

## The Impacts of Financial Development, Trade Openness, Natural Resources Rent, and Government Expenditure on Economic Growth: Evidence in Northeast Asia

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### **Abstract**

The association among financial development, trade openness, natural resources rent, government expenditure, and economic growth has been investigated by scholars, but the results have been controversial. This study attempts to examine the relationship among financial development, trade openness, natural resources rent, government expenditure, and economic growth in three Northeast Asian countries, namely China, Japan, and the Republic of Korea, between 1981 and 2020 using the fixed effect and random effect models. The results of the feasible generalized least squares model stated that economic growth of these countries can be fostered by financial development and trade openness. However, surprisingly, natural resources rent had a negative effect on the economic growth of the three countries in the region, while the relationship between government expenditure and economic growth was not statistically significant. Finally, policies are recommended to accelerate economic growth and achieve sustainable development for the region. First, financial development should be encouraged by improving domestic credit to the private sector. Second, trade openness should be facilitated to exploit competitive advantages in export-led growth, and science and technology. Finally, the countries should implement sustainable growth models to their reduce dependence on natural resources and achieve sustainable development for the region.

### **Keywords**

Financial development, trade openness, natural resources rent, government expenditure, economic growth

### **Introduction**

Financial systems accelerate the allocation of resources in different periods and places. Financial development has been considered as one of the key drivers to facilitate economic growth

**Received:** May 2, 2023  
**Accepted:** December 20, 2023

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(IMF, 2000). Financial integration provides more investment opportunities to investors by efficiently allocating capital, which reduces transaction costs and promotes economic growth (UN, 2017). According to Levine (2000), financial development serves important roles in financial securities, financial markets, and capital intermediaries by reducing costs in information gathering, contract management, and transactions. In addition, the risks of the financial system can be minimized, and the cycle of increasing data acquisition costs and agreement compliance can be discouraged by financial development (Eryilmaz *et al.*, 2015).

In Northeast Asia, the economies of China, Japan, and the Republic of Korea heavily depend on each other, especially after the Asian financial crisis in 1997 (Wong, 2005). China, which is known as one of the world's largest economies, has implemented economic reforms since 1978. China's financial system is highly regulated by the government (Cheng-Sze *et al.*, 2021). The growth rate of the Chinese economy has slowed down visibly since the global financial crisis of 2008–2009 (Murach *et al.*, 2022). According to Albert *et al.* (2015), only Japan, the Republic of Korea, Taiwan, and Israel performed similar growth strategies to China by export-led growth along with strong investments. Japan and the Republic of Korea are active members of the World Trade Organization, but recently these nations have undergone financial liberalization and financial reforms (Liu & Hsu, 2006). As the largest emerging economy, China has had to face various obstacles during the development process related to resource exhaustion, ecological imbalance, overcapacity, low production efficiency, and weak development of traditional industries (Fang & Yu, 2021). Japan, one of the largest capital suppliers and a global leader in technology, is known as the most advanced economy in Northeast Asia. However, its economy has been struggling because of slow growth and deflationary pressures for more than two decades. The Republic of Korea facilitates cooperation with neighboring countries to enhance growth, trade, and investments, and to achieve the energy security and political stability of the subregion. Since these East and Northeast

Asian (ENEAs) economies depend on trade and utilize export-led development strategies, interdependence and integration have been most pronounced in trade. For instance, before 2015, ENEAs economies contributed 20.2 percent to global trade with exports and imports accounting for 21.4 and 19.0 percent of the total, respectively (UN, 2017).

The influence of natural resource rent on economic growth is controversial. Sha (2023) found that higher natural resource rent discouraged economic development in G7 countries. Abdulahi *et al.* (2019) argued that the relationship between natural resources rent and economic growth in 14 resource-rich countries in Sub-Saharan Africa could be either positive or negative depending on the level of institutional quality. Ampofo *et al.* (2020) concluded that there was a long-term relationship among natural resources rent, trade openness, and economic growth in Australia, Brazil, Canada, the Democratic Republic of the Congo (DRC), India, and Saudi Arabia. Their results stated that an increase of natural resources rent had negative effects on the economy of these countries, except the DRC. Arslan *et al.* (2022) found that natural resource rent supported economic growth in China between 1970 and 2016. Hu *et al.* (2023) argued that oil and forest rentals had negative effects on the financial development of China in the long term, while the impact of mineral rents on financial development was ambiguous. Zuo *et al.* (2023) concluded that green development and green trade policies may foster resource utilization in China by reducing environmental costs.

Similarly, the nexus between government expenditure and economic growth has been strongly debated by scholars all over the world. Gurdal *et al.* (2020) claimed that government expenditure facilitated economic growth in G7 countries between 1980 and 2016. Likewise, a positive relationship between government expenditure and economic growth was observed in Nepal (Dhungel, 2022). According to Nguyen & Bui (2022), the effect of government expenditure on economic growth in 16 emerging markets and developing economies between 2002 and 2019 was either positive or negative

depending on the corruption control value. Onifade *et al.* (2020) found that government expenditure discouraged the Nigerian economy between 1981 and 2017.

