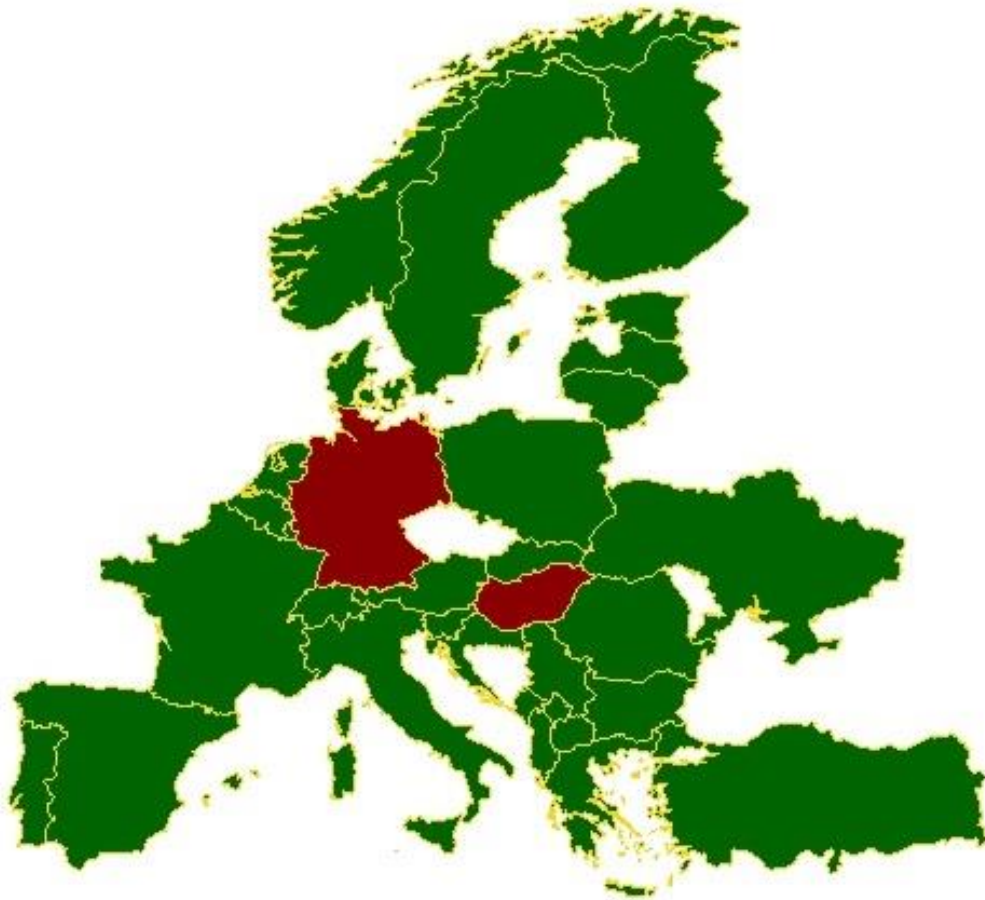


Measuring the Divide: A Multi-Metric Comparison of Opinion Polarization
across Europe, Germany, and Hungary.



Msc in Data Science for Society and Business
School of Business, Social & Decision Sciences

Stefano Giuliano Pinto

Matr.-No: 30007575

20th of May 2025

1st Supervisor: Prof. Dr. Jan Lorenz

2nd Supervisor: Dr. Mandi Larsen

Statutory Declaration

Family Name, Given/First Name	Pinto, Stefano Giuliano
Matriculation number	30007575
What kind of thesis are you submitting: Bachelor-, Master- or PhD-Thesis	Master

English: Declaration of Authorship

I hereby declare that the thesis submitted was created and written solely by myself without any external support. Any sources, direct or indirect, are marked as such. I am aware of the fact that the contents of the thesis in digital form may be revised with regard to usage of unauthorized aid as well as whether the whole or parts of it may be identified as plagiarism. I do agree my work to be entered into a database for it to be compared with existing sources, where it will remain in order to enable further comparisons with future theses. This does not grant any rights of reproduction and usage, however.

This document was neither presented to any other examination board nor has it been published.

German: Erklärung der Autorenschaft (Urheberschaft)

Ich erkläre hiermit, dass die vorliegende Arbeit ohne fremde Hilfe ausschließlich von mir erstellt und geschrieben worden ist. Jedwede verwendeten Quellen, direkter oder indirekter Art, sind als solche kenntlich gemacht worden. Mir ist die Tatsache bewusst, dass der Inhalt der Thesis in digitaler Form geprüft werden kann im Hinblick darauf, ob es sich ganz oder in Teilen um ein Plagiat handelt. Ich bin damit einverstanden, dass meine Arbeit in einer Datenbank eingegeben werden kann, um mit bereits bestehenden Quellen verglichen zu werden und dort auch verbleibt, um mit zukünftigen Arbeiten verglichen werden zu können. Dies berechtigt jedoch nicht zur Verwendung oder Vervielfältigung.

Diese Arbeit wurde noch keiner anderen Prüfungsbehörde vorgelegt noch wurde sie bisher veröffentlicht.

2025-05-17



Date, Signature

Acknowledgements

I would like to express my sincere gratitude to Prof. Dr. Jan Lorenz and Dr. Mandi Larsen for their invaluable contributions to my academic journey over the past two years. Their exceptional teaching, insightful advice, and dedicated service as reviewers for this thesis, including their coordination efforts, have been instrumental in my development and in the successful completion of this work.

Contents

Abstract	1
1 Introduction	2
2 Methods	4
2.1 ESS data	4
2.2 Software and packages	6
2.3 Polarization metrics	7
2.3.1 Non-neutrality	7
2.3.2 Average deviation from neutrality	8
2.3.3 Dispersion	8
2.3.4 Moderate divergence	9
2.3.5 Moderate group consensus	10
2.3.6 Moderate size parity	11
2.3.7 Explained variance of the first principal component	11
2.3.8 Average opinion	13
2.4 Web app for data exploration	13
3 Results	16
3.1 Europe	16
3.2 Germany	18
3.3 Hungary	20
3.4 Europe vs. Hungary vs. Germany	22
4 Discussion	24
4.1 Interpretation of results	24
4.2 Limitations	30
4.3 Novel insights	30
4.4 Future prospects	31
5 References	32
6 Appendix	42

Abstract

This thesis investigates opinion polarization concerning immigration in Europe. Employing longitudinal data from the European Social Survey and an exploratory web application, it addresses the question of increasing polarization across the continent. Seven polarization metrics, alongside one opinion-assessment metric, including a novel measure derived from Principal Component Analysis incorporating Likert-scale survey values, are utilized. A comparative analysis contrasts European averages with Germany and Hungary. The 2015 refugee crisis is identified as a key factor influencing polarization trends, with findings indicating increased polarization across nearly all metrics post-2015. Novel insights from this study reveal the role of economic factors in shaping immigration opinion polarization in Germany and highlight significant fluctuations in polarization levels within Hungary, challenging previously established knowledge.

Keywords: Computational Social Science, Immigration Opinion Polarization, Issue Alignment, European Social Survey (ESS), Principal Component Analysis (PCA) Germany, Hungary, Refugee Crisis, R, Shiny

1 Introduction

The global population of international migrants has increased substantially from 75 million in 1965 to approximately 272 million in 2019 (World Migration Report, 2020), with Europe being a primary destination (Haas et al., 2019). Migration is driven by factors including economic inequality, demographic shifts, and environmental crises (Richmond, 2002). Within Europe, attitudes toward immigration vary. Short-term increases in immigration in Western Europe correlate with more negative attitudes, particularly towards non-EU migrants. Conversely, regions with higher proportions of foreign-born residents tend to exhibit less anti-immigrant sentiment (Dražanová & Gonnot, 2023). National differences in these attitudes often reflect economic conditions, such as the severity of economic recessions (Hatton, 2016).

In opinion dynamics, polarization denotes the divergence of attitudes within a society, resulting in the formation of distinct, opposing groups (Williams, 2018). Regarding immigration, polarization manifests as significant or subtle variations in attitudes towards migrants, spanning from acceptance to opposition. Academic literature offers several definitions of attitudinal or political polarization. Social psychology describes group polarization, where deliberation intensifies pre-existing tendencies towards more extreme viewpoints (Sunstein, 2003). In political science, polarization refers to the increased divergence of opinions within larger groups or societies, with scholars distinguishing between elite and mass polarization. Elite polarization concerns the divergence of political parties or elected officials (Druckman et al., 2013), while mass polarization refers to the polarization of the general public, though its precise definition remains debated (Silva, 2018). A further distinction exists between affective polarization, the tendency for partisans to view opposing parties as disliked outgroups while favoring their own (Reiljan, 2020), and opinion polarization, which examines the distributional characteristics of public opinion on specific socio-political issues (DiMaggio et al., 1996). This thesis examines opinion polarization across three migration-related topics.

Researchers in opinion dynamics utilize diverse quantitative methodologies, including nonlinear modeling (Amelkin, Bullo & Singh, 2017), correlational studies (Nordio et al., 2019), kinetic theory-based Boltzmann equations (Düring & Wolfram, 2015), and stochastic modeling (Acemoglu et al., 2010). While this methodological pluralism allows for multi-faceted analysis, it complicates cross-study comparisons. A more streamlined set of metrics is needed to effectively capture opinion polarization on immigration in Europe. Simpler, robust metrics grounded in theory and empirical evidence would enhance the accessibility and

consistency of polarization assessments, facilitating clearer communication and cross-national comparisons for a more unified understanding.

Issue alignment, the correlation of attitudes across issues due to shared factors, is a relevant dimension of polarization. This alignment is associated with increased negative out-group affect and can intensify political hostility by amplifying perceived ideological distance (Bougher, 2017). Analyzing issue alignment concerning immigration opinions in Europe is crucial for understanding the broader political, social, and cultural context of these attitudes and their implications for public opinion, policy, and social cohesion. Prior research often employed singular, simplistic metrics (e.g., standard deviation) to quantify polarization (Musco et al., 2021; Koudenburg, Kiers & Kashima, 2021). This thesis advances the field by integrating multiple established metrics, each capturing distinct facets of polarization, to provide a more comprehensive and nuanced analysis of immigration-related opinion dynamics in Europe. Furthermore, this study introduces an innovative approach to quantifying issue alignment. Departing from conventional univariate measures, the proposed methodology simultaneously incorporates three attitudinal variables from the European Social Survey (ESS), offering a richer and potentially more accurate assessment of intra-individual coherence in immigration-related opinions.

The ESS, a large-scale, academically rigorous, cross-national survey conducted biennially across Europe, measures and compares attitudes, beliefs, values, and behaviours in over 30 European countries. This high-quality dataset serves as a key resource for researchers, policymakers, and the public to understand social change and differences across European societies (Eikemo et al., 2016). To the best of my knowledge, no existing Europe-wide study has systematically and comprehensively analysed opinion polarization by simultaneously examining overall and country-specific trends over time using multiple polarization metrics and a multi-variable approach to issue alignment with ESS data. Therefore, an analysis integrating multiple polarization metrics, differentiating overall and country-level trends across the entire ESS timeframe, and applying a novel multi-variable approach to issue alignment would significantly advance computational social science, offering a more nuanced understanding of European immigration opinion dynamics.

This leads to the central research question of this thesis: **Has there been an ongoing trend of several aspects of polarization, including issue alignment, in Europe regarding opinions about immigration?**

Drawing upon data from the ESS, this investigation explored the multifaceted nature of opinion polarization across Europe. To achieve this, eight distinct metrics, informed by existing literature, were computed to quantify various trends and aspects of polarization and general opinion dynamics, examining both overall and country-specific variations. Furthermore, a novel multi-variable approach to assess issue alignment was introduced, employing principal component analysis (PCA) to capture underlying structures in attitudinal data. The analysis utilized weighted survey data provided by the ESS, spanning from its inception in 2002 to the most recent available wave in 2022. The inclusion of weights ensured the representativeness of the findings for the national populations surveyed across this twenty-year timeframe. By analyzing these measures across successive ESS waves, significant temporal patterns in opinion dynamics were identified and characterized, illuminating the evolution of public sentiment on opinions regarding immigration.

2 Methods

The data were acquired from the ESS. Relevant variables were then selected and cleaned, including the removal of missing values and the transformation of survey round to the corresponding year. The final dataset comprised 403,837 respondents from 39 countries across ten survey waves. Following data cleaning, seven established polarization metrics were calculated for each round and country, alongside a distinct PCA to quantify issue alignment. The loadings and explained variance derived from the first principal component were then used for further interpretation.

