Causality test among foreign direct investment, trade openness and economic growth: recent evidence from BRICS and MINT countries

Doğrudan yabancı yatırım, ticari açıklık ve ekonomik büyüme arasında nedensellik testi: BRICS ve MINT ülkeleri

Sevilay Küçüksakarya[1] iD

[1] Assoc. Prof. Dr., Anadolu University, Eskişehir, Turkey, satlama@anadolu.edu.tr

ORCID: 0000-0002-4224-6100

Abstract

This study attempts to find new evidence of causality between foreign direct investment, trade openness, and economic growth for BRICS and MINT countries between 1990-2021 using the Dumitrescu-Hurlin panel causality test. We first check whether there is a cross-sectional dependence between the countries using different cross-sectional dependence tests. After we find out there is cross-sectional dependence, we perform the CIPS unit root test. All variables are stationary at their first differences, so we applied the Dumitrescu-Hurlin panel causality test. There is bi-directional causality between trade openness and economic growth only for MINT countries. For BRICS, we found unidirectional relationships between economic growth and foreign direct investment and trade openness to economic growth. There is a unidirectional relationship from trade openness to foreign direct investment for both country groups.

Keywords: BRICS, MINT, Economic Growth, Cross-sectional Dependence, Panel Causality

Jel Codes: C23, O16

Öz

Bu çalışma, Dumitrescu-Hurlin panel nedensellik testi kullanarak 1990-2021 yılları arasında BRICS ve MINT ülkeleri için doğrudan yabancı yatırım, ticari açıklık ve ekonomik büyüme arasındaki nedenselliği araştırmaya çalışmaktadır. İlk olarak, farklı yatay kesit bağımlılığı testleri ile ülkeler arasında yatay kesit bağımlılığı olup olmadığına bakılmıştır. Ülkeler arasında yatay kesit bağımlılığı olduğu sonucuna ulaştıktan sonra panel birim kök testi olarak CIPS testiyle serilerin durağanlığı test edilmiştir. Tüm değişkenler birinci farklarında durağandır, bu nedenle Dumitrescu ve Hurlin Nedensellik testi uygulanmıştır. Sonuçlara göre, sadece MINT ülkeleri için ticari açıklık ile ekonomik büyüme arasında çift yönlü nedensellik ilişkisi bulunurken, BRICS ülkeleri için, ekonomik büyümeden doğrudan yabancı yatırımlara ve ticari açıklıktan ekonomik büyümeye doğru tek yönlü nedensellik ilişkileri bulunmuştur. Her iki ülke grubu için ticari açıklıktan doğrudan yabancı yatırımlara doğru tek yönlü bir ilişki vardır.

Anahtar Kelimeler: BRICS, MINT, Ekonomik Büyüme, Yatay Kesit Bağımlılığı, Panel Nedensellik

JEL Kodları: C23, O16

Introduction

Jim O'Neill of Goldman Sachs first used the BRIC concept in 2001. It is a concept consisting of the initials of Brazil, India, Russia, and China, whose economies grew rapidly in those years. With the addition of the Republic of South Africa to the BRIC countries in 2011, the community was named BRICS. BRICS countries have been named as a group with no alternative that will affect the next 50 years due to their geographical location, political activities, rapidly growing economies, and rich underground reserves of countries such as Russia and Brazil. However, due to the weakening economic performance of the BRICS countries, especially in recent years, these optimistic forecasts gave way to concern. When the high growth rate in the BRICS countries slowed down, we came across MINT, another abbreviation, Fidelity Investments, introduced in 2014 and refers to the economies of Turkey, Mexico, Nigeria, and Indonesia, which Jim O'Neill also popularized (Gryczka, 2018). The high growth rate that these countries have achieved is the focus of MINT countries which are called the future's new four economies.