The effects of social, economic, and environmental factors on economic growth in Northeast Asia have been examined by scholars. Cheng-Sze *et al.* (2021) found that the Chinese economy was fostered by financial development between 1988 and 2018. Fan & Hao (2020) found that there was a long-term relationship among renewable energy consumption, economic growth, and foreign direct investment (FDI) in China between 2000 and 2015, while Hwang (2020) concluded that the effects of financial development on economic growth in the Republic of Korea could be either positive or negative depending on the rate of private credit. Liu & Hsu (2006) argued that financial development positively affects economic growth in Taiwan, but it has negative impacts on the economic growths of Japan and the Republic of Korea. Sawng *et al.* (2021) found that information, communication, and technology support economic growth in the Republic of Korea in the long run. A study by Vo *et al.* (2020) demonstrated that the economic growth of China has a positive relationship with financial development. Yu *et al.* (2023) stated that economic growth had a negative influence on green technology innovation in 285 cities in China between 2006 and 2018. However, none of the previous studies investigated the relationship among financial development, trade openness, natural resources rent, government expenditure, and economic growth in Northeast Asia. Thus, the central contribution of this paper is to explore the nexus among financial development, trade openness, natural resources rent, government expenditure, and economic growth in three selected Northeast Asian countries, namely China, Japan, and the Republic of Korea, between 1981 and 2020 using the fixed effect and random effect models. More importantly, policies are recommended to facilitate economic growth and achieve sustainable development for the region.

The relationship among financial development, trade openness, natural resources

rent, government expenditure, and economic growth has been examined by scholars. Hunjra *et al.* (2022) found that the economic growth of 50 low and middle-income countries was fostered by financial development between 1991 and 2020. Adeniyi & Omisakin (2012) argued that financial development supports economic growth in Ghana, Gambia, and Sierra Leone, but the relationship between financial development and the economy in Nigeria was not statistically significant. A study by Le & Bao (2020) concluded that financial development had positive effects on the economic growth of 16 Latin American and Caribbean Emerging Market and Developing Economies for the period 1990-2014. Anwar & Nguyen (2011) found that there was a positive relationship between financial development and economic growth in 61 provinces of Vietnam for the period 1997-2006. Nguyen (2022) claimed that the influence of financial development on the economic growth of Vietnam between 1991 and 2021 could be either positive or negative depending on the inflation rate. By contrast, Anwar & Sun (2011) stated that the impact of financial development on economic growth in Malaysia between 1970 and 2007 was insignificant.

Further, Baajike *et al.* (2022) argued that trade liberalization discouraged environmental sustainability in West Africa between 2005 and 2018, but it may have improved environmental sustainability due to quality institutions and a well-regulated market. Deng *et al.* (2022) found that foreign direct investment (FDI) inflows reduce and increase pollution before and after the threshold level, respectively, in upper-middle-income and low-income countries, while financial development facilitates and decelerates environmental pollution before and after threshold levels, respectively. Frost *et al.* (2022) addressed that financial development and financial technology had positive effects on households' financial wealth and financial returns in Italy for the period of 1991-2016. Ha (2023) concluded that financial institutions and the market had positive associations with the trade of environmental goods in 85 developing and 34 developed countries between 2000 and 2019. Likewise, Cai & Le (2023) found that

financial development and natural resources development have positive influences on economic growth of Viet Nam in the long-term, but these negatively affect economic growth in the short-term.

Habiba & Xinbang (2023) argued that financial development had a positive relationship with renewable energy consumption in seven emerging countries from 1991 to 2018. Hung (2023) found that digitalization, green investment, and financial development have positive impacts on economic sustainability in Vietnam. Kevser *et al.* (2022) concluded that there was a long-run relationship among biomass energy consumption, economic growth, and financial development in 15 selected countries between 1993 and 2017. Moreover, a bidirectional and positive relationship exists between financial development and biomass energy consumption, as well as between biomass energy consumption and economic growth. Khan *et al.* (2021) stated that technological innovations, economic growth, and FDI had a negative association with renewable energy in 69 countries over the period of 2000-2014. However, financial developments had significant and positive relationships with the renewable energy sector.

Cheng-Sze *et al.* (2021) stated that financial development supported the Chinese economy between 1988 and 2018, while Hwang (2020) argued that the influences of financial development on economic growth in the Republic of Korea could be either positive or negative depending on the rate of private credit. Fan & Hao (2020) found that there was a long-term relationship among renewable energy consumption, economic growth, and foreign direct investment in China over the period of 2000-2015. Liu & Hsu (2006) concluded that financial development has a positive association with economic growth in Taiwan, but it negatively affects the economic growth of Japan and the Republic of Korea. Sawng *et al.* (2021) found that the economic growth of the Republic of Korea was fostered by information, communication, and technology in the long run. Vo *et al.* (2020) demonstrated that the Chinese economy has a positive relationship with

financial development, while Yu *et al.* (2023) addressed that economic growth had a negative influence on green technology innovation in 285 cities in China from 2006 to 2018.

