



The Effect of Rising US Interest Rate on Cambodian Exports: An Application of ARDL Model

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Non-Technical Summary

- Exports have contributed crucially to Cambodia's economic growth. The top destination for Cambodian exports of goods is the US, accounting for 20% to 40% of the kingdom's total exports. The volume of Cambodia's exports to the US seemed to have suffered an unprecedented drop from mid-2022 until mid-2023.
- This study examines if the decrease in Cambodia's exports to the US had anything to do with the rising US interest rate. Monthly data of Cambodia's exports to the US is the dependent variable, whereas USD-KHR exchange rate, US GDP growth rate, US inflation rate, Cambodia's inflation rate, and the US interest rate (Federal Reserve's Discount Window Primary Credit Rate) are independent variables. Autoregressive Distributed Lag (ARDL) model was used.
- The estimation showed that the changes in the US interest rate had only short-term but no long-term effect on Cambodian exports to the US. A rate hike by 10 basis points coincided with a drop of demand for Cambodia's exports by 4.2%. The effect was short-lived and subsided within two months.
- Additionally, 1% appreciation of the USD against KHR in the current period was estimated to increase demand for Cambodian exports by 14% in the next period (short-run lagged effect).
- Lastly, the US GDP had the most significant long-term effect. 1 percentage point increase of the US GDP was estimated to increase Cambodian exports by 27% in the long term.

Introduction

Cambodia's economy had been growing at an average rate of 7.7% annually between 1998 and 2019 before decreasing to -3% due to the COVID-19 pandemic in 2020¹. In 2015, the kingdom obtained lower middle-income status, and it hopes to become upper middle-income country in 2030². Regarded as one of the 'fastest-growing economies', the country has depended on tourism and export of garments to sustain its economic growth³. Exports of goods and services, for example, has made up between 60% to 70% of the country's GDP (Figure 1).

Figure 1. Cambodia's Exports of Goods and Services as Percentage of GDP



Source: The World Bank,

<https://data.worldbank.org/indicator/NE.EXP.GNFS.ZS?locations=KH>

However, due to the weakening of external demand, rising inflation, and possibly the increase of interest rate around the world, Cambodia's exports experienced a decline, especially to its main export destinations: the US and EU. Total export of goods contracted by 14.2% during the first two months of 2023, compared to the same period in 2022⁴. Among this, the decline of garment exports accounted for 11.8 percentage points⁵. The US is by far the top export destination for Cambodian goods. The main products Cambodia exported to the US in 2022 include articles of

¹ The World Bank. 2023. "GDP Growth (annual %) - Cambodia." Accessed August 05, 2023.

<https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?locations=KH>.

² The World Bank. 2023. "The World Bank in Cambodia." April 12, 2023.

<https://www.worldbank.org/en/country/cambodia/overview>.

³ Ibid.

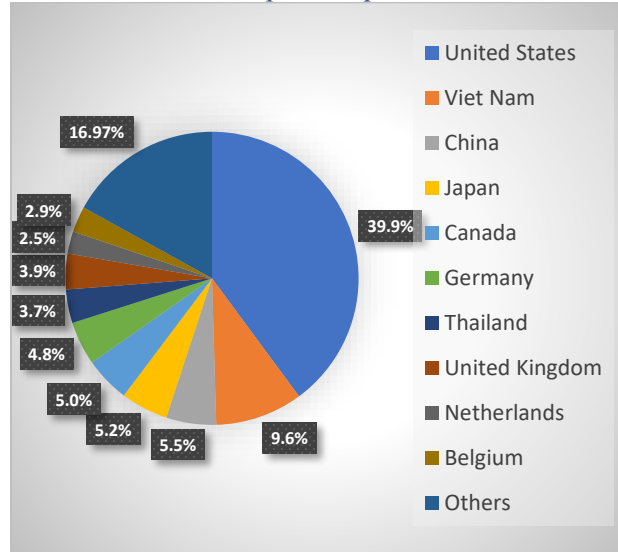
⁴ World Bank Group. 2023. "Cambodia Economic Update: Post-COVID-19 Economic Recovery." Phnom Penh.

<https://documents.worldbank.org/en/publication/documents-reports/documentdetail/099051523221517821/p17734003f2bcf02b0a89500f61b1f3ff7b>.

⁵ Ibid.

apparel and clothing accessories; articles of leather, saddlery and harness, and travel goods; electrical machinery and equipment and parts; furniture, bedding, mattresses, and mattress supports; and footwear⁶. The exports to the US alone made up about 40% (or USD 8.97 billion) of Cambodia’s total exports of goods in 2022, while the share of exports to other countries has been mostly within single digit⁷ (Figure 2). Figure 3 shows that the share of Cambodia’s export of goods to the US has made up between 20% and 40% of Cambodia’s total export of goods between 2017 and 2022.

