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Determinants of Gross Domestic Product: A Structural Equation Modeling

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Abstract

Aim: This study aims to construct and validate a Structural Equation Model (SEM) that identifies the predictive relationships among key macroeconomic variables influencing Gross Domestic Product (GDP) growth and to provide evidence that can support economic governance, fiscal policymaking, and strategic development planning.

Methodology: The study employed a quantitative, correlational, and predictive research design using Structural Equation Modeling. A balanced panel dataset consisting of annual secondary data from the 38 member countries of the Organisation for Economic Co-operation and Development (OECD) covering the period 1994–2023 was analyzed to examine the direct and indirect relationships among selected macroeconomic determinants of GDP.

Results: The findings indicate that all selected macroeconomic variables significantly influence GDP growth. Government expenditure and interest payments emerged as the strongest positive determinants of economic output, while debt levels and labor force participation also contributed positively. Conversely, inflation and unemployment exhibited significant negative effects on GDP. Government expenditure further served as a significant mediating variable through which several macroeconomic determinants affected economic growth.

Conclusion: The findings demonstrate that sustainable economic growth depends on a balanced combination of effective fiscal policy and macroeconomic stability. The validated SEM highlights the complementary roles of strategic public expenditure, prudent sovereign financing, and workforce participation in promoting long-term economic performance. These findings provide useful evidence for policymakers, government institutions, and development planners in designing integrated fiscal and economic governance strategies that strengthen economic resilience and support sustainable national development.

Keywords: *Gross Domestic Product; Structural Equation Modeling; Macroeconomic Determinants; Government Expenditure; Economic Governance; Fiscal Policy.*

INTRODUCTION

Gross Domestic Product (GDP) serves as the foundational metric for global business performance and strategic organizational planning, reflecting a nation's capacity to sustain growth. While traditional models emphasize linear macroeconomic drivers, recent global crises, such as the COVID-19 pandemic, have disrupted supply chains and fiscal stability, proving that modern corporate environments are highly vulnerable to interconnected global shocks. Although advanced economies provide robust benchmarks for consistent growth drivers, translating these insights to emerging markets requires careful contextualization (Asian Development Bank [ADB], 2023). Specifically, within the Association of Southeast Asian Nations (ASEAN) and the Philippines, rapid economic integration is juxtaposed against structural weaknesses such as inflation volatility and infrastructure gaps, challenging policymakers and business leaders to design resilient strategies for inclusive prosperity (World Bank, 2024). Furthermore, the absence of robust fiscal governance mechanisms often limits the capacity of emerging nations to implement effective economic governance reforms, leaving public policy highly reactive and susceptible to external volatility.

Despite extensive literature on macroeconomic drivers, a critical methodological gap persists in current economic and management research: the heavy reliance on traditional, single-equation regression frameworks (Abdullah et al., 2022). These linear approaches fundamentally fail to capture the complex, indirect pathways and

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simultaneous interdependencies among macroeconomic variables that dictate modern business environments (Hossain et al., 2024). For emerging economies like the Philippines, this fragmented analytical approach restricts policymakers and corporate strategists to viewing variables in a vacuum, leaving industries highly vulnerable to unintended systemic side-effects where an intervention in one sector inadvertently disrupts another. This analytical deficit translates directly into a severe problem for national governance; when economic governance strategies are formulated using isolated data points, fiscal mechanisms become disjointed, effectively paralyzing the execution of sound public policy. Consequently, there is an urgent organizational need for advanced modeling capable of equipping leaders with the multidimensional perspective required to design integrated, shock-resilient economic policies.

This present study addresses these systemic flaws and significantly improves upon previous empirical literature by developing and validating a Structural Equation Model (SEM) to decode inherently interconnected macroeconomic networks. Unlike traditional single-equation models, SEM functions as the definitive analytical framework capable of simultaneously mapping both direct and indirect mediating variables, such as government expenditure, that regression tools inherently overlook (Rahman, 2023). Consequently, this research holds profound significance for national and regional economic governance, providing fiscal and monetary authorities with an empirically validated public policy tool to optimize resource allocation and formulate growth-oriented interventions. By benchmarking robust, 30-year panel data from advanced economies to map interdependent growth pathways, the resulting model serves as a localized, predictive compass for the Philippines and the broader ASEAN region (ADB, 2025). Ultimately, this comprehensive approach empowers governance and business sectors to transition from reactive crisis management to proactive strategic planning, ensuring greater resilience against future shocks and fostering long-term sustainable advancement.

Review of Related Literature and Studies

Inflation and GDP Nexus: Understanding Their Interdependent Dynamics

The relationship between inflation and Gross Domestic Product (GDP) represents a highly complex, often non-linear macroeconomic dynamic where price movements dictate broader economic vitality (Abdullah et al., 2022). Empirical studies consistently demonstrate that inflationary pressures exert adverse effects on GDP, particularly within developing or resource-dependent economies where structural vulnerabilities exacerbate price instability (Bhawmick et al., 2023). Consequently, resolving these dynamics requires advanced modeling frameworks capable of unraveling the intricate structural linkages and indirect pathways through which consumer price variations dictate aggregate economic output (Hossain et al., 2024).

