sustainability

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The Impact of Trade Openness on Economic Stability in Asian Countries

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Abstract: The purpose of this study was to investigate the nexus between trade openness and three aspects of macroeconomic stability, including growth stability, inflation stability, and exchange rate stability, in 20 Asian countries from 2011 to 2019. The empirical analysis was carried out with the help of the autoregressive distributed lag (ADRL) model to examine the impact of trade openness on economic stability. Our results revealed that trade openness was negatively associated with the growth stability of the countries located in the Asian region, while the opposite was true for exchange rate stability in the short run. There was, however, no relation between trade openness and inflation stability, which requires further investigation. In addition to contributing new empirical evidence to academic literature, our study expects to have important implications for policymakers. In particular, Asian countries are recommended to speed up the process of trade liberalisation to accelerate long-run economic growth and exchange rate stability.

Keywords: trade openness; macroeconomic stability; Asian countries; ADRL

Citation: Nguyen, V.M.H.; Ho, T.H.; Nguyen, L.H.; Pham, A.T.H. The Impact of Trade Openness on Economic Stability in Asian Countries. *Sustainability* **2023**, *15*, 11736. https://doi.org/10.3390/su151511736

Academic Editor: Bruce Morley

Received: 3 May 2023
Revised: 9 June 2023
Accepted: 15 June 2023
Published: 30 July 2023

1. Introduction

It is commonly acknowledged that a stable macroeconomic environment is required for sustainable economic growth by providing a more secure environment for private sector investment decisions [1,2]. There is also compelling evidence, which is the contents and implementation of the macroeconomic reform agenda of the 1990s, to support this viewpoint [3]. For instance, in Latin America, the restoration of budgetary restraint and the decline in inflation came before the resumption of economic growth in Chile and Mexico. In contrast, the macroeconomic instability and high inflation that characterise the economic crises in Brazil and Argentina are punctuated by attempts at stabilisation. The rapidly developing nations of East Asia typically maintain single-digit or low double-digit inflation and largely avoided a balance of payments crises. Even when they experienced them, as in the case of Korea in 1980, they moved quickly to address them [4]. In light of this foundation, more recent research on macroeconomic stability frequently focuses on three key factors, including output growth stability, inflation stability, and exchange rate stability [5–8].

However, Fischer (1992) also stated that macroeconomic stability alone is insufficient for sustained growth [2]. Instead, the overall economic strategy pursued by outward orientation is also crucial. Following Fischer's view, current studies indicate that trade openness ("trade openness" can also be termed "trade liberalisation" by many other research articles. For the sake of consistency, in this paper, we will only use the term "trade openness") contributed significantly to the process of sustainable economic growth not only

in developed but also in developing countries [8–10]. Therefore, a country should engage in cross-border commerce with other nations. Additionally, it should boost production to compete with other trading partners in order to earn foreign currency from exporting goods and services. Because there is an abundance of unskilled labour in developing countries, trade openness allows a country's comparative advantage to be fully utilised by amplifying ideas and innovations, resulting in high returns on investments and enhancement of production [11–16]. For these reasons, trade openness is a crucial component of scholarly and policy discussion. Up until now, there is still an uncertainty on whether there is any relationship between trade openness and sustainable economic growth.

Regarding practical implications, policymakers, particularly in the developing world, were forced to reconsider the current import substitution policies and replace them with outward-oriented growth policies (i.e., trade openness). This development is a result of the impressive growth experiences of the Tiger economies in the East Asian region, as well as the recent marvellous growth experiences of China and India, which eventually provides an opportunity for developing countries to catch up with the richer counterpart [9,17,18]. Furthermore, the World Bank and International Monetary Fund both consider trade openness to be a vital part of the structural adjustment program in various developing countries. For example, trade openness can contribute to human development and sustainable economic growth, and it can then solve the problem of poverty and unemployment [19–21].

With respect to academic literature, many theories suggest the importance of trade openness in economic growth. Examples include the *neoclassical growth theory* [22,23] and the *absolute advantage theory* [24,25]. These theories emphasise how international trade influences changes in productivity and institutional quality, and are referred to as the "integration view" since it explains the importance of market integration and its obstacles in promoting global economic convergence. Furthermore, it is also the main factor affecting the sustainable growth of developing countries [26]. On the other hand, the *development of endogenous (new) growth theory* show that economic growth is exogenously accelerated by the technical progress—an endogenous factor rather than an exogenous one. Therefore, several policies such as R&D (Research and Development) expenditures, human capital, and trade openness could improve economic growth since the positively impact on technological change. This theory also asserts that interactions with other nations cannot result in long-term economic growth. Instead, sustainable economic growth can be achieved by expanding the scope of spillover [12,27–30]. Furthermore, the *compensation hypothesis* claims that economic growth stability (many studies also use the term "volatility" or "instability" instead of "stability". Since the two terms are interchangeable, in this paper, we shall use the term "stability") is seen as the consequential effect of either trade openness or increased trade exposure that dampers domestic economic stability [31–34]. In this paper, we reveal several gaps that we expect to contribute significantly to the literature. First, even though the stories of flourishing economic growth of Asia countries conveyed the importance of trade openness policies [9], until now, no study covered the whole Asia region related to the relationship between trade openness and economic growth. According to our knowledge, the literature regarding the relationship between trade openness and economic growth focused mostly on developed countries [32,33,35–38], or cross economies [39–43]. As for the Asian region, only several particular Asia countries were studied separately, i.e., Malaysia [44–46]; Pakistan and India [47,48], or several South Asian countries [49]. There were also studies conducted in countries and regions other than Asia [16,38,50–52]. Muinir et al. (2015) and Amna Intisa et al. (2020),might be the exceptions with respect to Asian region studies, but their data only covered up to the year 2010 and 2017, respectively [53,54]. Second, most studies paid attention to the nexus between trade openness and economic growth, while only a few concentrated on other aspects of macroeconomic stability, i.e., inflation stability [55] and exchange rate stability [56–58]. However, no study simultaneously examined all three aspects of macroeconomic stability, including growth stability, inflation stability, and exchange rate stability. Third, the previous studies showed no consensus in the empirical results based on

the above-mentioned theories. Instead, studies produced mixed and ambiguous results for the past few decades. On the one hand, an increasing number of academics discovered the beneficial effect of trade openness on economic growth [8,38,39,45,47]. On the other hand, some empirical studies found that trade openness hinders economic development [9,59–68]. By contrast, several other studies claimed conflicting results between trade openness and economic growth. For instance, Kim, Lin, and Suen (2016) found that trade openness enhances growth stability in the short run, but it eventually contributes to lower output stability in the long run in cross-countries [41]. The results above were further confirmed by the studies of Udeagha and Ngepah (2021) and Bartak et al. (2021) [16,40]. In particular, they additionally examined the nonlinear relationship and concluded that higher trade openness hampers economic growth, whereas lower trade openness induces increases in economic growth in the long run. Lastly, some studies contended that there is no proof that trade openness has an impact on economic growth [26,53,65,68,69].

With an aim to address the above research gaps, our study first provides empirical evidence on the nexus between trade openness and the three aspects of macroeconomic stability, adapted from Fischer (1992), in 20 Asian countries from 2011 to 2019 [2]. In recent years, it was noticed that Asian countries shifted toward a more liberal regime [18]. Therefore, an empirical study of the relationship between trade openness and economic stability would be helpful for policymakers to execute and implement the proper international trade policies in light of the observed statistics. Sustainable economic development is important [70,71], and so, it is important to find strategies or policies that promote it. If trade liberalisation has a beneficial effect on economic growth, policymakers will have simpler choices regarding foreign trade policies. However, alternative measures would need to be taken if trade openness did not promote development [72].

Our results demonstrate that trade openness has a significant long- and short-term impact on sustainable economic growth through macroeconomic stability across the Asian region, as assessed by the gross domestic products (GDP) fluctuations. However, the inflation stability-indicated link between trade openness and macroeconomic stability was negligible. Additionally, when macroeconomic stability was gauged by changes in exchange rates, higher trade openness raised macroeconomic growth stability in the short term.

The remainder of this study is structured as follows. Section 2 outlines the theoretical framework and reviews the relevant research on trade openness and economic stability to consequently propose the research hypotheses. Section 3 explains the methodology and the details of the data used in this study. Section 4 reports the empirical results and discussions, while Section 5 offers a summary of our findings and concluding remarks.