Figure 2. Cambodia's Top 10 Export Destinations in 2022

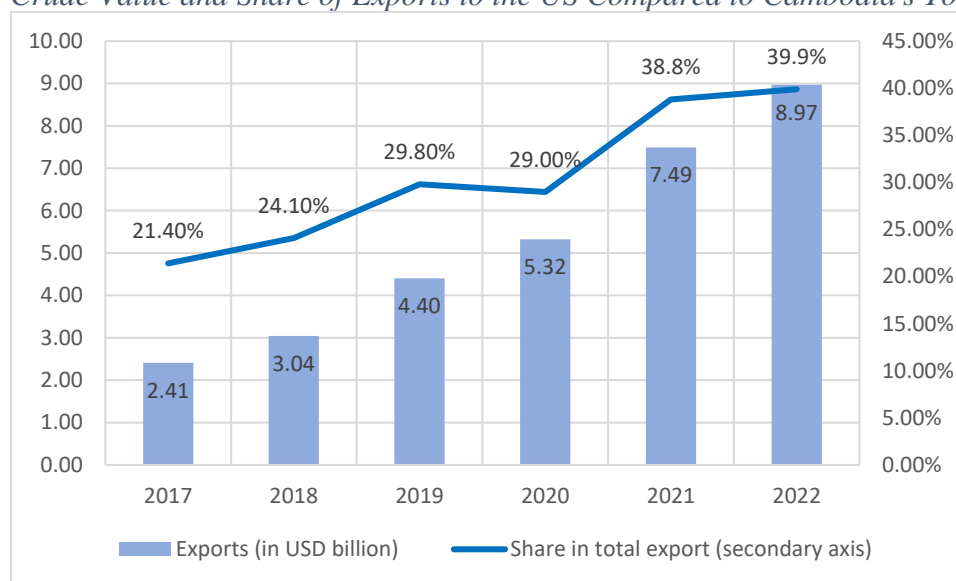


Source: General Department of Customs and Excise of Cambodia, <https://stats.customs.gov.kh/en/publication>

⁶ Trade Map. 2023. “Bilateral Trade between Cambodia and United States of America in 2022. Product: TOTAL All Products.” International Trade Centre. 2023. <https://www.trademap.org/Bilateral.aspx?nvpm=1%7c116%7c%7c842%7c%7cTOTAL%7c%7c%7c2%7c1%7c1%7c2%7c1%7c1%7c1%7c1%7c%7c1>.

⁷ General Department of Customs and Excise of Cambodia. 2023. “Export Statistics by TOP 20 Countries.” 2023. <https://stats.customs.gov.kh/en/publication>.

Figure 3. Crude Value and Share of Exports to the US Compared to Cambodia's Total Exports



Source: compiled by author with data from General Department of Customs and Excise of Cambodia, <https://stats.customs.gov.kh/en/publication>

However, Cambodia’s exports to the US experienced a significant drop in July 2022 and did not recover until a year later. Figure 4 below illustrates the monthly volume of exports to the US from Cambodia between January 2018 and July 2023. Since 2018, Cambodia has experienced a steady growth of exports to the US with seasonal spikes specifically during summers before subsiding back to regular trend. Nonetheless, between July 2022 and June 2023, the exports to the US experienced an unprecedented period of downfall. This drop coincided with the fact that the US Federal Reserve started raising its interest rates from March 2022 onward⁸. Therefore, can the decrease in exports from Cambodia to the US has anything to do with the rising interest rates in the US (with a lagged effect)? In theory, the increase of official interest rate of a country should lead to contraction in economic activities and consumption of the people and perhaps reduction in imports. However, it also can lead to increase in imports because the appreciation of its currency makes imports cheaper.

