UNIVERSITY OF MISKOLC
DOCTORAL SCHOOL OF ENTERPRISE THEORY AND PRACTICE
FACULTY OF ECONOMICS

DANG THAI BINH

THE IMPACT OF THE CREDIT GUARANTEE SYSTEM ON HUNGARIAN ECONOMY

Thesis Statements of Ph.D. Dissertation

Supervisor: Dr. Kovács Levente
Head of Doctoral School: Prof. Dr. Balaton Károly

MISKOLC, 2017
Contents
1. Introduction, rationale of the research .......................................................... 3
2. Purpose and methodology of the research ..................................................... 4
3. Result of Empirical Tests .............................................................................. 8

   H1: There is evidence what indicate that the credit guarantee system contributed to the development of the Hungarian economy ........ 9
   H2: Credit guarantee has a supporting role for SMEs by increasing loan availability to SMEs, improve access to finance for SMEs .......... 12
   H3: Credit guarantee has a significant role in increasing value added of SMEs in Hungary ......................................................... 13
   H4: There is a positive correlation between credit guarantee and the increasing employees of SMEs in Hungary ....................... 15
   H5a: There is a positive correlation between guarantee loans and sales of SMEs, which received guarantee loans from the credit guarantee institutions in Hungary ........................................... 16
   H5b: There is empirical evidence point out that guarantee loans can reduce the financial cost of SMEs, which received guarantee loans from the credit guarantee institutions in Hungary ......................... 17
   H5c: There is a positive correlation between guarantee loans and investment of SMEs, which received guarantee loans from the credit guarantee institutions in Hungary .............................. 19
   H6: Credit guarantee can provide incentives for the lender by encouraging banks to lend to enterprises ............................... 21
4. Conclusions and recommendations ............................................................... 22

   Conclusions .................................................................................................... 22
   Further recommendation ................................................................................ 25
1. Introduction, rationale of the research
I began my Ph.D. studies as a full-time Ph.D. student at Institute of World and Regional Economics, University of Miskolc from 2014. My research interest is in researching about credit guarantee for SMEs in Hungary and in the world, and its impact on the economy, SMEs, and the banking system. Credit guarantee has an important role in the economy of each country. It is a policy instrument to promote SMEs easier access to capital. Thereby helping SMEs development as well as promoting economic development. With passion in the area of credit guarantee, the author focused on the impact of the credit guarantee system on Hungarian economy. With this research, the author would like to prove the positive impacts of the credit guarantee system on the Hungarian economy. Through this research, the author would like to contribute some solutions to improve the effectiveness of the credit guarantee system of Hungary.

The dissertation consists of three main chapters:
1. Overview about credit guarantee schemes in the world; what is the reason for the emergence of credit guarantee schemes which are found in the economic theories. Base on the literature review, the author interprets the objectives of credit guarantee schemes, micro level, and its role. At the same time, the author determined what kind of methods to evaluate the effects of the credit guarantee schemes which are used by the economist.
2. The impact of credit guarantee system on Hungarian economy, the banking system, and SMEs were determined. The author focused the impact of credit guarantee system in the period from 2000-2013. In addition, the author built the process of the research and choose appropriate methods which will be used for the dissertation.
3. The author carried out an intensive evaluation of the effects of the credit guarantee system for the development of Hungarian economy and its role in dealing with the financial crisis in 2008. Also, the author evaluated the effects of credit guarantee system on SMEs by increasing value added, labor,
sales, investment and reduce financial costs. Moreover, in this research, the author pointed out credit guarantee system as an intermediary entity to help banks to unfreeze credit and share the risk for banks in the lending process.

2. **Purpose and methodology of the research**
The purpose of this study is to demonstrate the importance of the credit guarantee system for SMEs and the Hungarian economy as well as the banking system. This study focuses on assessing the impact of the credit guarantee system for the Hungarian economy in the following areas: economic development, credit operations, SMEs, labor, etc. The following questions arise:

1. *Which aspect does the credit guarantee system impact on the Hungarian economy?*
2. *What has changed in the economy from the appearance of the credit guarantee system in Hungary?*
3. *How does the credit guarantee system affect the Hungarian economy?*
4. *How to evaluate the impact of the credit guarantee system on the Hungarian economy?*
5. *How to improve the performance of credit guarantee system and enhance its role in the Hungarian economy?*

This study focuses on assessing the impacts of the credit guarantee system for the Hungarian economy. Based on the purpose and research questions, hypotheses are formulated at the beginning of the research and tested in the thesis. It is described by the following figure 1.

