

President's Speech: Is It an Indicator of National Budgetary Decisions?

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KANG, Hojun

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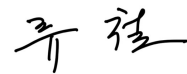
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ABSTRACT

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By

Hojun Kang

The level of integration between the political agendas that senior politicians suggest and the allocated budgets to support the policies they prioritize could directly affect a state's development and serve as an indicator of governance quality. This study analyzes the alignment between presidential agendas in speeches and budget allocations throughout all of South Korea's historical developmental stages, covering the rapid industrialization period under authoritarian governance in the 1970s until the developed state phase in which various policy demands erupted in the 2020s. The analyzed period is categorized into four phases. In the early phase, centralized development strategies led to rapid economic growth in South Korea. However, as societies advance, the appropriateness of these strategies is under question.

The present study employs KeyATM to measure presidential rhetoric in inaugural addresses and budget messages, by extracting keywords based on the standardized Classification of the Functions of Government (COFOG). Then, the two-sample Kolmogorov-Smirnov is utilized to address the limitations of correlation approaches in the analysis of political speeches and budget data. As a result, the strong alignment observed during the early development stage significantly weakened as South Korea transitioned to a developed country. Additionally, the unique characteristics of each COFOG category and president significantly influence the degree of alignment between

the presidential political rhetoric and budget allocations. While emphasizing the pivotal importance of balanced alignment between presidential agendas and budgetary allocations, this study suggests adaptive governance structures with greater sensitivity and responsiveness and provides practical insight for policymakers and senior politicians in a rapidly changing society.

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I. INTRODUCTION

Senior policymakers suggest strategic visions, promote policies, and attempt to implement corresponding budgetary allocations. Specifically, presidents sophisticatedly use opportunities to deliver major addresses or speeches as leaders of the people (Ragsdale, 1987). By selecting popular issues and appropriate moments, presidents can positively influence their legislative success (Canes-Wrone, 2001; Shogan, 2015) and their overall approval to some degree (Druckman & Holmes, 2004). Additionally, the rhetoric of presidential speeches can strongly affect and persuade the public, changing their opinions in favor of a president's preference in the short term (Cavari, 2013).

Therefore, the level of integration and divergence between the political agendas presidents suggest and the allocated budgets to support the policies they prioritize could directly affect a state's development and serve as an indicator of governance quality. Downs (1957) suggested the concept of a mandate to explain the relationship between politics and policies in the context of party politics. Additionally, Manin et al. (1999) stated that the legitimacy of an elected government could be evaluated by the coherence between policies and an electorate's expectations.

However, few studies have examined the degree to which political visions in presidential speeches are reflected in budget allocation processes. The present study posits that the interaction between presidents' political visions and government budget allocations can change due to socioeconomic transformations. Historically, several countries have achieved rapid and significant economic growth by adopting a centralized development strategy and relying on political authority and a skilled technocratic

bureaucracy. In these countries, which include Japan, Taiwan, and South Korea, policymakers have focused national competence on central political priorities and allocated budgets aligning with these priorities. However, as modern societies have become more complex, it remains uncertain whether centralized strategies can meet widely varying policy demands (Kang, 2003; Kim, 1997; Kwon, 2009; Pirie, 2018; Suh, 2014). In a sophisticated society, political authority and policy demands often conflict. Thus, in these countries, the dynamic interactions between presidential political visions and budgetary allocations must be investigated from a long-term perspective.

While considering the findings and limitations of prior research, the present study examines levels of convergence and divergence between presidential rhetoric and budget allocations throughout all of South Korea's historical developmental stages. The experience of South Korea, which has successfully transitioned from a developing country to a developed country, provides an exemplary model for other developing countries. It includes the stages of developing state, modernization, democratization, and its current status as a developed country. The present analysis covers the rapid industrialization period under authoritarian governance in the 1970s until the developed state phase in which various policy demands erupted in the 2020s.

By supplementing the findings of prior studies with modernization theory and developmental state theory, this study demonstrates the dynamic interactions between politics and budgets across three developmental stages. It utilizes the Keywords-Assisted Topic Model (KeyATM) to analyze a large number of presidential speeches and their contained rhetoric. The method provides analytical advantages when topics can be identified before fitting the model. Since it was recently developed and currently only a

few studies have used the algorithm, applying the KeyATM offers a novel contribution to the literature. This research also employs the two-sample Kolmogorov-Smirnov test to assess consistency between presidential political visions and actual budget allocations. As an alternative approach to correlation analysis, this test addresses the limitations of prior research that utilized conventional correlation analysis methods. By utilizing these methods, this analysis offers a dynamic perspective from which to examine the coherent alignment of politics and budgets across various developmental phases and provides useful insight for evaluating the governance of various administrations.

II. LITERATURE REVIEW

A. From the Rhetoric to Budgets: Presidential Influence on Policy Formulation and Budget Allocations

Political speeches to the mass public are the powerful devices of leading politicians and public officials to set or reset the agenda, propose their policy priorities that should be achieved, and appeal to the support or attention of the public. In particular, presidents have sophisticatedly used the opportunities to deliver major addresses or speeches as speechmakers and leaders of the people (Ragsdale, 1987). Classic studies portray the president as a central figure in agenda-setting (Baumgartner & Jones, 1993; Light, 1999). The president functions as the 'agenda setter-in-chief,' exerting substantial influence across various areas and underscoring the president's pivotal role in shaping policy directions (Rutledge & Larsen Price, 2014).

By selecting popular issues or appropriate moments, presidents can positively influence their legislative success (Canes-Wrone, 2001; Shogan, 2015), and their approval to some extent (Druckman & Holmes, 2004). Also, the rhetoric of presidential speeches has a strong effect on persuading the public and changing their opinion in favor of the president's preference in the short term (Cavari, 2013). Above all, presidential initiatives are more likely to gain congressional consideration compared to those proposed by members of Congress (Edwards & Wood, 1999).

According to Agenda-setting theory, presidents theoretically can unilaterally enact policy changes, underscoring significant executive control over policy implementation. Presidents considerably influence bureaucratic responsiveness and policy execution, and employ various administrative strategies and tools to steer agency behavior toward desired outcomes (Kagan, 2010; Howell, 2003). Their tools include the strategic use of political appointees, agency reorganization, oversight of new regulatory rules, and veto power (McCarty, 2000). These mechanisms align bureaucratic actions with presidential directives and preferences. However, presidential influence is moderated by institutional constraints, despite their power to command considerable resources to promote their agendas (Pereira & Acosta, 2010).

In the budget-making process, presidents and their agenda also lead to significant changes in budget revisions, cuts, and final outcomes. In addition to their control over bureaucratic actions, presidents strategically use veto power and their role in budget construction and implementation to influence legislative spending and reduce inefficiencies. McCarty (2000) finds that strong presidential veto power correlates with reduced distributive spending, while Inman (1993) highlights how 'universalistic

presidents' curb inefficient legislative logrolling to maximize net benefits across all districts, enhancing government effectiveness and fiscal responsibility. Berry et al. (2010) expand the scope of distributive politics literature by emphasizing the significant role of presidents in both constructing and implementing budgets. They identify two key phases where presidential influence is pronounced: the ex-ante phase, where the president has formal proposal authority over the budget, and the ex-post phase, where the president manages the distribution of federal funds. This dual capacity allows presidents to significantly impact the allocation of resources across different jurisdictions.

B. Challenges to Presidential Power and Mandate Theory

Despite the extensive literature on presidential power in the budget-making and policy-implementation process, the president's agenda-setting power could be hampered by various elements. For example, Edwards (1989) points out institutional and contextual factors that can diminish the president's influence, and according to O'Lessker (1992), new presidents often encounter challenges in modifying budgets established by their predecessors. Although presidents possess the formal right to issue directives and influence Human Resources, they do not always have real authority to effectively implement preferred policies (Aghion & Tirole, 1997). The nuanced nature of presidential power is underscored in these complexities and limitations.

Therefore, the relationship among the president, Congress, and the public in agenda-setting is not unilateral. While delivering the message, presidents communicate with Congress as shown in the case of the State of the Union address and its opposition

response (Shogan, 2015), and even have a reciprocal influence on issue salience with the public (Hill, 1998). In other words, the political discourses are newly formed, shifted, and reshaped in the middle of the interaction between presidential rhetoric and public opinion. The study of Eshbaugh-Soha & Peake (2004) quantitatively demonstrates that presidents can sometimes focus on and advocate for only a limited number of policies at any given time. This is because Congress also has the capability to set agendas, compete with the president to occupy agenda space, and even block presidential proposals (King, 1985).

Besides, multiple elements can complicate the coherent policy and agenda implementation. For example, the nature and communication of the agendas, the background and relationships of appointees, bureaucratic risk aversion, internal agency context, policy complexity, and the broader political and social environment (Provost & Gerber, 2019) are included. Peake (2001) also points out that policy areas such as defense, economic, and foreign policy issues can influence the decoupling of presidential priorities and actual policies.

Therefore, convergence and divergence between presidential political rhetoric and budget allocations often differently occur in complex contexts. The existing literature on their relationship is also contentious. While some studies support the ideal and potential of this coupling, others suggest conflicting arguments and evidence. However, at least the appropriateness of coupling between presidential rhetoric and actual budgets could be explained by the mandate theory.

