The Regional Differences Analysis of Bank Credit support and Economic Growth

---based on the panel data of HeBei province

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***Abstract*—In order to avoid the effect of spatial heterogeneity on the relation between bank credit and local economy development, this article have reduced the range of study to HeBei province. This article have set a Variable coefficient individual fixed effect model and used Section weighted estimation based on the panel data from 2000 to 2010 of 11 cities of HeBei province to do the Positive Analysis. The analysis is from two sides: the credit scale and credit quality. The results showed that the different regional credit scale and quality have different contribution to the local economy; credit quality valued more on the contribution to the local economy than credit scale.**

Keywords-bank credit; regional economic growth; panel data

I. INTRODUCTION

Finance is the core of modern economic development; capital is the "blood"of economic operation, while whether the function of "blood" can play depends on the capital flow. Although the capital and insurance market have developed fast, Bank have played a dominant role on social capital distribution, those two markets just have small effect. Bank credit, as the crucial source of investment, is becoming an important power which can promote regional economy. In recent years, as for the positive effect of the central four trillion investment and other measures as well as the policy of "three years have big change ,carry out the process of urbanization", each area of HeBei province have a soar credit quantity and the credit are mostly long-term.

However, at this present stage, each area of HeBei province have different extent of development, the bank credit have different contribution. For this reason, the study of how the credit scale and quality can support the region development is beneficial to reduce the gap between different regions and to promote comprehensive, balanced and sustainable development.

II. LITERATURE REVIEW

There are three category articles study the relation between bank credit and economic growth: trade research, regional research and holistic approach. Lots of scholars at home and abroad do the theoretical and empirical study about the impact the bank credit have on the regional economic growth. Levine(2000) thought that bank credit is the leading indicator of economic growth, backward countries can promote the development of economy through bank credit[1]. Wang Xiaoping(2003) have studied the western 's relation between credit and economic growth. Zhao xingbo (2009) used co integration analysis to study this relation of SHENZHEN. Zhu huan (2009) used panel data to study the relation of Jiangsu province and have come a conclusion that the cities' heterogeneity has obvious effect on the cities' development. Yao Linhua(2011) used 11 panel data to study this relation of the city of BaiSe and showed that bank credit have obvious promotional effect on the county economy. Recently most study focus on the relation between bank scale and regional economic growth, there is little study about the Utilization efficiency of bank credit and the effect on regional economic growth.

Currently, the unbalanced development of regional economy is not only reflected by the regional division of the East, Middle and West in China but also the small division within most provinces [2]. Therefore, when study the relation between financial issue and macro economic development it is essential to consider the concept of space. Li Jing etc. (2007) have studied the influencing factor of regional financial development and made a conclusion that the fixed region factor is the crucial reason of regional financial heterogeneity [3]. Li Lin etc. (2011) have considered the geographical feature of the financial cluster; they used spatial econometric analysis to study the effect of financial cluster and economic growth [4]. Consequently, the geographical factor must be considered into the study of the relation between bank credit and economic growth. The finished studies have neglected this factor.

Owing to the two considerations above, this article will reduce the area coverage of the object, control the impact of spatial heterogeneity has on the relation between bank credit and economic growth. This article put 11 counties of HeBei province as the object and used panel data model to do the empirical analysis of the regional difference caused by credit scale and credit quality.

III. MODEL SPECIFICATION AND DATA HANDLING

A. Index selection and data sources

In consideration of demographic effect on GDP, this model use RGDP as the indicator to economic growth. The development of bank credit include not only the larger scale

but also the higher quality, so this model used credit scale (CRE) and credit quality(XL) as the indicator to bank credit development. XL is the ratio of GDP and Bank credit balance indicating the value created by each unit of credit. As to the availability of the data, this article chooses RGDP, Local and foreign currency credit balance, credit quality from 2000 to 2010 as sample data among the 11 cities (Shijiazhuang , Tang Shan, Qinhuangdao , Han Dan, Xingtai, Zhangjiakou, Chengde, Cangzhou, Langfang, Hengshui)of HeBei province .Sample descriptive statistics analysis results showed by TABLE Ⅰ. Then, in order to reduce the effect of heteroscedasticity, we will logarithmize all the variables. All the data are from <HeBei financial yearbook> and <HeBei economy yearbook>.

