State Electoral Office
of Estonia

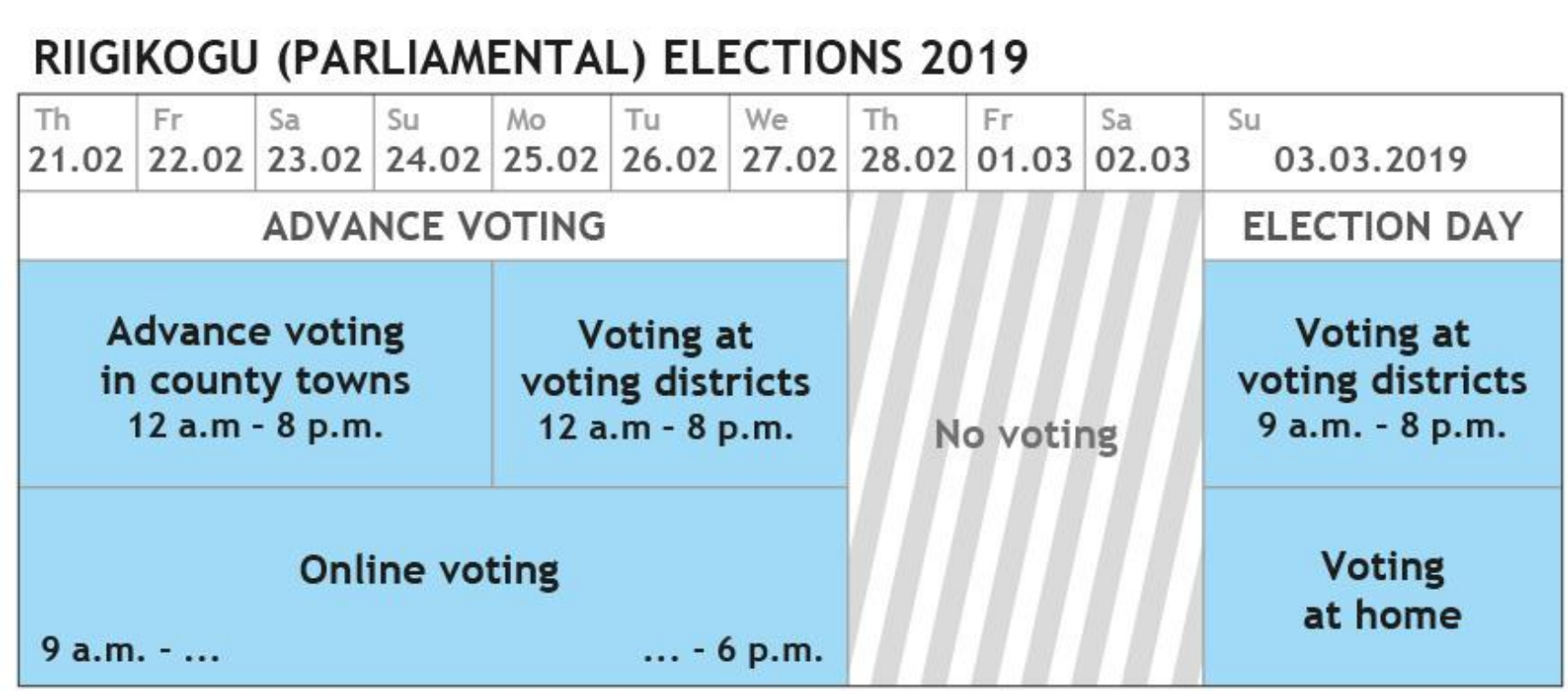
Riigikogu Elections 2019

Estonia also votes with paper ballots

Priit Vinkel, PhD
Head of State Electoral Office

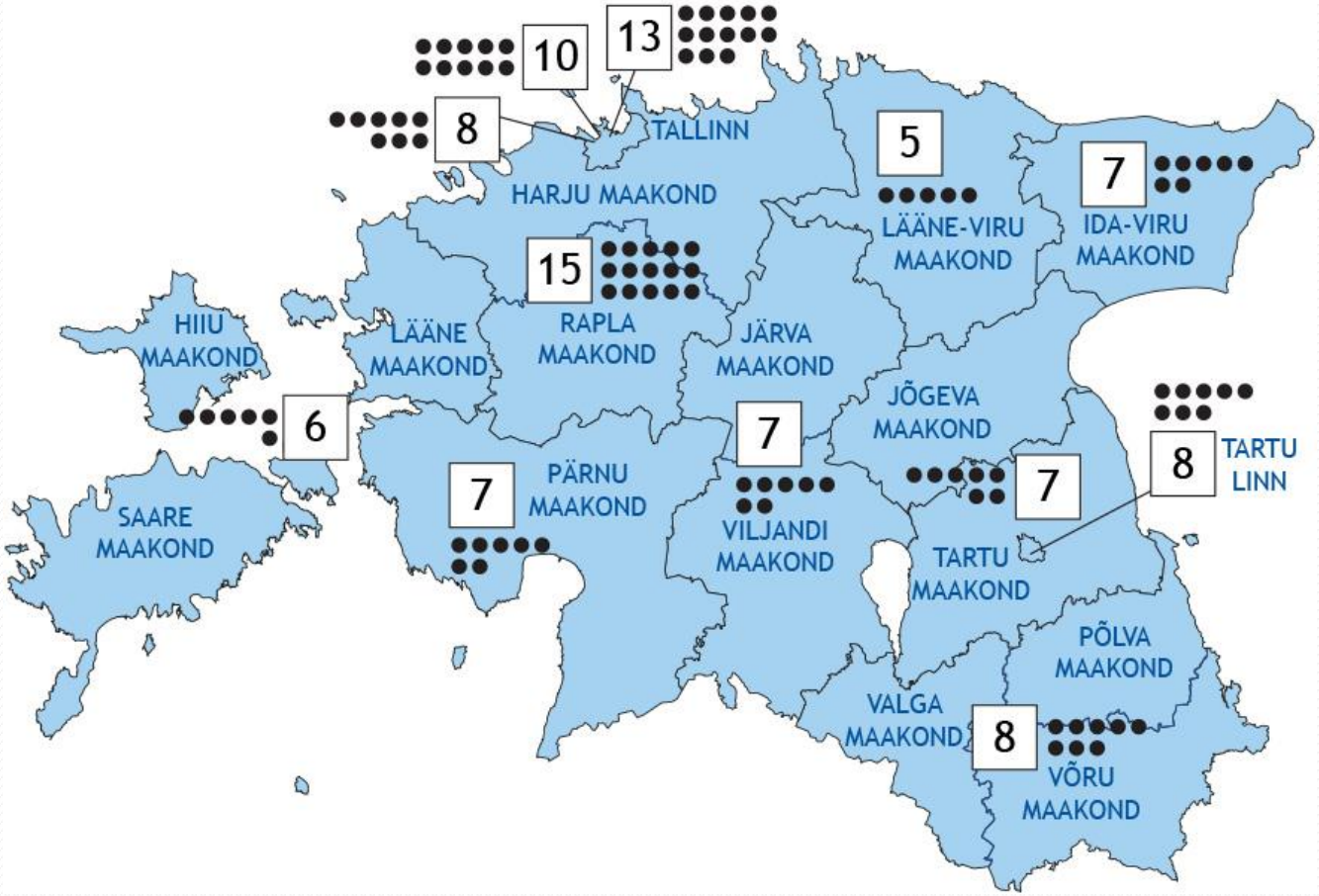
March 2nd 2019

Voting schedule in Estonia



Abroad voting: two days in ~40 locations with ballot + postal voting

Electoral Districts in 2019



State Electoral Office of Estonia

2019 Riigikogu Elections in Numbers

- Candidates 1099
- Party lists 10 (8 full lists with 125 candidates)
- Independent candidates 15
- Voters ~880 000 in Estonia and ~77 000 abroad

State Electoral Office of Estonia

2019 Riigikogu Elections Management in Numbers

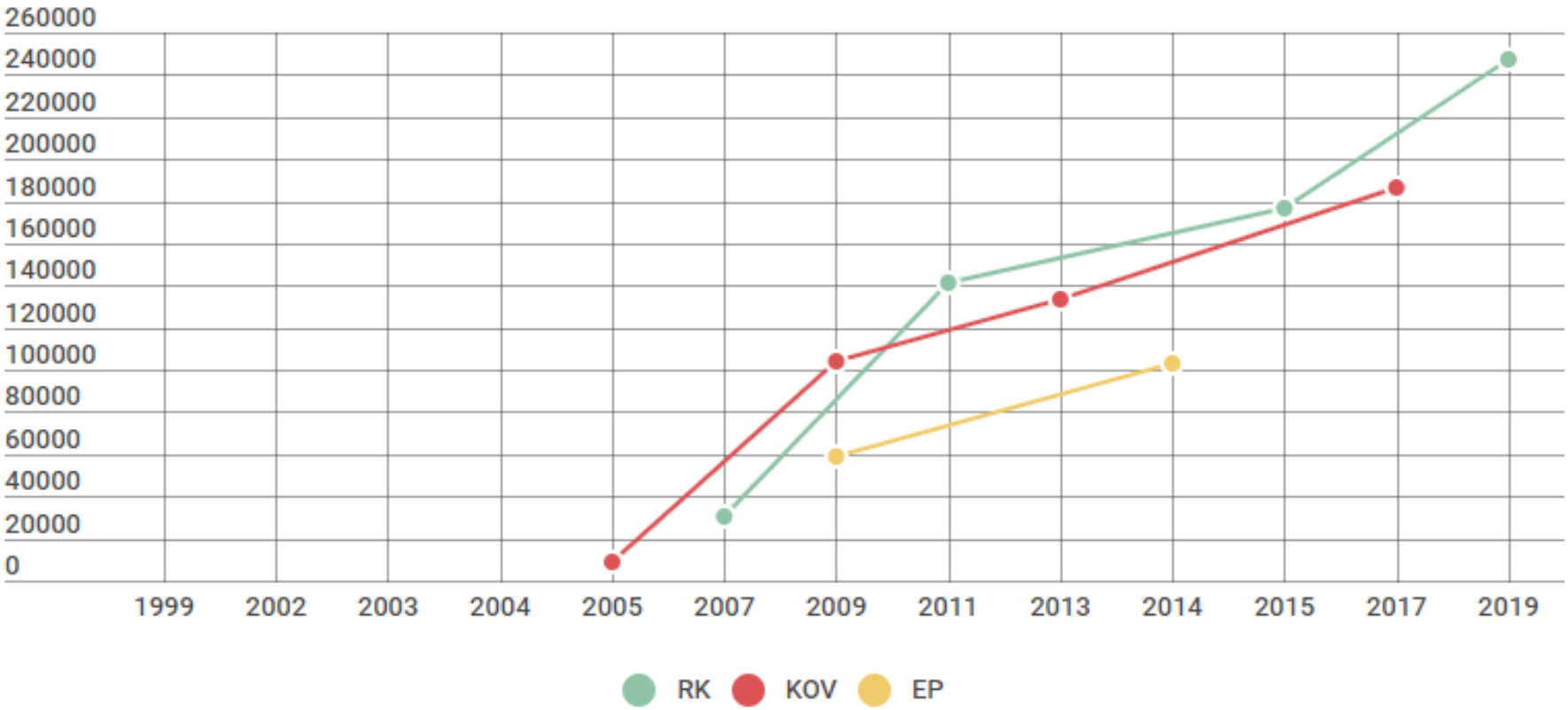
- Polling stations 451
- Local polling station staff 4000 +
- Municipalities/Local election managers 79
- Logistical managers 14 in counties + 16 around Tallinn

Voting Turnout Abroad

- Total number 1726
  - By mail 253
  - In embassies/consulates 1473

- Top 5
  - Finland 778
  - London 135
  - Brussels 130
  - Stockholm 118
  - Toronto 102

