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The effects of foreign direct investment and trade openness on economic growth amid crises in Asian economies

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Abstract

Purpose — The main objective is to examine the effects of foreign direct investment and trade openness on economic growth (SDG-8.1) about economic growth amid crises in 30 Asian economies.

Design/methodology/approach — The effects of FDI and trade openness on economic growth in the Asian region are examined using the fixed-effects model, panel corrected standard errors (PCSE), and generalized method of moments (GMM) estimations. The study also measures the long-run effects of the estimates and the granger causality tests.

Findings — The findings revealed that both FDI and trade openness contribute to boosting economic growth in Asian economies, and the effect is also persistent in the long run. We also find that the Asian and global financial collapse shocks in 1997-1998 and 2008-2009, respectively, adversely affected the region's economic growth. Additionally, the economic growths of some Asian countries are below the targeted level set in SDG-8.1.

Practical implications — The Asian countries should adopt appropriate policy measures for encouraging the inflow of FDI and cross-border trade of goods and services as it is evident that the inflow of FDI and open trade will improve local human capital and technological capabilities of the industries, which will ultimately help to enhance stable economic growth.

Originality/value — This study is unique in accompanying the Asian financial crisis and world recession in studying the effects of FDI and trade openness on SDG-8.1 in Asian economies.

Keywords — Foreign Direct Investment; Trade Openness; Sustainable Development Goal; Economic Growth

Introduction

Sustainable development is now the buzzword for creating a healthy and beautiful future for the coming generations. It is a way of ensuring balanced and livable earth for the creations living in it. The sustainable development goals (SDGs) or 2030 agenda were embraced by all United Nations (UN) member countries in 2015, comprising 17 goals to be achieved by 2030 based on countries' collective efforts and individual endeavors. One of the essential goals of SDGs is SDG-8 (sustained growth) which the countries must achieve to ensure sustainable development. Currently, Asia and

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the Pacific region are the utmost burgeoning economic constituency of the world. The region contributes to half of the world's GDP and one-third of global output, which paved the way for emancipating around 700 million people living in this region from poverty. So, to ensure sustainable development in Asia, there must have sustainable economic growth. Policymakers argue that foreign direct investment (FDI) and international trade can significantly affect the development effort. In addition to the movement of capital and goods and services between nations, both FDI and trade act as a prime source of crucial technical know-how and human capital development, which help the economy to achieve high growth. Based on these arguments, economies offer various incentives and policy relaxations to encourage FDI and open trade in their countries.

Foreign direct investment (FDI) and trade openness (TO) are essential drivers of economic growth. Over the years, several studies have focused on the effect that FDI and TO may exert on sustainable development, along with their causal relationship. The relationships among these three macroeconomic indicators have shown mixed evidence in the existing studies. Moreover, the causal link between the growth and FDI or TO and the reverse relationship between the variables required further attention. More specifically, the current paper is limited to the selected issue in the case of the Asian region. Thus, this study aims, in a broad aspect, to estimate the sustainability of Asian economies by exploring the outcomes of FDI and trade openness on sustainable economic growth, both in the short and long run. In addition, we consider two major crises, the Asian financial crisis, and the global financial crisis, in the growth model to find the exact impact of economic recession, FDI, and TO on growth in Asia. Previous studies did not consider the recession factors to measure the impact of FDI and TO on growth. Further, we employed a longer dataset of 27 years than existing studies of 30 Asian economies. We used panel data fixed-effects model, difference and system GMM estimation proposed by Arellano and Bond (1991) and Arellano and Bover (1995), long-run estimation of coefficients, and granger causality tests to produce more robust estimates, which is an almost new contribution to the existing literature.

Asian economic growth has been above the world's economic growth rate from 1991 to 2017. However, this growth shows two slumps due to the Asian financial crisis and the world recession. The Asian financial crisis resulted from currency devaluations in the South-East Asian nations in 1997. Due to the financial crisis in Asia, the flow of FDI and the economic growth rate of Asian economies dropped significantly as the crisis reached its peak. Consequently, other Asian and non-Asian countries also were affected by this crisis. South Korea, Malaysia, the Philippines, Indonesia, and Thailand were badly affected nations.