Matsangou (2015) states that BRICS and MINT countries differ in their cultures, backgrounds, languages, and structures. Nevertheless, these four countries also have essential standard features besides having rapidly growing economies. They have high populations, an attraction to global markets and effective governments. Brazil is classified as the largest economy in South America. While China is the first, India has become the third-largest economy in Asia. In addition, South Africa is in the second line on the list of Africa's largest economies. Russia is one of the G8 countries representing approximately 65% of the world economy. When we look at MINT countries as new future economies with high-level growth rates, they have young populations that are growing with high population growth and are very dynamic. In 2019, the coronavirus pandemic emerged in Wuhan, China, and has had serious effects on countries, such as growth rates and many different demographic and economic indicators. When the growth figures are examined, the BRICS and MINT countries, other than Turkey, also showed a downward trend in 2020. However, despite this decline, it is believed the BRICS and MINT country groups will become more vital in economic view comparing the world's leading developed countries in the future, according to the estimations announced. While one of the reasons why BRICS and MINT countries attract attention from academics is their economic and demographic characteristics, their influence in global markets also increases this interest. When we examine their natural resources, among the BRICS countries, we could classify India and China as net importers, while Russia, Brazil, and South Africa as net exporters; In MINT countries, we could categorize Turkey as a net importer in terms of natural resources and the other three countries as net exporters (World Bank, 2021).

Foreign direct investments are investments made by investors outside a country's borders by establishing production facilities such as factories, opening branches, acquiring real estate, or purchasing an existing company in whole or in part. Such investments play a vital role in developing the country's economy. Therefore, it is possible to discuss the many advantages of foreign direct investments. First, thanks to these new investments, the production capacity in the country will increase. This situation will contribute to the country's economic growth and reduce unemployment. In addition, the entry of new firms into the market will increase competition in the country. Despite these positive aspects, foreign direct investments also have some disadvantages. For example, local firms in the country may cease their activities by not being able to compete with large-scale investing firms. According to De Mello (1999), foreign direct investment's effects not only can be seen directly in economic growth but also indirectly in the workforce's education, the acquisition of skills, and direct technology transfer through new management habits and organizational arrangements by providing an increase in knowledge in the receiving country. When we evaluate the BRICS and MINT countries in terms of foreign direct investment stock, it is seen that both groups of countries are net FDI importers, except China and South Africa (UNCTAD, 2021).

In general, the importance of both BRICS and MINT countries lies in their potential to drive global economic growth and provide new trade and investment opportunities. By working together, these countries can help address common challenges and support each other's development, leading to a more balanced and stable global economy. Trade openness is another major factor for these countries. With the increase in trade openness, which is also accepted as an indicator of a country's level of trade liberalization, developing countries increase productivity and efficiency by using new technologies outside the country (Şahin, 2021). When evaluated from these aspects, trade openness and foreign direct investments can be considered crucial for both BRICS and MINT countries. This study tries to find new evidence on the direction of causality between foreign direct investment, trade openness, and economic

growth for Brazil, India, Russia, and China, South Africa as BRICS and Mexico, Indonesia, Nigeria, and Turkey as MINT countries between 1990-2021 applying Dumitrescu-Hurlin (2012) panel causality test.

The continuation of this paper is organized as follows. The existing literature was examined and presented in the second section of the study. In the third section, the data discussed in the study are introduced, and preliminary data analysis is summarized. The next section of the study explains the methodology, and the next section summarizes the analysis's empirical results. Finally, the sixth section concludes the findings of the study.

Literature review

Yusoff & Nuh (2015) emphasized trade and foreign direct investment are essential to a country's economic growth and competitiveness. Therefore, it is crucial to carry out these studies, especially in countries with emerging economies. When we examined the literature, it is possible to see that many studies examine the relationship between trade openness and economic growth and between foreign direct investments and economic growth. However, there are relatively few studies examining the relationship between trade openness, foreign direct investments, and economic growth, such as Liu, Burridge & Sinclair (2002); Makki & Somwaru (2004); Liu, Shu & Sinclair (2009); Lal (2017); Pradhan, Arvin & Hall (2019); Nguyen, Anwar, Alexander & Lu (2022). Table 1 summarises some studies in the literature that considered these three variables together.

Table 1: Studies Examining the Relationship between Foreign Direct Investment, Trade Openness and Economic Growth