## Methodology

### Data and sources

Data for the association among financial development, trade openness, natural resources rent, government expenditure, and economic growth in three Northeast Asian countries, namely China, Japan, and the Republic of Korea, between 1981 and 2020 were gathered from the World Development Indicators (WDI). This period was chosen for the study because it covers the Asian financial crisis in 1997 and the global financial crisis in 2008 that have influenced the social and economic situations of these countries in Northeast Asia. Therefore, a total of 120 observations were entered for data analysis. The panel data were employed for this paper because of the large sample, more degrees of freedom, more information, and less multi-collinearity among variables, which may help them overcome constraints related to the control of individual data points or time heterogeneity faced by the cross-sectional data (Hsiao, 2014).

### The fixed effect and random effect models

First, the multicollinearity phenomenon among the independent variables in the model was examined by the variance inflation factor (VIF), and if the VIF was found to be greater than or equal to 10, the multicollinearity phenomenon may exist (Gujarati, 2003). Second, both the fixed effect model (FEM) and random effect model (REM) were run. Next, the Hausman test was used to determine the most suitable model between the FEM and REM. Finally, autocorrelation and heteroscedasticity in the selected model were checked by the Wooldridge test and Wald test, respectively. If autocorrelation and heteroscedasticity occurred in the model, the feasible generalized least squares (FGLS) model would be run to ensure that the obtained estimates were viable and effective (Wooldridge, 2002).

The model specification was constructed based on the work of Le & Bao (2020) as follows:

$$GDP = f(FD, TO, RR, GE) \quad (1)$$

where: GDP represents the gross domestic product per capita (constant 2015US\$); FD means the financial development calculated by the domestic credit to the private sector (% of GDP); TO presents the trade openness (% of GDP); RR denotes the sum of oil rents, natural gas rents, coal rents, mineral rents, and forest rents (% of GDP); and GE presents the government expenditure (% of GDP).

The dependent and independent variables in the model were justified as shown in **Table 1**.

Equation 1 can be transformed into the natural logarithmic form as follows:

$$\ln GDP = \beta_0 + \beta_1 \ln FD + \beta_2 \ln TO + \beta_3 \ln RR + \beta_4 \ln GE + \varepsilon \quad (2)$$

where:  $\ln GDP$ ,  $\ln FD$ ,  $\ln TO$ , and  $\ln RR$  denote the natural logarithms of GDP per capita, financial development, trade openness, natural resources rent, and government expenditure, respectively;  $\beta_0$  is the intercept;  $(\beta_1, \dots, \beta_4)$  are parameters to be estimated; and  $\varepsilon_t$  presents the error term.

Both the FEM and REM were run by the Stata MP 14.2 software. The FEM presents advantages in case of omitted variables and when

these variables are correlated with other explanatory variables in the model. In addition, this model may assist in controlling for differences in time-invariant and unobservable characteristics, which can affect GDP per capita. The REM is useful if we do not have omitted variables and when these variables are uncorrelated with the explanatory variables in the model. In this case, the individual-specific effect is a random variable that is uncorrelated with the explanatory variables (Schmidheiny, 2016).

## Results

### GDP per capita, financial development, trade openness, natural resources rent, and government expenditure in Northeast Asia: An overview

Economic growth, financial development, trade openness, natural resources rent, and government expenditure of three Northeast Asian countries were described in **Table 2**.

As seen in **Table 2**, the average GDP per capita and financial development of the three Northeast Asian countries accounted for US\$17,198.56 and 123.38 percent, respectively. The rate of trade openness, natural resources rent, and government expenditure of the region accounted for 43.1 percent, 1.75 percent, and

**Table 1.** Covariates of the model

Variable name	Description	Source	Previous references
GDP per capita	GDP per capita (constant 2015 US\$)	WDI	Anwar & Nguyen (2011); Anwar & Sun (2011); Adeniyi & Omisakin (2012); Le & Bao (2020); Fan & Hao (2020); Osei & Kim (2020); Cheng-Sze <i>et al.</i> (2021); Sawng <i>et al.</i> (2021); Hunjra <i>et al.</i> (2022); Baajike <i>et al.</i> (2022); Cai & Le (2023); Yu <i>et al.</i> (2023)
Financial development	Domestic credit to the private sector (% of GDP)	WDI	Anwar & Nguyen (2011); Anwar & Sun (2011); Adeniyi & Omisakin (2012); Le & Bao (2020); Cheng-Sze <i>et al.</i> (2021); Baajike <i>et al.</i> (2022); Hunjra <i>et al.</i> (2022); Cai & Le (2023); Ha (2023); Habiba & Xinbang (2023); Hung (2023); Yi <i>et al.</i> (2023)
Trade openness	Trade (% of GDP)	WDI	Le & Bao (2020); Baajike <i>et al.</i> (2022)
Natural resources rent	The sum of oil rents, natural gas rents, coal rents, mineral rents, and forest rents (% of GDP)	WDI	Mohamed (2020); Hunjra <i>et al.</i> (2022); Cai & Le (2023)
Government expenditure	Government expenditure (% of GDP)	WDI	Yu <i>et al.</i> (2023)

**Table 2.** Characteristics of GDP per capita, financial development, trade openness, natural resources rent, and government expenditure in Northeast Asia

Variable	Mean	SD	Min	Max
GDP per capita	17,198.56	12,480.64	447.12	36,117.23
Financial development	123.38	48.55	40.79	217.76
Trade openness	43.10	22.39	13.57	105.57
Natural resources rent	1.75	3.35	0.01	19.18
Government expenditure	14.73	2.64	9.92	21.03

Note: SD denotes the standard deviation.

