

# Determinant Factors of Trade

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## Abstract

The purpose of this paper is to investigate the effect of GDP per capita growth on trade indicators. Moreover, we would like to investigate whether the developing level of the countries plays a significant role in this relationship. The dataset of 154 countries is derived from the World Bank World Development Indicator. By using regression analysis, the results highlight a positive relationship between GDP per capita growth and trade indicators for developing countries, while we couldn't capture significant relationship for developed countries, suggesting that the level of development in these countries plays an important role in the relationship. These findings have important insights for policymakers, investors, and managers.

## Keywords

Trade, Export, Import, FDI, GDP per capita growth, Regression

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## 1. Introduction

Trade indicators and GDP per capita growth are key macroeconomic parameters, commonly adopted as fundamental measures of a country's economic performance. Exports, imports, and foreign direct investment (FDI) inflow and outflow are used as proxies of trade in this paper. They allow the exchange of goods, capital, and technology across country borders, driving economic development and innovation. At the same time, GDP per capita growth is regarded as an important proxy for a country's overall economic well-being, reflecting improvements in living standards.

Exploring and understanding the relationship between trade indicators and GDP per capita growth is crucial for economists and policymakers aiming to design effective development strategies. While general economic theories suggest that increased trade and higher investment flows stimulate growth, the resulting

empirical findings are controversial, indicating that the relationship may vary across countries at different levels of development (Ekholm & Södersten, 2002; Wong, 2010; Adu-Gyamfi et al., 2020; Nguyễn and Phan, 2025).

Hence, this paper seeks to investigate this relationship through analysing the impact of trade variables on GDP per capita growth in developing and developed countries separately. The purpose of this paper is to contribute to the ongoing discussion about trade and development, investigating a broader set of trade-related indicators and disaggregating the analysis between developing and developed countries.

In this way, this paper makes contributions to the existing literature, offering a more comprehensive view on the trade and growth relationship, providing applicable insights on policy decisions. Thus, the findings have implications not only limited to trading policies, but also national economic planning. In addition, most of the existing literature treats countries as a homogeneous group; this paper differs from this literature through distinguishing between developed and developing countries, enabling a more detailed analysis of how GDP per capita growth affects trade. Moreover, this study considers trade from a multitude of dimensions, such as exports, imports, FDI inflows, FDI outflows, and trade, providing a broader insight into trade dynamics. This paper offers the most up-to-date and extensive dataset that presents more robust empirical evidence. These contributions provide important insights for policy makers, investors, and international organizations.

The paper proceeds as follows: Section 2 provides background information on the existing literature, Section 3 highlights the empirical findings, and Section 4 concludes the paper.

## 2. Literature Review

Various methodologies have been used to investigate the relationship between many different trade proxies and economic growth such as Granger Causality Test (Zestos & Tao, 2002; Asheghian, 2004), Johansen Cointegration Method (Wong, 2010), Regression Analysis (Makki & Somwaru, 2004; Grimes, 2006; Hermes & Lensink, 2003; Abbas et al., 2011), Time Series Data Analysis (Li et al., 2010), Panel Data Regression (Adu-Gyamfi et al., 2020; Batten & Vo, 2009; Nguyễn & Phan, 2025), VECM Model (Michelis & Zestos, 2004), ANOVA (Ali et al., 2023), ARDL Model (Yeboah et al., 2025; Rai & Raju, 2025), and Error Correction Model (Prawoto, 2025).

The variable used in the literature often varied. With some paper focused on macroeconomic indicators including trade (Ekholm & Södersten, 2002), GDP per capita growth (Kohli, 2004), CPI (Grimes, 2006), exports (Zestos & Tao, 2002), imports (Li et al., 2010), sustainable development (Nguyễn & Phan, 2025), FDI (Abbas et al., 2011), trade openness (Adu-Gyamfi et al., 2020), education attainment (Batten & Vo, 2009), air-transport passenger (Rai & Raju, 2025), investment in research and development (Šlander-Wostner et al., 2025), and exchange rate

(Prawoto, 2025).

