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Government expenditure and growth in MIST countries: Testing the armey curve

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Abstract

The correlation between government expenditure and economic development has been a subject of considerable interest within academic research and policymaking forums. The present study undertakes an investigation into the quadratic impact of this relationship drawing insights from the ARMEY curve hypothesis. It focuses on the MIST countries (Mexico, Indonesia, South Korea, and Turkiye) during the period from 1960 to 2023. The employment of the Westerlund cointegration test reveals the existence of a long-term relationship, indicating that all variables are cointegrated. The Augmented Mean Group (AMG) estimator further demonstrates that South Korea validates the ARMEY curve, while Indonesia and Mexico exhibit a positive relationship amongst variables. It is also concluded that, Turkiye does not demonstrate a significant quadratic relationship. The study's findings underscore the notion that government spending exerts distinct impacts on economic growth across different nations, thereby invalidating the widely held belief that the inverse-U shape relationship is universally applicable to the ARMEY curve. The results imply that government spending can have a positive effect on economic growth independent of reaching a threshold, thus challenging the conventional understanding of its impact on economic performance. This study underscores the need to consider country-specific factors when assessing the role of government spending in driving economic growth.

Keywords: Government expenditure, Economic growth, ARMEY curve, MIST countries

MİST ülkelerinde hükümet harcamaları ve büyüme: Armey eğrisinin test edilmesi

Öz

Kamu harcamaları ve ekonomik kalkınma arasındaki ilişki, akademik araştırma ve politika oluşturma forumlarında önemli bir ilgi konusu olmuştur. Bu çalışma, ARMEY eğrisi hipotezinden yola çıkarak kamu harcamalarının ekonomik büyüme üzerindeki ikinci dereceden etkisini araştırmaktadır. Çalışma, 1960-2023 yılları arasındaki dönemde MIST ülkelerine (Meksika, Endonezya, Güney Kore ve Türkiye) odaklanmaktadır. Westerlund eşbütünleşme testinin kullanılması, kamu harcamaları ile ekonomik büyüme arasında uzun vadeli bir ilişkinin varlığını ortaya koymakta ve tüm değişkenlerin eşbütünleşik olduğunu göstermektedir. Artırılmış Ortalama Grup (AMG) tahmincisi ayrıca Güney Kore'nin ARMEY eğrisini doğruladığını, Endonezya ve Meksika'nın ise kamu harcamaları ile büyüme arasında pozitif bir ilişki sergilediğini göstermektedir. Ayrıca, Türkiye'nin anlamlı bir ikinci dereceden ilişki göstermediği sonucuna varılmıştır. Çalışmanın bulguları, kamu harcamalarının farklı ülkelerdeki ekonomik büyüme üzerinde farklı etkiler yarattığı fikrinin altını çizmekte ve böylece ters-U şeklindeki ilişkinin ARMEY eğrisi için evrensel olarak geçerli olduğu yönündeki yaygın inancı geçersiz kılmaktadır. Sonuçlar, kamu harcamalarının bir eşiğe ulaşmaktan bağımsız olarak ekonomik büyüme üzerinde olumlu bir etkiye sahip olabileceğini göstermekte ve böylece ekonomik performans üzerindeki etkisine ilişkin geleneksel anlayışın tersine bir sonuç ortaya koymaktadır. Bu çalışma, kamu harcamalarının ekonomik büyümeyi desteklemedeki rolünü değerlendirirken ülkeye özgü faktörlerin göz önünde bulundurulması gerektiğinin altını çizmektedir.

Anahtar Kelimeler: *Kamu harcamaları, Ekonomik büyüme, ARMEY eğrisi, MIST ülkeleri*

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INTRODUCTION

The pursuit of economic prosperity and growth has been a persistent objective for nations across the globe. In the pursuit of this objective, scholars have advanced a variety of theoretical and empirical approaches. An integral component of this scholarly discourse pertains to the role of government in fostering economic growth. A comprehensive examination of the government's role has been undertaken in the literature (Kasal,2023). Despite the extensive research conducted on this topic, and the range of perspectives represented within that research, no conclusive consensus has emerged regarding this research area The divergent viewpoints concerning the positive and negative impacts of government spending are extensively acknowledged within scholarly and policy discourse (Bulut, et al., 2023). As nations aspire to attain advanced status, the impact of government spending becomes crucial, particularly in evaluating the beneficial and adverse effects of government size on economic performance and development. Hence, in the context of considering advanced nations, the role of government becomes particularly significant. The argument of Vedder and Gallaway (1998) that none of the countries in recorded history has achieved a high degree of economic prosperity without some degree of government intervention has been widely accepted. This assertion underscores the essential function of governmental policies in shaping economic performance. Additionally, the question of the appropriate 'degree of government intervention' has been widely debated and explored in various studies. In connection with this, the size and role of the government assumes a pivotal position, for it is recognized that an excessive level of intervention or A failure of effective governance may well result in adverse economic consequences.

