

## Politician polarization in Finland over recent years\*

### Abstract

We study politicians' ideological polarization, and its possible absence, in Finland. To measure ideological positions, we look at the responses of candidates to the voting advice applications for the parliamentary elections of 2011, 2015 and 2019, which provide an almost full coverage of the candidates. Moreover, we look at the relationship between local income polarization, at the municipal level, and the degree of polarization of the candidates coming from a given municipality. We find that there has not been a significant increase in ideological polarization over time, both between and within party, and that the degree to which candidates' positions differ depend strongly on the dimension considered. On the other hand, we find a significant positive relationship between local income polarization and the tendency of candidates to hold relatively extreme positions, indicating that growing income inequalities between different areas in Finland might lead to more polarized candidates' ideologies.

### 1. Introduction

One of the most prominent topics of the recent political debate, both among academics and the general public, is the increase in the polarization of political ideologies, i.e. the diverging tendency of political positions toward the opposite extremes, away from moderate opinions. This heightened interest can be explained by the political events of recent years, such as the election of Donald Trump in the US and the increasing success of populist movements around the world, which have brought up polarization on the forefront of the public discussion. This concerns both between and within-party polarization, with supposedly growing ideological differences between members of different parties, but also within the same party, as in the case of Brexit. While acknowledging this polarization trend, researchers have been interested in identifying the possible causes of this phenomenon, pointing to multiple economic, cultural, and social factors. Among

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the most mentioned causes, we find increasing income inequality, which has been observed in many Western countries, especially in the US.

In Finland, the rising vote share for the populist right-wing party, the Finns Party (PS), has been considered as a signal of polarizing society, where former voters of moderate parties have turned to more extreme views (on this, see Im, et al., 2020). However, it is not entirely clear whether there has been a systematic divergence in positions among Finnish politicians, especially when considering similar ideological dimensions over time. Regarding the possible drivers of polarization, while income inequality in Finland has not increased substantially over the last 10 years (looking at the Gini coefficient published by Statistics Finland, we see that it decreased from 2007 to 2017), there are considerably different income distributions at the geographical level. On this basis, it can be interesting to study patterns of polarization among politicians coming from different Finnish areas, to see whether there is a link between different degrees of economic inequality at the local level, and ideological polarization.

In this work, we focus on candidates' polarization, and its possible absence, in Finland, looking at the surveys of candidates' to the parliamentary elections in 2007, 2011, 2015 and 2019, provided by Yle (the Finnish public broadcasting company). One particularly beneficial aspect of these surveys is that they offer an almost universal coverage of the candidates to the parliamentary elections and allow us to measure candidates' ideologies for multiple dimensions. Moreover, they allow us to analyze both aggregate polarization (i.e., how much candidates' positions have grown apart across parties) and within-party polarization (how much candidates belonging to the same party have similar positions). Using candidates' replies to various statements, we compute indices which track positions on various topics over time. While the statements included in the surveys change between wave, we aggregate answers in order to create indicators which track similar positions. We finish the analysis by studying the relationship between income polarization at the municipal level, i.e. how large of a share of the population belongs to the bottom and top income deciles, relative to the share of population in the more central deciles, and the polarization of candidate views regarding economic policies (on the left-right dimension).

The results of our descriptive analyses do not point to any generalized pattern of polarization over time. When looking at both within- and between-party polarization, we do not see an overall divergence of opinions among candidates, at least for the dimensions we consider. Instead, we find different degrees of polarization depending on the topic. For example, we see strong polarization regarding NATO membership, and low level of polarization for economic policies,

as well as different time dynamics depending on the dimension, e.g. there is a converging tendency regarding attitudes on immigration, while the opposite is true for environmental issues.

The regression analysis of the link between local income polarization and the tendency of candidates to have polarized views on economic policies, shows that there is a positive and statistically significant relationship. In particular, we find that candidates who come from more income polarized municipalities tend to deviate more, in absolute terms, from the party-level ideological mean (as well as from the aggregate ideological mean). This is an intuitive result, and it indicates the possible risk of increasing political polarization at the geographical level.

Polarization has been a widely studied subject, thus it is not possible to give a comprehensive coverage of the existing literature briefly, but it is worth mentioning a number of works related to our analysis. Studies on polarization have considered multiple sides of the phenomenon, such as the polarization of the party system as a whole (see Dalton, 2008, or the interesting example on the link between financial crises and political polarization offered in Funke et al., 2016), of the electorate attitudes (for an example regarding US voters, see Gentzkow, 2016) and perceptions (see Alesina et al., 2019), and of the ideological positions of politicians. We are particularly interested in politicians' polarization, so it is worth looking at the works considering this issue in more details. One interesting example is Majlesi et al. (2017), a study on the effects of Chinese import penetration on voters' polarization. To estimate voters' positions, they look at the political orientation (proxied by the DW-Nominate scores, see Pole and Rosenthal, 1985) of congressional representatives. They find that voters in electoral districts which faced stronger import competition were more likely to remove moderate legislators. Moskowitz et al. (2019) find a similar result, i.e. that moderate legislators have been substituted by more ideological extreme ones, leading to an increased polarization in the US congress. In the European setting, Ladner (2014) uses a survey of the candidates to the European Parliament elections and finds different degrees of polarization on different dimensions and different European countries. However, his focus is static, as he considers only one election.

Papers using similar data sources as ours are von Schoultz and Papageorgiu (2019) and, especially, Isotalo et al. (2020). While there are a number of similarities between the latter work and the study here, our focus is slightly different. In the latter work, the authors look at how the ideological deviations from the median position within a party affect the electoral performance of a candidate, while we attempt to provide a more general overview of how the dispersion of political positions has changed over time, both within and across party.

