A thesis

on

Relationship among GDP, Exports and Imports in The United States, Japan, Germany and India.

This report is submitted to the Department of Accounting, Faculty of Business Studies, Hajee Mohammad Danesh Science and Technology University, Dinajpur for the partial fulfillment of the required degree of Master of Business Administration (MBA) program

Prepared By
Zarin Tasnim Zimu
Student ID−1703047
MBA in Accounting and Information Systems
Semester: III-2022, Batch 10th
Department of Accounting
Faculty of Business Studies
HSTU, Dinajpur.

Supervised By
Dr. Shaikh Mostak Ahammad
Professor
Department of Accounting
Faculty of Business Studies
HSTU, Dinajpur.

Hajee Mohammad Danesh Science and Technology University

Dinajpur−5200, Bangladesh.

June, 2024

A thesis
on

Relationship among GDP, Exports and Imports in The United States, Japan, Germany and India.

By

Zarin Tasnim Zimu
Student ID−1703047
MBA in Accounting And Information Systems
Semester: III-2022, Batch 10th
Department of Accounting
Faculty of Business Studies
HSTU, Dinajpur.

Approved by

Supervisor
Dr. Shaikh Mostak Ahammad
Professor
Department of Accounting
Faculty of Business Studies
HSTU, Dinajpur.

Co-supervisor
Saiful Islam ACMA
Associate Professor
Department of Accounting
Faculty of Business Studies
HSTU, Dinajpur.



Hajee Mohammad Danesh Science and Technology University
Dinajpur−5200, Bangladesh.

June, 2024

Acknowledgement

I am deeply grateful to the Almighty Allah, whose guidance has enabled me to pursue my study.

I extend my heartfelt appreciation to my esteemed teacher, as well as to my supervisor, Professor Dr. Shaikh Mostak Ahammad, and my co-supervisor Associate Professor Saiful Islam ACMA. Their unwavering support and guidance have been invaluable in navigating the complexities of legal research and conceptual challenges in my internship report.

I have dedicated considerable effort and diligence to gathering relevant documents on this subject matter. However, I acknowledge that my efforts may have limitations, and I cannot claim absolute perfection in the inclusion of all information in this thesis paper. There may be shortcoming factual error, or mistaken opinions, for which I take full responsibility. Nevertheless, I am committed to improving the quality and depth of my work in future.

……
Zarin Tasnim Zimu
Student ID−1703047
MBA in Accounting and Information Systems
Semester: III-2022, Batch 10th
Department of Accounting
Faculty of Business Studies
HSTU, Dinajpur.

Certificate of Supervisor

I hereby certify that Zarin Tasnim Zimu, with student ID number 1703047, currently pursuing an MBA in Accounting and Information Systems at the Department of Accounting, Batch 10th, Faculty of Business Studies, Hajee Mohammad Danesh Science and Technology University, Dinajpur-5200, is the author of the paper examining the '*Relationship among GDP, Exports and Imports in The United States, Japan, Germany and India'*.

Under my supervision, she has completed her analytical performance and submitted this report as part of the requirement for the Master of Business Administration degree in Accounting and Information Systems.

I wish her every success in life.

…….....

Dr. Shaikh Mostak Ahammad
Professor
Department of Accounting
Faculty of Business Studies
HSTU, Dinajpur.

Certificate of Co-supervisor

I hereby certify that Zarin Tasnim Zimu, holding student ID number 1703047, is currently pursuing an MBA in Accounting and Information Systems at the Department of Accounting, Batch 10th, Faculty of Business Studies, Hajee Mohammad Danesh Science and Technology University, Dinajpur-5200. She is the sole author of the paper under discussion, which delves into the Relationship among GDP, Exports and Imports in The United States, Japan, Germany and India.

Under my co-supervision, she diligently completed her evaluation and submitted analytical report as partial requirement for the Master of Business Administration degree in Accounting and Information Systems.

I wish her every success in life.

……
Saiful Islam ACMA
Associate Professor
Department of Accounting
Faculty of Business Studies
HSTU, Dinajpur.

