NATIONAL RESEARCH UNIVERSITY
HIGHER SCHOOL OF ECONOMICS

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PUBLIC OPINION OF A GOVERNMENT-ENABLED TECHNOLOGY, BY THE EXAMPLE OF INTERNET VOTING: SURVEY EVIDENCE FROM RUSSIA

BASIC RESEARCH PROGRAM
WORKING PAPERS

SERIES: POLITICAL SCIENCE
WP BRP 83/PS/2021

This Working Paper is an output of a research project implemented at the National Research University Higher School of Economics (HSE). Any opinions or claims contained in this Working Paper do not necessarily reflect the views of HSE

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Public opinion of a government-enabled technology, by the example of Internet voting: survey evidence from Russia[5]

Abstract

What are the determinants of individual-level trust in Internet-based voting in non-democracies? Modern digital and electronic transformations of the electoral process offer citizens new forms of voting, however it is not clear which citizens are prepared to trust these innovations. Existing work on trust in internet-based voting has mainly focused on Western democracies, where well-functioning institutions curb potential abuses. As a consequence, existing perspectives have drawn on work on technology adoption and focused on individual-level cost-benefit analyses and elite framing of these technologies. In non-democracies, however, there are few checks and balances on electoral manipulations that allow the authorities to shape outcomes extra-legally. In such settings, institutional trust in the authorities and beliefs about the ease with which internet-based voting can be abused take on new and greater salience. In this paper, we provide an exploratory analysis aimed at testing whether existing perspectives help explain trust in internet-based voting in electoral non-democracies, as well as whether concerns about abuse also play a role. To test these arguments, we make use of an online survey of over 16,250 respondents in the Russian Federation, a case regarded as archetypical in the literature on electoral non-democracies. Our findings provide important insights into public opinion surrounding novel electoral procedures, generally, and internet-based voting, more specifically, in non-democracies. These insights, in turn, have important implications for our understanding of attitudes towards electoral integrity in non-democracies and the potential for popular constraints on the ability of autocrats to modify electoral procedures to reproduce power.

Keywords: Internet voting, Institutional trust, Risk, Electoral Processes, Public opinion, Technology adoption, online voting, Russia, COVID

JEL Classifications: D8, D72

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[5] This research is supported by the Faculty of Social Sciences, HSE University as part of the grant project "Public Service Provision and Public Opinion of the Government during Digital Transformations: Evidence from Russia's Regions".

Introduction

Technological developments, as well as the current challenges of the Covid-19 pandemic, have intensified academic discussions about Internet-based voting (iVoting). In recent years, we can observe wider adoption of Internet-based voting in various non-democratic regimes. However, there is no consensus about the degree of trust in Internet voting, support and acceptance of such technology, and ultimate willingness to use this method. Intention to use iVoting is associated with its perceived usefulness and its ease of use[Carter and Campbell 2012; Yao and Murphy, 2007], secure and privacy protecting, and accurate [Yao, Murphy, 2007; Choi and Kim, 2012]. Attitudes towards government and positive perceptions of technology in a broader sense are also associated with greater willingness to use iVoting systems [Choi, Kim, 2012].

Most research on internet voting has focused on Western democracies, however. Such settings are characterized by high quality institutions that constrain governments and insure political accountability [North 1990]. Under such circumstances, new voting technologies are more likely to be viewed through a prism of technological diffusion and meritocratic optimization. By contrast, non-democratic settings are characterized by a number of challenges to trust in electoral processes, ranging from clientelistic use of government resources [Treisman 2015; Diaz-Cayeros et al. 2016] to outright fraud [Simpser 2013]. Given widespread evidence of electoral manipulations in such settings, it is unclear whether popular perceptions of internet voting will be driven by similar dynamics to those in democratic settings or instead focus on the (relative) potential for abuses in such systems.

This paper offers a preliminary and highly exploratory analysis of trust in internet-based voting in non-democracies. Using an original survey of over 16,500 respondents across 60 of Russia's regions, we explore whether existing theories of trust in Internet voting in democracies travel. We adopt an explicitly exploratory approach to this version of the paper, focusing attention on simple tests of key theories in existing work related to trust in the government implementing e-voting systems, familiarity with technology, and convenience of internet-based voting. Russia serves as an ideal setting to test the applicability of existing theories for several reasons. First,internet-based voting has become increasingly salient in the Russian context. Three large-scale experiments on "remote electronic voting" have already been implemented, first in Moscow (elections to the Moscow City Duma in 2019), then during voting on amendments to the Constitution of the Russian Federation (2020) and again during elections to the State Duma (in several regions, 2021). The Central Election Commission of Russia has already declared the "success" of the experiment and intent to scale iVoting technology across the whole country in the next federal elections[6]. Second, as with many electoral autocracies, Russian elections are characterized by wide-range of electoral manipulations [Frye et al. 2019a, 2019b; Harvey 2016, 2020] that are both publicly known and shape trust in elections [Reuter and Szakonyi 2021]. Such a setting is a hard test for the emerging consensus that support for and use of internet-based voting

[6] "A unified online voting system will be created by the next federal elections" - Chairman of the Central Election Commission Pamfilova.
URL:
https://iz.ru/1226279/2021-09-24/v-rf-sozdadut-edinuiu-sistemu-onlain-golosovaniia-k-sleduiushchim-vyboram (accessed: 28.11.2021) (in Russian).

platforms stems from largely functionalist calculations of convenience or familiarity with technology. Rather, they potentially suggest that as with many aspects of voting, institutional expectations about how electoral technologies will be used (and abused) condition attitudes towards them. Finally, Russia is widely regarded as an archetypical electoral autocracy and widely used as a basic case in studies of electoral authoritarian public opinion and political behavior [*see* Reuter 2017; Beazer and Rueter 2019, Forthcoming; Szakonyi 2020; Rosenfeld 2020]. As such, our study likely sheds light on dynamics across a wider range of countries than our limited setting would suggest.

Our work also makes several contributions to ongoing empirical and theoretical debates about how individuals relate to and value Internet voting, how they can build their trust in this form of voting, and what influences such trust. Theoretically, our work expands on existing theories about technology acceptance, innovation diffusion, and the perception of internet voting. However, we also refer to more traditional theories of political science, such as trust formation, the specifics of the electoral process in authoritarian countries, as well as changes in the political attitudes of the population. Empirically, our work presents novel and unique data on public opinion on a number of issues: Internet voting, trust and risk, and the impact of the pandemic (Covid-19) on the electoral process.

In the following section, we briefly review expectations from the existing literature that we intend to test. Section 3 lays out our data and empirical strategy. Section 4 presents our preliminary findings and interpretations of them. Section 4 concludes.