247 232 voters



Internet Voting Statistics

- Gender
  - M 45,5 %
  - F 54,5%

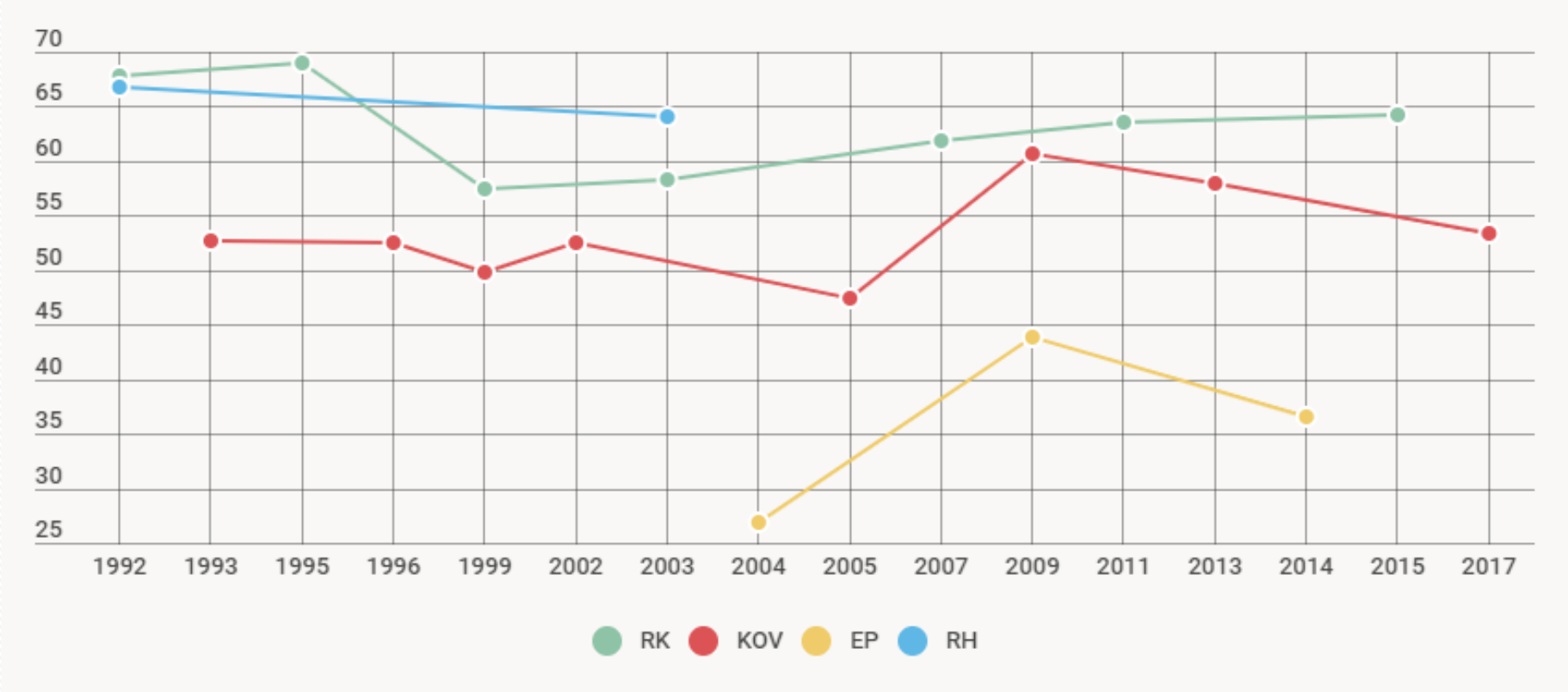
- E-ID
  - ID-card 69,2%
  - Digi-ID 1,6%
  - Mobile-ID 29,2%

- Operational System
  - Linux 0,7%
  - Mac 9,9%
  - Windows 89,4%

- Top 5 countries (besides EST)
  - FIN 4251
  - SWE 1426
  - GBR 974
  - GER 822
  - ESP 696

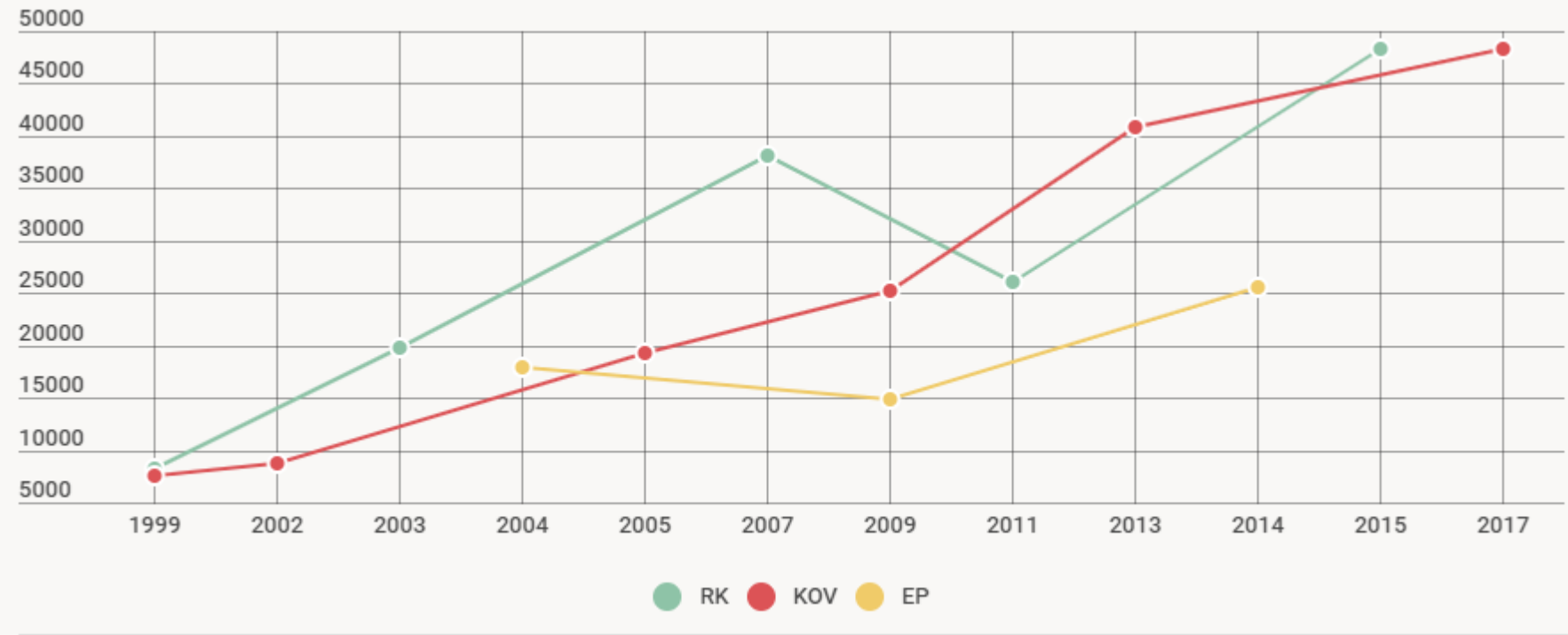
- Total number of countries (6,3% of I-votes)
  - 145 (previous record 116)

General Turnout

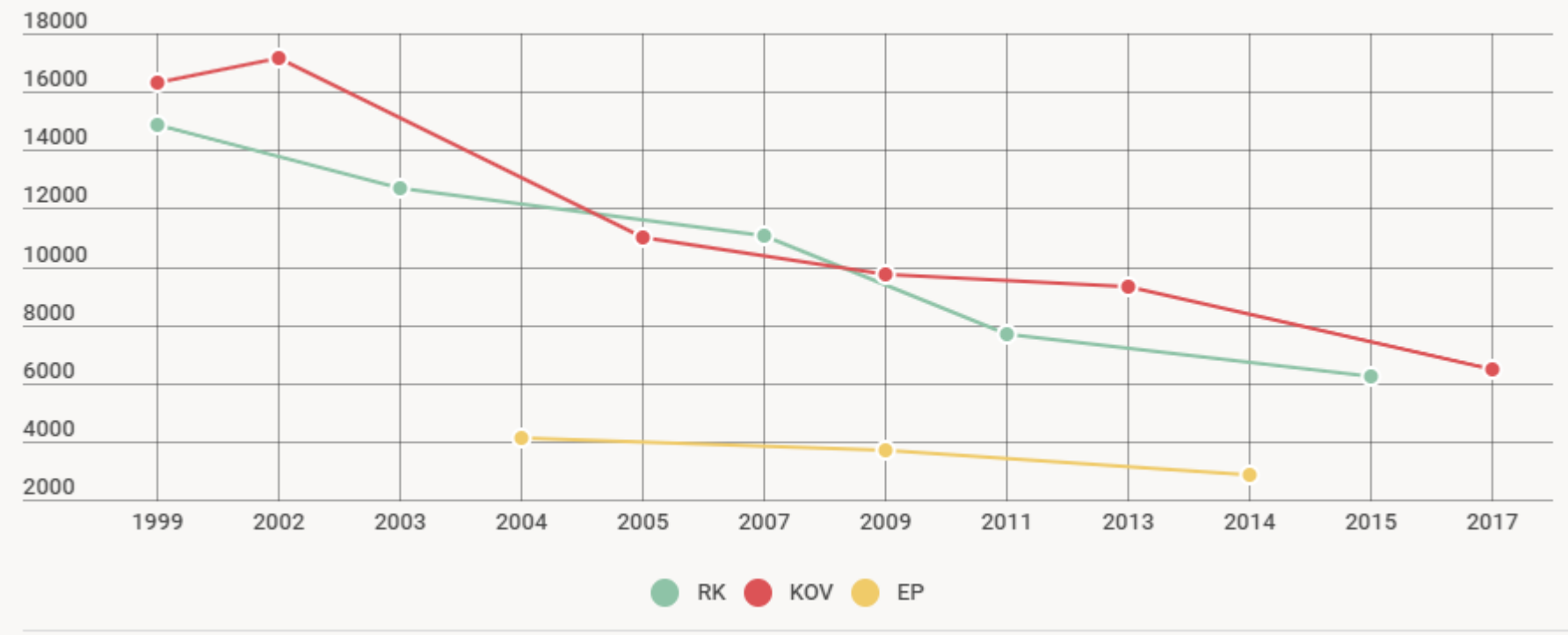


Share of advance votes (I+P) – close to 60%?

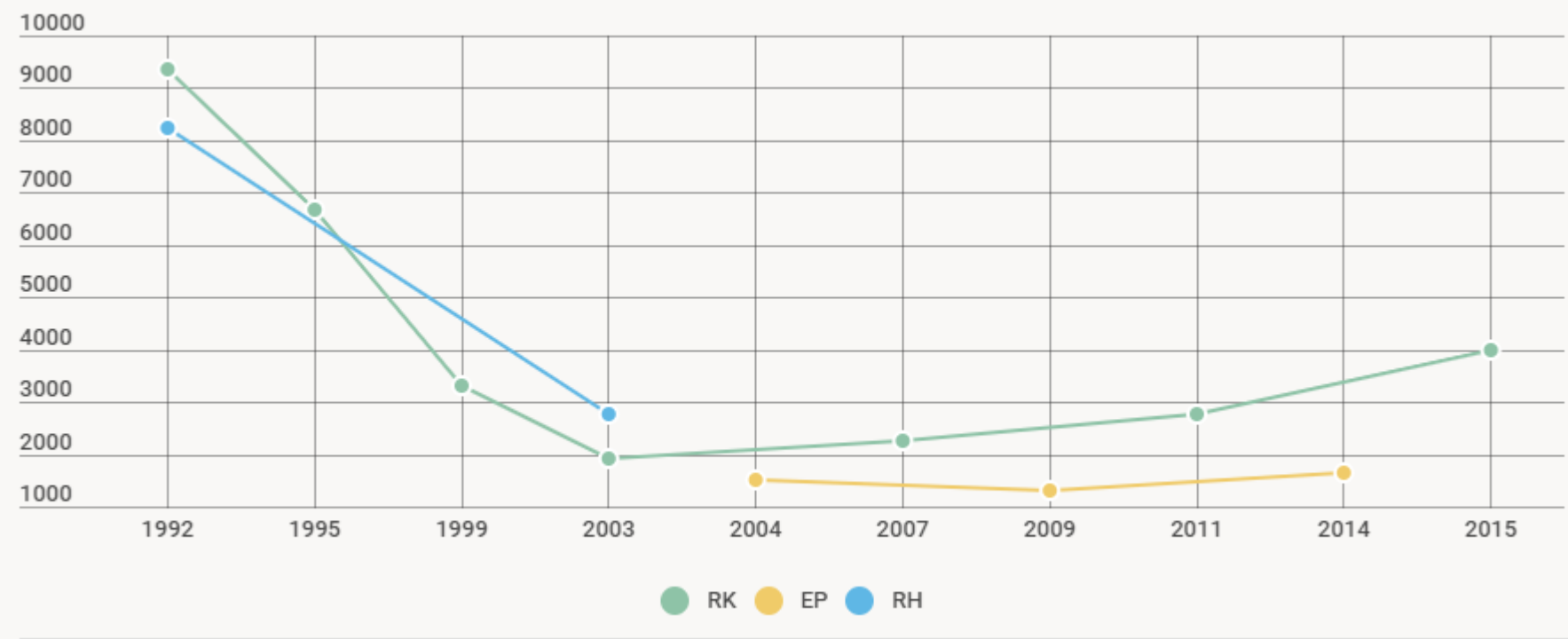
Voting Into Envelopes – 40 062



Voting at home (by paper on Election Day)



Voters permanently abroad (I+P) – 4347+2104



Main current topics

- Two-for-one elections in 2019
- The importance of guaranteeing election integrity (both organizational and public awareness)
- Ongoing importance of cyber security of ICT in elections

Future of Estonian Elections

- Introduction of electronic voters' lists in 2021
- Revamping the electoral infosystem by 2021
- Discussion on I-voting channels (smart devices)
- Internet Voting as a general governmental service

Thank you!

Questions?