2.1 ESS data

The data were obtained from the ESS Data Portal (2024) using the integrated datafile builder wizard, which facilitates the specific selection of variables, survey rounds, and countries of interest, and exports the resulting dataset as a CSV file. The analysis included data from the following 39 European countries: Albania, Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Kosovo, Latvia, Lithuania, Luxembourg, Montenegro, Netherlands, North Macedonia, Norway, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, and the United Kingdom. The ESS employs Likert-scales, a common method in social science for quantifying subjective data such as attitudes and satisfaction levels (Journal of Social Sciences, 2022). These scales typically range from strongly disagree (0) to neutral (5) to strongly agree (10), with intermediate options (e.g., Jamieson, 2004), measuring opinions by providing a range of choices for respondents. The

three relevant variables were *imwbent* ('Immigrants make country worse (0) or better (10) place to live'), *imueclt* ('Country's cultural life is undermined (0) or enriched (10) by immigrants'), and *imgbeco* ('Immigration is bad (0) or good (10) for country's economy'). Additional values representing questionnaire responses such as 77 = 'Refusal', 88 = 'Don't know', and 99 = 'No answer' were present in the data. These values were recoded as missing data points and subsequently removed from the dataset.

Weights are crucial in survey data as they ensure that the survey results accurately reflect the target population. While surveys aim for representative samples, imbalances can occur due to sampling design and response rates, leading to over- or under-representation of certain groups. Weights adjust the data to compensate for these imbalances, giving more influence to under-represented groups and less to over-represented ones (Pfeffermann, 1996; Ciol et al., 2006). In a Europe-wide study, for example, data from Germany would be weighted more heavily than data from Luxembourg to account for their significantly different population sizes and their respective contributions to the overall European trend. The ESS provides several weight variables. The analysis weight (*anweight*) corrects for differential selection probabilities within each country (as per sample design), nonresponse, noncoverage, and sampling error related to four post-stratification variables, while also accounting for differences in population size across countries. For ESS Round 9 onwards, *anweight* is included in the integrated data file (ESS weighting variables, 2024). For earlier rounds, *anweight* was derived by multiplying *pspwght* (post-stratification weight) with *pweight* (population weight), following ESS guidelines (Guide to Using Weights and Sample Design Indicators with ESS Data, 2024). Averaging across the 2002-2022 period, central and western European countries (excluding very small ones like Luxembourg) generally had higher weights compared to northern and eastern Europe. However, Russia had the largest average weight due to its substantial population size (Fig. 2.1).

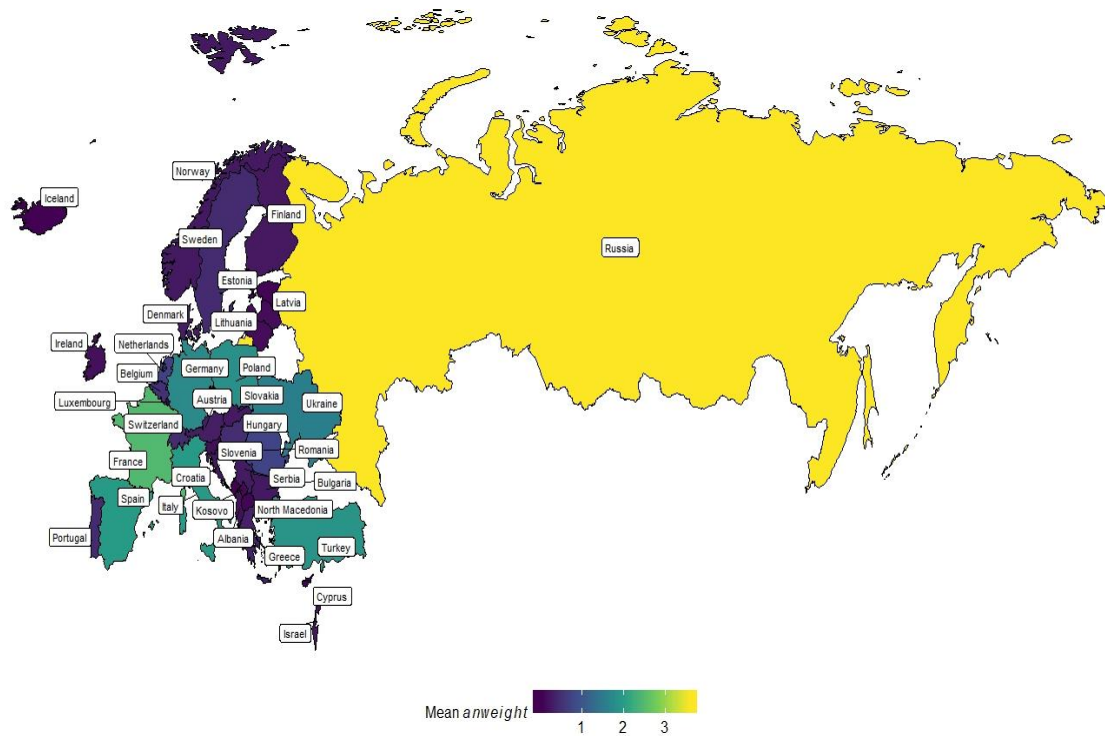


Fig 2.1 The mean analysis weight (*anweight*) values for ESS countries averaged across all survey rounds. Brighter colours indicate larger weights, signifying a greater contribution to subsequent calculations.

2.2 Software and packages

The data were analyzed using the R programming language (version 4.3.2; R Core Team, 2023). PCA was performed using the stats package (R Core Team, 2023). Data manipulation was conducted with the dplyr (Wickham et al., 2023) and glue (Hester & Bryan, 2024) packages. The countrycode package (Arel-Bundock, Enevoldsen & Yetman, 2018) was used for converting between 2-letter country codes and full country names. Missing data were handled using the naniar package (Tierney & Cook, 2023). Visualizations were created with the ggplot2 (Wickham, 2016) and ggrepel (Slowikowski, 2024) packages and composed using the Patchwork package (Pedersen, 2024). A complementary web application for visual data exploration was developed using the shiny (Chang et al., 2023), shinyWidgets (Perrier et al., 2025), and shinydashboard (Chang & Borges Ribeiro, 2021) packages. The complete implementation and related materials for this thesis are publicly available in a GitHub repository accessible at https://github.com/StefanoPinto/MA_repo. The exploratory web application can be found at https://stefanopinto.shinyapps.io/shiny_app/. Literature research was facilitated by the Consensus web application, and Google Gemini 2.0 Flash was used for spellchecking and rephrasing.

2.3 Polarization metrics

Consistent with prior research (DiMaggio et al., 1996; Evans et al., 2001; Bramson et al., 2016), opinion polarization was assessed using representative survey data, in this case provided by the ESS. The variables *imbgeco* ('Immigrants make country worse (0) or better (10) place to live'), *imueclt* ('Country's cultural life is undermined (0) or enriched (10) by immigrants'), and *imwbcnt* ('Immigration is bad (0) or good (10) for country's economy') each ranged from 0 (extremely negative) to 10 (extremely positive), with 5 representing a neutral stance. For several subsequent metrics, proportions $p_0, p_1, \dots, p_9, p_{10}$, representing the relative frequencies of valid responses for each option from zero to ten for the respective survey variable were calculated. These proportions, ranging from 0 to 1, indicate the fraction of the total represented by each response category. The weighted proportions of each level for *imbgeco*, *imueclt*, and *imwbcnt* were calculated for each round and country, incorporating the analysis weight (*anweight*). Following Bauer's (2019) concept of dimensionality, a unidimensional approach was employed for the polarization metrics, with the exception of the issue alignment metric. These metrics were calculated individually for each of the three variables, based on the distribution of valid responses within each country and round, excluding 'Don't know', 'Refusal', and 'No answer' responses. The assessment of polarization was grounded in established principles (DiMaggio et al., 1996) and axioms (Esteban & Ray, 1994; Duclos et al., 2004) for polarization measures, as reviewed and formalized by Bramson et al. (2016). Drawing inspiration from these works, six distinct and unidimensional aspects of polarization were employed, alongside a novel multidimensional metric for issue alignment and a general metric for average opinion, resulting in a total of eight metrics: seven quantifying polarization and one quantifying the general sentiment towards immigration.

2.3.1 Non-neutrality

$$\text{Non} - \text{neutrality} = 1 - p_5 \quad (1)$$

Non-neutrality, defined as not selecting the midpoint (5) on the 0-10 scale, serves as an indicator of polarization by quantifying the proportion of individuals holding non-impartial views. An increase in non-neutrality regarding immigration suggests a decline in neutral opinions and a greater concentration of individuals with accepting or objecting viewpoints. A completely polarized society would exhibit a complete absence of neutral stances, consistent with Esteban and Ray's (1994) axiom that polarization intensifies as population mass moves away from the center. Ademmer and Stöhr (2018) also employ a low proportion of central responses as a measure of polarization, aligning with observations of a 'disappearing center'

in other contexts (Abramowitz & Saunders, 2008; Fiorina & Abrams, 2008). Conversely, the reversed measure reflects Draca and Schwarz's (2021) 'disappearing centre' effect.

2.3.2 Average deviation from neutrality

$$\text{Average deviation from neutrality} = \frac{1}{5} |\mu - 5| \quad (2)$$

where

$$\mu = \sum_{i=0}^{10} i \cdot p_i$$

Average deviation from neutrality is calculated as the absolute difference between the mean opinion $\mu = \sum_{i=0}^{10} i \cdot p_i$ and the neutral point (5). While distinct, high average deviation can paradoxically indicate consensus at an extreme, contrasting with the typical view of polarization as the opposite of consensus. The measure is normalized by $\frac{1}{5}$ for a maximum value of 1. Regarding public opinion on immigration, a rising average deviation from neutrality indicates increasingly accepting or rejecting individual views. Maximum polarization in this sense occurs when everyone holds an extreme opinion (0 or 10). This aligns with Esteban and Ray's (1994) third axiom regarding shifting population mass from the central mass' and relates to social psychology's group polarization concept, capturing opinion shifts 'toward a more extreme point' (cf. Sunstein, 2003). However, maximal polarization here implies extremity-based consensus, contrasting with the subsequent polarization notion.

2.3.3 Dispersion

$$\text{Dispersion} = \frac{1}{5} \sum_{i=0}^{10} p_i \cdot |i - \mu| \quad (3)$$

DiMaggio et al. (1996) proposed that increased opinion dispersion hinders the establishment of centrist political consensus. Dispersion, quantified by the mean absolute deviation, reflects the average spread of individual opinions around the distribution mean, consistent with Bramson et al. (2016). For immigration attitudes, higher dispersion indicates greater individual divergence from the average. This contrasts with average deviation from neutrality, which measures the mean's shift from a fixed point (5). Maximum polarization under this dispersion metric occurs when a population is equally divided between extreme opposing views. Dispersion as a polarization measure has been utilized in prior research (Adams et al.,

2011; Bramson et al., 2016; Duffy et al., 2019; Rapp, 2016). The maximal dispersion value is normalized to 1 by a scaling factor of $\frac{1}{5}$.

2.3.4 Moderate divergence

$$\text{Moderate divergence} = \frac{1}{10} |\mu_{m[\text{oppose}]} - \mu_{m[\text{accept}]}| \quad (4)$$

with

$$p_{m[\text{accept}]} = p_1 + p_2 + p_3 + p_4$$

and

$$p_{m[\text{oppose}]} = p_6 + p_7 + p_8 + p_9$$

and

$$\mu_{m[\text{accept}]} = \frac{1 \cdot p_1 + 2 \cdot p_2 + 3 \cdot p_3 + 4 \cdot p_4}{p_{m[\text{accept}]}}$$

and

$$\mu_{m[\text{oppose}]} = \frac{6 \cdot p_6 + 7 \cdot p_7 + 8 \cdot p_8 + 9 \cdot p_9}{p_{m[\text{oppose}]}}$$

Bramson et al. (2016) argue that polarization extends beyond the previously mentioned aspects, proposing measures that consider group divergence, internal consensus, and size parity, contingent on the existence of distinct groups. While US research often utilizes self-identified partisans as predefined groups, which aligns with its two-party system, this approach is less applicable in the European context. Bramson et al. (2016) suggest an endogenous approach to group formation based on the opinion distribution itself. Lorenz (2017) identified five such endogenous groups within ESS opinion distributions: extreme left, moderate left, neutrals, moderate right, and extreme right. In this study, analogous groups are operationalized for each variable as follows: 0 (full acceptors), 1-4 (moderate acceptors), 5 (neutrals), 6-9 (moderate opponents), and 10 (full opponents). This separation of the scale's midpoint and endpoints acknowledges their differential treatment by respondents, with the midpoint representing neutrality and the endpoints signifying extreme positions (Tourangeau, 2018). To operationalize the group-based polarization dimensions described by Bramson et al. (2016), two endogenous groups are employed: The moderate accepting group $p_{m[\text{accept}]} = p_1 + p_2 + p_3 + p_4$ and the moderate opposing group $p_{m[\text{oppose}]} = p_6 + p_7 + p_8 + p_9$, as well

as the corresponding mean attitudes $\mu_{m[accept]} = \frac{1 \cdot p_1 + 2 \cdot p_2 + 3 \cdot p_3 + 4 \cdot p_4}{p_{m[accept]}}$ and $\mu_{m[oppose]} = \frac{6 \cdot p_6 + 7 \cdot p_7 + 8 \cdot p_8 + 9 \cdot p_9}{p_{m[oppose]}}$

Moderate divergence is quantified as the absolute difference between the means of the moderate accepting and moderate opposing groups, as described by Bramson et al. (2016). The measure is normalized by a factor of $\frac{1}{10}$. Regarding public opinion on immigration, increased moderate divergence indicates a larger gap between the average attitudes of moderately accepting and moderately opposing individuals. Maximum polarization, in this context, occurs when these average positions are maximally separated. This measure, also employed by DiMaggio et al. (1996) and Fiorina and Abrams (2008), reflects DiMaggio et al.'s (1996) bimodality principle: increased separation between opinion modes elevates the likelihood of social conflict.