Theory

There are many forms of electronic voting at elections (e.g. kiosk voting, punch card, and optical scans), with Internet-based voting as only one type [Gibson 2004; Pammett and Goodman 2013]. Research on democratic politics generally welcomes these technologies as means to increase voter turnout and encourage citizens to vote [Alvarez et al. 2009; Gibson, 2004; Norris 2004; Awad and Leis 2011; Germann and Serdült 2017]. Moreover, many studies indicate that the use of information and communication technologies (ICTs) and the Internet reinforce democratization and enable collective action [Bailard 2012a, 2012b; King et al. 2013; Stoycheff and Nisbet 2014]. Nonetheless, there is a great deal of skepticism, with many singling out internet-based voting, specifically, as being of questionable value in providing normatively desirable outcomes, such as increased turnout [Bochsler 2010; Goodman 2014].

From the standpoint of public opinion, research suggests a widespread positive attitude towards electronic (especially, internet-based) election procedures among citizens, the media and politicians in democratic contexts [Goodman 2014; Hall 2015; Milic et al. 2016]. Yet the introduction of new technologies into regular electoral processes may be risky and involve costs borne by society. Typically, democracies implement iVoting under conditions of relatively high levels of political trust, stable political institutions, and advanced technical and staffing capabilities. These factors mean that they can allow themselves to take risks. Considering e-voting as part of e-democracy, researchers point out that such technologies are aimed, among other things, at ensuring and maintaining legitimacy [Yusifov 2018]. From this point of view, it is quite logical to expect that the introduction of internet-based voting will be accompanied by an active information policy to promote a positive agenda. Moreover,

security issues during the implementation of this form of elections pose new risks to the authorities that require maintaining public confidence in the legitimacy of elections [Germann and Serdült 2017:3]. In other words: "In a democracy, imperfect as it works in reality, the legitimacy of the elected representatives is predicated on the trustworthiness of the voting system" [Mason 2004:7]. Indeed, many established democracies (Germany, France, Norway) have scrapped planned internet-based voting systems due to technical concerns and lack of consensus. Viewed in this light, iVoting creates a permanent crisis of legitimacy [Buchstein 2004] which cannot be afforded by liberal democracies. Norway provides a particularly clear example, as attempts to scale up internet-based voting after the trials in 2011 local elections and 2013 parliamentary elections (in some municipalities) were suspended despite the high level of public trust in this technology.[7]

Non-democracies have an ambiguous relationship to information and communication technologies (ICT), particularly with respect to elections. Recent work has chronicled the ways in which “smart” authoritarian governments have used ICT to ensure regime stability and reproduce power [Goebel 2013; Johnson and Kolko 2010; Truex 2017; Toepfl 2018], even while developing ICT infrastructures that can compete with those in developed democracies [Christensen 2019] and matching their pace of internet infrastructure deployments [Stier 2017]. In general, this work shows that authoritarian regimes have adapted and begun to apply new digital practices to strengthen their control over the populace and to increase legitimacy. Although less work has been done on internet voting in general, there is every reason to expect that these tools can be used to further traditional electoral manipulations techniques used by autocratic governments. A common tactic in such regimes is to mobilize voters with clientelistic appeals that tie outcomes voters desire – access to public benefits (or the ability to keep them), job retention, physical safety, etc. – to their electoral behavior [Mares and Zhu 2015; Diaz-Cayeros et al. 2016; Forrat 2018; Frye et al. 2014, 2019]. Other common tactics include direct manipulation of vote totals, such as by stuffing ballots [Simpser 2013; Harvey 2016, 2020]. To the extent that internet-based voting facilitates these methods, it may therefore be desirable for autocrats looking for ways to use the electoral system to reinforce their power. Such platforms may also be useful as a means of showing their modernity and legitimacy [Åström et al. 2012], both to the international system and internal audiences [Maerz 2016]. There are non-democratic regimes, which are no less successful in applying the Internet and digital technologies in the electoral processes despite the fact that they are short of staffing competencies and may not enjoy political trust from the populace. For example, the United Arab Emirates uses e-voting in Federal National Council elections and in engaging people in the development of government services[8], Venezuela uses electronic voting machines for its entire electorate[9], etc.

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[7] BBC misreports on ending of Norwegian internet voting pilots. Norwegian Government.
URL:
https://www.regjeringen.no/en/historical-archive/Stoltenbergs-2nd-Government/Ministry-of-Local-Government-and-Regiona/tema-og-redaksjonelt-innhold/kampanjesider/e-vote-trial/news-about-the-e-vote-2011-project/year/2013/BBC-misreports-on-ending-of-Norwegian-internet-voting-pilots/id764809/ (accessed: 28.11.2021).

[8] The United Arab Emirates’ Government portal. eVotung in the UAE.
URL: https://u.ae/en/about-the-uae/the-uae-government/evoting-in-the-uae (accessed: 28.11.2021).

[9] National Democratic Institute. E-voting Audits in Venezuela.
URL: https://www.ndi.org/e-voting-guide/examples/e-voting-audits-venezuela (accessed: 28.11.2021).

As in democracies, however, the ability of the authorities to achieve their goals via internet-based voting crucially depends on uptake of such technologies among the populace. Although a wide body of work suggests that the authorities often coerce voters into participating in elections via a variety of positive and negative inducements [Mares and Zhu 2015; Mares and Young 2016; Diaz-Cayeros et al. 2016; Frye et al. 2014, 2019a, 2019b], such strategies are costly and not easily applied widely across the population. As a consequence, electoral autocracies also rely on voters turning out voluntarily. Thus, a central question for studies of the adoption and diffusion of internet-based voting platforms in non-democracies revolves around the conditions under which the populace believes that such systems are trustworthy enough to use.

As a point of departure, the willingness of voters to trust (and use) internet-based voting systems may be governed by many of the same considerations that have been central to the literature on democracies. The foundation for many of such studies is utilitarian: voters trust e-voting systems due to expectations that such systems are useful and convenient [Warkentin et al. 2018]. Studies based on the theory of Technology Adoption and Diffusion of Innovation (DOI) [Rana et al. 2012; Choi and Kim 2012; Christian Schaupp and Carter 2005] also suggest that individuals may want to weigh the risks and benefits before deciding to use the technology. In this framework, increased perceptions of risk reduce the perceived benefits of the technology, while greater risk acceptance should increase it [Lean et al. 2009]. In other words, people who are generally more risk accepting should more readily engage with new technologies. At the same time, positive experiences with technology and those implementing it can also help to alter perceptions of its risks and benefits [Sønderskov and Dinesen 2016]. Where individuals have had positive experiences with technology in the past, they are more likely to weigh its benefits more highly than any potential costs or risks. Taken together, these technology adoption theories and DOI perspective suggest the following hypotheses:

Hypothesis 1. *Higher risk acceptance should be associated with greater trust in internet-based voting*.
Hypothesis 2. *Greater beliefs in the relative merits of internet-based voting relative to traditional, offline voting should be associated with greater trust in internet-based voting.*
Hypothesis 3. *Prior experience with and higher positive evaluations of e-government services should be associated with greater trust in internet-based voting*.