The mandate theory of representation (Downs, 1957) provided a basis for the coordination between these agendas of presidents, policy formulation, and budget

allocation. Mandate theory firstly explores the connection between politics and policies in the context of party politics. According to Manin et al. (1999), "under democracy, governments are representative because they are elected", and "winning platform becomes the mandate that the government pursues" (p.29). Next, mandate theory sets a normative relationship between the transparency of promises of elected officials during campaigns and their implementation in incumbency. The direct linkage between political priorities and policies in a representative democracy is advocated in the theory, as a transparent contract between the electorate and representative fosters accountability and trust. Several empirical studies have proved the theory, showing cases of congruence between parties's policy commitments and government implementation (Kalogeropoulou, 1989; Royed, 1996).

Presidential mandate can also be explained by the concept of the electoral mandate. Dahl (1990) suggests that the president holds the authority to pursue policies that embody the electorate's will, as a representative of the entire population. Presidential mandate theory assumes that presidents attain a mandate to implement the policies and programs advocated by the electorate after they win the election. Meanwhile, as the electoral mandate theory has evolved and expanded over time, dynamic and intertemporal elements have been integrated, beyond the mere perspective of single elections (Bevan & Jennings, 2014). According to these studies, it is desirable for politicians to set political priorities, coordinate efforts to develop policy agendas and explain the benefits of supporting their policy proposals. In other words, it is crucial to align presidential remarks with formal policy messages, ensuring a coherent 'democratic script' (Cavari et al., 2024).

However, as modern societies have become more complex, the alignment between presidential priorities and budget allocations often becomes uncertain, according to socioeconomic transformations. Even though it is desirable to achieve congruence between presidential political priorities and budgetary allocations, it is questionable whether centralized strategies can meet widely varying policy demands in more developed societies. (Kang, 2003; Kim, 1997; Kwon, 2009; Pirie, 2018; Suh, 2014). However, only a few studies have examined the degree to which political visions in presidential speeches are reflected in budget allocation processes, according to socioeconomic transformations. Historically, several countries have achieved rapid and significant economic growth by adopting a centralized development strategy and relying on political authority and a skilled technocratic bureaucracy. In these countries, which include Japan, Taiwan, and South Korea, policymakers have focused national competence on central political priorities and allocated budgets aligning with these priorities. Thus, in these countries, the dynamic interactions between presidential political visions and budgetary allocations must be investigated from a long-term perspective.

The present study posits that the interaction between presidents' political visions and government budget allocations can change, as a nation becomes more developed, in other words, evolve to the next development stages. Additionally, presidents who possess agenda-setting power and the necessary tools for policy implementation are more likely to integrate these elements effectively and keep their appointment with the electorate.

III. THEORETICAL BACKGROUND AND HYPOTHESES

To conceptualize the national development stages, this study categorizes the analyzed period (1970~2021), based on two criteria: 1) politics-driven and 2) policy-demand driven. This study suggests four distinct stages from the Development Stage I to IV and each stage represents a unique dynamic between presidential rhetoric and actual budgets, demonstrating how these factors interact across developmental contexts. At the same time, I assume that the policy formulation is manifested in actual budget allocation. Based on the state development literature of South Korea (Kang, 2003; Kim, 1997; Kwon, 2009) that identified 1970-1979 as the developmental state period, 1980-1996 as the transition period, and 1997-2021 as the post-OECD accession period, this study segmented the analysis period into four distinct phases.

In the Development Stage I, the levels of both politics-driven and policy-demand-driven developments are weak, and it indicates the early stage of state building. Since proactive political discourse is absent, it is difficult to identify emerging policy demands and alter the existing budget structure, leading to an increase in ad hoc spending. It is because political elites lack the strategic direction and do not secure sufficient fiscal investment. It leads to governance inefficiency and long-term challenges to sustainable development. Overall, the relationship between politics and budget is uncertain and unpredictable during this phase.

The Development Stage II is characterized by strong politics-driven and low policy-demand-driven developments, typifying the developmental state stage. This scenario typically occurs in the early- or mid-stages of a developmental state where national

governance institutions are robust and the bureaucracy efficiently executes budgets in line with political agendas and priorities. Thus, there is a significant alignment between presidential priorities and budget allocations. Budgetary decisions are closely integrated with political agendas, and policy implementation is also highly matched with the integration. During this phase, the alignment results in efficient governance and state development, as policy goals receive powerful financial support and significant resources are concentrated on infrastructure projects.

The Development Stage III is usually found in countries transitioning from a developmental state to a more advanced stage. Political leaders who succeeded in the early stage of development often maintain existing policies rather than adapt to new policy demands. However, they fail to align with the increasingly complex and diverse policy demands of a maturing society. For example, they must address broader policy needs, including democratization and social welfare, and pose new policy challenges, moving beyond a single focus on economic growth. During this change, the decoupling between political rhetoric and budget potentially occurs, as political leaders are required to revise policies and reallocate resources to meet a wide range of demands. At the same time, the resistance from bureaucratic and private sectors may result in inadequate budget allocations, and conflict against the changing rhetoric of political leaders. Stage III reflects these strong levels of both politics-driven and policy-demand-driven developments.

The Development Stage IV is characterized by weak politics-driven actions and strong policy-demand-driven initiatives in a sophisticated society where centralized development plans are no longer effective. In these mature societies, policy demands

usually precede political agendas, driven by pressures from the private sector, non-governmental organizations, and the international community. Advancements in science and technology, environmental issues, and social welfare become priorities, prompting subsequent budgetary support based on these sectors' needs and successes. However, despite these significant pressures driven by policy demands, political agendas and capabilities may lag, inadequately reflecting these emerging priorities, leading to a high potential for divergence between politics and budget. Conversely, the capability of bureaucrats to exhibit high policy independence and effectively allocate resources can be crucial, and their adaptability enhances their responsiveness and credibility. With their potential ability, budgetary support may be allocated to areas previously not emphasized in political discourse and it may meet the urgent needs of a sophisticated society, even in the absence of immediate political alignment.

As data commences from 1970, by which time South Korea had already moved into the Development Stage II, this study does not include a hypothesis related to the Development Stage I. This research posits the following hypotheses to examine the interaction between presidential political rhetoric and budget allocations in the context of the national development stages:

Hypothesis I: At the developmental state stage, there is a significant alignment between presidential political rhetoric and the actual budget.

Hypothesis II: As a country advances and the diversity of its policy demands increases, the alignment between presidential political rhetoric and the actual budget tends to weaken.

Hypothesis III: The degree of alignment between presidential political rhetoric and the actual budget is influenced by a country's political regime and changes in administration.

Hypothesis IV: The degree of alignment between presidential political rhetoric and the actual budget can vary across different governmental functions and expenditure areas.

IV. DATA AND METHODS

A. Subject of Analyses and Data Collection

This study examines the inaugural addresses and budget-related speeches of South Korean presidents, spanning from 1970 to 2021. This timeframe covers the period from President Park Chung-hee's tenure, marking the onset of Korea's significant economic development, through to the end of the most recent President Moon Jae-in's term. To ensure the credibility of the speech data, all sources were obtained from the Presidential Archives managed by the Korean Ministry of the Interior and Safety¹. During the analyzed period, a total of 7,830 presidential speeches were recorded. For this study, I specifically selected 15 inaugural addresses and 88 budget messages—comprising 54 speeches on the main budget and 34 on the supplementary budget. These were used to construct a comprehensive database for keyword extraction.

Budget data, another crucial variable in this study, is sourced from the OECD National Accounts to ensure the international reliability and consistency of the data. The database provides comprehensive panel data on government expenditures by function and

¹ <https://www.pa.go.kr/research/contents/speech/index.jsp>

country, covering 40 countries according to the standardized Classification of the Functions of Government (COFOG). For this study, I utilize budget panel data for ten functional areas of government expenditure in the Republic of Korea, drawn from the OECD Government Accounts Statistics, spanning the period from 1970 to 2021. The analysis period was selected to align with the availability of consistent data from both the OECD Government Accounts Statistics and the Presidential Archives of the Republic of Korea, thereby minimizing any potential arbitrariness in the study's timeframe.

Government expenditures can be classified in various ways, such as administrative, economic, and functional classifications. However, categorizing expenditures by function is most effective for understanding how individual governments prioritize and implement national strategies and policies (Mikesell, 2018). Unlike classifications based on government organization, functional classification offers the advantage of enabling consistent analysis of spending trends, regardless of organizational differences or structural changes within the government (Obeng, 2022). Moreover, the OECD's functional expenditure data provides comprehensive coverage of all government expenditures at the general government level, including all sub-sectors and local government budgets (Barnes et al., 2023). This makes it particularly suitable for studies that rely on long-term cumulative data and those that engage in cross-country comparisons. The COFOG categorizes government expenditures into ten primary divisions: general public services, defense, public order and safety, economic affairs, environmental protection, housing and community amenities, health, recreation, culture and religion, education, and social protection. These broad categories are further

subdivided into more specific groups and classes, as detailed in the OECD Government Accounts Statistics. Table I provides the descriptive statistics of the budget data.

Table I. Descriptive Statistics of Budget

COFOG Categories	Budget (%)				Observations
	Mean	SD	Min.	Max.	
General Public Services	14.22	1.34	11.4	16.96	52
Defense	12.42	4.82	7.1	23.2	52
Public Order and Safety	4.39	0.67	3.38	6.14	52
Economic Affairs	21.53	4.71	14.07	33	52
Environmental Protection	2.9	0.36	1.9	3.53	52
Housing and Community Amenities	4.77	1.19	3.05	7.76	52
Health	7.49	4.44	0.99	15.32	52
Recreation, Culture, and Religion	2.09	0.59	0.85	3.07	52
Education	17.81	2.61	13.63	22.8	52
Social Protection	12.38	6.36	3.06	24.35	52

Note. Budget data are obtained from the official OECD National Accounts database.