Author(s)	Time Period	Countries	Method	Result
Makki & Somwaru (2004)	1971-1980 1981-1990 1991-2000	66 developing countries	SUR TSLS	FDI and trade (+).
Naveed & Ghulam (2006)	1971-2000	23 developed countries	Fixed effect and control set of variables	Trade openness (+) TO->Growth
Omisakin, Adeniyin& Omojolaibi (2009)	1970-2006	Nigeria	Toda- Yamamoto non-causality test, The ARDL bounds testing	TO ->Growth FDI->Growth FDI and trade (+)
Klasra (2011)	1975–2004	Pakistan and Turkey	The ARDL bounds testing	In the short run; TO <-> Exports for Pakistan. FDI <-> Exports for Turkiye. In the long run; the growth-driven exports hypothesis for Turkiye and the openness-growth nexus for Pakistan.
Pradhan, Bagchi, Chowdhury, & Norman (2012)	1970-2010	10 OECD Countries	Panel-VAR Granger-causality tests	FDI<->TO FDI ->Growth TO->Growth
Dritsaki (2015)	1993-2011	3 Baltic countries	Pooled model FEM REM	Trade openness and foreign direct investment (+).
Yusoff &Nuh (2015)	1970-2008	Thailand	The co-integration test Granger Causality test	FDI ->Growth TO<->Growth
Sakyi, Commodore, & Opoku (2015)	1970–2011	Ghana	The ARDL bounds testing	Bhagwati hypothesis FDI and trade (+)
Hussain &Haque (2016)	1973 - 2014	Bangladesh	The Vector Error Correction Model (VECM)	The long-term relationship between all variables.
Bakari, S., & Sofien, T. (2019)	2002-2017	24 Asian economies	Fixed and random effect models	Foreign direct investment and exports (-)

Saleem & Shabbir (2020).	1975–2016	South Asian countries	ARDL bootstrap model	There is long-run co-integration between variables for all countries except Bangladesh.
Wiredu, Nketiah&Adjei (2020)	1998-2017	West African countries	Static Panel Data Model	The aggregated trade openness, investment, and inflation (+).
Banday, Murugan& Maryam (2021).	1990–2018	BRICS countries	ARDL Dumitrescu-Hurlin Granger causality test	FDI and trade openness (+) FDI <->Growth TO<->FDI TO->Growth
Kumari, Shabbir, Saleem, Khan, Abbasi, & Lopez (2021).	1985–2018	India	The Johansen co-integration and vector autoregression (VAR) model	No long-term relationship among all. FDI <-> GDP GDP <-> TO

When we consider the studies, different results can be obtained according to the characteristics of the periods and countries. Even if we have changed the analysis method, we can reach different results using data from the same countries or groups of countries (Baharom, Habibullah & Royfaizal (2008); Belloumi (2014); Dutta, Haider & Das (2017); Frimpong Magnus & Oteng-Abayie (2006)). The present study employs Dumitrescu-Hurlin (2012) for causality relationship among foreign direct investment, trade openness, and economic growth both in BRICS and MINT countries.

Data and preliminary analysis

This study aims to analyse the causal relationship between foreign direct investment, trade openness and economic growth separately in BRICS and MINT countries from 1990 to 2021. The list of countries includes Brazil, India, Russia, China, and South Africa for BRICS and Mexico, Indonesia, Nigeria, and Turkey for MINT. The annual data on our studies' variables, which includes gross domestic product per capita, foreign direct investment inflows ratio to GDP as foreign direct investment and total trade ratio to GDP as trade openness, are gathered from World Development Indicators. We calculated the logarithm of GDP per capita as a growth proxy. Tables 2 and 3, respectively, give the variable definitions, descriptive statistics and correlation analysis of the variables used in the study.

Table 2: Variables

Variable name	Symbol	Data Sources
Gross Domestic Product Per Capita	GDPPCGROWTH	World Development Indicators
Ratio of Foreign Direct Investment inflows to GDP (%)	FDI	World Development Indicators
Trade Openness GDP ratio (%)	TO	World Development Indicators

Table 3: Descriptive Statistics and Correlation Analysis of BRICS and MINT

Panel A: Variable descriptive statistics						
	BRICS			MINT		
	GDPPCGROWTH	FDI	TO	GDPPCGROWTH	FDI	TO
Mean	8.301775	1.98790	40.7478	8.351910	1.65071	48.6962
Median	8.673477	1.72853	42.1004	8.419478	1.62501	48.8016
Maximum	9.322624	6.18688	110.577	9.491803	5.79084	96.1861
Minimum	6.268176	-0.06007	15.1556	7.254250	-2.75744	20.7225
Std. Dev.	0.860321	1.45941	14.8258	0.722415	1.17724	13.4133
Skewness	-0.986859	0.61728	0.52157	-0.091236	-0.12781	0.57928
Kurtosis	2.629333	2.50932	4.596578	1.407472	5.08334	3.68786
Jarque-Bera	26.88638	11.7661	24.2482	13.70368	23.4969	9.68236
Probability	0.000001	0.00278	0.00000	0.001058	0.00000	0.007898
Observations	160	160	160	128	128	128
Panel B: Correlation matrix						
	BRICS			MINT		
	GDPPCGROWTH	FDI	TO	GDPPCGROWTH	FDI	TO
GDPPCGROWTH	1.000000			1.000000		
	------			------		
FDI	0.129784	1.000000		0.241677	1.000000	
	0.1009	--------		0.0060	--------	
TO	0.228491	-0.01230	1.000000	0.315390	0.80747	1.000000
	0.0037	0.8773	----------	0.0003	0.3649	----------

