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Get Out the Vote (or Don't):

Evaluating Manipulation Methods in Russian National Elections from 2000 to 2021

By

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ABSTRACT:

It is not disputed that Russia's elections under Vladimir Putin are fraudulent. Ballot stuffing to bolster the party's vote share or turnout numbers is among one of the known tactics. Existing analyses of the Kremlin's election manipulation either group together vote share and turnout fraud or evaluate them on a country-wide basis. Media noted the Kremlin's particular focus on improving turnout in the lead-up to the 2018 election, but no project has yet evaluated if turnout was manipulated or to what extent. By conducting a two-tiered regional analysis of precinct-level election data spanning ten election years, I use the Integer Percentage Point method and Resampled Kernel Density tests to compare turnout and vote share abnormalities. I ask how the nature of election fraud has changed during Putin's presidency. I find that, while vote share remains the primary number manipulated, ethnic republics exhibited different patterns of ballot stuffing than other regions. I suggest three implications of this work. First, that fraud is often easy to spot. Second, that election observers are a relevant policy response to election manipulation. Third, that turnout is a concern for the Kremlin, and should be considered in future analyses.

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I. Introduction and Problem Statement

This paper will expand on the methods of election fraud Vladimir Putin has used during his presidency. Existing analyses of his manipulation tactics either group together methods of ex-post fraud or evaluate them on a country-wide basis. Preliminary findings from Russian statisticians suggest the Kremlin changed tactics from manipulating Putin's vote share to manipulating turnout on a country-wide basis. The question remains when this switch occurred, to what extent, and where. To answer this question, I conduct a regional evaluation of each of Russia's eighty-five federal subjects' (regions) election results. I use the resample kernel density method (adapted from the integer point percentage method) to estimate the amount of fraud present in each type of ballot stuffing: leader's vote share and turnout. For all of Russia's regions, I identify a primary fraud method for each national election year of Putin's presidency: 2000, 2003, 2004, 2007, 2008, 2011, 2012, 2016, and 2018, and 2021. I ask, what is the nature of Russian electoral fraud at the regional level, and how has it changed over time?

Much of the literature surrounding Putin's election manipulation focuses on his motivations as an autocrat to maintain power or use elections as an information mechanism. An understanding of ex-post manipulation methods and the scale of the Kremlin's switch in electoral strategies remains largely unexplored. Studying the election manipulation methods of informational autocrats[1] like Putin will provide more context on the inner workings of these regimes and their use of democratic institutions to maintain control. Russia is a unique modern-day autocracy. If its leader is prioritizing turnout in regions across the country, a deeper understanding of where and how manipulation is occurring would help us re-evaluate the priorities of autocratic incumbents who use democratic institutions to their advantage. Examining

[1] Term developed by Guriev and Treisman, 'Informational Autocrats'. Concerns autocrats that use democratic institutions in various ways to maintain control rather than Stalin-era force and intimidation

regional differences in electoral manipulation methods also allows a closer look into the extent of the autocrat principal-agent problem, which argues that autocrats struggle to centralize their control over agents carrying out the fraud. This descriptive analysis, coupled with a comparison of the results to what would be expected based on game theoretic models of autocratic election manipulation, is necessary to expand our understanding of the nature of manipulation and why it might be occurring. I predict, based on logic explored in the literature review, that turnout fraud should be more prevalent than leader's vote share nationally. Turnout, and its implications of support, are valuable to an autocratic regime such as Putin's, particularly as protests become more relevant. However, following my analysis, I discover that turnout manipulation is confined to select contentious regions of Russia's vast political system, and is not a nation-wide trend. I recommend that policy makers consider Putin's concern for participation in his regime on the regional level, and the opportunities for revolt that come with fraud that is easy to see.

II. Relevant Background

Turnout

On May 7th of 2018, Vladimir Putin began his fourth presidential term after winning re-election that March. Official election data reported Putin's vote share at 76.7% with 67.5% registered voter turnout. In the months since election day, the 67.5% turnout number provided by election officials has been disputed by empirical analyses and independent election observers alike. While Putin's 2012 presidential campaign highlighted policy proposals and pro-United Russia party slogans, his 2018 campaign remained almost exclusively focused on simply encouraging Russians to vote. In the months leading up to the election, one statement from the Kremlin press team circulated Russian and international media alike: 70% of the vote with 70%

turnout.[2] In a document leaked to the Russian BBC, the Kremlin (reportedly) decided to transform the presidential election into a holiday to increase turnout by moving the election to March to coincide with the anniversary of Crimea's annexation.[3] The Kremlin's anxiety about voter turnout was not unfounded. The Levada Center, an independent research center based in Moscow (now legally a foreign agent in Russia), found in a November 2017 survey that only 24% of those they sampled would 'absolutely' vote in the 2018 election, and 34% responded they would 'most likely' vote.[4]

Multiple news outlets predicted months before the March voting day that Putin would win re-election. Yet despite Putin's consistently high popularity ratings and his security as an autocrat,[5] whistleblowers in Moscow and around the country began reporting constitutional violations in the days leading up to and following election day. The Golos Center, an independent election monitor, reported that 56% of their 977 election violation reports during the March 2018 election concerned voter turnout.[6] Using video feeds, the Golos Center's preliminary report found serious discrepancies between official reported turnout and the video feed count in some regions. The scale of the manipulation is, of course, difficult to weigh due to limited information, but the findings of statisticians and watchdogs support some level of election dishonesty in 2018.

While criticisms over authenticity are not new in the world of Russian elections, the media surrounding a potential low turnout rate following the Levada Center survey and the switch from vote share manipulation to turnout manipulation were unique to 2018. The standing empirical

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[2] Reported in Bennetts, 'Getting out the Vote, Putin Style'. Also included in other news articles and in official Kremlin statements to Russian media

[3] Translated BBC article: "Кремль решил превратить выборы президента в праздник для повышения явки"

[4] Levada Center, 'Possible Presidential Election Results [Возможные результаты президентских выборов]'.

[5] In this paper, I will refer to Vladimir Putin as an autocrat due to his consistent manipulation of democratic institutions to remain in power, including the 2020 constitutional referendum to extend his presidency and multiple accounts of election manipulation, voter suppression, and censorship

[6] Golos [Голос], 'Preliminary statements on results of public monitoring of the presidential elections'.

evidence supports the idea that a switch did occur. The Wilson Center's statisticians Kobak, Shpilkin and Pshenichnikov found similar election result anomalies in the 2016 parliamentary and 2018 presidential election data as they did in 2012. One difference, however, is that their analysis identifies a switch in the main method of manipulation from the leader's vote share to turnout based on an excess of integer polling stations between 2012 and 2016 (Kobak, Shpilkin, and Pshenichnikov 2018). The reason for this change is unclear, and it supports the observation that the Kremlin, and Putin in particular, is no longer just interested in winning elections, but in winning them with high turnout.

The easy justification for the shift in methods may be that turnout has been trending down in Russia throughout the 21st century. A quick look at the official turnout data from national-level elections from the past twenty years, however, does not show an immediate or obvious downward trend. Just considering presidential elections (which, in the 21st century, have occurred in 2000, 2004, 2008, 2012, and 2018), national turnout rates have consistently stayed within the 60% to 70% range, with the lowest turnout recorded at Putin's second election in 2004 at 64.3%, and the highest at 69.7% at Medvedev's 2008 presidential election. These numbers, of course, are subject to electoral manipulation, but referring to Figure 2 in Kobak, Shpilkin, and Pschenichnikov's report, leader's vote share was the primary abnormality in election data until the 2016 parliamentary elections, where leader's result and turnout switched. So, if turnout rates were not trending down before the 2018 presidential election, why has Putin become so focused on turnout? This is the question the descriptive analysis in this paper aims to answer.

Elections in Russia

Russia has a unique electoral system. To understand the empirical methods of this paper and its results, a brief introduction to the voting system is necessary. Russia's head of state is its

president. Vladimir Putin, a member of the United Russia[7] party, was first elected to office in 2000, re-elected for another four-year term in 2004, and became Prime Minister in 2008 under President Medvedev (he was unable to run for a consecutive third term due to the Constitution). In 2012, Putin ran for president and was elected for a new term of six years. In 2018, he was again re-elected until 2024. In 2020, a constitutional referendum passed allowing Putin to run again for two more six-year presidential terms. The president is elected by popular vote in a two round election system. Parties select their candidates for presidential elections. If no candidate gets 50% of the vote in the first round, the two candidates with the highest vote share have a run-off. Elections have not gone to the second round since Putin came into office. Every five years, part of the legislature is also elected. The Russian Parliament is bicameral. The upper chamber, the Council of Federation, is appointed by top officials in each of Russia's eighty-five regions. The lower chamber, the Duma, is elected with a parallel electoral system – "half of the deputies are elected with first-past-the-post (FPTP) and the other half with party-list proportional representation (PR) voting among the federal constituency with a threshold of 5 percent required for any party to win a seat" (Simon and Gueorguieva 2008, 80). This paper will use five Duma elections (2003, 2007, 2011, 2016, and 2021) and five Presidential elections (2000, 2004, 2008, 2012, and 2018) in its empirics.

The electoral system is divided up into multiple subdivisions. There are eighty-five regions (sometimes known as federal subjects, oblasts, or republics). Each region has multiple Territorial Election Commissions (TIKs is the Cyrillic acronym), which are usually named after the district they reside in (the names are sometimes interchangeable). Each TIK is comprised of electoral precincts or voting sites (UIK is the Cyrillic acronym). TIKs and UIKs are only relevant

[7] Единая Россия

for presidential and proportional representation Duma elections. First past the post Duma elections use 'constituencies' (OIK is the Cyrillic acronym) instead of TIKs. These are the single member districts that elect the other 225 members of the Duma. This paper focuses on fraud at the regional level, which is estimated using precinct-level data.

III. Literature Review: Preliminary Background and Significance

Informational Autocrats: Elections in Authoritarian Regimes

To examine the reasoning behind and the extent of the Kremlin's shift from manipulating Putin's vote share to manipulating turnout, an understanding of the existing literature on authoritarian states like Russia contextualizes why elections are manipulated in the first place. A new form of autocracy emerged in the 21st century led by *informational autocrats*. Guriev and Treisman (2019) offer a strong case for why autocrats like Putin choose to have elections and legislatures even if the results are falsified. In contrast to early authoritarian leaders like Stalin and Mao, informational autocrats choose to concentrate their power by using democratic institutions instead of terror. The authors argue the key to regimes like Putin's is manipulating information to "survive by leading citizens to believe – rationally but incorrectly – that they are competent and public spirited" (Guriev and Treisman 2019, 101). Of course, applying the characteristics of informational autocracy outlined by Guriev and Treisman to a regime such as Putin's, which historically has relied on television for its information control, has implications as Russia is an informational autocracy with an arguably shrinking information gap between the public and elites. While what motivates Putin may be harder to determine, the Kremlin's election manipulation can be contextualized by using the academic consensus on broader authoritarian types like informational autocracies.

Informational autocrats often use institutions like elections to maintain legitimacy, consolidate their power, and signal their political strength to the public and bureaucrats alike. Alberto Simpser, in his book *Why Governments and Parties Manipulate Elections: Theory, Practice, and Implications* (2013), focuses specifically on elections as tools for autocrats to maintain legitimacy and pushes back against the previous academic consensus: that autocrats excessively manipulate them just to win. Putin is a popular politician in Russia, and his approval ratings remain consistently high.[8] Since his first term as president in 2000, Putin would be more likely than not to win a free and fair election. Simpser explains why autocrats continue to manipulate elections they could win fairly: "electoral manipulation can potentially yield substantially more than simply winning the election at hand … [including] to discourage opposition supporters from turning out to vote or to protest; to convince bureaucrats to remain loyal to the government…" (Simpser 2013, 3).

The public, like the bureaucracy, poses a potential problem for an autocrat like Putin. Andrew Little unveils a second motivation autocrats may have to manipulate elections: to keep the public from staging a revolution. It is beneficial for an autocrat to change election results to distort their signal to the public. When deciding whether to protest, the public evaluates the costs and benefits of doing so after seeing election results. Strong election results may dissuade them, since they suggest the autocrat is more popular than anticipated. Little establishes that "the information provided by elections does not only affect incumbent behavior as emphasized in past work, but also all political actors from elites to citizens" (Little 2011, 273). Gill considers this

[8] Frye et al. support the validity of these approval ratings in their article "Is Putin's Popularity Real?". They conclude, using a 'list survey' method, that the Kremlin's reported approval ratings are relatively accurate. Of course, several other factors must be considered, particularly ex-ante election manipulation to remove opposition candidates, but it does appear that a majority of Russian's approve of their president to some extent.

idea of public signaling in the context of Russian elections, "[which] have been seen overwhelmingly as means through which popular support for the rulers is demonstrated, and the legitimacy of the system thereby affirmed" (Gill 2016, 354). He uses the term 'electoral authoritarianism' to refer to post-Cold War regimes that combine authoritarianism with democratic elections that involve some element of uncertainty about the eventual winner. In an electoral autocracy, elections "[disseminate] a public image of the invincibility of the ruling party/president … [and when] reflected in high turnouts and huge margins, elections can convey the message that opposition is pointless and cannot succeed" (Gill 2016, 357).

