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The Impact of Foreign Trade and Foreign Direct Investment on China's Economic Development: An Empirical Approach*

Nurbay SEY¹

Abstract

China achieved rapid economic development as a result of the reforms implemented in 1978. It is widely believed that foreign direct investments and foreign trade, which increased alongside these reforms, had a significant impact on this rapid economic progress. Consequently, this study sought to examine the effectiveness of foreign direct investments and foreign trade in facilitating China's rapid economic growth between 1978 and 2016, utilizing the SVAR method. Within the scope of the study, three variables were utilized: the growth rate, the ratio of foreign direct investments in GDP, and the ratio of foreign trade volume in GDP. In the initial part of the study, the growth process, foreign direct investments, and foreign trade of China were evaluated using graphical representations. In the following section, in the empirical part, initially crisis periods were incorporated into the model as a dummy variable in order to prevent crisis periods from affecting the results. Following this, unit root tests were conducted, and it was concluded that the series were non-stationary at the level but became stationary after taking their first differences. Therefore, in this study, the first differences of the series were utilized for analysis. In the subsequent part, autocorrelation and heteroskedasticity tests were applied to the model. The results of these tests indicated that the model is suitable for evaluation. Consequently, in the next part, the study proceeded to evaluate the impulse-response functions and variance decomposition results of the model. As a result of these analyses, it was concluded that both foreign direct investments and foreign trade, but especially foreign direct investments, have a significant impact on China's economic growth.

Keywords: SVAR Model, China's economy, Growth, Foreign Trade, Foreign Direct Investments

Jel Codes: O11, O24, F43

Çin'in Ekonomik Gelişiminde Dış Ticaret ve Doğrudan Yabancı Yatırımların Etkisi: Ampirik Bir Yaklaşım

Özet

Çin, 1978 yılında yaptığı reformlarla birlikte hızlı bir ekonomik gelişme kaydetmiştir. Bu hızlı ekonomik gelişmede reformlar ile birlikte artan doğrudan yabancı yatırımların ve dış ticaretin etkili olduğu düşünülmektedir. Dolayısıyla bu çalışma, Çin'in 1978-2016 yılları arasındaki hızlı ekonomik büyümeye doğrudan yabancı yatırımların ve dış ticaretin etkinliğini SVAR yöntemini kullanarak incelemeyi amaçlamıştır. Çalışma kapsamında büyümeye orani, doğrudan yabancı yatırımların GSYİH içindeki oranı ve dış ticaret hacminin GSYİH içindeki oranı olmak üzere üç değişken kullanılmıştır. Çalışmanın ilk bölümünde Çin'in büyümeye süreci, doğrudan yabancı yatırımlar ve dış ticareti grafikler yardımıyla değerlendirilmiştir. Takip eden bölümde ampirik kısımda, kriz dönemlerinin sonuçları etkilemesini önlemek amacıyla ilk olarak kriz dönemleri kukla değişken olarak modele dahil edilmiştir. Bunu takiben birim kök testleri yapılmış ve serilerin düzeyde durağan olmadıkları ancak birinci farkları alındıktan sonra durağan hale geldikleri sonucuna ulaşılmıştır. Bu nedenle, bu çalışmada serilerin birinci farkları analiz için kullanılmıştır. Takip eden bölümde modele otokorelasyon ve değişen varyans testleri uygulanmıştır. Bu testlerin sonuçları modelin değerlendirme için uygun olduğunu göstermiştir. Dolayısıyla, bir sonraki bölümde modelin etki-tepki fonksiyonlarının ve varyans ayırtırma sonuçlarının değerlendirilmesine geçilmiştir. Bu analizler sonucunda, hem doğrudan yabancı yatırımların hem de dış ticaretin, ama özellikle doğrudan yabancı yatırımların, Çin'in büyümesi üzerinde önemli bir etkiye sahip olduğu sonucuna varılmıştır.

Anahtar kelimeler: SVAR Modeli, Çin ekonomisi, Büyüme, Dış Ticaret, Doğrudan Yabancı Yatırımlar

Jel Kodu: O11, O24, F43

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¹ Res. Assist. Dr., Bolu Abant Izzet Baysal University / Faculty of Economics and Administrative Sciences, Economics, Bolu / Turkey **EMAIL:** seynurbay@ibu.edu.tr **ORCID:** 0000-0003-4125-8297

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1. INTRODUCTION

Today, China stands as one of the world's largest economies, having achieved an average growth rate of 9.77% between 1978 and 2016 (The World Bank, 2023a). Hence, it becomes essential to comprehend the underlying factors that facilitated the emergence of such significant developments in the Chinese economy. To understand the economic development of China, it is necessary to divide the Chinese economy into two distinct periods. The first period commenced with the Mao Zedong government in 1949, during which a strict centralist approach dominated economic policies. However, economic growth during this period did not reach the desired level, and the country grappled with political upheavals.

The second crucial period in the Chinese economy began in 1978, following the ascension of Deng Xiaoping to power. Under Deng's leadership, China initiated significant structural reforms and transitioned from a closed to an open economy. The introduction of open-market policies facilitated a substantial influx of foreign direct investment (FDI) into the country, resulting in profound transformations throughout the Chinese economy (Kerr, 2007).

China's process of opening up to the outside world has been carried out gradually. In line with this, foreign companies were only allowed to invest if they found a local partner company. This way, the strengthening of domestic companies was ensured. In subsequent stages, economic zones were established, and investments were directed towards those zones. During this process, with the growing strength of domestic companies, opportunities for foreign investment were significantly improved.

This study was conducted to comprehend the outcomes that emerged after these reforms. It specifically focuses on examining the impact of foreign trade and foreign direct investment on China's economic growth as a consequence of the reforms introduced in 1978. In this study, the sources of China's economic growth and the sustainability of its economic development have also been examined. This study aims to highlight the significance of foreign direct investment and exports in the rapid economic growth witnessed in China and to facilitate developing countries in benefiting from China's experience in their own economic growth processes. In fact, China's process of opening up to the outside world has unfolded in many aspects differently from other countries.