Work on trust in voting procedures also suggests that trust may be conditional on perceptions of costs associated with one modality of voting and not others. In some settings, traditional voting may be procedurally burdensome or carry with it increased risks to personal safety. Work on reform of voting procedures during the COVID-19 pandemic, for example, suggests that fear of infection drove greater demand for decentralized, less personal forms of voting such as via electronic platforms [Kassen 2021]. Although not necessarily tied to electronic voting, recent contributions suggest that exposure to scientific projections about the pandemic increased support for remote voting via mail [Kousser et al. 2021]. Other work suggests that while information about coronavirus exposure decreases comfort with voting in

person, it does not necessarily result in greater comfort with voting by mail [Safarpour and Hanmer 2021]. Although ambiguous on the question of trust, this work suggests that concrete fears associated with in-person voting potentially shape attitudes towards voting procedures. Within the context of the ongoing COVID pandemic (and the concrete threat it poses to individuals' health), we would therefore expect:

Hypothesis 4. *Fear of COVID-19 infection should increase trust in internet-based voting.*

Beyond cost-benefit and risk calculus, another central theme to existing work in democratic settings is institutional trust. Warkentin and her colleagues have demonstrated that trust plays a central role both at the technological level and at the level of social identity [Warkentin et al. 2018]. They show that citizens' intentions to vote on the Internet are related to the fact that they share the same values as the individuals affiliated with providing e-government (and internet-based voting) and the institutions they represent. Similarly, affinity also plays a role in work on acceptance of other types of electoral reforms, where voters' attitudes towards new voting procedures and technologies are colored by party cues on the potential impact of such systems on electoral outcomes. Although generally formulated as a question of elite-framing and information diffusion, such theories also implicitly rely on the notion that attitudes are shaped by affinity with those implementing (and usually benefiting from) electoral reforms [Mann et al. 2020]. Evidence is mixed, however, and other studies show that trust in government is not a significant predictor of support for internet-based voting [Powell et al. 2012].

Hypothesis 5. *Higher levels of trust in government will be associated with greater trust in internet-based voting.*

Hypothesis 6. *Higher support for the political party proposing and implementing internet-based voting should be associated with greater trust in internet-based voting*.

Hypothesis 7. *Greater trust in media sources dominated by the political party proposing and implementing internet-based voting should be associated with greater trust in internet-based voting.*

In autocratic contexts, affinity and trust take on more complicated dimensions. On the one hand, there is evidence that support for technological adoption is linked to generalized trust in government since citizens need to trust officials in charge of implementing new technologies (and their staff) to ensure its safe functioning [Antonov et al. 2019, 62]. This is in line with the conception discussed above. On the other hand, trust in e-voting might also be linked to expectations about the likelihood systems will be abused. Work on the political economy of institutions has long argued that the lack of constraints and accountability in such settings place few limits on the ability of autocrats to subvert institutions to reproduce power and acquire rents [i.e. North et al. 2009]. Unsurprisingly, therefore, electoral manipulation of all types are common features of electoral autocratic regimes [Simpser 2013; Rozenas 2016]. Although outright fraud is rare [Levitsky and Way 2010], regimes often engage in a mix of ballot box stuffing, vote buying, and voter intimidation [Magaloni 2006; Blaydes 2010;

Mares and Zhu 2015; Frye et al. 2019]. Given this context, voters may worry that new voting technologies are being introduced in order to facilitate such manipulations. Indeed, a large body of recent work suggests that even regime supporters generally frown upon electoral manipulation and have a preference for clean elections [Reuter and Szakonyi 2021]. Thus trust in autocratic settings may have less to do with support or affinity and more to do with beliefs about whether the proposed systems can facilitate abuse.

> **Hypothesis 8**. Greater beliefs that internet-based voting is less subject to electoral manipulations should be associated with greater trust in internet-based voting.

Data and Empirical Design

Our research is based on an original online survey of more than 16,250 respondents carried out across 60 Russian regions between July and September 2021. The sampling frame for the survey draws from an existing marketing panel with over 700,000 participants that is designed to be roughly representative of the online population of Russia, which is about 80% of the total population. The sampling procedure uses quotas for age, gender, and education drawn from 2010 census data to produce roughly representative samples for each of the 60 regions.[10] The main descriptive statistics of the sample are presented in Appendix Table A.1.

Our main dependent variable of interest is a question on trust in internet-based voting for federal elections, where responses could vary along a 7 point scale.[11] Figure 1 provides a visual summary of the question. The figure suggests that the populace as a whole is more likely to distrust internet-based voting, as most responses fall along the more negative side of the scale. Perhaps most strikingly, the modal category (28.8%) of responses do not trust internet-based voting at all.

To test our hypotheses, we make use of a simple linear, mixed-effects model with varying intercepts for our regions. Although our hypotheses in this version of the paper focus on individual-level determinants of trust in internet-based voting, the inclusion of varying intercepts for regions allows us to account for unmodeled regional-level variation and provides some protection against omitted variables (Gelman and Hill 2007). Our specifications take the following form:

$$Y_i = \alpha_0 + \beta_1 * IVariable_i + \beta_2 * X_i + \eta_r + \epsilon_i$$

Where the dependent variable is the trust in iVoting in federal elections and *IVariable* is one of our variables of interest as described below, which we enter one at a time into our specification to examine their plausibility. X_i is a vector of individual-level control variables for individual i (also described below), while η_r represents our region specific varying intercepts and ϵ_i is the individual-level error term.

[10] More details on the survey, its sampling procedure, and the representativeness of the resulting sample relative to the national population can be found in the "RSPS Survey Memo" available on the survey's project page: https://osf.io/rp7b5/.

[11] Precise question wording is reproduced in Appendix Table A.1.