2.3.5 Moderate group consensus

$$1 - \frac{1}{2} (MAD_{m[accept]} + MAD_{m[oppose]}) \quad (5)$$

where

$$MAD_{m[accept]} = \sum_{i=1}^4 \frac{p_j \cdot |i - \mu_{m[accept]}|}{\sum_{j=1}^4 p_j}$$

and

$$MAD_{m[oppose]} = \sum_{i=6}^9 \frac{p_j \cdot |i - \mu_{m[oppose]}|}{\sum_{j=6}^9 p_j}$$

Moderate group consensus is quantified by the mean absolute deviation (MAD) within the moderate accepting and moderate opposing groups. In contrast to the dispersion metric, higher group consensus corresponds to lower MAD values within these groups. Concerning public opinion on immigration, increased moderate group consensus signifies greater agreement among individuals within each moderate group. Maximum polarization, in this sense, occurs when each moderate group exhibits perfect agreement on a single opinion. This aspect, introduced by Bramson et al. (2016), aligns with the identification component of Duclos et al.'s (2004) identification-alienation framework, reflecting the internal coherence of moderate viewpoints.

2.3.6 Moderate size parity

$$\text{Moderate size parity} = \min\left\{\frac{p_{m[\text{accept}]}}{p_{m[\text{oppose}]}} , \frac{p_{m[\text{oppose}]}}{p_{m[\text{accept}]}} \right\} \quad (6)$$

Moderate size parity is defined as the ratio of the smaller to the larger moderate group's size. A parity of 1 indicates equally sized groups, representing maximum polarization in terms of size balance. This is a simplified operationalization of the measure proposed by Bramson et al. (2016). Regarding public opinion on immigration, increased moderate size parity signifies a more balanced number of moderately accepting and opposing individuals. Maximum polarization occurs when these two groups are of equal size. This aspect, introduced by Bramson et al. (2016), conceptually relates to DiMaggio et al.'s (1996) bimodality principle and the alienation component of Duclos et al.'s (2004) identification-alienation framework, where equal group sizes can amplify alienation.

2.3.7 Explained variance of the first principal component

While the preceding six metrics are unidimensional according to Bauer's (2019) classification, this seventh metric adopts a multidimensional approach by simultaneously considering *imbgeco*, *imueclt*, and *imwbent* using PCA. PCA transforms a dataset with potentially correlated variables into a new set of uncorrelated variables known as principal components (PCs). These PCs are ordered based on the amount of variance they explain from the original variables, allowing for the simplification of complex datasets while retaining critical information. The initial step in PCA involves calculating the covariance matrix to understand the magnitude and direction of the variables' individual and joint variation. Subsequently, the correlation matrix is derived from the covariance matrix through standardization. In this analysis, weights were integrated by calculating the correlation matrix using the analysis weight variable (*anweight*), resulting in a weighted correlation matrix upon which the subsequent PCA steps were based. Next, the eigenvectors and eigenvalues of the correlation matrix are computed. The eigenvectors represent the directions of the principal components, and the eigenvalues indicate the amount of variance explained by each component. By selecting the top few principal components—those with the highest explained variance—the dimensionality of the original data can be reduced (e.g., Abdi & Williams, 2010; Gewers et al., 2018). Essentially, PCA identifies the most significant patterns in a complex dataset by determining the directions of greatest variance and using these directions to represent the data in a simpler form. Analogously, imagine shining a light on a cloud of data points; the shadow represents a simplified version. PCA aims to find the optimal angle to

maximize the captured shape of the original cloud. Furthermore, it can be visualized as stretching the cloud along its longest axis and compressing it along its shortest, identifying the key transformations to simplify the data's representation.

As previously mentioned, each principal component (PC) accounts for a specific proportion of the total variance in the data. Building upon findings from a prior project within the ‘Capstone Project’ module, the first principal component (PC1) was identified as sufficient to capture and reflect a general attitude towards immigration. Notably, all loadings for PC1 were positive. In contrast to the ‘Capstone Project’, which observed alternating positive and negative loadings across different years, this ‘flipping’ did not occur in the current analysis. This discrepancy likely stems from the use of the `princomp()` function in R, which more readily accommodated the weighted correlation matrix, instead of the more commonly used `prcomp()` function. Furthermore, ensuring the consistency of PC1 variable loadings over time, particularly when averaged across Europe, was crucial to guarantee its reliable capture of the general attitude toward immigration. This consistency was confirmed (Fig. 2.2).

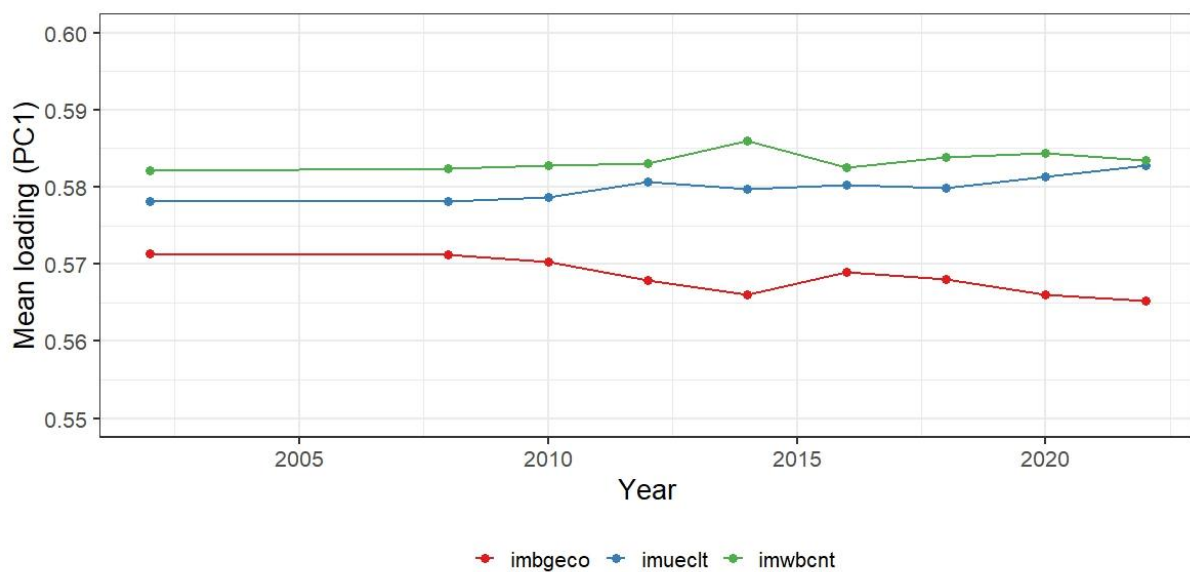


Fig 2.2 Mean PC1 Loadings of *imbgeco*, *imueclt* & *imwbcnt* across all countries over time. The corresponding loading values of the three variables were consistently between 0.55 and 0.60 over all rounds.

On the country level, the loadings of PC1 for the three considered migration variables ranged similarly stable between 0.54 and 0.60, with some smaller and larger differences between the countries (see appendix). The consistency of the loading values of PC1 ensured that there was no between-year variation of the meaning of PC1. The seventh metric was thus the explained variance of the first PC for a given year and country. The previously performed steps now allowed to visually identify trends by assessing the explained variance of PC1 over time.

2.3.8 Average opinion

$$\text{Average Opinion} = \frac{1}{n} \sum_{i=1}^n o_i \quad (6)$$

Finally, although not a direct measure of polarization, the weighted mean opinion values were calculated from the raw Likert values for each variable, year, and country. This was done to track the general direction of sentiment change (up or down the Likert-scale) within countries over time, providing a more comprehensive understanding alongside the polarization metrics.

2.4 Web app for data exploration

Investigating polarization dynamics across seven distinct metrics observed over ten time points spanning two decades (2002-2022) for three key variables presented a substantial analytical challenge, particularly when conducted at both continental and individual country levels. Consequently, a dedicated tool with the ability to facilitate effective data exploration, filtering, and visualization was built prior to the main analysis. With the data obtained from the ESS, this web application allowed to assess the temporal development of each metric and variable on both the continental and country levels. Additionally, it made it possible to rank the data using any of the metrics and variables for a given year. Lastly, it allowed to focus on a given country-year-variable combination, yielding insights into all metrics in comparison to the European average along with a view into the distribution of opinions (0 to 10 Likert values) for the same time frame (Figs. 2.3 to 2.6).



Fig 2.3 The ‘Overview + trend’ page of the exploratory web app, showing the development of the non-neutrality metric for the three opinion variables between 2002 and 2022 using the Europe-wide average.

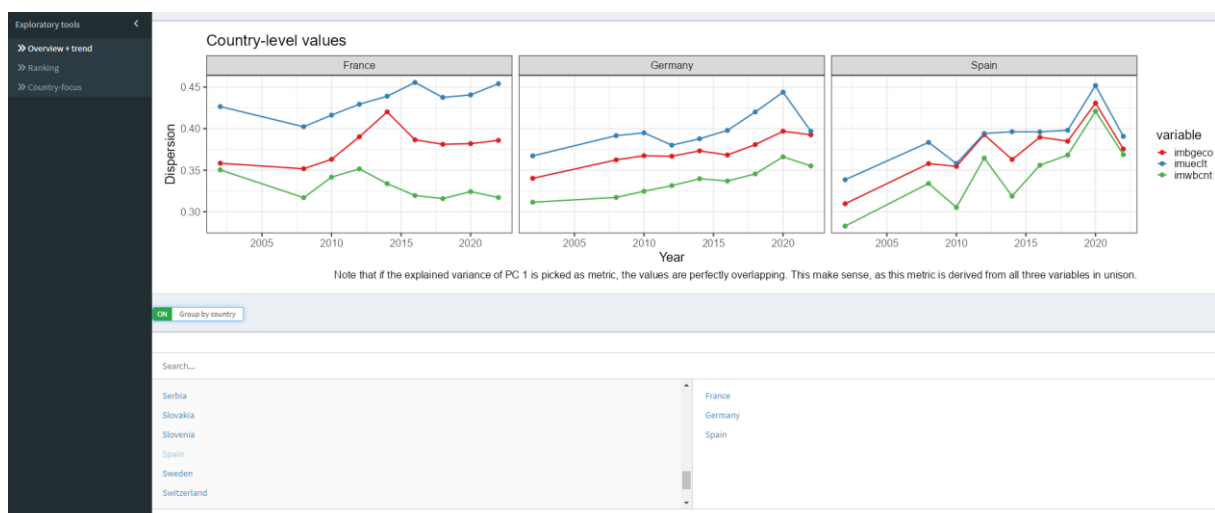


Fig 2.4 The ‘Overview + trend’ page of the exploratory web app, showing the development of the dispersion metric for the three opinion variables between 2002 and 2022 separately for France, Germany and Spain.

country	non_neutrality	avg_deviation_from_neutrality	dispersion	moderate_divergence	moderate_group_consensus	moderate_size_parity	expl_var_pc1
Austria	0.719	0.0215	0.326	0.4346	0.6815	0.1795	0.7166
Belgium	0.7069	0.1583	0.3412	0.4067	0.6967	0.1679	0.6772
Switzerland	0.7315	0.0649	0.3099	0.4191	0.7227	0.1273	0.6867
Czechia	0.7219	0.1902	0.3428	0.431	0.6443	0.1251	0.7202
Germany	0.7017	0.0094	0.3402	0.4145	0.7135	0.2166	0.6902
Denmark	0.7021	0.1656	0.3535	0.437	0.686	0.2363	0.7615
Spain	0.6897	0.0649	0.3096	0.4149	0.6957	0.1464	0.6844
Finland	0.7439	0.0738	0.3204	0.4077	0.7426	0.184	0.693
France	0.6592	0.0019	0.3584	0.4336	0.6406	0.2538	0.7929
United Kingdom	0.7133	0.1215	0.3508	0.4099	0.7031	0.1013	0.7744

Fig 2.5 The ‘Ranking’ page of the exploratory web app, showing all metrics for *imbgeco* in 2022. This table could now be sorted based on any of the metric, resulting in a corresponding country-ranking.