2. Literature Review

2.1. Theoretical Background

2.1.1. The Three Aspects of Macroeconomic Stability

According to Fischer (1992), a stable macroeconomic framework is an essential condition for a sustainable growth of an economy [2]. However, Fischer also stated that, by itself, the term macroeconomic stability is difficult to succinctly yet sufficiently define. The World Bank (1990) stated that macroeconomic stability is achieved within the five conditions of low and predictable inflation, appropriate interest rate, stable and sustainable fiscal policies, competitive and predictable real exchange rate, and viable balance of payments. From that premise, more recent studies on macroeconomic stability often focused on three main aspects, which could be aptly named "growth stability", "inflation stability", and "exchange rate stability" [5–8]. For the first aspect, growth stability, economic growth is calculated based on the growth of a country's GDP. In particular, the standard deviation of the annual GDP or GDP per capita growth rate (the latter is also coined by the World Bank as "output volatility") is a preferred measurement of the macroeconomic growth stability of a country (see, for example, [39,40,73]). There are two main reasons why scholars often use the standard deviation of GDP/GDP per capita as a measure for macroeconomic growth stability. First, GDP growth often results from changes in fiscal and monetary policies (see,

for example, [74,75]). Second, GDP growth is also impacted by changes in interest rates. The widely available data of countries' GDP or GDP per capita allows this strand of literature to compare economic growth stability between a large number of countries over a long period. For instance, Balavac and Pugh (2016) applied the formula to determine the relationship between trade openness and GDP stability in 25 transition countries from 1996 to 2010 [39]. In the same year, Chenaf-Nicet and Rougier (2016) examined the impact of macroeconomic stability, proxied by GDP stability, on foreign direct investments (FDI) flows between European Union (EU) and Middle East/North African (MENA) countries [73]. More recently, Bartak et al. (2021) conducted an episodic-approach study on the macroeconomic stability of as many as 182 countries over a long period of 67 years (from 1951 to 2017) relying on the above GDP stability formula [40].

Following Fischer's suggestion that macroeconomic stability can be impacted by inflation, the second aspect of macroeconomic stability research is "inflation stability". Studies in this research stream often examine the impact of inflation or inflation stability on the economic growth of a country. The original measure for inflation stability was developed by Grier and Tulloc (1989) and then Fischer (1992), who employed the standard deviation of the inflation rate as a proxied measure [76]. Similar to GDP-related data, inflation is readily available and, thus, can be used for studies across many countries over a long period. Therefore, studies usually used inflation as one of the core variables affecting the economic growth of countries, as well as their stability. One notable study is Al-Marhubi's (1998) research on the role of inflation stability on economic growth across 78 countries over the period of 21 years (1965–1985) [77]. In, perhaps, one of the most extensive studies in the field, Judson and Orphanies (1999) examined the relationship between inflation stability and macroeconomic growth across 119 countries over 34 years from 1959 to 1992 using Grier and Tulloc's measure [78].

Finally, the third main aspect of macroeconomic stability addresses the balance of payments in a country, often represented through its "exchange rate stability". To calculate this aspect, researchers usually apply the standard deviation of a country's real exchange rate. This measure is based on a theoretical contribution by Obstfeld and Rogoff (1998) [79]. In particular, they suggested that exchange rates uncertainties could result in an unexpected appreciation of a country's currency and, thus, could adversely affect its economic growth. The above measure also shares the advantage of the GDP and inflation measures, which is the wide availability of its data. Therefore, studies also employ the measure for exchange rate stability in multi-country research across a long period of time. Examples include Schnabl's (2008) study focusing on 41 small open economies around the European Monetary Union (EMU) border from 1994 to 2005 [80]. More recently and using the same measure, Morina et al. (2020) studied the impact of the balance of payments, proxied by the real exchange rate stability formula, on Central and Eastern European countries' macroeconomic growth [81].

2.1.2. Trade Openness

In this section, we present several theories that inform our sustainability study on macroeconomic stability. Regarding economic growth, there are mainly three strands.

In the first strand, the *neoclassical growth theory* suggests that trade openness can encourage capital formation and better resource allocation effectiveness, thereby facilitating an improvement in the quality of economic growth [8,23]. Similarly, the *absolute advantage theory* contends that access to bigger global markets via international trade increases productivity [24,25]. On the other hand, it was also suggested that trade can harm a country's growth potential if foreign demand is biased toward products with a lower learning potential [82] and that trade restrictions can lead to a reallocation of resources to the sectors with a higher growth potential [83]. In the second strand, the *new growth theory* demonstrates how technological advancement is an endogenous factor rather than an exogenous one that exogenously accelerates economic development. Therefore, given their favourable effects on technological change, several policies, including R&D spending, human capital, and trade openness in

knowledge-based industries, could enhance economic development. According to this theory, interactions with other countries cannot lead to long-term economic development because they only serve to broaden the scope of spillover effects. Increased foreign trade necessitates integration into deeper, more extensive, and stable markets. Thus, it may also require risk diversification, which may increase stability [8,12,27–30,47].

Finally, the *compensation hypothesis* claims that economic growth stability is seen as the consequential effects of trade openness. Since increased trade exposure reduces domestic economic stability, demands for compensation via generous systems of transfers and services increase. Additionally, because governments spend more on welfare to compensate individuals harmed by trade, more open economies typically have higher levels of spending [32,33,38,84].

For the other aspects, the *new growth theory* also explains that trade openness is likely to affect inflation by affecting output through increased foreign investment. Ashra (2002) explained the mechanism as follows: (1) improved efficiency, lowering costs by altering the composition of inputs used both domestically and internationally, (2) best use of resources, (3) improved capacity utilisation, and (4) increased foreign investment, thus increasing output growth and relieve price pressure [85].

In terms of the real exchange rate, the *macroeconomic theory* claims that non-monetary variables (i.e., productivity shocks, demand shocks, and labour supply shocks) may clarify real exchange rate stability. Additionally, the effect of these shocks on the real exchange rate may be slowed down or amplified depending on how open a market is [56,57].

2.2. Trade Openness and Its Impact on the Economy

Many studies employing at least one of the above aspects of macroeconomic stability also include trade openness as a very important variable affecting it. According to Yanikkaya (2003), a clear and fixed definition of trade openness was lacking [86]. In the beginning, and by definition, trade openness can be achieved by employing favourable exchange rate policies towards a country's export sector, regardless of the policies employed in its importing sector [87]. This definition was then amended by Harrison [88] (p. 420), who stated that trade openness should be treated as trade neutrality, which means a unit of foreign exchange saved through import substitution should equal a unit of foreign exchange earned through exports. More recently, the definition of trade openness is gradually becoming closer to the term "free trade", the system in which are no deliberate trade distortions or bias [86]. According to past economic studies, there is a significant relationship between trade openness and each of the three main aspects usually employed to explain countries' macroeconomic stability.

First, there are many studies on the impact of trade openness on GDP growth of countries. Classically, Rodrick et al. (2004) indicated that trade shares are not influential in determining accumulation or productivity [26]. Furthermore, when they controlled institutional quality, trade was almost always insignificant or often resulted in negative sign with the income levels of 79 countries. In 2016, Kim et al. examined the impact of trade on the economic growth stability of 73 countries over 52 years from 1960 to 2011 [41]. Relying on GDP growth stability as the main measure, they find trade openness reduces growth stability in the short run but increases it in the long run. In a more focused study on India and Pakistan's macroeconomic stability within the 30 years from 1985 to 2014, Adeel-Farooq et al. (2017) indicated that trade openness significantly and positively impacts the economic growth stability of the two countries [47]. More recently, Kong et al. (2021) concluded that trade openness can improve the quality of China's economic growth stability in both the short and long term [8]. In short, the previous studies showed no consensus in the empirical results based on the above-mentioned theories. Instead, studies produced mixed and ambiguous results for the past few decades. Hence, to conform with many past studies, we posit hypotheses H1a and H1b below:

H1a. *Trade openness has a positive impact on countries' growth stability in the short term.*

H1b. *Trade openness has a positive impact on countries' growth stability in the long term.*

Second, there are also studies that focused on the relationship of trade openness and inflation stability. However, they are seemingly less common than those on trade openness and growth stability. In addition, the focus is not only on inflation stability, but also current inflation level and its impact on macroeconomic stability together with trade openness. A specific example is Kim et al. (2016), in which they found that within a more open trade regime, countries with low inflation tend to have a lower macroeconomic stability in the short run, but higher stability in the long run [41]. More recently, Nguyen et al. (2022) confirmed that trade openness has a small but negative relationship with inflation stability in Vietnam from 1997 to 2020 [55]. Nevertheless, some other studies claimed that there is no significant relationship between trade openness and inflation stability. For example, Binici et al. (2012) concluded that trade openness does not impact the Organisation for Economic Cooperation and Development (OECD) countries' inflation [89]. Similarly, Munir et al.'s (2015) research on nine Asian countries from 1976 to 2010 found no significant association between trade openness and inflation stability [53]. We aimed to provide insights into this conflicting research area by stating the null hypotheses H2a and H2b below:

H2a. *Trade openness has no impact on countries' inflation stability in the short term.*

H2b. *Trade openness has no impact on countries' inflation stability in the long term.*

Third, studies on the relationship between trade openness and exchange rate stability usually indicate a positive association between the two variables. (Or, in other words, most of those studies indicate a negative association between trade openness and exchange rate volatility, as a reduction in (negative relationship with) volatility is an increase in (positive relationship with) stability.) Moreover, studies also often signify the importance of both variables in improving sustainable economic growth in general. For example, Baharom et al.'s (2008) study in Malaysia during 1975–2005 confirmed that trade openness and the balance of payments, proxied by the exchange rate, have a positive relationship [45]. Baharom et al. also stated that both variables also positively affect economic growth [45]. In their research of 82 countries from 1974 to 2013, Calderón and Kubota (2018) state that trade openness improves countries' real exchange rate stability [56]. In a more recent study in South Africa, Mpofu (2021) also confirmed that a positive relationship exists between trade openness and real exchange rate stability [58]. Based on past studies, we introduce hypotheses H3a and H3b below to verify again the positive relationship between trade openness and exchange rate stability:

H3a. *Trade openness has a positive impact on countries' exchange rate stability in the short term.*

H3b. *Trade openness has a positive impact on countries' exchange rate stability in the long term.*

3. Data and Methodology

3.1. Data

We used secondary data collected from the World Bank (www.databank.worldbank.org, accessed on 1 February 2023). Twenty Asian countries were studied from 2011 to 2019: Armenia, Azerbaijan, Bangladesh, Brunei Darussalam, Bhutan, China, Georgia, India, Israel, (it is notable that, among the countries whose data were collected, Israel stands out as a developed OECD country. Therefore, its unique characteristics relative to the other examined countries could significantly impact the regression's results. To ensure the robustness of our model, we attempted to re-run the regression without the data from Israel. However, the results remain almost the same, which is why we did not include them in this paper. Results of this variant will be provided upon request) Kazakhstan, Kyrgyz Republic, Cambodia, Sri Lanka, Maldives, Malaysia, Pakistan, Philippines, Singapore, Thailand, and Vietnam. This period was chosen because of the availability and certainty

of data. In particular, the global crisis period of 2008–2010 and the COVID-19 pandemic period of 2020–2022 were not included, ensuring the results of this study are not affected by global-scale negative events.