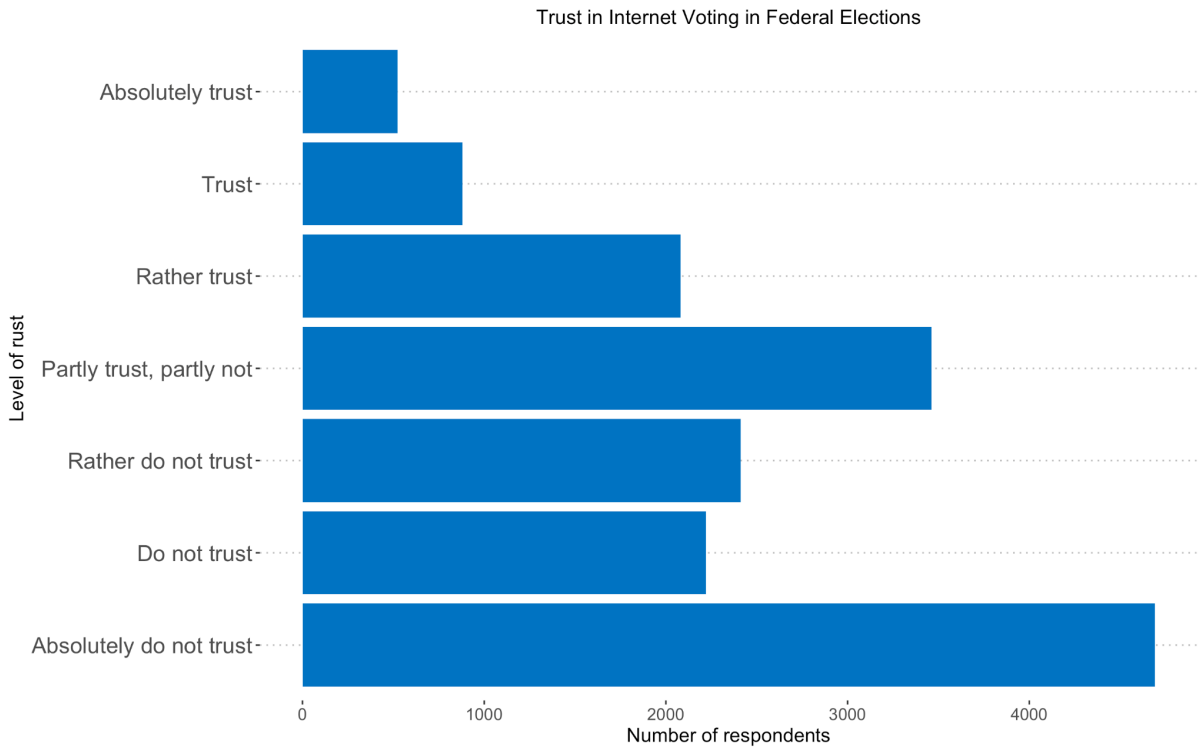

Fig. 1. Distribution of levels of trust in Internet voting

To test our hypothesis related to technological adoption, we make use of four relatively straightforward variables. We proxy for respondents' appetite for risk using a relatively standard question on risk aversion along a 10-point scale (H1). Our measure for the relative merits of technological solutions (H2) is likewise relatively straightforward. We make use of a question that asks voters what type of voting they prefer: traditional or internet-based voting. The response categories range from Traditional voting (1) to neither (5) to internet-based voting (10). We dichotomize the variable such that respondents who favor e-voting (6-10) take a value of 1 and all others take a value of 0.

Third, we proxy for respondents' previous experiences with digital government services (H3) by using respondents' evaluations of the key government e-service: the "Gosuslugi" platform (7-point scale). This service allows Russian citizens to perform a wide range of actions via the internet, including collecting information, submitting applications for services, receiving documents and permits, and tax payments. This platform is also widely used for voting related to government programs and initiatives and is a likely platform for future internet-based voting in Russia. Finally, we capture the potential environmental risks and costs of traditional votes using a question on whether respondents fear COVID-19 infection (on a 7-point scale).

To examine how institutional trust shapes trust in internet-based voting (H5), we begin with an index generated from a set of questions designed to capture respondents' trust in the incumbent politicians at various levels: the President, the Government, their regional

Governor, and their Mayor.[12] Our index is a simple arithmetic average of responses for each of these politicians. This question takes a rather broad conception of institutional trust, but we believe it is nonetheless a reasonable proxy. The heavy degree of personalization in the Russian political system means that it is almost impossible to disentangle trust in specific politicians from broader institutional considerations. Our question wording specifically focuses on governmental positions, rather than naming specific politicians, in part to attempt to ameliorate this concern. Nonetheless, to the extent the system is personalized, trust in specific politicians is likely to be heavily correlated with the institutions they represent.

We examine whether affinity-based trust in those promoting and implementing internet-based voting (H6) using a question on the party that the respondent feels closest too. Our measure takes a value of 1 if the respondent feels they are closest to United Russia, the party of power in Russia, and a 0 otherwise. We focus on affinity for United Russia, because it was the heaviest proponent of internet-based voting among Russian political parties and its politicians were extremely active in promoting the advantages of the system during public debates.

To explore the role of trust to media dominated by those promoting internet-based voting (H7), we make use of a set of questions on respondents' media diet and their preferred sources. Our measure makes use of a set of nested questions in which they are first asked which TV stations they watch at least once a week (exposure) and which three of those they watch regularly they trust the most. We focus on television, because it both remains a primary source of news for most Russians and is dominated by state-owned media. State-owned media is tightly linked to the Russian government and it's reporting is tightly controlled and generally hews to official narratives and pushes government priorities. Unsurprisingly, therefore, it both heavily reported on internet-based voting and heavily promoted it. Our measure takes on a value of 1 if respondents claimed they watched at least one state-owned TV channel more than once a week and if they selected at least one of these as one of their three most trusted TV channels. Otherwise, this variable takes a value of 0.[13]

Finally, we explore how concerns over the relative ease (with respect to traditional voting) of taking advantage of internet-based voting to conduct electoral manipulations (H7). To capture perceptions of this, we ask respondents to evaluate whether traditional or internet-based voting can be characterized as superior across four different dimensions: anonymity protections, transparency in the voting process itself, fairness and transparency of electoral results produced, and robustness to external interference. Although not necessarily capturing all possible dimensions of electoral manipulation, these four dimensions represent the most common set that are plausible across both traditional and internet-based voting. We

[12] For respondents in Moscow and St. Petersburg, we modify the question slightly due to the specifics of these regions. As the governor is also the mayor of these cities, we ask about "the head of the region" and the equivalent of a municipality head in other regions: the head of the local neighborhood or okrug.