B. Keywords and Topics Extraction from Presidential Speeches: Using KeyATM

In this study, I performed keyword extraction from presidential inaugural addresses and annual budget messages (including both main and supplementary budgets) to assess the political agendas of presidents and identify the strategic priorities embedded within these speeches. Presidents use speeches as a strategic tool to communicate their commitment to key issues to both the public and the legislature and to articulate their political agendas in response to current events (Cohen, 1995). Numerous studies have analyzed presidential speeches, particularly focusing on inaugural addresses as well as annual speeches like the State of the Union (SoU) address in the U.S. (Ericson, 1997). The inaugural address typically sets the stage for the president's broad political discourse,

while annual speeches often reinforce the president's overarching policy messages throughout their term (Hill, 1998). However, South Korean presidents do not deliver a separate SoU address. Instead, they present budget messages annually to the National Assembly, which serves as an equivalent to the U.S. SoU address. Therefore, I analyze the annual budget messages of South Korean presidents.

To extract topics in texts or messages, Latent Dirichlet allocation (LDA) and the Structural Topic Model (STM) have widely been used in the social science field (Roberts et al., 2019; Wratil et al., 2023; Park Chiseong & Shin Nari, 2021; Gilardi et al., 2021). However, one of the fundamental limitations of these algorithms is that researchers cannot predict the outcome before conducting topic modeling. Also, it is uncertain for researchers to decide how many topics(k) are most appropriate for their research. It may lead researchers to classify similar content into different topics or combine different content into the same topic (Eshima et al., 2024). Above all, it inevitably results in the researcher's subjectivity being applied to the process of topic modeling despite several indicators derived from the probability of held-out documents (Wallach et al., 2009) or estimated residual dispersion (Taddy, 2012), have been proposed the ways to complement with the issue. Moreover, these topic modeling algorithms merely allocate each word in documents to topics and do not provide a reasonable explanation for each topic. According to objectives, researchers must thus adjust these topics post hoc and arbitrarily interpret results. It may potentially compromise the objectivity of empirical research, causing issues in the interpretation itself (Eshima et al., 2024; Mimno et al., 2011).

On the other hand, the present research used a semi-supervised topic model approach, called the Keywords-Assisted Topic Model (KeyATM), to produce topics and keywords, and facilitate a meaningful comparison between the keywords in presidential speeches and numerical budget data. Since the KeyATM allows researchers to set up topics using substantive knowledge and information by specifying potential keywords that may be included in each topic before the model fitting, researchers can minimize issues of LDA and STM. In addition, the semi-supervised approach of the KeyATM is more convenient and time-efficient than other supervised topic models that require embedding and manual labeling of a large number of textual corpora (Eshima et al., 2024). This mechanism of the KeyATM is more advantageous over other unsupervised models for this research, because researchers already determined topics based on COFOG criteria, and the KeyATM eliminates the need for post-analysis of each topic. The content analysis to determine keywords for model fitting was guided by the International Monetary Fund's Manual of Financial Statistics (IMF, 2014). Table II provides 10 topics and determined keywords for each topic in this research.

To apply the approach, it is necessary to convert presidential addresses and messages into structured data. I first preprocessed the speech texts using the Python KoNLPy package, specifically the Okt (Open Korean Text) module. Preprocessing involved tokenizing the text and removing stop words. In this process, unnecessary parts, including punctuation, pronouns, conjunctions, interrogatives, and simple numbers, were deleted from the text. Meanwhile, I also normalized Korean and Chinese characters, if they have the same meaning since speeches in the early period usually comprised both characters together. Then, I applied the Bigram and Trigram models to identify the

semantic units for analysis, and if needed, assigned some units as compound words. The corpus constructed through these processes contains a total of 8,433 unique words.

Table II. Topic Labelling and Keywords

Topic Number	Topic Label	Keywords
Topic 1	General Public Services	"affairs", "amendment", "budget", "budgeting", "civil service", "governance", "government", "legislative", "local government", "national assembly", "public servant", "tax"
Topic 2	Defense	"defense", "forces", "military", "national defense", "north korea", "peace", "reunification", "security", "soldier", "weapon"
Topic 3	Public Order and Safety	"accident", "conflict", "corruption", "crime", "enforcement", "law", "public safety", "public security", "terrorism"
Topic 4	Economic Affairs	"economic", "economy", "enterprise", "export", "factory", "five years plan", "gdp", "import", "income", "industry", "investment", "market", "trade"
Topic 5	Environmental Protection	"atmosphere", "climate", "environment", "four river", "green", "greenhouse gas", "pollution", "renewable energy", "water"
Topic 6	Housing and Community Amenities	"community", "construction", "housing", "infrastructure", "real estate", "rental", "rural", "sewage", "soc", "street", "urban"
Topic 7	Health	"disease", "health", "health insurance", "healthcare", "medical", "pandemic", "pharmacy"
Topic 8	Recreation, Culture, and Religion	"arts", "asian game", "broadcasting", "cultural", "heritage", "history", "korean wave", "olympic", "recreational", "sport", "world cup"
Topic 9	Education	"academic", "curriculum", "education", "learning", "research", "school", "student", "training", "university"
Topic 10	Social Protection	"aging", "care", "childcare", "disabled", "healthcare", "insurance", "pension", "poverty", "social safety", "social welfare", "vulnerable", "welfare", "welfare system"

After constructing a corpus, I employed the KeyATM, using the predetermined 10 labels and keywords based on the COFOG's categorization. Among three models of KeyATM (*Base*, *Covariates*, and *Dynamics*), the present study chose to use the *Dynamics* model. While using time stamps before document-topic distribution, this model provides data on how the topic proportions have changed over time (Eshima et al., 2024). Thus, a

time variable from 1970 to 2021 was added to the data, except for 1987, 1989, and 1992 due to the absence of presidential inaugural addresses and budget messages in these years. To ensure the replicability of the result, 1,500 iterations were conducted. Through the process, I extracted keywords that could potentially be included in 10 topics, which correspond to 10 functional areas of government areas according to COFOG, and calculated the proportion of these topics.

Afterward, I manually reviewed the result of the topic modeling to ensure consistency and accuracy, according to the guidance of the International Monetary Fund's Manual of Financial Statistics (IMF, 2014). Although this manual approach carries the risk of researcher bias potentially impacting the reliability of the keyword selection, it also benefits from the researcher's insight into the historical and political contexts of the speeches, thereby enhancing the validity of the keyword categorization. Then, this research structured an entire keyword database by year and different presidential regimes in South Korea, spanning from 1970 to 2021, in the same way as the budget database. Table III provides the descriptive statistics of the keyword data of the analyses.

Table III. Descriptive Statistics of Keywords

COFOG Categories	Keywords (%)				Observations
	Mean	SD	Min.	Max.	
General Public Services	16.27	3.17	10.44	23.53	49
Defense	8.39	3.37	2.38	20.17	49
Public Order and Safety	8.58	1.77	5.04	12.5	49
Economic Affairs	16.73	3.15	10.34	26.79	49
Environmental Protection	7.14	2.89	0.00	11.94	49
Housing and Community Amenities	7.8	1.72	2.99	10.99	49

Health	6.63	2.27	2.38	10.71	49
Recreation, Culture, and Religion	7.84	2.26	1.25	12.6	49
Education	9.18	1.6	3.57	12.6	49
Social Protection	11.44	3	6.59	21.43	49

Note. The observation count is 49, due to the absence of presidential speeches for the years 1987, 1989, and 1992 in the Presidential Archives.

C. The Two-Sample Kolmogorov-Smirnov Test

This study employs the two-sample Kolmogorov-Smirnov test (hereafter, KS test) to analyze the hypotheses. Most existing studies analyzing political speeches employ correlation analysis methods. However, they acknowledge the limitations of correlation analysis and point out the need for alternative approaches. Therefore, I propose using the KS test, instead of a conventional correlation analysis, and it will offer a novel contribution to the literature.

The KS test evaluates the similarity of continuous or discontinuous one-dimensional probability distributions. It can be used in a one-sample format to determine if a sample aligns with a specific reference distribution, or in a two-sample format to compare whether two samples are from identical distributions. The two-sample KS test has been utilized across various fields of social science, such as macroeconomics (Reinhart & Reinhart, 2010), political science (Mian et al., 2014), and experimental economics which helps identify asymmetric effects and analyze natural experiments (Holt & Laury, 2005; Mora, 2020). For the analysis, I apply the two-sample KS test to compare distributions of keywords and budget allocations.

The two-sample KS statistic measures the discrepancy between the empirical distribution functions of two distinct samples. The calculation of the null distribution for

this statistic assumes that both samples originate from the same distribution. The two-sample KS test can be applied under a wide range of conditions, including those that accommodate discontinuities, heterogeneity, and dependencies between samples. This flexibility makes the two-sample KS test a broadly applicable and valuable nonparametric method for comparing two samples without specifying their common distribution (Naaman, 2021).

