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Do new voting technologies prevent fraud? Evidence from Russia

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Widespread concerns exist that new voting technologies invite electoral fraud. In states with a known record of electoral fraud, however, the use of new voting technologies may help reduce the incidence of fraud by automating parts of the voting and counting process. This study shows that the use of optical scan voting systems had a significant effect in terms of fraud reduction during the 2011 legislative election in Russia. This finding has implications for organizations and governments that seek to promote democratic elections in undemocratic states..

1. INTRODUCTION

While new voting technologies become more widespread across the world, a number of countries in recent years have rolled back the use of these technologies [Goldsmith 2011: 1]. When this happens, the reason in most cases is related to concerns that the technologies are vulnerable to voting fraud [e.g. Loeber 2008; Volkamer 2010]. New voting technologies in electoral authoritarian regimes, however, can play a role in reducing the incidence of fraud because they limit human involvement in the voting and counting process. Recent reports that the Central Election Commission of Russia is abandoning the use of new voting technologies, therefore, are thought to increase rather than decrease opportunies for voting fraud in that country [Buzin 2013; Sergeeva 2013].

There is much anecdotal evidence - but not more than that - that the use of optical scan voting systems in Russia over the past decade is associated with reduced fraud in the polling stations where these systems are used [e.g. Kobak 2011; Pshenichnikov 2011]. The evidence is usually based on a direct comparison of election results from polling stations where the optical scan voting systems were used, with election results from polling stations where these systems were not used. The evidence is unsatisfactory because the optical scan voting systems are not randomly distributed [Shen' 2012]. This study instead uses a differences-in-differences design to assess the claim that optical scan voting systems in Russia have reduced fraud: rather than comparing the results of polling stations that used optical scan voting systems with the results of polling stations that did not use them, we compare the relative election results - relative to election results of polling stations in the same district – from the December 2011 legislative election and 2012 presidential election in Russia of polling stations that did use optical scan voting systems in one of the two elections but not in the other. The article proceeds in three sections. The first section discusses the use of new voting technologies in Russian elections. The second section discusses what we know about fraud in the 2011 and 2012 Russian elections. The third section, finally, presents the data, method, and results.

2. NEW VOTING TECHNOLOGIES IN RUSSIA

New voting technologies come in two types: the tabulation of paper ballots by an electronic device, and electronic voting. In the former type, voters mark their preference on a paper ballot which is then tabulated automatically, while in the latter type, both the marking of the voter preference and the vote tabulation are done electronically [Alvarez and Hall 2010: 9]. Both types of new voting technologies have been used in Russia. On a very small scale, Russians in recent years have voted using electronic voting machines [*Kompleks Elektronnogo Golosovaniya – KEG*] that were designed and produced in Russia. Only 326 polling stations, or 0.3% of all polling stations, were equipped with such machines in the 2011 and 2012 elections. More widely used in Russia has been a type of 'optical scan voting system' or 'precinct count optical scanner' [IDEA 2011] called *Kompleks Obrabotki Izbiratel'nykh Byulletenei* [KOIB]. The KOIB was created in 2003, and has since been used in gradually increasing numbers: in the 2011 and 2012 national elections, roughly five percent of polling stations were equipped with KOIBs. Appendix 1 shows the distribution of KOIBs across Russia's 83 regions in these two elections.

The purpose of the KOIB, as of other optical scan voting systems, is to automatically read ballots and tally voting results. Once the results have been tallied, a printer that is connected to the KOIBs, which are always operated in pairs, prints a results protocol, while the results are also stored on a memory card inside the KOIB. Both the paper results protocol and the memory card are then transferred to the higher-level election commission, where the results are entered into the automated data-processing system which aggregates the results from all polling stations in the relevant election. The KOIBs make two types of voting fraud more complicated, if not impossible, to perpetrate – ballot-stuffing and tampering with the result protocol by members of election commissions [Lyubarev et al. 2007; Goldsmith 2011: 6]. Ballot-stuffing becomes difficult because ballots can be entered into the KOIB only one by one, and because they can be entered only slowly as the ballots are immediately scanned by the machine. Tampering with the results protocol is in principle impossible where KOIBs are used because the protocols are automatically produced by the KOIB system.

