British Journal of Political Science (2025), **55**, e153, 1–20
doi:10.1017/S0007123425100951

British Journal of Political Science

ARTICLE

How to Distinguish Human Error From Election Fraud: Evidence From the 2019 Malawi Election

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(Received 21 August 2024; revised 9 September 2025; accepted 10 September 2025)

Abstract
Voters and politicians often blame tallying irregularities on fraud, undermining perceptions of democratic and electoral credibility. Yet such irregularities also result from capacity failures and human error. We introduce several methods to assess competing causes of tallying irregularities leveraging the quasi-random administration of polling stations. Using these methods, we revisit the case of the 2019 Malawian presidential election which was famously canceled by the High Court due to widespread result-sheet edits and accusations of fraud. Contrary to the dominant consensus, we do not find evidence that edits were motivated by fraud or that they benefited the incumbent. Instead, we show that edits increased in proportion to the complexity of filling in result-sheets, suggesting a dominant role for human error. In addition to reinterpreting a historically important election, we also make the case that policy efforts to improve electoral credibility could productively be reallocated towards electoral administration rather than anti-fraud measures.

Keywords: Tallying irregularities; electoral forensics; election fraud; human error; Malawi

Introduction

In May 2019, Malawi held a closely contested presidential election between the incumbent, Peter Mutharika, and two main challengers: Lazarus Chakwera and Saulos Chilima. Mutharika's victory in the official tally was met with widespread protests. Chakwera and Chilima challenged the result in court, citing a suspiciously high proportion of polling station result-sheets that had been edited, contrary to electoral regulations. Undeterred by pressure from incumbent partisans – including through attempted bribery – the High Court annulled the election. Despite contesting narratives from some election observers and officials, most interpreted these events as a story about the victory of democratic institutions over fraud. *The Economist* named Malawi its 'Country of the Year', citing the courage of the court in overturning a 'rigged' election (The Economist, 2020). Similar sentiments were expressed by most media and foreign policy outlets.[1] In Malawi, the court's decision was likewise seen as a vindication of opposition claims. In 2020, 61 per cent of

[1]Chatham House awarded Malawi's High Court judges the 2020 Chatham House Prize in recognition of their 'courage and independence in defence of democracy' (Chatham House, 2020) and the United States-based Freedom House considered Malawi a prime example of democratic gains in 2020 due to the landmark ruling that overturned a flawed election in which 'the count was marred by evidence that Tipp-Ex correction fluid was used to alter vote tabulation sheets' (Freedom House, 2022). International media outlets described the election in similar terms (New York Times, 2020).

Malawians told Afrobarometer that they believed the disputed results announced by the Malawi Electoral Commission (MEC) were inaccurate. The survey also found that general trust in the MEC had plummeted (Afrobarometer, 2020). These events are not unique. Tallying irregularities often feature prominently in electoral disputes, including in recent court challenges in Kenya, Zambia, Nigeria, Zimbabwe, and Guatemala (Gerzso, 2023). Even when courts have failed to uphold challenges, doubts about the tallying process eroded trust in electoral institutions and government legitimacy (Alvarez et al., 2008; Kerr, 2024).

Tallying the results of an election is logistically challenging, especially in low-income democracies where shortcomings in experience, training, functioning equipment, and infrastructure are common. Past research has emphasized that almost all such elections produce some form of tallying irregularities, including miscounting of votes, arithmetic errors, and incorrectly filled-in result-sheets (Ansolabehere et al., 2018; Challú et al., 2020; Warner et al., 2021). These can represent intentional attempts to manipulate the election outcome, as many believe occurred in Malawi. Yet they can equally be deficiencies and flaws that result from 'incompetence, lack of resources, unforeseen disturbances, and simple human error' (Birch, 2011). The difficulty is to determine the causes of such irregularities. How can we tell whether they are driven by fraud or human error? What can we do to limit error and strengthen legitimacy?

To answer these questions we rely on evidence from the 2019 Malawi election. We code irregularities using result-sheet scans from 5,002 polling stations. We then adapt new and existing methods to distinguish fraud from error. First, we look at patterns of irregularities and voting in the 2019 Malawi election to assess the plausibility of competing stories of the 2019 election. We also compare against pre-aggregation figures recorded at the polling station by a civic NGO during the 2019 election as well as the results of the 2020 rerun election.

To assess the role of human error we leverage arbitrary cut-offs in the allocation of polling station streams and ballot papers, allowing us to examine how the complexity of filling in result-sheets impacted result-sheet edits. Finally, we conducted interviews with twenty-five polling station officials and observers involved in various stages of the tallying process. This is the most comprehensive evaluation of irregularities and fraud in this historic election.[2]

We argue for a reinterpretation of the 2019 elections. Our data suggest that the process was certainly flawed; there were widespread tallying errors and/or edits of polling station result-sheets: about 72 per cent of analyzed result-sheets contained irregularities, including Tipp-Ex, crossed-out figures, replaced ballot sheets, and tallying errors. However, we do not find convincing evidence that irregularities represent attempts by the incumbent party to alter the result. Most edits in 2019 affected only the part of the result-sheet in which the polling station totals are summarized while only a minority of them affected rows in which candidate votes were recorded. Further, we identify no positive association between edits and incumbent votes, either in the final results, when comparing with pre-aggregation figures, or when comparing with the 2020 election. Our evidence is also consistent with the null hypothesis that there is no relationship between edits and votes for opposition parties.

To be clear, we cannot rule out the possibility of any fraud: we do not test for many forms of fraud, and low levels of fraud are impossible for our methods to detect. Nonetheless, our analysis provides scant support for most claims about fraud which were made at the time, and favors the null hypothesis that edits did not harm or benefit any particular candidate.

In light of the null evidence, we examine the role of human error. Like many low-income democracies, Malawi lacks capacity to effectively administer the tallying process (Kerr, 2024). From interviews with election officials and election observer reports we identify many capacity and knowledge gaps. These issues were compounded in 2019 due to the rapid implementation of a new electronic tallying system that required fidelity with electoral procedure and refused

[2]Dzonzi (2021) and Tyburski (2019) also provide tabulations of some types of result-sheet edits in the 2019 Malawi elections, but do not assess the causes or consequences of these edits.

https://doi.org/10.1017/S0007123425100951 Published online by Cambridge University Press

submissions with arithmetic error. Further, resourcing deficiencies often meant that officials with little training worked late into the night to complete the tallying.

We provide evidence that arithmetic error and procedural uncertainty were indeed a dominant driver of result-sheet edits. Firstly, we identify quasi-random variation in tallying complexity driven by arbitrary cut-offs in the number of registered voters that determine the number of streams in a polling station. We show that polling stations requiring more complex tallying arithmetic were substantially more likely to see errors and edits in result-sheets. Secondly, we examine how procedural uncertainty about ballot allocation affected edits. We utilize rules regarding the number of ballots received at each polling station which, in combination with the number of polling streams, affected the difficulty in allocating ballots across polling streams. We show that in polling stations where allocation was more complex, the number of edits were higher than in polling stations where this was more straightforward. Together, these patterns suggest human error and capacity gaps – rather than fraud – were the predominant cause of edits.

Contribution

This study makes several methodological and empirical contributions. First, we provide new evidence on the extent of fraud and human error in low-capacity elections. Almost all election tallying is flawed to some degree, even in older and richer democracies (Ansolabehere et al., 2018; Ansolabehere and Reeves, 2004; Myagkov et al., 2009; Schedler, 2009). Likewise in Malawi, most elections have been marred by irregularities and accusations of fraud (Dulani, 2006; Dulani et al., 2019; Patel and Wahman, 2015; Seeberg and Wahman, 2024). However the question of whether such errors are fraudulent is a difficult one to answer. This difficulty can lead voters, courts, civic organizations, election monitors, and media to form unwarranted conclusions about the legitimacy of an election (Antenangeli and Cantú, 2019; Berlinski et al., 2023; Elklit, 2011; Hall and Wang, 2008; Idrobo et al., 2022).

