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The role of tax revenue and public spending in promoting export growth: Evidence from Cambodia

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Abstract

This study investigated the dynamic effects of fiscal and macroeconomic variables on Cambodia's export performance using a Vector Autoregressive (VAR) model, which included the analysis of Forecast Error Variance Decomposition (FEVD) and Impulse Response Functions (IRFs). The FEVD results revealed that while export growth was initially explained entirely by its own shocks, the influence of external variables increased over time. By the fifth forecast horizon, exports accounted for only 71.68% of their own variation, with government expenditure emerging as a significant contributor (16.26%) and maintaining a stable impact of around 16.5% through period 10. Exchange rate fluctuations accounted for approximately 8.03% of the forecast variance, while tax revenue and inflation contributed modestly, at 4.36% and 1%, respectively. The IRF analysis confirmed these findings, showing a strong and immediate response of exports to government spending shocks, especially in the early periods. In contrast, the responses to shocks in tax revenue, inflation, and exchange rates were relatively weak and statistically insignificant. These results underscore the pivotal role of productive public spending, particularly infrastructure investment, in driving export growth. Meanwhile, tax policy, inflation control, and exchange rate stability appear to play more secondary or indirect roles. The findings offer valuable insights for designing export-supportive fiscal and macroeconomic policies in Cambodia.

Keywords: Consumer price index, Export, Foreign exchange, Government spending, Tax revenue, VAR model.

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1. Introduction

The economic structure of Cambodia has been classified into three key sectors: agricultural, industry, and service, which accounted for 16.6%, 20.0%, and 63.4%, respectively, as of 2023. Reflecting a shift toward a service-oriented economy with

strong contributions from tourism, retail, and financial sectors. The garment and footwear industry is the cornerstone of Cambodia's economy, accounting for approximately 74% to 80% of total merchandise exports and employing over 700,000 workers, predominantly women. The sector has benefited from preferential trade agreements and low labor costs, making Cambodia a competitive destination for global apparel sourcing. In addition to manufacturing, agriculture continues to play a vital role, contributing around 16.6% of GDP. Key agricultural products include rice, cassava, rubber, maize, and cashew nuts. While its share in GDP has declined, agriculture remains central to rural livelihoods and domestic food security [1].

The tourism sector is another major contributor, being the second-largest source of foreign exchange after garments. Iconic heritage sites like Angkor Wat and Cambodia's natural landscapes have attracted millions of tourists annually, though the sector faced setbacks during the COVID-19 pandemic [2]. Finally, construction and real estate have seen rapid expansion, fueled by foreign direct investment, particularly from China, and urbanization in Phnom Penh and surrounding provinces. Infrastructure development, including roads, airports, and commercial buildings, has contributed to GDP and employment growth [3].

Cambodia's export markets are geographically diversified. The United States is the largest export destination, accounting for approximately 37% to 44% of total exports, predominantly in garments, footwear, and travel goods [1]. China serves as both a major trading partner and investor. While it is a growing export destination, its more dominant role lies in providing raw materials and capital goods for Cambodia's garment and construction sectors [4]. Other important markets include Japan, Canada, and Germany, each receiving 5–6% of Cambodia's exports, mostly in the form of apparel, bicycles, and agricultural products [5]. Regionally, Vietnam and Thailand are key partners, engaging in both exports and imports, particularly in processed foods, electronics, and cross-border agricultural trade.

The primary export products of Cambodia include garments, footwear, and travel goods, with the United States serving as the largest target market. However, recent developments in global trade tensions, particularly the U.S. trade war measures, have posed significant challenges. The United States has proposed imposing a 49% tariff on imports from Cambodia, which could severely undermine the competitiveness of Cambodian products in the U.S. market. Although negotiations between the Royal Government of Cambodia (RGC) and the U.S. are ongoing, there is growing concern that a failure to reach a favorable agreement could have adverse economic consequences. In particular, Cambodian exporters may lose market share to competitors from other countries not subject to such high tariffs.

The primary objective of this study is to empirically examine the extent to which fiscal policy indicators, specifically tax revenue and government expenditure, affect Cambodia's export performance. By analyzing these relationships, the research aims to determine whether fiscal tools significantly influence trade outcomes in an emerging market context. In addition to contributing to the academic literature, the study seeks to provide practical policy recommendations that can guide decision-makers. These insights are intended to support the formulation of fiscal strategies aimed at enhancing the country's export competitiveness. Ultimately, the research aspires to inform long-term policy planning that promotes sustainable economic growth and strengthens Cambodia's position in the global trade landscape.

The structure of this study is divided into five main sections: introduction, literature review, research methodology, empirical results, and conclusion with policy implications. Each section systematically contributes to analyzing the research problem and providing evidence-based recommendations for improving fiscal policy and export performance.

2. Literature Reviews

Pragidis et al. [6] through a comparative VAR analysis, it was demonstrated that tax increases tend to suppress exports more severely than equivalent reductions in government spending, highlighting the asymmetric effects of fiscal shocks. Building on the theme of expenditure composition, Shi [7] employed a time-series regression model using GRETl to link U.S. government consumption with GDP and trade, reinforcing the importance of how fiscal policy is allocated rather than merely its size. Expanding on these insights, Alam [8] applied a factor-augmented VAR (FAVAR) model to the U.S. economy and found that tax shocks have broad spillover effects on both output and exports. The model's ability to account for latent variables underscores the complexity of fiscal dynamics in influencing trade performance.