Many studies have focused on various countries and regions such as Asian countries (Ekholm & Södersten, 2002), East China (Li et al., 2010), New Zealand (Grimes, 2006), Japan (Wong, 2010), Ghana (Adu-Gyamfi et al., 2020), United States (Zestos & Tao, 2002), Croatia (Kovač et al., 2012), Latin America (Hermes & Lensink, 2003), SAARC countries (Abbas et al., 2011), Saudi Arabia (Ali et al., 2023), Central Europe (Michelis & Zestos, 2004), Indonesia (Prawoto, 2025), and Northern Europe (Šlander-Wostner et al., 2025).

The relationship between trade, FDI, exports, imports, and economic growth has been widely explored in the literature across countries. For example, Ekholm & Södersten (2002) and Zestos & Tao (2002) highlight that trade-driven growth varies by region. The Asian economy experienced strong export-led growth, while Western countries saw slower growth due to domestic policy issues. Similarly, Wong (2010) shows that trade supports growth in Japan and Korea, while volatility has a negative impact that is most significant in small open economies.

Several works emphasize the role of FDI, including Makki & Somwaru (2004), who indicate that FDI boosts growth effectively in developing countries. Similarly, Batten & Vo (2009) suggest the same result, pointing out education, financial systems, and trade openness to be important factors influencing the size of the impact. Hermes & Lensink (2003) also show that only countries with strong financial systems experienced higher growth. Asheghian (2004) emphasizes that FDI leads to growth in the United States; in contrast, Yeboah et al. (2025) point out that the relationship only holds in the short-run and FDI harms long-run growth.

It is obvious that trade is an important determinant factor of economic growth. Grimes (2006) suggests that the majority of New Zealand's GDP growth can be explained by higher levels of trade, while Kohli (2004) states that the effect of improved terms of trade is understated by real GDP.

Exports and imports are also essential drivers of economic growth. Li et al. (2010) show that exports drive GDP growth in East China, while Kovač et al. (2012) find that exports have a weak impact on growth in Croatia. At the same time, Ali et al. (2023) suggest that imports also contribute to GDP growth in Saudi Arabia.

In the most recent studies, many papers pay attention to sustainability, including Nguyễn & Phan (2025) and Pea-Assounga et al. (2025).

An extensive summary of literature is presented in **Table 1** below.

### 3. Empirical Evidence

#### 3.1. Data

**Table A1** presents the various proxies of trade and growth variables from the World Bank World Development Indicator. The dataset belongs to the year 2023 and consists of the data from 154 countries. The 154 countries are ranked according to their GDP per capita level. The top 77 countries with the highest GDP per

**Table 1.** An extensive summary of literature.

Authors	Year	Key variables	Method	Key findings	Region/country	Time period
Ekholm & Södersten	2002	Trade, GDP per capita growth	Descriptive statistics	Strong export-led growth in Asia, Western countries, had slower growth.	10 Western/Asia countries	1970-1995
Zestos & Tao	2002	Exports, imports, GDP	VECM, Cointegration and Causality Test	Strong trade-GDP causality in Canada, weaker in US.	Canada, US	1948-1996
Wong	2010	Real GDP per capita, labour, capital, terms of trade, oil price, financial development.	Cointegration method	Trade supports growth, while volatility harms small open economies.	Japan, Korea	1960-2006
Makki & Somwaru	2004	FDI, trade, domestic investment, human capital, GDP per capita	Regression	FDI and trade boost economic growth in developing countries.	66 Developing Countries	1971-2000
Li et al.	2010	GDP, Foreign trade, export, import	Time-series	Exports drive GDP growth in East China.	East China	1981-2008
Grimes	2006	Terms of trade, GDP growth, CPI, export, import	OLS	New Zealand's GDP growth is largely driven by trade.	New Zealand	1960-2004
Kohli	2004	GDP growth, real income growth, cumulative trading gains	Theoretical model, descriptive statistics	Real GDP often understates true income gains from improved terms of trade.	Global	1980-1996
Adu-Gyamfi et al.	2020	GDP, real exchange rate, trade openness, inflation	Panel data regression, pooled OLS	The relationship with GDP growth is positive for exchange rates, negative for inflation, and negligible for trade openness.	Ghana, 32 Sub-Saharan Countries	1998-2017
Kovač et al.	2012	GDP, exports, imports	Descriptive analysis	Exports had a weak impact on GDP growth.	Croatia, European Countries	2001-2010
Hermes & Lensink	2003	FDI, economic growth	Regression	FDI boosts economic growth only in countries with strong financial systems.	67 Countries	1970-1995

