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Financial Development and Employment Structure in China: A VAR-Based Analysis

Juan Wang
Faculty of Economics and Management, Universiti Kebangsaan Malaysia
Naziatul Aziah Mohd Radzi*
Faculty of Economics and Management, Universiti Kebangsaan Malaysia
Normaizatul Akma Saidi
Faculty of Hospitality, Tourism and Wellness, Universiti Malaysia Kelantan

Abstract

This study investigates the relationship between China's employment structure and financial industry structure, with a focus on their evolution and current dynamics. The objective is to assess how the development of China's financial sector influences labor distribution across primary, secondary, and tertiary industries, and vice versa. To achieve this, the study employs correlation analysis and a Vector Autoregressive (VAR) model using time-series data from 2000 to 2022. The financial development scale (FIR), financial development structure (FDS), and employment structure (ES) are the key variables. Data were sourced from the China Statistical Yearbook and the China Financial Statistical Yearbook. The empirical findings reveal that while China's financial development has progressed rapidly—marked by an expanding asset base and diversification—the scale and structure of financial development exert a negative impact on the employment structure in the long term, constraining its advancement. In contrast, improvements in the employment structure positively influence financial development in the short term. Among financial variables, the FDS has a stronger and more sustained effect on employment structure than FIR. The employment structure also exhibits strong self-stability. Based on these results, the study offers policy recommendations in three areas. Financial policy should target the efficient allocation of resources, support employment-intensive sectors, and align financial innovation with labor market needs. Industrial policy should promote closer industry–finance coordination and support the upgrading of traditional sectors to enhance job absorption. Employment policy

*Corresponding Author, Address: Faculty of Economics and Management, Universiti Kebangsaan Malaysia, 43600 UKM Bangi, Selangor Malaysia, Email: naziah.radzi@ukm.edu.my

should prioritize vocational training and strengthen employment services to increase labor adaptability and ensure market stability amid structural shifts.

Keywords: financial development; employment structure; structural transformation; VAR model; China
JEL Codes: E24; G21; O16; C32

1. Introduction

This study examines the relationship between China's employment structure and the structure of its financial industry. It explores the historical and contemporary development of both sectors, highlights their mutually reinforcing dynamics, and offers recommendations for modernizing the financial industry's organizational framework and optimizing the labor market.

Amid deepening economic globalization and the ongoing transformation and upgrading of China's domestic economy, the link between the financial industry structure and the overall employment structure has become increasingly significant.

Since the reform and opening-up period, China's financial industry has undergone profound changes. It has evolved from a monolithic national banking system into a diversified, multi-layered modern financial system. The scale of financial markets has steadily expanded, and their international influence has grown considerably. Today, China's banking, stock, bond, and insurance markets rank among the largest globally. However, structural issues remain. Internationally, the financial market still lacks adequate innovation capacity and internationalization relative to the size of the economy. Domestically, the structure remains dominated by indirect financing, which does not fully meet the financing needs of an innovation-driven real economy. Resource allocation within the financial sector is imbalanced, and support for small and medium-sized enterprises (SMEs) remains insufficient.

Employment, as the foundation of people's livelihoods, is a critical indicator of social stability and national prosperity. Improving the employment structure is a key priority in China's economic development strategy. It reflects the skill level and quality of the labor force and serves as a barometer for the country's economic progress. With economic restructuring and technological advancement, China's employment landscape is undergoing profound shifts. Employment in traditional industries is declining, while demand is surging in emerging sectors such as fintech and the digital economy.

Economic development and full employment are two central goals of China's macroeconomic policies. Coordinated development between the financial structure and the employment structure is essential to achieving these goals. Looking ahead, China's financial industry is expected to continue its path of structural optimization and upgrading. The proportion of direct financing is likely to increase, the multi-level capital market will continue to improve, and financial resources will be more precisely directed toward strategic national priorities and underserved areas.

Correspondingly, the employment structure will also undergo further adjustments. Employment in the financial sector is expected to grow moderately, with a shift toward more knowledge- and technology-intensive roles. The industry will attract more high-quality, innovative talent. Additionally, labor mobility between the financial sector and other industries will become more dynamic, promoting coordinated development and offering strong support for high-quality economic growth.

Current Situation of China's Financial Industry Structure

The strength of the Chinese government has been the primary driving force behind the development of the country's financial sector. Over time, China's financial industry has evolved into a structure predominantly led by the banking sector—a configuration that has persisted for a considerable period. As China's economy and financial systems have developed, the functions of the financial sector have improved, as reflected in the growing number of financial institutions and the exponential increase in financial assets.

Today, China's financial industry features a diverse range of financial services, comprehensive functionality, and a relatively complete system—all of which support the growth of the real economy. The banking sector remains at the core of this structure, while other key components include the securities, insurance, trust, and fund management industries. Figure 1 presents data on financial assets across these sectors.

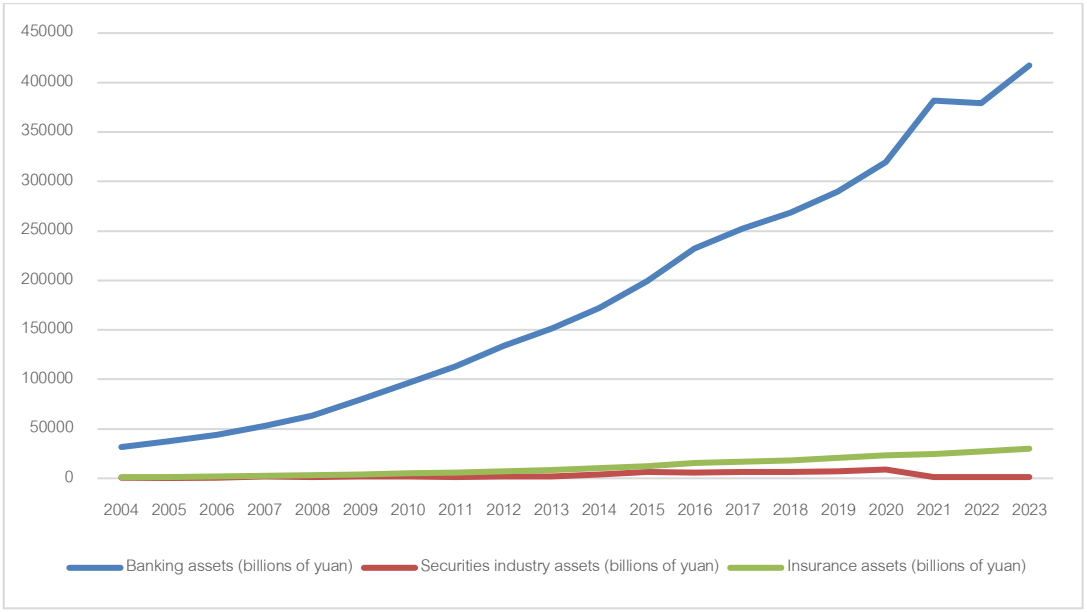

Figure 1: Asset growth in China's financial sector, 2004–2023

Source: China Financial Statistics Yearbook

Figure 1 illustrates the rapid expansion of China's banking, securities, and insurance sectors between 2004 and 2023. In 2004, the total financial assets of these sectors were 31,598.98 billion yuan for banking, 404.5 billion yuan for securities, and 1,195.37 billion yuan for insurance. By 2023, these figures had surged to

approximately 417 trillion, 1.384 trillion, and 2.996 trillion yuan, respectively. This explosive growth highlights the increasing strength and scale of China's financial industry.