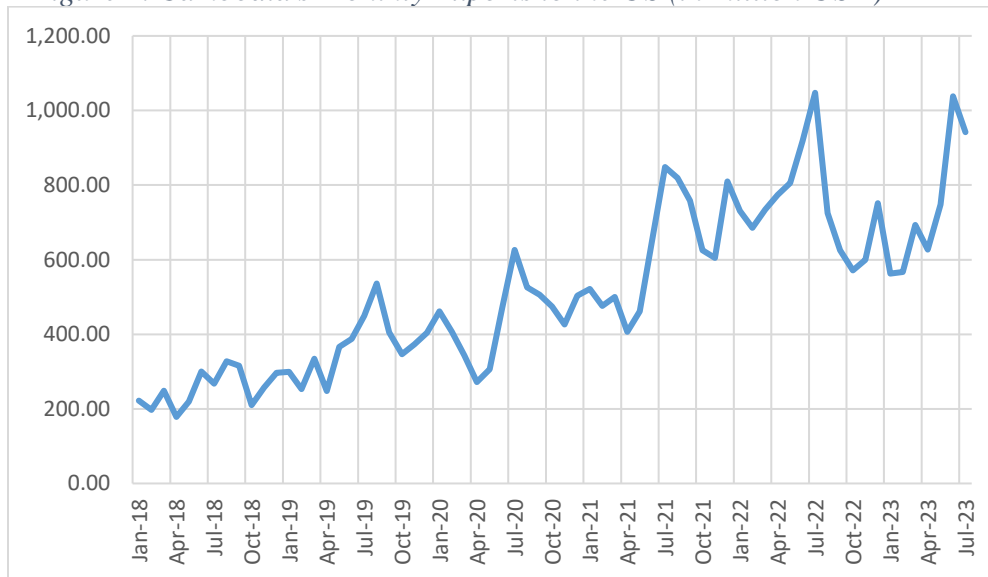
In addition, Cambodia-US trade relation also experienced a ‘structural change’. Since 1997, Cambodia had been the beneficiary country of the US Generalized System of Preferences (GSP), which was designed to help developing countries’ economies by allowing tariff-free entry for up to 5,000 types of goods entering the US market⁹. However, Cambodia’s access to GSP expired in

⁸ Kozlowski, Julian, and Samuel Jordan Wood. 2023. “The Many Interest Rates in 2022.” Federal Reserve Bank of St. Louis. January 12, 2023. <https://www.stlouisfed.org/on-the-economy/2023/jan/many-interest-rates-2022>.

⁹ U.S. Embassy in Cambodia. n.d. “USTR to Assess GSP Eligibility of Beneficiary Countries.” Accessed September 4, 2023. <https://kh.usembassy.gov/ustr-assess-gsp-eligibility-beneficiary-countries/>.

December 2020 and has been suspended since then¹⁰. This event might also contribute to the decrease of export mentioned above. This issue will also be looked into in this study.

Figure 4. Cambodia's Monthly Exports to the US (in million USD)



Source: compiled by author with data from General Department of Customs and Excise of Cambodia, <https://stats.customs.gov.kh/en/data-search>

Methodology and Data

Autoregressive Distributed Lag (ARDL) Model

To study the effect of the increasing US interest rates on Cambodian exports to the US, time series analysis with Autoregressive Distributed Lag (ARDL) model will be utilized because our variables of interest consist of mixed order of integration¹¹. Specifically, the dependent variable is stationary at first difference, I(1). Some independent variables are stationary at level, I(0), while some are stationary at first difference, I(1).

¹⁰ Ou, Sokmean, and Seavmey Meng. 2021. "Cambodia Calls on the US to Renew GSP Access as Competitiveness Stalls." *Cambodianess*. October 21, 2021. <https://www.cambodianess.com/article/cambodia-calls-on-the-us-to-renew-gsp-access-as-competitiveness-stalls#:~:text=Cambodia%E2%80%99s%20access%20to%20the%20GSP%2C%20which%20allows%20for,access%20to%20the%20trading%20scheme%20might%20be%20restored>.

¹¹ See Pesaran, M. Hashem, and Yongcheol Shin. 1995. *An Autoregressive Distributed Lag Modelling Approach to Cointegration Analysis*. Vol. 9514. Cambridge, UK: Department of Applied Economics, University of Cambridge.

An ARDL model is an ordinary least square (OLS)-based model which takes sufficient numbers of lags to capture the data generating process. It, therefore, allows for different lags for each variable in the estimate equation. The ARDL(p, q, ..., q) model is given as below¹²:

$$y_t = \alpha_0 + \alpha_1 t + \sum_{i=1}^p \beta_i y_{t-i} + \sum_{i=1}^q \delta_i x_{t-i} + u_t$$

Variables and Data Sources

In our study, we want to examine the effect of interest rate in the US on Cambodian exports. Therefore, our main variables of interest are Cambodian exports to the US (dependent) and the US interest rate (independent). USD-KHR exchange rate, US GDP growth, and US inflation rate are also included as additional regressors. GDP growth and inflation rate reflect the income level and welfare of the US economy and consumers. These independent variables reflect the demand-side effect on exports. Additionally, inflation rate in Cambodia will also be used as a regressor in order to reflect the effect of the changes in the price of Cambodian exports. The logic is that the change in price also affect the demand for Cambodian exports to the US (supply-side effect).

