



Research Article

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Empirical study on the relationship between financial structure and economic growth of Zhejiang province

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ABSTRACT

Finance is the core of modern economy, financial increasingly impacts on all aspects of China's economic and social life. In this paper, the empirical result shows that the per capita GDP and the proportion of secondary and tertiary industries has a significant impact on the financial rate through the establishment of the regression model and Granger causality test on the relationship between financial structure and economic growth in Zhejiang Province. And it also point out that the optimization of the financial structure will promote economic growth, moreover economic growth promote the optimization of financial structures through optimizing the economic structure, there is a dynamic interaction and circular relationship between the two. The empirical results suggest that Zhejiang Province should made great efforts in applying financial reform qualification, and actively develop the capital market of stocks, bonds, need to pay much more attention to the development of secondary and tertiary industries, establish and maintain good health legal economy market in Zhejiang Province.

Keywords: Financial structure, Economic growth, Regression model, Granger causality test.

INTRODUCTION

Finance is the core of modern economy. As economic globalization proceeds, financial increasingly impacts on all aspects of China's economic and social life. In modern economy, economic operation and financial activity is not separation, economic development must be accompanied by financial development. At the same time, the financial development promotes economic growth.

As early as 1911, the Austrian economist Joseph Schumpeter expounded a well-functioning financial system to promote long-term economic growth. In 1969, Goldsmith supported this assertion through empirical research, he thought that there is a rough parallel relationship between the economic and financial development. In 1973, McKinnon and Shaw put forward the theory of "financial repression" and "financial deepening". Kapoor et al developed static analysis of McKinnon and Shaw, they further clarified the important role of financial deepening on economic development in developing countries by the method of dynamic analysis. Endogenous financial theory is on the rise since the 1990s. Since then, Diamond, Levine, Beck and many famous scholars have carried out a variety of theoretical and empirical research on the relationship between financial development and economic growth.

In the process of national economic development, especially the vast territory of the country such as China, the non-balanced economic development is a big problem. China's economy is in transition economy, the new economic system constructing has basically completed, economic and financial reform will encounter the deeper difficulties and contradictions. In addition, the domestic and foreign scholars mainly focused on the national level when they study the relationship between financial development and economic growth, District level are relatively rare, and there is especially uncommon for the study of Zhejiang Province. Therefore, the study for relationship of financial development and economic growth in Zhejiang Province has a very strong significance.

EXPERIMENTAL SECTION

Variables selected

Finance-related rate (FIR) is the ratio of a country's total value of financial assets and the country's economic activity total at a specific date. Finance-related rate (FIR) formula expressed as $M2/GDP$, the meaning and function of its economics is that you can use it to illustrate the degree of monetization of the economy. This indicator can be a measure of a country's financial structure and economic development level, at the same time it is also one of the key scale to estimate a country's financial deepening, In this paper, we use the amount of the proportion of total financial assets in Zhejiang Province to measure Zhejiang Financial related rate (FIR).

GDP is often used as index to measure the overall national strength, If GDP is a reflection of national economic strength and the size of the market, so the per capita GDP is reflected in people's wealth and living standards, therefore, we use the per capita GDP(RJGDP) as the indicator of economic growth.

The proportion of the two and three industry was used as the index to measure the industrial structure optimization, so we used the proportion of the two and three industry (gdp2+3) as the industry structure index.

The basic data is derived from the "Zhejiang Provincial Statistical Yearbook 2010", we use the GDP of Zhejiang Province in 1978 – 2009; FIR is equal to the sum divided by the GDP of the province (no price adjustment), here the sum is the sum of balance of RMB deposits and outstanding loans of all financial institutions.