In a similar vein, Talarico [9] focused on small open economies and used time-series methods to show that tax revenue volatility undermines trade resilience, emphasizing the need for fiscal predictability. Complementing these findings, Carvelli [10] analyzed 28 OECD countries using a CS-ARDL model, revealing that productive government spending, particularly on infrastructure, enhances long-run export growth, whereas unproductive spending detracts from it. This aligns with results from Moyo et al. [11] who applied Bayer–Hanke cointegration techniques in South Africa and found that both taxation and spending shape economic and trade competitiveness. Finally, Garg et al. [12], using an ARDL model in a Gulf country context, it was concluded that moderate, predictable tax regimes support exporter confidence, especially when public spending is aligned with trade infrastructure development.

Arroyo Marioli et al. [13] conducted a cross-country panel data analysis covering emerging market economies (EMEs) from 1990 to 2021, revealing that fiscal volatility driven by inconsistent tax revenues and government spending undermines economic growth and, consequently, export competitiveness. Their findings emphasize the importance of stable and predictable fiscal frameworks, particularly in commodity-dependent economies, to support sustained export-led growth. Extending this analysis to a country-specific context, Oyeleke and Onatunji [14] applied a mixed-frequency VAR model to Nigeria to disentangle short- and long-term fiscal effects. They found that government spending serves as an effective short-run stimulus for economic activity, including exports, while tax revenues function more as a stabilizing force by containing inflationary pressures.

Building on this, Singh and Patel [15] explored the fiscal–trade nexus in India using ARDL and error-correction models. Their results further support the view that well-targeted government investment, especially in infrastructure and production-

linked sectors, can meaningfully enhance export growth, even if its short-term impact is limited. Together, these studies point to a common conclusion: while tax revenues provide macroeconomic stability, strategic and efficient government spending plays a more direct role in driving export expansion in emerging economies.

Kaharudin and Ab-Rahman [16], using a panel VAR model across 60 developing countries, explored the impact of different categories of government expenditure on private sector activity, a key driver of export capacity. Their findings suggest that economic and social spending enhance domestic income levels, thereby indirectly supporting exports, whereas defense spending tends to crowd out private investment, potentially limiting future export potential. Expanding on the fiscal–external sector link, Jiang and Li [17] employed a structural panel VAR across 18 emerging market economies (EMEs) and found that government spending shocks can have adverse trade effects despite stimulating short-term growth. Specifically, they observed that such fiscal shocks lead to domestic currency appreciation, which in turn worsens the current account and dampens export performance due to rising external debt and increased default risk. Together, these studies illustrate the nuanced nature of fiscal policy's influence on trade: while productive and targeted government expenditures may indirectly bolster exports, the macroeconomic side effects, particularly through exchange rate channels and fiscal imbalances, can offset these benefits if not carefully managed.

Moyo et al. [11] used ARDL and cointegration models to show that in South Africa, well-managed tax revenues contribute to macroeconomic stability, which helps curb inflationary pressures that could otherwise harm export competitiveness. Expanding this perspective, Marioli et al. [18] examined middle-income emerging market economies (EMEs) and found that tax revenue volatility undermines trade competitiveness, emphasizing the importance of consistent and predictable fiscal policy frameworks. These fiscal dynamics are closely tied to inflation effects, as demonstrated by Korchev [19], who applied time-series regressions in Eastern European EMEs and found that rising CPI inflation reduced external competitiveness by pushing up export prices a result made more sensitive by exchange rate fluctuations in ARDL models.

Silva [20], analyzing small open economies, further highlighted how inflation interacts with domestic production structures, indirectly lowering export performance through rising input costs. This relationship between fiscal policy, inflation, and competitiveness is echoed in the findings of Maitra and Ganguli [21] who used a cointegrated VAR model for India and reported that government investment spending leads to real exchange rate appreciation, thereby weakening export performance, while consumption-led spending has a depreciating effect. Similarly, Ugoh et al. [22] found that in Nigeria and South Africa, inflation and government consumption negatively affected the real exchange rate, although only the latter had a statistically significant impact on diminishing external competitiveness.

Arkana and Siddiqui [23] used a country-specific VAR model for Indonesia, it was found that government spending on infrastructure yields significant long-term gains in export performance. Their impulse response analysis also revealed that tax increases temporarily suppress exports, although the economy tends to recover within six quarters. This finding is echoed by Fernandez and Cruz et al. [24] who employed a panel VAR model across five Latin American economies. They observed that while government spending shocks generally stimulate exports, tax revenue volatility introduces uncertainty and raises operational costs for exporters, thereby weakening trade performance.

Kumar et al. [25] applied a Structural VAR (SVAR) model to Pakistan and reported that tax revenue shocks can have a stabilizing effect, supporting export growth gradually by enhancing macroeconomic stability. However, they cautioned that abrupt tax hikes may still dampen exports in the short term. Complementing these results, Alonso and D'Souza [26] used an ARDL model for Vietnam and found that public investment in logistics and energy infrastructure substantially improves export capacity, while increased taxation negatively affects short-term export outcomes by constraining private sector liquidity. Together, these studies underscore a consistent narrative: well-targeted public spending promotes export growth, while taxation policies must be predictable and supportive to avoid unintended disruptions to trade.

Banarjee and Chen [27], using a country-specific ARDL model for Indonesia, it was found that while tax revenue shocks have a small but significant short-term negative effect on exports, public infrastructure investment, particularly in logistics, consistently boosts export performance over both the short and long term. This aligns with Rodríguez et al. [28] who employed a structural VAR (SVAR) model for Mexico and reported strong positive export responses to government spending, especially in export-intensive sectors. However, they also noted that sudden tax hikes disproportionately impact manufacturing and agro-processing, highlighting asymmetric fiscal effects across industries.

