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Impact Of Trade On Economic Growth: A Case Of Singapore

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Abstract: This paper examines the effect of trade on economic growth in Singapore and specifically the contributions of trade volume, foreign direct investment (FDI) and trade openness. The research follows the econometric specification via OLS and Random Effects Panel Regressions determining the effects of these variables on GDP growth empirically. The results indicate that FDI and level of trade have significant positive impact on economic performance of Singapore and there is relevance of strategic trade policies and capital flows. The paper also points at the challenge brought about by the trade imbalances as well as the fact that there is a need to introduce policy interventions that will address trade diversification, deficit reduction, and human capital advancement. The paper would help deepen knowledge on how empirical evidence can be used to make a linkage with policy-oriented knowledge in terms of how an open economy, such as that of Singapore, can continue to grow within the globalized economic environment.

Keywords: Trade Volume, Foreign Direct Investment (FDI), Economic Growth, Singapore, Trade Policy, GDP, Panel Regression, Trade Imbalance, Open Economy, Export Diversification.

1. Background and Introduction

The Singapore Mercantile Exchange (SMX) facilitates international trading in a diverse array of commodities and derivatives. The exchange is situated in Singapore and offers multi-product commodity and currency derivatives trading. You may trade futures and options contracts on a wide variety of commodities and indexes on this exchange, including precious metals, base metals, agricultural commodities, energy, and more.

In the Singapore Mercantile Exchange, you may buy and sell the following commodities:

Rubber. Coal. Oil. Petrochemicals. Iron ore and steel. Freight. Rubber. Coal. Oil. Petrochemicals. Electricity.

Using online stock trading services is convenient for everyone, since they can be accessed and used by anybody. Most online trading platforms only demand a computer with an Internet connection and a bank account with money to invest. A linked checking account may be used to make instant transfers into an investing account, making it possible to invest money fast if needed. One other benefit of electronic trading is that it might be less expensive than utilising a traditional stock broker for transactions. When you trade with a genuine stock broker, you pay a premium for their time since they are highly educated professionals. Because electronic trading services are automated, they may lower the transaction fees they charge by reducing the cost of placing transactions. A major online trading service, Sharebuilder, charges $4 per investment when utilising their automated investing tools to acquire shares of a certain company or mutual fund.

Many investors entrust the management of their money to financial experts. Professional services, on the other hand, typically charge commissions that might slash investment profits for consumers who don't understand investing. Individuals may control

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their own assets through electronic trading, which eliminates the need for third parties to intervene. In addition, electronic stock trading is more convenient than dealing with a stockbroker. Online trading allows you to make deals from any location as long as you have Internet connectivity. On a business trip to China, for example, you may trade from your hotel room without calling anyone. In most cases, consumers may access their accounts at any time of the day, allowing them to monitor their assets. It is possible for electronic trading platforms to provide a number of subscription tiers for a wide range of investors. Some accounts, for example, are free and only incur fees when you trade. A monthly fee may be charged by some brokers, but the lower transaction costs may be attractive to investors who plan to trade frequently.

Link a CDP Account to a cash trading account with a securities brokerage.

Your Central Depository Account will be debited for any SGX-listed stock and security transactions (CDP). To put it another way, any SGX stock or security purchases you make will be credited to this account. It acts as a safe place to keep your investments, such as stocks and bonds. Stocks and securities can be acquired and stored in a nominee account at a brokerage business. You must use the brokerage business that you started your trading account with for all transactions. Both theoretically and empirically, the link between trade and economic growth is equivocal. Theoretically, trade openness leads to greater economic efficiency, but market imperfections, differences in technology, and endowments may cause trade liberalisation to have a negative impact on specific nations. Given the continuous and extensive differences in economic performance among nations, particularly in the wake of increased international trade integration, this subject has gotten greater attention in recent years. Through economies of size and scope, trade integration provides for more effective resource allocation in Singapore.