3.2. Research Model

To assess the impact of trade openness on macroeconomic stability in Asian countries, we used the research models set up by Baharom et al. (2008), Zhang et al. (2019), and Kong et al. (2021) as follows [8,45,90]:

$$MS_{it} = \beta_0 + \beta_1 TOP_{it} + \beta_2 Z_{it} + \varepsilon_{it} \quad (1)$$

where i stands for the i-th country, t for year t, MS represents macroeconomic stability variable, TOP is trade openness, and Z are control variables. The control variables inherited from the previous studies include employment ratio, government capital reserves, private capital reserves, money supply, and foreign direct investment FDI.

As for the control variable, following previous studies on trade openness and macroeconomic stability, we used the following variables: employment rate [91]; government and private capital reserves [92–94]; and foreign direct investment (FDI) [8,45,95]. Table 1 below describes the variables in the research model in detail.

Table 1. Description of research variables in the model.

	Variable	Explanation	Measure
MS	Macroeconomic stability	Growth stability	Standard deviation of the annual GDP growth rate (SD_LNGDP)
		Inflation stability	Standard deviation of the annual inflation rate (SD_INFLATION)
		Exchange rate stability	Standard deviation of real exchange rate (SD_EXCHANGE)
TOP	Trade openness	Ratio of import and export difference to GDP	(Export—Import)/GDP
Z	Control variables	Employment rate	Standard deviation of the ratio of employed workers which is divided by the total number of people in the labour force (SD_EMP)
		Government capital reserves	GOV.
		Private capital reserves	PRI
		Foreign direct investment	Ln (FDI)
		M2 Monetary Aggregate	The ratio of M2 money supply to GDP (M2_GDP)

Source: Synthesis of the author team.

3.3. Research Methodology

We used the autoregressive distributed lag (ARDL) framework to estimate the model (1) because ARDL is considered a successful, flexible, and easy-to-use model for analysing multivariate time series or tabular data. When investigating time series, the first step is to check the stationarity of the data series. According to Pesaran et al. (2001), the ARDL model is flexible in handling time series cases that are not of the same integrated order [96]. Additionally, it also has more advantages in reliability than Johansen's cointegration test technique in the case of small sample sizes. In terms of estimating long-term relationships, the ARDL model does not estimate the system of equations but estimates each equation separately and can accept the different lags of the variables in the model.

To implement the ARDL model, after unit root testing of the data series, we took the following steps:

1. Determine the lags of variables in the model via the Akaike Information Criterion (AIC) and Schwarz Criterion (SC);
2. Determine the co-integration between variables and looks for long-term relationships between variables;

3. Test the long-term relationships between variables in the model through the ARDL regression model with defined lags;
4. Verify standard distribution and autocorrelation of residuals and data interpolation.

4. Empirical Results

4.1. Preliminary Investigation

4.1.1. Descriptive Statistics

Table 2 presents the statistical results describing the variables observed in the model. It shows that for the indicator of macroeconomic stability, the standard deviation of the SD_GDP was at an average of 1.28%, fluctuating from 0.03% to 8.34%. The standard deviation of the SD_INFLATION was 1.21%, fluctuating in the range of 0.02–5.85%. The standard deviation of SD_EXCHANGE was 201.95% on average, fluctuating between 0.00% and 1408.68%.

Table 2. Statistics describing the study sample.

	SD_GDP	SD_INF	SD_EX	*TOP*	SD_EMP	GOV.	PRI	LN_FDI	M2_GDP
N	177	177	177	177	177	177	177	177	177
Min	0.03	0.02	0.00	4.21	0.01	8.66	8.97	14.79	26.69
1 sq qu	0.38	0.51	0.12	10.72	0.20	10.56	11.00	20.61	43.02
Median	0.75	1.06	1.22	16.79	0.36	11.85	13.11	22.04	63.09
Mean	1.24	1.38	58.11	24.81	0.49	11.73	12.63	21.99	75.69
3rd qu	1.80	1.84	6.22	26.69	0.70	12.67	13.64	23.35	93.76
Max	8.34	5.85	1408.68	112.19	2.07	15.51	16.42	26.40	207.67
Var	1.63	1.46	40,785.78	660.11	0.13	2.73	3.34	4.72	1752.92
Sd	1.28	1.21	201.95	25.69	0.37	1.65	1.83	2.17	41.87

Note: Collated by the author. SD_GDP: Standard deviation of the annual GDP growth rate; SD_INFLATION: Standard deviation of the annual inflation rate; SD_EXCHANNGE: Standard deviation of real exchange rate; *TOP*: Trade openness; SD_EMP: Standard deviation of the ratio of employed workers to the total number of people in the labore force; GOV: Government capital reserves; PRI: Private capital reserves; LN_FDI: Natural log of Foreign Direct Investment; M2_GDP: The ratio of M2 money supply to GDP.

For other indicators, trade openness (*TOP*) was measured through the ratio of import and export difference to GDP with an average of 24.81%, fluctuating in the 4.21–112.19% range. The standard deviation of SD_EMP was 0.49% on average, with fluctuations in the 0.01–2.07% range. Government capital reserves (GOV), at an average of 11.73% of GDP, fluctuated between 8.66% and 15.51%. Private capital reserves (PRI) were 12.63% of GDP on average, fluctuating from 8.97% to 16.42%. The value of foreign direct investment (LN_FDI), at an average of 21.99, fluctuated between 14.79 and 26.4. The ratio of M2 money supply to GDP (M2_GDP) had an average of 75.69% and fluctuated from 26.69% to 207.67%.

4.1.2. Correlation Coefficient Matrix

Table 3 reports the analysis results of the correlation coefficient between variables in the model. The results indicate that the independent variables were poorly correlated with each other, suggesting that there was no multicollinearity between the independent variables. In addition, *TOP* had a positive correlation with the SD_GDP and SD_INFLATION but a negative correlation with the SD_EXCHANGE. The correlation coefficients in Table 4 only reflect the correlation in the linear regression model. Because the linear correlation coefficient was low, the linear regression model cannot be used and we need to find another one. Through the Dickey–Fuller augmented test, it indicates that ARDL model can be suitable. In terms of statistics, the adjusted R-squares coefficient of 0.3 or more was still considered acceptable.

Table 3. Correlation coefficient matrix.

	SD_GDP	SD_INF	SD_EX	*TOP*	SD_EMP	GOV	PRI	FDI	M2_GDP
SD_GDP	1.000								
SD_INF	0.299	1.000							
SD_EX	−0.190	0.117	1.000						
TOP	0.282	0.074	−0.175	1.000					
SD_EMP	0.317	0.035	−0.113	0.198	1.000				
GOV.	−0.278	−0.138	−0.060	−0.296	−0.149	1.000			
PRI	−0.247	−0.139	−0.092	−0.278	−0.150	0.962	1.000		
FDI	−0.163	−0.154	−0.040	−0.003	−0.233	−0.120	−0.166	1.000	
M2_GDP	−0.220	−0.315	−0.086	0.060	−0.121	0.145	0.111	0.709	1.000

Table 4. Dickey–Fuller augmented test.

Variables	ADF Statistic	Lags Order	*p*–Value	Conclusion
SD_GDP	−4.2272	5	0.01000	Stationary
SD_INFLATION	−4.4111	5	0.01000	Stationary
SD_EXCHANGE	−3.9956	5	0.01094	Stationary
TOP	−4.1148	5	0.01000	Stationary
SD_EMP	−4.4535	5	0.01000	Stationary
GOV.	−3.8549	5	0.01786	Stationary
PRI	−3.4540	5	0.04869	Stationary
LN_FDI	−3.8664	5	0.01729	Stationary
M2_GDP	−3.9677	5	0.01231	Stationary

4.2. Unit-Root Test and Co-Integration Test

4.2.1. Unit-Root Test

Table 4 shows that all variables through the Dickey–Fuller augmented test had *p*-values under 5% significance. Therefore, we have grounds to conclude that the data series was all stationary. That is, the data are eligible to build an ARDL model between dependent variables and independent variables.