Expanding the scope regionally, Singh and Patel [15] applied a dynamic panel GMM model across six South Asian economies. They confirmed that tax revenue stability, rather than its volume, plays a critical role in supporting export growth. Conversely, recurrent spending, such as public sector wages, was negatively associated with exports due to its limited productivity impact. In Brazil, Oliveira and Santos [29] used a PVAR model to show that targeted investments in ports and highways promote sustained export growth. However, tax revenue volatility undermined exporter confidence and constrained trade financing capacity. Chowdhury and Khan et al. [30] used a time-series SVAR for Bangladesh and showed that improved tax efficiency enhances export diversification, whereas excessive defense and consumption-related public spending hinder export growth due to resource misallocation.

A review of the existing literature reveals that numerous empirical studies have examined the relationship between fiscal policy, particularly tax revenue and government expenditure and export performance across various countries and regions. These studies have provided valuable insights into how fiscal instruments influence trade dynamics in both developed and developing economies. However, despite this global attention, there is a noticeable lack of such research in the Cambodian context. Empirical investigations specifically focused on assessing the impact of fiscal policy on Cambodia's export sector remain limited or virtually absent. This gap in the literature highlights the need for further exploration. Therefore, to address this research gap, the current study aims to empirically examine the influence of tax revenue and public spending on

Cambodia's export performance. The findings are expected to contribute to the academic discourse while also offering evidence-based recommendations to policymakers seeking to enhance the country's trade competitiveness through fiscal policy.

3. Methodology

The objective of this research was to evaluate Cambodia's export performance by examining the dynamic interactions between key macroeconomic variables. To achieve this, the study employed a system of equations known as the Vector Autoregressive (VAR) model developed by Sims [31]. The model incorporated five endogenous variables: export (EXPORT), tax revenue (TAX), government expenditure (GEXP), consumer price index (CPI), and foreign exchange rate (FX). This framework allowed for the analysis of interdependencies among the variables without imposing strong theoretical restrictions, providing a comprehensive understanding of how fiscal and macroeconomic factors influence export dynamics in Cambodia. The VAR(p) model of order p is specified as:

$$Y_t = A_0 + A_1 Y_{t-1} + A_2 Y_{t-2} + \dots + A_p Y_{t-p} + \varepsilon_t$$

Where:

$$Y_t = \begin{bmatrix} EXPORT_t \\ TAX_t \\ GEXP_t \\ CPI_t \\ FX_t \end{bmatrix} \text{ be the vector of endogenous variables at time } t$$

A_0 is a vector 1×5 intercept,

A_1, A_2, \dots, A_p are 5×5 coefficient matrices,

$\varepsilon_t \sim i.i.d. N(0, \Sigma)$ is a vector of white noise errors,

Σ is the covariance matrix of the error terms

As a preliminary step, this study conducts the Augmented Dickey-Fuller (ADF) unit root test on all time series variables to determine their stationarity, which is a fundamental requirement in time series analysis. The ADF test assesses whether a variable contains a unit root, with the null hypothesis stating that the series is non-stationary Dickey and Fuller [32]. If a data series is found to be non-stationary at the level, it is differenced once, and the test is re-applied to assess whether the transformed series achieves stationarity. Ensuring stationarity is essential to avoid spurious regression results and to ensure the validity of the econometric estimations applied in the VAR model framework.

The next step involves determining the optimal lag length for the VAR(p) model, denoted as p , which represents the number of lags to be included in the system. The selection of the appropriate lag length is crucial, as it affects the model's ability to capture the dynamic relationships among variables accurately. This decision is guided by several information criteria, including the log-likelihood (LogL), likelihood ratio (LR) test, final prediction error (FPE), and Akaike information criterion (AIC) [33]. These criteria assess the model's goodness of fit while penalizing for over-parameterization. In general, the model with the lowest value of the selected information criterion is considered the most appropriate, as it strikes a balance between explanatory power and parsimony.

Once the optimal lag length of the model is identified, the estimation of the VAR model parameters is carried out. While the primary objective of the VAR framework is to generate Forecast Error Variance Decomposition (FEVD) and Impulse Response Functions (IRFs), it is essential to first ensure the stability of the model. This is assessed through a stability test, which confirms whether the estimated system is dynamically well-behaved. Although the VAR model incorporates five endogenous variables, EXPORT, TAX, GEXP, CPI, and FX, resulting in a system of five equations, the subsequent analysis and interpretation of both FEVD and IRFs in this study will focus exclusively on the export variable. This approach allows for a more targeted examination of how fiscal and macroeconomic shocks influence Cambodia's export performance.

The study covers the period from January 2011 to July 2022, comprising a total of 138 monthly observations. Data on tax revenue and government expenditure were obtained from the Table of Government Financial Operations (TOFE), published by the Ministry of Economy and Finance (MEF), and are measured in billions of Khmer Riel (KHR). Meanwhile, data on exports (measured in millions of U.S. dollars (USD)), the Consumer Price Index (CPI), and the foreign exchange rate (FX) expressed as the KHR/USD period average were sourced from the International Financial Statistics (IFS) database of the International Monetary Fund (IMF). All data series were transformed using the natural logarithm, and the first differences of these logged values were computed to represent the growth rates of each respective variable. This transformation ensures linearity and stationarity for time series analysis, making the data suitable for econometric modeling.