[13] Following standard practice we take state-owned media as Russia 1, First Channel, NTV, Channel 360, Channel Star, Channel Five, OTR, Russia Today, TV Center. These public broadcasting channels were established and (or) are funded by the Russian government sources (federal or regional). In addition we also include NTV, as it is owned by state-backed Gazprom media. See also: List of state television and radio broadcasting organizations that have a state share (contribution) in their authorized capital and of television and radio broadcasting organizations that broadcast in the territories of half or more of the constituent entities of the Russian Federation. Central Electoral Commission of the Russian Federation. URL: http://www.cikrf.ru/banners/duma_2011/info/smi/teleradio.php (accessed: 28.11.2021) (in Russian).

recode these variables to be equal to 1 if respondents characterized internet-based voting across the given dimension (0 otherwise) and then summed the results to produce our index.

In addition to our main independent variables of interest, we also include a number of control variables designed to rule out potential alternative explanations for trust in internet-based voting. These include respondents' age, gender, the size of the locality in which they reside, belief in anonymity of elections (generally), interest in politics, the share of their family's expenditure spent on food and rent, frequency of internet usage, reliance on social benefits from the state, employment status, and a vector of dummy variables equal to 1 if respondents watch state-owned TV more than once a week, have completed higher education, are employed in the public sector are employed in the oil and gas industry, or are employed in heavy manufacturing. Although most of these controls are standard and straightforward, we would note that variables related to industrial employment (or public sector employment) or dependence on state benefits are not. In both weakly institutionalized and electoral autocratic settings, these groups are both particularly vulnerable to coercion to participate in elections [Mares and Young 2009] and also likely to be targeted by state propaganda. Although we have no theoretical priors about their support for trust in internet-based voting, there is strong reason to suspect that they should differ from the average member of the population.

Further descriptions of all the variables used in our analysis (independent variables of interest and controls), along with the full wording of associated questions, coding schemes, and basic summary descriptives are provided in Appendix Table A.1.

Results

Table 1 shows the results of our main analysis.[14] Models 1.1 - 1.3 begin by exploring our hypotheses related to theories of technological adoption. Model 1.1 suggests a positive, significant correlation between risk acceptance and trust in internet-based voting. The magnitude of this effect is quite weak, however, suggesting some hesitation even among the risk tolerant. Models 1.2 and 1.3 also show positive significant correlations between relative preference for iVoting (relative to traditional voting) and positive evaluations of other government e-services (respectively) and trust in iVoting. Model 1.4 then explores how the perceived risks of traditional voting shape trust in iVoting. Here we see that fear of COVID exposure (a relevant risk of in-person voting during our survey period) also has a positive, significant correlation with our measure of trust in iVoting.

Turning to our hypotheses related to trust, Model 1.5 suggests a positive, significant correlation between generalized trust in government and trust in e-voting. Model 1.6 suggests that support for the party of power, which heavily promoted iVoting systems, is also a positive and significant predictor of support for iVoting. Similarly, Model 1.7 suggests that respondents who indicated state-owned media sources, who also heavily promoted iVoting, were among their most trusted were also more likely to trust iVoting. Model 1.8 explores

[14] For space considerations, Table 1 omits controls. Table B.1 includes the full output. Control variables include: age, gender, locality size, belief in anonymity of elections, exposure to state-owned TV, higher education, interest in politics, share of expenditures on food and utilities, Internet usage frequency, reliance on the social support from the state, current job situation, employment in public sector, heavy manufacturing, and oil and gas industries.

whether individuals' beliefs about the extent to which iVoting are vulnerable to electoral manipulations relative to traditional voting shape trust. Again, we find a positive, significant correlation between these variables. Finally, in Model 1.9 we explore whether our main independent variables of interest remain robust to being included simultaneously. All but risk acceptance do.

	Dependent variable:								
	Trust in Internet Voting in Federal Elections								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Risk Acceptance	0.02***								0.01
	(0.01)								(0.005)
Comparative Advantage		1.32***							1.00***
		(0.03)							(0.03)
E-service Quality			0.20***						0.11***
			(0.01)						(0.01)
Fear of Infection				0.08***					0.04***
				(0.01)					(0.01)
Trust in government					0.67***				0.53***
					(0.01)				(0.01)
"United Russia" Supporter						0.73***			0.23***
						(0.03)			(0.03)
Trust in State-owned TV							0.67***		0.28***
							(0.04)		(0.04)
Perceptions of Relative Ease of Abuse of iVoting (descending)								0.46***	0.26***
								(0.01)	(0.01)
Constant	0.90***	0.81***	0.48***	0.81***	−0.03	1.15***	1.09***	0.76***	−0.35***
	(0.12)	(0.11)	(0.12)	(0.12)	(0.11)	(0.11)	(0.12)	(0.11)	(0.11)
Individual Level Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	16,272	16,272	16,272	16,272	16,272	16,272	16,272	16,272	16,272
Log Likelihood	−30,220.69	−29,204.13	−29,959.15	−30,162.90	−29,153.82	−29,947.83	−30,099.84	−29,473.29	−27,663.98
AIC	60,495.38	58,462.26	59,972.30	60,379.80	58,361.63	59,949.66	60,253.69	59,000.58	55,395.95
BIC	60,703.20	58,670.09	60,180.12	60,587.63	58,569.45	60,157.48	60,461.51	59,208.40	55,657.66
Note:									*p<0.1; **p<0.05; ***p<0.01

Table 1. Predictors of Trust in Internet Voting

Discussion

Our analysis suggests that trust in iVoting in Russia is relatively nuanced. On the one hand, we find evidence consistent with standard theories from literature on technology adoption and diffusion of innovation (H1 - H3). This is an interesting result, since it suggests that existing theories of trust in iVoting and attitudes towards technology developed in Western democracies can generalize to authoritarian contexts. On the other hand, our measures vary in the extent to which they capture the relationships at the heart of technological adoption and DOI theories. Our measures of risk acceptance and perceptions of the comparative advantage of iVoting, in particular, potentially include in them some of the core concepts of trust and beliefs about abuse (or willing to accept the potential for it) that are central to our trust hypotheses. That we find trust in government and a measure designed to examine respondents' relative perceptions of iVoting's robustness to traditional voting *with respect to electoral manipulation* are also significant predictors of trust would suggest some caution in assuming that existing theories generalize straightforwardly. For different reasons, our measure of evaluations of state-run online systems may also fail to capture relative evaluations of the risks and benefits of technology. This measure may also reflect broader positive experiences and lack of security fears on the internet, rather than specific experiences with these systems, suggesting an entirely different mechanism.

Of all the measures associated with traditional technology adoption theories, only our measure of fear of COVID is significant and relatively robust to alternative explanations.

