Financial Inclusion, Industrial Structural Upgrading and National Economic Resilience

Linmei Wang[1*], Peiyan Song[2]

[1]Associate professor, Dept. of Marxism, Sichuan University, Chengdu, China
[2]postgraduate, Dept. of Economics, Sun Yat-sen University, Guangzhou, China

Abstract: In the context of the new era of accelerated evolution of the current century-old changes, the country's economic resilience has become a controlling factor in determining whether a country's economy can develop smoothly and safely. Substantial enhancement of the level of economic resilience of the country, financial inclusive development and industrial structure upgrading play an unignorable role in it. Based on the World Bank's global economic and social development database from 2011 to 2021, and on the basis of reconstructing the internationally comparable financial inclusion and national economic resilience index system, the impact of financial inclusion and industrial structure upgrading on national economic resilience in 64 economies is examined in depth by using the panel random-effects model, instrumental variable method, extended regression model and intermediary mechanism test, and the study finds that financial It is found that the increase in the level of financial inclusion has a positive effect on the enhancement of national economic resilience, but the upgrading of industrial structure directed by the increase in the proportion of the service industry will weaken the national economic resilience to a certain extent; the upgrading of industrial structure plays an obvious intermediary role in the process of financial inclusion affecting the national economic resilience, and the financial inclusion and the upgrading of industrial structure can synergistically improve the enhancement of the country's economic resilience. Further examining the heterogeneity, it is found that the development of financial inclusion has a significant positive impact on the economic resilience of countries of all types of cleanliness levels and countries of all income levels, and as the level of corruption increases, the greater the role of financial inclusion in promoting the economic resilience of the country. And among different income groups, The boosting effect of financial inclusion on national economic resilience is strongest in low- and middle-income countries, followed by upper-middle-income, and weakest in high-income countries. After the robustness test, the conclusion still holds, and this paper provides classified empirical support for different types of countries to further optimize financial and industrial policies to enhance national economic resilience according to local conditions.

Keywords: Financial Inclusion; Industrial Structural Upgrading; National Economic Resilience; Panel Data

I Introduction

While economic ties between countries have become increasingly close under the wave of globalization, the instability of the current international situation poses risks and challenges to global economic development. As a result, how to enhance the resilience of national economic development has gradually become the focus of attention of governments around the world. National economic resilience reflects the ability of a country's socio-economic system to cope with external shocks and its ability to recover from such shocks, and is a key indicator for judging whether a country's national economic system can withstand external shocks. The strength of a country's economic resilience is closely related to the health of its financial environment. A large number of studies have found that a sound financial environment can promote capital flows and allocation, thereby stimulating national investment and innovation, and thus becomes a controlling factor in enhancing the resilience of a country's economy. At the same time, a sound financial system can also effectively protect against financial risks and further enhance the ability to withstand the impact of the international economic crisis.

Judging from the development of the international financial system in the twenty-first century, financial exclusion has been difficult to eliminate. In some developing countries, the imbalance in the allocation of financial resources and the widening gap between the rich and the poor have increased the vulnerability of their economic systems. In order to address these challenges, the United Nations first proposed the concept of financial inclusion in 2005, with the aim of calling on countries to provide affordable, appropriate and effective financial services to all segments of society, with a focus on improving the financial exclusion of disadvantaged groups such as micro and small enterprises, farmers and low-income people in cities and towns. According to the Global Financial Inclusion Index 2021 database released by the World Bank, global financial inclusion has made significant progress since 2011, not only in terms of the rapid increase in account penetration in financial institutions, but also at the level of increased accessibility to financial services and the reduction of gender disparities.

For China, although its research in the field of financial inclusion started late, with the improvement of China's comprehensive strength, the concept of financial inclusion has been increasingly emphasized. In 2013, at the Third Plenary Session of the 18th CPC Central Committee, China for the first time elevated "financial inclusion" to a national strategy, and then at the end of 2015, rapidly introduced the "Plan for Promoting the Development of Inclusive Finance (2016-2020)", emphasizing that the development of inclusive finance is an inevitable requirement for building a moderately prosperous society in all aspects. Inclusive Financial Development Plan (2016-2020)", emphasizing that the development of inclusive financial services is an inevitable requirement for building a moderately prosperous society. After the 19th CPC National Congress, as China's economy enters the stage of high-quality development, promoting high-quality development is an inevitable requirement to follow the law of economic development and maintain sustained and healthy economic development, and it is an inevitable requirement to adapt to the change of the main contradiction in China's society and solve the problem of unbalanced and insufficient development. The central government further listed improving financial exclusion and expanding the breadth and depth of financial services as important measures to achieve high-quality development, while emphasizing the need to accelerate the optimization and upgrading of the industrial structure and to promote the successive transformation of old and new kinetic energies.2023 The State Council then went on to issue the "Opinions of the State Council on the Implementation of the State Council on Promoting the High-quality Development of Inclusive Finance," which highlights the unique role of financial inclusion in the promotion of the common wealth Meanwhile, on December 27, 2023, the State Council issued the Catalogue of Industrial Structure Adjustment (2024 Edition), pointing out that promoting industrial structure adjustment is an important initiative to build a modernized industrial system, enhance the core competitiveness of industries, and promote industries to move towards the middle and high end of the global value chain, and is a powerful support for China's national economic construction and China's status as a great power. Therefore, China's simultaneous efforts in industrial structure upgrading and financial inclusive development will be an important way to realize high-quality economic development in the future. At present, China urgently needs to continuously

improve financial inclusion to solve the problem of accessibility of financial services in China, and at the same time, it also needs to utilize the development of financial inclusion to accelerate the development and growth of strategic emerging industries. Therefore, timely attention to the impact of cross-country financial inclusive development, industrial structure upgrading and national economic resilience will not only help China absorb and learn from international experience to promote its own economic resilience, but also have important theoretical and practical significance for China to achieve the goal of building a strong socialist modernized country in the new era.

2 Literature review

2.1 Financial inclusive development and economic resilience

In essence, financial inclusion is the basis for reducing poverty, achieving economic growth, and increasing the financial resilience of households, and it contributes to the construction of a more stable financial and economic system. In terms of the meaning of financial inclusion, Leyshon and Thrift (1995) view it as the process of making financial services accessible to disadvantaged groups such as low-income earners who have difficulty in accessing financial services, and further, Peachey et al. (2006) point out that financial inclusion focuses on the word "inclusive" (i.e., just as all people have access to compulsory education, so all people deserve to have access to financial services). Further, Peachey et al. (2006) state that financial inclusion emphasizes the word "inclusive", just as education is compulsory for all, so is access to financial services for all. In terms of empirical research, Nanda (2016) earlier measured the level of financial inclusion in 68 countries by constructing a cross-country financial inclusion index, and found that financial inclusion can improve the financial resilience of households, thus realizing the promotion of the economic resilience of the country; similarly, on the country scale, Vo (2020), through the study of financial inclusion and stability in Asian countries, found that increased financial inclusion can improve the financial resilience of the country. found that the improvement of financial inclusion can enhance the country's financial stability, thus strengthening the country's economic resilience; however, it is worth mentioning that some scholars, such as Su et al. (2023), have found that there is significant heterogeneity in the impact of financial inclusion on economic resilience, such as for countries with different levels of income, the extent and ways of financial inclusion to improve economic resilience are not exactly the same. The development of financial inclusion and economic resilience in one region can increase the level of economic resilience in other regions through spatial spillover effects.

