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EXPLORING THE LINK BETWEEN FINANCIAL GLOBALIZATION, FINANCIAL DEVELOPMENT, HUMAN DEVELOPMENT AND ECONOMIC GROWTH IN CHINA

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Abstract

The main objective of this study is to examine the relationship between globalization, financial development, human development and economic growth. The financial dimension of globalization, which is a multi-dimensional concept, is focused on, and the impact of financial globalization is investigated. The analysis was conducted in China. The KOF Globalization Index was used to represent financial globalization, the share of domestic loans given to the private sector in GDP was used to represent financial development, the Human Development Index was used to represent human development, and the GDP per capita value was used to represent economic growth. Because the stationarity levels of the variables were different from each other and there was a variable with I (2), the Toda-Yamamoto causality test was applied as a method. According to the results of the analysis covering the period 1990-2022, there is a causal relationship between the variables. There is bidirectional causality between financial globalization and economic growth. The causal relationship between human development and economic growth is also bidirectional. The causality relationship between financial development and economic growth is one-way, and the direction of causality is from economic growth to financial development. Economic growth should be encouraged to enhance financial development in China. Moreover, policies aimed at improving financial globalization and human development can be used to increase economic growth.

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Introduction

The factors that determine economic growth and the effects of these factors on economic growth have been an interesting subject of research for many years. This issue continues to be valid today (Boldeanu & Constantinescu, 2015) because new concepts that are linked to economic growth are emerging and the results obtained differ from country to country. There are various factors affecting economic growth. Studies on the determinants of economic growth in theoretical and empirical literature generally focus on factors such as physical and human development, investments, technology, and fiscal and monetary policy decisions (Amarathunga, 2012). As the globalization process accelerated after the 1980s, the relationship between globalization and economic growth became a popular topic (Fuinhas et al., 2019). Although there is a large body of literature investigating the relationship between globalization and economic growth, studies focusing on financial globalization are very few. Globalization is a comprehensive concept that brings together different dimensions: economic, social, political, cultural and financial. Every dimension is important and integral to globalization. However, examining the effects of financial globalization specifically has special importance. The reason for this is that there is a lack of empirical evidence on the relationship between financial globalization and economic growth. In addition, there are some features that distinguish financial globalization from other types of globalization (Doan & Nguyen, 2024). Financial globalization is the removal of obstacles to capital movements and the realization of capital flows from country to country without being subject to geographical restrictions. Because of financial globalization, national financial markets have been integrated with each other, and a single, global financial market has emerged (Arestis et al., 2005). Financial globalization has both increased the capital flow among developed countries and initiated an intense capital flow from developed countries to developing countries (Egbetunde & Akinlo, 2015). Increased capital flow creates various advantages for the country attracting capital. One of these advantages is the supply of resources that will support the development of the financial system. Since national saving rates are low, especially in developing countries, it is difficult to meet the amount of funds needed by the financial system with national savings. Incoming foreign capital encourages financial development by increasing the fund supply in the economy. Thus, transaction costs in the financial sector are reduced, the integration of the national financial sector with international markets is facilitated, consumption and investment balances are achieved, and borrowing and lending conditions are improved (Luqman et al., 2023). All of these reduce economic recessions, alleviate financial pressures, improve economic conditions and help increase national savings. Financial globalization plays a role in ensuring that economies achieve a stable structure (Bhatti et al., 2021). Although financial globalization has positive effects, it should also be remembered that it carries risks for the global economy. Because of the increased interaction between countries, problems experienced in the financial system of any country may affect other countries and problems may spread on a global scale (Sahoo & Sethi, 2023).

Although there are many factors affecting economic growth, another of these factors is financial development. Financial globalization impacts economic growth as a driving force for financial development. Looking at the relationship between financial development and economic growth, it is seen that this relationship is an important and controversial issue (Mengesha & Berde, 2023). There are numerous studies in the literature that examine the relationship between financial development and economic growth. In studies based on empirical analyses, researchers have obtained different results depending on the country or country groups they examined. The studies in the first group found that financial development causes economic growth. The studies in the second group found that economic growth is the source of a stronger and more efficient financial system. However, there are also studies that identify a bi-directional causality relationship between financial development and economic growth. Contrary to these three groups, some studies could not reach a significant relationship between economic growth and financial development (Hasan & Barua, 2015). Therefore, it can be stated that no absolute conclusion has been reached regarding the relationship between financial development and economic growth, and discussions on the subject continue. Even if there are analyses that reach different conclusions, it should not be ignored that financial development and economic growth are two intertwined and interacting concepts. The main basis of the views that argue that financial development will increase economic growth is the idea that financial development plays a key role in the creation of capital accumulation. It becomes easier to allocate resources to productive investments in economies with developed financial systems. Financial development reduces transaction costs, diversifies risk, speeds up access to information and enriches investment opportunities (Trebicka et al., 2024). All of these helps create new job opportunities, contribute to the revival of the real sector, the production of more goods and services, and the sustainability of economic growth. Increasing capital accumulation supports technological progress by increasing the amount of resources allocated to innovation and research and development activities (Rinosha & Mustafa, 2021). Those who argue that

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economic growth will support financial development state that increasing the amount of output in the economy will require more and more diverse financial services. According to these views, as economic growth increases, the need for financial services that are highly efficient, well-functioning, and have a variety of tools also increases (Pandey et al., 2024).