4.2.2. Co-Integration Test

Table 5—Panel A shows that in the Trace and Maximum eigenvalue tests, only in the case of 1 co-integration vector that the critical values at both 5% and 1% were less than the corresponding statistical value. This result means that there exists a cointegration relationship between variables. Thus, we have a basis for considering the long-term ARDL model. For Panel B, in the Trace and Maximum eigenvalue tests, only in the case of 0 co-integration vectors, the critical values at both 5% and 1% were smaller than the respective statistical value. This result means that there exists a unique co-integration relationship between the variables and there is a basis for considering the long-run ARDL model. Finally, in Panel C, the Trace and Maximum eigenvalue tests show that the critical values at both 5% and 1% were less than the corresponding statistical value only in the case of 0 co-integration vectors. This result means that there exists a co-integration relationship among the variables. Therefore, there is a basis for considering the long-term ARDL model.

4.2.3. ARDL Model Selection

The results in Table 6—Panel A describe the evaluation index of the Akaike information criterion AIC estimation model with the dependent variable SD_GDP. The results show that in ARDL models with different order coefficients, the ARDL model (1,2,1,1,1,0,0) had the lowest Akaike information criterion of 500.3201. Therefore, this model is best suited for data interpolation. On the other hand, Panel B shows that in ARDL models with different order coefficients, the ARDL model (1,0,0,2,2,0,0) had the lowest Akaike information criterion of 499.06930. Therefore, this model is best suited for data interpolation. Finally, the results in Table 6—Panel C show that the ARDL model (1,2,0,1,1,1,1) had the

lowest Akaike information criterion of 2239,865. Therefore, this model is best suited for data interpolation.

Table 5. Trace and Maximum eigenvalue tests.

Test	Null Hypothesis	Statistic	5% Critical Value	1% Critical Value
Panel A: SD_GDP				
Trace	0 co-integration vector	187.69	124.25	136.06
	1 co-integration vector	124.62	90.39	104.20
	2 co-integration vector	64.58	70.60	78.87
	3 co-integration vector	42.88	48.28	55.43
	4 co-integration vector	25.90	31.52	37.22
	5 co-integration vector	13.12	17.95	23.52
	6 co-integration vector	4.60	8.18	11.65
Maximum eigenvalue	0 co-integration vector	63.07	44.91	51.30
	1 co-integration vector	60.04	39.43	44.59
	2 co-integration vector	21.70	33.32	38.78
	3 co-integration vector	16.98	27.14	32.14
	4 co-integration vector	12.79	21.07	25.75
	5 co-integration vector	8.51	14.90	19.19
	6 co-integration vector	4.60	8.18	11.65
Panel B: SD_INFLATION				
Trace	0 co-integration vector	164.89	124.25	136.06
	1 co-integration vector	101.05	90.39	104.20
	2 co-integration vector	64.64	70.60	78.87
	3 co-integration vector	43.11	48.28	55.43
	4 co-integration vector	26.16	31.52	37.22
	5 co-integration vector	12.93	17.95	23.52
	6 co-integration vector	4.54	8.18	11.65
Maximum eigenvalue	0 co-integration vector	63.84	44.91	51.30
	1 co-integration vector	36.42	39.43	44.59
	2 co-integration vector	21.53	33.32	38.78
	3 co-integration vector	16.95	27.14	32.14
	4 co-integration vector	13.23	21.07	25.75
	5 co-integration vector	8.39	14.90	19.19
	6 co-integration vector	4.54	8.18	11.65
Panel C: SD_EXCHANGE				
Trace	0 co-integration vector	163.68	124.25	136.06
	1 co-integration vector	100.57	90.39	104.20
	2 co-integration vector	63.17	70.60	78.87
	3 co-integration vector	41.82	48.28	55.43
	4 co-integration vector	25.68	31.52	37.22
	5 co-integration vector	13.07	17.95	23.52
	6 co-integration vector	4.76	8.18	11.65
Maximum eigenvalue	0 co-integration vector	63.11	44.91	51.3
	1 co-integration vector	37.4	39.43	44.59
	2 co-integration vector	21.35	33.32	38.78
	3 co-integration vector	16.14	27.14	32.14
	4 co-integration vector	12.61	21.07	25.75
	5 co-integration vector	8.31	14.9	19.19
	6 co-integration vector	4.76	8.18	11.65

Table 6. Model selection according to the AIC index.

Panel A: SD_GDP								
ID	**SD_GDP**	***TOP***	**SD_EMP**	**GOV.**	**PRI**	**LN_FDI**	**M2_GDP**	**AIC**
1	1	2	1	1	1	0	0	500.3201
2	1	2	1	1	1	0	1	500.4397
3	1	2	1	0	1	0	0	500.8088
4	1	2	0	1	1	0	0	500.8367
5	1	2	1	1	2	0	0	501.4777
6	1	2	1	1	1	1	1	501.9884
7	1	2	0	1	1	1	1	502.0566
8	1	2	1	2	1	1	1	502.8354
9	1	2	1	1	2	1	1	503.1007
10	1	1	1	1	1	1	1	505.0645
Panel B: SD_INFLATION								
ID	**SD_INFLATION**	***TOP***	**SD_EMP**	**GOV**	**PRI**	**LN_FDI**	**M2_GDP**	**AIC**
1	1	0	0	2	2	0	0	499.06930
2	1	0	0	2	2	0	1	500.53410
3	1	0	0	2	2	1	1	502.51820
4	1	0	0	2	1	1	1	502.92650
5	1	0	0	1	1	1	1	503.15890
6	1	0	1	1	1	1	1	504.58890
7	1	1	1	1	1	1	1	506.43510
Panel C: SD_EXCHANGE								
ID	**SD_EXCHANGE**	***TOP***	**SD_EMP**	**GOV**	**PRI**	**LN_FDI**	**M2_GDP**	**AIC**
1	1	2	0	1	1	1	1	2239.865
2	1	2	0	1	1	1	2	2240.203
3	1	2	0	1	1	2	1	2241.000
4	1	2	1	1	1	1	1	2241.800
5	1	2	0	1	2	1	1	2241.841
6	1	2	0	2	1	1	1	2241.865
7	1	1	1	1	1	1	1	2251.506

4.3. ARDL Model Estimation Results

4.3.1. ARDL Model Estimation Results

Table 7—Panel A presents the results of the ARDL model regression (1,2,1,1,1,0,0), the specific estimation coefficient was as follows:

Table 7. ARDL model estimation results.

Variables	**Coefficient**	**Std. Error**	***t*–Test**	***p*–Value**
Panel A: SD_GDP (1,2,1,1,1,0,0)				
(Intercept)	2.3198185	1.0249514	2.263	0.0249
SD_GDP_{t-1}	0.3621607	0.0717350	5.049	0.0000 ***
TOP_t	0.0155832	0.0076935	2.025	0.0445 **
TOP_{t-1}	−0.0089743	0.0096344	−0.931	0.3530
TOP_{t-2}	0.0006306	0.0063022	0.100	0.9204
SD_EMP_t	0.5557864	0.2536052	2.192	0.0298 **
SD_EMP_{t-1}	−0.4024415	0.2627199	−1.532	0.1275
GOV_t	0.5778227	0.4309124	1.341	0.1818
GOV_{t-1}	−0.6442804	0.4229689	−1.523	0.1296
PRI_t	−0.7610779	0.3953300	−1.925	0.0560 *
PRI_{t-1}	0.8217079	0.3921763	2.095	0.0377 **
LN_FDI_t	−0.0789160	0.0497773	−1.585	0.1148
$M2\_GDP_t$	−0.0007993	0.0022466	−0.356	0.7225

Table 7. *Cont.*

Variables	Coefficient	Std. Error	*t*–Test	*p*–Value
Panel B: SD_INFLATION (1,0,0,2,2,0,0)				
(Intercept)	1.266137	0.987271	1.282	0.2015
$SD\_INFLATION_{t-1}$	0.561764	0.064413	8.721	0.0000 ***
TOP_t	0.001585	0.003099	0.512	0.6097
SD_EMP_t	−0.159361	0.221025	−0.721	0.4719
GOV_t	0.923947	0.422243	2.188	0.0301 **
GOV_{t-1}	−1.426024	0.587712	−2.426	0.0163 **
GOV_{t-2}	0.621166	0.414332	1.499	0.1358
PRI_t	−0.937760	0.396946	−2.362	0.0193 **
PRI_{t-1}	1.395204	0.556871	2.505	0.0132 **
PRI_{t-2}	−0.579654	0.393377	−1.474	0.1425
LN_FDI_t	−0.006544	0.048093	−0.136	0.8919
$M2\_GDP_t$	−0.004501	0.002269	−1.984	0.0490 **
Panel C: SD_EXCHANG (1,2,0,1,1,1,1)				
(Intercept)	−104.50532	141.97706	−0.736	0.46276000
$SD\_EXCHANGE_{t-1}$	0.64940	0.05734	11.326	0.00000000 ***
TOP_t	−2.78557	1.10275	−2.526	0.01250000 **
TOP_{t-1}	2.50269	1.39460	1.795	0.07460000 *
TOP_{t-2}	−0.21891	0.90698	−0.241	0.80959000
SD_EMP_t	19.06966	31.77715	0.600	0.54928000
GOV_t	−160.58185	63.64756	−2.523	0.01261000 **
GOV_{t-1}	173.10485	62.95149	2.750	0.00665000 ***
PRI_t	107.35100	59.56061	1.802	0.07336000 *
PRI_{t-1}	−129.71707	59.13194	−2.194	0.02969000 **
LN_FDI_t	37.08143	12.16516	3.048	0.00269000 ***
LN_FDI_{t-1}	−23.86773	12.26932	−1.945	0.05348000 *
$M2\_GDP_t$	−3.48445	0.68706	−5.072	0.00000108 ***
$M2\_GDP_{t-1}$	3.17504	0.70156	4.526	0.00001160 ***

Residual standard error: 0.9696 on 162 degrees of freedom. Multiple R-squared: 0.3523, Adjusted R-squared: 0.3044. F-statistic: 7.344 on 12 and 162 DF, *p*-Value: 1.113×10^{-10}. *, **, *** significance at the 10%, 5%, and 1% levels, respectively. Residual standard error: 0.9687 on 163 degrees of freedom. Multiple R-squared: 0.4018, Adjusted R-squared: 0.3615. F-statistic: 9.955 on 11 and 163 DF, *p*-Value: 1.025×10^{-13}. *, **, *** significance at the 10%, 5%, and 1% levels, respectively. Residual standard error: 144.4 on 152 degrees of freedom. Multiple R-squared: 0.5559, Adjusted R-squared: 0.5179. F-statistic: 14.64 on 13 and 152 DF, *p*-Value: $<2.2 \times 10^{-16}$. *, **, *** significance at the 10%, 5%, and 1% levels, respectively.