On one hand, many studies show that election and party officials do modify polling station tallies to manipulate outcomes (Hyde and Marinov, 2012). Cantú (2019) shows that about 30 per cent of polling station results were altered in the infamous 1988 Mexican election, and provides evidence that many of these alterations were consistent with fraud. Callen and Long (2015) compare vote figures in the Afghan 2010 presidential election recorded at polling stations before aggregation with the final results. They find discrepancies in candidate vote figures in 78 per cent of observations and show that these systematically favor candidates with close links to staff at aggregation centers. Beber and Scacco (2012) find suspicious patterns of similar handwriting across tally sheets in elections in Nigeria and show that the last digits in vote totals deviate from a uniform distribution, suggesting fabrication.

On the other hand, election reports often note the role of human and procedural error in explaining irregularities.[3] Additionally, academic studies have increasingly contested assumptions about the frequency of fraud in highly irregular elections. Challú et al., (2020) examine recounts in a large set of Mexican elections. They find that over 40 per cent of polling station-level tallies display inconsistencies in which the numbers recorded in the result-sheet do not add up. Typically, these consist of smaller algebraic errors when the numbers of cast, invalid, and unused ballots are summed. The authors show that inconsistencies are associated with lower education, higher workload, and tallying complexity. They do not however find any evidence of fraud. In a related study, Warner et al. (2021) examine irregularities in result-sheets in the 2013 Kenyan elections. They find that over a third of result-sheets contain irregularities, most commonly instances in which edits have been made, but also procedural irregularities. They examine the co-occurrence between irregularities and candidate vote-shares and make use of the random

[3]For example, the European Union (2016,2019,2022) discuss human error in the tallying of recent elections in Kenya, Zambia, and Malawi.

https://doi.org/10.1017/S0007123425100951 Published online by Cambridge University Press

assignment of election observers to individual polling stations, but do not find evidence that irregularities represent fraud. Instead, they argue, most irregularities were plausibly caused by human error. Elklit (2011) similarly argues that discrepancies that featured prominently in fraud allegations and the ensuing violence following the 2007 Kenyan election were often caused by computational and other errors that occurred during tabulation.[4]

Our study confirms that human error is an underappreciated cause of tallying irregularities, and offers new and causally motivated methods to assess the prevalence of human error. In addition, we show how the electoral procedure plays a role in driving irregularities. As such, we are able to offer new and actionable policy insights on how to improve electoral administration and reduce distrust in elections.

Furthermore, our research contributes methods to forensically assess the integrity of elections. Election scholars have developed a range of methods to identify suspicious patterns in electoral data (Beber and Scacco, 2012; Callen and Long, 2015; Cantú, 2019; Goel et al., 2020; Klimek et al., 2012; Leemann and Bochsler, 2014; Montgomery et al., 2015; Myagkov et al., 2009; Rundlett and Svolik, 2016). However, the majority of these methods have focused on identifying fraud, rather than examining alternative explanations that might contribute to tallying irregularities. In this study, we introduce methods to help scholars and policy makers weigh the role of human error relative to fraud in irregular elections.

Finally, we believe that it is crucial that we learn the right lessons from this historic election. The 2019 Malawi election has been widely cited by media and civil society as an example of how a robust legal system and united opposition can overturn a fraudulent election. However noble this narrative, it neglects less convenient facts about the unintended consequences of technological innovation, insufficient resourcing, and administrative oversight. While we identify many serious issues, we also show that many of the claims of international and domestic actors about the scale and form of fraud do not align with the data. Ensuring a repeat of the 2019 crisis requires not just strong legal institutions but investment in improving the oversight and administration of electoral procedure.

The 2019 Malawi Election

On 21 May 2019 Malawi organized tripartite elections. This was the sixth general election since the transition to multiparty politics in 1994. The elections were a considerable undertaking for the Malawi Electoral Commission (MEC), which in the lead-up to the election had registered just short of 7 million voters and prepared 5,002 polling stations across the country.

The election involved 7 presidential candidates, 1,327 parliamentary candidates, and 2,690 local government candidates from 13 different political parties or standing as independents. In the presidential elections, the incumbent president, Peter Mutharika, of the Democratic Progressive Party (DPP), faced stiff competition from opposition candidate Lazarus Chakwera of the Malawi Congress Party (MCP) and his once vice-president, Saulos Chilima, who had formed his own party, the United Transformation Movement (UTM). The three main candidates campaigned actively in the lead-up to the election, both on the ground and online (Yeandle, 2025). The election day was largely peaceful. Most polling stations opened on time and observers reported positively on the voting process (African Union, 2019; European Union, 2019). The reported turnout was fairly large at 74 per cent and the geographic distribution of voter support for the main candidates followed that of previous elections (Wahman and Brooks, 2021). Seven days after polling, the MEC declared Mutharika the winner with 38.57 per cent of the vote against Chakwera's 35.41 per cent and Chilima's 20.24 per cent.

[4]Related studies have also sought to examine other electoral patterns that are frequently highlighted in fraud allegations, such as delays in reporting electoral outcomes (Antenangeli and Cantú, 2019) and shifts in late-counted votes (Idrobo et al., 2022), arguing that these can often be explained by non-fraudulent factors.

https://doi.org/10.1017/S0007123425100951 Published online by Cambridge University Press

The outcome of the election was immediately contested by the losing candidates, who alleged that the administration of the election, especially the recording and aggregation of votes, was marred by irregularities and fraud (Absalom, 2019; Dzonzi, 2021). In particular, they highlighted polling station result-sheets that had been edited and altered either by pen or with the aid of correction fluid. In some cases the result-sheets had been defaced to the point that it was impossible to verify what the original figures were. The use of correction fluid caused critics to dub the election as the 'Tipp-Ex election'. Other irregularities that fueled allegations of fraud were result-sheets with missing signatures of presiding officers or monitors and cases where result-sheets had been replaced by duplicate versions intended as copies for monitors or other unofficial result-sheets. The MCP and UTM consequently filed a petition with the Malawi High Court, claiming that irregularities were used to alter the results in favor of the incumbent, and seeking the nullification of the presidential results. During the proceedings, mass protests were organized in the main cities demanding the resignation of the MEC chair, Jane Ansah, and a rerun of the election.

Following lengthy proceedings, the court ruled unanimously in favor of the petitioners, and their decision was mostly affirmed later by Malawi's Supreme Court (Nkhata et al., 2021). The court emphasized that the 'irregularities were so widespread, systematic and grave that the results of the election have been compromised and cannot be trusted as a reflection of the votes' (Chilima v. Mutharika, 2019). The court faulted the MEC on, among other issues, failures to adhere to statutory requirements on handling tally sheets and log books and accepting tally sheets that had been tampered with. Consequently, they held that 'the first respondent [Peter Mutharika] was *not* duly elected president of Malawi' (Chilima v. Mutharika, 2019), and moved to annul the elections and call for a new ballot within 150 days. This was only the second time in Africa, after Kenya in 2017, that a court had overturned a president's victory.[5] Unlike in Kenya – where the opposition boycotted the rerun – the Malawian opposition won the repeat election in June 2020 on a joint ticket, with Chakwera of MCP elected as president, and Chilima of UTM as his vice-president.

It should be noted that the High Court did not explicitly rule that the election was stolen, nor did the court attempt to adjudicate quantitative debates over the impacts of irregularities on election outcomes.[6] Even so, most interpreted the ruling as a verification of the fraud accusations. The MCP secretary general announced to the press after the ruling that 'We are happy with the outcome of the case. We went to court alleging that the polls were rigged. What we have seen today is that our argument had merit' (The Guardian, 2020). Afrobarometer surveys following the court case indicate that a majority of Malawians doubted the accuracy of the original election results announced by the MEC and questioned the whole integrity of the process. Trust in the MEC plummeted (Afrobarometer, 2020).[7] Author interviews with election administrators and partisan observers show that even those involved in the electoral administration remain convinced that the process was fraudulent and that the result-sheet edits were evidence of this fraud.[8] Experimental studies conducted following the election also demonstrate that voters often associated irregularities in result-sheets, such as edits or missing signatures, with less reliable and even fraudulent tabulation (Mbozi, 2025).