To conduct hypothesis testing using the two-sample KS test, consider $X: (x_1, x_2, \dots, x_m)$ and $Y: (y_1, y_2, \dots, y_n)$ as independent random samples with sizes m and n , respectively. These samples are drawn from continuous or ordered categorical populations with cumulative distribution functions (CDFs) F and G , respectively. The objective of this research is to test the null hypothesis that the distribution functions F and G are equal.

$$H_0: F(t) = G(t), \text{ for every } t.$$

The null hypothesis is evaluated against a comprehensive two-sided alternative hypothesis.

$$H_a: F(t) \neq G(t) \text{ for at least one value of } t.$$

The test statistic, known as the D-statistic, for the two-sample KS test is computed as follows:

$$D_{n,m} = \sup_t |F_n(t) - G_m(t)|,$$

Where F_n and G_m are the empirical distribution functions for the first and second samples, respectively, and **sup** denotes the supremum function. Intuitively, $D_{n,m}$

represents the greatest absolute difference between the two empirical cumulative distribution functions.

The null hypothesis is rejected at the α significance level if the D-statistic exceeds the critical value, D-critical as follows.

$$D_{n,m} > c(\alpha) \sqrt{\frac{n+m}{n \cdot m}}$$

The sizes of the first and second samples are denoted by n and m , respectively. Critical values, $c(\alpha)$, corresponding to conventional significance levels α of 0.05 and 0.01 have been established, with values of 1.358 and 1.628, respectively (Berger & Zhou, 2014).

In the analysis, the null hypothesis asserts that the distribution of keywords in presidential speeches matches the distribution of budget allocations. Rejecting the null hypothesis suggests a divergence between the distributions of keywords that extracted from presidential speeches, and budget allocations. Conversely, failure to reject the null hypothesis suggests that there is no significant decoupling, indicating consistency between the distributions of keywords and budget allocations.

V. EMPIRICAL FINDINGS

A. The Result of Topic Modeling

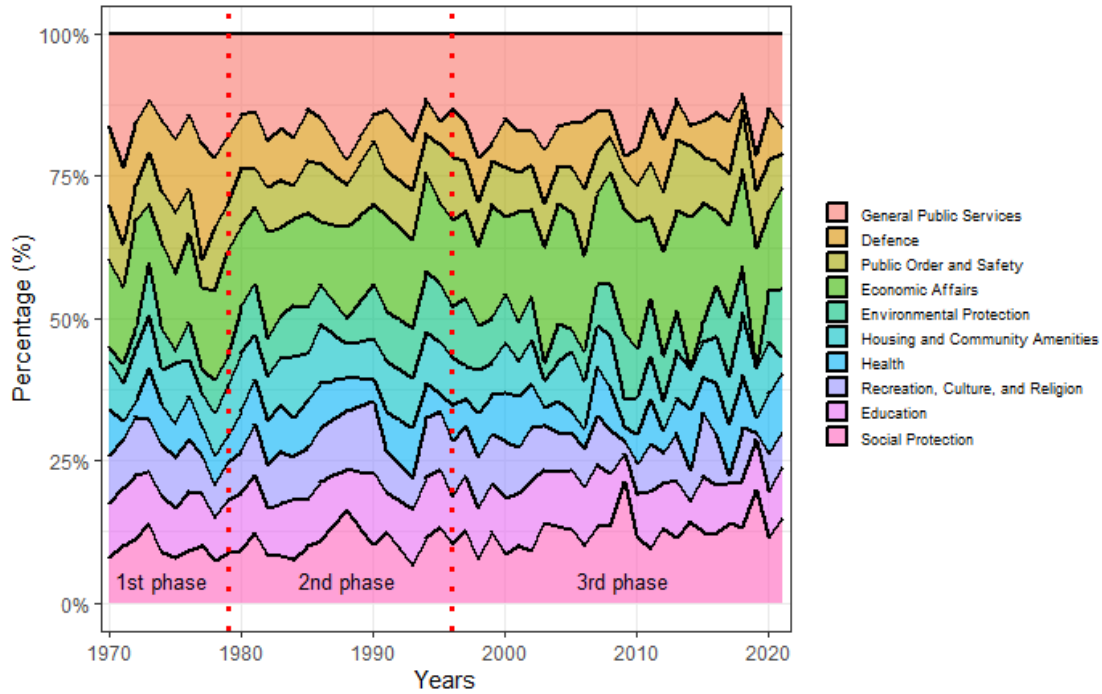
Before suggesting the result of topic modeling, the present study segmented the analysis period into three distinct phases, based on the state development literature of

South (Kang, 2003; Kim, 1997; Kwon, 2009). Since data does not include the Development Stage I, this research hereafter marks the Development Stage II, III, and IV as the 1st phase, 2nd phase, and 3rd phase, respectively, for interpretational convenience.

To examine my hypotheses, I segmented the analysis period into three distinct phases, based on the state development literature of South (Kang, 2003; Kim, 1997; Kwon, 2009) These phases are defined as follows: 1970-1979, identified as the developmental state period (1st phase); 1980-1996, referred to as the transition period (2nd phase); and 1997-2021, recognized as the post-OECD accession period(3rd phase). The conclusion of the first phase in 1979 coincides with the death of President Park Chung-hee, marking a significant transitional point in the country's history after his 17-year presidency. The 2nd phase ended in 1997, aligning with South Korea's accession to the OECD, signaling its entry into the ranks of developed nations.

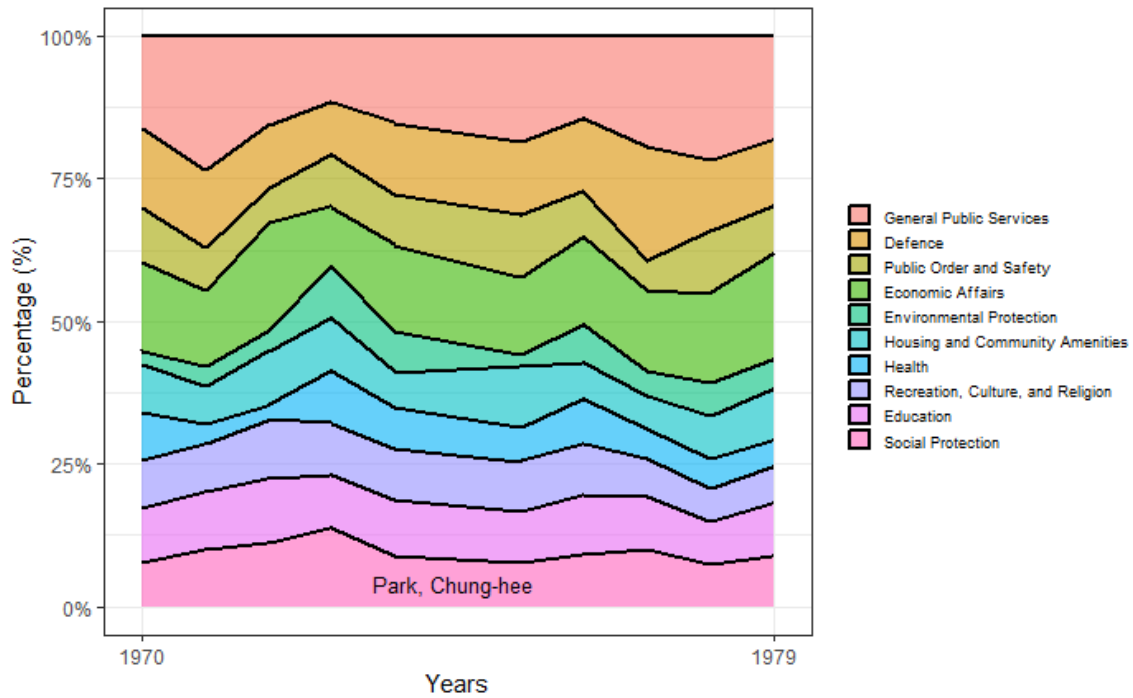
Figure I illustrates the evolving distribution of keywords from presidential speeches across different phases and the ten governmental spending categories of COFOG. During the analyzed period (1970~2021), the keywords extracted from presidential speeches reflect the political priorities and agenda of the country's top leadership. These shifts in keyword distribution across each COFOG category highlight how presidential rhetoric has evolved to address national goals and satisfy policy demands, stressing the most pivotal government function at each stage.

Figure I. Keyword Distributions from Presidential Speeches across Development Stages and Government Functions



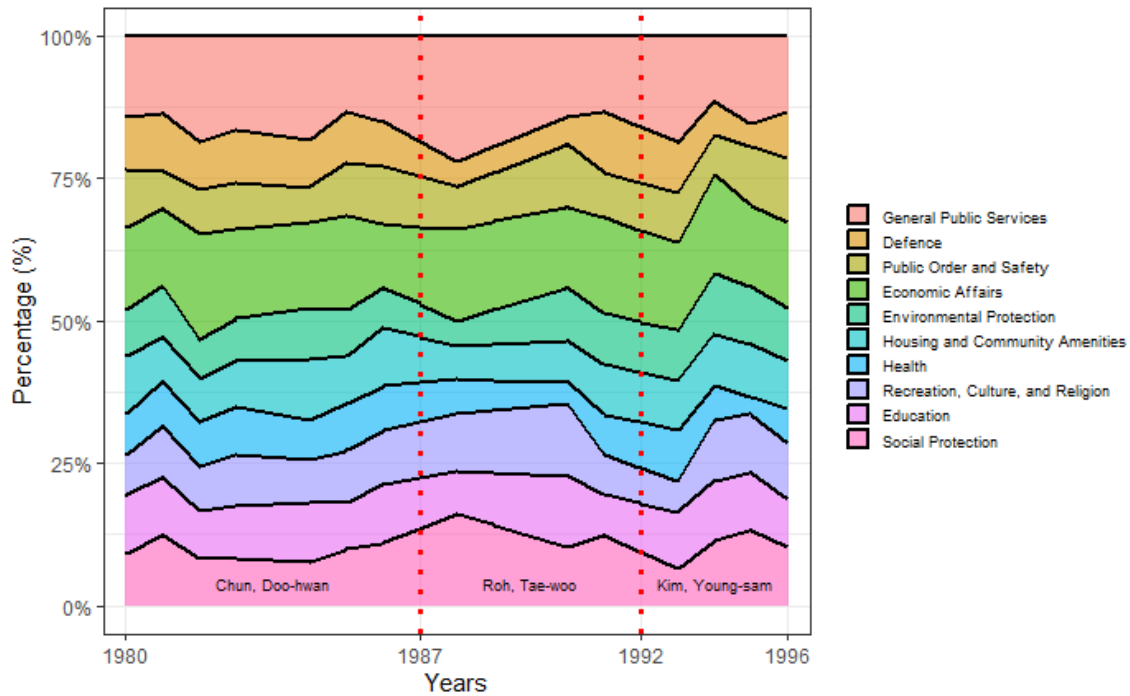
In the 1st phase, presidential rhetoric covering General Public Services and Economic Affairs was emphasized, as the nation pursued rapid development. However, as South Korea transitioned to a more advanced stage, educational and social functions prominently began to surface in the presidential speeches. Lastly, a relatively strong concentration on welfare and social functions of governments was marked in the 3rd phase. However, it did not mean that presidents refused the discussion on economic affairs and public services in the phase. Still, a consistent emphasis on these areas has been maintained.