Russia under Putin is an electoral authoritarian regime because of Putin's tactics to remove opposition like Alexei Navalny before the election and manipulate the results afterwards. If the Kremlin's manipulation tactics ever were to fail, a genuine challenge to the regime could arise in an election. Gill asserts that, as of 2016, he believes "the major problem the regime faces has been the inability of the party to produce the level of popular support at the polls required to stabilize the regime and marginalize the opposition" (Gill 2016, 269). The only ways to address this issue, he argues, are to reform the party, limit independent election monitoring, or to carry on with minor election manipulation and 'getting out the vote'. He predicted that the Kremlin would focus on turnout in the 2018 presidential elections, which is vital for contextualizing this switch in election manipulation tactics.

The Logic of Electoral Fraud

In a country like Russia with a strong bureaucratic base, the Kremlin has a vested interest in maintaining the image of strength for its potential competitors. Simpser elaborates on elections as a signal to bureaucrats in a 2014 article with Gehlbach titled "Electoral Manipulation as

Bureaucratic Control." Using a formal model, they establish that autocrats, needing bureaucratic support to sustain their regime, and bureaucrats, needing the autocrat to maintain their privileged position, engage in electoral manipulation. Manipulation can be a solution to what Horn and Shepsle refer to as "coalition drift," when a leader may fall from power, which could impact an agent's delegated task. In their model, Gehlbach and Simpser find:

> … a bureaucrat has an incentive to exert effort on a ruler's behalf, to the extent that a representative citizen is likely to respond to such effort by returning the ruler to power. Manipulation in this setting provides the ruler with an opportunity to persuade the bureaucrat that the citizen is of a type most likely to respond to bureaucratic effort. (Gehlbach and Simpser 2015, 222)

Kalinin and Mebane (2017) test this signaling mechanism in their model evaluating fraud in the 2016 State Duma Elections. They use Rozenas' resample kernel density method and a finite mixture 'frauds' model to examine the Kremlin's increase in election 'signaling' behavior since 2004. They find that the 2016 election had the most extensive magnitude of fraud since the 2000 presidential election, finding, in particular, that "the estimated magnitude of election fraud and its spread across the country suggests that Russian election anomalies are deeply embedded in both the regional and local levels" (Kalinin and Mebane 2017, 7). Official turnout was the lowest recorded in recent Russian history at 48%. Using their model as foundation for their conclusions, Kalinin and Mebane argue that governors were interested in boosting turnout to provide regions with more support in the lower chamber. Members of the Russian government may use election fraud to 'signal' their loyalty. Election abnormalities, particularly in turnout and vote share for United Russia, serve as a 'signal' to the Kremlin.

To evaluate the Kremlin's interest in turnout, it is necessary to understand how Putin, as an autocrat, weighs the risks and benefits of falsifying elections. As previously established by Gehlbach and Simpser (2015), Little (2011), and Gill (2016), the choice to commit electoral

fraud is made in the context of potential threats from bureaucrats and the public, as well as with the understanding that elections represent a public signal to both challengers. To evaluate the extent of that fraud in 2018, academic context to the fraud methods the Kremlin has employed since Putin's rise to power in 2000 is needed. Luo and Rozenas establish two different ways an autocrat can manipulate an election: ex-ante manipulation (before the election, when the election is made unfair) and ex-post manipulation (after the election, when the results are made unclear). An autocrat can either do one or the other, or both. There is a system of tradeoffs between an incumbent's decision to use ex-ante and ex-post manipulation. Using a Bayesian game, the authors argue ex-ante manipulation does not increase the risk of conflict but worsens accountability; ex-post manipulation increases the risk of conflict but improves accountability. Ex-post fraud is more dangerous for an autocrat to carry out, but it is also most common. Strong incumbents, Luo and Rozenas argue, should manipulate elections ex-ante because ex-post fraud increases the likelihood of violence (Luo and Rozenas 2018, 20). While this game contextualizes the trade-offs autocrats like Putin make between different election manipulation strategies, its applicability to the 2018 election is limited. The Kremlin used both ex-ante and ex-post methods – it ousted Navalny from running for the presidency and increased television propaganda for United Russia, as well as manipulated turnout and Putin's vote share after the election. Many of the 2021 political protests and arrests in Russia have been centered around ex-ante manipulation, particularly Navalny's removal from the election and his subsequent imprisonment.

Rundlett and Svolik discuss the motivations for post-election fraud in an autocracy and the extent to which the 2011 and 2012 Russian legislative and presidential elections were manipulated. They create a 'global games' model, where the authors predict the actions of agents

(poll workers) as a result of their individual assessments of an incumbent's (Putin's) popularity. Incumbents who lack the popularity to attain reelection will inspire less agents to engage in fraud than incumbents with the popularity to win without fraud, since the latter comes with a larger reward factor and lower risk factor than the former. This leads to an under or an oversupply of fraud. When the incumbent is very popular, actors are more likely to overcompensate. When the incumbent is not popular, they underestimate how much they need to stuff ballots and can lose the election. Rundlett and Svolik then consider how much Putin's vote share in the 2012 presidential election was manipulated by evaluating how many precincts reported rounded vote shares at multiples of five, using Kobak et al's integer percentage point method (described further below). They find evidence supporting their claim "that precinct-level vote shares corresponding to multiples of five are indeed over-represented in Putin's and United Russia's results but not those of other candidates or parties" (Rundlett and Svolik 2016, 194).

Turnout as a Primary Method of Fraud

Why would turnout be a strategic number for the Kremlin to falsify? There are a few existing theories on turnout and its significance in post-communist countries, particularly Russia. Pacek, Pop-Eleches, and Tucker develop a theory for when post-communist voters vote in their article "Disenchanted or Discerning: Voter Turnout in Post-Communist Countries." Turnout has been on the decline, and the authors develop and test three competing theories: depressing disenchantment, motivating disenchantment, and stakes-based choice making. Motivating enchantment predicts voters will be more likely to vote when economic and political conditions are worse, while depressing disenchantment predicts they will be less likely to. Stakes-based choice making predicts voters will be more likely to vote in more 'important' elections. They find that voter participation patterns seem to be a result of what is 'at stake' in an election,

instead of general disenchantment with the political system. Turnout is therefore much higher "in elections for more important institutions, when countries face fewer external constraints on policymaking, and when the long- term political future of the country is more questionable" (Pacek, Pop-Eleches, and Tucker 2009, 473). They test this theory using a dataset of competitive elections in post-communist countries, which does exclude Russian elections beyond 2004 (since, after this point, they were no longer considered 'free'). Pacek, Pop-Eleches, and Tucker find that turnout is on average 12% higher in 'dominant' elections than in 'dominated' elections (presidential elections in a presidential system over parliamentary elections in a presidential system, for example). Voters vote when elections matter. Considering Russian elections after 2004 in the context of these findings, however, demonstrates why turnout may be so inconsistent. Voting in an election is only a function of electoral stakes when there is an "information environment that allows voters to discern the policy implications of election results" (Pacek, Pop-Eleches, and Tucker 2009, 484). Most Russian voters know that election results are fraudulent from the few remaining independent media publications like Meduza. There are limited policy implications attached their vote because the outcome remains as expected.

McAllister and White focus on an abnormal phenomenon in Russian elections called voting 'against all' that existed until 2006, where voters can choose to reject all candidates on the ballot in place of abstaining or making their vote invalid. They still cast a ballot, but do not give their vote to anyone. The amount of 'against all' votes being cast increased since Putin came into office. In the early 21st century, Russians had the most vote choice they had experienced in decades, and yet "a considerable body of survey evidence suggested there was little faith that competitive elections had given ordinary Russians an effective means of influencing the

government that was nominally accountable to them" (McAllister and White 2008, 68). McAllister and White find through their empirical analysis of regional differences and individual voter demographics that voting 'against all' is often a protest vote against Russian democratic standards, similar to a third party vote in a Western democracies (McAllister and White 2008, 84). The option to vote 'against all' was removed after the 2006 election. McAllister and White predict that this action is likely to have consequences – likely leading to turnout falling further, "although increasing numbers are likely to take part and then spoil their ballot paper as a means of expressing generalized dissatisfaction" ((McAllister and White 2008, 67). Turnout inconsistencies since 2006, coupled with low enthusiasm for elections and record low turnout in the 2016 Parliamentary elections, may be why the Kremlin is particularly concerned with manipulating it.

Detecting Turnout Manipulation

In modern Russia, voters must weigh the worth of voting in an election where their vote will likely have no impact. Of course, due to Putin's relatively high approval ratings, some voters support Putin and will vote for him in presidential elections. Some vote for opposition parties, even though they are aware their candidate will not win. Others choose not to take the time to go to the polls when the impact of their vote is minimal at best. These different groups of voters are constituted of different ages and demographics. By encouraging Russian citizens to vote, the Kremlin is attempting to target voters that reject the electoral institution itself or are apathetic to the fraudulent political process.

Turovsky is a Russian political scientist at the Higher School of Economics in Moscow who published an article in 2020 analyzing the differences in voter mobilization between parliamentary and presidential elections in election cycles from 1995-2018. He focuses on the

electoral consolidation process from parliamentary to presidential elections that incumbents (like Vladimir Putin) use to maintain power. Turovsky finds that almost all viable candidates in presidential elections rely on their party electorate to win elections, not on gaining new voters. Since 1996, however, turnout has been steadily declining. In 2018 the author notes a significant difference between turnout for parliamentary and presidential elections (over 19 percentage points) and increased voter turnout in seventy-eight of Russia's eighty-five regions. Turovsky credits this increase to the campaign, but as will be later discussed, it is possible this jump was the result of significant turnout rate manipulation at the precinct level. Another conclusion worth noting is that Turovsky finds "the incumbent benefited from higher turnout in 2000, 2004, 2008, and 2012, while increased turnout in 2018 did not work so definitively to increase Putin's numbers, even though he was, of course, the main beneficiary of the higher turnout" (Turovsky 2018, 533). An explanation for this abnormality remains unclear.

Distributions of voter turnout can indicate fraud. In a dataset of turnout numbers with random variation, the distribution should look somewhat 'normal' (bell-shaped) (Myagkov, Ordeshook, and Shakin 2009). When ballot stuffing occurs, however, the distribution skews to the right, eventually appearing bimodal. If bimodality, along with an unexpected and selective jump in participation, appears in a turnout distribution suddenly from one election to the next, fraud is a possibility. Ballot stuffing can result in two different statistical phenomena. First, if ballot stuffing is happening to a greater extent in the same districts over time, the distribution appears more and more bimodal. Second, if ballot stuffing in some districts begins impacting practices in others, the distributions will be bimodal and, over time, become more unimodal and right skewed as districts even out their manipulation.

Territorial Election Commissions (TECs[9]) are the main electoral administrative units in Russia (often referred to as districts) and are subsets of the administrative region (also known as *oblasts*, federal subjects, or republics). Within TECs are precincts (Local Election Commissions). If precincts reporting abnormally high turnout are not separated from the rest, the distribution will appear unimodal, even though fraud is occurring. The second set of TECs that have abnormally high numbers "… might also yield a normal distribution, but with a mean shifted in accordance with the magnitude of the fraud committed", therefore "if [the analyst] fails to separate the two subsets and simply add distributions, [they] should observe a multimodal density or one with an overly fat or extended right tail" (Myagkov, Ordeshook, and Shakin 2009, 84). Myagkov, Ordeshook, and Shakin outline this phenomenon in the context of Russian elections, along with other 'election forensics' methods in *The Forensics of Election Fraud: Russia and Ukraine*.

The Integer Percentage Point Method

Using officially reported election data, political scientists and statisticians alike developed a method that can identify election results that have likely been falsified. Rundlett and Svolik as well as Kobak et al have supported their theories that, due to the human propensity towards 'round' numbers (integers), manipulated election results often have irregular 'spikes' at whole numbers that cannot simply be attributed to chance.[10] This paper will use a combination of existing methods of quantifying fraud through integer point percentages to conduct its analysis of turnout and leader vote share from 2012-2018.

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[9] This acronym is based on the translated title. In Russia, Территориальные избирательные комиссии (Territorial Election Commissions) are commonly referred to as ТИК (tik) and Участковые избирательные комиссии (Precinct/Local Election Commissions) as УИК (uik)

[10] Used by Rundlett and Svolik in their article 'Deliver the Vote!', by Kobak, Shpilkin, and Pschenichnikov in their election reports released in 2012 and 2018, Klimek et al in "Statistical detection of systematic election irregularities", and other scholars.

In their article “Integer percentages as electoral falsification fingerprints” Kobak, Shpilkin, and Pshenichnikov demonstrate the reliability of using integer-value peaks for estimating fraud. Existing literature supports a human attraction to round numbers (particularly fives and tens) and similar methods have been used to detect scientific misconduct. Kobak, Shpilkin, and Pshenichnikov compare raw data from Russian elections spanning 2000 to 2012 to similar elections in other countries. Using leader’s vote share and turnout percentages, they find that the number of polling stations reporting integer percentages instead of fractional values from 2000 to 2012 was abnormally high (Kobak, Shpilkin, and Pshenichnikov 2016, 15). They define percent integer values as “all percentage values deviating from an integer by at most 0.05 percentage points” (Kobak, Shpilkin, and Pshenichnikov 2016, 5). They exclude any polling station with 100% turnout or less than 100 registered voters because these are often artificial election sites like hospitals, prisons, and military units. For each election year, they count how many polling stations had turnout or leader’s vote share at an integer percentage ±0.05%. They verify the significance and size of these findings using Monte Carlo simulations, which evaluate the null hypothesis that “first, the election outcome at each polling station represents the true average intentions of voters at that particular location, and second, each person at each polling station votes freely and independently”(Kobak, Shpilkin, and Pshenichnikov 2016, 6). The Monte Carlo simulations find that the amount of integer polling stations in election years 2004 and onwards could not have occurred by chance. This finding allows scholars to estimate the level of fraud using official reported data instead of relying on solely anecdotal accounts of ballot stuffing. One of the limitations of this method is its inability to “estimate the overall impact of falsifications: not all ballots at dishonest polling stations are necessarily fraudulent, and not all dishonest polling stations report integer percentages” (Kobak, Shpilkin, and Pshenichnikov 2016, 15).

