute difference is small (between .34 and 1.40%), and of course provides no evidence of improper ballot nullification.

So far we have shown that in areas where allegations of misconduct were made, there were statistically significant deviations from the expected turnout rates and ballot nullification rates, consistent with the allegations. We now approach the data from a different angle.

Table 10. Null Ballots (%) by Province

Province	*N*	*Mean*	*Std. Dev.*
Cabo Delgado	1065	3.76	3.45
Cidade de Maputo	757	1.92	1.20
Gaza	883	2.63	1.71
Inhambane	784	3.95	2.49
Manica	719	3.53	5.59
Maputo (Province)	718	2.94	1.95
Nampula	2233	4.43	3.77
Niassa	643	4.33	6.45
Sofala	1013	3.75	5.38
Tete	879	5.44	7.33
Zambezia	2161	4.73	4.40
Control Group	3272	3.20	3.50

Table 11. Comparison of Means for Null Ballots - Non-Control Provinces vs. Control Group

Province	Mean Difference	Std. Error of Difference	T-test	P-value	95% Confidence Interval
Nampula	-1.23	0.10	-12.24	<.001	(-1.43; -1.03)
Niassa	-1.14	0.26	-4.37	<.001	(-1.65; -0.63)
Tete	-2.24	0.26	-8.79	<.001	(-2.74; -1.74)
Zambezia	-1.55	0.11	-13.60	<.001	(-1.76; -1.31)
Gaza	0.56	0.08	6.72	<.001	(0.40; 0.73)
Cabo Delgado	-0.57	0.12	-4.63	<.001	(-0.81; -0.33)
Manica	-0.34	0.22	-1.54	0.124	(-0.76; 0.09)

Table 12. Null Ballots (%) for Treatment Districts

Group	*N*	*Mean*	*Std. Dev.*
Angoche (Nampula)	189	4.71	4.46
Murrupula (Nampula)	80	3.91	2.62
Changara (Tete)	82	2.33	2.34
Tsangano (Tete)	70	9.04	9.25
Milange (Zambezia)	229	5.87	6.01
Control Group	3272	3.20	3.50

Table 13. Comparison of Means for Null Ballots - Treatment Districts vs. Control Group

District	Mean Difference	Std. Error of Difference	T-test	P-value	95% Confidence Interval
Angoche (Nampula)	-1.51	0.33	-4.57	<. 001	(-2.16; -0.86)
Murrupula (Nampula)	-0.72	0.30	-2.41	.018	(-1.32; -0.13)
Changara (Tete)	0.87	0.27	3.27	.002	(0.34; 1.40)
Tsangano (Tete)	-5.84	1.11	-5.28	<.001	(-8.05; -3.63)
Milange (Zambezia)	-2.67	0.40	-6.37	<.001	(-3.46; -1.88)

Regression analysis

We employ regression analysis to determine whether there is a significant correlation between party support and irregularities at the polling station level – a result that would further lend credence to allegations of systematic misconduct. We set up two simple models to answer two questions concerning party support and irregularities: 1) is there a correlation between party support (as expressed by the number of voters at each polling station that voted for a particular candidate) and voter turnout rates?; and 2) is there a correlation between party support and the percentage of nullified ballots at each polling station?

The allegations of fraud were directly linked to party support. First, Renamo alleged that its delegates were excluded in areas where Frelimo was strongest. If this were true, we would expect to find evidence of ballot box stuffing in Frelimo strongholds. Second, it was claimed that attempts were made to prevent Renamo supporters from voting. If this were true, we would expect to find unusually low turnout in areas where Renamo was strongest.

We begin the analysis at the national level. Regression 1 (Table 14) shows the results of a model that estimates voter turnout based on the number of votes cast and the percentage of voters that voted for each of the main candidates. Holding the number of votes cast constant, we find that the percentage of voters that voted for the Frelimo candidate has a positive and significant effect on voter turnout. Conversely, the percentage of voters that voted for the opposition (Renamo) candidate is negatively and significantly correlated with turnout. These results are robust to the inclusion of provincial dummy variables, which control for potential systematic differences at the provincial level, such as urbanisation or literacy rates.[4] Interpreting the significance of this apparent relationship is complicated by the fact that the party support variable is an expression of votes cast, not *ex ante* voter intention. It is reasonable to suppose that Frelimo's landslide victory was due to a more ambitious constituent base than that of the opposition, or that Renamo voters were not motivated enough to vote. In other words, the direction of causality may run from turnout to party support, rendering the model inconclusive. We deal with this issue in the second stage of our analysis below. At this point we can only conclude that the results are in line with our expectations if fraud took place.