2.2 Financial inclusive development and industrial structural upgrading

From the existing international research, foreign scholars for financial inclusion and industrial structure research started earlier, the theoretical cognition is also more clear, but there is still some controversy in the conclusion. For example, Hicks (1969) proposes that: the development of the industry has a huge demand for new technologies and long-term investment in capital, and the occurrence of industrial revolution needs to be based on the emergence of financial revolution as the basis for the conclusion that financial development promotes the upgrading of industrial structure as a prerequisite; Arizala (2013) argues that financial inclusion can be enhanced to promote the development of the financial industry and the financial industry can also further improve the technological innovation ability of enterprises, thus forming a catalytic effect on industrial development; in addition, Bruhn and Love (2014) also found that increased financial inclusion can better expand the coverage of financial services, thereby strengthening the capital allocation function, optimizing the reallocation of credit funds among industries, and enhancing the efficiency of industrial development; and similar to this is the study of Kapoor (2014), who, through the study of the impact of the level of financial inclusion on the economic development of different cities, found that the improvement of the level of financial inclusion will accelerate the adjustment and upgrading of industrial structure. However, there are some scholars who take the opposite view, such as Taiji (2011) who found that the relationship between the development of financial inclusion and industrial structure upgrading is not clear. Once cross-country data are involved, it is not difficult to find that the enhancement of financial capability has a facilitating effect

on industrial structure transformation in developed countries, but the performance is not significant for less developed and developing countries.

In domestic research, some scholars have actively explored the impact of financial inclusion on the change of China's industrial structure using different empirical methods, and the findings are generally more positive. For example, through the analysis of data from 31 provinces and cities in China, Zhang (2016) found that improved financial inclusion can reduce labor transfer costs, promote the transfer of rural labor to cities and thus promote industrial structure upgrading; Xie and Wang. (2017) pointed out that the promotional effect of the development of financial inclusion on the upgrading of industrial structure is realized through the exertion of financial development's universality and increases with the level of financial inclusion; Zhang (2022) further found that financial inclusion development has a significant impact on the upgrading of industrial structure in China. Zhang (2022) further found that there is a threshold effect in the impact of financial inclusive development on industrial upgrading, which is presented through the rationalization and advancedization of the industrial structure affected by financial inclusion. Xie (2016) further argues that only appropriate financial inclusion development will enhance the innovation ability and innovation incentives of the manufacturing industry, and excessive financialization will accelerate the decline of the manufacturing industry.

2.3 Upgrading of industrial structure and economic resilience

A large number of studies have shown that there is a very close relationship between industrial structure and national economic resilience, and that the rationality and healthy development of industrial structure often has a significant impact on a country's economic resilience. Therefore, when a region is hit by an economic shock, the industrial structure of the region is often the first to be affected. As Hassink (2010) found, the strength of the industrial structure also determines whether factors of production can flow sufficiently between industries after a shock to mitigate the impact of economic shocks. The perspectives on the interrelationship between industrial structure and economic resilience explored in the world at present are diverse: by measuring the resilience of 295 metropolitan regions in the United States after the 2008 financial crisis, Fusillo (2022) found that the most economically resilient regions possessed a very diversified industrial structure; Brown et al (2017) found that, by analyzing the relationship between 1977 and 2011 between the exploring the effects of industrial diversity and concentration on stability in Ohio counties, find that counties with more diverse industrial structures perform better during periods of state or local employment shocks. Among the relevant domestic studies, the most representative one is that of Zhang (2021), who took 283 cities above prefecture level in China as the object of study and found that industrial structure upgrading along with a certain degree can improve the economic resilience of cities, but the lag in the flow of factors of production and the excessive reliance on the service industry will hinder the enhancement of economic resilience from the upgrading of the industrial structure; similarly Chen (2023), based on a study of the economic resilience of 2012 - 2021 panel data of 30 provinces and cities in China, also found that industrial digital upgrading can stabilize the industrial chain and enhance regional economic resilience by exerting the aggregation effect.

In general, the current research on the relationship between financial inclusion and economic resilience by scholars at home and abroad has made some progress. However, the current academic community has not yet formed a unified standard for the construction of the indicator system of financial inclusion and economic resilience, especially when it comes to research between countries, the conclusions are often inconsistent. At the same time, in the study of financial inclusive development and economic resilience, the current literature does not directly link the two concepts of financial inclusion and economic resilience, and the research in this area is still more focused on the theoretical aspects, the relative lack of empirical analysis. There is also a lack of systematic research that puts the three concepts of financial inclusion, industrial structure upgrading and national economic resilience under one framework, and the logic of the role of how financial inclusion affects national economic resilience through the channel of industrial structure upgrading is not yet clear. Therefore, the marginal contributions of this paper are: first, the index system for measuring financial inclusion and national economic resilience is constructed based on the cross-country data system, which provides a clear and comparable methodology for calculating and comparing financial inclusion and national economic resilience among different countries;

second, based on the new perspective of industrial structural upgrading, it systematically explores the mechanism of financial inclusion's influence on the national economic resilience and its economic consequences, and it provides an opportunity for Second, it systematically explores the mechanism and economic consequences of financial inclusion on national economic resilience based on the new perspective of industrial structure upgrading, providing a clear policy direction for the global exploration of the economic practice of financial inclusion and the national formulation of the policy system to enhance national economic resilience, and at the same time, providing empirical evidence to support China's further consolidation of the achievements of the real economy in financial services and the high-quality integration of development and security.

3 Theoretical framework and definition of variables

3.1 Theoretical framework and research hypotheses

According to the existing research results, it is not difficult to find that financial inclusion plays an important role in the development of the macro-economy. On the one hand, this role is because financial inclusion is the improvement, supplementation and perfection of traditional finance, is to provide more equal and extensive financial services for the "market failure" in the process of financial development (Li et al. 2020), which solves the most critical financial constraints in the economic growth model. It solves the most critical financial constraints in the economic growth model; on the other hand, the increase in the level of financial inclusion can promote the enhancement of new economic dynamics and improve the efficiency of the national economy from the level of optimization and upgrading of the industrial structure (Shen, 2022), therefore, in the uncertain economic environment, it is of greater significance in enhancing the resilience of the national economy.

From the perspective of financial innovation theory and economic development theory, financial inclusive development promotes the enhancement of national economic resilience mainly based on the following logistics. First, financial inclusive development can significantly reduce the threshold of financial access, reduce financial exclusion and improve the efficiency of capital utilization from the aspects of accessibility and usability of financial services, alleviate the contradiction between financial fairness and efficiency to a certain extent, and provide corresponding financial protection for disadvantaged groups, including small and medium-sized micro-enterprises as well as disadvantaged groups such as the "three rural areas", thus enhancing national economic resilience to a certain extent. To a certain extent, it eases the contradiction between financial equity and efficiency, and provides corresponding financial protection for disadvantaged groups, including small and medium-sized enterprises and the "three rural areas" and other disadvantaged groups, thus enhancing the resilience of the national economy. Second, the development of financial inclusion helps build a systematic and perfect financial system, which is an important task for preventing and resolving major risks, and also an important prerequisite for maintaining sustained and healthy economic development and promoting high-quality economic development. Third, financial inclusive development further lays a solid foundation for social harmony and stability, helps safeguard people's livelihood and risk prevention, and has regulatory significance for anti-monopoly, anti-unfair competition, and preventing disorderly expansion of capital. Based on the above theory, the author puts forward hypothesis 1:

H1: Financial inclusive development contributes to the resilience of national economies.

Secondly, according to the theory of industrial structure change and the theory of industrial linkage, upgrading the industrial structure is the key to a country's economic development and the enhancement of the country's economic resilience. Here, the development of the real economy is the foundation of industrial restructuring. In the long run, without a strong real economic system, it will be difficult to maintain the health and stability of the national economy by relying only on the development of the tertiary industry, such as commerce, finance, entertainment, etc., which will make it easier for the country to be exposed to risks when facing economic shocks. In the case of having a good foundation of real economy, industrial structure upgrading can directly improve a country's risk-resistant ability, and at the same time, it can also promote the diversified development of the country's macroeconomic structure; while in the case of having a weak foundation of real

economy, if blindly upgrading the industrial structure leads to the proportion of the tertiary industry's output value is too large, the country's economy will be too dependent on the tertiary industry due to the lack of sufficient primary and secondary industry's output value as a support. The tertiary industry will form a single over-dependence, which will reduce the national economic resilience. Based on the above theory, the corresponding hypothesis is proposed:

H2: Dependence on the tertiary sector in the context of a weak real economy will reduce the country's economic resilience.