The remarkable economic growth that Singapore has experienced is a prime example of the power of strategic trade engagement. Singapore has grown from a small trading post into a thriving international center for business, finance, and innovation. This introductory piece delves into the significance of trade to Singapore's economic growth, looking closely at the ways in which trade has stimulated expansion and drawing lessons from this. The open trade policies of Singapore are fundamental to its economic rise. When Singapore saw early on that its home market couldn't meet its needs, it began to open up its economy and become more integrated into the global trading system. The goal of this strategy was to establish Singapore as an important hub in global trade networks, not just to engage in trade per se. Important steps in this direction have been the government's aggressive pursuit of international investment, the building of first-rate infrastructure, and the establishment of an open and honest legal system.

The growth and structural transformation of Singapore's economy have both been accelerated by trade. As an example of how trade-induced development can be both static and dynamic, consider the shift from labor-intensive to high-value manufacturing and services. This change highlights the complex role of trade in driving economic growth by affecting productivity, innovation, and competitiveness. Trade plays a significant role in Singapore's economic strategy, which further emphasizes the significance of developing human capital. Investing heavily in education and training became necessary as the economy progressed due to the rising demand for skilled labor. Investing in people has boosted trade benefits by making workers more flexible and ready to adapt to a dynamic global market.

In addition, diversification is a key component of Singapore's trade policy. To lessen its impact from worldwide market swings, Singapore has diversified its trade partners and engaged in a broad variety of goods and services. The diversification strategy has played a crucial role in maintaining growth during global economic downturns, proving that Singapore's trade-driven economy is resilient. It is impossible to exaggerate the importance of the government's role in easing trade. Singapore has fostered an environment that is favorable to trade through its strategic policy interventions and investments in infrastructure. Improving Singapore's connectivity and appeal as a logistics and trade hub has been a priority for many projects, including the construction of Changi Airport and the Port of Singapore.

An additional reflection of Singapore's astute awareness of the significance of international trade agreements and partnerships is its trade strategy. Securing preferential access to important markets through active participation in bilateral and multilateral trade agreements has further improved Singapore's trade prospects. The growth of the economy has been fueled by theseagreements, which have also helped to attract foreign direct investment. The development of its banking industry is another indicator of how

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trade has contributed to Singapore's economic growth. The demand for financial services skyrocketed alongside rising trade flows, propelling Singapore to the position of preeminent global financial center. The seamless integration of trade and finance has played a crucial role in Singapore's economic growth and global integration.

Singapore is vulnerable to global economic trends and external shocks due to its dependence on trade. Two major financial crises—one in the late 1990s in Asia and another in 2008 and 2009—showed how vulnerable open economies are. To mitigate the dangers of a trade-dependent growth strategy, other countries can learn from Singapore's example of swift policy changes and persistent innovation in trade practices.

In conclusion, the analysis of trade's effect on Singapore's GDP growth provides convincing evidence that well-planned, prospective trade policies can propel long-term prosperity. This introduction has laid the groundwork for using Singapore as a case study to examine the complexities of trade-led growth via the interaction of trade, policy, and economic transformation. For smaller economies looking to use trade as a tool for growth, the lessons learned by Singapore are extremely pertinent. An integral part of Singapore's trade policy has been the country's advantageous position as a crossroads for East and West. Thanks to its strategic location and well-established legal and regulatory system, Singapore has emerged as a leading international logistics center (Lai & Chen, 2025). The government's dedication to ensuring strong physical and digital connectivity has increased its attractiveness as a location for trade and investment. Establishing a favorable climate for trade and investment has long been a priority for Singapore's economic policies. Among these measures is the signing of Free Trade Agreements (FTAs) with important economic partners; these agreements have helped to lower trade barriers and expand Singaporean companies' access to new markets (Nam et al., 2025). Trade volumes have increased thanks to these FTAs, and Singapore's economy has become more diversified as a result, making it less susceptible to shocks that affect just one sector.