However, Figure 1 reveals that the banking sector continues to hold a disproportionately large share of the industry, with its 2023 total assets far exceeding the combined assets of the securities and insurance sectors. This dominance suggests that any issues within the banking sector could pose significant risks to the stability of the entire financial system and hamper economic growth. Such concentration also weakens the international competitiveness of China's financial industry—particularly in the underdeveloped securities and insurance sectors. Furthermore, the banking sector remains the central locus of systemic financial risk within the industry.

Status of Employment Structure in China

The implementation of China's reform and opening-up policy dismantled the dual division system between urban and rural areas and supported continuous growth in nationwide employment. Since the establishment of the socialist market economy in 1992, China's economy has undergone remarkable expansion. In 1992, the country had 661.52 million employed people. By 2023, this number had increased to 740.41 million. Employment in China is primarily categorized into three sectors:

- Primary industry employment includes individuals engaged in agriculture, forestry, animal husbandry, and fishery. This sector serves as the human resource backbone for the nation's foundational industries.
- Secondary industry employment covers mining, manufacturing, the production and supply of electricity, heat, gas, and water, as well as construction. It reflects the real economy's capacity to absorb labor and is a key engine of economic development.
- Tertiary industry employment involves a wide range of service sectors, including wholesale and retail, transportation, warehousing and postal services, accommodation, and catering. This sector reflects the level of economic activity and the extent of economic diversification.

Together, these sectors constitute the overall employment structure. Changes in their relative proportions reflect shifts in the industrial structure and correspond to different stages of economic development. Figures 2 and 3 illustrate the employment landscape.

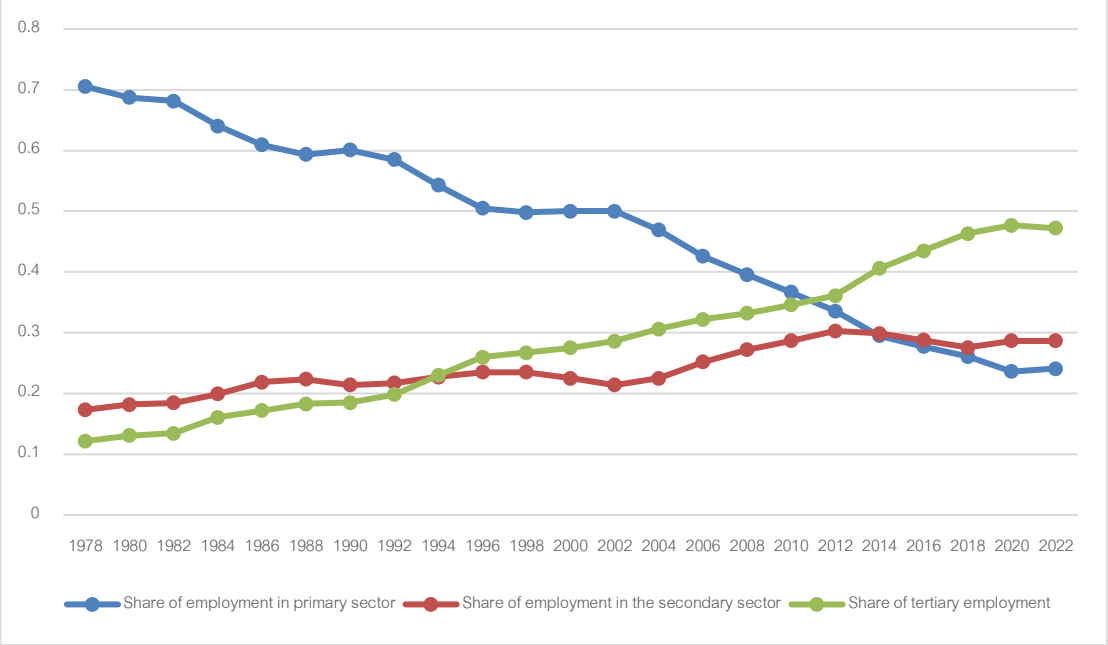

Figure 2: Industrial structure of employment in China

Source: China Statistical Yearbook

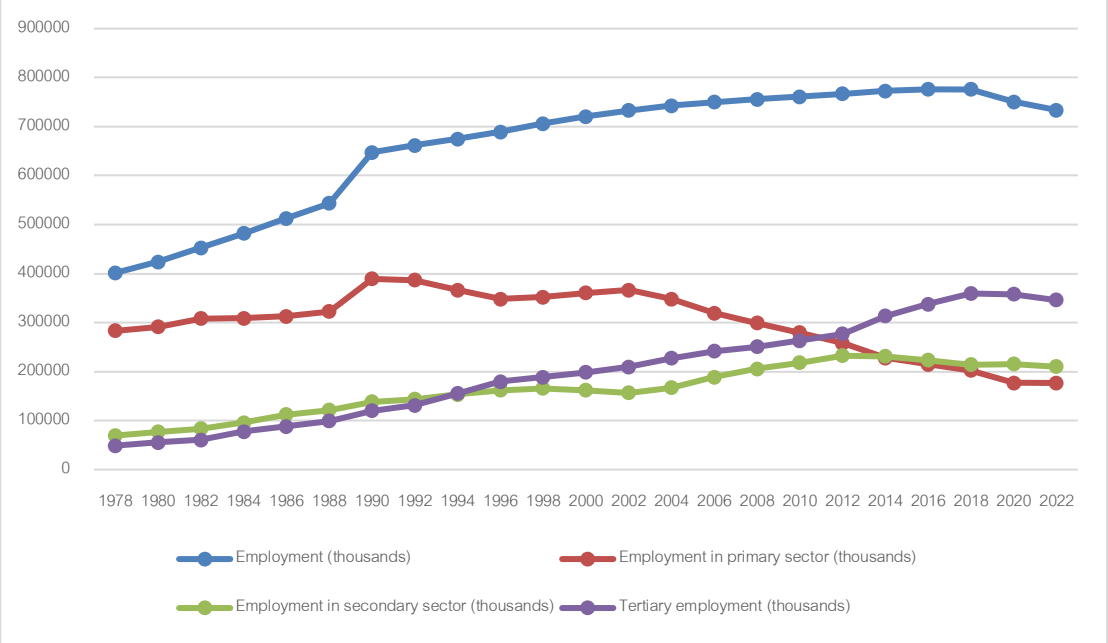

Figure 3: Trends in the evolution of China's employment structure

Source: China Statistical Yearbook

Figures 2 and 3 show that China's labor force was initially concentrated in the primary sector. As the economy grew, labor shifted to the secondary sector, and once industrial development matured, it moved further into the tertiary sector. This progression aligns with Petty-Clark's principle, which describes the structural transformation of employment during economic development.