Rundlett and Svolik build on this article and others in "Deliver the Vote! Micromotives and Macrobehavior in Electoral Fraud" when evaluating fraud in the 2011 and 2012 elections. Rather than counting all integers, as Kobak, Shpilkin, and Pschenichnikov do in their article, Rundlett and Svolik only count multiples of five ±0.5. To examine digit distribution, they round to the nearest multiple of 0.5%, "extract the unit and the first decimal place digits (e.g. both 76.481 and 46.532 become 6.5), and pool them into the twenty resulting digit pairs" (Rundlett and Svolik 2016, 26). Then, in order to see if overrepresentation of multiples of five is increasing over time, they develop a measure of 'ruggedness' by taking the difference between the actual distribution of a candidate's results and its optimal kernel density estimate (a smoothing function) (Rundlett and Svolik 2016, 29). They find that the extent of fraud is increasing in Putin and United Russia's precinct-level vote share.

Gehlbach, in a blog post for The Monkey Cage, uses the graphical methods of detecting fraud that Mygakov, Ordeshook, and Shakin explore in their book *The Forensics of Election Fraud: Russia and Ukraine*. He demonstrates these indicators with frequency graphs of the region Chechnya's percent vote for United Russia and percent turnout, and a graph of the relationship between percent turnout and percent vote for United Russia. In Exhibit A, the frequency graph of Chechnya's percent vote for United Russia, the distribution is not normal and demonstrates a thickening right tail at upper vote shares (Gehlbach 2012). Gehlbach also points out spikes at familiar fractions (3/4, 4/5), which, as noted above, are also indicators of fraud. In Exhibit C, comparing percent turnout and percent vote for United Russia in Chechnya, there is a strong relationship between turnout and United Russia's vote share – a strong indicator that "United Russia is scooping up essentially all of the marginal votes over a certain level"

(Gehlbach 2012). Identifying graphical indicators of fraud provides even further evidence of malpractice.

The integer percentage point method, while very helpful in evaluating flawed election data, does have some potential drawbacks. Rozenas outlines these in his article critiquing the method based on the discrete and rational numbers being evaluated – "whenever election data contain a large number of moderately sized electoral units (less than tens of thousands of voters), it is entirely expected that coarse vote-proportions will occur relatively frequently" (Rozenas 2017, 42). He establishes an extra step to the method called a 'resampled kernel density' method (RKD). As noted above, Rundlett and Svolik employ this method and find evidence of fraud in the 2012 Russian presidential elections. While this analysis will focus primarily on the mechanism used by Kobak et al due to its ability to compare different electoral manipulation tactics, Rozenas' criticism is valid and necessary to highlight when conducting this kind of analysis.

Conclusion

The academic consensus on the motivations of autocrats is that elections can be manipulated for a multitude of purposes, including to publicly signal to bureaucrats and the public alike to the strength of the incumbent, avoid revolution, and maintain legitimacy. The strategies they can use to manipulate elections to achieve those goals include ex-anti and ex-post manipulation. In 2018, Putin used both. The extent of the Kremlin's ex-post election manipulation can be followed from 2012, with Rundlett and Svolik's analysis, to 2018, with Kobak, Shpilkin, and Pshenichnikov's. Turovsky's analysis supports Kobak et al's finding that turnout may be a new priority for Putin. Both Rundlett and Svolik and Kobak et al agree that higher counts of integer percentages in

election results are signs of electoral fraud, with the caveat that Rozenas discusses regarding discrete number analysis.

While research exists evaluating the extent of Putin's electoral fraud, a focus on turnout and its prevalence over Putin's presidency is absent from the literature. Thus, a study using the methods employed by reputable social scientists to evaluate the significance of Putin's change in tactics will expand on the current understanding of his regime and their ability to control democratic institutions to remain in power. If informational autocrats use elections to maintain legitimacy, we should see more turnout manipulation than leader's vote share manipulation.

IV. Research Design and Methods

Data

In Russia, all election results are available at the precinct level through the Central Election Commission's website. Scraping election results from the Central Election Commission, however, proves difficult due to the website's coding structure. Dmitry Kobak, one of the authors mentioned above, publishes raw datasets for every election from 2000 to 2021 on his GitHub in Excel *csv* format.[11] These were imported into Stata and variables were renamed using a codebook and formatted into *dta*. While the datasets contain all the variables the Central Election Commission publishes, this paper primarily focuses on region, precinct, registered voters, valid votes, invalid votes, turnout, and vote share. As Rundlett and Svolik do, I drop all precincts with less than fifty valid votes or with turnout greater than or equal to 100%, as these are typically administrative voting sights at military bases, hospitals, or nursing homes. I also drop regions within the dataset that are not typically considered a part of Russia's voting system, such as Baikonur, international absentee voters, and the two regions that make up Crimea.

[11] https://github.com/dkobak/elections/tree/master/data

Method

This paper uses a combination of methods examined in the Literature Review to evaluate fraud in Russia's elections from 2000 to 2021 on the regional level. I use replication code from Rundlett and Svolik as the basis of my analysis. I adopt the parameters for inclusion determined by Rundlett and Svolik. 'Integer' percentages are defined as multiples of five ±0.5. I also employ their formulas for turnout and leader's vote share. Turnout is defined as the number of valid and invalid votes cast divided by the number of registered voters in the precinct. Leader's vote share is measured as the number of votes for Putin or United Russia divided by the number of valid and invalid votes cast. My preliminary measure of fraud was the proportion of precincts in each region with integer percentages in each of the methods of fraud. I compare the two kinds of fraud, considering their significance, to create a visual of each region.

After conducting this original analysis, I determined it was necessary to involve a method of evaluating fraud that would account for chance. There are some multiples of five that would be expected to occur in election data and are not indicative of foul play. Rozenas' Resampled Kernel Density method is an expansion of the integer percentage point method that accounts for this discrepancy. The Resampled Kernel Density (RKD) method "detects fraud by comparing the kernel density of the observed vote-shares against a sample of kernel densities drawn from the null distribution of vote-shares" (Rozenas 2017, 48). A kernel density estimate determines the probability of a value occurring within a variable. In this case, we are interested in what the probability of 'coarse' vote shares (percentages divisible by five) occurring naturally is and comparing those likelihoods to our observed values. The kernel density estimate uses qualities of observed election data[12] to make inferences about the population and estimate probabilities of

[12] The package uses raw numbers rather than percentages, but the same values were used to estimate. That is, on the precinct level, votes for Putin, turnout (valid votes plus invalid votes), and registered voters.

each one. This creates an estimate for a null hypothesis of no fraud, which can then be compared to the observed values. The difference between the two indicates which precincts are very likely fraudulent, and those become a part of the 'fraud' count (percentage of precincts that are most likely fraudulent). I use Rozenas' replication code to apply the *spikes* package to the ten election years in question, extracting fraud estimates for Putin's vote share at the regional level.[13]

In the interest of clarifying which methods specifically are being used, who they were developed by, how they are carried out, and what they measure, Table 1 explains this work's contribution to existing parameters for estimating electoral fraud, and the labels I will be using to refer to each procedure.

Table 1: Methods referenced in this analysis

Method	*Methodology*	*Cited from*	*Election years used on*	*Results returned*
Resampled Kernel Density (RKD)	R *spikes* package, which runs a kernel density estimate using the provided data. Compares estimates to observed values, and calculates a percentage of precincts that are still abnormal, taking chance into account	Rozenas 2017	2003, 2007, 2011, 2012 (national level)	Fraud estimate (estimated % of fraudulent precincts for Putin's vote share)
Graphical Digit Analysis	Replication code, including requirements for inclusion, rounding parameters, formulas, and figures. Graphical indicators of manipulation	Rundlett and Svolik 2016; Myagkov, Ordeshook, and Shakin 2009	1996, 1999, 2000, 2003, 2004, 2007, 2011, 2012 (national level, some individual regional analysis)	Figures 1-6
Integer Percentage Point	Calculate percentage of precincts reporting vote share for Putin or turnout at a 'coarse' number (multiple of 5) as an indicator of fraud (not official fraud estimate).	Kobak, Shpilkin, and Pshenichnikov 2016	2000, 2003, 2004, 2007, 2008, 2011, 2012 (national level)	Fraud indicator (% of precincts reporting coarse numbers in vote share or turnout)
This paper's contribution to the literature				
Resampled Kernel Density, Graphical Digit analysis, Integer Percentage Point	Use Integer Percentage Point method and Resampled Kernel Density methods to conduct analysis for all years on the regional level, supplemented with figures	This paper's contribution to the literature	2000, 2003, 2004, 2007, 2008, 2011, 2012, 2016, 2018, 2021 (all at the regional level)	Fraud indicators for both turnout and vote share, fraud estimates for leader's vote share

[13] https://cran.r-project.org/web/packages/spikes/spikes.pdf

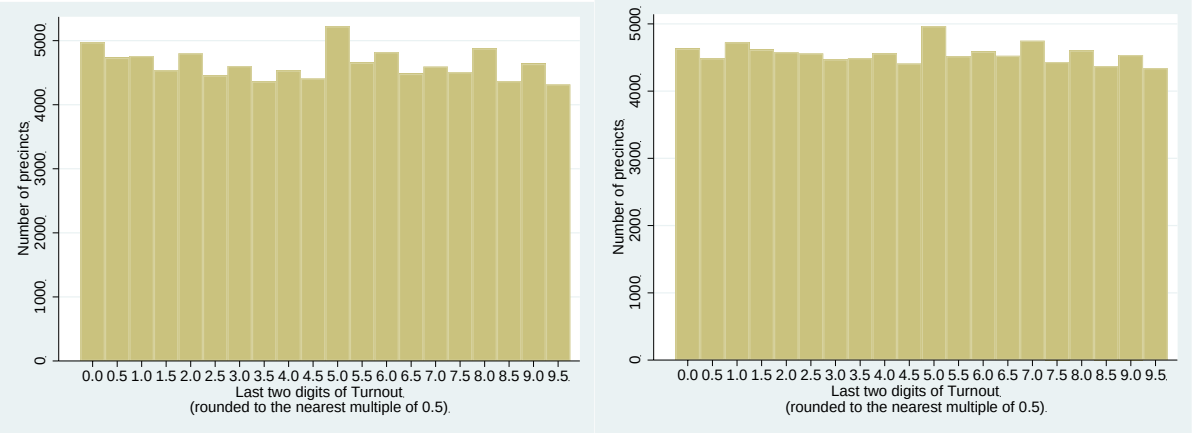
I first provide an overview of fraud on the country-wide level for 2012, 2016, and 2018 with graphical analysis of indicators (Mygakov, Ordeshook, and Shakin 2009; Gehlbach 2012). I then conduct a fraud analysis of each of the 85 regions for 2000, 2003, 2004, 2007, 2008, 2011, 2012, 2016, 2018, and 2021, and determine a primary method of fraud (turnout or leader's vote share) for each. Using this analysis, I am able to describe if, when, and where this switch in methods occurred. I identify trends and the spread of fraud across the country from 2000 to 2021. Finally, I use these results to evaluate a hypothesis based on the literature: If informational autocrats use elections to maintain legitimacy, we should see more turnout manipulation than leader's vote share. Leader legitimacy is enhanced, and opposition is deterred, if it appears that the autocrat not only wins, but wins with widespread support.

V. Integer Percentage Point Results

Contextualizing the Integer Percentage Point Method

Before creating any measures of fraud, I examine graphics from the years in question for visual indicators of foul play. These figures were created with replication code from Rundlett and Svolik. Below is a replication of Rundlett and Svolik's Figure 6, which plots the last two digits of percentage vote for Putin (United Russia) in the 2011 Parliamentary election. I have replicated this figure to produce the frequency of the last two digits of turnout for the 2018 Presidential and 2021 Parliamentary elections. As you can see in Figures 1 and 2, there is a suspicious spike at the 5% mark for turnout in both years. In 2018, an abnormal spike at 5.0 can be seen. This trend continues through to 2021. This indicates an overrepresentation in 'clean' multiples of 5% in the national data for these two elections – numbers such as 65%, 75%, and so on. To identify similar trends in another fraud type, I produced the same distributions for leader's

vote share. The first year a spike can be seen at 0.0 or 5.0 is in 2008, and the distributions continue to show abnormalities at 0.0 and 5.0 for all later election years, apart from 2016.