14.7 percent, respectively, on average (**Table 2**).

As seen in **Figure 1**, the average GDP per capita of the three countries in the region increased over the period of 1981-2020 and was dominated by Japan, followed by the Republic of Korea, and then China. The GDPs per capita of Japan and the Republic of Korea increased by 1.7 times and 7.3 times, respectively, from 1981 to 2020, while the GDP per capita of China grew more than 23 times during the same period (**Figure 1**).

The financial development of the three Northeast Asian countries presented an upward trend between 1981 and 2020 implying the importance of domestic credit to the private sector in these economies. Financial development was dominated by Japan, followed by China, and then the Republic of Korea. For example, by 2020, the financial development of Japan reached about 193 percent of the GDP, while the financial developments of China and the Republic of Korea accounted for about 182 percent and 164 percent, respectively (**Figure 2**).

As seen in **Figure 3**, the trade openness of the three Northeast Asian countries increased over the last four decades (1981-2020). The highest trade openness belonged to the Republic of Korea, followed by China, and then Japan. For instance, by 2020, the trade openness of the Republic of Korea accounted for about 69 percent, while the values of China and Japan accounted for about 34 percent and 31 percent, respectively (**Figure 3**).

As seen in **Figure 4**, the natural resources rent of the three Northeast Asian countries tended to decrease between 1981 and 2020. The natural

resources rent of China rapidly dropped by about 18 percent from about 19 percent in 1981 to about 1 percent in 2020, while the rates of the Republic of Korea and Japan slightly declined by 0.52 percent and 0.02, respectively, in the same period (**Figure 4**).

The government expenditure of the three Northeast Asian countries presented an upward trend between 1981 and 2020. Japan had the highest government expenditure, followed by China, and then the Republic of Korea. The government expenditure of Japan increased by about 6.3 percent from about 14 percent in 1981 to about 21 percent in 2020, while the proportions of China and the Republic of Korea rose nearly 4 percent and 6 percent, respectively, in the same period (**Figure 5**).

### **The impact of financial development, trade openness, natural resources rent, and government expenditure on economic growth in Northeast Asia**

First, a correlation matrix and VIF were employed to examine the multicollinearity of the independent variables in the pooled ordinary least squares (POLS) model.

The results show that the correlation coefficients among variables were appropriate, reflecting that there was no multicollinearity among the independent variables of the model (**Table 3**).

**Table 4** presents the regression result of the POLS model.

As seen in **Table 4**, the adjusted R-squared was equal to 0.923, representing that 92.3 percent of the GDP per capita variation was explained by variables in the model. Financial development

and trade openness had significant and positive relationships with economic growth, but the increase of natural resources rent decelerated the

GDP per capita in the region (Table 4).

The VIF test for multicollinearity was presented in Table 5.