Another important factor that affects economic growth is human development. Human development is a concept that expresses all kinds of knowledge, skills and abilities of people living in a country. The factors that differentiate the economic growth and development levels of countries are a subject that has been studied for many years. Factors such as natural resources, capital accumulation and physical capital generally explain these differences. However, with endogenous growth theories, human development has begun to be recognized as also important in growth differences between countries. Not only the quantity but also the quality of human resources impacts economic growth (Anaduaka, 2014). All policies implemented in the fields of education, health, research activities, technological innovation and increasing the productivity of the workforce contribute to the increase of human development. Economic growth also increases because of investments contributing to human development (Sarwar et al., 2021). However, another factor that makes human development important is that it not only helps output growth but is also one of the fundamental building blocks of sustainable growth and development. Especially in recent years, it has been emphasized that output growth is not sufficient, and that growth must be sustainable, and that countries are moving toward the goal of sustainable development. Human development is one of the necessary conditions for sustainable growth (Pramaditya et al., 2024). Because research shows that as the level of human development increases, people tend to purchase environmentally friendly products, and their awareness of the environment increases. Education and knowledge positively affect people's environmental consciousness, facilitate long-term decision-making processes and help sustainable growth (Bekele et al., 2024). For this reason, countries need to attach importance to human development not only for economic growth but also for seeking solutions to environmental problems (Sasmita et al., 2024).

Considering the relationship between the concepts of globalization, financial development, human development and economic growth, it is thought that this study differs from other studies in the literature in some ways and will contribute to the literature. Many studies have investigated the impact of globalization on economic growth or the impact of financial development on economic growth. Likewise, there are many studies examining how human development affects economic growth. However, there are fewer studies examining globalization, financial development, human development and economic growth using the same model. In existing studies, either general globalization index data was used as a globalization indicator, or the analysis was conducted within the scope of economic globalization. This study focuses only on financial globalization and attempts to determine the effects of financial globalization. The liberalizations in capital movements that occur with financial globalization both support financial development and play a role in economic growth. Financial globalization, financial development, and human development are important indicators affecting economic growth, and revealing the relationship between these indicators can be a guide in shaping future policies. This study investigates the relationship between the concepts for China. China is a country that stands out with its high growth rates, large amount of financial assets, efforts to integrate with global markets, and human development. We have not found a similar study on China that considers these variables in the same model. For this reason, revealing the relationship between the variables and China's economic growth can serve as an example for future studies.

In the study, analysis was conducted using data from China covering the period 1990-2022. The stationarity levels of the variables are different from each other. While the independent variables, financial globalization, financial development and human development, are I (1), the dependent variable, economic growth, is I (2). Therefore, the Toda-Yamamoto causality test was used in the analysis.

Literature review

There are many studies in the literature that examine the relationship between globalization and economic growth, financial development and economic growth, and human development and economic growth. However, there are very few studies examining globalization, financial development, human development, and economic growth variables through the same model.

In studies examining the relationship between globalization and economic growth, general globalization index data were generally used instead of sub-dimensions of globalization. Studies dealing with the sub-dimensions of globalization have focused on economic globalization, and analyses that include financial globalization in the model have remained limited. Didzgalvyte-Bujauske et al. (2019) examined the impact of globalization on economic growth for developing countries. GMM analysis was conducted using data covering the period 1970-2017 from 125 developing countries. The effects of both the general globalization index and economic, social and political globalization

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have been examined. The general globalization index negatively affects economic growth. While economic globalization affects economic growth negatively in the short term, it affects it positively in the long term. Verma and Srivastava (2022) examined the relationship between globalization and economic growth within the scope of co-integration and causality analysis. In the analysis made for India, six different dimensions of globalization were discussed. Financial globalization is one of these dimensions. There is convergence in the long term between all dimensions of globalization and economic growth. There is a bi-directional causal relationship between financial globalization and economic growth. Sadiat et al. (2023) analyzed the relationship between globalization and economic growth in Nigeria. In the study where the ARDL method was applied, data from Nigeria covering the period between 1988 and 2022 were used. The effects of both the general globalization index and different globalization indices, including economic, social and political, have been investigated. Economic, social, and political globalization and general globalization have a positive impact on economic growth. Noman et al. (2023) considered the Pakistani case to examine the effects of globalization on economic growth. ARDL analysis was carried out in line with the data of Pakistan covering the period 1971-2021. The general globalization index represents globalization. According to the results of the analysis, globalization has a negative impact on economic growth in Pakistan. Nguea et al. (2024) analyzed African countries by examining the effects of financial globalization and democracy on economic growth. Data from 40 countries in the African continent between 1990 and 2014 were used and the GMM method was applied. Financial globalization and democracy have a positive impact on economic growth. Adjei et al. (2024) examined how financial globalization and governance indicators affected economic growth in Sub-Saharan African countries. In Sub-Saharan African countries, foreign capital inflows and improvements in the quality of governance increase economic growth. Therefore, financial globalization needs to be improved to increase capital inflows. Doan and Nguyen (2024) analyzed the effects of financial globalization on economic growth for the ASEAN-6 countries. The GMM method was applied using data covering the 2002-2021 period. In the ASEAN-6 countries, financial globalization positively affects economic growth.