Regarding the second part of our analysis, i.e. the study of the possible link between income inequality and candidates' ideological polarization, there is ample previous literature on the topic, especially for the US. A few examples are McCarty, et al. (2016), Garand (2010) and Winkler (2019). A tangential literature has been focused on the economic factors underlying the recent rise in support of populist parties. Among the most recent works we find Algan et al. (2017), and Guiso et al. (2020).

The rest of the paper is structured as follows: in Section 2 we discuss the data and how we form the indicators of candidates' ideologies and of polarization, while in Section 3 contains the results. Finally, Section 4 concludes.

## 2. Data description and methodology

Our analysis needs two ingredients: information on candidates' positions on different topics and information on the vote share obtained by different candidates (to weight candidates' ideologies). While the latter is easy to obtain, we use candidate-level vote share for the 2011, 2015 and 2019 parliamentary elections, measures of candidates' attitudes are hard to obtain, especially over time. To do that, we look at the responses to Yle voting advice applications (VAA) for the aforementioned elections. It has been shown (see, e.g. Isotalo et al., 2020), that these VAAs cover a large share of the candidates, and that Finnish voters do look at the responses of the candidates to guide their voting decisions. Looking at the vote shares of the candidates who participated in the VAAs, we see that they cover between a minimum of 82 percent and a maximum of 98 percent of total votes (at the electoral district level), implying that we can be confident on the degree of representation of candidates' positions offered by the data.

A harder problem to tackle is whether we can measure candidates' attitudes in a consistent way over time. This is not straightforward, because the statements included in the VAAs are not identical across different waves of the survey, so our best bet is to select statements that proxy similar dimensions over time. We are interested in polarization dynamics regarding six aspects/dimensions: EU/euro membership, NATO, cultural ideologies (on a liberal-conservative scale), climate change and environmental issues, immigration and, finally, economic policies (on a left-right scale). We go into details on how we compute the indicators tracking positions on these dimensions, in the next subsection.

In our analysis we do not consider all parties of the political spectrum. In particular, we keep only the parties that have participated in every election we consider, and only those parties which have had at least one seat in the parliament during the same time period. The remaining parties are the

Social Democratic Party of Finland (SDP), the Finns Party (PS), the Centre Party (KESK), the National Coalition Party (KOK), the Green League (VIHR), the Left Alliance (VAS), Christian Democrats (KD) and the Swedish People's Party (RKP)

## 2.1 Measures of candidates' attitudes

For each dimension/year, we select a set of statements that we deem to be able to define a candidate position. Depending on the VAA wave, we use one or multiple statements.

Opinions on whether Finland should join NATO are easy to track, because the statements regarding this dimension are the same across waves. Specifically, the statement is: "NATO membership would enhance Finland's defensive capabilities". Given the stability of the statement over time, we are confident to track accurately candidates' positions, and their possible shifts, regarding NATO membership in different elections.

Regarding attitudes toward EU/eurozone membership things are slightly trickier. First of all, the statements available to us regard economic aspects related to the eurozone (i.e. the adoption of the euro), rather than the European Union. Moreover, there is quite a discrepancy between the 2011 statement and the 2015 and 2019 ones. In the first case, the statement is "Finland should keep supporting EU countries in economic difficulties", while for the years 2015 and 2019 the statement is "Finland would be better off outside of the euro". The first statement, related to the eurozone debt crisis which hit countries such as Italy and Greece, is more specific than the latter ones and we expect that not all candidates in favor of euro are also in favor of additional financial aid packages to other eurozone countries. While there is inconsistency in the ideology estimation, it is not obvious whether the first statement is more polarizing than the latter.

Regarding the immigration attitudes dimension, we have a similar problem. The statement we use for 2011 is "Economic support for immigrants should be reduced", while for 2015 the two statements are "Immigration to Finland should be limited due to terrorist threats" and "Finland should take more responsibility for incoming refugees", and finally for 2019 we have two statements "Increased immigration has been a danger for Finland" and "We need immigration to have enough workers for the social and healthcare industry". We can see that the statement in 2011 regards the economic aspect of immigration (welfare expenditures), while the 2015 statements are focused on security issues (related to refugee crisis and the rise of ISIS in Syria and Iraq). The 2019 VAA offers us a mixed measure of positions regarding immigration, touching both economic and security aspects.

For the cultural index, on the liberal-conservative dimension, we are again in a situation where the statements differ substantially between waves. However, there are multiple statements for each wave, and we hope that averaging over multiple statements can help creating a consistent indicator. The same goes for tracking climate and economic-related attitudes, i.e. we have multiple statements per year, and we hope that aggregating over multiple questions can help identify candidates' ideology consistently. For the sake of brevity, we report individual statements in the appendix.

To what degree having different statements across different VAAs matters? When studying how polarization evolved over time, for different ideological dimensions, we would like to have a measurement of those dimensions to be consistent over time, while allowing for shifts of positions due to new candidates, or even due to changes in attitudes of the same candidates, possibly caused by different settings (for example, during the 2015 refugee crisis, we might expect a more polarized view of immigration, compared to normal times).

We can get an idea of how much we are able to measure attitudes consistently, by looking at candidates appearing in all three VAAs. In particular, we compute the correlation between the ideological scores of continuing candidates for different years.