Finally, industrial structural upgrading is an important transmission mechanism for financial inclusion to influence the resilience of a country's economy, playing a crucial intermediary role. Specifically, financial inclusion first enhances financial support for small and medium-sized enterprises (SMEs) and start-ups, which are often an important source of innovation and technological progress. Through access to finance, these enterprises are able to effectively conduct R&D activities and launch new products, contributing to technological progress and upgrading of industries. The process of upgrading the industrial structure, especially with the transformation of industries to high-technology and service-oriented industries, in turn provides a new impetus for economic growth, thus enhancing the economy's resilience to external shocks. Therefore, the author puts forward the following hypothesis:

H3: Structural upgrading of industries mediates the process by which financial inclusion development affects the economic resilience of countries.

Combining the above theories and research hypotheses, the author draws the overall logical framework of this paper, as shown in Figure 1.
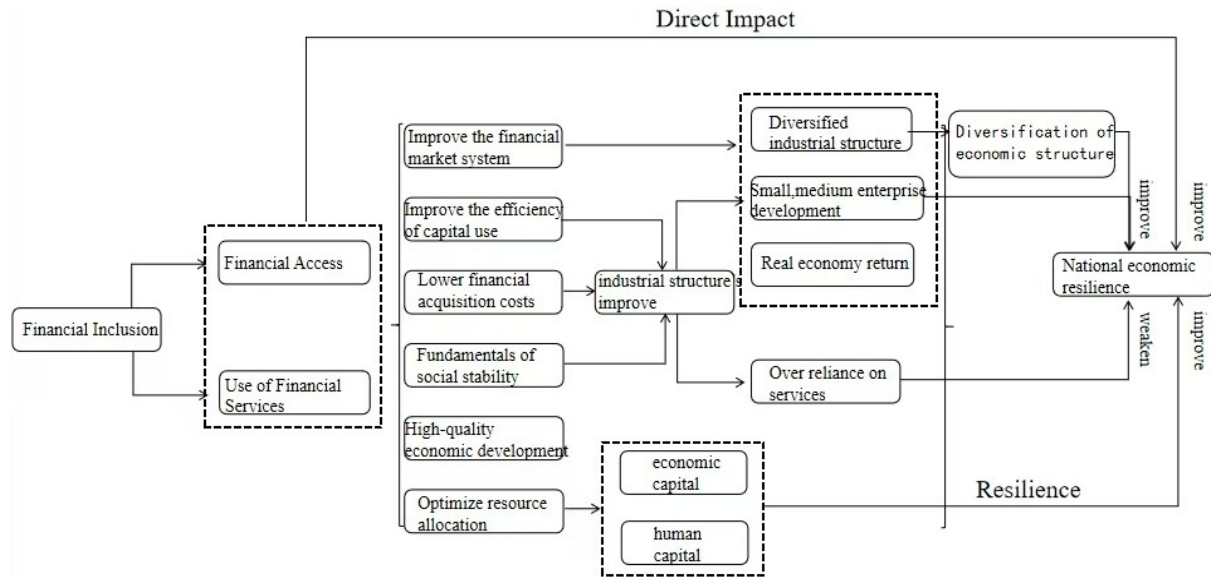

Figure 1. Theoretical framework

3.2 Selection of indicators and modeling

3.2.1 Explanatory variables: measurement of financial inclusion

In terms of measuring financial inclusion, Regan and Paxton (2003) did a pioneering study in which they suggested that financial inclusion can be measured in terms of both the breadth of financial services and the depth of financial services, and that this is done with the aim of improving the ease of accessibility of basic financial services to people in the community as well as making good use of these financial services to achieve the desired results; while Sarma (2016) argues that financial inclusion indicators can be measured in three dimensions: geographic penetration, availability of financial services, and effectiveness of product use; while Dabla et al. (2021) utilize three dimensions of financial inclusion such as the ability of firms to obtain loans (financial breadth), the amount of collateral that needs to be provided for firms' loans (financial depth), and the ability of financial institutions to provide loans at low cost (financial efficiency) to synthesize a financial inclusion index. Combined with the existing studies, the author believes that it is more reasonable to choose the World Bank's

Financial Inclusion Index, which is currently more systematic and comprehensive, as a reference. The purpose of the World Bank's Financial Inclusion Index is to promote the inclusiveness and accessibility of the financial system globally and to ensure that all people can access and benefit from financial services. Therefore, in its Global Financial Inclusion Index Database Report 2021, the World Bank has optimized and integrated a large number of financial inclusion measures from a priori studies, and constructed financial inclusion indicators from the dimensions of accessibility and usability of financial services, in order to measure the degree of development of financial inclusion in individual countries (see table 1).

Table 1. System of financial inclusion indicators

target variable	Level 1 indicators	Secondary indicators	causality
Financial inclusion score	Accessibility of financial services	Proportion of population aged 15+ with a bank account	+
		Have an account at a financial institution	+
		Have a debit or credit card	+
	Accessibility of financial services	Had borrowed from formal finance	+
		Have borrowed from family or friends	+
		Worked in savings in financial institutions	+

After determining the indicator system of financial inclusion, it is necessary to assign the first-level and second-level indicators, and before the assignment process, it is necessary to standardize the data, and for the raw data of each country, its element the raw value of the ith second-level indicator under the jth first-level indicator. Each column of data is first standardized to eliminate the effect of indicator scale and order of magnitude. The standardized data are denoted as xij.

$$x'_{ij} = \frac{x_{ij} - min(x_{1j}, x_{2j}, x_{3j})}{max(x_{1j}, x_{2j}, x_{3j}) - min(x_{1j}, x_{2j}, x_{3j})}$$

And then the entropy weighting method was used to calculate the weights of the secondary indicators. For each of the secondary indicators under financial accessibility and financial usability, their weights are calculated separately:

$$p_{ij} = \frac{x'_{ij}}{\sum_{i=1}^{2} x'_{ij}} \tag{1}$$

$$e_{ij} = -\frac{1}{ln\ n}\sum_{i=1}^{2} p_{ij} \times lnp_{ij} \tag{2}$$

$$w_{ij} = \frac{1 - e_j}{\sum_{j=1}^{3}(1 - e_j)} \tag{3}$$

The TOPSIS method was then used to calculate the scores of the first-level indicators. A weighted normalized decision matrix R is constructed, and the scores for financial accessibility and financial usability are calculated separately based on the weights and the normalized data. The calculation formula is as follows:

$$r_{ij} = w_{ij} \cdot \frac{x'_{ij}}{\sqrt{\sum_{i=1}^{2} x'^{2}_{ij}}} \tag{4}$$

$$d_i^+ = \sqrt{\sum_{j=1}^{3}(r_{ij} - A_j^+)^2} \tag{5}$$

$$d_i^- = \sqrt{\sum_{j=1}^{3}(r_{ij} - A_j^-)^2} \tag{6}$$

$$S_i = \frac{d_i^-}{d_i^+} \tag{7}$$

Finally synthesize the composite index of financial inclusion. Applying the TOPSIS method again, the composite index of financial inclusion score is calculated based on the scores and weights of financial accessibility and financial usability. Through the above calculation process, we can obtain a comprehensive financial inclusion index that integrates the accessibility and usability of financial services, as well as the importance of each indicator in the overall evaluation. Table 2 summarizes the basic financial inclusion index for 64 countries for the relevant years.

Table 2. Changes in financial inclusion in 64 countries, 2011-2021

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
average value	0.290	0.341	0.376	0.397	0.409	0.413	0.413	0.413	0.416	0.426	0.444
(statistics) standard deviation	0.172	0.208	0.233	0.248	0.254	0.254	0.251	0.248	0.246	0.246	0.255

Looking at Table 2, it can be seen that the average financial inclusion index scores of 64 countries have increased year by year from 2011 to 2021, indicating a steady increase in the development of financial inclusion in the world. And while the average level of financial inclusion improves, it can be seen that the variance shows a decreasing trend between 2015 and 2020, which is due to the reduction of the gap between countries as more countries begin to focus on financial inclusion development, while the increase in the variance in 2021 may be due to the impact of the differences in the economic resilience of the individual countries, which leads to the epidemic shocks caused by the different shocks in each country, which resulting in a widening of the variance.