In studies examining the relationship between financial development and economic growth, it has generally been concluded that financial development positively affects economic growth. However, there are also studies showing opposite results for some countries. Puatwoe and Piabuo (2017) examined the impact of financial development on economic growth through the example of Cameroon and applied the ARDL method. Three different variables were used as indicators of

financial development. These variables are the broad money supply, the share of deposits in GDP and loans with the private sector. All three indicators representing financial development have a positive impact on economic growth eventually. In the short term, a broad money supply positively affects economic growth. The effect of the deposit rate and the amount of domestic credit on economic growth in the short term is negative. Skare et al. (2019) studied the relationship between financial development and economic growth in Poland. The period 1990-2018 was discussed. In Poland, financial development increases economic growth. Additionally, there is a bidirectional causality relationship between financial development and economic growth. Sumarni (2019) investigated the relationship between financial development and economic growth in Indonesia. Data from 2005 to 2016 were used. According to ARDL analysis, there is a long-term, positive relationship between financial development and economic growth in Indonesia. Developments in the financial system enable economic growth to increase. An et al. (2021) examined the effects of financial development and liberalization on economic growth in the context of Sub-Saharan African countries. Data for the period 1985-2015 from 30 Sub-Saharan African countries were used. Financial development reduces economic growth in low- and middle-income countries while increasing economic growth in high-income countries. Similarly, financial liberalization decreases economic growth in low- and middle-income countries but plays a role in increasing economic growth in high-income countries. Odhiambo and Nyasha (2022) investigated the causal relationship between financial development and economic growth in Uganda. Data from the 1980-2015 period were included in the analysis, and five different indicators were used to represent financial development. Depending on the indicators used, the direction of the causal relationship between financial development and economic growth varies. For example, when the ratio of private loans provided by deposit banks to GDP is used as an indicator of financial development, there is no causality between financial development and economic growth. When the ratio of bank deposits to GDP is used, there is a one-way causality from financial development to economic growth. Aziz et al. (2023) examined the relationship between financial development and economic growth and included information and communication technologies in the model. Data covering 2001-2017 from 10 developing countries in Asia were used. There is a positive and statistically meaningful relationship between financial development and economic growth. While information and communication technologies alone affect economic growth negatively, this effect becomes positive when combined with financial devel-

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opment. Puscasu (2024) investigated the relationship between financial development and economic growth. In the analysis conducted for countries that are members of the European Union, the panel regression method was applied using data between 1990 and 2021. Financial development affects economic growth positively. However, the balance between the financial sector and the real sector is important. There must be harmony between the funds created in the financial sector and the production of the real sector.

In studies examining the relationship between human development and economic growth, human development generally affects economic growth positively and that there is a co-integration and causality relationship between them. Anyanwu et al. (2015) studied the relationship between human development and economic growth in Nigeria. The analysis is based on data from 1981 to 2010. According to ARDL analysis results, human development positively affects economic growth in Nigeria. However, this effect is statistically insignificant. Deviations that occur in the short term are balanced in the long term. Appiah et al. (2019) examined the relationship between human development and economic growth and carried out an analysis for African countries. Data from African countries between the years 1990 and 2015 were used. In Africa, human development positively affects economic growth. Qamruzzaman et al. (2021) conducted an analysis of South Asian countries to reveal the impact of human development and financial innovations on economic growth. The analysis is based on data from 6 countries in South Asia covering the period 1981-2016. ARDL and Granger causality analyses were implemented. Human development and financial innovation enable economic growth to increase. There is bidirectional causality between human development and economic growth. Sultana et al. (2022) investigated whether the relationship between human development and economic growth differs depending on the development levels of countries. The SGMM method was applied in the analysis using the data set covering the period 1980-2008 belonging to 141 developed and developing countries. While human development increases economic growth in developing countries, it slows down economic growth in developed countries. Djamal et al. (2023) examined the impact of human development on economic growth in South Africa. Data between 2000 and 2021 were used. According to ARDL analysis, while human development affects economic growth positively in the short term, it affects it negatively in the long term. Wegari et al. (2023) examined the impact of human development on Ethiopia's economic growth. The study, in which ARDL analysis is used, addresses the period 1980-2020. There is a co-integration relationship among the variables in the long run. Human development affects economic growth positively.

Data and methodology

In this study, the relationship between financial globalization, financial development, human development and economic growth is examined for China. The variables and their explanations in the dataset are included in Table 1. As can be seen from the table, the KOF Globalization Index was used as a financial globalization indicator. The share of domestic credit given to the private sector in GDP for financial development and the amount of GDP per capita for economic growth are included in the model. The Human Development Index was used as a human development indicator. Since human development is a multidimensional concept, composite indices are often used in its measurement. The indicator commonly used to represent human development in studies in the literature is the Human Development Index. The Human Development Index is a multi-dimensional indicator prepared by the United Nations Development Program. It measures within 3 basic dimensions: education, health and income level (Manullang et al., 2024). Data set covers the period 1990-2022. Data covering the years 1990-2022 were used in the analysis because the widest and most current time range available for the four variables in the model belongs to this period.