Not everyone agreed that the election was fraudulent, however. During the election, the non-governmental Malawi Election Support Network carried out a parallel vote tabulation (PVT) in a random sample of polling stations (Malawi Election Support Network, 2019). Their findings

[5]Globally, this also marks a rare event. Prior to Malawi and Kenya, courts have annulled presidential victories only in Ukraine in 2004, in the Maldives in 2010, and in Austria in 2016.

[6]For discussion of the standards used by the High Court see Nkhata et al. (2021).

[7]In 2020, 46 per cent of Malawians said the results were 'not accurate at all', 15 per cent said they were 'not very accurate', 33 per cent said they were 'not free and fair', and 22 per cent said they were 'free and fair, with major problem'. In the same survey, only 35 per cent of Malawians said they trust the MEC 'somewhat' or 'a lot'. In comparison 54 per cent trust parliament and 68 per cent trust the 'courts of law' (Afrobarometer, 2020).

[8]Author interviews. See Appendix Section 8.

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showed that the official results did not significantly deviate from the PVT for any of the main candidates, suggesting the absence of systematic aggregation fraud. MEC officials also maintained that irregularities were a result of arithmetic errors on the part of presiding officers, and their subsequent attempts to correct these. Presiding officers who submitted sworn statements in court asserted that they had altered result-sheets to correct for errors in ballot reconciliation, arithmetic errors which were caused when adding stream results together, and other numerical mistakes (Chilima v. Mutharika, 2019). MEC officials emphasized that when correcting errors, their instructions were that these were only to be made to the parts of the result-sheet in which polling station totals were recorded (such as the number of received and unused ballots, canceled and rejected votes, and the total number of valid and cast votes), without affecting figures for candidate votes (Chilima v. Mutharika, 2019).

Statements by some international election observers supported the MEC's position. For instance, the European Union election observer mission reported that 'the unpreparedness of presiding officers to accurately complete forms with balanced figures and their poor understanding of the procedures, and an inability to perform simple arithmetic operations, significantly slowed down the process and opened it up to substantial error and accusation' (European Union, 2019, 29). EU observers further reported that the vast majority of result-sheets received at constituency tally centers contained numerical discrepancies and, consequently, could not be entered into the electronic transmission system. Independent auditors contracted to support constituency tallying also reported that they often had to help presiding officers to re-balance tallying figures and questioned whether the officers had received sufficient training (Binder Dijker Otte, 2019).

Tallying Irregularities in the 2019 Malawi Elections

The Tallying Process

In the 2019 elections, the MEC prepared 5,002 polling stations. To ease crowding, stations with more than 800 registered voters were divided into separate streams with a maximum of 800 voters per stream. Voters were assigned to polling stations based on where they had registered to vote, and directed into different streams on election day in accordance with the alphabetical order of their surname (MEC, 2019, 59–63).

Once balloting was completed, presiding officers were responsible for counting the ballots in each stream, under the supervision of observers, and reporting results on a result form, known as Forms 66A, B, and C (one for each election type). Once completed, duplicate copies of the result-sheets were to be provided to party representatives and posted outside the polling station.[9]

Presiding officers (or their assistants) physically presented these forms and ballots at 197 constituency tally centers (CTCs). CTC officers were then responsible for scanning the forms and entering the results into a database. The software used to transfer results was designed to detect arithmetical errors in the result-sheet, requiring correction before the results could be submitted (European Union, 2019; Yeandle, 2025). Finally, the National Tallying Centre in Blantyre conducted a final tally and reported the certified count to the MEC. Partisan and non-partisan election observers were present at all stages of the counting process (MEC, 2019).

A main contention of opposition parties was that the Forms 66 did not represent the actual tally. As evidence, parties demonstrated that the forms, as scanned by the CTC, contained numerous edits and other tallying irregularities. Sometimes Forms 66 were also unsigned and did not represent the official version of the form. In the most egregious cases, forms were handwritten on a blank sheet of paper. It is often unclear at what stage in the tallying these edits occurred. In interviews, several presiding officers suggested that these were edits that (other) corrupt presiding

[9]According to observers, about 93 per cent of polling stations complied (Malawi Election Support Network, 2019).

https://doi.org/10.1017/S0007123425100951 Published online by Cambridge University Press

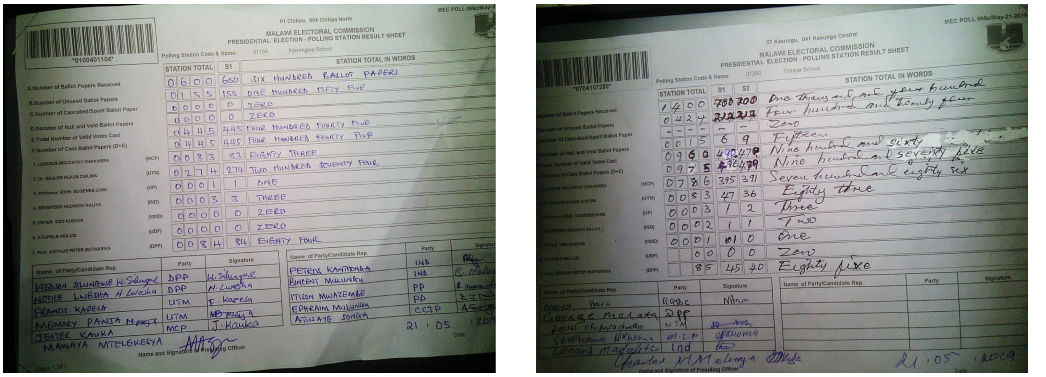

Figure 1. Result-sheets from the 2019 Malawi presidential elections.
Note: this figure shows example Forms 66C for the presidential election.

officers made under cover of darkness. Other presiding officers suggest edits were made by CTC staff, allegedly in order to correct tallying errors which were identified by the software or independent auditors at the CTCs (author interviews, European Union (2019)).

In this article, we focus on the claim of opposition candidates that these edits were at least partly motivated by an effort to advantage the incumbent Peter Mutharika. In the aftermath of the election, this claim was made publicly and in sworn statements to the High Court. For instance, opposition candidate Saulos Chilima asserted in a statement to the High Court that 'votes in favor of [the incumbent] were inflated at various polling centres' and that the MEC was 'party to the rigging and tampering with the results of the election in that it acquiesced to the acts of its employees, servants and agents of altering or tippexing results recorded on tally sheets' (Chilima v. Mutharika, 2019, 43, 361). Witnesses' statements to the court asserted that MEC officials intervened specifically in incumbent dominant areas, or in ways that otherwise favored the incumbent (Chilima v. Mutharika, 2019), 17, 89, 91). We also focus on the claims by MEC and some observer organizations that result-sheet edits – by pen or by correction fluid – were not attempts to fraudulently alter election results but a product of arithmetic and other errors that occurred in the tabulation process, and attempts to correct these.

We provide examples of edited and non-edited Forms 66 in Figure 1. The left-hand panel shows a result-sheet that has been filled in correctly with no suspicious marks in the columns where vote figures and totals are entered. The right-hand panel, however, shows characteristic marks found in many of the submitted result-sheets, such as figures that have been manually altered with pen or with the aid of correction fluid. We provide additional examples in the Appendix (S1–S4).