Interest Rate Dynamics and its Influence on Gross Domestic Product: An Analytical Perspective

Interest rates operate as a central mechanism within macroeconomic systems by directly dictating borrowing costs, modulating capital allocation, and influencing corporate investment behavior (Allen & Prabowo, 2023). However, the transmission of these movements is complicated by asymmetric market information, biased investor beliefs, and structural limitations like the effective lower bound on nominal rates (Bauer & Chernov, 2024). Furthermore, the specific macroeconomic impact of global interest rate hikes is highly heterogeneous, varying significantly across emerging markets based on localized financial development and external debt profiles (Hoek et al., 2022).

The Interplay between Unemployment and Gross Domestic Product: Analytical Perspectives on Economic Growth Dynamics

Labor market utilization, measured primarily through the unemployment rate, serves as a foundational indicator of economic health that inversely correlates with GDP growth in alignment with Okun's Law (Al-kasasbeh, 2022). High unemployment reflects a severe underutilization of national resources, which directly stifles consumer spending and acts as a massive constraint to both economic development and productivity. Moreover, the structural relationship between these variables exhibits differing elasticity depending on a nation's development stage, with developing countries frequently demonstrating stronger inverse sensitivities compared to advanced economies undergoing complex technological and automation shifts (Bordot, 2022).

Labor Force Participation Rate as a Key Determinant of Gross Domestic Product Dynamics

The labor force participation rate (LFPR) is a primary supply-side determinant that establishes the productive capacity and baseline economic activity of a nation (Ahn & Hamilton, 2022). Conversely, strategically

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dismantling institutional barriers to elevate female labor force participation serves as a powerful catalyst for regional economic progress and resilience (Chai, 2022). Ultimately, the structural dynamics of the LFPR demonstrate substantial cross-country variability, indicating that a robust and active labor pool is intricately tied to sustained, aggregate GDP expansion (Amin et al., 2024).

Government Expenditures and Their Role in Shaping GDP Dynamics

Government expenditures act as a vital fiscal policy instrument for managing aggregate demand and stimulating national economic activity. Empirical evidence illustrates that the efficacy of state spending in driving GDP growth is deeply contingent upon institutional quality, efficient tax mobilization, and the specific structural composition of the public budget (Chen et al., 2022). Additionally, the impact of government expenditure is highly dynamic across different time frequencies, requiring nuanced evaluations of how varied fiscal interventions translate into real economic expansion (Cenc, 2022).

Debt Levels and GDP: Unpacking the Complex Nexus for Economic Growth

Sovereign debt presents a highly complex, dual-natured relationship with GDP, acting simultaneously as a crucial resource for financing developmental investments and a potential structural constraint on sustainable growth (Beha & Ruxho, 2024). Advanced wavelet analyses confirm that debt impacts are highly time-scale specific; while short-term borrowing can stimulate output by funding productive activities, the long-term accumulation of elevated public debt frequently dampens growth prospects (Ayoub et al., 2025). High external debt burdens inherently constrain human capital development, increase fiscal vulnerabilities, and establish severe developmental bottlenecks in heavily indebted nations (Beyene & Kotosz, 2023).

The Role of Governance on Macroeconomic Determinants of GDP

Traditional macroeconomic determinants of GDP must be evaluated alongside institutional quality when building a structural equation model. Effective governance is foundational for long-term growth, though emerging economies rely more heavily on corruption control than developed nations to realize these benefits (Durguti et al., 2024; Misi Lopes et al., 2023). Furthermore, robust governance acts as a critical moderator that ensures macroeconomic interventions, such as research and development expenditure, successfully translate into tangible economic expansion (Chagwiza et al., 2024).

Public Policy Implications of Inclusive GDP Modeling

Structural equation models evaluating GDP determinants offer vital empirical evidence to help policymakers design equitable socio-economic frameworks. Rather than pursuing aggregate economic expansion in isolation, governments must enact targeted policies that guarantee these economic benefits remain accessible to the broader population (Makatsaria, 2025). By treating GDP as a holistic development indicator, this modeling approach ensures national fiscal strategies align with inclusive, sustainable mandates (Paul & Adoji, 2022).

Synthesis

Effective governance and robust regulatory environments act as critical moderators that translate traditional macroeconomic determinants into sustainable GDP growth, particularly in emerging economies requiring strict corruption control. Furthermore, strategic public policies must manage the interdependent dynamics of inflation, unemployment, and labor force participation to ensure equitable wealth distribution. Integrating these qualitative dimensions into structural macroeconomic models ensures that GDP functions not merely as a production metric, but as a comprehensive indicator of inclusive development.