Figure II. Keyword Distributions from Presidential Speeches across Government Functions in the 1st Phase



The 1st phase (Figure II) is entirely covered by the Park Chung-hee regime. The dominant topics in presidential speeches in the 1st phase were General Public Services and Economic Affairs, reflecting the emphasis on rapid economic growth and administrative support for state development. The distribution of General Public Services surged from 16.17% to 23.53% in 1971, then stabilized between 15% and 20% in the phase. Despite its fluctuation, the figure for Economic affairs also stayed from 10% to 16%, reaching a peak of 18.97% in 1972. The keyword proportion of the Defense function, which was about 11 to 20% in the period, also represented its political priorities under the military regime. In the cases of other categories, several functions, including Environmental Protection, Education, and Social Protection, experienced a small amount of increase, but their political priorities were still limited.

Figure III. Keyword Distributions from Presidential Speeches across Government Functions in the 2nd Phase



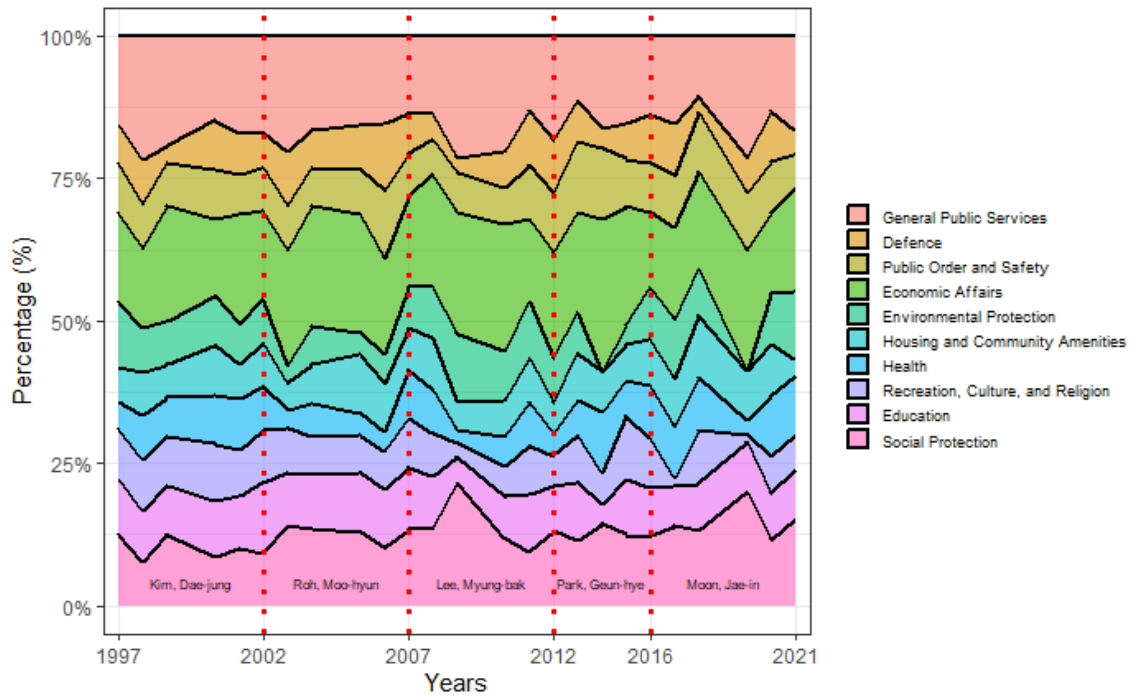
As South Korea entered the 2nd phase (Figure III, 1980–1996), marked by the presidency of Chun Doo-hwan, Roh Tae-woo, and Kim Young-sam, there was a significant shift in the topics highlighted in presidential speeches. General Public Services and Economic affairs continued to be a core concern in presidential rhetoric. Despite a slight decrease to 13.19% in the last year of this phase, General Public Services still demonstrated its prominence in political priorities, reaching 22.06% in 1988. Economic Affairs also showed a series of fluctuations, with a decline during the early 1980s and early 1990s. However, it still remained the second pivotal issue, occupying between 13% and 18% in the phase.

Interestingly, as society advanced, the proportion of other issues started to increase in presidential speeches, and it means that the political agenda of presidents

started to shift toward these areas in this period. The noticeable increase in keyword distributions in the area of Environmental Protection and Education demonstrates that the transition began to be accelerated. Compared to the 1st phase, the governmental function of Environmental Protection started to be clearly emphasized in presidential speeches in the 2nd phase. While it was still a minor topic, the growth from 6.49% in 1980 to under 10% by the mid-1990s indicates that environmental issues gained traction in presidential addresses to some extent. The keyword distribution of Education also marginally increased, reaching a peak of 12.6% in 1990. Beyond the economic growth, the leadership of South Korea started to concentrate on the quality of human resources in response to rapid development, and environmental elements that developed countries had already focused on.

Additionally, keywords classified in topics of Health and Social Protection more frequently appeared during this phase. The average proportion of Health and Social Protection keywords increased by over 1% compared to figures of the 1st phase. As national development progresses, a recognition of the need for better social service emerges, and political priorities to address the issue are also heightened. On the other hand, the level of attention to Defense continued to decline even to 4.08% in 1995. Although Defense is still one of the important governmental functions, presidents no longer consider it the most pivotal agenda in their speeches. This transition reflects that presidents and their administrations began to escape from the simple and centralized national strategy for the nation's development, considering different policy demands from the society.

Figure IV. Keyword Distributions from Presidential Speeches across Government Functions in the 3rd Phase



The 3rd phase (Figure IV), spanning from 1997 to 2021, covers President Kim Dae-jung, Roh Moo-hyun, Lee Myung-bak, Park Geun-hye, and Moon Jae-in tenures. In this sophisticated and mature society, various policy demands often precede political agendas and these demands thrive independently with high policy independence of bureaucrats. During this phase, Social Protection took center agenda in presidential addresses, alongside continuing discussions of Economic Affairs and General Public Services. From 1997 to 2021, the Social Protection discourse held over 10% to 21.43% (2009), except for a few years, such as 1998, 2000, 2002, and 2011. These figures marked that social safety nets, public welfare policies, and an aging population became a key part of presidential agendas. The emphasis on Health also supported this assumption, with an increase from 4.85% in 1997 to 10.45% in 2021.

However, Economic Affairs was still a dominant part of presidential addresses. During the presidencies of Lee Myung-bak (2008-2012) and Park Geun-hye (2013-2016), which continuously stressed economic issues, the keyword distributions of this topic peaked at nearly, and sometimes over 20%. General Public Services also demonstrated a similar pattern, settling a meaningful proportion of about 10-20%, despite several times of fluctuations.

Environmental Protection showed the most dramatic pattern in this phase. In several years, such as 1997, 2009, and 2021, keyword distributions of the function were over 11%, becoming one of the most pivotal parts of the presidential agenda. On the other hand, presidents sometimes did not or rarely mention this topic in their addresses. Although awareness of environmental issues was growing in presidential rhetoric with wide demands of the society, it was not considered a steadily core part of presidential priorities.

As seen in Public Order and Safety, Education, and Recreation, Culture, and Religion, keyword distributions of other functions remained stable in the 3rd phase, along with former phases. There were several exceptions, such as the temporary increase of Recreation, Culture, and Religion before the 2002 World Cup held in South Korea and Japan. However, stable distributions of these topics represent that they are consistently relevant to the government's goals, as long-term issues that are less likely to be affected by political discourse.

Overall, the result of topic modeling demonstrates that keyword distributions in presidential speeches clearly reflect the political agenda presidents have prioritized. The

shift of keyword distributions is aligned with the historical background and development strategies of each phase.

In the 1st phase, economic and public services' keywords dominated the presidential rhetoric, leading to rapid economic growth supported by centralized and politics-driven developmental strategies. Additionally, the attention on the Defense area was maintained under the military authoritarian regimes. In the 2nd phase, as societies evolved and became more sophisticated, there was a rise in social issues, such as Environmental Protection, Education, Health, and Social Protection. This trend continued in the 3rd phase. But, together with emerging issues, presidents still also concentrated on conventional issues, such as public services and economic growth. This transition underscores that South Korea experienced multiple stages from a developmental state that only focused on economic growth and centralized control to a mature society grappling with complex social, economic, and environmental challenges.