Despite progress and modernization, challenges remain. A persistent issue, as noted by Wei, Ren, and Li (2005), is that China's employment structure lags behind its industrial structure. Although there is a significant correlation between the two, misalignment hinders optimal economic outcomes. Only through coordinated development of both structures can China accelerate economic growth and achieve full employment.

2. Theoretical Basis

2.1 Financial Structure Theory

Financial structure theory explores the composition and relationships among financial instruments, institutions, and markets, as well as their impact on economic activity. It defines financial structure as the forms, functions, and relative scales of a country's financial institutions and instruments.

Early work by Gurley and Shaw in the 1950s distinguished between various components of the financial sector—such as banking vs. non-banking institutions, direct vs. indirect financing, and intrinsic vs. extrinsic money—but did not formally define financial structure.

In 1969, Goldsmith was the first to define financial structure and introduced the Financial Interrelation Ratio (FIR), calculated as the ratio of a country's financial assets to its GDP. He categorized financial structures into three levels based on FIR:

- Low-level: $0.2 < FIR < 0.5$
- Medium-level: $0.5 < FIR < 0.75$
- High-level: $FIR > 0.75$

Goldsmith's work laid the foundation for analyzing the role of financial structure in economic development. Subsequent research has expanded on this to examine its impact on resource allocation, corporate financing, risk management, innovation, and macroeconomic stability. As financial markets evolve, the theory continues to be refined to reflect new realities.

2.2 Optimal Financial Structure Theory

This theory suggests that an economy's factor endowment structure determines its optimal industrial structure, firm size, and risk profile. An efficient financial structure should mobilize savings, channel them into productive investments, and allocate capital effectively while minimizing systemic risk.

According to Lin (2010), the ideal financial structure should align with the economy's industrial and technological makeup. It refers to the arrangement and proportion of financial institutions and their interactions, tailored to the characteristics of enterprises, industrial composition, and technological development.

2.3 Petty-Clark Theorem

British economist William Petty was among the first to apply statistical and mathematical methods to economic research. In his work Political Arithmetic, he noted that differences in labor income across agriculture, manufacturing, and commerce would drive labor migration toward higher-paying sectors.

Building on this, Clark analyzed employment data from over 40 countries and proposed that as an economy develops, labor shifts from:

- Primary industry (agriculture),
- to Secondary industry (manufacturing),
- and then to Tertiary industry (services).

This transformation reflects broader economic progress and structural change.

2.4 Lag Theorem of Employment Structure Transformation

Chenery and Syrquin (1980) analyzed employment and economic data from both developed and developing countries. They found that while developed countries experience synchronous evolution of industrial and employment structures, developing countries often do not.

In developed nations, labor gradually shifts from primary to secondary and tertiary sectors in tandem with industrial upgrading. In contrast, developing countries often see employment shifts without corresponding industrial transformation. This mismatch results in low employment absorption in technology-intensive industries, widening employment gaps, and uneven structural development. As a result, the transformation of industrial and employment structures does not occur simultaneously in developing economies.

3. Literature Review

3.1 Financial Industry Structure

Goldsmith et al. (1969) was the first to define financial structure as the relative scale of financial instruments and institutions. He proposed the Financial Interrelation Ratio (FIR)—the ratio of a country's financial assets to its GDP—and argued that increasing FIR supports economic growth. Gurley and Shaw (1955) also studied financial structure, suggesting that its role in economic development depends heavily on government policy.

To address financial repression, Cole and Shaw (1974) introduced the financial deepening theory, emphasizing that finance and the economy interact positively when markets are not distorted by government interference. Levine (1997) argued that a developed financial industry reduces transaction costs, fosters innovation, and accumulates capital—thus promoting growth.

Hellmann et al. (1997) introduced the concept of financial restraint, a balance between financial repression and laissez-faire, in which limited government intervention can support finance–economy synergy. Dobronogov and Iqbal (2007) warned that excessive financial development may lead to negative externalities. Ergungor (2008) found no clear link between financial structure and growth.

Allen et al. (2012) examined cross-country data and found that bank-based systems are slower to recover from financial crises. Sehrawat and Giri (2017), using data from SAARC countries, showed that financial development and trade openness promote growth. Allen et al. (2018) linked financial structure evolution to real sector development. Ehigiamusoe and Lean (2019) highlighted that financial system structure is critical to environmental quality through dynamic modeling techniques.

3.2 Employment Industry Structure

Fisher (1938) introduced the three-sector model, linking employment shifts to economic development. Kuznets (1955) showed that urbanization drives labor from primary to secondary industries, followed by a shift to the tertiary sector once industrial employment saturates. Building on Petty's work, Clark (1940) formalized the Petty–Clark Theorem, noting that labor moves progressively through the three sectors as economies grow.

Matusz (1994) used an efficiency-wage model to show that trade policy impacts employment distribution; for instance, subsidies for high-wage sectors may reduce total employment. Kletzer (2002) found that rising imports reduced employment in U.S. labor-intensive sectors. Pianta and Vivarelli (2003) showed that technological change increases employment, but outcomes vary by country. Varblane et al. (2003) emphasized the role of FDI in shaping employment structure.

O'Donoghue and Townshend (2005) found a shift toward service-based jobs in the UK. Coccia (2013), analyzing 27 European countries, highlighted interactions between public education spending, R&D, and employment. Malik (2015) found no significant impact of FDI on employment in India's manufacturing sector using a dynamic labor demand model.

3.3 Financial Industry Structure and Employment Industry Structure

Goldsmith et al. (1969) argued that financial development, as measured by FIR, reflects upgrading of the financial structure. Katz and Murphy (1992) emphasized that technological progress increases demand for high-skilled labor. Levine (1997) demonstrated how a developed financial sector boosts innovation and growth.

Mortensen and Pissarides (1999) attributed employment shifts to the reallocation of production factors, driven by technology. Rendón (2000) found that financial development reduces hiring and firing costs, supporting employment. Koskela and Stenbacka (2004) linked improved credit markets with rising equilibrium unemployment under profit-sharing. Wang and Wang (2005) concluded that China's financial system was not yet effective in improving employment outcomes. Lin and Sun (2008) found that an increase in the market share of small and medium-sized banks positively correlated with China's growth. Collender and Shaffer (2009) noted that banking concentration in the U.S. was associated with faster employment growth.

Kan (2010) argued that trade structures in different sectors affect employment patterns. Pagano and Pica (2012) showed that financial development boosts employment and productivity but that crises reduce jobs. Philippon and Reshef (2013) noted that overdeveloped financial sectors may experience diminishing returns, resulting in lower labor demand.

Boustanifar (2014) found U.S. banking reforms significantly affected labor-intensive industries. Sharma and Rotthoff (2019) observed that insurance market concentration reduced employment opportunities and wage share. Kim et al. (2019) argued that financial development encourages capital over labor, increasing unemployment. Chen et al. (2021) found that higher financial development levels could limit entrepreneurship and increase joblessness due to market saturation.

