Social Media, Incumbent Support, and Election Irregularities: Evidence from Malawi

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Abstract

How does rising access to social media shape elections in low-income democracies? In a controversial, overturned election in Malawi, I show how exposure to online platforms can reduce unfair incumbency advantages and improve election administration. First, leveraging geocoded polling station returns and the expansion of 3G mobile internet in a difference-in-differences setting, I show that incumbent vote share and election irregularities decline in newly exposed areas. Second, I use survey data to show that coverage corresponds to higher individual-level social media access and anti-incumbent sentiment. Third, I draw on detailed interviews with voters, party activists, and election officials to examine mechanisms. These reveal opposition parties made more effective use of social media, online platforms allowed civic education campaigns to reach more voters, and internet access helped officials coordinate on election day. This paper contributes to the literature on social media, party strategy, and election administration in new democracies.

Keywords: Social media; internet; elections; voting; democracy; Malawi

1. Introduction

How does rising access to social media affect the quality of elections? For some, online platforms are a "liberation technology" that topples autocrats and dominant parties (Diamond, 2010; Miner, 2015; Manacorda and Tesei, 2020). For others, they allow disinformation to dominate campaigns and polarise voters (Lelkes et al., 2017). For others still, effects are overstated and have only minimal impacts on public opinion (González-Bailón et al., 2023; Guess et al., 2023b, 2023a; Nyhan et al., 2023).

But despite a growing literature on the political consequences of social media, we know little about its effects in low-income countries (Tucker et al., 2018). Many of the world's democracies are characterised by low economic development, weak media infrastructure, and regular accusations of electoral malpractice. Online platforms offer a profound shift in the ways voters access information, learn about politics, and engage with political parties. However, the extent to which existing findings travel and the mechanisms by which social media matters remain open questions.

I document two channels by which online platforms can improve election quality in low-income settings. First, opposition parties can directly mobilise voters, undercutting some of the unfair advantages incumbents hold. Second, election officials and civic education campaigns can better coordinate, aiding election administration by reducing irregularities. Social media is a multifaceted phenomenon, but I demonstrate two ways rising access might matter. These diverge from a growing focus on partisan polarization and minimal effects hypotheses in Western countries.

I study these questions in Malawi, in the context of a controversial election. Malawi is a multiparty democracy characterised by unfair incumbency advantage, episodic election violence, and allegations of election fraud (Dionne and Dulani, 2014; Patel and Wahman, 2015; Borzyskowski and Wahman, 2021). I study the country's 2019 vote, which saw significant irregularities and was later overturned by the country's supreme court.

First, I use geocoded polling station returns and high-resolution maps of 3G mobile internet coverage. In a difference-in-differences setting, I leverage the expansion of coverage to proxy local access to the internet, showing that ruling party vote share and irregularities decrease in areas that came online. This

is robust to a series of modelling choices, and I provide qualitative and quantitative evidence to support identifying assumptions.

Second, I demonstrate that internet coverage corresponds to individual-level political behaviour. Using a geocoded post-election survey, I show respondents living in areas with internet reception are more likely to have access to a smartphone, get more news from social media, and are less supportive of the ruling party.

Third, I draw on focus group discussions and elite interviews across Malawi to explore causal mechanisms. These reveal differences in how opposition and ruling parties used social media to campaign, its importance in disseminating civic education, and how officials and observers used online platforms to coordinate on election day. This reveals a series of channels through which internet access and social media shaped incumbent support and election administration, opening several avenues for future research.

I make three central contributions to the literature. The first is expanding the study of the internet's political consequences to a globally important, and understudied, country case. In low-income democracies like Malawi, growing access to social media is arguably more transformative than in its wealthier counterparts (Mbiti and Blumenstock, 2015) and adds to our understanding of party competition and election integrity (Zhuravskaya et al., 2020). This paper points to ways social media can improve election quality in such contexts, adding nuance to our understanding of how the internet and social media shape political outcomes.

The second is to triangulate fine-grained quantitative data with detailed qualitative evidence. Using high-resolution coverage maps and geocoded polling station returns, this study offers an unusual level of spatial precision. Interviews and focus group discussions offer both descriptive leverage on causal mechanisms and direct support for the inferential assumptions underpinning the quantitative analyses (Seawright, 2016). The paper identifies that social media matters and can offer tangible explanations as to why. This is a significant empirical advance on existing work.

Lastly, the discussion of mechanisms raises several topics for future research to investigate. Accounts from Malawi stress the supply-side importance of social media provision; even in areas where most

voters do not have access to a device, online platforms matter for party organisation and communication with local opinion leaders. Civic education campaigners emphasised the spillover effects of social media access; rather than explicitly campaigning online, they found that in-person events were magnified by attendees' ability to share photos and videos. Election officials saw online platforms, especially WhatsApp groups, as critical for election day coordination and management. These themes diverge from an overwhelming focus on personal access to devices in the existing literature and speak to debates about incentives and official behaviour (Rundlett and Svolik, 2016). Consistent with recent work (e.g., Lynch and Gadjanovaa, 2022; Bessone et al., 2022), the evidence from Malawi shows how internet provision might have more nuanced, indirect effects.

The paper proceeds as follows. Sections 2 and 3 outline existing work on internet access, social media, and elections, highlighting the under-study of Malawi and similar countries. Sections 4 and 5 introduce the case of Malawi, the 2019 general election, and the fine-grained spatial data with which I study it. Sections 6 and 7 present the main results, showing that exposure to mobile internet negatively affects incumbent vote share and ballot irregularities, reflected in local public opinion. Section 8 draws on qualitative evidence to explore mechanisms, before Section 9 concludes.

2. Internet Access, Social Media, and Democracy

The advent of the internet and social media is a marked structural change, sparking scholarly debate about its merits and drawbacks for democracy. Most existing work falls into three broad camps: those who see new online platforms as improving, worsening, or having no significant effect on the quality of elections. But low-income democracies, such as Malawi, remain understudied.

The first camp, largely inspired by the events of the Arab Spring, emphasises how social media fosters protest and political violence (See Pierskalla and Hollenbach, 2013; Christensen and Garfias, 2018; Manacorda and Tesei, 2020; Fergusson and Molina, 2020). Opposition groups can use online platforms to solve collective action problems, overcoming the advantages held by the incumbent. A related literature stresses the role of information. When unbiased, online platforms are a vehicle to learn about government performance, holding ruling parties accountable where they have performed poorly (Guriev et al., 2021; Manacorda and Tesei, 2020). Accessible information can directly benefit opposition parties, who can target new voters outside strongholds (Miner, 2015; Donati, 2023). This

explains, in part, why many regimes use censorship and shutdowns to minimise open discussion online (e.g. King et al., 2013; Freyburg and Garbe, 2018).

A second body of work stresses information conveyed online is routinely biased. Social media can drive disproportionate exposure to like-minded content (Cinelli et al., 2021), which polarises across partisan and other social divides (e.g. Lelkes et al., 2017; Bail et al., 2018; Choi et al., 2021). This makes voters less sensitive to the true performance of government, and can thus undermine accountability and faith in the democratic process.

Finally, in some contexts, there is evidence that social media may not substantively matter. A series of recent micro-level experiments, based predominantly in the United States, suggest that varying online exposure has only small effects on beliefs (e.g. González-Bailón et al., 2023; Guess et al., 2023b, 2023a; Nyhan et al., 2023).

However, each of these camps studies different parts of the world that are difficult to compare. Work on "liberating" potential falls in less free countries: autocratic states characterised by oppression, a lack of free speech, and a lack of institutionalised opposition. Work on polarization and recent experiments are predominantly based in the US, which is already characterised by hyper-partisan, saturated media environments. Low-income democracies fall somewhere in between, representing a theoretically important type of case. On the one hand, they are not autocratic; elections occur regularly, opposition parties occasionally win power, and there is some degree of free speech. But on the other, there are legitimate concerns about how well democracy functions; governments have extensive material and informational advantages in election campaigns, and elections are not always fairly administered.

3. Online Platforms and Election Quality in Low-Income Countries

In this paper, I study two election features pertinent to low-income democracies: the extent to which incumbents enjoy unfair advantages and the impact of poor election administration. I expect that increasing access to social media can improve election quality by reducing the prevalence of both factors.

3.1 Diminishing Incumbency Advantage

Dominant incumbent parties can leverage state power to secure informational and organisational advantages in elections. Online platforms allow opposition parties to undercut these institutional advantages by balancing out biased media and mobilising new voters.

First, social media platforms can be used to inform new voters. Ruling parties can heavily influence conventional, often state-funded, mass media platforms – like radio, television, and newspapers (Bleck and van de Walle, 2018). This confers institutional advantages over opposition parties by ensuring voters only learn the positive aspects of government performance. As access to online platforms increases, voters can access content from a broader range of political perspectives. This might be through direct online exposure or an indirect *lack* of exposure to government information, as voters substitute conventional media with online counterparts.

Second, online platforms can expand the organisational reach of under-resourced parties. Opposition groups no longer need to physically travel across the country to reach voters, nor bear the risk of violence that can accompany campaigning in government strongholds or remote regions (Borzyskowski and Wahman, 2021). Instead, party headquarters can remotely coordinate with local activists to reach voters and campaign (Fisher et al., 2023). This helps overcome the incumbent's large "ground operation" and electoral advantages.

A growing literature finds support for these two channels across Africa, using interviews with party activists and voters to establish how online platforms are used around election time (e.g., Hassan and Hitchen, 2022; Dwyer and Molony, 2019; Nyabola, 2018). However, there remains minimal evidence that quantifies how such patterns affect election results in Africa – or low and middle-income democracies more generally. Donati (2023) provides evidence that mobile internet access benefitted opposition parties in South Africa, Bessone et al. (2022) consider how politicians in Brazil strategically engage voters online, and Miner (2015) shows that internet access contributed to the defeat of a dominant party in Malaysia. Beyond these studies, however, evidence remains scarce.

3.2 Improving Election Administration

Many low-income democracies face regular accusations of fraud and malpractice, so the quality of election administration is an important political outcome. Existing literature outlines two ways online platforms can improve it: monitoring and efficiency.

First, a series of experimental studies have shown online platforms can be used to monitor vote counting, deterring irregular behaviour.[1] Requiring observers to disseminate photographs of ballots reduce irregularities in Afghanistan (Callen and Long, 2015; Callen et al., 2016), while evidence from Colombia and Afghanistan suggests social media could be an effective platform for citizen oversight (e.g., Garbiras-Díaz and Montenegro, 2022; Gonzalez, 2021). But while existing work shows how online platforms can be an effective tool in the hands of civic groups, they do not explicitly test the effects of social media access and its organic expansion. This paper makes such a contribution.

Second, electoral commissions can use internet-based technologies to work more efficiently, aggregating votes and communicating outcomes in real-time. Polling station and commission staff can also coordinate with each other on election day and help resolve logistical problems that might have previously benefitted one party over another.[2] This significantly accelerates processes (Igboechesi, 2019), minimises the risk of upstream irregularities (Birch, 2011), and improves transparency and confidence in results. However, we know little about the microfoundations underpinning officials' behaviour (Rundlett and Svolik, 2016).

I provide evidence that expanding social media access reduced irregularities in a controversial election in Malawi. I pair this with a detailed qualitative examination of why through discussions with party activists, civil society organisations, and election commission staff.

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[1] These are specific applications of more general monitoring experiments, based around election observation. For evidence that observers reduce fraudulent activity see: Garber and Cowan, 1993; Hyde, 2007; Ichino and Schündeln, 2012; Leeffers and Vicente, 2019; Asunka et al., 2019.