We collected the monthly export data from Cambodia to the US between January 2018 and July 2023 from the General Department of Customs and Excise of Cambodia¹³. Data on USD-KHR exchange rate (monthly average) was collected from the National Bank of Cambodia¹⁴. US monthly GDP growth rate was obtained from Federal Reserve Economic Data (FRED) database¹⁵, while US inflation rate was collected from Statista¹⁶. The monthly inflation rate data in Cambodia is collected from World Bank Global Economic Monitor of Knoema¹⁷. Lastly, regarding the US interest rate, Discount Window Primary Credit Rate set by the Fed will be used. This interest rate is the rate the Fed charged on loans to generally sound depository institutions and is set relative to the Federal Open Market Committee's (FOMC) target range for the federal funds rate (FRED 2023). Primary Credit Rate was obtained from the Federal Reserve Economic Data (FRED) database¹⁸.

¹² Based on Kripfganz, Sebastian, and Daniel Schneider. 2018. "ARDL: Estimating Autoregressive Distributed Lag and Equilibrium Correction Models." In Proceedings of London Stata Conference.

<https://ideas.repec.org/p/boc/usug18/09.html>.

¹³ General Department of Customs and Excise of Cambodia. 2023. "Export Statistics by TOP 20 Countries." 2023.

<https://stats.customs.gov.kh/en/publication>.

¹⁴ National Bank of Cambodia. 2023. "Monetary and Financial Statistics Data." Last modified August 15.

https://www.nbc.gov.kh/english/economic_research/monetary_and_financial_statistics

¹⁵ "Leading Indicators OECD: Reference Series: Gross Domestic Product (GDP): Normalised for United States." Federal Reserve Economic Data | FRED | St. Louis Fed. Last modified September 12, 2023.

<https://fred.stlouisfed.org/series/USALORSGPNOSTSAM>.

¹⁶ "Monthly Inflation Rate U.S. 2022." Statista. Last modified October 13, 2022.

<https://www.statista.com/statistics/273418/unadjusted-monthly-inflation-rate-in-the-us/>.

¹⁷ "World Bank Global Economic Monitor." Knoema. Accessed August 20, 2023.

<https://public.knoema.com/qhpqgve/world-bank-global-economic-monitor>.

¹⁸ "Discount Window Primary Credit Rate." Federal Reserve Economic Data | FRED | St. Louis Fed. Accessed August 08, 2023. <https://fred.stlouisfed.org/series/DPCREDIT>.

Every variable contain data between January 2018 and July 2023 (67 observations). The data on Cambodian exports to the US (measured in USD) and exchange rate (measured in KHR per USD) went through natural-logarithm (ln) transformation. This transformation allows easier interpretation on the estimates (interpretation in percentage).

Table 1. Summary of Variables in the Model

	Variables	Abbreviation	Measurement
Dependent	Cambodian exports to the US	ln_exp	ln-transformed
	USD-KHR exchange rate	ln_exr	ln-transformed
Independent	US GDP growth rate	gdp	percentage
	US inflation rate	inf	percentage
	Cambodia's inflation rate	cam_inf	percentage
	Discount Window Primary Credit Rate	pcr	percentage

Our ARDL model is given by:

$$\begin{aligned}
 \ln_exp_t = & \alpha_0 + \alpha_1 t + \sum_{i=1}^p \beta_i \ln_exp_{t-i} + \sum_{i=1}^q \delta_i \ln_exr_{t-i} + \sum_{i=1}^q \varepsilon_i gdp_{t-i} + \sum_{i=1}^q \gamma_i inf_{t-i} \\
 & + \sum_{i=1}^q \theta_i cam_inf_{t-i} + \sum_{i=1}^q \sigma_i pcr_{t-i} + u_t
 \end{aligned}$$

This study includes 67 observations. However, they are monthly data that extend only 5 years (2018-2023) due to the limitation in data collection, especially Cambodia's data. This can arise as the limitation of this study. Thus, any interpretation of and reference to this study must be done with caution taking into account this limitation.

Model Building

Unit Root Test

Before running our time series analysis, unit root test must be conducted in order to determine the stationarity of each series. For this test, we will use Augmented Dickey-Fuller (ADF) test and Kwiatkowski–Phillips–Schmidt–Shin (KPSS) test in order to cross-check the order of stationarity¹⁹. Both tests will use Akaike Information Criteria (AIC) selection.

¹⁹ Following Rahman, Mohammad Mafizur, and Mohammad Abul Kashem. 2017. "Carbon Emissions, Energy Consumption and Industrial Growth in Bangladesh: Empirical Evidence from ARDL Cointegration and Granger Causality Analysis." *Energy Policy* 110 (November): 600–608. <https://doi.org/10.1016/j.enpol.2017.09.006>.