TABLE I. DESCRIPTION STATISTICAL ANALYSIS OF SAMPLE

	RGDP（yuan）	*Credit balance of local and foreign currency*	*Credit quality*
mean	16117.68	678.3137	1.551177
Mid-value	13704.00	474.9200	1.479430
max	59389.00	2920.399	3.391624
min	1329.000	156.3000	0.804456
variance	9593.015	549.0980	0.450732

B. Model selection

Panel data includes cross section, time and variable three-dimensional information, it can reflect the change and difference of economic behavior comparing to cross section data alone or time series data. So panel data model have become an important progress of Econometric theory method and are popularized by more and more econometricians. In view of this, this article set up the panel data model and the general type of the model is:

$$Y_{it} = a_{it} + \beta_{it} X_{it} + \xi_{it} (i = 1,2 \cdots N, t; t = 1,2 \cdots, T) \quad (1)$$

there into： Y_{it} is the dependent variable， a_{it} is the model intercept; β_{it} is the parameter vector ; $X_{it} = (X_{1t}, X_{2t} \cdots X_{kt})$ is the explanatory variable； ξ_{it} is Immediately error term； K is the number of explanatory variable； N is the number of Section members ； t is the number of period; We have set the following panel data model：

$$\ln rgdp_{it} = \alpha_{it} + \beta_{it} \ln cre_{it} + \delta_{it} \ln xl_{it} + \xi_{it} \quad (2)$$
$$(i = 1,2,\cdots,11; t = 2000,2001,\cdots 2010)$$

C. The stationary test of variable

In order to avoid the Spurious regression arose by the non-station of time series, firstly test the station of the time series. It is classified into two method of the panel data unit root test method: one is on the condition of the same root, test the unit root, LLC method, Breitung test, Breitun test and Hadri test is contained. The other is on the condition of different root test; it contains Im-Pesaran-Skin test, Fisher-ADF test and Fisher-PP test. To prove the station of the results, this article adopted the 4 method to test.

TABLE Ⅱ shows: the variables that are lnrgdp、lncre and lnxl is nonstational under the significance levels of 5% and 1%。Its' first difference D(lnrgdp)、D(lnlcre) and D(lnxl) are stational under the significance levels of 5% and 1%。Then, the variables that are lnrgdp、lncre and lnxl are all variables of I(1), which lay a foundation to the following analysis:

TABLE II. UNIT ROOT TEST ABOUT PANEL DATA

	*Levin, Lin & Chu t**	*Im, Pesaran and Shin W-stat*	*ADF-Fisher Chi-square*	*PP-Fisher Chi-square*	
lnrgdp	1.7713	4.8974	2.1636	13.4726	Nonstationarity
D(lrgdp)	-44.82***	-13.47***	73.31***	96.32***	Stationarity
lncre	8.523	10.1791	0.0483	0.3237	Nonstationarity
D(lcre)	-3.191***	-1.683**	41.54***	44.74***	Stationarity
lnxl	-0.85221	-0.4549	28.3735	17.9593	Nonstationarity
D(lnxl)	-4.518***	-3.293***	58.28***	54.97***	Stationarity

note："**"means through test under the significance levels of 5%；"***"means through test under the significance levels of 1%；D means the first difference of time series .