[2] For example, if a polling station officer is unsure how to process a ballot, their station is having security issues, or they did not receive enough ballots for the registered voters, the ability to communicate online can help resolve these issues faster.

4 The Case

4.1 Democracy in Malawi

I study elections in Malawi, one of many "third-wave" democracies that has held multiparty elections since the 1990s (Cheeseman, 2015). These elections matter, with evidence that Malawian voters reward or punish government performance and that the government has become more responsive since democratisation.[3]

But Malawi's elections are not perfect, characterised by institutional advantages for the ruling party, concerns about irregularities, and sporadic incidents of violence and intimidation (Dionne and Dulani, 2014; Borzyskowski and Wahman, 2021). The ruling party dominates public broadcast media and is accused of using state resources to fund rallies, using the police to disperse opposition campaigns, and targeting development projects into competitive areas (European Union, 2020). Moreover, there are regular complaints about irregularities – and accusations of fraud – in the aftermath of elections (Patel and Wahman, 2015).

Many states across Sub-Saharan Africa, South America, and South Asia have similar experiences. Section A.2 of the supplementary materials shows that Malawi sits close to the global median on V-Dem's Electoral Democracy Index (Coppedge et al., 2020), while Western democracies and MENA countries shaped by the Arab Spring sit at the distribution's poles.

Malawian politics is dominated by two political parties. First is the Malawi Congress Party (MCP), formed in 1959 towards the end of British rule (Mccracken, 1998). The MCP governed as a single party for three decades in the post-independence period until the establishment of multiparty elections in 1994 (Kalua, 2011). The party remained out of power since, until re-taking office in 2020 as leaders of an opposition alliance.

[3] A series of single-country studies demonstrate Malawian voters' responsiveness perceptions of government performance, from food security, to agricultural subsidies, to corruption (see: Ferree and Horowitz, 2010; Mpesi and Muriaas, 2012; Dionne and Horowitz, 2016; Dulani et al., 2021). In addition, much of the cross-national literature on democratic outcomes includes Malawi as part of the sample, showing the positive effect of free and fair elections on infant mortality, education spending, and public good provision (e.g., Baum and Lake, 2003; Kudamatsu, 2012; Harding and Stasavage, 2013; Harding, 2020).

Second is the Democratic Progressive Party (DPP), formed in 2005 by then-President Bingu wa Mutharika as a breakaway faction of the United Democratic Front. The DPP has been electorally dominant in recent years, winning the 2009, 2014 and (initially) 2019 general elections (Ferree and Horowitz, 2010; Patel and Wahman, 2015). Part of this time was spent in opposition after President Mutharika died in office in 2012, and his replacement, Vice-President Joyce Banda, left the DPP to form her own party in protest to Mutharika grooming his brother as his successor (Cammack, 2012). From opposition, the party won the 2014 election and remained in power until 2020 under Mutharika's brother Peter. In this paper I study changes in incumbent support in 2019, so concentrate on vote shares for the DPP.

4.2 The 2019 Presidential Election

Malawi's 2019 election was controversial. Incumbent Peter Mutharika was narrowly re-elected, prompting mass outrage and accusations of malpractice (Cotterill, 2020; Gwede, 2020).[4] Complaints centred around the use of correction fluid to alter results sheets, ballots being inconsistently marked null and void, more people voting than registered, and discrepancies between polling station tallies and official results. International election observers were reluctant to declare fraud but did note the DPP's institutional advantages and the presence of irregularities in certain areas as areas of concern (European Union, 2020; African Union, 2019).

Opposition parties challenged the election results in court. In February 2020, judges annulled the vote and scheduled a re-run for later in the year, under a new electoral system more favourable to the opposition.[5] An MCP-led opposition alliance won the re-run, and their candidate, Lazarus Chakwera, peacefully took power (Nkhata et al., 2021).

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[4] The 2019 election also included voting for MPs and local councillors, but these races were far less salient and *not* nullified by the supreme court. For instance, EU election observers note that the presidential race "dominated" the election, while "parliamentary and local government candidates campaigned primarily through small meetings and door-to-door canvassing" (European Union, 2020, p. 16) Similarly, African Union observers noted that "The presidential race dominated news coverage over parliamentary and local government elections" (African Union, 2019, p. 23). MPs and councillors elected in 2019 have since been granted a one-year extension to their terms, to allow for a harmonised tripartite election in 2025.

[5] In 2019, winning the Presidency required a simple plurality of votes. Given Malawi's regional divides, this ensured that the DPP and MCP always gained a similar share of support, and election outcomes were close. In 2020, this was replaced with a majority system, in which the winning candidate had to obtain 50% + 1. If no candidate initially achieved this, there would be a run-off between the two highest placed candidates. The DPP were concerned this system could foster anti-DPP strategic voting across multiple opposition parties in any run-off.

4.3 Ballot Rejection as an Election Irregularity

Alongside incumbent support, I focus on a salient and systematically observable irregularity from Malawi's 2019 election – the number of votes officially declared null and void in each polling station. While it is unclear whether ballots were rejected to advantage the ruling party, it is one of many factors that led judges to overturn the election.

Accounts on the ground suggest two ways ballots might be inconsistently rejected at different levels of tabulation. The first is inside polling stations. Upon entering a station and confirming their identity, voters have a finger marked with indelible ink so they cannot vote more than once.[6] In some stations, however, there were reports of voters receiving ballots before this ink had been allowed to dry. This led to smudging, and subsequent markings in more than one candidate's box. While it was often obvious which candidate a voter had selected, the smudge could be grounds to discard the ballot as null and void.

In interviews, staff from the electoral commission told me that rejecting such ballots was a subjective decision made by the presiding officer in the presence of party monitors. There was often "pressure from those [parties] who are losing. Sometimes the officials sway to those making noise…[they] can reasonably accept [the ballot] or be strict and let it go." For some in the opposition, the fact that presiding officers were teachers – selected and vetted by the Ministry of Education – fed concerns they were biased toward the government and selectively rejected ballots to benefit the DPP.

The second is at constituency tallying centres (CTC), where polling station results are processed. A salient feature of the 2019 election was the adoption of IT systems at CTCs, where officials entered results digitally to be transmitted to the electoral commission's national headquarters. The system was programmed to only accept results that added up – i.e., the total number of votes matched the sum of those for each candidate. This posed a problem, as many individual results sheets contained simple arithmetic errors. To "fix" this, constituency officials sometimes changed parts of the ballot to amend errors. This either led to discrepancies between hand-written sheets and official results, or to post-hoc

[6] This is standard practice in many countries around the world, most famously in India.

revisions of original sheets made with pen or, more controversially, correction fluid. It is contested whether this process carried partisan bias. Opposition parties claim the procedure was used to increase the DPP's tally, while the electoral commission insists it was just a technicality. According to the commission, officials sometimes changed the number of null and void votes to fit with other statistics, like the total number of valid ballots cast.

These shortcomings drove an unusually high rate of ballot rejection. The EU Election Observer Report notes that "proper procedures were not followed in 15 out of 32 polling stations where [EU] teams observed, which also includes inconsistent and random decisions about null and void votes" (European Union, 2020, p. 31). Many rural areas had a "percentage of null and void ballots (that were) excessively high" (p. 71). African Union observers described polling officials' "inability to reconcile" total voting tallies with the number of rejected ballots (African Union, 2019, p. 28), while Commonwealth teams reported "inconsistent interpretations of what constituted a null or void vote" (Commonwealth Observer Group, 2019, p. 3).

I examine whether the unusually high ballot rejection rate is lower in areas exposed to mobile internet coverage. This serves as a proxy for local variation in the quality of election administration.

5. Data

5.1 Election Results

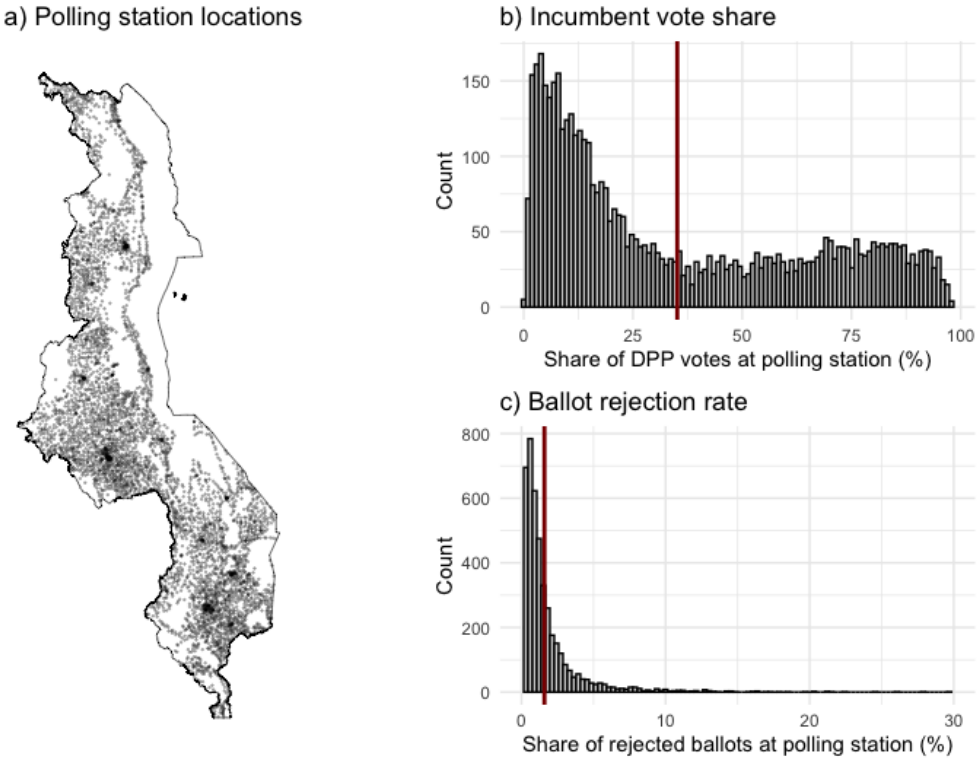
I take geocoded polling station results from the Malawi Electoral Commission (MEC) for the 2014 and 2019 votes. This offers location data for 83% of all polling stations in 2014 and 98% of all stations in 2019.[7] I combine these to create a geocoded panel dataset of 7,302 observations.[8] This offers an unusual degree of spatial specificity, allowing us to effectively measure electoral changes within very small communities, held constant between elections.

[7] Less data is available in 2014 due to widely reported problems storing results sheets, with many lost in fires at warehouses (BBC News, 2014).

[8] In Section A.1 of the Supplementary Materials, I run a series of balance checks to measure the characteristics of missing stations.

Figure 1 maps the location of stations across the country and presents initial descriptive statistics from the 2019 election. Stations are distributed across the country and follow major population centres. Within each station, an average of 35.1% were cast for the incumbent, and 1.59% were rejected.[9]

Figure 1: Overview of Polling Station Data.



Note: Panel (a) presents the geocodes of available stations across Malawi (N=4910), while Panels (b) and (c) plot the distribution of station-level incumbent support and ballot rejections in the 2019 election (N=5002). Red lines represent the mean share. This data was provided by the Malawi Electoral Commission.

5.2 Social Media Access

I use mobile internet coverage maps to proxy local internet and social media access. In Section 7, I show coverage is associated with higher individual-level access to smartphones and social media platforms.

[9] Note that these figures differ slightly from the official election results, as this is the average of polling-station shares and doesn't weight by station size. In the overall results, the incumbent got 38.57% of the vote, with a rejection rate of 1.46%.