Table 14. Regression 1: National Level Turnout

Regression 1 **Dependent Variable = Turnout %**					
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Votes Cast	0.095 (120.39)			0.094 (117.33)	0.094 (118.23)
% Guebuza		0.141 (21.71)		0.053 (11.76)	
% Dhlakama			-0.124 (-18.31)		-0.047 (-10.21)
Observations	11857	11855	11855	11855	11855
R-Squared	.55	.038	.028	.56	.55

Regression 2 presents the results of a simple model in which the percentage of nullified ballots is the dependent variable and party support is the independent variable. The results indicate a negative and significant correlation between expressed support for the Frelimo candidate (Guebuza) and the percentage of nullified ballots; conversely the model indicates a positive and significant correlation between support for the opposition candidate (Dhlakama) and the percentage of nullified ballots.

[4] In most cases the provincial dummy variables were significant, suggesting that there were indeed systematic differences across regions affecting turnout rates. However, we do not report them here in order to maintain simplicity in the models, and because they did not affect the significance of the results.

Table 15. Regression 2: National Level Null Ballot %

Regression 2 **Dependent Variable = Percentage of "Nulos" in Ballot Box**		
	(1)	**(2)**
% Guebuza	-0.028 (-19.81)	
% Dhlakama		0.026 (17.66)
Observations	11855	11855
R-Squared	.032	.026

These results are more clearly suspicious. It is possible that there is a systematic difference in the ability of individuals to properly fill out a ballot that falls along party lines, such as literacy (Renamo voters tend to be less educated). However, these results are also robust to the inclusion of provincial dummy variables, which ought to catch such effects. We suspect that the difference is due to improper ballot nullification at polling stations where Renamo support was considered a threat to a Frelimo victory.

The next stage of analysis focuses on the control group sample. If there were unobservable factors affecting voter turnout or ballot nullification that happen to fall along party lines, there should be no appreciable difference in results from the national and control group samples. Regressions 3 and 4 repeat the models used above, this time drawing just on the control group sample.

Table 16. Regression 3: Control Group Turnout

Regression 3 **Dependent Variable = Control Group Turnout %**					
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Votes Cast	0.092 (56.66)			0.092 (56.56)	0.092 (56.43)
% Guebuza		-0.042 (-4.22)		-0.025 (-3.46)	
% Dhlakama			0.052 (5.11)		0.026 (3.61)
Observations	3272	3272	3272	3272	3272
R-Squared	.50	.005	.008	.50	.50

Table 17. Regression 4: Control Group Null Ballot %

Regression 4 **Dependent Variable = Control Group Percentage of "Nulos" in Ballot Box**		
	(1)	**(2)**
% Guebuza	-0.013 (-6.38)	
% Dhlakama		0.011 (5.32)
Observations	3272	3272
R-Squared	.012	.009

The explanatory power of both models (R-squared statistic) falls to inconsequential levels, indicating that party support is not robustly affecting turnout rates or null ballot rates in the control group provinces. Interestingly, the coefficients on the party support variables switch places. Now it is support for the *opposition* candidate that is positively correlated with turnout. It may be the case that Renamo voters rallied in the control group provinces (three are predominately Frelimo and one Renamo), or that Frelimo voters became lazy, or that the model is poorly specified. Whatever the explanation, it is clear from the reversal of signs and insignificant explanatory power of the model that the correlations between party support and turnout observed at the national level are being driven by the provinces where allegations of fraud were greatest (i.e. the provinces excluded from the control group).

The results from Regression 4, which assess the correlation between party support and nullified ballots within the control group provinces, are more in line with the national-level results, although the fit of the model is again reduced to insignificance. This further suggests that the treatment provinces are driving the trends observed at the national level. In order to verify this, we repeat the models again in Regressions 5 and 6, this time using just polling stations from our treatment provinces (Nampula, Niassa, Tete, Zambezia and Gaza). Given our results thus far, we are not surprised to find that expressed support for the Frelimo candidate is positively and significantly correlated with turnout, and negatively and significantly correlated with the percentage of ballots nullified at the polling station level. Indeed, the fit of the models dramatically improves for this comparison group.

The scatter plots in Figures 4 and 5 illustrate the difference in the correlation between turnout and party support in the control group and treatment group samples. The break in the data at the 85% level of support for Guebuza is a graphic representation of the suspicious nature of the correlation. Huddled in the upper right hand corner of the graph is a host of polling stations where turnout levels were significantly higher than the national average and where support for Guebuza was nearly universal. Although voting preferences are often segregated territorially (Schelling 1971), the difference between the two groups does raise suspicions that

the high level of turnout and support for Guebuza in some treatment group polling stations was a consequence of misconduct.

Finally, we re-run the models for Tete province, which received the greatest number of formal complaints, and which so far has statistically deviated from the control group most severely (Tables 20 and 21). Once again we find that party support is highly significantly correlated with voter turnout and the percentage of nullified ballots, and once again we find that the fit of the model improves dramatically over the previous set of regressions.

