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Rationality of Internet Voting in Estonia

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Abstract. This paper discusses internet voting in Estonia on the basis of rational choice perspectives. It emphasizes particularly the importance of "bounded rationality" with emphasis on the Estonia – specific context in understanding the adoption of internet voting in the last seven elections. The key to the adoption process has been diffusion of ID card, which crucial for using wide range of online services offered by private and public sector organizations. Despite constantly increasing turnout the nature of internet voting is transactional. It has not made substantial contribution to online democratic participation other than making voting more convenient for certain segments of society.

Keywords. Internet voting, electronic voting, remote electronic voting, Estonia, rationality of voting, voting process

Introduction

Estonia is only country in the world where citizens have voted online in the municipal, national and European elections. The internet voting[2] is not just one unique initiative that makes Estonia to stand out. Its citizens have used internet banking since 1996, submitted their online tax declarations since 2000, bought bus tickets with their mobile phones for many years and done various other remote electronic transactions for a long time that have not been available in many parts of the world. This paper explores how these different online services provided by both public and private sector have contributed to the spread of internet voting in Estonia. It analyzes the government voting initiative in order to see whether it is primarily transactional mimicking "services first, democracy later" type of thinking or does it give an indication that the government has gone beyond "fallacy of electoralism" by managing to engage citizens in a substantial way. The paper describes key elements of the internet voting process, highlights different factors affecting internet voting turnout and the distributional impacts on the basis of insights from rational choice theories.

Estonia's pioneering use of internet voting is particularly remarkable in the context of its heritage. While being a middle-income former socialist country, many studies on e-government cluster Estonia together with wealthiest countries in Europe and the world. Indeed, the UN E-Government Survey 2008 ranked it 13th in the world and compared Estonia with the Nordic countries, not with the ex-socialist countries [1]. If

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[2] This paper uses terms internet voting, online voting, electronic voting, e-voting and remote electronic voting for the same concept which is remote electronic voting to cast one's vote over the internet. It is different from electronic voting, which may take place at the polling station or may simply refer to counting votes electronically.

Estonia is placed into the context of Central and Eastern European countries with similar levels of per capita Gross Domestic Product (GDP) and socialist heritage it is the undisputed e-government leader. The paper starts by discussing theoretical framework. Then it will highlight key characteristics of internet voting in the last seven elections from 2005 to 2014. After that the paper will analyze the reasons for voting online as well as the distributional impact of internet voting. The paper concludes by highlighting key findings.

1. Theoretical Framework

The theoretical framework is not based on emerging literature on internet voting and/or e-government. It approaches internet voting as one form of voting on the basis on rational choice perspectives. The key argument of the paper is that the literature on internet voting can benefit from incorporation of insights from the literature on "traditional voting". As the paper is concerned with the rationality of internet voting, then rational choice can be an obvious choice as a starting point. The arguments put forth by other schools of thought and the literature on internet voting can be assessed in the future research. Certainly this limits the scope of this paper as the rationality for remote electronic voting can be assessed from a variety of perspectives both conceptually and empirically. However, since the arguments for electronic voting are essentially instrumentalist, then conceptually it would be best assess them on the grounds of same instrumentalist logic on the basis rational choice schools of thought.

The instrumentalist view of voting assumes that a key barrier for low turnout is cost faced by individual voter. This assumes that individuals are self-interested utility-maximizers or at minimum act according to their preferences, who engage in cost-benefit analysis in the voting process. Following philosopher Joel Feinberg this notion could be labeled as "psychological egoism-based" approach to voting behavior [2]. However, if we assume that individual voter is self-interested in this manner, then the best way to minimize costs would be not to vote at all. One vote will not change the outcome [3]. Hence, whatever benefits outcome of elections will deliver will be the same regardless whether one vote is submitted or not. Reduction of transaction costs and increasing efficiency of voting process delivered by the availability of remote electronic voting will not change this calculation. Any kind of voting – online or offline – will still imply cost for individual voter however insignificant it may or may not be. Nevertheless, this Olsonian interpretation of rationality fails to address the question why such large segments of population in most democracies still vote. The behavior of 50–60 percent of population is seen as irrational on the basis of this approach. The Olsonian approach to rational choice is not useful model for empirical analysis.