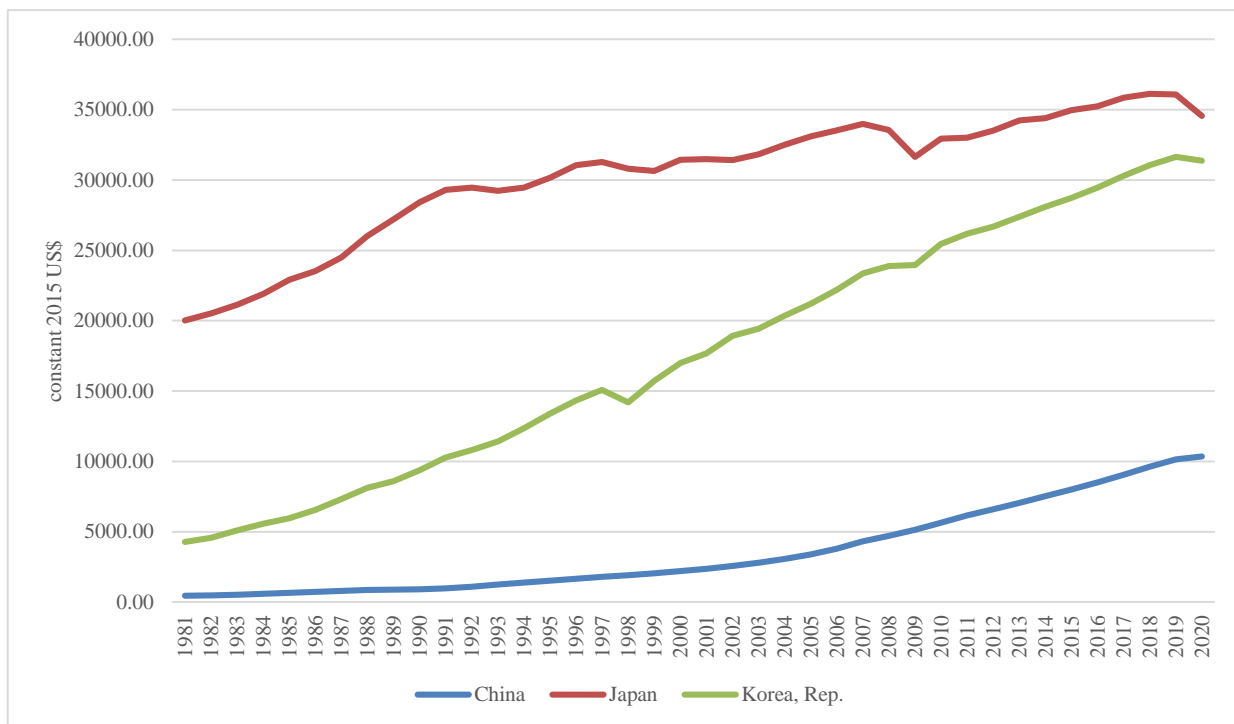


Figure 1. GDP per capita of three Northeast Asian countries  
Source: World Bank (2023a)

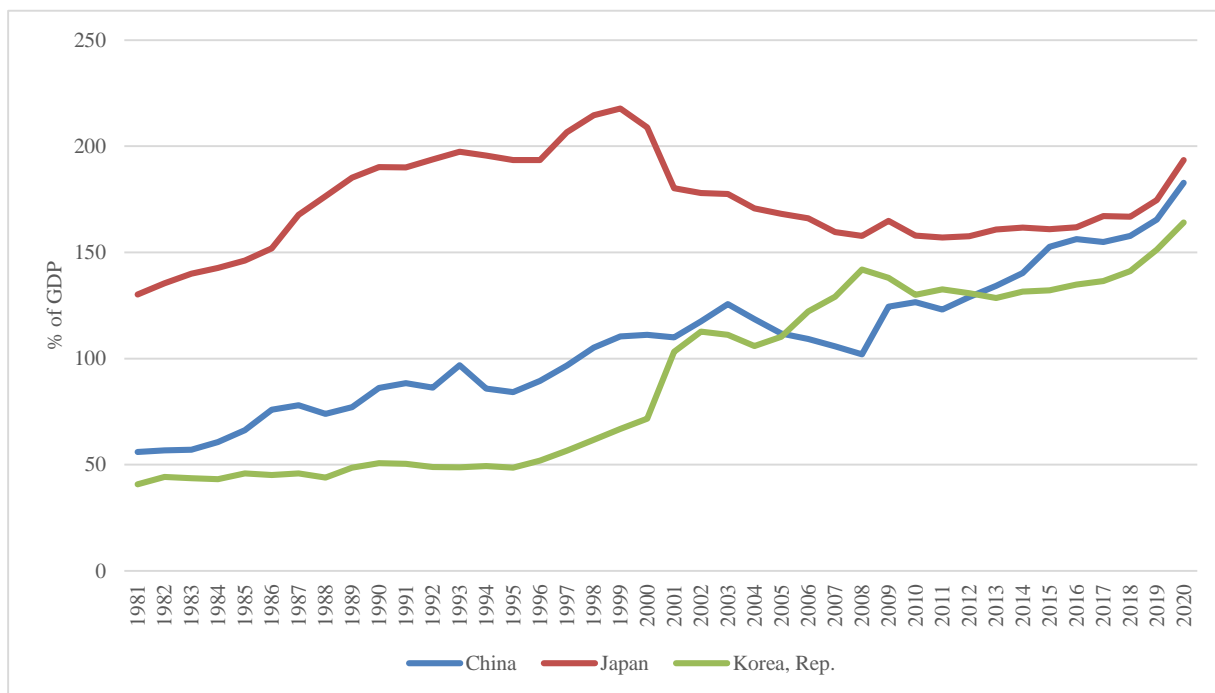
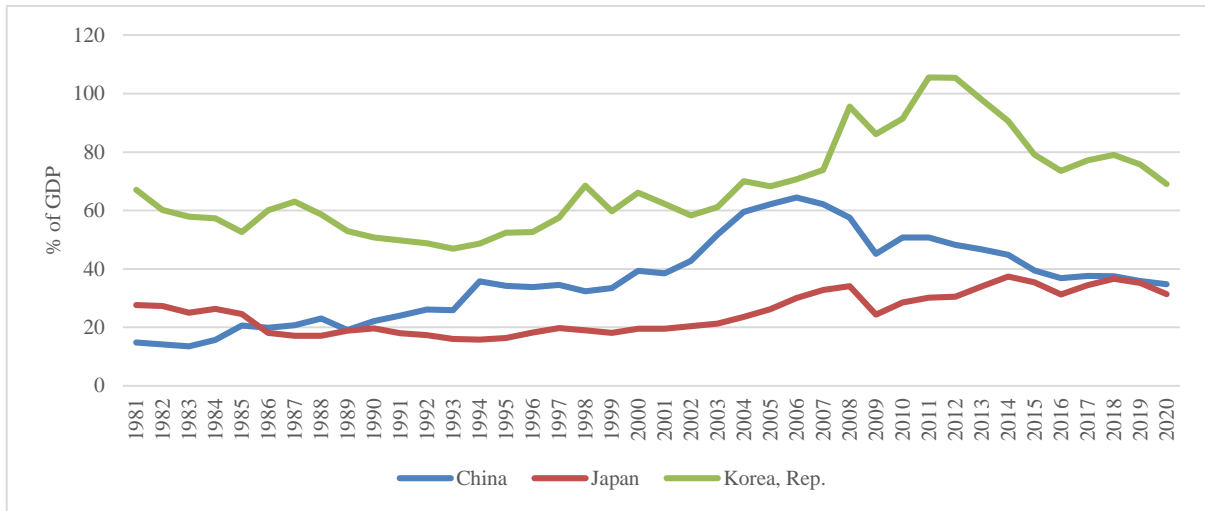
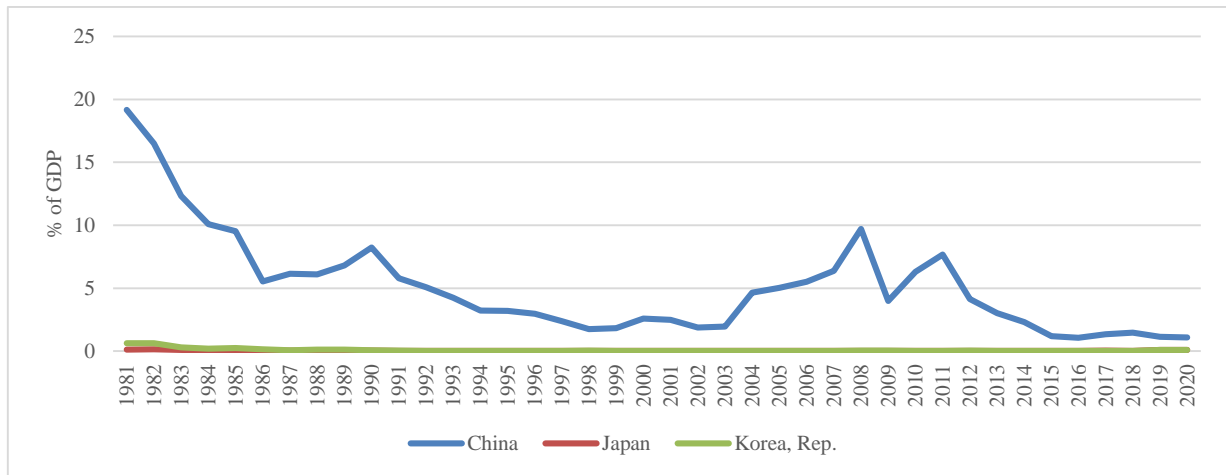