4. Empirical Results

This section presents a critical component of the study, as it displays the empirical findings that support the research conclusions. The analysis is systematically organized into three main parts to provide a comprehensive understanding of the data and model performance. The first part includes graphical analysis and descriptive statistics, offering an initial overview of the behavior, trends, and variability of the key variables under investigation. The second part focuses on essential preliminary tests, including the Augmented Dickey-Fuller (ADF) unit root test, the determination of the optimal lag length for the Vector Autoregressive (VAR) model, and the stability test of the model. These steps are fundamental to ensuring the reliability and validity of the econometric analysis. The final part of the section presents the core results of the study through Forecast Error Variance Decomposition (FEVD) and Impulse Response Functions (IRFs), which help interpret the dynamic relationships among the selected macroeconomic variables.

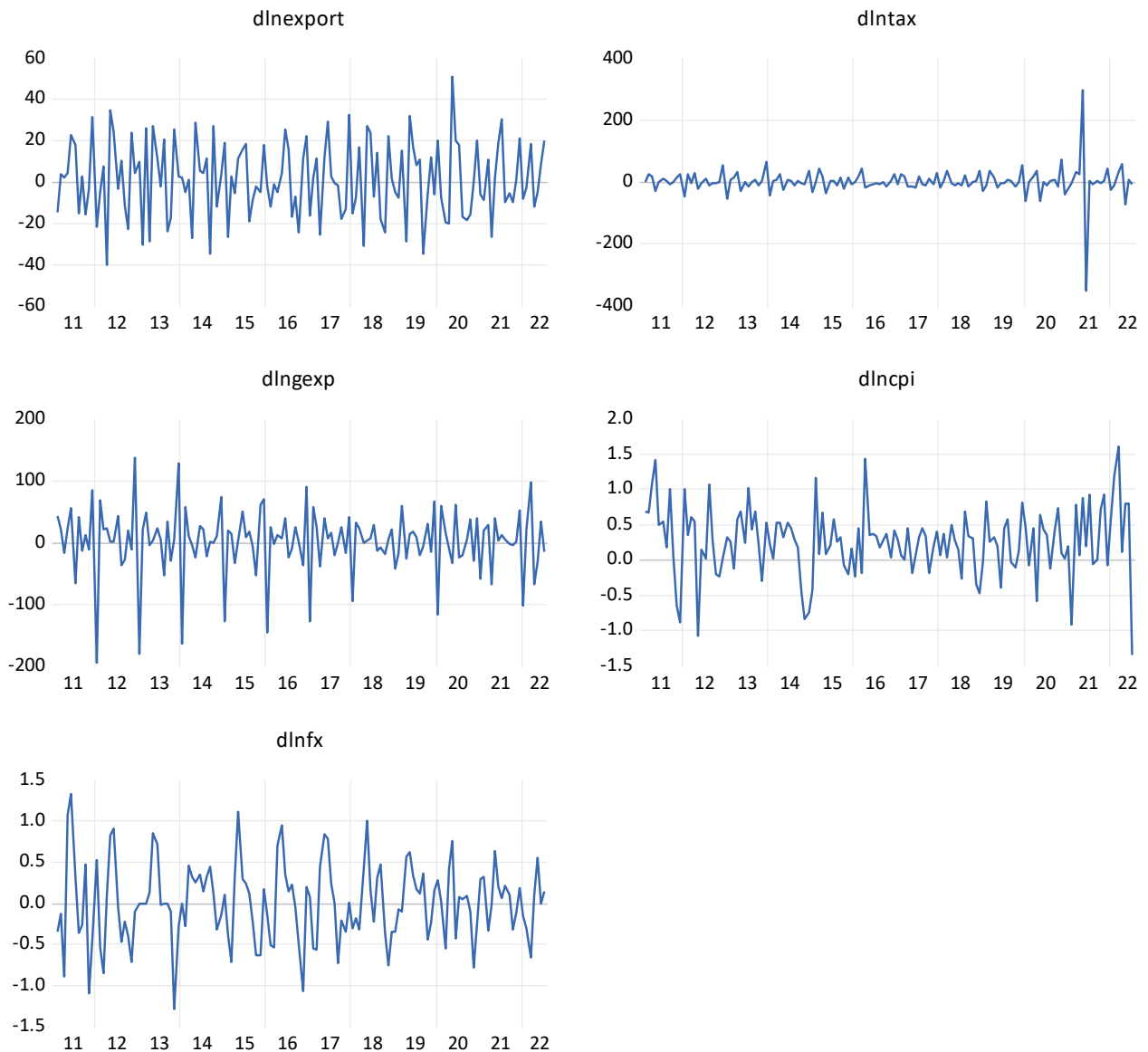


Figure 1.
Time series plot of first-differenced variables.

The plot of DLNEXPORT exhibits significant volatility over the sample period, with sharp peaks and troughs indicating large swings in monthly or quarterly export performance. This variability could be attributed to external shocks, global trade fluctuations, or domestic policy changes. Despite the volatility, the mean appears relatively stable, suggesting no persistent trend in the first-differenced series. DLNTAX also shows high fluctuations, especially around the 2020–2022 period, potentially reflecting the impact of COVID-19 on fiscal policy and revenue collection. Although the series remains centered around zero, the presence of extreme values indicates episodes of major tax reforms or economic disruptions.