That is, faced with real risks individuals act rationally and turn to technological alternatives to achieve goals that are too dangerous to accomplish with analog means. Although here we are focused on COVID fears, we would expect these findings to apply to situations where respondents face more generalized, credible fears of in person voting, such as physical intimidation or terrorism at polling places. Nevertheless, our interpretation of these findings, taken as a whole, is that institutional concerns are likely much more central than objective evaluations of the merits of technology with respect to these variables.

Turning to our measures of trust, we find a great deal of evidence consistent with the notion that trust in the government matters for attitudes towards iVoting. Beyond the fact that generalized trust in government officials is correlated with attitudes towards iVoting (H5), we also find that party affiliation and trust in state-owned media are also important. Both of these are consistent with theories of trust in electoral procedures that highlight the role of affinities and information. Perhaps most surprisingly, United Russia supporters had stronger trust in iVoting (H6), despite general consensus that the party is weak and lacks broad bases of support. Yet United Russia was a strong proponent of the move to iVoting, and its elites made concerted efforts to message around the importance and trustworthiness of the iVoting system. They also heavily advertised the success of early experiments with iVoting conducted during election cycles prior to 2021. To the extent that Russia's party system can be considered institutionalized [Coppedge et al. 2021], however, this finding is consistent with existing work on the role of elite messaging in strengthening attitudes towards electoral procedures. Thus, despite the authoritarian practices and institutional specifics of party representation in Russia, party affiliation still influences trust in voting.

Our results with respect to trust in state-owned media are also consistent with elite-driven accounts of trust in voting (H7). Existing theories emphasize the importance of elite messaging in shaping attitudes towards electoral procedures broadly. Petitpas et al. [2021] suggest that efforts around one technology potentially spill over to others, as, "..., communication activities surrounding the opportunity to e-vote are likely to stimulate participation, regardless of whether citizens eventually vote through the internet or another voting channel (at the ballot box or by postal mail)." [Petitpas et al. 2021, 3]. Although we do not know how exposure to state media shaped attitudes towards other voting procedures, our findings do suggest that its full-throated support for iVoting was successful in bolstering trust among those who watched it. Taken together, these findings suggest that the information policy of the state and its ability to message around iVoting are just as crucial as basic technical elements in fostering trust amongst the populace.

At the same time, our findings also suggest an important channel through which trust likely flows. Consistent with theories rooted in institutional economics, we find that beliefs about the iVoting's robustness (relative to traditional voting) to electoral manipulations are a strong predictor of trust in it. Despite the relative widespread use of electoral manipulation, evidence suggests that voters in electoral autocracies are not resigned to such techniques. Beyond educated and opposition voters, evidence suggests that such regimes face backlash from their own supporters when manipulation is both publicized and blatant [Weitz-Shapiro 2012; Tucker 2007; Reuter and Szakonyi 2021]. From this perspective, it is therefore no surprise that voters that believe iVoting to be robust to common forms of manipulation are therefore more likely to trust it more. Although our data cannot speak to how such beliefs are

formed in the first place, it is reasonable to read these results together with those related to United Russia supporters and trust in state media to suggest that elite messages around the integrity of iVoting are the likely mechanism. Crucially, however, all of our trust related measures remain significant when included in the same specification. This suggests that although they are likely related, there are other channels or frames by which support for United Russian and trust in state-owned media shape trust in internet-based voting.

Conclusion

This paper has sought to examine the determinants of individual-level trust in Internet-based voting in non-democracies. Using a unique survey of Russian citizens, we conducted an exploratory analysis, in which we drew on existing explanations prominent in the literature on technological adoption and trust in electoral procedures. Our results suggest that in many ways, the determinants of Russian trust in internet voting systems mirrors the West. On the one hand, individuals with higher risk acceptance, better evaluations of internet voting relative to traditional voting, and previous positive experiences with e-voting platforms have higher trust in Internet voting. Our findings also suggest that fear of a concrete and salient risk – infection with COVID – was also heavily correlated with attitudes towards Internet-based voting. These findings are consistent with theories of technological adoption, in which acceptance is a function of risk acceptance and careful evaluation of the relative costs and benefits of the technology.

On the other hand, we also find that institutional trust also plays a strong role in trust in internet-based voting, much as it does in the West. We find that voters who support the party of power, United Russia, and who trust state-owned media sources are more likely to trust voting. We interpret these findings as indicative of the importance of elite signaling and affinity in Russia, as both United Russia and state-owned media were heavy proponents of internet-based voting and framed them as convenient, secure, honest, and safe. Unlike in classic democratic settings, however, autocracies are rife with the potential for electoral manipulations. Although concerns about the possibility of manipulations are consistent with the trust theories prominent in the literature on the West, we expect such concerns to be more salient in electoral autocracies. Consistent with this view, we also find voters who believed that internet-based voting was less subject to electoral manipulation were also more likely to trust internet-based voting. Although we cannot be certain, we believe these results complement our findings on the importance of elite framing by United Russia and state media, as circumstantial evidence suggests they heavily emphasized the integrity of internet-based voting.

Taken together, our study provides preliminary evidence that Russian public opinion around internet-based voting bears striking parallels to public opinion in the Western settings that dominate the literature. With rare exceptions, such as the contemporary US, electoral integrity is rarely a serious concern in this literature, however. Instead, existing studies have focused on the role of cost-benefit calculations surrounding technological adoption or elite framing and signals about electoral processes. Our exploratory analysis suggests, however, that more attention should be paid to beliefs about the ability of new electoral processes to address issues of electoral integrity. Thus one major contribution of this paper is to highlight the importance of considering how new technologies restrict (or enable) electoral

manipulation when considering support for new procedures in weakly institutionalized democracies and non-democratic regimes. Although such views are compatible with classic theories of trust and elite framing, they represent a new and promising mechanism for understanding how these phenomena work.

Our study contributes to a growing body of work trust in new forms of voting procedures, and particularly on internet-based voting, as well as the broader literature on electoral authoritarian elections. First, our findings complement a growing body of work that focuses on applying theories of technology adoption and diffusion of innovation to electronic forms of voting, including internet-based voting. Consistent with these studies, we provide evidence of how risk, previous positive experiences with e-government, and institutional trust influence the population's perception of Internet voting. Our work advances this literature by demonstrating the applicability of theories developed in studies of Western democracies to electoral authoritarian settings.