Identifying Irregularities

To identify irregularities in the tallying process, we first collected the population of all Forms 66 as scanned by CTCs and reported by the MEC. We manually coded each scan in the 2019 presidential, parliamentary, and local government election based upon whether edits were made. For the presidential election we further coded whether the result-sheet was the correct form or whether duplicate or other incorrect copies had been used as well as which result-sheet row edits occurred in.[10] Other data used in the analyses below include coded result-sheet scans from the

[10]Other studies (Cantú, 2019; Warner et al., 2021) use machine learning to complete this task. The smaller number of result-sheets, and the relatively poor quality of scans, however, favored a manual approach in this case.

https://doi.org/10.1017/S0007123425100951 Published online by Cambridge University Press

2014 election, official vote figures for each polling station in the 2019 election, registration data, and socio-demographic data for the areas surrounding the polling station. Furthermore, we make use of polling station observations carried out by the National Initiative of Civic Education (NICE) containing some 4,700 presidential results collected at polling station level at the end of voting on election day and results from the 2020 rerun election.[11]

Patterns of Irregularities

The coding of result-sheets confirms media and other reports suggesting that result-sheet irregularities – especially edits of vote figures – were widespread in 2019. In most cases, however, these only affected the part of the result-sheet in which station totals were summarized, and typically only one or two rows. In the presidential election, up to 3,513 result-sheets – 71.8 per cent of the analyzed scans – contained edits, done either with pen or with correction fluid. The share of edited result-sheets is similar in both the parliamentary (69.7 per cent) and councilor (70.3 per cent) elections. Further, in 34.4 per cent of the analyzed presidential scans, presiding officers did not submit the original result-sheet, but instead a duplicate copy or a result-sheet originally intended for a different polling station in which the polling station code and name had been altered.[12] These types of irregularities are not a new phenomenon in Malawi, however. In a separate coding of 2014 presidential election forms, we find that 66 per cent of result-sheets contained edits.[13]

Figure 2 provides a more detailed picture of result-sheet edits in the 2019 presidential election. Firstly, as can be noted in the left-hand panel, only a small share of rows were edited in most forms. On average, out of the 13 rows in the result-sheets, only 2.8 rows were affected by edits. Further, as shown in the right-hand panel, the result-sheet rows that were most often affected include the row for valid votes and total cast votes. Approximately 40–45 per cent of result-sheets contained edits in these rows. This is followed by rows containing other reconciliation data, including received and unused ballots, canceled and invalid votes. Some 15–30 per cent of result-sheets had edits in these rows. Finally, rows where candidate votes were recorded had relatively few edits; 10 per cent or less of result-sheets showed any edits in these rows. Analysis of the result-sheet edits in the 2014 presidential elections suggests that these followed similar patterns; most edits affected only a few rows, typically only the part of the result-sheet in which polling station totals are summarized (Appendix Table S1).

Geographically, instances of edited result-sheets in 2019 were spread out across the entire country. Out of 193 constituencies, not a single one was unaffected. Comparisons using observational data (presented in Appendix Table S3) suggest that a very strong predictor of edits is the number of registered voters. The larger the polling station is in terms of registered voters, the more likely the result-sheet will contain edits, including in the candidate row. This association is robust to the inclusion of other covariates and fixed effects. As we argue below, we believe this positive association occurs at least partly because larger polling stations have more polling streams, contributing to increased complexity in filling in the result-sheet, and increased workload due to larger numbers of voters. We also examine the impact of other variables, including the main candidates' stronghold areas, the margin of victory in the parliamentary constituency, nightlight luminosity, and dependency ratio in the areas around polling stations, but do not find significant or robust associations.

[11]See the Appendix for a complete description of the data sources and coding procedures.

[12]It is possible that these incorrect forms are related to other tallying edits. For example, some presiding officers claimed that they used unofficial forms because the originals were already edited. We do not find evidence that this is the case. Models testing the association find either no significant association or even a slight positive association between unofficial forms and edits (see Appendix S2). Re-coding incorrect result-sheets as edits does not substantially alter any estimates.

[13]See Appendix Table S1 for detailed statistics on irregularities in 2019 and 2014.

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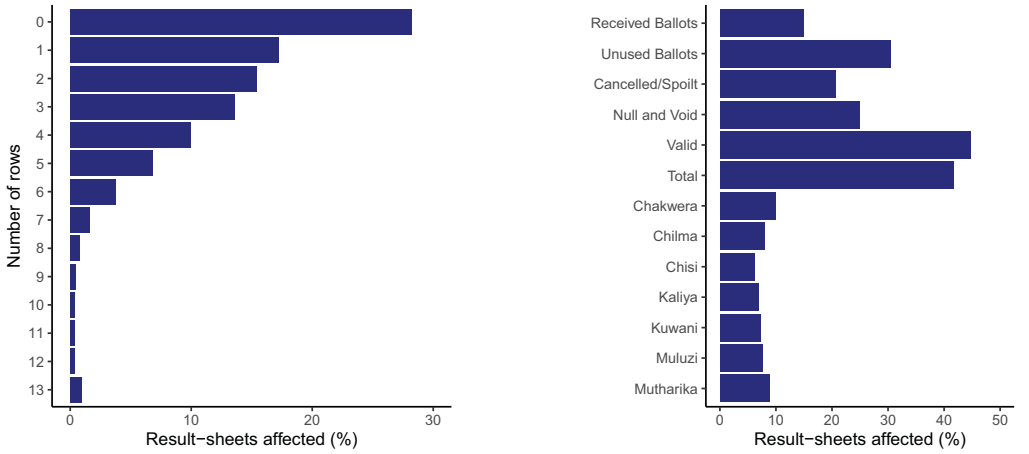

Figure 2. Distribution of edits in the 2019 presidential election.
Note: this figure shows the distribution and form of edits to Forms 66C in the 2019 election.

Examining the Role of Fraud

Tallying irregularities in the 2019 election were widespread, but were they driven by attempts to tamper with the election results? While there are many ways this tampering might have occurred, we particularly focus on the claim by opposition candidates and others at the time that officials from the MEC edited result-sheets in order to inflate votes for then-incumbent, Peter Mutharika. As noted above, this was a main claim of opposition candidates' and witnesses' sworn statements to the Malawi High Court and, following the court's rulings, was largely accepted as truth by many domestic and international media sources.

One observable prediction of these claims is that edited Forms 66C showing the presidential election tally should be more likely to favor Mutharika compared to unedited forms. Further, we should observe this bias especially among those forms which have edits to the candidate totals. Edits to other areas of the form (such as the number of received ballots or the total number of cast votes) are unlikely to have an effect on constituency tallies and are more plausibly reflective of arithmetic error.[14]

Rather than favoring Mutharika directly, it is also possible that edits were used to suppress votes for one or both of the two leading opposition candidates, Saulos Chilima and Lazarus Chakwera. If so, we might observe that edited forms are less likely to favor these leading opposition candidates relative to unedited forms.

These predictions imply the following testable hypotheses:

Hypothesis 1. *(a) Forms 66C with edits will add more votes for President Mutharika than Forms 66C without edits. (b) This effect will be greater when forms contain edits to candidate rows.*

Hypothesis 2. *(a) Forms 66C with edits will add fewer votes for Lazarus Chakwera and Saulos Chilima than Forms 66C without edits. (b) This effect will be greater when forms contain edits to candidate rows.*

As one approach to evaluating these hypotheses, we simply compare vote totals for edited and non-edited forms. Specifically, we estimate the regression in Equation (1) where v_{ij} equals the vote

[14]Total number of cast votes (line E), for instance, has to reflect the totals from each candidate vote (lines 1–7), so attempts to edit only line E without also changing lines 1–7 would prevent the form from being submitted at the CTC.