Through Figure 1, I presented the hypotheses of my research as well as the methods that were applied to test the hypotheses. In addition, it is used to analyze the impact of the credit guarantee system on the Hungarian economy. From identifying hypotheses and methods as well as the content of the impact of the credit guarantee system on Hungarian economy, the author started to do deep and detailed research on methods. The data needed to be were collected and compliance with my thesis. Finally, I
made my calculations, and I drafted the thesis statements as shown in the following Figure 2.

**H1:** There is evidence that indicates the credit guarantee system contributed to the development of the Hungarian economy.

**H2:** Credit guarantee has a supporting role for SMEs by increasing loan availability to SMEs, improving access to finance for SMEs.

**H3:** Credit guarantee has a significant role in increasing value added of SMEs in Hungary.

**H4:** There is a positive correlation between credit guarantee and the increasing employees of SMEs in Hungary.

**H5a:** There is a positive correlation between guarantee loans and sale of SMEs which received guarantee loans from the credit guarantee institutions in Hungary.

**H5b:** There is empirical evidence pointing out that guarantee loans can reduce financial cost of SMEs which received guarantee loans from the credit guarantee institutions in Hungary.

**H5c:** There is a positive correlation between guarantee loans and investment of SMEs which received guarantee loans from the credit guarantee institutions in Hungary.

**H6:** Credit guarantee can provide incentives for the lenders by encouraging banks to lend to enterprises.
The main aim of this research is to analyze the impact of the credit guarantee system on Hungarian economy from 2000 to 2013. In my research, I used mainly database from the World Bank, Eurostat,
Hungarian Central Statistical Office, European Association of Guarantee Institutions, Garantiqa Hitelgarancia Zrt, Rural Credit Guarantee Foundation, etc. In my dissertation, I examined the following hypotheses:

**Hypothesis 1:** There is evidence what indicate that the credit guarantee system contributed to the development of the Hungarian economy. When credit guarantee system supports SMEs easier to access bank financing mean it helps SMEs survive and development. Through it, credit guarantee system promotes the development of Hungarian economy; in particular, it is an important tool to deal with the financial crisis in 2008 and help economic recovery of Hungary.

**Hypothesis 2:** For SMEs, in particular, SMEs have difficulty accessing bank financing due to insufficient conditions about collateral, creditworthiness, etc.; credit guarantee is useful tools to help SMEs overcome that obstacles. By providing credit guarantees, the credit guarantee institutions increase to access bank financing for SMEs and reduce their credit constraint.

**Hypothesis 3:** Credit guarantee is regarded as a policy tool of the government to help SMEs overcome obstacles in accessing finance. By helping SMEs easily access finance, the credit guarantee institutions promote the development of SMEs.

**Hypothesis 4:** Through guarantee activities, the credit guarantee institutions support SMEs to survive and develop. When SMEs exist and develop, they will attract and create more jobs, reduce unemployment. At the same time, it helps to increase the proportion of employees of SMEs in the total labor force of Hungary.
Hypothesis 5: When SMEs receive loan guarantees from the credit guarantee institutions, it will make changing in their status and performances. Meaning that guarantee loans with favourable conditions can promote SMEs increasing sales, increase their R&D and investment and hence productivity growth, reduce financial cost.

H5a, There is a positive correlation between guarantee loans and sales of SMEs which received guarantee loans from the credit guarantee institutions in Hungary

H5b, There is empirical evidence point out that guarantee loans can reduce financial cost of SMEs which received guarantee loans from the credit guarantee institutions in Hungary.

H5c, There is a strong positive correlation between guarantee loans and investment of SMEs which received guarantee loans from the credit guarantee institutions in Hungary

Hypothesis 6: SMEs as customers have large numbers but many risks in the lending activities for banks. Therefore, between SMEs and banks have a gap in the provision of credit. By providing guarantee loans, credit guarantee institutions have an important role in unfreezing of credit from banks to SMEs, reducing the gap between banks and SMEs in credit activities. Since then credit guarantee reduces risk for bank, transfer risk to the credit guarantee institutions, reduce costs related to collateral

3. Result of Empirical Tests

To assess the impact of the credit guarantee system on Hungarian economy, SMEs, banks, the author used econometric techniques. At the same time, the author used financial data concerning a sample of SME, the macro data related to GDP, value added of SMEs, employee of SMEs, total employees, and the data related to guarantee value of credit guarantee institutions of Hungary, etc. My aim is to find econometric evidence about the positive effect of the credit guarantee system on economic additionality and financial additionality for Hungarian economy, SMEs and banks.
In this research, the author used main econometric test methods will ensure better evaluation, and its results are strong evidence, meaningful. To test the hypotheses in the thesis, the author used many different methods in quantitative analysis such as VAR Granger Causality model, Fixed effect model, Linear-log model, etc. Base on hypotheses, type of variables, the purpose of testing, type of data, etc the author will select an appropriate methodology for testing. These hypotheses were tested with 0.05 level of significance and were done by EVIEW. All hypotheses are tested and evaluated specific results, which are presented following:

**H1: There is evidence what indicate that the credit guarantee system contributed to the development of the Hungarian economy**

First, To determine if the credit guarantee system contributed to the development of the Hungarian economy, the author used VAR Granger Causality model to test hypothesis 1. This is the type of model, which indicates causes and results. By this method, the author examined whether guaranteed loans is the cause of GDP.

<table>
<thead>
<tr>
<th>Causality test</th>
<th>Lags</th>
<th>Guaranteed loans --&gt; GDP</th>
<th>GDP --&gt; Guaranteed loans</th>
<th>Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guaranteed loans --&gt; GDP</td>
<td>2</td>
<td>2950342 (0.0000)*</td>
<td>2245038 (0.0000)*</td>
<td>VAR model</td>
</tr>
</tbody>
</table>

Comment: by VAR models I present the F-tests of zero restrictions, in parentheses the p-value; * 5% significance level; GDP: gross domestic product at current prices.

Source: Own edition and calculations (EVIEW).

**Table 1: Test H1 by using VAR Granger Causality model**

The result shows that the value of Chi-square statistic is 29.50342, and its corresponding P value is 0.0000 < 0.05. Since the P-value is less than 0.05, we can conclude that guaranteed loans cause GDP. Therefore, we
accept hypothesis HA: The credit guarantee system has a significant role in boosting economic development of Hungary.

Besides, in order to determine whether the credit guarantee system contributed to the development of the Hungarian economy, a Linear-Log model was applied using EVIEW.

<table>
<thead>
<tr>
<th>Linear-Log model</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-squared</td>
</tr>
<tr>
<td>Coefficient</td>
</tr>
<tr>
<td>Prob (F-statistic)</td>
</tr>
</tbody>
</table>

Source: Own edition and calculations (EVIEW)

**Table 2: Test H1 by using Linear-Log model**

From the table above we can observe that R-squared is 0.450063, and its corresponding P value is 0.0000 < 0.05. Based on the regression function obtained, we can conclude that hypothesis HA is appropriate and acceptable.

In addition, according to European Association of Guarantee Institutions (AECM), the importance of a credit guarantee institution in the economy can be measured by the ratio of outstanding guarantees to GDP. If this ratio is greater than 1%, that means the credit guarantees system has an important role in the development of the economy.

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hungary</td>
<td>1.49%</td>
<td>1.50%</td>
<td>1.87%</td>
<td>1.64%</td>
<td>1.37%</td>
<td>1.46%</td>
</tr>
<tr>
<td>Average of ACEM</td>
<td>0.62%</td>
<td>0.62%</td>
<td>0.78%</td>
<td>0.67%</td>
<td>0.58%</td>
<td>0.56%</td>
</tr>
</tbody>
</table>

Source: [http://www.aecm.eu](http://www.aecm.eu), [http://ec.europa.eu/eurostat](http://ec.europa.eu/eurostat) and own elaboration

**Table 3: Outstanding guarantees to GDP of credit guarantee system of Hungary in the period 2007 -2012 (%)**
Looking at Table 3, it shows the ratio of Hungary increased steadily from 2007 to 2012 and in particular, this ratio increased during the financial crisis from 2008 to 2010. It expresses the guarantee system of Hungary plays a major role in helping to stabilize the economy during the financial crisis. To explain the position of the credit guarantee system in the Hungarian economy, we can compare the ratio of credit guarantee system of Hungary with other countries in the European region. This ratio of Hungary is very high when comparison with other countries in the region and ranks only second behind Italy.