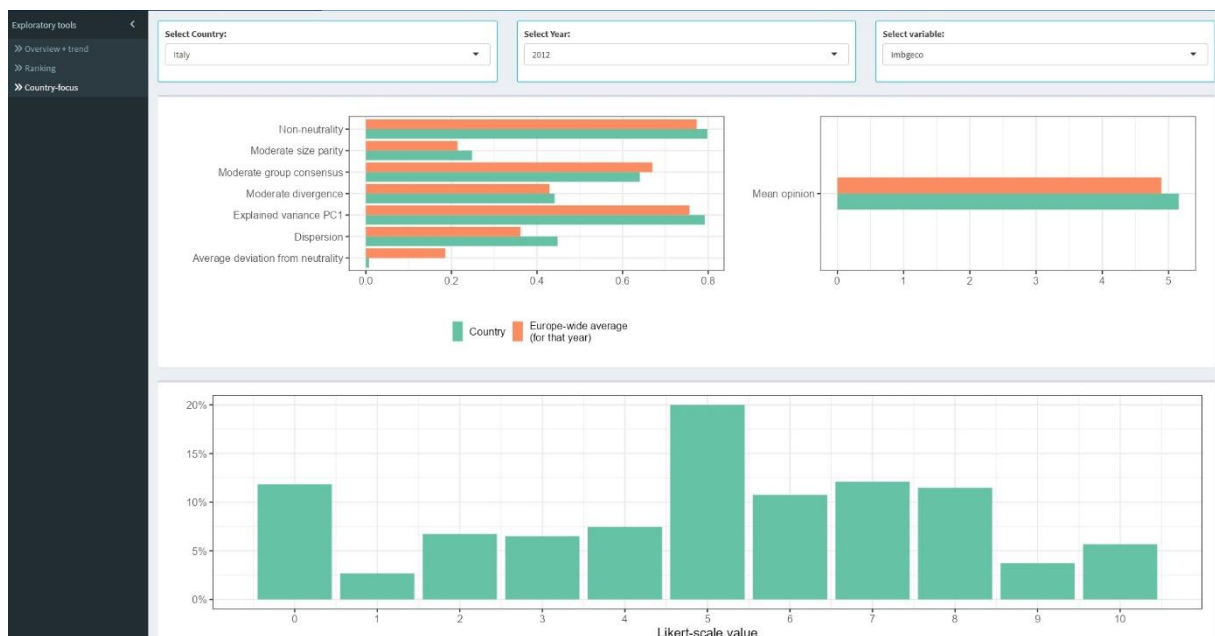


Fig 2.6 The ‘Country-focus’ page of the exploratory web app, showing the development of all polarization metrics for *imbgeco* in 2012 for Italy in comparison with the Europe-wide averages. The bottom plot shows the distribution of the Likert values for the same time frame.

3 Results

Based on insights from the web application, a comparison of European average polarization metrics with those of Germany and Hungary was conducted, as these two countries potentially represented contrasting public sentiments, while the aggregated European data offered a valuable overview and reference point.

3.1 Europe

Considering Europe as a whole by averaging across all countries, ongoing trends were found in the form of increases in polarization for almost all metrics and variables. Especially visible for the timeframe around 2015, increases in average deviation from neutrality, increases in dispersion, increases in the explained variance of the first principal component, increases in moderate divergence and thus corresponding decreases in moderate group consensus, a strongly decreasing moderate size parity, and a very clear upward trend in non-neutrality were identified. Paired with these results, a tendency for an increase of the mean opinions towards a more slightly approving sentiment was discovered (Fig 3.1).

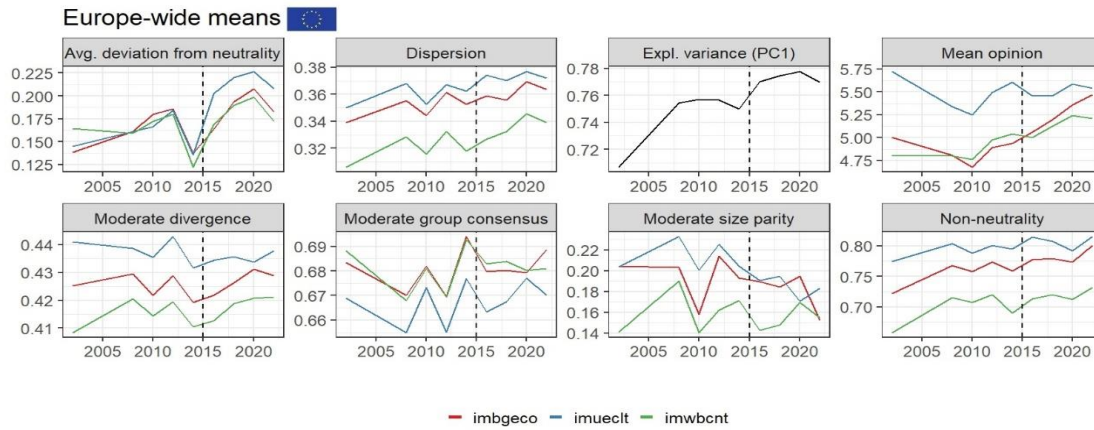


Fig 3.1 The seven aspects of polarization and the mean opinion over time on the European continental level averaged across all available countries between 2002 and 2022. Avg. deviation from neutrality: Shows the average extent to which opinions deviate from a neutral stance, i.e., an increase of acceptance **or** rejection. Higher values suggest stronger opinions, indicating increasing polarization. The trends for the three variables seem to show a general increase in deviation from neutrality, suggesting that opinions on immigration have become less neutral and more shifted towards the extremes, particularly since 2015. Dispersion: Measures the deviation from the average opinion. Higher dispersion indicates a shift towards a more extreme opinion (in both directions), and can thus be a sign of polarization. The trends here show an upward tendency, again implying that the range of opinions on immigration have shifted towards the extreme ends on the individual level, again especially visible after 2015. Expl. variance (PC1): Refers to the explained variance of the first principal component of the PCA based on the three migration variables. A higher value suggests that a single underlying dimension (the general sentiment towards immigration) explains a larger proportion of the variance in opinions. The upward trend in this graph suggests that opinions on immigration have become increasingly structured, indicating an increase in polarization in the form of issue alignment, with a notable spike after 2015. Mean opinion: Shows the average opinion for each variable on the original Likert-scale. Small values indicate resentment, five indicates a neutral stance, and large values indicate approval. All three variables a tendency to increase in mean opinion towards the later part of the observed period. The period around 2010 seems to have been a turning point for all three variables, with opinions generally having started to improve towards a mildly positive stance after that year. Moderate divergence: Captures the extent to which the average views of the moderately accepting and moderately opposing individuals diverge. The trends have been somewhat fluctuating, but there appears to be an overall increase in moderate divergence, indicating an ongoing increase in polarization between the two moderate groups, again more visibly after 2015. Moderate group consensus: Assesses the level of agreement within the two moderate groups. Over the years, the values have been fluctuating, but again, results show see a decrease in consensus right after 2015, indicating an ongoing increase in opinion polarization. Moderate size parity: Captures the ratio of the smaller to the larger group holding moderate opinions. Here, results have been fluctuating, but a decrease in group size parity is visible for *imbgeco* (economic factors) and *imueclt* (cultural factors) after 2015, again indicating an increase in polarization since that time. Non-neutrality: Measures the prevalence of non-neutral opinions. Higher values indicate a larger proportion of the population holding either positive or negative views on immigration. All three variables show a clear upward trend, especially after 2015, suggesting an ongoing and significant increase in the proportion of Europeans holding non-neutral opinions on immigration.

3.2 Germany

Similar to the Europe-wide results, the polarization metrics focussed on Germany showed the year 2015 to have been a crucial turning point in regards to immigration opinions. The average deviation from neutrality increased for economic considerations, and decreased for overall and cultural variables. Dispersion increased, indicating a greater diversity of views. The explained variance of the first principal component increased, indicating that opinions on different variables of immigration became more aligned in a process otherwise known as issue alignment. The mean opinion decreased for cultural and general views, but again increased for economic considerations. Moderate divergence increased, and thus moderate group consensus decreased, indicating greater polarization even among those not holding extreme views. Moderate size parity increased, suggesting polarization for all three variables. Lastly, non-neutrality clearly increased (Fig. 3.2).

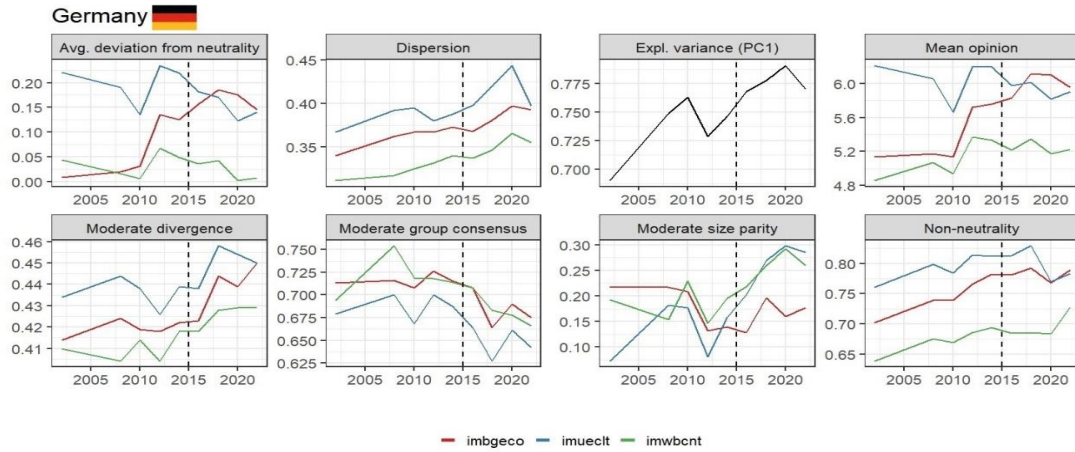


Fig 3.2 The seven aspects of polarization and the average opinion over time for Germany. Avg. deviation from neutrality: Shows how far, on average, opinions deviate from the neutral point. For *imueclt* (cultural), and *imwbcnt* (overall quality of life), the average deviation from neutrality has been decreasing after 2015, whereas *imbgeco* (economic) has been increasing, suggesting that economic considerations have become more important and thus a more polarizing factor. Dispersion: Measures the deviation from the average opinion. Higher dispersion indicates a shift towards a more extreme opinion (in both directions), and can thus be a sign of polarization on the individual level. For all three variables, the dispersion generally has been increasing after 2015, indicating a greater diversity of opinions about immigration. Expl. variance (PC1): Represents the amount of variance in the combined data of the three immigration variables that is explained by the first principal component of a PCA. A higher explained variance suggests that the opinions on these three variables tend to move together. The plot shows a general increase in explained variance of PC1 after 2015. This suggests that since that period, opinions on whether immigration is good for the economy, enriches culture, or makes the country a better place have become more aligned, which is a process known as issue alignment. Mean opinion: Shows the average opinion on the original Likert-scale. For *imueclt* and *imwbcnt*, the mean opinions have been decreasing after 2015, indicating a shift towards more negative views on the cultural and overall impact of immigration at that point, whereas *imbgeco* has been increasing, indicating a growing believe that immigrants might boost the economy. Moderate divergence: Measures the difference in average opinion between those moderately accepting and those moderately opposing immigration. An increase indicates greater polarization between these moderate groups. The plot shows a clear increase in moderate divergence for all three variables after 2015, signifying that the gap between moderately accepting and moderately opposing individuals has widened considerably following that year. Moderate group consensus: Measures the agreement within the moderately accepting and moderately opposing groups. For all three variables, there has been a general decrease in moderate group consensus after 2015. This suggests that within both the moderately accepting and moderately opposing groups, opinions have become more varied around that time. Moderate size parity: The ratio of the smaller to the larger moderate group. The plot shows that the parity increased has been increasing after 2015 for all three variables. This suggests that the size of the two moderate groups have become more equal in size, indicating an increase in polarization among the members of the moderate groups during that period. Non-neutrality: Shows the proportion of individuals holding non-neutral views. For all three variables, there have been weak increase in non-neutrality after 2015, suggesting only a mild shift towards both more extreme ends of the opinion spectrum.

3.3 Hungary

Considering Hungary, results strongly suggest yet again that the period around 2015 has been a critical turning point for public opinion on immigration. Before this time, average opinions tended to be slightly positive to neutral. The timeframe around 2015 appears to have triggered a significant shift: Average opinions turned sharply negative across all three dimensions (economic, cultural, and general impact). Opinions became more polarized, with individuals holding stronger views, both positive and negative, leading to higher average deviation from neutrality and increased dispersion. Views on the different variables of immigration became more aligned, as indicated by the increasing explained variance of the first principal component. Additionally, we found a growing divergence between moderate groups: The gap between those with moderately accepting and moderately opposing views widened. Also, the relative size of the moderately opposing group appears to have increased. Opinions became more extreme, with a larger proportion of the population holding non-neutral views, indicating polarization. In summary, the refugee crisis seems to have acted as a polarizing event in Hungary, leading to more negative, less neutral, and more divergent opinions on the various facets of immigration. However, many of the polarization metrics exhibited much more fluctuations for Hungary than their counterparts for the European averages and Germany (Fig. 3.3).