DLNGEXP displays strong irregular movements, with both positive and negative spikes. The extreme downward spikes could represent sharp spending cuts or budgetary realignments, while the upward shifts may reflect fiscal stimulus efforts. The persistent volatility highlights the discretionary nature of public finance management over the observed period. Changes in the consumer price index (DLNCPI) are relatively moderate compared to the fiscal variables. The series remains within a narrow range (approximately -1.5 to +1.5), suggesting relatively stable inflation dynamics, except for noticeable fluctuations during certain periods, particularly in 2020 and 2022, which may correspond to global inflationary pressures or supply chain disruptions. The foreign exchange rate series (DLNFX) is the least volatile among the five variables, fluctuating within a narrow band of approximately -1.3 to +1.3. This indicates a relatively stable exchange rate regime, likely due to effective central bank interventions or managed float policies. However, occasional deviations suggest external pressures, such as capital flows or regional currency adjustments.

The graphical inspection reveals that while export, tax, and government expenditure data exhibit considerable volatility, CPI and exchange rate changes are comparatively stable. These patterns are consistent with expectations in emerging economies, where fiscal policy is more reactive and prone to shocks, while monetary and exchange rate policies often aim to preserve macroeconomic stability. These plots justify the need for robust time-series econometric models to analyze the dynamic interactions among these variables.

Table 1.
Descriptive statistics.

Statistics	DLNEXPORT	DLNTAX	DLNGEXP	DLNCPI	DLNFX
Mean	1.3543	1.1612	1.2263	0.2636	0.0085
Median	1.4231	-0.0899	5.2256	0.2835	0.0000
Maximum	50.9894	295.1299	137.3533	1.6043	1.3284
Minimum	-40.3750	-350.5610	-195.7594	-1.3507	-1.2897
Std. Dev.	17.9521	45.8014	51.9972	0.4854	0.4756
Observations	138	138	138	138	138

Table 1 provides descriptive statistics for the first-differenced natural logarithms of key macroeconomic variables: exports (DLNEXPORT), tax revenue (DLNTAX), government expenditure (DLNGEXP), consumer price index (DLNCPI), and foreign exchange rate (DLNFX), based on 138 observations. These statistics offer initial insights into the behavior, variability, and distribution of the data before conducting further econometric analysis. The mean value of 1.35% suggests modest average growth in exports, while the standard deviation of 17.95% indicates high volatility. The wide range from a minimum of -40.38% to a maximum of 50.99% reflects sharp fluctuations, likely driven by external shocks or global market dynamics. With a mean of 1.16%, the data shows average growth in tax revenue. However, the extremely large standard deviation (45.80%) and the wide range between the minimum (-350.56%) and maximum (295.13%) highlight severe variability. The negative median value (-0.0899) suggests that tax revenues may have frequently declined during certain periods, potentially due to policy changes, administrative issues, or external disruptions. The average change in public spending is 1.23%, with a relatively high standard deviation of 51.99%, indicating considerable variability. The minimum value of -195.76% and a maximum of 137.35% suggest sharp fiscal contractions and expansions, possibly reflecting periods of crisis response or budget reallocation.

Table 2.
ADF unit root test.

Model	Statistic	At Level				
		LNEXPORT	LNTAX	LNGEXP	LNCPI	LNFX
With Constant	t-Statistic	0.1585	-2.0566	0.2968	-0.4254	-1.1421
	Prob.	0.9689	0.2627	0.9773	0.9004	0.6976
		n0	n0	n0	n0	n0
With Constant & Trend	t-Statistic	-1.4327	-10.4633	-2.0967	-2.9712	-3.1841
	Prob.	0.8468	0	0.5423	0.1442	0.0924
		n0	***	n0	n0	*
Without Constant & Trend	t-Statistic	7.9427	0.581	3.8174	6.3685	0.4349
	Prob.	1.0000	0.8407	1.0000	1.0000	0.8063
		n0	n0	n0	n0	n0
Model	Statistic	At First Difference				
		DLNEXPORT	DLNTAX	DLNGEXP	DLNCPI	DLNFX
With Constant	t-Statistic	-11.9618	-11.235	-12.7816	-10.1474	-3.6832
	Prob.	0.0000	0.0000	0.0000	0.0000	0.0054
		***	***	***	***	***
With Constant & Trend	t-Statistic	-11.9085	-11.1952	-12.7738	-10.1032	-3.8087
	Prob.	0.0000	0.0000	0.0000	0.0000	0.0192
		***	***	***	***	**
Without Constant & Trend	t-Statistic	-1.7588	-11.2319	-11.554	-8.255	-3.6712
	Prob.	0.0747	0.0000	0.0000	0.0000	0.0003
		*	***	***	***	***

Note: (*) Significant at the 10%; (**) Significant at the 5%; (***) Significant at the 1% and (no) Not Significant
Probability based on MacKinnon (1996) one-sided p-values.

The mean inflation rate change is 0.26%, with a narrow range and low standard deviation (0.49%), indicating relative price stability. The maximum and minimum values (1.60% and -1.35%) suggest moderate inflationary and deflationary pressures during the observed periods. The foreign exchange rate shows an almost neutral mean (0.0085) and median (0.0000), suggesting overall stability in currency fluctuations. The standard deviation is low (0.48%), and the small range between the maximum (1.33%) and minimum (-1.29%) further confirms limited volatility in exchange rate movements.