Theoretical Framework

The theoretical framework integrates Keynesian theory, which links Government Expenditure, Debt Levels, and Interest Payments to aggregate demand, with monetarist principles that map the Inflation Rate to monetary stability. Additionally, endogenous growth theory frames both the Labor Force Participation Rate and the Unemployment Rate as critical determinants of labor efficiency and long-term economic expansion. By uniting these perspectives, the framework provides a comprehensive lens to analyze macroeconomic trends, directly informing evidence-based governance and public policy.

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Conceptual Framework

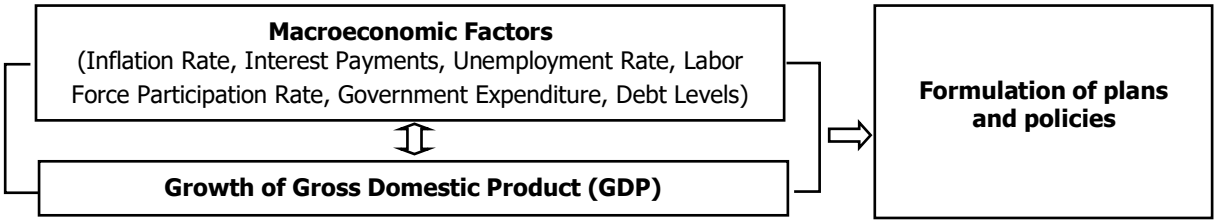

Figure 1. Research Paradigm

This conceptual framework highlights the dynamic interplay between macroeconomic variables and GDP growth, forming a continuous feedback loop. Macroeconomic factors such as inflation rate, interest payment, unemployment rate, labor force participation rate, government expenditure, and debt levels act as drivers that directly influence GDP performance. At the same time, GDP growth itself feeds back into these variables, shaping inflationary pressures, debt levels, and employment conditions. This interdependent cycle represents the current state of the economy, where no factor operates in isolation but rather in constant interaction with others.

The framework then transitions into an analytical flow, where observed data from the GDP–macroeconomic relationship becomes the foundation for policymaking. Policymakers rely on this evidence to identify challenges such as unemployment or opportunities like fiscal surpluses. This stage emphasizes that governance is not arbitrary but rooted in systematic analysis of economic realities. The causal arrow pointing forward symbolizes the movement from observation to action, ensuring that decisions are grounded in measurable outcomes.

The final stage of the model illustrates the formulation of plans and policies as the strategic response of governing bodies. Here, interventions are tailored to address specific economic conditions revealed in the feedback loop. For instance, in cases of stagflation—where inflation is high but GDP stagnates—policies may focus on supply-side reforms or tighter monetary controls. This outcome underscores the importance of aligning policy measures with the nuanced relationship between GDP and its underlying drivers.

Overall, the framework demonstrates an Input-Output model where economic realities serve as inputs and policy responses emerge as outputs. It reinforces the principle that effective governance depends on integrating economic theory with real-world data. The use of such evidence-based data to support public governance and management is also consistent with recent studies such as Abenojar et al. (2025) and Tiquis (2025). In the present study, it is the position of the researchers that, by continuously monitoring the interaction between GDP and macroeconomic indicators, policymakers can design interventions that are both responsive and goal-oriented, ultimately fostering sustainable economic growth.

Statement of the Problem

The fundamental problem addressed by this study is the limited empirical understanding of how interconnected macroeconomic determinants collectively influence Gross Domestic Product (GDP) and how these complex relationships may inform economic governance, fiscal policymaking, and sustainable development planning. Existing economic and management studies predominantly employ fragmented single-equation regression models that analyze macroeconomic variables independently, thereby failing to capture their simultaneous interactions, indirect effects, and mediating mechanisms, particularly the role of government expenditure. This methodological limitation restricts policymakers, public administrators, and development planners from obtaining a comprehensive understanding of macroeconomic dynamics necessary for evidence-based decision-making. Moreover, translating economic experiences from advanced economies into effective policy interventions for emerging economies remains challenging without analytical frameworks capable of modeling these complex structural relationships. Addressing this gap is essential for strengthening governance capacity, improving fiscal policy formulation, enhancing institutional resilience, and supporting sustainable economic growth through more integrated and data-driven public policy decisions.

General Objective

To construct and validate a Structural Equation Model (SEM) that explains the direct and indirect relationships among selected macroeconomic determinants of Gross Domestic Product (GDP) and provides evidence to support economic governance and fiscal policymaking

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Specific Objectives

1. To determine the direct and indirect effects of the selected macroeconomic determinants on Gross Domestic Product using Structural Equation Modeling.
2. To develop and validate a SEM capable of capturing both the direct and mediated effects of these macroeconomic variables on GDP.
3. To formulate evidence-based policy recommendations derived from the structural relationships between macroeconomic factors and GDP identified within the validated SEM.

Research Questions

1. What are the direct and indirect effects of the selected macroeconomic determinants on Gross Domestic Product?
2. What SEM can be developed and validated to capture both direct and mediated effects of macroeconomic variables on GDP?
3. What policy recommendations can be derived from the structural relationships between macroeconomic factors and GDP identified in the SEM?