After the Great Depression of the 1930s, 2008-2009 was the most severe global financial crisis as it lasted from December 2007 to June 2009. With a global recession, consumption in the US decreased, and the savings rate increased, which affected global growth because US consumers consume more than any other country, which is the primary source of demand for many countries. The Arab countries entered the crisis due to the fall of oil prices in the world trade markets, and most Asian regions were much affected by the global recession. So, with data from various sources, we see that Asia has diverse experiences due to the world recession in 2008-2009. China's GDP growth for 2008, anticipated by the IMF, was 9.7%, reduced to 8.5% in 2009. The economy of Hong Kong slid into a downturn in the last quarter of 2008 and was determined to develop at 2% in 2009. The administration of Taiwan pronounced to reduce government expenditures and burn through billions of dollars due to falling growth and encountered a fall of 26% in the financial exchange market values in 2008. In the second quarter of 2008, the economy of Japan shrank by 0.6%, and in 2009 Malaysia experienced a shrinkage of its GDP by 1.7%. India had a minimal effect of recession as the export contains only 15% of its GDP, and it experienced a growth rate of 6.7% in the 2008-2009 FY. Bangladesh also showed strong economic growth and was thought not to be affected by the recession. The Philippines was thought to reverse the outcomes of the recession, and it recorded positive economic growth in 2009.

Since the opening up of China's domestic market, the flow of FDI has been increasing into the Asian region. India also offers a wide variety of services which paved the way for India to attract FDI. Accordingly, Japan offers industrial machinery and electric parts to the world. Now, Vietnam

and Bangladesh produce garments products at lower costs than China. Middle Eastern countries supply most of the world's crude oil and earn the FDI in oil-intensive industries.

The increased flow of FDI creates spillover effects by improving human capital and assimilating newer technologies. Moreover, foreign direct investment flow and stock, international trade flow, bulk production, and improved R&D ensure the quality and variety of products. Moreover, the flow of FDI among the Asian economies is also rising.

As WTO has been trying to ensure tariff and restriction-free trade worldwide, world trade in merchandise and services has been increasing, and trade openness is also seeing an upward trend. Soon after joining the WTO in 1995, trade openness among countries increased substantially. From the inception of SDG targets, various international bodies, researchers, and academicians have evaluated its progress towards its final achievement. Countries adopting SDG targets have taken several measures to reach the expected SDG goals. So, the effectiveness of those measures is appraised by the level of achievement in different analyses. We have now focused on the participating countries' position on SDG achievement to show the progress of the Asian economies for the time being.

From the beginning of SDGs, participating member countries have committed to devoting their efforts to achieving the destined targets within the stipulated time. As the SDG targets are fixed to achieve by 2030, Asian economies have made several determinations by this time and have shown constant progress towards achieving goals. For the economic progress in SDG-8.1.1, LDCs have a fixed target of 7% of real GDP to be achieved by 2030 to ensure sustainable growth in the world. Asian economies have continuously advanced towards SDG goals by the end of 2018. Though few countries only achieved the landmark of 7% of real GDP, most nations are on track to boost economic growth to the expected level, but some Asian economies are lagging in that perspective. So, it reminds us to bolster and strengthen the efforts towards increasing real GDP in Asian economies. Having experienced more FDI flows, increased volume of trade in merchandise and services, and more openness to trade, Asia has been growing more rapidly than any other region.

Literature Review

Foreign Direct Investment (FDI)-Economic Growth Nexus

Foreign Direct Investment (FDI) has played an optimistic and noteworthy role in the host economy by creating spillover effects. FDI has also increased aggregate production in the recipient country by combining labor and physical capital. So, FDI rests a mark on economic growth in the recipient country directly via ensuring capital stock and indirectly through ensuring human capital development and upgrading technology. Chaudhury, Nanda, and Tyagi (2020) identified the impact of FDI on the economic growth of South Asian countries for the period of 1990 to 2014. They found that the sectoral composition of FDI influences the impacts of FDI in South Asian countries. Ridzuan, Ismail, and Hamat (2018) explored the impression of FDI and trade openness on sustainable development in Malaysia using data from 1970 to 2013. Results show that FDI positively affects economic growth; it causes better income distribution and lowers carbon emissions, but trade openness leads to higher growth, better income distribution, and an insignificant environmental impact. The mixed findings suggested that Malaysian policymakers revisit existing policies, pay more attention to attracting FDI, and scrutinize the trade openness matters to ensure sustainable development by achieving SDGs.