Table 3 shows that trade openness has a positive period average value in both country groups. There is a positive and significant linear association between economic growth, foreign direct investment, and trade openness. The pairwise correlations between foreign direct investment differ among the country groups and are not significant—openness and economic growth in both the BRICS and MINT countries.

Methodology

In the methodology part of the study, we apply Dumitrescu & Hurlin (2012)'s panel causality test to analyse the causal relationships between foreign direct investments, trade openness, and economic growth. To apply this test to the panel, first, we must examine whether there is a cross-sectional dependence between the countries. To test the cross-sectional dependence, we prefer the Lagrange Multiplier developed by Breusch-Pagan (1980), the Cross-sectional Dependence test proposed by Pesaran (2004), and the Bias-Adjusted Cross-sectional Dependence Lagrange Multiplier test proposed by Pesaran, Ullah, & Yamagata (2008) test in the study. After we found out there is cross-sectional dependence between countries. Because of that, we performed the 2nd generation panel unit root test of the cross-sectionally augmented IPS (CIPS) developed by Pesaran (2007) to investigate the stationary of variables. Finally, we use the Dumitrescu & Hurlin (2012) panel causality test in the final.

The Dumitrescu-Hurlin panel causality test is an adapted superior version of the Granger causality test. The difference between the Dumitrescu-Hurlin panel causality test and the Granger causality test is that it assumes all coefficients vary between sections. We can also use it in the presence of cross-sectional dependency and for both situations that may arise when the time and observation interval of the panel are evaluated. In other words, in the case of both T < N and T > N, it can also be applied for additional in unbalanced and heterogeneous panels. Dumitrescu & Hurlin (2012) examine the following linear heterogeneous model:

$$y_{it} = \alpha_i + \sum_{k=1}^{L} \gamma_i^k y_{it-k} + \sum_{k=1}^{L} \beta_i^k x_{it-k} + \varepsilon_{it} \quad , \text{i=1, 2,..., N: t=1, 2,..., T}$$

Where α_i, $\gamma_i^{(k)}$ and $\beta_i^{(k)}$ represents the constant term, lag parameter and coefficient slope, respectively. The null and alternative hypotheses are below:

$$H_0 : \beta_i = 0, \quad H_1 : \begin{cases} \beta_i = 0 & \forall_i = 1, 2, \ldots\ldots\ldots N \\ \beta_i \neq 0 & \forall_i = N_1 + 1, \; N_1 + 2, \ldots\ldots, N \end{cases}$$

According to the null hypothesis, homogeneous Granger causality exists for all cross-section units. And, at least, the alternative hypothesis points out the assumption of one causal relationship in the panel data. The results obtained from the Dumitrescu-Hurlin causality test are given in Table 6. Our test results align with Yusoff & Nuh's (2015) study.

Empirical results

To investigate the causal relationship between FDI, trade openness, and economic growth, we first identified the existence of cross-sectional dependence between countries belonging to the BRICS and MINT country groups by applying the Lagrange Multiplier test, the Cross-sectional Dependence test, and the Bias-Adjusted Cross-sectional Dependence Lagrange Multiplier test in the study. Test results are given in Table 4.