The estimated results indicate that trade openness (*TOP*) positively impacts macroeconomic stability measured by the GDP stability in Asian countries at a 5% significance level with a regression coefficient of 0.015868. This result demonstrates that when trade openness increases, the stability of economic growth decreases, which reduces the stability of economic growth. This result can be explained by the fact that as exports increase, the gross national product consequently increases to a greater extent. This result is consistent with the result of Mireku et al., 2017, which concluded that economic growth stability is negatively influenced by changes in trade openness in both the long and short term [38]. They explained that this result could be directly attributed to the rise in foreign direct investment and multinational firms operating in the country. Secondly, the negative openness–stability relationship may be linked to many benefits of bilateral and multilateral trade that the economy gained after being opened. Thirdly, the change of trade policies from import-led substitution policies to export-led policies can also be the reason. The institution of import controls and import substitution agenda of the government negatively influence the balance of payment position of the country. Moreover, the output growth stability might be linked to the economy's lack of comparative advantage in producing and processing of several essential commodities. Therefore, changes in the price of these goods on the global market unavoidably result in higher or lower GDP growth [38]. In addition, DiGiovanni and Levchenko (2009) also found that the relationship between trade openness and overall

stability was negative and economically significant [97]. Bartak et al. (2021) proved a positive relationship between openness and economic growth but a negative relationship between openness and growth stability [40].

Table 7—Panel B presents the results of the ARDL model regression (1,0,0,2,2,0,0), the specific estimated coefficients were as follows:

The estimated results show that trade openness (*TOP*) had no impact on macroeconomic stability through the indicator measuring inflation stability in Asian countries. This shows that when trade openness increases, it does not increase or decrease the stability of inflation. This result is consistent with the results of the study of Nguyen, Phan, and Tran (2022), which concluded that trade openness negatively influences inflation, but the effect is negligible [55]. In addition, Munir, Hasan, and Muhammad (2015) proved that there was no significant relationship between inflation and trade openness in their selected Asian countries [53]. They explained that trade openness is insignificant when some of the channels through which inflation is impacted are taken into account in the model. The study of Binici et al. (2012) also had the same result, which showed that trade openness does not affect inflation in OECD countries [89]. Furthermore, Watson (2016) demonstrated that trade openness has two opposite effects on the inflation stability of countries [98]. On the one hand, trade integration and greater competition increase the strategic complementarity of firms' pricing decisions and the degree of real price rigidity, making inflation less sensitive to changes in the economic conditions in the country. On the other hand, stronger competitive pressure increased the opportunity cost of not adjusting prices. Thus, it led to more frequent price adjustments, reducing the rigidity of nominal prices and making inflation more sensitive to other shocks. The overall impact of these changes can cancel each other out.

Table 7—Panel C presents the results of the ARDL model regression (1,2,1,1,1,0,0). The specific estimated coefficients were as follows:

The results illustrate that trade openness (*TOP*) positively impacts macroeconomic stability through the measurement of exchange rate stability in Asian countries at a 5% level of significance with a regression coefficient of −2.78557. This result demonstrates that as trade openness increases, it increases exchange rate stability and, thus, the economic growth stability. To further explain this result, considering the Government's tendency to increase the stability of the exchange rate in countries where imports and exports increase. This result was consistent with the results of the study of Calderón and Kubota (2018), Caporale et al. (2014), and Hau (2002), which also proved the positive relationship between trade openness and real exchange rate stability [56,57,99]. In addition, Mpofu (2021) found that in the floating exchange rate regime, the higher the trade openness, the more real exchange rate stability is improved [58]. Hau (2002) explained that the more open economies generally have a more responsive aggregate price level [57]. The effect of the domestic money supply shock on the real household balances is, thus, reduced, increasing real exchange rate stability.

4.3.2. Long- and Short-Term Estimates for the ARDL Model

Table 8—Panel A contains the long-term and short-term estimation results for the ARDL model. In particular, it shows that TOP_{t-1} impacts SD_GDP in the long run at the 5% significance level and TOP_t affects SD_GDP in the short run at a 5% significance level. As for Panel B, the long-term and short-term estimation results for the ARDL model show that only the $SD\_INFLATION_{t-1}$ affects SD_ INFLATION in the long term at 1% significance level. Meanwhile, GOVt and PRIt impact SD_INFLATION in the short term at 5% significance level. Finally, in panel C, the long- and short-term estimation results for the ARDL model indicate that $SD\_INFLATION_{t-1}$ impact the long-term SD_EXCHANGE at a 1% significance level. In addition, the variables of TOP_t; GOV_t; PRI_t; LN_FDI_t; $M2\_GDP_{t-1}$ impact short-term SD_EXCHANGE in a statistically significant way.

Table 8. Long-term and short-term estimated results for the ARDL model.

Models	Variables	Coefficient	Std. Error	*t*–Test	*p*–Value
Panel A: SD_GDP					
Long–term model	(Intercept)	2.3198185	1.0249514	2.263	0.0249
	SD_GDP_{t-1}	−0.6378393	0.0717350	−8.892	0.0000 ***
	TOP_{t-1}	0.0072395	0.0033482	2.162	0.0321 **
	SD_EMP_{t-1}	0.1533450	0.2627332	0.584	0.5603
	GOV_{t-1}	−0.0664578	0.1729009	−0.384	0.7012
	PRI_{t-1}	0.0606300	0.1511257	0.401	0.6888
	LN_FDI_t	−0.0789160	0.0497773	−1.585	0.1148
	$M2\_GDP_t$	−0.0007993	0.0022466	−0.356	0.7225
Short–term model	ΔTOP_t	0.0155832	0.0076935	2.025	0.0445 **
	ΔTOP_{t-1}	−0.0006306	0.0063022	−0.100	0.9204
	ΔSD_EMP_t	0.5557864	0.2536052	2.192	0.0298 **
	ΔGOV_t	0.5778227	0.4309124	1.341	0.1818
	ΔPRI_t	−0.7610779	0.3953300	−1.925	0.0560 *
Panel B: SD_INFLATION					
Long–term model	(Intercept)	1.266137	0.987271	1.282	0.2015
	$SD\_INFLATION_{t-1}$	−0.438236	0.064413	−6.803	0.0000
	TOP_t	0.001585	0.003099	0.512	0.6097
	SD_EMP_t	−0.159361	0.221025	−0.721	0.4719
	GOV_{t-1}	0.119088	0.175738	0.678	0.4990
	PRI_{t-1}	−0.12221	0.154237	−0.792	0.4293
	LN_FDI_t	−0.006544	0.048093	−0.136	0.8919
	$M2\_GDP_t$	−0.004501	0.002269	−1.984	0.0490
Short–term model	ΔGOV_t	0.923947	0.422243	2.188	0.0301
	ΔGOV_{t-1}	−0.621166	0.414332	−1.499	0.1358
	ΔPRI_t	−0.93776	0.396946	−2.362	0.0193
	$\Delta L(PRI_{t-1})$	0.579654	0.393377	1.474	0.1425
Panel C: SD_EXCHANGE					
Long–term model	(Intercept)	−104.50532	141.97706	−0.736	0.46276000
	$SD\_EXCHANGE_{t-1}$	−0.35060	0.05734	−6.115	0.00000001 ***
	TOP_{t-1}	−0.50179	0.47084	−1.066	0.28814000
	SD_EMP_t	19.06966	31.77715	0.600	0.54928000
	GOV_{t-1}	12.52300	24.83116	0.504	0.61472000
	PRI_{t-1}	−22.36607	21.84607	−1.024	0.30746000
	LN_FDI_{t-1}	13.21370	7.56977	1.746	0.08279000 *
	$M2\_GDP_{t-1}$	−0.30941	0.34375	−0.900	0.36942000
Short–term model	ΔTOP_t	−2.78557	1.10275	−2.526	0.01250000 **
	ΔTOP_{t-1}	0.21891	0.90698	0.241	0.80959000
	ΔGOV_t	−160.58185	63.64756	−2.523	0.01261000 **
	ΔPRI_t	107.35100	59.56061	1.802	0.07336000 *
	ΔLN_FDI_t	37.08143	12.16516	3.048	0.00269000 ***
	$\Delta M2\_GDP_{t-1}$	−3.48445	0.68706	−5.072	0.00000108 ***

Note: *, **, *** significance at the 10%, 5%, and 1% levels, respectively.