The academic community has conducted extensive research into the connection between government spending and the influence of its size on economic growth. This discourse has been dominated, in essence, by the interrogation of the question of whether government expenditure is a primary catalyst of economic growth or whether the contrary is true, i.e., whether government spending drives economic growth. This discourse typically assumes the form of a dichotomy, characterized by two conflicting perspectives: The first of these is Wagner's Law proposed by Wagner(1883), which asserts that the size of government spending is proportionate to the rate of economic growth; the second perspective is Keynesian economics reflects the concepts introduced by Keynes (1936), which suggests that the government plays a catalytic role in stimulating economic activity by increasing spending when growth is sluggish, in order to stimulate the economy. Wagner's Law asserts that an upward trend in government spending is inevitable consequence of economic growth, given that greater national income invariably

leads to a greater demand for public services and infrastructure. Conversely, the Keynesian viewpoint asserts that state expenditure boosts economic growth by augmenting aggregate demand and fostering economic activity. Beyond the direction of causality, the effect of the scale of government on economic growth has been debated in terms of its positive and negative effects. Despite ongoing discussions, no universally accepted conclusion has emerged concerning the optimal magnitude of government size. In this respect, the extant literature reveals two conflicting perspectives. The first perspective, as advanced by Chen and Lee (2005), underscores the potential benefits of elevated government expenditure, positing that it can exert a favourable influence on economic growth. Conversely, the opposing viewpoint asserts that augmented government expenditure may exert deleterious effects, impeding rather than fostering economic growth. Scholars such as Barro et al. (2003) have argued that excessive government intervention may impede economic growth, citing government inefficiencies as a potential hindrance. It is evident that these two perspectives, in their current form, address merely a single aspect of the relationship and neglect to consider the potential for quadratic interactions. Consequently, these perspectives do not provide a comprehensive analysis of the complex dynamics involved.

In contrast to other views, Barro (1990), Armey (1995), Rahn and Fox (1996), and Scully (1994) propose an alternative viewpoint. Collectively, these perspectives underpin what is commonly termed the Armey Curve. Armey (1995) proposes a nuanced perspective by suggesting that the link that exists for government spending and economic growth is not linear, demonstrating that the impact of government intervention varies depending on its scale and efficiency. The fundamental proposition of the Armey Curve posits that an expansion of government size enhances economic growth until a certain threshold is reached. However, beyond this point, any further expansion of government involvement leads to a decline. This relationship is visually represented as an inverted U-shaped curve, illustrating that while government intervention in a certain degree facilitates economic progress, excessive government presence may stifle economic progress due to inefficiencies and excessive regulation. The Armey curve also posits the argument that a state of anarchy, or a complete absence of government, would prove detrimental to economic growth, as it would fail to provide the necessary incentives for savings, investment and market stability (Bozma et al., 2019). The fundamental premise of the Armey Curve theory is that there exists an ideal threshold of government intervention; once this limit is exceeded, any further expansion becomes counterproductive.

In relation to this, the Armey Curve demonstrates conceptual resemblance to the Laffer Curve, proposing the presence of an optimum tax rate that is the highest attainable government revenue (Miller, 2017). A notable point in common is the emphasis on the importance of equilibrium in government intervention, with both theorizing that excessive taxation and government size have the capacity to impede private sector activity and, by extension, reduce economic efficiency.