Table 4: The Cross-Sectional Dependence Tests Results

Test/ Variables	BRICS			MINT		
	GDPPCGROWTH	FDI	TO	GDPPCGROWTH	FDI	TO
CD_{BP}	259.0638 (0.0000)	38.1632 (0.0000)	89.1204 (0.0000)	152.9027 (0.0000)	11.191 (0.0826)	46.441 (0.0000)
CD_{LM}	55.6923 (0.0000)	6.2974 (0.0000)	17.6918 (0.0000)	0.729 (0.0000)	42.516 (0.1340)	11.674 (0.0000)
LM_{adj}	55.6117 (0.0000)	6.2168 (0.0000)	17.6112 (0.0000)	0.664 (0.0000)	42.389 (0.1515)	11.610 (0.0000)
CD	16.0593 (0.0000)	3.8215 (0.0000)	5.9273 (0.0000)	2.609 (0.0000)	12.3435 (0.9152)	0.0658 (0.0000)

Table 4 indicates Pesaran's cross-sectional dependence test (CD) results (2004). From these results, since the probability value is zero, we reject the null hypothesis of cross-sectional independence in the case of economic growth and trade openness for both country groups. Therefore, we can also add BRICS's foreign direct investment to that group. This outcome shows that these variables are correlated across the panel. Therefore, if a shock occurs in any of the variables, there will be a potential for this shock to spread to other countries. Therefore, we must use the 2nd generation panel unit root test for these variables. However, we failed to reject the null hypothesis for the MINT country group's foreign direct investment variable. Because of this reason, we are supposed to use the 1st generation panel unit root for the MINT country group's foreign direct investment variable.

Except for foreign direct investment belonging to MINT countries, all the test's results in Table 4 indicate a cross-sectional dependence between the countries. Therefore, we will use the 1st generation panel unit root test of Maddala & Wu (1999) only for foreign investment data belonging to the MINT country group. Except this, according to the results of CD tests, we choose 2nd generation panel unit root tests of Pesaran, Smith, & Yamagata (2013)s', named cross-sectional augmented panel unit root IPS (CIPS), to determine the degree of the integration of each variable. The results are given in Table 5.

Table 5: 1st and 2nd Generation Panel Unit Root Tests

Test/ Variables	BRICS		MINT			
	Pesaran (CIPS)		Maddala and Wu (WU)		Pesaran (CIPS)	
	without trend	with trend	without trend	with trend	without trend	with trend
GDPPCGROWTH	-1.274	-1.103	-	-	-0.643	-0.093
D.GDPPCGROWTH	-5.818*	-5.997*	-	-	-3.960*	-4.495*
TO	-2.012	-2.712	-	-	-1.016	-2.565
D.TO	-4.795*	-4.801*	-	-	-5.582*	-5.595*
FDI	-2.154	-2.191	63.2734	48.5273	-	-
D.FDI	-5.560*	-5.711*	145.1131*	119.2921*	-	-

Notes: MW test assumes cross-section independence. CIPS test assumes cross-section dependence. *denotes rejection of the null hypothesis of no co-integration at a 1% significance level.

As seen in Table 5, our 1st and 2nd generation panel unit root tests results indicate that foreign direct investment, trade openness and economic growth are stationary, which means I(1). After we found out that all variables were stationary at their first differences, we applied the Dumitrescu-Hurlin panel causality test. Table 6 denotes these results.

Table 6: The Dumitrescu-Hurlin Causality Tests Results

Null Hypothesis/Groups	BRICS		MINT	
	Zbar-Stat	Probability	Zbar-Stat	Probability
FDI does not homogeneously cause GDPPCGROWTH	1.075	0.282	-1.044	0.296
GDPPCGROWTH does not homogeneously cause FDI	2.663	0.007***	1.605	0.100*
TO does not homogeneously cause GDPPCGROWTH	3.916	0.000***	4.982	0.000***
GDPPCGROWTH does not homogeneously cause TO	0.612	0.540	2.695	0.007***
TO does not homogeneously cause FDI	1.665	0.095*	1.752	0.079*
FDI does not homogeneously cause TO	-0.118	0.905	-0.773	0.439

Note:∗∗∗p < 0.01,∗∗p < 0.05,∗p < 0.1.

Based on the test results in Table 6, it can be concluded that there is bi-directional causality between trade openness and economic growth only for MINT countries. Considering MINT countries, we can also denote a bi-directional relationship between GDPPCGROWTH and trade openness, including only MINT countries. For BRICS countries, there are unidirectional relationships from economic growth to foreign direct investment and trade openness to economic growth. And, also for both country groups, there is a unidirectional relationship from trade openness to foreign direct investment.