Cyber Resilience of Democratic Systems

Liisa Past

McCain Institute, Next Generation Leader

Estonian Parliamentary Elections

March 2019

CYBER SECURITY OF ELECTIONS

- NEVER ready
- NOT possible
- NEVER in isolation
- NOT a technical problem

BUT we need to act now


KEEP CALM!
PANIC ON!
imgflip.com

CONSTITUTIONAL ISSUE

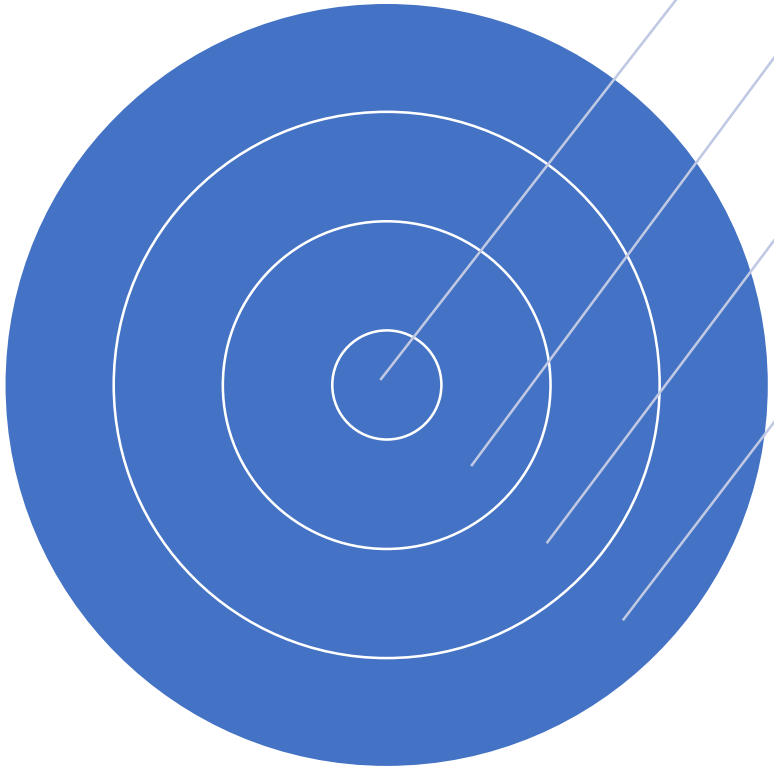
- Free, fair, open elections based on secret ballot

“Elections are general, uniform and direct. Voting is secret.”

Constitution of the Republic of Estonia, § 60

ECOSYSTEM APPROACH

COMPREHENSIVE RISK MANAGEMENT



Voting

Election technology

Auxiliary systems, facilitators and vendors

Integrated information operations

Compendium on Cyber Security of Election Technology

CG Publication 03/2018

NIS Cooperation Group

July 2018

Phase(s)	Assets	Examples of Threats
Setup	Party/candidate registration	• tampering with registrations; • DoS or overload of party/campaign registration, causing them to miss the deadline; • fabricated signatures from sponsor.
Setup	Electoral rolls	• identity fraud during voter registration; • Deleting or tampering with voter data ; • DoS or overload of voter registration system, suppressing voters.
Campaign	Campaign IT	• hacking candidate laptops or email accounts; • hacking campaign websites (defacement, DoS); • misconfiguration of a website; • leak of confidential information.
All phases	Government IT	• hacking/misconfiguration of government servers, communication networks, or endpoints; • hacking government websites, spreading misinformation on the election process, registered parties/candidates, or results; • DoS or overload of government websites.
Voting	Election technology	• tampering or DoS of voting and/or vote confidentiality during or after the elections; • software bug altering election results; • tampering with logs/journals; • breach of voter privacy during the casting of votes; • tampering, DoS, or overload of the systems used for counting or aggregating results; • tampering or DoS of communication links used to transfer (interim) results; • tampering with supply chain involved in the movement or transfer of data. .
Campaign, public	Media/press	• hacking of internal systems used by media or press; • tampering, DoS, or overload of media communication links;

INEVITABLY: ADVERSARY

- Seeks to undermine democracy
- Reactive and opportunistic
- Well resourced
- Patient
- All and any tools and targets

WAY FORWARD

- Risk management
- International cooperation
  - Operational information exchange and exercises
- Cross-agency cooperation
- Last mile in the EU context

NEW METHODOLOGY CALCULATING COST-EFFICIENCY OF VOTING CHANNELS: IS INTERNET VOTING CHEAPER IN ESTONIAN MUNICIPAL ELECTIONS?

ROBERT KRIMMER, DAVID DUENAS-CID & IULIIA KRIVONOSOVA

RAGNAR NURKSE DEPARTMENT OF INNOVATION AND GOVERNANCE, DIGIGOVLAB

www.digigovlab.ee

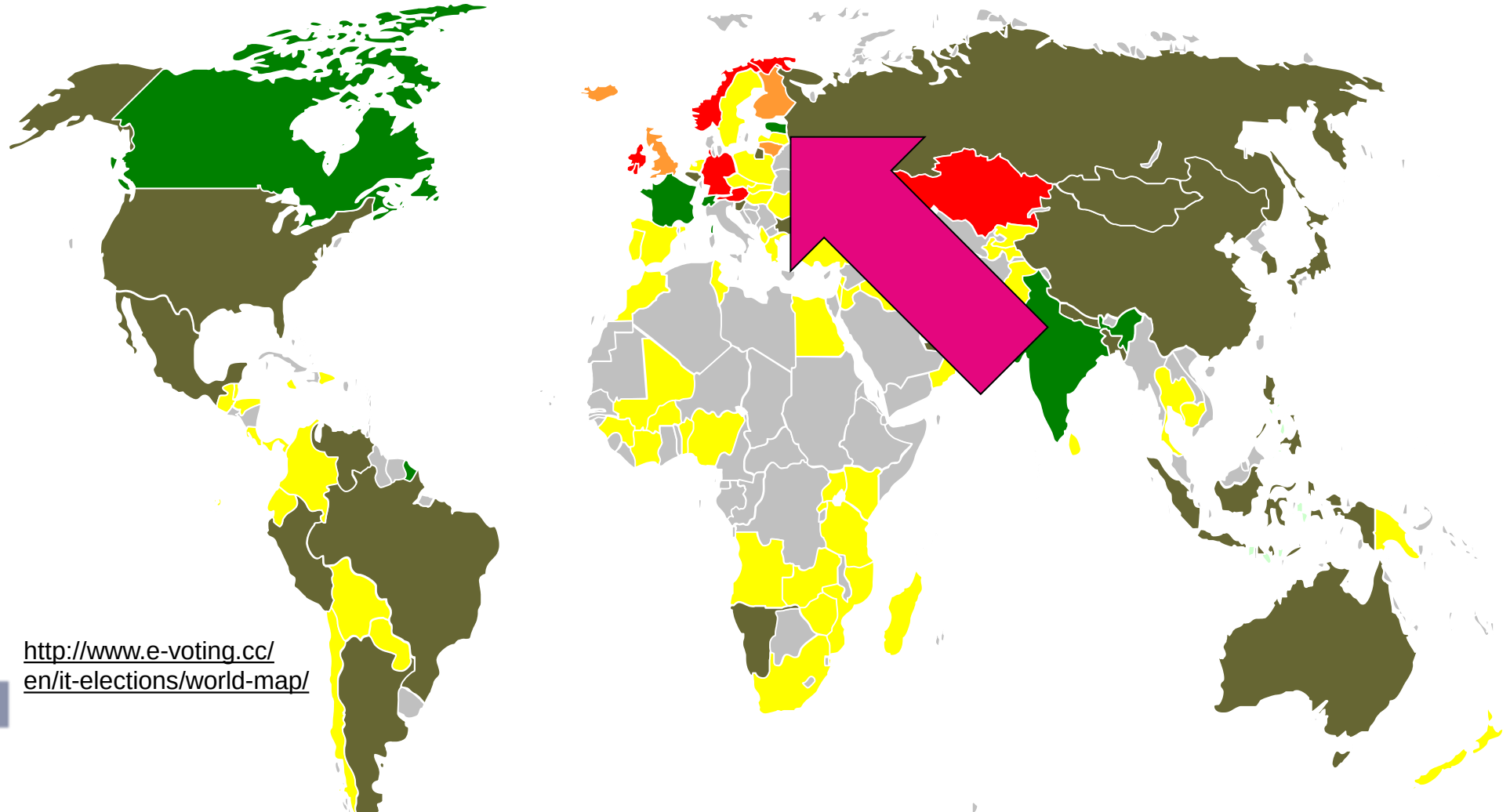
TAL TECH

DIGIGOVLAB

- Interdisciplinary Competency Center for Digital Government Research
- Internationally competitive, domestically relevant, leading center for user and practice driven research on digital government
- Develop and coordinate a collaborative and cooperative ecosystem for digital government research among Estonian universities
- Open for collaboration internationally

TAL TECH

Worldmap of E-Voting



http://www.e-voting.cc/en/it-elections/world-map/

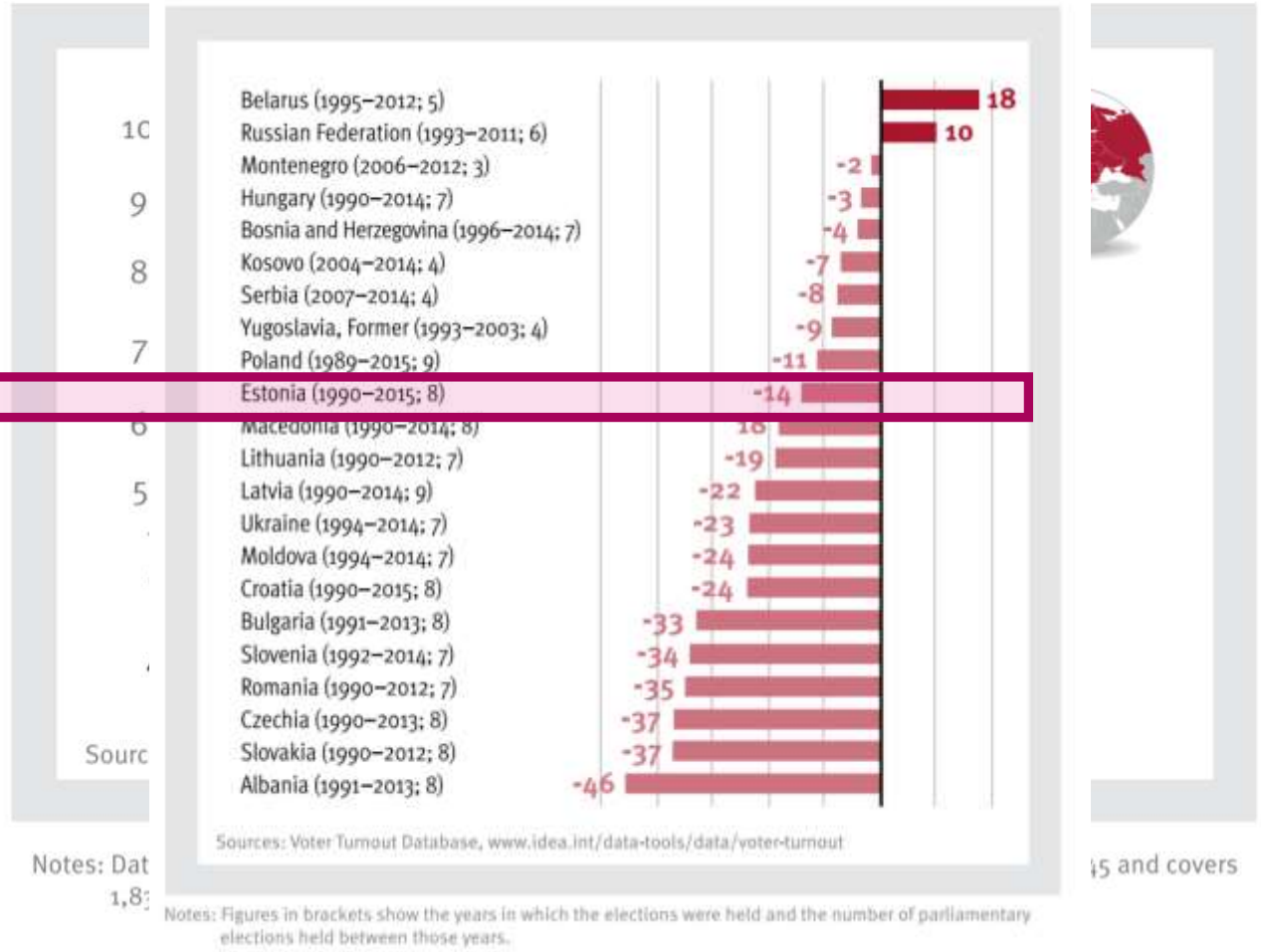
TAL TECH

WHY THIS RESEARCH?