Table 1: Variables and description

Variable	Symbols	Description	Data Source
Economic Growth	GDP	GDP per capita (constant 2015 US$)	World Bank
Financial Globalization	FINGLOB	KOF Globalization Index	KOF Swiss Economic Institute
Financial Development	FINDEV	Domestic credit to the private sector (% of GDP)	World Bank
Human Development	HUMANDEV	Human Development Index	Our World in Data

Source: Author's own work.

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The next stage after determining the variables and time interval is to decide on the method to be applied. To decide on the method, first the stationarity levels of the variables were determined by performing the unit root test. The augmented Dickey-Fuller (ADF) unit root test was used in the study, and the unit root test was performed according to the model with trend and constant.

The ADF test is an expansion of the test developed by Dickey and Fuller (1981). There are three different models in the ADF testing. These are the models without trends and constants, the models with trends, and the models with trends and constants. The equations used to test the models are listed below. μ in the equation is the constant term, t is the trend, p is the number of lags and ε is the error term (Arltova & Fedorova, 2016).

$$\Delta y_{t-i} = \delta y_t + \sum_{i-1}^{p} \beta_i \Delta y_{t-i} + \varepsilon_i \qquad (1)$$

$$\Delta y_{t-i} = \mu + \delta y_t + \sum_{i-1}^{p} \beta_i \Delta y_{t-i} + \varepsilon_i \qquad (2)$$

$$\Delta y_{t-i} = \mu + \beta_t + \delta y_t + \sum_{i-1}^{p} \beta_i \Delta y_{t-i} + \varepsilon_i \qquad (3)$$

In the ADF test, the hypotheses used to determine the stationarity of the series are listed below. The H_0 hypothesis states that the series is stationary, while the H_1 hypothesis states that the series is not stationary.

H_0: The series does not contain a unit root (it is stationary)

H_1: The series contains a unit root (it is not stationary)

According to the unit root test, it is seen that three of the variables are I (1) and one is I (2). Since the stationarity levels of the variables are different from each other and there is a variable that is second-order stationary among the variables, the Toda-Yamamoto causality test was chosen as the method.

The Toda-Yamamoto causality test was introduced in 1995 and is a method that finds a solution to the weaknesses of traditional causality tests. There are some restrictions in traditional causality tests, depending on the degree of stationarity of the variables and whether there is a co-integration relationship between the variables (Tiemele et al., 2024). The Toda-Yamamoto causality test reduces these limitations, providing flexibility for the analyses. The Toda-Yamamoto causality test is based on the extended VAR model and examines the causality relationship between variables with the Wald test (Obinna & Innocent, 2024). To apply the Toda-Yamamoto causality test, the varia-

bles do not have to be stationary at the same level. This test can also be applied to series with different stationarity levels and second-order stationary series. In addition, data loss is prevented because the series are processed with the level values (Phaju & Khadka, 2023).

There is a two-stage process to perform the Toda-Yamamoto causality test. First, the stationarity level (dmax) of the variables is determined. Second, the optimum lag length (k) is determined for the variables, (k + dmax) value is used in the VAR model created for analysis (Toda & Yamamoto, 1995).

Equations 4 and 5 below express the causality equations based on VAR analysis used in the Toda-Yamamoto test.

$$yt = \alpha_0 + \sum_{i=1}^{k} b_{1i} \cdot y_{t-i} + \sum_{i=k+1}^{k+dmax} b_{2i} \cdot y_{t-1} + \sum_{i=1}^{k} c_{1i} \cdot x_{t-i} + \\ \sum_{i=k+1}^{k+dmax} c_{2i} \cdot x_{t-i} + e_{1t} \qquad (4)$$

$$yt = d_0 + \sum_{i=1}^{k} e_{1i} \cdot x_{t-i} + \sum_{i=k+1}^{k+dmax} e_{2i} \cdot x_{t-i} + \sum_{i=1}^{k} f_{1i} \cdot y_{t-i} + \\ \sum_{i=k+1}^{k+dmax} f_{2i} \cdot y_{t-i} + e_2 \qquad (5)$$

The equation created for the analysis, considering the variables and method determined in the study, is given below:

$$lnGDP_t = \beta_0 + \beta_1 lnFINGLOB_t + \beta_2 lnFINDEV_t + \\ \beta_3 lnHUMANDEV_t + \varepsilon_t \qquad (6)$$

The natural logarithm of the variables was taken, and the analysis was carried out with the help of the Eviews program. The results obtained at each stage of the analysis are explained in detail in the next chapter of the study.

Results

In the analysis part of the study, the descriptive statistics of the variables were first examined. Information about the descriptive statistics is given in Table 2. The number of observations in the database is 33. While the variable with the largest standard deviation is lnGDP, the variable with the smallest standard deviation is lnHUMANDEV. The variables with skewness values less than 0 are lnGDP, lnFINGLOB, and lnHUMANDEV. These variables are left-skewed. The variable lnFINDEV is skewed to the right because its skew value is greater than 0. The kurtosis value is less than 3 for all variables, and the variables have a flat distribution.