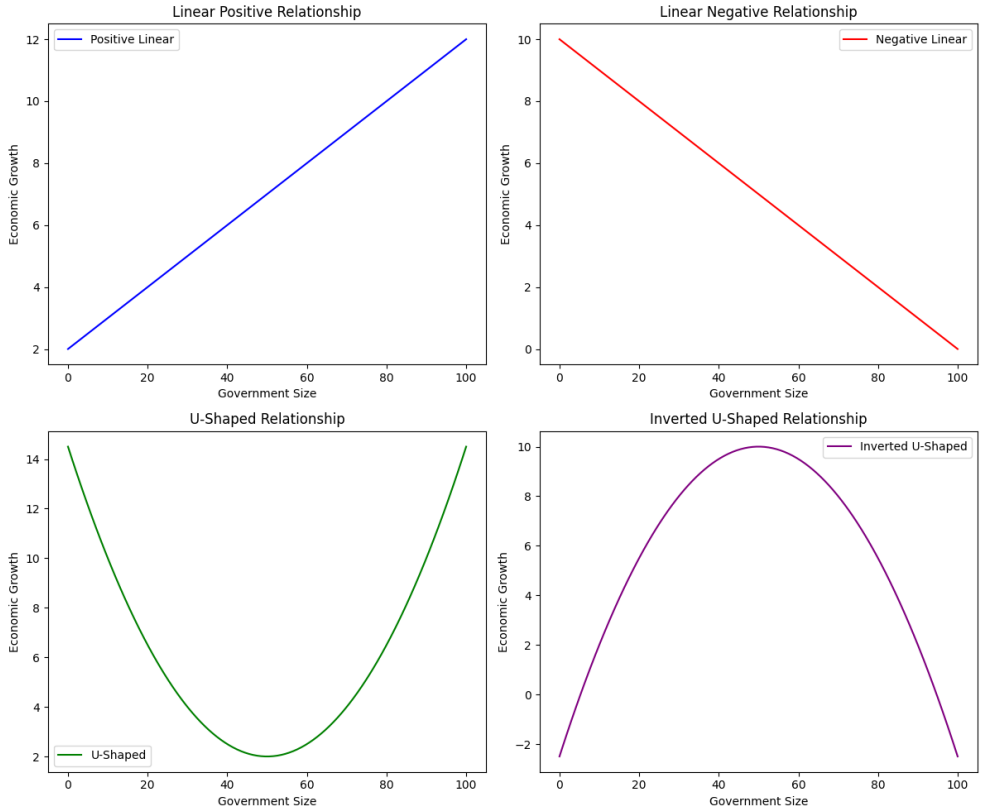

Figure 1. Government size versus economic growth dynamics

As the literature on the size of government and its association with economic growth shows, there exists a plethora of divergent perspectives regarding this relationship. Beyond researches in the literature, it is evident that two variables can exhibit both positive and negative linear relationships. When accounting for quadratic relationships, it is essential to incorporate these distinct interactions into the analysis. As illustrated in Figure 1, four distinct possibilities emerge, each representing a unique scenario that requires further examination and analysis within the context of the discussion. The initial possibility is a positive relationship, which suggests that an increase in government size promotes economic growth. Consequently, an augmentation in government size has consistently been demonstrated to exert a favorable influence on economic growth. Conversely, the existence of a negative relationship is indicative

of the fact that an expansion of government size tends to reduce economic growth. The latter perspective suggests a parsimonious government as optimal, since an escalation in the size of government has been demonstrated to result in a decrease in economic growth. Thirdly, an additional relationship can be identified that is characterized by a quadratic function, where government size initially boosts economic growth up to a threshold, beyond which any subsequent expansion will have an adverse effect on economic growth. This finding aligns with the concept that moderate government intervention can be advantageous; however, beyond a certain point, further expansion can lead to inefficiencies. Conversely, an alternative quadratic relationship indicates that A first-phase growth in government size may initially lead to a reduction in economic growth until a threshold is reached, after which any further expansion may enhance economic growth. An additional significant development in the investigation of the Armey Curve is its recent integration into broader research domains beyond the traditional focus on economic growth and government size, including areas such as health (Trofimov, 2024), environmental studies (Ayad et al., 2023; Pirgaip et al., 2023), and tourism (Bulut et al., 2023).

In this study, the nature of the quadratic association between government size and economic growth is empirically examined and also tested the existence of the Armey Curve. The study's objective is twofold: First, the objective of the present investigation is the provision of information regarding additional perspectives to the literature by assessing whether the size of government influences economic growth in the nations examined and secondly, to provide insights into policy formulation and economic development strategies. The present study aims to achieve two things. Firstly, it will test the theoretical underpinnings of the Armey Curve. Secondly, it will explore the practical implications of government intervention in different economic contexts. This will provide insights into policy formulation and economic development strategies. The novelty of this study lies in its examination of the Armey curve hypothesis for the MIST countries (Mexico, Indonesia, South Korea, and Turkiye) - a previously unexplored country group in this context. By employing an extended temporal framework (1960-2023), this research provides the comprehensive empirical analysis of the government spending-growth relationship in these strategically important emerging economies. The study contributes to the literature by: (i) testing the applicability of the Armey curve to a new set of economies with distinct developmental characteristics; (ii) generating country-specific government spending-economic growth nexus; and (iii) offering policy-relevant insights tailored to emerging market contexts.

The present study is organized in the following format. The initial section is intended to introduce the fundamental concepts that are explored in this paper. It also provides an overview of the theoretical framework and the research objectives. The subsequent section discusses the relevant literature in detail on the subject, encompassing prior empirical investigations and theoretical discourse pertaining to the correlation between the magnitude of governmental authority and economic expansion. The methodology and the data utilized are outlined in the third part. The employed econometric techniques and the used variables to analyses the connection of the variables are specified in the third section. The fourth and final section of the present study presents and presents the empirical findings and discusses their implications, as derived from the econometric methods previously outlined. The concluding part summarizes the critical findings of the study, discusses policy recommendations, and gives an overview of the study's impact on the existing body of work related to government size and economic growth.