Figures 1-2: Last two digits of % turnout nationally in 2018 and 2021, from left to right

Figures 3-5 show the changing nature of the relationship between precinct-level turnout and leader's vote share. By 2018, the relationship is less linear and almost horizontal, a change from 2012 and 2016, which appear more linear. In 2012 a thickening at 60% and roughly 95% is apparent, along with thickening at 40% and roughly 95% in the 2016 comparison. The relationship between turnout and leader's vote share, how they are distributed, where there is a thickening of data points, and how linear it is, can indicate that the results have been manipulated. In 2018, Putin's vote share is relatively high – even when turnout is low. There is a very slight positive relationship, but, compared to 2012 and 2016, 2018 appears flatter and less linear. In 2012 and 2016, there is noticeable thickening at the very top right corner. A flatter relationship does not necessarily indicate less fraud. Since the beginning of the 2010s, Putin has consistently reached at least 55% of the vote in most regions, creating a sort of 'floor' with little variation.

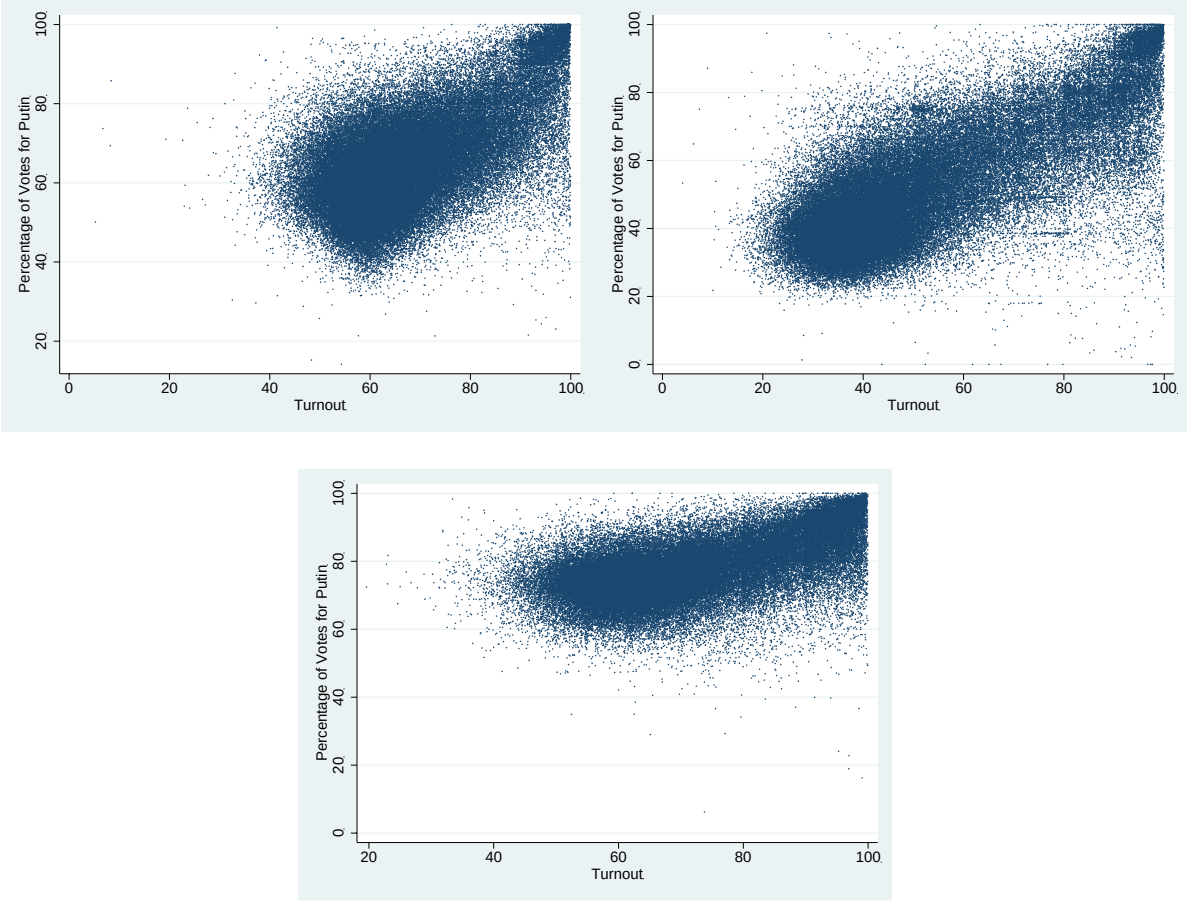


Figure 3-5: Examining the relationship between turnout and vote for Putin for years 2012, 2016, and 2018

The basis of the integer percentage point method is that fraud can be seen in abnormal 'spikes' at coarse vote shares. These spikes can be observed in distribution graphs of Putin's vote share and reported turnout, with the number of precincts on the y axis. Figure 6 demonstrates the distribution of votes for United Russia in the 2016 Parliamentary election. You can see a significant spike in the number of precincts reporting percentages at 55%, 70%, 75%, and 95%. This trend can be similarly observed in the other distributions of both turnout and leader's vote share, with spikes appearing to increase in frequency as time went on, particularly following the 2008 Presidential election.

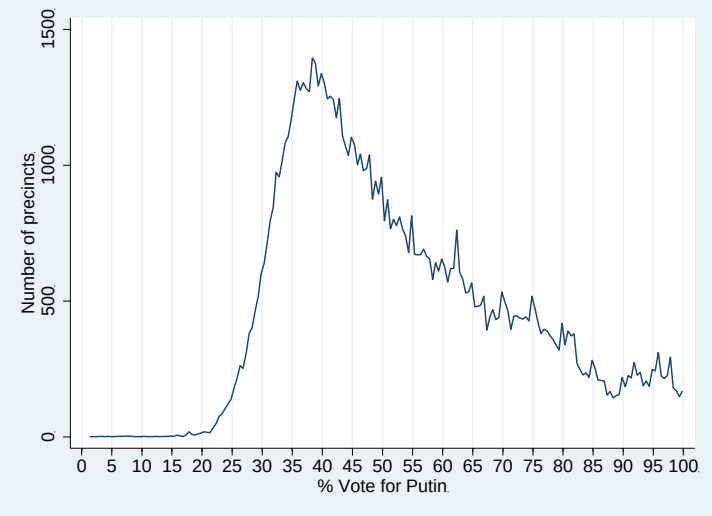


Figure 6: Distribution of % Vote for United Russia for 2016 Parliamentary Election

Graphical indicators are helpful to identify trends to anticipate when looking at the data more closely. Coupled with literature reviewed in preparation for this analysis, it is expected that fraud begins to increase following the 2008 election. As mentioned above, after 2003 Russian elections were no longer considered 'free', and reports of election manipulation became more widespread. Furthermore, I anticipate that 2018, as indicated multiple times, may have been an abnormality, not necessarily a trend, as its deviations seem to rectify themselves in 2021 according to the graphical evidence. This will be further explored in the empirical analysis. Of course, since there has only been one national election since 2018, it is not possible to assert whether it experienced an unexpected interest in turnout that was eventually redirected.

Preliminary Regional Fraud Markers

As coarse vote shares are indicative of fraud, I first use the non-normalized integer-based method to calculate the percentage of precincts per region per year that reported turnout or vote share that was divisible by five. I do this for both Putin's vote share and turnout, and then plot the resulting fraud indicators (% of precincts reporting coarse vote shares), with year on the x-axis and percentage on the y-axis. From a cursory glance, it appears most regions report roughly

similar percentages of fraud indicators for Putin's vote share and turnout. They waver around 10%, overall. There are some, however, that deviate from this apparent baseline.

After examining each of these figures, I identified seven regions that had particularly interesting or abnormal patterns over the twenty-year time period in question: Чеченская Республика (Republic of Chechnya), Карачаево-Черкесская Республика (Karachay-Cherkess Republic), Магаданская область (Magadan Oblast), Ненецкий автономный округ (Nenets Autonomous District), Республика Дагестан (Republic of Dagestan), Республика Ингушетия (Republic of Ingushetia), and Республика Марий Эл (Mari El Republic). Geographically, four of the seven regions I identified are in the North Caucasian federal district, including the Republic of Dagestan, Karachay-Cherkess, the Chechen Republic, and the Republic of Ingushetia. It is worth noting the ongoing conflict and separatist movement in Chechnya. The other three republics are in the Far Eastern, Volga, and Northwestern federal districts.

The Chechen Republic, as seen in Figure 7, has particularly abnormal coarse vote share patterns. This region had to be removed from a composite figure displaying all eighty-five of Russia's regions because the y-axis scale had to be altered. Most notably, in 2012 there is a significant difference between the proportion of coarse vote shares for turnout and for Putin's vote share – the latter sits at about 65%, over 50% higher than the former. This means, in 2012, over 60% of precincts in Chechnya reported Putin as receiving a share of the vote that was exactly a multiple of 5 ±0.5. This is the highest proportion of any of those I calculated. Turnout appears to be (statistically significantly) higher than leader's vote share in 2007 and 2016, while in 2003, 2004, 2008, 2018, and 2021 they are almost indistinguishable (the Chechen Republic did not begin voting in Russian elections until 2003).

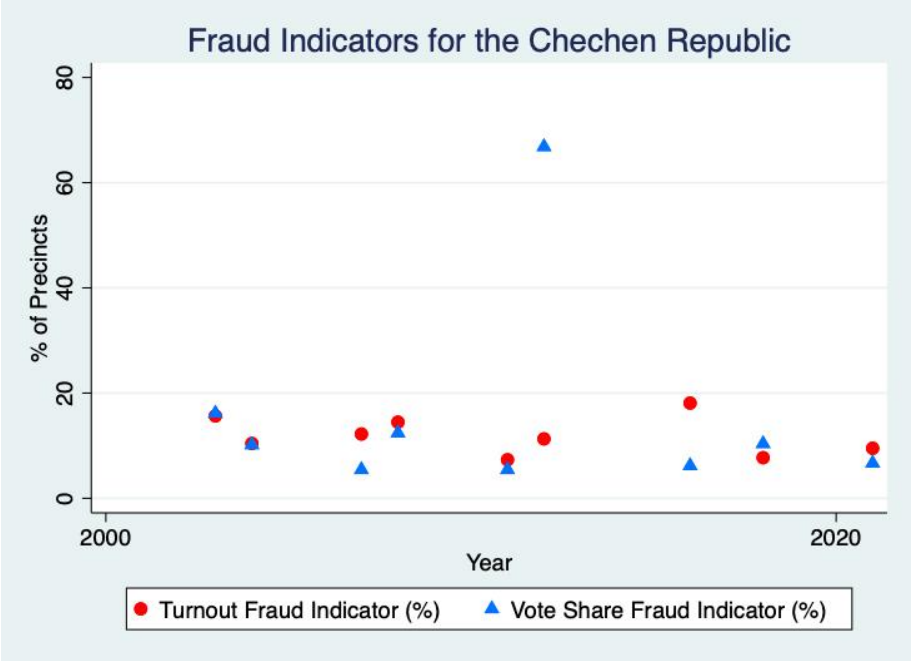
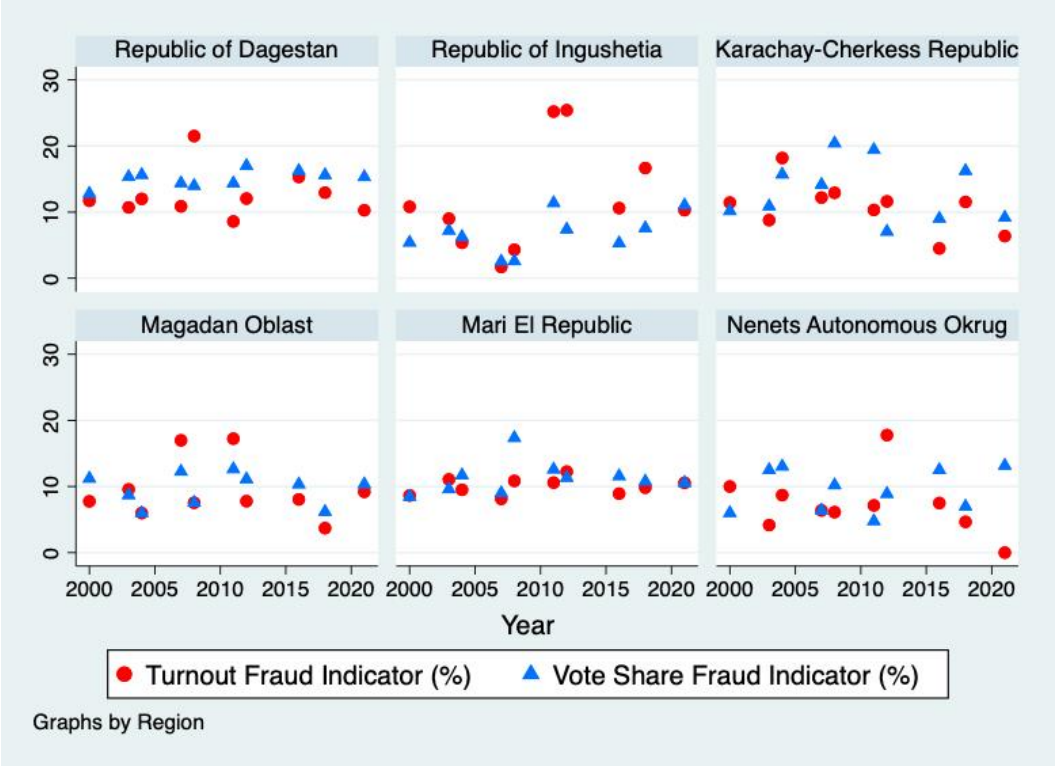


Figure 7: Preliminary Fraud Indicator Results for Chechnya

Among Figures 8-13, the notable aspect lies in the differences between the fraud methodologies. Unlike the other regions whose points I plotted, the Karachay-Cherkess Republic, Magadan Oblast, Nenets Autonomous District, Republic of Dagestan, Republic of Ingushetia, and Mari El Republic bounce back and forth between methods, with significant differences between the two. The Republic of Ingushetia (Figure 9) demonstrates two high spikes in turnout coarse vote shares in 2011 and 2012 at around 25%, compared to roughly 10% of precincts reporting coarse vote shares for Putin. Turnout coarse vote shares continue to be a higher proportion of precincts than Putin's vote share is in both 2016 and 2018. The Republic of Dagestan (Figure 8), contrary to the Republic of Ingushetia, trends towards vote share fraud except for in 2008, when turnout spikes above Putin's vote share. The Nenets Autonomous District (Figure 13) and the Karachay-Cherkess Republic (Figure 10) similarly seem to have higher vote shares for Putin's vote share than turnout, apart from 2012. The Mari El Republic (Figure 12) is relatively consistent (its method types do not appear significantly different from

one another) except for in 2008, where there is a spike in vote shares for Putin. The Magadan Oblast (Figure 11) is similarly consistent beyond 2007 and 2011.