Reason 1: Alternative Voting Systems to confront turnout decline

General tendency of declining turnouts around the globe

Yes, also in Estonia

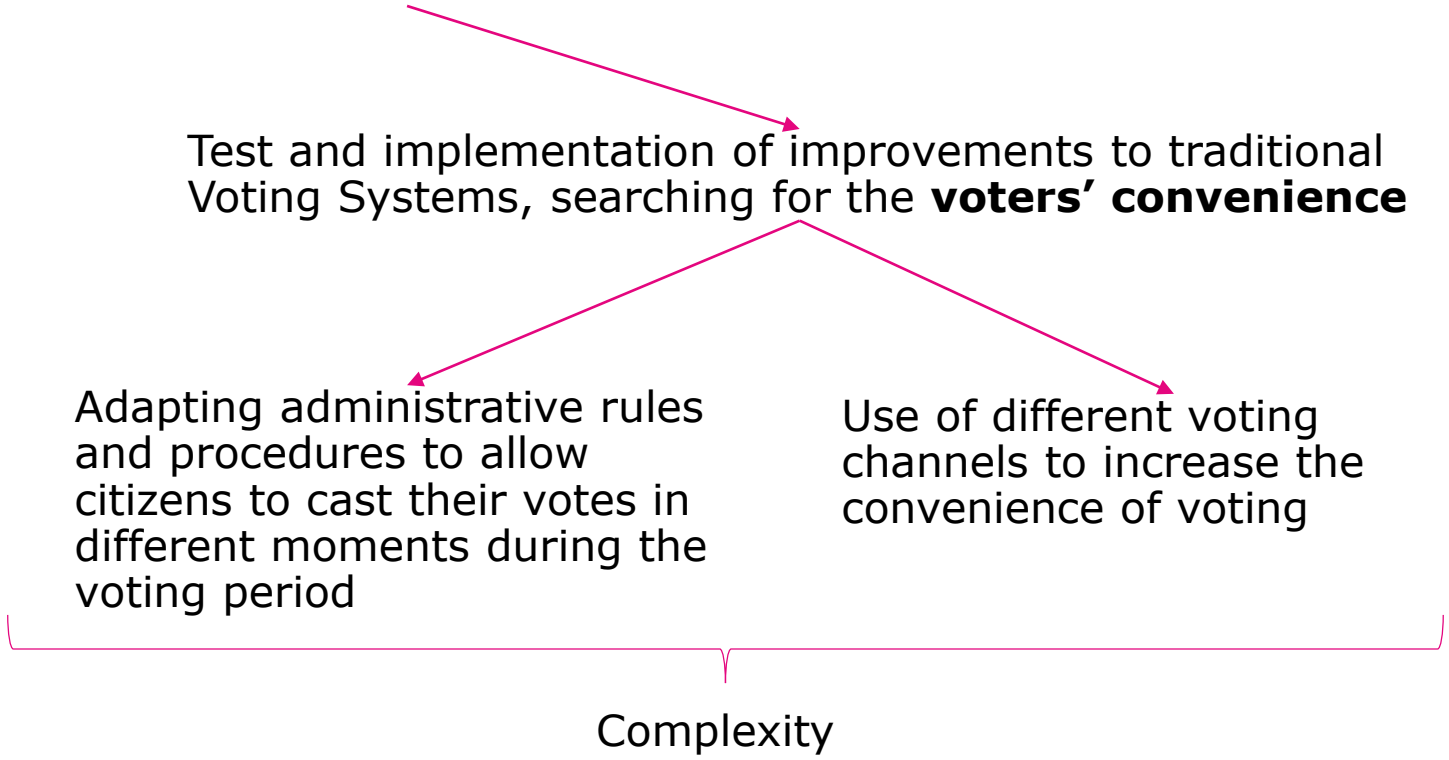


Solijonov, A. (2016). Voter Turnout Trends around the World. *International IDEA*. https://doi.org/10.1189/jlb.1212633\r jlb.1212633

WHY THIS RESEARCH?

Reason 1: Alternative Voting Systems to confront turnout decline

General tendency of declining turnouts around the globe



TAL TECH

WHY THIS RESEARCH?

Reason 2: Unsolved question in Estonia + Academia

Questions raised by Wolfgang Drechsler:

1) Are the effects of e-voting really beneficial for Democracy?
2) Will e-voting increase voter turnout?
3) **How high are the costs really?**

Drechsler, W. (2004). The Estonian e-Voting Laws Discourse: Paradigmatic Benchmarking for Central and Eastern Europe. *NISPAcee Occasional Papers,* V (2): 11-17

TAL TECH

WHY THIS RESEARCH?

Reason 2: Unsolved question in Estonia + Academia

<u>How high are the costs really?</u>

Amongst those who tried: No proper method of calculation of costs provided successful results.

1) Lack of capacity to calculate hidden costs (administrative costs) using budgets
2) Lack of (need/will) to respond to questionnaires / budget information requirements
3) Lack of capacity to allocate costs of using public infrastructures

TAL TECH

METHODOLOGY PROPOSED

We propose a combined use of:

Business Process Reengineering (BPR),

Business strategy directed towards rethinking the way an organization functions by analyzing its internal workflows and business process

Activity-Based Costing (ABC),

method that identifies and assigns costs to activities and then assigns those costs to products (votes in our case).

in particular, the use of Time-Driven ABC (TD-ABC)

ABC model in which Time is considered to be the main cost driver.

TAL TECH

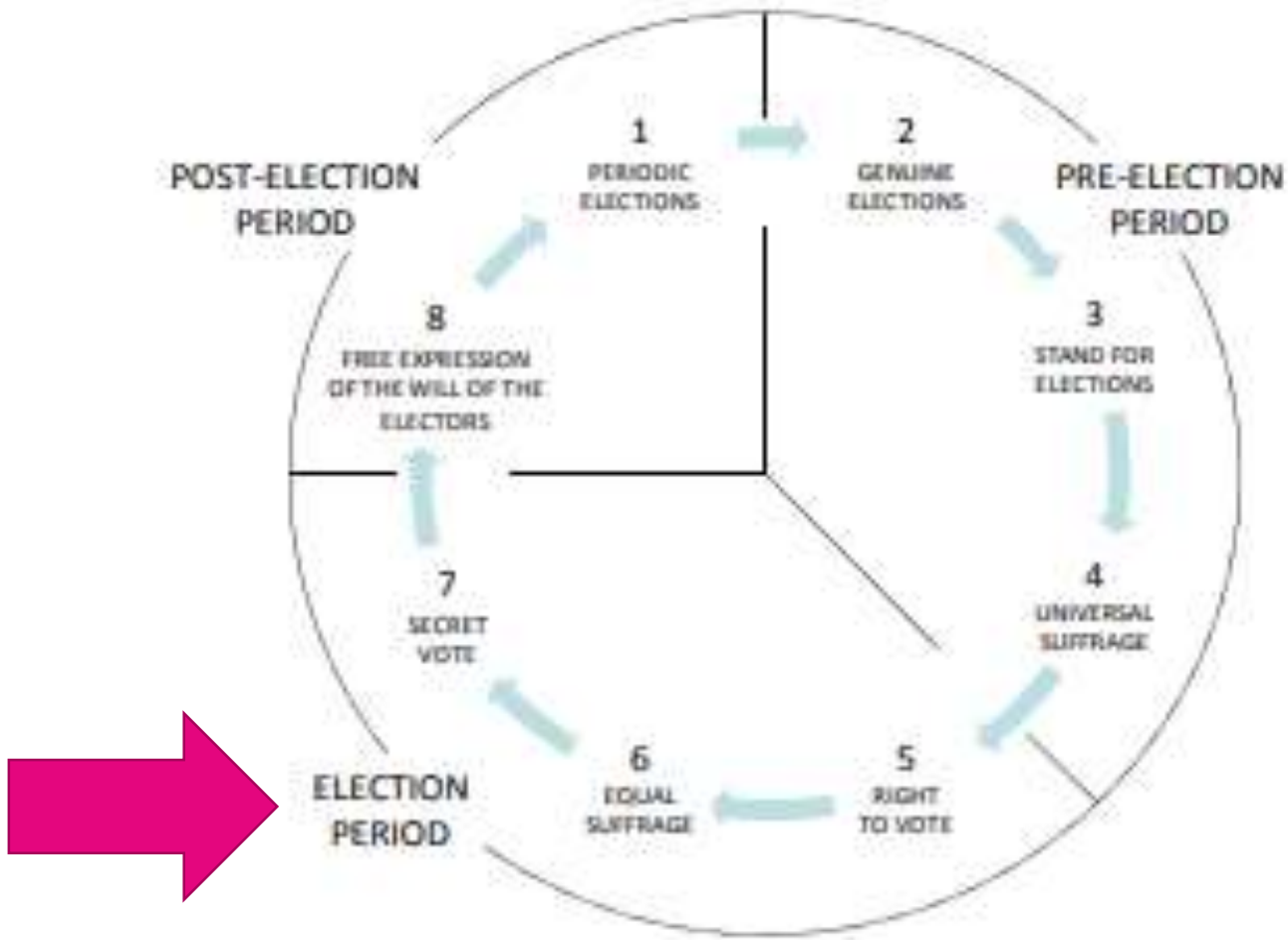
5 STEPS

1. Narrowing the Electoral Cycle
2. Process Mapping, Business Process Modelling and Data Collection
3. Lists of Activities and Identifying Resource Pools
4. Attributing Costs
5. Transferring Costs

TAL TECH

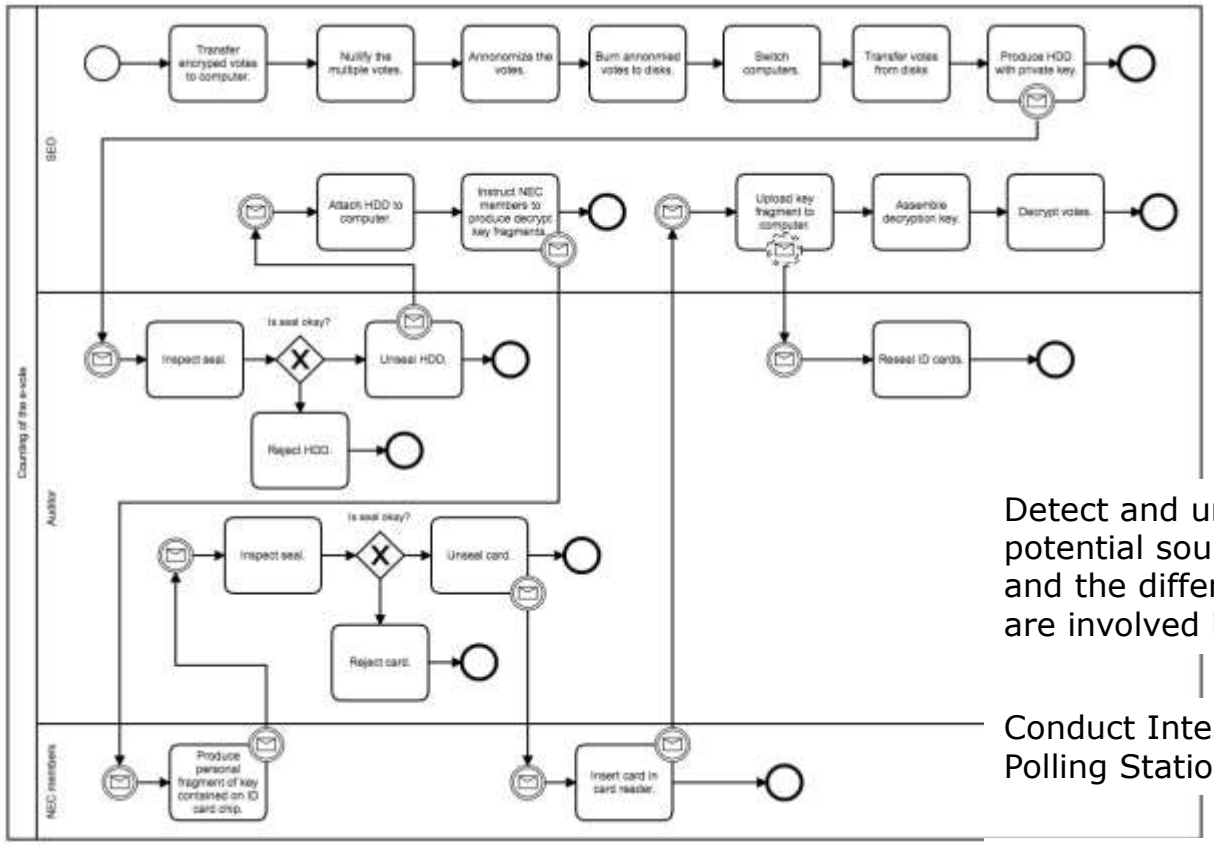
5 STEPS

Narrowing the Electoral Cycle
Process Mapping, Business Process Modelling and Data Collection
Lists of Activities and Identifying Resource Pools
Attributing Costs
Transferring Costs



5 STEPS

Narrowing the Electoral Cycle
Process Mapping, Business Process Modelling and Data Collection
Lists of Activities and Identifying Resource Pools
Attributing Costs
Transferring Costs



Detect and understand the potential sources of expense and the different activities that are involved in every process.