Armeanu et al. (2018) investigated the sustainable economic growth drivers of 28 European countries from 2002 to 2012. They examined several drivers of economic growth and got the negative association of economic growth sustainability with science and technology graduates, corruption perceptions index, infrastructures, and old-age dependency ratio. In contrast, there is positive association of sustainable economic growth with traditional 18-22-year-old students and expenditure per student in higher education, total expenditure on research and development and employment rates of recent graduates. Considering the Asian Financial Crisis, several studies such as Kizilkaya, Ahmet, and Akar (2016) for 39 countries, Baharumshah and Almasaied (2009) for Malaysia, and Acharyya (2009) for India have reported FDI impact on economic growth is positive and significant.

Several studies have found an optimistic but statistically insignificant relationship between FDI and growth. Makki and Somwaru (2004) identified the influence of Foreign Direct Investment

and trade on economic growth from the perspective of 66 developing countries from 1971 to 2000 using the seemingly unrelated regression (SUR) model with three equations for cross-country analysis. The results exhibited that trade and FDI positively contributed toward advancing growth, but their effects on growth are insignificant. FDI and trade showed a strong connection, and their interaction effects are momentous in impacting growth. Using panel data approaches, Kotrajaras (2013) tried to identify the effect of FDI on economic growth by conducting research on15 East-Asian nations from 1990 to 2009. The results showed mixed nature where FDI has positive and significant consequences on economic growth in high and middle-income economies. However, it showed an insignificant effect in low-income nations. He stated that the outcomes vary based on the countries' capacity to absorb and reap the benefits of inward FDI. The same positive and statistically insignificant results were also found by Lyroudi, Papanastasiou, and Vamvakidis (2004) for 17 transition economies from 1995 to 1998. Odhiambo (2022) examined the interaction between foreign direct investment and economic growth in Kenya during 1980-2018 using the ARDL bounds testing approach. It found unidirectional causality from economic growth to FDI in Kenya.

A negative but statistically significant and insignificant finding between FDI and growth is also reported in several studies. Alfaro, Chanda, Kalemli-Ozcan, and Sayek (2010) investigated FDI and economic growth connections using the GMM panel estimators between 1981 and 1999. The outcomes demonstrated that the inflow of FDI negatively affected nations' growth. Ahmed (2012) employed OLS regression on data from 1999 to 2008 in Malaysia, struggling to spot the result of FDI and growth in the productivity of Malaysia. The discoveries displayed that inflows of FDI adversely added to the total factor productivity (TFP) and adversely influenced economic growth. Another research by Mazenda (2014) investigated the connection between FDI and financial development from 1960 to 2002, utilizing Johansen cointegration and VECM from the viewpoint of South Africa. The outcome indicated that FDI negatively affects growth in South Africa.

Trade Openness-Economic Growth Nexus

Trade openness is estimated by calculating the summation of the volume of exports and imports, which GDP normalizes. So, how trade openness affects economic growth is the most sought question over decades. The common belief is that the degree of openness makes its economy vulnerable and open to external shocks. On the other hand, greater trade openness brings higher economic growth rates. Most of the literature on trade and growth demonstrates that trade openness rests a congenial effect on an economy's growth and income levels.

The following researchers found a positive and statistically significant association between trade openness and growth. Nguyen and Bui (2021) investigated the effect of trade openness on the economic growth of ASEAN-6 countries from 2004-2019. The authors used a fixed effects model to analyze the data and found that trade openness significantly impacts economic growth, but the effect varies with the threshold level. Arabiyat, Mdanat, and Samawi (2020) investigated the nature of inclusive growth in the case of Jordan. For that purpose, researchers used the panel data of 26 years ranging from 1990 to 2015. For the estimation, they used the GMM, FMOLS, and DOLS regression models and inferred that trade openness showed an affirmative and significant consequence on inclusive growth. However, the connection is considerably enfeebled by poverty and income inequality at the national and regional levels.

However, Sachs and Warner (1995) found a positive and statistically insignificant liaison between trade openness and growth. They utilized a cross-country sample of 122 nations and a wide assortment of data to discover the cycle of worldwide combinations and evaluate its impacts on economic growth in the improving nations. They utilized cross-country pointers of exchange openness as the proportions of every nation's direction to the world economy and presumed that transparency is insufficient to create development; stable macroeconomic strategies, underlying approaches, and establishments are also required.

Polat, Shahbaz, Rehman, and Satti (2015) studied the upshot of monetary improvement on financial development in South Africa by consolidating exchange transparency in the creative work from 1970 to 2011. They utilized the Bayer-Hanck consolidated cointegration way to deal with inspecting the quite a while ago run connection between the factors. The outcomes demonstrate

that monetary improvement animates financial development, yet exchange receptiveness hinders financial development. Specialists recommended that the administration divert exchange strategies to harvest ideal products of monetary improvement since quite a while ago run financial development. The interest side speculation is approved in South Africa.