Empirical analysis

After smoothing, we get new indexes of industrial structure(gdp23SM) and economic growth (RJGDPSM), these two variables as explanatory variables, After smoothing, we obtained the new financial related rate FIRSM ,the variable act as the explained variable.

$$\text{FIRSM} = B_0 + B_1 \text{gdp23SM} + B_2 \text{RJGDPSM} + u$$

Using Eviews software, We obtained the following results:

Dependent Variable: FIRSM
 Method: Least Squares
 Date: 05/14/12 Time: 19:58
 Sample: 1978 2009
 Included observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.317667	0.454580	-5.098480	0.0000
GDP23SM	0.048810	0.006190	7.884844	0.0000
RJGDPSM	3.48E-05	5.58E-06	6.240406	0.0000
R-squared	0.949180	Mean dependent var		2.011854
Adjusted R-squared	0.945675	S.D. dependent var		1.000784
S.E. of regression	0.233260	Akaike info criterion		0.015732
Sum squared resid	1.577893	Schwarz criterion		0.153144
Log likelihood	2.748296	Hannan-Quinn criter.		0.061280
F-statistic	270.8205	Durbin-Watson stat		0.502504
Prob(F-statistic)	0.000000			

Figure 1 OLS regression results

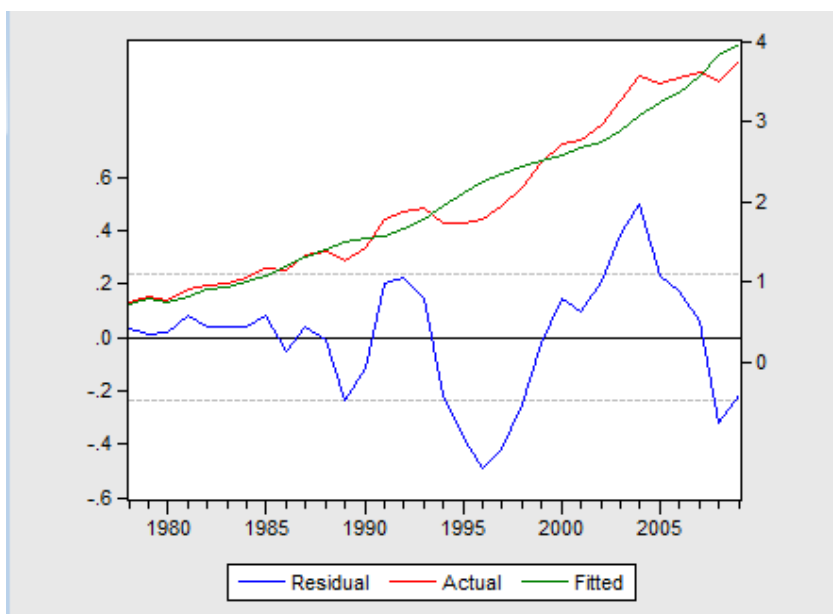


Figure 2 The fitting effect

Then we have the following equation:

$$\text{FIRSM} = -2.317667 + 0.048810 \text{ gdp23SM} + 3.48\text{E-}05\text{RJGDPSM}$$

From the results of regression analysis, we found that regression all through the significant test statistics, because R-squared=0.94, this shows that the regression equation fitted well. Then, when k=3, n=32, If significance level $\alpha=0.05$, we can find $DW=0.502504 < DL=1.31$, it indicate the existence of a positive correlation. So, we need to carry on the serial correlation test, the following is LM test structure:

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	25.07853	Prob. F(2,27)	0.0000
Obs*R-squared	20.80206	Prob. Chi-Square(2)	0.0000

Figure 3 LM test

$$LM(2) = nR^2 = 20.80206 > \chi^2_{0.05}(2) = 5.99147$$

This shows that the model has one order and two order autocorrelation. Based on the generalized difference method, we use the iterative method to estimate the model, the estimation results are as follows Figure4.

Here, $DW = 2.03$, $k=3$, $n=30$, this shows that the model has no first-order autocorrelation.

When the model eliminate the effects of the autocorrelation, the model should be as follows:

$$\text{FIRSM} = -2.367523 + 0.049534\text{GDP23SM} + 3.41\text{E-}05\text{RJGDPSM}$$

S =	(0.918476)	(0.012352)	(1.05E-05)
t =	(-2.577664)	(4.010266)	(3.245911)
R-squared=0.980167	DW=2.030430	F=308.8794	

R-squared=0.98016, So the regression equation fitted quite well.