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total for candidate i in polling station j. e_j equals one if a polling station Form 66C had one or more edits and zero otherwise. β is the coefficient estimate and ϵ is the residual error term. Since edits had to happen prior to the constituency tabulation in order for them to have altered the result, we include u_k constituency fixed effects in most specifications and cluster standard errors at the constituency level. We also include the number of registered voters as a control since polling station size represents a likely confounder.[15]

$$v_{ij} = \beta e_j + u_k + \epsilon_{ij} \tag{1}$$

Figure 3 reports the findings. Contrary to predictions, most estimates are consistent with the null hypothesis of no relationship between edits and candidate votes. We see one significant correlation between edits and the vote count for the third-place candidate, Chilima. While seemingly consistent with Hypothesis 2, this effect appears to be spurious and non-causal: once we include constituency fixed effects or limit the analysis to edits in candidate rows, this estimate is also consistent with the null. Notably, all correlations between edits in the candidate rows and candidate votes are small and consistent with the null. Since an official would have to edit candidate rows in order to change the result-sheet vote count, this casts doubt on claims that irregularities were biased to favor any particular candidate. Most correlations are also in the wrong direction to those suggested by Hypotheses 1 and 2.

However, this evidence alone is not sufficient to reject these fraud hypotheses. For one, we do not expect irregularities to be randomly distributed throughout the country. If, as we contend below, many of these irregularities were the result of human error and administrative capacity, we would expect these irregularities to correlate with demographic and geographic features which could also be correlated with voting preferences, resulting in upward or downward bias in these estimates.

We use several strategies to more precisely identify the effect of edits. First, we augment our analysis with data from polling station observations conducted by NICE, a credible and respected Malawian civic organization. NICE sent local observers across the country on election day and recorded the presidential results from some 4,700 polling stations prior to them being sent to the CTCs for aggregation.[16]

If, as was usually alleged, illicit edits occurred after the results were certified by observers, these NICE observations should be independent of edits. We can therefore isolate the effect of edits on candidate votes by subtracting the NICE and MEC tallies, as shown in regression Equation (2). Here v_{ij}^{MEC} indicates the vote count for candidate i in polling station j according to the MEC. v_{ij}^{NICE} indicates the corresponding vote count according to the NICE tabulation. We again control for registered voters.

$$v_{ij}^{MEC} - v_{ij}^{NICE} = \beta e_j + u_k + \epsilon_i \tag{2}$$

On average, discrepancies between the NICE and MEC tabulations are small, yet some polling stations show more sizeable differences (see Appendix S4 for details). Discrepancies here may be the result of additions/reductions made in the candidate votes during the aggregation process, but may also represent tabulation errors by NICE or MEC.

We show estimates from Equation (2) in Figure 4.[17] Again, the results are consistent with the null hypothesis. We find near-significant and negative coefficients for Mutharika and Chilima

[15]Larger polling stations are more subject to error due to the greater number of tabulations (see discussion section). In the Appendix we also consider alternative specifications that do not use this control.

[16]Out of these 4,700 tallies, we remove results in 180 polling stations in which the combined number of votes for individual candidates is larger than the number of registered voters, likely due to tabulation errors made by NICE observers or incorrect polling station identifiers. In robustness tests we rerun the main analyses but include these 180 polling stations. Coefficients for tallying irregularities in these robustness tests do not differ in statistical significance – or the lack thereof – from the main analyses.

[17]Main regression tables presented in Appendix S10–S11.

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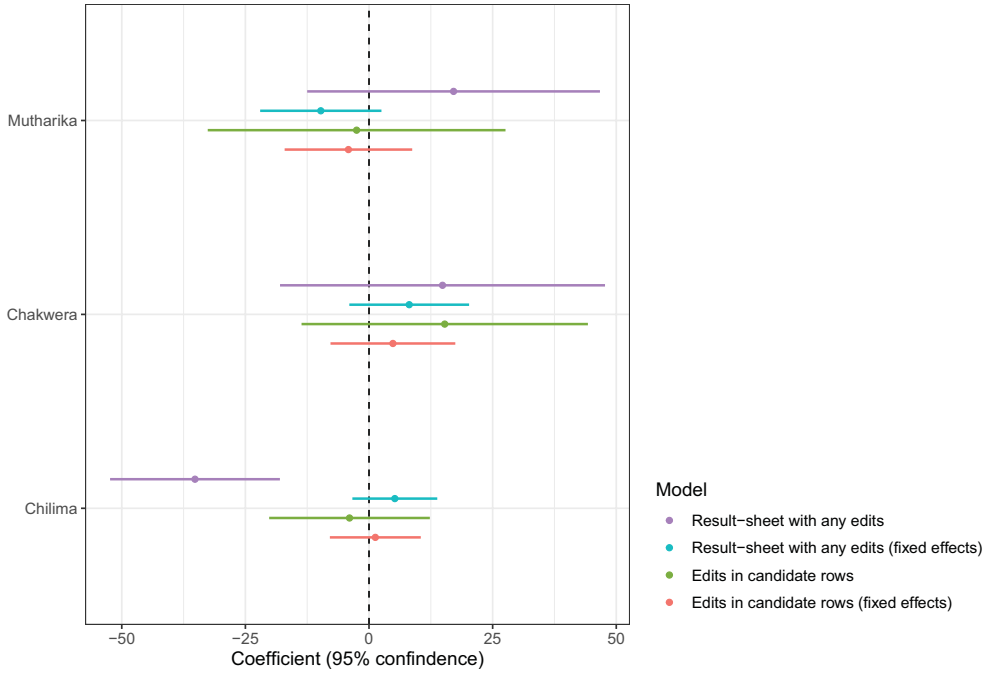

Figure 3. Tallying irregularities and candidate votes.
Note: this figure shows coefficient estimates from a regression of candidate votes on edits in Form 66C with and without constituency fixed effects. Horizontal lines indicate the 95 per cent confidence intervals.

under some specifications, yet these are not robust to the inclusion of fixed constituency effects. Notable is the negative correlation between edits and incumbent (Mutharika) votes, which is inconsistent with Hypothesis 1.

One might worry that the estimates from Figure 2 are likewise subject to manipulation or error. In the Appendix we consider other tests that rely on alternate identification strategies. As a third test, in Appendix Section 6 we compare the 2019 tallies to the tallies from the repeat election in 2020. This 2020 election was almost entirely free of the kinds of edits that marred the 2019 count. As a result, if we observe a decrease in votes for Mutharika in 2020 particularly in those polling stations with edits, we might interpret this fact as evidence that the 2019 election was inflated in favor of Mutharika.[18] However, in these tests we are likewise unable to reject the null hypotheses.

As a fourth test, in Appendix Section 6, we leverage the quasi-random assignment of voters to polling stream by surname to test whether irregularities affect voting *within* polling stations, adapting methods pioneered by Cantú (2014). These tests are also consistent with a null effect of irregularities on candidate tallies. While these effects are specific to the subset of multi-stream polling stations, they also do not rely on unverifiable assumptions about independence of irregularities with other electoral tallies. As such, they imply that such assumptions are not substantial to our conclusions.

While not our main goal, in the Appendix we also consider some alternative hypotheses about how fraud might have occurred in the 2019 election. Perhaps most plausibly, we consider the possibility that patterns of fraud were not uniform across the entire country. For instance, it is likely that candidates are more capable of committing fraud in areas where they have local

[18]This comparison is not unproblematic. Not least, it is likely that voters conditioned their behavior on the level of fraud in 2019, as well as on the alternative slate of candidates in 2020.