Student's declaration

The writing of this thesis paper is an essential aspect of the thesis program at Hajee Mohammad Danesh Science and Technology University, Dinajpur-5200, regarding the Master of Business Administration (MBA) degree in the Department of Accounting, Faculty of Business Studies. A thorough professional curriculum is provided by this program. After completing a 180-day thesis program successfully under the guidance of Professor Dr. Shaikh Mostak Ahammad and Associate Professor Saiful Islam ACMA in the Department of Accounting, this thesis has been completed in compliance with academic criteria. It gives me great pleasure and pride to submit my thesis, "Relationship among GDP, Exports and Imports in The United States, Japan, Germany and India." I have worked really hard to prepare this report and to compile a wealth of data in order to improve its quality. But I recognize that there are always going to be limitations because I'm only human.

I officially certify that this report, which I wrote for academic credit toward my MBA in Accounting and Information Systems, is entirely original.

……
Zarin Tasnim Zimu
Student ID−1703047
MBA in Accounting and Information Systems
Semester: III-2022, Batch 10th
Department of Accounting
Faculty of Business Studies
HSTU, Dinajpur.

Abstract

This study examines the relationship among GDP, Exports, and Imports in The United States, Japan, Germany, and India using panel data from 1984 to 2022. By employing various statistical methods such as panel unit root tests, Johansen cointegration tests, VECM test, Wald Tests, Ganger-Causality tests, and impulse response functions, it is found that while neither export nor import causes fluctuations in GDP in the short run, they both significantly affect GDP over the long run. Furthermore, there is no indication of reverse causation between GDP and Exports, there is just a one-way causal link. Lastly, complex responses to GDP shocks are seen in the exports and imports.

Keywords: GDP, Exports, Imports.

Table of contents

	Title	Page no.
Chapter	Acknowledgement	i
	Certificate of Supervisor	ii
	Certificate of Co-supervisor	iii
	Student's declaration	iv
	Abstract	v
	Contents	vi-vii
	List of tables	vii
	List of graphs/figures	viii
Chapter 1	Introduction	1-2
Chapter 2	Literature review	3-4
Chapter 3	Methodology of the study	5-7
3.1.	Methodology	5
3.2.	Panel Unit Root Analysis	5
3.3.	Johansen's Cointregation test	5
3.4.	VECM TEST	6
3.5.	Wald test	6
3.6	Ganger-causality test	6
3.7.	Panel Multivariate Impluse Response Functions (IRFs)	7
3.7.	Data	7
Chapter 4	Analysis and interpretation	8-13
4.1.	Panel Unit Root Results	8
4.2.	Johansen Fisher Panel Cointegration Test Result	9
4.3.	Vector Error Correction Model Result	10
4.4.	Wald Test Result	10
4.5.	Ganger Causality Test Result	11
4.6.	Panel Multivariate impulse response function (IRFs) Result	12
Chapter 5	Findings and suggestions	14
5.1.	Findings	14
5.2.	Suggestions	14

Chapter 6	Conclusions, policy implications and future work	15
6.1.	Conclusions	15
6.2.	Policy implications	15
6.3.	Future work	15
	References	16

List of tables

Table no.	Title	Page no.
Table 1	Outcomes of Panel unit root LLC and IPS tests	8
Table 2	Outcomes of Panel unit root ADF and PP tests	9
Table 3	Outcomes of of Johansen Fisher Panel Cointegration Test	10
Table 4	Outcomes of Vector Error Correction Model for Dependent variable GDP	10
Table 5	Wald Test for exports of goods and services	11
Table 6	Wald test for imports of goods and services	11
Table 7	Pair-wise Ganger Causaity	12
Table 8	Residual diagnostic tests:	13

List of graphs/ figures

Figure no.	Title	Page no.
Figure 4.1	Panel IRFs comparison for four countries	13

CHAPTER 1

Introduction

Over the last forty years, the global economy has witnessed significant transformations in trade patterns, economic growth, and geopolitical dynamics. Understanding the trends in Gross Domestic Product (GDP) and trade flows, particularly exports and imports of goods and services, is crucial for comprehending the economic evolution of nations and their positions in the global marketplace. In this research study, we delve into the GDP, exports, and imports of goods and services for a forty-year period spanning from 1984 to 2022 across four key economies: the United States, Japan, Germany, and India.

These four nations represent diverse economic landscapes, each with unique historical trajectories, industrial structures, and policy frameworks. The United States, as the world's largest economy, has long been a dominant force in global trade, with its economic performance shaping international markets. Its intricate relationship between trade and GDP reflects a reliance on imports and exports across various industries, necessitating a delicate balance to sustain economic momentum.