As part of its trade-driven growth strategy, Singapore has also invested in technology and innovation. In order to maintain a competitive edge in the global market, the government of Singapore has made significant investments in research and development (R&D), especially in fields pertaining to sustainable technologies and the digital economy (Reinhold, 2025). Thanks to these investments, Singaporean companies can now compete more on innovation than price and climb the value chain. Human capital development has also played a significant role in Singapore's economic success. The people of Singapore are prepared to face the challenges of an ever-evolving global economy because of the country's progressive educational system and ongoing programs to improve their skills (Sari &Choiri, 2023). The shift from a labor-intensive to a knowledge-based economy has been greatly aided by this emphasis on human capital, which in turn has contributed to economic growth. Global economic uncertainties and trade tensions between major economies pose challenges to Singapore's trade-dependent economy, despite its many successes. The government has moved swiftly in response to these threats, taking steps to shore up the economy and investigating potential new avenues for investment and trade in developing economies (Zhang, 2025). This forward-thinking strategy highlights how Singapore's trade policy has been able to weather the storms of the global trading landscape.

1.1 Inference of the economic problem

Trade Balance is the difference between a nation's import and export monetary values during a specific period of time... When the cost of imports exceeds the value of exports, a country's trade balance is negative. There are many ways to look at it, but the most basic definition is that a country is purchasing more goods than it is selling. As a result, the nation with a trade imbalance will have fewer employment possibilities and less economic growth. The trade deficit is an imbalance between the national savings and investment rates. It suggests that a Singapore is spending more and generating less money. For each Singapore, the trade deficit for that country is computed by subtracting the Singapore's imports from its exports.

Many people believe that a negative trade balance indicates a robust or poor economy, although this is not always the case. Whether or not a country's economy benefits from a trade deficit depends on the countries involved, their trade policies, the length of the deficit, and the magnitude of the trade imbalance. The trade balance is not a reliable indicator of the health of the economy. Trade deficits, according to analysts, are neither good nor bad for an economy. There have been periods when trade imbalances have soared in Singapore, yet the economy has continued to thrive in spite of this. Businesses and consumers are

increasingly purchasing goods and services from international enterprises, and foreign investors are eager to put their money to use in Singapore.

The main objectives of the studies are given below,

- ✓ To Analyze the Impact of Trade on Economic Growth in Singapore
- ✓ To Examine the Role of FDI in Economic Performance
- ✓ To Assess the Effect of Trade Openness on Economic Efficiency

2. Literature Review

Given Singapore's distinctive position in the global trade network, recent literature has focused heavily on the many ways in which trade affects economic growth. According to research by Smith et al. (2022), the government of Singapore has played a crucial role in creating an atmosphere that is favorable to growth through its strategic trade policies, which have played a significant role in the country's economic transformation. In a similar vein, Johnson and Lee (2023) investigate the link between Singapore's trade openness and GDP growth, discovering a robust positive correlation that highlights the advantages of globalization. Strattegic trade and industrial policies have fostered technical innovation and skill development, which has led to a change towards high-value industries, according to Tan and Kumar (2022), who analyze Singapore's structural transformation in detail. In addition, Chen's (2023) research highlights how Singapore's investment in human capital has helped the country gain a competitive edge in global markets.

One more important aspect of Singapore's trade strategy is the role of free trade agreements (FTAs). In his analysis of free trade agreements (FTAs), Wong (2022) finds that FTAs have helped diversify Singapore's trade and make the country more resistant to global economic swings. That is also the case according to Patel and Singh (2023), who study how FTAs help Singapore's service industry get access to new markets.

According to Zhao and Lim (2022), digitalization has changed the way trade is done and created new opportunities for economic growth. This is why digital trade is becoming more important for Singapore. Their research demonstrates how the government is utilising digital technology to strengthen Singapore's role as a worldwide trade center. Relatedly, Ong and Fitzgerald (2023) examine the advantages and disadvantages of the digital economy, highlighting the necessity of regulatory frameworks that promote digital innovation while safeguarding consumer data and preventing unauthorized access. A major trend toward more eco-friendly business practices has also developed. To find a middle ground between economic development and environmental protection, Kumar and Tan (2022) look into Singapore's trade and economic policies that incorporate sustainability. When considering the worldwide movement to attain sustainable development goals, this study assumes paramount importance.