Figures 8-13: Preliminary Fraud Results for the Republic of Dagestan, Republic of Ingushetia, Karachay-Cherkess Republic, Magadan Oblast, Mari El Republic, and the Nenets Autonomous Okrug

These figures illustrate the relevance and value of subsetting methods of fraud from one another on the regional level. Trends in an individual region can skew the overall results of a national elections towards turnout or vote share fraud, while the answer may be contained within a few republics. Furthermore, in doing so, I can identify regional justifications for why certain kinds of fraud may be occurring.

Differences of Significance

There are limitations with coarse vote share counts generated by the integer percentage point method. They are indicators of fraud, not an estimate. Many of the points from year to year lie close to one another, with no clear difference between them. To isolate individual years where

there was a significant difference between the amount of precincts reporting coarse vote shares in turnout and in Putin's vote share, I ran t-tests. I compared the means of percentage coarse votes for turnout and vote share with precinct-level data. I tallied p-values below an alpha p-value of 0.05. I was particularly interested if any regions had a lot of years where turnout had significantly more coarse vote shares than leader's vote share.[14]

The Republic of Ingushetia reported the most elections (three) with significantly more coarse vote shares in turnout than in leader's vote share of eighty-three regions (Figure 9). The most elections a region's fraud indicators favored Putin's vote share was nine in the Republic of Tatarstan. Due to the 'switch' between national-level coarse percentages for vote share and turnout observed by Kobak et al in the 2018 presidential election, I was curious if, over time, there were more significant differences favoring Putin than turnout, and if that pattern mirrored Kobak et al's (2018) findings.

Of the eighty-three regions, only some had fraud indicators with significant differences between them over the ten election years. Of those with these points, the majority appeared to 'favor' leader's vote share over turnout (that is, $p<0.05$ for $diff < 0$). When these regional counters are subset by year and plotted in *Appendix A* however, they mimic Kobak et al's (2018) figure demonstrating the excess of integer polling stations by method. There is a statistically significant difference between points favoring turnout and points favoring vote share in 2007, 2008, 2011, and 2012. Between 2012 and 2016, the amount of significant points favoring vote share falls and those favoring turnout increase. While the difference between the two methods of ballot stuffing is not significant in 2016, it is in 2018, when turnout points continue to increase.

[14] This was run as a two-sample t-test with equal variances. Stata returns p-values from three comparisons to consider in opposition to the H_0: H_A: $diff < 0$ (vote share is larger than turnout), $diff \neq 0$ (there is a difference between the two), and $diff > 0$ (turnout is larger than vote share). Each region was run to compare fraud indicators for each of the ten election years in question.

The 2021 parliamentary election offers the only data after 2016 and 2018, in which there is a statistically significant return to pre-2016 patterns, with more points favoring vote share than turnout.

Regional leanings (which method of ballot stuffing they may favor, based on the indicator) can be clearly seen within the data collected from the integer percentage point method. Outlier regions were identified as those with more than two points favoring turnout, or more than three favoring Putin. The Republic of Ingushetia, which borders the Chechen Republic, is the only region with three turnout fraud indicators that are significantly higher than vote share. These occur in 2011, 2012, and 2018 (these are visible in Figure 12). Ingushetia has no measures in which the vote share fraud indicator is significantly higher than turnout. The Republic of Tatarstan, in opposition to the Republic of Ingushetia, has nine out of the ten election years significantly favoring coarse numbers for Putin's vote share (2021 is the only exception). These two regions, along with the other outliers, will be further elaborated on in my findings.

V. Resampled Kernel Density Results

Limitations of the Resampled Kernel Density Method

I elaborate on these preliminary plots to conduct more rigorous statistical testing, using the Resampled Kernel Density (RKD) method, developed by Rozenas (2017). In doing so, I can remove the element of chance from my fraud counts and identify a percentage of precincts per region per year that are abnormal. The RKD R package, *spikes*, provided some limitations in the process of obtaining fraud estimates. The package works specifically to estimate leader's vote share fraud, using a series of kernel density graphs to compare observed values to. To estimate turnout fraud, the package would need to be entirely adapted both conceptually and in its code. It was beyond the scope of this paper to adapt *spikes* to provide estimates for turnout fraud. Ideally,

fraud estimates from the RKD package would provide numbers for turnout that could be compared to the region-level estimates of Putin's vote share. As this was a limitation, I consider the RKD estimates for leader's vote share independently, and then compare them to the fraud indicators for leader's vote share produced by the integer percentage point method. I am still able to do comparison between the fraud indicators but cannot provide a baseline on which to compare these indicators to find what is truly 'abnormal'. Further work to be able to replicate the RKD package for use on turnout numbers is needed to provide a more robust conclusion.

Comparing Putin's Vote Share Estimates and Indicators

The *spikes* package was run on all eighty-three of Russia's administrative regions for the ten election years. It returns a fraud estimate, which is the estimated percentage of precincts in the sample (region, in this instance) that have likely manipulated Putin's vote share.[15] The RKD method, unlike the Integer Percentage Point calculations, removes the element of chance from the estimate, leaving only what is abnormal. In the process of graphically observing the relationship between these two variables, as well as examining all the scatterplots created using the Integer Percentage Point results, it became increasingly clear that about 10% of coarse vote shares were occurring naturally in the election results. In all eighty-three regions, there were very few cases of proportions under that baseline. As established by Shikano and Mack, the most likely second digit of a vote-share, according to Benford's Law, is 0 (Shikano and Mack 2011, 723). The likelihood of a second-digit 0 is around 12% (or one-tenth). The Integer Percentage Point method determines the proportion of precincts that are evenly divisible by five (±0.5), and 0 naturally occurs about 10% of the time as one of ten possible second digits, so this is not

[15] This estimate can vary slightly, as it depends on comparing the observed data to what would be expected by the null hypothesis of no fraud. The null is estimated using a one-time simulation, so some fluctuation by up to ±0.5% is anticipated if the package is run multiple times on the same data.

surprising. Any ordinary least squares (OLS) regressions that were run using the fraud indicators returned a constant of around 10% as well.

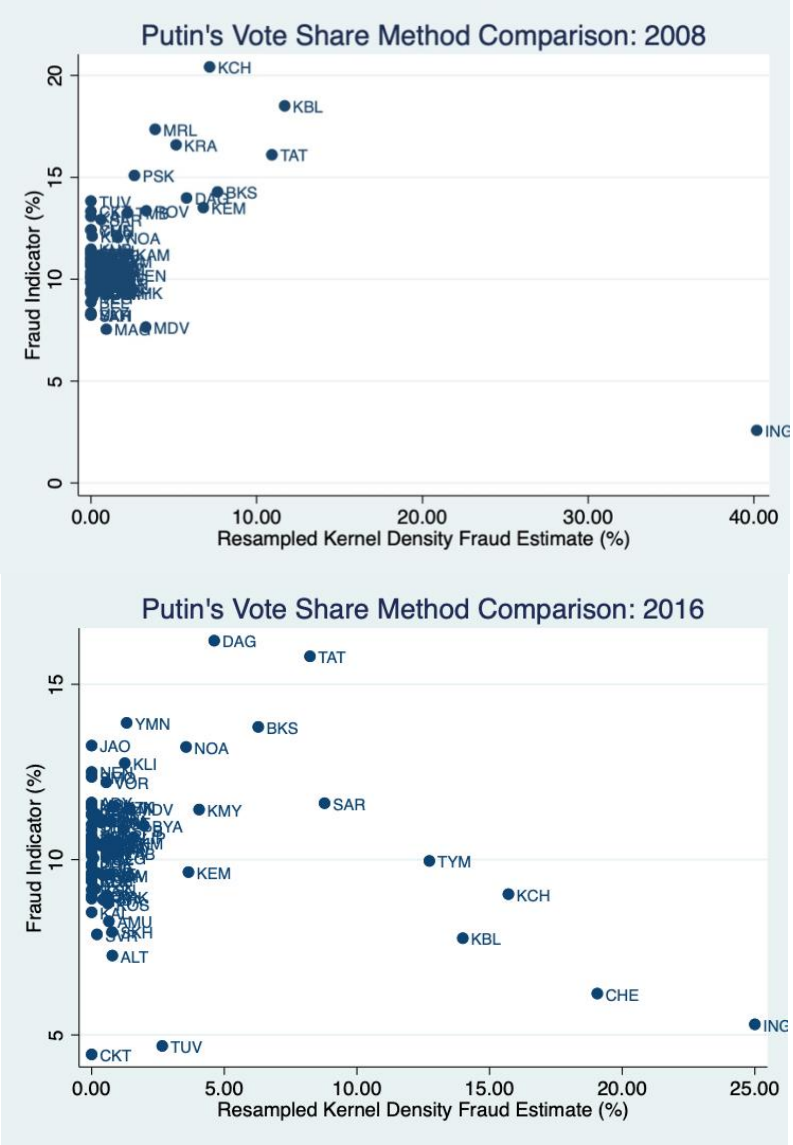


Figure 15 and 16: Comparing RKD estimates to fraud indicators for Putin's 2008 and 2016 vote share, by region.[16]

With this expected threshold in mind, I compare these two methods in scatterplots for each election year (Figure 15 and 16). Outlier regions observed in the Integer Percentage Point

[16] To make it easier to plot and identify outliers, I created three-letter codes for each region, so they are identifiable. A complete list of the regions and their codes is in *Appendix D*

estimates remain outliers in the RKD estimate. There is a clear cluster around the 10% mark on the y-axis, as anticipated. Regions with higher fraud indicators, such as the Karachay-Cherkess Republic, Kabardino-Balkarian Republic, and the Republic of Tatarstan, similarly appear in the RKD estimate. In Figure 15, they edge further along the x-axis and above the cluster around (1,10). Ingushetia is displaced far from the other estimates, with a little over 40% estimated fraud and an oddly low fraud indicator below the standard 10%. These four regions were among those identified as regions of interest in Figures 8-13. An additional plot created for 2016 (Figure 16) is less cohesive than the relationship between the two measures in 2008. Chechnya and Ingushetia both had a high fraud estimate with a very low fraud indicator. The Karachay-Cherkess and Kabardino-Balkarian Republics also fall within this pattern. All four of these regions are in Russia's North Caucuses.

There is no clear linear pattern between the Integer Percentage Point and RKD methods. Outlier or 'abnormal' (deviating from the 10% threshold) regions, as indicated by the Integer Percentage Point method, do appear to have higher fraud estimates on the RKD, but there is quite a bit of deviation from any obvious relationship. The Integer Percentage Point method overestimates, which is why it is considered only an indicator of fraud. It is possible that Ingushetia and Chechnya had a low proportion of percentages ending in a multiple of five because of their size. Ingushetia is a small region with only 138 precincts. Chechnya is slightly larger with 500 precincts. Smaller regions create more 'noise', which can lead to more variation in the data that may appear as fraud. The RKD estimate can predict this and remove spikes due to chance from the resulting fraud count. This does not explain why the fraud indicators for these outlier regions in Figure 19 are so low compared to the estimates. Another explanation is that these two regions have more falsified vote-shares (2/3, 4/5) than they do vote shares divisible by

five. The RKD algorithm is a “method constructed to detected falsification of vote-shares”, which can sometimes be missed by digit-tests that may lead to false errors or underestimations (Rozenas 2017, 54). When the turnout and vote share distributions for Ingushetia in the 2016 Parliamentary election are plotted on a histogram, both Figure 17 and 18 show sharp spikes at roughly 71% and 74%. The RKD was able to detect these sharp spikes as fraud because, after running the kernel density estimate, it predicted that they were too common in the data to be natural. The Integer Point Percentage method, however, only tallies multiples of five as indicators, not any percentage that may be oddly overrepresented. From year to year, many of the outliers seen in Figures 17 and 18 demonstrate these sharp spikes at high rates of turnout and vote share that were not included in the indicator statistic because of the nature of the second digit (not a 0 or a 5). Whether or not they are fraudulent is uncertain, but, as estimated by the RKD, they are abnormally prolific for a region the size of Ingushetia.