Theoretically relevant features of social media, like the ability to send photos and videos, require access to a fast internet connection. Like many African countries, Malawi's mainline internet infrastructure, like broadband or fibre-optic connectivity, is limited outside corporate environments (Hjort and Poulsen, 2019). Most public usage occurs over mobile internet (like 3G), made available by the preponderance of telecom providers and ever-cheaper data packages.

I use proprietary spatial data on 3G mobile internet coverage in Malawi, taken directly from telecom providers and submitted to the Global System for Mobile Communications Association (GSMA), an industry body. In conjunction with Collins Bartholomew, this data is sold under license as a series of yearly coverage maps. In Malawi, data is available for December 2014, 2016, 2017 and 2018.

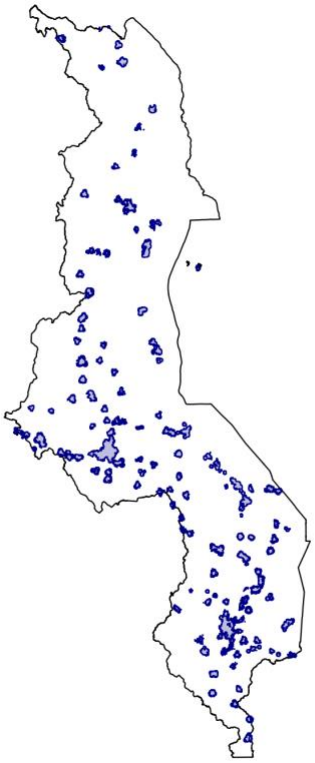
This data offers a credible estimate of local coverage availability on the ground. Areas are inside coverage if signal strength is above an industry-standard decibel level, a calculation that accounts for the role of local topography. Outside coverage, reception is weak and unreliable. Maps are spatially fine-grained and only made available to researchers under license, so there is no clear incentive to systematically misestimate provision. There is growing precedent for using this data in academic research, from studies of electoral behaviour to economic development and public health.[10]

One concern with using coverage availability is that incumbents might target infrastructure to their supporters. In Malawi, however, this does not appear to be the case. In Section A.3 of the supplementary materials, I show that coverage rollouts are not correlated with incumbent support in previous elections. This matches focus group discussions with voters across the country, who told me that 3G coverage was neither politicised nor publicised by political parties. In rural Mchinji, a district in Central Malawi, voters told me that internet coverage "was just there one day." Even in Blantyre, the nation's commercial capital, people "just saw [their] phone updated" and "can't say [they] saw the politicians" taking credit.

[10] On electoral behaviour, see: Manacorda and Tesei, 2020; Guriev, Melnikov, and Zhuravskaya, 2021; Grossman et al., 2021; Gonzalez, 2021. On economic development, see: Wantchekon and Riaz, 2019; Chiplunkar and Goldberg, 2022. On public health, see: Maffioli and Gonzalez, 2020; Xu, 2022.

Second, Malawi's telecom infrastructure is managed by an independent regulator. Licenses are granted by the Malawi Communications Regulatory Authority (MACRA), a non-partisan body established in 1998 (MACRA, 2022). Cell tower construction and maintenance are handled by private sector providers, who are obliged to fill coverage gaps identified by MACRA as part of its regular audits and "network gap analyses" (Phiri, 2021). As a MACRA official told me, there are "no political considerations. It's us, the regulator, who decides where the network needs to go". Expanding coverage has been a bipartisan part of Malawi's economic strategy for decades, with MACRA itself estimating coverage gaps cost Malawi around $13 million a year in GDP (Phiri, 2021). Figure 2 visualises coverage in Malawi during the 2019 general election.

Figure 2: 3G mobile internet coverage in Malawi (December 2018)



6 Polling Station Difference-In-Differences

6.1 Specification

I use coverage rollouts between the 2014 and 2019 general elections to identify the effect of internet exposure in a difference-in-difference setting. While coverage was sparse during this period, the

number of stations inside coverage areas increased by around 14%, with most of this increase coming in 2017, two years before the election (see Table 1). The rest of this section presents results from three specification types, addressing the dynamic nature of mobile coverage and the political importance of administrative units.

Table 1: Coverage Provision in Malawi (2014-2019)

Year	Count	Increase (%)
Dec 2014	508	0
Dec 2016	514	1.2
Dec 2017	578	12.6
Dec 2018	578	0

6.1.1 Baseline

First, I present baseline models that measure whether a given polling station is in or outside coverage in election t. I adjust for polling station and election fixed effects, γ_i and α_t, respectively. This represents a two-wave difference-in-differences set-up, identifying variation from stations that enter coverage between elections.

$$y_{it} = \beta_1(\text{inside}_{it}) + \gamma_i + \alpha_t + \epsilon_{it} \quad (1)$$

One important feature of coverage exposure is that represents a dynamic effect. As coverage arrives, more people begin using devices, political parties adapt their strategies, and electoral effects accrue gradually over time.

In a straightforward two-way fixed effects specification, this can cause problems, as "always treated" units – those inside coverage for both the 2014 and 2019 elections – continue to exhibit treatment effects (Goodman-Bacon, 2018). To address this concern, I follow recommendations from recent literature and remove always-treated polling stations from this baseline analysis (Dube et al., 2023).

6.1.2 Coverage as a Dynamic Treatment

Next, I present a second specification that explicitly models dynamic effects. I leverage the staggered nature of the rollout and the fact that it gives rise to multiple treatment groups based on when coverage arrives in a given area. I classify polling stations into one of three groups, g, based on when they are first coded as inside coverage. Those inside coverage in 2014 are classed as early adopters, those entering in 2016/17 are classed as late adopters, and those that never enter are the pure control.

From here, I estimate the below specification, which captures the group-specific effect of being inside coverage during the 2019 election. In recent terminology, this is analogous to the ATT_{gt} (Callaway and Sant'Anna, 2021).[11] The common reference group remains the pure control. I continue to use a two-way fixed effects estimator as electoral outcomes are only observed twice (once in 2014 and once in 2019).[12]

$$y_{igt} = \beta_1 \left(\text{inside}_{igt} \times \text{group}_{ig} \right) + \gamma_i + \alpha_t + \epsilon_{igt} \quad (2)$$

6.1.3. Politically Significant Administrative Units

Lastly, I account for the fact that presidential results were processed at distinct administrative levels and that local elections took place on the same day. Presidential election votes are counted at polling stations and then sent to constituency tallying centres (CTCs). The same staff will oversee ballots from all polling stations in a constituency, raising the possibility that constituency-level factors might determine the nature of irregularities. In other words, comparing polling stations rather than constituencies might omit important cross-sectional variations in how ballots were counted.

Additionally, the 2019 election was "tripartite," with simultaneous elections for the Presidency, parliament, and local councillors. Voters are exposed to constituency-level campaigns from prospective MPs and ward-level campaigns from prospective councillors. While distinct from the

[11] In this specification, "inside" takes on a slightly different meaning to before. I code all observations in 2014 as being outside coverage, so that we can measure the impact among the early adopter group. This means the interpretation, for this group, is the effect of being in coverage for the full five years between 2014 and 2019, whereas for the other groups represent the effect of *entering* coverage in between.

[12] Recent estimators for dynamic treatments, such as those proposed by Callaway and Sant'Anna (2021) or Sun and Abraham (2021), require more than two observations of each unit to function. Instead, my approach is analogous to "local projection" against a clean control group, which remains unbiased under TWFE (Dube et al., 2023).

Presidential race, these races are not wholly independent. For instance, candidates from the same party might coordinate campaign efforts or exchange resources for endorsements (Chiweza et al., 2021). Without accounting for these contextual differences, looking within polling stations might omit important spatial variation.

I address these concerns by re-running each specification with constituency- ($N = 193$) and ward- ($N = 433$) fixed effects, rather than polling station. This compares stations with others in their constituency or ward, accounting for cross-sectional variation while holding constant higher-level patterns. I cluster standard errors at the polling station level throughout, as this is the unit from which repeated observations are drawn.

6.2 Prerequisites

Before proceeding to the results, I consider the conditions necessary for causal interpretation. As in any difference-in-differences design, this entails assuming parallel trends and no anticipation of treatment.

The former – parallel trends – suggests stations receiving coverage would have exhibited outcomes like those in the control group, had they not received coverage. This is impossible to test directly, but suggestive evidence can be found by studying the determinants of where and when coverage is received. Coverage expansions in Malawi are governed by an independent regulator, without overt partisan interest. In Section A.3 of the Supplemental Materials, I show that past incumbent support and ballot rejection do not predict future coverage allocation.

The latter – no anticipation – requires voters to not anticipate future coverage provision. This is unlikely to be a problem, as coverage is not a political issue, and outcomes are measured five years apart (in 2014 and 2019). Anticipation effects would mean voters' behaviour in 2014 is shaped by knowledge of when and where coverage rollouts would fall over the next five years. However, from focus group discussions, it is clear this information was not available. Voters, instead, told me coverage arrived almost by surprise, without politicians or telecom companies publicly seeking credit. Even in Blantyre, one of the first parts of Malawi to receive 3G, voters received SMS messages encouraging them to register for mobile internet only after 3G towers had been installed and activated.

Overall, there is no evidence that coverage was politically targeted to certain voter types, nor that voters knew in advance when coverage would arrive in their community. This gives confidence that the parallel tends and no-anticipation assumptions are reasonable.

6.3 Results

I present the results of each specification, showing that coverage reduces both incumbent support and the ballot rejection rate. These effects are most precisely estimated in areas that have been inside coverage for longer.

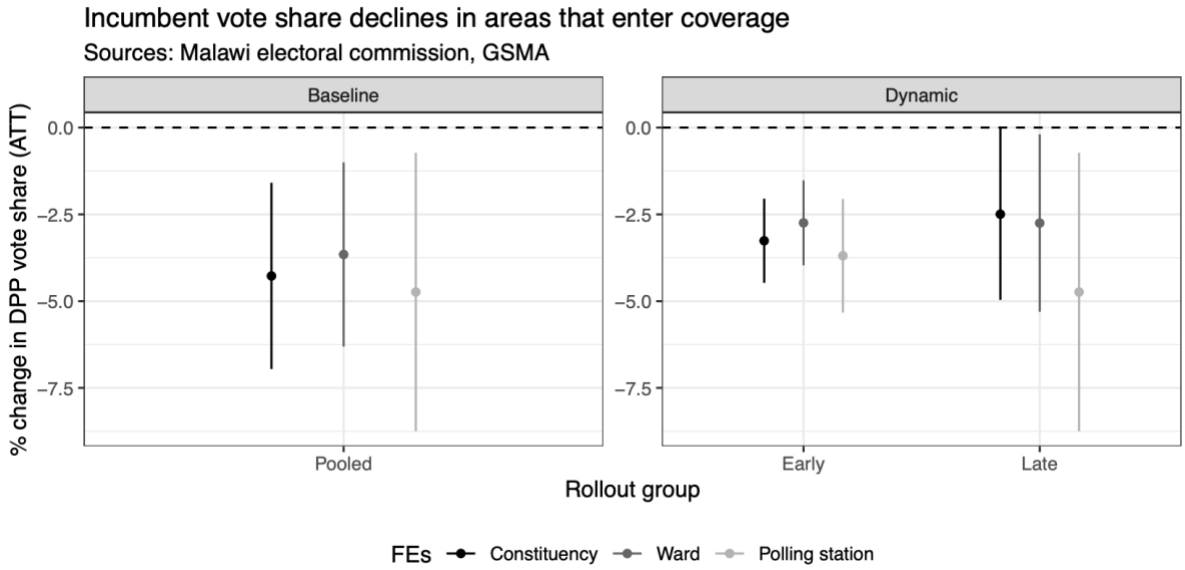
In the following figures, the left panel presents estimates from the baseline specification, pooling stations newly entering coverage and comparing them with those that never do. The right panel presents dynamic estimates by a station's specific rollout group. In both, fixed effects alternate between the polling station, ward, and constituency. Point estimates represent the ATT of entering coverage or being inside for a certain period.