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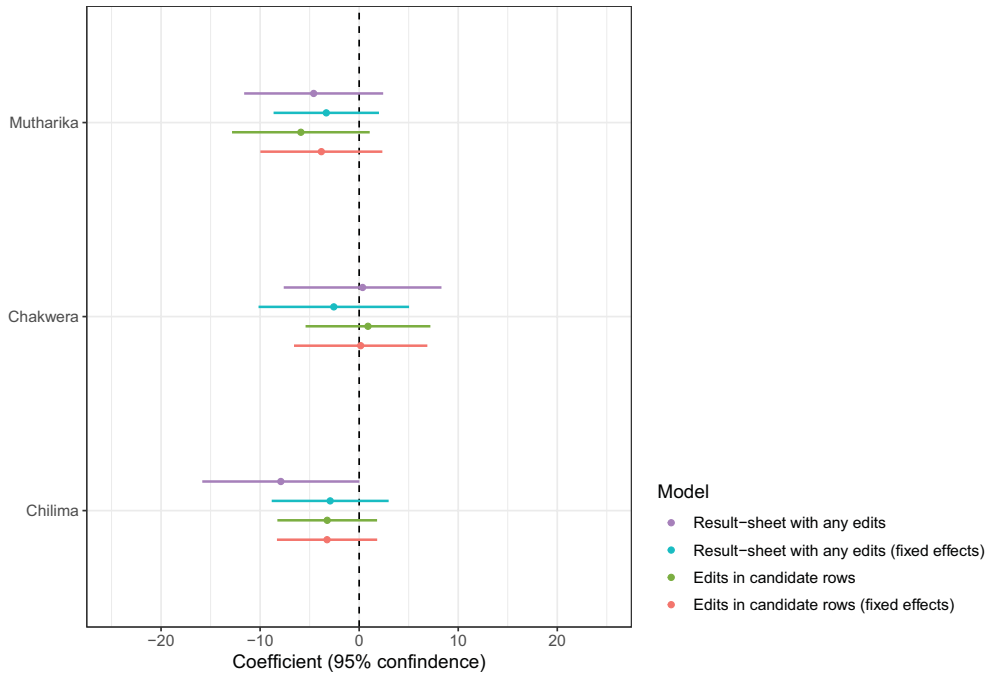

Figure 4. Tallying irregularities and changes in candidate votes during aggregation.
Note: this figure shows separate estimates from Equation (2) with and without constituency fixed effects. Horizontal lines indicate the 95 per cent confidence intervals.

dominance or leverage over poll workers (Wahman, 2023). However, contrary to this alternative hypothesis, we find no evidence that edits significantly favored candidates in their party or ethnic strongholds.

It is important to emphasize that our analysis in no way certifies that the 2019 election was free of malfeasance. Especially we cannot rule out very small effects, or locally heterogenous effects across candidate tallies. Nor can we rule out fraud that might have been unrelated to the Form 66C edits, such as ballot box stuffing or biased vote invalidation. Nonetheless, the sum of this evidence strongly suggests that the most prominent claim about fraud in the 2019 election is flawed: tallying edits did not systemically favor President Mutharika (or any other candidate) to an identifiable degree.

Examining the Role of Human Error

In light of the evidence against the fraud hypothesis, we proceed to examine the role of human error in generating irregularities. As the MEC maintained at the time, result-sheet edits may reflect genuine attempts to correct for arithmetic and other errors in the result-sheets (Binder Dijker Otte, 2019; European Union, 2019; MEC, 2019). A challenge in testing this human error claim is that it is impossible from observation alone to confidently determine whether an error was made intentionally or unintentionally. Instead, we test this claim indirectly by examining the effect of exogenous differences in *tallying complexity* across polling stations. Specifically, we hypothesize that result-sheet edits should increase when polling station officials have more complex computational or logistical tasks to complete.[19]

[19]These tests offer alternative explanations for result-sheet edits highlighted in fraud allegations but do not in themselves constitute evidence for or against fraud.

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The Number of Polling Streams and Result-Sheet Edits

We first examine the relationship between edits and quasi-random variation in the number of polling streams at a polling station. We expect the number of polling station streams to be a reasonable proxy for tallying complexity. Figure 1 provides examples of result-sheets with a single stream (left-hand panel) and two streams (right-hand panel). In polling stations with a single stream, presiding officers recorded the vote figures for the only stream and then copied these figures into the 'station total' column. In the case of multiple streams, presiding officers first recorded the individual streams, and then calculated the sums for each row into the 'station total' column. This increased the arithmetic complexity of the task and consequently possibilities for errors necessitating edits. We therefore test the following hypothesis:

Hypothesis 3. *Polling stations with multiple streams will have more result-sheet edits than stations with only one stream.*

To examine the relationship between streams and result-sheet edits, we rely on a rule that each polling stream can only have a maximum of 800 registered voters. The arbitrary rule of capping registered voters at 800 per stream enables us to identify the causal effect of streams under standard regression discontinuity (RDD) assumptions (Cattaneo, Idrobo et al., 2020). Both observer reports and court proceedings suggest that adherence to this rule was nearly universal. This is likely because there was limited opportunity for non-compliance. The number of streams for each of the 5,002 polling stations was established after voter registration was completed and publicly released by the MEC ahead of the election. Moreover, deviating from this would have been logistically challenging, as presiding officers were still required to report vote figures on result-sheets according to the predetermined number of streams. In the analyses below we therefore treat the number of registered voters as a running variable which allocates the units into treatment and control (Cattaneo, Idrobo et al., 2020). We then look at the rate of irregularities across the 800-voter cut-off. We focus primarily on the comparison between polling stations with only one or two streams. These were the most prevalent type of polling station – 72 per cent of polling stations had either one or two streams – and we expect that the contrast in complexity of filling the result-sheet is the greatest between these two types of polling stations.

In the analyses below, we estimate the local average treatment effect (LATE) for polling stations with 0 to 1,600 registered voters at the cut-off of 800.5 with a conventional local linear regression model using the first-order polynomial, while applying the data-driven optimal bandwidth selection procedures suggested by Calonico et al. (2014) and De Magalhães et al. (2025). We estimate the LATE on the average rate of edits in all three elections in 2019 – the presidential, parliamentary, and local councilor – as well as for each election separately. The results, displayed in Figure 5 and Table 1, show a substantively positive and statistically significant effect of increasing the number of polling streams from one to two on edits. This positive effect is found in all three elections, when measured together and separately.

On average, the rate of edits increases by about 20 percentage points at the cut-off. These effects do not depend on the selected bandwidth. For the presidential election we calculate LATEs for multiple bandwidths both closer to and further away from the cut-off and the effects remain positive and statistically significant, until very close to the cut-off due to lack of observations (Appendix S16). The results are also robust to different orders of the local polynomial (Appendix S17).

In the Appendix, we also test the effect of increasing the number of streams from two to three and from three to four (Appendix Table S12 and S13). The results are consistent, but not always statistically significant at conventional levels. Given the lower power of these tests and the weaker expected increase in complexity at higher stream densities, these weaker effects are not surprising.[20]

[20]There may also be a ceiling effect, as the rate of edits gradually increases with the number of registered voters and is on average close to 80 per cent at these higher cut-offs.