Table 2 presents the Augmented Dickey-Fuller (ADF) unit root test results for five macroeconomic variables in Cambodia: the natural logarithm of export (LNEXPORT), tax revenue (LNTAX), government expenditure (LNGEXP), consumer price index (LNCPI), and foreign exchange rate (LNFX). The test evaluates stationarity under three model specifications: with constant, with constant and trend, and without constant and trend, both at level and at first difference.

Across all five variables, the results indicate non-stationarity at the level. Under the “with constant” model, none of the variables have statistically significant t-statistics, with all p-values exceeding 0.05. For example, LNEXPORT has a t-statistic

of 0.1585 and a p-value of 0.9689, far from rejecting the null hypothesis of a unit root. Even under the “with constant and trend” model, only LNTAX is significant at the 1% level ($t = -10.4633$), and LNFX is marginally significant at the 10% level ($t = -3.1841$). This suggests weak evidence of stationarity at the level, except in rare cases, confirming that most series are integrated of order one, $I(1)$.

When the variables are first-differenced, all series become stationary across all model specifications. For instance, DLNEXPORT under the “with constant” model shows a highly significant t-statistic of -11.9618 ($p = 0.0000$), clearly rejecting the null hypothesis of a unit root. Similar results are observed for DLNTAX, DLNGEXP, DLNCPI, and DLNFX, all of which are significant at the 1% or 5% level. These outcomes are consistent across models, confirming the robustness of the findings.

The ADF test results clearly indicate that all variables, exports, tax revenue, government expenditure, CPI, and exchange rate are non-stationary at the level but stationary at the first difference. Therefore, the series is classified as $I(1)$. This justifies the use of time-series models that require the execution of the VAR model at first difference.

Table 3.
VAR lag order selection criteria.

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-2184.93	NA	84642224	32.443	32.551	32.487
1	-2117.71	128.463	45297750	31.818	32.464*	32.080
2	-2056.55	112.343	26553282	31.282	32.466	31.763
3	-2014.16	74.743*	20598507*	31.025*	32.746	31.724*

The selection of an appropriate lag length is crucial in VAR modeling, as it affects the model’s ability to capture the dynamic relationships among variables while maintaining efficiency and avoiding overfitting. The criteria reported include the log-likelihood (LogL), likelihood ratio (LR), Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Criterion (SC), and Hannan-Quinn Criterion (HQ). Based on a majority of criteria (AIC, FPE, HQ, and LR) presented in Table 3, Lag 3 is the most appropriate lag length for the VAR model. While the Schwarz Criterion favors a more conservative lag length (Lag 1), the consistency among the other criteria suggests that including three lags will best capture the underlying dynamics of the system. This choice balances model complexity with predictive accuracy, making it suitable for subsequent estimation and forecasting.

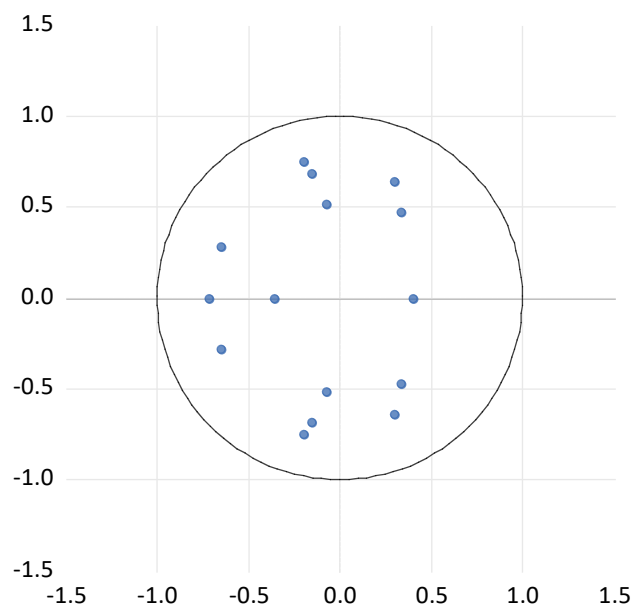


Figure 2.
Inverse roots of the AR characteristic polynomial.

Figure 2 displays the inverse roots of the autoregressive (AR) characteristic polynomial derived from a VAR model. Each blue point in the complex plane represents an eigenvalue (root) of the VAR model’s companion matrix. The dashed circle marks the unit circle, a critical threshold used to assess the stability of the VAR system.

In VAR modeling, the system is considered stable (i.e., dynamically stationary) if all roots lie strictly within the unit circle. Stability is a key requirement for valid impulse response functions, forecast error variance decomposition, and long-run equilibrium analysis. When this condition is met, shocks to the system will eventually dissipate rather than cause explosive behavior. In this figure, all inverse roots are clearly located inside the unit circle, with none touching or crossing the boundary. This indicates that the estimated VAR model satisfies the stability condition, confirming that the system is dynamically well-behaved and suitable for further structural analysis.

The inverse root plot confirms that the VAR model is stable, ensuring that the estimated parameters are reliable and that the model's predictions and dynamic analyses (FEVD, IRFs) are valid over time. This stability enhances confidence in the econometric model's interpretability and policy implications.

Table 4.
Variance decomposition of export.