In this context, the SVAR model was applied, utilizing the growth rate, the ratio of foreign trade volume in GDP, and the ratio of foreign direct investment in GDP as variables. In this way, the study aims to understand the effects of foreign trade and foreign direct investments on the growth of the Chinese economy.

The reason for selecting foreign direct investment and foreign trade variables is that these variables are considered significant factors in the development of developing countries. Indeed, there are significant studies in the literature that support this theory. In fact, in the literature, FDI and foreign trade are acknowledged as critical factors that enhance capital accumulation, facilitate technology transfer, and promote economic growth by increasing productivity.

In Solow-type standard neoclassical growth models, FDI is conventionally regarded as a contribution to the host economy's capital stock (Brems, 1970). However, new growth theories internalize the role of knowledge accumulation or technology as an independent production factor and provide capital (Romer 1994). According to this perspective, FDI has the potential to permanently influence the growth rate. In fact, FDI can impact output by augmenting the capital stock. If foreign and domestic capital complement each other, as stated by Hanson, the impact of FDI on total output will be enduring (Hanson, 2001).

Borensztein et al. (1998) also pointed out that Foreign Direct Investment (FDI) inflows directly elevate the technology level in the host economy. Various mechanisms can account for this effect.

One of these mechanisms is that FDI inflows increase intermediate product variety and diversify the types of capital equipment in the host economy. In doing so, FDI flows lead to enhanced productivity in the host economy. Another significant mechanism through which FDI affects growth is learning. FDI inflows disseminate knowledge about production methods, product design, and novel organizational and managerial techniques. In this context, imitation becomes a crucial element.

In addition to the impact of foreign investments, foreign trade is also considered an important factor in growth. Foreign trade can have both positive and negative impacts on a country's economy. The determining factor for this impact is whether technology is transferred to the country through foreign trade (Grossman & Helpman, 1991). Dollar (1992) also state that outward-oriented developing economies experienced much faster growth compared to inward-oriented economies. Sachs & Warner (1995) demonstrated in their research that the growth resulting from trade liberalization was higher than the growth before liberalization. Coe & Helpman (1993) revealed that international trade accelerated technology transfer in OECD countries.

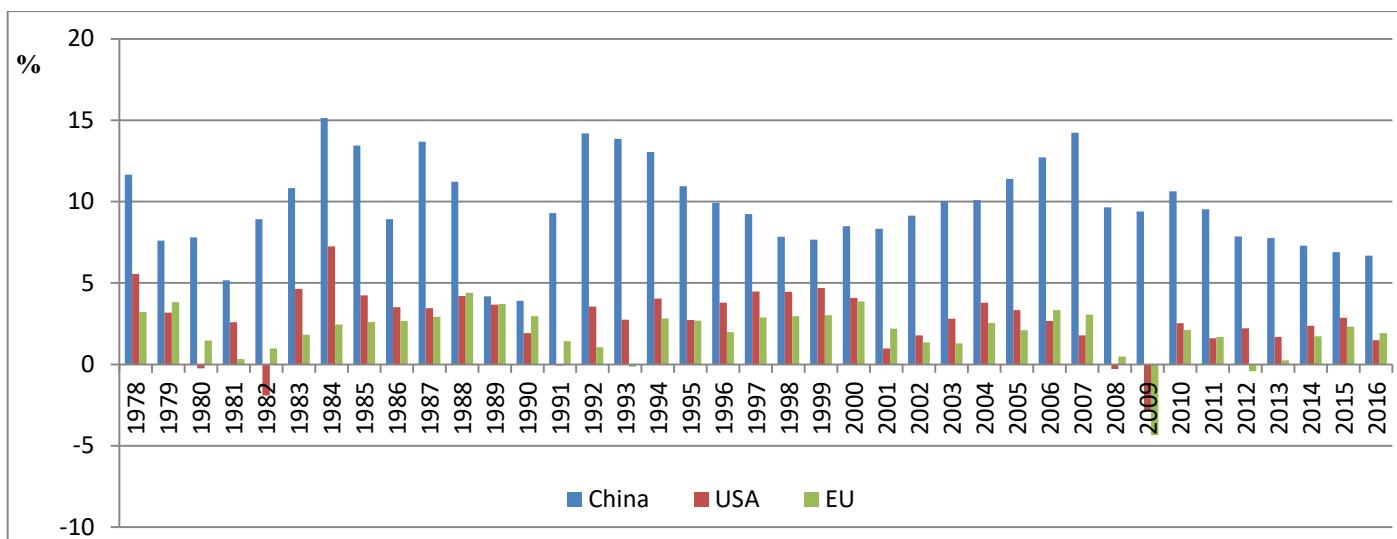
In this context, FDI and foreign trade are assumed to be particularly influential in the development processes of developing countries. Therefore, discussing the impact of these variables on China's growth and ensuring that other developing countries benefit from the example of China is important.

2.ECONOMIC GROWTH IN CHINA

Although China initiated its industrialization efforts during the Mao era, there was a substantial difference in China's growth performance before and after 1978 (Yang, 1996). Between 1950 and 1978, China's annual average growth rate was 3%, but between 1978 and 2016, this rate increased significantly to 9.7% (The World Bank, 2023a).

China's growth figures experienced a substantial increase after 1980, when the reforms began to yield positive results. In 1984, China recorded an impressive growth rate of 15%. However, in 1989, this rate declined to 4.18% due to political issues (Wu-Beyens, 1992). Nevertheless, after 1990, with the rise in FDI, China became the fastest-growing country in the world between 1991 and 2001. Additionally, after China's accession to the World Trade Organization in 2001, FDI in the country surged. Consequently, as a result of these FDIs, China's annual growth rate consistently remained above 9% from 2001 to 2011 (WTO, 2023). Figure 1 depicts the growth rates of China, the US, and the EU over the years. As evident from the graph, China has achieved a remarkable economic growth process since 1978, particularly when compared to the USA and the EU.