3.4 Research Gap

Most research on the financial industry structure focuses on its relationship with macroeconomic performance or industrial transformation. Similarly, studies on employment structure often explore links with industry dynamics, FDI, or trade. While some research examines the employment effects of financial development, it typically addresses aggregate employment levels rather than structural alignment.

Few studies, domestically or internationally, specifically analyze the interaction between financial industry structure and employment structure. This study aims to fill that gap by drawing on existing theories and applying them to explore the relationship between these two structures in the context of China.

4. Methodology

4.1 Correlation Coefficient Analysis

In the context of economic development, sectors within the financial industry interact with one another and exhibit measurable correlations with the employment structure. To assess the structure of China's financial sector, this study uses the proportion of total assets held by the banking, securities, and insurance industries, following Li & Jia (2005).

To explore the relationship between financial structure and employment structure, we examine the correlation between the asset proportions of these financial sectors and the employment proportions in China's primary, secondary, and tertiary industries. This analysis provides insights into the interdependence between the composition of financial industry assets and employment distribution across sectors.

The Pearson correlation coefficient, proposed by Karl Pearson, is used to quantify the linear relationship between variables. Specifically, the correlation coefficient measures the strength and direction of the relationship between the asset share of the i-th financial industry and the employment share of the j-th sector. The formula used for this calculation is:

$$r_{ij} = \frac{n\sum x_i y_j - \sum x_i \sum y_j}{\sqrt{\left\{n\sum x_i^2 - \left(\sum x_{\{i\}}\right)^{\{2\}}\right\}\sqrt{\left\{n\sum y_j^2 - \left(\sum y_j^2 - \left(\sum y_{\{j\}}\right)^{\{2\}}\right)\right\}}} \quad (1)$$

r_{ij} denotes the correlation coefficient between the proportion of assets in the i financial industry and the proportion of employment in the j industry. Let x_i (where i = 1 represents the banking industry, i = 2 represents the securities industry, and i = 3 represents the insurance industry) denote the proportion of assets of the banking, securities, and insurance industries to the total assets of the entire financial industry, and let y_j (where j = 1, 2, 3) represent the employment proportion of the three industries. The value range of r_{ij} is (-1,1); when r_{ij} is equal to 0, we can say there is no correlation between the proportion of assets of the financial industry I and the proportion of employment of industry j, i.e., there is no mutual influence when rij is equal to 1, we can say there is a positive linear correlation between the proportion of assets of the financial industry I and the proportion of employment of industry j, i.e., the changes of both of them will be in the same direction of the same degree when r_{ij} is - 1, it means that the changes of financial industry I and the proportion of employment of industry j

will be in the same direction of change. When r_{ij} is -1, it means that the proportion of assets in financial industry i and the proportion of employment in industry j are negatively linearly correlated, i.e., the changes of the two industries will move in the opposite direction to the same extent. In this paper, the correlation coefficients between the proportion of assets in China's financial industries and the proportion of employment in the three major industries are expressed through a matrix, as shown in the formula:

$$R = (r_{11}\ r_{12}\ r_{13}\ r_{21}\ r_{22}\ r_{23}\ r_{31}\ r_{32}\ r_{33}\ ) \quad (2)$$

4.2 VAR Model Design

4.2.1 Model Introduction

Traditional econometric models often rely on economic theory to represent relationships between variables in a static framework. However, this approach may not adequately capture the dynamic interactions between variables, and it often leads to pseudo-regression issues due to rigid distinctions between endogenous and exogenous variables.

The Vector Autoregressive (VAR) model overcomes these limitations by allowing all variables in the system to be treated as endogenous. It effectively captures the interdependencies among multiple economic variables and analyzes their dynamic responses to random shocks. This makes the VAR model well-suited for studying economic systems characterized by mutual feedback. The general form of a VAR model of order p, denoted as VAR(p), is expressed as follows:

$$y_t = \Phi_1 y_{t-1} + \Phi_2 y_{t-2} + \cdots + \Phi_p y_{t-p} + Hx_t + u_t \quad (3)$$

where y_t is i-dimensional column vector of endogenous variables at time t, Φ_i is an i × i-dimensional matrix, H is an i × j matrix, x_t is a column vector of j-dimensional exogenous variables, p is the lag order, t is the number of samples, and it is a k-dimensional random perturbation term.

4.2.2 Variable Selection

This study employs three core variables in the VAR model: Financial Development Scale (FIR), Financial Development Structure (FDS), and Employment Structure (ES). Each is defined and justified as follows:

1) Financial Development Scale (FIR):

American economist Goldsmith et al. (1969) first defined financial structure and introduced the Financial Interrelation Ratio (FIR)—the ratio of total financial assets to GDP—as a measure of financial development. He argued that a higher FIR indicates a more advanced financial system and plays an irreplaceable role in promoting economic growth. In this study, FIR is calculated annually using time-series data. Total financial assets are defined as the sum of deposits, stock market value, and premium income of financial institutions. FIR thus captures the dynamic relationship between financial asset accumulation and national income, serving as a proxy for the overall level of financial development in China.

2) Financial Development Structure (FDS):

Chinese scholars have developed various indicators to measure the structural composition of the financial system. For example, Wang and Sun (2003) used the ratio of securities balance to total financial assets, while Ma (2018) proposed (total financial assets one deposit)/total financial assets. This paper adapts Ma's approach slightly and defines FDS as: (market value of stocks + premium income)/total financial asset. This indicator reflects the relative development of the securities and insurance markets in China. A higher FDS value indicates a more diversified and optimized financial structure, with a growing share of non-banking financial sectors.

3) Employment Structure Indicator (ES):

Based on the Petty–Clark Theorem, which describes the transition of labor from the primary sector to the secondary and eventually to the tertiary sector with economic development, this paper uses ES to represent the degree of structural optimization in employment. ES is measured as (number of people employed in the tertiary industry / total number of employed people). A higher ES value reflects a shift toward service-based employment, indicating a more advanced and modern employment structure aligned with economic progress.

4.3 Data Sources and Descriptive Statistics

The data used in this study consist of annual time series from 2003 to 2022, drawn primarily from the China Statistical Yearbook and the China Financial Statistical Yearbook. These sources provide comprehensive and authoritative information on national economic and financial indicators. A summary of the descriptive statistics for the selected variables is presented in Table 1.

Table 1: Statistical descriptive table for each indicator

	Total employment (ten million)	Employment in the tertiary sector (ten million)	GDP (hundred billion)	Total financial assets (hundred billion)	FIR	FDS	ES
average value	75.0706	28.0646	530.1093	1336.9892	2.2878	0.2448	0.3733
median	75.4470	27.1850	487.9401	1038.4656	2.3796	0.2441	0.3570
maximum values	76.3490	35.8680	1204.7240	3419.9613	2.9285	0.4619	0.4800
minimum value	72.0850	19.8233	100.2800	173.4911	1.7070	0.1151	0.2750
standard deviation	1.2400	5.4085	349.1511	1027.5072	0.4197	0.0659	0.0696
skewness	-0.9424	0.0897	0.4574	0.6485	-0.0422	1.1444	0.2361
kurtosis	-0.1175	-1.4583	-1.0580	-0.7951	-1.5403	4.2459	-1.4457

Source: Authors' calculations using EViews.