Table 2. Summary of Unit Root Test Result

<i>variables</i>	<i>ADF</i>	<i>KPSS</i>
	<i>stationary at</i>	
ln_exp	1 st Difference	1 st Difference
ln_exr	1 st Difference	1 st Difference
gdp	Level	Level
inf	Level	Level
cam_inf	Level	Level
pcr	1 st Difference	1 st Difference

Source: summarized from tests generated in Eviews 12

From both ADF and KPSS tests, the dependent variable series (ln_exp) is stationary at 1st Difference or I(1). Ln_exr and pcr are also I(1), while gdp, inf, and cam_inf are stationary at level or I(0). These results verify the use of ARDL model for the analysis.

Lag Order Selection

The next step in our model building is to determine the optimal lag for the model. Although ARDL allows for each variable to have different unrestricted optimal lag, we still need to set maximum optimal lag order for the series. For this purpose, we will use the help of Vector Autoregression (VAR)'s lag order selection criteria²⁰. According to the VAR Lag Order Selection, the optimal lag for the series is 2.

Diagnostics Tests

First and foremost, we need to run model specification test (Ramsey RESET Test) to verify if the model is mis-specified²¹. Table 3 show that the model is well-specified (at 5% level of significance) as the p-values are higher than 0.05.

Table 3. Ramsey RESET Test

	<i>Value</i>	<i>df</i>	<i>Probability</i>
Specification: LN_EXP LN_EXP(-1) LN_EXR LN_EXR(-1) LN_EXR(-2) GDP GDP(-1) GDP(-2) INF INF(-1) CAM_INF PCR PCR(-1) C @TREND			
t-statistic	0.296229	49	0.7683
F-statistic	0.087751	(1, 49)	0.7683
Likelihood ratio	0.114512	1	0.7351

²⁰ See Magoti, Edwin, and John Mtui. 2020. "The Relationship between Economic Growth and Service Sector in Tanzania: An Empirical Investigation." *African Journal of Economic Review* 3 (2): 219–38.

²¹ See Ramsey, J. B. 1969. "Tests for Specification Errors in Classical Linear Least-Squares Regression Analysis." *Journal of the Royal Statistical Society: Series B (Methodological)* 31 (2): 350–71. <https://doi.org/10.1111/j.2517-6161.1969.tb00796.x>.

Source: generated in Eviews 12

Next, we need to examine the stability of the model by doing Cumulative Sum test (CUSUM) and Cumulative Sum of Squares test (CUSUMSQ)²². The figures below plot the result of both tests. The dotted lines indicate the critical bounds at 5% significant level. The series fluctuated within and did not cross the critical bounds throughout the whole period in both the CUSUM and CUSUMSQ, indicating that the model is stable. The results also indicate that there is no structural break present in the model, so the dummy for structural break, particularly the dummy for GSP, is not needed.

Figure 5. CUSUM Test

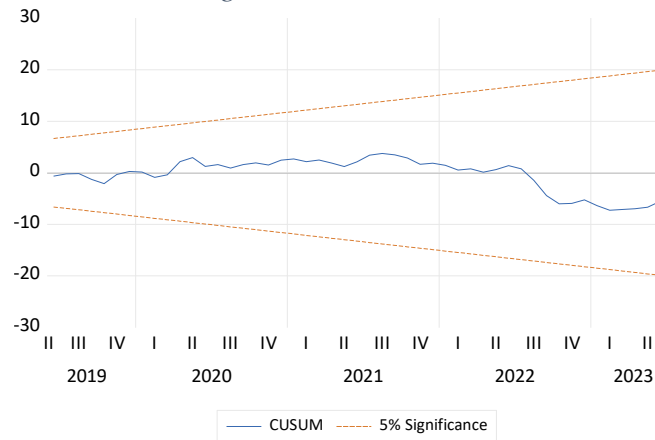
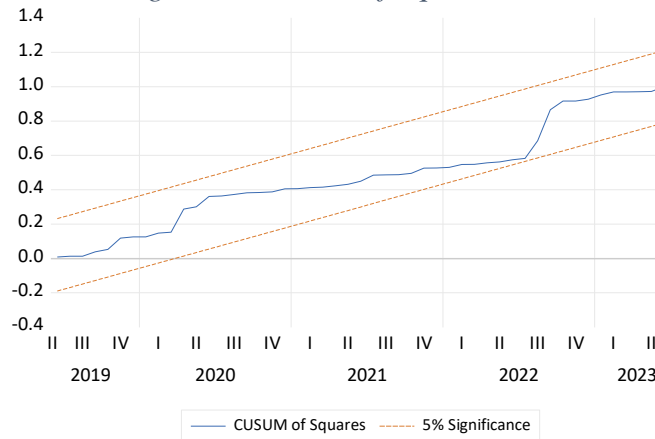


Figure 6. CUSUM of Squares Test



Source: Generated in Eviews 12

²² See Brown, R. L., J. Durbin, and J. M. Evans. 1975. "Techniques for Testing the Constancy of Regression Relationships Over Time." *Journal of the Royal Statistical Society: Series B (Methodological)* 37 (2): 149–63. <https://doi.org/10.1111/j.2517-6161.1975.tb01532.x>.