3.2.2 Explained variables: measurement of national economic resilience

From the point of view of existing studies, the factors affecting a country's economic resilience are diverse and depend mainly on the overall economic structure, policy environment and governance level of a particular country. Existing studies on the measurement of economic resilience are broadly divided into two categories, one drawing on Rizzi et al. (2018) to comprehensively reflect the degree of economic resilience by constructing a system of indicators, and the other using core indicators to measure the level of economic resilience, such as Xu and Wang (2017), who use a regional sensitivity index to measure economic resilience. At present, there are more domestic studies examining regional economic resilience at the provincial and county scales, most of which are based on the local regional scope, dividing regional economic resilience into four dimensions of resistance, resilience, adjustment, and transformation indicators for the construction of regional economic resilience (Martin, 2012), and there is a lack of cross-country level economic resilience indicator system. Therefore, based on the analytical methods of related literature and combined with data availability, the author reclassified the dimensions affecting economic resilience, and finally selected 5 dimensions and 13 indicators to reconstruct the national economic resilience comprehensive indicators. The selection of specific indicators is shown in Table 3.

Table 3. National system of economic resilience indicators

target variable	Level 1 indicators	Secondary indicators
National economic resilience	economic development	GDP per capita growth rate
		GNI growth rate
		Fixed asset growth rate
	Foreign trade and debt	Exports as a share of GDP
		Imports as a share of GDP
		Total foreign exchange reserves
	Labor market conditions	unemployment rate
		Labor force participation rate
	Infrastructure development	Fixed broadband ownership (per 100 population)
		Landline subscriptions (per 100 population)
	social stability	Inflation as measured by CPI (annual rate)
		Percentage of female members of national parliaments
		Military expenditure as a percentage of GDP

From Table 2, it can be seen that these five dimensions are all important indicators affecting whether a country's macroeconomic performance is good or not, as well as affecting an economy's ability to resist risk, recovery and development. And then the critical method is used to obtain the weight vector, and the consistency test is carried out to

finally obtain the standardized values weights the five first-level variables. The initial value of national economic resilience index can be calculated by the following formula:

$$\text{ERI} = \sum_{i=1}^{5} W_i X_i \qquad (8)$$

According to formula (8), the author calculated the trend of the overall level change of national economic resilience for 64 countries from 2011-2021, as shown in Table 4.

Table 4. Summary of changes in economic resilience in 64 countries, 2011-2021

particular year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
average value	127.3	132.3	125.4	123.4	119.1	121.1	1294	130.3	138.0	151.0	164.2
(statistics) standard deviation	212.5	217.3	203.2	199.4	192.9	194.5	206.6	209.4	224.6	250.2	265.0

By analyzing the overall trend of the overall economic resilience level of 64 countries over the period from 2011 to 2021, we find that the average level of national economic resilience has shown an upward trend in the time intervals of 2011 to 2012 and 2016 to 2021, while the global level of economic resilience has declined from 2013 to 2015, but overall, the overall national economic level has has increased in the past 11 years, but the data variance has also widened while the global economic resilience has increased, and the consideration is caused by the difference in the growth rate of economic resilience of countries with different income levels, which also provides data support and practical basis for the study of the necessity of the heterogeneity among individual countries. In the subsequent empirical model, in order to better mitigate the degree of volatility of the calculated national economic resilience index, we uniformly logarithmize it, which is particularly explained here.

3.2.3 Selection of other variables

(1) Control variables. As for the control variables, the author selects population density, population dependency ratio, urban population share and the share of government general final consumption expenditure in GDP as the control variables, and all of them are logarithmically processed in the modeling process at the same time. Here, population density is the ratio of the total population to the administrative area of each country; population dependency ratio refers to the ratio of the number of non-working-age people to the number of working-age people in the overall population of each country; urban population ratio refers to the proportion of the urban population, which is defined as the population residing in cities and towns, to the total population of each country; and the share of the government's general final consumption expenditures in GDP is the proportion of all recurrent consumption expenditures incurred by the government for the purchase of goods and services (including employee compensation). Some studies have shown that financial help from the government can help boost a country's economic resilience (Yang., 2015).

(2) Mediating variable. We choose to use advanced industrial structure (AIS) as the mediating variable, and the calculation method of AIS refers to the ratio of the output value of tertiary industry to that of secondary industry used by Zhang and Ran (2018) in their study of financial inclusive development and industrial structure optimization problem to measure.

In summary, the author lists the variable definitions and symbol descriptions for all variables as shown in Table 5.

Table 5. Introduction and description of variables

Variable type	notation	norm	Logarization or not
explanatory variable	ED	National economic resilience	Yes
explanatory variable	IFI	Financial Inclusion Index	No
	IFI_AIS	interaction term	No
intermediary variable	AIS	Advanced industrial structure	No
control variable	PD	population density	Yes
	DR	dependency ratio	Yes
	POUP	Percentage of urban population	Yes
	GGFCE	General government final consumption expenditure	Yes

3.3 Modeling

3.3.1 Baseline modeling

In order to verify the relationship between financial inclusion development, industrial structure upgrading and national economic resilience, the author utilizes the panel data of 64 countries around the world from 2011 to 2021 to implement the multiple regression analysis. Before the analysis, it is necessary to determine the fixed effect model and the random effect model through the Housman test, and the test results found that Prob= 0.6599 is not significant, and it is not possible to reject the original hypothesis. Thus, this paper sets the random effect model to carry out the benchmark regression in the following form:

$$ED_{i,t} = \alpha + \beta IFI_{i,t} + \gamma AIS\_IFI_{i,t} + \delta AIS_{i,t} + \eta X_{i,t} + \theta_i + \varepsilon_{i,t} \qquad （9）$$

In Equation (9), subscripts i and t denote the country and year, respectively, and, denotes a series of control variables, population dependency ratio (DR), including population density (PD), proportion of urban population (POUP), and general government final consumption expenditure (GGFCE). θ_i Refers to randomly varying individual characteristics, a perturbation term for individual change over time.

3.3.2 Mediating effects modeling

In addition to the benchmark regression, the author also tests the mediating mechanism of industrial structural upgrading in financial inclusion affecting the country's economic resilience by building the following model:

$$ED_{i,t} = \alpha_0 + \alpha_1 IFI_{i,t} + \alpha_2 AIS\_IFI_{i,t} + \alpha_3 AIS_{i,t} + \alpha_4 X_{i,t} + \theta_i + \varepsilon_{i,t} \qquad （10）$$

$$AIS_{i,t} = \beta_0 + \beta_1 IFI_{i,t} + \beta_2 AIS\_IFI_{i,t} + \beta_3 X_{i,t} + \theta_i + \varepsilon_{i,t} \qquad （11）$$

$$ED_{i,t} = \gamma_0 + \gamma_1 IFI_{i,t} + \gamma_2 AIS_{i,t} + \gamma_3 AIS\_IFI_{i,t} + \gamma_4 X_{i,t} + \theta_i + \varepsilon_{i,t} \qquad （12）$$

Where equation (11) is the mediating variable regression equation and the explanatory variable is industrial structure upgrading (AIS). Firstly, model (12) is used to test the effect of financial inclusion on the economic resilience of the country and examine whether significant. If significant, then model (11) is used to fit the regression of financial inclusion and industrial structure upgrading, and finally model (12) is used to regress financial inclusion, industrial structure upgrading and national economic resilience into the same equation. Under the condition that both significant, if not significant, it indicates that industrial structure upgrading has a mediating effect on financial inclusion affecting international economic resilience.