Russian authorities have often commended the introduction of new technology, including KOIBs, into Russian elections. In an article published in 2012, head of the Central Election Commission Vladimir Churov praised the KOIBs for being a domestically developed and produced technology, and for being more secure than some equivalents used in Western countries [Churov 2012]. Two years before, then prime minister Vladimir Putin ordered that by 2015 95% of voters use KOIBs in elections [Kornya 2013]. And Moscow mayor Sobyanin insisted on the use of a large number of KOIBs in the 2013 mayoral elections in Moscow, arguing that the KOIBs would ensure a fair election [Demidyuk 2013]. Despite these endorsements, it was announced in July 2013 that KOIBs, along with KEGs, will be phased out. The official reason for the abandonment of KOIBs is that, due to the increase in the number of political parties in Russia, the ballots that will be used in future elections will be longer than can be processed by the KOIBs [Subbotina 2013].

3. FRAUD IN THE 2011-2012 ELECTION CYCLE

Russians went to the polls in December 2011 to elect a new legislature, and again three months later to elect a new president. The legislative election was won by the ruling United Russia party, which is affiliated with Putin, with 49% of the vote, down from 64% four years earlier. Turnout in these elections was reported at 60%. A widespread perception of election fraud was one of the reasons behind the biggest street demonstrations in Russia since the early 1990s, that followed the election. The presidential election in March 2012 was won by Vladimir Putin, who previously served as president between 2000 and 2008. According to the official election results, Putin took home 64% of the vote, and turnout stood at 65%.

Electoral fraud is understood here as deliberate and illegal acts that are meant to distort electoral outcomes [Lehoucq 2003: 233; Vickery and Shein 2012: 9]. Since the elections, a flurry of research has produced insights into the scope, geographical distribution, and nature of fraud committed in the elections. Much of this research is 'election forensics', drawing from precinct-level data published on the website of the Central Election Commission of Russia and subordinate election commissions. Election forensics applied to the 2011 and 2012 election has drawn on previous research that especially found anomalous turnout patterns in the 2003-2004 and 2007-2008 election cycles [Mebane and Kalinin 2009; Myagkov et al. 2009]. Next to anomalies in turnout distribution, election forensics studies have also focused on irregular patterns in the distribution of second-digits and last digits in electoral returns that could point to manipulation [Beber and Scacco 2012; Deckert et al. 2011; Mebane 2011; Sjoberg 2012]. In the context of Russian elections, Mebane and Kalinin [2010] in particular revealed changes in the location of fraud in the 2007 and 2008 election by using second-digit mean tests. Election forensics analyses of the 2011 and 2012 elections reveal a high degree of anomalous turnout, not just in regions that are notorious for reporting incredible election results [such as Bashkortostan, Chechnya, and Mordovia], but across Russia. Turnout is often not only remarkably high, but it is disproportionately often also suspiciously approximate to round numbers: when the distribution of turnout in the 2011 and 2012 elections is plotted, spikes are visible at 70%, 75%, et cetera [Gehlbach 2012; GOLOS 2012b: 131; Shpil'kin 2012]. In the 2011 elections, for almost every polling station with anomalously high turnout, the party that benefits most from the surplus of votes is United Russia: whereas for all other parties turnout shows no discernible correlation with vote share, the vote share of United Russia is higher as turnout is higher [Golos 2012a: 237; Klimek et al.: 2012]. The same phenomenon is visible in the 2012 election with regard

to the Putin vote [Shpil'kin 2012]. The implication is that both reported turnout and the reported result for United Russia and Putin are associated with the incidence of fraud; the higher turnout and the result for United Russia and Putin are, especially relative to polling stations in the same administrative unit, the more likely it is that fraud has been committed to achieve the high turnout and the strong result for the ruling party and Putin [GOLOS 2012a: 232-238; GOLOS 2012b: 130-135; Shpil'kin 2011a; Shpilkin 2012c]. Turnout and vote share anomalies in the official results were more prevalent in the 2011 election than in the 2012 election. The research accordingly finds that fraud was committed on a bigger scale in 2011 than in 2012 [Kobak 2012; Shen' 2012].