Several studies also reported mixed findings. Such as, Carvalho et al. (2019) examined the liaison between shared exchange progression and per capita GDP for 15 Latin American nations through the monetary emergency of 2008. He individually applied the expanded gravity exchange model for the pre-emergency in 2004-2006, during-emergency in 2007-2009, and post-emergency periods in 2010-2012. For the model particulars, the study utilized Geographical physiognomies and majority rule government paces of republics as an instrument for regular two-sided exchange masses. By testing various methodologies of exchange receptiveness, he discovered grouped outcomes. For example, first and foremost, a reasonably sure association between exchange receptiveness and development is discovered while thinking about just Latin American states.

Jalles (2012) explored the affiliation among openness, provincial trade agreements, and growth in the point of view of twenty-one South and South-East Asian nations for 25 years spreading from 1980-to 2004. The scientist utilized Bayesian Model Averaging (BMA), Granger Causality tests, Generalized Method of Moments (GMM), and OLS relapse models. The outcomes demonstrated a blended input for receptiveness to development in two subsamples. Chen, Zhang, and Wang (2022) examined the impact of economic growth and trade openness on the energy intensity of 30 provinces and regions in China during 2005-2018 using a dynamic panel model. They found that energy intensity is reduced by economic growth and trade openness when control variables are considered, and the regional variability of energy intensity is insignificant between the east and west of China. Furthermore, a negative relationship between the factors is found in the wake of taking out exceptions and remembering all merchant nations.

Economic Crisis and Economic Growth

Economic recession and the financial crisis substantially adversely impact the stable economic growth of developing countries. The recession transmits primarily through import-export and financial flows such as FDI, remittances, and development assistance, forcing millions back into unemployment and poverty. Afonso and Blanco-Arana (2022) reexamined the relation between economic growth and financial development in the global financial crisis of 2007-2008 in respect of EU/OECD countries during 1990-2016. They adopted random effects and the GMM model and found that financial development had both linear and non-linear impacts on economic growth, even in crises. Tadmon and Njike Tchaptchet (2022) established a stochastic model to examine the channel through which a financial crisis affects economic growth. They showed in respect of the deterministic case that the economy might come together either to a stress-free equilibrium or a stressed balance. In the stochastic case, they figured out a value around which the level of economic growth fluctuates. Li and Zhang (2022) explored the relationship between economic growth and bank development before and after the financial crisis in 2008 during 2002-2012 with quarterly data for US states. Using a two-step system GMM and granger causality test and found that in the long run, there exists bi-directional causality. In the short run, the crisis has amended the link by changing unidirectional causality before the problem to bi-directional causality after the crisis between bank development and growth. Tadmon and Njike Tchaptchet (2022a) used a mathematical model to investigate the relationships between financial crisis spread, economic growth, and unemployment. They stated that unemployment is the prime way financial crises affect economic growth.

Methods

Based on the data availability, we have collected panel data of selected 30 Asian countries, which include Bangladesh, Bahrain, Brunei Darussalam, China, Cambodia, Hong Kong, India, Indonesia, Iran, Israel, Japan, Kazakhstan, Korea, Kyrgyzstan, Kuwait, Laos, Macao, Mongolia, Malaysia, Nepal, Pakistan, Philippines, Russia, Saudi Arabia, Singapore, Sri Lanka, Tajikistan, Thailand, Turkey, and

Vietnam over the period 1991-2017. World Development Indicators (WDI), International Monetary Fund (IMF) database, and Penn World Table (PWT) are the primary sources of data.

One of the core targets of SDG-8 refers to sustainable economic growth. We use SDG target 8.1 as our dependent variable, which is at least 7% per year of GDP growth in underdeveloped economies. Our primary variable of interest is FDI and trade openness. FDI manipulates an economy directly by increasing the capital stock and indirectly by creating spillover effects, i.e., bringing new technology, knowledge, expertise, and skills to the welcoming economy. The endogenous growth model assumes FDI to affect growth endogenously by creating increasing returns in production through positive externalities and spillover effects. So, the model for this study will be generated using the Cobb-Douglas (CD) production function. Zhang (2003) followed the endogenous model to devise and formulate his study to identify the result of FDI on economic growth by enhancing the total factor productivity (TFP). We assume that FDI affects growth both indirectly and in a straight line. For the indirect impression of FDI on economic growth, we focus on how FDI affects growth through TFP. Ghosh Roy and den Berg (2006) found that countries with greater trade openness can absorb technology that arrives with FDI. This study also considers Kotrajaras's (2013) model, which explained that human capital (HC), level of infrastructure (Infra), and trade openness (TO) also impact TFP. As per the definition of production function:

$$Y = AL^{\beta_1}K^{\beta_2} \tag{1}$$

Y is the output of the economy, which is the combination of total factor productivity (A), the labor force (L), and capital stock (K). Following Zhang (2003), Ghosh Roy and Van den Berg (2006), and Kotrajaras (2013), we can define TFP in the following way,

$$A = \alpha FDI^{\beta_4}HC^{\beta_5}Infra^{\beta_6}TO^{\beta_7} \tag{2}$$

Combining Equation (1) and (2) and considering panel data,

$$Y_{it} = \alpha {L_{it}}^{\beta_1}{K_{it}}^{\beta_2}{FDI_{it}}^{\beta_3}{HC_{it}}^{\beta_4}{Infra_{it}}^{\beta_5}{TO_{it}}^{\beta_6} \tag{3}$$

Taking logarithm in Equation (3), we get

$$lnY_{it} = \beta_0 + \beta_1 lnL_{it} + \beta_2 lnK_{it} + \beta_3 lnFDI_{it} + \beta_4 lnHC_{it} + \beta_5 lnInfra_{it} + \beta_6 lnTO_{it} + u_{it} \tag{4}$$

Based on the existing literature, such as Makki and Somwaru (2004), we later combine several macro-economic variables that have an impression on the economic growth of Asian economies, such as government consumption (GC), domestic investment (DI), inflation, a dummy for Asian financial crisis, a dummy for world recession and the interaction term of FDI with trade openness (FDITO) as these variables have an impression on the economic growth of Asian economies. Thus, after rearranging the coefficient, the equation would be

$$lnGDPgr_{it} = \beta_0 + \beta_1 lnFDI_{it} + \beta_2 lnTO_{it} + \beta_3 lnHCI_{it} + \beta_4 lnDI_{it} + \beta_5 lnLabor_{it} + \beta_6 lnInfra_{it} + \beta_7 lnGC_{it} + \beta_8 ln(FDI \times TO)_{it} + \beta_9 lnInflation_{it} + \beta_{10} AFC_{it} + \beta_{11} Recession_{it} + u_{it} \tag{5}$$

Lastly, we further aim to investigate the causal relationship between FDI and TO, GDP growth, and the direction of causality using the Granger causality test. Where GDPgr denotes the per capita GDP growth rate, FDI represents the inflow of foreign direct investment(% of GDP), TO is trade openness (trade expressed as a percentage of GDP), HCI is the log of the human capital index, DI is the domestic investment refers to gross fixed capital formation used as the proportion of GDP, Labor is the log of the total labor force, Infra is the infrastructure proxied by fixed telephone line subscriptions expressed as per 100 people, and GC is the government consumption as a percentage of GDP. AFC and recession are dummy variables for the Asian financial crisis and world recession which is equal to 1 for the Asian financial crisis time (1997-1998), otherwise equal to 0, and 1 for the world recession period (2008-2009), otherwise, it is equal to 0. The subscript i stands for country i in each group where i = 1, …, 30 for Asian economies, and subscript t stands for a time where t = 1991, …, 2017.

Results and Discussion

This study uses Pesaran cross-sectionally augmented dickey fuller (pescadf) test allows researchers for accounting cross-sectional dependence among the heterogeneous panel units (Pesaran, 2004). Unit root tests for dummy or categorical variables do not make sense as they try to decide whether a stationary process generated a variable. So, we do not need to test unit roots for dummy variables. We found all variables stationary at first difference.

In theory, economic growth is affected by an extensive collection of macroeconomic variables, and it is also affected by its own lagged values (previous year's growth). The dynamic panel model measures this economic growth impact by its last year. The advantage of the dynamic panel model is the control of endogeneity problems using the instrument variable. In Tabel 1, we have used the dynamic panel model to check the endogeneity problem and the robustness.