4 Empirical analysis

4.1 Baseline regression

Based on the theoretical framework and variable definitions in the previous section, the author first verifies the basic relationship between financial inclusion, industrial structure upgrading and national economic resilience, for which we implement a benchmark regression using static panel feasible least squares estimation. In the regression in order to mitigate the impact of multicollinearity, we synchronize the estimation of parameters by incorporating stepwise regression methods, and the final estimation results are shown in Table 6.

Table 6. Benchmark regression results (random effects)

variables	(1) ED	(2) ED	(3) ED	(4) ED	(5) ED	(6) ED	(7) ED
IFI	0.489 ***	0.514 ***	0.196	0.286	0.270	-0.118	-0.258
	(6.47)	(6.65)	(0.98)	(1.40)	(1.33)	(-0.60)	(-1.29)
AIS		-0.292	-0.078**	-0.084**	-0.084**	-0.108 ***	-0.150 ***
		(-1.49)	(-2.26)	(-2.45)	(-2.45)	(-3.31)	(-4.31)
AIS_IFI			0.098*	0.102*	0.096*	0.138 **	0.181 ***
			(1.72)	(1.78)	(1.69)	(2.54)	(3.28)

DR				-0.292**	-0.247*	-0.045	-0.043
				(-2.30)	(-1.93)	(-0.37)	(-0.35)
PD					0.180**	0.132*	0.143**
					(2.52)	(1.9)	(2.04)
POUP						1.791***	1.710***
						(8.80)	(8.36)
GGFCE							0.225***
							(3.33)
cons	3.907***	3.983***	4.130***	5.252***	4.285***	-3.549***	-3.774***
	(31.28)	(29.94)	(26.2)	(10.24)	(6.69)	(-3.29)	(-3.51)
Obs	704	704	704	704	704	704	704
R^2	0.160	0.196	0.211	0.253	0.170	0.230	0.232

Note: t-statistics in parentheses, *, **, *** denote 10%, 5%, 1% significance levels, respectively

From Table 6, we can find that the improvement of the core variable financial inclusion index has a contributing effect on the improvement of national economic resilience as a whole, which is consistent with the basic theoretical hypothesis. At the same time, the coefficient of the industrial structure upgrading variable is negative, indicating that industrial structure upgrading characterized by the expansion of the proportion of the service sector will reduce the national economic resilience to a certain extent, and further observation of the interaction term reveals that the coefficient of the interaction term between industrial structure upgrading and financial inclusion is significantly positive, which indicates that financial inclusion can improve the national economic resilience in cooperation with the upgrading of the industrial structure and that the two have better synergistic effects. Finally, observing the coefficients and significance of the control variables, it is found that the increase of population density, the proportion of urban population, and the increase of general final consumption expenditure of the government can significantly enhance the national economic resilience to a certain extent, whereas the increase of the population dependency ratio and the national economic resilience show a certain inverse relationship, which suggests that the aging of the population has a certain weakening effect on the national economic resilience.

4.2 Robustness regression

Although the benchmark regression has initially confirmed the statistical significance of all variables, in order to exclude the statistical bias of omitting important variables, the author also needs to carry out the robustness regression of the empirical results through the two-stage instrumental variables model and the establishment of the dynamic panel system generalized distance model. Operationally, we firstly use the two-stage IV model with one period lag of the financial inclusion index (IFI_IV), industrial structure advanced one period lag (AIS_IV), and one period lag of financial inclusion and industrial structure upgrading (IFI_AIS_IV) respectively as instrumental variables in the two-stage regression, and at the same time implement the weak instrumental variables test and exogeneity test of the instrumental variables, and the results show that all the instrumental variables pass the hansen J test and the weak instrumental variables test, which indicates that the instrumental variables are valid (see Table 7). Meanwhile, the lagged one-period (ER_IV) of the country's economic resilience is selected as an instrumental variable to be re-estimated in the systematic dynamic panel data model (see Table 8), and the results of AR order and Hansen exogeneity test are reported, which show that the sign of the core explanatory variables remains unchanged in both the systematic dynamic panel data model and the two-phase instrumental variables model, and the sign of the control variables also does not change significantly, indicating that the benchmark variables are valid (see Table 7). There is also no significant change in the sign of the control variables, indicating that the benchmark regression results are generally robust and reliable.

Table 7. Results of the two-stage instrumental variable model

variables	(1) ED	(2) ED	(3) ED
IFI_IV	0.374 ***	0.461 ***	-0.424
	(2.57)	(3.10)	(-1.36)
AIS_IV		-0.051*	-0.192 ***
		(-1.80)	(-3.63)
IFI_AIS_IV			0.268 ***
			(3.19)
DR	0.123	0.062	0.064
	(0.85)	(0.43)	(0.44)
PD	0.160 **	0.170 **	0.156 **
	(2.17)	(2.39)	(2.20)
POUP	1.724 ***	1.663 ***	1.692 ***
	(7.46)	(7.29)	(7.42)
GGFCE	0.110*	0.162 **	0.230 ***
	(1.67)	(2.24)	(3.06)
cons	-4.723***	-4.305 ***	-4.126***
	(-3.87)	(-3.54)	(-3.40)

Note: z-values in parentheses, *, **, and *** indicate 10%, 5%, and 1% significance levels, respectively

Table 8. Results of generalized moments estimation data model for dynamic panel system

variables	(1) ED	(2) ED	(3) ED	(4) ED
ED (-1)	1.000 ***	1.00 ***	0.939 ***	1.013 ***
	(92.68)	(88.22)	(33.53)	(51.46)
IFI	0.073*	0.061**	-1.731**	0.006
	(1.75)	(1.77)	(-2.17)	(0.849)
AIS	-0.109		-0.429**	
	(-0.66)		(-2.33)	
DR	0.017		0.034*	
	(1.36)		(1.74)	
PD	0.075	0.022	-0.172*	0.081
	(1.08)	(0.44)	(-1.76)	(1.50)
GGFCE	-0.045	-0.061***	0.211	
	(-1.12)	(-2.64)	(1.36)	
POUP		-0.010		-0.061*
		(-0.33)		(-1.95)
IFI_AIS			0.639**	
			(2.42)	
cons	-0.232	0.102	1.354**	-0.174
	(-0.64)	(0.43)	(2.50)	(-0.80)
AR (1)	-4.69 ***	-4.69 ***	-4.35 ***	-4.71 ***
AR (2)	-0.80	-0.79	0.49	-0.81
Hansen test	63.00 ***	63.24 ***	20.80 ***	59.55 ***

Note: t-values in parentheses, *, **, and *** indicate 10%, 5%, and 1% significance levels, respectively

4.3 Endogenous treatment

Endogeneity treatment is necessary because data availability is easily received when selecting data, and at the same time, reverse causality between variables cannot be completely removed, leading to biased parameter estimation. In our study, for one thing, the data of 64 countries selected for regression analysis may have sample selection problems, while there may be reverse causality between industrial structure upgrading and financial inclusion, so endogeneity treatment is needed. In order to solve the endogeneity problem, the author here uses the more cutting-edge extended regression model to deal with it, which is able to deal with the endogeneity problem caused by sample selection bias and variable reverse causality bias at the same time, so it has a better advantage. In the model, the author uses the population dependency ratio (DR), including population density (PD), and the proportion of urban population (POUP) as instrumental variables for the financial inclusion index (IFI), and utilizes a two-step effective confidence set construction model (Lian Yujun, 2021) to conduct a weak instrumental variable test, and the test results all pass. The proportion of urban population (POUP), population dependency ratio (DR), and population density (PD) are further selected as instrumental variables for the financial inclusion index (IFI), and the ordered variable INC, which measures the income level of each country, is added as an instrumental variable, and an extended regression analysis is used to solve the endogeneity problem, and the results find that all the core variables are significant after the implementation of the model revaluation, and the coefficients of covariance of the instrumental variables are significant, indicating that the endogeneity of the instrumental variables is not significant, and that the results pass. The coefficients of covariance are significant, indicating that the endogeneity problem is solved accordingly and the model estimation results are generally reliable. The specific estimation results are shown in Table 9.

