

UNIVERSITY OF MISKOLC
SCHOOL OF ENTERPRISE THEORY AND PRACTICE
FACULTY OF ECONOMIC



DOCTORAL DISSERTATION

Dang Thai Binh

Miskolc, 2017

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**The impact of the credit guarantee system on Hungarian
economy**

DOCTORAL DISSERTATION

Supervisor: Dr. Kovács Levente

Miskolc, 2017

Declaration

I am Dang Thai Binh, confirm that this dissertation submitted for the degree of Ph.D. in the credit guarantee system is my individual and expressed in my own words. Any uses made within it of the works of other authors in any form (e.g. ideas, equations, figures, text, tables) are properly acknowledged. A full list of the references employed has been included.

Signed: Dang Thai Binh

Miskolc, 2017

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Chapter I. Introduction

1.1. Small and medium enterprises in Hungarian entrepreneurial environment

SMEs is termed as companies with no more than 250 employees and a maximum turnover of €50 million (Neil Burton, 2011). SMEs are seen as an important entity in the European economy (approx 90% of EU enterprises) and providing around 75 % of jobs in private sector. According to research by Krisztián Tibor Csubák and József Fejes (2014), the major characteristics of the SME sector in Hungary are:

- Hungarian enterprises have fragmented structure in which nearly 95% of Hungarian enterprises are micro, SMEs)

- Lack of a well structured enterprises, especially SMEs (less than 1 percent)
- 70 percent of the employees work for SMEs
- Most Hungarian SMEs don't have enough collateral
- Productivity rate is relatively low
- Skill management is low
- Insufficient financial know-how
- Low innovation initiative
- SMEs have difficulty accessing finance because of financial crisis, etc.

According to research by Apatini (1999) pointed out that the main financing problems of the Hungarian SME sector are concentrated in the following areas:

- Lack of capital,
- For bank loans: the high fixed costs related to the credit and insufficient collateral,
- For equity financing: the expectations of high returns and the resistance to active involvement in the management.

Besides, according to research by Szerb (2000) and Fülöp (2004) SMEs have problems in accessing funding and unable to connect with the capital markets, leading to limited finance. Zsolt Zsombori (2015, p.7) indicated that “especially for smaller sized businesses the regular credit facilities do not pose a realistic alternative for financing in certain of the enterprise’s risky life stages”

Although SMEs face many difficulties in the development, SMEs play a major role in Hungary’s economic growth, providing the source for most new jobs. According to the statistics the end of 2013, the number of SMEs was 551,076 and accounted for 99.9% of total enterprises in Hungary; along with the number of employees was 1,777,698 and accounted for 71.2% of total employment. It pointed out that the contribution of the SMEs in terms of the workforce (71.2%) is higher than that across European (66.5%). SMEs employ two-thirds of all employees, and compared to large corporations, they are less likely to let people go in times of crisis. Besides contributing about €26 billion over 50% total economic added value. The contribution of Hungarian SMEs to the economy, defined as a percentage of the value added compared with the European average, is lower than the EU average.

	Number of enterprises			Number of employees			Value added		
	Hungary		EU27	Hungary		EU27	Hungary		EU27
	Number	Share	Share	Number	Share	Share	Billion €	Share	Share
Micro	521,981	94,6%	92.10%	885,167	35.50%	28.70%	9	18.70%	21.10%
Small	24,883	4,5%	6.60%	472,316	18.90%	20.40%	8	15.80%	18.30%
Medium	4,212	0,8%	1.10%	420,215	16.80%	17.30%	9	18.60%	18.30%
SMEs	551,076	99.90%	99.80%	1,777,698	71.20%	66.50%	26	53.20%	57.60%
Large	800	0.10%	0.20%	718,304	28.80%	33.50%	23	46.80%	42.40%
Total	551,876	100%	100%	2,496,001	100%	100%	49	100%	100%

Source: <http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis>

Table 1. 1. Basic Figures – 2013

The analysis of the Hungarian entrepreneurial environment clearly highlights all enterprises in Hungary are SMEs (Table 1.4). The number of Hungarian enterprises compared with the GDP gradually decreased in the time. It due to the increase in the

value of GDP and reflects the enhanced average production efficiency of the enterprises.

Year	Number of enterprises	Gross domestic product (Million HUF)	No. of enterprise/GDP
2000	625,147	13321531	4.69%
2001	645,881	15383442	4.20%
2002	693,788	17421576	3.98%
2003	700,855	19077348	3.67%
2004	708,307	21023630	3.37%
2005	707,756	22470802	3.15%
2006	698,146	24153022	2.89%
2007	688,058	25560380	2.69%
2008	701,408	27071868	2.59%
2009	688,996	26297412	2.62%
2010	696,680	27085900	2.57%
2011	690,375	28166115	2.45%
2012	644,692	28660518	2.25%
2013	640,174	30127349	2.12%

Source: Hungarian Central Statistical office and own

Table 1. 2. Number of enterprises by GDP

In fact, from 2000-2013, the number of SMEs added to the number of micro-enterprises (approximately 95 percent) accounted for 99 percent of all Hungarian enterprises. And when we analyze the number of Hungarian enterprises by type of business, it is clear show that the automotive and real estate sectors are the most relevant. However, these sector had opposite trends: the first is down-ward while the second is upward. The boom in the real estate sector 2008 and the growth of the sector of financial brokerage, it pointed out two signs which are consistent with the Great Financial Crisis. It affected on economic activity, the financial market and particularly

affect the survival development of SMEs. The financial crisis and economic recession led to the number of enterprises of Hungary dropped 7.7 percent from 2002-2013.