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Table 2: Descriptive statistics of variables

	lnGDP	lnFINGLOB	lnFINDEV	lnHUMANDEV
Mean	8.208556	3.698556	4.783369	-0.446178
Median	8.242958	3.768682	4.766427	-0.421594
Maximum	9.354954	3.901351	5.226860	-0.238257
Minimum	6.807971	3.272138	4.433267	-0.729811
Std. Dev.	0.798104	0.177455	0.234741	0.155239
Skewness	-0.155610	-0.784931	0.270408	-0.314093
Kurtosis	1.719664	2.577504	2.089903	1.811399
Jarque-Bera	2.387162	3.634080	1.541044	2.485161
Probability	0.303134	0.162506	0.462771	0.288638
Sum	270.882400	122.052300	157.851200	-14.723890
Sum Sq. Dev.	20.383060	1.007693	1.763308	0.771174
Observations	33.000000	33.000000	33.000000	33.000000

Source: Author's own work.

The next stage after examining the descriptive statistics is to determine the method to be used for the analysis. To determine the method to be used in the study, the stationarity levels of the series must first be determined. To determine the stationarity levels, the ADF unit root test was applied in this study. The ADF unit root test results are shown in Table 3. According to the ADF unit root test results, the lnFINGLOB, lnFINDEV and lnHUMANDEV variables become stationary after taking their first differences. This series is I (1). Since lnGDP, the dependent variable, did not become stationary after the first difference was taken, the second difference was taken. lnGDP is I (2) because it is stationary after the second difference is taken.

Table 3: ADF unit root tests

At level			
Variable	**t-Statistics**	**Critical Value**	**Prob.**
lnFINGLOB	-1.943187	-4.273277 (1%)	0.6089
		-3.557759 (5%)	
		-3.212361 (10%)	
lnFINDEV	-2.359771	-4.273277 (1%)	0.3921
		-3.557759 (5%)	
		-3.212361 (10%)	
lnHUMANDEV	1.862211	-4.284580 (1%)	1.0000
		-3.562882 (5%)	
		-3.215267 (10%)	
lnGDP	-0.865776	-4.296729 (1%)	0.9471
		-3.568379 (5%)	
		-3.218382 (10%)	
The first difference			
Variable	**t-Statistics**	**Critical Value**	**Prob.**
lnFINGLOB	-6.161464	-4.284580 (1%) *	0.0001
		-3.562882 (5%) **	
		-3.215267 (10%) ***	
lnFINDEV	-5.660523	-4.284580 (1%) *	0.0003
		-3.562882 (5%) **	
		-3.215267 (10%) ***	
lnHUMANDEV	-4.856259	-4.284580 (1%) *	0.0025
		-3.562882 (5%) **	
		-3.215267 (10%) ***	
lnGDP	-1.964071	-4.296729 (1%)	0.5965
		-3.568379 (5%)	
		-3.218382 (10%)	

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The second difference			
Variable	t-Statistics	Critical Value	Prob.
lnGDP	-8.219640	-4.296729 (1%) *	0.0000
		-3.568379 (5%) **	
		-3.218382 (10%) ***	

Note: *, **, and *** denote significance at 1%, 5%, and 10%, respectively

Source: Author's own work.

According to the ADF unit root test results, the stationarity levels of the variables used in the model are not the same and there is a variable that is I (2). For this reason, it is not possible to apply methods such as the Johansen analysis, the Engle-Granger analysis, the Granger causality test, and ARDL analysis. To use the Johansen analysis, the Engle-Granger analysis and the Granger causality test, the variables must be stationary at the same level. For ARDL analysis to be used, the series must be I (0) and/or I (1), and a series with I (2) must not be included in the model. For this reason, it can be stated that the most suitable method for the model is the Toda-Yamamoto causality analysis. In the study, the Toda-Yamamoto causality test was used. For the Toda-Yamamoto test, the optimal lag length was first determined. The results regarding the optimum delay length are in table 4. According to the information in the table, the optimal lag length for the model is 1.

Table 4: Lag selection criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	139.0853	NA	1.44e-09	-9.005689	-8.818863	-8.945922
1	349.4477	350.60390*	3.44e-15*	-21.963180*	-21.029050*	-21.664340*
2	361.9683	17.52885	4.63e-15	-21.731220	-20.049780	-21.193310
3	380.5380	21.04565	4.62e-15	-21.902530	-19.473790	-21.125560

Note: *Stands for the criterion selecting the lag order. LR, FPE, AIC, SC, and HQ represent the sequential modified LR test statistic, final prediction error, Akaike information criterion, Schwarz information criterion, and Hannan–Quinan information criterion, respectively

Source: Author's own work.