<div align="center">Table 9. Extended regression model results</div>

master equation (math.)	(1) ED	(2) ED
control variable	there are	there are
IFI	3.02**	3.405**
	(3.69)	(4.62)
AIS	-0.468 ***	-0.427 ***
	(-4.90)	(-4.78)
AIS_IFI	0.449 ***	0.366**
	(2.72)	(2.35)
INC=1	0.195	
	(1.27)	
INC=2	0.057	-0.029
	(0.23)	(-0.15)
Constant	4.037 ***	3.947 ***
	(9.31)	(9.64)
Corr (INC, ER)	0.290 ***	0.219*
	(3.17)	(1.89)
Corr (IFI, ER)	-0.570 ***	-0.586***
	(-10.20)	(-11.79)
Corr (I) , INC)	-0.667 ***	-0.617 ***
	(-13.37)	(-6.61)

Note: z-values in parentheses, *, **, and *** indicate 10%, 5%, and 1% significance levels, respectively

4.4 Analysis of the mechanism of the mediating effect

Considering that financial inclusion development may further act on national economic resilience changes by influencing industrial structure upgrading, for this reason, the author further verifies the existence of the mediating effect mechanism of industrial structure upgrading. According to the mediation effect model already established in the previous section. The results of the implementation of the mediation effect test are shown in Table 10.

Table 10. Mediated effects test regression results

variables	(1) ED	(2) AIS	(3) ED
IFI	0.341 ***	-4.163 ***	-0.258
	(2.34)	(-27.84)	(-1.29)
AIS_IFI	-0.016	1.375 ***	0.181 ***
	(-0.51)	(41.70)	(3.28)
DR	-0.012	-0.235	-0.043
	(-0.10)	(-1.85)	(-0.35)
PD	0.140*	0.051	0.143*
	(1.96)	(1.57)	(2.04)
POUP	1.687 ***	0.0364	1.710 ***
	(8.12)	(0.26)	(8.36)
GGFCE	0.120	0.692 ***	0.225 ***
	(1.89)	(10.11)	(3.33)
AIS			-0.150 ***
			(-4.31)
cons	-3.927 ***	1.512	-3.774 ***
	(-3.61)	(1.77)	(-3.51)
Obs	704	704	704
R^2	0.211	0.892	0.233
F	134.7 ***	2224.47 ***	156.42 ***

Note: z-values in parentheses, *, **, *** denote, respectively, 5%, 1%, 0.1% significance level

In Table 10, models (1), (2) and (3) prove the mediating role of industrial structure upgrading in the transmission mechanism of financial inclusion affecting national economic resilience. Among them, model (1) confirms the positive impact of financial inclusion development on the country's economic resilience, while model (2) further verifies the reverse relationship of industrial structure upgrading on the country's economic resilience. If the interactive effect of financial inclusion and industrial structure upgrading is considered, the empirical results can still see the positive synergistic effect between the two. Meanwhile, model (3) further proves that industrial structure upgrading acts as a mediating variable of financial inclusion affecting national economic resilience.

4.5 Heterogeneity analysis

4.5.1 Consider the heterogeneity of government cleanliness levels

According to existing research, countries with high levels of clean government tend to be more economically resilient. This is because governments with high levels of transparency and integrity are more likely to manage resources effectively, reduce corruption and improper transfer of benefits, improve governance efficiency, and contribute to the investment environment and economic stability. Therefore, in order to explore the differences in the economic resilience of financial inclusion and industrial structure upgrading among countries with different degrees of cleanliness, the author uses the International Corruption Perceptions Index released by Transparency International to classify the cleanliness of 64 countries into three categories: comparative cleanliness (100-70), minor corruption (70-40), and serious corruption (40-0), among

which comparative cleanliness (100-70), minor corruption (70-40), and serious corruption (40-0) are more likely to have higher economic resilience. (40-0), with 18 countries in the relatively clean category, 20 countries in the minimally corrupt category, and 26 countries in the seriously corrupt category. Then the regression analysis was re-implemented on the data of the three subsamples of comparative cleanliness, minor corruption, and serious corruption, and the estimation model for different subsamples was determined by the Housman test, and the results of the parameter estimation are shown in Table 11.

Table 11. Heterogeneity analysis considering subgroups of countries' cleanliness levels

variables	Comparative clean countries			Minor corrupt countries			Highly corrupt countries		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	ED	ED	ED	ED	ED	ED	ED	ED	ED
IFI	0.266 ***	0.279 ***	0.036	0.600 ***	-0.369	-0.408	0.709 ***	1.045	0.844
	(2.90)	(2.97)	(0.1)	(6.04)	(-1.31)	(-1.44)	(3.15)	(1.53)	(1.20)
AIS		-0.187	-0.041		-0.026	-0.055	-0.123 ***	-0.150 **	-0.190**
		(-0.64)	(-0.47)		(-1.37)	(-1.22)	(-2.79)	(-2.08)	(-2.40)
AIS_IFI			-0.031		0.190 ***	0.175**		-0.156	-0.875
			(-0.30)		(2.64)	(2.25)		(-0.63)	(-0.35)
DR			0.737 ***		0.759 ***	0.762 ***		-1.061 ***	-1.027 ***
			(3.08)		(3.73)	(3.45)		(-5.29)	(-5.07)
DP			0.22 **			0.709**		-1.035 ***	-1.010 ***
			(2.00)			(2.33)		(-4.13)	(-4.02)
POUP			2.734 ***			0.182 ***		2.575 ***	2.529 ***
			(2.70)			(0.27)		(7.44)	(7.27)
GGFCE			0.337 ***			0.403			0.125
			(2.12)			(3.24)			(1.23)
cons	4.428 ***	4.482 ***	-12.119 ***	3.728 ***	1.141	-4.233	3.982 ***	2.510	2.228
	(17.18)	(16.19)	(-2.89)	(70.38)	(1.52)	(-1.24)	(35.45)	(1.43)	(1.26)
Obs	198	198	198	220	220	220	286	286	286
mould	random effects model			individual fixed-effects model			individual fixed-effects model		

Note: z-values are in parentheses for the random effects model, t-values are in parentheses for the fixed effects model, and *, **, and *** indicate 10%, 5%, and 1% significance, respectively

From the estimation results in Table 12, it can be seen that regardless of the level of corruption in the country, financial inclusion enhancement has a positive impact on all on the country's economic resilience enhancement, and further analysis of the coefficients reveals that with the increase in the level of corruption, the more pronounced is the promotion of financial inclusion on the country's economic resilience. As for industrial structural upgrading, it has a non-significant effect on the economic resilience of countries in the cleaner countries group, but it has a better significance in the mildly corrupt subgroup, and further observation of the coefficients reveals that industrial structural upgrading weakens the economic resilience of this group of countries at high levels of corruption.

The empirical study also found that the interaction effect of financial inclusion and industrial structural upgrading was statistically significant in improving the economic resilience of the country in the mildly corrupt countries, but not in the other subgroups of countries.

4.5.2. Considering the heterogeneity of national income levels

Theoretically, countries with higher income levels tend to have more developed financial market systems, more abundant employment opportunities and more comprehensive social security systems, and are therefore able to achieve stable income growth and stronger economic resilience. In addition, in countries with higher income levels, residents have a

higher per capita disposable income, and thus have a more pronounced preference for wealth management through financial institutions, so the degree of participation in the financial behavior of the population is correspondingly higher, and the overall financial inclusion development basis and potential is also greater. To this end, the author further considers the heterogeneous impact of national income level factors on financial inclusion and industrial structure upgrading on national economic resilience. According to the World Bank's 2023 latest country income grouping standards, the author examines the 64 countries categorized into high-income group, upper-middle-income group, lower-middle-income group, and after carrying out the Housman test, finally determines that the high-income group adopts a two-way fixed effects model, and the upper-middle-income group and the middle-income group use individual fixed effects model to implement the grouping regression estimation.