Simultaneously, the financial crisis in 2008 led to the disbursed loan volume of SMEs decreased; compare to the peak year of 2008 and that of 2011, the disbursed SMEs loan volume decreased more than 35%, approximately HUF 1300 billion; although in 2012 the disbursed SMEs loan volume increased to HUF 750 billion but still less than 11% compared to 2008 peak (Krisztián, T. C and József, F, 2014, p.4). In 2012 the overall corporate loan volume was stagnating, so the SME loan volume growth in 2012 can be explained by the fact that some large enterprises have been reclassified into SME category.

HUF Billion	2008	2009	2010	2011	2012
All SMEs	3 896,971	2 901,288	2 881,652	2 753,319	3 484,774
medium-sized	1 384,659	1 129,032	1 183,294	1,241,432	1 717,035
small-sized	1 275,594	990,107	1 020,905	797,307	1 039,321
micro-sized	1 236,718	782,149	677,453	714,580	728,418

Source: PSZÁF (2013)

Table 1. 3. Disbursed loan volume to the SME sector 2008-2012

Thus we can see the existence and development of Hungarian SMEs depend on the economy's health. In which SMEs are important components and indispensable of the Hungarian economy so it needs the attention and more support by the government, especially support in accessing the capital.

Staff categories	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Micro-enterprises	94.84	94.96	95.27	95.18	95.09	95.00	94.94	94.99	95.00	95.37	95.38	95.36	95.12	95.16
Small enterprises	4.13	4.05	3.87	3.96	4.07	4.17	4.21	4.13	4.12	3.81	3.83	3.85	4.03	3.99
Medium enterprises	0.86	0.83	0.72	0.72	0.71	0.70	0.72	0.74	0.74	0.69	0.67	0.67	0.71	0.71
SMEs	99.83	99.84	99.86	99.86	99.87	99.87	99.87	99.87	99.86	99.87	99.87	99.87	99.86	99.86
Large enterprises	0.17	0.16	0.14	0.14	0.13	0.13	0.13	0.13	0.14	0.13	0.13	0.13	0.14	0.14

Source: Hungarian Central Statistical office and own elaboration

Table 1. 4. Number of enterprises by size (%)

Economic sector	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Agriculture, forestry and fishing	25,246	24,784	24,274	23,519	22,921	23,081	22,744	23,331	23,206	22,633	23,457
Mining and quarrying, Manufacturing, Electricity, gas and Water supply	67686	66269	63822	60864	58486	57817	54632	54458	53692	51304	49861
Construction	72,140	73,588	73,698	71,670	70,053	70,869	67,730	66,033	63,705	55,544	54,276
Wholesale and retail trade; repair of motor vehicles and motorcycles	153,776	152,935	149,402	145,544	144,023	144,015	139,254	139,546	138,964	133,866	132,081
Transportation and storage	36,118	35,074	34,187	32,975	32,108	32,115	30,779	30,263	29,700	23,315	23,152
Accommodation and food service activities	33,290	33,236	32,737	31,997	31,877	32,372	32,193	32,352	32,017	30,827	29,563
Information and communication	29,964	31,263	31,821	32,632	32,120	33,447	33,487	34,371	34,488	33,685	33,643
Financial and insurance activities	21,471	23,176	25,146	25,420	25,712	28,050	25,947	27,673	26,143	23,039	20,519
Real estate, renting and business activities	165335	168369	170869	171939	169687	176846	176061	179193	178273	172193	171979
Education	21,621	23,557	24,945	25,060	24,511	25,235	27,497	28,420	28,471	27,035	27,054
Human health and social work activities	21,441	22,248	22,759	23,801	24,191	25,475	26,613	27,623	28,548	28,805	28,819
Other service activities	52767	53808	54096	52725	52369	52054	51985	53323	53056	42316	45633
Total	700,855	708,307	707,756	698,146	688,058	701,408	688,996	696,680	690,375	644,692	640,174

Source: Hungarian Central Statistical Office

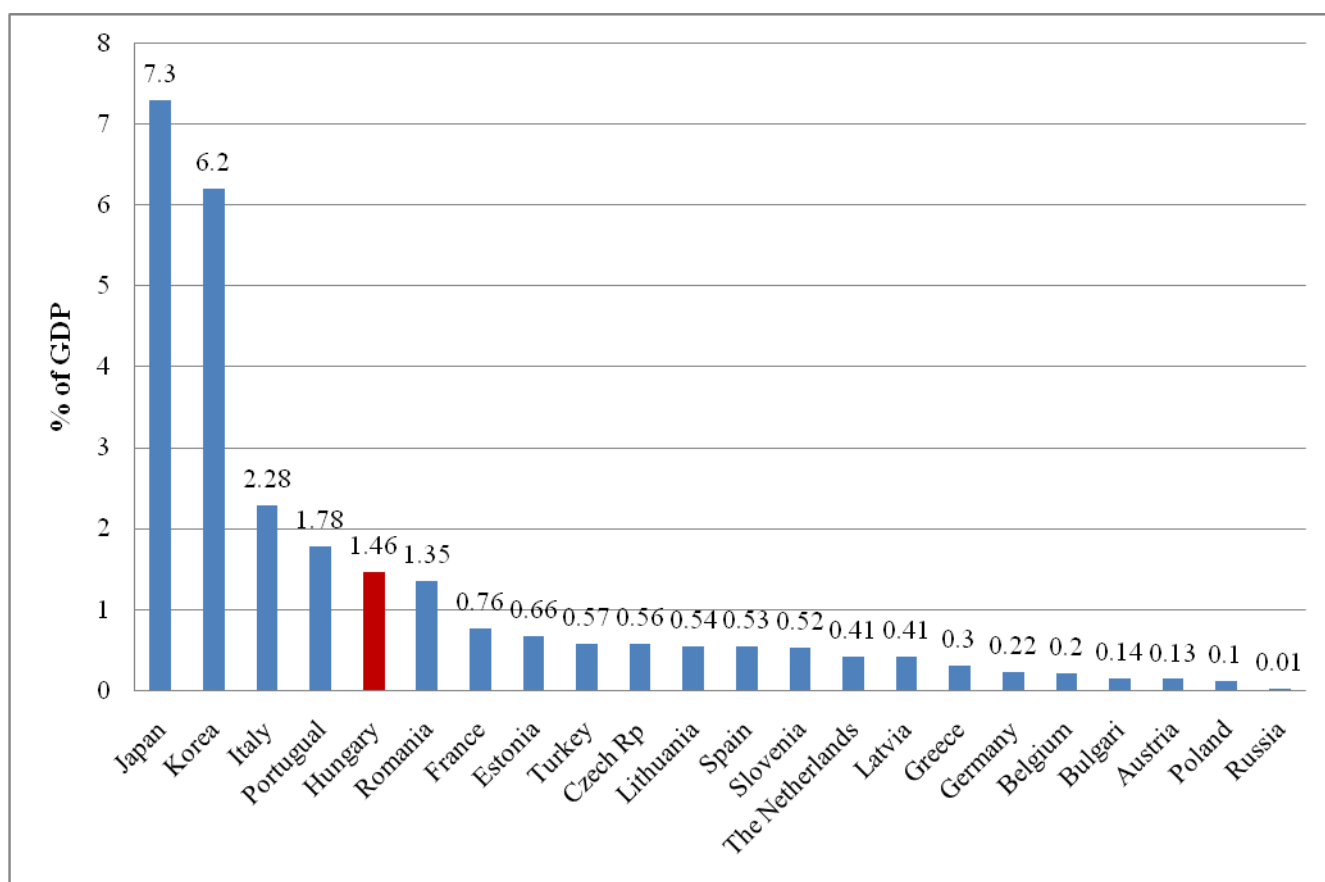
Table 1. 5. Number of enterprises by economic sector