6.3.1 Incumbent Support Falls

The first results are presented in Figure 3 below and show initial evidence that 3G coverage expansions reduced incumbent support in 2019. Looking at the aggregate results on the left, we see DPP vote share reduces by 3%-5% as a polling station enters coverage. The findings are robust across polling station-, ward-, and constituency-fixed effects.

The dynamic results on the right break this down. Against expectations, results are broadly consistent between coverage groups – areas exposed to 3G for longer behave similarly to those that have only recently joined. This is consistent with the claim that 3G coverage and, by extension, access to online platforms and social media reduced incumbent support in the 2019 election.

Figure 3: Effects on Incumbent Support



***Note*:** In the baseline specification, all stations that enter coverage between 2014 and 2019 are compared to those outside coverage. Stations always inside coverage are dropped. Dynamic specifications measure the marginal effect of coverage for each station based on the time they entered coverage. Early were already in coverage in 2014; Late entered in 2016 or 2017. Bars represent 95% confidence intervals, with standard errors clustered by polling station throughout. The results suggest entering mobile internet coverage reduces incumbent vote share and that this effect is driven by polling stations that have been inside coverage for longer periods.

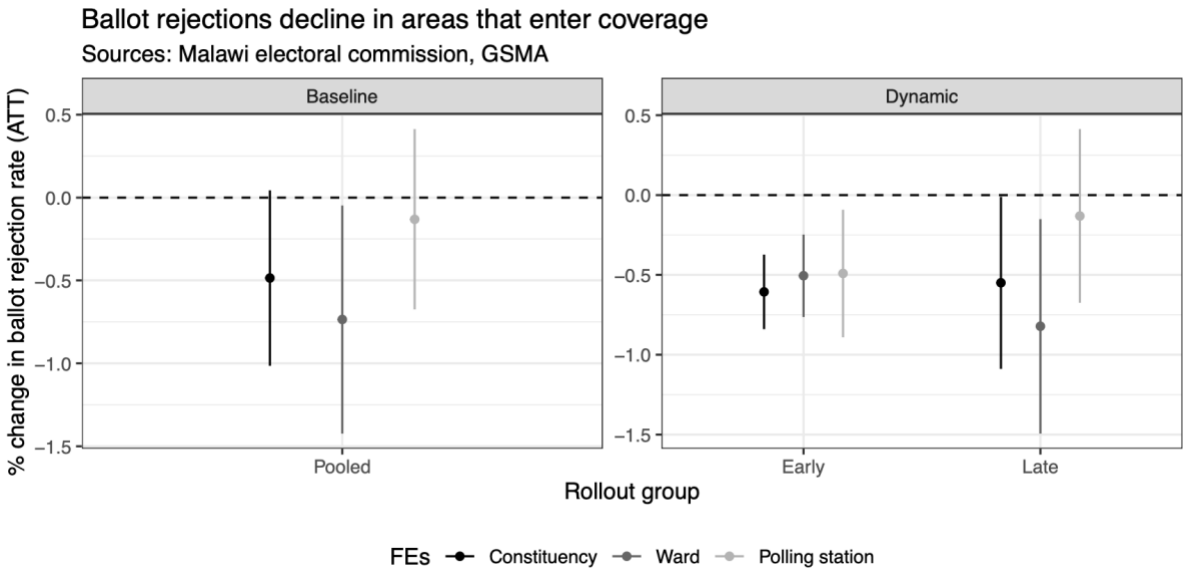
6.3.2 Fewer election irregularities

The second results, presented in Figure 4, provide evidence that 3G coverage reduced ballot rejection. Looking first to the left panel, we see that entering coverage decreases the rejection rate by around 0.2%-0.75%. Unlike incumbent support, this result varies across spatial units. Under the most stringent polling station specification, differences between stations fail to reach statistical significance. But under their ward ($N = 433$) and constituency ($N = 193$) counterparts, entering coverage precipitates a significant decline in ballot rejection.

On the right panel, we see point estimates are more precisely and consistently estimated for early adopters. Here, across all specifications, ballot rejections fall by around 0.5%. For their late-adopting counterparts the estimates are less precise, but hold under ward and constituency fixed effects.

Overall, the evidence suggests 3G coverage reduced the ballot rejection rate in 2019. But it also suggests that spatial units matter, with cross-sectional ward and constituency variation seeming to capture something about changing patterns of ballot rejection. One reason for this might be the central role of constituency tallying centres in the election, discussed in Section 8.

Figure 4: Effects on Ballot Rejection



Note: In the baseline specification, all stations that enter coverage between 2014 and 2019 are compared to those outside coverage. Stations always inside coverage are dropped. Dynamic specifications measure the marginal effect of coverage for each station based on the time they entered coverage. Early were already in coverage in 2014; Late entered in 2016 or 2017. Bars represent 95% confidence intervals, with standard errors clustered by polling station throughout. The results suggest entering mobile internet coverage reduces ballot rejection rates, depending on the choice of spatial fixed effects.

6.3.3 Summary

These analyses provide evidence that exposure to mobile internet coverage can improve election quality. Declining ruling party support indicates a softening of unfair incumbency advantages, while falling irregularities suggest elections were better administered, and voters better informed, in areas entering coverage.

I now examine the microfoundational assumptions underpinning these effects: does mobile internet coverage represent a reasonable proxy for *individual-level* social media access and attitudes? I use

evidence from a geocoded post-election survey to suggest this is the case before turning to qualitative data that points to a series of mechanisms to explain the results.

7 Individual-Level Behaviour

So far, in this paper, I have tested the electoral effects of mobile internet exposure at the polling station level. While this is more spatially precise than most existing work, the questions raised are still about individuals: Are individual voters living in covered areas more likely to access social media, and are they less supportive of the ruling party?

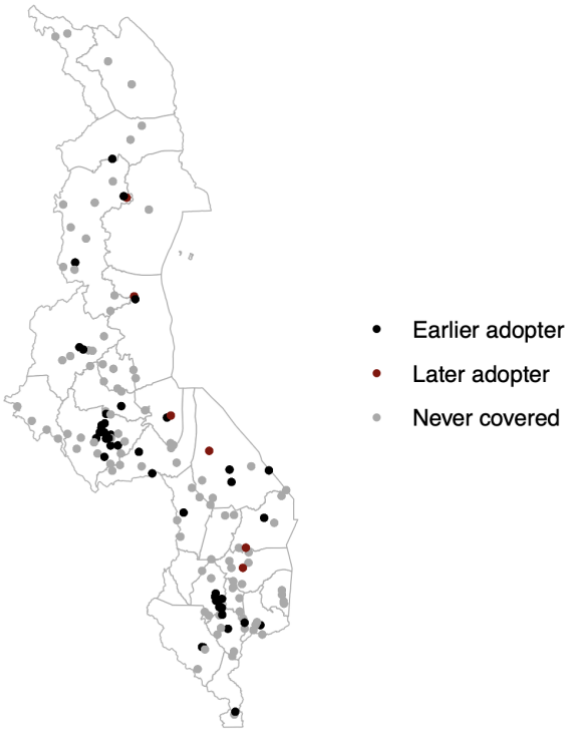
I turn to a geocoded public opinion survey fielded in the aftermath of the election, showing that respondents living in areas more exposed to coverage are more likely to use a phone and get news from social media while being less supportive of the DPP.

7.1 Data and Design

I measure public opinion in the aftermath of the 2019 election with special access geocoded survey data from Round 8 of the Afrobarometer. This is a nationally representative survey from Malawi in the autumn of 2019, a few months after the election. At this stage, the DPP had been declared the winner, but the Supreme Court was considering legal arguments about irregularities. It was not evident the election would be annulled, nor that the DPP would lose power in just a few months.

Afrobarometer provides the coordinates of survey enumeration areas, fine-grained spatial units that correspond to small urban neighbourhoods or clusters of villages ($N = 150$). Using the same mobile internet coverage maps as before, I use respondents' locations to code each as in or outside coverage and in an earlier or later coverage-adopting group, based on their enumeration area. This process is explained in further detail in Section A.4 of the Supplementary Materials. Figure 5 visualises the enumeration areas and the treatment groups to which they correspond.

Figure 5: Enumeration Areas from Afrobarometer Round 8 in Malawi



Note: The survey contained 150 enumeration areas, each with 8 respondents. Of these 150 enumeration areas, 44 were early adopters (352 respondents), 6 were late adopters (48 respondents), and 100 were in the pure control (800 respondents).

I estimate a series of descriptive specifications, outlined in Equation 3 below. These specifications capture differences in public opinion between enumeration areas based on coverage provision. These differences do not carry causal interpretation on their own terms but can offer evidence consistent with previous analysis, or existing explanations in the literature.

$$y_{ied} = \beta_1 \text{group}_{ed} + \xi X_{ied} + \gamma_d + \epsilon_{ied} \quad (3)$$

I adjust for a series of demographic controls, covering partisanship, education, gender, ethnicity, urbancy, and a wealth index that captures access to basic goods. I also account for district-fixed effects (N=28) to ensure comparisons are made within parts of the country that are geographically, politically,

and culturally similar. I cluster standard errors at the enumeration area level throughout and include 90% confidence intervals due to the smaller sample size.[13]

7.2 Results

7.2.1 Access to online content

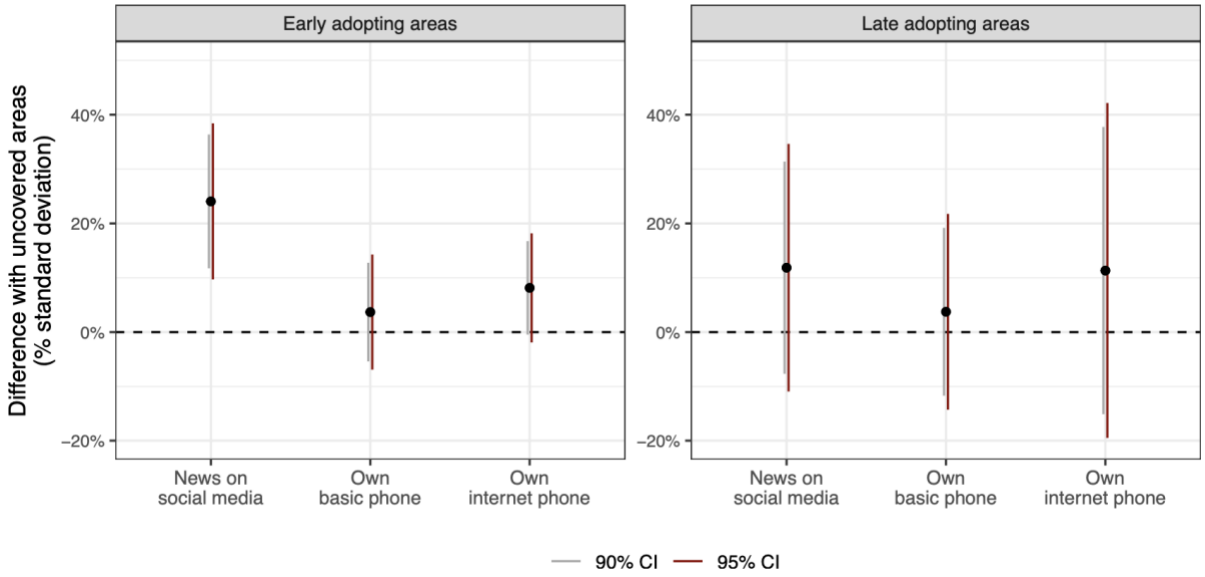
I first consider variation in individual-level access to content online. I use questions about device access – whether a respondent owns a basic mobile phone or a smartphone capable of accessing the internet – and how often they get news from social media platforms.