Similarly, Japan, renowned for its industrial prowess and technical innovation, exhibits a complex interplay between GDP and commerce. The country's significant exports of equipment, electronics, and automobiles contribute to GDP growth, yet its dependence on energy imports and global demand fluctuations pose challenges, requiring strategic management of trade policies.

Germany, Europe's largest economy, showcases a deep integration between GDP and trade, driven by its role as an export powerhouse. Leveraging engineering excellence and manufacturing prowess, Germany maintains a robust trade surplus primarily through exports of automobiles, machinery, and chemicals. However, global demand fluctuations and trade tensions can impact its export performance, influencing overall GDP growth.

India, with one of the highest growth rates globally, offers a distinctive perspective on the GDP-trade relationship. Despite advancements in services, pharmaceuticals, and information technology, India's trade balance is affected by imports of commodities like gold and crude oil. Export diversification initiatives aim to overcome regulatory barriers and infrastructure constraints, supporting GDP development.

This study adopts a multimodal approach, utilizing panel data analysis spanning four decades from the World Bank Data repository (1984–2022). Employing various analytical methods such as panel unit root tests, Granger-Causality tests, and Vector Error Correction Models (VECM), we explore short-term fluctuations and long-term trends in the association between GDP, exports, and imports.

The research aims to provide valuable insights for policymakers, economists, and stakeholders by elucidating the intricate relationship between GDP and trade dynamics. Understanding the impact of exports and imports on GDP growth informs more effective policy decisions, promoting sustainable economic growth and enhancing global competitiveness. By shedding light on these complex interactions, this study contributes to advancing our understanding of economic development and trade patterns in diverse global contexts.

Furthermore, the study suggests that proactive measures to strengthen the economy should focus on facilitating exports, reducing reliance on imports, and monitoring the interplay among GDP, exports, and imports. Future research could delve deeper into sector-specific analyses to tailor policies for optimal economic outcomes across industries.

CHAPTER 2

Literature review

Numerous studies have been carried out on exports, imports, and GDP growth by researchers and policymakers. There is variation in the findings of various research about the relationship among these three elements. Cointregation tests and VAR or VEC models have been the focus of most current research.

Mohsen (2015) investigated how imports and exports affected Syria's economic development. In his study, using the Johansen Cointegration test, he showed that imports and exports have a significant and positive influence on GDP (gross domestic product). Using the Ganger Causality test, he found that there was a two-way causal relationship between GDP, import, and export in both the short and long terms. The GDP will respond positively in the years that follow an export shock, according to the impulse response function, but adversely in the years that follow an import shock.

Melepo and Jordaan (2024) examined the relationship between GDP per capita, imports, and exports in the SACU nations of Namibia, Botswana, Lesotho, South Africa, and Eswatini (Swaziland). They discovered that the relationships between GDP per capita, imports, and exports varied depending on the nation. While the import-led growth hypothesis was only verified in Namibia, the export-led growth hypothesis was validated for Botswana and Eswatini. The findings indicated that there was a bi-directional Granger causation between imports and growth for Lesotho and South Africa, and between exports and growth for Botswana. As a result, there was no obvious temporal precedence. Lastly, there was proof supporting the growth-led export theory for South Africa, Lesotho, and Botswana.

These mixed findings indicated that SACU countries should not solely dedicated their available resources to pursuing trade openness in promoting economic development but also address domestic economic reform strategies.

Hesman (2015) looked at how imports and exports affected the Arab nations' economic growth from 1995 to 2013. Throughout 17 countries, he employed a panel data approach and discovered that, from 1995 to 2013, exports and imports had a positive impact on economic growth in Arabia. He suggested that it was a crucial signal for gauging the work element's efficacy and efficiency in reaching a particular output level during the manufacturing process.

There was a need to increase technology imports to boost labor productivity, directly promoting economic growth and improving living standards in Arab countries.

Bakari and Mabrouki (2017) investigated the relationship between Panama's imports, exports, and economic development between 1980 and 2015. Vector Auto Regression Model, the Johansen co-integration analysis and the Granger-Causality tests were tested in this paper. The analysis's conclusions led to the conclusion that imports and exports had no impact on Panama's economic growth and found a reciprocal link between imports and economic growth and exports and economic development.