IV. THE EMPIRICAL ANALYSIS OF BANK CREDIT AND REGIONAL ECONOMIC GROWTH

A. Co-integration test

There are two test methods of panel data co-integration: one is based on Engle and Granger two step test, namely Pedroni test and Kao test. The other is based on Johansen co-integration test. This article adopted the former one ， TABLEⅢ shows the results. Pedroni' s Monte Carlo test shows the result ： when T＞100， 7 statistics have good test effect and are stationary[5] ， Among the 7statistics,5 can decline the original assume (do not exist co-integration relation) under the significance of 10%.So bank credit , credit quality and local economic growth have co-integration relation.

B. Panel data Model Specification

There are 3 categories of panel data model: Constant coefficient model of no individual influence $y_i = \alpha_i + x_i \beta_i + u_i$ (3), variable intercept model: $y_i = m + x_i \beta_i + \alpha_i^* u_i$ (4) and constant coefficient model of individual influence $y_i = \alpha + x_i \beta + u_i$ (5). This article used F test to make sure which category these samples is suit for.

Basic original assume ： H1： $\beta_1 = \beta_2 = \cdots = \beta_N$ H2： $\alpha_1 = \alpha_2 = \cdots = \alpha_N$ $\beta_1 = \beta_2 = \cdots = \beta_N$.

Criterion rule: if H2 is accepted ,then the model is the Constant parameters ,the test is over; if H2 is declined, then test H1.IF H1 is accepted , then the model is variable intercept one; if H1 is declined , then the model is variable parameters model.

TABLE III. PEDRONI CO-INTEGRATION TEST

Test statistic	*Statistic*	*Prob.*
Panel v-Statistic	1.406865	0.0797
Panel rho-Statistic	-1.460271	0.0721
Panel PP-Statistic	-6.665326	0.0000
Panel ADF-Statistic	-0.268226	0.3943
Group rho-Statistic	1.456358	0.9274
Group PP-Statistic	-9.434113	0.0000
Group ADF-Statistic	-2.025885	0.0214

Put individual influence into consideration, there are two condition: fixed influence and random influence, we used Hansman test to assure the type of model .The general train of thought of Hansman test is: to set up random influence model firstly, if individual influence is not correlated to explanatory variable, accept the original assume, set the model as random influence type; otherwise decline the original assume, set the model as fixed influence type. TABLE Ⅳ shows the result of Hansman test , Corresponding probability is 0.00, so we set individual influence as fixed type, in another word , we use fixed influence variable paraments model to analyze.

TABLE IV. HAUSMAN TEST RESULT

Test cross-section random effects			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	25.595453	2	0.000

C. Model estimation

When doing the regression estimate to the sample, we adopted Cross Section Weights，CSW to reduce the Section heteroscedastic. Based on the model type, Eviews6.0 had the regression estimate results showed as table 5. From the fitting results, the one that adopted Section weighted estimation is better. Adjusted R^2 reached to 0.9998，all the parameters can pass the statistical test under the significance levels of 5% and DW is equal to 1.99 which means that the model has no autocorrelation.

D. Rresults analysis

The TABLE Ⅴ shows：

Firstly, the expansion of bank credit scale has evident positive effect to all the region of HeBei province. However, the contribution of different local credit scale is different. On the whole, Tangshan, Zhangjiakou, Chengde, when the 3 cities' bank credit increase by 1%, it will bring over1% economic local growth ,Tangshan is most evident ,the number is equal to 1.42%；apart from these 4 cities, others can not reach1%. Compared with other cities, Zhangjiakou and Chengde are beneficial to their late city development and the advantage of backwardness. While, as to Shijiazhuang, Qinhuangdao, the relative advanced cities, the expansion of bank credit scale has lesser effect to the local economic development.