Figure 1: Growth Rates (1978-2016)



Source: (The World Bank, 2023a)

3.FDI IN CHINA

Mao's desire was to turn China into a self-sufficient country. As a result, his policies led to China becoming a closed country for many years, resulting in the nation falling behind in the development of technology and missing out on the advantages of modern production techniques. However, when Deng Xiaoping assumed power, he took decisive steps to integrate China with the global economy and attract foreign investments (Kobayashi, Baobo, & Sano, 1999; Kerr, 2007).

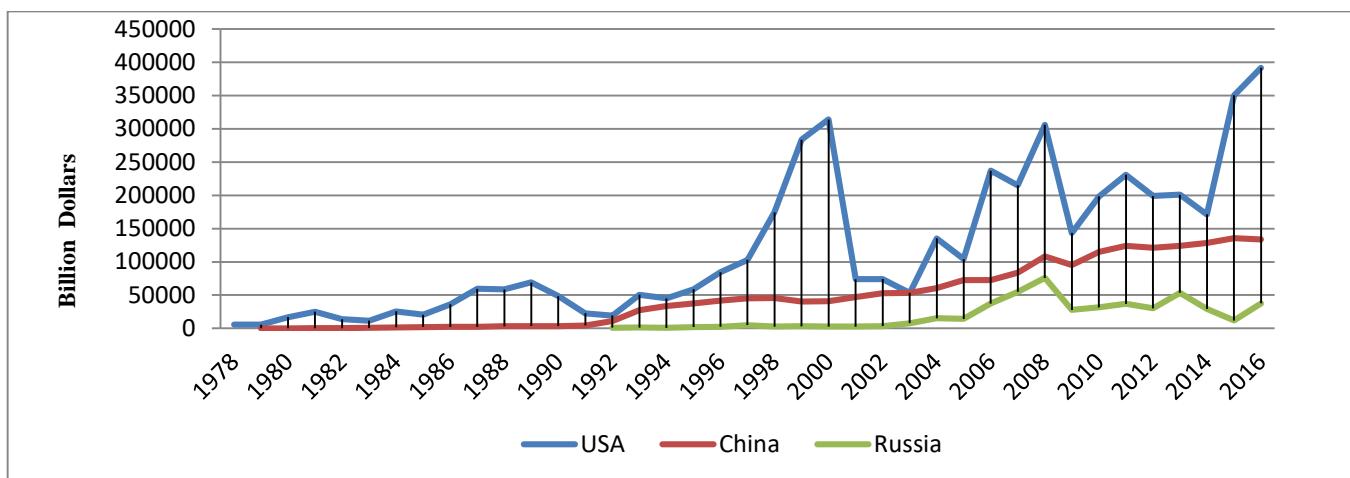
In this regard, foreign companies were permitted to invest in China, but with the requirement of having Chinese partners. Additionally, foreign investments in China were subject to various conditions. Foreign firms had to employ cutting-edge production technology and focus on export-oriented products to be eligible for investment in China. Initially, foreign investors were restricted to operating solely in "special economic zones" rather than freely choosing their investment locations. Nevertheless, over time, efforts were made to eliminate bureaucratic obstacles and streamline the investment process in China (Chung, Chang, & Zhang, 1995).

As a consequence of these policies, China has experienced a substantial and rapid increase in FDI since the inception of reforms in 1978. Prior to the reform era, FDI inflows were nearly negligible; however, by the year 2016, China had emerged as one of the foremost destinations for foreign investment globally. When analyzing the trend of foreign direct investments in China, four breaking points draw attention, leading to four different periods (Enright, 2016).

- The first period (1979-1984): China initiated its process of opening up during this phase. Although the opening-up was gradual, the country managed to attract an average of 360 million dollars in foreign investment annually.
- The second period (1984-1991): With the establishment of special economic zones, China experienced a substantial increase in foreign direct investment. During this period, the country attracted an average of 2.7 billion dollars of foreign capital inflow each year.
- The third period (1991-2001): China further accelerated its policies to attract foreign investment. As a result, between 1992 and 2001, the average annual foreign direct investment in China surged to 36.8 billion dollars.
- The fourth period (2002-2016): China's accession to the World Trade Organization opened up new opportunities for foreign investors. Consequently, the country experienced a remarkable surge in foreign direct investment, averaging 107 billion dollars annually between 2002 and 2016.

When comparing foreign direct investments (FDI) in China with those in developed countries like the United States (USA) and developing countries like Russia, China demonstrates a higher degree of stability. Notably, the USA has exhibited significant fluctuations in FDI levels over the years, while China has consistently experienced a continuous rise in foreign direct investments over the long term. Figure 2 depicts FDI in China, USA and Russia from 1978 to 2016.

Figure 2: Foreign Direct Investments in China, USA and Russia (1978- 2016)



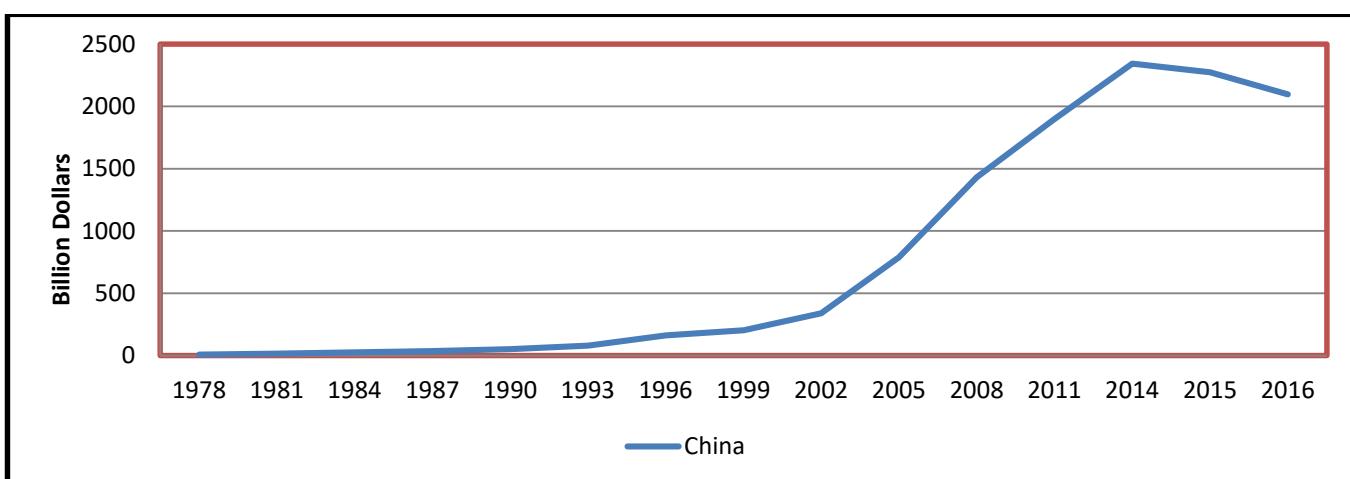
Source: (UNCTAD, 2023)