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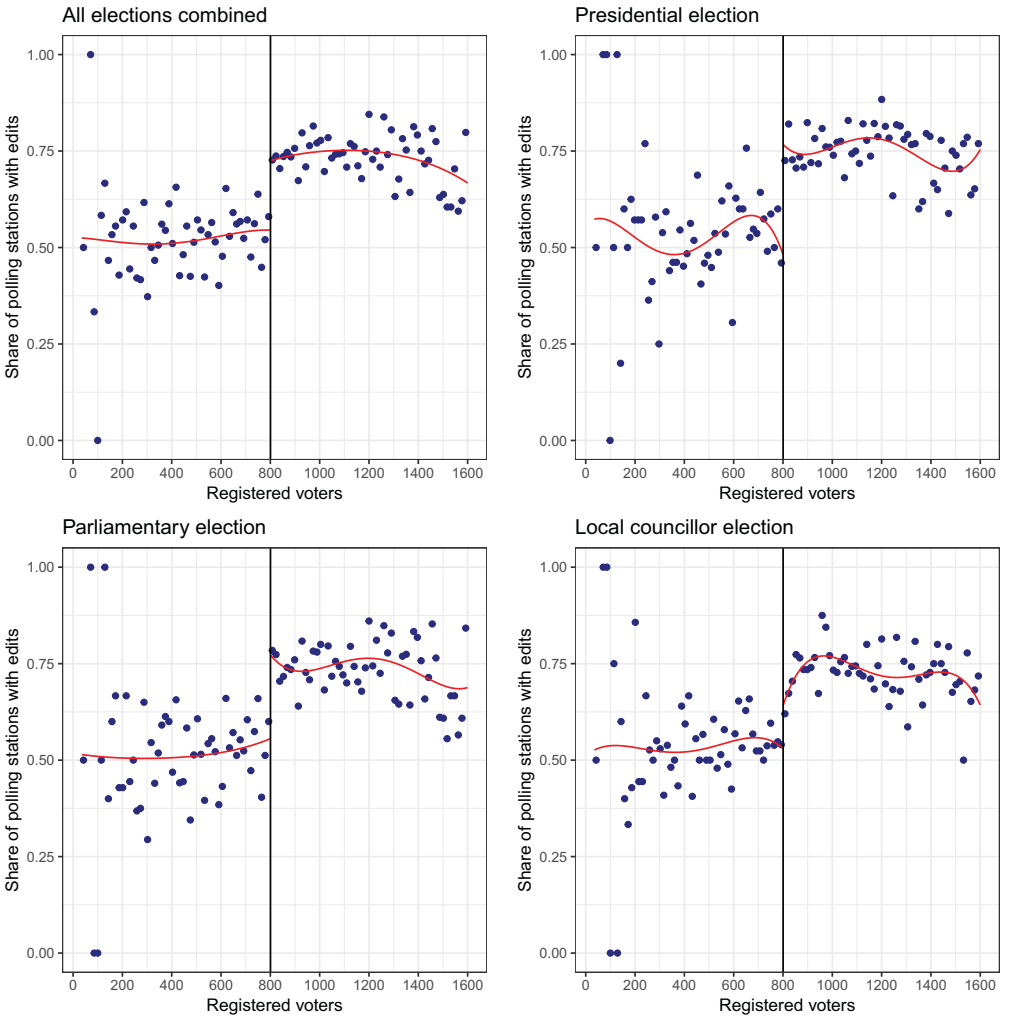

Figure 5. RDD plots: result-sheet complexity and irregularities in the 2019 Malawi elections.
Note: this figure shows how the rate of irregularities varies by the number of registered voters associated with a polling station. The discontinuity at 800 voters implies that polling stations with multiple streams were more likely to see irregularities. Red lines show the local polynomial regression line.

A threat to validity of RDDs is that the studied objects sort themselves under or above the cut-off. This could for example be a concern if voters selected the polling stations based on the likely number of streams (Harris, 2021). Strategic sorting of this kind is however less likely in Malawi because the law stipulates that voters need to be registered in the area of their residence (Malawi Electoral Law, Part III, paragraph 10). We conduct McCrary tests using multiple bandwidths to examine possible sorting, following Cattaneo, Jansson et al. (2018). For the cut-off between polling stations with either one or two polling streams at 800.5 registered voters we do not find any statistically significant evidence of sorting at any bandwidth (see Appendix Figure S18 and Table S14).[21]

[21]For higher cut-offs, we find some near-significant coefficients at a few of the tested bandwidths in sorting tests. This may however be due to the relatively few numbers of polling stations at these levels (see Appendix Figure S18 and Tables S15–S16).

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Table 1. RDD estimates: result-sheet complexity and result-sheet edits in the 2019 elections

	Combined		Presidential		Parliamentary		Local councilor	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Conventional	0.184***	0.174**	0.246***	0.262***	0.203***	0.217***	0.126*	0.082
	(0.044)	(0.055)	(0.058)	(0.072)	(0.051)	(0.062)	(0.062)	(0.078)
Bias-corrected	0.186***	0.175**	0.264***	0.270***	0.210***	0.220***	0.112+	0.076
	(0.044)	(0.055)	(0.058)	(0.072)	(0.051)	(0.062)	(0.062)	(0.078)
Robust	0.186***	0.175**	0.264***	0.270***	0.210***	0.220**	0.112	0.076
	(0.053)	(0.059)	(0.068)	(0.076)	(0.061)	(0.067)	(0.074)	(0.084)
Bandwidth	MSE	CER	MSE	CER	MSE	CER	MSE	CER

Note: $+ p < 0.1$, $^{*} p < 0.05$, $^{**} p < 0.01$, $^{***} p < 0.001$. *Note:* this table shows estimates of result-sheet edits around the 800 registered voter cut-off in the different elections. Conventional, bias-corrected, and robust estimates are presented for mean squared error (MSE)-optimal (column 1) and coverage error rate (CER)-optimal (column 2) bandwidth selectors. Standard errors are reported in parentheses. All models were estimated with the first-order polynomial.

To alleviate concerns that the effects might be driven by imbalances between polling stations above and below the cut-off points, we check for the balance of key pre-treatment variables. For instance, irregularities could vary due to social characteristics of the neighborhood around the polling center, such as economic development or the social composition of registered voters at the polling station. Balance tests for the presidential election at the cut-off between one and two polling streams at 800.5 registered voters shows no significant differences in polling stations just above or just below the cut-off on any of these variables (see Appendix S19).[22] We also carry out a placebo test following Cattaneo, Idrobo et al. (2020) examining the effect of the true cut-off at 800.5 registered voters and different artificial cut-offs between 400 and 1,200 registered voters. This test suggests that the outcome of interest only jumps discontinuously at the true cut-off (see Appendix S21).

Allocation of Received Ballots and Result-Sheet Edits

Another common and plausibly exogenous source of tallying complexity involved the reconciliation of received ballots in each polling station. As part of their responsibilities, presiding officers were required (prior to opening a ballot box) to reconcile the number of ballot papers allocated to each polling station stream against the number of unused and spoilt ballots and enter this information into Form 66 (line A) (Dzonzi, 2021). This served as an important check on ballot box stuffing since observers or auditors could check the number of unused and spoilt ballots against the recorded total to make sure that no ballots were removed or replaced. The fact that there were edits in the row for the number of allocated ballots in 15 per cent of polling station result-sheets was therefore a significant cause of concern in post-election debates (Dzonzi, 2021).

Using exogenous variation in the complexity of the reconciliation process, we examine the role of human error in driving errors in ballot reconciliation. Specifically, we take advantage of the fact that ballots were delivered to polling stations in booklets of 100 ballots in proportion to the number of registered voters plus 3 per cent. Individual ballots in the booklets were numbered so that the presiding officer could easily verify how many ballots had been used from each booklet and how many remained. Booklets of 100 ballots were therefore not intended to be broken up and

[22]It is also possible that the number of streams affects vote figures in the present election, including turnout, the rate of invalid votes, or even candidate vote-shares (Harris, 2021), which in turn could account for changes in edits. We therefore also test the balance on these variables at the cut-off in Appendix S20 but do not find any significant imbalances.

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divided into smaller parts (Chilima v. Mutharika, 2019). Therefore, each polling station received ballots as follows: the number of registered voters multiplied by 1.03 rounded up to the closest 100.[23]

It follows that the complexity of reconciling ballots increased fairly substantially whenever presiding officers were forced to break up booklets of 100 in order to distribute ballots across polling streams. For instance, in polling station 7012 in Kasungu the number of registered voters was 1,130, equating to 2 polling streams and 1,200 received ballots.[24] In this case, ballots could be allocated equally (600 + 600) to the two streams without breaking the booklet of 100 ballots.[25]

In other polling stations such equal allocation in whole 100s of ballots was not possible. For example, polling station 12126 in Mchinji had 2 polling streams and received 1,300 ballots. In these cases, presiding officers had to choose whether to break the booklet so as to allocate an equal number of ballots to each stream or to allocate different amounts of ballots to the different streams. This created a number of challenges since an unequal allocation sometimes meant that ballots had to be shared across polling station streams. Moreover, by breaking up books of 100, presiding officers lost an easy way to determine the number of unused ballots.