	<b>2011-2015</b>	<b>2011-2019</b>	<b>2015-2019</b>
<b>NATO</b>	0.84	0.82	0.85
<b>EU/EURO</b>	0.45	0.45	0.75
<b>IMMIGRATION</b>	0.75	0.62	0.74
<b>CLIMATE</b>	0.62	0.74	0.66
<b>CULTURAL (LIB-CON)</b>	0.43	0.58	0.73
<b>ECON. (LEFT-RIGHT)</b>	0.85	0.72	0.76

**Table 1:** Candidate-level correlation coefficients of ideology indicators between different VAA waves.

We can draw few considerations from Table 1. First of all, we see that even when the ideological dimension is well defined and consistent over time, such as in the case of NATO membership, the correlation for continuing candidates is not perfect, although it is very strong. In this specific example, some candidates have changed (to a degree) opinion on whether Finland should join NATO, over the years. Thus, we can expect that non-perfect correlations do not imply an inconsistent estimation of ideologies, but it can derive from genuine changes in opinions.

Another interesting aspect we can gather from Table 1 is that there seem to be a stronger correlation of ideologies between the 2015 and 2019 VAAs, at least for most dimensions. Still, in all cases we find quite strong positive correlation coefficients. The only somewhat problematic cases are found when we try to estimate attitudes regarding the EU/euro and the cultural dimension, for the 2011 VAA. In particular, the statements contained in this wave seem to lead us to estimate somewhat different concepts, compared to the latter waves. Overall, we can say that we are able to estimate candidates' attitudes fairly consistently over time, especially for the latter years. This does not ensure us that the use of different statements across different waves can affect our analysis of polarization (certain statements might be inherently more polarizing than others, even if they lead to similar candidates position), but the results in Table 1 are comforting.

## 2.2 Measuring polarization

Once we set a way to measure attitudes, on a number of topics for candidates and parties, we need to compute the degree of polarization in the party system. This is not simple, because the literature has not found one clearly superior way to measure polarization. For example, Schmitt (2016) identifies 210 possible ways to measure polarization, which depend on whether we weight positions of parties and candidates by their vote shares (or seats) and on whether we measure distances between candidate-level attitudes and an ideological center, or between the positions of different parties.

In this work, we rely on a simple standard deviation measure of polarization, where we use vote shares to weight the importance of individual candidates and parties, both to measure attitudes' means and the party system polarization. It could be also interesting to calculate polarization without weighting candidates' positions by their vote share, because it could offer us a view of how the supply of candidates with possibly diverging ideologies has changed over time. However, to keep the length of the analysis short, we do not report results on unweighted polarization, but they are available upon request.

To summarize, we start by computing candidate-level attitudes, using the VAA statements discussed in the previous subsection, and using those we compute party-level positions. Formally, the position for party  $j$  and topic  $k$ , is given by:

$$\overline{P}_{jk} = \sum_{i=1}^N w_{ij} P_{ijk}, \quad (1)$$

where  $w_{ij}$  is the vote share for candidate  $i$  in party  $j$ , which is the ratio between the votes for candidate  $i$  and the total votes for party  $j$ , and  $P_{ijk}$  is the measure of attitudes for candidate  $i$ , in party  $j$ , regarding topic  $k$ .  $N$  denotes the total number of candidates in a given party. Given (1), we can calculate within-party polarization, for party  $j$  and topic  $k$ , by using:

$$Pol_{jk} = \sqrt{\sum_{i=1}^N w_{ij} (P_{ijk} - \bar{P}_{jk})^2}. \quad (2)$$

To compute aggregate polarization, i.e. the polarization between parties, we follow a similar approach as in (1) and (2), i.e. we first compute the ideological center of the party system, for a given topic, and then compute overall polarization. These two measures are obtained by the following two formulas:

$$\bar{P}_k = \sum_{j=1}^M w_j P_{jk}, \quad (3)$$

where  $M$  in (3) is the total number of parties and  $w_j$  is the vote share for party  $j$ , and

$$Pol_k = \sqrt{\sum_{j=1}^M w_j (P_{jk} - \bar{P}_k)^2}. \quad (4)$$

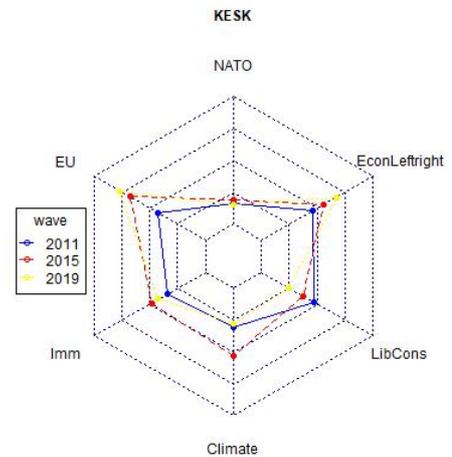
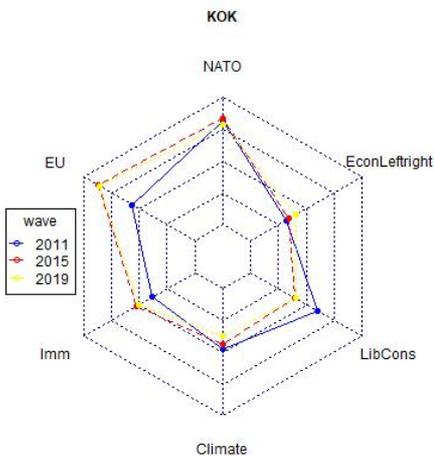
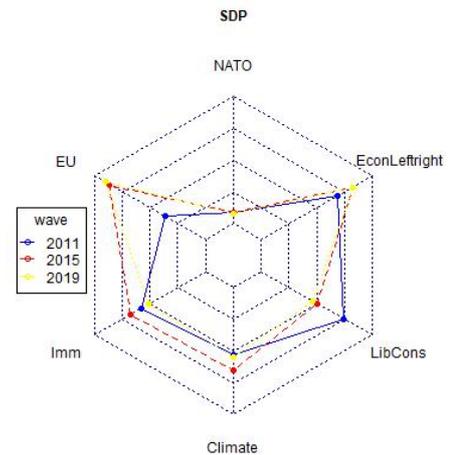
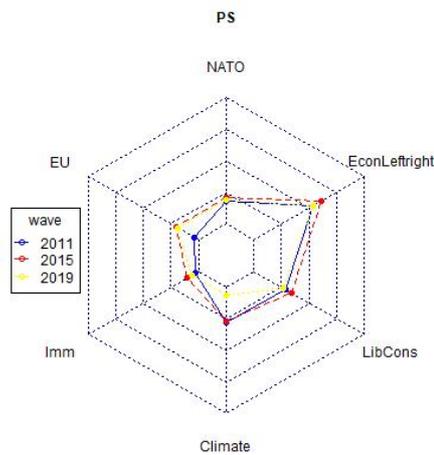
Using (1)-(4) we are able to compute within and between party polarization over time, and the results are reported in the next section.