1. 2. Introduction about credit guarantee systems

SMEs are an important part of the economy and the driving force for the development of each country (Beck et al, 2005). However, in the process of development, SMEs face many difficulties and challenges, such as technology, management skills, problem of information asymmetry, quality workforce, competition, market, economic and financial crisis, etc. Among them, one of the major difficulties of SMEs is accessing capital from banks and credit institutions. One reason for this is the lack of collateral. In addition, banks and financial institutions find it difficult to evaluate the creditworthiness of SMEs. Besides, SMEs have more difficulties in diversifying financial, both cross-border and by source, and have to rely mostly on local bank credit. In addition, SMEs' limited sources of funds are further constrained by higher credit rationing and more penalizing credit conditions (European Central Bank, 2014). To solve this problem, the countries around the world have used different financial tools to help SMEs easily access finance. One of the effective financial instruments applied by several countries in the world is credit guarantee. Credit guarantee is applied in many countries around the world from the developed countries to the developing countries. And it is implemented in various ways such as the credit guarantee schemes, credit guarantee funds, credit guarantee companies, etc. Credit guarantee can provide guarantees for SMEs when its collateral is insufficient and can also help to reduce information asymmetries. In whatever way it has been implemented, the aim of credit guarantee is to help SMEs easily access finance, thereby promoting the development of SMEs as well as the development of the economy.

In many countries, credit guarantee has existed since the beginning of the 20th century (Beck et al., 2010). According to Green (2003), more than 2,250 guarantee schemes exist in over 100 countries in the world. Pombo (2010) estimated that some form of credit guarantee service exists in most regions of the world with exceptions of few countries in Asia, Northern and Eastern Europe and Central America. Credit

guarantee has already been operating in most of the countries in Europe. Credit guarantee institutions have played an important role in the financial framework of the European economy (Paola Leone et al, 2012). In some European countries, credit guarantee works fairly well, for instance as in Italy, Portugal, and Hungary. Efficient operation of the guarantee system of a country is expressed through the indicator of outstanding guarantee to GDP. According to European Association of Guarantee Institutions (AECM), if this index is greater than 1%, that means the credit guarantees system has an important role in the development of the economy.



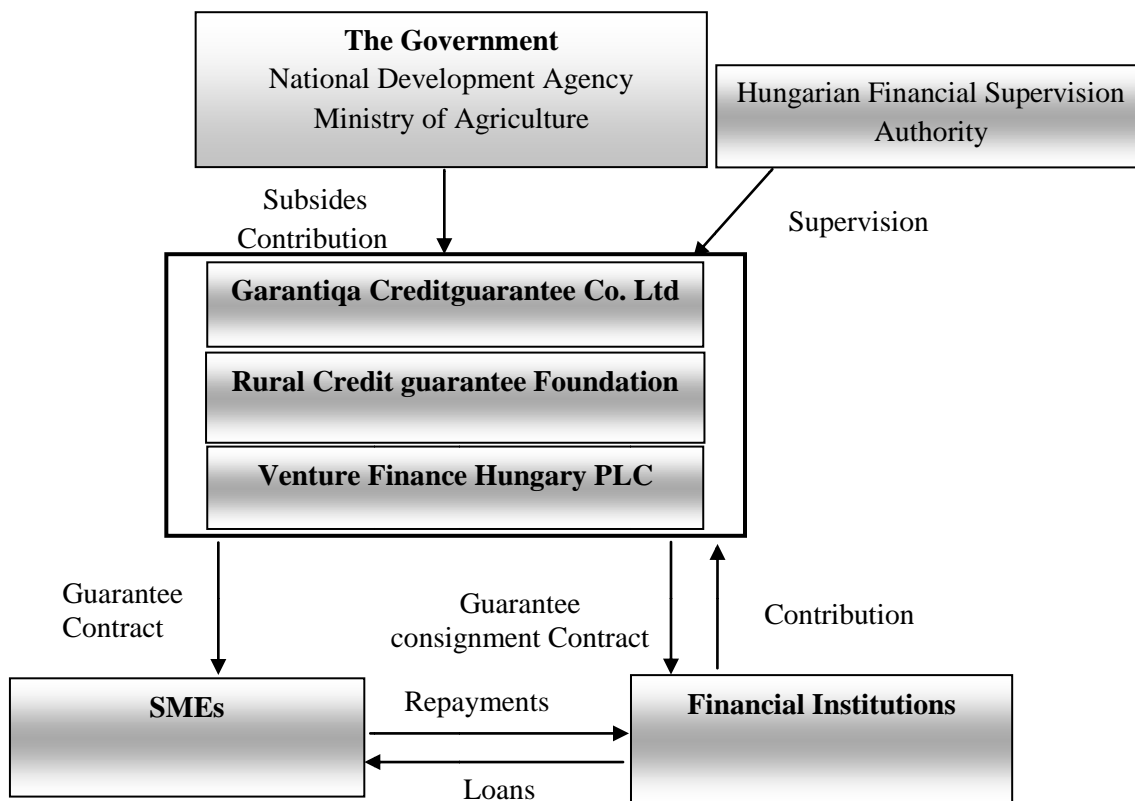
Source: AECM (2012)