Conduct Interviews: EMBs, Polling Station Staff

On-site Observations

TAL TECH

5 STEPS

Narrowing the Electoral Cycle
Process Mapping, Business Process Modelling and Data Collection
Lists of Activities and Identifying Resource Pools
Attributing Costs
Transferring Costs

Create separate lists of activities for each voting channel

List resource pools: labor, depreciation, transportation, rentals, printing, stationery

Transportation cost pool for County Centers					
Process N°	Activity	Description	Price per km	Distance in km	Cost (Price per km * Distance in km
1	Delivery of equipment	by 2017 standard 0,15€ per km	0,15	24.276,4	3.641,46
4	Voter identification at voters' location (home voting)		0,15	16.470	2.470,5
6	Ballots' transportation for recounting		0,15	16.470	2.470,5
	Subtotal				8.582,46

TAL TECH

5 STEPS

Narrowing the Electoral Cycle
Process Mapping, Business Process Modelling and Data Collection
Lists of Activities and Identifying Resource Pools
Attributing Costs
Transferring Costs

Allocate costs from precise data or budgets

In cases where direct attribution is not possible, "time" is the cost driver: multiplying the time of a certain activity by the cost per minute

Labour Costs per County Centers					
Activity	Description	Activity	Total time in min per activity per all VDCs	Wage in euro per minute, Incl. taxes	Labour cost for employee for all VDCs
Delivery of equipment	One member per VDC to deliver equipment	Once per election; early, advance and election day voting	7.806	0,16	1.256,88
Stamping ballots before voting	One person per VDC to stamp ballots	Once per election; early, advance and election day voting	1.618	0,16	260,44
Setting the voting place (Installing voting booths, ballot boxes)	One person per VDC comes one day before the voting to set the voting place	Once per election; early, advance and election day voting	3.360	0,16	540,98

TAL TECH

5 STEPS

Narrowing the Electoral Cycle
Process Mapping, Business Process Modelling and Data Collection
Lists of Activities and Identifying Resource Pools
Attributing Costs
Transferring Costs

Calculation of Time required for "Producing" a Ballot (add time spent on every activity and divide it by number of ballots casted)

Calculation of Cost per Activity per Ballot (time spend on every activity multiplied by the cost per minute)

Calculation of Final Range of Costs (add every cost of every activity involved in a ballot)

Range: 80% level of confidence for Price Estimates and time estimates

Cost per ballot calculation			
	Early Voting	Advance Voting	Election Day Voting
Delivery of equipment	0,45	0,45	0,46
Stamping ballots before voting	0,26	0,26	0,28
Setting the voting place (installing voting booths, ballot boxes)	0,26	0,26	0,28
Voter identification Chairperson	0,78	0,78	0,79
Voter identification VDC members	0,26	0,26	0,28
Processing of advance votes from outside	0,36	0,36	0,29
Counting of ballots	0,26	0,26	0,28
Ballots' transportation for recounting	0,45	0,45	0,46
Recounting	0,26	0,28	0,28

FINDINGS

Calculation of cost-efficiency

Cost Range per Ballot (in €) for the Analysed Period		
	Min.	Max.
Advance Voting in County Centers	5,48	5,92
Advance Voting in Ordinary Polling Stations	16,24	17,36
Early Voting in County Centers	5,83	6,30
Election Day Voting in County Centers	4,97	5,58
Election day Voting in Ordinary Polling Stations	2,83	3,01
Internet Voting	2,17	2,26

TAL TECH

FINDINGS

Methodological considerations

TDABC allows to build a process of data collection ending in the comparison of cost-effectiveness of different voting channels

TDABC allows to unveil the most resource demanding activities that trigger cost expenditures.

The use of BPMNs allows the analysis of electoral processes and to consider its further redesign.

Direct observation helps to overcome some methodological challenges that previous researches faced: limited access to data, lack of coherent expenditure tracking

TAL TECH

THANK YOU FOR YOUR ATTENTION

robert.krimmer@taltech.ee, david.duenas@taltech.ee, iuliia.krivonosova@taltech.ee

I-voting reliability from voters' perspective

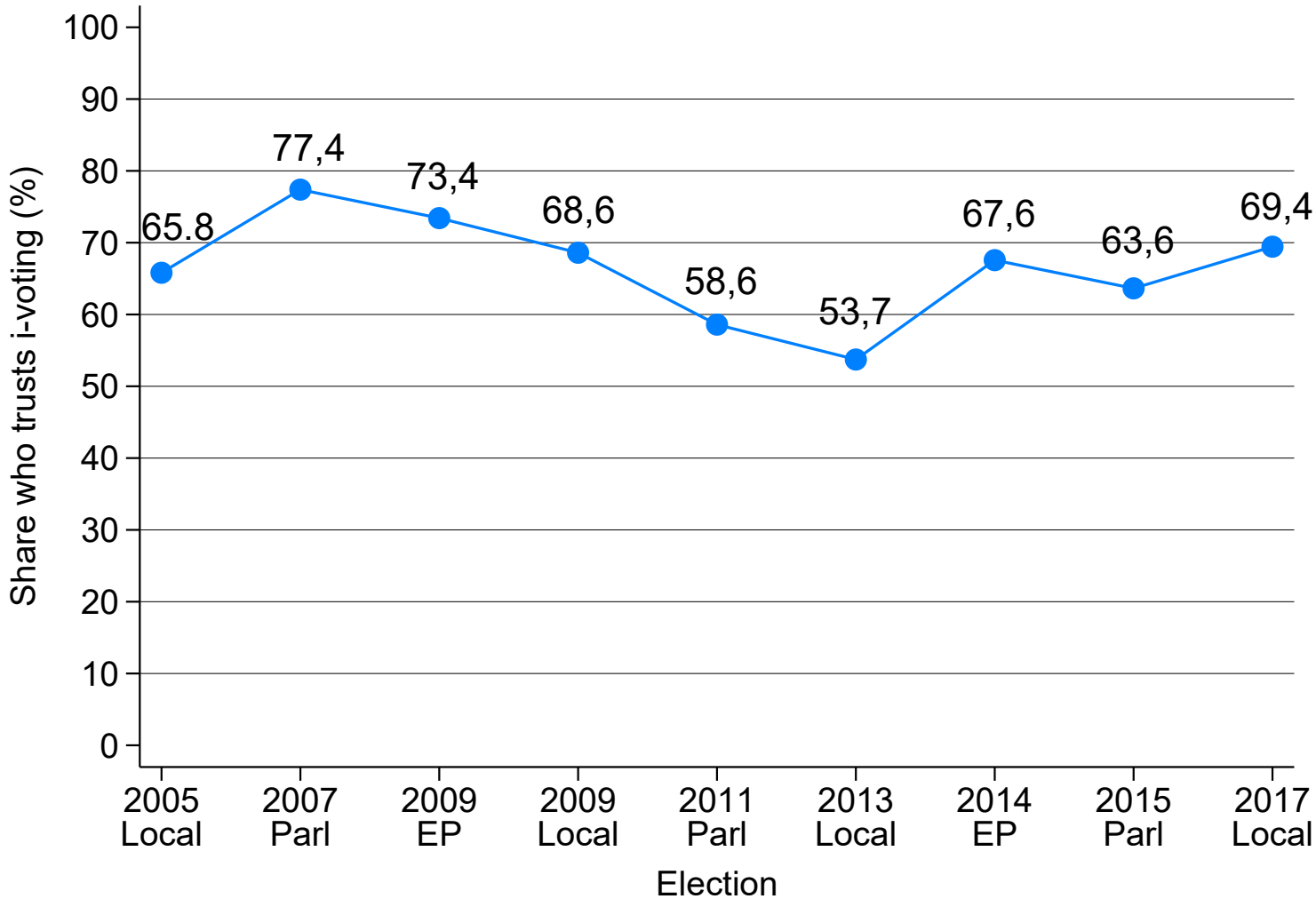
Johan Skytte Institute of Political Studies