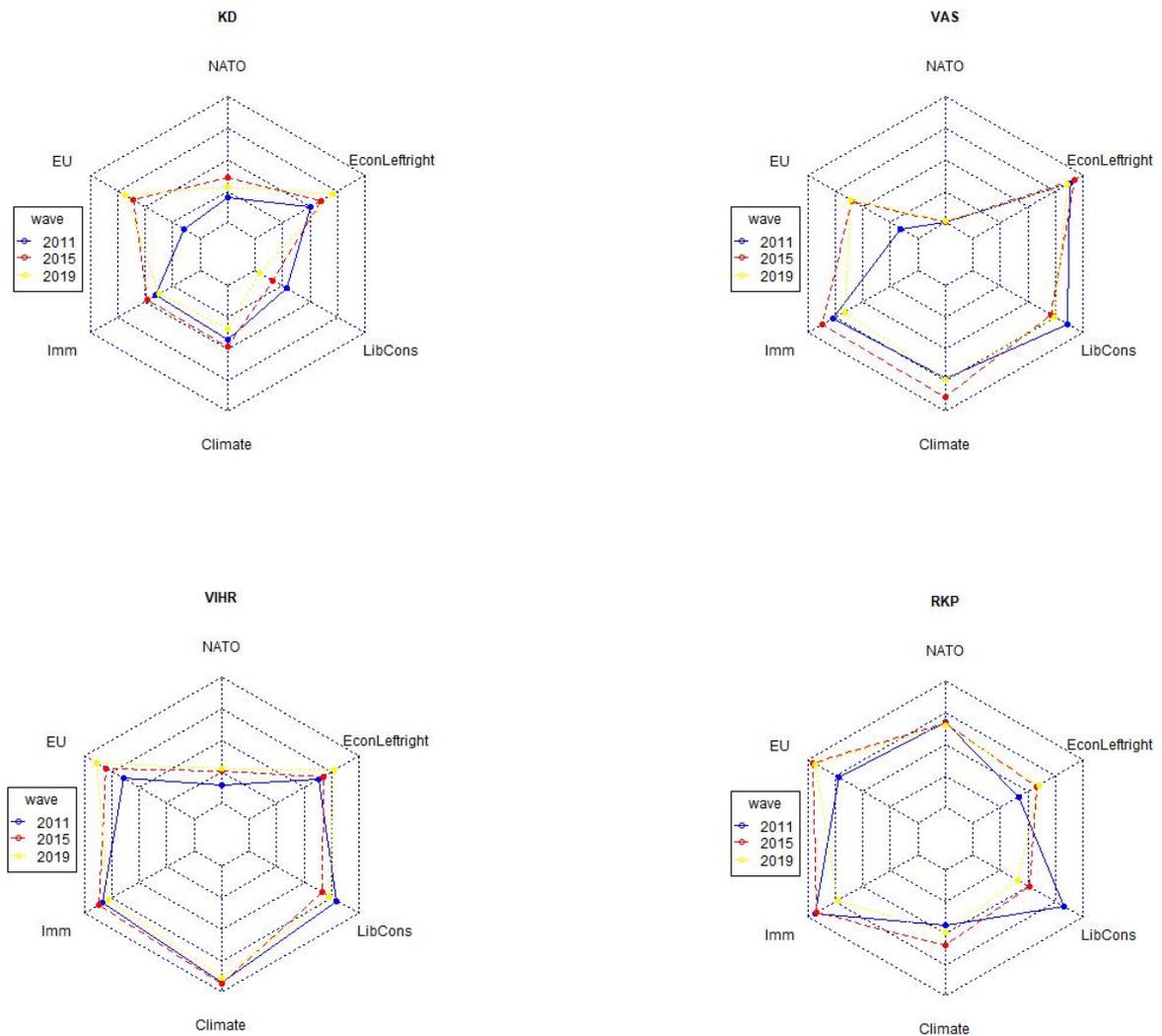
### 3. Results

We structure this section by first reporting the positions of parties on the selected topics, and how they changed over time. After that, we show results on within and between party polarization. Finally, we report the findings of the regressions of candidates' political polarization onto local income inequalities.

### 3.1 Party positions

We start by summarizing the party positions on the topics we have discussed in section 2.1, using spider charts as visual aid. Before that, it is important to delineate how we scale the indicators of attitudes. In our case, a more positive number indicate a more positive position toward NATO membership, the euro, pro-immigration views, more concern for environmental issues, more liberal views (vs. conservative ones) and finally more “left-wing” economic positions (vs. economic liberalism). The scale goes from a minimum of 1 to a maximum of 5.





**Figure 1:** Spider charts for parties' positions regarding selected topics. Party averages are computed by summing candidate-level responses and weighted them using candidates' vote shares. Lines closer to the edges of the charts represent higher values (on the scale one to five).