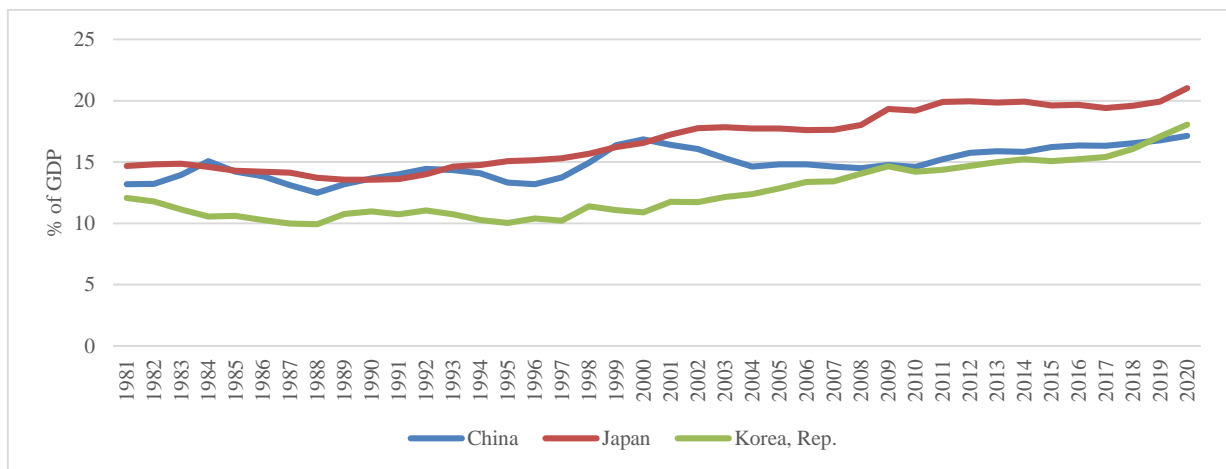
Figure 2. Financial development of three Northeast Asian countries  
Source: World Bank (2023b)