Most importantly, the motivation of individual voter do not necessarily stem from the outcome of elections but rather from the voting process. Self-interested voter may maximize utility by acting on the basis of the sense of civic duty. If community and friends consider voting important, then participation in the elections delivers benefits related to a social standing. Indeed, rational choice literature, for example, has demonstrated that citizens may cast a vote simply because of a personal need which is not material, sense of civic duty which makes them feel good and reputational gains as others see them in the voting booth [4]. In other words, it may be rational to vote in a particular institutional context. Thus the act of voting cannot be analyze on the basis of

universal rationality but rather on the basis of contextual or bounded rationality.[3] There is a rich body of literature which sees the rationality as something to be understood only in a specific context [5,6]. It is useless to argue whether people are rational or irrational because rationality is not absolutist concept. The emphasis has to be on different degrees of rationality. For instance, some people may vote simply over the internet because they perceive it as innovative, they may want to try it or because they have read about in media.

Approaching the rationality of internet voting on the basis of particular context, the benefit of reduced transaction costs[4] in casting a vote through electronic means may be offset by the cost of not being able to show to others the act of voting – e.g. the fulfillment of civic duty. Thus if participation in the process is important, then remote electronic voting has opposite effect. It does not allow demonstrating participation in the voting process to a peer-group. Electronic voting is all about cutting the time spent for voting ritual. Bounded rationality may also imply that voter's motivation comes from imperfect knowledge and understanding of voting process. Individual voter may believe that one vote matters – even if it does not. Voters have imperfect information which may imply that they might be misled about the importance of voting [7,8]. However, assumption of "rational ignorance" would not lead to increased turnout resulting from electronic voting. Voters who vote anyway may change the method of voting from offline to online but it does not affect turnout.

The rationale for internet voting cannot come from a calculative singular approach where we assume perfect rationality and utility maximization. Voters have many different identities and they have multitude of preferences. Some voters may be encouraged to vote simply because remote electronic voting is available. This does not imply that they will vote next time. For many others the availability of remote electronic voting is not even necessary (not to mention sufficient) condition for submitting their vote. Hence, we should assume "bounded rationality" instead of perfect rationality when approaching theoretically and analyzing empirically remote electronic voting [5]. Electronic voting might be a good substitute for offline alternatives for some people but certainly not for everybody. From purely theoretical grounds it is difficult to see how the remote electronic voting contributes to increased turnout. Hence, the instrumentalist case that making voting convenient will contribute to increased turnout does not hold on the grounds of instrumentalist logic.

The next chapter applies these theoretical insights to the case of Estonia where internet voting has been used in the last seven elections. The discussion is based on data from the Estonian Electoral Commission and secondary sources. The research method is descriptive and do not offer any causal analysis. By providing descriptive statistics on the internet voting from 2005 to 2014, the research highlights key characteristics of internet voting and elaborates on data on the basis of rational choice framework.

[3] Bounded rationality refers to individual rationality which is limited by context within which individuals make decisions and operate. Imperfect information, resources, formal rules, social norms, interactions with others, uncertainty and dependence on previous choices are factors that limit the rationality of individuals.

[4] Transaction costs: any kind of undertaking involves costs that are higher than zero. These costs stem from searching information, uncertainty about outcomes, formal and informal rules in a particular environment. The concept of transaction costs is linked with bounded rationality (see above). Notion of perfect rationality would assume that transaction costs are zero while bounded rationality implies that transaction costs are always higher than zero.