By examining the causal link between imports and exports, Hiçyılmaz (2022) looked at the places where imports were dependent on exports. According to his research, there was unidirectional causation between imports and exports in four locations, whereas bidirectional causality was present in six regions. He demonstrated that there was bidirectional causation between imports and exports based on panel results.

CHAPTER 3

Methodology of the study

3.1. Methodology

This research examines the relationship among GDP, exports (goods and services), and imports (goods and services) in four countries: The United States, Japan, Germany, and India. This investigation employs a variety of empirical approaches, utilizing several methods to comprehensively analyze the data.

Firstly, the panel unit root test (Levin et al., 2002; Im, Pesaran, and Shin 2003; Fisher ADF, 1979; Phillips-Perron (PP), 1988) is utilized to assess the stationary and non-stationary variables and ascertain the sequence of integration. Secondly, Johansen's Panel cointegration test is applied to ascertain the presence of cointegration. Thirdly, Panel Vector Correction Model (VECM) and Wald tests are conducted to examine the causal relationship between correlated variables. Fourthly, the Ganger Causality test is employed to determine the causal links between correlated variables. This study concludes by employing the Multivariate Impulse Response Function panel to determine the impact of each unit shock on the variables within the VAR system. It should be noted that this study uses Eviews 12 Econometrics software to generate estimations based on the methodology established in Robert Hall's work (1965).

3.2. Panel Unit Root Analysis

Panel unit root analysis is utilized for determining the stationary and non-stationary variables under this investigation. Four distinct panel unit root tests are used in this study to ascertain the variables' order of integration. The first test is evolved by Levin et al. (2002); the second one is developed by Im et al. (2003); the third the test is introduced by Maddala and Wu (1999) and Choi (2001) called Augmented Dickey Fullar (ADF) and Phillip Perron Fisher.

The above four test, Null hypothesis have a unit root (not stationary data) which is more than 5%, while alternative have no unit root and data are become stationary which is less than 5%.

3.3. Johansen’s Cointregation test

This test effectively evaluates the long-term relationships among variables in a panel dataset by combining two methodologies to give a reliable assessment of cointegration relationships

in panel data. The first one is the multivariate time series dataset cointegration test, which is performed using the Johansen-Juselius method. It calculates the number of cointegrating vectors, or long-term connections between the system's variables. The second is the Fisher Panel Method, a statistical method that creates a single test statistic by aggregating the findings of several independent tests. The Fisher panel technique combines the findings of individual tests performed on each cross-section (e.g., individual nations, enterprises) in the context of panel data, where both cross-sectional and time-series dimensions are present, to produce an overall evaluation of cointegration over the whole panel.

3.4. VECM tests

The cointregation test can only detect relationships between variables; it cannot determine the direction of causality. Cointegrated variables can be included in VECM, an extension of Vector Autoregression (VAR) model. When variables in the system are discovered to be cointegrated, showing long-term linkages, VECM is very helpful.

This multivariate time series model is capable of capturing equilibrium relationships between variables over the long run as well as short-term changes.

3.5. WALD test

A statistical hypothesis test called the Wald test is employed in regression models to evaluate the significance of a set of coefficients. By taking the estimated coefficient and standard error and squaring the result, the statistic is computed. Under the null hypothesis, this ratio approximates a chi-squared distribution.

3.6. Ganger-causality test

Granger causality evaluates if the previous values of one variable aid in forecasting the future values of another. In econometrics, it is commonly used to investigate possible causal links in time series data. Regression models containing lagged values of the potential causative variable are estimated for the test, and predictive performance is compared. Granger causality, however, suggests statistical connection rather than direct causation. Results interpretation calls for prudence and taking other pertinent considerations into account.

3.7. Panel Multivariate Impluse Response Functions (IRFs)

Panel impulse function throws a VAR system into a loop. This research looks at each variable's unit shock and how it affects the VAR system.

3.8. Data

The study's date sets, comprising real GDP, exports of goods and services, and imports of goods and services for The United States, Japan, Germany, and India from 1984 to 2022, is sourced from the World Bank, a secondary data provider.