Then, we will run normality test and heteroskedasticity test on the residuals²³. The p-value and Jarque-Bera are higher than 0.05, indicating the normality of residuals at 5% significance level. Meanwhile, the p-values in Breusch-Pagan-Godfrey test in Table 4 indicates that the residuals do not suffer heteroskedasticity issue.

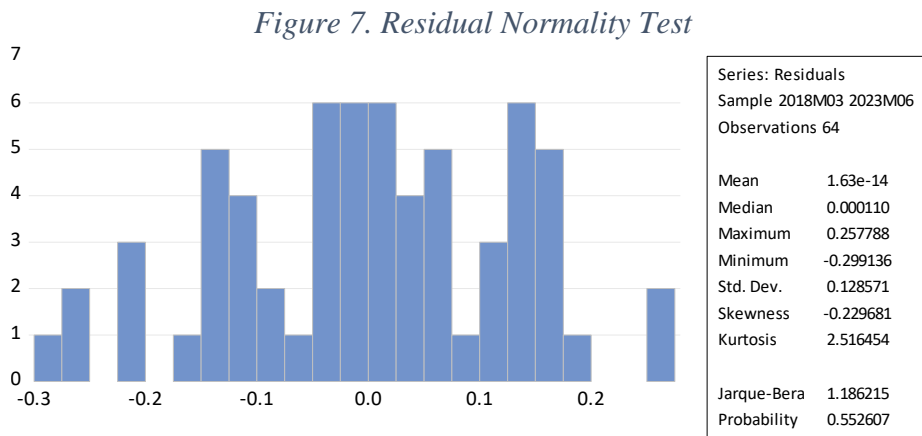


Table 4. Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	0.988557	Prob. F(13,50)	0.4757
Obs*R-squared	13.08612	Prob. Chi-Square(13)	0.4412
Scaled explained SS	6.056061	Prob. Chi-Square(13)	0.9441

Source: Generated in Eviews 12

Last but not least, we need to check if the model’s residuals have serial correlation problem. Breusch-Godfrey serial correlation LM test is used. The p-value are higher than 0.05, showing that there is no serial correlation issue in our model.

Table 3. Breusch-Godfrey Serial Correlation LM Test

Null hypothesis: No serial correlation at up to 2 lags

F-statistic	0.757390	Prob. F(2,48)	0.4744
Obs*R-squared	1.957919	Prob. Chi-Square(2)	0.3757

Source: generated in Eviews 12

This study includes 67 observations. However, this sample is monthly data that extend only 5 years (2018-2023) due to the limitation in data collection, especially Cambodia’s data. This can

²³ Based on Jarque, Carlos M., and Anil K. Bera. 1980. “Efficient Tests for Normality, Homoscedasticity and Serial Independence of Regression Residuals.” *Economics Letters* 6 (3): 255–59. [https://doi.org/10.1016/0165-1765\(80\)90024-5](https://doi.org/10.1016/0165-1765(80)90024-5).

arise as the limitation of this study. Thus, any interpretation of and reference to this study must be done with caution.

Estimation Results of ARDL Model

ARDL Bound Test

The bound test was developed by Pesaran et al. (2001)²⁴ in order to test the existence of co-integration or relationship between dependent variable and independent variables. The test is based on F-statistics and t-statistics used to test the significance of lagged level variables. The null hypothesis of the test is “No level relationship”. Table 6 below shows the result of the bound test. The value of F-statistics is higher than the critical values at every level of significance, whereas the absolute value of t-statistics is also higher than the absolute values of the critical values at all level of significance. Thus, the null hypothesis is rejected, and there exists cointegration between the dependent variable and the independent variables.

Table 6. ARDL Bound Test Result

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	7.084282	10%	2.75	3.79
k	5	5%	3.12	4.25
		2.5%	3.49	4.67
		1%	3.93	5.23
Actual Sample Size	64		Finite Sample: n=65	
		10%	2.897	4.022
		5%	3.372	4.613
		1%	4.482	5.923
			Finite Sample: n=60	
		10%	2.912	4.047
		5%	3.407	4.632
		1%	4.505	5.92
t-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
t-statistic	-5.498667	10%	-3.13	-4.21
		5%	-3.41	-4.52
		2.5%	-3.65	-4.79

²⁴ Pesaran, M. Hashem, Yongcheol Shin, and Richard J. Smith. 2001. “Bounds Testing Approaches to the Analysis of Level Relationships.” *Journal of Applied Econometrics* 16 (3): 289–326. <https://doi.org/10.1002/jae.616>.