Figure 6 presents the results. Ownership of basic mobile phones is no different between respondents living in and out of 3G coverage, but early adopters are slightly more likely to own a smartphone ($p = 0.14$). In turn, early adopters get significantly more news from social media, with an effect size of around 25% of a standard deviation.

This is consistent with the idea that coverage expansions drive an increase in mobile internet use on the ground, though it suggests some access social media without necessarily owning a device. In Section 8, I provide qualitative evidence to make sense of this result, rooted around the role of local community leaders in sharing online information, rather than everyone using their own device.

[13] This approach follows Choi et al. (2021), who use the same data for a cross-national sample.

Figure 6: Mobile Internet Coverage and Personal Exposure to Online News in Malawi



Note: The results plot the cross-sectional differences between areas in and outside coverage, in district-fixed effect specifications that control for a range of demographic indicators. Bars represent 95% and 90% confidence intervals, with standard errors clustered by survey enumeration area. The results show respondents living in early covered areas are more likely to own a smartphone and get more news from the internet and social media.

7.2.2 Incumbent support

I next consider whether respondents in covered areas are less supportive of the ruling party. I use three measures of incumbent support: voting intention in the next general election, trust in the ruling party (the DPP), and whether a respondent has participated in a protest over the past twelve months.[14] Voting intention and trust present direct measures of DPP support. And given the timing of the survey, it is likely the protest activity would have been against the election results and, by extension, the DPP.[15]

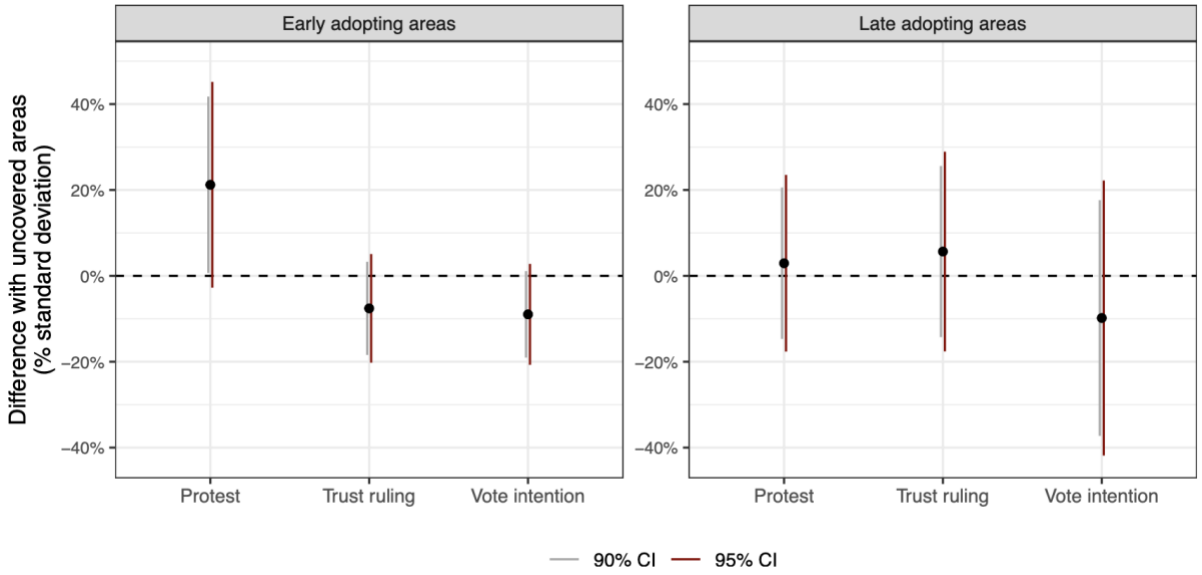
[14] Unfortunately, the Afrobarometer does not ask respondents how they voted in the previous election, so I must instead rely on intention questions. At the time the survey was fielded, however, it was not clear the 2019 election would be re-run in 2020. Therefore, this intention question does not capture the impact of the court decision or any possible changes it had on attitudes towards the DPP.

[15] At the time, the BBC reported that "since the disputed results were announced last May, there have been regular anti-government protests. Some of these have resulted in looting and the destruction of property, including government offices. Two people – one police officer and one civilian – are known to have been killed during the demonstrations" (Jegwa, 2020).

Figure 7 presents the findings. Among early adopters, respondents living inside coverage are less likely to intend to vote for the DPP and are less trusting of the party. These respondents are more likely to report attending a protest over the past twelve months. There are no effects among later adopters, who have been exposed to coverage for less time (and, as per Figure 6, do not seem to get more news from social media).

These results provide suggestive evidence that internet coverage does filter down to individual-level actions and opinions, but only among those who have been exposed to coverage for the longest period. Moreover, the finding on protest replicates a sizable literature on mobile coverage and collective action (e.g., Christensen and Garfias, 2018; Manacorda and Tesei, 2020), helping validate the empirical approach.

Figure 7: Mobile Internet Coverage and Incumbent Support in Malawi



Note: The results plot the cross-sectional differences in opinion between areas in and outside coverage, in district-fixed effect specifications that control for a range of demographic indicators. Bars represent 95% and 90% confidence intervals, with standard errors clustered by survey enumeration area. The results show respondents living in early covered areas are more likely to protest, less trusting of the ruling party, and less likely to vote DPP.

8 Mechanisms and Avenues for Future Research

So far, we have seen evidence that 3G coverage reduced incumbent vote share and election irregularities in Malawi's controversial 2019 election. At the individual level, we have also seen that social media use is higher, and DPP support lower, in areas with mobile internet reception. In this final empirical section, I examine the potential mechanisms underpinning these effects. These results are based on focus group and interview discussions across Malawi, involving over 80 voters, party activists, MPs, civic education campaigners, and election officials. Further information about data collection can be found in Section A.5 of the Supplementary Materials.

Three themes emerge from the discussions focused on the supply side of politics: opposition parties campaigned more effectively online, civic education campaigners used social media to amplify their messages, and election officials used online platforms to coordinate on election day.

8.1 Asymmetric Technology Adoption by Parties

In 2019, the main opposition (MCP) adapted to online platforms faster than the incumbent. In urban areas, the opposition could garner strong support among young people; however, even in remote areas, the party used WhatsApp groups to maintain regular communication with community leaders. This allowed them to make specific, localised campaign promises and offer viable alternatives. By contrast, the ruling party relied predominantly on the institutional advantages they enjoyed as incumbents.

First, the opposition made a deliberate effort to use online platforms to target voters in urban areas. This involved sharing photos and videos to promote upcoming rallies. In the words of one party organiser: "Most of the people who are living here [in Lilongwe] access our information using social media…[they] use smartphones, so read our information, our manifestos, what it is we are talking about." Rural areas, where fewer people owned smartphones, required a different strategy. The party relied on community leaders – like chiefs or heads of local governance committees – and individuals more likely to have access to an internet-capable device and be connected to others in their communities to spread their messages. The MCP used platforms like WhatsApp to share campaign materials and receive policy ideas. One activist described how "we have structures in every district … those guys [community leaders] help us organise. We communicated with them on WhatsApp, it was easier to organise, they helped us get people to come to rallies."

Embedding themselves within rural communities, the MCP was able to earn trust among residents. In focus groups, voters said this allowed the party to make credible, targeted promises. One participant said the MCP would engage him on WhatsApp to find out "what people needed." Another described how the MCP "were here all the time."

This twin-pronged approach – direct engagement with urban voters and targeted engagement with rural community leaders – was not matched by the ruling DPP. Instead, the party used more conventional campaign tactics, stemming from the institutional incumbency advantages they enjoyed. One such tactic was control of state media. The DPP "dominated the airwaves on both state-owned radio and television…" and "the separation between the President's political party and presidential functions were unclear" (African Union, 2019, p. 23). One MCP activist lamented state media for saying only "good things about DPP [and] bad about MCP." Even DPP activists tended to agree, with

one discussing a prominent, supposedly impartial newsreader, known as "The Cadet," who left Malawi's public television to become the DPP's director of strategy after the election.

Another was the use of patronage and campaign handouts to keep voters onside. EU election observers note that "abuse of incumbency during elections is a recurring problem in Malawi" and that there were "extensive reports indicating an unlevel playing field in the campaign, with the ruling party unduly benefiting from misuse of state resources" (European Union, 2020, p.18). This included significant payments to chiefs, allocating parastatals to politically relevant areas to enhance local services, and more cash and in-kind payments at rallies than opposition parties could afford.[16]

However, the DPP remained sceptical about the value of using social media in the campaign. A senior 2019 election strategist for the party told me, "If you depend a lot on social media, you may not succeed." Activists highlighted "network problems, you have problems communicating" in villages and rural areas, saying instead that "we have to do physical communication." This resulted in weaker ties with voters, who, in 2019, reported less contact with the ruling party. Rural voters described how they "had no way to communicate with [DPP officials]," and it was hard to get in touch "because [they] didn't know anybody" and the DPP were like "visitors in their own country." Even in Blantyre, a DPP stronghold, many described switching to the MCP in 2019, asking, "How can someone represent us if they don't know the problems we are facing?"

In many ways, these arguments are consistent with existing scholarship on party strategy elsewhere in Africa. How ruling parties can leverage state resources in elections is well documented, and the DPP's tactics resonate with the wider literature (see Bleck and van de Walle, 2018). Likewise, the MCP's strategies fit with newer work on how African parties have adapted to social media. Evidence from across the continent stresses the importance of party institutionalisation to establish well-organised social media campaigns (e.g., Fisher et al., 2023).

Going forward, researchers should further investigate the use of social media to communicate with local community leaders, especially in rural areas. This finding speaks to a growing literature on how

[16] There were also some reports of opposition activities being suppressed, particularly in DPP stronghold areas, and a lack of police response.

politicians learn about local needs in contexts of weak state presence (e.g., Jablonski and Seim, 2022). However, this literature has yet to be connected with work on party strategy and the adoption of new digital technologies.

8.2 Civic Education Campaigns on Social Media

Beyond party strategies, Malawian elections see significant efforts by non-partisan civic education campaigns. These are widespread, revolving around voter registration, mock voting exercises, and candidate debates. Civic education campaigns in Malawi take a variety of forms. Organisations like NICE (National Initiative for Civic Education) and the CCJP (Catholic Commission for Justice and Peace) exist to educate voters nationwide about election procedures and party platforms, while outreach efforts by the election commission offer targeted voter registration campaigns. These programmes can shape electoral politics by reducing participation costs, motivating social norms among peers, and increasing citizen knowledge (Harder and Krosnick, 2008).

While these exercises nominally take place in person, they are documented by participants on social media. Campaigns spill over to a wider group of voters not physically present at events, indicating another route by which mobile internet shapes incumbent support and election irregularities. Some campaigns might implicitly benefit opposition parties. Candidate debates, meetings with community leaders, or the distribution of leaflets can allow under-resourced opposition parties a way to outline policy platforms.

Others might directly lower election irregularities. In the 2019 election, for instance, NICE organised a series of mock voting exercises. These plausibly reduced the number of genuine mistakes made by voters, thus lowering the ballot rejection rate in affected areas.

While these campaigns occur in person, there is often a heavy online presence. Participants use platforms like WhatsApp and Facebook to share photos and videos of events and ensure their reach goes beyond those able to physically attend. One civil society representative directly involved with the 2019 Election told me that "people take a lot of photos and share" so that those "who are not there can learn." Meanwhile, younger voters were particularly "good at following up issues through social media."