Table 1. Turnout and Internet Voting in the Estonian Elections (2005–2014)

Type of elections	Date	E-votes (% of all votes)	Turnout (%)	E-voting turnout (% of all eligible voters)
Municipal elections	October 2005	1.8	47.4	0.9
Parliamentary elections	April 2007	5.4	62	3.4
European Parliament	June 2009	14.7	43.9	6.5
Municipal elections	October 2009	15.7	60.6	9.5
Parliamentary elections	March 2011	24.3	63.5	15.4
Municipal elections	October 2013	21.2	58	12.3
European Parliament	May 2014	31.3	36.5	11.4

Source: Composed by the author on the basis of data from the Estonian Electoral Commission [11]

2. Internet Voting in Estonia

Internet voting is the most well-known initiative to engage public in democratic process in Estonia. As Estonia is the only country in the world where citizens have voted online in the municipal, national and European elections, then the internet voting in Estonia has received a considerable scholarly attention [9,10]. Particularly, the 2007 parliamentary elections have been scrutinized from various angles. This section offers an overview of last seven elections, highlights key elements of voting process and discusses the main characteristics of internet voting in Estonia.

The possibility to vote online was first used in October 2005 when almost two percent of all voters, which translates into one percent of the electorate, used this opportunity in the municipal elections (Table 1). This experiment was followed the parliamentary elections in April 2007 where about 5 percent of casted votes were submitted online. In June 2009, the European Parliament Elections were held where close to 15 percent of votes were submitted online. In the last municipal elections in October 2009 almost 16 percent of the votes were casted online. The parliamentary elections of 2011 achieved a new record where over 24 percent of votes were submitted online. The municipal elections of 2013 saw somewhat lower turnout of internet voters – slightly over 21 percent. However, the latter should be compared with the municipal elections where obviously it is the best turnout of internet voters as well as offline voters among the last three municipal elections. In the European Parliament elections of May 2014 over 31 percent of votes were submitted online – although the overall turnout was lowest at 36.5 percent of last seven elections.

The core idea behind the Estonian internet voting system is that the provision of these online channels for voting removes another barrier by making voting more "convenient" [9]. Proponents of remote electronic voting in Estonia, however, often extend their argument beyond convenience and insist that this type of voting will increase turnout in elections. Electronic voting will reduce transaction costs and enhance efficiency in the voting process. Citizens find it easier to cast their vote and they face lower costs of voting. Of course, benefits of electronic voting such as reduced transaction costs are only one side of the coin. On the other side, the electronic voting has also costs – e.g. reduced civic engagement, privacy and security concerns. Indeed, these costs are not just technical or emerge from a particular civic republican and/or communitarian theoretical perspective. In order to comprehend costs and benefits of internet voting, the the next parts describe the internet voting process.

2.1. The Estonian ID-Card

Starting with the consideration of instrumental facts, internet voting reduces some transaction costs for voting while it increases some others. From a purely practical point of view, voters do not simply need access to the computer but the use of national ID-card is required as well. The use of ID-card requires a purchase of ID-card reader. Cheaper versions of the reader can be purchased for slightly less than $10 dollars. More expensive versions can cost $40–50 dollars. The ID-card itself costs slightly more than $20 dollars. Certainly, the ID card is not only necessary for online voting but can be used of a variety of online services provided by public and private sectors. In addition, the ID-card can be used as a regular identification document within Estonia and it serves as a substitute for passport for traveling within the 27- countries of the European Union.

One reason why the government introduced ID-cards in 2002 was to provide a more secure and sophisticated substitute for online identification method provided by the Internet banking, where cards with numerical codes were used. Even though government has issued half million ID-cards by March 2005, the new identification method did not gain immediately considerable following in the online environments [12]. People used these cards primarily off-line. The bank-issued cards have been used in parallel and before the ID-card as an identification method for government provided online services. In recent years banks have actively supported the use of ID cards in Internet banking by lowering the amount of daily transactions that can be made by older Internet bank identification methods and also charging smaller fees for transactions made with the ID-cards.