Moreover, based on the research by Tamási and Vilagi (2011) showed that if 1 percent decreasing in credit supply will reduce Hungary's 0.2 percent of GDP. Thus, in the absence of the presence of credit guarantee system would reduce the GDP of Hungary as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Potential GDP decrease in the lack of credit guarantee system (%)</th>
<th>Potential GDP decrease (Billion HUF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>0.65</td>
<td>8,703</td>
</tr>
<tr>
<td>2001</td>
<td>0.77</td>
<td>11,893</td>
</tr>
<tr>
<td>2002</td>
<td>0.92</td>
<td>15,964</td>
</tr>
<tr>
<td>2003</td>
<td>0.84</td>
<td>16,063</td>
</tr>
<tr>
<td>2004</td>
<td>1.19</td>
<td>25,021</td>
</tr>
<tr>
<td>2005</td>
<td>0.76</td>
<td>17,099</td>
</tr>
<tr>
<td>2006</td>
<td>0.83</td>
<td>20,139</td>
</tr>
<tr>
<td>2007</td>
<td>0.97</td>
<td>24,852</td>
</tr>
<tr>
<td>2008</td>
<td>1.09</td>
<td>29,381</td>
</tr>
<tr>
<td>2009</td>
<td>1.32</td>
<td>34,699</td>
</tr>
<tr>
<td>2010</td>
<td>1.16</td>
<td>31,327</td>
</tr>
<tr>
<td>Year</td>
<td>LSME</td>
<td>GDP Reduction</td>
</tr>
<tr>
<td>------</td>
<td>------</td>
<td>---------------</td>
</tr>
<tr>
<td>2011</td>
<td>0.89</td>
<td>24,937</td>
</tr>
<tr>
<td>2012</td>
<td>0.87</td>
<td>24,989</td>
</tr>
<tr>
<td>2013</td>
<td>1.01</td>
<td>30,469</td>
</tr>
<tr>
<td>Total</td>
<td>13.29</td>
<td>315,538</td>
</tr>
</tbody>
</table>

Source: Own calculation base on data from Garantiqa and Rural Credit Guarantee Foundation, https://www.ksh.hu

Table 4: The impact of credit guarantee system on the budget of Hungary

The above results indicate that Hungary's GDP from 2000-2013 can decrease 13.29% and its corresponding reduction 315.538 billion HUF. There are also many other researches indicated a positive impact of credit guarantees for the economy (World Bank, 2012). According to research by Crowling (2010), indicated that credit guarantee reduced credit rationing. Riding et al (2001) when studied the credit system of Canada found that 75% of enterprises would not have received loans. A research by Schmidt et al (2010), indicated that without guaranteed loans will decrease 0.1% GDP of Germany. So, we can confirm that credit guarantee has a significant role and is a useful financial tool to promote growth and economic development.

**H2: Credit guarantee has a supporting role for SMEs by increasing loan availability to SMEs, improve access to finance for SMEs**

In order to determine whether credit guarantee has a supporting role for SMEs by increasing loan availability, improve access to finance for SMEs, a Linear-Log model. First, the author selected the following function to test the hypothesis:

\[ \text{LSME} = C(1) + C(2)*\log(\text{GRT}) \]

(LSME: loan availability to SMEs by banks; GRT: guaranteed loans by credit guarantee system)
The data was analyzed with Eview software and the following regression function was obtained:

\[ \text{LSME} = -9419.620 + 2228.756 \cdot \log(\text{GRT}) \]

### Linear-Log model

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-squared</td>
<td>Credit guarantee has a supporting role for SMEs by increasing loan availability to SMEs, improve access to finance for SMEs</td>
<td>0.771945</td>
</tr>
<tr>
<td>Coefficient</td>
<td></td>
<td>2228.756</td>
</tr>
<tr>
<td>Prob (F-statistic)</td>
<td></td>
<td>0.000035</td>
</tr>
</tbody>
</table>

Source: Own edition and calculations (EVIEW)

**Table 5: Test H2 by using Linear-Log model**

From the table above we can observe that R-squared is 0.771945, and its corresponding P value is 0.000035 < 0.05. Based on the regression function obtained, we can conclude that hypothesis HA is appropriate and acceptable: Credit guarantee has a supporting role for SMEs by increasing loan availability to SMEs, improve access to finance for SMEs.

**H3: Credit guarantee has a significant role in increasing value added of SMEs in Hungary**

In order to determine whether credit guarantee has a significant role increasing value added of SMEs in Hungary, a Linear-Log model was applied using EVIEW.

First, the author selected the following function to test the hypothesis:

\[ \text{VDS} = C(1) + C(2) \cdot \log(\text{GRT}) \]

(VDS: value added of SMEs in Hungary; GRT: guaranteed loans by credit guarantee system)
The data was analyzed with Eview software and the following regression function was obtained:

\[ VDS = -10013.48 + 2875.790 \times \log(GRT) \]

<table>
<thead>
<tr>
<th>Linear-Log model</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-squared</td>
</tr>
<tr>
<td>Coefficient</td>
</tr>
<tr>
<td>Prob (F-statistic)</td>
</tr>
<tr>
<td>Prob (F-statistic)</td>
</tr>
</tbody>
</table>

Source: Own edition and calculations (EVIEW)

**Table 6: Test hypothesis H3 by using Linear-Log model**

From the table above we can observe that R-squared is 0.804381, and its corresponding P value is 0.000014 < 0.05. Based on the regression function obtained, we can conclude that hypothesis HA is appropriate and acceptable: Credit guarantee has a significant role in increasing value added of SMEs in Hungary.