While some communities were visited by civic education campaigns, others recalled learning about them through WhatsApp. Many rural communities recalled being sent information by relatives and friends, checking that they were registered to vote, outlining "what a good candidate is," explaining how to make informed choices, and "showing [them] how to vote." Urban voters, who were worried about their rural relatives' lack of information, also shared information from civic education campaigns they attended. In the words of one, rural voters "just stick to one party… [it's] annoying because they cannot see."

This line of reasoning slots into existing empirical evaluations of African voter education campaigns, focusing on increased electoral competition, registration, and electoral fraud (e.g., Harris et al., 2021; Mvukiyehe and Samii, 2017). However, we know less about how these campaigns spill over and how social pressure from one's wider social network can shift electoral outcomes through online exposure. This qualitative evidence from Malawi provides a starting point for such investigations.

8.3 Election Day Coordination through Online Platforms

In addition to civic education campaigns, there is evidence officials used online platforms to improve administration on the day of the vote. Staff from the electoral commission used shared WhatsApp groups to coordinate, while party monitors used them to send information and receive advice from their national headquarters.

In Malawian elections, officials are stationed at various levels of vote counting. Ballots are cast in polling stations, from which results sheets are delivered to constituency tallying centres, where they are verified, aggregated, and sent to the national office. Presiding officers manage polling stations, while returning officers oversee constituency activities. Staff are drawn almost exclusively from the education sector, with local teachers being deployed in polling stations, managed by more senior school inspectors at the constituency level.

Staff have different levels of experience, with polling station officers being less likely to have worked in an election before, and their constituency counterparts still often require assistance from national headquarters (European Union, 2020, p. 11).

This asymmetry creates a need for communication and coordination within constituencies. When speaking with officials, it became clear this interaction was made easier in areas with mobile internet coverage. Officials could communicate across WhatsApp groups rather than relying on individual phone calls or SMS messages. For instance, one constituency returning officer stressed, "Whatsapp messages [were] easier for us and more accurate [than phone calls]." Dealing with interference – like intimidation, frivolous complaints by parties, and so on – was also made easier, as presiding officers could get assistance more easily.

These findings resonate with existing work on election integrity, often stressing the importance of aggregation fraud as vote counts move between administration levels (see Callen and Long, 2015; Beber and Scacco, 2012) and the role of election observers and party monitors in mitigating problems (e.g., Ichino and Schündeln, 2012; Asunka et al., 2019). However, within this literature, the specific roles of the internet and online platforms remain under-theorised. Malawi's experiences perhaps point to broader trends that scholars should continue to develop in future.

9 Discussion

The advent of the internet is a profound technological change with political consequences that have reverberated around the globe. Nowhere is this truer than in low-income democracies, where online platforms have leapfrogged conventional forms of mass media present in wealthier parts of the world (Mbiti and Blumenstock, 2015). However, these countries remain considerably under-represented in the wider literature on internet access, social media, and democracy (Tucker et al., 2018).

I begin to fill the gap by studying the effects of internet access in a controversial election in Malawi. I analysed the country's 2019 Presidential election, in which the ruling party was re-elected before a court-ordered re-run. I asked how online platforms shaped two important dimensions of electoral quality: unfair incumbency advantage and ballot irregularities. The evidence suggests that local internet coverage, corresponding to individual-level access to online platforms, reduced both incumbent support and the share of rejected ballots.

I first drew on fine-grained election data to uncover aggregate patterns. Linking polling station returns to high-resolution maps of 3G mobile internet coverage, I show that internet exposure reduces

support for the ruling party. Moreover, polling stations inside coverage areas have a lower rate of ballot rejections, a salient mode of irregularity in this election.

Next, I used geocoded survey data to understand the individual-level determinants of the results. Those living inside 3G coverage areas were more likely to own a smartphone, report getting more news from social media, and were less personally supportive of the ruling party. These results are robust to a range of demographic and political controls and are driven by areas that have been inside coverage the longest.

Lastly, I used qualitative data to shed light on mechanisms, drawing on focus group discussions and interviews with voters, party activists, MPs, and election officials. These showed that the ruling party was slow to adapt to social media, that online platforms allowed civic education campaigns to reach more voters, and that election officials used the internet to coordinate on election day. These findings provide multiple paths connecting the arrival of 3G coverage with a systematic decline in ruling party support and ballot rejection.

Taken together, these findings make several contributions to the literature. The first is empirical. By studying Malawi, I study one of many low-income democracies that have seen multiple handovers of power but in which elections are characterised by irregularities and accusations of malpractice (Dionne and Dulani, 2014; Patel and Wahman, 2015). This moves the internet and social media literatures on from a strong focus on polar cases: elections in wealthy countries, or the overthrow of autocratic regimes.

Relatedly, the paper triangulates a wide range of sources and empirical approaches. From unusually fine-grained election returns to geocoded survey data to in-depth interviews with key actors, the empirical strategy tells a rich story about a deeply controversial period for Malawian democracy. In so doing, it offers statistically robust evidence that rests on well-specified microfoundations and accounts for the experiences of voters and officials on the ground.

The paper also raises a number of theoretical questions for future research. First is the nuanced relationship between mobile coverage availability and personal use of social media. As discussions with opposition activists made clear, political parties can effectively use online platforms to

communicate with local opinion leaders, who disseminate information to residents without access to a device. This suggests social media can be used to sow information into communities and still have significant political impact, even if device ownership is low. While a large body of work has studied how information percolates through in-person social networks in rural Africa (e.g., Larson et al., 2022), we know less about how online content impacts offline settings, particularly in election campaigns.

Second, are the spillover effects of civic education. In interviews, there was a clear belief that social media allowed in-person campaigns to reach voters who were not physically present. In turn, this offers one way in which 3G coverage – through the ability to receive information online - can reduce election irregularities. This suggests why civic education experiments often yield mixed results (Harris et al., 2021), perhaps driven by the difficulty of avoiding online spillovers. But these remain empirical questions without clear answers and should be investigated in future work.

Third is the ways election staff use online platforms. There has been minimal analysis of how officials interact and coordinate on election day. How, precisely, might polling station officers engage constituency returning officers, and does this reduce administrative irregularities? Equally, in what contexts might the ability to coordinate increase the capacity of biased officials to engage in fraud? Both questions remain open and important but understudied.

The rapid spread of internet access and widespread uptake of social media have transformed politics around the globe. This paper speaks just some of the ways in which this transformation may improve electoral accountability, offering important insights for scholars and practitioners going forward.

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Social Media, Incumbent Support, and Election Irregularities: Evidence from Malawi

Supplementary Materials

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A.1 Election data

Polling station election data comes directly from the Malawi Election Commission (MEC).

For 2019, the complete set of results is available. For 2014, a subset - around 85% - is available. As discussed in the main text, this is due to well-documented administrative difficulties in 2014 - and the loss of physical results sheets.

Polling station co-ordinates are provided by MEC for 4,910 stations. The available stations cover around 98% of the 2019 data, and 96% of the available 2014 sample.

Below, I present results from balance checks to consider a) how representative the 2014 data is of the full sample of stations, and b) if stations with missing co-ordinates are systematically different to those with them available

A.1.1 Balance I (2014 coordinates)

To begin, I consider potential differences in missing 2014 polling stations. From the universe of results in 2019 ($N = 5002$), I consider differences between stations with co-ordinates available and not available in 2014.

The tables below present the results. Missing stations, in 2019 at least, had a slightly higher ballot rejection rate and incumbent vote share, no systematic difference in turnout, and a lower number of registered voters. Rejection rate differences are not consistent across spatial fixed effects, and differences in incumbent vote share are generally very small (around 0.9%).

It is worth stressing that these differences might add caveats to the *external* validity of the results, from the available stations to the universe of stations, but in a difference-in-differences setting they do not undermine *identification*.

Table A1: Comparing missing 2014 polling stations with full 2019 results (Ward FEs)

Dependent Variables:	Rejected (%)	Incumbent (%)	Turnout	Registered voters
Model:	(1)	(2)	(3)	(4)
Variables				
Missing in 2014 results	0.230*	0.870**	-2.02	-1,692.1***
	(0.138)	(0.424)	(3.12)	(61.5)
Fixed-effects				
Ward	Yes	Yes	Yes	Yes
Fit statistics				
Observations	5,002	5,002	4,279	4,823
R^2	0.15554	0.92872	0.34311	0.58205
Within R^2	0.00061	0.00087	0.00015	0.23373

Clustered (Ward) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Table A2: Comparing missing 2014 polling stations with full 2019 results (Constituency FEs)

Dependent Variables:	Rejected (%)	Incumbent (%)	Turnout	Registered voters
Model:	(1)	(2)	(3)	(4)
Variables				
Missing in 2014 results	0.240*	0.874**	-4.68*	-1,638.6***
	(0.130)	(0.423)	(2.67)	(78.2)
Fixed-effects				
Constituency	Yes	Yes	Yes	Yes
Fit statistics				
Observations	5,002	5,002	4,279	4,823
R^2	0.10387	0.91188	0.25073	0.49000
Within R^2	0.00069	0.00078	0.00110	0.20413

Clustered (Constituency) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Table A3: Comparing missing 2014 polling stations with full 2019 results (District FEs)

Dependent Variables:	Rejected (%)	Incumbent (%)	Turnout	Registered voters
Model:	(1)	(2)	(3)	(4)
Variables				
Missing in 2014 results	0.044	3.24***	0.002	-927.5***
	(0.116)	(0.607)	(2.62)	(254.3)
Fixed-effects				
District	Yes	Yes	Yes	Yes
Fit statistics				
Observations	5,002	5,002	4,279	4,823
R^2	0.03893	0.84541	0.09868	0.23262
Within R^2	4.05×10^{-5}	0.01136	1.53×10^{-9}	0.09448

Clustered (District) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

A.1.2 Balance II (2019 coordinates)

Second, I consider differences between stations for which station-level coordinates are available. I do so for the full election results in 2019. Across the board, there is no consistent evidence of differences in DPP vote share or the ballot rejection rate.

The only difference is that missing stations are smaller - as measured by a lower number of registered voters. This likely reflects their more peripheral locations, and thus the higher difficulty faced by the electoral commission in finding their precise co-ordinates.

Table A4: Comparing polling stations with and without co-ordinates (Ward FEs)

Dependent Variables:	Rejected (%)	Incumbent (%)	Turnout	Registered voters
Model:	(1)	(2)	(3)	(4)
Variables				
Missing coords	-0.011	-0.574	-0.526	-447.0***
	(0.233)	(1.15)	(1.10)	(47.6)
Fixed-effects				
Ward	Yes	Yes	Yes	Yes
Fit statistics				
Observations	5,002	5,002	5,002	5,002
R^2	0.15503	0.92867	0.49946	0.53052
Within R^2	2.92×10^{-7}	7.7×10^{-5}	0.00014	0.00580

Clustered (Ward) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Table A5: Comparing polling stations with and without co-ordinates (Constituency FEs)

Dependent Variables:	Rejected (%)	Incumbent (%)	Turnout	Registered voters
Model:	(1)	(2)	(3)	(4)
Variables				
Missing coords	-0.035	-0.386	-0.567	-468.0***
	(0.203)	(1.09)	(1.22)	(57.9)
Fixed-effects				
Constituency	Yes	Yes	Yes	Yes
Fit statistics				
Observations	5,002	5,002	5,002	5,002
R^2	0.10326	0.91181	0.42748	0.42364
Within R^2	2.87×10^{-6}	3.02×10^{-5}	0.00015	0.00557

Clustered (Constituency) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Table A6: Comparing polling stations with and without co-ordinates (District FEs)

Dependent Variables:	Rejected (%)	Incumbent (%)	Turnout	Registered voters
Model:	(1)	(2)	(3)	(4)
Variables				
Missing coords	-0.073	-2.43**	0.525	-600.1***
	(0.197)	(0.924)	(1.77)	(63.9)
Fixed-effects				
District	Yes	Yes	Yes	Yes
Fit statistics				
Observations	5,002	5,002	5,002	5,002
R^2	0.03890	0.84375	0.20739	0.17488
Within R^2	1.29×10^{-5}	0.00073	0.00010	0.00693

Clustered (District) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

A.2 Malawi in context

As discussed in the main text, one reason why Malawi is an appropriate country in which to study questions of social media and accountability is its middling position between poles.