Foreign direct investment in China has experienced changes on a sectoral basis over the years. In the early years of China's opening up, the majority of foreign investments were directed towards the industrial sector, and state support primarily focused on these industries. Specifically, in 1990, 84.4% of foreign direct investments were made in the industrial sector. However, as time progressed, especially after 2005, foreign direct investment in the services sector saw rapid growth. Eventually, in 2010, FDI in the services sector surpassed that in the industrial sector. These upward trends continued beyond 2010, and by 2015, the services sector accounted for 67.48% of the total foreign direct investments in China.

4. FOREIGN TRADE IN CHINA

Prior to 1979, China was a country that adopted a closed economic system of isolation from the world and did not do much trade with almost any country except Hong Kong (Morrison, 2019). Therefore, in 1978, China's export revenue was only \$ 6.8 billion. However, with trade liberalization as a result of Deng's reforms, China has made significant progress in foreign trade and increased its export income to \$ 45 billion in 1990 and to \$ 253 billion in 2000. This increase continued and China's export revenue increased to \$1.65 trillion in 2010. Finally, in 2022, this figure was 3.72 trillion dollars. So, this situation shows how important foreign trade is to China's economic development. Figure 3 depicts the trends of goods and services exports in China over the years.

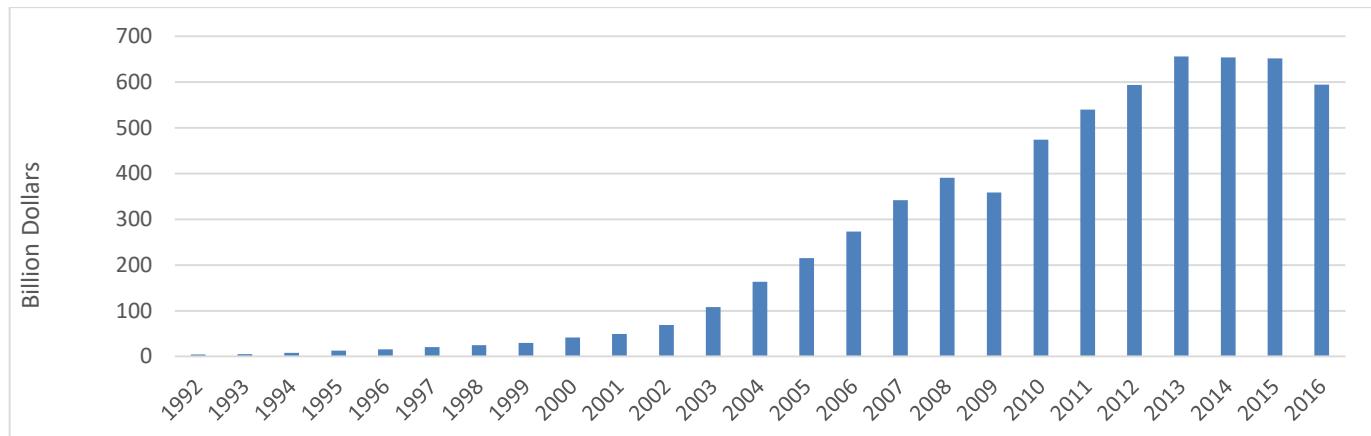
Figure 3: China's Export Goods and Services by Years (1978-2016)



Source: (The World Bank, 2023b)

China's trade has not only increased in terms of volume but has also shown significant improvement in the quality of its exported products over the years (Silva-Ruete, 2006). Initially, during the early stages of the reform, China's exports were characterized by cheap and poor-quality products. However, in subsequent periods, there has been a remarkable advancement in the export of advanced technology. In fact, China's high technology exports, which amounted to 4 billion dollars in 1992, surged to 215 billion dollars in 2005 and further increased to an impressive 594 billion dollars in 2016. Figure 3 illustrates the trend of China's high-tech exports over the years.

Figure 4: China's High Technology Exports



Source: (The World Bank, 2023c)

5. LITERATURE REVIEW

It is widely acknowledged by many researchers that foreign direct investments (FDI) and foreign trade play crucial roles in the economic growth of developing countries. Nevertheless, empirical studies have yielded mixed results. While some studies have found a positive effect of FDI and foreign trade on economic growth, others have not observed such an effect. Table 1 displays some significant studies conducted on this matter.

Table 1: Literature Review

Research	Country/Region Period	and Variables	Method	Conclusion
Zhang (2001)	Provinces of China (1984-1998)	1-)GDP 2-)FDI 3-)Human capital 4-)Domestic investments	Panel Regression	FDI directly affects the growth of China.
Sun & Parikh (2001)	29 provinces of China (1985-1995)	1-)GDP 2-)Export 3-)Labor 4-)FDI 5-)Domestic investments	Panel Regression	In the case of openness, exports and FDI in China have a positive impact on China's growth.
Shan (2002)	China (1986-1998)	1-)Output 2-)FDI 3-)Export	VAR Model	FDI and output affect each other, so there is a two-way causality between FDI and growth.