4.3.3. Test for the Existence of Cointegration between Variables in the Model

Table 9 describes the results of the bound test for the existence of cointegration among the variables in the models. The results show that both the F-test and *t*-test give *p*-values of less than 5% significance. Therefore, we have a basis to conclude that the co-integration relationship exists between the variables in the models.

Table 9. Bound Test Results.

Types of Test	Model with SD_GDP Dependent Variable		Model with SD_INFLATION Dependent Variable		Model with SD_EXCHANGE Dependent Variable	
	Statistic	***p*–Value**	**Statistic**	***p*–Value**	**Statistic**	***p*–Value**
F–test	9.9952	0.000001	6.0030	0.0003272	4.8997	0.0012750
t–test	−8.8916	0.000001	−6.8035	0.0001314	−6.1148	0.0006687

4.3.4. Data Interpolation Results

The figures represent the data interpolation results of the dependent variable SD_GDP (Figure 1), SD_INFLATION (Figure 2) and SD_EXCHANGE (Figure 3). The red line depicts the interpolation result, while the blue line describes the original value of the dependent variable. The figures show that the interpolation lines closely match the curve of the original value (blue lines), which implies that the regression results in the model (1) were quite good.

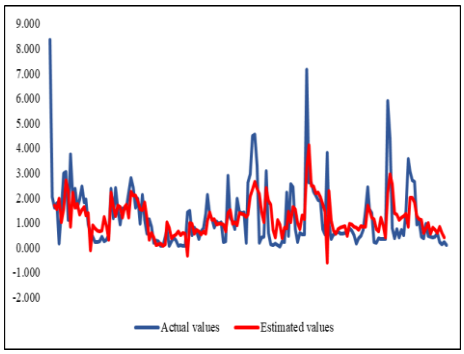

Figure 1. The data interpolation result with SD_GDP dependent variable.

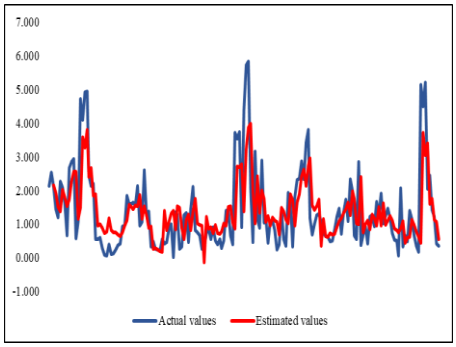

Figure 2. The data interpolation result with SD_INFLATION dependent variable.

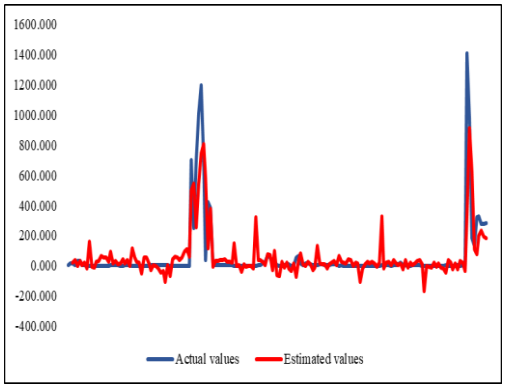

Figure 3. The data interpolation result with SD_EXCHANGE dependent variable.

5. Conclusions

The ARDL model was used in this study to analyse the impact of trade openness on macroeconomic stability in 20 Asian countries from 2011 to 2019 with employment rate, government capital reserves, private capital reserves, foreign direct investment, and M2 monetary aggregate as the control variables. The results showed that trade openness negatively influences macroeconomic stability which is measured through GDP fluctuations in Asian countries both in the short and long term. However, the correlation between trade openness and macroeconomic stability indicated by inflation stability was insignificant. In addition, when macroeconomic stability was measured through exchange rate fluctuations, greater trade openness increased the stability of macroeconomic growth in the short run. There were two implications following these results.

First, the more open an economy is, the more the GDP growth rate fluctuates, which reduces macroeconomic stability in Asian countries. Trade openness has several advantages, such as increasing import and export opportunities and creating employment opportunities, which, in turn, significantly enhance economic growth. However, it is also notable that the degree of economic growth fluctuates at a larger rate than that of trade openness. This result proposed that Asian countries should take advantage of increased trade openness, exports, and output to meet the demand for exported goods and services and develop the economy. However, at the same time, they should focus on technological innovation to increase the long-term productivity and output without being dependent on exports. This strategy should allow them to achieve sustainable economic development in the long term.

Second, trade openness increased exchange rate stability, resulting in greater macroeconomic stability in Asian countries. In the context of globalisation, trade liberalisation can easily increase trade openness. Consequently, countries need to take advantage of the short-term exchange rate stability brought about by the increased trade openness. If they can make use of the short-term stability to build up a stable monetary policy and a solid, trustworthy environment for their economy, their long-term economic sustainability can be achieved. In conclusion, we believe our study about the effect of trade openness on macroeconomic stability contributes to promoting economic sustainability and increasing international integration. In addition, we made certain contributions to the measurement methods of economic stability and provided empirical evidence on the correlation between trade openness and economic stability in Asian countries. The relationship between trade openness and economic growth stability can be positive or negative depending on countries, stages of development, and time periods. Previous studies mainly focused on the linear correlation between trade openness and economic growth stability, inflation, and exchange rate. However, previous articles did not mention the short- and long-term mechanisms of this relationship and the stability factors in business cycles. To address the existing research gap, we adopted a more comprehensive approach. First, we built an autoregressive distributed lag (ARDL) model within a unified analytical framework to examine the relationship between trade openness and economic stability indicated by growth, inflation, and exchange rate fluctuations. Second, an error correction model was also established to clarify these variables' short- and long-term effects.

However, our study still had certain limitations. In particular, we did not examine the difference in the relationship between different groups of countries. The impact of trade openness on macroeconomic stability can be affected by cross-country, data, or other estimated characteristics. Additionally, the impact of some characteristics on imports and exports between specific countries can significantly change the nature of the trade openness–macroeconomic stability relationship. Future follow-up research can, thus, continue to expand our study. First, subsequent research may examine differences in the relationship between countries grouped by different characteristics. Second, it would be interesting to assess the relative impact of trade openness on the macroeconomic stability of different countries through nation-specific characteristics. For instance, each country's import–export industry's unique circumstances and characteristics would warrant closer examination. Another example would be the inflation difference between different pairs of trading countries. We believe that by narrowing down the

research to specific countries or groups of trading countries, a more detailed evaluation of each country's macroeconomic stability can be expanded from the basis of our study.

Author Contributions: Conceptualisation, V.M.H.N.; methodology, A.T.H.P.; software, L.H.N.; validation, V.M.H.N., A.T.H.P. and T.H.H.; formal analysis, V.M.H.N. and A.T.H.P.; investigation, L.H.N.; resources, L.H.N.; data curation, L.H.N.; writing—original draft preparation, V.M.H.N., A.T.H.P. and T.H.H.; writing—review and editing, V.M.H.N., A.T.H.P., L.H.N. and T.H.H.; visualisation, A.T.H.P.; supervision, V.M.H.N.; project administration, V.M.H.N.; funding acquisition, V.M.H.N. and A.T.H.P. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by Van Lang University, Ho Chi Minh City, Vietnam.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: The data presented in this study are available on request from the corresponding author.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Bleaney, M.F. Macroeconomic stability, investment and growth in developing countries. *J. Dev. Econ.* **1996**, *48*, 461–477. [CrossRef]
2. Fischer, S. Macroeconomic stability and growth. *Cuad. De Econ.* **1992**, *29*, 171–186.
3. Montiel, P.; Servén, L. Macroeconomic stability in developing countries: How much is enough? *World Bank Res. Obs.* **2006**, *21*, 151–178. [CrossRef]
4. Little, I.M.D. (Ed.) *Boom, Crisis, and Adjustment: The Macroeconomic Experience of Developing Countries*; World Bank Publications: Washington, DC, USA, 1993.
5. Agénor, P.R.; Pereira da Silva, L.A. Macroeconomic stability, financial stability, and monetary policy rules. *Int. Financ.* **2012**, *15*, 205–224. [CrossRef]
6. Basyariah, N.; Kusuma, H.; Qizam, I. Determinants of sukuk market development: Macroeconomic stability and institutional approach. *J. Asian Financ. Econ. Bus.* **2021**, *8*, 201–211.
7. Brychko, M.; Bilan, Y.; Lyeonov, S.; Mentel, G. Trust crisis in the financial sector and macroeconomic stability: A structural equation modelling approach. *Econ. Res. Ekon. Istraživanja* **2021**, *34*, 828–855. [CrossRef]
8. Kong, Q.; Peng, D.; Ni, Y.; Jiang, X.; Wang, Z. Trade openness and economic growth quality of China: Empirical analysis using ARDL model. *Financ. Res. Lett.* **2021**, *38*, 101488. [CrossRef]
9. Hye, Q.M.A.; Lau, W.Y. Trade openness and economic growth: Empirical evidence from India. *J. Bus. Econ. Manag.* **2015**, *16*, 188–205. [CrossRef]
10. Udeagha, M.C.; Ngepah, N. Trade liberalization and the geography of industries in South Africa: Fresh evidence from a new measure. *Int. J. Urban Sci.* **2020**, *24*, 354–396. [CrossRef]
11. Krueger, A.O.; Berg, M.A. *Trade, Growth, and Poverty: A Selective Survey*; International Monetary Fund: Washington, DC, USA, 2003. Available online: https://www.imf.org/en/Publications/WP/Issues/2016/12/30/Trade-Growth-and-Poverty-A-Selective-Survey-16281 (accessed on 2 May 2023).
12. Krueger, A.O. Import substitution versus export promotion. *Financ. Dev.* **1985**, *22*, 20.
13. Krueger, A.O. The experience and lessons of Asia's super exporters. In *Export-Oriented Development Strategies*; Routledge: London, UK, 2019; pp. 187–212.
14. Gnangnon, S.K.; Brun, J.F. Trade openness, tax reform and tax revenue in developing countries. *World Econ.* **2019**, *42*, 3515–3536. [CrossRef]
15. Ngepah, N.N. International trade and agricultural production: Evidence from the Southern African Development Community sub-region. *Dev. South. Afr.* **2014**, *31*, 494–514. [CrossRef]
16. Udeagha, M.C.; Ngepah, N. The asymmetric effect of trade openness on economic growth in South Africa: A nonlinear ARDL approach. *Econ. Chang. Restruct.* **2021**, *54*, 491–540. [CrossRef]
17. Banday, U.J.; Murugan, S.; Maryam, J. Foreign direct investment, trade openness and economic growth in BRICS countries: Evidences from panel data. *Transnatl. Corp. Rev.* **2021**, *13*, 211–221. [CrossRef]
18. Tahir, M.; Khan, I. Trade openness and economic growth in the Asian region. *J. Chin. Econ. Foreign Trade Stud.* **2014**, *7*, 136–152. [CrossRef]
19. Acheampong, A.O.; Boateng, E.; Amponsah, M.; Dzator, J. Revisiting the economic growth–energy consumption nexus: Does globalization matter? *Energy Econ.* **2021**, *102*, 105472. [CrossRef]
20. Nourzad, F.; Powell, J.J. Openness, growth, and development: Evidence from a panel of developing countries. *Sci. J. Adm. Dev.* **2003**, *1*, 72–94.