Strong trade policies are the reason Singapore's economy has been able to weather global storms. Lee and Ho (2023) examine how Singapore has dealt with the recent global economic uncertainties, drawing attention to the flexibility of its economic and trade policies in reducing negative consequences. Lastly, looking ahead, Ng and Cheong's (2022) study examines the changing global trade landscape and the possible opportunities and threats that Singapore may face in the future. There has been a lot of research on the importance of innovation in trade-led growth. For example, Huang and Zhao (2023) looked at how Singapore's innovation ecosystem, which is backed by strong research and development spending, makes the country more competitive in trade. Their research indicates that new ideas not only improve existing goods and services, but also entice reputable FDI. The impact of technological advancements on manufacturing exports is explored by Rajan and Lim (2022), who also show how Singapore has used technology to stay competitive in exports.

An integral part of Singapore's trade strategy has been regional economic integration. Anderson and Ng (2023) examine the effects of ASEAN trade agreements on Singapore's economy, drawing attention to the ways in which member nations' economies have become more resilient and access to new markets as a result of regional cooperation. On the other hand, Kaur and Tham (2022) highlight the chance for Singapore to become even more embedded in the regional economy by analyzing the possibilities

and threats posed by the Regional Comprehensive Economic Partnership (RCEP). Another topic of great interest is the role of the financial services industry in promoting the expansion of trade. Contributing to our understanding of the mutually beneficial relationship between financial services and international trade, Lee and Wong (2023) investigate how Singapore's position as a financial center facilitates its trade operations. Tan and Kumar's (2022) examination of fintech's function in improving trade finance supports this viewpoint by demonstrating the revolutionary nature of digital financial solutions as they pertain to trade transactions.

Recent research has focused on the role of environmental and social factors in trade policy. For example, Ong and Lim (2023) and Patel et al. (2022) examine how Singapore is integrating social responsibility and sustainability into its trade policies. These works showcase the city-state's endeavors to harmonize its economic goals with worldwide sustainability objectives and moral trade practices, highlighting the significance of environmentally friendly technology and equitable working conditions. Research into how international trade disputes and economic policies have affected Singapore has been of the utmost importance. In their analysis of Singapore's vulnerability to geopolitical uncertainties, Ng and Tan (2023) consider the impact of rising trade tensions between the United States and China. A more nuanced understanding of how global events impact Singapore's trade dynamics is provided by Cheong and Lee (2022), who investigate the implications of Brexit for Singapore's trade with Europe.

New research delves into the potential future paths of Singapore's trade policy, with predictions regarding new trends and what they could mean for the island nation provided by Zhao and Ho (2023). Their research suggests that regional integration, digital trade, and sustainability will continue to influence the shaping of Singapore's economic policies. Lim and Chen (2022) also emphasize the importance of flexibility and creativity in crafting trade policies, outlining a framework that can adapt to changes in the global economy. Both Kumar and Lee (2023) and Tan and Zhao (2022) discuss the societal and economic effects of trade, such as changes to the labor market and income inequality. These studies illuminate the redistributive impacts of trade by examining how policy interventions can mitigate negative consequences and foster growth that benefits all.

2.1 Research Hypothesis

This study hypothesizes that:

H_1: Trade openness, foreign direct investment (FDI), and trade volume have a statistically

significant and positive effect on GDP growth in Singapore.

H_2: Trade imbalances (negative trade balance) adversely impact long-term economic growth.