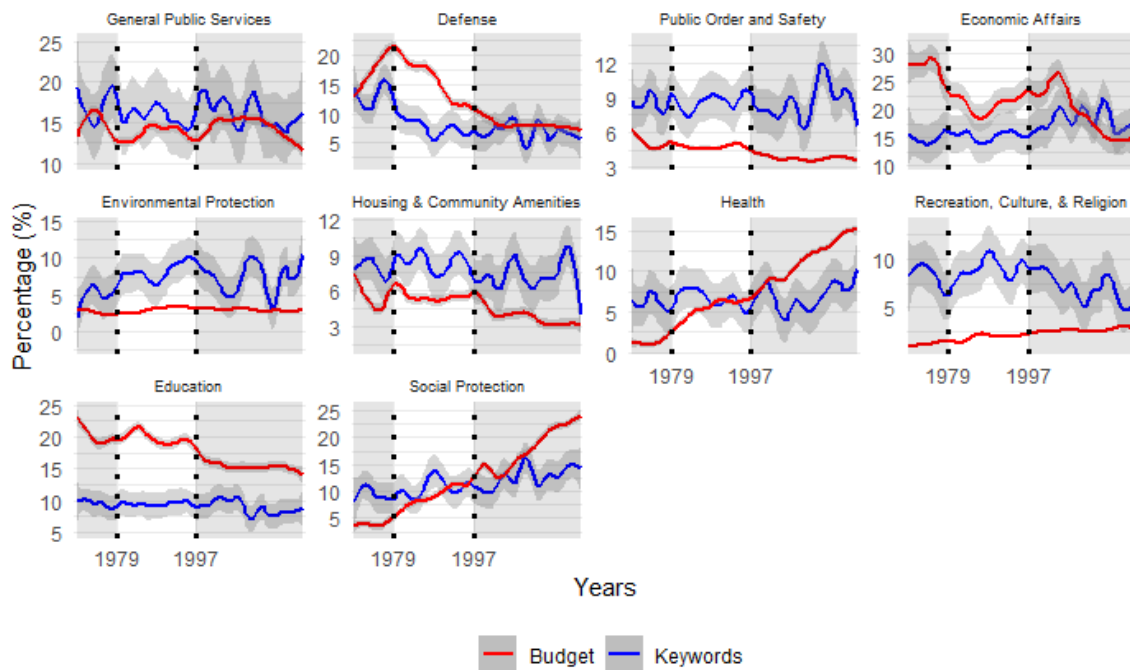
In the next part, this study will compare keyword distributions reflecting changing presidents' concerns and actual budget allocations of South Korea during the analyzed period.

B. Comparison between Keyword and Budget Distributions

Figure I illustrates the evolving keyword distributions of presidential speeches and actual budgets, expressed as percentages, across different developmental stages and the ten governmental spending categories of COFOG. During the analyzed period, the relationship between the topic and keyword distributions of presidential speeches and

budget allocations in South Korea varied significantly across different sectors. Figure V shows the evolution of these two dimensions for 10 COFOG categories, with the blue line showing the percentage of keywords mentioned in speeches and the red line representing the percentage of the national budget. Despite the convergence of trends of two variables in several topics, keyword distributions in presidential speeches and budget allocations do not always align, highlighting the difference between the policy priorities of presidents and actual budgets.

Figure V. Comparison between Keyword Distributions from Presidential Speeches and Budget Allocations across Development Stages and Government Functions



Note. 1) The first grey area is the 1st phase, the white area is the 2nd phase, and the last grey area is the 3rd phase. 2) The graph is accompanied by 95% confidence intervals.

In General Public Services, the budget consistently remained high ranging between 15% and 20% during the analyzed period, along with the trend of keyword distributions.

It reflects the ongoing administrative importance and presidents' emphasis on the topic. However, both figures show a gradual decline, representing diminishing influence in budget and presidential rhetoric, as other emerging issues become prominent.

For Defense and Public Order and Safety, the budget continued to decline after South Korea entered the 2nd phase. In particular, budget allocations for Defense rapidly decreased, and a similar trend appeared in keyword distributions in presidential speeches. This indicates that while Defense was a pivotal budgetary item and a core area in the political discourse of presidents during the military regime, it became an inconspicuous topic as South Korea was democratized. Public Order and Safety shows a similar trend, but the keyword distributions experienced a fluctuation several times, unlike budget allocations, and it was overestimated than the actual budget.

When it comes to Economic Affairs, there was a divergence between budget allocations and keyword distributions in presidential speeches. While the budget decreased in general except for the increase between the mid-1980s and the early 2000s, keyword distributions increased during the analyzed period. However, Economic Affairs still dominated the presidential rhetoric and budget allocations, the decline in budget might result from the increase of emerging issues.

Environmental Protection was negligible budget allocations and the percentage remained stable during the entire period. On the other hand, the importance considerably grew in presidential speeches, meaning presidents began to concentrate on environmental agenda, as society developed. While environmental concerns became a more significant issue in presidential rhetoric, fiscal commitments were slower to follow.

In Housing and Community Amenities, both the budget and keyword mentions showed some alignment, with a slight decrease during the analyzed period. However, unlike budget proportion that continuously declined, keyword distributions experienced frequent and intense fluctuations. This indicates that the president's attention was unstable on this topic, providing different agendas. However, this instability was not reflected in the budget process.

Both Health and Social Protection show a dramatic shift and strong correlations between the keyword distributions and budget allocations. The budget amount of the two categories rapidly increased from under 5% to over 15% and 20%, respectively, as South Korea entered the latter stages. These changes correspond to the growing proportion of keywords in presidential speeches. The convergence represents the political attention of presidents and administrations to adapt diverse policy demands on social welfare and public health.

Even though Recreation, Culture, and Religion are not dominant themes in presidential discourse and budget allocations, its budget steadily increased during the entire period. In contrast, keyword distributions continued to decrease, but the gap between the two variables also declined since keyword proportion had been overestimated over the actual budget. This indicates the increased convergence between presidential political rhetoric and budget allocations on this topic. On the other hand, Education stands out as a topic where the budget consistently declined, while keyword distributions remained stable. Given that Education is a long-term issue that is less likely to be affected by political discourse, the decrease in education's budget might result from the increase of other emerging issues' proportion.

Across these 10 categories, the comparison between keyword distributions in presidential speeches and budget allocations reveals a complex picture of South Korea's political priorities and the actual budget over time. In several topics, there is a relatively clear correlation between keyword distributions and actual budgets. However, there were ambiguous, or even reverse trends in other categories. In the next part, this research examines hypotheses, as suggested above, using the KS test, beyond the descriptive interpretation.

C. The Empirical Findings of KS Test

1) The Result across Development Stages

Table IV presents the results of a two-sample KS test comparing keyword distributions (percentages) from presidential speeches to actual budget allocations across development stages.

Table IV. KS Test Result across Development Stages

Analysis Period (Years)	D-statistic	D-critical		p-value (significance)
		$\alpha=0.05$	$\alpha=0.01$	
Total Period (1970-2021)	0.140	0.188	0.225	0.223
1 st phase (1970-1979)	0.112	0.187	0.224	0.522
2 nd phase (1980-1996)	0.193	0.188	0.225	0.040*
3 rd phase (1997-2021)	0.193	0.188	0.226	0.041*

Note: *: statistically significant at the significance levels of 5%

The results from the KS test in Table IV can be summarized as follows. First, in the 1st phase, when South Korea was in the developmental state stage, the similarity between political keyword distributions and budget allocations across the ten governmental spending categories based on the COFOG cannot be statistically rejected at conventional significance levels of 5% and 1%. The D-statistic (0.112) is considerably lower than the critical values of 0.187 and 0.224 for the 5% and 1% significance levels, respectively, with a p-value of 0.522, further supporting this finding. This result suggests that the government's budgetary commitments were considerably aligned with the political agendas and strategic priorities articulated by the government during this developmental state phase. The finding indicates that the political objectives and strategic priorities were closely mirrored in actual budgets during the developmental state stage, thus Hypothesis I is confirmed. This coupling can be interpreted as one of the pivotal factors that contributed to the national growth of South Korea in the 1970s.

Second, in the 2nd phase, when South Korea experienced the transition period, the D-statistic of the two-sample KS test is 0.193, exceeding the critical value of 0.188 at the 5% significance level, with a p-value of 0.040. In other words, the null hypothesis of similarity between political keyword distributions and budget allocations across ten governmental spending categories is rejected, and this result suggests a statistically significant divergence between political agendas and actual budgets emerged in the transition period of national development.

Third, the same pattern emerged in the 3rd phase from 1997 to 2021. In this phase of a nation's development, societal sophistication is heightened, complexity increases, and advanced development proceeds. In this period, the D-statistic (0.193) of the two-

sample KS test also surpasses the 5% significance level critical value of 0.188, with a p-value of 0.041. Therefore, the null hypothesis of convergences between political keyword distribution and actual budgets across 10 governmental spending categories in the period is rejected. It implies that the alignment between political keyword distributions and budget allocations after South Korea became a member of the OECD has substantially diverged. These findings above of statistically significant decoupling between presidential political rhetoric and the actual budget both in the transition and developed periods confirm Hypothesis II. In other words, as a country advances and the diversity of policy demands increases, the alignment among presidential priorities and budget allocations tends to weaken.