Table 1. Regression Results
Dependent variable: Economic Growth (GDPGR)

Variables	(i) PCSE	(ii) FE-robust	(iii) Difference GMM (Two-step)	(iv) System GMM (Two-step)
L.*ln*GDPgr		0.215***	0.231**	0.414**
		(0.057)	(0.090)	(0.177)
*ln*FDI	0.337***	0.249***	0.250*	0.200*
	(0.060)	(0.083)	(0.128)	(0.098)
*ln*TO	0.002	0.014	0.057**	0.022**
	(0.003)	(0.009)	(0.021)	(0.009)
AFC	-3.041**	-3.208***	-2.789***	-3.032***
	(1.195)	(0.709)	(0.725)	(0.669)
Recession	-3.182***	-3.162***	-3.220***	-3.076***
	(1.102)	(0.487)	(0.591)	(0.586)
*ln*DI	0.084***	-0.0002	0.019	0.024
	(0.028)	(0.050)	(0.041)	(0.042)
*ln*GC	-0.139***	-0.168**	-0.126	-0.068
	(0.035)	(0.077)	(0.078)	(0.053)
*ln*Infra	-0.016	0.024	0.008	-0.010
	(0.014)	(0.025)	(0.034)	(0.026)
*ln*Inflation	-0.011***	-0.009***	-0.010***	-0.007***
	(0.002)	(0.002)	(0.002)	(0.020
*ln*Labor	0.278***	-1.137	0.048	0.153**
	(0.084)	(0.974)	(1.362)	(0.065)
*ln*HCI	0.652	-1.349	-3.926	-1.801
	(1.041)	(2.527)	(2.929)	(1.302)
*ln*FDI×*ln*TO	-0.0009***	-0.0006**	-0.0009**	-0.0009**
	(0.000)	(0.0003)	(0.000)	(0.000)
Constant	-2.062	22.72	-	-
	(1.554)	(14.63)		
Observations	725	706	676	706
Number of country	30	30	30	30
R-squared	0.285	0.274	-	-
Robust SE/Corrected SE	Yes	Yes	Yes	Yes
Groups/Instruments	-	-	30/15	30/18
AR(1) p	-	-	0.001	0.005
AR(2) p	-	-	0.416	0.725
Sargan Test (p)	-	-	0.430	0.119
Hansen Test (p)	-	-	0.470	0.398

Notes: Star signs ***, ** and * denote statistical significance at the 1%, 5% and 10% levels respectively; brackets contain standard errors under robust measures; p-values are conveyed for AR (1), AR (2), Sargan test and Hansen statistics. Estimation techniques of GMM estimator is using of xtabond2 of STATA (Roodman 2009).

In column (i), we have used the Panel Corrected Standard Errors (PCSE) to check all the problems, i.e., heteroscedasticity, cross-sectional dependence, and first-order auto-correlation problems in the short panel data model. Here, we see that FDI and TO positively affect economic growth in Asian economies, whereas AFC and Recession show significant native impact on growth. Almost all models above produced the same results for interested explanatory variables, i.e., FDI, TO, AFC, and recession, with only exceptions in some control variables.

In column (ii), the robust measure of fixed effects has been used to correct the heteroskedasticity problems. We observe closely that standard errors have increased by the robust estimation to correct them from heteroskedasticity problems. Here, we find that all four interested independent variables are significant. Foreign Direct Investment (FDI) and trade openness (TO) show coefficients of 0.299 and 0.0216, which are significant at the 0.01 level, stating that if the inflow of FDI and openness increases in Asia, the economic growth will be boosted by 0.299% and 0.0216% respectively. The dummy used for the shock of the Asian financial crisis (AFC) and recession significantly negatively impacted Asia's economic growth (GDPgr). The coefficients of -3.163 and -3.103 mean that due to the shock of financial collapse in 1997-1998 and the world recession in 2008-2009, Asian economies sharply dropped, respectively. Among control variables, domestic investment (DI) and infrastructure (Infra) positively impact growth, and other control variables, i.e., GC, HCI, labor, inflation, and interaction of FDI and TO, show a negative effect on economic growth. Inflation is negative and significant at 0.01 level with a coefficient of -0.0112 which means that if inflation goes up by 1%, it will drive economic growth down by 0.0112%. The interaction term FDI and TO shows a significant and negative influence on economic growth, and its coefficient of -0.000736 is significant at a 0.05 level.

From column (iii), we see that in the two-step difference-GMM, the lagged dependent variable (L.GDPGR) is positive and significant at 0.05 levels. Its coefficient of 0.231 states that if the previous year's economic growth changes by 1%, it will boost the current year's economic growth by 0.231%. It indicates a strong relationship between the present growth rates with the past. We observe that all of the coefficients of the lagged dependent variable are below 1, which denotes the presence of strong conditional convergence that is supported in the literature and mentioning to dynamic process stability over the methods (Fayissa & Nsiah, 2010; Petreski, 2009; Roodman, 2009).