Period	S.E.	DLNEXPORT	DLNTAX	DLNGEXP	DLNCPI	DLNFX
1	15.03	100.00	0.00	0.00	0.00	0.00
2	16.49	89.21	0.01	10.52	0.02	0.24
3	17.52	82.34	1.09	9.98	0.59	6.00
4	17.80	79.90	1.46	11.11	0.63	6.90
5	18.85	71.68	3.66	16.26	0.87	7.53
6	19.01	70.70	3.85	16.76	0.89	7.80
7	19.10	70.18	4.17	16.75	0.98	7.92
8	19.13	70.06	4.23	16.70	0.99	8.02
9	19.20	70.16	4.31	16.57	1.01	7.96
10	19.22	70.05	4.36	16.56	1.01	8.03

Table 4 indicates the results of FEVD for the export over a 10-period forecast horizon. FEVD allows us to understand the proportion of the forecast error variance in exports that can be attributed to shocks in itself and in other variables: tax revenue, government expenditure, consumer price index, and exchange rate. In the first period, 100% of the variance in exports is explained by its own innovations, which is expected in the short term. However, as the horizon expands, the influence of other variables begins to emerge. By period 5, the contribution of exports to its own forecast error variance declines to 71.68%, indicating growing interaction with other macroeconomic variables.

Government expenditure becomes a key external driver of export fluctuations, explaining 16.26% of the forecast error variance by period 5 and maintaining a stable influence around 16.5%–16.7% from periods 6 to 10. This suggests that fiscal spending, particularly public investment, has a meaningful and sustained effect on export performance. Tax revenue contributes modestly, rising from near zero to 4.36% by period 10, implying that fiscal stability or tax changes have a limited but increasing influence on export outcomes. Similarly, exchange rate fluctuations account for 8.03% of the forecast error variance by period 10, reflecting the importance of external competitiveness and currency valuation in shaping export trends. In contrast, inflation has the least impact, contributing only about 1% throughout the forecast horizon. This indicates that short-term price level changes have a relatively minimal effect on export volatility in this model.

Overall, the FEVD results reveal that while exports are initially driven by their own momentum, government expenditure and exchange rate movements become the most influential external factors over time. The findings highlight the importance of fiscal spending and exchange rate stability in enhancing Cambodia's export performance, while tax policy and inflation play secondary roles. These insights can inform policymakers aiming to design export-supportive fiscal and monetary strategies.

Response to Cholesky One S.D. (d.f. adjusted) Innovations
95% CI using analytic asymptotic S.E.s

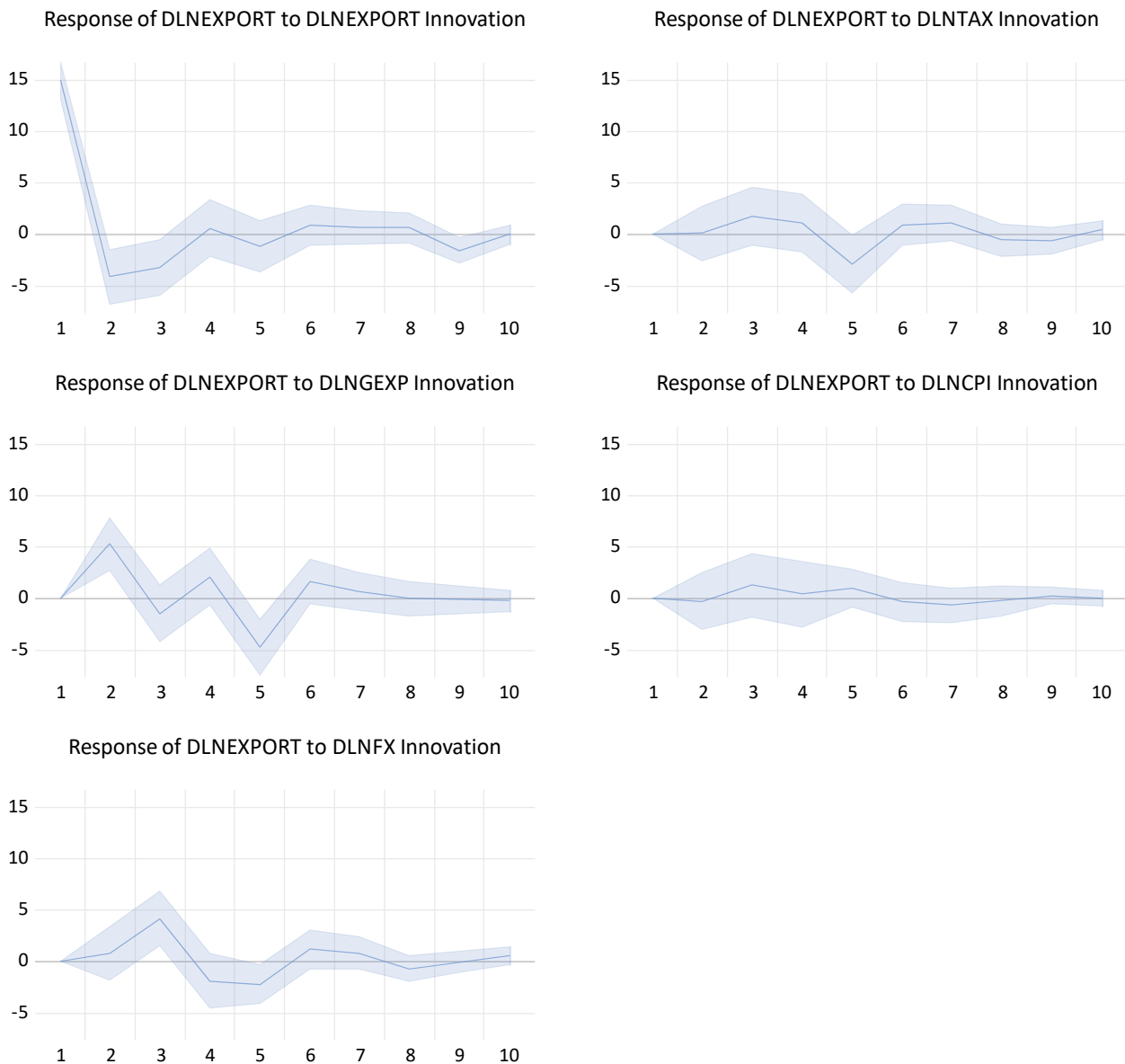


Figure 3.
Impulse response function of export.