		4-)Labor force		
Carkovic and Levine (2005)	Developing countries (1960-1995)	1-)FDI 2-)GDP	OLS and ABBB	There is no relationship between the variables
Hansen & Rand (2006)	31 developing countries	1-)FDI 2-)GDP	Granger Causality	FDI has a positive impact on growth.
Yao (2016)	28 provinces of China (1978-2000)	1-)Labor 2-)Capital 3-)human capital 4-)Exchange rate 5-)FDI 6-)Exports 7-)Transport	Pedroni's panel unit root test Arellano and Bond's dynamic panel data	Both exports and FDI have a positive impact on growth.
Yao, Wei, and Liu (2007)	Chinese regions (1979-2003)	1-)FDI 2-)Export 3-)Human capital 4-)Transportation	Panel Regression	FDI affected China's rapid growth after 1980.
Zhao & Du (2007)	China (1980-1995)	1-)GDP 2-)FDI 3-)Export 4-)Import	VAR Model	FDI does not have a significant enhancing effect on the development of the Chinese economy.
Vu, Gangnes, & Noy (2008)	China and Vietnam (1990-2004)	1-)Labor 2-)Capital 3-)Foreign capital 4-)FDI	Variance Inflation Factor (VIF)	In both countries, FDI has a positive impact on economic growth.
Sun & Heshmati (2010)	31 regions of China (2002-2007)	1-)GDP 2-)Capital stock 3-)Labor 4-)R&D 5-)Export	Data Envelopment Analysis (DEA)	Trade was an important factor in China's increasing economic performance.
Agrawal and Khan (2011)	China and India (1993-2009)	1-)Gross Domestic Product 2-)Gross Capital Formation 3-)Labor Force 4-)FDI 5-)Human Capital	Multiple Regression	FDI has a positive impact on economic growth.
Hossain A. and Hossain M. (2012)	Bangladesh, Pakistan and India (1972-2008)	1-)FDI 2-)GDP	ADF Engle-Granger co-integration VECM	There is no significant relationship between the variables.

Yalta (2013)	China (1982-2008)	1-)GDP 2-)FDI	Granger Causality	FDI may not always lead to higher economic growth. There can be sectoral and regional variations.
Anwar and Nguyen (2014)	Eight regions of Vietnam (2000-2005)	1-)FDI 2-)FDI generated spillovers 3-)Factor productivity	Panel Data	The results varied across regions.
Tabassum and Ahmed (2014)	Bangladesh (1972-2011)	1-)FDI 2-)Economic growth 3-)Domestic investments 3-)Export and import	Dinamic Regression	FDI has a positive impact on economic growth.
Nwaogu and Rian (2015)	53 African and 34 Latin American and Caribbean countries (1970-2009)	1-)FDD 2-)Foreign aid remittances 3-)Economic growth	GMM and OLS	FDI has a positive impact on economic growth
Agrawal (2015)	BRICS (1989-2012)	1-)Economic Growth 2-)FDI	Panel Granger Causality	There is a positive relationship between the variables.
Yu, Chen, & Sun (2017)	30 provinces of China (1993-2007)	1-)GDP 2-)FDI 3-)Domestic investments 4-)Labor force 5-)Capital stock	Panel Regression	The increase in FDI strengthens domestic firms.
Kong, Peng, Ni, Jiang, & Wang (2021)	China (1994-2018)	1-)FDI 2-)Trade openness 3-)Exchange rate	ARDL	There is a long-term stable cointegration relationship between the degree of trade openness and economic quality.

Zhang (2001) conducted a study to understand how foreign direct investments in Chinese cities affect domestic investment and growth, and found that foreign direct investments positively impact China's growth. Sun and Parikh (2001) conducted a similar study for 29 cities in China and revealed that increased openness leads to exports and foreign direct investments becoming influential factors in the economic growth of Chinese cities.

Shan (2002) using a VAR model, tested the impact of exports, labor, and foreign direct investments on output in China. The study identified a mutual causality between foreign direct investments and output. However, Carkovic and Levine (2005) did not find similar results in their research for developing countries. On the other hand Hansen & Rand (2016) have reached the conclusion that FDI has a positive impact on growth in developing countries.

Yao (2006) has reached the conclusion that both exports and FDI have a positive impact on growth in China. Yao, Wei, and Liu (2007) concluded that the increasing inflow of foreign direct investments played an effective role in China's rapid growth after 1980. Zhao & Du (2007) examined the relationship between GDP, FDI, exports, and imports between 1980-1995 using a VAR model. Contrary to common belief, the study concluded that foreign direct investments didn't have as

significant an impact on China's growth. In their study covering China and Vietnam, Vu, Gangnes, & Noy (2008) concluded that foreign direct investments have a positive impact on growth in both countries. A different result from this study was obtained in the research conducted by Sun and Heshmati in 2010. Sun & Heshmeti (2010) conducted a study in 31 regions of China between 2002 and 2007 and concluded that global trade was an important factor in China's increasing economic performance.

Agrawal and Khan (2011) investigated the impact of foreign direct investment on growth in China and India between 1993 and 2009. The study found that FDI significantly influenced the growth of both countries. However, not all research studies have found such strong impacts of FDI on economic growth. Hossain A. and Hossain M. (2012) tested the relationship between FDI and national income using the Granger causality test for Bangladesh, Pakistan, and India. The study found no significant relationship between the variables. Yalta (2013) reached a similar conclusion and showed that FDI in China between 1982 and 2008 did not have as much impact as thought. According to Yalta, the impact of FDI can vary by sector.

Anwar and Nguyen (2014) investigated the impact of FDI on total factor productivity in eight regions of Vietnam. The results varied across regions, with some regions experiencing a significant increase in total productivity due to FDI, while in others, this effect was less pronounced.

Tabassum and Ahmed (2014) examined the impact of FDI on economic growth in Bangladesh between 1972 and 2011. The study concluded that FDI is an effective factor contributing to economic growth. Nwaogu and Rian (2015) conducted a study testing the effects of foreign direct investment (FDI), foreign aid, and remittances on economic growth in African, Latin American, and Caribbean countries. The research concluded that FDI has a highly positive impact on economic growth. Agrawal (2015) analyzed the relationship between FDI and growth in six BRICS countries between 1989 and 2012. The study found a significant and balanced relationship between the two variables. Kong, Peng, Ni, Jiang, & Wang (2021) concluded that trade openness has a positive impact on growth in China.