Figure 1. 1. Outstanding guarantee amount by countries as a percentage of GDP

In particular, many European countries have chosen credit guarantee as a tool to deal with the international financial crisis in 2008. According to AECM (2010), credit guarantee operation in 21 EU countries rose by 22% from 2007 to 2009 in order to ensure that SMEs have enough financial resources to operate and deal with the crisis.

Especially in the financial crisis, the demand for collateral increased significantly during the crisis (OECD, 2012), so the credit guarantee is an effective tool to support SMEs and start-ups overcome this obstacle and easily access finance. At the same time, credit guarantees also play a significant role in helping banks, and financial institutions reduce credit risk in lending to SMEs. In the case, if the SMEs couldn't pay up, the credit guarantee organization will pay back “a pre-determined amount” of the outstanding loan. In the case, if the SMEs couldn't repay for the lender, the credit guarantee organization will pay back "a pre-determined amount" of the outstanding loan. On the other hand, it will be reduced the loss of the financial institution and minimizes the lender's credit risk (OECD, 2016).

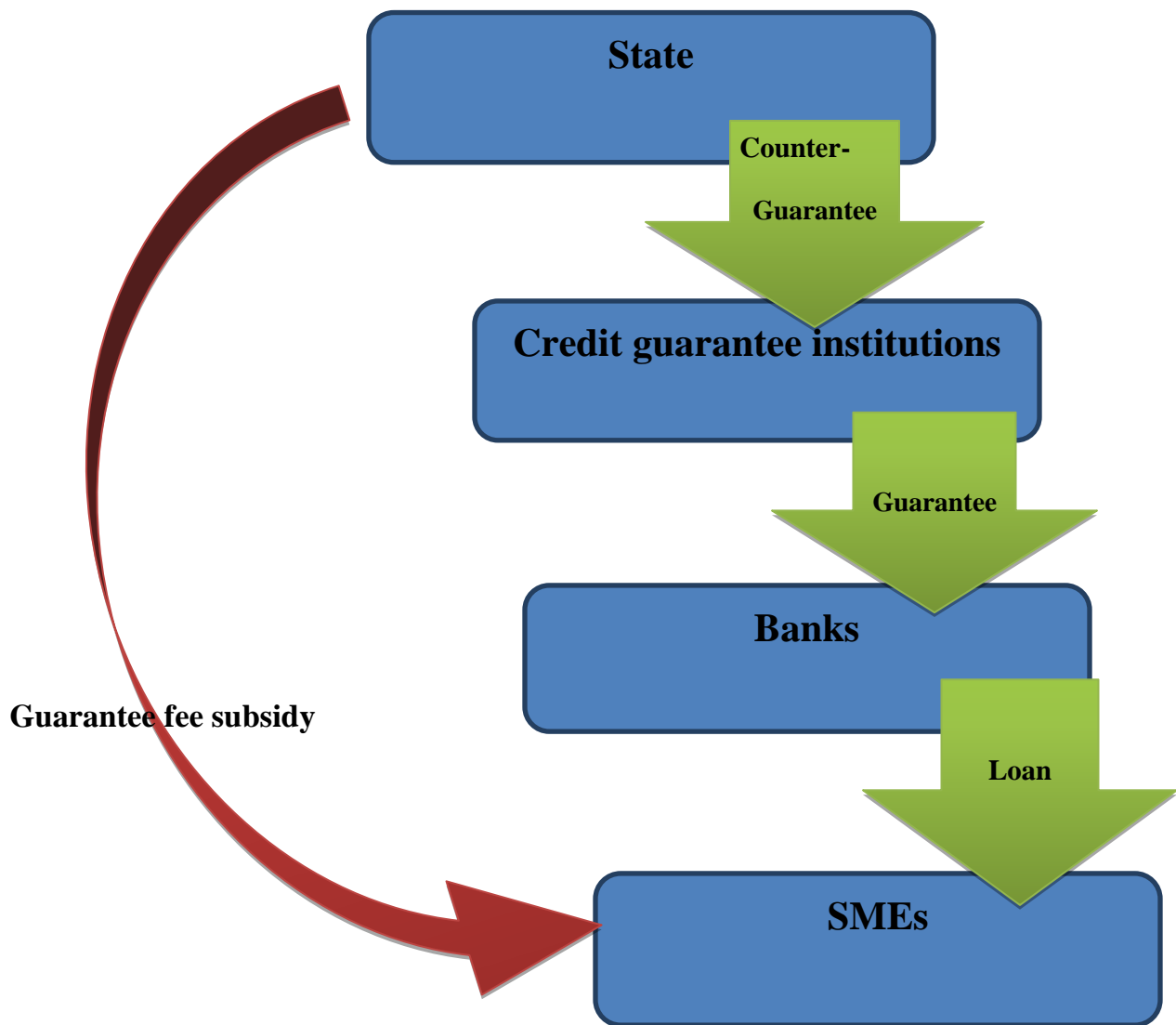
In Europe and in the world, the credit guarantee system of Hungary is one of the largest credit guarantee systems with well-structured and long tradition. Besides, the credit guarantee system in Hungary is a model successfully applied in credit guarantee activities. Each country would like to choose a suitable model credit guarantee; the Hungarian system of credit guarantee has a model, including three major credit guarantee institutions: Garantiqa Creditguarantee Co. Ltd, Rural Credit Guarantee Foundation, and Venture Finance Hungary Private Limited Company; in which Garantiqa Creditguarantee Co.Ltd (Garantiqa) plays a most important role. Government ensures that the business area of each credit guarantee institution is not overlapping and avoids wasting financial resources. Each credit guarantee organization's aim is to provide credit guarantee service for a specific business sector. Rural credit guarantee Foundation aims to provide credit guarantees for rural and agricultural SMEs, while Garantiqa aims to provide credit guarantee services for SMEs, local governmental enterprises, local government. Venture Finance Hungary Private Limited Company provides credit guarantee services for micro-SMEs.