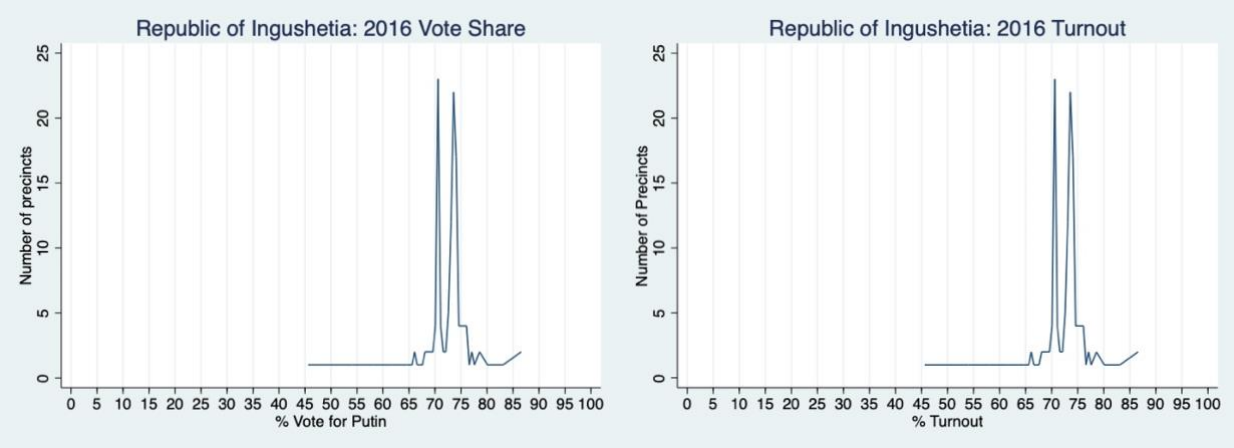


Figure 17 and 18: Histograms of Ingushetia’s 2016 Vote Share and Turnout Precinct-Level Results

The Integer Percentage Point method was valuable to detect outliers and regions with abnormal patterns. All ‘abnormal’ regions identified by the prevalence of integer values in their proportions were also identified by the RKD estimate. Where it falls short is also considering proportions outside of multiples of five and general abnormal patterns that could also indicate

fraud. It is useful as a detection tool for abnormalities and a comparison tool. To quantify the actual amount of fraud, it is less helpful.

Region Type and Fraud Estimates

In the process of identifying and considering outliers, it became increasingly clear that regions in the same geographical area were appearing outside of the norm. Existing work on Russia's ethnic republics and their relationship with election fraud has established a relationship between the two (Goodnow, Moser, and Smith 2014; Ananyev and Poyker 2021). Russia's regions fall into one of six categories: oblasts, republics, krais, autonomous okrugs, federal cities, and autonomous oblasts. For the purposes of this analysis, the Republic of Crimea and Sevastopol were removed from the dataset, placing the number of regions at eighty-three. Most regions are oblasts (55%), but a significant share of Russia's federal subjects (25%) are ethnic republics. Whether or not a region is ethnically Russian remains an indicator of fraud. Electoral fraud only began to appear outside of republics in ethnically Russian oblasts following the 2004 Presidential election (Myagkov, Ordeshook, and Shakin 2009; Goodnow, Moser, and Smith 2014). Findings regarding regional leaders and their participation in manipulation suggest that, to signal fraud, "geographically concentrated ethnic minorities may contribute to authoritarianism through collusion with (rather than competition against) central authorities, especially in the practice of manipulating elections" (Goodnow, Moser, and Smith 2014, 15). From 2005 to 2012, Putin replaced gubernatorial elections with "Kremlin appointments, hoping to create a more performance-based administrative system," with successful governors required "to meet the political criteria of preventing unrest and, most critically, delivering large vote totals for Kremlin candidates and parties in federal elections" (Reisinger and Moraski 2017, 200–201). The link between ethnic populations and electoral manipulation has been established as one regional

leaders may use to signal their control of the area (Ananyev and Poyker 2021; Goodnow, Moser, and Smith 2014).

VARIABLES	RKD Vote Share Fraud Estimate (%)
Ethnic Republic[17]	1.841***
	(0.269)
Population Density[18]	-0.000838***
	(0.000233)
Gross Regional Product[19]	6.57e-10
	(3.26e-09)
Distance to Moscow[20]	-7.28e-05*
	(4.36e-05)
Education[21]	0.159***
	(0.0236)
Constant	-3.195***
	(0.573)
Observations	574
R-squared	0.166

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 2: Regression Results

With this literature in mind, I chose to add an indicator for region type and created dummy variables for each of the six. I ran an exploratory ordinary least squares (OLS) regression with the RKD vote-share fraud estimate as the dependent variable, and each of the six region types as independent variables. All regions were included, as well as all years (2000-2021). As anticipated, only one of the six had a statistically significant impact on the estimate: type two, the indicator for ethnic republics. There were only two federal cities (type five) included in this analysis (Crimea's Sevastopol is the third), and there is only one autonomous oblast. In line with

[17] Coded as a dummy variable, with 1 being Ethnic Republics, and 0 being non-Ethnic Republics
[18] People per kilometer^2 of the regional area
[19] Basic prices (producers' prices for goods and services) in millions of Rubles
[20] Distance from the regional capital to Moscow (kilometers)
[21] Share of employees with higher education (%)

Ananyev and Poyker's analysis, I controlled for population density, gross regional product, distance to Moscow, and education. I was unable to obtain data for their fifth control (access to the internet). I used region-level demographical data from the International Center for the Study of Institutions and Development for this analysis.[22][23] The results of this preliminary regression model (Table 2) indicate a positive correlation between whether a region is an ethnic republic and its estimated proportion of fraudulent precincts (for Putin's vote share). This result is statistically significant to a $p<0.01$, with a coefficient of 1.841.

VI. Findings

A Few Regions, not a National Change

One of the initial purposes of this analysis was to examine national trends on a regional level. Following the 2012 Presidential election, Kobak et al note a national switch in integer anomalies from leader's vote share to turnout (Kobak, Shpilkin, and Pshenichnikov 2018, Figure 2). This paper built on previous literature concerning the human propensity towards 'round' numbers, unusual prevalence of zeroes and fives in Russian election data, and motivations for ballot-stuffing to measure integer irregularities on the regional level. By parsing out these anomalies from the national level, I aimed to understand the changing nature of electoral fraud from a smaller scale. One of the limitations with estimating fraud on the national level is that a few significantly manipulated regions can skew the results into appearing more nationally relevant than they are.

[22] The database on economic and political indicators for the Russian regions in 1998-2014 has been created by the International Center for the Study of Institutions and Development as part of the research project "Institutions and Economic Development: The Role of Bureaucracy and Experiments as a Method of Analysis and Evaluation of Reforms" (supported by the Basic Research Program of the Higher School of Economics, 2011-2013).

[23] For many of the demographic variables, the most recent data is for 2012. As the 2020 census was delayed and has not yet been publicly released, 2012 is the most recent observation for many of the regions.

Overall, Russia's regions did not collectively begin demonstrating more abnormalities in their turnout numbers than Putin's vote shares. When the fraud indicators for turnout and vote share (% of precincts in the region that were multiples of 5 ±0.5) are plotted by regions, for many the two are almost indiscernible. While running difference-in-different t-tests, it became increasingly clear that, overall, there was not much variation between the two indicators in most regions for most years. Of those regions who did have a significant difference between their methods for any given year, eighty-nine observations suggested vote-share manipulation, and only forty-six turnout. *Appendix B* replicates Kobak et al's figure with the fraud indicators for turnout and leader's vote share generated by the Integer Percentage Point method. Turnout is very slightly above the vote-share indicator in 2016, 2018, and 2021, but not to a significant degree. There are some fluctuations within the 1-2% range, but the fraud indicators remain relatively stable and at similar values to one another at the national level. Without subsetting regions by type or other characteristics, we see a small switch that could simply be due to chance on the national level.

When the indicators are split between the six 'types' of regions, they show a different pattern.[24] Oblasts (Figure 19a), which compose over half of Russia's regions, have remained relatively consistent, with the two average indicators indistinguishable from one another when plotted. Republics, as discussed above, often have more propensity than other types of regions to 'overdo' ballot stuffing to signal to the Kremlin their control of the territory. 2012 spikes the average % of precincts with a multiple of five up to almost 14%. Recall in Figure 7 Chechnya's extreme spike in 2012 to over 60% of precincts reporting a vote share for Putin that was a

[24] Federal Cities and Autonomous Oblasts are included here for continuity's sake. Note there are only two regions for the first, and one for the second, making their patterns less reliable to compare to. Most of Russia's regions are oblasts, republics, and krais.

multiple of five. These kinds of outliers can skew the data into demonstrating one region's outlier or trend as a national one. The Jewish Autonomous Oblast, which is the only Autonomous Oblast in Russia, recorded turnout that was divisible by five in 14% of its precincts. That one average (likely due to noise from such a small sample), in a relatively small region, would have its precincts included in a national-level estimate.

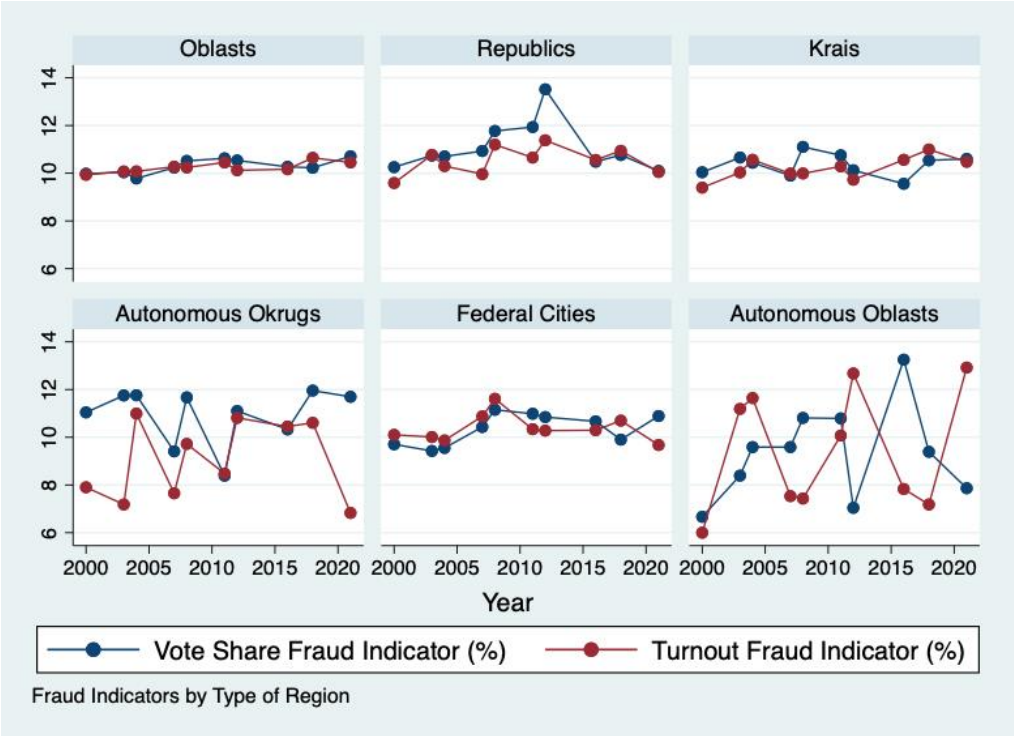


Figure 19a-f: Average of regional indicators for turnout and vote share fraud, split by region type

It is not possible to truly compare the degree of vote share fraud to turnout fraud with the current indicators. To do so conclusively, the *spikes* package needs to be adapted to estimate fraudulent precincts for turnout. Abnormal distributions of turnout have long been a method of flagging regions for election fraud (Myagkov, Ordeshook, and Shakin 2009; Simpser 2013; Goodnow, Moser, and Smith 2014). While the Integer Percentage Point method can identify regions that have irregular patterns by visuals alone, it cannot provide an adjusted estimation as the *spikes* package can. Overall, few regions demonstrate turnout numbers that are abnormally

higher than vote shares (for a comprehensive plotting of vote share fraud indicators, turnout fraud indicators, and vote-share fraud estimates, see *Appendix C*). The regions that do, such as the Republic of Ingushetia, seem to be driving these national trends. By conducting digit-level analysis of turnout and Putin's vote share at the regional level, we can see ethnic, regional, and economic areas where odd or abnormal patterns arise. Whether or not these few regions will continue to manipulate turnout is dependent on upcoming elections as the Kremlin tightens its control over Crimea and the Caucuses.

The North Caucasus Federal District

In the process of this analysis, similar regions were identified as outliers by both the Integer Percentage Point method and the RKD model. Among these, many were within a geographical area of Russia often identified as North Caucasia, including the Republics of Chechnya, Ingushetia, Dagestan, Karachay-Cherkess, and Kabardino-Balkaria. All are ethnic republics, with a majority non-Russian population. Previous work argues that high turnout (and other methods of electoral fraud) can be best associated with the amount of the region's population that is non-Russian, "[indicating] that leaders of ethnic regions first demonstrated the ability and willingness to provide high turnout […] [and] when other regional leaderships became better at promoting higher turnout in the 2000s, the ethnic regions pushed their turnout levels to even higher levels" (Reisinger and Moraski 2017, 201). Other authors have primarily considered the relationship between region type and election fraud as either related to turnout or vote shares, not the two cohesively. This paper aimed to consider the two in conversation with one another. At its core, ballot stuffing, in many respects, is one of the most basic forms of election fraud. Regional election officials will either add ballots by hand to hit a certain quota or bolster the numbers. A governor or city official's relationship with the Kremlin is dependent on

their ability to control an election to such a degree that a certain turnout or vote share for Putin and his party can be achieved (Ananyev and Poyker 2021). How the election official chooses to stuff ballots for Putin has an impact on turnout – whether that be to void ballots for other candidates, add fake ballots for Putin, or change who citizens vote for (Rundlett and Svolik 2016). If the official chooses to add ballots in favor of Putin, that will bolster turnout. Other kinds of election mishandling, such as preventing people from voting at the polls or unfairly counting ballots as late or invalid, will not result in a higher turnout.