Second, our paper also explores channels by which institutional trust can shape trust in internet-based voting. Our work is consistent with existing findings that show how elites, particularly when supported by captured media, can influence public opinion and shape attitudes towards major changes in the electoral process. Where we advance the literature, however, is by showing that an important element of trust revolves around voters' beliefs in the relative integrity of internet-based voting and its robustness to electoral manipulation. Although we do not tie this directly (or causally) to elite framing, there is substantial anecdotal evidence that integrity was central to the Russian state's narratives around internet-based voting. More importantly, our work suggests that even in environments rife with public reports of electoral manipulation, the ability of new voting technologies to safeguard the integrity of elections is a crucial determinant of trust in them. Given the unfortunate tendency for parties in some Western democracies to claim electoral manipulations to justify losses, we suspect that this insight has important implications for understanding public opinion surrounding electoral procedures beyond non-democracies.

A major limitation of the current study is that we are unable to identify causal relationships, making it unclear exactly how institutional trust operates and the specific beliefs that elites, whether the dominant party or state-owned media, inculcate in the populace. Although we find suggestive evidence, more work needs to be done to understand how and when particular frames mediate the relationships between institutional trust, messaging, and attitudes towards electoral processes such as internet-based voting. In future work, we plan to examine these dynamics more precisely using vignette experiments that attempt to manipulate beliefs about the extent to which internet-based voting is subject to electoral manipulation and explore how and when media diets and institutional trust moderate these effects. Future work might also examine reforms to electoral procedures beyond internet-based voting, in order to see if our results are applicable beyond new technology to electoral procedures more broadly.

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Appendix A. Summary Statistics of the Variables (sample size – 16272)

Table A.1: Variable Descriptions and Summary Statistics

Variable name	The question asked / Variable description	Mean / frequencies	Std.	Min	Max
Dependent variable					
Trust in Internet voting in federal elections	Response to the question "To what extent do you trust online voting for elections at the following levels?" on the 7-point Likert scale	3.079	1.728	1	7
Independent variables					
Risk acceptance	Response to the question "To what extent are you willing to take risks?", where 1 is "absolutely not ready to take risks" and 10 is "willingly take risks"	4.46	2.278	1	10
Comparative advantage	Dummy variable equal to 1 if respondent answered 6 or above to the following question and 0 otherwise. Generally speaking, which of the voting types do you prefer? 1. Traditional voting 2-4 5.To the same extent traditional and Internet voting 6-9 10. Internet voting	0.208	0.406	0	1
E-service quality	Response to the question "Please, evaluate the quality of the services delivered by the government in your region via the following digital platforms: Gosuslugi portal." on the 7-point Likert scale	4.887	1.428	1	7

Fear of infection	Response to the question “To what extent do you worry about getting infected with Coronavirus?” on the 7-point Likert scale	3.889	1.741	1	7
Trust in government	Average of for the 4 responses to the question “What do you think, do people like you trust or do not trust… the President; the Government; the Governor of your region; the City Mayor” with 5-point Likert scale and localized versions of the two latter options for Moscow and Saint Petersburg	2.492	0.947	1	5
“United Russia” supporter	Dummy variable equal to 1 if respondent checked “United Russia” answering the question “Which of the following parties do you feel closest to?”	0.214	0.41	0	1
Trust in state-owned TV	Dummy variable equal to 1 if respondent checked one of the following channels as a channel he or she trusts from the list of channels that he or she watches at least once a week: Russia 1, First Channel, NTV, Channel 360, Channel Star, Channel Five, OTR, Russia Today, TV Center.	0.434	0.496	0	1
Perceptions of relative ease of abuse of iVoting	Index variable constructed on the basis of the following questions: “If we speak about traditional voting by going to a polling place and electronic voting on dedicated platforms (e.g., Gosuslugi), which of these two types of voting is best characterized by the following features?” “Anonymity”, “Transparency of the voting procedure”, “Fairness and transparency of the voting results”, and “Possibility of external interference into the voting procedure”. We recoded these variables to be equal to 1 if respondents characterized iVoting as being less subject to abuse, which corresponds to answer categories 4 and 5 for all items except “External Interference” (answer categories 1 and 2). We then summed the resulting 4 variables to produce our index.	0.9995	1.534	0	4
Control variables					

Age	Divided into cohorts: “digital natives” (18-29) (27.07%); 30-39 (32.26%); 40-49 (20.7%); 50-59 (13.36%); 60-69 (5.83%); 70+ (0.77%) years old.	38.01	12.782	18	83
Belief in anonymity of elections	Agreement with the statement “In Russia, the anonymity of voting is defended” on the 7-point Likert scale	3.394	1.618	1	7
Exposure to state-owned TV channels	Dummy variable equal to 1 if respondent checked one of the following channels as a channel he or she watches at least once a week: Russia 1, First Channel, NTV, Channel 360, Channel Star, Channel Five, OTR, Russia Today, TV Center (for more details, see description of the variable *Trust in state-owned TV channels*).	0.536	0.499	0	1
Gender	1-male, 2-female	1.619	0.486	1	2
Higher education	Dummy equal to 1 for respondents with at least higher education	0.393	0.488	0	1
Locality size	Coded as a factor with the first category as a reference level: 1. In a city / town / village with 100,000 or fewer residents 2. In a city with 100,000-250,000 residents 3. In a city with 250,000-500,000 residents 4. In a city with 500,000-1,000,000 residents 5. In a city with more than 1,000,000 residents *(except for Moscow and Saint Petersburg)* 6. Saint Petersburg 7. Moscow	1. 3364 (20.67 %) 2. 1645 (10.11 %) 3. 3347 (20.57 %) 4. 4295 (26.4 %) 5. 2576 (15.83 %) 6. 543 (3.33			

		%) 7. 502 (3.09 %)			
Interest in politics	7-point Likert scale about the degree to which respondent is interested in politics	3.922	1.467	1	7
Share of expenditures on food and utilities	What is the approximate share of your household's monthly expenses you spend on food and utilities? 1. 0-10 % 2. 11-20 % 3. 21-30 % 4. 31-40 % 5. 41-50 % 6. 51-60 % 7. 61-70 % 8. 71-80 % 9. 81-90 % 10. 91-100 %	5.409	2.222	1	10
Internet usage frequency	How often do you use the Internet? 1. Occasionally, but no less often than bi-yearly 2. Several times a month 3. Several times a week 4. I use the internet daily, but less than 4 hours a day 5. I check the internet more than 4 hours a day	4.533	0.679	1	5
Reliance on the social support from the state	5-point Likert scale on how important is social support from the state, such as pensions, benefits, social benefits to the respondent and his (her) family wellbeing.	2.352	1.367	1	5
Employed	Dummy equal to 1 for respondents who are permanently or temporarily employed	0.625	0.484	0	1
Public sector	Dummy equal to 1 for respondents who checked the corresponding statement as	0.159	0.366	0	1

employee	applicable to them				
Oil and gas industry	Dummy equal to 1 for respondents who are employed in oil and gas industry	0.02	0.147	0	1
Heavy manufacturing	Dummy equal to 1 for respondents who are employed in heavy industries	0.034	0.181	0	1