Source: Own elaboration

Figure 1. 2. Credit guarantee system in Hungary

The government directly supports the credit institutions via agencies, financial institutions by different ways, such as providing capital, sharing risk with the credit institutions by implementing the counter-guarantee, support through low-interest loans, tax reduction, etc. In addition, the government usually indirectly supports the credit institution by increasing reputation for the credit institution through the participation of the government; make regulations for lenders in collaborating with the credit institution, supports fees for the borrower in collaborating with the credit institution, etc.



Source: Own elaboration

Figure 1. 3. The mechanism of State support for credit operations in Hungary

During operation and development, the credit guarantee system of Hungary has achieved some results and success, particularly its role with regard to the development of SMEs and the Hungarian economy. However, so far, there has not been an in-depth study and a thorough assessment of the impact of the credit guarantee system on Hungarian economy. Therefore, with this study, the author did an in-depth analysis and focused on the evaluation of the impact of the credit guarantee system for Hungarian economy then propose solutions to complete the operation of credit guarantee system application in Hungary.

This dissertation includes five main chapters: (1) Introduction, (2) Problem statement, (3) Literature review, (4) Data analysis and hypotheses testing, and (5) Conclusions and recommendations.

Chapter II. Problem statement

2.1. Introduction and rationale of the research

I began my Ph.D. studies as a full-time Ph.D. student in Faculty of 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.

2.2. Purpose and the methodology of the research

Before this study, there are many studies on credit guarantee and the impact of credit guarantees on the economy. Mendizabl et al (2014) pointed out that although, the relationship between the bank and the SMEs' credit rationing is widely analyzed in many kinds of literature, but the scholars have under emphasised the guarantee limit. Credit guarantees for SMEs and the impact of credit guarantees have had many studies in the past. Jacob Levitsky and Ranga N. Prasad (1989) provided information on the credit guarantee schemes in 27 developed and developing countries. This paper helps the readers to understand the operation of credit guarantee system (main elements, scope, and problem). At the same time, this study also presents an evaluation of the guarantee schemes that the authors examined the scope and impact, additionally of lending, creating confidence, loss rate in different regions in the world.

Credit guarantees have an important role and impact on SMEs, lenders and the economy. According to Levitsky (1997b); Beck, Klaper & Mendoza (2010) credit guarantee effects are in the form of increasing lending to SMEs, increase access to

finance of SMEs. Credit guarantee helps SMEs to reduce the costs of borrowing (Beck et al., 2010). Furthermore, credit guarantee ensures new business formation, development, and expansion (Levitsky, 1997b; Nitani & Riding, 2005; Roodman & Qureshi, 2006).

Besides, credit guarantee also encourages lenders by providing collateral as compensation in case the loan is not repaid (Boocok and Shariff, 2005), to diversify risk across loan guarantee means that credit guarantee institution will cooperate with many lenders to underwrite loans (Beck et al, 2010), allowing lenders to transfer risk of recovery of loan to the guarantor (Levitsky, 1997b). Credit guarantees encourage the lenders to help them overcome the problem of information asymmetry (Beck et al., 2010). The guarantors will participate in the application and monitoring process.

Credit guarantee is used as a policy tool to implement the national policies. According to Kang & Heshmati (2008), credit guarantee helps welfare and stability of society, accelerates economic growth and decrease unemployment. In addition, credit guarantee creates more jobs (Riding & Hannes, 2001) and reduces poverty generally (Roodman & Qureshi, 2006).