However, these are more recent developments which build on the initial success of identification method used by the banking sector, which became an influential IT innovator by introducing internet banking in 1996 [13]. The quality, security and simplicity of its service attracted the majority of internet users as its customers. Already in 2002, 57 percent of Estonian internet users used internet banking. This service classified as the third most important reason for internet use, behind communicating via email (76 percent) and using search engines (62 percent) [13]. Many state agencies started to use the identification verification system used in internet banking, thereby enabling government services to work online. Since 2000 Estonians have been able to file their taxes online, using the identification system offered by electronic banking services. The study on use of government online services conducted in 2002 already indicated then that the 48 percent of Estonian internet users pay for e-government services through the internet banking [14]. Other ways of using e-government services were less exploited by the people.

Since most people use banking services often, then it has created habit to make transactions online which has made adoption of ID-card and internet voting easier. It has been rational for the banks to cooperate with government because it allows reaping benefits from the Internet as a network good. Essentially, banks such as Hansapank (it was renamed Swedbank in 2008) became hubs in the network. Clients are able to access services of government agencies as well as other services provided by private sector with a few mouse clicks while being logged onto the online banking environment. Citizens accessing government agencies are directed to the websites of banks if it was necessary to identify his or her identity. It was rational for government agencies to rely on this solution and cooperation because it was efficient, secure, simple and kept costs minimal. Both Internet-banking based solutions as well as new ID-card avoided the

Table 2. Characteristics of Internet Voting in the Estonian Elections (2005–2014)

Type of elections	E-voters outside of Estonia (% of all e-voters/ number of countries)	Length of e-voting (days)	E-votes as share of all pre-election day votes (%)	Mobile ID users (% of all e-voters)	First time online ID-card users (%)
Municipal 2005	N/A	3	7.2	N/A	61
Parliamentary 2007	2/51	3	17.6	N/A	39
Euro. Parliament 2009	3/66	7	45.4	N/A	19
Municipal 2009	2.8/66	7	44	N/A	18.5
Parliamentary 2011	3.9/105	7	56.4	1.9	N/A
Municipal 2013	4.2/105	7	50.5	8.6	N/A
Euro. Parliament 2014	3.7/98	7	59.2	11.0	N/A

Source: Composed by the author on the basis of data from the Estonian Electoral Commission [11]

necessity to created different identification systems for private and public sector organizations. Most importantly, banks have considerable power to influence behavior through price discrimination, then banks have really been key drivers of the ID-card adoption process.

This context allows understanding the role of ID-card in the elections. Naturally, it follows that one of the main reasons for low participation in online voting in the municipal elections of fall 2005 is simply the fact that the online use of ID card was not widely spread. Many people did not use ID-card for online transactions because they used old identification techniques. As the Table 2 shows, 61 percent of all internet voters were first online ID card users in the 2005 elections. In the 2007 elections the first time online users of ID-card users made up 39 percent. Overall, only 25 000 ID card-owners used their cards online in 2006. In 2009 the number of online users of ID-card had increased ten-fold to about 250 000 [15]. Subsequently, the percentage of first time online ID-card users in the European elections dropped to 19 and in the municipal elections to 18.5.

Similarly, voters were able to use mobile ID instead of ID card in the last two elections. The data shows that in 2011 election only 1.9 percent of internet voters used mobile ID while in 2013 the percentage had increased to 8.6 and in 2014 to 11 percent. The mobile ID does not imply that people can vote on any mobile phone. Rather it is mobile phone based identification method alternative to ID card, which allows to submit votes and conduct transactions in online environments. In sum, the role of ID card and mobile ID demonstrate that internet voting is a typical adoption process as described by Rogers [15], where early adopters proved ID card as well as mobile ID a reliable way to submit votes and conduct transactions online. As a result increasingly higher percentage of voters have started to rely on these methods.