Research Hypotheses

H_{O1} There is no significant direct and indirect effects between the selected macroeconomic determinants and GDP.

H_{O2} Government expenditure does not significantly mediate the relationship between the selected macroeconomic determinants and GDP.

METHODS

Research Design

This study employed a quantitative, correlational, and predictive research design utilizing SEM. Structural Equation Modeling was selected because governance systems and macroeconomic policies involve multiple interdependent variables whose direct and indirect effects cannot be adequately represented using conventional regression models.

Data Sources and Sampling

Data were sourced from the OECD Economic Outlook database, encompassing all 38 member states with annual records spanning a 30-year period from 1994 to 2023. This comprehensive extraction yielded a balanced longitudinal panel dataset comprising 1,140 country-year observations. A purposive sampling method was employed, deliberately targeting OECD economies due to the high fidelity and standardization of their macroeconomic reporting systems.

Research Instrument

No primary research instrument was employed in this study. Since the investigation relied exclusively on secondary data mining, the macroeconomic indicators were extracted directly from the OECD databases and supplemented by the IMF databases, specifically for the inflation rate. These sources provided standardized and internationally recognized measures of macroeconomic performance across member countries.

The absence of a survey, interview schedule, or other primary data collection instrument was justified by the nature of the research design, which focused on archival datasets. Data mining procedures were applied to retrieve, clean, and preprocess the relevant indicators, ensuring comparability across countries and years. Thus, the "instrument" for this study was effectively the structured datasets themselves, as curated from authoritative OECD sources.

Data Collection

The data gathering procedure began with the systematic data mining of macroeconomic indicators from the OECD database. Data mining was employed to extract relevant country-level indicators for the period 1994–2023, ensuring that the study relied exclusively on secondary, archival data from a reputable international source. The data were cleaned to address missing values and standardized to ensure comparability across countries and years. The

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dataset was then organized into panel format, enabling both cross-sectional and longitudinal analysis. The analytical process proceeded in stages: descriptive statistics and trend analyses were first conducted to address the question of historical patterns in OECD indicators. Correlation and regression analyses were then employed to examine the relationships between macroeconomic factors and GDP growth. Factor analysis followed, identifying latent constructs within the indicators to prepare for SEM development. Finally, the SEM was constructed and validated, with bootstrapping and cross-validation techniques applied to test the accuracy and predictive validity of the model.

Data Analysis

The analysis began with data preparation to ensure dataset reliability. Missing data was addressed using Little's MCAR test, the Expectation-Maximization algorithm, and supplementary IMF data. All currency variables were standardized to USD. Outliers were identified using Z-scores, boxplots, and the Mahalanobis Distance test, then managed via 90% Winsorization for rate-based variables and Log10 transformations for USD-denominated variables. Finally, First Differencing corrected non-stationarity, and Multiple Imputation generated complete datasets to preserve statistical power.

Diagnostic tests were then conducted to satisfy the assumptions required for Maximum Likelihood estimation. Stationarity was confirmed using the Augmented Dickey-Fuller and Kwiatkowski-Phillips-Schmidt-Shin tests, while Variance Inflation Factors and Tolerance levels ruled out multicollinearity. Although formal tests flagged the data as non-normal, the robust sample size (1,140 observations) allowed the analysis to safely proceed under the Central Limit Theorem and the Law of Large Numbers. Additionally, the Durbin-Watson test confirmed the independence of observations by verifying the absence of serial correlation.

The final phase evaluated the macroeconomic relationships. Pearson correlations and Multiple Linear Regression first measured the predictors' linear associations and overall impact on GDP. Next, Structural Equation Modeling (SEM) and Path Analysis via SPSS AMOS were used to map the direct and indirect pathways. The Sobel Test was applied to verify the statistical significance of government expenditure as a mediating variable. Finally, the model's structural fit and forecasting accuracy were strictly validated using standard indices, and R^2 values.

Ethical Considerations

Ethical considerations were central to the study's design. Because the study exclusively analyzed publicly available secondary datasets that contained no identifiable human participants, formal ethics review and informed consent were not required under institutional research ethics guidelines.

The analysis was conducted objectively, avoiding the misrepresentation or misuse of results for political or ideological purposes. To uphold the highest standards of research integrity, the study implemented rigorous diagnostic protocols to guarantee data accuracy throughout the extraction and transformation phases. Furthermore, by transparently documenting the structural models, data sources, and the responsible use of AI technologies, the methodology ensures full computational reproducibility for future scholars. By maintaining these stringent controls over data handling, the study ensured full compliance with international academic and ethical standards.

RESULTS and DISCUSSION

This chapter presents and discusses the findings of the study based on the analysis of OECD macroeconomic data using Structural Equation Modeling (SEM). The structural model was evaluated to examine the relationships between the exogenous macroeconomic indicators—Inflation Rate, Unemployment Rate, and Labor Force Participation Rate—and the endogenous outcomes of Government Expenditure and Gross Domestic Product (GDP).