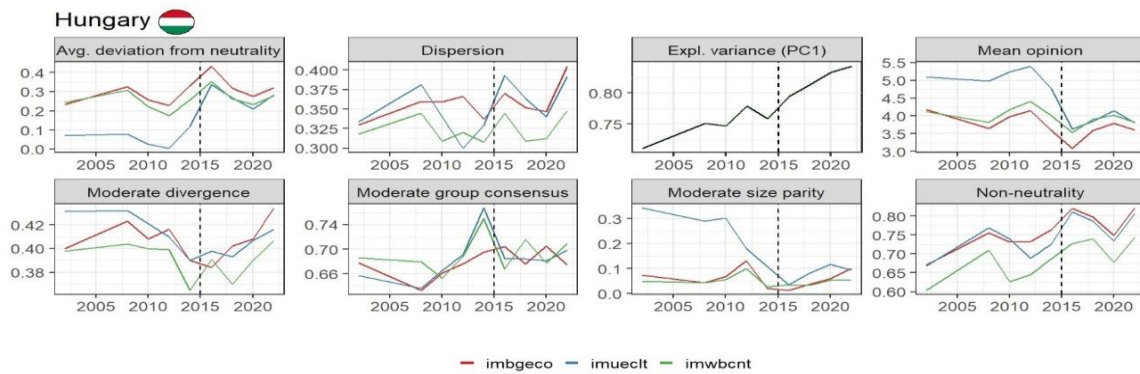


Fig 3.3 The seven aspects of polarization and the average opinion over time for Hungary. Avg. deviation from neutrality: Shows how far, on average, opinions are from the neutral midpoint. Results indicate a general trend of increasing deviation from neutrality across all three variables after directly 2015, with a quickly following decrease. This suggests that opinions have become less neutral and more strongly held in either the positive or negative direction during that time, but also indicate a certain volatility of opinions stances. Dispersion: Measures the deviation from the average opinion on the individual level. The plot shows that there was a spike of increasing dispersion levels after 2015 for all three variables, suggesting an average shift towards more extreme opinions in both directions during that period. But again, that spike was rather quickly followed by a decrease, which, in turn, has been followed by an ongoing increase, again indicating fluctuating opinions. Expl. variance (PC1): The explained variance of the first principal component from a PCA combining the three immigration variables shows a clear and ongoing upward trend, especially after 2015. This suggests that a single underlying dimension - the general attitude towards immigration – has become increasingly dominant in explaining the variation in opinions across the three measured variables. Opinions on the economic, cultural, and societal impacts of immigration have become more aligned during that timeframe, indicating ongoing issue alignment. Mean opinion: This displays the average opinion. For all three variables, the mean opinion generally decreased after 2015, indicating a shift towards more negative average perceptions of immigration. Followed by a slight increase thereafter, but still way below the neutral value of 5. Moderate divergence: Measures the gap between the average opinions of moderately accepting and moderately opposing groups. Results show an ongoing increase in moderate divergence after 2015 for all three variables after ten years of decrease, suggesting that the views of those with somewhat positive and somewhat negative initial stances on immigration have been drifting further apart at that time, albeit with quite the fluctuations. Moderate group consensus: Shows the internal agreement within the moderately accepting and moderately opposing groups. The plot shows varying trends, but there isn't a clear consistent pattern of increasing or decreasing consensus within these moderate groups across all three variables since 2015 due to strong fluctuations. Moderate size parity: The ratio of the smaller to the larger moderate group. The plot shows an increase in moderate size parity around and after 2015. This suggests that the size of the two moderate groups have become more equal in size, indicating an increase in polarization among the members of the moderate groups during that period. Non-neutrality: Represents the proportion of individuals holding non-neutral views. There was an increase in non-neutrality across all three variables as of 2015, indicating that more people moved away from a neutral stance and adopted a more definite positive or negative opinion on immigration at that time. However, shortly after that increases, a decrease followed until 2020, which, in turn has been followed by another increase, once more pointing at the presence of more strongly fluctuating opinions in Hungary.

3.4 Europe vs. Hungary vs. Germany

For both the European averages and the Germany and Hungary individually, 2015 was found to be a turning point in immigration opinion dynamics. Treating the European averages as an overall central point of reference made it easier to spot differences and deviations on the country-levels of Germany and Hungary. Comparing the Europe-wide results, starting at 2015, several similarities, but also striking differences were discovered.

Regarding non-neutrality, increases were observed in the European averages, Germany, and Hungary. This indicates an overall trend of deviation from the neutral midpoint of 5 across Europe. However, initial non-neutrality values in 2015 were already high for Europe overall, Germany, and Hungary, ranging from 0.70 to 0.80. A more fluctuating pattern was again noted for Hungary. Across Europe, an increase in the average deviation from neutrality was detected for all three variables. A similar increase, albeit with greater fluctuations, was observed for Hungary. In contrast, for Germany, only *imbgeco* exhibited an increase, while the other two variables showed a decreasing trend. This suggests that among German citizens, economic considerations are more divisive than those related to culture or general life quality. Increasing trends in dispersion were observed both across Europe and individually in Germany and Hungary. However, dispersion values fluctuated more strongly in Hungary. This suggests that patterns of increasing individual deviation from the average attitude are not limited to a few individual countries but are prevalent across Europe. Similar to the dispersion metric, an increase in the proportion of explained variance of the first principal component was observed across Europe, as well as at the country level in Germany and Hungary. This suggests issue alignment not only at the continental level but also within individual countries. For moderate groups (individuals with ESS survey responses of 1-4, termed ‘moderate acceptors’, or 6-9, termed ‘moderate opponents’), an increase in moderate divergence was observed in European averages and individually in Germany and Hungary. This reveals a continuous widening of the gap between the average views of moderately accepting and moderately opposing individuals, leading to more polarized positions. Stronger fluctuations were again evident in Hungary. Regarding moderate group consensus, European averages showed no significant change after 2015 for *imbgeco* and *imwbcnt*, whereas *imueclt* visibly increased. This indicates that overall, in Europe, the distribution of opinions on economic and overall life-quality impacts remained relatively stable among moderate groups, while in-group consensus regarding the cultural impact of immigrants increased. In contrast, Germany experienced a drop in moderate consensus for all three variables, demonstrating an ongoing heterogenization of opinions among moderate groups concerning the economic, cultural, and

overall life-quality impacts of immigration. Compared to the European average and Germany, Hungary displayed strongly fluctuating patterns of moderate consensus for *imbgeco* and *imwbcnt*, suggesting instability with short-lived phases of agreement and disagreement after 2015. Regarding moderate size parity, European averages showed a decrease from 0.20 to 0.16 for *imbgeco* and *imueclt*, while *imwbcnt* remained relatively stable. This indicates a trend of decreasing moderate size parity, suggesting a growing imbalance in the number of moderately accepting versus moderately opposing individuals regarding immigration. This decrease in moderate size parity actually signifies reduced polarization among moderate voters, as maximum polarization occurs when both groups are of equal size. In Germany, moderate size parity increased for all three variables: *imueclt* and *imwbcnt* rose from 0.20 to 0.30, and *imbgeco* increased from 0.15 to 0.18 (2015-2020). This indicates strong increases in polarization concerning cultural and overall life-quality impacts, and a weaker but substantial increase in polarization regarding the economic impacts of immigration among moderate voters in Germany. In Hungary, weaker increases were observed for *imbgeco* and *imueclt*, rising from 0.05 to 0.1, suggesting a slight increase in polarization among moderate voters concerning economic and cultural considerations of immigration. Notably, the initial moderate size parity values in Hungary in 2015 (0.05) were considerably smaller than in Germany (0.20) and Europe overall (0.20), indicating a much greater imbalance in moderate-sized groups in Hungary at the beginning of the period. Finally, regarding the average opinion value, increases were observed in all three variables across Europe, indicating a general trend toward a pro-immigrant attitude. In Germany, a positive trend was seen for *imbgeco*, a decreasing trend for *imueclt*, and no discernible trend for *imwbcnt*. This suggests a growing sentiment in Germany that immigrants may benefit the economy, coupled with a concurrent belief that immigrants may negatively impact cultural life. In stark contrast to the generally pro-immigrant trend in Europe and the mixed trends in Germany, Hungary exhibited a clear decrease in opinions regarding all three variables, indicating an overall trend of increasing resentment toward immigration.

In summary, the results indicate that 2015 marked a pivotal point for immigration opinions in Europe. Post-2015, deviations from a neutral stance were observed at both continental and national levels for Germany and Hungary, with economic factors exhibiting the most divisive influence in Germany. Concurrently, an increasing proportion of variance was explained by the first principal component. Furthermore, evidence suggested a growing polarization and size imbalance within moderate groups. However, an increase in average Likert opinion values was also found in European averages. In Germany, a divergence emerged, with

increasing belief in the economic benefits of immigration alongside growing concerns about negative cultural impacts. The trend of increasing resentment toward immigration in Hungary aligns with expectations. More notably, however, stronger fluctuations were observed in Hungary for five out of eight metrics, suggesting greater opinion volatility compared to Germany and the European average.

4 Discussion

Several results indicated 2015 as a pivotal year for immigration dynamics across Europe, Germany, and Hungary, leading to increases in various aspects of opinion polarization regarding immigration. This can be attributed to the peak of the European refugee crisis in that year. During this period, over one million individuals arrived in Europe by sea, primarily fleeing conflicts in the Middle East, Africa, and South Asia, particularly Syria (Almustafa, 2021; Piguet, 2024). Prior research suggests that the 2015 refugee crisis strained European institutions and politics, resulting in heightened party competition and polarization. Political elites and parties adjusted their stances, with right-wing and populist movements gaining influence by emphasizing national sovereignty and stricter immigration controls. The crisis acted as a catalyst for movements and parties challenging the existing political order, often employing xenophobic rhetoric (e.g., Izak, 2021; Hutter & Kriesi, 2021; Yaseen et al., 2025). However, regional differences emerged, with Eastern and Western Europe exhibiting varied responses, where trust in domestic and EU institutions played a significant role in shaping attitudes (Peshkopia, Bllaca & Lika, 2018).

4.1 Interpretation of results

Clear evidence of increased polarization, in the form of increasing non-neutrality, was found across Europe and in Hungary after 2015, although this increase was very weak for Germany. This indicates an ongoing trend of shifting away from a neutral stance across Europe, albeit with varying degrees. Indeed, following 2015, many European countries experienced a departure from neutral positions, with public opinion becoming more divided and, in some instances, more negative toward immigration, particularly in countries where the discourse centered on security concerns (e.g., Cichocki & Jabkowski, 2019; Torres, 2019). Regarding Germany, only very weak evidence for increasing non-neutrality after the 2015 refugee crisis was observed. Prior research suggests that specific events, such as the 2015-16 New Year's Eve sexual assaults and the 2016 Berlin terror attack in Germany, may have led to temporary negative (i.e., non-neutral) shifts in attitudes toward refugees. However, these changes were often short-lived and did not typically translate into long-term trends (Vollmer & Karakayali,

2018; Schmidt-Cantra & Czymara, 2020). For Hungary, a clearer increase in non-neutrality was observed after 2015, likely due to governmental anti-immigration campaigns. However, this was followed by a period of decreasing non-neutrality between 2016 and 2020, indicating a move towards a more neutral stance. After 2020, a sharp increase in non-neutrality was again evident. This volatility, also seen in other metrics, suggests that opinions on immigration among many Hungarians tend to change relatively quickly. This contradicts research indicating stable and strongly anti-immigration views in Hungary during this period (e.g., Bajomi-Lázár, 2019; Bíró-Nagy, 2021). In addition to increased non-neutrality in Hungary, a general shift away from a neutral opinion stance on immigration across Europe was observed on average from 2015, as indicated by increases in the average deviation from neutrality. The way political actors and the media frame immigration can contribute to the differentiation and polarization of public opinion (Lahav, 2004; Kehrberg, 2007). Notably, the distinction between ‘immigrant’ and ‘refugee’ can lead to more nuanced, and sometimes more polarized, attitudes. Generally, more positive views are held toward refugees than immigrants, with attitudes varying further based on the ethnicity, country of origin, and economic background of newcomers (Kehrberg, 2007). However, while some countries exhibited more restrictive opinions in response to increased immigration flows and political framing, overall shifts in public opinion across Europe have been relatively mild, with significant variation between countries (Hatton, 2016). For instance, in Germany, increased polarization was only observed regarding economic considerations, as indicated by an increasing average deviation from neutrality for the *imbgeco* variable. Indeed, the sentiment of Germans toward immigration can be shaped by economic self-interest, such as concerns about personal finances and job security (Van Hauwaert & Vegetti, 2025). Germans with neoliberal economic views are more likely to perceive immigrants as a burden on the welfare state, whereas those with left-leaning economic views are more inclined to see immigrants as beneficial (Grdešić, 2019). While the metric identified economic factors as the divisive force shaping immigration opinion in Germany, other research suggests a more complex interplay of factors. According to Fetzer (2000), cultural marginality and ethnocentrism are often stronger predictors of anti-immigration sentiment than economic self-interest, particularly in Western Germany.

Unlike non-neutrality and average deviation from neutrality, dispersion quantifies the average spread of individual data points around the mean of a distribution, rather than a fixed value like the neutral 5. Thus, dispersion measures an individual's deviation from the average opinion; higher dispersion indicates a wider range of opinions. For Europe overall, weak

increases in dispersion were observed for *imbgeco* and *imueclt* as of 2015, with *imwbcnt* showing a slightly stronger increase in a pattern that began in 2002. This aligns with existing research reporting only mild shifts in public opinion on immigration between 2002 and 2012, attributing this partly to the severity of economic recessions (Kehrberg, 2007). A similar pattern was evident for Germany. However, Hungary again exhibited much stronger fluctuations in dispersion following an increase immediately after 2015, suggesting greater volatility of opinions at the individual level during that period.