LITERATURE REVIEW

The body of research explored in this paper presents a diverse range of findings, reflecting the complexity of this issue across different economic contexts. A substantial proportion of the extant research is dedicated to identifying the optimal size of government expenditure, a concept frequently analyzed through the lens of the Armey Curve Hypothesis. One such study was conducted by Ram (1986), who examined data from 115 countries using cross-sectional analyses in combination with time series analyses to assess the influence of government size on economic performance and growth. The results of the study suggest the presence of a positive relationship among the variables. Additionally, the cross-sectional results indicated that relative factor productivity was higher in the government sector compared to the remainder of the economy, particularly throughout the 1960s. Building on these early insights, subsequent research sought to refine the relationship this relationship across different contexts and time periods. Building on Ram's work, Karras (1996) carried out an empirical investigation of 118 nations over the period 1960–1985 to identify the optimal size of government. The results obtained indicated that government services were significantly productive, and that were oversupplied in Africa, undersupplied in Asia, and optimally supplied elsewhere. Building on this, Karras (1997) conducted an investigation that encompassed 20 European countries from 1950 to 1990, thereby corroborating his earlier conclusions that government services remained significantly productive and were, on average, optimally provided. Furthermore, Guseh (1997) examined annual time-series data from 59 middle-income developing countries from 1960 to

1985. The study's findings introduced a more complex dimension to the debate, indicating that a rise in government size had an adverse effect on economic growth. Of particular note was the finding that the adverse impact was three times stronger in nondemocratic socialist systems compared to democratic market systems. This finding underscores the importance of political and economic structures in shaping the effects of government size. Building on this, Vedder and Gallaway (1998) conducted a study of the U.S. economy over the period 1947-1997. Their research concluded that the Armey curve peaked when federal government expenditures reached 17.45% of GDP. When incorporating data on state and local government expenditures, the optimal government share increased to 28.8% of GDP.

In a geographical context other than the one previously discussed, Schaltegger and Torgler (2006) investigated the growth effects of public expenditure at the state and local levels in Switzerland between 1981 and 2001.This finding lends further support to the argument that excessive government expenditure can impede economic performance, at least within specific contexts. Building on this line of inquiry, Mutaşcu and Miloş (2009) examined the optimal size of government spending within European Union member states for the period 1999–2008. Their findings suggested that, for EU-15 countries, an average public expenditure level of 30.42% of GDP could have maximized GDP growth at 3.96% per year. A similar outcome was observed for EU-12 countries, where an expenditure level of 27.46% of GDP was found to potentially lead to a maximum GDP growth rate of 7.69% per year.

In further exploration of the relationship, Samimi et al. (2010) used a threshold regression method in a sample of Islamic countries. The researchers' findings suggested that if the size of government were below a certain threshold, it exerted a favorable influence on economic growth. Conversely, when government size exceeded the threshold, its effect on growth was found to be negative. A notable finding was the absence of a significant impact of the size of the government on economic growth in Turkiye and Jordan. This study emphasized the importance of context-specific thresholds in assessing the role of government expenditure. Furthermore, Facchini and Melki (2013) introduced a historical dimension to the discussion in France from 1896 to 2008. Their findings revealed an inverted U-shaped relationship during one of France's longest stable democratic periods.

In a more contemporary context, Altunç and Aydın (2013) conducted a study from 1995 to 2011 on the association between Turkiye, Romania, and Bulgaria. Empirical evidence suggests that public expenditure as a share of GDP exceeded optimal levels in all three

countries, aligning with previous studies that warned against excessive government intervention.

In a developing economy, Alimi (2014) studied government size in Nigeria from 1970 to 2012 to determine its optimal level. The findings confirmed that the concept of an optimal government size is not limited to developed nations but is also relevant in developing economies such as Nigeria. This further underscores the universal applicability of the discourse surrounding government size. In a related study, Mendonça and Cacicedo (2015) carried out an empirical analysis focusing on Brazil, examining the period from 2000 to 2013. Their findings suggested that an increase in the size of government contributed beneficially to economic growth.

In a study, Bozma et al. (2019) examined the relevance of the Armey Curve Hypothesis for the G7 countries over the period from 1981 to 2014. The empirical findings of the study supported the hypothesis for the U.S., Canada, and France; however, the other members did not show the same pattern. This finding suggests that the relationship amongst variables may vary significantly across different economic and institutional frameworks. Furthermore, Goh and Aznan (2023) explored this relation for the case of Malaysia and South Korea between 2005 and 2019. Their findings revealed that while government operating expenditures in both countries were not excessive and contributed positively to economic growth, Malaysia's investment expenditure had not fully realized its potential to accelerate economic growth in comparison to South Korea.