Table 12. Heterogeneity analysis considering subgroups of different country income levels

variables	high-income country			Upper middle-income countries			Lower middle-income countries		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	ED	ED	ED	ED	ED	ED	ED	ED	ED
IFI	0.455 ***	0.413 *	0.468 ***	0.555 ***	0.526	-0.357	0.475	1.951 *	1.263
	(3.88)	(1.77)	(2.02)	(3.75)	(1.13)	(-0.78)	(1.21)	(1.70)	(1.13)
AIS	0.011	0.009	0.023	0.098 ***	0.133 **	-0.010	-0.225 ***	-0.159	-0.220**
	(0.64)	(0.21)	(0.56)	(2.94)	(2.09)	(-0.17)	(-3.52)	(-1.40)	(-1.86)
AIS_IFI		0.008 *	0.005		-0.055	0.119 **		-0.466	-0.352
		(1.74)	(0.09)		(-0.34)	(1.84)		(-1.07)	(-0.83)
DR		0.359 *	0.354		0.353 *	0.341		-1.977 ***	-1.315 ***
		(1.76)	(1.56)		(1.73)	(1.23)		(-6.98)	(-4.17)
DP		0.463 *	0.340			0.078		-0.387	-1.262 ***
		(1.86)	(1.36)			(0.19)		(-1.24)	(-3.28)
POUP		0.834	0.191			1.878 ***			2.264 ***
		(1.02)	(0.23)			(5.28)			(3.70)
GGFCE			-0.291 ***			0.458 ***			0.137
			(-2.71)			(3.45)			(1.06)
cons	4.268 ***	-3.148**	1.211	3.651 ***	2.256 ***	-6.501***	4.051 ***	13.503 ***	5.902**
	(41.74)	(-0.66)	(0.24)	(40.06)	(2.72)	(-2.62)	(25.26)	(7.07)	(-2.25)
Obs	363	363	363	176	176	176	165	165	165
mould	two-way effects model			individual fixed-effects model			individual fixed-effects model		

Note: t-values are in parentheses, and *, **, and *** indicate 10%, 5%, and 1% significance levels, respectively.

From the regression results, financial inclusion has a significant positive effect on the economic resilience of high-income countries, upper-middle-income countries, and lower-middle-income countries, with the strongest effect in lower-middle-income countries, the second in upper-middle-income countries, and the weakest in high-income countries. This indicates that financial inclusive development can be an effective way to enhance economic resilience in countries with different income levels. From the perspective of the impact of industrial structure upgrading on economic resilience, industrial structure upgrading can significantly enhance the economic resilience of countries with high and middle income levels, while it is not conducive to the enhancement of the economic resilience of countries with low and middle income levels, and the impact on the economic resilience of countries with high income levels is not significant. Further analysis reveals that financial inclusion and industrial structural upgrading can have a significant synergistic effect on the resilience of countries in high-income and upper-middle-income countries, but not in lower-middle-income countries.

5 Conclusions and recommendations

5.1 Main findings

Based on the public database of the World Bank, this paper obtains the financial inclusion index and national economic resilience score of each country through the preliminary construction of the financial inclusion index system and national economic resilience measurement index system of 64 countries from 2011 to 2021, and measures the advanced industrial structure by the ratio of tertiary to secondary industries, and employs the panel random-effects model, the intermediary effect model and the panel random-effects model to empirically test the impact of financial inclusion development on the national economic resilience and its internal mechanism. Using the panel random effect model and mediation effect model, we empirically examined the impact of financial inclusion development on national economic resilience and the internal mechanism, and the main conclusions are as follows:

First, from 2011 to 2021, the economic resilience and financial inclusion of the 64 sample countries in the world have shown a relatively stable development trend, while the global economic resilience is improving, the data variance has expanded due to the differences in the growth rate of economic resilience of countries at different income levels, and the variance of national economic resilience expanded significantly in 2020 due to the impact of the epidemic, and the financial inclusion of the 64 countries in that year declined, and the epidemic shock had a negative impact and influence on the world economy.

Secondly, the development of financial inclusion clearly contributes to the enhancement of national economic resilience and is an important driver of the development and enhancement of global economic resilience in the current era, and this result is robust. Financial inclusion provides funds for the development of the real economy, while optimizing the allocation of resources in the economy. In the heterogeneity analysis of the political cleanliness subgroup, as the level of corruption increases, the more obvious is the contribution of financial inclusion to the economic resilience of the country. This may be because countries with higher levels of political probity generally have more comprehensive and extensive financial service provision. On this basis, the higher the level of political probity, the smaller the marginal effect of financial inclusion development on national economic resilience. In the heterogeneity analysis of income level subgroups, financial inclusive development also has a significant positive effect on countries at different income levels, which again suggests that financial inclusive development is an important way for countries to enhance their economic resilience.

Thirdly, industrial structure advancement is an important mechanism for financial inclusion to promote national economic resilience, and the mediation effect model suggests that financial inclusion enhances national economic resilience by facilitating the return and development of the real economy, and that financial inclusion can have a stronger positive impact on economic resilience when it is accompanied by the advancement of industrial structure. The improvement of financial inclusion provides the necessary financial support for the development of the service industry and high-tech industry, including the promotion of innovation and technological upgrading, as well as the support of entrepreneurship and expansion of new industries At the same time, with the optimization of economic structure and industrial upgrading, more employment opportunities can be created, labor productivity can be increased, and thus the economy's ability to resist risks and adaptability can be strengthened, and the financial inclusion improves the availability of funds for innovative projects. accessibility, while the advanced industrial structure favors the development of innovative and knowledge-intensive industries. The combination of the two not only promotes technological progress and innovation, but also enhances the international competitiveness of the economy, making it more resilient in the global market. As for the heterogeneity analysis of the political cleanliness subgroup, the effect of industrial structure upgrading on the country's economic resilience is not significant for the cleaner subgroup, while for the cleaner subgroup the interaction term has a better significance, and the combination of financial inclusion and industrial structure helps to promote its economic resilience, and in the serious corruption subgroup the industrial structure advanced becomes a significant factor that affects the country's economic resilience, and at this point blindly proceeding with the industrial structure upgrading will enhance economic vulnerability.

In the heterogeneity analysis of income level subgroups, industrial structure has a significant positive effect on the economic resilience of middle- and high-income countries, while for middle- and low-income countries, premature industrial structure upgrading will increase economic vulnerability without forming a good foundation of the real economy.

5.2 Policy recommendations

From the empirical results, financial inclusive development is an important way to enhance the resilience of the national economy, and reducing financial exclusion by improving the accessibility and usability of financial services will become the direction and hotspot for the development of each country. On the basis of China's economic foundation as the world's largest developing country, we should further strengthen the importance of financial inclusive development, and we need to do a better job in the construction of basic financial institutions, realize the full coverage of banks and other financial institutions in areas where the disadvantaged groups are located, so as to better solve the problem of financing difficulties of small and medium-sized enterprises. At the same time, we should do a good job of popularizing financial literacy, so as to realize the unity of equity and efficiency. In addition, we should further enhance our political integrity and improve the credibility and transparency of the government, so as to provide a good social foundation for the development of financial inclusion and the construction of a more perfect financial market system, and we should also take into account China's basic national conditions and national culture, carry out the necessary financial innovation, and utilize the inclusive financial tools to satisfy the multifaceted needs of the development of enterprises.

On the other hand, industrial structural upgrading and financial inclusive development should be given equal importance, and industrial structural upgrading should not be promoted blindly. The real economy should first be injected with a strong cardiac stimulant to lay a good foundation for the real economy, so as to avoid blindly upgrading the industrial structure, which would lead to economic vulnerability. Meanwhile, corresponding supporting measures should be taken to avoid the negative effects of industrial transformation in the short term leading to increased economic vulnerability, as well as to avoid the economy's overdependence on a single service industry and increased risk exposure to specific economic activities. At the same time, it encourages mass entrepreneurship and provides the necessary financial support and assistance for the restructuring of the country's industrial structure.