FDI escalates the excellence of human capital in the host economy by cultivating the host country firms' methodological knowledge and management skills, thus resulting in economic growth for developing and developed nations, stated Kizilkaya et al. (2016). Here, Foreign Direct Investment (FDI) displays a positive and significant impact on economic growth. It has a coefficient of 0.250, which shows significance at the 0.10 level. It means that if the inflow of FDI increases by 1%, then economic growth will be increased by 0.250%, remaining other things the same. The same results are found in the research by Acharyya (2009) and Baharumshah and Almasaied (2009). Trade openness (TO) is positive and significant at a 0.05 level of significance which claims that trade openness in Asian economies has contributed to enhancing economic growth as the same is found earlier in the study of Arabiyat et al. (2020) and Frankel and Romer (1999). The Asian financial collapse of 1997-1998 had a substantial negative shock on Asian economies and the world. Here, we have found evidence that AFC has a negative and significant influence on economic growth. It contains a coefficient of -2.789 which means that due to the Asian financial collapse from 1997 to 1998, the Asian economic growth declined sharply. This result is justified by Thangavelu, Wei Yong, and Chongvilaivan (2009). The coefficient of recession is -3.220, which states that incongruence with the world economic recession in 2008-2009, the Asian economies also showed a downward trend in economic growth, and the value of the coefficient is statistically significant at a 0.01 level of significance. Government consumption (GC) is negative but not significant, which means if government consumption expenditure increases economic growth of a country decreases. This situation can happen when the government of any economy finances its expenditure by raising taxes on people's and corporations' incomes. Infrastructure (Infra) is positive, labour is positive, and human capital index (lnHCI) is negative, but all of these controlled variables are insignificant in explaining the variation in the dependent variable (GDPgr). As inflation hampers the normal lifestyle

of the people in any country, we have found evidence that its coefficient is negative and significant at a 0.01 level of significance. Due to a 1% increase in inflation, Asian economic growth has decreased by 0.0096%. The interaction term of foreign direct investment and trade openness (FDI×TO) is negative but significant at 0.05 with a coefficient of -0.000925.

From (iv), in the two-step system-GMM, we notice that the coefficients of all interested independent variables are significant and show the expected sign. Here, we have also found proof of the lagged dependent variable affecting economic growth, which offers a positive and considerable influence. FDI and trade openness have shown their coefficients' positive and significant value in affecting the economic development of Asian economies. Similarly, as predicted in earlier models, AFC and recession significantly negatively influence economic growth. The coefficient of control variables shows expected signs and influence on the dependent variable.

In the above table, we have displayed four different results for the economic growth model to check the robustness of the results. We observe that the static regression model results are similar to those in the dynamic panel models (difference-GMM and system-GMM). So we confirm the validity of results found in all models as the post-estimation methods prompted the accurate decision.

Estimating Long-run Impact of FDI and Trade openness on Economic Growth

This study investigates the long-run effect of FDI, trade openness, Asian financial crisis, recession, and other control variables on economic growth. In the dynamic panel model, researchers find a scope to measure the long-run coefficients of the independent variables on the explained variable. This system of approximating the long-run coefficients and the standard errors has been provided by Papke and Wooldridge (2005) in a dynamic panel data model.

Table 2 includes the long-run impact of predictor variables that were statistically significant under the system-GMM estimation. We see that the long-run coefficient of FDI is positive and statistically significant at a 5% level. The coefficient of FDI states that if the inflow of FDI increases in Asian economies by 1%, it will boost the region's economic growth by 0.038% over the long haul. Trade openness (TO) also shows a positive and significant effect on economic growth in the long run by explaining that a 1% change in openness will trigger Asian growth by 0.04%. Asian financial crisis (AFC) and recession also significantly negatively influenced economic growth in Asian economies, ultimately similar to those in the short run. As an indicator of financial instability in economic growth, inflation has negatively influenced growth studies. Here, we find the coefficient of inflation is -0.0111928, which is significant at the 0.01 level stating that if inflation increases by 1%, economic growth will decrease by 0.0112%. The long-run impact of labor is positive on economic growth, and its coefficient (0.261) is statistically significant at a 0.05 level. The interaction effect of FDI and trade openness is negative on growth in the long run, and the 0.05 level of significance validates it. Therefore, we observe that all of the significant estimates in the short run also remained significant in the long run under the system-GMM estimation.

