A Study on the Determinants of Credit Guarantee Supply: Using Big-Data & Mediation Effect

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Abstract. The objective of this study is to examine the effect of guarantee accidents of the Regional Credit Guarantee Foundation that provides public finance service on guarantee supply. To this end, the mediating effect of the volume of credit guarantee searching and amount of default normalization that Naver Trend makes available is examined and presented as practical data for the operation of the credit guarantee system for the Regional Credit Guarantee Foundation. The data used in this study include guarantee-related data from January 2007 to September 2014 and the data of search volume provided by Naver Trand

Keywords: Volume of Credit Guarantee Searching, Guarantee Supply, Default Amount, Amount of Default Normalization, Mediation Effect

1 Introduction

In 2012, the IDC expected that the big-data market would continue expanding as much as 39 to 60% every year, and that it would reach USD 16.9 to 32.1 by 2015 and expand to the point of 40ZB (1 trillion GB) by 2020. Although big-data itself has no value, it becomes valuable when going through steps of analysis and processing and finally creating added values. Big-data that is expected to create values and brighten the future of the nation and businesses in it is collected, stored, and utilized by public organizations at present. While researches on and utilization of big-data are conducted by private enterprises, particularly large companies, there have been relatively few cases of public organizations utilizing big-data[1].

Accordingly, researches need to be conducted on how public agencies can make full use of big-data and reflect it in credit guarantee supply policies of the Regional Credit Guarantee Foundation. Thus, this study aims to examine the extent that the volume of credit guarantee searching in terms of big-data use and internal determinants of the Regional Credit Guarantee Foundation affect guarantee supply. It is expected that the findings will be a practical basis for credit guarantee management of the Regional Credit Guarantee Foundation. In addition, these findings will provide

factor determinants based on which the Regional Credit Guarantee Foundation can adjust the volume of guarantee supply and thus minimize loss from accumulating unnecessary guarantee supply.

2 Theoretical Background and Modeling

2.1 Big-Data

Big-data is defined as various types of accurate and reliable data being used by public institutions and companies for effective planning of strategies although there may be somewhat different definitions of it among organizations. McKinsey[2] defines this term as data so gigantic that it is impossible to store, manage, and analyze with existing data processing methods. In other words, big-data is understood as a type of data that exceeds the basic scope of management. IDC[3] defines it as next generation technology and architecture designed to extract values from various types of data at low expenses and to support ultra-high speed collection, exploration, and analysis of data. Gartner[4], a market survey agency, defines it as a phenomenon that various types of data are produced so fast in the 21st century that companies cannot accommodate them properly. Lately, big-data is a hot issue in Korea as well. Basically, characteristics of big-data are represented by 3V(Volume, Velocity, and Variety)[5].

2.2   Formulation of research Model

Prior to designing the research model of this study, the granger causality test was conducted to grasp the causality among determinants. As a result, the significance probability of the volume of credit guarantee searching to guarantee supply was 0.003, that of the amount of default normalization to guarantee supply 0.005, and that of the default amount to the amount of default normalization 0.027 respectively as shown in Granger Causality Test. This indicates that the former factors are causal determinants of the latter factors. In other words, the order of causality is as follows: the volume of credit guarantee searching $\rightarrow$ guarantee supply, amount of default normalization $\rightarrow$ guarantee supply, default amount $\rightarrow$ amount of default normalization. For the research model of this study presented in <Figure 1>, the assumed causal relation is "the default amount $\rightarrow$ volume of credit guarantee searching," and Hypothesis I is decided as below:

△CGS	→	△lnGS
↑		↑
△lnDefault	→	△lnNODE
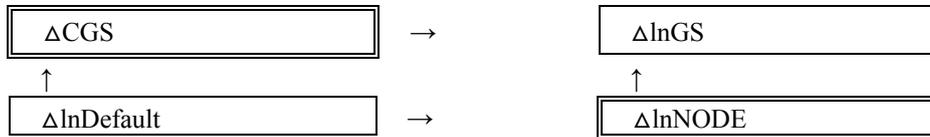
Fig. 1. The Research Model : CGS(Volume of Credit Guarantee Searching), GS(Guarantee Supply), Default(Default Amount), NODE(Amount of Default Normalizaiotn)