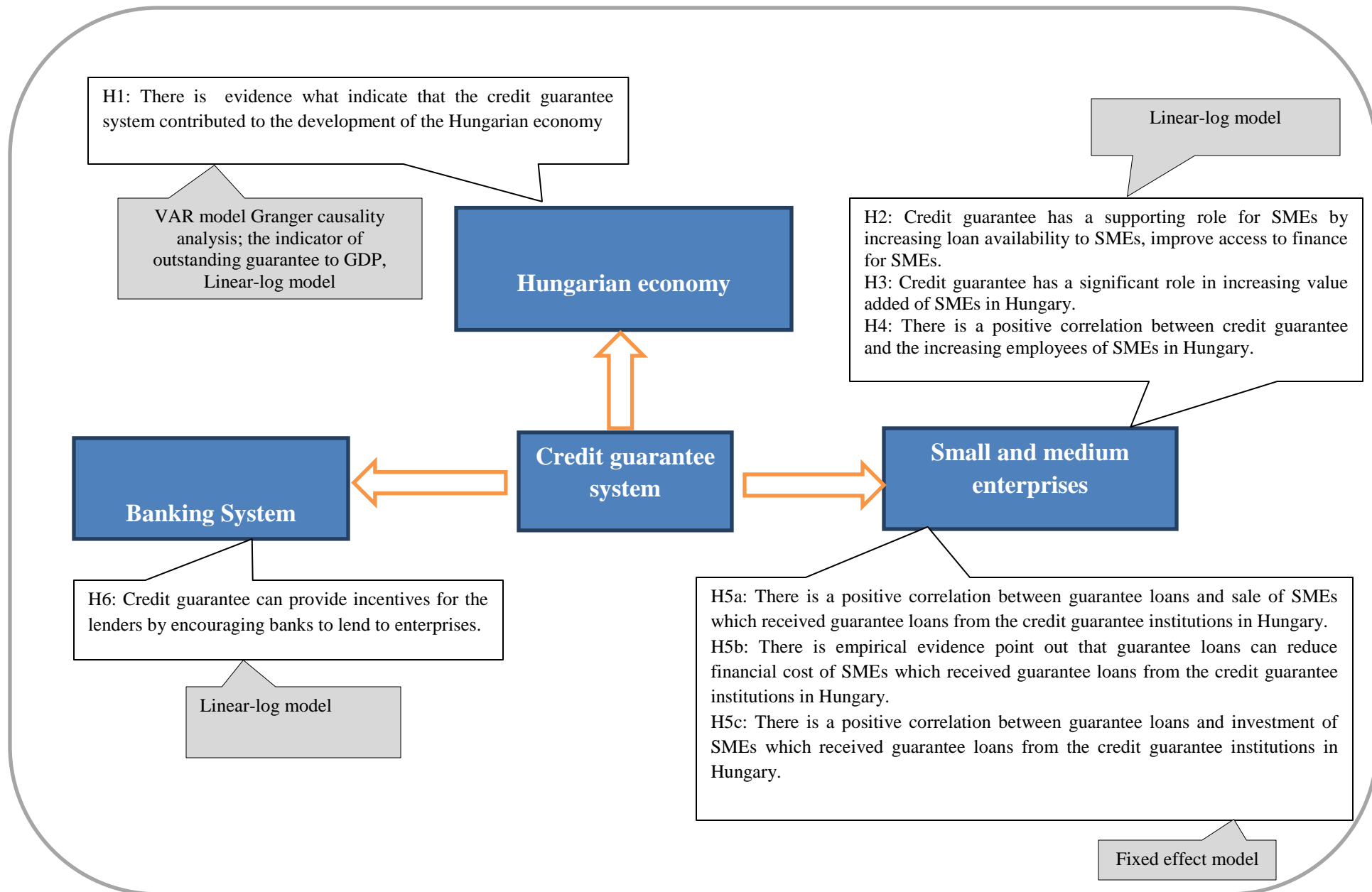
Iihyock Shim (2006) investigated the economic impact of the credit guarantee, in the Asian countries; he used the ratio of credit guarantees outstanding to GDP to evaluate the effects of credit guarantees for economy welfare. According to this ratio, Japan and Korea are over 5% in the time period from 2001-2005. A study conducted by the OECD (2013) indicated that credit guarantees amount to a significant rate of GDP. In Europe, the highest rate of outstanding guarantee to GDP was recorded in Italy 2.2%, Portugal 1.9%, and Hungary 1.4%. By contrast, in Asia, the highest rates are in Japan 7.3%, Korea 6.2% and Chinese Taipei 3.6%. Moreover, in the statistics of AECM (AECM, 2013) used the ratio of credit guarantees outstanding to GDP to assess the impact of credit guarantees for the economy of all members of AECM. In another study of Korean Credit Guarantee Fund (2012) indicated credit guarantee has an important role to help the national economy, especially SMEs to overcome the

financial crisis in 2008. In addition, other studies also indicate credit guarantees to help create more jobs, reduce the information asymmetry between borrowers and lenders, increasing exports, etc.

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 for the Hungarian economy?*

This study focuses on assessing the impacts of the credit guarantee system on 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 2.1:



Source: Own editing

Figure 2. 1. Structure of the study with hypotheses and methods of analysis

To address the issues raised in this study, the author used quantitative research method. Quantitative research method will be conducted to verify the variables and the relationship between the variables in the research model. The variables were used in this study can be divided into independent variables and the dependent variables. The influence of the independent variables on the dependent variables will be studied in the analysis of data. Based on these hypotheses, this research focuses on the key variables are as follows:

Hypothesis	Variable	
	Dependent variable	Independent variable
H1	GDP	GRT: guaranteed loans by credit guarantee system
H2	LSME: loan availability to SMEs by banks	GRT: guaranteed loans by credit guarantee system
H3	VDS: value added of SMEs in Hungary	GRT: guaranteed loans by credit guarantee system
H4	ESMTT: Employee of SMEs/Total employees	GRLE: guaranteed loans by credit guarantee system/ Total loans to SMEs by banks
H5a	Net sale	Guaranteed loans
H5b	Interest paid	Guaranteed loans
H5c	Fixed tangible asset ratio	Guaranteed loans
H6	TL: Total loans by banks in Hungary	GRT: guaranteed loans by credit guarantee system

Source: Own elaboration

Table 2. 1. The main variables of the study

Evaluating the effect of the credit guarantee is not new in economic literature. In most of the studies that used questionnaire approach to assessing the impact of the credit guarantee schemes such as Nera (1990), Piedad (1992) and KPMG (1999). Riding and Haines (2001) also used this method to survey of a sample of Canada's SBLA loan

guarantee. This research there was some incremental economic benefits due to SBLA guarantee loan. Boocock and Shariff (2005) when assessing the impact of Malaysia's Guarantee scheme used the questionnaire in combination with some case studies. They use semi-structured interviews with borrowers and lenders and key informants. Gale (1991) used ad hoc model to assess the US credit program on credit allocations to different sectors of the US economy. However, by using quantitative research method, the scholars mainly used OLS-Ordinary Least Square for study (Anuchitworawong et al, 2006; Busetta and Presbiterio, 2006; Columba et al, 2009; Cowling, 2010; Uesugi et al, 2006; Zecchini and Ventura, 2009; etc).