March 2, 2019

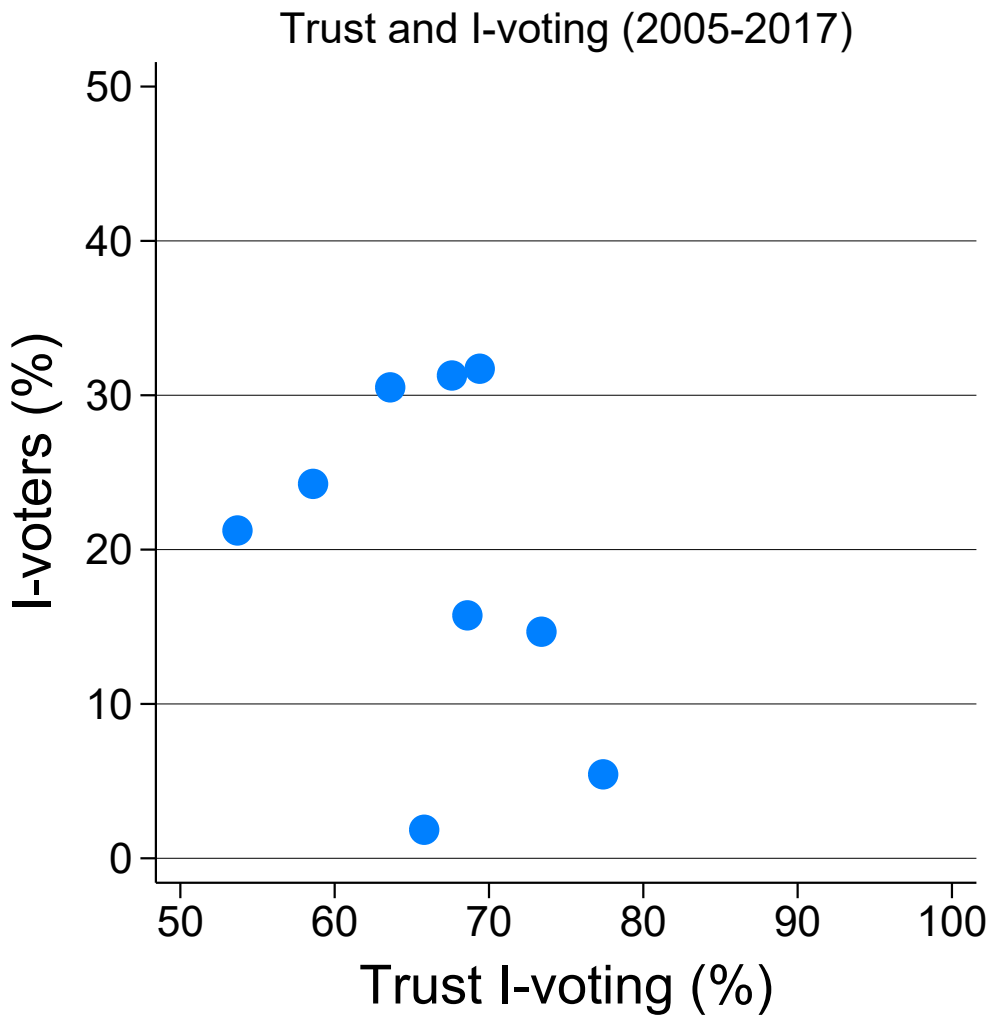
CITIS
Center of IT Impact Studies

UNIVERSITY OF TARTU

Trust level over time

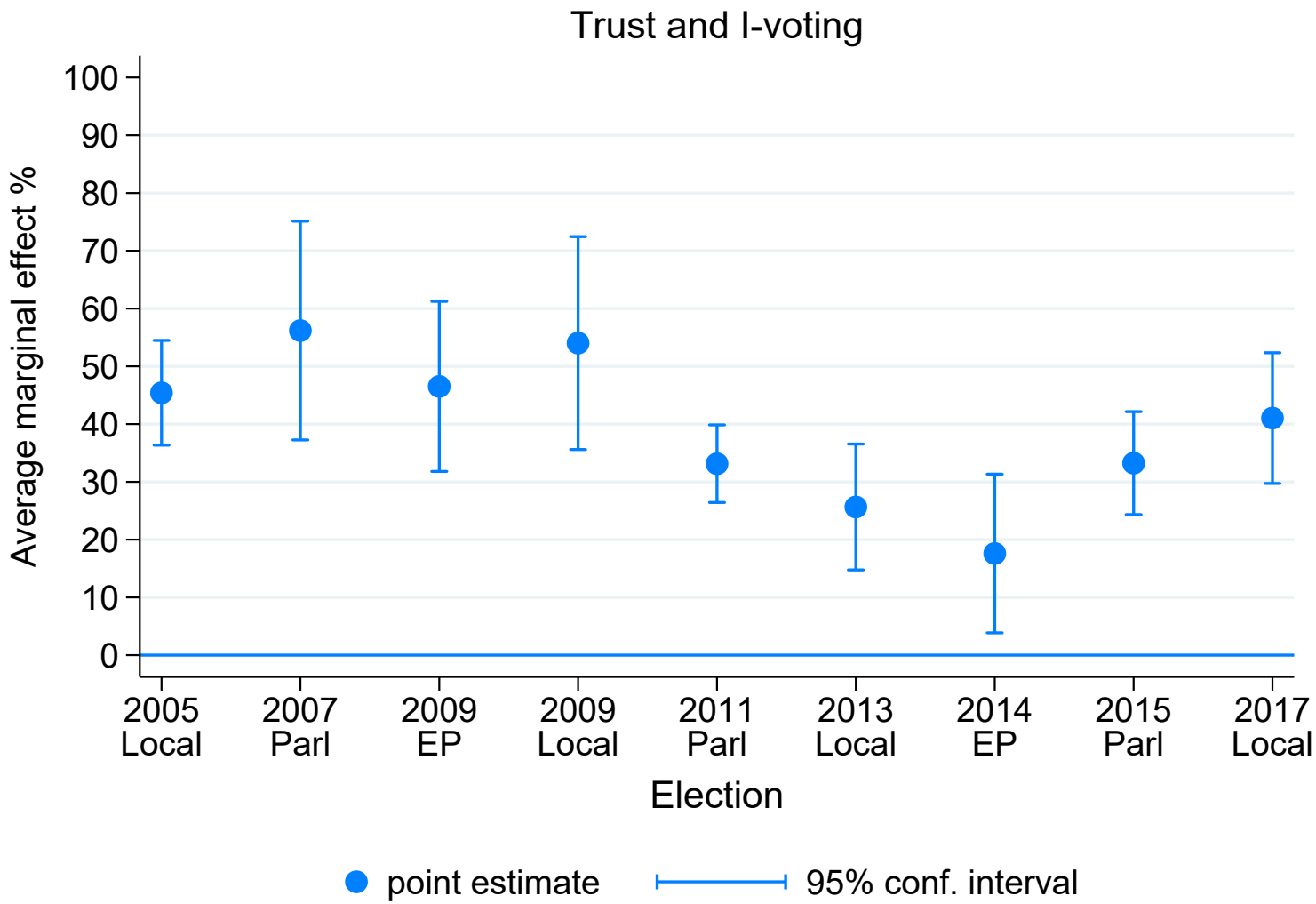


No apparent association with usage on aggregate



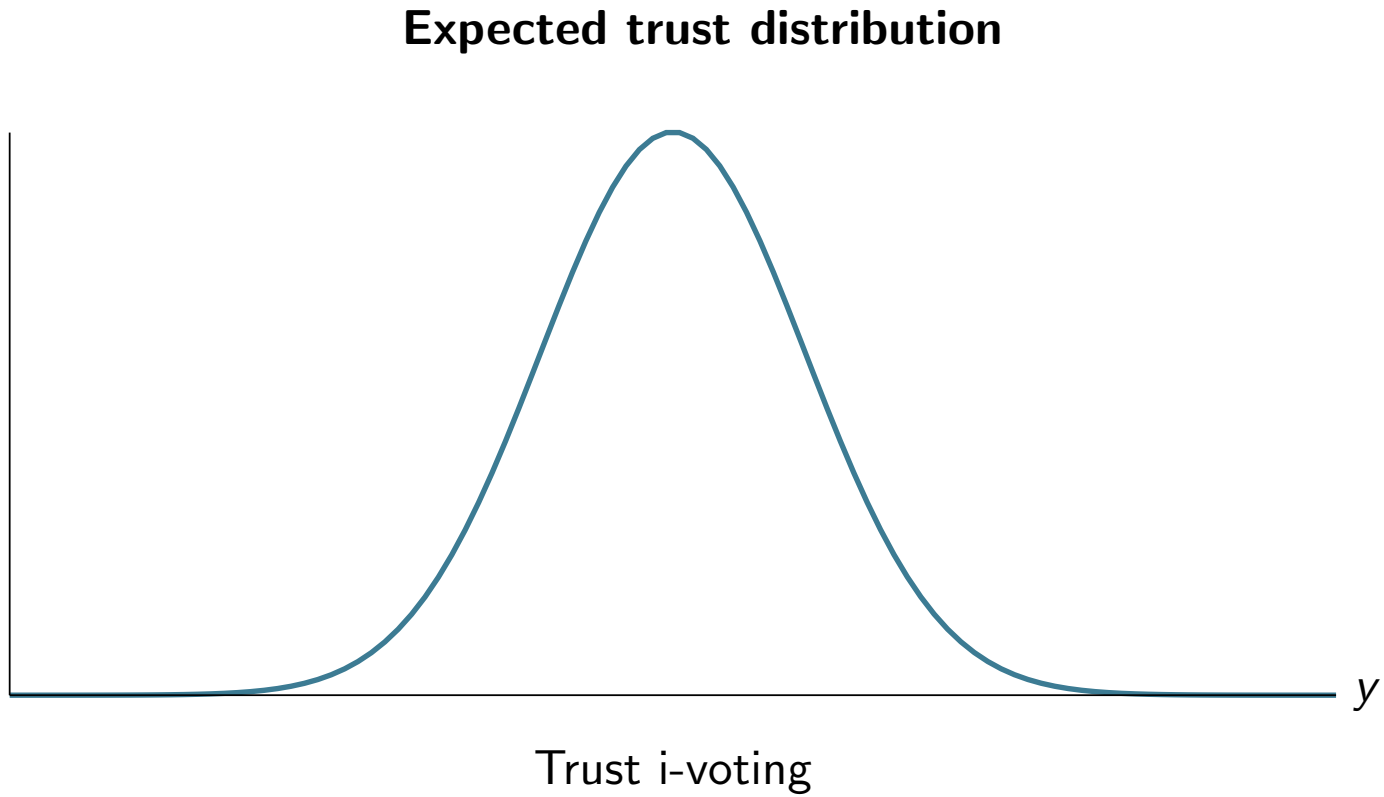
Strong association at the individual level

- Explains i-voting probability very well $Pr(y = 1|x) = F(x\beta)$



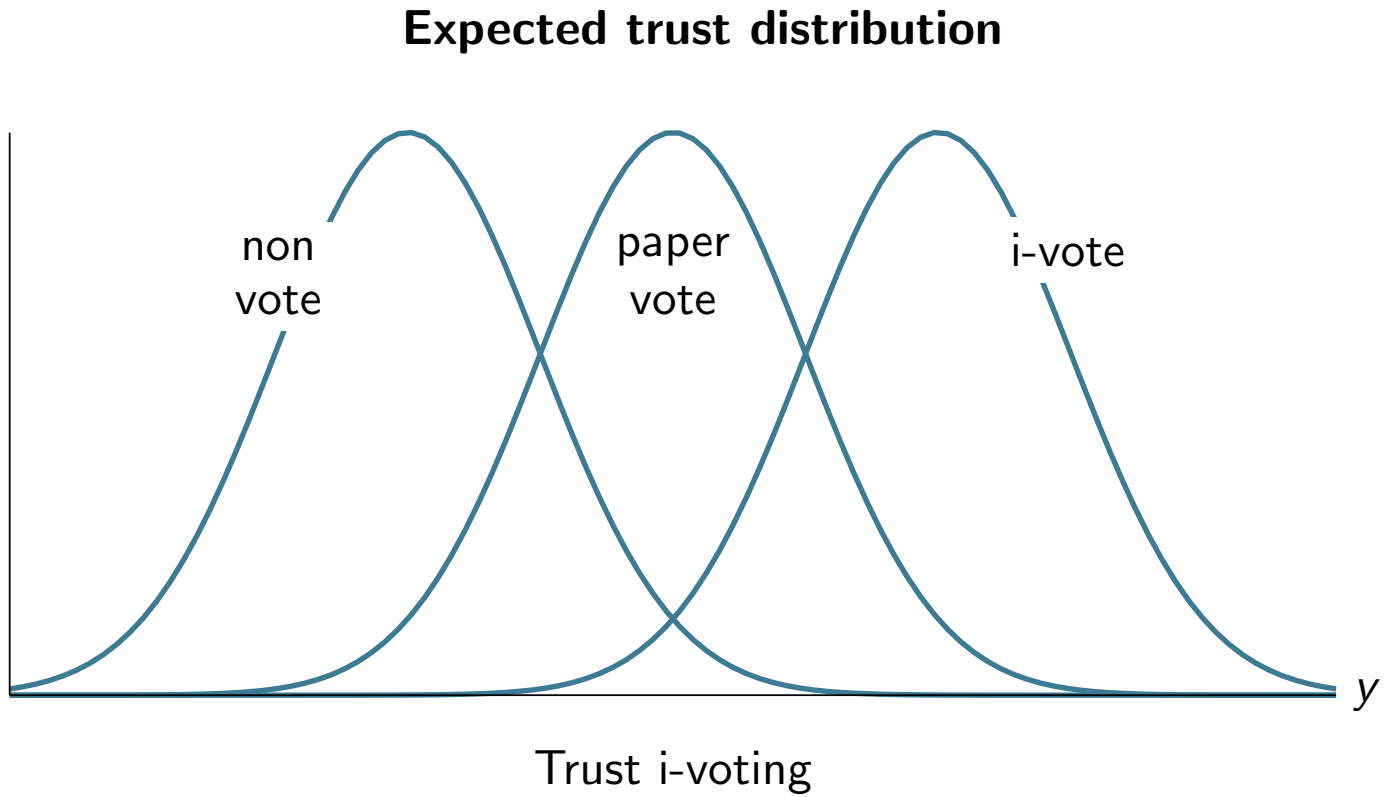
Trust structure

- What trust distributions usually look like



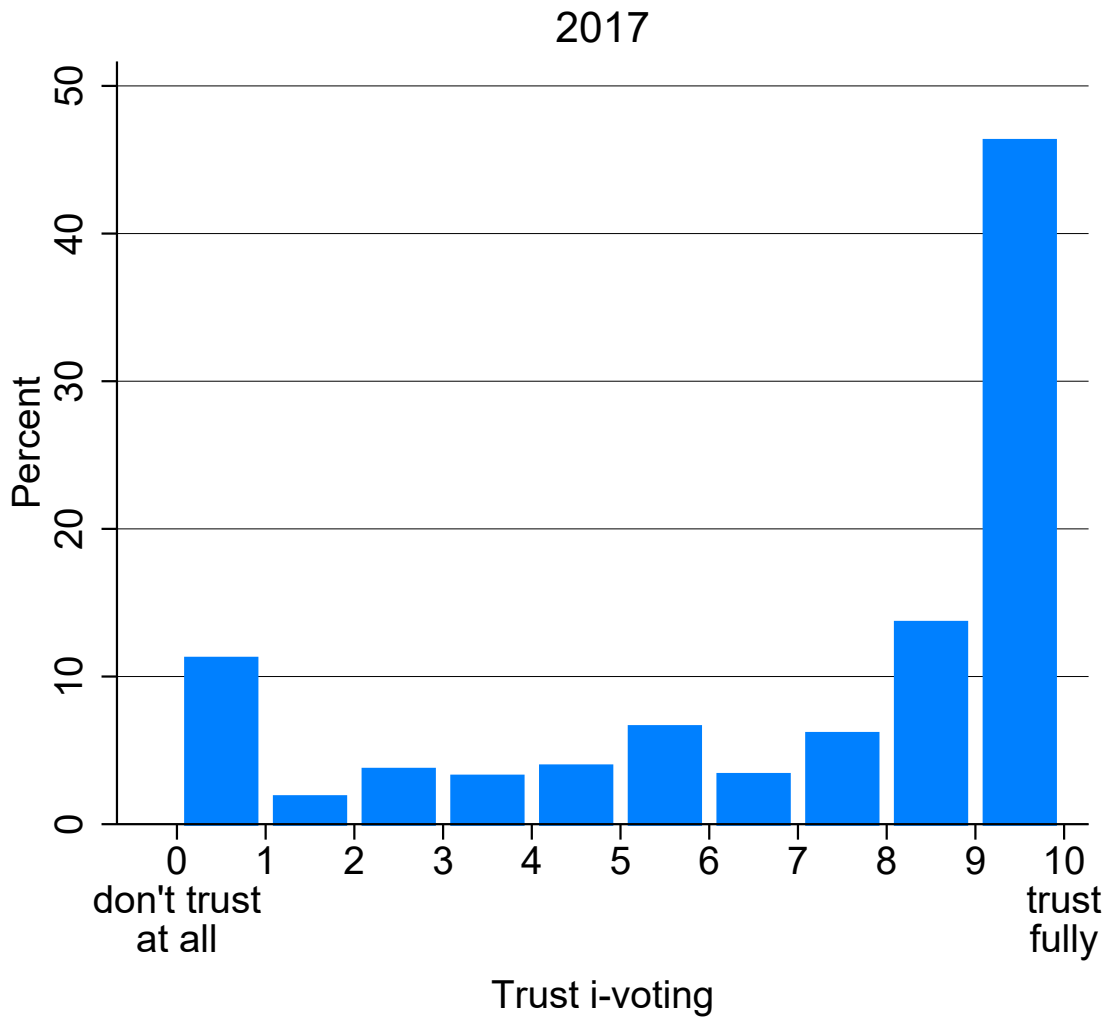
Trust structure

- How trust should drive i-voting:



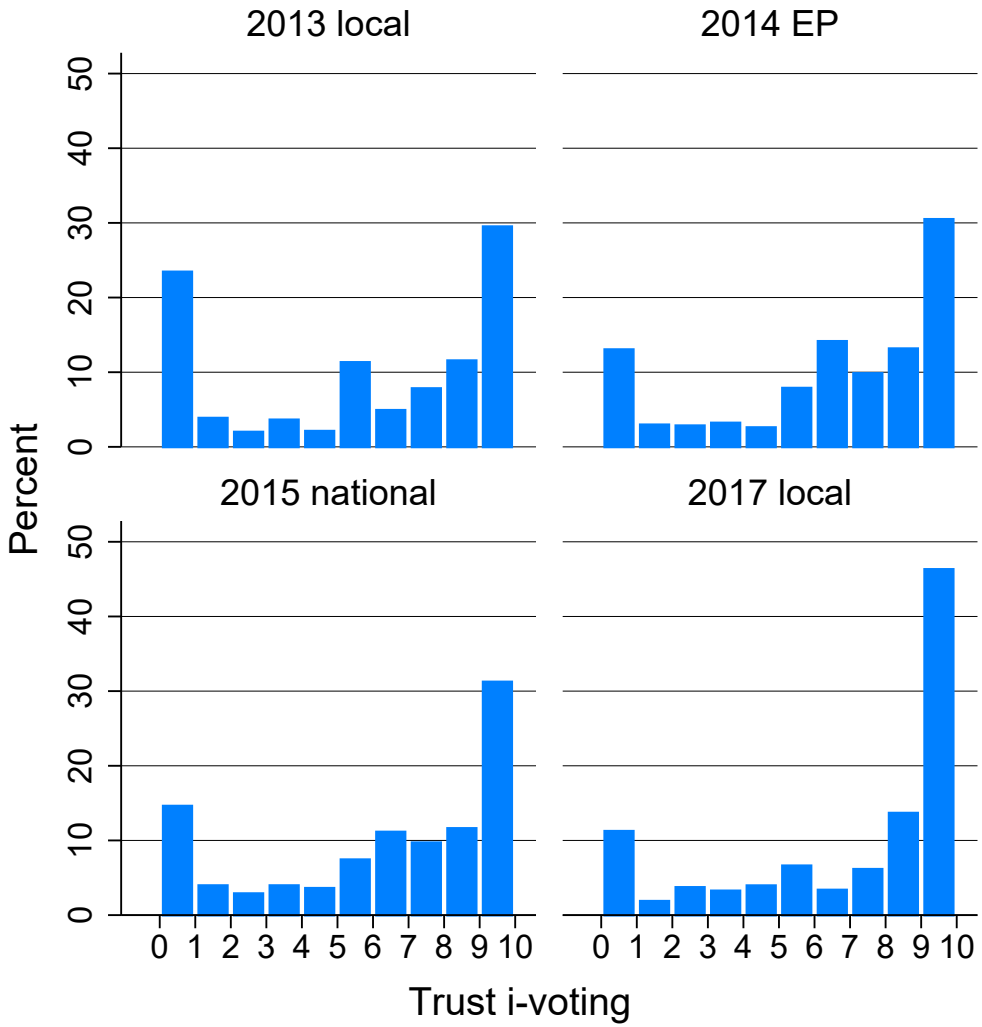
Trust structure

- What trust distribution actually looks like



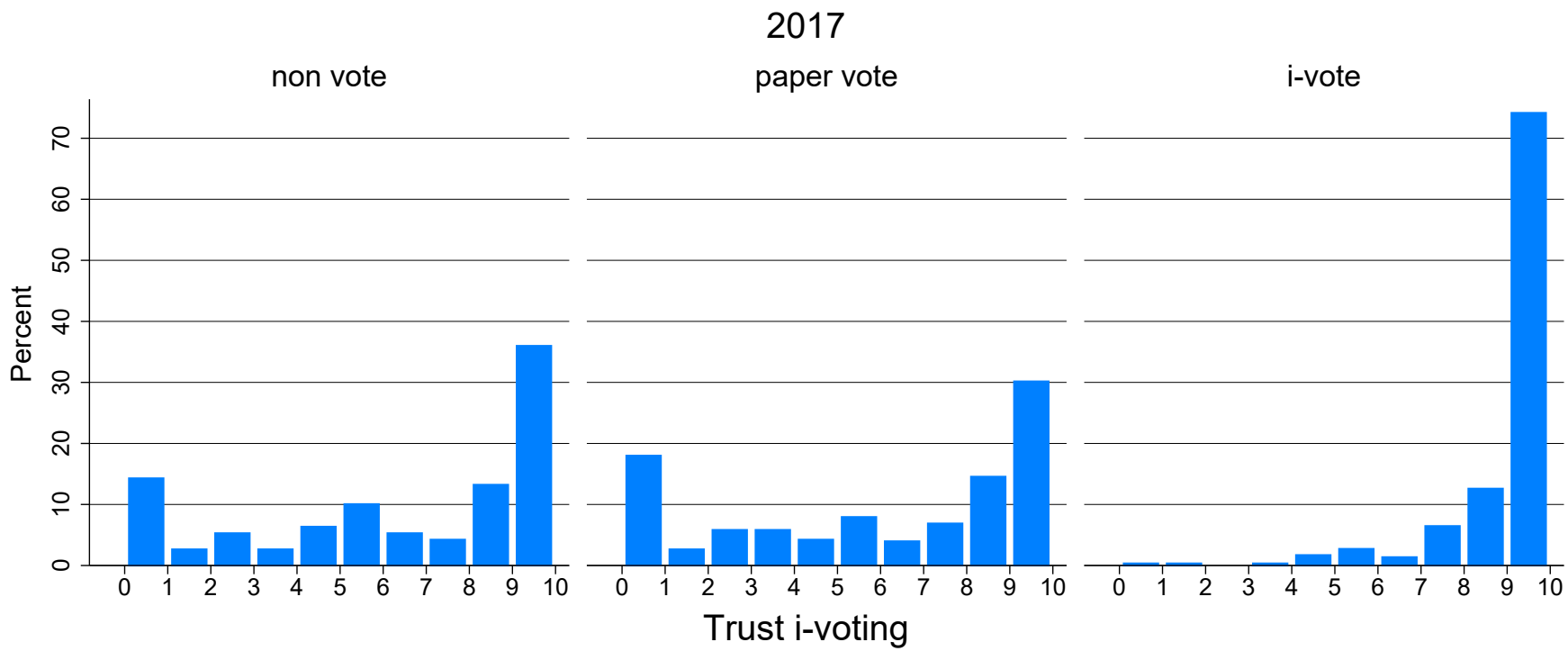
Trust structure

- Changes over the years



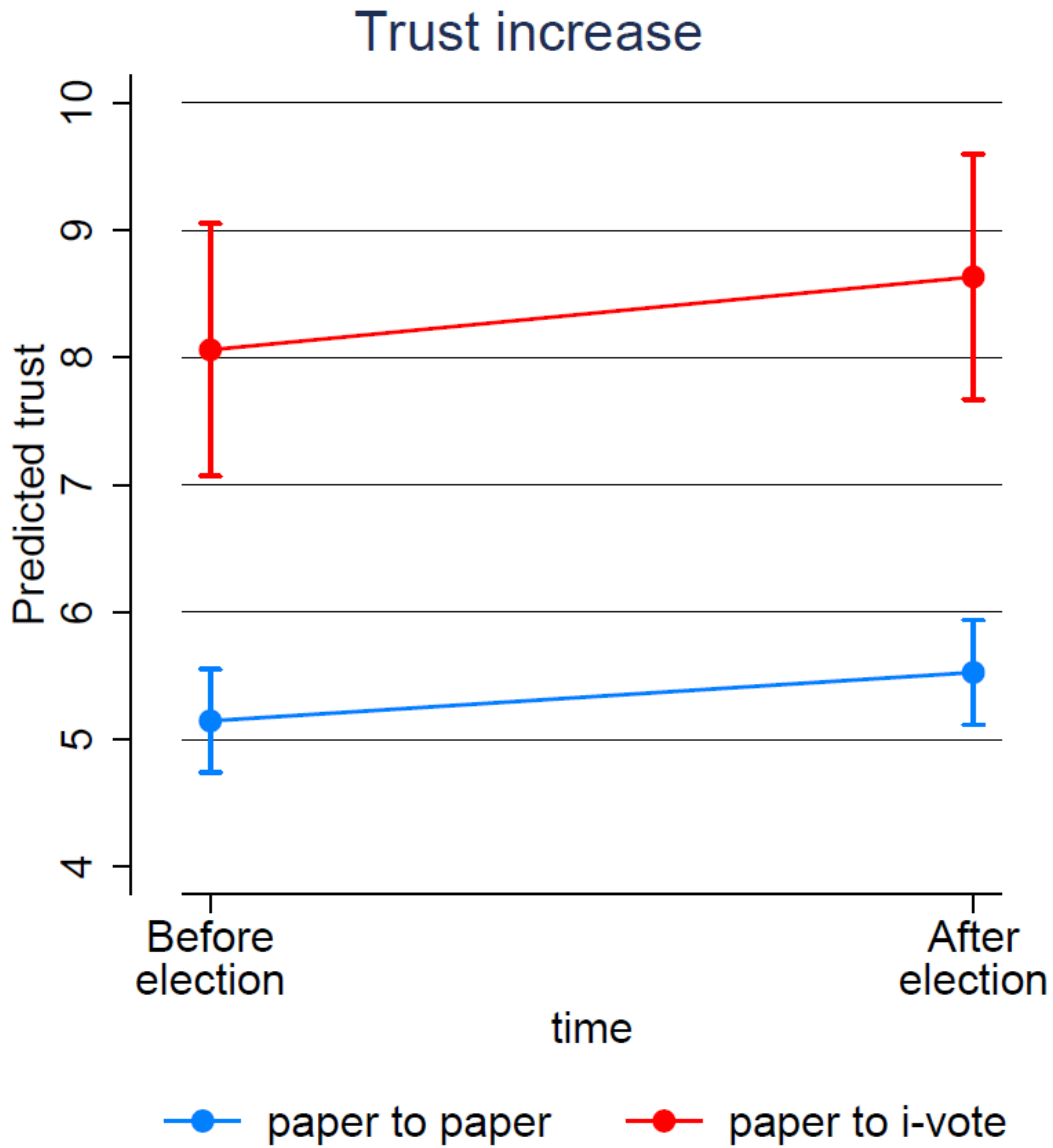
Trust structure

- Raises the question of trust as a precondition or result of experience



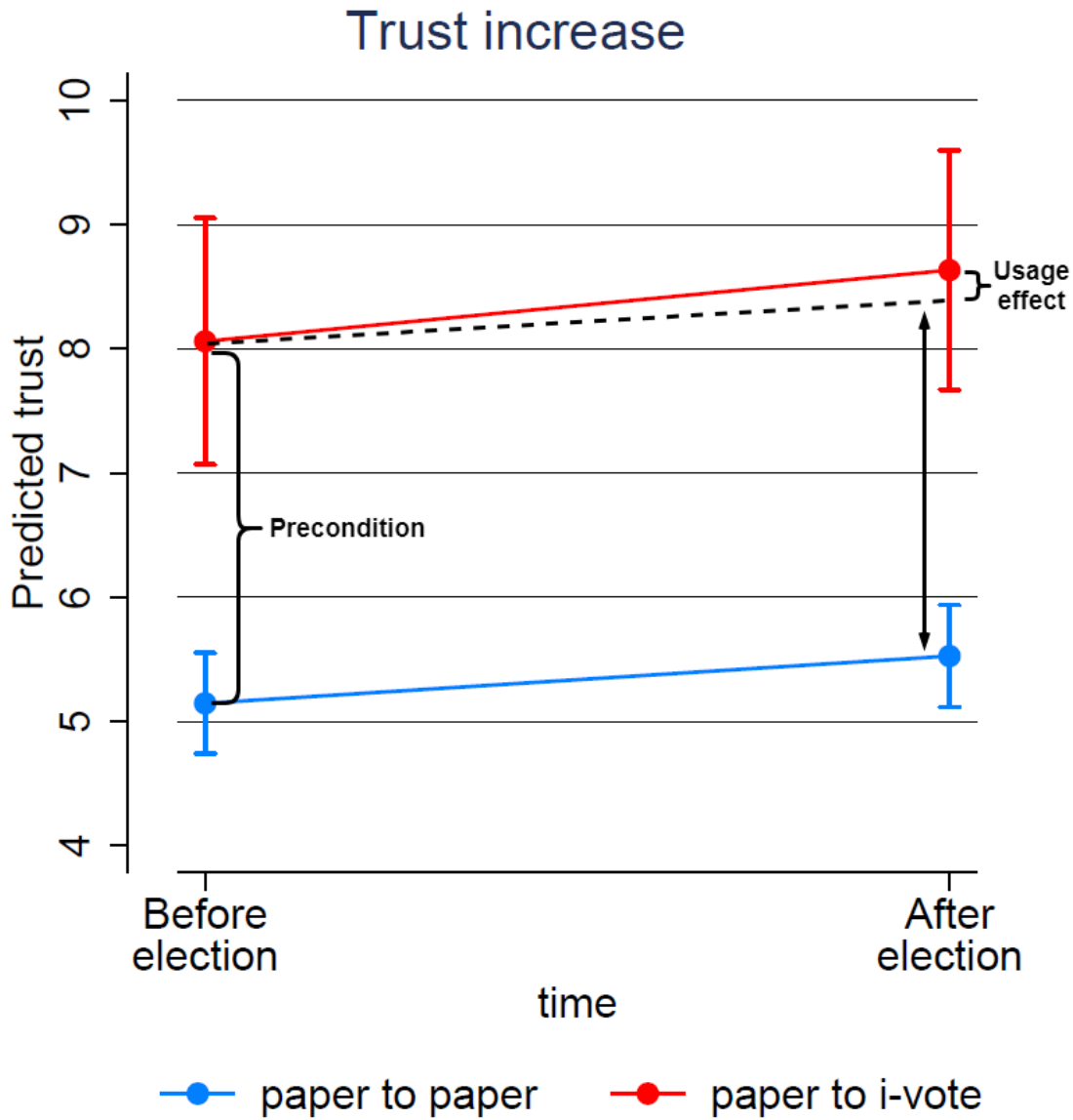
Difference in difference from a panel in 2014

- Run a dif-dif estimation: $Y_{it} = \alpha + \beta T_{it} t + \gamma T_{it} + \pi t + \epsilon_{it}$