Moreover, the fact that, during the period from 2000-2013 Valued added created by SMEs tend to be growing, it represents growth and development of SMEs in Hungary. At the same time, it also represents the Hungarian government's policies to focus more resources on supporting for SMEs and through this also represents credit guarantee system is effective in supporting SMEs create more value added and developing. It proves the credit guarantee system is an important policy tool of the state in promoting SMEs and the Hungarian economy.
Figure 3: Value added created by SMEs of Hungary (2000=100%)

**H4: There is a positive correlation between credit guarantee and the increasing employees of SMEs in Hungary.**

In order to determine whether credit guarantee has made increasing employees of SMEs in Hungary, a Linear-Log model was applied using EVIEW.

First, the author selected the following function to test the hypothesis:

\[ \text{ESMTT} = C(1) + C(2) \times \log(\text{GRLE}) \]

(ESMTT: Employee of SMEs/Total employees; GRLE: guaranteed loans by credit guarantee system/ Total loans to SMEs by banks).
Linear-Log model

<table>
<thead>
<tr>
<th></th>
<th>There is a positive correlation between credit guarantee and the increasing employees of SMEs in Hungary</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-squared</td>
<td>0.385291</td>
</tr>
<tr>
<td>Coefficient</td>
<td>0.037838</td>
</tr>
<tr>
<td>Prob (F-statistic)</td>
<td>0.0236</td>
</tr>
</tbody>
</table>

Source: Own edition and calculations (EVIEW)

**Table 7: Test hypothesis H4 by using Linear-Log model**

From the table above we can observe that R-squared is 0.385291, and its corresponding P value is 0.0236 < 0.05. Based on the regression function obtained, we can conclude that hypothesis HA is appropriate and acceptable: There is a positive correlation between credit guarantee and the increasing employees of SMEs in Hungary.

**H5a: There is a positive correlation between guarantee loans and sales of SMEs, which received guarantee loans from the credit guarantee institutions in Hungary.**

In order to determine whether there is a positive correlation between guarantee loans and sales of SMEs, which received guarantee loans from the credit guarantee institutions in Hungary, a Fixed effect model was applied using EVIEW.

First, the type of data which was used by the author to test hypothesis 5a is panel data because the data was collected from 50 companies during the three years from 2012 to 2014. Therefore, the author needs to check the Hausman ratio to choose which model (Fixed effect model or Random effect model) will be used.
### Hausman Test

<table>
<thead>
<tr>
<th>Chi-Sq. Statistic</th>
<th>22.560417</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-Sq. d.f.</td>
<td>1</td>
</tr>
<tr>
<td>Prob.</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

Source: Own edition and calculations (EVIEW)

**Table 8: Hausman test for hypothesis H5a**

From the table above, we can observe that the Hausman ratio is 0.0000 < 0.05, therefore Fixed effect model was selected to test hypothesis H5a.

### Fixed effect model

<table>
<thead>
<tr>
<th>R-squared</th>
<th>There is a positive correlation between guarantee loans and sales of SMEs, which received guarantee loans from the credit guarantee institutions in Hungary</th>
<th>0.996506</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coefficient</td>
<td>-0.007716</td>
<td></td>
</tr>
<tr>
<td>Prob(F-statistic)</td>
<td>0.0002</td>
<td></td>
</tr>
</tbody>
</table>

Source: Own edition and calculations (EVIEW)

**Table 9: Test hypothesis H5a by using Fixed effect model**

From the table above we can observe that R-squared is 0.996506, and its corresponding P value is 0.0002 < 0.05. Due to P value less than 5%, we reject hypothesis Ho and accept hypothesis HA: There is a positive correlation between guarantee loans and sales of SMEs, which received guarantee loans from the credit guarantee institutions in Hungary.

**H5b: There is empirical evidence point out that guarantee loans can reduce the financial cost of SMEs, which received guarantee loans from the credit guarantee institutions in Hungary.**

In order to determine whether there is empirical evidence point out that guarantee loans can reduce the financial cost of SMEs, which received
guarantee loans from the credit guarantee institutions in Hungary, a Fixed effect model was applied using EVIEW.