**Figure 3.** Trade openness of three Northeast Asian countries  
 Source: World Bank (2023c)



**Figure 4.** Natural resources rent of three Northeast Asian countries  
 Source: World Bank (2023d)



**Figure 5.** Government expenditure of three Northeast Asian countries  
 Source: World Bank (2023e)



**Table 3.** The correlation matrix

Variable	LnGDP per capita	LnFinancial development	LnTrade openness	LnNatural resources rent	LnGovernment expenditure
LnGDP per capita	1.00				
LnFinancial development	0.57	1.00			
LnTrade openness	0.17	-0.27	1.00		
LnNatural resources rent	-0.89	-0.33	-0.11	1.00	
LnGovernment expenditure	0.30	0.79	-0.27	-0.06	1.00

**Table 4.** Regression of the POLS model

Variables	Coefficients	Standard Errors	t	P-value
LnFinancial development	0.990***	0.129	7.65	<0.001
LnTrade openness	0.468***	0.064	7.25	<0.001
LnNatural resources rent	-0.397***	0.015	-25.65	<0.001
LnGovernment expenditure	0.150	0.308	0.49	0.627
Constant	1.742***	0.596	2.92	0.004
Number of obs.	120			
F(4, 115)	360.85			
Prob > F	0.000			
R-squared	0.926			
Adj R-squared	0.923			
Root MSE	0.351			

Note: \*\*\* denotes statistical significance at 1%

**Table 5.** The VIF test for multicollinearity

Variables	VIF	1/VIF
LnFinancial development	3.57	0.28
LnGovernment expenditure	3.07	0.32
Natural resources rent	1.34	0.74
LnTrade openness	1.14	0.87
Mean VIF	2.28	

The VIF was equal to 2.28 ( $VIF < 10$ ) and this reflects that there was no multicollinearity among the independent variables of the POLS model (**Table 5**).

Second, both the FEM and REM were estimated, and the results are presented in **Table 6**.

Third, the Hausman test was run to choose the most appropriate model. The P-value of the Hausman test was equal to 0.000 (P-value = 0.000) and therefore the FEM was selected as the most suitable model.

Fourth, the Wooldridge test and Wald test were employed to check the autocorrelation and heteroscedasticity, respectively, of the selected model. The results of the Wooldridge and Wald tests were presented in **Table 7**.

The Wooldridge test showed that the P-value was equal to 0.006 (P-value < 0.05) and this implied that the null hypothesis should be rejected, reflecting that there was autocorrelation in the FEM. Regarding the Wald test, the P-value was equal to 0.000 (P-value < 0.05) reflecting that the null hypothesis should be rejected, and

**Table 6.** Regression of the FEM and REM

Variables	FEM	REM
LnFinancial development	1.049***	0.990***
LnTrade openness	0.900***	0.468***
LnNatural resources rent	-0.205***	-0.397***
LnGovernment expenditure	-0.565**	0.150
Constant	2.153***	1.7422***
Number of observations	120	120
Number of groups	3	3
F(4, 113)	140.46	
Prob > F	0.000	
Wald chi2(4)		1443.42
Prob > chi2		0.000
R squared:		
Within	0.832	0.768
Between	0.863	0.998
Overall	0.808	0.926
Correlation (u <sub>i</sub> , X <sub>b</sub> )	0.495	0 (assumed)

**Table 7.** The Wooldridge test and Wald test for the FEM

Variables	Wooldridge test (Autocorrelation)	Wald test (Heteroscedasticity)
LnFinancial development	Null hypothesis: There is no autocorrelation Alternative hypothesis: There is autocorrelation	Null hypothesis: There is no heteroscedasticity Alternative hypothesis: There is heteroscedasticity
LnTrade openness	F(1, 2) = 150.77	Chi <sup>2</sup> (3) = 1165.67
LnNatural resources rent	Prob > F = 0.006	Prob > chi <sup>2</sup> < 0.001
LnGovernment expenditure		

therefore, there was heteroscedasticity in the FEM (**Table 7**). As a result, the feasible generalized least squares (FGLS) model was run to overcome the autocorrelation and heteroscedasticity issues of the FEM. The results of the regression in the FGLS model are illustrated in **Table 8**.

As seen in **Table 8**, financial development and trade openness facilitated economic growth, however natural resources rent had a negative impact on the GDP per capita. These imply that the economic growth of the three Northeast Asian countries can be fostered by financial development and trade openness, while over-exploitation of natural resources may discourage economic growth in the region (**Table 8**).