Appendix B. Full Estimation Results for Main Specifications

Table B.1: Predictors of trust in Internet voting, full estimation

	Dependent variable:								
	Trust in Internet Voting in Federal Elections								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Main Predictors of Interest									
Risk Acceptance	0.02***								0.01
	(0.01)								(0.005)
Comparative Advantage		1.32***							1.00***
		(0.03)							(0.03)
E-service Quality			0.20***						0.11***
			(0.01)						(0.01)
Fear of Infection				0.08***					0.04***
				(0.01)					(0.01)
Trust in government					0.67***				0.53***
					(0.01)				(0.01)
"United Russia" Supporter						0.73***			0.23***
						(0.03)			(0.03)
Trust in State-owned TV							0.67***		0.28***
							(0.04)		(0.04)
Perceptions of Relative Ease of Abuse of iVoting (descending)								0.46***	0.26***
								(0.01)	(0.01)
Control Variables									
Belief in Anonymity of Elections	0.45***	0.42***	0.41***	0.44***	0.27***	0.41***	0.43***	0.43***	0.22***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Exposure to State-owned TV	0.14***	0.19***	0.10***	0.12***	0.004	0.08***	−0.39***	0.17***	−0.19***
	(0.03)	(0.02)	(0.03)	(0.03)	(0.02)	(0.03)	(0.04)	(0.02)	(0.04)
Age. Reference level – 18-29 y.o.									
30-39	−0.20***	−0.15***	−0.23***	−0.21***	−0.13***	−0.18***	−0.21***	−0.15***	−0.10***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
40-49	−0.12***	−0.07*	−0.16***	−0.14***	−0.05	−0.08**	−0.14***	−0.03	0.02
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.03)
50-59	−0.12***	−0.06	−0.15***	−0.17***	−0.09**	−0.04	−0.14***	−0.03	0.02
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
60-69	−0.11*	0.01	−0.11*	−0.17***	−0.12**	−0.03	−0.14**	−0.02	0.04
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.05)
70+	0.03	0.18	0.07	−0.03	−0.07	0.10	−0.02	0.17	0.22*
	(0.14)	(0.13)	(0.14)	(0.14)	(0.13)	(0.14)	(0.14)	(0.14)	(0.12)
Gender (female)	0.17***	0.14***	0.11***	0.12***	0.13***	0.10***	0.13***	0.13***	0.04*
	(0.03)	(0.03)	(0.03)	(0.03)	(0.02)	(0.03)	(0.03)	(0.03)	(0.02)
Higher Education	0.05**	0.04	0.03	0.04	0.02	0.08***	0.07***	0.08***	0.03
	(0.03)	(0.03)	(0.03)	(0.03)	(0.02)	(0.03)	(0.03)	(0.03)	(0.02)
Locality size. Reference level – population under 100,000									
100,000-250,000	−0.11**	−0.09**	−0.10**	−0.11**	−0.08*	−0.09**	−0.10**	−0.07*	−0.04
	(0.05)	(0.04)	(0.05)	(0.05)	(0.04)	(0.05)	(0.05)	(0.04)	(0.04)
250,000-500,000	−0.02	−0.03	−0.01	−0.03	−0.02	0.01	−0.01	0.03	0.03
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.03)
500,000-1,000,000	−0.04	−0.05	−0.02	−0.05	−0.02	−0.03	−0.03	−0.01	−0.02
	(0.04)	(0.03)	(0.04)	(0.04)	(0.03)	(0.04)	(0.04)	(0.03)	(0.03)
More than 1,000,000	0.003	−0.02	0.01	−0.01	0.01	0.02	0.02	0.03	0.02
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Saint Petersburg	−0.05	−0.10	−0.05	−0.06	−0.02	−0.02	−0.02	−0.01	−0.02
	(0.09)	(0.08)	(0.08)	(0.09)	(0.08)	(0.09)	(0.09)	(0.08)	(0.07)
Moscow	0.21**	0.20**	0.19**	0.21**	0.13	0.20**	0.22**	0.26***	0.15**
	(0.09)	(0.08)	(0.09)	(0.09)	(0.08)	(0.09)	(0.09)	(0.09)	(0.07)
Interest in Politics	0.03***	0.04***	0.02***	0.03***	0.05***	0.03***	0.03***	0.03***	0.03***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Share of Expenditures on Food and Utilities (descending)	0.05***	0.04***	0.04***	0.05***	0.02***	0.04***	0.05***	0.04***	0.01**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.005)
Internet Usage Frequency	−0.04**	−0.03	−0.07***	−0.03*	−0.004	−0.04**	−0.04**	−0.05***	−0.02
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Reliance on Social Support from the State	0.03***	0.02*	0.02**	0.02**	0.0005	0.02**	0.03***	0.03***	−0.01*
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Employed	−0.03	−0.03	−0.05*	−0.02	0.01	−0.02	−0.03	−0.03	0.01
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.02)
Public Sector Employee	0.17***	0.14***	0.14***	0.17***	0.13***	0.14***	0.17***	0.14***	0.08**
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Oil and Gas Industry	0.14	0.04	0.17**	0.14*	0.15**	0.11	0.14*	0.07	0.03
	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.07)
Heavy Manufacturing	0.17***	0.13**	0.19***	0.17**	0.21***	0.18***	0.17**	0.14**	0.16***
	(0.07)	(0.06)	(0.07)	(0.07)	(0.06)	(0.07)	(0.07)	(0.06)	(0.06)
Constant	0.90***	0.81***	0.48***	0.81***	−0.03	1.15***	1.09***	0.76***	−0.35***
	(0.12)	(0.11)	(0.12)	(0.12)	(0.11)	(0.11)	(0.12)	(0.11)	(0.11)
Observations	16,272	16,272	16,272	16,272	16,272	16,272	16,272	16,272	16,272
Log Likelihood	−30,220.69	−29,204.13	−29,959.15	−30,162.90	−29,153.82	−29,947.83	−30,099.84	−29,473.29	−27,663.98
AIC	60,495.38	58,462.26	59,972.30	60,379.80	58,361.63	59,949.66	60,253.69	59,000.58	55,395.95
BIC	60,703.20	58,670.09	60,180.12	60,587.63	58,569.45	60,157.48	60,461.51	59,208.40	55,657.66
Note:									*p<0.1; **p<0.05; ***p<0.01

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