## Continued

Abbas et al.	2011	FDI, GDP, CPI	Regression	FDI drives GDP growth.	SAARC Countries	2001-2010
Batten & Vo	2009	Growth, FDI, trade openness, education attainment	Panel data	FDI supports economic growth.	79 Countries	1980-2003
Asheghian	2004	GDP, FDI, DI, TFP	Granger Causality Test	FDI growth drives US economic growth.	US	1960-2000
Michelis & Zestos	2004	Exports, imports, GDP growth	Granger causality test, VECM	Two-way causality between trade and GDP growth.	6 EU Countries	1951-1997
Ali et al.	2023	Exports, imports, GDP	ANOVA	Saudi Arabia's total exports and imports align with GDP.	Saudi Arabia	2002-2021
Nguyễn & Phan	2025	FDI, GDP, sustainable development, trade	Panel data analysis	The relationship with sustainability is positive with exports and FDI, negative with imports, and negligible with economic growth.	64 Developing Countries	1990-2019
Yeboah et al.	2025	GDP, FDI, trade openness	ARDL	FDI boosts short-term growth but harms it long-term, while trade openness does the opposite.	9 European Countries	1995-2021
Slander-Wostner et al.	2025	Investment in R&D and human capital, growth, trade	Regression	Human capital and R&D investments together enhance productivity and exports.	US, Europe, Asia	2001-2019
Prawoto	2025	GDP, trade taxes, exchange rate, imports	ECM	Imports rise with GDP, exchange rates, and manufacturing.	Indonesia	1989-2023
Rai & Raju	2025	GDP per capita, Air-transport, trade openness	ARDL	Air transport and trade openness boost economic development.	20 High-Income Nations	1971-2019

capita are classified as developed countries, while the bottom 77 countries with the lowest GDP per capita are classified as developing countries. The variables include GDP per capita as a percentage of annual growth (GDP per capita), trade as a percentage of GDP (Trade), imports of goods and services as a percentage of GDP (Imports), exports of goods and services as a percentage of GDP (Exports),

foreign direct investment net inflows as a percentage of GDP (FDI inflow), and foreign direct investment net outflows as a percentage of GDP (FDI outflow).

### 3.2. Model

To investigate the relationship between growth and trade indicators, we estimated the following regression model.

$$Y_i = \beta_0 + \beta_1 X_i + \varepsilon_i$$

where  $Y_i$  is the dependent variable for observation  $i$ , which refers to trade, imports, exports, FDI inflow, and FDI outflow.  $\beta_0$  is the constant term, representing the expected value of the dependent variable when the independent variable is zero.  $\beta_1$  is the coefficient for the dependent variable, which includes GDP per capita growth. The coefficient shows how much the dependent variable changes when the independent variable changes by 1 unit.  $\varepsilon_i$  is the error term, which represents the difference between the actual value and the predicted value from the model. We estimated the following regression models.

$$\text{Trade}_i = \beta_0 + \beta_1 \text{GDP per capita growth}_i + \varepsilon_i \quad (\text{Model 1})$$

$$\text{Imports}_i = \beta_0 + \beta_1 \text{GDP per capita growth}_i + \varepsilon_i \quad (\text{Model 2})$$

$$\text{Exports}_i = \beta_0 + \beta_1 \text{GDP per capita growth}_i + \varepsilon_i \quad (\text{Model 3})$$

$$\text{FDI inflow}_i = \beta_0 + \beta_1 \text{GDP per capita growth}_i + \varepsilon_i \quad (\text{Model 4})$$

$$\text{FDI outflow}_i = \beta_0 + \beta_1 \text{GDP per capita growth}_i + \varepsilon_i \quad (\text{Model 5})$$