We observe a number of errors consistent with human error of this sort. For instance, in some cases streams were first allocated an unequal number of ballots, but this was then later altered either with pen or with correction fluid so that each stream was given exactly the same number.[26] In other cases each stream seems to have first been given an equal number of ballots, but then this has been corrected when the total number of ballots in this row did not equate to the correct number of received ballots.[27] We therefore propose the following testable hypothesis:

Hypothesis 4. *Polling stations in which it was possible to allocate ballots equally across streams will have fewer result-sheet edits than polling stations in which this was not possible.*

To test whether the allocation of ballots across polling streams affected edits we fit the regression in Equation (3) for all polling stations with two or more polling streams. e_j equals edits in the result-sheet. Here we estimate separate models for 1) edits in the row for received ballots (Form 66 line A) and 2) the combined number of rows edited. a_j equals one if it was possible to allocate ballots evenly across streams and zero otherwise. This is calculated by dividing the number of received ballots with the number of streams and recording in which polling stations the quotient is in even 100s.[28] We also control for the number of streams in the polling station s_j and constituency fixed effects u_k.

$$e_j = \beta a_j + s_j + u_k + \epsilon_j \tag{3}$$

Consistent with human error, the results of the regression presented in Table 2 show clearly negative and statistically significant effects on both outcome variables. On average, in multi-stream polling stations, the possibility of allocating ballots equally across polling streams reduces the share of

[23]Analysis of Forms 66 indicates that the recorded number of received ballots matches this number exactly in about 90 per cent of result-sheets.

[24]1,130×1.03 = 1,163.9 rounded up to 1,200.

[25]It is possible to allocate ballots differently; however, this was rare in practice: when equal allocation was possible presiding officers allocated ballots equally across polling streams in booklets of whole 100s 90 per cent of the time (based on analysis of non-edited Forms 66).

[26]For example, in polling station 12126 each stream is recorded to have been allocated 650 ballots after figures in this row had been edited with correction fluid. In polling station 8064 each stream was recorded to have received 680 ballots after figures had been edited with pen.

[27]For example, in polling station 11098 each stream has seemingly first been given 600 ballots each. Yet, as the total number of received ballots is recorded as 1,900, the calculation is incorrect and consequently the number of received ballots in one of the polling streams has been altered with pen to 700.

[28]We calculate this for each polling station irrespective if the correct number of received ballots was recorded in the result-sheet. The variable can therefore be seen as recording the intention-to-treat.

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Table 2. Even allocation and result-sheet edits

	Dependent variable:			
	Edit in row for received ballots		Total number of rows with edits	
	(1)	(2)	(3)	(4)
Even allocation	−0.059***	−0.063***	−0.238***	−0.292***
	(0.012)	(0.013)	(0.072)	(0.072)
Fixed stream effects	Yes	Yes	Yes	Yes
Fixed constituency effects	No	Yes	No	Yes
Mean edits in ps with uneven allocation	0.19	0.19	2.77	2.77
Observations	3,467	3,467	3,467	3,467
R^2	0.031	0.098	0.055	0.156
Adjusted R^2	0.027	0.041	0.051	0.103

Note: *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$.

edits in the row for received ballots by a third and the total number of rows affected by about a tenth. In the Appendix, we consider and reject other possible explanations for this correlation.[29]

These analyses provide evidence that result-sheet edits in the 2019 elections were often driven by human error. When presiding officers were faced with more complex tasks of filling out the result-sheet – due to varying number of streams or possibilities to allocate ballots evenly – they were more prone to errors and, consequently, to editing result-sheets.

Conclusion

Despite improvements in electoral procedures and monitoring, support for elections has declined in twenty-six out of thirty African countries over the last decade (M'Cormack-Hale and Dome 2022). About one in every five elections globally are now followed by riots and protests alleging fraud[30] and a growing number of elections end in legal disputes (Gerzso, 2023). Addressing this legitimacy deficit requires a better understanding of when and why electoral procedures go awry.

To this end, we evaluate the role of fraud and human error in Malawi's infamous and annulled 2019 election. In a comprehensive evaluation of polling station result-forms, and comparing polling stations both cross-sectionally and across different time-points in the aggregation process, we find little to no evidence that polling station irregularities benefited the incumbent party – or any party. While this analysis does not mean that this election was free of all fraud, the findings contradict the main form of systemic fraud claimed by opposition candidates and High Court claimants at the time and still accepted by most domestic and international media sources.

In light of this evidence, and building on evidence from interviews with polling station officials and observers, we propose hypotheses about the role of human error and staffing capacity in the 2019 election. To test these hypotheses, we introduce new statistical tests to identify the causal effect of computational complexity on tallying error. Our results confirm that human error likely played a substantial role in the irregularities and result-sheet edits that led to the election annulment.

Our reassessment implies lessons for electoral integrity efforts. For one, it suggests that human error is often underappreciated as a cause of tallying error and that investments in basic capacity may go a long way to improving electoral legitimacy. Especially, raising the skills and capacity of poll workers, and particularly presiding officers, can reduce possibilities for computational errors.

[29]The possibility of allocating ballots equally across streams is a product of both the number of polling streams and the number of received ballots which we believe are exogenous to other features of the polling station. This assumption is supported by a balance test of key pre-treatment variables, including social characteristics and the social composition of registered voters, which shows no significant associations (see Appendix S22).

[30]Based on data from Hyde and Marinov (2012) from 2010 to 2020.

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Additionally, our analysis favors procedures that limit the necessity for polling station officials to conduct complex calculations. For instance, a large share of irregularities in Malawi likely could have been avoided if – like in many countries – polling station officers were only tasked with reporting overall ballot counts rather than totaling ballots within each stream.[31]

Our analysis also highlights unintended consequences of investments in electoral integrity (Barkan, 2013; Cheeseman et al., 2018; Sibande, 2021; Warner et al., 2021). Thanks to donor investment, Malawian elections feature a robust digitized tallying and form transmission process. Rather than highlighting fraud in 2019, this procedural integrity appears to have forced a standard of rigor into the tallying process which did not in fact exist. Even though the level of irregularities in 2019 was not particularly unique, the visibility of these and the ease with which political entrepreneurs could use such irregularities to claim fraud or seed distrust were high.

Finally, we contribute new forensic methods to identify the causal effect of computational complexity on tallying irregularities. To date, most forensic work on elections has focused on identifying fraud. Yet to have an effective and legitimate election we need not just an honest tallying procedure, but an accurate one. To this end, we expect our methods will be useful for researchers and policy makers interested in a more general diagnosis of the causes and consequences of tallying error.

Supplementary material. The supplementary material for this article can be found at https://doi.org/10.1017/S0007123425100951.

Data availability statement. Replication data for this paper can be found in Harvard Dataverse at https://doi.org/10.7910/DVN/WVZIXQ.

Acknowledgements. We thank the National Initiative of Civic Education and George Ofosu for sharing data. Jimmy Mkandawire and Alex Yeandle assisted with data collection. We received invaluable feedback from Richard Klein, Amanda Domingues, Nandini Patel, Adam S. Harris, Elliot Green, Jeroen Gunning, and three anonymous reviewers. We are indebted to the late Francisco Cantú whose research helped inspire this work and who advised the study design.

Funding statement. This research was supported by a grant from the London School of Economics and Political Science.

Competing interests. The authors declare no competing interests.

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[31]Malawi is increasingly unique in its requirement for stream-level aggregation. For instance, Zambia recently changed procedures to only require polling station-level ballot counts in response to observer concerns (European Union, 2016).

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Cite this article: Ahlbäck J and Jablonski R (2025) How to Distinguish Human Error From Election Fraud: Evidence From the 2019 Malawi Election. *British Journal of Political Science* 1–20. https://doi.org/10.1017/S0007123425100951