First, the author determines the type of data, which used to test hypothesis 5a is kind of panel data because the data was collected from 50 companies during the three years from 2012 to 2014. Therefore, the author should check Hausman ratio to choose which model (Fixed effect model or Random effect model) will be used.

<table>
<thead>
<tr>
<th>Hausman Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-Sq. Statistic</td>
</tr>
<tr>
<td>Chi-Sq. d.f.</td>
</tr>
<tr>
<td>Prob.</td>
</tr>
</tbody>
</table>

Source: Own edition and calculations (EVIEW)

**Table 10: Hausman test for hypothesis H5b**

From the table above we can observe that the Hausman ratio is $0.0042 < 0.05$, therefore Fixed effect model was selected to test hypothesis H5b.

<table>
<thead>
<tr>
<th>Fixed effect model</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-squared</td>
</tr>
<tr>
<td>Coefficient</td>
</tr>
<tr>
<td>Prob (F-statistic)</td>
</tr>
</tbody>
</table>

Source: Own edition and calculations (EVIEW)

**Table 11: Test hypothesis H5b by using Fixed effect model**

From the table above we can observe that R-squared is 0.926926, and its corresponding P-value is $0.000000 < 0.05$. Due to P-value less than 5%, we reject hypothesis Ho and accept hypothesis HA: There is empirical evidence point out that guarantee loans can reduce the financial cost of...
SMEs, which received guarantee loans from the credit guarantee institutions in Hungary.

In addition, according to the Financial Stability Report on (2012) of Magyar Nemzeti Bank, pointed out the role of credit guarantees for lending operations. This research concerned the loss given default and the offered interest rate condition of 3 large banks of Hungary. The results of this study indicated that: “if companies’ total loan demand was satisfied even without a credit guarantee, a credit guarantee could still have a positive impact: namely, bank’s credit supply would increase as result of cost reduction achieved, but for another clientele”. This proves that the credit guarantee has a role in reducing interest rate as well as reducing financing cost of SMEs which received guarantee loans from credit guarantee institutions.

![SME interest rate (cost part for the bank)](image)

Source: Magyar Nemzeti Bank (2012)

**Figure 4: The role of credit guarantee in reducing the interest rates of SMEs**

**H5c:** There is a positive correlation between guarantee loans and investment of SMEs, which received guarantee loans from the credit guarantee institutions in Hungary.
In order to determine whether there is a positive correlation between guarantee loans and investment of SMEs, which received guarantee loans from the credit guarantee institutions in Hungary, a Fixed effect model was applied using EVIEW.

First, the author determines the type of data which used to test hypothesis 5a is kind of panel data because the data was collected from 50 companies during the three years from 2012 to 2014. Therefore, the author should check Hausman ratio to choose which model (Fixed effect model or Random effect model) will be used.

<table>
<thead>
<tr>
<th>Hausman Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-Sq. Statistic</td>
</tr>
<tr>
<td>Chi-Sq. d.f.</td>
</tr>
<tr>
<td>Prob.</td>
</tr>
</tbody>
</table>

Source: Own edition and calculations (EVIEW)

**Table 12: Hausman test for hypothesis H5c**

From the table above we can observe that the Hausman ratio is 0.0326 < 0.05, therefore Fixed effect model was selected to test hypothesis H5c

<table>
<thead>
<tr>
<th>Fixed effect model</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-squared</td>
</tr>
<tr>
<td>Coefficient</td>
</tr>
<tr>
<td>Prob(F-statistic)</td>
</tr>
</tbody>
</table>

Source: Own edition and calculations (EVIEW)

**Table 13: Test hypothesis H5c by using Fixed effect model**

From the table above we can observe that R-squared is 0.940442, and its corresponding P-value is 0.0062 < 0.05. Due to P value less than 5%, we reject hypothesis Ho and accept hypothesis HA: There is a positive correlation between guarantee loans and investment of SMEs, which
received guarantee loans from the credit guarantee institutions in Hungary.

**H6: Credit guarantee can provide incentives for the lender by encouraging banks to lend to enterprises.**

In order to determine whether credit guarantee can provide incentives for the lender by encouraging banks to lend to enterprises, a Linear-Log model was applied using EVIEW.