As a result, numerous important studies have shown in the literature that foreign direct investments and foreign trade have significant effects on the process of economic development. However, there are also studies that contradict this, demonstrating that FDI and foreign trade do not have a significant impact on growth.

DATA AND METHODOLOGY

6.1 Data

This study focuses on estimating the impacts of FDI and foreign trade during China's rapid growth process. The analysis involves annual data spanning from 1978 to 2016, and the results are obtained using the SVAR model. The study utilized three variables: the growth rate, the ratio of foreign direct investment to the national income, and the ratio of foreign trade volume to the national income. The data was sourced from the World Bank database.

Table 2: Variables

Variables	Abbreviation	Source
Growth Rate	GR	World Bank
The Ratio of Foreign Direct Investment in National Income	FDI	World Bank
The Ratio of Foreign Trade Volume in National Income.	TR	World Bank

In the initial stage of the study, the series were de-trended. Subsequently, to mitigate impact of crises on the results, the crisis years were incorporated into the model as dummy variables. The specific crisis years added as dummy variables in the model are 1986, 1989, 1993, 2003, 2009, and 2015.

In this study, the variables were ordered from exogenous to endogenous, following a specific sequence. The order of variables from exogenous to endogenous is as follows:

1. The ratio of foreign trade volume to the national income
2. The ratio of foreign direct investment to the national income
3. The growth rate

Consequently, foreign trade is considered not to be influenced by other variables, while FDI is affected by foreign trade, and the growth rate is affected by both foreign trade and FDI.

The determination of the variable order took into account the existing literature on the subject (Hussain & Haque, 2016; Kanayo & Emeka, 2012).

$$\begin{aligned} TR_t &= d_{TR1} \\ FDI_t &= d_{TR2} + d_{FDI1} \\ GR &= d_{TR3} + d_{FDI2} + d_{GR1} \end{aligned}$$

6.2 Methodology

The Structural VAR (SVAR) model, introduced by Sims in 1980, offers an alternative to the large-scale macroeconomic models. The SVAR model shares similarities with the standard VAR model; however, it diverges in that impulse response functions are derived by imposing short and long-run constraints, leading to a more comprehensive understanding of the effects of shocks.

The SVAR model is based on the standard VAR model. Below it is shown the VAR model with 2 variables and 1 lag.

$$\begin{aligned} Y_{t1} &= \delta_{10} + \delta_{11}Y_{t1-i} + \delta_{12}Y_{t2-i} + u_{t1} \\ Y_{t2} &= \delta_{20} + \delta_{21}Y_{t2-i} + b_{12}Y_{t2-i} + u_{t2} \end{aligned}$$

To obtain a SVAR model from this equation, it's necessary to add a simultaneous term to the VAR equation. This added simultaneous term ensures verticalization of the responses. The new equation is shown below.

$$\begin{aligned} Y_{t1} &= \delta_{10} + \delta_{11}Y_{t1-i} + b_{11}Y_{t2-i} + a_{12}Y_{t2+i} + u_{t1} \\ Y_{t2} &= \delta_{20} + \delta_{21}Y_{t2-i} + b_{12}Y_{t2-i} + a_{22}Y_{t2+i} + u_{t2} \end{aligned}$$

A brief representation of the resulting SVAR equation is as follows.

$$Y_t = A_0 + A_1Y_{t-1} + e_t$$

The SVAR model enhances the traditional VAR model by incorporating structural features that allow for a more nuanced analysis of the underlying economic relationships and the impacts of various shocks on the system.

In the structural VAR model, the relationship between variables is expected to adhere to an economic theoretical framework. The model incorporates a sequence of error terms based on economic theory, where shocks are ordered from exogenous to endogenous. Utilizing the Cholesky decomposition method, constraints are imposed on the unknown parameters. If the number of constraints is n then, $(n^2 - n)/2$ constraints are applied to the model. Consequently, the first variable contains its own structural shock, the second variable encompasses the structural shock of the

previous variable as well as its own, and the last variable includes its own structural shock as well as the structural shocks of all previous variables. This approach allows for a clearer interpretation of the causal relationships and the propagation of shocks in the system.

6.3 Empirical Results

6.3.1 Unit Root Tests

In this study, three unit root tests, namely the Augmented Dickey-Fuller (ADF) test (Dickey & Fuller, 1979), the Phillips-Perron (PP) test (Phillips & Perron, 1988), and the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test (Kwiatkowski et al., 1992), were utilized to assess the stationarity of the series.

In ADF and PP tests, the null hypothesis indicates that the series has a unit root, while the alternative hypothesis suggests stationarity. In the KPSS test, on the other hand, the reverse is true: the null hypothesis implies that the series is stationary, while the alternative hypothesis indicates that they possess a unit root.

On the other hand, to determine the appropriate lag length, the Schwarz information criterion (SIC) was employed in the ADF test, while the Bartlett Kernel method was used for estimating the error terms in the KPSS and PP tests. The Newey-West method was also employed to estimate the bandwidth.

All unit root tests were conducted using the E-Views software, and the obtained results are presented in Table 3.

Table 3: Unit Root Tests

	ADF		PP		KPSS	
	Constant	Constant and Trend	Constant	Constant and Trend	Constant	Constant and Trend
GR	-4.16(1)***	-4.05 (1)	-2.99**	-3.10	0.113***	0.10
FDI	-1.617(0)	-1.06(0)	-1.70	-1.23**	0.40**	0.18*
TR	-1.84(1)	-1.37(1)	-1.77	0.85	0.62**	0.12*
d_GR	-5.41(1)*	-5.37(1)*	-7.56*	-9.64*	0.18*	0.18**
d_FDI	-4.77(0)*	-4.92(0)*	-4.64*	-4.86*	0.21*	0.08*
D_TR	-4.12(0)*	-4.36(0)*	-4.12*	-4.39*	0.26*	0.11*

* represents 1% significance ** represents 5% significance *** represents 10% significance

The number in parentheses represents the number of lags.