CHAPTER 4

Analysis and interpretation

4.1.Panel Unit Root Results

The results of the panel unit root test are shown in Tables 1 and 2. The four panel unit root tests are as follows: the Im, Pesaran, and Shin (IPS) test; the Levin, Lin, and Chu (LLC) test; the Augmented Dickey-Fuller (ADF) test; and the Phillips-Perron (PP) test.

Table 1 presents the findings of two panel unit root tests, the IPS and LLC tests, while Table 2 display the findings from two additional panel unit root tests, the Fisher PP and ADF tests.

The variables in this table, lnGDP, lnEX, and lnIM, stand for the levels of GDP, exports and imports of goods and services, and ΔlnGDP, ΔlnEX, and ΔlnIM, respectively, stand for the first differences in GDP, exports and imports of goods and services.

Majority of panel unit root tests (LLC, IPS, ADF, and PP test) for the variables lnGDP, lnEX, and lnIN in Tables 1 and 2 indicate that intercept, intercept, and trend and none fail to reject null hypothesis, indicating that the variables are not stationary at level. The alternative hypothesis is accepted and the null hypothesis is rejected throughout the panel unit root test of first difference of variables when first difference data are taken into account. It shows that the variables are stationary at the first difference of the panel unit root test but not at level.

Table 1: Outcomes of Panel unit root LLC and IPS tests

	LLC Test			IPs Test	
Variables in levels	Intercept	Intercept and Trend	None	Intercept	Intercept and Trend
lnGDP	-2.1003 (0.01)	1.5878 (0.94)	11.8950 (1.00)	-0.9170 (0.17)	-0.6343 (0.26)
lnEX	-2.8084 (0.00)	-0.0396 (0.48)	8.9550 (1.00)	0.0889 (0.53)	1.6579 (0.95)
lnIM	-2.6479 (0.00)	-1.3226 (0.09)	9.4539 (1.00)	0.0534 (0.52)	0.8636 (0.80)
Variables in 1st differences					
ΔlnGDP	-9.7837 (0.00)	-10.1957 (0.00)	-4.1116 (0.00)	-7.9555 (0.00)	-8.0056 (0.00)
ΔlnEX	-11.5787 (0.00)	-11.5951 (0.00)	-7.5930 (0.00)	-10.0017 (0.00)	-9.9017 (0.00)
ΔlnIM	-9.5805 (0.00)	-8.9995 (0.00)	-6.6513 (0.00)	-7.9993 (0.00)	-7.4013 (0.00)

Note: The values included in parenthesis are P values.

Table 2: Outcomes of Panel unit root ADF and PP tests

Fisher ADF test				Fisher PP test		
Variables in levels	Intercept	Intercept and Trend	None	Intercept	Intercept and Trend	None
lnGDP	14.6137 (0.06)	10.0231 (0.26)	0.0003 (1.00)	16.6690 (0.03)	25.3886 (0.00)	0.0041 (1.00)
lnEX	8.5104 (0.38)	3.0704 (0.92)	0.0027 (1.000	16.6693 (0.03)	2.8192 (0.94)	4.2E (1.000
lnIM	5.6857 (0.68)	6.5184 (0.58)	0.0004 (1.00)	30.899 (0.00)	1.7996 (0.98)	0.0001 (1.00)
Variables in 1st differences						
ΔlnGDP	68.3845 (0.00)	62.9787 (0.00)	37.3944 (0.00)	73.5443 (0.00)	84.2577 (0.00)	42.3136 (0.00)
ΔlnEX	88.2064 (0.00)	81.2351 (0.00)	73.6497 (0.00)	89.9489 (0.00)	93.4889 (0.00)	72.2844 (0.00)
ΔlnIM	68.3866 (0.00)	57.9217 (0.00)	53.3459 (0.00)	68.7474 (0.00)	234.697 (0.00)	51.1652 (0.00)

Note: The first difference operator is Δ. The value in parenthesis is the p-value.

4.2. Johansen Fisher Panel Cointegration Test Result

Null hypothesis has cointegration in this test. Table 3 demonstrates that in None (trace test and max-eigen test) p value less than 5%, which indicates that the null hypothesis is rejected. There is no cointegration but ultimately a relationship among them. At most 1, the p value is close to 5% in max-eigen test and less than 5% in trace test. We cannot accept null hypothesis. At most 2 the p-value is significant meaning that we accept the null hypothesis. This suggests that at most 2 the variables have a long-term relationship association between the variables.