Fourth, during the entire period of this analysis (1970-2021), the D-statistics (0.140) of the two-sample KS test falls below the critical values (0.188 and 0.225) for the 5% and 1% significance levels, respectively, with a p-value of 0.223. This result indicates that the divergence between keyword distributions and budget allocations is not statistically significant. Therefore, the null hypothesis of alignment between the distributions of political keywords and actual budgets over the whole extended timeframe of the analysis is not rejected. With all results above, this study finds that the separation between presidential political rhetoric and the actual budget is likely to grow, as a country develops and its society becomes more sophisticated.

2) The Result across Presidential Administrations

Next, the present study repeated the KS tests to compare political keyword distributions and actual budget allocations across different presidential regimes in South Korea during the analysis period. This study postulates that the varying political, economic, and social contexts associated with each presidency may influence the outcomes of these KS tests. As detailed in Table V, the analysis period includes nine presidential administrations (regimes), which are categorized as follows with the names of the presidents included: 1970-1979 (Park Chung-hee), 1980-1987 (Chun Doo-hwan), 1988-1992 (Roh Tae-woo), 1993-1997 (Kim Young-sam), 1998-2002 (Kim Dae-jung), 2003-2007 (Roh Moo-hyun), 2008-2012 (Lee Myung-bak), 2013-2016 (Park Geun-hye), and 2017-2021 (Moon Jae-in). With the diverse development stages, distinctive leadership styles and policy contexts may potentially impact the convergence or divergence between presidential political rhetoric and budget allocations.

Table V. KS Test Result across Presidents (Administrations)

President (Years)	D-statistic	D-critical		p-value (significance)
		$\alpha=0.05$	$\alpha=0.01$	
Park, Chung-hee (1970-1979)	0.127	0.188	0.225	0.367
Chun, Doo-hwan (1980-1987)	0.176	0.188	0.225	0.08
Roh, Tae-woo (1988-1992)	0.222	0.189	0.227	0.012*
Kim, Young-sam (1993-1997)	0.241	0.188	0.225	0.005**
Kim, Dae-jung (1998-2002)	0.175	0.189	0.226	0.085
Roh, Moo-hyun (2003-2007)	0.240	0.188	0.226	0.005**
Lee, Myung-bak (2008-2012)	0.143	0.188	0.225	0.234
Park, Geun-hye (2013-2016)	0.214	0.189	0.227	0.018*
Moon, Jae-in (2017-2021)	0.250	0.188	0.226	0.003**

Note: *: statistically significant at the significance levels of 5%, **: statistically significant at the significance levels of 1%

In Table V, the relationship between political keyword distributions and budget allocations is significantly variable across different presidential regimes in South Korea. Firstly, during the authoritarian period of Presidents Park Chung-hee and Chun Doo-hwan, p-values are respectively 0.367 and 0.08, showing that there was no statistically significant between political keyword distributions and actual budgets. They exceed conventional significance thresholds. This result implies that the alignment of presidential political rhetoric and budget allocations is relatively straightforward under a strong military dictatorship. The centralized and strong authority of these administrations facilitates the direct imposition of political objectives on policy decisions, matching with resource allocation.

On the other hand, significant separations are observed during the administrations of Presidents Roh Tae-woo and Kim Young-sam. Under these regimes, p-values are respectively 0.012 and 0.005, and these figures are below the established significance levels. This period marked pivotal milestones for South Korea. Under the Roh Tae-woo administration, the direct presidential election system was introduced in South Korea. President Kim Young-sam succeeded in making South Korea accede to the OECD. These developments were the signal of South Korea's transition from a developmental state to a more developed and sophisticated society.

Despite a couple of exceptions, the decoupling between political keyword distributions and budget allocations became more obvious, as the society of South Korea advanced. Under the presidency of Kim Dae-jung and Lee Myung-bak, the null hypothesis of similarity between the political keyword distributions and budget allocations is not rejected, given the p-values of 0.085 and 0.234 respectively. In contrast,

during the administrations of President Roh Moo-hyun, Park Geun-hye, and Moon Jae-in, the divergence is statistically significant. Roh Moo-hyun's administration indicates a clear divergence, with a p-value of 0.005. For President Park Geun-hye and Moon Jae-in's regimes, p-values are respectively 0.018 and 0.003, and these figures indicate statistically significant differences between political keyword distributions and budget allocations. Given the Asian economic crisis under Kim Dae-jung and the global financial crisis under Lee Myung-bak, the evident alignments between political agendas and actual budgets were necessary to effectively respond to national-level crises and concentrate the nation's capabilities and resources.

In sum, the results depicted in Table V support hypothesis III, arguing the alignment between presidential political rhetoric and the actual budget varies depending on the political regime. Along with different development stages, governance structures, and policy contexts, different presidencies influence how these factors interact and align with each other.

3) The Result across Development Stages and Spending Categories

Table VI provides results from two-sample KS tests comparing distributions of keyword distributions in presidential speeches and budget allocations across developmental stages and ten government spending categories as defined by the COFOG. The present study assumes that the degree of convergence between presidential political rhetoric and budget allocations across government functions. The analysis is to reflect the

transitioning policy emphases and national strategies under different developmental and policy contexts.

Throughout the whole period (1970~2021), a statistically significant separation between keyword distributions and actual budgets was demonstrated in all spending categories. The significance levels of 5% include Health (0.014) and Social Protection (0.025), and the significance levels of 1% encompasses General Public Services (0.000), Defense (0.001), Public Order and Safety (0.000), Economic Affairs (0.000), Housing and Community Amenities (0.000), Recreation, Culture, and Religion (0.000), and Education (0.000). The values in parentheses are the p-values for the null hypothesis. This result implies that keyword distributions in presidential speeches do not match how the actual budgets are allocated in all governmental functions during the whole analyzed period in this study.

Meanwhile, the relationship between presidential political rhetoric and budget allocations evolves in a few categories, as South Korea enters the latter phase. When it comes to General Public Services, the alignment between keyword distributions and actual budgets appears during the 1st and 2nd phases. In the 3rd phase, this convergence collapsed, exhibiting a statistically significant decoupling (0.015). A similar trend occurs in areas of Housing and Community Amenities where the null hypothesis of similarity between the political keyword distributions and budget allocations is not rejected, given the p-values of 0.052, during the 1st phase. However, during both the 2nd and 3rd phases, p-values are 0.000 and this figure indicates statistically significant differences between keyword distributions and actual budgets. Conversely, Economic Affairs and Social Protection show significant coupling between keyword distributions and budget

allocations in the 3rd and 2nd phases, respectively, despite the decoupling in the 1st phase.

These results confirm Hypothesis IV. In other words, the extent of alignment between presidential political rhetoric and budget allocations may differ across distinct governmental expenditure areas and functions. At different stages of a nation's development, the variation of alignment is influenced by the distinct characteristics of each category and the policy emphases placed on them. This differential convergence and divergence across functions may be explained by several elements. For example, decoupling tends to be more obvious in areas that are highly influenced by external elements or those experiencing unpredictable changes, such as Housing and Community Amenities. Also, presidents of the early development period tended to control General Public Services to support rapid economic growth, stressing it in both their agendas and actual budget process. These findings suggest that further systematic research is needed to understand the underlying dynamics of this phenomenon.

Table VI. KS Test Result across Development Stages and Spending Categories

Spending Category (COFOG)	Total Period (1970-2021)		1 st Phase (1970-1979)		2 nd Phase (1980-1996)		3 rd Phase (1997-2021)	
	D-statistic	p-value (sig.)	D-statistic	p-value (sig.)	D-statistic	p-value (sig.)	D-statistic	p-value (sig.)
General Public Services	0.392	0.000**	0.500	0.168	0.429	0.085	0.440	0.015*
Defense	0.369	0.001**	0.800	0.002**	1.000	0.000**	0.560	0.000**
Public Order and Safety	0.941	0.000**	0.800	0.002**	1.000	0.000**	1.000	0.000**
Economic Affairs	0.500	0.000**	1.000	0.000**	0.929	0.000**	0.320	0.156
Environmental Protection	0.840	0.000**	0.800	0.002**	1.000	0.000**	0.880	0.000**
Housing and Community Amenities	0.739	0.000**	0.600	0.052	0.882	0.000**	0.800	0.000**
Health	0.304	0.014*	1.000	0.000**	0.584	0.006**	0.640	0.000**
Recreation, Culture, and Religion	0.939	0.000**	1.000	0.000**	1.000	0.000**	0.880	0.000**
Education	1.000	0.000**	1.000	0.000**	1.000	0.000**	1.000	0.000**
Social Protection	0.284	0.025*	1.000	0.000**	0.286	0.458	0.640	0.000**

Note: *: statistically significant at the significance levels of 5%, **: statistically significant at the significance levels of 1

4) The Result across Presidents (Administrations) and Spending Categories

Table VII provides results from two-sample KS tests comparing distributions of keyword distributions in presidential speeches and budget allocations across regimes (administrations) and ten government spending categories as defined by the COFOG. With the expenditure categories, the presidency itself may influence the outcomes of KS tests. The analysis is to reflect whether regime changes impact the degree of convergence between presidential political rhetoric and budget allocations across government functions.

In certain categories, the relationship between political keyword distributions and budget allocations shows consistency across regimes. When examining General Public Services, p-values during all presidencies are above the established significance levels, showing that there is no statistically significant decoupling between political keyword distributions and actual budgets. In contrast, in Public Order and Safety and Education, p-values indicate statistically significant differences between political keyword distributions and budget allocations during all presidencies.

