**Introduction**

Research territory definition

The global number of international migrants has grown significantly, from 75 million in 1965 to around 272 million in 2019 (World Migration Report, 2020). Europe has emerged as one of the primary global destinations (Haas et al., 2019). Economic inequality, demographic pressures, and environmental crises are just some of the drivers of migration (Richmond, 2002). In Europe, opinions about immigration are heterogeneous. In Western Europe, short-term increases in immigration can lead to more negative attitudes, particularly when immigrants are from non-EU countries. However, regions with a higher share of foreign-born populations tend to be less anti-immigrant (Dražanová & Gonnot, 2023). Differences between countries often reflect economic conditions, for example the severity of a current recession (Hatton, 2016).

Niche establishment within research territory

In the context of opinion dynamics, polarization refers to the divergence of attitudes within a society, often leading to the formation of distinct and opposing groups (Williams, 2018). In the context of immigration, polarization can manifest as stark differences or subtle distinctions in attitudes towards migrants, ranging from acceptance and support to scepticism and opposition.

Media reports often report somewhat loosely about a “polarized Europe” (SOURCE). In the academic literature, however, several definitions of political or attitudinal polarization exist. For example, social psychology provides the concept of group polarization, which is a phenomenon where “members of a deliberating group move toward a more extreme point in whatever direction is indicated by the members’ predeliberation tendency” (Sunstein, 2003). In politics, polarization describes a phenomenon of accentuated differences in larger groups or societies. Political scientists distinguish between elite and mass polarization. Whereas elite polarization looks at the polarization of parties or elected officials (Druckman et al., 2013), mass polarization refers to polarization of the general public (although the pertinent literature disagrees on the exact definition of the concept, Silva, 2018). Another distinction is made between affective polarization and opinion polarization (sometimes called attitude polarization). Affective polarization refers to “a tendency among party supporters (partisans) to view other party/parties as a disliked outgroup(s) while holding positive ingroup feelings for one’s own party” (Reiljan, 2020).

Niche occupation

Opinion polarization looks at the “distributional properties of public opinion” (DiMaggio et al, 1996) regarding certain socio-political topics. This thesis investigated opinion polarization on three migration-related issues.

Researchers investigating opinion dynamics have been employing a diverse array of quantitative methodologies. This methodological pluralism encompasses various survey designs, scaling techniques, and statistical modelling approaches, each with its own strengths and limitations. Examples include approaches using nonlinear modelling (Amelkin, Bullo & Singh, 2017), correlational studies (Nordio et al., 2019), Boltzmann equations originating from kinetic theory (Düring & Wolfram, 2015), stochastic modelling (Acemoglu et al., 2010), and more. While this variety allows for the exploration of the topic from different analytical angles, it also presents challenges in comparability across studies. Polarization is one type of opinion dynamic, and thus, researchers are not united as to the way they define and assess polarization either. Depending on their approach, researchers draw different conclusions (see e.g., Iyengar et al., 2012). Despite the richness of quantitative approaches, there seems to be a need for a more streamlined set of metrics to effectively capture different facets of opinion polarization regarding immigration in Europe. This current landscape, while offering detailed insights, can hinder comparative analysis and the identification of overarching trends. Using a few simpler, yet robust, metrics grounded in established theoretical frameworks and previous empirical research could offer a more accessible and consistent way to assess key dimensions of polarization. Such a focused set of indicators would facilitate clearer communication of research findings, enable more meaningful cross-national comparisons, and ultimately contribute to a more unified understanding of the evolving patterns of polarization surrounding immigration in Europe.

One additional aspect of polarization is issue alignment. Issue alignment refers to the process by which people's attitudes, beliefs, or preferences on one set of issues become correlated or aligned with their attitudes on other issues, often due to shared ideological, partisan, or social factors. This concept is commonly studied in political science, sociology, and psychology to understand how individuals or groups develop cohesive worldviews or political identities. Issue alignment is associated with increased negative political affect, particularly towards out-groups. This alignment of issue attitudes can exacerbate political hostility, as individuals perceive others with differing issue alignments as more ideologically distant (Bougher, 2017). Investigating issue alignment regarding immigration opinions in Europe is an important topic because it sheds light on how attitudes toward immigration are connected to broader political, social, and cultural dynamics, with significant implications for understanding public opinion, policy-making, and social cohesion.

Prior research in this domain frequently adopts a singular methodological lens to quantify polarization, sometimes using just a very simple metric such as the standard deviation (e.g., Musco et al, 2021; Koudenburg, Kiers & Kashima, 2021). In contrast, this thesis advances the field by integrating multiple established metrics, each capturing distinct facets of polarization, to provide a more comprehensive and nuanced understanding of immigration-related opinion dynamics across Europe. Furthermore, we introduce an innovative approach to quantifying issue alignment. Departing from conventional single-variable measures, our methodology incorporates three attitudinal variables simultaneously, offering a richer and potentially more accurate assessment of how opinions on different aspects of immigration cohere within individuals.

To our knowledge, there is no existing systematic, Europe-wide study that comprehensively analyses opinion polarization by simultaneously considering overall and country-specific trends over time using multiple polarization metrics alongside a multi-variable approach to issue alignment. While studies have examined aspects of polarization across Europe and utilized ESS data, they often focus on a limited number of metrics or employ single-variable measures for issue alignment. Therefore, an analysis that integrates several polarization metrics, distinguishes between overall and country-level dynamics across the extensive timeframe covered by the ESS (2002-2022), and incorporates a novel multi-variable approach to issue alignment would represent a significant and novel contribution to the field of computational social science. This comprehensive approach would offer a more nuanced and in-depth understanding of the complex landscape of opinion dynamics related to immigration in Europe.

This leads to the leading 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 European Social Survey (ESS), this investigation delved into the multifaceted nature of opinion polarization across Europe. To achieve this, we computed six distinct metrics, informed by existing literature, to quantify various trends and aspects of polarization, examining both overall patterns and country-specific variations. Furthermore, we introduced a novel multi-variable approach to assess issue alignment, employing principal component analysis (PCA) to capture underlying structures in attitudinal data. Our analysis utilized the weighted survey data provided by ESS, spanning the period from its inception in 2002 up to the most recent available wave in 2022. Including these weights ensured that our findings are representative of the national populations surveyed across this twenty-year timeframe. By analysing these measures over successive ESS waves, we were able to identify and characterize significant temporal patterns in opinion dynamics, shedding light on the evolution of public sentiment on opinions regarding immigration.