21. Tahir, M.; Mazhar, T.; Afridi, M.A. Trade openness and sectoral growth in developing countries: Some new insights. *J. Chin. Econ. Foreign Trade Stud.* **2019**, *12*, 90–103. [CrossRef]
22. Helpman, E.; Krugman, P. *Market Structure and Foreign Trade: Increasing Returns, Imperfect Competition, and the International Economy*; MIT Press: Cambridge, MA, USA, 1987.
23. Rodrik, D. Imperfect competition, scale economies, and trade policy in developing countries. In *Trade Policy Issues and Empirical Analysis*; University of Chicago Press: Chicago, IL, USA, 1988; pp. 109–144.
24. Smith, A. *An Inquiry into the Nature and Causes of the Wealth of Nations*; Strahan, W., Cadell, T., Eds.; University of Chicago Press: London, UK, 1776; Volume 1.
25. Thirlwall, A.P. *Trade, Trade Liberalisation and Economic Growth: Theory and Evidence*; African Development Bank: Abidjan, Côte d'Ivoire, 2000; Volume 63.
26. Rodrik, D.; Subramanian, A.; Trebbi, F. Institutions rule: The primacy of institutions over geography and integration in economic development. *J. Econ. Growth* **2004**, *9*, 131–165. [CrossRef]
27. Grossman, G.M.; Helpman, E. Endogenous innovation in the theory of growth. *J. Econ. Perspect.* **1994**, *8*, 23–44. [CrossRef]
28. Romer, P.M. Increasing returns and long-run growth. *J. Political Econ.* **1986**, *94*, 1002–1037. [CrossRef]
29. Romer, P.M. The problem of development: A conference of the institute for the study of free enterprise systems. *J. Political Econ.* **1990**, *98*, S1–S11.
30. Lucas, R.E., Jr. On the mechanics of economic development. *J. Monet. Econ.* **1988**, *22*, 3–42. [CrossRef]
31. Bergh, A. The Compensation Hypothesis Revisited and Reversed. *Scand. Political Stud.* **2021**, *44*, 140–147. [CrossRef]
32. Down, I. Trade openness, country size and economic volatility: The compensation hypothesis revisited. *Bus. Politics* **2007**, *9*, 1–20. [CrossRef]
33. Ehrlich, S.D.; Hearn, E. Does compensating the losers increase support for trade? An experimental test of the embedded liberalism thesis. *Foreign Policy Anal.* **2014**, *10*, 149–164. [CrossRef]
34. Ma, Y.; Yao, C. Openness and government size: Revisiting the relationship using a large cross-country panel. *Int. Rev. Econ. Financ.* **2022**, *79*, 448–465. [CrossRef]
35. Dahmani, M.; Mabrouki, M.; Ben Youssef, A. ICT, trade openness and economic growth in Tunisia: What is going wrong? *Econ. Chang. Restruct.* **2022**, *55*, 2317–2336. [CrossRef]
36. Giovanni, J.D.; Levchenko, A.A. Trade openness and volatility. *Rev. Econ. Stat.* **2009**, *91*, 558–585. [CrossRef]
37. Ho, T.T.; Tran, X.H.; Nguyen, Q.K. Tax revenue-economic growth relationship and the role of trade openness in developing countries. *Cogent Bus. Manag.* **2023**, *10*, 2213959. [CrossRef]
38. Mireku, K.; Animah Agyei, E.; Domeher, D. Trade openness and economic growth volatility: An empirical investigation. *Cogent Econ. Financ.* **2017**, *5*, 1385438. [CrossRef]
39. Balavac, M.; Pugh, G. The link between trade openness, export diversification, institutions and output volatility in transition countries. *Econ. Syst.* **2016**, *40*, 273–287. [CrossRef]
40. Bartak, J.; Jabłoński, Ł.; Jastrzębska, A. Examining GDP growth and its volatility: An episodic approach. *Entropy* **2021**, *23*, 890. [CrossRef]
41. Kim, D.H.; Lin, S.C.; Suen, Y.B. Trade, growth and growth volatility: New panel evidence. *Int. Rev. Econ. Financ.* **2016**, *45*, 384–399. [CrossRef]
42. Majumder, M.K.; Raghavan, M.; Vespignani, J. Oil curse, economic growth and trade openness. *Energy Econ.* **2020**, *91*, 104896. [CrossRef]
43. Raghutla, C. The effect of trade openness on economic growth: Some empirical evidence from emerging market economies. *J. Public Aff.* **2020**, *20*, e2081. [CrossRef]
44. Aslam, B.; Hu, J.; Ali, S.; AlGarni, T.S.; Abdullah, M.A. Malaysia's economic growth, consumption of oil, industry and CO_2 emissions: Evidence from the ARDL model. *Int. J. Environ. Sci. Technol.* **2022**, *19*, 3189–3200. [CrossRef]
45. Baharom, A.H.; Habibullah, M.S.; Royfaizal, R.C. The relationship between trade openness, foreign direct investment and growth: Case of Malaysia. MPRA Paper, No. 11928. 2008. Available online: https://mpra.ub.uni-muenchen.de/11928/1/MPRA_paper_11928.pdf (accessed on 2 May 2023).
46. Nguyen, M.-L.T.; Bui, T.N. Trade openness and economic growth: A study on Asean-6. *Economies* **2021**, *9*, 113. [CrossRef]
47. Adeel-Farooq, R.M.; Abu Bakar, N.A.; Raji, J.O. Trade openness, financial liberalization and economic growth: The case of Pakistan and India. *South Asian J. Bus. Stud.* **2017**, *6*, 229–246. [CrossRef]
48. Kumari, R.; Shabbir, M.S.; Saleem, S.; Yahya Khan, G.; Abbasi, B.A.; Lopez, L.B. An empirical analysis among foreign direct investment, trade openness and economic growth: Evidence from the Indian economy. *South Asian J. Bus. Stud.* **2023**, *12*, 127–149. [CrossRef]
49. Rahman, M.M.; Saidi, K.; Mbarek, M.B. Economic growth in South Asia: The role of CO_2 emissions, population density and trade openness. *Heliyon* **2020**, *6*, e03903. [CrossRef] [PubMed]
50. Cevik, E.I.; Atukeren, E.; Korkmaz, T. Trade openness and economic growth in Turkey: A rolling frequency domain analysis. *Economies* **2019**, *7*, 41. [CrossRef]
51. Ghazouani, T.; Boukhatem, J.; Sam, C.Y. Causal interactions between trade openness, renewable electricity consumption, and economic growth in Asia-Pacific countries: Fresh evidence from a bootstrap ARDL approach. *Renew. Sustain. Energy Rev.* **2020**, *133*, 110094. [CrossRef]