Source: Generated in EViews 12

Estimation Output

Table 7 illustrates the output of our ARDL estimation with ARDL (1, 2, 2, 1, 0, 1) model. The adjusted R-square of 0.88 indicates goodness of fit of the model. In other words, 88% of the variation in dependent variable can be explained by the independent variables in the model, while the other 12% is explained by other factors. The Durbin-Watson result approaching 2 shows that there is no issue of autocorrelation. Moreover, exports (exp) is found to have a lagged effect on itself. The coefficients for each variable imply both short-term and long-term effects. Therefore, we should look at these effects separately.

Table 7. ARDL Estimation Output

Dependent Variable: LN_EXP, Method: ARDL				
Maximum dependent lags: 2 (Automatic selection)				
Model selection method: Akaike info criterion (AIC)				
Dynamic regressors (2 lags, automatic): LN_EXR GDP INF CAM_INF				
PCR; Selected Model: ARDL(1, 2, 2, 1, 0, 1)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LN_EXP(-1)	0.371150	0.114364	3.245339	0.0021
LN_EXR	-3.679808	5.465036	-0.673336	0.5038
LN_EXR(-1)	11.04828	7.175517	1.539720	0.1299
LN_EXR(-2)	-14.42320	5.134115	-2.809287	0.0071
GDP	0.157541	0.039741	3.964185	0.0002
GDP(-1)	0.058031	0.033063	1.755164	0.0854
GDP(-2)	-0.046353	0.028160	-1.646084	0.1060
INF	-0.167588	0.056877	-2.946507	0.0049
INF(-1)	0.197389	0.059655	3.308829	0.0017
CAM_INF	0.014723	0.023262	0.632904	0.5297
PCR	-0.418975	0.129818	-3.227406	0.0022
PCR(-1)	0.388828	0.136575	2.846984	0.0064
C	70.72553	33.86199	2.088641	0.0419
@TREND	0.011822	0.002653	4.456432	0.0000
R-squared	0.909154	Mean dependent var		19.97619
Adjusted R-squared	0.885534	S.D. dependent var		0.426569
S.E. of regression	0.144320	Akaike info criterion		-0.842927
Sum squared resid	1.041414	Schwarz criterion		-0.370671
Log likelihood	40.97365	Hannan-Quinn criter.		-0.656881
F-statistic	38.49103	Durbin-Watson stat		1.901046
Prob(F-statistic)	0.000000			

Source: Generated in EViews 12

Long-term Estimate

This study mainly concerns the long-term relationship between Cambodian exports to the US and the Fed's official interest rate. Long-term relation refers to the situation in which the variables in the model are in equilibrium. The long-term relationship between every independent variable and the dependent variable (exports) is shown in Table 10. We see that the effect of the US interest rate (Primary Credit Rate) on exports is not statistically significant. The same thing applies to exchange rate and Cambodia's inflation rate. Only the effect of GDP is statistically significant at 5%, while the effect of inflation rate is significant only at 10% level.

Table 8. ARDL Long-Term Estimate

ARDL Long-Run Form				
Levels Equation				
Case 5: Unrestricted Constant and Unrestricted Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LN_EXR	-11.21846	7.274457	-1.542172	0.1293
GDP	0.269092	0.065105	4.133211	0.0001
INF	0.047390	0.027978	1.693839	0.0965
CAM_INF	0.023412	0.036522	0.641039	0.5244
PCR	-0.047940	0.033245	-1.442031	0.1555

Source: Generated in EViews 12

According to the coefficients, the increase of GDP by 1 percentage point (ppt), say from 2% to 3%, increases Cambodian exports to the US by 27% in the long-term. Likewise, the rise of inflation rate in the US by 1 ppt increases Cambodian exports by 5% in the long-term. These effects are based on ceteris paribus condition. The impact of GDP on exports appears enormous because 1 ppt increase in GDP of the US is actually enormous compared to the value of Cambodian exports.

Short-term Estimate

Table 9 illustrates short-term effects based on error correction regression. Short-term effect refers to the situation in which there are constraints or shocks in the system. Regarding this, exchange rate has a negative and statistically significant lagged impact on exports, whereas GDP has a positive and statistically significant instantaneous impact on exports. US inflation and interest rate exhibit negative and statistically significant influence on exports. The absence of Cambodia's inflation from the ECM regression shows that it has no effect on exports in the short term. Error Correction Term is negative (-0.628) and statistically significant at 1% level, showing a fast convergence in the model. In particular, it shows that the deviation from equilibrium level in the current month will be corrected by 62.8% in the next month.