### 3.3. Descriptive Statistics

**Table 2.** (a) Descriptive statistics for developing countries; (b) Descriptive statistics for developed countries.

(a)					
Variable	Obs	Mean	Std. Dev.	Min	Max
GDP per capita	77	2.51	3.375	-7.35	15.218
Trade	77	77.421	39.468	28.603	284.537
Imports	77	45.31	22.761	17.12	134.515
Exports	77	32.112	21.092	5.271	150.022
FDI inf	77	2.96	3.669	-2.497	18.491
FDI outf	64	0.197	0.598	-2.477	2.589
(b)					
Variable	Obs	Mean	Std. Dev.	Min	Max
GDP per capita	77	1.401	2.817	-7.217	8.922
Trade	77	100.459	46.833	24.899	237.216
Imports	77	48.957	22.817	12.475	102.158
Exports	77	51.502	24.926	11.012	135.058
FDI inf	77	1.478	7.287	-33.098	15.643
FDI outf	72	-0.52	7.392	-34.162	6.907

**Table 2(a)** and **Table 2(b)** present descriptive statistics for GDP per capita growth and various trade indicators for developing countries and developed countries, respectively. GDP per capita has 77 observations. In developing countries, the mean is 2.51 with a standard deviation of 3.375, while in developed countries, the mean is 1.401 with a standard deviation of 2.817. The values range from a minimum of  $-7.35$  to a maximum of 15.218 in developing countries, and from  $-7.217$  to 8.922 in developed countries.

Trade has 77 observations with a mean of 77.421 for developing countries and 100.459 for developed countries, and a standard deviation of 39.468 for developing and 46.833 for developed. The range for trade spans from 28.603 to 284.537 in developing countries and from 24.899 to 237.216 in developed countries.

Imports are based on 77 observations. In developing countries, the mean value is 45.31 with a standard deviation of 22.761. In developed countries, the mean is slightly higher at 48.957, with a standard deviation of 22.817. The range of import values extends from  $-17.12$  to 134.515 in developing countries and from 12.475 to 102.158 in developed countries.

Exports are drawn from 77 observations, with developing countries reporting a mean of 32.112 and developed countries a higher mean of 51.502. Standard deviation is measured at 21.092 for developing and 24.926 for developed. The range runs from a minimum of 5.271 for developing and 11.012 for developed to a maximum of 150.022 for developing and 135.058 for developed.

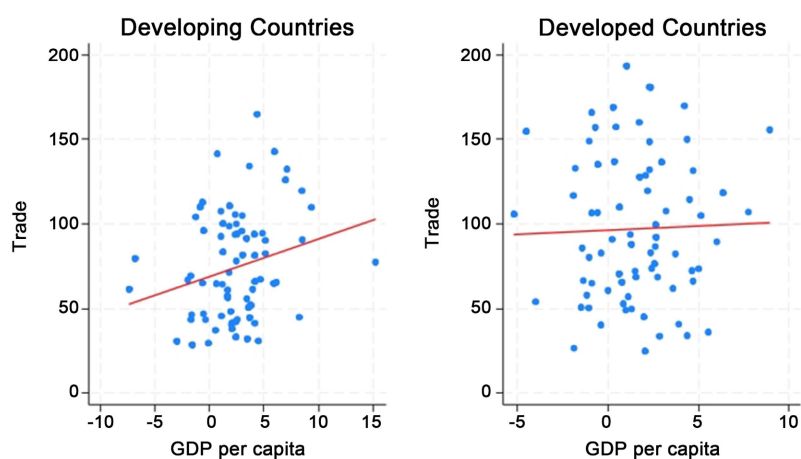
FDI inf has 77 observations. Developing countries record a mean of 2.96, with variability reflected in a standard deviation of 3.669. In contrast, developed countries show a lower mean of 1.478 and a standard deviation of 7.287. The values extend from a minimum of  $-2.497$  to a maximum of 18.491 for developing countries, and from  $-33.098$  to 15.643 for developed countries.

FDI outf has 64 observations for developing countries and 72 observations for developed countries. The mean is 0.197 in developing countries and  $-0.52$  for developed countries, and the standard deviation is at 0.598 for developing and 7.392 for developed. The values range from a minimum of  $-2.477$  for developing and  $-34.162$  for developed to a maximum of 2.589 for developing and 6.907 for developed.