Malawi has meaningful elections, but legitimate concerns about irregularities, incumbency advantage, and political violence. As such, it is located between well studied polar cases; free and fair wealthy democracies in the West, and autocracies.

The figures below provide evidence to this point, comparing Malawi's score on V-Dem's electoral democracy index to other regions.

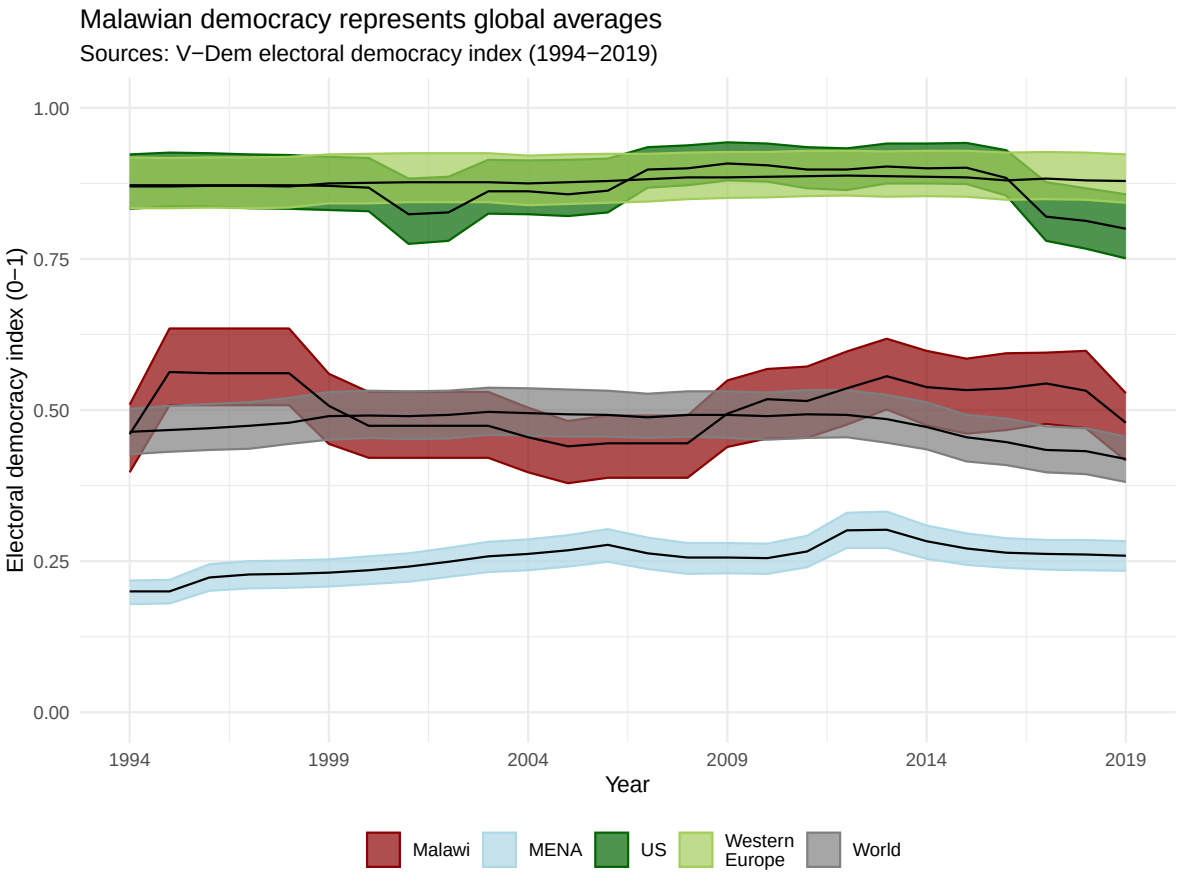

Figure A1: V-Dem electoral democracy index (time series)

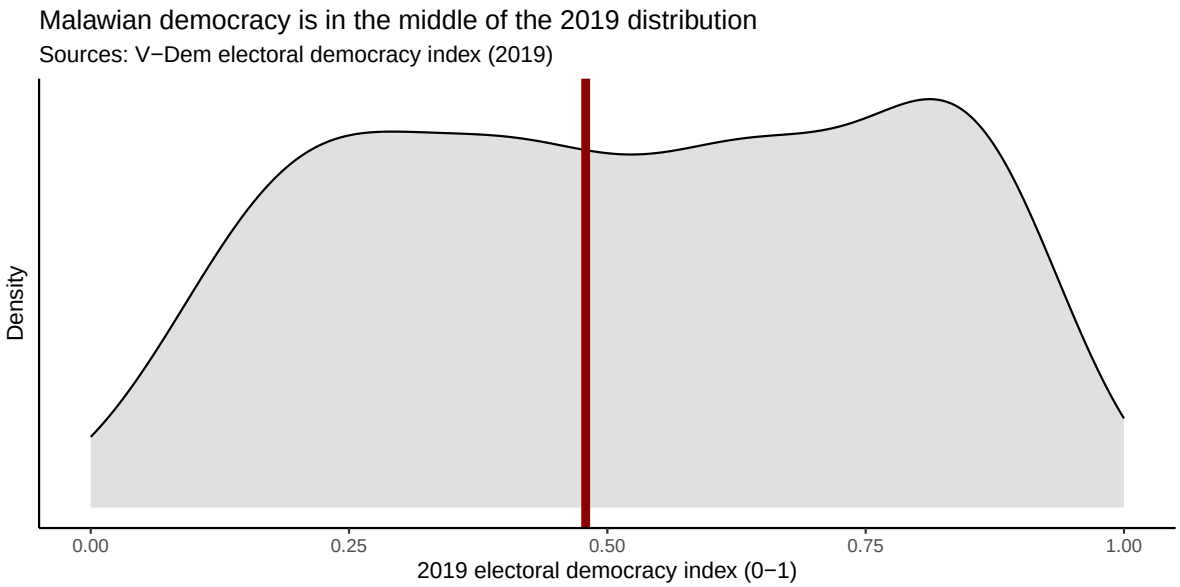

Figure A2: V-Dem electoral democracy index (2019)

A.3 Difference-in-differences analyses

A.3.1 Predicates of coverage

As discussed in the main text, the difference-in-difference analysis invokes an assumption of *parallel trends*. Absent coverage being realised, polling stations in the treatment group would continue to act like those in the control groups over time.

This assumption might be violated if there is relevant, time-varying selection into which areas receive coverage. For instance, if coverage is allocated to the President's supporters to mobilise future support, or to those with unusually high or low rates of ballot rejection.

This assumption rests on unobserved potential outcomes, so cannot be directly empirically tested. As a suggestive test, however, we can use balance tests to better understand how coverage is assigned. To do this, I take election results from 2014, and use them to model the probability of a polling station being in any of the (future) coverage rollout groups, as opposed to remaining in the pure control.

The results are presented in the tables below. There are no consistent differences in DPP vote. Late adopters have a slightly lower ballot rejection rate, but this difference is so small (around 0.001%) that it is not substantively meaningful.

Table A7: Balance checks (Early adopters)

Dependent Variable:	inside					
Model:	(1)	(2)	(3)	(4)	(5)	(6)
Variables						
DPP share (%)	0.0010*	0.0007	0.001			
	(0.0006)	(0.0008)	(0.001)			
Rejected share (%)				-0.0007	-0.002	-0.002
				(0.002)	(0.002)	(0.002)
Fixed-effects						
Ward	Yes			Yes		
Constituency		Yes			Yes	
District			Yes			Yes
Fit statistics						
Observations	3,540	3,540	3,540	3,540	3,540	3,540
R^2	0.401	0.286	0.061	0.401	0.286	0.060
Within R^2	0.001	0.0006	0.002	5.61×10^{-5}	0.0003	0.0003

*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Table A8: Balance checks (Late adopters)

Dependent Variable:	inside					
Model:	(1)	(2)	(3)	(4)	(5)	(6)
Variables						
DPP share (%)	0.0002	4.54×10^{-5}	0.0005**			
	(0.0003)	(0.0004)	(0.0002)			
Rejected share (%)				-0.0009**	-0.0007*	-0.0009**
				(0.0004)	(0.0004)	(0.0003)
Fixed-effects						
Ward	Yes			Yes		
Constituency		Yes			Yes	
District			Yes			Yes
Fit statistics						
Observations	3,103	3,103	3,103	3,103	3,103	3,103
R^2	0.353	0.242	0.033	0.353	0.242	0.031
Within R^2	0.0004	1.35×10^{-5}	0.002	0.0005	0.0003	0.0003

*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

A.3.2 Full results

The tables below present the main results of the difference-in-difference analyses from the main text.

As discussed, there is evidence of a decline in both DPP vote share and the ballot rejection rate as stations enter 3G coverage.

Table A9: Mobile internet, incumbent support and ballot rejection (Pooled difference-in-difference estimates)

Dependent Variables:	Incumbent vote share			Rejection rate (%)		
Model:	(1)	(2)	(3)	(4)	(5)	(6)
Variables						
Inside	-4.74**	-4.27***	-3.66***	-0.131	-0.486*	-0.736**
	(2.05)	(1.37)	(1.35)	(0.277)	(0.270)	(0.351)
Fixed-effects						
Polling station	Yes			Yes		
Election	Yes	Yes	Yes	Yes	Yes	Yes
Constituency		Yes			Yes	
Ward			Yes			Yes
Fit statistics						
Observations	6,206	6,206	6,206	6,206	6,206	6,206
R^2	0.89041	0.82014	0.83155	0.53545	0.06204	0.08750
Within R^2	0.00121	0.00105	0.00077	2.23×10^{-5}	0.00027	0.00059

Clustered (Polling station) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Table A10: Mobile internet and incumbent support (Group specific panel estimates)

Dependent Variable:	Incumbent vote share		
Model:	(1)	(2)	(3)
Variables			
Inside × Group = Alwaystreated	-3.69***	-3.26***	-2.74***
	(0.835)	(0.618)	(0.624)
Inside × Group = Midadopter	-4.74**	-2.49**	-2.75**
	(2.05)	(1.26)	(1.30)
Fixed-effects			
Polling station	Yes		
Election	Yes	Yes	Yes
Constituency		Yes	
Ward			Yes
Fit statistics			
Observations	7,222	7,222	7,222
R^2	0.89001	0.81439	0.82885
Within R^2	0.00498	0.00346	0.00263

Clustered (Polling station) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Table A11: Mobile internet and ballot rejection (Group specific panel estimates)

Dependent Variable:	Rejection rate (%)		
Model:	(1)	(2)	(3)
Variables			
Inside × Group = Alwaystreated	-0.491**	-0.607***	-0.506***
	(0.204)	(0.119)	(0.132)
Inside × Group = Midadopter	-0.131	-0.550**	-0.822**
	(0.278)	(0.275)	(0.343)
Fixed-effects			
Polling station	Yes		
Election	Yes	Yes	Yes
Constituency		Yes	
Ward			Yes
Fit statistics			
Observations	7,222	7,222	7,222
R^2	0.53354	0.06047	0.08762
Within R^2	0.00169	0.00237	0.00198

Clustered (Polling station) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

A.4 Microfoundations

A.4.1 Geocoded Afrobarometer

As discussed in the main text, I combine geocoded Afrobarometer survey data with mobile coverage maps. I use data from Round 8 of the survey in Malawi, which was fielded to a nationally representative sample ($N = 1200$) in late 2019.