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Model Development and Validation

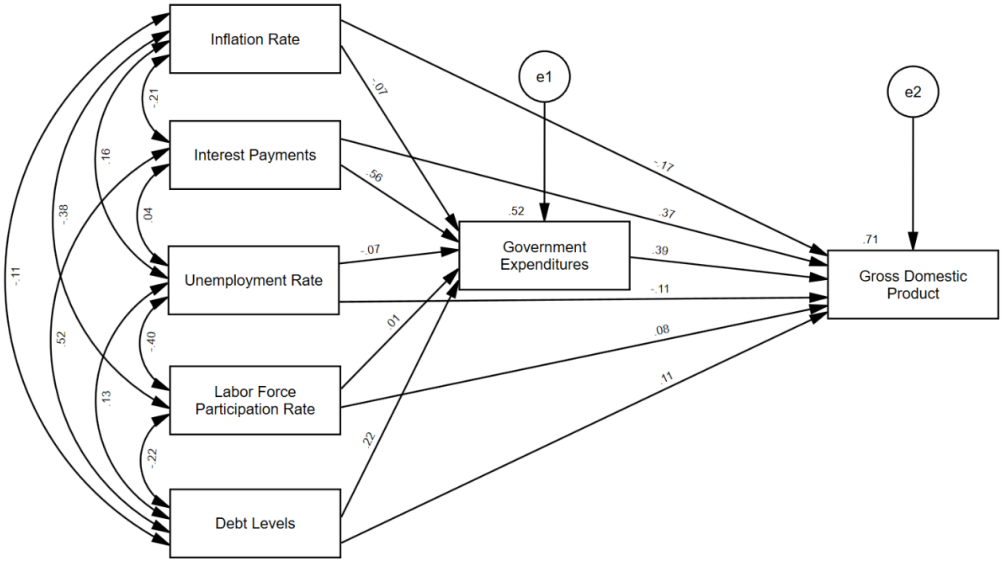

Figure 2. Structural Equation Model of Macroeconomic Determinants of Gross Domestic Product with Government Expenditure as a Mediator

Table 1

Standardized Regression Weights and Significance Levels for the Structural Model

Path Relationship	Direct Effect (β)	Indirect Effect (β)*	Total Effect (β)	Result
Inflation → GDP	-.174	-.027	-.201	Significant
Interest Payments → GDP	.372	.218	.590	Significant
Unemployment → GDP	-.110	-.027	-.137	Significant
Labor Participation → GDP	.080	.004	.084	Significant
Debt Levels → GDP	.114	.086	.200	Significant
Gov. Expenditure →GDP	.385	—	.385	Significant

Note: Indirect effects are calculated by multiplying the path from the predictor to Government Expenditures by the path from Government Expenditures to GDP (e.g., for Interest: 0.56 × 0.39 = 0.218).

Table 1 presents the decomposition of effects for the structural model, providing a granular view of how macroeconomic determinants influence Gross Domestic Product (GDP). By partitioning the total influence of each predictor into direct and indirect components, the model clarifies the role of Government Expenditure as a vital mediating mechanism.

The analysis reveals crucial indirect pathways within the macroeconomic model, particularly regarding the debt-expenditure link. Debt levels exhibit a significant indirect effect of 0.086, confirming that in OECD nations, the accumulation of national debt is not a "dead-end" variable. Rather, it actively fuels GDP by providing the necessary capital to facilitate public spending. Furthermore, the data highlights what the findings conceptually interpret as an "interest paradox." Interest payments demonstrate a notably large indirect effect of 0.218, suggesting that while debt servicing is technically a fiscal cost, it remains structurally tied to the high-spending environments characteristic of expanding OECD economies. Ultimately, within this model, the inherent fiscal burden of interest is mathematically outweighed by the broader economic growth benefits generated by the expenditures it supports.

The total effects for Inflation (-.201) and Unemployment (-.137) represent the primary "drag" on economic output. The negative indirect effects for both variables indicate a "double-hit" phenomenon: they not only damage GDP directly by reducing investment and consumption but also indirectly by slightly eroding the government's ability to spend effectively. This confirms that price and labor stability are essential "pre-conditions" for fiscal policy to be successful.

Unlike the fiscal variables, Labor Force Participation relies almost entirely on its direct effect (β = .080). Its

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negligible indirect effect (.004) indicates that the benefits of an active workforce bypass the government expenditure mechanism and flow directly into the real economy. Rather than representing established theoretical constructs, the results offer a conceptual interpretation of a dual-track growth model: a "Fiscal Engine" driven by debt/expenditure and a "Human Capital Track" driven by labor supply.

For governance and public policy, these findings dictate a dual-track strategy that harmonizes debt-financed public investment with strict macroeconomic stabilization. Authorities must strategically leverage sovereign borrowing to fuel productive government expenditures while aggressively mitigating inflation and unemployment to prevent these systemic constraints from neutralizing fiscal gains. Ultimately, sustainable economic governance requires treating price stability and workforce activation not merely as isolated targets, but as mandatory pre-conditions for maximizing the overall effectiveness of state-led fiscal interventions.

