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# MAPPING POLITICAL ALLIANCES: COSINE SIMILARITY ANALYSIS OF BUNDESTAG MPs' VOTING TRENDS

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## Abstract

Employing a comprehensive cosine similarity analysis, this paper examines the voting patterns of Bundestag Members of Parliament (MPs) across four legislature periods in German political history. The focus is on Cabinet I under Willy Brandt (SPD & FDP), Cabinet II under Helmut Kohl (CDU & FDP), Cabinet I and IV under Angela Merkel (CDU & SPD), with the primary aim of unraveling the intricate dynamics of political alliances. The methodology involves calculating the cosine similarity for each pair of MPs based on their common votes and the overarching hypothesis posits that shifts in government coalition significantly shape cooperation and opposition patterns among MPs. To enhance the efficiency of the analysis and capture the essence of MPs' voting behaviors, the dataset has been condensed to the first and last three months of each legislative period. This focused approach efficiently distills the core dynamics while mitigating complexity. Concentrating on the initial and concluding phases, characterized by significant policy debates and legislative decisions, ensures a representative outcome in the analysis. This focused examination allows the identification of nuanced shifts and alignments in voting patterns, contributing to a comprehensive understanding of the broader legislative periods. The findings underscore the nuanced interplay between political affiliations and policy alignment, providing valuable insights into the fluid nature of political alliances within the German Bundestag. Notably, the analysis illuminates a compelling example: members of the Free Democratic Party (FDP) exhibited heightened voting similarity with the Christian Democratic Union (CDU) when both parties are part of the same government coalition. This observation serves to reinforce the central hypothesis, indicating that shifts in government coalition indeed have a substantial impact on the cooperation and divergence patterns among Members of Parliament (MPs). The comprehensive cosine similarity analysis applied to the voting patterns of Bundestag MPs over the specified historical periods supports the contention that political alliances intricately shape their collaborative dynamics. By delving into specific Cabinets led by key figures such as Willy Brandt, Helmut Kohl and Angela Merkel, this paper not only highlights the broad evolution of political affiliations but also sheds light on the temporal dynamics within each legislative period. In conclusion, this paper offers a valuable exploration of the interplay between political alliances and voting patterns in the German Bundestag, providing insights that deepen our comprehension of the fluid nature of political dynamics. The observed patterns not only validate the initial hypothesis but also present a compelling narrative of how shifts in government coalitions shape the collaborative landscape among MPs over different legislative periods in German political history.

## 1 Introduction

The German Bundestag is the biggest stage for politicians to convene and discuss significant national matters, making it the foundation of the nation's democratic governance. The creation and breakup of political coalitions within this parliamentary system has a substantial influence on legislative procedures, policy results and the larger sociopolitical environment. Thus, a sophisticated understanding of how these coalitions work and change is crucial for academics and decision-makers alike, offering insights into cooperating and opposing dynamics that influence the political trajectory of the country. Political alliances have a major influence on policy decisions, legislative landscapes and the complex structure of parliamentary systems. A thorough comprehension of these alliances is essential for interpreting the multifaceted nature of the political forces within the framework of the German Bundestag. In order to fully understand the significance of understanding political relationships inside the German Bundestag and analyzing their effects over key historical eras, this paper will undertake an extensive probe. Examining how MPs alter their voting behavior in relation to their participation in the government, alongside a comparative assessment of dissimilarity across distinct time periods, can yield a comprehensive insight into the ideological proximity among political parties. The analysis also aims to discern which parties exhibit a higher degree of compromise and opportunism, contrasting those that demonstrate a steadfast commitment and unwavering adherence to their beliefs.

### 1.1 Research Question and Significance

In light of this, the paper aims to answer the following fundamental question: *What is the impact from shifts in government coalitions on the cooperative and non-cooperative behaviors of German Bundestag MPs?* This investigation is extremely significant as it not only explores the historical development of political coalitions but also illuminates the temporal dynamics within particular legislative eras. While addressing this question, MPs whose ideologies diverge from their party line have emerged and intriguingly, the cosine similarity approach as a byproduct, serves in identifying individuals associated with more extreme fringe group ideologies. This revelation is a consequential outcome of the analysis based solely on the similarity of voting behavior.

### 1.2 Key Periods for Analysis

The focus is on significant junctures in German political history, symbolized by the cabinets of Willy Brandt, Helmut Kohl and Angela Merkel, in order to decipher these complexities. These time frames represent pivotal moments in the political landscape of the nation, characterized by certain coalition forms and policy orientations.

Cabinet I under Willy Brandt marks a break with the two-decade-long tradition of conservative leadership in the office of the chancellor. Several ministries underwent major reform under the social-liberal cabinet. Complete dissolution occurred for the Federal Treasury Ministry, the Federal Council Affairs Ministry, and the Ministry for Refugees, Displaced Persons, and War Victims. In addition, the standalone Health Ministry since 1961 was also dissolved and integrated into the Ministry for Family, Youth, and Health. The Ministry for All-German Affairs was renamed the Ministry for Inter-German Relations as part of the Ostpolitik and remained so until reunification. The Ministry of Education and Science replaced the Ministry for Scientific Research.

Cabinet II Kohl has been marked by the Flick Affair and a decrease in government participation in the industry. The government underwent substantial adjustments as a result of the Flick Affair. Martin Bangemann succeeded Otto Graf Lambsdorff as Federal Minister of Economics on June 27, 1984, following his resignation. On November 5, 1984, Philipp Jenninger, the Parliamentary State Secretary at the Federal Chancellery, succeeded Rainer Barzel as President of the Bundestag. During the investigation of the scandal, it became evident that the CDU, CSU, SPD, and FDP had violated the provisions of the Party Law. However, there were differing perspectives in the societal discourse on these events. Leading representatives of the political parties demonstrated little awareness of wrongdoing, contending that party financing was a challenging matter and at most, a minor offense. Between 1981 and 1984, there were several attempts to legislate amnesty, but these efforts faced resistance from the press and the grassroots of individual parties. Ultimately, however, the Party Law's donation regulations as well as MPs' secondary income reporting obligations were tightened. The nonprofit statute was also modified to guarantee the distinction between different categories of tax-exempt organizations. It was expressly unlawful for nonprofit organizations to endorse political parties, and it was also forbidden for political parties to take funds from nonprofit organizations. Concurrently, the advancement of democracy was presented as a novel altruistic objective, excepting instances in local governments and