The impulse response functions of export to one-standard-deviation Cholesky innovations in itself and four other macroeconomic variables: tax revenue, government expenditure, consumer price index, and foreign exchange rate are presented in Figure 3. These IRFs trace the effect of a one-time shock to each variable on export over a 10-period horizon, along with 95% confidence intervals.

The IRF shows a strong and immediate positive response in period 1, followed by a rapid decline and some oscillation in the short term before stabilizing. This pattern suggests that export growth is highly self-reinforcing in the short run but that the effect dissipates quickly, indicating limited persistence of past export shocks. The response of exports to a shock in tax revenue is mildly positive in the first few periods, peaking around periods 3 to 4, but the response is generally small and statistically insignificant as it remains within the confidence bands. This suggests that tax revenue changes have a limited and uncertain influence on short-term export dynamics.

The response to government expenditure shocks is more pronounced. Export reacts positively and significantly in the early periods, with peaks observed around period 2 and again near period 5. The initial reaction is strong and gradually diminishes over time. This implies that public spending, especially productive expenditure such as infrastructure, positively influences export performance. Inflation shocks produce a slightly positive response in exports during the initial periods, although the magnitude is modest and largely statistically insignificant. This indicates that inflationary pressures may have a small stimulative effect on exports, possibly through relative price adjustments, but are not a major driver in the medium term. The response of exports to exchange rate shocks is mildly positive in the first few periods, with the impulse peaking around period 3 before tapering off. The response remains modest and close to zero, suggesting that while exchange rate movements can affect export dynamics, their overall impact in this case appears limited.

The IRF analysis reveals that among the fiscal and macroeconomic variables considered, government expenditure shocks have the most consistent and significant positive effect on export growth, followed by relatively weaker and less significant responses to shocks in tax revenue, inflation, and exchange rates. These findings emphasize the importance of public spending, particularly in export-enabling sectors, as a key driver of trade performance, while also suggesting that tax and monetary variables may play more supportive or indirect roles in shaping export outcomes in Cambodia.

5. Conclusion and Policy Implication

The empirical analysis of Cambodia's export dynamics using FEVD and IRFs offers important insights into the influence of fiscal and macroeconomic variables on trade performance. The FEVD results demonstrate that, while exports are initially driven entirely by their own shocks, the influence of other macroeconomic variables becomes increasingly significant over time. By the fifth period, exports explain just over 71% of their own variation, while government expenditure emerges as a key external driver, accounting for approximately 16%–17% of forecast error variance from period 5 onward. Exchange rate fluctuations also play a modest role, contributing over 8% by period 10, followed by tax revenue with an increasing but limited influence. Inflation, by contrast, exerts minimal impact on export variation.

The IRF analysis further reinforces these findings. A one-time shock to government expenditure produces a consistent and significant positive response in exports, particularly in the early periods. This underscores the critical role of productive public spending, such as infrastructure investment, in stimulating export growth. Meanwhile, the responses to tax revenue, inflation, and exchange rate shocks are generally weaker and statistically insignificant, suggesting their effects are either indirect or short-lived in the Cambodian context.

Together, the FEVD and IRF results indicate that fiscal policy, especially government expenditure, plays a more direct and substantial role in enhancing export performance than monetary variables. While tax policy, inflation, and exchange rate stability do influence exports, their effects appear secondary. These findings highlight the importance of designing fiscally responsible, investment-oriented public spending strategies to strengthen Cambodia's export sector. Additionally, maintaining exchange rate stability and ensuring predictable tax regimes can complement these efforts by providing a supportive macroeconomic environment for trade competitiveness and growth.

The findings of this study carry important policy implications for enhancing Cambodia's export performance through fiscal and macroeconomic channels. The empirical results reveal that government expenditure, particularly when directed toward productive investment, has the most significant and sustained positive effect on export growth. Therefore, fiscal policy should prioritize capital spending in export-enabling sectors such as transport infrastructure, logistics, energy, and trade facilitation. Public investments that reduce trade costs and enhance supply chain efficiency can directly support the competitiveness of Cambodian exports in global markets. Furthermore, the limited and statistically weak impact of tax revenue on exports suggests that the structure and predictability of taxation matter more than the magnitude. Policymakers should thus focus on maintaining a stable and transparent tax regime to support business confidence and long-term investment in export-oriented industries.

In addition, the modest influence of exchange rate fluctuations underscores the need to sustain macroeconomic and currency stability. While exchange rate policy may not serve as a primary tool for export promotion, avoiding volatility can protect exporters from unexpected cost shocks and maintain the country's competitiveness. Finally, given that inflation showed minimal influence on exports, monetary authorities should continue to maintain price stability, but without relying on inflation control as a direct mechanism for boosting trade. In sum, the government should adopt a strategically targeted, investment-led fiscal policy, complemented by sound monetary and exchange rate management. These coordinated efforts will foster a resilient macroeconomic environment conducive to long-term export growth and trade diversification in Cambodia.

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