As a result of the unit root tests, it was found that the series exhibit a unit root when analyzed at the level. However, after taking the first differences of the series, they were found to be stationary.

6.3.2 Diagnostic Tests

In order to apply the SVAR model, it is necessary to ensure that there is no autocorrelation in the model. To test for autocorrelation, the Lagrange Multiplier (LM) test is utilized in this study.

The hypotheses of the LM test, as proposed by Breusch (1978) and Godfrey (1978), are as follows:

$$H_0: \text{No autocorrelation}$$

$$H_1: \text{Autocorrelation}$$

In the study, since annual data is used, the presence of autocorrelation is tested up to the 3rd degree. The determination of the number of lags has been done using the Akaike Information Criterion (AIC). The results indicate that all probability values (p-values) are greater than 0.05. Consequently, the null hypothesis (H_0) is accepted, implying that there is no significant autocorrelation present in the model's residuals.

The results of the LM test are shown in Table 4.

Table 4: LM Test

Number of Lags	LM statistics	s.d.	Prob.
1	9.919105	9	0.3571
2	4.588679	9	0.8686
3	9.789151	9	0.3693

Another requirement for the SVAR model is that the error terms must exhibit constant variance. The White test examines whether the error terms in the model exhibit heteroskedasticity, which can lead to biased and inefficient estimates in the SVAR model. To test this condition, the White test is utilized in this study. The hypotheses of the White test, as proposed by White (1980), are as follows:

$$H_0: \text{Homoscedasticity}$$

$$H_1: \text{Heteroskedasticity}$$

The results of the White test are shown in Table 5.

Table 5: White Test

Chi Square	d.f.	Prob.
95.10984	90	0.3360

As observed in Table 20, the probability value of the White test is greater than 0.05, indicating that the null hypothesis cannot be rejected. This result suggests that the error terms exhibit constant variance, fulfilling another condition of the SVAR model.

Additionally, as mentioned earlier, the LM test results showed that there is no significant autocorrelation in the model's residuals. Combined with the constant variance of the error terms, these findings confirm that the model is suitable for SVAR analysis.

With the autocorrelation and heteroskedasticity tests yielding satisfactory results, the SVAR model can be deemed reliable for further analysis. It can be used to evaluate the results obtained from the SVAR model to gain insights into the effects of foreign direct investments and foreign trade on China's economic growth during the period under study (1978-2016).

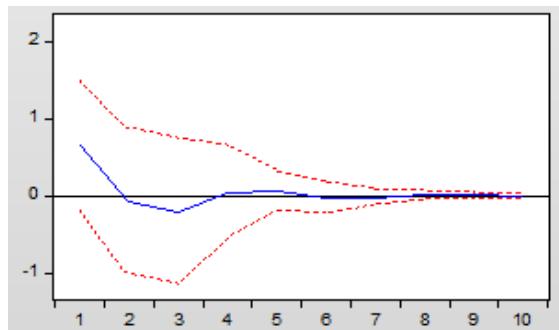
6.3.3 Impulse-Response Analysis

Impulse response functions are obtained from the E-views software using the structural decomposition method. The graphs show how the growth rate responds to shocks in foreign trade and foreign direct investment.

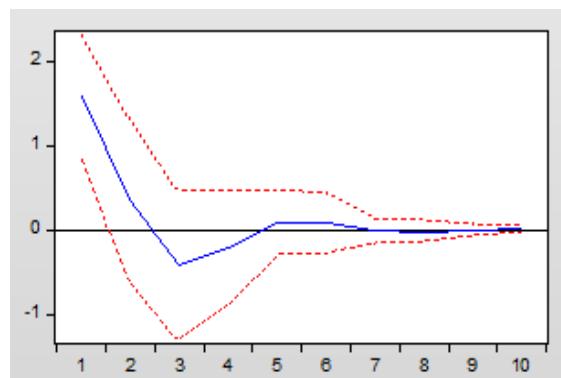
The impulse response functions visually demonstrate how changes in foreign trade and foreign direct investment impact the growth rate. They provide valuable insights into the direction and magnitude

of the responses, allowing us to understand the transmission mechanisms of shocks and their implications for China's economic development.

Figure 5: Impulse- Response Analysis



1: Growth's Response to a Shock in Foreign Trade



2: Growth's Response to a Shock in Foreign Direct Investments

The impulse response functions from the SVAR analysis reveal the following effects of shocks to foreign trade and foreign direct investment on the growth rate:

Shock to Foreign Trade:

- The growth rate experiences a downward trend in the first two periods following the foreign trade shock, indicating a negative impact on economic growth.
- The negative effect persists until the fourth period, leading to a sustained reduction in the growth rate.
- However, after the sixth period, the effect of the shock gradually diminishes, and the growth rate returns to its initial level, showing that the negative impact fades away over time.

Shock to Foreign Direct Investment (FDI):

- Similar to the shock to foreign trade, the growth rate tends to decrease in the first two periods following the FDI shock, reflecting a negative influence on economic growth.
- However, the effect of the shock remains positive, indicating that, despite the initial decline, FDI eventually contributes positively to the growth rate.

- In the third period, the shock turns negative until the fifth period, causing a temporary negative effect on the growth rate.
- Nevertheless, the effect of the FDI shock completely disappears in the seventh period, indicating that the negative impact is transitory and the growth rate stabilizes over time.

6.3.4 Variance Decomposition

Variance decomposition reveals what percentage of the change in the variable is caused by the delay of the variable itself and what percentage is caused by the delay in other variables. (Gujarati & Porter, 2012).