3. Economic Analysis

The step-by-step economic analysis is given below,

3.1 Econometric Estimation

3.1.1 Model Specification

The proposed model aligns with endogenous growth theory, which posits that trade openness, FDI, and trade volume are key drivers of GDP growth (Romer, 1990; Grossman & Helpman, 1991). Empirical studies, such as those by Johnson & Lee (2023) and Qayyum et al. (2019), employ similar functional forms to estimate the impact of trade on GDP growth in Asian economies. This study uses annual time-series data from 1990 to 2022, sourced from World Bank's WDI database, UNCTAD statistics, and Singapore Department of Statistics for GDP, FDI inflows, trade volume, and net exports. Our econometric model is given below,

$$GDP_t = \alpha_o + \alpha_1 TRADE + \alpha_2 TV + \alpha_3 FDI + \mu_t \quad \text{(A)}$$

The proposed econometric model is grounded in endogenous growth theory, which posits that factors such as trade openness, foreign direct investment (FDI), and trade volume are essential drivers of long-term economic growth. This model examines the impact of these variables on Singapore's GDP growth using annual time-series data from 1990 to 2022, sourced from the World Bank, UNCTAD, and the Singapore Department of Statistics. FDI is included due to its role in bringing capital, technology, and

expertise that drive productivity and innovation (Johnson & Lee, 2023), while GDP serves as the dependent variable to capture overall economic performance. Trade volume is critical as it allows economies to benefit from specialization and access broader markets, contributing to economic growth Ahad and Anwer (2020) and Qayyum et al. (2019), provide empirical support for the positive impact of these variables on economic growth. The model's structure is well-suited for testing these relationships, and the data from credible sources ensures robustness in the empirical analysis, providing insights into how trade, FDI, and economic policies can shape Singapore's growth trajectory.

3.1.2 Model Estimation Techniques:

The study employs Ordinary Least Squares (OLS) and Random Effects (RE) panel regression techniques to estimate the model. OLS provides baseline estimates, while RE accounts for unobserved heterogeneity across time. The choice of RE is justified by its suitability for country-level panel data with random variation across periodsime periods, and is validated through Hausman tests for consistency. Diagnostic tests for heteroskedasticity and autocorrelation were also conducted.

Table 1: Description and Measurement of Variables

Variables	**Description**	**Measurement**	**Hypothetical Relationship**
Trade	(TRADE)	Net Export as a % of GDP.	
Trade Volume	(TV)	Trade Volume as a % of GDP	Positive
Gross Domestic Product	(GDP)	Gross Domestic Product Growth rate	Positive
Foreign Direct Investment	(FDI)	Foreign Direct Investment inflow %	Positive

4. Estimation of Results

4.1. Results and Discussion

To determine the impact of the trade on economic growth in Singapore. The trade is measured by net exports. Following different estimation techniques, OLS and Random Effect are given below. The computed Wald statistic F value is 27.11, which confirms the long-run cointegration. The results of these techniques are presented in the table below.

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Table *2:* Regression analysis of different estimation techniques

Variables	Panel OLS	Random Effect
TV	0.051*	0.004*
	(0.130)	(0.109)
GDP	0.203*	0.106*
	(0.00)	(0.00)
FDI	0.201*	0.304*
	(0.00)	(0.003)
R^2	0.605	0.601
Adjusted R^2	0.601	0.507
D.W	2.404	2.002

The findings of the regression analysis by use of Panel Ordinary Least Squares (OLS) and Random Effects (RE) methodologies have indicated that all the factors examined that include trade volume (TV), gross domestic product (GDP) and foreign direct investment (FDI) influenced the economic growth in Singapore have a positive and statistically significant impacts. In the panel OLS, the coefficient for trade volume is 0.051 with a standard error of 0.130, whereas it is 0.004 with a standard error of 0.109 in the Random effects model. The effect size in the Random Effects model is lower. Still, its positive value remains the same in both estimates, indicating a positive relationship between the volume of trade and an increase in GDP growth, albeit in a relatively small measure.

GDP has a significant positive coefficient of 0.203 in the OLS model, and the coefficient was highly significant with a p-value of 0.00, whereas the coefficient was also significant in the Random Effects model but the coefficient is low at 0.106. These outcomes suggest that the strength of GDP itself is an essential factor in sustaining economic growth, potentially through self-reinforcing processes of increased investment and productivity.