Dependent Variable: FIRSM
 Method: Least Squares
 Date: 05/14/12 Time: 20:07
 Sample (adjusted): 1980 2009
 Included observations: 30 after adjustments
 Convergence achieved after 7 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.367523	0.918476	-2.577664	0.0162
GDP23SM	0.049534	0.012352	4.010266	0.0005
RJGDPSM	3.41E-05	1.05E-05	3.245911	0.0033
AR(1)	1.095496	0.181177	6.046554	0.0000
AR(2)	-0.472853	0.207631	-2.277373	0.0316

R-squared	0.980167	Mean dependent var	2.094225
Adjusted R-squared	0.976994	S.D. dependent var	0.978918
S.E. of regression	0.148481	Akaike info criterion	-0.825707
Sum squared resid	0.551165	Schwarz criterion	-0.592174
Log likelihood	17.38561	Hannan-Quinn criter.	-0.750998
F-statistic	308.8794	Durbin-Watson stat	2.030430
Prob(F-statistic)	0.000000		

Inverted AR Roots	.55-.42i	.55+.42i
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Figure 4 The estimation results of iterative method

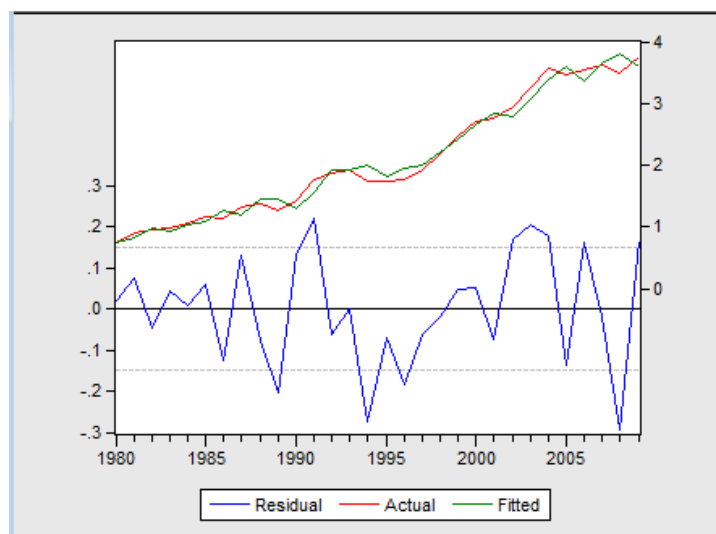


Figure 5 The fitting effect after adjustment

ADF test: In the time series analysis of economic phenomena, there are generally required to smooth the time series data. But when doing statistical analysis, statistical data from the queries are usually nonstationary, For stationary test of each variable by ADF test is needed. The test results as below:

Null Hypothesis: D(LNFIR) has a unit root
 Exogenous: Constant, Linear Trend
 Lag Length: 1 (Automatic based on SIC, MAXLAG=7)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.506624	0.0063
Test critical values:		
1% level	-4.309824	
5% level	-3.574244	
10% level	-3.221728	

Null Hypothesis: D(LNGDP23) has a unit root Exogenous: Constant, Linear Trend Lag Length: 1 (Automatic based on SIC, MAXLAG=7)			
		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.821027	0.0000
Test critical values:	1% level	-4.309824	
	5% level	-3.574244	
	10% level	-3.221728	

Null Hypothesis: D(LNRJGDP) has a unit root Exogenous: Constant, Linear Trend Lag Length: 3 (Automatic based on SIC, MAXLAG=7)			
		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.533875	0.0064
Test critical values:	1% level	-4.339330	
	5% level	-3.587527	
	10% level	-3.229230	

Figure 6 ADF tests

The test results show : In 1%, 5% and 10% level, There is a first-order stationary sequence by first-order difference. In order to determine whether there is a long-term stable relationship between variables, three variables need to do co-integration test.

Co-integration test: The co-integration theory illustrate: Put two or more than two non-stationary time series to special combinations may appear stationary. This paper uses co-integration test to detect whether there is a long-term equilibrium relationship between variables, the co-integration test results show that there is a long-term equilibrium relationship between the three groups.