A rich source of qualitative information about fraud in the 2011 and 2012 elections is the website www.kartanarusheniy.org [Map of Violation], where, through crowd-sourcing, over 13000 reports on irregularities in the two election were brought together. A study of the reports has found that the most common forms of fraud during the voting process, that were reported to the site, were ballot-stuffing, group voting, multiple voting, and vote-buying. Forms of fraud most often reported with regard to the vote count include intentional miscounting and tampering with the results protocol [Bader 2013]. As noted, two of these forms of fraud – ballot-stuffing and tampering with the results protocol – are made more difficult when KOIBs are used.

Since both ballot-stuffing and tampering with result protocols were widespread in the elections, we would expect polling stations with KOIBs to have lower turnout and a lower vote share for United Russia [in 2011] and Putin [in 2012] than polling stations without KOIBs, all else being equal. Russian bloggers have written about districts and cities where polling stations with KOIBs indeed had lower turnout and vote share than polling stations without KOIBs. In a number of districts in Mordovia, for example, polling stations with KOIBs on average reported 69% vote share for United Russia, while polling stations in the same districts without KOIB reported an average vote share of 89% [Shpil'kin 2012a]. Similarly, in the Yurginskiy district of Tyumen region, the two polling stations with KOIBs reported a vote share for United Russia in the low sixties, while all other polling stations, without KOIBs, had over ninety percent vote share for the ruling party [Kireev 2011]. These small-scale analyses directly compare results from polling stations with KOIBs, with results from polling stations without KOIBs in districts where some of the polling stations were equipped with KOIBs. For a larger study of the effect of the use of KOIBs in polling stations, however, this approach is inadequate because the polling stations with KOIBs are not randomly selected. The next section proposes and applies a simple, alternative method to assess the effect from the use of KOIBs.

4. DATA, METHODOLOGY, RESULTS

KOIBs were present in 76 out of the 83 regions of the Russian Federation in both the 2011 and 2012 elections [see appendix 1]. The remaining regions had small numbers of KEGs instead. In 2011, KOIBs were present in 4,828 of the roughly 95,000 polling stations in the country, against 5,249 in 2012. In neither election did the Central Election Commission of Russia reveal which polling stations were given KOIBs. Many regional election commissions, however, did provide information on the location of KOIBs inside the respective regions, suggesting that decisions about where to install the KOIBs were made at the regional level. One Russian blogger in particular has collected these regional-level data on the location of KOIBs for both elections [Shpil'kin 2011b; Shpil'kin 2012b], The data for some regions remain missing. Altogether, for 67 out of 76 regions with KOIBs do we know for both elections which polling stations had KOIBs. 4,063 KOIBs were present in these regions in 2011, against 4,447 in 2012. In 26 of the 67 regions, KOIBs were present in exactly the same polling stations in 2012 as in 2011. In six regions, by contrast, the location of all polling stations was different compared with the other election. There were 996 polling stations with KOIBs in the 2011 election that subsequently did not have KOIBs in the 2012 election. Conversely, there were 1,392 polling stations with KOIBs in the 2012 election that did not have KOIBs in the 2011 election.

In Russia and elsewhere, the borders of precincts and the numbering of polling stations often change from one election to the next. Due to the fact that the 2011 and 2012 elections were only three months apart, this happened in relatively few cases between these two elections, which makes it possible to directly compare most of the individual polling stations across the two elections. Of

the 996 polling stations that did have KOIBs in 2011 but not in 2012, 804 polling stations, divided over 111 districts, had the same number in 2012, or the corresponding 2012 polling station could easily be identified. Of the 1,392 polling stations that did have KOIBs in 2012 but not in 2011, the corresponding polling station in 2011 could be identified in 916 cases, divided over 110 districts. Altogether, then, the analysis is based on 1,720 [804 + 916] cases. Appendix 2 lists the number of cases per region.