In this research, to evaluate the relationship between the variables, the author used various quantitative methods such as VAR models Granger causality, linear-log model, Fixed effect model. At the same time, the author combined using descriptive statistical methods for analysis and evaluation in order to provide the best results. Each method will be applied appropriately to each hypothesis, types of data, research purposes.

VAR models Granger causality is used for hypothesis H1 because by using this method the author expects to point out that credit guarantee activity is the cause of the growth of GDP. At the same time, in hypothesis H1 the author assumes that credit guarantee system provides loan guarantees to SMEs under the best conditions and other factors do not change and do not affect the relationship between guarantee loans and GDP.

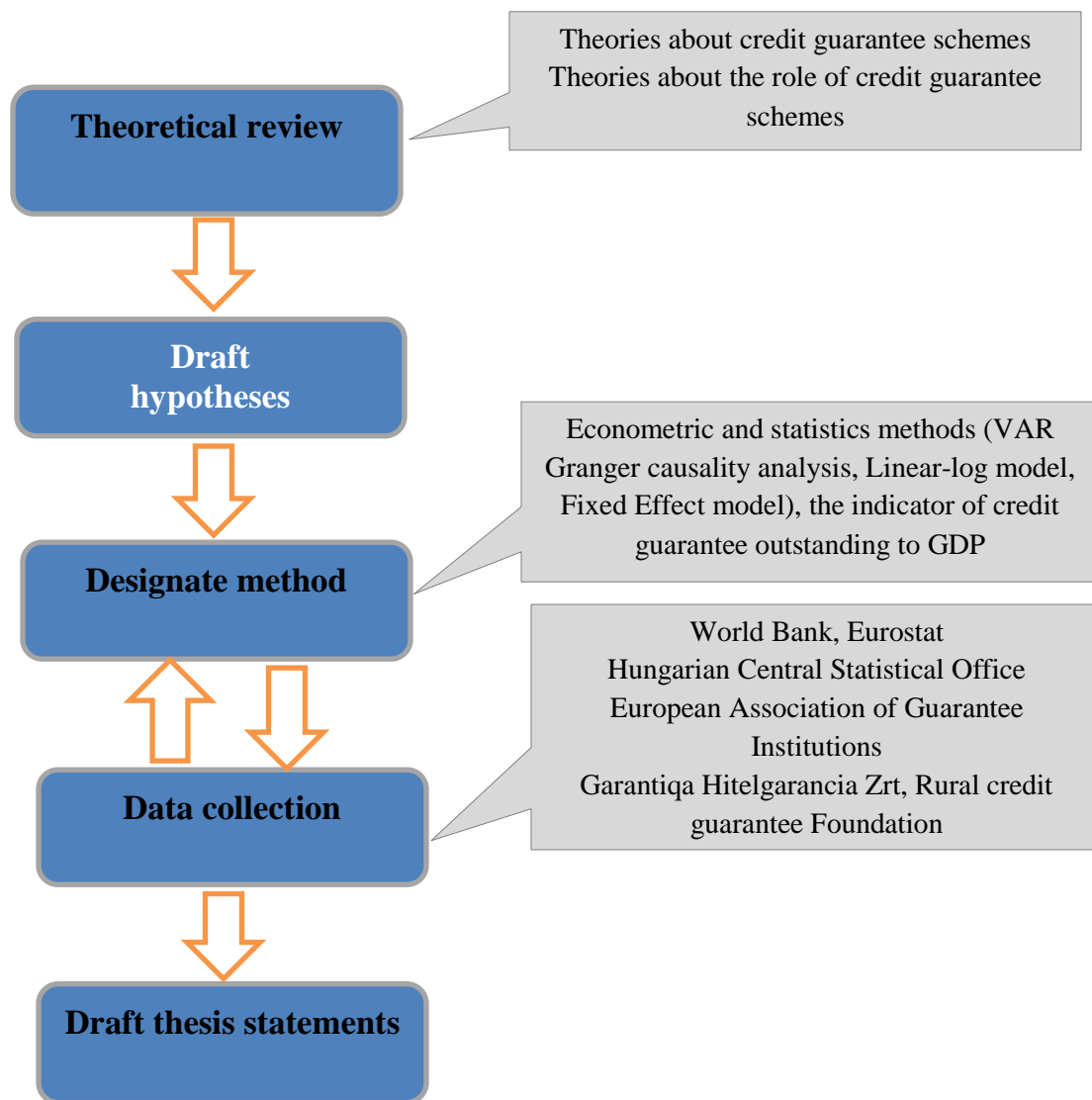
For hypotheses H1, H2, H3, H4 and H6, first the author draws the graphs to represent the relationship between the dependent variable and independent. Based on the graphs (Figure 4.1, 4.4, 4.5, 4.7, 4.9), the author found that the dependent variables depend on the independent variables by logarithm function form. Therefore, Linear-log model is the appropriate method to test for these hypotheses.