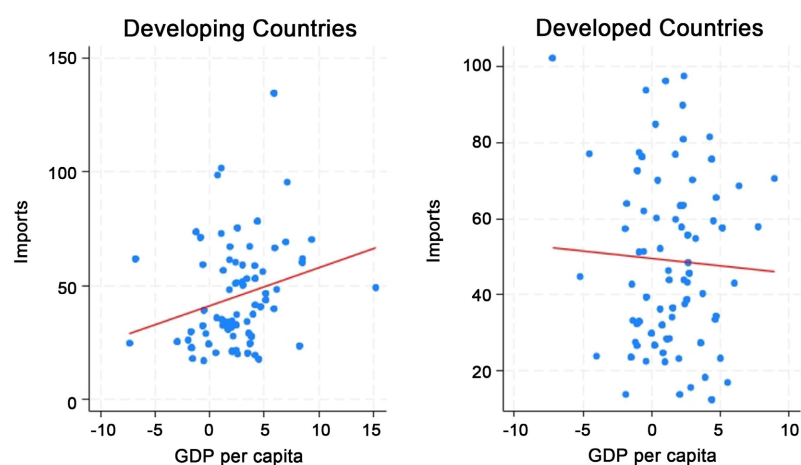
### 3.4. Findings

The scatterplot graphics between GDP per capita growth and various trade variables are presented in **Figure 1-5**.

Scatterplot **Figure 1** shows an interesting connection between trade and GDP per capita growth for developing and developed countries in panels a and b, respectively. It is clear that GDP per capita growth positively correlates with trade for developing countries, suggesting that the higher level of GDP per capita growth contributes to a higher level of trade. Interestingly, the relationship between GDP per capita and trade is not so strong for developed countries.



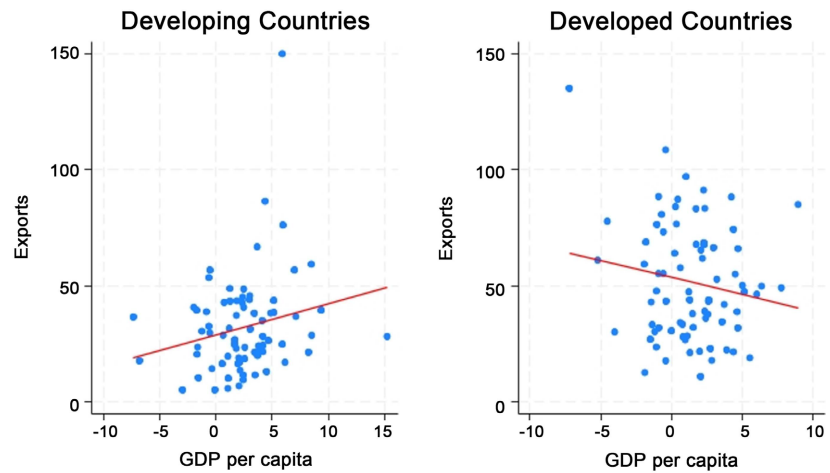
**Figure 1.** Scatterplot graphics between trade and GDP per capita growth.



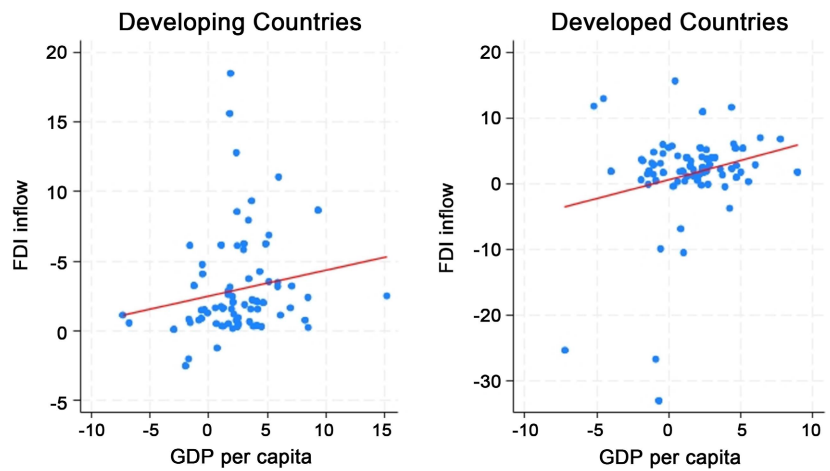
**Figure 2.** Scatterplot graphics between imports and GDP per capita growth.