Moreover, in a recent empirical study, Bollers (2024) investigated the validity of the Armey curve hypothesis in the context of Guyana, employing annual time-series data from 1990 to 2021. The results confirmed the existence of a relationship between government expenditure and economic performance, supporting the Armey curve's theoretical predictions in Guyana. Specifically, the study estimated the optimal level of government spending at 23.04% of GDP, beyond which additional fiscal expansion was found to exert adverse effects on economic growth. In addition, the empirical results of Kunawotor, Ahiabor, and Yobo (2024) demonstrate a statistically significant inverse relationship between government size and economic welfare across African nations, suggesting that larger public sectors may impede welfare-enhancing growth

The review of the existing literature indicating a broad spectrum of findings. While some studies posit the positive effects of government spending, others caution against excessive

expansion. The heterogeneity of the results underscores the significance of economic structure, governance systems, and expenditure efficiency in determining the influence of government size on growth. Consequently, ascertaining the influence of government spending on economies continues to be a multifaceted yet pivotal issue for policymakers worldwide.

As evident from the literature reviewed above, there is no clear consensus among previous studies, with various patterns of influence observed among the key variables. Notably, while the Armey curve hypothesis has been extensively tested for many countries, its applicability to the MIST countries remains unexplored in the extant literature. This study addresses this void by providing the first empirical examination of the government spending-growth relationship in the MIST bloc. Therefore, applying panel data analysis and identifying the specific nature and direction of influence for each country is essential to better understand the role of government consumption, whether it exerts a positive or negative effect. This research seeks to contribute to the existing body of knowledge by addressing this gap and examining the extent to which economic growth in these countries has been shaped by changes in government consumption, including both its linear and quadratic impacts.

MATERIAL AND METHOD

The present study explores the quadratic association between economic growth and government expenditure within the framework of the Armey Curve. To this end, the study utilizes GDP per capita (in current LCU) and general government final consumption expenditure (in current LCU) as the primary variables to examine this relationship across the sample of countries from 1960 to 2023. The period from 1960 to 2023 was selected for analysis due to the availability and continuity of relevant data throughout these years. The dataset utilized in this study is sourced from the World Development Indicators (WDI), a comprehensive repository of global economic and developmental statistics maintained by the World Bank. Mexico, Indonesia, South Korea, and Turkey—collectively referred to as the MIST countries—are included in this analysis due to their significant shared characteristics. These nations are recognized for their advancing economic development, characterized by large populations, individual contributions exceeding 1% of global GDP, and membership in the G20, highlighting their growing influence in the international economic landscape (Tarakcıoğlu, et al., 2024).

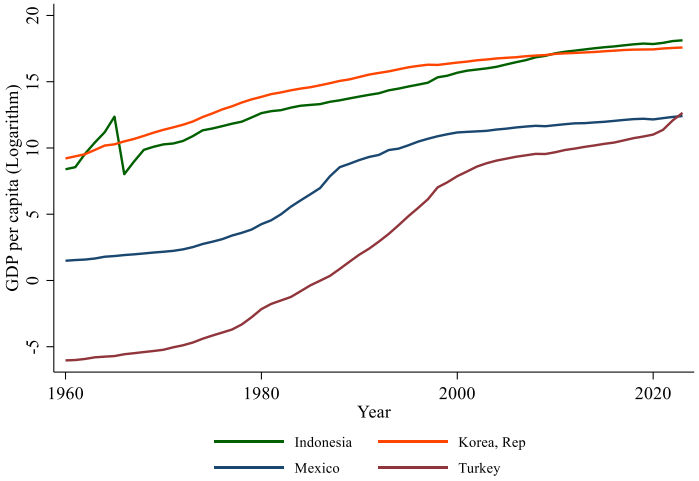

Figure 2. Evolution of GDP across the years

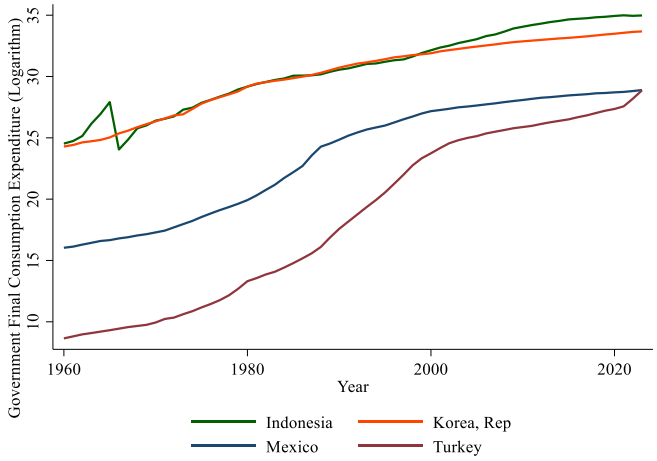

Figure 3. Evolution of government expenditure across the years

To examine the long-term trends and patterns of these variables, variables are presented in Figures 1 and 2. As depicted in the figures, both GDP per capita and government spending exhibit a general upward trajectory over time. However, despite this overall increase, certain fluctuations can be observed in some countries, reflecting economic cycles, policy changes, and external shocks that may have influenced government expenditure and economic growth dynamics.