The North Caucasus regions have been in conflict with the Kremlin for quite some time. Following the 1991 dissolution of the Soviet Union, conflict between insurgents in Chechnya and neighboring Ingushetia erupted. In 1996, Chechnya achieved de facto independence, and "particularly with the spread of Islamist militancy through the region there was concern, both in Moscow and in the West, that other North Caucasian republics would follow, perhaps jeopardizing the cohesion of the Russian Federation as a whole" ((Ware 2011, 494). Two wars would follow between Chechnya and the Russian government, with Putin avidly against the separatist movement with the "intention to rationalize the governing institutions of the Russian Federation and to bring regional laws into compliance with the constitution" (Evangelista 2002, 131). The patrimonial governance in the Chechen Republic, which requires local officials to achieve specific electoral results as well as prevent mass protest, sends planned voting results to local regimes before elections to direct officials to achieve the required percentage of votes to demonstrate their political efficiency (Gelman and Ryzhenkov 2011, 456). Officials, particularly in politically uneasy regions like Chechnya and Ingushetia, falsify results to meet those goals. Therefore, the Integer Percentage Point method was able to identify irregularities specifically in vote shares and turnout numbers from the North Caucasus. The method identifies irregularities

by noticing the benchmarks the Putin regime likely asked local officials to achieve; numbers like 65%, 70%, and 80%.

VIII. Policy Recommendations

While it may appear that electoral fraud's impact is confined solely to the country in which it is being conducted, informational autocrats like Vladimir Putin use manipulated results to maintain their legitimacy, test local allegiance to the regime, and discourage public protest. This has important implications for the study of fraud, as well as Western understandings of Russia's political climate and public opinion towards it. Although it has recently become more restricted, compared to other authoritarian regimes like China, Russia has historically had relatively free media and internet access. As natural turnout numbers decrease and Russian citizens express their intentions not to vote in polls, ballot-stuffing will likely continue. Reminiscent of the national shift from fraud being conducted primarily in ethnic republics to becoming more widespread, it remains to be seen if this tendency towards bolstering turnout numbers in Republics will spread to ethnically Russian regions.

1. Fraud is Often Obvious

When studying and analyzing Russian election fraud, it becomes quite clear that Russian officials do not seem concerned with how obvious their manipulation is. The very existence of the Integer Percentage Point method, and its ability to detect regions that are likely conducting fraud, supports this claim. I have bolstered the credibility of second-digit integers as an indicator of abnormality by comparing it to the Resampled Kernel Density method, which identified many of the same regions as likely fraudulent. As previous literature has argued using game theoretical models and officially reported data, for Russian officials much of the purpose of conducting fraud is to make it obvious to Kremlin officials (Moser and White 2016; Kalinin 2018). Local

leaders, who are frequently members of the bureaucracy and, in many cases, appointed by the Kremlin (or helped into a position), signal their competency to control their election results by reaching clear benchmarks. Often Western governments interpret this at face value as simply lazy. If a regime is conducting electoral fraud, why would they allow their citizens to notice it? Elections, just as they are a signal to the Kremlin, are also a signal to the public. They can make citizens more or less able to protest against a regime – good results are beneficial to an autocrat in that they introduce a collective action problem (Little 2011). Do other citizens think this way, or is it just me? If I protest, will I be the only one? If an autocrat can falsify results successfully without notice, they can introduce this dilemma. However, in a similar fashion, there is also something to risk from clearly fraudulent results. Even if they serve as a vehicle through which local actors can prove their loyalty, they can also hint to the public the true opinions of those around them.

Introducing accountability for election fraud is difficult. While it may incite protest, even if citizens are able to overcome a collective action problem, repression is sure to follow. Exposing how fraudulent election results are in the free media using statistical methods like those referenced in this paper (which has been done by Kobak and his coauthors, despite their frequent censorship) has real implications for the Russian public. Although many may know, just from word of mouth and skepticism, that elections are not entirely truthful, being confronted with the reality of fraud (and the extent of it) may be capable of encouraging both passive and active rebellion from the Russian public. As discontent grows, so does repression to quell it, until, ultimately, the collective action problem is (hopefully) overcome as citizens are confronted with the regime's violence. Bridging the information gap is how accountability becomes possible.

2. Accountability Can be Created Using Election Observers

Along the same theme of accountability, recent work using conveniently assigned election observers suggests that poll watchers can deter manipulation (Little 2011; Enikolopov et al. 2013). Enikolopov et al find, in a 2012 study of Moscow, that the "mere presence of independent observers at the polling stations decreased reported vote shares of United Russia by almost 11 percentage points, even though many of these observers were removed before the vote counting process was finished" (Enikolopov et al. 2013, 448). If the policy goal is to encourage democratic elections in Russia while Putin is still in power, placing election observers may be an option to introduce accountability for fraud. The Organization for Security and Co-operation in Europe (OSCE), who has historically sent poll watchers to Russia for national elections, was unable to do so in 2021 due to limitations set by the Russian government.[25] As Putin becomes more and more concerned about the longevity of his position and repression increases, it will become more and more difficult to access Russian election data and station poll workers.

3. Turnout and its Significance to Putin

Previous work has established that turnout is an important signal to the bureaucracy, an autocrat, and the public on the regime's strength and popularity. In the process of this analysis, it became increasingly clear that the Kremlin's focus on turnout is not a national one, but perhaps targeted. Using official election data, it does not appear that election fraud (at least, ballot stuffing) has focused exclusively on turnout nation-wide. Many regions have remained relatively consistent in their fraud indicators at around 10%, which, as stated, is likely the baseline due to chance. However, regions, particularly Republics in the North Caucasus Federal District, have introduced turnout fraud into the vote shares since the last 2000s. Allison White finds in a recent

[25] Organization for Security and Co-operation in Europe, "No OSCE observers for Russian parliamentary elections following major limitations."

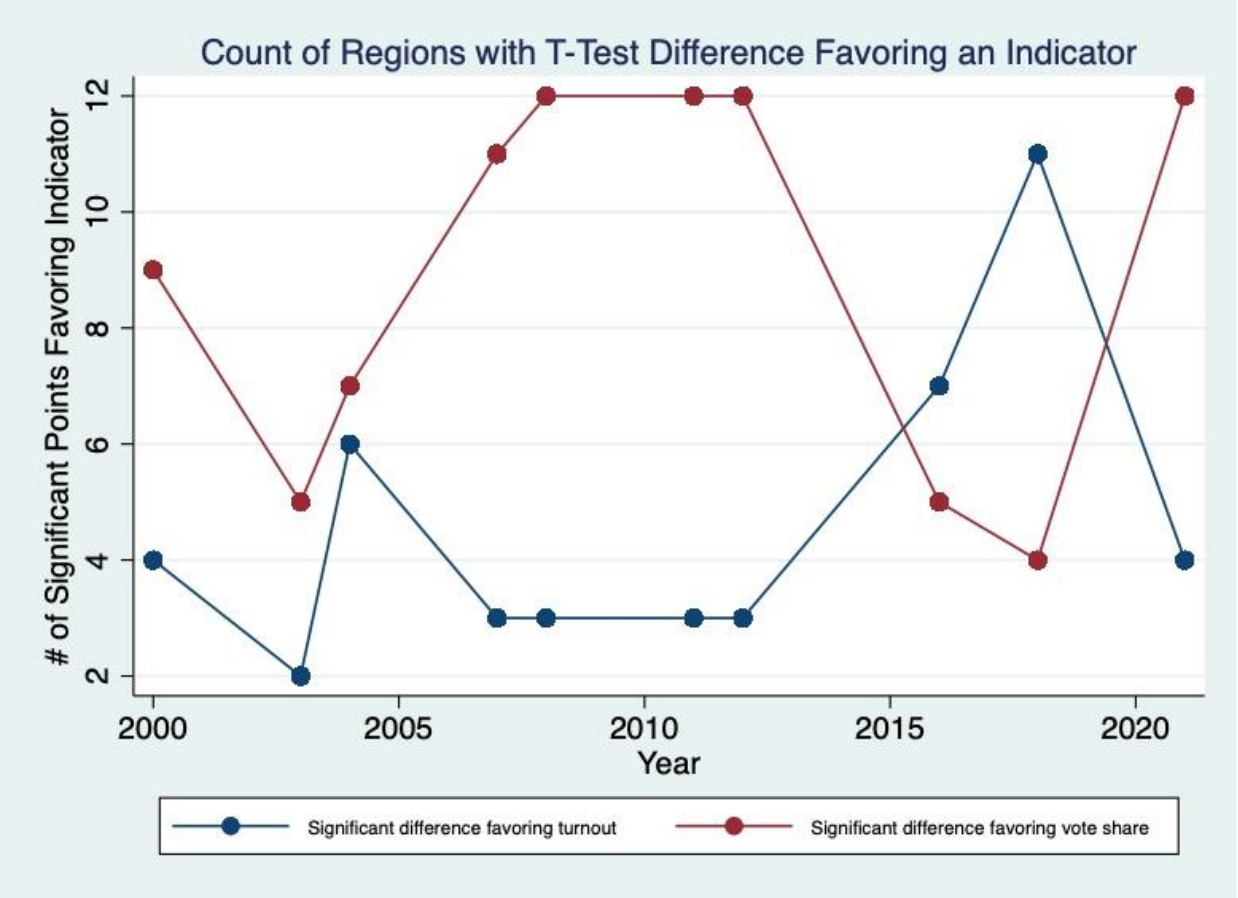
paper that ethnic demographic changes depressed turnout in former strongholds (White 2021). Surveys formatted specifically to allow citizens to share their true feelings have supported that Putin is relatively popular among Russian citizens (Frye et al. 2017). The Kremlin's particular fascination with turnout in the 2018 Presidential election, as well as Russia's increasing problem with encouraging citizens to vote, suggests a new direction for the country's younger generation. Informational autocrats like Vladimir Putin utilize democratic institutions such as elections for a variety of purposes – most notably, as suggested by these findings, to maintain the image of country-wide support. However, as access to the internet broadens, the Kremlin is left with the double-edged sword of deciding whether to repress political participation or support it in a way that benefits them. Whether it continues to stuff ballots and turn people away from the polls or refocuses its energy on encouraging citizens to participate in the ceremony of democracy, has important implications for geopolitical study of Putin and his motivations, especially in the context of Ukraine.

VIV. Conclusion

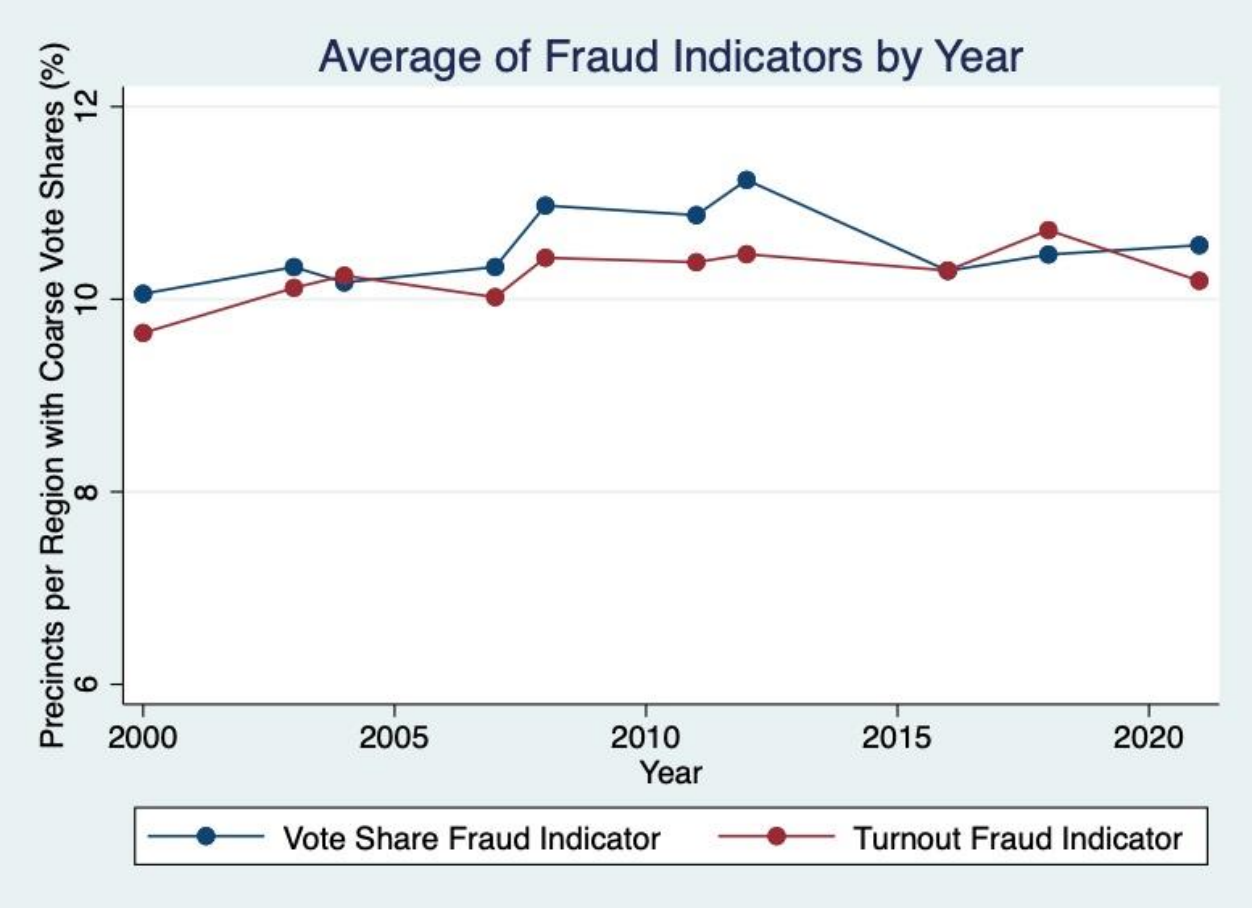
Russian elections may seem like an oxymoron. As this paper has established, however, even manipulated vote counts can reveal a lot about a regime's motivations, support, and control over independent local actors. To truly compare vote share fraud to turnout fraud on the regional level, the *spikes* package must be adapted to conduct a resampled kernel density analysis on turnout distributions. The findings of this paper suggest that, if it is adapted, future research may be able to identify hotspots of each type of fraud, and ultimately conclude more on the Kremlin's choices regarding ballot stuffing. Following my two-tiered analysis, I find that turnout manipulation was not a national-level change, but one that occurred primarily in ethnic republics.