In **Figure 2**, we use different proxies of trade as an import. Scatterplot **Figure 2** shows a relationship between imports and GDP per capita growth for developing and developed countries in panel a and panel b, respectively. It is clear that GDP per capita growth positively correlates with imports for developing countries, suggesting that the higher level of GDP per capita growth contributes to a higher level of imports. In contrast, there exists a slightly negative relationship between GDP per capita and imports for developed countries.

In relation to imports, we use exports as a different proxy of trade in **Figure 3**. The scatterplots in panel a (developing countries) and panel b (developed countries) illustrate the relationship between exports and GDP per capita growth. GDP per capita growth appears to be positively correlated with exports for developing countries, while negatively correlating with exports for developed countries. This finding indicates that the higher level of GDP per capita growth contributes to a higher level of exports for developing countries while a lower level of exports for developed countries.



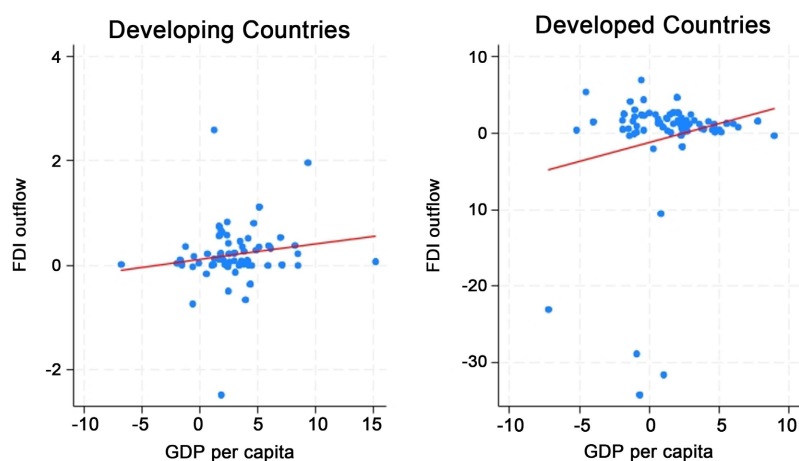
**Figure 3.** Scatterplot graphics between exports and GDP per capita growth.



**Figure 4.** Scatterplot graphics between FDI inflow and GDP per capita growth.

In **Figure 4**, FDI inflow is used as an alternative proxy of trade. Scatterplot **Figure 4** shows an association between FDI inflow and GDP per capita growth for developing and developed countries in panel a and panel b, respectively. The correlation between GDP per capita growth and FDI inflow is found to be positive for both developing and developed countries, suggesting that a higher level of GDP per capita growth contributes to a higher level of FDI inflow.

FDI outflow is used as the last proxy of trade in **Figure 5**. Scatterplot **Figure 5** displays the correlation between FDI outflow and GDP per capita growth for developing and developed countries in panel a and panel b, respectively. While the relationship between GDP per capita growth and FDI outflow is slightly positive for developing countries, GDP per capita growth is more positively associated with FDI outflow for developed countries. Overall, these findings show that a higher level of GDP per capita growth contributes to a higher level of FDI outflow for developing countries, and this relationship is strong for developed countries.



**Figure 5.** Scatterplot graphics between FDI outflow and GDP per capita growth.

**Table 3.** Regression analysis for developing countries.

	(Model 1)	(Model 2)	(Model 3)	(Model 4)	(Model 5)
VARIABLES	trd	exp	imp	fdii	fdio
gdpper	3.021** (1.301)	1.346* (0.718)	1.675** (0.751)	0.183** (0.091)	0.029 (0.021)
Constant	69.839*** (4.195)	28.733*** (2.173)	41.106*** (2.998)	2.500*** (0.463)	0.112 (0.094)
Observations	77	77	77	77	64
R-squared	0.067	0.046	0.062	0.028	0.026

Robust standard errors in parentheses; \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.1$ .