After the optimal lag length is determined, some diagnostic tests on the model need to be performed. First, an autocorrelation test was conducted to check whether the error terms in the model were related to each other. Table 5 includes the LM test results used to test the existence of autocorrelation. According to the 2-lag autocorrelation LM test results, there is no relationship between the error terms. The H_0 hypothesis states that there is no autocorrelation among the error terms. Since the probability values are greater than 0.05, the H_0 hypothesis is accepted, and it is concluded that there is no autocorrelation in the model.

Table 5: Autocorrelation LM test results

Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	19.84554	16	0.2273	1.291513	(16, 61.7)	0.2316
2	44.18164	32	0.0743	1.503520	(32, 60.6)	0.0857

Source: Author's own work.

After it was determined that there was no autocorrelation problem, a heteroskedasticity test was performed on the model. Whether there was heteroscedasticity was tested with the White test. The results of the heteroscedasticity test are shown in Table 6. As can be seen from the table, the probability value of the test is greater than 0.05. This shows that there is no problem of heteroskedasticity in the model.

Table 6: White heteroscedasticity test

Chi-sq	df	Prob.
99.99899	80	0.0646

Source: Author's own work.

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In the next stage, we tested whether the model met the assumption of normality. The error terms of the model must have a normal distribution. To test the normality assumption, the Jargue-Bera normality test was applied. According to the results in Table 7, since the probability value is greater than 0.05, the assumption of normality is met. This means that the error terms of the model are normally distributed.

Table 7: Jargue-Bera normality test results

Jargue-Bera	df	Prob.
11.28288	8	0.1862

Source: Author's own work.

As another diagnostic test, it was checked whether the model satisfied the stability condition. To determine whether the model satisfies the stability condition, the inverse roots of the AR characteristic polynomials were examined. The inverse roots of the AR characteristic polynomials must be within the unit circle. As can be seen in the figure below, the inverse roots of the AR characteristic polynomials are inside the unit circle. Accordingly, the VAR model established in the study is stable.

Figure 1: Inverse root test of the AR characteristic polynomial
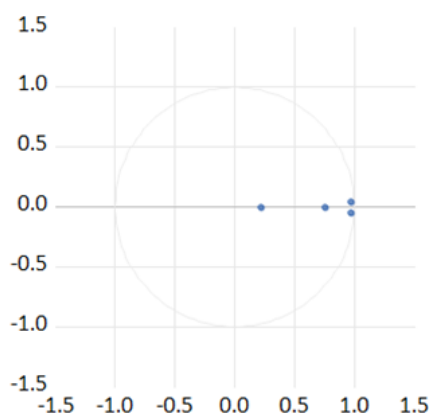
Source: Author's own work.

There is no problem with autocorrelation, heteroskedasticity, normality, and stability in the VAR model created in the study. Therefore, it was concluded that the application of the Toda-Yamamoto test was appropriate. For the Toda-Yamamoto test to be applied, the (k + dmax) value must be determined. Because of the analysis, the optimal lag length (k) was 1. The maximum order of integration (dmax) is 2. Because the economic growth variable is stationary to the second degree. Therefore (k + dmax) is 3. Accordingly, the Toda-Yamamoto test was performed, and the results of the test are given in Table 8.

Table 8: Toda-Yamamoto causality test results

Variables	WALD Test Statistics	df	Prob.	Results
FINGLOB → GDP	5.999048	3	0.0143	Causality
FINDEV → GDP	1.259997	3	0.2616	No Causality
HUMANDEV → GDP	15.691940	3	0.0000	Causality
GDP → FINGLOB	11.346640	3	0.0007	Causality
FINDEV → FINGLOB	0.817142	3	0.3660	No Causality
HUMANDEV → FINGLOB	17.840890	3	0.0000	Causality
GDP → FINDEV	22.427520	3	0.0000	Causality
FINGLOB → FINDEV	32.789750	3	0.0000	Causality
HUMANDEV → FINDEV	8.644219	3	0.0032	Causality
GDP → HUMANDEV	10.633190	3	0.0011	Causality
FINLOB → HUMANDEV	4.302393	3	0.0380	Causality
FINDEV → HUMANDEV	4.485266	3	0.0341	Causality

Source: Author's own work.

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According to the test results, there is a bi-directional causality relationship between lnGDP and lnFINGLOB. Similarly, the causal relationship between lnGDP and lnHUMANDEV is bidirectional. Although there is a causal relationship between LnGDP and lnFINDEV, this relationship is unidirectional. The direction of the relationship is from lnGDP to lnFINDEV.

In the analysis, the causality relationship among the independent variables was also examined. There is a one-way causal relationship between lnFINGLOB and lnFINDEV. The direction of the relationship is from lnFINGLOB to lnFINDEV. There is a bidirectional causality between lnFINGLOB and lnHUMANDEV. A bidirectional relationship between lnFINDEV and lnHU-MANDEV was also detected.