Granger causality test: The causal relationship between the variables is refers to the dependence of the variables, Purely from a regression relationship we cannot see whether there is a causal relationship between the variables. So we will have three variables into two groups respectively for causality test. Test results are as follows:

Null Hypothesis:	Obs	F-Statistic	Prob.
LNRJGDPSM does not Granger Cause LNFIRSM	29	3.43743	0.0345
LNFIRSM does not Granger Cause LNRJGDPSM		4.10443	0.0187

Null Hypothesis:	Obs	F-Statistic	Prob.
LNGDP23SM does not Granger Cause LNRJGDPSM	27	5.00327	0.0060
LNRJGDPSM does not Granger Cause LNGDP23SM		3.99761	0.0152

Figure 7 Granger causality tests

We can see from the above results: there is a strong reciprocal causation relationship between Zhejiang's per capita GDP (RJGDP) and Zhejiang's financial related rate (FIR), It shows that the financial structure and economic growth in Zhejiang province has the dynamic circulation.

CONCLUSION

Through the empirical analysis we get the following regression model:

$$\text{FIRSM} = -2.367523 + 0.049534\text{GDP23SM} + 3.41\text{E-}05\text{RJGDPSM}$$

$$\begin{array}{lll} S & = & (0.918476) \quad (0.012352) \quad (1.05\text{E-}05) \\ t & = & (-2.577664) \quad (4.010266) \quad (3.245911) \\ \text{R-squared} & = & 0.980167 \quad \text{DW} = 2.030430 \quad \text{F} = 308.8794 \end{array}$$

From above we can see: the Zhejiang's per capita GDP (RJGDP), the two or three industry in Zhejiang province accounted for the total proportion of GDP (gdp23) has a significant impact on Zhejiang Province financial related rate. And then the coefficient of gdp23 is larger than the coefficient of per capita GDP(RJGDP), this shows that gdp23 contribution to the financial related rate greater than per capita GDP(RJGDP).

From Grainger causality test we know: the optimization of financial structure can promote economic growth, at the same time, the economic growth can through optimizing the economic structure to promote the optimization and development of financial structure.

Based on conclusion , we put forward a few suggestions:

a) Encourage and support the private capital to participate in the reform of local financial institutions
The reform optimization of the financial structure embodied in the scale and diversified of financial structure and expansion in the number. Private capital participation will promote the diversification of existing financial structure in Zhejiang Province Adding new village banks, loan companies, rural fund cooperatives and other financial organizations can enrich the current financial structure. Reasonable guide private capital to the establishment of venture capital investment enterprises, equity investment enterprises and related investment management institutions, have great role in promoting the economic growth of Zhejiang Province

b) Focus on improving the proportion of the two or three industry to optimize the economic structure.
From the reform and opening-up, Zhejiang province's agricultural, construction, financial services and other services play a decisive role in the economic growth. But with the further development of the economy, the industry structure adjustment of our province is imperative. In recent years, service industry contribute more and more for economic growth. At the same time, it is also important to maintain good finance development.

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REFERENCES

- [1] Ross levine. *Jouranal of Money, Credit and Banking*.1998, 30(3): 596-613.
- [2] Wang zhaoxing, China financial structure theory[M]. Beijing: China financial press, 1991.
- [3] Zhang Junzhou. Analysis of regional finance in China [M]. Beijing: China Economic press, 1995
- [4] Wang Weian. *Journal of Zhejiang University* (Humanities and social sciences edition).2000, 30 (1): 135-137.
- [5] Li liang. The modern financial structure introduction [M]. Beijing: Economic Science press, 2001
- [6] Monetary policy analysis group of the people's Bank of China Hangzhou branch:financial operation report for 2010 years.
- [7] Xu Weixiang. *Business Economics and management* (.2002 3):27-29
- [8] Sun Jingshui. Econometrics tutorial [M]. Beijing: Tsinghua University press, 2009
- [9] Sulaiman D,Adnan Hussain,M. Anwar Jalil. *European Journal of Social Sciences*. 2009,Volume (11), 419-427.