Table 2

Sobel Test Results for Government Expenditure as a Mediator of Macroeconomic Determinants on GDP

Path	Indirect Effect (Sobel Test)				95% CI	
	Est. (ab)	SE	*z*	*p*	LB	UB
Inflation → GovEx → GDP	-0.648	0.05	-12.973	<.001	-0.746	-0.55
Interest → GovEx → GDP	0.165	0.003	61.276	<.001	0.16	0.171
Debt → GovEx → GDP	0.056	0.002	34.031	<.001	0.053	0.059
Unemployment → GovEx → GDP	-0.005	0.000	-12.796	<.001	-0.005	-0.004
Labor → GovEx → GDP	0.001	0.000	1.999	0.046	0.000	0.001

Note. GovEx = Government Expenditure; GDP = Gross Domestic Product; Est. = Unstandardized indirect effect estimate; SE = Standard error; CI = Confidence interval; LB = Lower bound; UB = Upper bound.

To evaluate whether government expenditure significantly mediates the relationship between the five macroeconomic determinants and Gross Domestic Product, Sobel tests (z-tests) were conducted. The statistical significance of the indirect effect was evaluated using both the standard normal distribution (z-score) and the corresponding 95% confidence intervals (CI). An indirect effect is deemed statistically significant if its p-value is less than .05 and its 95% confidence interval does not straddle zero.

Inflation Rates via Government Expenditure. The indirect effect of inflation on GDP through government expenditure was statistically significant (ab = -0.648, SE = 0.050, z = -12.973, p < .001). The 95% confidence interval [-0.746, -0.550] excludes zero, confirming a robust mediation effect. The negative coefficient indicates that higher inflation rates significantly depress government expenditure margins (or real purchasing/allocative power), which in turn leads to a downstream reduction in Gross Domestic Product.

Interest Payments via Government Expenditure. Government expenditure significantly mediated the relationship between interest payments and GDP (ab = 0.165, SE = 0.003, z = 61.276, p < .001). The 95% confidence interval [0.160, 0.171] remains entirely positive and narrow, signaling high estimation precision. This indicates a positive indirect path: higher interest payments are associated with expansions in government expenditure frameworks (potentially due to increased debt servicing or fiscal structural changes), which ultimately exerts a positive transmission effect on aggregate GDP within this model's scope.

Debt Levels via Government Expenditure. The indirect path from national debt to GDP through government expenditure was positive and statistically significant (ab = 0.056, SE = 0.002, z = 34.031, p < .001). Because the 95% confidence interval [0.053, 0.059] does not contain zero, the mediation is confirmed. This implies that debt acts as a financing lever that expands government spending, which subsequently generates a significant positive indirect contribution to economic output.

Unemployment Rate via Government Expenditure. The indirect effect of unemployment on GDP via government expenditure was statistically significant but small in absolute magnitude (ab = -0.005, SE < .001, z = -12.796, p < .001). The 95% confidence interval [-0.005, -0.004] establishes that the effect is reliably negative. This confirms that higher unemployment suppresses or alters the structural efficiency of government expenditure, resulting in a minor but statistically undeniable negative indirect drag on GDP.

Labor Force Participation Rate via Government Expenditure. The indirect effect of labor force participation on GDP through government expenditure was positive and statistically significant at the threshold level (ab = 0.001, SE < .001, z = 1.999, p = .046). The 95% confidence interval [0.000, 0.001] barely avoids touching zero at the lower boundary, indicating a very subtle, marginal mediation effect. While a larger labor force faintly increases GDP through the channel of public expenditure, the strength of this transmission mechanism is the

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weakest among all analyzed macroeconomic determinants.

The Structural Equations

Equation A: The Mediation Model (Predicting Government Expenditures)

This equation models the first stage of your structural path, where the exogenous macroeconomic factors determine fiscal output.

$$\Delta GovEx = -1.78(\Delta IR) + .454(\Delta IP) - 0.13(\Delta UR) + 0.002(\Delta LFPR) + 0.154(\Delta DL))] + \zeta$$

Where: *ΔGovEx = Differenced Government Expenditures (post-Log)*
ΔIR = Differenced Inflation Rate (post-winsorization)
ΔIP = Differenced Interest Payments (post-Log)
ΔUR = Differenced Unemployment Rate (post-winsorization)
ΔLFPR = Differenced Labor Force Participation Rate (post-winsorization)
ΔDL = Differenced Debt Levels (post-Log)
ζ (Zeta) = represents the structural error terms

Equation B: The Structural Model (Predicting GDP)

This equation models the final stage, including the direct effects of the exogenous variables and the effect of the mediator.

$$\Delta GDP = 0.364(\Delta GovEx) - 4.310(\Delta IR) + .285(\Delta IP) - 0.019(\Delta UR) + 0.009(\Delta LFPR) + 0.075(\Delta DL) + \zeta$$