Based on Lorenz (2017), two moderate groups, moderate acceptors and moderate opponents, were identified. An increase in moderate divergence across Europe, particularly in Germany and Hungary, was observed. In Germany, internal divisions and conflicting messages on immigration policy within moderate parties, such as the Christian Democratic Union (CDU), resulting from the presence of both pro- and anti-immigration stances, reflected broader divergences among moderate voters (Schmidtke, 2024). A clear antagonism between supporters and opponents of immigration within the German electorate, including moderates and centrists, has been shown in studies, with this divide being particularly visible on the issue of immigration (Hebenstreit, 2022). In Hungary, the government's intensive anti-immigration campaigns, especially during and after the 2015 migration wave, significantly influenced public opinion. Consequently, widespread anti-immigration sentiment across the political spectrum, including among moderates (Bocskor, 2018), was generated. Prior to the crisis, minor differences in anti-immigrant attitudes existed between political groups, including moderates. However, following the crisis and the government's campaign, these differences became more pronounced, with party preference playing a larger role in shaping attitude (Barna & Koltai, 2019).

With increasing moderate divergence, a logical decrease in moderate consensus should occur, a finding supported by observations in Germany and Hungary post-2015. Notably, the moderate group consensus for Hungary exhibited greater fluctuation compared to Germany, suggesting higher volatility in Hungarian moderate voters' opinions on immigration relative to Germany and the European average. This observation contrasts with research indicating the temporal stability of public immigration preferences. However, fluctuations in the salience of immigration as a political issue, potentially driving temporary increases in support for far-right parties during periods of high public visibility (Magistro & Wittstock, 2021; Cools, Finseraas & Røgeberg, 2021), could be a confounding factor.

Across Europe, a decrease in moderate size parity for *imbgeco* and *imueclt* was found, indicating reduced polarization among moderate voters regarding economic and cultural factors. This contradicts research reporting attitude stability across Europe with limited evidence of significant divergence or convergence between pro- and anti-immigration groups, including moderates (Hatton, 2016). Nevertheless, significant spatial clustering of anti-immigrant attitudes has been reported (Di Lillo, 2018). While such clustering exists, it does not necessarily reflect a Europe-wide shift in the balance between moderate pro- and anti-immigrant groups. Indeed, substantial evidence indicates Hungary as an anti-immigration hotspot, as evidenced by decreasing Likert-scale opinion values (see below).

In Germany, increases in moderate size parity were observed for all three variables after 2015, indicating a trend toward more equal group sizes of moderate acceptors and moderate opponents, and consequently, increased polarization among moderately opinionated individuals. Current research lacks clear evidence of a sustained trend toward parity between these groups post-2015, suggesting this finding offers a novel insight. While less pronounced than in Germany, similar increases in moderate size parity across all three variables were found in Hungary after 2015, following years of decreasing size parity (i.e., decreasing polarization among moderate groups). This suggests the susceptibility of even moderate group members to state-driven anti-immigrant propaganda in either direction. Notably, for all variables, the moderate size parity reached values below 0.1, indicating highly imbalanced group sizes at this point. Prior research does not clearly suggest such extreme inequality in the group sizes of moderate pro- and anti-immigrant opinionated citizens in Hungary. Indeed, available research and survey data do not indicate a dramatic imbalance between these groups before the 2015 migration crisis (e.g., Schneider, 2007), implying that these findings may provide another novel insight.

Analysis of raw Likert-scale opinion values revealed positive trends for the average opinion across Europe, moving slightly above the neutral 5 since 2010. This increase was particularly evident for *imbgeco* and *imwbcnt*, while *imueclt* remained relatively stable post-2015. This suggests that despite media coverage and government campaigns in certain countries fostering anti-immigrant sentiment, the average European maintains a slightly positive view on immigration, especially concerning its economic potential and impact on overall quality of life. Prior research indicates a gradual shift toward more positive attitudes about immigrants in Western EU countries since the 2000s, largely attributed to the greater openness of younger generations. However, this positive trend appears to be decelerating, with newer cohorts not

exhibiting significantly more positive attitudes than preceding ones (Schmidt, 2021). The results, however, show stagnation only for *imueclt* while *imbgeco* and *imwbcnt* continue to show an upward trend. Examination of raw Likert-scale opinion values in Germany suggests a growing segment of the population perceives immigrants as potentially beneficial for the economy, while simultaneously, another segment believes immigrants may negatively impact cultural life after 2015. Indeed, in Germany, immigration is widely acknowledged for its positive economic contributions, particularly in addressing labor shortages and supporting economic growth. Historically, immigration has aided Germany in mitigating demographic challenges, such as an aging population and labor shortages, by supplying both high- and low-skilled workers, thereby enhancing productivity, innovation, and overall economic growth (Higgins & Klitgaard, 2019; Grajdeanu, 2023). Despite common concerns, most studies indicate minimal to no negative impact of immigration on native employment or wages (Prantl & Spitz-Oener, 2020). While immigrants can contribute to cultural diversity (Giovanis, Akede & Ozdamar, 2021), debates and concerns persist among some groups in Germany regarding potential cultural change or loss of traditional values. Diminished support for welfare programs among some native-born Germans has been observed with increasing proportions of immigrants, particularly during periods of high unemployment. This reflects concerns about social cohesion and resource allocation, especially in the initial stages of immigration waves (Schmidt-Catran & Spies, 2016). In contrast to the mixed trends in Germany, Hungary exhibits an overall trend of increasing resentment towards immigration. The Hungarian government, particularly under Viktor Orbán, has implemented intensive anti-immigration campaigns since 2015, framing immigration as both an economic and security threat. These campaigns have conflated migrants with terrorists and criminals and presented the government as the protector of Hungarian and Christian values (Bocskor, 2018; Bajomi-Lázár, 2019). The highly politicized media environment in Hungary, characterized by limited pluralism and critical voices, has amplified government messaging and reduced the visibility of alternative perspectives on immigration (Farkas, 2021). Consequently, this trend is largely attributable to deliberate political strategies portraying immigration as a danger to Hungarian values and identity, especially since 2015. However, it is important to note that several of the polarization metrics indicate strong fluctuations for Hungary.

A novel polarization metric, the explained variance of the first principal component (PC1) from a PCA using the three immigration variables, was introduced. An increase in the proportion of explained variance of PC1 was interpreted as an increase in issue alignment – the synchronization of opinions toward immigration. For instance, with increasing issue

alignment, an individual agreeing that immigrants benefit a country's cultural life would be increasingly likely to also consider them beneficial for the economy. This pattern was observed both when averaged across Europe before and after 2015, and at the country level for Germany and Hungary. Indeed, individuals holding positive views of immigrants in one domain, such as cultural life, are often more likely to hold positive views in other domains, such as economic contributions (Van Hauwaert, S., & Vegetti, F., 2025). The findings indicate that the rates of increasing issue alignment have been roughly comparable for both Germany and Hungary after 2015. Germany generally exhibits more positive opinions about immigration than Hungary (see below; Bocskor, 2018; Heath & Richards, 2019; Bíró-Nagy, 2021). However, other research suggests that the alignment of positive opinions is more probable among individuals with higher political tolerance, stronger European identity, and better information about immigration (Lahav, 2004; De Coninck, 2020; Van Hauwaert & Vegetti, 2025), leading to an expectation of a faster rate of alignment in Germany than in Hungary.

While the 2015 immigration crisis is a recognized turning point in shaping opinions on immigration, its significant reflection in the polarization results is notable. Several indicators suggest that opinion polarization has occurred at both the European continental and national levels (at least for Germany and Hungary), affecting both moderate and more extreme groups since 2015. Particularly striking are the substantial fluctuations observed in five out of eight metrics for Hungary in that year, indicating a higher degree of change and volatility in opinions than previously understood, potentially even at the individual level. This finding is surprising given (or perhaps precisely because of) the country's autocratic, anti-immigrant leadership.

The results suggest a nuanced and multifaceted nature of opinion polarization. In Germany, economic considerations appear to be the primary driver of polarized stances, with cultural concerns seemingly secondary. Conversely, the strong fluctuations in Hungary's metrics make it challenging to definitively determine whether economic, cultural, general quality-of-life factors, or a combination thereof, have been driving opinion polarization since 2015. Nevertheless, a concurrent trend of a unifying 'overall immigration opinion' appears to be emerging across Europe, as well as in Germany and Hungary. The analysis also illuminates the less frequently examined moderate group, demonstrating that polarization has also occurred within this group at both continental and national levels.

This thesis provides a novel understanding of European immigration opinion dynamics through a robust, large-scale empirical approach. By employing established polarization metrics alongside a newly introduced metric—the explained variance of the first principal component (also serving as a measure of issue alignment)—this study elucidates both continental and national complexities in economic, cultural, and quality-of-life considerations shaping opinions on immigration. Partially challenging assumptions from existing research, this thesis offers a valuable contribution to the field. Moreover, the development of an extensible exploratory web application furnishes a practical tool for future research and analysis in this domain.

4.2 Limitations

Despite the novel insights offered by this study, certain limitations should be acknowledged. The analysis primarily focused on two specific countries, Germany and Hungary, in addition to European averages. While these selections provided valuable contrasting cases, the inclusion of additional countries, such as a Scandinavian nation known for its progressive policies, could have yielded further nuanced and contrasting perspectives. However, time constraints necessitated a focus on Germany and Hungary alongside the European average. Furthermore, the temporal analysis of the time series data relied predominantly on visual assessment rather than the application of specific trend identification methods. Although visual assessment facilitated the identification of salient patterns, future research could benefit from employing formal time series methodologies such as the Mann-Kendall trend test to quantify trends with greater statistical rigor. Finally, some interpretations were based on trends commencing shortly after 2015, despite the availability of data up to 2022. It is worth noting, however, that many of these trends did extend into 2022 and potentially beyond. Repeating the analysis as soon as the ESS releases the survey data for the latest round (2024) might show whether the identified trends indeed continue into the present or take a different direction.

4.3 Novel insights

While frequently corroborating existing research, this thesis also yielded several novel insights. For Germany, an unreported trend of increasing size parity was observed starting in 2015, along with a stronger influence of economic factors compared to cultural ones. Another previously undocumented finding is the extremely unequal moderate group sizes in Hungary, also commencing around 2015. Contrary to prior research suggesting a faster rate of issue alignment in Germany than in Hungary, the findings indicate a similar pace of ‘alignment of

issues' between the two countries. This could imply a closer ideological alignment regarding immigration than previously assumed, or that factors like political tolerance, European identity, and information access are less influential on the speed of issue alignment than other variables. Furthermore, while previous research suggests consistent immigration opinions in Hungary, the results indicate greater volatility than previously recognized, suggesting that significant portions of the Hungarian population may not be as entrenched in government-driven anti-immigration narratives as commonly believed. Lastly, the research reveals a decreasing trend in moderate group size equality across Europe since 2015 for *imbgeco* and *imueclt*, indicating depolarization, which contrasts with previous research reporting more stable patterns.

4.4 Future prospects

The continuous increase in the explained variance of PC1 across Europe suggests a trend toward a more binary perception of 'the immigrant', consolidating concerns about the economy, culture, and overall quality of life into a singular overarching concern. This merging of previously distinct dimensions could potentially erode the nuances identified in this study, thereby increasing the risk of further polarization.

This research has demonstrated the necessity of nuanced perspectives to pinpoint the underlying factors and geographical locations of immigration opinion polarization hotspots, also suggesting that the Hungarian population may not be the monolithic bastion of anti-immigrant sentiment it is sometimes portrayed as. However, the results also indicate that these nuances might be overshadowed by a more generalized perception of immigration, at least concerning economic, cultural, and overall quality-of-life considerations. This process could be amplified by the increasing prominence of (far-)right parties across Europe. As of May 2025, Germany has a conservative leader in Friedrich Merz (CDU), while the AFD is gaining influence. Viktor Orbán also remains in power in Hungary. Nevertheless, a positive aspect is the continuing improvement in the average opinion about immigration across Europe, and the presence of a new Pope who may advocate for pro-immigration worldviews.