4.4 Correlation Analysis Method

Using data on the asset composition of China's financial industry and the employment distribution across the primary, secondary, and tertiary sectors from 2000 to 2022, this study applies the Pearson correlation coefficient to analyze the relationship between the structure of the financial industry and the employment structure.

The resulting correlation coefficient matrix quantifies the strength and direction of these relationships, providing insight into the degree of alignment between financial asset distribution and sectoral employment trends in China.

$$R = (0.7531 \ -0.5434 \ -0.7453 \ -0.1435\ 0.0125\ 0.2110 \ -0.9352\ 0.7922\ 0.9173\ ) \quad (4)$$

Based on the correlation coefficients in the matrix, we can assess the relationship between the structure of China's financial industry and its employment structure. The following conclusions can be drawn:

First, the correlation between the banking sector's asset share and employment proportions across industries reveals distinct patterns. The correlation coefficient between banking assets and primary industry employment is positive (0.7531), while the coefficients with the secondary and tertiary sectors are negative (-0.5434 and -0.7453, respectively). This indicates a strong positive association between banking assets and employment in the primary industry, and a negative association with employment in the other two sectors.

These results suggest that as the dominance of the banking sector declines—reflected by its shrinking asset share—the proportion of employment in the primary sector also decreases. This implies a labor shift from the primary sector to other industries, particularly the tertiary sector. Notably, the strongest negative correlation is between banking assets and tertiary industry employment, implying that a decline in the banking sector's dominance may stimulate employment growth in the service sector.

Second, the relationship between the asset shares of the securities and insurance sectors and employment across industries is more nuanced. For the securities sector, the correlation coefficients with the primary, secondary, and tertiary industries are -0.1435, 0.0125, and 0.2110, respectively. These values suggest weak correlations, indicating that the securities sector has limited direct influence on employment distribution.

In contrast, the insurance sector shows strong correlations with employment across industries. The correlation with the primary sector is highly negative (-0.9352), while that with the tertiary sector is strongly positive (0.9173). This reflects a clear labor shift from agriculture to services as the insurance sector grows. The correlation with the secondary sector is also positive (0.7920), suggesting some employment growth in industry, though the effect is less pronounced than in the tertiary sector.

In summary, the evolution of the financial industry structure appears to influence labor allocation across sectors. A declining share of banking assets and a rising share of insurance assets are associated with a labor shift from the primary to the secondary and tertiary sectors, with the tertiary sector absorbing the most workers. This suggests that service industries have greater employment absorption capacity, and their development can lead to substantial employment growth.

The securities sector, by comparison, has a relatively weak influence on employment structure and has yet to demonstrate a clear role in optimizing labor distribution. Therefore, reducing the dominance of the banking sector and expanding the insurance industry may be effective strategies for promoting a more balanced and modern employment structure in China.

4.5 VAR Model Empirical Analysis

This study utilizes time series data from 2000 to 2022 to construct a VAR model using the three indicators: FIR (Financial Development Scale), FDS (Financial Development Structure), and ES (Employment Structure). To address potential heteroskedasticity in the data, each variable is transformed using the natural logarithm, resulting in the variables lnFIR, lnFDS, and lnES.

4.5.1 Unit Root Test

Before estimating the VAR model, it is essential to ensure that the data series are stationary to avoid issues of spurious regression. To test the stationarity of the variables, this study employs the Augmented Dickey–Fuller (ADF) test. The unit root tests for lnFIR, lnFDS, and lnES are conducted using EViews 13. The test results, summarized in Table 2, confirm whether each variable is stationary at level or requires differencing.

Table 2: Unit root test for each variable

Variable	Forms of Testing (C, T, K)	T-statistics	P-value	T-statistics (5% level	Conclusion
LnES	（0，0，0）	-2.389105	0.0196	-1.958088	Stable
LnFIR	（C，1，0）	-4.611846	0.0070	-3.632896	Stable
LnFDS	（C，0，0）	-3.141001	0.0380	-3.004861	Stable

Source: Authors' calculations using EViews.

Note: C denotes the constant term in the unit root test equation, T represents the trend term, and K indicates the lag order. The lag order (K) in this study is selected automatically based on the Schwarz Information Criterion (SIC) and the Akaike Information Criterion (AIC).

According to the unit root test results presented in Table 2, lnES, lnFIR, and lnFDS all reject the null hypothesis of a unit root at the 5% significance level. This indicates that each data series is stationary in its level form. Therefore, the VAR model can be constructed directly using the original (log-transformed) series, ensuring model stability.

4.5.2 Determination of Lag Order p in the VAR Model

When constructing a VAR model, it is essential to determine the appropriate lag length to accurately capture the dynamic relationships among the variables. In econometric analysis, lag selection is typically based on information criteria, including the Schwarz Criterion (SC), Akaike Information Criterion (AIC), Hannan–Quinn Criterion (HQ), and Likelihood Ratio (LR) test. This study uses EViews 13 to determine the optimal lag length for the VAR model. The results of the lag selection procedure are presented in Table 3.

Table 3: Lag Order Selection Criteria for the VAR Model

Lag	LogL	LR	FPE	AIC	SC	HQ
0	39.29639	NA	4.40e-06	-3.820672	-3.671551	-3.795435
1	86.26821	74.16603*	8.24e-08*	-7.817706	-7.221218*	-7.716757
2	91.29781	6.353177	1.37e-07	-7.399769	-6.355915	-7.223108
3	99.86883	8.119921	1.83e-07	-7.354614	-5.863395	-7.102241
4	120.6828	13.14567	9.26e-08	-8.598190*	-6.659605	-8.270104*

Source: Authors' calculations using EViews.

Note: * indicates the optimal lag according to each criterion.

Based on the principle of minimum information loss, the optimal lag length is selected using multiple information criteria. As shown in Table 3, when the lag order is 1, the values of LR, FPE, and SC reach their minimum, indicating optimal model fit. Therefore, this study adopts a lag length of 1 for the VAR model.

4.5.3 Granger Causality Test

As shown in Table 4, the p-values for all variable pairs are below the 0.05 significance level. According to the Granger causality test rule, when the p-value is less than the threshold (0.05), the null hypothesis of no causality is rejected. This indicates that significant causal relationships exist among the three variables: FIR, FDS, and ES.

The results confirm that changes in one variable provide valuable information for forecasting the others, demonstrating mutual predictive power. Since FIR, FDS, and ES are endogenous to one another, they are jointly determined and interrelated, rather than being influenced by external (exogenous) factors alone.

Given these dynamics, it is appropriate to employ a Vector Autoregression (VAR) model, which allows each endogenous variable to be expressed as a function of the lagged values of all variables in the system. This approach effectively captures the complex interactions among financial development scale, financial development structure, and employment structure. Consequently, the VAR model provides a robust framework for dynamic analysis, forecasting, and policy simulation related to the interdependencies among these economic indicators.