First, the author selects a form of the function to estimate is:

\[ TL = C(1) + C(2) \times \log (GRT) \]

(TL: total loans by banks in Hungary; GRT: guaranteed loans by credit guarantee system)

Then the author estimated by Eview software and obtained the regression function:

\[ TL = -13810.44 + 3542.719 \times \log (GRT) \]

**Table 14: Test hypothesis H6 by using Linear-Log model**

<table>
<thead>
<tr>
<th>Linear-Log model</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>R-squared</td>
<td>0.886449</td>
</tr>
<tr>
<td>Coefficient</td>
<td>3542.719</td>
</tr>
<tr>
<td>Prob (F-statistic)</td>
<td>0.000001*</td>
</tr>
</tbody>
</table>

Source: Own edition and calculations (EVIEW)

From the table above we can observe that R-squared is 0.886449, and its corresponding P value is 0.000001 < 0.05. Therefore, we can conclude that the regression function obtained is appropriate and acceptable hypothesis HA: Credit guarantee can provide incentives for the lender by encouraging banks to lend to enterprises.
In fact, the significance of the credit guarantee system has been shown to help ensuring that the stability of financial markets. For banks and financial institutions when a loan that has the guarantee of a credit guarantee institution means that the risk of such loans will be reduced. And for banks and financial institutions when a loan that the credit guarantee, under Basel II, it will reduce the burden on capital requirements of financial institutions. It means that banks and credit institutions can expand the scope of the loan to SMEs. It means that the credit guarantee system contributes to the expansion of lending by banks and financial institutions to SMEs in Hungary.

4. Conclusions and recommendations

Conclusions

The main contribution of this paper is to evaluating the impact of the credit guarantee system to SMEs, the economy, and the banking sector. Through the above analysis, this paper shows that credit guarantee system in Hungary has a significant impact in bringing many benefits to SMEs such as help SMEs to get easier access to capital and low-interest rates, reduction in finance cost, increase the volume and the time of the loans and innovation. In this study also indicated that at the macro level, the system has an important role in promoting the development of SMEs and also there are many programs for support to SMEs especially in the financial crisis. For the economy, a significant effect is to stabilize the economy. Especially in this study, the author demonstrated that the credit guarantee system has an important role and is a factor that contributes to GDP growth. Besides, credit guarantee system was considered to be an effective policy instrument to help the government to deal with and overcome the financial crisis. Furthermore, through promoting and supporting SMEs development, it will lead to growth and development of the economy. Also, this study pointed out the impact of the credit guarantee system to financial institutions. Credit guarantee system shares
the risk with the banks through credit guarantees and helps the banks to expand lending, reduce costs in the lending process and reduce capital requirements of banks. In addition, this study also indicated that the credit guarantee system has an important role in creating jobs.

To achieve the objectives of this research, a quantitative research method was applied. By using quantitative research methods combined with the actual evidence, it will ensure that the result of this research is credible and valuable for utilization.

Based on the literature review, data analysis and hypotheses testing, the following are the results of the findings and research:

<table>
<thead>
<tr>
<th>No.</th>
<th>Thesis statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thesis 1</td>
<td>There is evidence what indicate that the credit guarantee system contributed to the development of the Hungarian economy</td>
</tr>
<tr>
<td>Thesis 2</td>
<td>Credit guarantee has a supporting role for SMEs by increasing loan availability to SMEs, improve access to finance for SMEs</td>
</tr>
<tr>
<td>Thesis 3</td>
<td>Credit guarantee has a significant in increasing value added of SMEs in Hungary.</td>
</tr>
<tr>
<td>Thesis 4</td>
<td>There is a positive correlation between credit guarantee and the increasing employees of SMEs in Hungary.</td>
</tr>
<tr>
<td>Thesis 5a</td>
<td>There is a positive correlation between guarantee loans and sales of SMEs, which received guarantee loans from the credit guarantee institutions in Hungary.</td>
</tr>
<tr>
<td>Thesis 5b</td>
<td>There is empirical evidence point out that guarantee loans can reduce the financial cost of SMEs, which received guarantee loans from the credit guarantee institutions in Hungary.</td>
</tr>
<tr>
<td>Thesis 5c</td>
<td>There is a positive correlation between guarantee loans and investment of SMEs, which received guarantee loans from the credit guarantee institutions in Hungary.</td>
</tr>
<tr>
<td>Thesis 6</td>
<td>Credit guarantee can provide incentives for the lender by encouraging banks to lend to enterprises.</td>
</tr>
</tbody>
</table>

Source: own editing
Through the implementation of this study as well as during my research on the credit guarantee system of Hungary and around the world, the author offers some solutions to improve the system of credit guarantees of Hungary, which are as follows:

- The credit guarantee institutions of Hungary, as well as credit guarantee institutions around the world, is considered as financial intermediaries; therefore, it needs to strictly adhere to the rules and regulations.
- However, the credit guarantee institutions characterized in encouragement, support borrowers, and lenders and influenced by moral hazard in the financial relationships in the process of implementation of guarantee activities. Thus, to ensure the development and sustainability of credit guarantee institutions, it is necessary to closely monitor credit guarantee institutions; they should be transparent in their operations and compliance with rules and regulation.
- The credit guarantee institution is generally considered as a tool to support SMEs so that each organization should set objectives and specific target subjects, the program guarantees required special programs and avoids to overlap in order not to waste financial resources.
- The credit guarantee institutions should be designed and organized activities to help troubled firms in accessing finance due to insufficient collateral, lack of credit history, etc. Credit guarantee organization with appropriate design will ensure the provision of financial and economic additionality to the economy, SMEs, banks as well as assure financial sustainability of itself.
- Credit guarantee institutions and the banks should coordinate their activities to reduce the problem of asymmetric information between borrowers and lenders, especially SMEs. At the same time, building a credit information system to collect information about SMEs which help
any lender or credit guarantee organization to easily obtain information on SMEs to assess SMEs.

- Credit Guarantee Institutions need to get support from the government, including the guarantee of private organizations to ensure survival and sustainable development. Nevertheless, credit guarantee institutions should implement effectively the objectives of the government. In addition, credit guarantee institutions also need the cooperation and support from the banks in guarantee activities. It will create a mechanism to share the risks and responsibilities associated with relative entities (banks, credit guarantee institutions, SMEs), and avoids moral hazard.

- To operate efficiently, credit guarantee institution should pay special attention to structural cost, financial management, credit quality, etc. It will help the credit guarantee institutions to earn the benefit from guarantee activities, more independence and reduce reliance or government intervention.

**Further recommendation**

Credit guarantee system has an important role to SMEs, the economy, and the financial institutions. Therefore, assessing the impact of the credit guarantee for the above objects is a critical research content. In the future, the scholars can research and assess the impact of the credit guarantee system for each industry, specific sectors (agriculture, industry, services, etc) or the region of Hungary. Another research approach that the scholars can focus on is the impact of credit guarantees on banks' bad debts.

In addition, further research should be conducted to study the credit guarantee demand for SMEs and what factors affecting the credit guarantee demand for SMEs. It would be very useful for credit guarantee institutions, policy makers, banks and the government.
**References:**


Central Statistical Office of Hungary: http://www.ksh.hu
DFID (2005), Do Credit Guarantees Lead to Improved Access to Financial Services? Recent evidence from Chile, Egypt, India and Poland, Policy Division Working Paper, UK Department for International Development.
Freedman, 2004
European Association of Guarantee Institutions (AECM): http://www.aecm.eu,
Garantiqa Creditguarantee Co. Ltd: http://www.hitelgarancia.hu/
Korea Credit Guarantee Fund. (2012). Credit guarantee and credit evaluation system for SME development in Kazakhstan. Knowledge sharing program.


Levitsky, J. (1997a). Credit guarantee schemes for SMEs–an international review. Small Enterprise development, 8(2), 4-17.


Magyar Nemzeti Bank: http://felugyelet.mnb.hu

Mendizabal et al. (2014). Degree of Guarantee Rationing and Banking Relationship of Spanish SME. Procedia - Social and Behavioral Sciences, Volume 109, 8 January 2014, Pages 753–757
Oh et al. (2009). The Effect of Mutual Guarantee Consortia and SME Finance. Munich Personal RePEc Archive: 14032
Pombo P. (2010). 15 Anos de Evolución de los Sistemas de Garantías Iberoamericano, XV Foro Iberoamericano de Sistemas de Garantía y Financiamento para la Micro y Pyme, Mexico, 30 September –1 October 2010
PSZÁF (2013): A részvénytársasági hitelintézetek (MFB, EXIM, KELER nélkül) mikro-, kis- ésközépavállalkozásoknak nyújtott hiteleinek alakulása, PSZÁF Downloaded from: www.pszaf.hu/bal_menu/jelentesek_statisztikak/statisztikak/pszaf_idosorok/idosorok?pagenum=1
Rural Credit Guarantee Foundation: www.avhga.hu
Schmidt et al. (2010). Macroeconomic Benefits of German Guarantee Bank’s. Institution for Small and Medium-sized Enterprises at University of Trier, Trier, 30 June
Author’s dissertation related publications


8. Dang Thai Binh, Hoang Thi Huong. (2016). The solutions to improve the efficiency of the credit guarantee system for SMEs in Vietnam, the 5th International Conference on Emerging Challenges: Partnership Enhancement (ICECH2016), Hanoi University of Science and Technology and Leipzig University (Germany).