VIV. Appendices

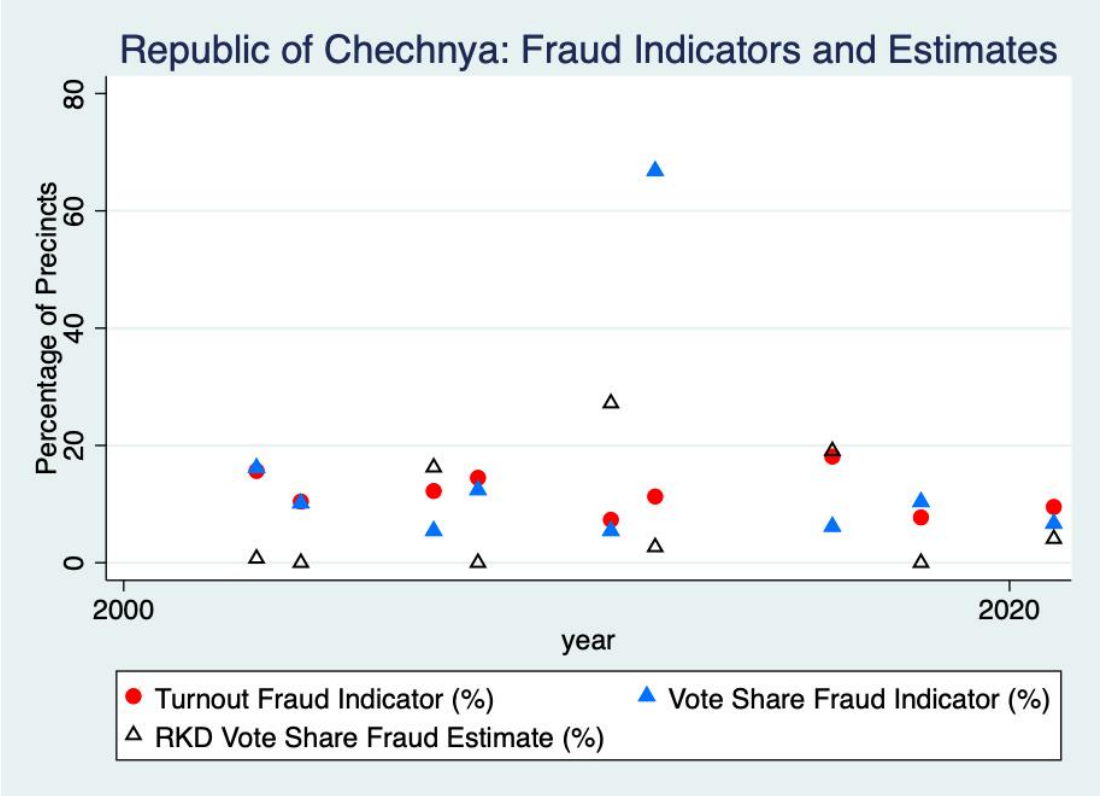
A. T-Test results comparing average percentage coarse votes for turnout and vote share

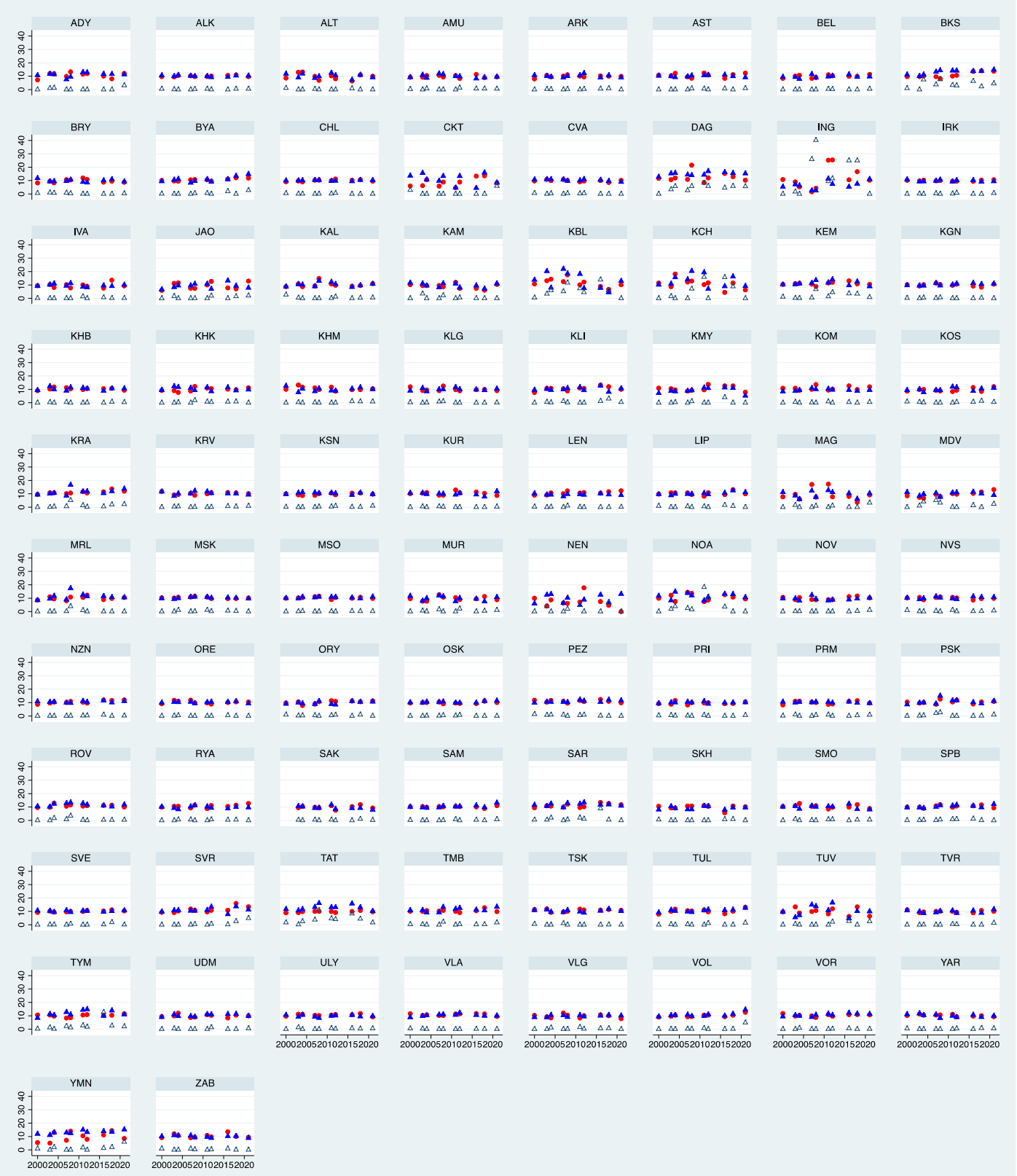


B. *Replication of Kobak et al Figure 2. Average regional indicator for vote share and turnout fraud*



C. *Method Comparison for All Regions (Chechen Republic is separated due to its need for a different axis)*

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D. List of Region Names and Codes

ADY	Adygea Republic	Республика Адыгея (Адыгея)
ALK	Altai Krai	Алтайский край
ALT	Altai Republic	Республика Алтай
AMU	Amur Oblast	Амурская область
ARK	Arkhangelsk Oblast	Архангельская область
AST	Astrakhan Oblast	Астраханская область
BEL	Belgorod Oblast	Белгородская область
BYA	Bryansk Oblast	Брянская область
BRY	Buryatia	Республика Бурятия
CHE	Chechnya	Чеченская Республика
CHL	Chelyabinsk Oblast	Челябинская область
CKT	Chukotka Autonomous Okrug	Чукотский автономный округ
CVA	Chuvashia Republic	Чувашская Республика - Чувашия
ING	Ingushetia	Республика Ингушетия
IRK	Irkutsk Oblast	Иркутская область

IVA Ivanovo Oblast Ивановская область

JAO Jewish Autonomous Oblast Еврейская автономная область

KBL Kabardino-Balkarian Republic Кабардино-Балкарская Республика

KAL Kaliningrad Oblast Калининградская область

KLG Kaluga Oblast Калужская область

KAM Kamchatka Krai Камчатский край

KCH Karachay-Cherkess Republic Карачаево-Черкесская Республика

KEM Kemerovo Oblast Кемеровская область

KHB Khabarovsk Krai Хабаровский край

KHM Khanty-Mansi Autonomous Okrug Ханты-Мансийский автономный округ - Югра

KRV Kirov Oblast Кировская область

KOM Komi Republic Республика Коми

KOS Kostroma Oblast Костромская область

KRA Krasnodar Krai Краснодарский край

KSN Krasnoyarsk Krai Красноярский край

KGN Kurgan Oblast Курганская область

KUR Kursk Oblast Курская область

LEN Leningrad Oblast Ленинградская область

LIP Lipetsk Oblast Липецкая область

MAG Magadan Oblast Магаданская область

MRL Mari El Republic Республика Марий Эл

MDV Mordovia Republic Республика Мордовия

MSK Moscow Город Москва

MSO Moscow Oblast Московская область

MUR Murmansk Oblast Мурманская область

NEN Nenets Autonomous Okrug Ненецкий автономный округ

NZN Nizhny Novgorod Oblast Нижегородская область

NOA North Ossetia–Alania Republic Республика Северная Осетия - Алания

NOV Novgorod Oblast Новгородская область

NVS Novosibirsk Oblast Новосибирская область

OSK Omsk Oblast Омская область

ORE Orenburg Oblast Оренбургская область

ORY	Oryol Oblast	Орловская область
PEZ	Penza Oblast	Пензенская область
PRM	Perm Krai	Пермский край
PRI	Primorsky Krai	Приморский край
PSK	Pskov Oblast	Псковская область
BKS	Republic of Bashkortostan	Республика Башкортостан
DAG	Republic of Dagestan	Республика Дагестан
KMY	Republic of Kalmykia	Республика Калмыкия
KLI	Republic of Karelia	Республика Карелия
KHK	Republic of Khakassia	Республика Хакасия
TAT	Republic of Tatarstan	Республика Татарстан (Татарстан)
ROV	Rostov Oblast	Ростовская область
RYA	Ryazan Oblast	Рязанская область
SPB	Saint Petersburg	Город Санкт-Петербург
SAK	Sakha Republic	Республика Саха (Якутия)
SKH	Sakhalin Oblast	Сахалинская область

SAM	Samara Oblast	Самарская область
SAR	Saratov Oblast	Саратовская область
SMO	Smolensk Oblast	Смоленская область
SVR	Stavropol Krai	Ставропольский край
SVE	Sverdlovsk Oblast	Свердловская область
TMB	Tambov Oblast	Тамбовская область
TSK	Tomsk Oblast	Томская область
TUL	Tula Oblast	Тульская область
TUV	Tuva Republic	Республика Тыва
TVR	Tver Oblast	Тверская область
TYM	Tyumen Oblast	Тюменская область
UDM	Udmurt Republic	Удмуртская Республика
ULY	Ulyanovsk Oblast	Ульяновская область
VLA	Vladimir Oblast	Владимирская область
VOL	Volgograd Oblast	Волгоградская область
VLG	Vologda Oblast	Вологодская область

VOR	Voronezh Oblast	Воронежская область
YMN	Yamalo-Nenets Autonomous Okrug	Ямало-Ненецкий автономный округ
YAR	Yaroslavl Oblast	Ярославская область
ZAB	Zabaykalsky Krai	Забайкальский край

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