Table 6: Long Run Foreign Trade Variance Decomposition

	Standard error	TR	FDI	GR
1	4.106503	98.72014	1.219512	0.060348
2	4.447058	93.20698	4.978352	1.814670
3	4.500761	90.99659	7.008777	1.994630
4	4.586034	87.69647	9.648481	2.655046
5	4.591672	87.56382	9.657944	2.778235
6	4.595250	87.42946	9.793657	2.776879
7	4.596193	87.40438	9.803290	2.792330
8	4.596347	87.39853	9.808545	2.792921
9	4.596427	87.39634	9.809773	2.793885
10	4.596436	87.39597	9.809895	2.794137

The variance decomposition results in Table 6 provide valuable insights into the drivers of changes in foreign trade for China over time. Here are the key observations from the results: In the first period, 98.72% of the changes in foreign trade are attributed to the change in foreign trade itself, indicating a strong autocorrelation effect. In the subsequent periods, the impact of foreign direct investment (FDI) on changes in foreign trade increases gradually. In the second period, 4.98% of the changes in foreign trade are attributed to FDI, and this percentage continues to rise in the following periods. The effect of economic growth (GR) on changes in foreign trade remains relatively low throughout the analyzed time horizon. In the first period, it is only 0.06%, and while it slightly increases in later periods, it remains significantly lower compared to FDI. As the period progresses, the impact of FDI on foreign trade becomes more significant, while the contribution of foreign trade itself decreases. This indicates the growing influence of FDI in driving changes in China's foreign trade. By the tenth period, 87.39% of the change in foreign trade is explained by foreign trade itself, 9.8% by FDI, and 2.79% by economic growth. This suggests that FDI has become more effective than economic growth in shaping the changes in China's foreign trade over the years.

The variance decomposition results presented in Table 7 provide insights into the factors contributing to the changes in foreign direct investments (FDI) in China over time.

Table 7: Long Run Foreign Direct Investments Variance Decomposition

	Standard error	TR	FDI	GR
1	0.717624	22.00339	64.74504	13.25157
2	0.851779	15.83686	65.34260	18.82055
3	0.870961	15.23691	64.67377	20.08932
4	0.891574	15.20774	64.83806	19.95420
5	0.894367	15.13869	64.45466	20.40665
6	0.895035	15.14602	64.47566	20.37832
7	0.895286	15.14021	64.44844	20.41135
8	0.895308	15.14077	64.44814	20.41109
9	0.895323	15.14039	64.44684	20.41278
10	0.895325	15.14041	64.44666	20.41293

As the periods progress, it can be observed that the impact of FDI on itself remains relatively stable, ranging from 64.45% to 64.75% across the periods. In the first period, it is evident that foreign trade has a considerable influence on FDI, contributing 22% to the changes in FDI, while economic growth contributes 13.25%. However, as time passes, the influence of foreign trade on FDI decreases slightly, while the impact of economic growth increases. By the tenth period, it is seen that 64.44% of the change in FDI is caused by the changes in FDI itself, 15.14% by the changes in foreign trade, and 20.41% by the changes in economic growth. This indicates that economic growth becomes more influential in driving changes in FDI in later periods. Overall, the results suggest that both foreign trade and economic growth have a significant impact on the increase in foreign direct investments in China.

Table 8 shows the variance decomposition results of China's economic growth.

Table 8: Long Run Economic Growth Variance Decomposition

	Standard error	TR	FDI	GR
1	2.554413	6.527587	38.26341	55.20900
2	2.589780	6.421493	39.20827	54.37023
3	2.649191	6.750828	39.94021	53.30897
4	2.660160	6.730079	40.25808	53.01184
5	2.662326	6.774388	40.29492	52.93069
6	2.663788	6.774491	40.34297	52.88254
7	2.663913	6.779727	40.34069	52.87959
8	2.664034	6.779949	40.34509	52.87496
9	2.664049	6.780431	40.34462	52.87495
10	2.664057	6.780463	40.34489	52.87464

According to Table 8, in the first period, 55.2% of the change in China's growth was caused by shocks in growth itself, 38.26% by shocks in FDI, and 6.52% by shocks in foreign trade. In the following periods, the ratios do not change much, and by the 10th period, 52.87% of the change in growth is attributable to itself, 40.34% to changes in foreign direct investments, and 6.78% to changes in foreign trade. The variance decomposition reveals that FDI has a significant role in the growth of China's economy.

7.CONCLUSION

In 1978, China embarked on a transformation from a closed economy to an open economy through structural reforms, which resulted in significant changes and high economic growth. The study focused on China's development process during this period.

With the implementation of reforms, China shifted its development policies and embraced greater integration with the global economy, gradually transitioning into a free market economy.

In the early stages of China's reform, the country utilized its large population advantage to attract foreign investments across various sectors. However, the government also took measures to enhance the competitiveness of domestic investors. Initially, foreign firms were required to partner with local companies to invest in China. As domestic firms became more competitive, China gradually opened up further to foreign investors. With its accession to the World Trade Organization, China became a fully open economy and emerged as the world's leading exporter of goods and services.

In this context, the SVAR model was conducted in this study in order to understand the impact of foreign trade and foreign direct investments on the development of the Chinese economy. The research focused on the period from 1978 to 2016 and aimed to understand the effects of shocks in foreign direct investment (FDI) and foreign trade on China's economic growth.

Based on the analysis, the study found that in the long run, foreign direct investment (FDI) contributes approximately 40.34% to China's economic growth, while exports account for about 6.48% of the growth. Additionally, the study explored the relationships between the growth rate, FDI, and foreign trade, and it revealed that these three parameters have a positive relationship with each other. This suggests that FDI and foreign trade have significant positive effects on China's economic growth, and they are interconnected factors influencing each other in the process.

In conclusion, the research provides evidence supporting the importance of foreign direct investment and foreign trade in driving China's economic growth over the analyzed period from 1978 to 2016. These results support the finding of Yao, Wei, and Liu (2007) that foreign direct investments played a significant role in China's rapid growth after 1980. Similarly, these findings are consistent with the study by Sun & Hashmati (2010) which focused on the impact of foreign trade on China's rapid growth.

The study also highlights the role of these factors in China's transformation from a closed economy to an open economy, which led to substantial economic development. Moreover, the study draws attention to China's strategic policy of protecting domestic producers during the process of opening up to foreign investments and trade.

Overall, the findings emphasize the significance of foreign investment and international trade in shaping China's economic growth trajectory and underscore the importance of a well-balanced approach to leveraging these factors to promote sustained economic development.

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