Table 4: Granger Causality Test

Dependent variable: FIR

Excluded	Chi-sq	df	Prob.
FDS	3.841459	1	0.0499
ES	11.16633	1	0.0008
All	16.78459	2	0.0002

Dependent variable: FDS

Excluded	Chi-sq	df	Prob.
FIR	4.247847	1	0.0455
ES	5.446239	1	0.0250
All	8.303222	2	0.0042

Dependent variable: ES

Excluded	Chi-sq	df	Prob.
FIR	5.698837	1	0.0152
FDS	6.592170	1	0.0091
All	11.752860	2	0.0034

Source: Authors' calculations using EViews.

4.5.4 VAR Model Stability Testing

Once the lag order of the VAR model has been determined, it is essential to test the model's stability. Without confirming stability, subsequent analyses—such as impulse response functions and variance decomposition—may produce invalid or misleading results.

The most common method for testing VAR model stability is the AR root (characteristic root) test. According to this method, the model is considered stable if the modulus of all inverse roots of the characteristic polynomial is less than one, meaning that all roots lie within the unit circle in the complex plane.

In this study, the AR root test is conducted using EViews 13, and the results are presented in Figure 4. As shown, all AR roots lie inside the unit circle, confirming that the VAR model is dynamically stable and suitable for further analysis.

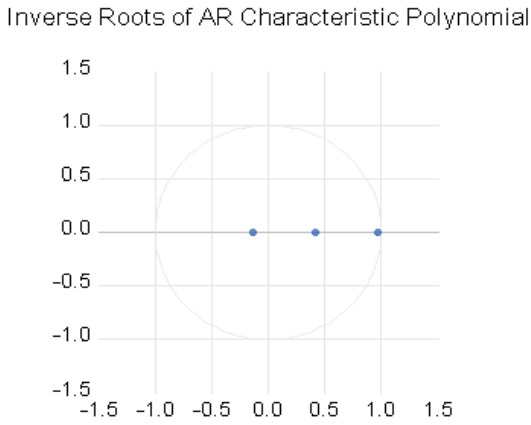

Figure 4: AR root test situation diagram

Source: Authors' calculations using EViews.

The VAR model has a total of KP roots, K being the number of variables and P being the lag order. Hence, this paper has 3 × 1 = 3 (3 means numbers of variables, 1 means the lag period) roots based on the above figure, which can be found in the mode of the root if the value of its root is less than 1; all three characteristic roots fall within the unit circle, so the VAR model in this paper is stable.

4.5.5 Determination of the VAR model

The lag P of the VAR model determined in this paper is 1. There are four variables to build the VAR model, as shown below:

$$LNFDSt=\Phi 11LNFDSt\text{-}1+\Phi 12LNFIRt\text{-}1+\Phi 13LNESt\text{-}1+c1+u1,,t \quad (5)$$

$$LNFIRt=\Phi 21LNFDSt\text{-}1+\Phi 22LNFIRt\text{-}1+\Phi 23LNESt\text{-}1+c2+u2,,t \quad (6)$$

$$LNESt=\Phi 31LNFDSt\text{-}1+\Phi 32LNFIRt\text{-}1+\Phi 33LNESt\text{-}1+c3+u3,,t \quad (7)$$

Within the VAR model, all three equations are estimated using least squares estimation, and the specific equations are calculated as follows:

Table 5: Model Equation

	R-squared
LNFDS=0.621735*LNFDS(-1)-1.197926*LNFIR(-1)+1.343819*LNES(-1)+1.767192	0.621430
LNFIR=0.111260*LNFDS(-1)-0.301583*LNFIR(-1)+1.088713*LNES(-1)+2.328035	0.766402
LNES=-0.032871*LNFDS(-1)+0.061233*LNFIR(-1)+0.941593*LNES(-1)-0.131204	0.992151

Source: Author's calculations using EViews.

Where LNES(-1), LNFDS(-1), and LNFIR(-1) denote the lagged period of China's employment structure index, financial development scale, and economic development structure, respectively. The R-square of the decidable coefficients estimated by the three equations are 0.621430, 0.766402, and 0.992151, respectively, indicating a robust explanatory validity of the model.

4.6 Impulse Response Analysis

Following the establishment of the VAR model, impulse response analysis is conducted to examine the dynamic interactions among the variables. The impulse response function (IRF) analyzes how endogenous variables respond over time to external shocks—represented by one-time innovations in the model's error terms.

In this study, two sets of impulse responses are evaluated. First, FIR and FDS are used as impulse variables to assess their effects on ES. Then, ES is used as the impulse variable to evaluate its impact on FIR and FDS. The dynamic response patterns resulting from these shocks are depicted in Figure 5.

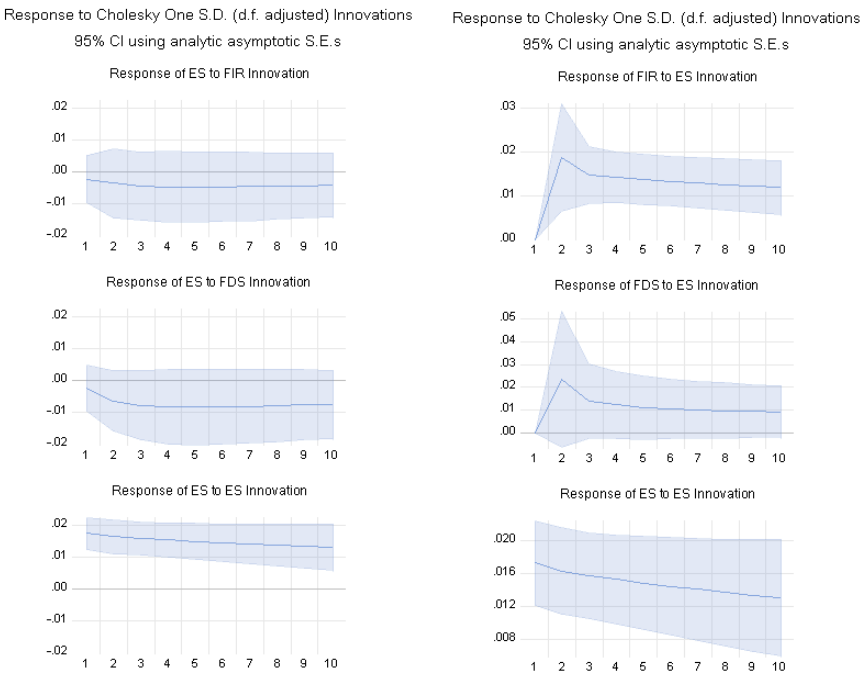

Figure 5: Impulse Response of financial industry structure and employment structure in China

Source: Author's calculations using EViews.

The horizontal axis in Figure 5 represents the number of periods, while the vertical axis indicates the magnitude of the impulse response. Based on the analysis of Figure 5, the following conclusions can be drawn:

1) Self-response of ES: When a shock is applied to ES, it generates a substantial positive response in the current period. However, the effect gradually declines over time, suggesting that while changes in employment structure initially have a strong impact, this influence diminishes in subsequent periods.
2) Response of ES to FIR and FDS shocks: ES exhibits a negative response when subjected to shocks from FIR and FDS, indicating an adverse effect. The maximum negative impact occurs in the fourth period, after which the effect gradually stabilizes. This implies that, in the short run, both financial development scale and structure exert an inhibitory influence on employment structure—with the impact of FDS being more pronounced.
3) Response of FIR and FDS to ES shocks: In contrast, when ES acts as the impulse variable, both FIR and FDS display a positive response, peaking in the second period, before gradually declining and stabilizing. This pattern reflects a lagged positive effect, suggesting that improvements in employment structure take time to influence financial development indicators.