Our method is based on analysis of the 'flow of votes' between elections, and follows a differences-in-differences design.[1] We compare the relative election returns – relative to the returns of polling stations in the same district – across the 2011 and 2012 elections of polling stations that did have KOIBs in 2011 but not in 2012, and of polling stations that did have KOIBs in 2012 but not in 2011. The design makes a parallel trend assumption, i.e. average change in turnout and incumbent vote share of polling stations with KOIBs in 2011 or 2012 is similar to that of polling stations in the same districts without KOIBs in both 2011 and 2012. The assumption is considered valid given that the districts are relatively small - comprising, on average, 37 polling stations - and geographically homogenuous. Take the following example. Polling station 1737 in the Leninsky district of Novosibirsk did use KOIBs in the 2011 election, but not in 2012. In the 2011 election, the polling station reported turnout of 56% and a 25% vote share for the ruling United Russia party. For the polling stations in the district that did not use KOIBs, mean turnout and United Russia vote share comprised 64% and 42%, respectively. For polling station 1737, consequently, turnout was 8% lower, and United Russia votes share 17% lower, than for polling stations without KOIBs in the district. The same polling station 1737 reported 65% turnout and 51% vote share for Putin in the 2012 election, while mean turnout and Putin vote share for the polling stations that did not have KOIBs in the 2011 elections, was 66% and 62% respectively. In 2012, then, the difference in turnout and vote share between polling station 1737, this time without KOIBs, and the polling stations that did not use KOIBs in 2011, was only 1% and 11% respectively, compared with 8% lower turnout and 17% lower vote share in 2011. By extension, the effect of the use of KOIBs [the 'KOIB effect'] in polling station 1737 in 2011 was a 7% decrease in turnout, and a 6% decrease in vote share for the incumbent candidate.

This calculation is performed for all 1,720 cases. For polling stations that did have KOIBs in 2011 but not in 2012, we find that the KOIB effect amounts to a decrease of 3.8% in turnout and a 4.8% decrease in vote share for the incumbent candidate. For polling stations that did have KOIBs in 2012 but not in 2011, the effect is much smaller: a 0.4% decrease in turnout, and a 0.6% decrease in incumbent vote share. Table 1 summarizes our findings. The absence of a considerable KOIB effect in the 2012 election can be explained in two ways. First, there was no fraud, or less fraud, in the districts with KOIBs in the 2012 election, that KOIBs could have prevented or reduced. Second, the forms of fraud that KOIBs are thought to forestall were prevalent despite the use of KOIBs. Considering the presence of a significant KOIB effect in 2011, however, the much smaller KOIB effect in 2012 seems to reflect the finding from election forensics analyses that the 2012 election was substantially less fraudulent than the 2011 election.

Table 1. The KOIB effect in the 2011 and 2012 elections

	number of polling stations	**KOIB effect on turnout**	**95% confidence interval**	**σ**	**KOIB effect on incumbent vote share**	**95% confidence interval**	**σ**
2011 legislative election	804	-3.8%	-4.4% to -3.2%	9.5%	-4.8%	-5.4% to -4.2%	8.4%
2012 presidential election	916	-0.4%	-0.9% to 0.1%	7.6%	-0.6%	-1.3% to 0.1%	11.1%

The KOIB effect was significant in the 2011 election. One possible explanation for the fact that polling stations reported lower relative turnout in 2011, when they were equipped with KOIBs, than in 2012, when they were not equipped with KOIBs, is that the KOIBs intimidate voters, or that voting with KOIBs produces more invalid ballots. For voters, however, the act of voting in a polling

[1] For examples of studies that equally look at the 'flow of votes', see Levin et al, 2009, and Myagkov et al., 2009

station with KOIBs is identical to the act of voting in a polling station without KOIBs. Besides, if the alternative explanation would be correct, the KOIB effect should also be visible in the 2012 elections. If we zoom in on the data, we observe a divide between regions with a highly significant KOIB effect, and regions seemingly without such an effect. To illustrate this, table 2 shows the KOIB effect in all regions with more than twenty cases of polling stations with KOIBs in one of the two elections but not in the other. A strong KOIB effect can be noted in the Chelyabinsk, Nizhnii Novgorod, and Novosibirsk regions. In other regions, the effect is mixed or rather insignificant. The relative lack of a KOIB effect in some regions can be related to a lower incidence of election fraud. Further research should shed light on the reasons behind the regional differences.