Table 3: Outcomes of Johansen Fisher Panel Cointegration Test

Johansen Fisher Panel Cointegration Test				
	Fisher stat.* (from trace test)	p-value	Fisher stat.* (from max-eigen test)	p-value
None	35.83	0.00	27.63	0.00
At most 1	15.89	0.04	14.64	0.06
At most 2	12.62	0.12	12.62	0.12

Note: Deterministic trend specification is considered in intercept (no trend) in CE and VAR.

4.3.Vector Error Correction Model Test

In this model, the coefficient which is the speed of adjustment toward the long-run equilibrium denoted by C (1), must have a negative sign and p value need to be less than 5%.

Table 4 represents the outcomes of VECM when GDP is dependent variable, the p value is less than 5% and C (1) is negative, at -0.0089, suggesting a significant long-term causation between the two independent variables. This indicates that, over time, exports and imports have substantial an impact on the dependent variable, GDP.

Table 4: Outcomes of Vector Error Correction Model for Dependent variable GDP

Variables	Coefficient	Std. Error	t-statistic	P-value
C(1)	-0.0089	0.0040	-2.2159	0.00
C(2)	-0.0441	0.0157	-2.7979	0.02
C(3)	0.2791	0.1065	2.6186	0.00
C(4)	-0.0414	0.0391	-1.0586	0.29
C(5)	0.0282	0.0414	0.6813	0.49
C(6)	0.0209	0.0030	6.9251	0.00

4.4.Wald Test Result

Table 5 represents that the probable value of the Chi-square is 0.28, more than 0.05, indicating that it cannot reject null hypothesis. It implies that there is no short-term causal

relationship between GDP and exports. In other words, exports cannot cause GDP. Likewise, Table 6's Chi-square probability of 0.49, which is higher than 0.05,it also reject null hypothesis, implies that there is no short-term causal relationship between GDP and imports.

Table 5: Wald Test for exports of goods and services

Null Hypothesis C (4)= 0

Test Statistic	Value	df	P- value
F-statistic	1.1207	(1, 143)	0.29
Chi-square	1.1207	1	0.28

Table 6: Wald test for imports of goods and services

Null Hypothesis C (5)= 0

Test Statistic	Value	df	P- value
F-statistic	0.4642	(1, 143)	0.49
Chi-square	0.4642	1	0.49

4.5.Ganger Causality Test

Table 7 represents the impact on three variables in pair.

In first pairs, we accept alternative hypothesis as the p-value is 0.00 less than 5%,

It indicates that lnex does not Ganger cause lnGDP. On the other hand, we cannot reject null hypothesis as the p-value is 0.86, meaning that GDP does not cause export. In second pairs, the p-value is less than 5%, we can reject null hypothesis, meaning that import cause GDP. On the other hand, lnGDP does not Ganger cause lnIM, the p-value is greater than5%, we accept alternative hypothesis, meaning that GDP does not cause import.

The last pairs, lnIM does not Ganger cause lnEX, the p-value is greater than 5%, we accept the null hypothesis and also lnEX does not Ganger cause lnIM is greater than 5%, we also accept the null hypothesis. Meaning that, imports does not cause exports and vice-versa.

The whole result shows that, exports have significant impact on GDP. But there is no causal relationship in the reverse direction or between exports and imports at the significant level.

Table 7: Pair-wise Ganger Causaity

Null Hypothesis	F-Statistics	P-value
lnEX does not Ganger Cause lnGDP	11.9184	0.00
lnGDP does not Ganger Cause lnEX	0.0290	0.86
lnIM does not Ganger Cause lnGDP	6.4153	0.01
lnGDP does not Ganger Cause lnIM	0.2478	0.61
lnIM does not Ganger Cause lnEX	2.5490	0.11
lnEX does not Ganger Cause lnIM	0.2504	0.61

4.6. Panel Multivariate impulse response function (IRFs) Result

The panel impulse response function (IRFs) applies a shock to each variable and sees the effect on the VAR system.

The impulse responses are shown in figure 1 as the blue line. How the independent variables respond to a shock is demonstrated. This graph represents responses during ten periods of time.