The results represented in Figure 1 are more or less in line with what we expect in terms of party-level views of the chosen topics. For example, we find that the KOK shows a strongly positive attitude toward a possible NATO membership, as well as a strong tendency toward economic liberalism. On the other hand, the PS show a strong degree of euroscepticism, as well as anti-immigration positions. In terms of changes over time, we find fairly stable positions for each party and topic, with the notable exception of attitudes toward the euro. In particular, we find a substantial positive shift (i.e. more positive view of the euro) for each party from the 2011 wave to the 2015 one. It is likely that this is due to the different nature of the adopted statement (support of eurozone countries in difficulty vs. a general view of the euro), as well as different economic conditions (in 2011 the eurozone was in the midst of a deep economic crisis). One interesting result is that the parties with the most negative (PS) and positive (VIHR) attitudes toward the euro do not show a large shift between the 2011 wave and the rest. In any case, the results in Figure 1 support the intuition we gathered from Table 1, i.e. when

we consider attitudes toward the euro over time, we have to bear in mind the discrepancy between the 2011 wave and the rest.

### 3.2 Within-party polarization

We now turn to the main focus of our analysis, i.e. the degree of polarization among candidates, and its change over time. In this subsection we look at within-party polarization, meaning how much attitudes of candidates' belonging to the same party are close to the party ideological center, for the selected topics. In practice, we calculate this using (1) and (2). Measures of polarizations are reported in Table 2, while their difference over time are in Table 3.

	<b>NATO</b>	<b>EURO</b>	<b>IMM.</b>	<b>CLIMATE</b>	<b>CULT. LIB- CONV</b>	<b>EC. LEFT- RIGHT</b>	
<b>2011</b>							
<b>KD</b>	0.89	0.80	1.18	1.00	0.83	0.47	
<b>KESK</b>	0.79	1.15	0.95	0.94	0.95	0.40	
<b>KOK</b>	0.82	1.06	1.23	0.90	1.06	0.44	
<b>PS</b>	0.86	0.41	0.32	0.83	1.03	0.53	
<b>RKP</b>	1.03	0.91	0.60	0.85	0.83	0.46	
<b>SDP</b>	0.72	1.08	1.11	0.87	0.76	0.41	
<b>VAS</b>	0.06	0.87	1.12	1.04	0.68	0.34	
<b>VIHR</b>	0.78	0.93	0.84	0.46	0.65	0.59	
<b>2015</b>							
<b>KD</b>	1.02	1.06	0.83	1.04	0.45	0.54	
<b>KESK</b>	0.81	0.96	0.85	1.12	0.64	0.54	
<b>KOK</b>	0.59	0.65	0.83	1.02	0.64	0.45	
<b>PS</b>	0.90	0.83	0.53	0.90	0.68	0.60	
<b>RKP</b>	0.98	0.42	0.66	1.02	0.65	0.51	
<b>SDP</b>	0.63	0.67	0.82	1.08	0.67	0.41	
<b>VAS</b>	0.22	1.12	0.76	0.92	0.60	0.27	
<b>VIHR</b>	1.08	0.70	0.58	0.61	0.71	0.56	
<b>2019</b>							
<b>KD</b>	0.99	0.98	0.75	0.75	0.20	0.48	
<b>KESK</b>	0.73	0.92	0.74	0.56	0.73	0.52	
<b>KOK</b>	0.90	0.73	0.90	0.76	0.76	0.52	
<b>PS</b>	0.91	0.90	0.37	0.39	0.55	0.52	
<b>RKP</b>	1.21	0.49	0.72	0.83	1.01	0.50	
<b>SDP</b>	0.68	0.61	0.88	0.86	0.81	0.41	
<b>VAS</b>	0.25	1.19	0.87	0.92	0.76	0.38	
<b>VIHR</b>	1.01	0.62	0.72	0.58	0.79	0.49	

**Table 2:** Within-party polarization for different VAA waves. calculated using (2).

	<b>NATO</b>	<b>EURO</b>	<b>IMM.</b>	<b>CLIMATE</b>	<b>CULT. LIB- CONV</b>	<b>EC. LEFT- RIGHT</b>
<b>2015- 2011</b>						
<b>KD</b>	0.13	0.26	-0.34	0.04	-0.37	0.07
<b>KESK</b>	0.02	-0.18	-0.10	0.18	-0.31	0.14
<b>KOK</b>	-0.23	-0.41	-0.41	0.11	-0.42	0.02
<b>PS</b>	0.04	0.41	0.22	0.07	-0.35	0.07
<b>RKP</b>	-0.05	-0.49	0.06	0.17	-0.18	0.04
<b>SDP</b>	-0.09	-0.40	-0.30	0.22	-0.09	0.00
<b>VAS</b>	0.16	0.26	-0.36	-0.12	-0.08	-0.08
<b>VIHR</b>	0.29	-0.23	-0.26	0.16	0.05	-0.03
<b>2019- 2015</b>						
<b>KD</b>	-0.03	-0.08	-0.08	-0.29	-0.26	-0.06
<b>KESK</b>	-0.08	-0.04	-0.11	-0.56	0.09	-0.02
<b>KOK</b>	0.31	0.09	0.07	-0.26	0.12	0.07
<b>PS</b>	0.01	0.07	-0.16	-0.50	-0.14	-0.08
<b>RKP</b>	0.22	0.07	0.06	-0.20	0.36	-0.01
<b>SDP</b>	0.05	-0.06	0.06	-0.22	0.15	0.00
<b>VAS</b>	0.02	0.07	0.11	0.00	0.16	0.12
<b>VIHR</b>	-0.07	-0.08	0.14	-0.04	0.08	-0.07

**Table 3:** Differences in within-party polarization over time, measured using (2).

Few comments on Table 2 and 3. While it is hard to describe a clear pattern in terms of which parties or topics are more polarizing, there are few exceptions. For example, the degree of within-party polarization is smaller when talking about economic policies (on the left-right dimension), while immigration seems to be a more polarizing topic. In terms of party patterns, we cannot find a party that is unequivocally more polarized than the others, instead we see that certain parties show stronger within-differences regarding specific dimensions. One interesting example is offered by the PS, which show strong ideological cohesion w.r.t. immigration, while there is more dispersion on topics such as NATO membership. The opposite case is represented by the left-wing party (VAS), where we find a low degree of polarization regarding NATO membership, while there are more internal differences when considering immigration.