Table 2. The KOIB effect in selected regions

	KOIB effect on turnout 2011	**KOIB effect on incumbent vote share 2011**
Altay krai	-2.4%	-0.2%
Belgorod region	-0.7%	-0.9%
Chelyabinsk region	-12.8%	-22.1%
Chuvashia republic	-1.1%	-2.5%
Ivanovo region	1.4%	2.5%
Krasnoyarsk krai	1.5%	-0.6%
Nizhnii Novgorod region	-10.6%	-6.7%
Novosibirsk region	-6.6%	-6.7%
Perm krai	3.0%	-4.3%
Yaroslavl region	3.4%	-9.5%

We also find confirmation that the distribution of KOIBs at the district level was not random: polling stations that used KOIBs in the 2011 election but not in the 2012 election still had 2.3% lower turnout and 2.8% lower incumbent vote share on average than polling stations of the same district in 2012, when they did not use KOIBs. The equivalent figures for the 2012 elections are smaller: 0.3% and 1.3% respectively. It appears that, especially for the 2011 election, regional authorities disproportionately selected polling stations for the use of KOIBs that would also have had lower turnout and incumbent vote share when KOIBs would not have been used.

5. CONCLUSIONS

When new voting technologies are introduced, there are often legitimate concerns that these technologies can be manipulated to commit electoral fraud. It stands to reason that such concerns particularly arise in the context of an electoral authoritarian regime such as Russia's. Rather than being conducive to more fraud, however, this study indicates that the optical scan voting systems that have been used in Russia over the past decade reduce rather than enhance the incidence of fraud. The likely explanation is that, by automating the vote count, the optical scan voting systems take human involvement out of part of the voting and counting process and thus narrow the scope for fraud.

The finding that new voting technologies can contribute to reducing the incidence of electoral fraud in an undemocratic state has implications for international and non-governmental organizations as well as governments that promote democratic elections. From the perspective of these stakeholders, the decision by the Russian authorities to abandon new voting technologies should be a matter of concern. While the introduction of new voting technologies always warrants close scrutiny, the findings from this study suggest that there may be sense in promoting their wider application in states with a known record of electoral fraud.