According to the Toda-Yamamoto causality analysis, there is a causal relationship between financial globalization, financial development, human development and economic growth in China. Financial globalization is the origin of economic growth. Additionally, economic growth is also the source of financial globalization. In other words, financial globalization affects economic growth and is influenced by economic growth. A causal relationship between human development and economic growth. Although human development is the reason for economic growth, economic growth is also the cause of human development. The direction of causality between financial development and economic growth is from economic growth to financial development. Accordingly, the reason for financial development is economic growth. Increases in economic growth are an important factor in ensuring financial development. The unidirectional causality relationship between economic growth and financial development is consistent with the development of China's financial sector and the literature. In the literature, a one-way causality relationship from economic growth to financial development is generally seen in developing countries. This situation is also valid for China. Although significant structural reforms were carried out in China's financial sector after 1978, financial markets have not yet completed their development, and financial depth has not reached high levels. For financial development in China to increase, economic growth needs to increase. As economic growth increases, financial development also increases as the demand for financial products and services increases (Jalil & Ma, 2008). Economic growth fuels financial markets in China. The development of the financial system in China can be examined by dividing it into pre-1994, 1994-2001 and post-2001 periods. In 1994, radical reforms to regulate the financial system in China began in 1994. Before 1994, no financial system existed based on the functioning of the market mechanism. After 1978, the central planning system began to loosen, and non-bank financial institutions and new banks entered the Chi-

nese financial markets. However, radical reforms were made after 1994 (Maswana, 2011). Foreign banks were allowed to operate in Chinese markets, and two stock exchanges were established. China's membership in the World Trade Organization in 2001 also accelerated financial development. The post-2001 period can be described as the financial liberalization process for China. During this period, loan and deposit interest rates were liberalized, the number of foreign banks increased, and the efficiency of the financial intermediation system improved. Despite the reforms, the efficiency of the financial sector in China must be increased, capital markets, and modernize financial markets (Zhang et al., 2012). The unidirectional causality relationship obtained in the study also supports this hypothesis. In China, financial markets have not yet become the engine of growth. In China, financial development does not lead to economic growth, but economic growth does.

The development of financial globalization in China is also parallel to financial development. With the reform policies that began after 1978 and the acceleration of globalization throughout the world, the amount of FDI in China increased rapidly from the 1980s to the 2000s (Shahbaz et al., 2018). After becoming a member of the World Trade Organization in 2001, Chinese capital began to flow to foreign countries. Thus, China has become a country that both attracts and provides foreign countries with capital flows. This situation accelerated the financial globalization process (Mao & Kim, 2019). The finding that the relationship between financial globalization and economic growth in China is bidirectional also confirms this process. The inflow of foreign capital to China because of financial liberalization leads to increased economic growth. The increase in capital volume and economic growth contribute to the financial globalization process by enabling Chinese capital to flow to different countries.

Conclusions

In this study, the relationship between financial globalization, financial development, human development and economic growth is examined through China. The dataset covers the period between 1990 and 2022. The method used in the analysis is the Toda-Yamamoto causality test. The variables in the model have different levels of stationarity, and the dependent variable, economic growth, is stationary to the second degree. For this reason, the Toda-Yamamoto causality test, which is an appropriate method for testing the causality relationship between variables that are stationary at different levels, was preferred. According to the test results, there is a bidirectional causality relationship between financial globalization and economic growth. Financial globalization is the reason for economic growth. At the same time, economic growth is also the cause of finan-

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cial globalization. Considering the bidirectional causality relationship between them, practices that will support financial globalization and expand its scope can be implemented. Thus, economic growth can be sustained. Since the late 1970s, China has accelerated its efforts to integrate into global markets and has implemented various reforms within the scope of the globalization process. Comprehensive policies have been implemented for the globalization of production, trade, and financial markets. Although China has made progress over time in the scope of financial globalization, there are still shortcomings in this regard, and these deficiencies need to be addressed. In order to develop financial globalization, the economic and political independence of the Chinese central bank must first be ensured. The existence of a central bank that is not fully independent disrupts the process of financial globalization. The central bank should determine policies by considering market conditions, not public authorities' decisions.

China has a structure dominated by state-owned commercial banks. Although the market share of publicly owned commercial banks has decreased over time with globalization, this share is still much higher than that of privately owned banks. Since the efficiency of state-owned commercial banks is quite low compared with other banks, this situation disrupts the functioning of financial markets. To prevent this, measures can be taken to increase the efficiency of publicly owned banks, publicly owned banks can be privatized, and regulations can be made to facilitate the entry of privately-owned banks into the market. Moreover, foreign-owned banks in China have a negligible share in terms of number and capital volume. Increasing the number of foreign-owned banks can increase the efficiency of financial markets by increasing market competition. Various measures should be taken to ensure the establishment and continued operations of foreign capital banks. For example, to save time, legal barriers to market entry for foreign-owned banks should be removed, and bureaucratic obstacles should be reduced.

To enhance financial liberalization in China, revisions in regulation and supervision are needed. Regulations regarding financial markets in China change frequently, and there are contradictions between the regulations. This reduces the effectiveness of financial globalization. Decision-making processes should be based on a specific system, and decisions that frequently change should be avoided. Long-term plans should be made, and care should be taken to comply with the plans made. The supervision of banks and other financial institutions operating in financial markets should be effective. Inspections should be carried out at regular intervals and a penalty mechanism should be put in place when necessary. Care must be taken to ensure that audits are conducted in a transparent, fair, and impartial manner.