Table 2. Long-Run Coefficients

Variables	Coefficients	Standard Errors	P>|z|
*ln*FDI	0.341	0.164	0.038**
*ln*TO	0.038	0.019	0.040**
AFC	-5.173	1.767	0.003***
Recession	-5.248	2.272	0.021**
*ln*Inflation	-0.0112	0.001	0.000***
*ln*Labor	0.261	0.115	0.023**
*ln*FDI×*ln*TO	-0.002	0.001	0.033**

N.B. ***, ** and * display the significance levels at the 1%, 5% and 10% respectively.

Granger Causality Tests

Following Dumitrescu and Hurlin (2012), we applied the Granger Causality test to estimate how FDI, GDP growth, TO, and growth influence each other. We have reported the appropriate lag structure for the test as suggested by the Akaike Information Criterion (AIC) in Table 3. The test

produces Wald statistic, Z-bar statistic, and Z-bar tilde statistic results and among these, we have presented and discussed Wald statistic and z-bar tilde statistic. Moreover, "the Z-bar tilde statistic is favoured if the number of entity (N) is large and a number of a time period (T) is small," as suggested by Dumitrescu and Hurlin (2012). The results show that FDI granger causes economic growth (GDPgr), which becomes significant at 0.05. Still, growth does not granger cause FDI as stating the existence of unidirectional causality. Government consumption (GC), labor, and human capital index have unidirectional causality to economic growth. However, trade openness (TO), domestic investment (DI), infrastructure (Infra), and inflation do not have granger causality from and to economic growth.

Table 3. Granger Causality Tests

Null Hypothesis	Wald statistic	Z-bar tilde statistic	Prob.	Conclusion
FDI does not granger cause GDPgr	22.578	2.143**	0.032	Unidirectional
GDPgr does not granger cause FDI	17.308	1.108	0.268	causality
TO does not granger cause GDPGR	12.430	0.150	0.881	No granger
GDPgr does not granger cause TO	10.938	-0.143	0.886	causality
DI does not granger cause GDPgr	19.822	1.602	0.109	No granger
GDPgr does not granger cause DI	14.612	0.578	0.563	causality
GC does not granger cause GDPgr	22.980	2.222**	0.026	Unidirectional
GDPgr does not granger cause GC	10.098	-0.308	0.758	causality
Infra does not granger cause GDPgr	14.066	0.439	0.661	No granger
GDPgr does not granger cause Infra	10.883	-0.143	0.886	causality
Inflation does not granger cause GDPgr	10.392	-0.233	0.816	No granger
GDPgr does not granger cause Inflation	10.771	-0.164	0.870	causality
Labor does not granger cause GDPgr	26.864	2.776***	0.006	Unidirectional
GDPgr does not granger cause Labor	9.554	-0.386	0.699	causality
HCI does not granger cause GDPgr	28.302	3.042***	0.002	Unidirectional
GDPgr does not granger cause HCI	10.018	-0.301	0.763	causality

N.B. 1%, 5% and 10% significance levels are represented by ***, ** and *. The lag order selection was made based on the AIC criteria.

Conclusion

This study shows that almost all regression techniques produce positive results for FDI. If FDI increases, economic growth also increases in Asian economies in the short and long run. FDI displayed unidirectional causality to economic growth, whereas trade openness showed no Granger-causality from and to the economic growth of Asian economies. Expectedly, trade openness also positively influences economic growth, which elaborates that when an economy is exposed to the outer world, its volume of trade, competition, and rivalry among the producers increase, thereby leading to higher growth. The Asian financial crisis shock and the world recession have negatively influenced Asian economic growth. From almost all techniques, Asian financial crisis and recession showed a negative and significant effect on Asian economic growth. Domestic investment, infrastructure, labor, and human capital show mixed results on economic growth based on different regression methods from all control variables. Government consumption, inflation, and the interaction effect of FDI and trade openness showed a negative outcome on economic growth in all tests.

Asian policymakers should formulate and implement policies to ease business and ensure a favorable environment for foreign investment and open trade. Asian economies need to formulate and implement shock absorptive and cautionary policies to keep the economy strong and viable to prevent regular economic activities from financial collapse. Moreover, the economic cost of a crisis can be reduced by ensuring a decent macroeconomic environment, a high level of reserve management, and a sound banking system. Asian policymakers must pay special attention to curbing the inflation rate and formulate updated policies by revisiting existing policies regarding

human capital and government consumption expenditures to achieve SDG-8 (decent work and economic growth) within the stipulated time.

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