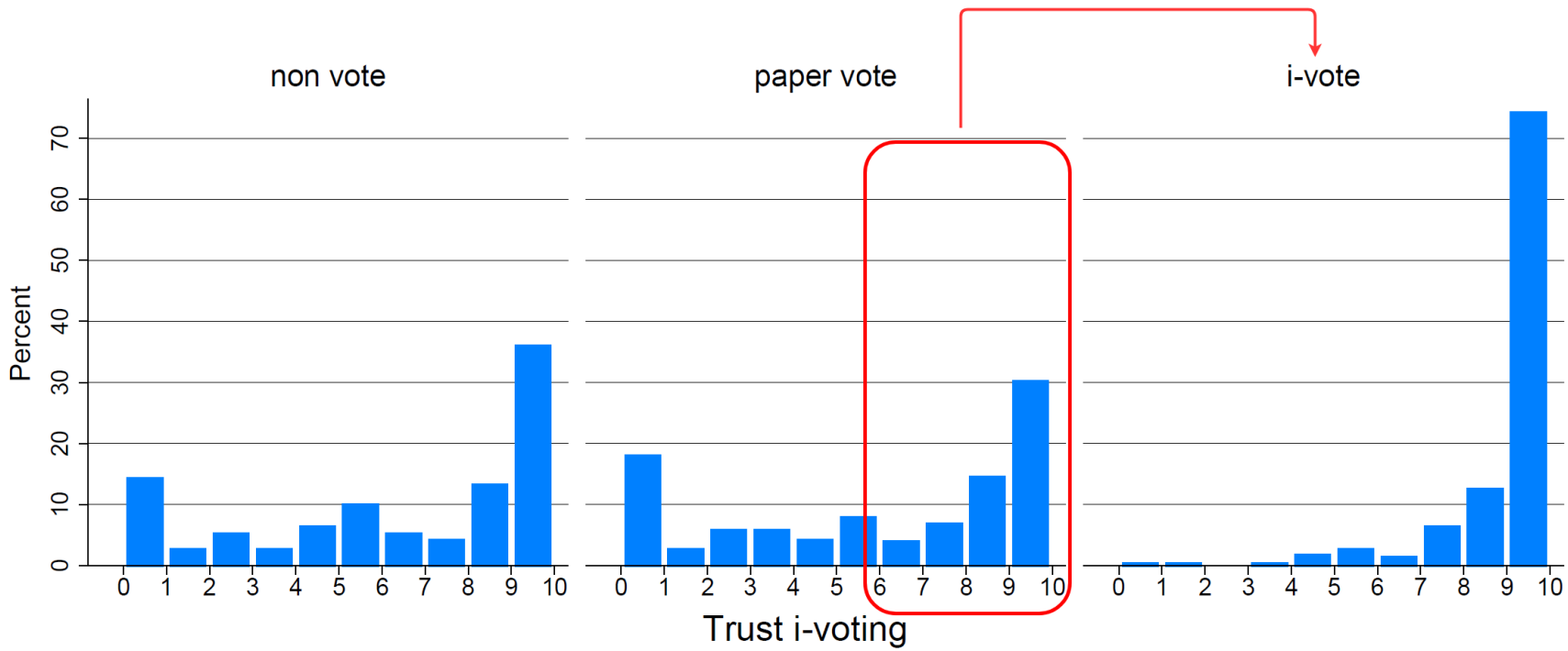
Difference in difference from a panel in 2014

- Run a dif-dif estimation: $Y_{it} = \alpha + \beta T_{it} t + \gamma T_{it} + \pi t + \epsilon_{it}$



Trust structure

- Trust is a precondition, user experience adds very little
- People with high pre-existing trust self-select into i-voting



Landscape of Political Parties in Estonia – Past and Present

Martin Mölder

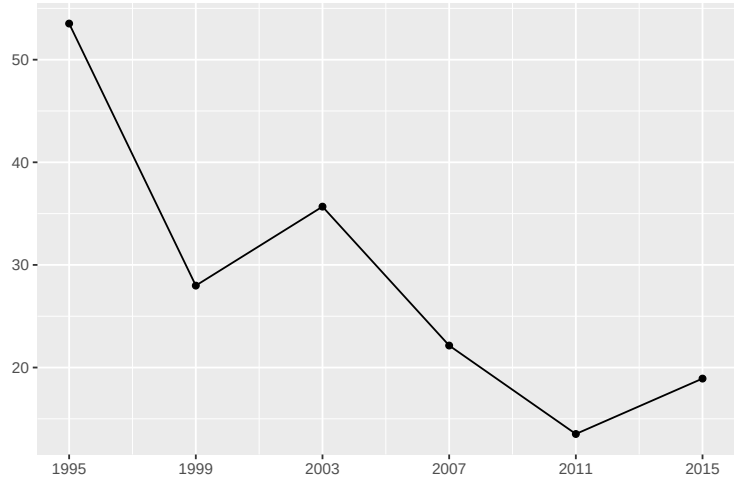
University of Tartu
Johan Skytte Institute of Political Studies

2. March 2019

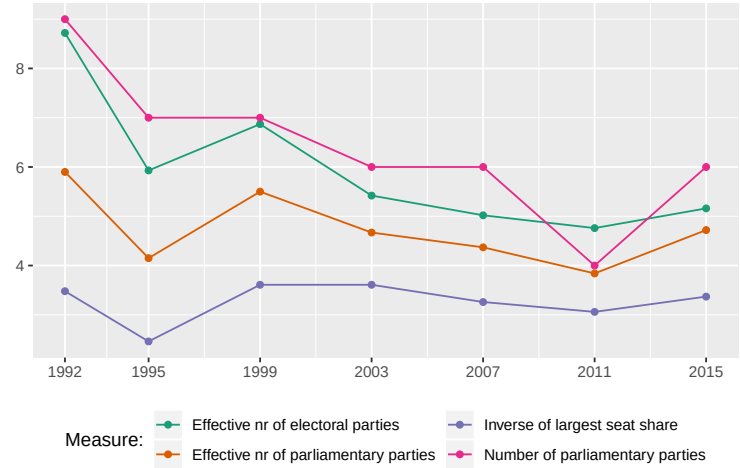
Overview

- Party system institutionalisation.
  - Stability of voters preferences.
  - Number of parties.
  - Party interaction in government.
  - Turnover of MPs.
  - Evolution of party manifestos.
- The political landscape.
  - Party manifestos in 2015.
  - Voters' perceptions and locations.
  - Candidate space.
  - Manifestos at the 2019 election.

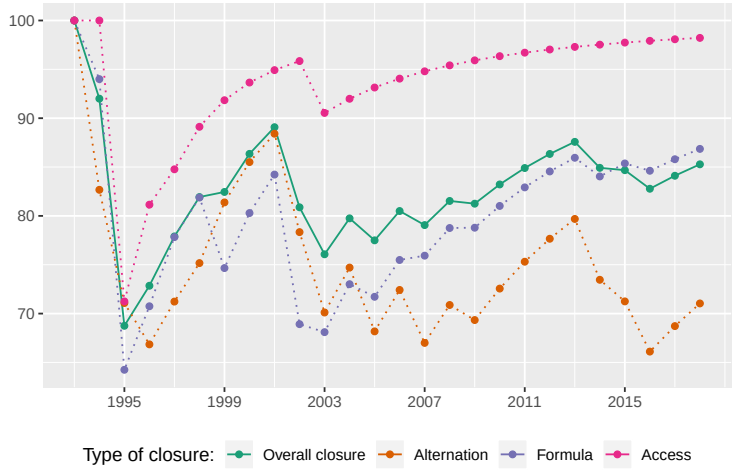
Electoral Volatility



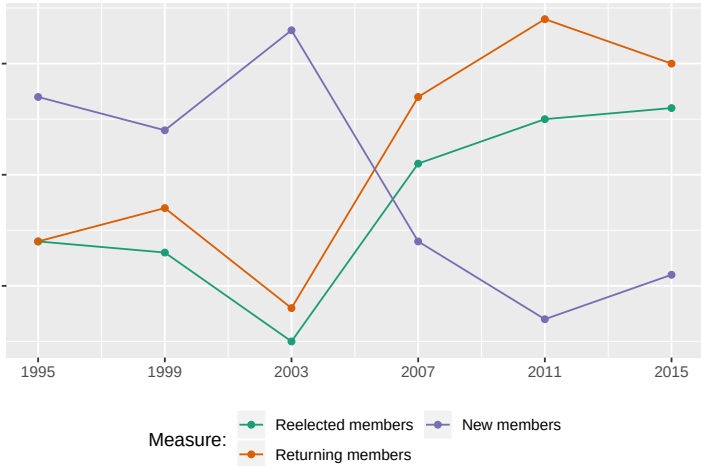
Number of Parties



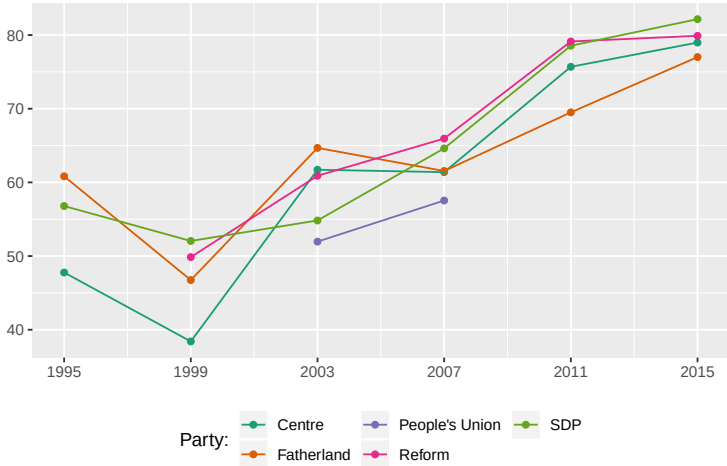
Party System Closure



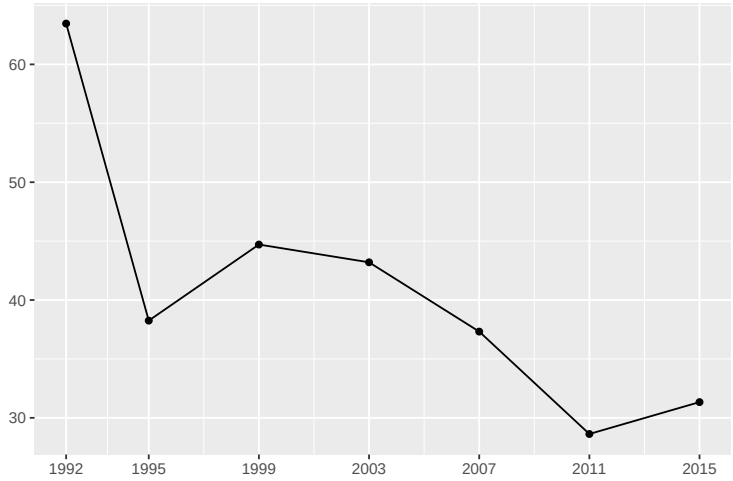
Turnover of MPs



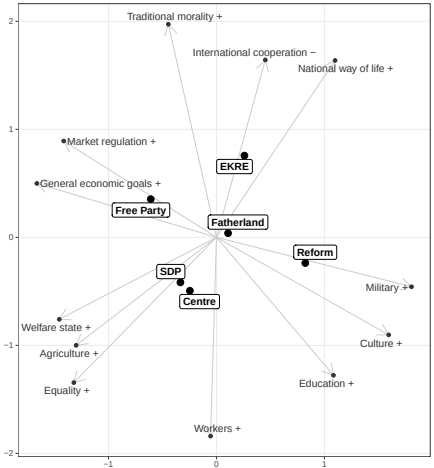
Changes in Party Manifestos



Manifesto Differences Between Parties

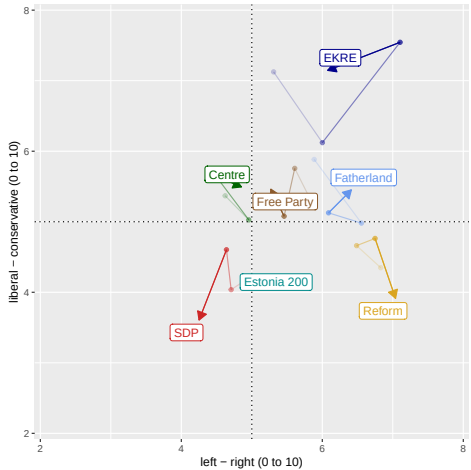


Party Manifestos at the 2015 Election

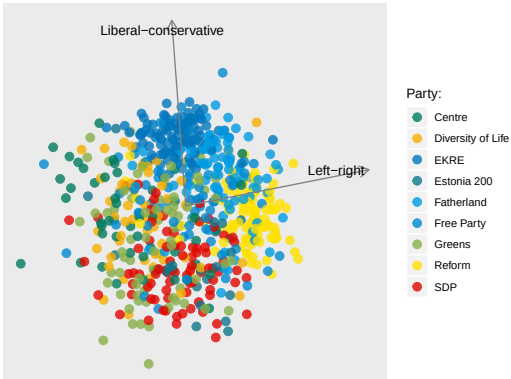


Voters Perceptions of Parties in 2018

Ideological Landscape of Voters 2016-2018



Political Differences Between Candidates at the 2019 Election



Party Manifestos at the 2019 Election