Table 18. Regression 5: Treatment Group Turnout

Regression 5 **Dependent Variable = Comparison Group Turnout %**					
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Votes Cast	0.100 (106.57)			0.095 (93.93)	0.096 (95.39)
% Guebuza		0.266 (27.68)		0.103 (16.18)	
% Dhlakama			-0.247 (-25.20)		-0.096 (-14.49)
Observations	6801	6799	6799	6799	6799
R-Squared	.60	.11	.085	.61	.61

Table 19. Regression 6: Treatment Group Null Ballot %

Regression 6 **Dependent Variable = Comparison Group Percentage of "Nulos" in Ballot Box**		
	(1)	**(2)**
% Guebuza	-0.034 (-16.42)	
% Dhlakama		0.033 (14.94)
Observations	6799	6799
R-Squared	.038	.032

Table 10. Regression 7: Tete Province Turnout

Regression 7 **Dependent Variable = Tete Province Turnout %**					
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Votes Cast	0.082 (30.31)			0.068 (23.56)	0.070 (24.34)
% Guebuza		0.499 (18.59)		0.236 (9.92)	
% Dhlakama			-0.501 (-17.19)		-0.229 (-9.10)
Observations	879	879	879	879	879
R-Squared	.51	.28	.25	.56	.55

Table 11. Regression 8: Tete Province Null Ballot %

Regression 8 **Dependent Variable = Tete Province Percentage of "Nulos" in Ballot Box**		
	(1)	**(2)**
% Guebueza	-0.048 (-5.24)	
% Dhlakama		0.045 (4.61)
Observations	879	879
R-Squared	.030	.024

In sum, the regression analysis indicates a systematic relationship between party support and the irregularities that we would expect to find if fraud were indeed committed. In the control group of four provinces where few complaints were made, there are no significant correlations, yet in the treatment group we see exactly what we would expect if there were misconduct – a correlation between high turnout and support for Frelimo (implying ballot box stuffing), a correlation between low turnout and Renamo support (suggesting organisational failure), and a correlation between high levels of nullified ballots and Renamo support. The fact that the results are significant at the national level emphasises the scale of the problem,

and the analysis shows that these irregularities occurred in precisely the provinces that were the subject of Renamo complaints.