Upon application, Afrobarometer provides coordinates of survey enumeration areas. These are small, randomly sampled units within the country from which individuals are sampled by random walk. In Round 8 in Malawi, there were 150 such areas, each containing 8 respondents.

Based on enumeration area, I classify respondents as in or outside coverage. Those living in areas covered in 2014 are classified as early adopters, and those entering coverage later are classified as later adopters. This matches the procedure used for the difference-in-differences analysis of electoral data.

These coordinates contain a random offset to preserve respondent anonymity. I assume this offset is orthogonal to coverage, and so any resulting false positives/negatives will cancel off and not shape the aggregate results.

A.4.2 Analysis

I use respondents' coverage groups to measure descriptive differences in access to social media, incumbent support, and evaluations of the 2019 election.

I do this with models of the following form, controlling for a vector of socioeconomic controls ξX_{ied}. This includes a respondent's age, education, ethnicity, urbancy, partisanship, and access to a basket of basic goods and services.

I adjust for district fixed effects γ_d throughout ($N = 27$), and cluster standard errors by enumeration area, the level at which treatment is assigned.

$$y_{ied} = \beta_1 \text{group}_{ed} + \xi X_{ied} + \gamma_d + \epsilon_{ied} \tag{1}$$

The results of this analysis are in the tables below.

Table A12: Mobile internet exposure and individual-level phone use

Dependent Variables:	Own phone	Internet phone	News (social media)
Model:	(1)	(2)	(3)
Variables			
Group = Early	0.04	0.08	0.24***
	(0.05)	(0.05)	(0.07)
Group = Late	0.04	0.11	0.12
	(0.09)	(0.16)	(0.12)
Partisanship = DPP	0.01	0.02	-0.004
	(0.04)	(0.05)	(0.06)
Partisanship = MCP	0.04	-0.02	-0.11
	(0.04)	(0.06)	(0.07)
Partisanship = Other	0.04	-0.07	0.07
	(0.09)	(0.10)	(0.16)
Partisanship = UDF	0.08	0.03	-0.008
	(0.09)	(0.14)	(0.17)
Age	-0.0002	-0.003**	-0.001
	(0.0003)	(0.002)	(0.001)
Education (None)	-0.43***	-0.77***	-2.0***
	(0.06)	(0.11)	(0.24)
Education (Primary)	-0.29***	-0.61***	-1.9***
	(0.04)	(0.09)	(0.25)
Education (Secondary)	-0.03	-0.36***	-1.2***
	(0.04)	(0.08)	(0.24)
Urban	0.21***	0.02	0.21
	(0.07)	(0.07)	(0.14)
Wealth basket	-0.01***	0.001	0.003
	(0.004)	(0.005)	(0.007)
Fixed-effects			
District	Yes	Yes	Yes
Fit statistics			
Observations	1,009	547	1,004
R^2	0.17957	0.25941	0.33630
Within R^2	0.11994	0.19738	0.27667

Clustered (Enumeration area) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*
Ethnicity fixed effects not shown to conserve space

Table A13: Mobile internet exposure and support for the ruling party

Dependent Variables:	Trust ruling party	Intend to vote for incumbent	Attended protest last 12 months
Model:	(1)	(2)	(3)
Variables			
Group = Early	-0.08	-0.09	0.21*
	(0.07)	(0.06)	(0.12)
Group = Late	0.06	-0.10	0.03
	(0.12)	(0.16)	(0.10)
Partisanship = DPP	0.45***	0.56***	-0.07
	(0.08)	(0.08)	(0.06)
Partisanship = MCP	-0.31***	-0.67***	0.21**
	(0.07)	(0.08)	(0.09)
Partisanship = Other	0.07	-0.01	0.28
	(0.19)	(0.28)	(0.18)
Partisanship = UDF	-0.18	-1.0***	-0.001
	(0.20)	(0.21)	(0.21)
Age	-0.0004	-0.0006**	0.0002
	(0.0004)	(0.0003)	(0.0007)
Education (None)	0.58***	0.24	0.13
	(0.20)	(0.15)	(0.16)
Education (Primary)	0.48***	0.23*	0.21
	(0.18)	(0.13)	(0.14)
Education (Secondary)	0.31*	0.21*	0.15
	(0.17)	(0.13)	(0.16)
Urban	0.05	0.07	-0.13
	(0.12)	(0.19)	(0.22)
Wealth basket	-0.02***	-0.01**	0.009
	(0.007)	(0.005)	(0.007)
Fixed-effects			
District	Yes	Yes	Yes
Fit statistics			
Observations	998	805	1,010
R^2	0.32810	0.67455	0.12268
Within R^2	0.11926	0.35599	0.03678

Clustered (Enumeration area) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*
Ethnicity fixed effects not shown to conserve space

A.5 Mechanisms

A.5.1 Focus groups with voters

In July and August 2023, ten focus group discussions were held across Malawi.

Each discussion had 8 participants, selected in conjunction with a local contact and said to be knowledgeable of their community. All participants provided informed consent to participate in the study.

Most discussions were gender balanced. In Blantyre and Ntchisi, one discussion was carried out with an all-women group, while in Lilongwe and Mchinji one was with an all-men group.

Figure A3 highlights the 5 districts sampled. I do not provide more precise location information than this to preserve respondent annonymity.

Of the five districts, three were from the Central region (an MCP stronghold) and two were from the Southern region (a DPP stronghold). This ensured rough partisan balance across the discussions.

Figure A4 plots the distribution of DPP vote shares and ballot rejection rates, at the polling station level, in sampled and non-sampled communities. As three Central region districts were included, the average DPP vote share is slightly lower than the overall national figure. The ballot rejection rate is statistically indistinguishable.

A.5.2 Elite interviews

Between July and August 2023, further one-on-one interviews were conducted with a series of stakeholders across Malawi. I provide brief discussion of these below, again noting the importance of annonymity with which respondents agreed to take part.

A.5.2.1 Party strategists Interviews were conducted with 6 strategists from the DPP and MCP, the main ruling and opposition parties referenced throughout the article. These discussions took place in Lilongwe, and included youth organisers, low-ranking activists, and senior co-ordinators involved in the 2019 campaign.

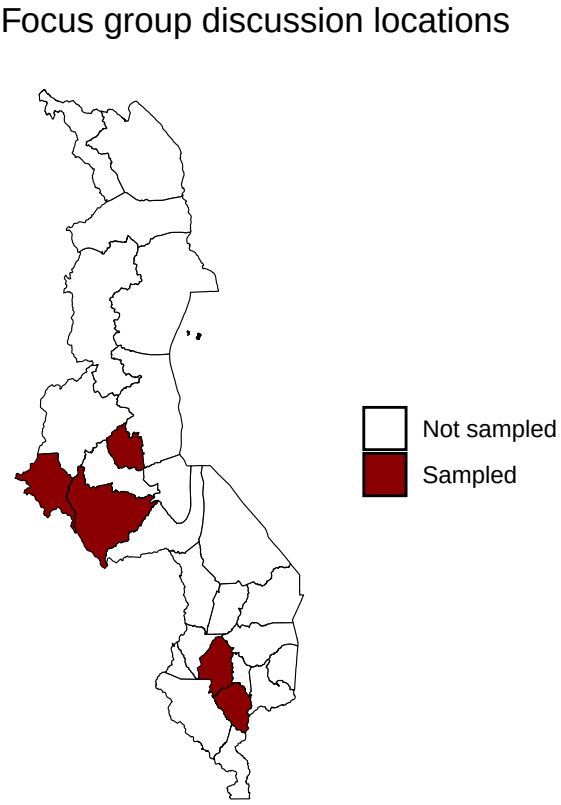

Figure A3: Locations of focus group discussions

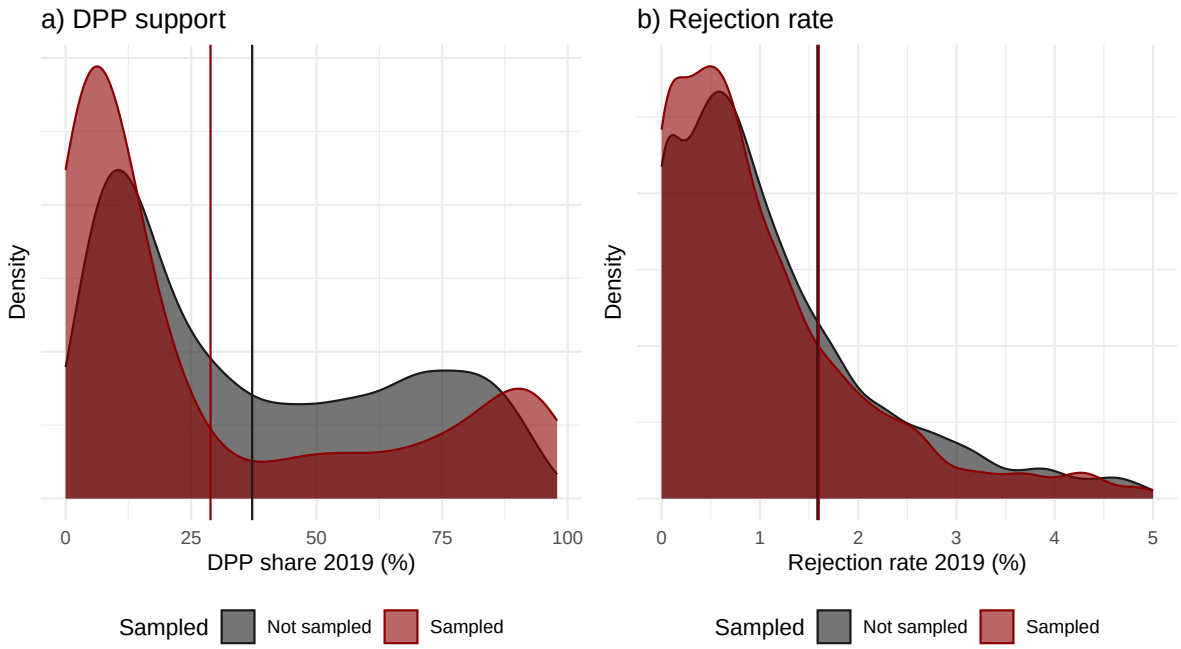

Figure A4: Sampled districts in comparative perspective

A.5.2.2 MEC staff Interviews were conducted with 4 representatives from the Malawi Electoral Commission, all in Blantyre. All worked in the 2019 general election, and collectively had experience working at polling stations, constitituency tally centres, and national HQ.

A.5.2.3 MACRA staff Interviews were conducted with 3 staff members from MACRA - Malawi's communication regulatory authority. The staff were knowledgeable of the processes involved with granting telcom licenses in Malawi. MACRA is based in Blantyre, but these discussions took place digitally.

A.5.2.4 Civil society organisation staff Interviews were conducted in Lilongwe with three staff members from a leading Malawian civil society organisation. All staff had experience organising civic education campaigns in the 2019 election, and two had experience working as election monitors in the 2019 election.