Table 9. ARDL Short Run Estimate

ARDL Error Correction Regression				
ECM Regression				
Case 5: Unrestricted Constant and Unrestricted Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	70.72553	10.33992	6.840049	0.0000
@TREND	0.011822	0.001977	5.979096	0.0000
D(LN_EXR)	-3.679808	4.201800	-0.875769	0.3853
D(LN_EXR(-1))	14.42320	4.284853	3.366091	0.0015
D(GDP)	0.157541	0.026240	6.003792	0.0000
D(GDP(-1))	0.046353	0.023803	1.947335	0.0571
D(INF)	-0.167588	0.041032	-4.084290	0.0002
D(PCR)	-0.418975	0.090261	-4.641806	0.0000
CointEq(-1)*	-0.628850	0.091966	-6.837855	0.0000

Source: Generated in EViews

The coefficients in ECM show that the effects of GDP and inflation are still statistically significant. In the short run, the increase of the US GDP by 1 ppt is estimated to increase exports by about 16%. Exchange rate has a lagged effect on exports. An increase of exchange rate (appreciation of USD against KHR) by 1% in the current period tend to increase exports in the next period by 14%. Meanwhile, our main independent variable interest rate has a short-term negative effect on exports. An increase of the interest rate by 1ppt, say from 4% to 5%, reduces exports by almost 42%. These effects are based on ceteris paribus condition.

Interpretation of Findings

Through long-term and short-term analysis, we can establish the following interpretation. First of all, regarding the long-term effect, the size of the US economy has the most significant influence on the volume of Cambodia's exports to the US. 1 ppt increase of the US GDP is estimated to increase Cambodian exports by 27% in the long term. The second significant long-term effect comes from the US inflation rate, in which 1ppt rise of inflation coincides with 5% increase of Cambodian exports. Second, Cambodia's inflation rate (representing the cost of exports) has no effect on exports in both short term and the long term. Thirdly, regarding short-term effect, 1% appreciation of the USD against KHR in current period is estimated to increase Cambodian exports to the US by 14% in the next period (lagged effect). This is because appreciation of the USD against KHR makes Cambodian products cheaper and thus more attractive. On the other hand, 1 ppt increase in inflation reduces demand for exports by 17% (sign opposite to the long-term effect). This might reflect the overshooting reaction from the part of US consumers to inflation shock. Last but not least, the changes in US official interest rate is found to have huge short run effect on Cambodian exports. 1 ppt or 100 basis points increase of the interest rate is estimated to reduce

demand for Cambodia's exports by 42%. Since the Fed usually increases its rate incrementally, say by 10 or 20 basis points, it is more logical to interpret the increase in basis point. Thus, the increase of the interest rate by 10 basis points is estimated to reduce exports by 4.2% in the short term. Based on the Error Correction Term, the short run effect will subside approximately within two months. All of these effects are based on ceteris paribus conditions.

Conclusion

Cambodia's economy has been performing well during the last two decades. Among other factors, exports have played a crucial role in contributing to this phenomenal growth and has accounted for 60% to 70% of the country's GDP. The top destination for Cambodian exports of goods is the US, making up between 20% and 40% of the kingdom's total exports. Meanwhile, the volume of Cambodia's exports to the US seemed to have suffer an unprecedented drop from mid-2022 until mid-2023. This drop might be the result of events such as surging inflation or weakening of overall demand. However, one factor whose timeframe seems to have coincided with the decreasing exports is the raising of official interest rate by the US Federal Reserve. Thus, this study was conducted to examine whether the decrease in Cambodia's exports to the US had anything to do with the rising US interest rate.

Monthly data of Cambodia's exports to the US was used as the dependent variable, whereas monthly data of USD-KHR exchange rate, US GDP growth rate, US inflation rate, Cambodia's inflation rate (to reflect supply-side shock), and US Federal Reserve's interest rate (Discount Window Primary Credit Rate) were independent variables. ARDL model was implemented, since there existed a mixed order of integration (I(0) and I(1)) among the variables in the model. Bound test indicated existence of cointegration between dependent variable and independent variables. The estimation outputs showed that the changes in US official interest rate did not have long-term effect on Cambodian exports to the US. Only the short-term effect is present. In particular, if all else remained unchanged, a rate hike by 10 basis points coincided with a drop of demand for Cambodia's exports by 4.2%. Nonetheless, the effect was short-lived, and the deviation returns to equilibrium within two months. Likewise, 1% appreciation of the USD against KHR in the current period was estimated to increase demand for Cambodian exports by 14% in the next period (short-run lagged effect). Lastly, it was also found out that the US GDP had the most significant long-term effect on the demand for Cambodia's exports. 1 ppt increase of the US GDP was estimated to increase Cambodian exports by 27% in the long run.

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