Beyond its function as a graphical representation of the variables, Table 1 provides the reader with a thorough exposition of these statistical properties. These statistics offer insights into the central tendency, dispersion, and distribution of the variables, allowing for a better understanding of their characteristics across different countries and time periods.

Table 1. Descriptive statistics

	GDP	***GS***
Mean	9.826	25.675
Median	11.311	27.282
Max	18.123	34.989
Min	-6.030	8.648
Std. Dev.	6.507	6.875
Skewness	-0.909	-0.895
Kurtosis	2.959	2.940
Jarque-Bera	35.312	34.232
Prob.	0.000	0.000
Obs.	256	256

As illustrated in Table 1, the mean values for both variables indicate their central tendency, while the median demonstrates the middle point of the data, thereby providing insights into the symmetry of the distributions. The range, which is captured by the maximum and minimum values, highlights the spread of the data for both variables, thus suggesting variability in the observations. Standard deviation values for both variables point to the extent of dispersion around the mean.

The skewness values indicate that both variables exhibit a negative skew, suggesting that the data is slightly stretched towards the lower end. The kurtosis values reveal that the distributions are slightly flatter than a normal distribution, indicating less peakedness and more spread-out data. The Jarque-Bera test results, with very low p-values, indicate that both GDP and GS significantly deviate from a normal distribution.

In addition to the data used in this study**, t**he present study also explores how government spending exhibits a quadratic relationship with economic growth, using advanced econometric techniques. The core hypothesis suggests a quadratic relationship, where government spending initially stimulates economic growth but may have diminishing or even adverse effects when it exceeds a certain threshold. This relationship is mathematically represented as

$$GDP_{it} = f(GS_{\mathrm{it}}, GS_{\mathrm{it}}^2) \qquad \textit{Eq (1)}$$

where GDP_{it} denotes economic output for country i in time period t, and GS_{it} represents government spending. The empirical approach used in this research can be described as it follows:

$$GDP_{\mathrm{it}} = \alpha_0 + \alpha_1 GS_{\mathrm{it}} + \alpha_2\, GS_{\mathrm{it}}^2 + \varepsilon_{it} \qquad \textit{Eq (2)}$$

α_1 captures the linear effect of government spending on economic growth, while α_2 accounts for the quadratic effect, which, if negative and statistically significant, would confirm

an inverted U-shaped relationship, if α_1 is positive and significant. The contaray version can be counted for U shaped relationship. If both of them have the same sign, there would not be any u shaped relation between variables.

Before proceeding with estimation, addressing cross-section dependence is essential because different econometric techniques either account for or ignore it, which can impact the reliability of results. The study utilizes a series of tests in accordance with Breusch & Pagan (1980), Pesaran (2004), Baltagi et al. (2012). Identifying cross-sectional dependence guides the selection of suitable econometric methodologies to ensure robust findings.

Following this, the stationarity of the variables are assessed by utilizing the Pesaran CIPS Test, as it was introduced by Pesaran (2007). Furthermore, the homogeneity of the series represents a significant issue that requires further consideration. To this end, the Delta homogeneity test proposed by Pesaran and Yamagata (2008) was employed.

This study employs the Westerlund (2007) cointegration test to assess long-run equilibrium relationships among the variables. Unlike conventional cointegration tests, the Westerlund approach properly accounts for cross-sectional dependence among series, a crucial feature given the economic interdependencies within the country sample. To ensure the robustness of the findings against potential small-sample biases, Westerlund cointegration test is implemented with 1,000 bootstrap replications.

For estimation, the study utilizes the Augmented Mean Group (AMG) estimator, proposed by Eberhardt and Bond (2009). It is particularly effective in panel data analysis as it accounts for cross-sectional heterogeneity and unobserved common factors that may influence economic growth. Unlike traditional estimation methods, which often underestimate dynamic relationships, AMG provides more robust and unbiased estimates by addressing potential complexities (Chandra Voumik et al., 2023).

Overall, this study systematically investigates the quadratic relationship between economic growth and government spending through a rigorous econometric framework. By incorporating cross-sectional dependence tests, stationarity analysis, and cointegration testing, and by employing the AMG estimator, it ensures the robustness and accuracy of results.

EMPIRICAL RESULTS

The findings from the econometric estimation are outlined in this section, in accordance with the methodology previously outlined. The initial step entails the identification of the cross-sectional dependence of the variables, as illustrated in Table 2.

Table 2. Cross-section dependency tests

	Breusch Pagan LM	Breusch Pagan LM	Bias Corrected Scaled LM	Pesaran CD
GDP	356.772***	101.259***	101.227***	18.887***
GS	362.919***	103.033***	103.001***	19.049***

GDP: Gross Domestic Product, GS= Government Consumption

The following table presents the findings from a series of tests designed to identify the presence of cross-sectional dependence in panel data concerning GDP and Government Spending (GS). The evaluation of the tests reveals that all of them collectively provide insights into the cross-section dependency for all variables. Collectively, the findings indicate that all variables exhibit cross-sectional dependence, underscoring the necessity for employing suitable econometric techniques to address these dependencies in subsequent analyses.