Where: *ΔGDP = Differenced Gross Domestic Product (post-Log)*
ΔGovEx = Differenced Government Expenditures (post-Log)
ΔIR = Differenced Inflation Rate (post-winsorization)
ΔIP = Differenced Interest Payments (post-Log)
ΔUR = Differenced Unemployment Rate (post-winsorization)
ΔLFPR = Differenced Labor Force Participation Rate
ΔDL = Differenced Debt Levels (post-Log) (post-winsorization)
ζ (Zeta) = represents the structural error terms

The first equation confirms that Interest Payments (B = .454) and Debt Levels (B = .154) are the primary drivers of fiscal expansion. The second equation demonstrates that after controlling for direct labor and price effects, Government Expenditure (B = .364) serves as a significant positive determinant of GDP growth. This system of equations successfully captures the mediated economic flow from sovereign financial obligations to national economic output, providing a comprehensive mathematical map of the 38 OECD economies.

Table 3

Summary of Goodness-of-Fit Indices for the Structural Model

Fit Index	Value	Criteria/Threshold	Interpretation
Absolute Fit			
CMIN (X^2)	2.107	p > .05	Excellent
CMIN/DF	2.107	< 3.0	Excellent
Root Mean Square Error of Approximation (RMSEA)	0.007	< .06	Excellent
Incremental Fit			
Comparative Fit Index (CFI)	1	> .95	Excellent
Tucker-Lewis Index (TLI)	1	> .95	Excellent
Normal Fit Index (NFI)	1	> .90	Excellent
Parsimony Fit			
PRATIO	0.048	Closer to 1.0 is better	Acceptable

The structural model exhibits a superior level of fit, as evidenced by both absolute and incremental indices. The CMIN/DF value of 2.107 is well below the conservative threshold of 3.0, indicating that the discrepancies

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between the observed and implied covariance matrices are minimal. Furthermore, the p-value for the Chi-square test is .147; in SEM, a non-significant p-value (> .05) is the desired result, as it indicates that the model does not significantly differ from the actual data.

The RMSEA value of .007 is exceptionally low, falling far below the standard .06 cutoff for a "close fit." This suggests that the model is highly parsimonious and has a very low error of approximation. Additionally, the incremental fit indices (CFI, TLI, and NFI) all reached the perfect value of 1.000. This signifies that the hypothesized structural model provides a 100% improvement over the baseline independence model. Collectively, these indices provide a robust justification for the structural paths analyzed, confirming that the model effectively captures the economic reality of the OECD panel.

Table 4

Summary of Predictive Accuracy

Index	Value	Criteria/Threshold	Interpretation
R^2 (GDP)	0.71	High is better (> .50)	High Accuracy
R^2 (GovEx)	0.52	Moderate is better (> .30)	Moderate Accuracy
Akaike Information Criterion (AIC)	70.107	Lower than Independence Model	Excellent
Expected Cross-Validation Index (ECVI)	0.003	Smaller values suggest stability	Excellent
HOELTER (.05)	41,532	> 200	Highly Sufficient Sample

The predictive accuracy of the model is assessed through the squared multiple correlations (R^2). The model accounts for 71% of the variance in Gross Domestic Product (R^2 = .710), representing a high level of predictive power for macroeconomic longitudinal data. Additionally, the model explains 52% of the variance in Government Expenditures, confirming its role as a stable mediator.

The AIC (70.107) and ECVI (.003) values are remarkably low compared to the Independence model (AIC = 62,797.3). In SEM, lower values for these criteria indicate that the model is likely to be stable across different samples and is not over-fitted. Finally, the Hoelter Index value of 41,532 far exceeds the standard threshold of 200. This confirms that the sample size is more than sufficient to produce stable estimates and that the model results are statistically reliable. These findings solidify the model's status as a high-accuracy tool for explaining the determinants of OECD economic growth.

Conclusions

The validated structural model maps the highly complex, multi-channel pathways through which macroeconomic determinants dictate national economic output, providing a comprehensive framework that corrects simpler linear assumptions.

The Inflation-GDP Nexus

The model identifies inflation as a severe systemic inhibitor of economic growth (Hossain et al., 2024). By correcting pre-imputation methodologies that mistakenly linked price increases to positive demand-pull dynamics (Abdullah et al., 2022), the model confirms that high or unstable inflation introduces severe structural drags (Bhawmick et al., 2023). Price volatility aggressively suppresses real economic output by severely damaging a government's long-term fiscal planning capacity, effectively constraining overall national performance. From a public policy perspective, this underscores the necessity for governance frameworks that prioritize stringent inflation-targeting and proactive market stabilization measures to safeguard fiscal predictability. Central banks and price regulatory boards may utilize these findings to execute stringent inflation-targeting frameworks and supply-side market interventions that actively safeguard the state's fiscal purchasing power.