Figure 4. Control Group Scatter Plot of Frelimo Support and Turnout

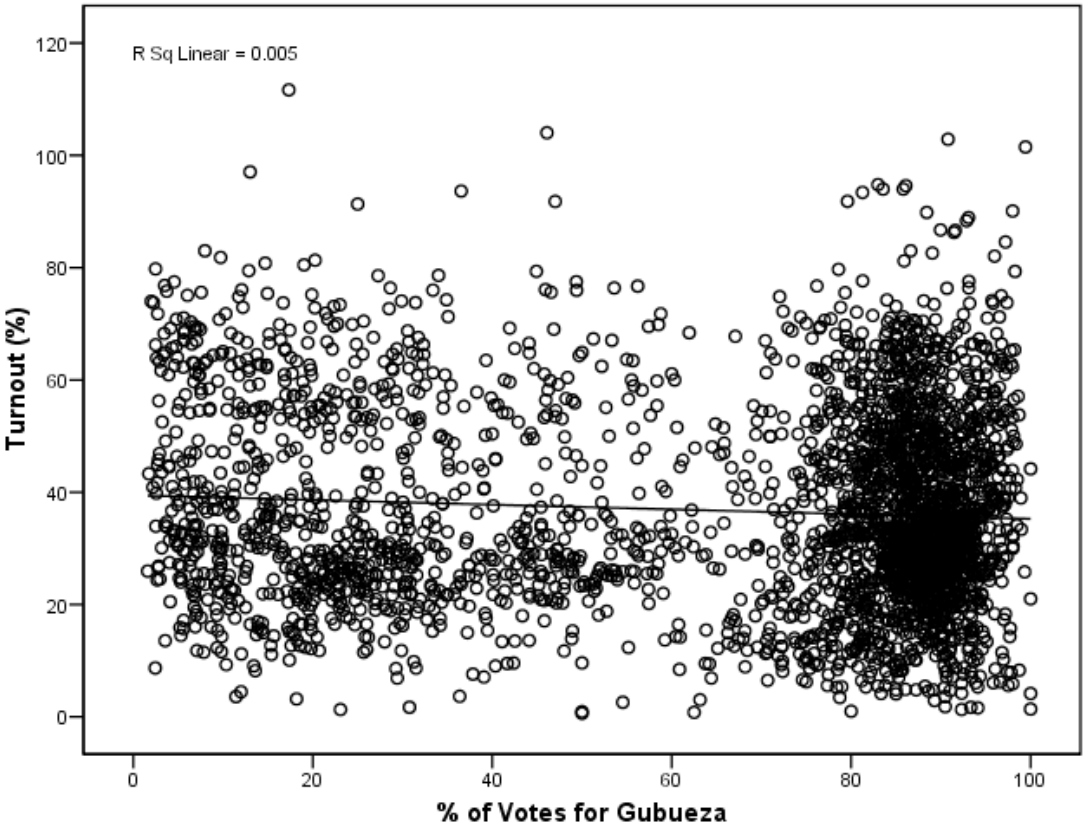
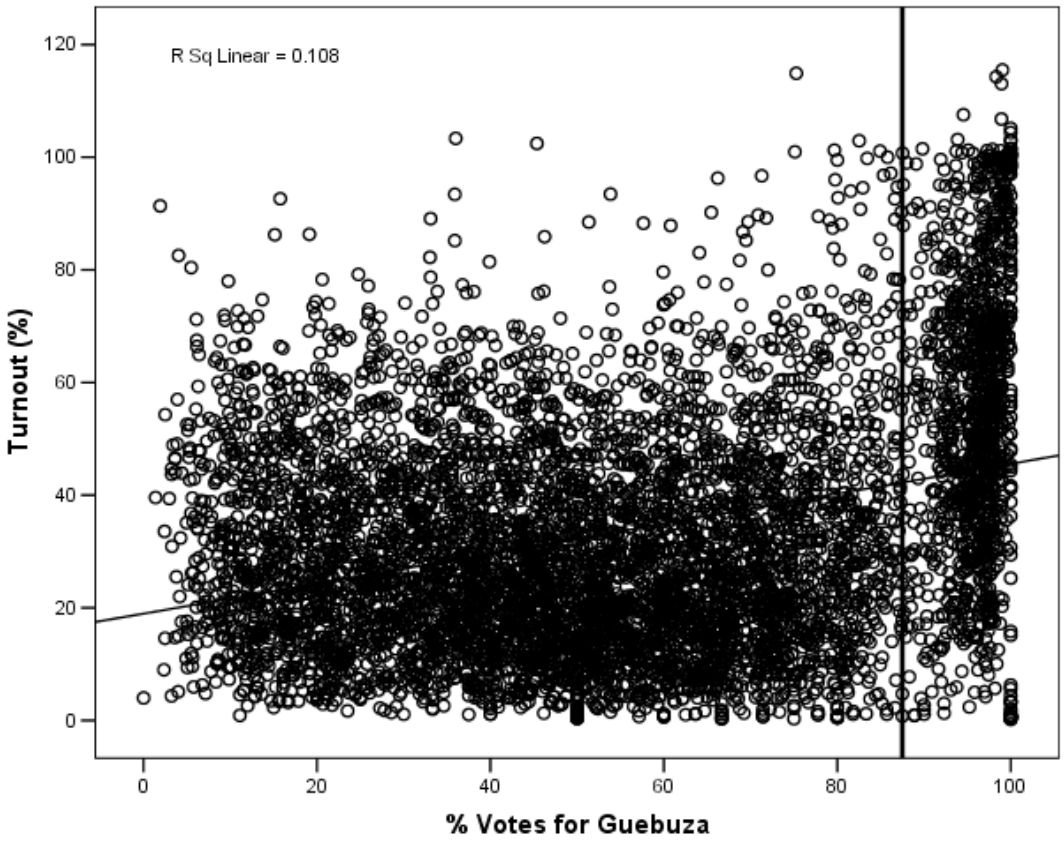


Figure 5. Treatment Group Scatterplot of Frelimo Support and Turnout



Conclusion

It is important to reiterate that all of the statistical evidence presented above does not "prove" that misconduct took place. However, all of the results are consistent with the specific allegations of fraud that were made. The accumulated evidence suggests that fraud did take place, and that it was significant.

We started with complaints of misconduct by the main opposition party and by international observers. By examining the data, we then identified hundreds of polling stations which did indeed correspond to the complaints and where there seemed to have been ballot box stuffing (benefiting Frelimo) on the one hand and improper ballot nullification and organisational failure which made it hard for people to vote (harming Renamo) on the other.

The next step was to use statistical methods to see if the problem was widespread, rather than simply in isolated polling stations. The strength of the analysis, and our conclusion, lies in our identification strategy, which has sought to corroborate specific allegations made in specific locations and which has consistently made conservative assumptions in order to err on the side of underestimating the scale of irregularities. The evidence presented favours the conclusion that ballot box stuffing, improper ballot nullification and organisational failure did indeed take place on a large scale. Furthermore, we conclude that fraud was most prevalent in those provinces where Renamo complained about misconduct.

While the overall election result was unaffected by the fraud, our analysis offers a simple strategy for assessing allegations of misconduct and points to areas of concern for those managing or observing future elections in Mozambique and elsewhere.

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LSE, Houghton Street, London WC2A 2AE
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