Coming back to costs and benefits, it is obvious that the adoption of ID-card and its reader did represent significant costs in the early voting experiments in 2005 and 2007. However, it does not represent significant costs for the considerable proportion of voters anymore as they have adopted this technology already as consumers. But the cost of ID-card and its reader represent only the surface of the iceberg. Any analysis of costs has to go beyond it and consider entire internet voting process.

2.2. Internet Voting Process

The voting procedure is relatively simple and less complicated than conducting transactions with government in some other online environments such as the business regis-

ter. The voter starts by inserting the ID-card into card reader and opening the webpage for voting (www.valmised.ee). Then the voter verifies his/her identity using the first four-digit personal identification number (PIN1) of ID-card. This number is given to voter when the card is issued together with PIN 2 and PUK code. Both PIN codes are used also for all other online transactions with the ID card that require digital signature. After entering the first PIN number the server checks whether the voter is eligible by using the data from the population register.

Once the eligibility is verified, the voter is shown the candidate list of the appropriate electoral district and can click on her/his choice which is encrypted. This decision has to be confirmed by inserting digital signature in the form of second five-digit PIN code (PIN 2). The submission of the vote concludes the process for individual voter. If the voter changes its mind, then there is a possibility of electronic re-vote: e-voters can cast their votes again electronically and in that case, their previous votes will be deleted. As far as privacy and security are concerned, then at the vote count, the voter's digital signature is removed. The members of the National Electoral Committee can together open the anonymous e-votes and count them.

Certainly, voters may experience difficulties in this otherwise straightforward process. Voters have different levels of sophistication in using internet, they have different computer skill levels, their computers may be configured differently and they may use software that is not always compatible with the ID-card reader. The practice in Estonia has shown that cheaper ID-card readers may be sometimes quite unreliable and not work properly with some browsers (such as Firefox and Google Chrome). Hence, the technology may create additional barrier for voting for some individuals rather than to move the barriers. It creates uncertainty as this way of voting may not always be reliable.

One way of tackling these challenges is to vote early and not to leave it for the last minute. While most people go to polls on Sundays, internet voting is spread over seven days (it used to be three days in 2005 and 2007). Hence, internet voters can cast their vote already six days before the elections. If any technical difficulties occur, there is sufficient time to solve these problems or vote in the traditional way at the ballot box. Table 2 shows that in the first two elections the share of internet votes as a percentage of all pre-election day votes ranged between 7 and 18 percent. At the same time, in the last five elections it ranged between 44 and 59 percent. The 7-day internet voting period has it made easier for voters to submit their votes and half of the voter prefer to do it early rather than on the last day. This is one way for tackling potential uncertainty which technology may sometimes cause. It also reduces the symbolic importance of election day and makes voting as a result more transactional.

Table 2 shows also that the percentage of internet votes is miniscule in comparison with votes submitted in Estonia. In 2013 only 4.2 percent of internet votes were submitted abroad which implies that less than six thousand people voted abroad. At the same time there are tens of thousands Estonians living in Finland, not to mention other countries. Municipal election may be a local affair which does not interest Estonians living abroad but the European Parliament elections and parliamentary elections interest them even less as only 2–4 percent of internet votes have been submitted outside of Estonia. Even though, number of countries from where Estonians submit their voters has increased from 51 in 2007 to 105 in 2013, internet voting is still a domestic matter as 96–98 percent of votes are submitted by residents of Estonia.

This fact alone brings attention back to the importance of context for explaining rationality of internet voting. It seems that this method of voting would serve best the

Estonians outside Estonia and would allow increasing turnout by making voting for them possible. However, the expat community has not been eager to pick up internet voting and it really gathers primarily for domestic audience who could without major difficulties vote also in the traditional voting booth. Particularly so by considering that a considerable amount of internet voters are urban and the distance to voting booths is smaller in urban locations than in the countryside. The votes of residents of two largest cities – Tallinn and Tartu – have amounted to 40–50 percent of all internet votes in the last six elections.