APPENDIX 1. KOIBS IN THE 2011 AND 2012 ELECTIONS

Region	2011 Duma election	2012 Presidential election
Adygeya republic	14	14
Altay republic	13	13
Altay krai	100	100
Amur region	40	40
Arhangelsk region	53	53
Astrakhan region	35	35
Bashkortostan republic	178	178
Belgorod region	61	61
Bryansk region	58	58
Buryatiya republic	41	41
Chechnya republic	0	0
Chelyabinsk region	111	111
Chukotka autonomous region	3	3
Chuvashia republic	59	59
Dagestan republic	92	92
Ingushetiya republic	7	8
Irkutsk region	94	94
Ivanovo region	39	40
Jewish autonomous region	8	8
Kabardino-Balkaria republic	0	0
Kaliningrad region	27	27
Kalmykia republic	14	15
Kaluga region	37	37
Kamchatka krai	17	18
Karachaevo-Cherkessia republic	13	13
Karelia republic	30	30
Kemerovo region	87	87
Khabarovsk krai	42	43
Khakhasia republic	0	0
Khanty-Mansiyskiy autonomous region	30	30
Kirov region	66	66
Komi republic	0	0
Kostroma region	35	35
Krasnodar krai	132	132
Krasnoyarsk krai	109	112
Kurgan region	59	59
Kursk region	61	61
Leningrad region	49	49
Lipetsk region	46	46
Magadan region	7	7
Mariy El republic	0	0
Mordovia republic	44	45
Moscow	250	250
Moscow region	167	167
Murmansk region	0	0
Nenetskiy autonomous region	3	3
Nizhny Novgorod region	123	119
North Ossetia	19	19
Novgorod region	28	28
Novosibirsk region	101	101
Omsk region	95	95
Orenburg region	92	92
Oryol region	40	40
Penza region	59	59
Perm krai	95	95
Primorye krai	77	77
Pskov region	33	33
Rostov region	132	132
Ryazan region	55	55
Saint-Petersburg	20	120
Sakha [Yakutia]	41	41
Sakhalin region	23	23
Samara region	88	88
Saratov region	92	92
Smolensk region	41	41
Stavropol krai	65	65
Sverdlovsk region	300	600
Tambov region	52	52
Tatarstan republic	0	0
Tomsk region	100	110
Tula region	56	61
Tver region	67	67
Tyumen region	58	58
Tyva republic	10	10
Udmurtiya republic	59	59
Ulyanovsk region	51	51
Vladimir region	49	49
Volgograd region	85	85
Vologda region	100	100
Voronezh region	84	84
Yamalo-Nenetskiy autonomous region	11	11
Yaroslavl region	47	47
Zabaykalskiy krai	49	50
total	4828	5249

APPENDIX 2. NUMBER OF CASES

Region	2011 Duma election	2012 Presidential election
Adygeya republic	0	0
Altay republic	0	0
Altay krai	54	62
Amur region	0	0
Arhangelsk region	4	5
Astrakhan region	0	0
Bashkortostan republic	0	0
Belgorod region	27	27
Bryansk region	0	0
Buryatiya republic	0	0
Chechnya republic	0	0
Chelyabinsk region	43	43
Chukotka autonomous region	0	0
Chuvashia republic	61	59
Dagestan republic	17	18
Ingushetiya republic	0	1
Irkutsk region	0	0
Ivanovo region	39	40
Jewish autonomous region	0	0
Kabardino-Balkaria republic	0	0
Kaliningrad region	8	7
Kalmykia republic	3	4
Kaluga region	0	0
Kamchatka krai	1	2
Karachaevo-Cherkessia republic	9	9
Karelia republic	0	0
Kemerovo region	5	5
Khabarovsk krai	0	0
Khakhasia republic	0	0
Khanty-Mansiyskiy autonomous region	0	0
Kirov region	0	0
Komi republic	0	0
Kostroma region	0	0
Krasnodar krai	18	17
Krasnoyarsk krai	54	54
Kurgan region	0	0
Kursk region	10	10
Leningrad region	0	0
Lipetsk region	4	4
Magadan region	0	0
Mariy El republic	0	0
Mordovia republic	0	0
Moscow	3	0
Moscow region	0	0
Murmansk region	0	0
Nenetskiy autonomous region	0	0
Nizhny Novgorod region	123	119
North Ossetia	0	0
Novgorod region	0	0
Novosibirsk region	102	101
Omsk region	0	0
Orenburg region	0	0
Oryol region	0	0
Penza region	8	12
Perm krai	95	95
Primorye krai	5	4
Pskov region	8	8
Rostov region	0	0
Ryazan region	3	3
Saint-Petersburg	0	105
Sakha [Yakutia]	0	0
Sakhalin region	0	0
Samara region	0	0
Saratov region	0	0
Smolensk region	11	11
Stavropol krai	22	26
Sverdlovsk region	0	0
Tambov region	4	4
Tatarstan republic	0	0
Tomsk region	11	10
Tula region	0	7
Tver region	0	0
Tyumen region	0	0
Tyva republic	0	0
Udmurtiya republic	0	0
Ulyanovsk region	0	0
Vladimir region	0	0
Volgograd region	0	0
Vologda region	0	0
Voronezh region	0	0
Yamalo-Nenetskiy autonomous region	5	3
Yaroslavl region	47	41
Zabaykalskiy krai	0	0
total	804	916

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