Meanwhile, in Defense and Economic Affairs, the divergence between political keyword distributions and budget allocations is statistically significant before the administrations of President Roh Moo-hyun. However, after the presidency of Roh Moo-hyun, p-values are steadily higher than the threshold, representing statistically significant alignments during the presidency of Roh Moo-hyun, Lee Myung-bak, Park Geun-hye, and Moon Jae-in. Similarly, consecutive significant couplings between keyword distributions and budget allocations appear in Health and Social Protection. P-values of

Health exceed conventional significance thresholds under the presidency of Roh, Tae-woo, Kim, Young-sam, Kim, Dae-jung, and Roh, Moo-hyun. In Social Protection, from Chun, Doo-hwan's to Lee, Myung-bak's regimes, statistically significant convergences are observed, except for temporary decoupling under the Kim, Dae-jung's administration.

In categories such as Housing and Community Amenities, Environmental Protection, and Recreation, Culture, and Religion, some presidents exhibit relatively higher alignment between their political rhetoric and budget allocations, while others show significant separation in these areas. This indicates that the relationship between political keyword distributions and budget allocations is not consistent across administrations and varies by president and category.

For example, in Housing and Community Amenities, Park, Chung-hee, Kim Young-sam, and Kim Dae-jung demonstrate a statistically significant alignment, as reflected in their higher p-values (0.052, 0.079 and 0.079 respectively), meaning their keyword distributions are more closely matched their actual budgets. In contrast, other presidents show significant separation with lower p-values than the threshold. In the Environmental Protection category, Roh, Moo-hyun, Park, Geun-hye, and Moon Jae-in exhibit significant alignment between keyword distributions and actual budgets, whereas there are divergences under other presidents' administrations. Lastly, in the Recreation, Culture, and Religion category, only the presidential rhetoric of Lee, Myung-bak, and Moon, Jae-in matches with the budget allocations, marked by p-values of 0.079 and 0.357, respectively.

Overall, the p-values for each COFOG category and administration demonstrate significant variation, indicating that the convergence and divergence between presidential rhetoric and actual budget allocations are not uniform across different governmental functions. Except for General Public Services, Public Order and Safety, and Education, the degree of alignment varies by category and political regime. The result also illustrates that some administrations have more significant alignment or separation in certain areas than others. Therefore, data from Table VII provides strong evidence in favor of Hypothesis III and IV, confirming that the alignment between presidential political rhetoric and actual budget allocations indeed varies by changes in administration and expenditure areas.

Table VII. KS Test Result across Presidents (Administrations) and Spending Categories

Spending Category (COFOG)	Park(a) (1970-79)	Chun (1980-87)	Roh(a) (1988-92)	Kim(a) (1993-97)	Kim(b) (98-2002)	Roh(b) (2003-07)	Lee (2008-12)	Park(b) (2013-16)	Moon (2017-21)
	p-value (sig.)	p-value (sig.)	p-value (sig.)	p-value (sig.)	p-value (sig.)	p-value (sig.)	p-value (sig.)	p-value (sig.)	p-value (sig.)
General Public Services	0.168	0.056	0.679	0.357	0.079	0.873	0.357	0.771	0.357
Defense	0.002**	0.000**	0.036*	0.008**	0.008**	0.873	0.357	0.229	0.357
Public Order and Safety	0.002**	0.000**	0.036*	0.008**	0.008**	0.008**	0.008**	0.029*	0.008**
Economic Affairs	0.000**	0.005**	0.036*	0.008**	0.008**	0.079	0.873	0.229	0.079
Environmental Protection	0.002**	0.000**	0.036*	0.008**	0.008**	0.079	0.008**	0.229	0.079
Housing and Community Amenities	0.052	0.000**	0.036*	0.079	0.079	0.008**	0.008**	0.029*	0.079
Health	0.000**	0.000**	0.679	0.357	0.810	0.079	0.008**	0.029*	0.008**
Recreation, Culture, and Religion	0.000**	0.000**	0.036*	0.008**	0.008**	0.008**	0.079	0.029*	0.357
Education	0.000**	0.000**	0.036*	0.008**	0.008**	0.008**	0.008**	0.029*	0.008**
Social Protection	0.000**	0.087	0.286	0.873	0.008**	0.357	0.079	0.029*	0.008**

Note: 1) *: statistically significant at the significance levels of 5%, **: statistically significant at the significance levels of 1 2) Park(a): Park, Chung-hee, Park(b): Park, Geun-hye, Roh(a): Roh, Tae-woo, Roh(b): Roh, Moo-hyun, Kim(a): Kim, Young-sam, Kim(b): Kim, Dae-jung

VI. DISCUSSION AND CONCLUSION

To evaluate governance quality, it is crucial to understand the degree of integration between the strategic visions of presidents and the corresponding budgetary allocations. There are extensive pieces of literature exploring presidential influence on policy implementation and budget allocation; however, only a limited number of studies have explored the shifting relationship between the political agendas of presidents and actual budgets in the complex context of a country's developmental period. While centralized authorities in developing countries tend to focus on rapid economic growth policy, they are transitioning to the state of a developed country, in which various policy demands often appear. During the early development stage, the effectiveness of centralized development strategies is noticeable, along with their authoritative political control and technocratic bureaucracy. However, as societies advance, the appropriateness of the politically centralized development strategies continuously comes under question.

The present study, therefore, investigated the alignment between presidential political rhetoric and budgetary allocations across different stages of national development. The research offers a comprehensive analysis of the dynamic interactions and transitions among these elements over time. By concentrating on South Korea which has successfully transitioned through various developmental phases, this research provided valuable insights into the governance mechanisms that drive economic and social progress.

To conceptualize the national development stages, this study categorized the analyzed period into four stages, based on two criteria: politics-driven and policy-demand

driven. However, as our data covers a period beginning in 1970, by which time South Korea had already moved into Development Stage II, the analyzed period includes only Development Stages II to IV to examine four hypotheses that explore the interactions between presidential political rhetoric and budget allocations in the context of the national development stages. The present study employed KeyATM to measure presidential rhetoric in inaugural addresses and budget messages by extracting keywords based on the standardized Classification of the Functions of Government (COFOG). Additionally, the two-sample Kolmogorov-Smirnov test was utilized to address the limitations of correlation approaches in the analysis of political speeches and budget data.

The empirical findings of this study offer significant insights. During Development Stages II, the presidential political rhetoric and agendas were closely reflected in budgetary allocations, contributing to the significant economic growth of South Korea. In contrast, this alignment weakened as the country transitioned to a developed state, highlighting the challenges of maintaining congruence in a changing policy environment. As the society of South Korea continued to become more sophisticated and developed, the alignment between political agendas and budgetary decisions further diminished. Moreover, the results showed that the alignment between presidential messages and budget allocations varied across different governmental functions. Specifically, significant separation was clear in most categories, including Defense, Public Order and Safety, Environmental Protection, Health, Recreation, Culture, and Religion, and Education. On the other hand, in General Public Services, and Housing and Community Amenities, statistically significant coupling appears in the analysis of the early period of national development. The political regime is another pivotal element

influencing the degree of alignment between presidential priorities, as seen in the rhetoric, and actual budgets. As presidents and their administrations changed, the categories in which coupling and decoupling respectively appear continue to transition, except for General Public Services, Public Order and Safety, and Education categories where the same pattern is seen during the whole analyzed period. In other words, the unique characteristics of each president and administration significantly influenced the degree of alignment between the presidential political rhetoric and budget allocations.

This study emphasizes the importance of balanced alignment between political agendas and budgetary allocation in promoting effective governance and state development. As societies evolve and complex policy demands arise, adaptive governance structures that balance presidential political priorities; emerging policy needs; and budgetary support for policy implementation become increasingly essential. This research advances the theoretical discourse on state development and provides practical insights for policymakers who seek to overcome the challenges of governance in a rapidly changing society. With a novel method of evaluating the quality of governance, policymakers can allocate and adjust public resources with greater responsiveness. Meanwhile, senior politicians can strategically approach their messaging to more effectively encourage policy coherence. Above all, both parties can be held publicly accountable—politicians by the transparency with which they communicate their demands to the public, and policymakers by how appropriately they allocate resources to address those demands. This research has also shown that the effectiveness of a politically centralized model may be limited, and this is clearly seen in the more complex context of developed countries. Therefore, it is imperative to equip governance with

greater sensitivity and responsiveness and to strategically allocate resources and budgets to address emerging new policy demands in advanced societies.

Despite the valuable insights offered by the empirical findings of this study, several limitations highlight the need for further and more in-depth research. First and foremost, the study does not incorporate important political variables such as political ideology, election year effects, and political alignment between the executive and legislative branches. These variables could significantly influence the level of alignment between presidential rhetoric and budget allocations. Similarly, including economic and demographic variables in future studies would provide a more comprehensive insight into how the presidential agenda translates into budgetary allocations.

Another critical consideration for in-depth research is the evolving nature of presidential political messages and agendas. As witnessed in many cases of "populist" politicians, the form of political rhetoric has changed from formal speeches to more fragmented and informal channels, and since these fewer formal communications might not translate into politicians' mandates and commitment, the relationship between politicians' messages and the national budget may become more ambiguous or separated. Conversely, given the increasing amount of informal communication between politicians and the public, this phenomenon may contribute to abundant data, leading to more comprehensive and systematic analysis. The influence of these changing patterns of delivery of political messages should be included in future research to examine whether and how the type of political rhetoric affects the alignment between presidential agendas in their messages or speeches and budget allocations in a country.

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