2.3. The Distributional Impact of Internet Voting

The qualities of ID-card reader, computer hardware and software by as well as skill-level in using these technologies are important factors whether internet voting makes voting more easier to citizens or not. The role of resources and knowledge, of course, raise the issue of digital divide[5] and its effects on internet voting in Estonia [10]. The segments of society with a lower income, and insufficient computer skills are less likely to cast their votes online than wealthier and better educated citizens.

One way to measure the impact of digital divide is too look at age structure of internet voters. 18–34 year olds made up 43 percent of all internet voters in 2005 and 44 percent in 2007. After that their share has been dropping and reached 36 percent in 2011. At the same time the share of over 55 year old voters was 15 percent in 2005 but has increased to 21 percent in 2011. The share of internet voters between 35 and 54 has stayed more and less constant in all six elections with slightly more than 40 percent. This does not indicate a significant divide considering that young are always eager to adopt new technologies while older generations tend take a more conservative view. The dynamics show that the older generation is actually following the young in the adoption process.

The data on distributional impact of internet voting on different sexes is showing the same pattern. In 2005, 54 percent of internet voters were male and 46 percent were female. Their roles had been reversed by 2011 as 54 percent of internet voters were female and 46 percent were male.

By attempting to see the impact of internet voting on educational and economic criteria the distribution of votes between cities and rural areas can be used as a proxy. More than half of the votes were submitted in capital city of Tallinn and its surrounding Harju county in 2013, where the GDP per capita is highest in Estonia and people have the best education. However, if one considers that 60 per cent of Estonian GDP is generated in this region, then the distribution of votes does not seem distortive. If the second largest city Tartu and its surrounding county are added to the picture, then over 60 percent of internet votes were submitted in the two largest metropolitan areas. At the same time, voters in quite urbanized and industrialized county Ida-Virumaa in the north-east Estonia counted only four percent of internet votes in 2013. As non-citizen residents can vote in the municipal elections, then this low turnout cannot be explained by ineligibility. Rather, the internet voting has not been adopted among Russian speaking population to the extent it has spread among Estonian speakers.

[5] Digital divide is situation where certain social groups have resources, skills and knowledge for utilization of information and communication technologies while other social groups lack these necessary preconditions for internet use. Digital divide may exit between countries and regions as well as within regions, countries, cities, towns and villages (for instance, see Norris 2001).

Table 3. Distribution of internet votes among political parties in the Estonian Elections (2005–2014)

Type of elections/Party	Reform (% of all e-votes)	IRL (% of all e-votes)	Center	Social democrats	Greens
Municipal 2005	33	18 + 10[6]	9	10	N/A
Parliamentary 2007	35	27	9	13	11
Euro. Parliament 2009[7]	20	17	11	10	3
Municipal 2009	25	23	15	11	2
Parliamentary 2011	37	25	10	18	4
Municipal 2013	22	26	9	15	N/A
Euro. Parliament 2014[8]	32	19	6	15	N/A

Source: Composed by the author on the basis of data from the Estonian Electoral Commission [11]

One way to analyze the distributional impact is to consider the influence of internet voting on political parties. Parties representing less fortunate segments of population are skeptical about the internet voting, while center-right parties were the main champions of the internet voting initiatives. However, Alvarez et al argue that the results of Estonian internet voting have not introduced socio-economic and political bias when controlling for other variables [9]. Nevertheless, their own data about the 2007 elections shows that only 9.1 percent of internet voters voted for the Center Party, which received 26.1 percent of overall votes. The Center Party is a populist, left of center political party, which represents older, more Russian-speaking and economically challenged segments of Estonian population than other main parties. Naturally, it might be that the supporters of this party have lower levels of computer skills and this is the reason for lower share of internet votes. Nevertheless, seeing skills as more important explanatory variable than socio-economic status is just a restatement of the argument.