## Discussion

It has been empirically found that financial development and trade openness foster economic growth in the three selected Northeast Asian countries, and this implies the importance of financial development and trade openness to the economy of these countries. Our findings are consistent with the conclusions of Vo *et al.* (2020) and Cheng-Sze *et al.* (2021) who argued that economic growth in China is facilitated by financial development. However, our results are contrary to Liu & Hsu (2006), who concluded that financial development has a negative impact on economic growth in Japan and the Republic of Korea, while Hwang (2020) claimed that the effect of financial development on the economic

**Table 8.** Regression of the FGLS model

Variables	Coefficients	Standard Errors	z	P-value
LnFinancial development	0.823***	0.133	6.15	<0.001
LnTrade openness	0.381***	0.084	4.49	<0.001
LnNatural resources rent	-0.178***	0.022	-7.91	<0.001
LnGovernment expenditure	0.238	0.295	0.81	0.420
Constant	3.206***	0.798	4.02	<0.001
Number of observations	120			
Number of groups	3			
Wald chi2(4)	154.26			
Prob > chi2	0.000			

Note: \*\*\* denotes statistical significance at 1%.

growth of the Republic of Korea may be either positive or negative depending on the rate of private credit. Private credit was found to be positively associated with economic growth in the Republic of Korea if the share of household credit out of private credit was less than 46.9 percent; otherwise, private credit had a negative relationship with economic growth (Hwang, 2020). Our results can be interpreted by reasons as follows. First, the ratio of domestic credit provided by the banking sector over GDP is one of the most popularly used indicators for banking sector development. In general, the financial systems of Northeast Asian countries heavily depend on the banking sector rather than on capital markets, where the rate of domestic credit provided by the banking sector over the GDP is higher than market capitalization over the GDP. During the early stages of development, key industries were promoted by providing low-interest rates and relatively depreciated exchange rates under management of the governments. Second, the Japanese banking system, dominated by large banks, has been suffering from serious problems with non-performing loans since the bursting of the stock market and urban real estate bubbles at the beginning of the 1990s. At the same time, the Japanese economy slumped into long stagnation. To solve these problems, the Japanese government started to encourage financial reforms. However, the financial reforms were not sufficient to terminate the stagnation in the early 1990s. Similarly, Korea's banks also had an intertwined relationship with

the government and financial reforms following in Japan's steps. Moreover, to join the OECD and to meet the OECD's requirements, without taking account of financial structural imperfections, the process of financial deregulation not only continued but was also accelerated. The Korean government even further abolished financial account controls. The financial and currency crisis eventually burst in 1997-1998 (Liu & Hsu, 2006). Third, ENEA economies depend on trade, and since these countries utilize export-led development strategies, interdependence and integration have been most pronounced in trade. For instance, by 2015, ENEA economies contributed 20.2 percent to global trade with exports and imports accounting for 21.4 and 19.0 percent of the total, respectively. With a significant increase in trade for the last two decades, the ENEA subregion has become the second-largest trading bloc after the European Union (UN, 2017).

Further, surprisingly, our results reveal that natural resource rent had a significant and negative influence on economic growth in the three Northeast Asian countries. Cai & Le (2023) found that natural resources rent has a positive relationship with the economic growth of Vietnam in the long run, but it negatively affects economic growth in the short run. Wang *et al.* (2020) demonstrated that natural resource rent released more carbon emissions for the G7 economies, while Tu *et al.* (2021) argued that natural resource rent had a positive association with carbon emissions in China. China is known

as the largest emerging economy, however, during its development process, this country has had to deal with issues related to resource exhaustion, ecological imbalance, overcapacity, low production efficiency, and weak development of traditional industries (Fang & Yu, 2021). China, Japan, and the Republic of Korea follow exports-led strategies along with strong investments. Japan and the Republic of Korea are active members of the World Trade Organization, and these countries are the largest capital suppliers and global leaders in technology in Northeast Asia (UN, 2017). The three Northeast Asian countries have developed sustainable economic models by relying on exports and science and advanced technology rather than the over-exploitation of natural resources.

Our results stated that the effect of government expenditure on economic growth in Northeast Asia was insignificant and this is consistent with the conclusions of Lee *et al.* (2019). This finding may be interpreted as follows. First, China still maintains a socialist system, and the influence of the government on the market is mainly through state-owned enterprises. Moreover, government intervention is very active through various tax incentives and subsidies. Consequently, the impact of government expenditure on economic growth is low. In other words, due to the active intervention of the government on the market by providing factors for economic growth, government expenditure does not have a great influence on economic growth. Second, since the AFC in 1997, the Korean government has reduced government intervention in the market and increased the flexibility of the labor market according to the recommendations of the International Monetary Fund (IMF). Therefore, the intervention of the government in Korea has eased more than before.

## Conclusions and Policy Implications

This paper aimed to explore the nexus among financial development, trade openness, natural resources rent, government expenditure, and economic growth in three Northeast Asian

countries, namely China, Japan, and the Republic of Korea, between 1981 and 2020 using the fixed effect and random effect models. The results of the feasible generalized least squares model revealed that financial development and trade openness support economic growth, but natural resources rent had a negative relationship with the economic growth of the three Northeast Asian countries, while the relationship between government expenditure and economic growth was not statistically significant.

Appropriate policies should be recommended to foster economic growth and achieve sustainable development for the Northeast Asia region. First, financial development should be accelerated since it has a positive contribution to economic growth by focusing on improving the role of domestic credit to the private sector. Second, trade should continue to develop in the three Northeast Asian countries because it supports economic growth by exploiting competitive advantages in export-led growth and science and technology. Lastly, sustainable growth models such as low-carbon economy, green economy, and circular economy should be considered for implementation by the governments to reduce dependence upon natural resources and ensure sustainable development.

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