In figure 1 the first row represents the impulse responses of the variables (lnGDP-lnEX-lnIM) to a unit shock in the lnGDP. From the row, it is discernible that one unit shock in lnGDP has negative reaction to lnEX and positive reaction to lnIM. The second graph of this row indicates that one unit shock to lnEX is sharply decline and remains in the negative region. In third graph, one unit shock to lnIM sharply increased in positive region.

In second row of the figure, represents the impulse responses of variables (lnEX-lnGDP-lnIM) to a unit shock in lnEX. From this row it indicates that one unit shock in lnGDP and lnIM both have positive reaction. In first graph one unit shock to lnGDP slowly increased in the whole ten years. The third graph of this row indicates that one unit shock to lnIM increase approximately in same ratio in every year.

In third row, represents the impulse responses of variables (lnIM-lnEX-lnGDP) to a unit shock in lnIM. From first graph of this row it indicates that a one unit shock to lnGDP gradually increased in first three years then become stable upto ten years. Third graph in the row, indicates that one unit shock to lnEX gradually goes down in first three years then in four to ten years it became stable all happen in positive region.

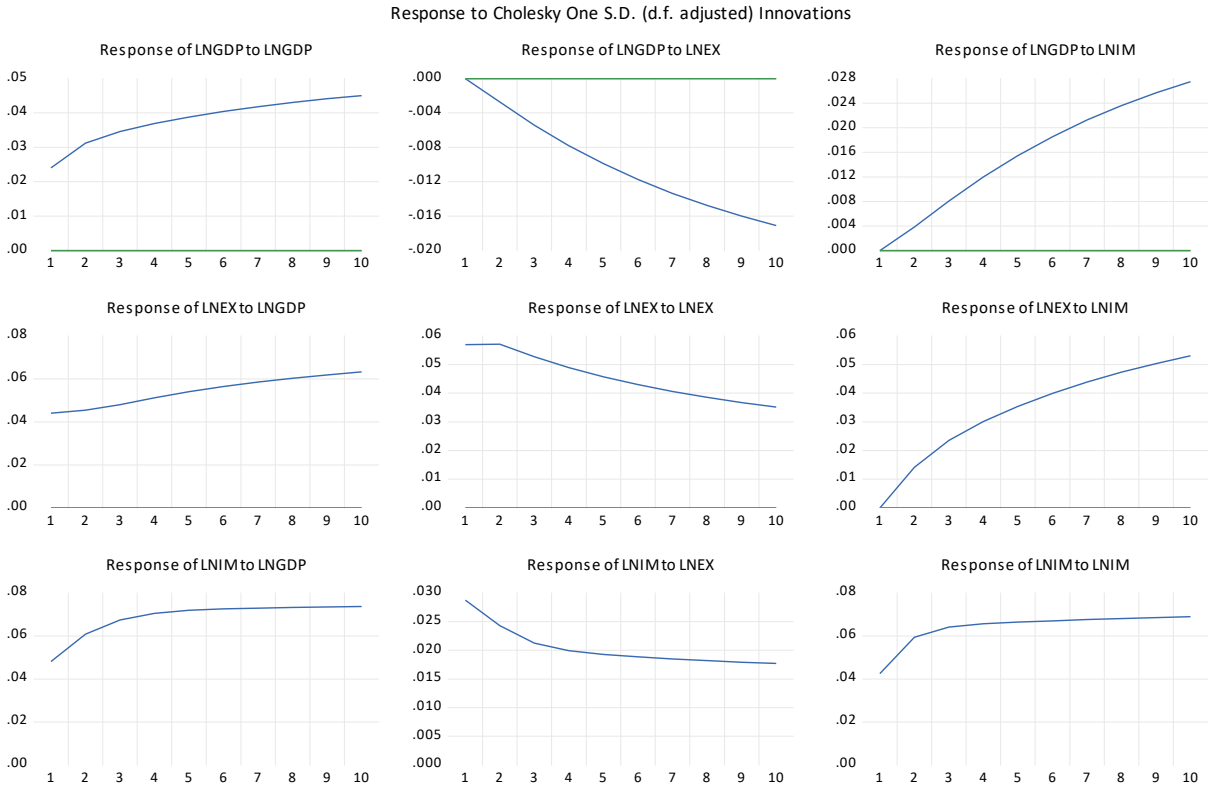

Figure1: Panel IRFs comparison for four countries.