Table 3: CIPS unit root test

	Level	First Difference
GDP	-0.675	-3.389***
GS	-1.103	-2.835**

GDP: Gross Domestic Product, GS= Government Consumption

The following table presents the results of the CIPS unit root test. This test assesses whether Gross Domestic Product (GDP) and Government Spending (GS) are stationary at both the level and first difference. At the level, the test statistics for GDP (-0.675) and GS (-1.103) are not statistically significant, suggesting the presence of a unit root and, therefore, non-stationarity. However, after implementing the first difference, the test statistics for GDP (-3.389***) and GS (-2.835**) become significant at the 1% and 5% levels, respectively, indicating that both series are stationary in their first differences. This finding suggests that GDP and GS are integrated of order one, I(1).

Table 4. Slope heterogeneity test

	Delta	Prob.
Adj.	8.573	0.000
	8.941	0.000

Adj= Adjusted, Prob= Probability

As shown in Table 6, the findings of the slope heterogeneity test are illustrated. it is employed to determine whether the slope coefficients in a panel data model vary across cross-sections. The adjusted and unadjusted Delta statistics, respectively measuring the degree of heterogeneity, yield a probability value of 0.000, thereby indicating statistical significance.

Table 5. Westerlund cointegration test result

Statistic	Value	Z- value	Prob.	Robust Prob.
Gt	-3.365	2.888	0.002	0.010
Ga	-14.436	1.694	0.045	0.018
Pt	-6.369	2.850	0.002	0.015
Pa	-15.633	3.494	0.000	0.005

Prob= Probability

Furthermore, the Westerlund cointegration test has yielded substantial evidence that suggests a significant degree of cointegration among the variables. The Westerlund (2007) cointegration test yields statistically significant results across all test statistics, providing robust evidence of a stable long-run equilibrium relationship among the examined variables. These results collectively reject the null hypothesis of no cointegration, suggesting that the variables are cointegrated and exhibit a long-run equilibrium relationship.

Table 6. Augmented mean group estimator results

	Coefficient	S.D.	Prob.
	Indonesia		
GS	0.517	0.105	0.000
GS²	0.010	0.001	0.000
	Korea, Rep		
GS	1.388	0.096	0.000
GS²	-0.006	0.001	0.000
	Mexico		
GS	0.688	0.029	0.000
GS²	0.007	0.000	0.000
	Turkiye		
GS	0.984	0.018	0.000
GS²	-0.000	0.000	0.774

S.D.= Standard Deviation, Prob= Probability, GS= Government Consumption

The findings derived from the AMG estimator revealed significant statistical evidence, shedding light on the structural aspects and interactions of the variables under investigation across four different countries: Specifically, the focus is on Indonesia, South Korea, Mexico, and Turkiye. For Indonesia, the coefficient for government spending (GS) is positive and statistically significant, indicating that rise of government spending enhances economic growth. Furthermore, the quadratic term (GS^2) is also positive, suggesting that higher government spending continues to promote growth without evident diminishing returns. A parallel observation can be made in Mexico, where both GS and GS^2 are positive and significant, indicating that economic growth is favorably influenced by increased government spending, and that this influence is not contingent upon an optimal threshold.

Conversely, South Korea exhibits an inverted U-shaped relationship, indicating that the variable's impact increases to a point before diminishing as the variable continues to rise. The

GS coefficient is significantly positive, indicating that initial increases in government spending stimulate growth. However, the negative and significant GS2 coefficient suggests that excessive government spending eventually reduces economic growth, indicating the presence of an optimal level beyond which additional spending becomes counterproductive. In contrast, Turkiye exhibits a predominantly linear relationship between government spending and economic growth. The GS coefficient is positive and significant, but the GS^2 coefficient is not statistically significant, indicating an absence of compelling evidence for a quadratic effect. This finding suggests that government spending exerts a positive impact on economic growth in Turkiye, but it does not provide clear evidence of a threshold beyond which the impact becomes negative.

The results of this study demonstrate the heterogeneous effects of government spending on economic growth across different countries. While some nations, like South Korea, demonstrate diminishing returns at higher levels of spending, others, such as Indonesia and Mexico, exhibit benefits from sustained increases in government expenditure. Turkiye, on the other hand, demonstrates a straightforward positive relationship without substantial quadratic effects. These variations underscore the significance of country-specific factors, such as fiscal policy efficiency, economic structure, and institutional frameworks, in determining the impact of government spending on growth. Therefore, accepting a single perspective on the relationship is insufficient for capturing the complexity across nations, as clearly demonstrated by the findings of this study, which asserts that government consumption and its quadratic form can have varying impacts across different countries.