TABLE V. PANEL DATA REGRESSION RESULT

Variable	*Coefficient*	*t-Statistic*	*Prob*
C	2.723771	10.99999	0.000
SJZ-LOG(CRESJZ)	0.898648	75.90168	0.000
TS--LOG(CRETS)	1.415915	4.010354	0.000
QHD-LOG(CREQHD)	0.894867	104.1371	0.000
HD--LOG(CREHD)	0.940112	162.0519	0.000
XT--LOG(CREXT)	0.939576	378.0439	0.000
BD--LOG(CREBD)	0.958072	278.0574	0.000
ZJK--LOG(CREZJK)	1.047648	59.29755	0.000
CD--LOG(CRECD)	1.007229	80.45522	0.000
CZ--LOG(CRECZ)	0.949376	118.8179	0.000
LF--LOG(CRELF)	0.919288	91.30574	0.000
HS--LOG(CREHS)	0.942931	126.8312	0.000
SJZ--LOG(XLSJZ)	0.882682	33.27505	0.000
TS--LOG(XLTS)	3.622111	2.282005	0.025
QHD--LOG(XLQHD)	0.891342	22.42018	0.000
HD--LOG(XLHD)	0.985704	96.4438	0.000
XT--LOG(XLXT)	0.954388	208.858	0.000
BD--LOG(XLBD)	0.969071	133.0816	0.000
ZJK-LOG(XLZJK)	1.136786	12.85079	0.000
CD--LOG(XLCD)	1.123826	28.86893	0.000
CZ--LOG(XLCZ)	0.955149	103.3249	0.000
LF--LOG(XLLF)	0.933009	25.57297	0.000
HS--LOG(XLHS)	0.947008	69.93655	0.000
Fixed Effects (Cross)			
SJZ--C	0.401395		
TS--C	-4.985527		
QHD--C	1.50305		
HD--C	0.124065		
XT--C	0.355664		
BD--C	-0.207232		
ZJK--C	0.110638		
CD--C	0.56174		
CZ--C	0.31136		
LF--C	1.027298		
HS--C	0.797548		
Weighted Statistics			
Adjusted R-squared	0.999808	DW	1.99038
Unweighted Statistics			
R-squared	0.922312	DW	1.45236

Secondly, the improvement of bank credit quality also has evident positive effect to all the region of HeBei province. As a whole, the improvement of credit quality has larger effect than the expanse of credit scale to the local economy. Among them, Tangshan is the most obvious,

when the credit quality increased by 1%, it will promote local economy by 3.62%, while the credit scale can promote only by 1.41%.

Thirdly, the foundation of the local and their infrastructure have obvious effect to the economy development. Under no consideration of bank credit scale and quality; other factors have the contribution rate of 2.72%. Among them, Qinhuangdao, Langfang, Hengshui have bigger average contribution rate positive deviance, which means the three cities mostly depend on their non-financial factors such as fixed assets investment to develop their economy; on the contrary, Tangshan, Baoding have bigger average contribution rate negative deviance, which means the three cities mostly depend on their financial credit to develop.

V. CONCLUSIONS AND SUGGESTIONS

Based on the panel data of 11 cities in HeBei province, this article set a variable coefficient individual fixed effect model, the analysis shows that, firstly bank credit scale and quality have promotional effect to the local economy. But different region has different contribution rate. Secondly, the improvement of credit quality has larger effect than the expanse of credit scale to the local economy. For the sake of reduce the gap between different region, to make the most use of the credit scale and quality to support the local development and to promote comprehensive, balanced and sustainable development, we have the following suggestions:

1）To enhance the bank credit quality, in other word, to enhance the efficiency of credit fund, to make use of credit to promote local economy. Above all, strengthen the directing function of local government, and put the credit fund to the large-scale infrastructure, small and medium-sized enterprises and emerging industry. Avoid the waste of blind investment. In the second place, the bank should reinforce credit management, optimize the credit structure, and guard against credit risk. At last, strengthen the management of credit fund, and assure its safety and liquidity.

2）Under no considerations of bank credit scale and quality, other factors have the different contribution rate to HeBei's economy. As to Qinhuangdao and Langfang, the cities depend less on bank credit, they should exploit their own advantages, develop characteristic economy, to realize the development of their own economy; as to the cities with no obvious advantage nor higher credit effect, local government should increased economic policy support, give an overall consideration to the regional economy to reduce the gap between different region.

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