3 Method

Data collected for this study includes the guarantee records of the Regional Credit Guarantee Foundation operating its credit guarantee system for domestic small businesses. The period of data collecting and investigation is from January 2007 to the end of September 2014. The accident amount, which is a dependant variable, is part of the guarantee data of the Regional Credit Guarantee Foundation, and the default amount and amount of default normalization, which are independent variables, are also part of the guarantee data of this institution.

4 Empirical Analysis

To verify Hypothesis I, a simple regression analysis was conducted as shown in Table 1 and the causal relation of 'the accident amount→ the volume of credit guarantee searching' was examined. As a result, it turned out that the non-standardized regression coefficient was 30.315, t-value 3.138, and significance probability 0.002 respectively, which is significant. Hence, the causal relation of 'the default amount→ the volume of credit guarantee searching' was demonstrated, and the analysis of mediation effect by means of this research model is valid.

Table 1. Hypothesis I - Test Result

Classification	△CGS		△lnNODE	
	B(t-value)	Prob.	B(t-value)	Prob.
Constant Term	-0.320(-0.124)	0.901	0.014(0.642)	0.522
△lnDEFAULT	30.315(3.138)	0.002	-0.014(-0.164)	0.870

As the accident amount affected guarantee supply, Sobel Test was conducted as in Table 2 to measure the mediation effect of the volume of credit guarantee searching and the amount of default normalization. As a result, it turned out that the volume of credit guarantee searching had mediation effect while the amount of default normalization did not. Sobel test, which is a tool to verify the significance of mediation effect,

basically assumes that all data is of normal distribution. Thus, it is necessary to examine the causality through another regression analysis after a granger causality test.

Table 2. Result of Mediation Effect Analysis

Mediation Effect					Test	Test statistic	Std. error	Prob.	Result
$\triangle$lnDEFAULT	$\rightarrow$	$\triangle$lnCGS	$\rightarrow$	$\triangle$lnGS	Sobel	7051.547	0.042	0.000	
					Aroian	7051.547	0.042	0.000	Adopted
					Goodman	7051.547	0.042	0.000	
$\triangle$lnDEFAULT	$\rightarrow$ E	$\triangle$lnNOD	$\rightarrow$	$\triangle$lnGS	Sobel	-0.031	0.038	0.945	
					Aroian	-0.018	0.065	0.985	Rejected
					Goodman	NaN	NaN	Nan	

5 Conclusions

The objective of this study is to examine the effect of guarantee default of the Regional Credit Guarantee Foundation that provides public finance service on guarantee supply. To this end, the mediating effect of the volume of credit guarantee searching and the amount of default normalization that Naver Trend makes available is examined and presented as practical data for the operation of the credit guarantee system for the Regional Credit Guarantee Foundation. Hierarchical regression analysis and Sobel test for mediation effect measurement were also conducted.

As a result, it turned out that the volume of credit guarantee searching had mediation effect while the amount of accident normalization did not.

It is thought that to make a reliable plan, it is necessary to take into account semi-structured data such as SNS, Facebook, Twitter, images, and videos, which account for 80% of the entire data resources, as well as log data. These findings also cal be reflected in various policies by combining public and private data.

Therefore, this study is expected to be a basis for governmental agencies that provide public finance service as well as the Regional Credit Guarantee Foundation to establish policy finance supply strategies. This year, the government plans to supply 10 trillion won to support small businesses. Finding and utilizing determinants necessary for such public finance service supply policies will contribute not only to preventing resources from being wasted but also to maximizing the policy efficiency.

Oliver[5] suggests three factors confirmation/ disconfirmation, perceived performance, and satisfaction that has influence on satisfaction/ dissatisfaction and proposes Expectation and Disconfirmation Model. Therefore, future study needs to examine Public Guarantee System with satisfaction of Citizen.

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