Table 8: Residual diagnostic tests:

Test	value
R-squared	0.8659
Adjusted R-squared	0.8641
F-statistic	494.1525
P-value (F-statistic)	(0.00)

Diagnostic test indicates that overall specification adopted is satisfactory.

CHAPTER 5

Findings and Suggestions

5.1. Findings

This research is conducted to explore the relation among GDP, Exports, and Imports in four countries in The United States, Japan, Germany and India. For this study, several empirical estimations are conducted and find that:

According to the estimate of the panel unit root test, the variables (GDP, exports and imports of goods and services) are stationary at first difference. In Johansen Fisher Panel Cointegration test, demonstrates that at most two cointegration relation with each other. To estimate the causality among variables, VECM suggests that a stable long-run relationship among the three variables and the Wald test does not reveal significant short term dynamics. Meaning that in the long run, both exports and imports significantly influence GDP but in short run neither export nor import causes GDP. Ganger Causality test demonstrate a statistically significant influence on GDP, indicating a directional relationship, where changes in export can lead to corresponding changes in GDP. However, there is no causal relationship in reverse direction, meaning that the fluctuation of GDP have no impact on exports. The analysis also discovers that no causal link between imports to exports, or vice versa. To estimate the impulse response function detects that a one unit shock to GDP induces a negative response in exports and a positive response in imports. One unit shock to exports of induces a positive reaction both in GDP and imports and lastly a unit shock to imports leads to a gradual increase in GDP and a decline followed by stabilization in export.

5.2. Suggestions

The research emphasizes the importance of specific plans to make the economy stronger, focusing on boosting our ability to sell things abroad and making trade easier. We need to support companies that sell internationally, make it simpler to do business, and improve our roads, ports, and other infrastructure. By selling more to other countries and encouraging new ideas, we can make businesses more efficient and lower the chances of problems. To ensure our economy stays strong in the long run, we need a well-thought-out plan to deal with any obstacles that might get in the way.

CHAPTER 6

Conclusions, policy implications and future work

6.1. Conclusions

This article examines the relationship among GDP, Exports, and Imports in The United States, Japan, Germany, and India. The annual data for the years 1984 to 2022 are used to accomplish this goal. According to the results of the analysis we have established that GDP, exports and imports are cointregated in the long run and both export and imports significantly influence GDP in this economies and export and import don't cause GDP in short run also find a unidirectional causal relationship from export to GDP. However, no reverse causality is observed, meaning that the fluctuations in GDP do not have impact on export. In addition, the complex responses of exports and imports to GDP shocks underscore the dynamic nature of economic interactions within these countries.

6.2. Policy implications

The results of the study have various policy implications for policymakers to consider in economic planning. Policymakers should prioritize creating an export-friendly environment to boost the economy. This can be achieved by promoting exports and making trade easier. Additionally, policymakers should focus on promoting diversification in products and export markets to reduce the risks arising from over-reliance on specific sectors.

6.3. Future work

The study has provided valuable insights into the relationship among GDP, Exports, and Imports. However, there are still opportunities for further research. Future studies could investigate the underlying mechanisms of the observed causal relationships using more advanced econometric techniques. It would also be beneficial to explore the role of other factors such as exchange rates, foreign direct investment, and trade policies in shaping trade dynamics and economic growth.

REFERENCES

Hadman, B.S.S (2016). The Effect of Exports and Imports on Economic Growth in the Arab Countries: A Panel Data Approach. *Journal of Economics Bibliography*, 3(1).

Hiçyılmaz, B. (2022). Exports and Imports Relation: Panel Causality Analysis with Regional Data for Turkey. *Uluslararası Yönetim İktisat Ve İşletme Dergisi,* 18(1), 208-223.

Kónya, L. (2006). Exports and growth: Granger causality analysis on OECD countries with a panel data approach. *Economic Modelling*, 23(6), 998-992.

Mohsen, A.S. (2015), Effects of exports and imports on the economic growth of seria. *Euro-Asian journal of Economics and* Finance, 3(4), 253-261.

Molepo, E. P., & Jordaan, A. C. (2024). A causal analysis between exports, imports and GDP per capita in the Southern African Customs Union Countries. *Studies in Economics and Econometrics*, 1–18.