**Table 3** presents the results of 5 different regression models for developing countries. The dependent variables are trade, exports, imports, FDI inflow, and FDI outflow. Each column corresponds to distinct model which an explanatory variable as GDP per capita growth. If the results are statistically significant at 1% level, we indicated by (\*\*\*), the 5% level (\*\*) and the 10% level (\*). The sign in front of the vertical coefficients suggests whether GDP per capita growth has a statistically positive or negative impact on the dependent variable. “-” represents negative impact, while “+” represents positive impact on the dependent variable. We use a single variable regression model may rise concern about potential omitted variable bias. However, our primary objective at this stage was to identify the direct relationship between dependent variable and independent variable. In future analysis, we plan to introduce addition control variable to test the validity of our results. According to models 1 - 4, GDP per capita growth is positively associated with trade, exports, imports, and FDI inflow. In model 5, the relationship between GDP per capita growth and FDI outflow is statistically insignificant. The result supports the positive effect of GDP per capita growth on trade for developing countries, suggesting that the higher level of GDP per capita growth contrib-

utes to high level of trade, exports, imports, and FDI inflow. The result is robust based on many different proxies of trade.

**Table 4.** Regression analysis for developed countries.

	(Model 1)	(Model 2)	(Model 3)	(Model 4)	(Model 5)
VARIABLES	trd	exp	imp	fdii	fdio
gdpper	-1.868 (2.421)	-1.476 (1.369)	-0.392 (1.088)	0.595 (0.431)	0.497 (0.346)
Constant	103.075*** (6.931)	53.568*** (3.800)	49.506*** (3.208)	0.644 (1.305)	-1.193 (1.229)
Observations	77	77	77	77	72
R-squared	0.013	0.028	0.002	0.053	0.037

Robust standard errors in parentheses; \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1.

**Table 4** displays the outcomes of 5 different regression models for developed countries, where the dependent variables are trade, exports, imports, FDI inflow, and FDI outflow. Each column corresponds to a separate model in which GDP per capita growth is the explanatory variable. The sign in front of the vertical coefficients indicates whether GDP per capita growth has a statistically positive or negative effect on the dependent variable. The findings emphasize that GDP per capita growth does not exert a statistically significant impact on proxies of trade in developed countries. This contrasts with the results for developing countries, where GDP per capita growth plays a more decisive role in shaping trade. The developing level of the countries has a significant effect on these relationships. For growing economies undergoing development, there exists a higher demand for imports of goods, capital, and investment. At the same time, as they expand, their export capacity also increases. Therefore, there is a stronger relationship between trade and GDP per capita growth for the developing countries. On the other hand, developing economies, with their relatively stable export capacity and low reliance on imports from abroad, show no significant relationship.

#### 4. Conclusion

The paper investigates the effect of GDP per capita growth on trade, imports, exports, and FDI, with a particular focus on the development level of countries in shaping this relationship. By employing scatterplots and regression analysis, the findings indicate that GDP per capita growth is a significant driver of trade, exports, imports, and FDI in developing countries. In contrast, the relationship was found to be statistically insignificant for developed countries.

Future studies could include additional economic or institutional factors to gain a more comprehensive understanding of what drives trade. In addition, they could focus on specific regions to gain a more detailed view of the relationship. Sustainability could also be assessed as an important factor. Moreover, future studies

could investigate how external shocks, such as the Financial Crisis and the Covid-19 pandemic, influence the trade and growth relationship. Future research could employ Granger Causality Test and instrumental variable techniques to identify the direction of causality more accurately. We also suggest that future research could further explore regional variations.

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## Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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## Appendix

**Table A1.** Data definition.

Indicator	Variable	Definition	Source
GDP per capita	GDP per capita (annual % growth)	Gross domestic product is the total income earned through the production of goods and services in an economic territory during an accounting period. The core indicator has been divided by the general population to achieve a per capita estimate.	WDI World Bank
Trade	Trade (% of GDP)	Trade is the sum of exports and imports of goods and services.	WDI World Bank
Imports	Imports of goods and services (% of GDP)	Imports include goods transferred and services provided from non-residents to residents.	WDI World Bank
Exports	Exports of goods and services (% of GDP)	Exports include goods transferred and services provided from residents to non-residents.	WDI World Bank
FDI inflow	Foreign direct investment, net inflows (% of GDP)	Foreign direct investment are the net inflows of investment to acquire a lasting management interest in an enterprise operating in an economy other than that of the investor.	WDI World Bank
FDI outflow	Foreign direct investment, net outflows (% of GDP)	This series shows net outflows of investment from the reporting economy to the rest of the world, and is divided by GDP.	WDI World Bank