Unemployment Dynamics and the "Double-Hit" Phenomenon

Validating Okun's Law within modern multi-variable panels, labor underutilization acts as a premier structural constraint to aggregate economic vitality. The model uncovers a critical "double-hit" phenomenon regarding unemployment. Labor market degradation not only directly dampens private consumption but simultaneously generates a negative indirect pathway that erodes the state's internal fiscal allocation capacity. This confirms that labor inefficiencies systemically echo into broader macro-social outcomes, straining public budgets. Effective governance therefore requires integrated public policies that treat job creation and active labor market programs not just as social safety nets, but as essential tools for preserving state fiscal integrity. Departments of

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labor and regional employment agencies may utilize these insights to deploy active labor market programs and job creation initiatives not merely as social safety nets, but as essential tools to preserve state fiscal integrity.

The Sovereign Financing Paradox

A defining revelation of this research is the empirical resolution of the "Sovereign Financing Paradox," which contradicts traditional theories that view public debt and high interest obligations as inherently growth-suppressing dead-ends. Instead, national debt and interest payments operate as dominant positive drivers of economic output because they serve as the primary structural fuel for government expenditures. In this framework, public debt accumulation is a highly productive mechanism. Because government expenditure functions as the ultimate engine of aggregate productive capacity, the macroeconomic returns of state-led expenditures mathematically outweigh the foundational fiscal costs associated with debt servicing (Rahman, 2023). For public policy, this implies that governance should shift away from blanket debt-aversion and instead focus on establishing rigorous institutional safeguards that ensure borrowed funds are channeled into high-yield, productive public investments. National treasuries, departments of finance, and infrastructure planning authorities may utilize this framework to abandon blanket debt-aversion, establishing institutional safeguards that strategically channel borrowed funds into high-yield, productive public investments.

The Autonomous Human Capital Track

Operating entirely independently of centralized state spending, the labor force participation rate establishes a resilient, purely positive "Human Capital Track." Workforce mobilization bypasses public sector budget mechanisms to directly stimulate the real economy (Ahn & Hamilton, 2022). This dynamic confirms that even within economies highly sensitive to capital movements, the underlying supply of active, engaged labor serves as an autonomous anchor for sustainable and inclusive growth. Consequently, governance frameworks must prioritize public policies aimed at removing structural barriers to employment, ensuring that human capital development remains a central, self-sustaining pillar of national economic strategy. Human resource commissions, women's regulatory bodies, and labor departments may utilize these findings to draft targeted policies that dismantle structural and socio-cultural barriers to employment, maximizing the demographic dividend to sustain regional growth.

Recommendations

Translating these global structural insights into actionable, evidence-based economic policies for emerging regions—specifically ASEAN and the Philippines—yields the following core recommendations:

1. Transition to Productive Sovereign Leverage: Fiscal and planning authorities, such as the Department of Finance (DOF) and the Department of Economy, Planning and Development (DEPDev), may abandon defensive, purely austerity-driven budgetary frameworks. The government may utilize public borrowing as an active funding channel rather than a dead-end strain. To match the growth dynamics observed in advanced nations, debt accumulation may be strictly and transparently bound to high-multiplier capital infrastructure investments, public utilities, and asset development, coordinated with agencies like the Department of Public Works and Highways (DPWH). This ensures that the long-term economic returns systematically outpace and cushion debt-servicing obligations.
2. Establish Price and Labor Stability as Fiscal Pre-conditions: Central banks (such as the Bangko Sentral ng Pilipinas) and economic planning agencies may prioritize absolute price and labor market stability not merely as isolated targets, but as core requirements for fiscal policy success. Since inflation and unemployment structurally degrade the state's internal capacity to spend efficiently, authorities, potentially in collaboration with the Department of Agriculture (DA) and the Department of Trade and Industry (DTI), may implement pre-emptive supply-side interventions—including localized food reserves, agricultural logistics stabilization, and targeted corporate incentives—to shield public budgets from sudden domestic macro-shocks.
3. Institutionalize Workforce Activation Channels: To fully capitalize on the independent "Human Capital Track" and maximize demographic dividends, policymakers, led by institutions like the Department of Labor and Employment (DOLE), may eliminate institutional and socio-cultural barriers to workforce engagement. National strategies, supported by bodies such as the Philippine Commission on Women (PCW) and the DTI, may focus heavily on expanding female labor force participation (through accessible childcare and parental protections), formalizing informal employment sectors, and lowering regulatory entry costs for small and medium enterprises (SMEs). Because the returns of workforce activation flow directly into the real economy without straining public budgets, an expanded labor supply provides a resilient, non-inflationary buffer for sustainable and inclusive regional growth.

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Future Research Directions

Future research should expand this structural architecture by integrating global trade indicators, such as net trade balances and liberalization metrics, to capture economic competitiveness in export-oriented regions like ASEAN. Subsequent studies could model international capital flows by introducing Foreign Direct Investment (FDI) as a predictor or mediating variable to clarify its interaction with domestic output and labor markets. Finally, incorporating external macroeconomic volatility variables—including exchange rate dynamics, commodity fluctuations, and supply chain disruptions—would allow researchers to empirically simulate the resilience of these internal structural engines against global crises.

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