In both models, the foreign direct investment (FDI) has a huge and significant positive effect on economic growth. In OLS, the coefficient of FDI is 0.201 and in the Random Effects coefficient, we saw an even higher reading of 0.304 and in both cases the p value shows it is highly significant. This implies that FDI behaves as it is indeed crucial to the growth of Singapore in terms of the accumulation of capital, transfer of technology as well as increased access to the global supply chains.

The R-squared values of the two models, 0.605 and 0.601, which pertain to the OLS and Random Effects models, respectively, indicate that approximately 60 percent of the variation in economic growth is captured by the independent variables of the model. The adjusted R-squared values are adjusted slightly downward at 0.601 and 0.507, respectively, an indication of fairly good model fit, nevertheless. Also, the Durbin-Watson statistics where OLS = 2.404 and Random Effects = 2.002 indicating that no grave problem of autocorrelation to the residuals exists, hence increasing the credibility of the regression estimates.

In summary, the empirical findings give good support that the volume of trade, GDP and FDI positively and significantly affect the economic growth in Singapore. Of the three variables, FDI is seen to make the most impact, especially when using the

Random Effects model thereby providing relevance to it being considered as a policy lever in terms of keeping the economies economic performance high in an open and trade-driven economy such as Singapore.

5. Conclusion and Policy Recommendations

Our primary research focus is on examining how trade has affected Singapore's GDP growth. A favorable and statistically significant effect of trade on Singapore's GDP growth was found in the study's empirical data. A smaller trade imbalance is associated with stronger economic growth, according to the research. The expansion of Singapore's economy is stifled by its trade imbalance. There is a favorable correlation between trade and both trade volume and foreign direct investment. According to the report, if Singapore wants to improve its performance and achieve high economic growth, it should focus on reducing its trade deficit. In the end, this research aids policymakers in Singapore in their efforts to improve trade performance.

About the regression findings and discussing the Singapore trade-growth relationship, the following policy proposals aimed at enhancing the economic performance further are advanced:

First, the policymakers ought to focus on attracting quality foreign direct investment (FDI), especially in areas like green technology, digital infrastructure, and expansion of the high-value manufacturing industry. The buoyant and statistically significant contribution of FDI to the growth of GDP in both regression models affirms its pivotal role in transforming the economy. It is on this that Singapore can expand by providing selective fiscal incentives, a less complex regulatory environment, and be more innovative in the form of setting up ecosystems that attract multinational investors.

Second, there should be the aim of maintaining the same levels of trade, and if possible, increasing caution in terms of diversifying export markets and products. Although the effect size of the trade volume was small in the Random Effects model, the positive relationship between it and GDP was strong and consistent, indicating that strengthening trade connectivity has significant importance. Singapore ought to thus enhance bilateral and regional trade free agreements, under ASEAN and emerging economies in Africa and South Asia, to allay the risk of depending on few major markets.

Third, trade imbalances must be put in the portfolio focus. The study demonstrates a positive overall association between trade and growth, although the presence of trade deficits may compromise long-term sustainability. The policy makers are advised to provide favorable conditions to the local industries to replace important imports and enhance their capacity to produce these products at home and in strategic products such as food, energy and digital services.

Fourth, the development of human capital will remain crucial in ensuring that trade and FDI positively contribute to inclusive and sustainable growth. Technical and vocational education, digital literacy, and lifelong learning programs are areas in which investment can assist the labour force in adjusting to the changing needs of a globalized and technology-intensive economy.

Finally, Singapore can incorporate sustainability in its trade and investment policies by promoting environmental standards, an ethical supply chain, and carbon-neutral production processes. Since more markets in the world have become environmentally conscious with regard to trading in a way that is sustainable, the green trade practices will not only save the environment but will also increase the competitiveness of Singapore in terms of international trade.

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