The financial risks and intermediary costs are quite high in China. High financial risks cause domestic and foreign investors to be reluctant to enter the financial markets, thus narrowing the financial market's capital volume. High intermediation costs weaken domestic banks' international competitiveness.

Public influence on financial markets in China continues to exist, and the public sector's crowding out effect on the private sector is also high. To develop financial globalization, the influence of the government should be minimized and a system based on market conditions should be established. Activities of credit institutions other than banks should be expanded.

It has also been determined that there is a causal relationship between financial development and economic growth. This relationship is unidirectional, and the direction of the relationship is from economic growth to financial development. The unidirectional relationship shows that economic growth needs to be increased to realize financial development. In China, the increase in economic growth plays a role in the creation of a financial system that is stronger, more resistant to shocks, has deeper markets and has a higher variety of instruments.

There is also a causality relationship between human development and economic growth, and there is a bidirectional causality. There is a need to develop human development for economic growth to occur. At the same time, an increase in economic growth must be achieved for human development to proceed. These two concepts support each other. Over time, China has improved its human development capacity, increased the education level of its people , and enriched its human resources in terms of quality. Continuing human development-related policies and enriching them with new policies may have a positive impact on China's economic growth. To enhance human development in China, improving the quality of education and reducing educational inequalities are necessary. An increase in human development can be achieved by increasing the share of well-educated and qualified people in society. However, disparities between regions in China are quite high, and this is reflected in human development. To increase human development, investments in education and personal development must increase. In rural areas, household income and resources allocated to education are limited. To prevent this, the government should give importance to rural development policies. Support policies such as student loans and scholarships can be increased for rural households. In addition to the disparity in educational opportunities between rural and urban areas, gender inequality in education poses an obstacle to human development in China. Policies should be developed to prevent girls from being deprived of quality education, and the im-

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portance given to gender equality should be increased. The school dropout rates in China are quite high. While there are reasons for high school dropout rates related to income levels, there are also reasons such as social restrictions and exclusion. These reasons may differ in rural and urban areas; therefore, they must be identified correctly, and region-specific policies must be implemented.

It is extremely important to increase the amount of resources allocated to education in China to correctly determine the areas where resources will be directed, and to prioritise resource efficiency. China has shortcomings in its retirement and social security systems despite its economic development. Social security reforms must include economically and socially disadvantaged groups. Moreover, despite China's large population, the population is ageing. Population policies can be reconsidered to increase human development and create a young, dynamic, and educated population. Because the population structure and birth rate of each region differ, regions can implement their own population policies. Thus, reaching higher levels of human development may be possible.

As can be seen, there is a strong causal relationship between financial globalization, financial development, human development and economic growth in China, which is one of the world's leading countries with its economic growth rates, trade volume, population structure, technology and innovation production capacity. This study can contribute to the literature by focusing on financial globalization and emphasizing the importance of financial and human development for China. However, despite the study's contributions to the literature, it also has some limitations. One of the main limitations of this study is the difficulty in variable selection. Numerous variables are used in the literature to represent financial development. Private Sector Credit to GDP, M2 to GDP, Deposits to GDP, Public Debt Securities to GDP, Private Debt Securities to GDP, Accounts per thousand adults (commercial banks), and Government bond yields (3-month and 10-year) are just a few. It is difficult to choose among these variables. Domestic credit to the private sector (% of GDP) was used as the indicator of financial development. There are two main reasons for this. First, the private sector's share of credit in China's GDP has increased significantly over time. This rate has been above 100%

every year for the last 27 years. Therefore, this may be a suitable variable to illustrate and highlight the change in China's financial sector. The second reason is related to the data set's availability. Data for some variables are not current or date back to more recent times than the 1990s. For the reliability of the analysis, a variable that can provide data for the longest period was preferred. However, research can be conducted in different countries, and different variables can be used in different studies.

KOF financial globalization index data were used in this study. The KOF globalization index includes various sub-indicators, including economic, social, and political globalization, in addition to financial globalization. In this study, it was aimed to emphasize financial globalization in order to fill the gap in the literature. Since different indicators, such as human and financial development, are also considered in addition to globalization, a higher number of variables may reduce the reliability of the analysis when the number of observations is considered. Therefore, care was taken to ensure that the number of independent variables was not too high. However, future studies should focus solely on the effects of globalization and conduct analyses that combine different types of globalization.

Another limitation of the study is related to the method. To perform the Toda-Yamamoto causality test, it is not necessary for the series to be co-integrated. In addition, since the series does not have to be stationary, the difference of the series is not needed, and no data loss occurs. Owing to these features, the Toda-Yamamoto causality test provides flexibility and reduces estimation bias. However, despite its advantages, it also has some disadvantages. For example, the Toda-Yamamoto causality test does not examine the existence of a causal relationship by dividing it into periods and does not provide information about whether the relationship is permanent or temporary. It may be insufficient to explain the structural breaks and nonlinear structures in the series. Therefore, in future studies, the results obtained using similar variables but different methods for China can be compared. Frequency-domain causality analysis and Fourier Toda-Yamamoto causality test may be preferred. Determining whether the obtained results differ according to the methods used may further contribute to the literature.

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