Lastly, in the face of the economic impact of the global crisis, it was necessary to strengthen interconnectivity among countries and promote the flow of factors of production among them in order to better stabilize the global economic situation. In order to strengthen the concept of a community of destiny, global economic organizations should increase the supply of financial resources to the countries concerned, so as to unleash the full potential of their economic resilience, thereby realizing the pattern of high-quality development of the world economy.

References

Leyshon A, Nigel T. (1995). Geographies of financial exclusion: financial abandonment in Britain and the United States." Transactions of the Institute of British Geographers,(3):312-p341.

Peachey S, Alan R. (2006). Access to Finance: Measuring the Contribution of Savings Banks. World Savings Bank Institute, Brussels: Belgium.

Nanda K, Mandeep K. (2016). Financial inclusion and human development: cross-country evidence." Management and Labor Studies 41 (2):127-153.

Vo, D, Nhan Thien N, Loan Thi-Hong V. (2021). Financial inclusion and stability in the Asian region using bank-level data. Borsa Istanbul Review 21 (1): 36-43.

SU Xiaofeng, WANG Chao, JIANG Xiaoli et al. Impact of digitalization construction on economic resilience and spatial spillover effects-taking Fujian Province as an example. Journal of Fujian Agriculture and Forestry University (Philosophy and Social Science Edition),2023 (05):42-51.DOI:10.13322/j.cnki.fjsk.2023.05.006.

Arizala F, Cavallo E, Galindo A, (2013). Financial Development and TFP Growth: Cross-Country and Industry-Level

Evidence ", Applied *Financial Economics*,23 (6): 433-448.

Bruhm M, Love I, (2014). The Real Impact of Improved Access to Finance: Evidence from Mexico , The *Journal of Finance*, 69 (3): 1347-1376.

Kapoor,A,(2014).Financial Inclusion and the Future of the Indian Economy , Futures,(56):35-42.

Zhang Tongjin. Research on the urban-rural income distribution effect of inclusive financial development--Based on the perspective of industrial structure upgrading. Journal of Shanxi University of Finance and Economics,2016,38 (06):28-40.DOI:10.13781/j.cnki.1007-9556.2016.06.003.

Xie J, Wang W, Li S.(2017). The industrial structure upgrading effect of inclusive financial development. Contemporary Economic Research,(03):74-83.

Taiji F, (2009). Financial Institution and Firm Heterogeneity: Effects of International Capital Movement and Costly Trade in Goods on Industrial Structures", *KOKUSAI KEIZAI.(2):14-25*

Xie J, Wang W, Che S.(2016). Evaluation and distributional characterization of economic resilience of catastrophe risk. Journal of Hunan University (Social Science Edition),30 (03):85-93.DOI:10.16339/j.cnki.hdxbskb.2016.03.014.

HASSINK R. (2010). Regional resilience: a promising concept to explain differences in regional economic adaptability?", Cambridge Journal of Regions, Economy *and Society.3 (*1):45-58.

Fusillo F, Consoli D, Quatraro F. (2022). Resilience, skill endowment, and diversity: evidence from US metropolitan areas ", *Economic Geography*, 98 (2) : 170-196.

Brown L, Greenbaum R T.(2017). The role of industrial diversity in economic resilience: an empirical examination across 35 years" , Urban *Studies,54 (*6) : 1347-1366.

ZHANG M, WU Q, LI W. (2021).Industrial structure change, total factor productivity and urban economic resilience. Journal of Zhengzhou University (Philosophy and Social Science Edition),54 (06):51-57.

CHEN S. (2023).Industrial digitalization drives high-quality economic development: the mediating role of economic resilience. Modern Marketing.(09):130-133.DOI:10.19921/j.cnki.1009-2994.2023-09-0130-042.

LI J, PENG Y, MA S.(2020). Financial inclusion and China's economic development: Multidimensional connotation and empirical analysis. Economic Research,55 (04):37-52.

Regan S, Paxton W. (2003), Beyond bank accounts: full financial inclusion, 2003.

Sarma M. (2016). Measuring financial inclusion for Asian economies ", Financial inclusion in Asia: Issues and policy concerns, (1):3-34.

Dabla-Norris E, Ji Y, Townsend R M, et al. (2021). Distinguishing constraints on financial inclusion and their impact on GDP, TFP, and the distribution of income , *Journal of Monetary Economics*, 117: p1-p18.

Rizzi P, Graziano P, Dallara A. (2018).A capacity approach to territorial resilience: the case of European regions ", *The Annals of Regional Science*, 60 (2): 285-328.

XU Y, WANG C. (2017).Influencing factors of regional economic elasticity in the context of financial crisis--Taking Zhejiang Province and Jiangsu Province as an example. Progress in Geographic Science,36 (08):986-994.

Martin R. (2012). Regional economic resilience, hysteresis and recessionary shocks. Journal *of Economic Geography,*12 (1):1-32.

YANG Y,WANG P,LI Y,(2015). A study of the impact of financial subsidies on firms' R&D investment and performance-Empirical evidence from Chinese GEM listed companies. Finance and Economics, (01):24-31.DOI:10.13762/j.cnki.cjlc.2015.01.004.

Zhang L, Ran G. (2018).Industrial structure optimization effect and regional heterogeneity of financial inclusive development . Economic and Management Research,,39 (09):41-52.DOI:10.13502/j.cnki.issn1000-7636.2018.09.004.

Author Introduction

First author& Corresponding author, Linmei Wang, female, born in 1987, Ph.D. Associate professor, Dept. of Marxism, Sichuan University, Obtained a PhD in Economics from Sichuan University in 2015，research interest in digital finance and Innovation management, email: scuwlm2022@163.com.

Appendix: List of 64 sample countries (economies)

A. Classification by income level

high income level					
Irish	Australia	Belgium	German	Canadian	the Lithuanian republic, former Baltic Soviet republic
Estonia	Polish	French	Suomi	Republic of Croatia (1991-)	Maltese
Austrian	South Korea (Republic of Korea)	Denmark	the Netherlands	Latvia	United States of America
Portugal	Japanese	Sweden	Cyprus	Slovakia	Slovenia
Uruguay	Spanish	Greece	Singaporean	New Zealand	Hungary
Palestine	Italy	United Kingdom of Great Britain and Northern Ireland			
Upper middle income level					
Brazilian	Albania	Bulgaria	Bosnia and Herzegovina	Dominican Republic	Georgia
Ecuador	Columbia (District of, or University etc)	Georgia (country)	Romania	Malaysia	Mauritius
Republic of Moldova, former Soviet republic on the border with Romania	Mexico	Serbia	Thailand		
Lower middle income level					
Cambodian	Pakistan	Bolivia	Bangladesh (formerly East Pakistan)	Belarus	Philippine

Algeria	Indonesia	India	Zimbabwe	Mongolia	Kyrgyzstan
Kenya	Nicaragua	El Salvador	Zimbabwe		

B.Classification by level of government corruption

It's cleaner					
Australia	Austrian	Belgium	Canadian	German	Denmark
Estonia	Suomi	French	United Kingdom of Great Britain and Northern Ireland	Irish	Japanese
the Netherlands	New Zealand	Singaporean	Sweden	Uruguay	United States of America

petty corruption					
Bulgaria	Cyprus	Spanish	Georgia (country)	Greece	Republic of Croatia (1991-)
Hungary	Palestine	Italy	South Korea (Republic of Korea)	the Lithuanian republic, former Baltic Soviet republic	Latvia
Maltese	Mauritius	Malaysia	Polish	Portugal	Romania
Slovakia	Slovenia				

Aggravated corruption					
Zimbabwe	Mongolia	Albania	Algeria	Pakistan	Brazilian
Bosnia and Herzegovina	Bolivia	Dominican Republic	Georgia	Ecuador	Philippine
Columbia (District of, or University etc)	Kyrgyzstan	Cambodian	Zimbabwe	Kenya	Mongolia
Bangladesh (formerly East Pakistan)	Republic of Moldova, former Soviet republic on the border with Romania	Mexico	Nicaragua	El Salvador	Serbia
Thailand	Belarus	India	Indonesia		