52. Malefane, M.R.; Odhiambo, N.M. Trade openness and economic growth: Empirical evidence from Lesotho. *Glob. Bus. Rev.* **2021**, *22*, 1103–1119. [CrossRef]
53. Munir, S.; Hasan, H.; Muhammad, M. The effect of trade openness on inflation: Panel data estimates from selected Asian economies (1976–2010). *Southeast Asian J. Econ.* **2015**, *3*, 23–42.
54. Amna Intisar, R.; Yaseen, M.R.; Kousar, R.; Usman, M.; Makhdum, M.S.A. Impact of trade openness and human capital on economic growth: A comparative investigation of Asian countries. *Sustainability* **2020**, *12*, 2930. [CrossRef]
55. Nguyen, T.T.; Phan, T.D.; Tran, N.A. Impact of fiscal and monetary policy on inflation in Vietnam. *Investig. Manag. Financ. Innov.* **2022**, *19*, 201–209. [CrossRef]
56. Calderón, C.; Kubota, M. Does higher openness cause more real exchange rate volatility? *J. Int. Econ.* **2018**, *110*, 176–204. [CrossRef]
57. Hau, H. Real exchange rate volatility and economic openness: Theory and evidence. *J. Money Credit Bank.* **2002**, *34*, 611–630. [CrossRef]
58. Mpofu, T.R. The determinants of real exchange rate volatility in South Africa. *World Econ.* **2021**, *44*, 1380–1401. [CrossRef]
59. Adhikary, B.K. FDI, trade openness, capital formation, and economic growth in Bangladesh: A linkage analysis. *Int. J. Bus. Manag.* **2011**, *6*, 16. [CrossRef]
60. Eriş, M.N.; Ulaşan, B. Trade openness and economic growth: Bayesian model averaging estimate of cross-country growth regressions. *Econ. Model.* **2013**, *33*, 867–883. [CrossRef]
61. Goh, S.K.; Sam, C.Y.; McNown, R. Re-examining foreign direct investment, exports, and economic growth in Asian economies using a bootstrap ARDL test for cointegration. *J. Asian Econ.* **2017**, *51*, 12–22. [CrossRef]
62. Jalil, A.; Rauf, A. Revisiting the link between trade openness and economic growth using panel methods. *J. Int. Trade Econ. Dev.* **2021**, *30*, 1168–1187. [CrossRef]
63. Lawal, A.I.; Nwanji, T.I.; Asaleye, A.; Ahmed, V. Economic growth, financial development and trade openness in Nigeria: An application of the ARDL bound testing approach. *Cogent Econ. Financ.* **2016**, *4*, 1258810. [CrossRef]
64. Mohamed Sghaier, I. Trade openness, financial development and economic growth in North African countries. *Int. J. Financ. Econ.* **2021**, *28*, 1729–1740. [CrossRef]
65. Vlastou, I. Forcing Africa to open up to trade: Is it worth it? *J. Dev. Areas* **2010**, *44*, 25–39. [CrossRef]
66. Rathnayaka Mudiyanselage, M.M.; Epuran, G.; Tescașiu, B. Causal Links between Trade Openness and Foreign Direct Investment in Romania. *J. Risk Financ. Manag.* **2021**, *14*, 90. [CrossRef]
67. Rigobon, R.; Rodrik, D. Rule of law, democracy, openness, and income: Estimating the interrelationships1. *Econ. Transit.* **2005**, *13*, 533–564. [CrossRef]
68. Zahonogo, P. Trade and economic growth in developing countries: Evidence from sub-Saharan Africa. *J. Afr. Trade* **2016**, *3*, 41–56. [CrossRef]
69. Musila, J.W.; Yiheyis, Z. The impact of trade openness on growth: The case of Kenya. *J. Policy Model.* **2015**, *37*, 342–354. [CrossRef]
70. Ulaşan, B. Trade openness and economic growth: Panel evidence. *Appl. Econ. Lett.* **2015**, *22*, 163–167. [CrossRef]
71. Baldwin, R.E.; Forslid, R. Trade and growth Any unfinished business? *Eur. Econ. Rev.* **1998**, *42*, 695–703. [CrossRef]
72. Willard, L. Does Openness Promote Growth? *Agenda A J. Policy Anal. Reform* **2000**, *7*, 251–260. [CrossRef]
73. Chenaf-Nicet, D.; Rougier, E. The effect of macroeconomic instability on FDI flows: A gravity estimation of the impact of regional integration in the case of Euro-Mediterranean agreements. *Int. Econ.* **2016**, *145*, 66–91. [CrossRef]
74. Alesina, A.; Ardagna, S. Large changes in fiscal policy: Taxes versus spending. *Tax Policy Econ.* **2010**, *24*, 35–68. [CrossRef]
75. Coenen, G.; Straub, R.; Trabandt, M. Fiscal policy and the great recession in the euro area. *Am. Econ. Rev.* **2012**, *102*, 71–76. [CrossRef]
76. Grier, K.B.; Tullock, G. An empirical analysis of cross-national economic growth, 1951–1980. *J. Monet. Econ.* **1989**, *24*, 259–276. [CrossRef]
77. Al-Marhubi, F. Cross-country evidence on the link between inflation volatility and growth. *Appl. Econ.* **1998**, *30*, 1317–1326. [CrossRef]
78. Judson, R.; Orphanides, A. Inflation, volatility and growth. *Int. Financ.* **1999**, *2*, 117–138. [CrossRef]
79. Obstfeld, M.; Rogoff, K. Risk and Exchange Rates. In *Economic Policy in the International Economy: Essays in Honor of Assaf Razin*; Cambridge University Press: Cambridge, MA, USA, 2003; pp. 74–120.
80. Schnabl, G. Exchange rate volatility and growth in small open economies at the EMU periphery. *Econ. Syst.* **2008**, *32*, 70–91. [CrossRef]
81. Morina, F.; Hysa, E.; Ergün, U.; Panait, M.; Voica, M.C. The effect of exchange rate volatility on economic growth: Case of the CEE countries. *J. Risk Financ. Manag.* **2020**, *13*, 177. [CrossRef]
82. Spilimbergo, A. Growth and trade: The North can lose. *J. Econ. Growth* **2000**, *5*, 131–146. [CrossRef]
83. Azarnert, L.V. Trade, luxury goods, and a growth-enhancing tariff. *Macroecon. Dyn.* **2018**, *22*, 1462–1474. [CrossRef]
84. Mehta, D.; Mallikarjun, M. Impact of fiscal deficit and trade openness on current account deficit in India: New evidence on twin deficits hypothesis. *EconomiA* **2023**, (*ahead-of-print*).
85. Ashra, S. *Inflation and Openness: A Study of Selected Developing Economies*; Working Paper No. 84; Indian Council for Research on International Economic Relations: New Delhi, India, 2002.

86. Yanikkaya, H. Trade openness and economic growth: A cross-country empirical investigation. *J. Dev. Econ.* **2003**, *72*, 57–89. [CrossRef]
87. Krueger, A.O. Liberalization, direction of bias, and economic growth. In *Liberalization Attempts and Consequences*; NBER: Cambridge, MA, USA, 1978; pp. 277–300.
88. Harrison, A. Openness and growth: A time-series, cross-country analysis for developing countries. *J. Dev. Econ.* **1996**, *48*, 419–447. [CrossRef]
89. Binici, M.; Cheung, Y.W.; Lai, K.S. Trade openness, market competition, and inflation: Some sectoral evidence from OECD countries. *Int. J. Financ. Econ.* **2012**, *17*, 321–336. [CrossRef]
90. Zhang, D.; Du, W.; Zhuge, L.; Tong, Z.; Freeman, R.B. Do financial constraints curb firms' efforts to control pollution? Evidence from Chinese manumanufacturing firms. *J. Clean. Prod.* **2019**, *215*, 1052–1058. [CrossRef]
91. Mohseni, M.; Jouzaryan, F. Examining the effects of inflation and unemployment on economic growth in Iran (1996–2012). *Procedia Econ. Financ.* **2016**, *36*, 381–389. [CrossRef]
92. Aizenman, J.; Lee, J. International reserves: Precautionary versus mercantilist views, theory and evidence. *Open Econ. Rev.* **2007**, *18*, 191–214. [CrossRef]
93. Obstfeld, M.; Shambaugh, J.C.; Taylor, A.M. Financial stability, the trilemma, and international reserves. *Am. Econ. J. Macroecon.* **2010**, *2*, 57–94. [CrossRef]
94. Pina, G. The recent growth of international reserves in developing economies: A monetary perspective. *J. Int. Money Financ.* **2015**, *58*, 172–190. [CrossRef]
95. Herzer, D. How does foreign direct investment really affect developing countries' growth? *Rev. Int. Econ.* **2012**, *20*, 396–414. [CrossRef]
96. Pesaran, M.H.; Shin, Y.; Smith, R.J. Bounds testing approaches to the analysis of level relationships. *J. Appl. Econom.* **2001**, *16*, 289–326. [CrossRef]
97. Di Giovanni, J.; Levchenko, A.A. International trade and aggregate fluctuations in granular economies. *Soc. Econ. Dyn. Meet. Pap.* **2009**, *419*, 585.
98. Watson, A. Trade openness and inflation: The role of real and nominal price rigidities. *J. Int. Money Financ.* **2016**, *64*, 137–169. [CrossRef]
99. Caporale, G.M.; Sova, A.D.; Sova, R. The short-run and long-run effects of trade openness on financial development: Some panel evidence for Europe. *Int. J. Financ. Econ.* **2022**. (*online ahead of print*). [CrossRef]