In terms of changes over time, again we do not find a clear pattern. While there are some topics around which we find a stable degree of within-party polarization, such as economic policies, we often find a case where changes between VAA waves depend on the topic and party considered, as well as the time frame. For example, the PS show declining within-party differences when looking at cultural issues, and the same goes for the KD. Looking at specific dimensions, we find that attitudes regarding climate-related issues show a convergent tendency, within-parties, between the 2015 and 2019 elections.

Overall, we do not find a clear pattern in terms of polarization between candidates belonging to the same party. Within-party differences have not grown or decreased substantially from 2011 to 2019, however it is interesting to analyze how *between*-party polarization has evolved. We look at this in the next subsection.

### 3.3 Between-party polarization

In this section, we look at between-party differences in terms of attitudes regarding the topics considered, and how they changed over time. We follow the approach as in the previous subsection, i.e. we rely on weighted measures of polarization, which are calculated following (3) and (4). Results are reported in Table 4.

YEAR	NATO	EURO	IMM.	CLIMATE	CULT. LIB-CONS	EC. LEFT-RIGHT
2011	1,43	0,74	1,12	0,54	0,62	0,43
2015	1,25	0,95	1,00	0,63	0,26	0,46
2019	1,14	1,08	0,81	1,04	0,57	0,40

**Table 4:** Between-party polarization for different VAA waves, calculated using (4)

As in the discussion regarding within-party polarization, it is hard to gauge a monotonic trend in the polarization between parties. However, the results in Table 4 allow us to draw some conclusions. First of all, there are substantial degrees of polarization between different dimensions. While we find large differences in attitudes regarding NATO membership, the opposite is true (surprisingly) for economic issues. The former results is explained by the bipolarized view on NATO membership: on the one hand we find the KOK and the RKP parties, which are strongly in favor of joining NATO, while on the other side of the spectrum (strongly against joining) we find the rest of the parties. The small reduction in polarization which we see during the years can be attributed to the slight shift toward more positive opinions, regarding NATO, for the KD and VIHR.

Looking at attitudes on economic policies we find quite a different picture. While parties such as KOK and VAS have quite “extreme” views on economic policies, specifically the KOK is in strong favor of economic liberalism while VAS is strongly in favor of traditionally left-wing economic policies, we find that the remaining parties are pretty close to each other around the ideological center. This can explain the low degree of polarization for this dimension.

In terms of changes over time, we find a fuzzy picture. The ideological differences regarding certain topics have been stable over time, for some topics they have decreased, while for others we find

increased polarization. An example of ideological convergence between parties is immigration, where we see a gradual shift toward more central (in the sense concentrated around the center of the scale) views of immigration (see Figure 1). One possible explanation for this feature can be found in the different perspective of immigration touched by the statements in the VAAs. In 2011, the statement regarding immigration focuses on the economic side of the phenomenon, while the latter surveys consider the security side of immigration. It is possible that the economic consequences of immigration generate more polarized views, compared to security issues, which can be treated with more moderation. Still, the VAAs from 2015 and 2019 consider the security side of immigration, and we keep seeing a decline in polarization.

Looking at climate-related issues, we notice a gradual increase in polarization, especially in the most recent election. Figure 1 gives us a possible explanation for this, i.e. the hardening of PS positions in terms of environmental issues toward a focus on economic interests.

To sum up, it is hard to argue that the Finnish political system as experienced a generalized increase in polarization, both when looking at candidates of the same party and at between-party differences. Instead, we see that attitudes regarding specific topics have been diverging over time, while the opposite is true for other issues. Finally, party positions regarding certain dimensions, in particular the economic left-right dimension, have been close to each other and have not experienced any significant change over time.

### 3.4 Income polarization and candidates' economic policies views

We conclude our empirical analysis by looking at the relationship between local income polarization and the ideological polarization of candidates regarding economic policies. Intuitively, we expect that increasing income divergence, and the resulting concentration of population in the bottom and top income deciles, can lead, or at least be positively correlated, with more extreme views on economic policies. On the other hand, we expect to see more uniform views on economic matters in localities with a more concentrated income distribution.

To test the intuition described above, we need to have a measure of income polarization at the desired local level (in this case municipalities), and of the candidate-level ideological gap from the party center. For the latter, we can rely on similar indicators as the ones in section 2.2. In particular we use (1) to measure the (weighted) average attitudes on economic matters, at the party level. We then

calculate polarization for candidate  $i$ , in party  $j$ , and year  $y$ , by computing  $P_{iy,dev} = |P_{iy} - \overline{P}_y|$ <sup>1</sup>, where we omit the index  $k$ , because we focus only on the economic policy dimension. The positions of a candidate are measured in the same fashion as in the main analysis, i.e. using the statements concerning the economic dimension.