Conclusion

The study investigates the causal relationship between foreign direct investment, trade openness, and economic growth for BRICS and MINT countries from 1990 to 2021. In this context, we examine cross-sectional dependence between countries for each variable. Except for the foreign direct investment's variable of MINT countries, we found cross-sectional dependence for other variables in the panel. In other words, when a shock occurs in these variables, it can spread out to other countries. After finding the cross-sectional dependence in the panel, we applied the CIPS unit root test and saw that the series were stationary at their first differences. After we applied the Dumitrescu-Hurlin panel causality test, the results drew various conclusions for the causal relationship between foreign direct investment, trade openness, and economic growth in BRICS and MINT countries. According to these results, while there is unidirectional causality from growth to foreign direct investments for BRICS and MINT countries, there is unidirectional causality from growth to trade openness for BRICS countries and bi-directional causality for MINT countries. In both groups, we observed a unidirectional causality relationship from trade openness to foreign direct investment for the BRICS and MINT countries. If these countries want to attract FDI first, they have to increase their per capita GDP to a certain level. Foreign investors carefully watch developments and aggregate demand within these countries. Another finding of this study that supports this conclusion is that trade openness is one of the primary causes of FDI in these

countries. As these countries have been opening more to foreign trade, there will be a surge in the inflow of foreign direct investment. As a result of these facts, these countries should increase their per capita GDP and the share of foreign trade in their GDP to implement a development strategy successfully.

References

Baharom, A. H., Habibullah, M. S., & Royfaizal, R. C. (2008). The relationship between trade openness, foreign direct investment, and growth: Case of Malaysia.

Bakari, S., & Sofien, T. (2019). The impact of trade openness, foreign direct investment and domestic investment on economic growth: New evidence from Asian developing countries.

Banday, U. J., Murugan, S., & Maryam, J. (2021). Foreign direct investment, trade openness and economic growth in BRICS countries: evidences from panel data. *Transnational Corporations Review*, *13*(2), 211-221.

Belloumi, M. (2014). The relationship between trade, FDI and economic growth in Tunisia: An application of the autoregressive distributed lag model. *Economic systems*, *38*(2), 269-287.

Breusch, T.S & Pagan, A.R. (1980). The Lagrange Multiplier Test and Its Applications to Model Specification Tests in Econometrics. Review of Economic Studies, 47, 239-53.

De Mello, L. R. (1999). Foreign direct investment-led growth: evidence from time series and panel data. *Oxford economic papers*, *51*(1), 133-151.

Dritsaki, C. (2015). Effect of trade openness and foreign direct investment on economic growth: An empirical research of the three Baltic countries. *International Research Journal of Finance and Economics*, *133*, 191-199.

Dumitrescu, E. I., & Hurlin, C. (2012). Testing for Granger Non-Causality In Heterogeneous Panels. Economic Modelling, 29 (4): 1450-1460.

Dutta, C. B., Haider, M. Z., & Das, D. K. (2017). Dynamics of economic growth, investment and trade openness: Evidence from Bangladesh. *South Asian Journal of Macroeconomics and Public Finance*, *6*(1), 82-104.

Frimpong Magnus, J., & Oteng-Abayie, E. F. (2006). Bounds testing approach: an examination of foreign direct investment, trade, and growth relationships. *American Journal of Applied Sciences, Forthcoming*.

Gryczka, M. (2018). MINT countries as possible rising stars in the global economy–benchmarking with BRICS countries. *Acta Scientiarum Polonorum. Oeconomia*, *17*(3), 23-32.Im, K. S., Pesaran, M. H., & Shin, Y. (1997). Testing for Unit Roots in Heterogenous Panels. DAE, Working Paper 9526, University of Cambridge.

Hussain, M. E., & Haque, M. (2016). Foreign direct investment, trade, and economic growth: An empirical analysis of Bangladesh. *Economies*, *4*(2), 7.

Klasra, M. A. (2011). Foreign direct investment, trade openness and economic growth in Pakistan and Turkey: An investigation using bounds test. *Quality & Quantity*, *45*(1), 223-231.

Kumari, R., Shabbir, M. S., Saleem, S., Khan, G. Y., Abbasi, B. A., & Lopez, L. B. (2021). An empirical analysis among foreign direct investment, trade openness and economic growth: evidence from the Indian economy. *South Asian Journal of Business Studies*.

Lal, A. K. (2017). Foreign direct investment, trade openness and GDP in China, India and Mexico. *The Singapore Economic Review*, *62*(05), 1059-1076.