DISCUSSION AND CONCLUSION

Economic growth and government spending have long been central themes in the literature, with numerous perspectives advanced to elucidate the complex and interconnected dynamics underpinning their relationship. The Armey Curve Hypothesis has introduced a novel perspective by emphasizing the existence of a threshold beyond which government size may have diminishing or negative effects on economic growth. This concept bears resemblance to the Kuznets Curve, which delineates the dynamic processes underlying income inequality, and the Laffer Curve, which offers an illustration of the relationship between tax rates and revenue.

This study aims to determine the presence of a correlation between the magnitude of government size and economic growth adheres to a linear (positive or negative) trend, an inverted U-shaped pattern (as postulated by the Armey Curve), or a U-shaped pattern. The

analysis is conducted on MIST countries (Mexico, Indonesia, South Korea, and Turkiye), revealing notable variations across different economies. The Westerlund cointegration test was used to confirm the presence of a long-term relationship, thereby suggesting that Fiscal policy has a decisive impact on economic outcomes over time. However, AMG estimator yielded inconsistent results, indicating that a universally consistent relationship among these countries does not exist.

The AMG estimation results underscore salient discrepancies in the influence of government expenditure on economic growth. A positive and statistically significant quadratic form characterizes the relationship between the variables in Indonesia and Mexico, signifying that an augmentation in government spending continues to stimulate economic growth without an evident point of diminishing returns. In these economies, higher public expenditures contribute to expansion without clear negative effects, suggesting that government intervention remains beneficial. Conversely, South Korea displays an inverted U-shaped pattern, where government spending initially promotes economic growth, but beyond a certain threshold, additional spending results in diminishing or even negative returns. This outcome aligns with the postulations of the Armey Curve Hypothesis, which posits that excessive government involvement may engender inefficiencies or impede private sector growth. Turkiye, on the other hand, exhibits a linear relationship, where augmented government spending exerts a consistently positive influence on economic growth, devoid of substantial evidence of a quadratic effect. This observation suggests that, in contrast to the case of South Korea, a definitive threshold does not exist where government spending ceases to yield positive economic outcomes.

The findings indicate that the inverted U-shaped relationship between government size and economic growth is not universally applicable. While government expenditure has been observed to exert a positive influence in all four countries, it is only in South Korea that an excess in government spending has been demonstrated to impede economic growth. In contrast, for Indonesia, Mexico, and Turkiye, government expenditures appear to consistently contribute to economic expansion without reaching a peak or turning point. These variations underscore the significance of country-specific factors, such as fiscal policy efficiency, institutional quality, and economic structure, in determining the impact of government intervention. For policymakers, this underscores the necessity of exercising caution with regard to excessive public spending in South Korea, while also highlighting the potential for the other three countries to further expand government expenditures to support economic growth. This

underscores the need for fiscal policies that are tailored to the unique characteristics of each economy, as opposed to a universal approach.

Limitations and strengths

The relationship between government size and economic growth has been a central theme in economic research, particularly within the context of emerging economies. In this regard, the present study demonstrates several strengths. First, it investigates this relationship over an extensive time span, covering the period from 1960 to 2023, with a specific focus on the MIST countries (Mexico, Indonesia, South Korea, and Turkiye). The study's objective is twofold: first, to examine the contextual relevance of the Armey Curve in diverse national settings, and second, to assess the empirical validity of the curve across these contexts. The selection of economies for study is based on the presence of certain characteristics, including rapid growth trajectories and evolving institutional structures. A notable strength of the research is its comprehensive temporal and geographical coverage, which facilitates a nuanced understanding of how government size influences growth under varying conditions. However, it is important to acknowledge the limitations inherent to the study. These limitations include constraints related to data availability. Despite the extensive coverage, these limitations precluded the possibility of a more comprehensive analysis. Moreover, the incorporation of comparative analyses involving countries from disparate economic groupings could have yielded more profound insights and enhanced the interpretability and generalizability of the findings.

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Tasarım *Design*	Yöntem ve araştırma desenini tasarlamak *To design the method and research design.*	Yunus SAVAŞ
Literatür Tarama *Literature Review*	Çalışma için gerekli literatürü taramak *Review the literature required for the study*	Yunus SAVAŞ
Veri Toplama ve İşleme *Data Collecting and Processing*	Verileri toplamak, düzenlemek ve raporlaştırmak *Collecting, organizing and reporting data*	Yunus SAVAŞ
Tartışma ve Yorum *Discussion and Commentary*	Elde edilen bulguların değerlendirilmesi *Evaluation of the obtained finding*	Yunus SAVAŞ

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This study does not involve human participants, personal data, or any form of experimental intervention. As it solely relies on publicly available secondary data related to macroeconomic indicators, ethical committee approval is not required in accordance with institutional and international research ethics guidelines.