5 **References**

- Abdi, H. and Williams, L. (2010) 'Principal component analysis', Wiley Interdisciplinary Reviews: Computational Statistics, 2. Available at: <https://doi.org/10.1002/wics.101>.
- Abramowitz, A.I. and Saunders, K.L. (2008) 'Is polarization a myth?', The Journal of Politics, 70(2), pp. 542-555. Available at: <https://doi.org/10.1017/S0022381608080493>.
- Acemoglu, D., Como, G., Fagnani, F. and Ozdaglar, A. (2010) 'Opinion Fluctuations and Disagreement in Social Networks', Economics of Networks eJournal. Available at: <https://doi.org/10.1287/moor.1120.0570>.
- Adams, J., de Vries, C.E. and Leiter, D. (2011) 'Subconstituency reactions to elite depolarization in the Netherlands: An analysis of the Dutch public's policy beliefs and partisan loyalties 1986 – 98', British Journal of Political Science, 42(1), pp. 81–105. Available at: <https://doi.org/10.1017/S0007123411000214>.
- Ademmer, E. and Stöhr, T. (2018) Europeans are more accepting of immigrants today than 15 years ago. Evidence from eight waves of the European Social Survey. MEDAM Policy Brief, October. Available at: <https://www.stiftung-mercator.de/de/publikationen/europeans-are-more-accepting-of-immigrants-today-than-15-years-ago/>.
- Almustafa, M. (2021) 'Reframing refugee crisis: A “European crisis of migration” or a “crisis of protection”?', Environment and Planning C: Politics and Space, 40, pp. 1064-1082. Available at: <https://doi.org/10.1177/2399654421989705>.
- Amelkin, V., Bullo, F. and Singh, A. (2017) 'Polar Opinion Dynamics in Social Networks', IEEE Transactions on Automatic Control, 62, pp. 5650-5665. Available at: <https://doi.org/10.1109/TAC.2017.2694341>.
- Arel-Bundock, V., Enevoldsen, N. and Yetman, C. (2018) 'countrycode: An R package to convert country names and country codes', Journal of Open Source Software, 3(28), 848. Available at: <https://doi.org/10.21105/joss.00848>.
- Bajomi-Lázár, P. (2019) 'An anti-migration campaign and its impact on public opinion: The Hungarian case', European Journal of Communication, 34, pp. 619-628. Available at: <https://doi.org/10.1177/0267323119886152>.
- Barna, I. and Koltai, J. (2019) 'Attitude Changes towards Immigrants in the Turbulent Years of the 'Migrant Crisis' and Anti-Immigrant Campaign in Hungary', Intersections. Available at: <https://doi.org/10.17356/IEEJSP.V5I1.501>.

Bauer, P.C. (2019) Conceptualizing and measuring polarization: A review. SocArxiv working paper, 12 September. Available at: <https://doi.org/10.31235/osf.io/e5vp8>.

Bíró-Nagy, A. (2021) 'Orbán's political jackpot: migration and the Hungarian electorate', *Journal of Ethnic and Migration Studies*, 48, pp. 405-424. Available at: <https://doi.org/10.1080/1369183X.2020.1853905>.

Bocskor, Á. (2018) 'Anti-Immigration Discourses in Hungary during the 'Crisis' Year: The Orbán Government's 'National Consultation' Campaign of 2015', *Sociology*, 52, pp. 551-568. Available at: <https://doi.org/10.1177/0038038518762081>.

Bougher, L. (2017) 'The Correlates of Discord: Identity, Issue Alignment, and Political Hostility in Polarized America', *Political Behavior*, 39, pp. 731-762. Available at: <https://doi.org/10.1007/S11109-016-9377-1>.

Böcskei, B. and Molnár, C. (2019) 'The radical right in government? – Jobbik's pledges in Hungary's legislation (2010–2014)', *East European Politics*, 35, pp. 1-20. Available at: <https://doi.org/10.1080/21599165.2019.1582414>.

Bramson, A., Grim, P., Singer, D.J., Fisher, S., Berger, W., Sack, G. and Flocken, C. (2016) 'Disambiguation of social polarization concepts and measures', *Journal of Mathematical Sociology*, 40(2), pp. 80–111. Available at: <https://doi.org/10.1080/0022250X.2016.1147443>.

Cichocki, P. and Jabkowski, P. (2019) 'Immigration attitudes in the wake of the 2015 migration crisis in the Visegrád Group countries', *Intersections*. Available at: <https://doi.org/10.17356/IEEJSP.V5I1.480>.

Ciol, M., Hoffman, J., Dudgeon, B., Shumway-Cook, A., Yorkston, K. and Chan, L. (2006) 'Understanding the use of weights in the analysis of data from multistage surveys', *Archives of physical medicine and rehabilitation*, 87(2), pp. 299-303. Available at: <https://doi.org/10.1016/J.APMR.2005.09.021>.

Chang, W., Cheng, J., Allaire, J., Sievert, C., Schloerke, B., Xie, Y., Allen, J., McPherson, J., Dipert, A. and Borges, B. (2023) shiny: Web Application Framework for R. R package version 1.8.0. Available at: <https://CRAN.R-project.org/package=shiny>.

Chang, W. and Borges Ribeiro, B. (2021) shinydashboard: Create Dashboards with 'Shiny'. R package version 0.7.2. Available at: <https://CRAN.R-project.org/package=shinydashboard>.

- Cools, S., Finseraas, H. and Røgeberg, O. (2021) 'Local Immigration and Support for Anti-Immigration Parties: A Meta-Analysis', *American Journal of Political Science*. Available at: <https://doi.org/10.1111/AJPS.12613>.
- De Coninck, D. (2020) 'Migrant categorizations and European public opinion: diverging attitudes towards immigrants and refugees', *Journal of Ethnic and Migration Studies*, 46, pp. 1667-1686. Available at: <https://doi.org/10.1080/1369183X.2019.1694406>.
- Di Lillo, M. (2018) 'The geography of anti-immigrant attitudes across Europe, 2002–2014', *Journal of Ethnic and Migration Studies*, 138, pp. 1-19. Available at: <https://doi.org/10.1080/1369183X.2018.1427564>.
- DiMaggio, P., Evans, J.H. and Bryson, B. (1996) 'Have American's social attitudes become more polarized?', *The American Journal of Sociology*, 102(3), pp. 690–755.
- Dochow-Sondershaus, S. and Teney, C. (2024) 'Opinion polarization of immigration and EU attitudes between social classes – the limiting role of working class dissensus', *European Societies*, 26, pp. 1363-1394. Available at: <https://doi.org/10.1080/14616696.2024.2312948>.
- Duclos, J., Esteban, J. and Ray, D. (2004) 'Polarization: Concepts, measurement, estimation', *Econometrica*, 72(6), pp. 1737-1772. Available at: <https://www.jstore.org/stable/3598766>.
- Duffy, B., Hewlett, K., McCrae, J. and Hall, J. (2019) *Divided Britain? Polarization and fragmentation trends in the UK*. King's College London research report, September. Available at: <https://www.kcl.ac.uk/policy-institute/assets/divided-britain.pdf>.
- Düring, B. and Wolfram, M. (2015) 'Opinion dynamics: inhomogeneous Boltzmann-type equations modelling opinion leadership and political segregation', *Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences*, 471. Available at: <https://doi.org/10.1098/rspa.2015.0345>.
- Draca, M. and Schwarz, C. (2021) *How polarized are citizens? Measuring ideology from the ground-up*. SSRN research paper, 11 May. Available at: <https://doi.org/10.2139/ssrn.3154431>.
- Dražanová, L. and Gonnot, J. (2023) 'Attitudes toward immigration in Europe: Cross-regional differences', *Open Research Europe*, 3. Available at: <https://doi.org/10.12688/openreseurope.15691.1>.

- Druckman, J.N., Peterson, E. and Slothuus, R. (2013) 'How elite partisan polarization affects public opinion formation', *American Political Science Review*, 107(1), pp. 57–79. Available at: <https://doi.org/10.1017/S0003055412000500>.
- Eikemo, T., Bambra, C., Huijts, T. and Fitzgerald, R. (2016) 'The First Pan-European Sociological Health Inequalities Survey of the General Population: The European Social Survey Rotating Module on the Social Determinants of Health', *European Sociological Review*, 33, pp. 137-153. Available at: <https://doi.org/10.1093/ESR/JCW019>.
- European Social Survey (2024) ESS Data Portal. Available at: <https://ess.sikt.no/en/?Table=overview>.
- ESS weighting variables (2024). Available at: <https://www.europeansocialsurvey.org/methodology/ess-methodology/data-processing-and-archiving/weighting>.
- Esteban, J. and Ray, D. (1994) 'On the measurement of polarization', *Econometrica*, 62(4), pp. 819-852.
- Evans, J.H., Bryson, B. and DiMaggio, P. (2001) 'Opinion polarization: Important contributions, necessary limitations', *American Journal of Sociology*, 10(4), pp. 944–959. Available at: <https://doi.org/10.1086/320297>.
- Farkas, E. (2021) 'Discussing immigration in an illiberal media environment: Hungarian political scientists about the migration crisis in online public discourses', *European Political Science*, 21, pp. 95-114. Available at: <https://doi.org/10.1057/s41304-021-00340-y>.
- Fetzer, J. (2000) 'Economic self-interest or cultural marginality? Anti-immigration sentiment and nativist political movements in France, Germany and the USA', *Journal of Ethnic and Migration Studies*, 26, pp. 23-5. Available at: <https://doi.org/10.1080/136918300115615>.
- Fiorina, M.P. and Abrams, S.J. (2008) 'Political polarization in the American public', *Annual Review of Political Science*, 11, pp. 563–588. Available at: <https://doi.org/10.1146/annurev.polisci.11.053106.153836>.
- Funk, N. (2016) 'A spectre in Germany: refugees, a ‘welcome culture’ and an ‘integration politics’', *Journal of Global Ethics*, 12, pp. 289-299. Available at: <https://doi.org/10.1080/17449626.2016.1252785>.

FWU Journal of Social Sciences. Likert-scale in Social Sciences Research: Problems and Difficulties (2022). Available at: <https://doi.org/10.51709/19951272/winter2022/7>.

Gewers, F., Ferreira, G., Arruda, H., Silva, F., Comin, C., Amancio, D. and Costa, L. (2018) 'Principal Component Analysis', *ACM Computing Surveys (CSUR)*, 54, pp. 1-34. Available at: <https://doi.org/10.1145/3447755>.

Giovanis, E., Akdede, S. and Ozdamar, O. (2021) 'Impact of the EU Blue Card programme on cultural participation and subjective well-being of migrants in Germany', *PLoS ONE*, 16. Available at: <https://doi.org/10.1371/journal.pone.0253952>.

Grajdeanu, A. (2023) 'The demo-economic effects of Germany's migration', *Culegere de lucrari stiintifice: Simpozion stiintific al tinerilor cercetatori*, vol 1. Available at: <https://doi.org/10.53486/9789975359023.09>.

Grdešić, M. (2019) 'Neoliberalism and Welfare Chauvinism in Germany', *German Politics and Society*. Available at: <https://doi.org/10.3167/gps.2019.370201>.

Guide to Using Weights and Sample Design Indicators with ESS Data (2024). Available at: https://www.europeansocialsurvey.org/sites/default/files/2023-06/ESS_weighting_data_1_1.pdf.

Haas, H., Czaika, M., Flahaux, M., Mahendra, E., Natter, K., Vezzoli, S. and Villares-Varela, M. (2019) 'International Migration: Trends, Determinants, and Policy Effects', *Population and Development Review*. Available at: <https://doi.org/10.1111/PADR.12291>.

Hatton, T. (2016) 'Immigration, public opinion and the recession in Europe', *Economic Policy*, 31, pp. 205-246. Available at: <https://doi.org/10.1093/EPOLIC/EIW004>.

Heath, A. and Richards, L. (2019) 'How do Europeans differ in their attitudes to immigration? Findings from the European Social Survey 2002/03 – 2016/17'.

Hebenstreit, J. (2022) 'Voter Polarisation in Germany: Unpolarised Western but Polarised Eastern Germany?', *German Politics*, 32, pp. 63-84. Available at: <https://doi.org/10.1080/09644008.2022.2056595>.

Hegedüs, D. (2019) 'Rethinking the incumbency effect. Radicalization of governing populist parties in East-Central-Europe. A case study of Hungary', *European Politics and Society*, 20, pp. 406-430. Available at: <https://doi.org/10.1080/23745118.2019.1569338>.

- Helbling, M., Jäger, F., Maxwell, R. and Traunmüller, R. (2023) 'Broad and Detailed Agreement: Public Preferences for German Immigration Policy', *International Migration Review*. Available at: <https://doi.org/10.1177/01979183231216076>.
- Hester, J. and Bryan, J. (2024) glue: Interpreted String Literals. R package version 1.7.0. Available at: <https://CRAN.R-project.org/package=glue>.
- Higgins, M. and Klitgaard, T. (2019) 'How Has Germany's Economy Been Affected by the Recent Surge in Immigration?'
- Hoogduin, and Hemelrijk, C. (2020) 'Migration and migrants: A global overview', *World Migration Report*, pp. 255–266. Available at: <https://doi.org/10.1002/wom3.12>.
- Hutter, S. and Kriesi, H. (2021) 'Politicising immigration in times of crisis', *Journal of Ethnic and Migration Studies*, 48, pp. 341-365. Available at: <https://doi.org/10.1080/1369183X.2020.1853902>.
- Izak, K. (2021) 'Changes in the perception of immigration, integration, multiculturalism and threats of Islamic radicalism in certain EU member states', 13, pp. 375-403. Available at: <https://doi.org/10.4467/20801335PBW.21.017.13574>.
- Kehrberg, J. (2007) 'Public Opinion on Immigration in Western Europe: Economics, Tolerance, and Exposure', *Comparative European Politics*, 5, pp. 264-281. Available at: <https://doi.org/10.1057/PALGRAVE.CEP.6110099>.
- Koudenburg, N., Kiers, H. and Kashima, Y. (2021) 'A New Opinion Polarization Index Developed by Integrating Expert Judgments', *Frontiers in Psychology*, 12. Available at: <https://doi.org/10.3389/fpsyg.2021.738258>.
- Kumari, K. and Yadav, S. (2018) 'Linear regression analysis study', *Journal of the Practice of Cardiovascular Sciences*, 4, pp. 33-36. Available at: https://doi.org/10.4103/JPCS.JPCS_8_18.
- Jamieson, S. (2004) 'Likert-scales: how to (ab)use them', *Medical Education*, 38. Available at: <https://doi.org/10.1111/J.1365-2929.2004.02012.X>.
- Pedersen, T. (2024) patchwork: The Composer of Plots. R package version 1.2.0. Available at: <https://CRAN.R-project.org/package=patchwork>.