4.6.1 Hypothesis Testing of Impulse Response Coefficients

Figure 6 illustrates the impulse response functions between key variables, accompanied by 95% confidence intervals based on Analytic Asymptotic Standard Errors (S.E.). These intervals are used to assess the statistical significance of impulse response coefficients over time.

In the "Response of ES to FIR Innovation" panel, a one-standard-deviation shock to the Financial Development Scale (FIR) results in a negative response from the Employment Structure (ES) in the initial periods. Although the estimated impulse response (the blue curve) remains below zero, most of the coefficients fall within the 95% confidence band. This suggests that, at the 95% confidence level, we fail to reject the null hypothesis that the impulse response is zero—indicating the effect of FIR on ES is not statistically significant.

Similarly, in the "Response of ES to FDS Innovation" graph, a shock to the Financial Development Structure (FDS) also produces an initial negative response from ES. Again, the response coefficients largely lie within the confidence interval, implying that the impact of FDS on ES is also not statistically significant at the 95% confidence level.

In contrast, the "Response of FIR to ES Innovation" shows that FIR responds positively to a shock in ES, with the response peaking early and then stabilizing. Notably, some impulse response coefficients exceed the bounds of the 95% confidence interval, indicating that the null hypothesis of zero effect is rejected during those periods. Therefore, the impact of ES on FIR is statistically significant in certain time frames.

For the "Response of FDS to ES Innovation", although the response fluctuates initially before stabilizing, most of the coefficients remain within the 95% confidence bounds. As a result, the impulse response of FDS to ES is not statistically significant in most periods.

Overall, the analysis reveals that while the Employment Structure (ES) has a statistically significant effect on the Financial Development Scale (FIR) in select periods, its influence on the Financial Development Structure (FDS) is generally weak and statistically insignificant. Conversely, the shocks from FIR and FDS on ES do not exhibit significant effects within the confidence interval.

Though this hypothesis testing does not directly modify the VAR model, it is critical for model interpretation, policy relevance, and refining future model specifications.

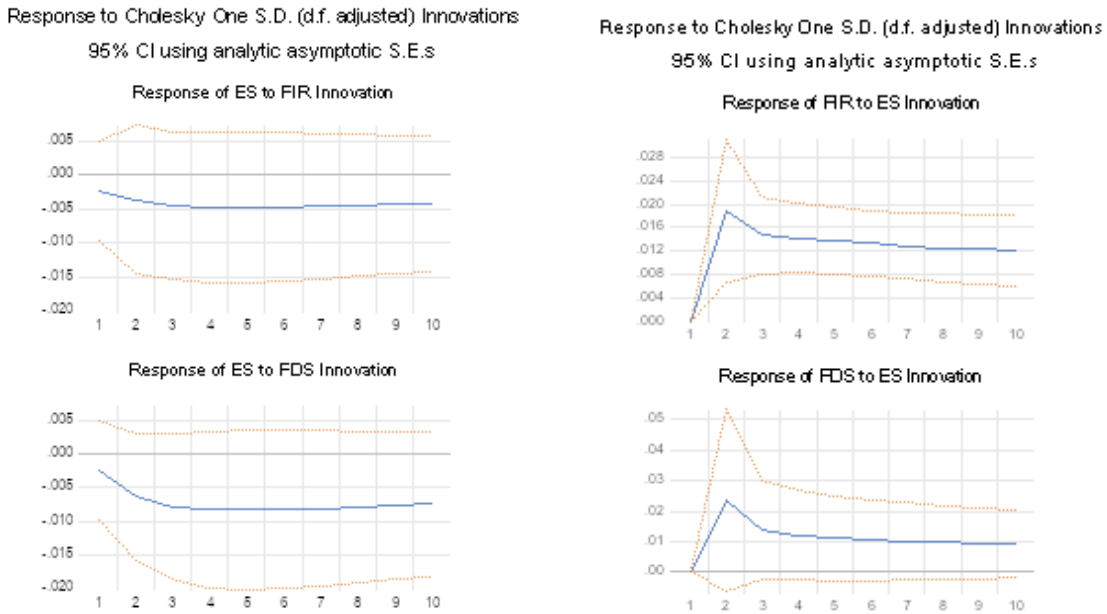

Figure 6: Hypothesis Testing of Impulse Response Coefficients
Source: Author's calculations using EViews.

4.6.2 Variance Decomposition

Variance decomposition helps quantify the contribution of different structural shocks to fluctuations in endogenous variables. In this analysis, the employment structure (ES) is treated as the response variable, and its variance is decomposed into components attributable to the financial development scale (FIR) and financial development structure (FDS).

Table 6: Variance Decomposition of China's Employment Structure (Periods 1–10)

Period	S.E.	FIR	FDS	ES
1	0.097950	1.724174	1.977160	96.29867
2	0.100608	2.922652	7.534776	89.54257
3	0.101692	4.022543	11.31434	84.66311
4	0.102868	4.750049	13.80089	81.44906
5	0.104057	5.241061	15.46072	79.29822
6	0.105220	5.582477	16.61121	77.80631
7	0.106333	5.828954	17.44039	76.73065
8	0.107388	6.013222	18.05983	75.92695
9	0.108384	6.155282	18.53721	75.30751
10	0.109322	6.267707	18.91494	74.81735

Source: Author's calculations using EViews.

Key Findings:

1. Dominance of ES's own influence:

   The employment structure is largely influenced by its own past values. In the first period, self-contribution accounts for 96.30% of the variance. Although this share declines over time, it remains high at 74.82% in the 10th period, indicating strong self-stability and persistence.

2. Limited impact of FIR:

   The financial development scale contributes a relatively small and stable share to ES fluctuations. Its contribution rises slowly from 1.72% in the first period to 6.27% by the 10th period, suggesting that FIR has a modest and gradual effect on employment structure changes.

3. Greater influence of FDS:

   In contrast, the financial development structure exerts a stronger and steadily increasing impact. Its contribution grows from 1.98% in period 1 to nearly 19% by period 10. This indicates that FDS plays a more prominent and influential role in driving employment structure changes than FIR.

These findings are consistent with the earlier impulse response analysis, reinforcing the conclusion that FDS has a more substantial and systematic impact on the employment structure than FIR. The evolving role of financial structure changes should therefore be given closer attention in policy formulation, particularly in efforts to align financial sector reforms with labor market development.