It is clear that there is an uneven distribution of internet along the party lines (Table 3). For instance, Reform Party received 35 percent of internet votes while its total score was 28 percent of votes in 2007. Similarly, the IRL received 27 percent of internet votes in comparison with 18 percent of total votes. In other words, two main center-right parties received a total of 63 percent of internet votes, while their share of total votes was 46 percent. Both of these parties were actively pushing for the implementation of remote electronic voting and the results show clearly they have benefited more than other main parties. Similar pattern has been persistent also in all other elections between 2005 and 2014.

2.4. Turnout and Internet Voting

The previous discussion showed that the electorate of center-right parties used more internet voting than center-left parties. However, the crucial question is whether these gains came by increasing turnout or simply substituting internet voting for ballot-box. Alvarez et al argue on the basis of data from the 2007 parliamentary elections that online voting mobilized "more casual voters" [9]. They found that 11 per cent of online voters probably would not have or for sure would not have voted without this option. Similarly, Vassil found that 14 percent of internet voters would not have voted in the

[6] The IRL was two separate parties in 2005. Isamaliit (IL) got 18 percent of votes and Res Publica (RP) 10 percent of votes. In the next elections both parties had jooned forces and were running as one party – Isamaa ja Res Publica Liit (IRL).

[7] Independent candidate Indrek Tarand received 32 percent of all internet votes. More than any political party in these elections.

[8] Independent candidate Indrek Tarand received 16 percent of all internet votes.

2007 parliamentary elections by other ways than internet [17]. Both of these studies relied on survey data which is of limited nature and cannot properly estimate substitution effects. In a methodologically more sophisticated approach Bochsler estimated the magnitude of substitution effect and found that the internet voting in 2007 elections did not lead to increased turnout, but attracted the same social groups who usually vote [10].

This outcome is consistent with the conceptual discussion provided in the theoretical framework, which holds that internet voting does not necessarily increase participation in the elections. In democracies, adult citizens can vote but large minorities or even majorities choose not to exercise this right even if the transaction costs are low. Similarly, internet voting may decrease transaction costs but does not necessarily increase participation. In many cases, it may simply serve as a substitute for citizens already actively engaged in political participation.

Nevertheless, the last results of municipal elections were correlated with increased participation. The turnout is unusually high for a municipal election, which seems to suggest that e-voting might have contributed for the increased participation. However, online voters made up almost 15 percent of voters also in the European Parliament elections, where the turnout was close to 44 percent. Of course, there are other factors at play such as economic issues and dissatisfaction with particular municipal governments in explaining the high turnout. Most importantly, the elections results are overdetermined and correlations do not imply causation. The data also suggests that older people and more women are using online voting option, which reveals that this method of voting is becoming more widespread and ordinary voters may simply use it as a substitute for offline options.

3. Conclusion

This descriptive analysis suggests that the internet voting is broadly consistent with the arguments presented by the rational choice school of thought. The internet voting has decreased transaction costs for those who for whatever reasons plan to vote anyway. The rationality can be explained on the basis of the specific context of Estonia rather than on the basis of universal rationality. This limits the lessons to be drawn to other countries from the Estonian experience.

Constantly increasing number of Estonians has used opportunities to vote online in the last six elections. The key element in encouraging the internet voting has been adoption of government issued ID cards by increasingly greater segments of Estonian society. As the ID card can be used in multiple offline and online environment, its widespread use in using both online services provided by public and private sectors has contributed to the internet voting turnout. Internet voting is primarily used by residents of Estonia, not by expats and institutional changes to increase voting period from three to seven days have encouraged adoption of internet voting.

The internet voting has a distributional impact on political parties as the center-right parties have higher share of internet votes than center-left parties. However, there is no strong evidence that internet voting has increased turnout and hence, it cannot be argued that it has reallocated votes among different parties. Even if internet voting may be reducing quality of democracy in Estonia by making voting purely transactional and benefited some groups more than others, it has not decreased the turnout in the elec-

tions. Most importantly, it has made voting more convenient for constantly increasing number of voters.

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