Liu, X., Burridge, P., & Sinclair, P. J. (2002). Relationships between economic growth, foreign direct investment and trade: evidence from China. *Applied economics*, *34*(11), 1433-1440.

Liu, X., Shu, C., & Sinclair, P. (2009). Trade, foreign direct investment and economic growth in Asian economies. *Applied Economics*, *41*(13), 1603-1612.

Maddala, G. S., & Wu, S. (1999). A comparative study of unit root tests with panel data and a new simple test. *Oxford Bulletin of Economics and statistics*, *61*(S1), 631-652.

Makki, S. S., & Somwaru, A. (2004). Impact of foreign direct investment and trade on economic growth: Evidence from developing countries. *American journal of agricultural economics*, *86*(3), 795-801.

Matsangou, E. (2015). Is MINT the next BRIC. *The New Economy of*, *4*, 2015.

Naveed, A., & Shabbir, G. (2006). Trade openness, FDI and economic growth: A panel study. *Pakistan Economic and Social Review*, 137-154.Shaikh, F. M. (2010, August). Causality relationship between foreign direct investment, trade and economic growth in Pakistan. In *International Conference on Applied Economics ICOAE 2010* (pp. 717-722).

Nguyen, A. T., Anwar, S., Alexander, W. R. J., & Lu, S. H. (2022). Openness to trade, foreign direct investment, and economic growth in Vietnam. *Applied Economics*, *54*(29), 3373-3391.

Omisakin, O., Adeniyi, O., & Omojolaibi, A. (2009). Foreign direct investment, trade openness and growth in Nigeria. *Journal of Economic Theory*, *3*(2), 13-18.

Pesaran, M.H. (2004). General Diagnostic Tests for Cross Section Dependence in Panels, Cambridge Working Papers in Economics, 435.

Pesaran, M.H. (2007). A simple Panel Unit Root Test in the Presence of Cross-section Dependence, J. Appl. Econ., 22, 265-312.

Pesaran, M. H., Ullah, A., & Yamagata, T. (2008). A bias-adjusted LM test of error cross-section independence. The econometrics journal, 11(1), 105-127.

Pesaran M. H., Smith, L. V. & Yamagata, T. (2013). Panel unit root tests in the presence of a multifactor error structure, Journal of Econometrics, Vol. 175, pp. 94– 115.

Pradhan, R. P., Bagchi, T. P., Chowdhury, K., & Norman, N. R. (2012). Growth, foreign investment and trade-openness interactions in ten OECD countries: a panel-VAR approach. *International Journal of Banking, Accounting and Finance*, *4*(4), 273-293.

Pradhan, R. P., Arvin, M. B., & Hall, J. H. (2019). The nexus between economic growth, stock market depth, trade openness, and foreign direct investment: the case of ASEAN countries. *The Singapore Economic Review*, *64*(03), 461-493.

Sakyi, D., Commodore, R., & Opoku, E. E. O. (2015). Foreign direct investment, trade openness and economic growth in Ghana: An empirical investigation. *Journal of African Business*, *16*(1-2), 1-15.

Saleem, H., & Shabbir, M. S. (2020). The short-run and long-run dynamics among FDI, trade openness and economic growth: using a bootstrap ARDL test for co-integration in selected South Asian countries. *South Asian Journal of Business Studies*, *9*(2), 279-295

Şahin S. (2021). Doğrudan Yabancı Yatırım, Ticari Açıklık ve Ekonomik Büyüme: Seçilmiş Ülkeler ve Türkiye Örneği"

UNCTAD. (2021). World Investment Report 2021. Investing in Sustainable Recovery. https://unctad.org/system/files/official-document/wir2021_en.pdf

Wiredu, J., Nketiah, E., & Adjei, M. (2020). The relationship between trade openness, foreign direct investment and economic growth in West Africa: Static panel data model. *Journal of Human Resource and Sustainability Studies*, *8*(1), 18-34.

World Bank (2021). Open Trade and Competitiveness Data. Retrieved from https://www.worldbank.org/en/news/feature/2017/01/09/tcdata360-a-big-addition-to-the-world-of-open-trade-and-competitiveness-data

Yusoff, M. B., & Nuh, R. (2015). Foreign direct investment, trade openness and economic growth: Empirical evidence from Thailand. *Foreign Trade Review*, *50*(2), 73-84.