5. Empirical Results

This study utilizes financial data from 2000 to 2022 to construct a Vector Autoregressive (VAR) model incorporating Employment Structure (ES), Financial Development Scale (measured as Financial Interrelation Ratio: FIR), and Financial Development Structure (FDS). Using variance decomposition and impulse response functions, the empirical relationships among these variables were analyzed, yielding the following results:

1) FIR and FDS negatively affect ES, indicating that both impede the development of China's employment structure and reflect a strained relationship between financial development and labor allocation. China's financial sector has long been dominated by the banking system, with only a small proportion of assets held by other sectors such as securities, insurance, trusts, and funds. This results in a financial industry structure that remains relatively outdated compared to those of developed countries. Therefore, improving China's employment structure requires modernizing the financial sector and rationalizing the allocation of financial assets.
2) The inhibitory effect of FDS on the employment structure is more pronounced than that of FIR. Although China's financial sector has expanded rapidly over the past four decades—reflected in the growth of financial assets, the number of financial institutions, and overall financing volumes—the sector's development remains heavily influenced by government power. This strong government presence limits the sector's responsiveness to market forces, which in turn restricts its ability to support the evolving employment structure effectively.
3) In the short term, improvements in China's employment structure positively affect both FDS and FIR. However, this promotional effect is limited in the long term. As the employment structure improves, more workers are employed in the tertiary sector, which serves as a key talent pool for the financial industry. This transition supports the growth and optimization of the financial industry structure but does not significantly alter the broader financial or economic development framework over time.

5.1 Discussion

Since the 1990s, both scholars and practitioners have widely recognized the financial sector's positive contribution to economic growth and output expansion, coinciding with improvements in financial development levels. Early research—largely theoretical and now somewhat dated—argued that financial sector development facilitates the flow of capital. Even with limited funding and underdeveloped financing channels, businesses could establish production lines. As financial sector development increased, so too did labor demand.

However, the global financial crisis sparked new debate within both domestic and international academic communities. In China, domestic scholars have largely focused on national data. Various regression analyses have shown that financial development in China tends to reduce unemployment and increase employment. Based on these findings, some argue that promoting financial development is essential for job creation (Xiao & Si, 2018).

In contrast, international scholars analyzing their respective countries have found that, in many cases, financial systems with higher levels of development did not perform as expected during the crisis. Employment

levels dropped significantly, even in nations with mature financial sectors. In these cases, market participants panicked, liquidated assets, prioritized liquidity, and triggered a freeze in the flow of funds, exacerbating unemployment. As noted by Epstein and Shapiro (2019), these economies required years of adjustment before recovering to pre-crisis employment levels.

This suggests that the relationship between financial development and employment may be nonlinear. Financial development can promote employment up to a certain threshold, beyond which it may have adverse effects. Based on the empirical findings of this study, the structure of financial development in China exerts a negative influence on the employment structure.

The contradictory conclusions in the existing literature may stem from differences in country contexts, time periods, and research methodologies. Most studies are focused on individual countries and often use distinct analytical frameworks. In China's case, the financial system has evolved significantly alongside rapid economic growth—from a relatively underdeveloped system to one of considerable scale. As a result, the role of financial development appears to have shifted—from supporting job creation and employment growth to, in some cases, contributing to job displacement.

5.2 Recommendations

This section summarizes the research findings and provides several policy recommendations aimed at optimizing China's financial sector and labor market structures. The coordinated development of these two systems is expected to have a mutually reinforcing effect.

(1) Financial Policies

Optimize the allocation of financial resources:

Although the current scale and structure of financial development show no significant short-term impact on the employment structure, optimizing financial resource allocation remains essential. The government should guide financial institutions to increase credit support for industries with strong employment absorption capacity—such as labor-intensive manufacturing and service sectors. Special financial support programs could be implemented, offering preferential loan interest rates or favorable loan quotas to help these industries expand and generate more jobs.

Promote coordination between financial innovation and structural optimization:

Encourage financial innovation and develop financial products and service models closely aligned with employment promotion. For instance, small and micro-enterprises that drive employment through entrepreneurship could benefit from innovative products such as start-up guarantee loans or intellectual property–based financing. These tools can alleviate financing constraints while supporting job creation. Additionally, further optimization of the financial structure is needed—particularly by promoting the development of direct financing markets—to reduce enterprise financing costs and improve the efficiency of financial services for the real economy and employment growth.

(2) Industrial Policies

Strengthen coordination between industry and finance:

Promote alignment between industrial and financial policies by establishing an industry–finance information-sharing platform. This would allow financial institutions to better understand industrial development trends and corporate financing needs, thus offering targeted financial support for industrial upgrading and employment capacity expansion. For example, in supporting emerging industries, financial institutions should be encouraged to make early arrangements that ensure adequate financial backing for enterprise growth and workforce absorption.

Facilitate transformation and employment absorption in traditional industries:

Traditional industries continue to play a significant role in employment. As these sectors undergo transformation and upgrading, policy support—such as tax incentives and fiscal subsidies—should be provided. Enterprises should be encouraged to adopt new technologies and processes to enhance productivity while maintaining and expanding employment. For example, financial subsidies for smart manufacturing projects can help safeguard existing jobs and attract new labor during the transition process.

(3) Employment Policies

Enhance vocational skills training:

Given the limited direct impact of financial development on the employment structure, efforts should also focus on strengthening the employment side. The government should increase investment in vocational education and skills development. Training programs should be tailored to reflect industry needs and labor market dynamics, equipping workers with relevant, competitive skills. This approach improves the adaptability of the labor force to shifts in both financial and industrial structures.

Improve the employment service system:

Reinforce public employment service platforms to offer more precise services, such as job matching, career guidance, and employment information dissemination. By reducing information asymmetries in the labor market, these platforms can facilitate the efficient allocation and rational flow of labor. Even if changes in financial and industrial structures yield only limited direct effects on employment, a robust employment service system can help ensure overall labor market stability.

6. Conclusion

This study investigates the mutual relationship between China's employment structure and its financial industry structure. It assesses the current state of both systems and explores their interdependence through correlation analysis and an empirical examination using a Vector Autoregressive (VAR) model. The key findings are as follows:

1) China's financial industry is dominated by the banking sector, which serves as the backbone of the system. Other sectors—such as securities, insurance, trusts, and funds—complement this core, creating a financial system characterized by a wide variety of services and comprehensive functionality that supports the real economy. However, the banking sector holds a disproportionately large share of total financial assets, far exceeding those of the securities and insurance sectors

combined. This concentration increases systemic risk: instability in the banking sector could significantly affect the entire financial system and pose serious threats to China's economic growth.

2) The evolution of China's employment structure follows a classic three-sector transformation, where labor initially concentrates in the primary sector (agriculture), then shifts to the secondary sector (industry), and ultimately to the tertiary sector (services) as the economy develops. This pattern aligns with the Petty-Clark theorem (not "Mathieu-Clarke theorem"). However, a substantial portion of China's labor force remains in the primary sector, while the tertiary sector still lags behind that of advanced Western economies. Further efforts are needed to accelerate the transition toward a more optimized, service-oriented employment structure.

3) There is a statistically significant correlation between the employment structure and the financial industry structure in China. The empirical analysis using the VAR model indicates that the employment structure is negatively impacted by the structure and scale of China's financial development—particularly by the structural characteristics. Although improvements in the employment structure have positive short-term effects on financial development, this influence diminishes over time, showing limited long-term impact on the scope and organization of the financial sector.

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