To measure income polarization at the local level, we rely on the share of population of a municipality by income decile, where the deciles are defined at the national level. Income polarization at the municipal level is then given by the ratio between the share of population in the first (bottom) and tenth (top) income deciles and the share of population within the fourth, fifth (median) and sixth deciles. For robustness, we define the ratios using also the bottom two and the top two income deciles. Formally, for municipality  $m$  and year  $y$ , the degree of polarization is given by:

$$IncP_{ym} = (sh_{1,ym} + sh_{10,ym}) / (sh_{4,ym} + sh_{5,ym} + sh_{10,ym}), \quad (5)$$

and

$$IncP_{ym}^* = (sh_{1,ym} + sh_{2,ym} + sh_{9,ym} + sh_{10,ym}) / (sh_{4,ym} + sh_{5,ym} + sh_{10,ym}), \quad (6)$$

where  $sh_n$  indicates the share of municipal population in the  $n^{\text{th}}$  decile. Once we have yearly income polarization measures, we take the average over the three years preceding the election of interest. Unfortunately, the latest VAA (for the 2019 elections) does not provide information on candidates' municipalities, so we can only use the 2011 and 2015 waves, meaning that we average income polarization over the period 2008-2010 for the 2011 elections, and over the years 2012-2014 for the 2015 elections.

To analyze the relationship between candidate-level polarization and local income polarization, we use simple pooled cross-sectional regression, where we include both candidate and municipal-level controls (collected in vectors  $m$  and  $c$ , respectively), in order to limit (in part) the risk of spurious correlations between our main explanatory variable of interest and the dependent variable. Our candidate-level controls include party of membership, age and income bracket, education level and gender. For municipal controls, we include the natural log of median income and of population, the

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<sup>1</sup> Notice that the concept we are investigating here is within-party polarization. In our regression analysis, it is hard to study proper between party polarization, because it would require us to aggregate individual candidates' positions. However, we have also tried to use ideological deviations from the aggregate mean position, i.e.  $P_{iy,dev}^* = |P_{iy} - \overline{P}_y|$ . The results we find using this alternative indicator are in line with the ones reported in the main text.

share of population working in manufacturing, the employment rate and the share of residents with tertiary education.

The resulting regressions equation is given by:

$$P_{iy,dev} = \beta_0 + IncP_{ym}\beta_1 + \eta_y + m_{ijy}\beta_2 + c_{iy}\beta_3 + \epsilon_{iy}. \quad (7)$$

In (6),  $\epsilon_{iy}$  is an iid error,  $\eta_y$  is a year fixed effect, to control for factors affecting all candidates during different years, and  $\beta_2$  and  $\beta_3$  are the coefficients associated with municipal and candidate-level controls, respectively. Our main coefficient of interest is  $\beta_1$ .

Before proceeding to the results of the regressions, it is important to point out that our analysis does not allow us to make claims of causality. Even though we include a number of controls, to attenuate omitted variable biases, we still risk an inverse causality problem. Despite the fact that we use explanatory variables that are antecedent the elections (and thus the measure of candidate ideology), there is a possibility that more polarized politicians, elected in previous elections, would push for reforms that could lead to more income divergence. Moreover, it might be that our controls do not capture cultural factors that affect both income and ideological polarization. To sum up, our analysis cannot be used to establish a cause-effect relationship, however the possible relations we find can be considered relatively robust.

The regression table is structured by the type of controls included. We first start with a very simple regression including the municipal-level income polarization and the year fixed-effect. We then add to the regression party dummies, then municipal-level controls and finish by estimating a full model including also candidate-level controls. To keep the discussion contained, we do not report the individual coefficients for the control variables, and we indicate simply whether they are included in a given specification. Estimates for the coefficients of the controls are available upon request.

Model	$P_{iy,dev}$			
	1.	2.	3.	4.
$IncP_{ym}$	0.0759*** (0.0199)	0.0679*** (0.0197)	0.0713** (0.0311)	0.128*** (0.0468)
R-squared	0.006	0.044	0.045	0.062
$IncP^*_{ym}$	0.0544*** (0.0150)	0.0487*** (0.0147)	0.0500** (0.0238)	0.0834** (0.0331)
R-squared	0.005	0.044	0.045	0.062
Observations	2,740	2,740	2,740	2,086
Year FE	YES	YES	YES	YES
Party dummies		YES	YES	YES
Mun. controls			YES	YES
Candidate controls				YES

**Table 5:** Results for the regression of candidate-level ideological deviation, from the party mean, onto municipal-level income polarization. The top quadrant of the table contains results where we use income polarization measured as in (5), while the bottom part of the table shows results for income polarization measure (6). Robust standard errors in parentheses.

The results in Table 5 support our intuition regarding the positive link between local income polarization and the degree to which candidates' opinions on economic policies deviate from their party ideological center. In particular, we find that the coefficients associated to our indicators of income polarization are positive and strongly statistically significant, regardless of the specification considered and the income deciles used to define the share of populations in more "extreme" income brackets. Interestingly, when we look at the largest specification, i.e. the one including municipal and candidate-level controls, the size of the coefficients become much larger. Notice however, that our model does not seem to be able to explain a large fraction of the variation in within party polarization, possibly due to the fact that we lack information on local socio-cultural factors that could be able to explain the ideological polarization of the candidates.<sup>2</sup>

In terms of the quantitative significance of the results, we find the relationship to be quite strong. Looking at the full specification (column 4.), we find that a one point increase in the ratio between the share of residents in the bottom and top deciles, and the share of municipal population in the three middle income deciles, is associated with a 0.13 higher candidate-level deviation from the party ideological center, on average. This is roughly one third of the standard deviation of the dependent variable. To give a better idea of the size of relationship, we find that going from the minimum degree

<sup>2</sup> The regressions concerning the deviation of candidates' positions from the national mean, instead of the within-party variations, present much larger  $R^2$ s. This could be due to the fact that some controls, like the party dummies, are able to explain how far the ideologies of candidates from a given party are from the aggregate, while they are less helpful in explaining within-party differences.

of municipal income polarization (0.21) to the maximum (3.92) is associated with a 0.5 increase in the deviation of candidates' positions from the party mean. The average ideological deviation we have in our sample is roughly 0.4, so the effect (in a correlational sense) is quite large.