- Lahav, G. (2004) 'Public Opinion Toward Immigration in the European Union', *Comparative Political Studies*, 37, pp. 1151-1183. Available at: <https://doi.org/10.1177/0010414004269826>.
- Lorenz, J. (2017) 'Modeling the evolution of ideological landscapes through opinion dynamics', in Jager, W., Verbrugge, R., Flache, A., de Roo, G. and Lugosi, L. (eds) *Advances in social simulation 2015*.
- Lugosi, N. (2018) 'Radical right framing of social policy in Hungary: between nationalism and populism', *Journal of International and Comparative Social Policy*, 34, pp. 210-233. Available at: <https://doi.org/10.1080/21699763.2018.1483256>.
- Magistro, B. and Wittstock, N. (2021) 'Changing Preferences versus Issue Salience: The Political Success of Anti-immigration Parties in Italy', *South European Society and Politics*, 26, pp. 383-411. Available at: <https://doi.org/10.1080/13608746.2021.2009107>.
- Musco, C., Ramesh, I., Ugander, J. and Witter, R. (2021) How to Quantify Polarization in Models of Opinion Dynamics. *ArXiv*, abs/2110.11981.
- Neis, H., Meier, B. and Furukawazono, T. (2018) 'Welcome City: Refugees in Three German Cities', *Urban Planning*. Available at: <https://doi.org/10.17645/UP.V3I4.1668>.
- Nordio, A., Tarable, A., Chiasserini, C. and Leonardi, E. (2019) 'Opinion Dynamics on Correlated Subjects in Social Networks', *IEEE Transactions on Network Science and Engineering*, 7, pp. 1901-1912. Available at: <https://doi.org/10.1109/TNSE.2019.2956861>.
- Perrier, V., Meyer, F. and Granjon, D. (2025) shinyWidgets: Custom Inputs Widgets for Shiny. R package version 0.9.0. Available at: <https://CRAN.R-project.org/package=shinyWidgets>.
- Peshkopia, R., Bllaca, L. and Lika, J. (2018) 'Individual similarities and regional differences: the impact of 2015 refugee crisis on Europeans' attitudes toward immigration', *European Politics and Society*, 23, pp. 660-678. Available at: <https://doi.org/10.1080/23745118.2021.1927375>.
- Pfeffermann, D. (1996) 'The use of sampling weights for survey data analysis', *Statistical Methods in Medical Research*, 5, pp. 239-261. Available at: <https://doi.org/10.1177/096228029600500303>.

- Piguet, E. (2024) The Asylum Migration Crisis in the Balkans and on the Road to Europe: Unfolding the Drivers Complex, The 5th Congress of Slavic Geographers and Ethnographers. Available at: <https://doi.org/10.46793/csge5.32ep>.
- Prantl, S. and Spitz-Oener, A. (2020) 'The Impact of Immigration on Competing Natives' Wages: Evidence from German Reunification', *Review of Economics and Statistics*, 102, pp. 79-97. Available at: https://doi.org/10.1162/rest_a_00853.
- Rapp, C. (2016) 'Moral opinion polarization and the erosion of trust', *Social Science Research*, 58, pp. 34–45. Available at: <https://doi.org/10.1016/j.ssresearch.2016.02.008>.
- Reiljan, A. (2020) '‘Fear and loathing across party lines’ (also) in Europe: Affective polarisation in European party systems', *European Journal of Political Research*, 59(2), pp. 376–396. Available at: <https://doi.org/10.1111/1475-6765.12351>.
- Richmond, A. (2002) 'Globalization: implications for immigrants and refugees', *Ethnic and Racial Studies*, 25, pp. 707-727. Available at: <https://doi.org/10.1080/0141987022000000231>.
- Schmidt, K. (2021) 'The dynamics of attitudes toward immigrants: Cohort analyses for Western EU member states', *International Journal of Comparative Sociology*, 62, pp. 281-310. Available at: <https://doi.org/10.1177/00207152211052582>.
- Schmidtke, O. (2024) 'Migration as a building bloc of middle-class nation-building? The growing rift between Germany’s centre-right and right-wing parties', *Journal of Ethnic and Migration Studies*, 50, pp. 1677-1695. Available at: <https://doi.org/10.1080/1369183X.2024.2315350>.
- Schmidt-Catran, A. and Czymara, C. (2020) “Did you read about Berlin?” Terrorist attacks, online media reporting and support for refugees in Germany', *Soziale Welt*. Available at: <https://doi.org/10.5771/0038-6073-2020-1-2-201>.
- Schmidt-Catran, A. and Czymara, C. (2022) 'Political elite discourses polarize attitudes toward immigration along ideological lines. A comparative longitudinal analysis of Europe in the twenty-first century', *Journal of Ethnic and Migration Studies*, 49, pp. 85-109. Available at: <https://doi.org/10.1080/1369183X.2022.2132222>.
- Schneider, S. (2007) 'Anti-Immigrant Attitudes in Europe: Outgroup Size and Perceived Ethnic Threat', *European Sociological Review*, 24, pp. 53-67. Available at: <https://doi.org/10.1093/ESR/JCM034>.

- Silva, B.C. (2018) 'Populist radical right parties and mass polarization in the Netherlands', *European Political Science Review*, 10(2), pp. 219–244. Available at: <https://doi.org/10.1017/S1755773917000066>.
- Su, X., Yan, X. and Tsai, C. (2012) 'Linear regression', *Wiley Interdisciplinary Reviews: Computational Statistics*, 4. Available at: <https://doi.org/10.1002/wics.1198>.
- Sunstein, C. (2003) 'The law of group polarization', in Fishkin, J.S. and Laslett, P. (eds) *Debating Deliberative Democracy*, pp. 80-101. Blackwell Publishing.
- Slowikowski, K. (2024) ggrepel: Automatically Position Non-Overlapping Text Labels with 'ggplot2'. R package version 0.9.5. Available at: <https://CRAN.R-project.org/package=ggrepel>.
- Teney, C. and Rupieper, L. (2023) 'A New Social Conflict on Globalisation-Related Issues in Germany? A Longitudinal Perspective', *Kolner Zeitschrift Fur Soziologie Und Sozialpsychologie*, pp. 1-30. Available at: <https://doi.org/10.1007/s11577-023-00884-5>.
- Tierney, N. and Cook, D. (2023) 'Expanding Tidy Data Principles to Facilitate Missing Data Exploration, Visualization and Assessment of Imputations', *Journal of Statistical Software*, 105(7), pp. 1-31. Available at: <https://doi.org/10.18637/jss.v105.i07>.
- Torres, M. (2019) 'Public Opinion toward Immigration, Refugees, and Identity in Europe: A Closer Look at What Europeans Think and How Immigration Debates Have Become So Relevant', pp. 70-76.
- Tourangeau, R. (2018) 'The survey response process from a cognitive viewpoint', *Quality Assurance in Education*, 26(2), pp. 169-181. Available at: <https://doi.org/10.1108/QAE-06-2017-0034>.
- Vadhanavisala, O. (2020) 'Radical Right-Wing Politics and Migrants and Refugees in Hungary', *European Journal of Social Sciences*. Available at: <https://doi.org/10.26417/ejss-2020.v3i1-89>.
- Van Der Brug, W. and Harteveld, E. (2021) 'The conditional effects of the refugee crisis on immigration attitudes and nationalism', *European Union Politics*, 22, pp. 227-247. Available at: <https://doi.org/10.1177/1465116520988905>.

Van Hauwaert, S. and Vegetti, F. (2025) 'Public responsiveness and the macro-origins of immigration opinions across Western Europe', *European Political Science Review*. Available at: <https://doi.org/10.1017/s1755773925000037>.

Vollmer, B. and Karakayali, S. (2018) 'The Volatility of the Discourse on Refugees in Germany', *Journal of Immigrant & Refugee Studies*, 16, pp. 118-139. Available at: <https://doi.org/10.1080/15562948.2017.1288284>.

Wickham, H., François, R., Henry, L., Müller, K. and Vaughan, D. (2023) *dplyr: A Grammar of Data Manipulation*. R package version 1.1.4. Available at: <https://CRAN.R-project.org/package=dplyr>.

Wickham, H. (2016) *ggplot2: Elegant Graphics for Data Analysis*. Springer-Verlag New York.

Williams, L. (2018) *Polarization in Contemporary Societies: Causes and Consequences*. Routledge.

Yaseen, M., Ghayoor, S., Hassan, M., Jabeen, F., Hassan, M. and S. (2025) 'The Political Dynamics of Refugee Migration in Europe: Analyzing the Impact of Nationalism, EU Solidarity, and the Dublin Regulation Post-2015 Migrant Crisis', *The Critical Review of Social Sciences Studies*. Available at: <https://doi.org/10.59075/ma4tcx41>.

Zimmerer, F. (2016) 'German media on the refugee crisis: how the refugees-welcome campaign has backfired'.

6 Appendix

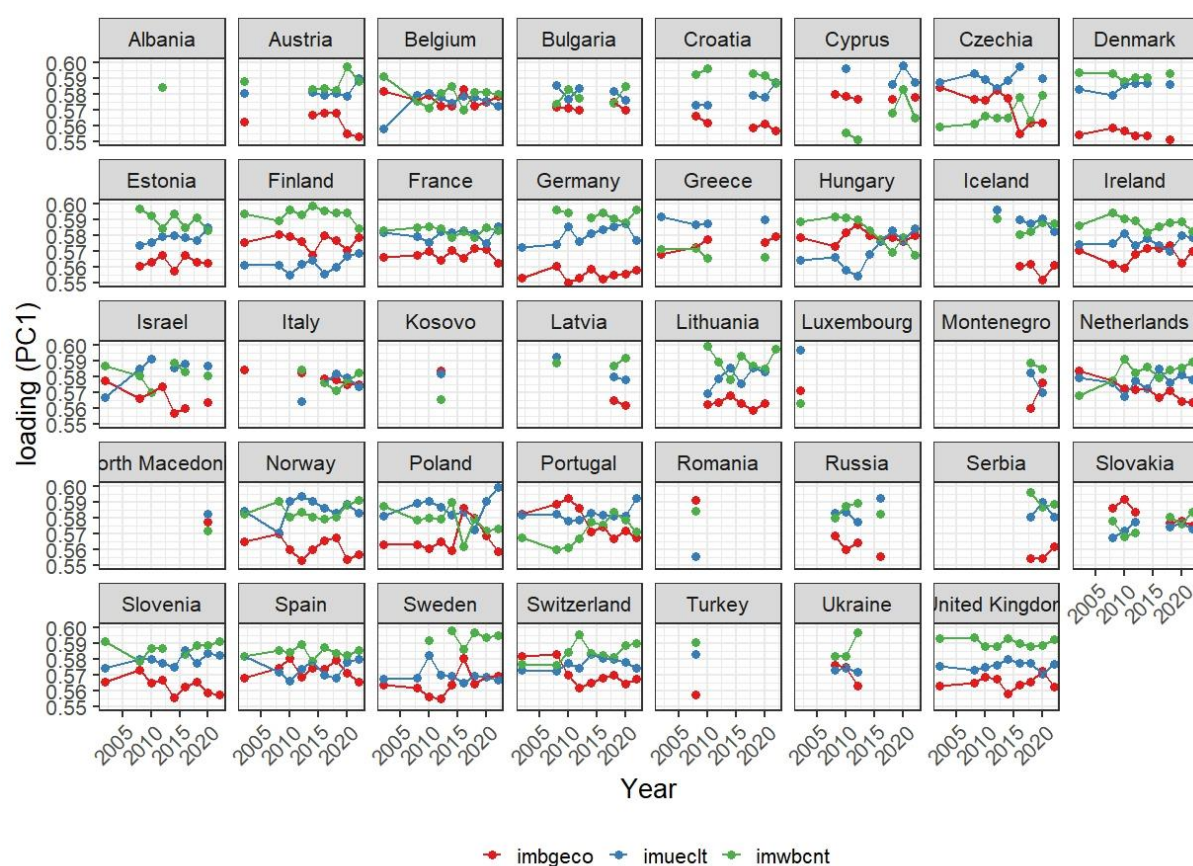


Fig 6.1 The loadings of PC1 for all countries and years. The plot shows how for several countries, not all rounds were available. Some countries, for example Albania, Kosovo and Romania, only participated once, meaning for those countries, no trend analysis would have been possible. However, even those countries could be included when calculating the European averages. More importantly is, that Germany and Hungary participated in enough rounds to conduct meaningful trend analyses.