All in all, we find a quite strong relationship between income and candidate polarization, even after controlling for important factors such as party, candidate income, median income of the municipality or share of local employment in manufacturing. It can be interesting, in further works to see whether this link is reflected in local attitudes and electoral outcomes.

#### 4. Conclusions

Political polarization, or its absence, has been an intensively studied topic in recent years. In this work, we examine the dynamics of polarization for candidates to the Finnish parliamentary elections for years 2011, 2015 and 2019. Contrary to what is widely brought up in the public discussion, we do not see a polarization phenomenon for the ideological dimensions we consider, instead we see that both between and within-party deviation from the center positions have been relatively stable over time. We do find that certain topics are associated to a higher tendency of candidates to have more extreme positions, and we observe that candidates' attitudes are more heterogeneous in certain parties, but these patterns have not changed substantially over time.

In the second part of the analysis, we look at the association between local income polarization, meaning the prevalence of local population to be in the bottom and top income groups vs. the more central income deciles, and the deviation (from the party mean) of candidates' opinions on economic policies, on the left-right dimension. We find that candidates coming from municipalities with higher income polarization tend to deviate more from the party average position on economic matters, even after controlling for a wide range of municipal and candidate characteristics. This supports the view, illustrated in works such as McCarty, et al. (2006), that income inequalities are associated with ideological polarization.

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## Appendices

### Appendix 1. Results for the 2011, 2015 and 2019 elections

In this appendix we report the vote share for the parties and elections considered in the analysis. Notice that we omit many minor parties, so the vote shares in the table do not sum up to 100 percent.

<b>PARTY</b>	<b>2011</b>	<b>2015</b>	<b>2019</b>
<b>SDP</b>	19.1	16.5	17.7
<b>PS</b>	19.1	17.7	17.5
<b>KOK</b>	20.4	18.2	17.0
<b>KESK</b>	15.8	21.1	13.8
<b>VIHR</b>	7.3	8.5	11.5
<b>VAS</b>	8.1	7.1	8.2
<b>RKP</b>	4.3	4.9	4.5
<b>KD</b>	4.0	3.5	3.9
<b>TOTAL</b>	98.1	97.5	94.1

Table A1: Vote share (in percentage points) for the parties included in the analysis, for the parliamentary elections in 2011, 2015 and 2019.

### Appendix 2. Selected statements from the VAAs

In this appendix we report the statements we have relied on to define candidates' positions over time. The list below is structured into groups corresponding to different dimensions and year.

#### 1) NATO

- a) 2011: Belonging to NATO would strengthen Finland's security policy position.
- b) 2015: Belonging to NATO would strengthen Finland's security policy position.
- c) 2019: Belonging to NATO would strengthen Finland's security policy position.

## 2) Euro

- a) 2011: Finland should keep supporting EU countries in economic difficulties.
- b) 2015: Finland would fare better without the euro.
- c) 2019: Finland would fare better without the euro.

## 3) Immigration

- a) 2011: The use of tax funds to support immigrants should be reduced.
- b) 2015: Finland should take more responsibility in taking refugees coming to the EU.  
Immigration to Finland should be limited due to the terrorism threat.
- c) 2019: The increasing number of immigrants has made Finland less safe.  
The financing of social and healthcare services requires significantly more immigration.

## 4) Climate

- a) 2011: We should have a weekly vegetarian day in schools.  
Use of peat in energy production should be reduced to mitigate global warming.
- b) 2015: Containment of climate change should take precedence on industrial competitiveness.
- c) 2019: Finland should be on the forefront in the battle of climate change, even if it would create costs to Finns.  
Finland should not rush the ban of diesel and petrol cars.  
The State should discourage meat consumption, e.g. by introducing a tax.  
There is too much deforestation in Finland

## 5) Cultural (liberal-conservative dimension)

- a) 2011: Registered same-sex couples should have the same rights of married heterosexual couples.  
There should be fewer trained artists in Finland.
- b) 2015: There should be more police force in Finland.  
In network surveillance, state security is more important than the protection of citizens' privacy.  
Terminally ill persons have the right to euthanasia.
- c) 2019: Persons with incurable illnesses have the right to euthanasia.  
Gender reassignment surgery should be allowed also to minors.  
Traditional values are the basis for a good life.

## 6) Economic (left-right dimension)

- a) 2011: Individuals' responsibility for their own and their family's well-being should be increased.  
There is no need to restrict in any way the right to strike.

Unemployed persons should be incentivized to work by staggering the current unemployment protection more.

Taxation on corporate profits should be reduced.

To reduce unemployment, weekly working hours should be reduced to 35 hours.

Taxation on high incomes should be increased.

Government spending should be cut to achieve budget balance.

Students in tertiary educations should finance more their studies by taking loans.

b) 2015: In Finland it is too easy to live off social security.

The opening hours of shops and other businesses should be liberalized.

Workers minimum hours should be protected by law.

The earnings-related unemployment protection length should be shortened.

Finland cannot afford current social and healthcare expenditures.

Healthcare and social services should be provided first and foremost by the public sector.

The costs for elderly care should be covered more by the family.

c) 2019: Sales of wines and strong beers should be allowed in supermarkets.

It is fair that in society some groups are doing better than others.

Finnish laws should allow more freedom to citizens to make their own decisions and take their own responsibilities.

To balance State budgets, spending cuts are preferable than higher taxes.

Social and healthcare services should be mainly provided by the public sector.

Elderly care should be more outsourced to the private sector.