For hypothesis H5, the selection of a model to test is done through the following steps. The first step, the author needs to identify what type of data which used to test

the hypothesis H5. Because of the data was collected from financial statements of 50 different companies during the period from 2012 to 2014, each company has unique and different business activities. Therefore this data the kind of panel data, Fixed effect model or Random effect model is the most appropriate method will be used to test this hypothesis. Moreover, the author needs to implement Hausman Test to choose exactly Fixed effect model or Random effect model will be used.

In this research, the hypotheses were compared to the usual 0.05 expected significant level. The basic data of this research were collected mainly from Garantiqa Company and Rural Credit Guarantee Foundation. All data were collected and testing the hypothesis is done by EVIEW software.

Through Figure 2.1, 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 2.2:



Source: Own editing

Figure 2. 2. Progress of the research

2.3. Research framework

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 obstacle. 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

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 favorable 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 the 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.

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 the risk for the bank, transfer risk to the credit guarantee institutions, reduce costs related to collateral assets, etc.

The hypotheses and methodology are summarized in Table 2.2:

(**H₀** = Null Hypothesis and **H_A** = Alternate Hypothesis)

Hypothesis	Description	Methodology
H1	<p>H0: There is not evidence what indicate that the credit guarantee system contributed to the development of the Hungarian economy.</p> <p>HA: There is evidence what indicate that the credit guarantee system contributed to the development of the Hungarian economy.</p>	VAR model Granger causality, Linear-log model, calculating the ratio of outstanding guarantees to GDP
H2	<p>H0: Credit guarantee has not a supporting role for SMEs by increasing loan availability to SMEs, improve access to finance for SMEs</p> <p>HA: Credit guarantee has a supporting role for SMEs by increasing loan availability to SMEs, improve access to finance for SMEs</p>	Linear-Log model
H3	<p>H0: Credit guarantee has not significant role in increasing value added of SMEs in Hungary.</p> <p>HA: Credit guarantee has a significant role in increasing value added of SMEs in Hungary.</p>	Linear-Log model
H4	<p>H0: There is not a positive correlation between credit guarantee and the increasing employees of SMEs in Hungary.</p> <p>HA: There is a positive correlation between credit guarantee and the increasing employees of SMEs in Hungary.</p>	Linear-Log model
H5a	<p>H0: There is not a positive correlation between guarantee loans and sales of SMEs which received guarantee loans from the credit guarantee institutions in Hungary</p> <p>HA: There is a positive correlation between guarantee loans and sales of SMEs which received guarantee loans from the credit guarantee institutions in Hungary</p>	Fixed effect model
H5b	<p>H0: There is not 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.</p> <p>HA: There is empirical evidence point out that</p>	Fixed effect model

	guarantee loans can reduce the financial cost of SMEs which received guarantee loans from the credit guarantee institutions in Hungary.	
H5c	<p>H0: There is not a positive correlation between guarantee loans and investment of SMEs which received guarantee loans from the credit guarantee institutions in Hungary</p> <p>HA: There is a positive correlation between guarantee loans and investment of SMEs which received guarantee loans from the credit guarantee institutions in Hungary</p>	Fixed effect model
H6	<p>H0: Credit guarantee cannot provide incentives for the lenders by encouraging banks to lend to enterprises.</p> <p>HA: Credit guarantee can provide incentives for the lenders by encouraging banks to lend to enterprises.</p>	Linear-log model

Source: Own editing

Table 2. 2. Hypotheses of the research

2.4. Scope and limitation of research

The scope of this study is limited to the credit guarantee system of Hungary and data focused on two major credit guarantee institutions: Garantiqa Creditguarantee Co. Ltd and Rural Credit Guarantee Foundation. Data were collected to test the hypotheses H1, H2, H3, H4, H6 from 2000 to 2013 based on the value of the guarantee of the two organizations above and the macroeconomic indicators. In hypothesis H5, data were collected from 2012-2014 of 50 SMEs which received guarantee loans from Rural Credit Guarantee Foundation.

Chapter III. Literature review

The literature review begins with an overview of credit guarantee schemes in the world. After that, the author did a deep analysis of the objectives and roles of credit guarantee. Further, in this chapter, the methods to assess the effects of the credit guarantee scheme are discussed in detail.

3.1. Overview of the credit guarantee in the world

SMEs play a significant role in every country in the world; they accounted for 90 to 99 percent of the enterprises (OECD, 2006). According to Nitani & Riding (2005), SMEs have an important role in creating new businesses, more jobs, develop innovative product ideas, and enhance productivity. However, SMEs often face a difficult problem in obtaining credit from the banks and financial institutions. In solving this problem, many countries in the world established credit guarantee schemes (CGSs) to help SMEs easily access credit and through that promote the development of the economy.

Levitsky (1997) stated that the first credit guarantee scheme began in Europe in the 1840s. And in Asia, the credit guarantee scheme emerged in the Philippines in 1952, then in the 1970s it was established in Indonesia, Malaysia, Pakistan, Korea, etc. Until 2003, there were 2250 CGSs existing and operated in 100 countries in the world (Green, 2003). In special, credit guarantees have been selected by many countries in the world as an effective financial tool to deal with financial crisis. Uesugi et al (2010) stated that there were 19 countries in OECD countries which used CGSs as a supporting tool for SMEs in order to easily access finance and overcome financial crisis. Thus, it can be said that credit guarantee scheme has become a tendency, and it is applied in most of the countries around the world. So what is the reason for the rise of credit guarantee schemes in the world?

More study have indicated that CGSs were established to support SMEs to solve the difficulties to obtain bank financing. Challenges faced by SMEs in accessing bank finance caused by the following reasons (Thai Binh Dang, 2016):

- 1, Inadequate collateral (Pozzolo, 2004; Beck et al, 2008; Makhool et al, 2005)
- 2, Issue with information asymmetry (Mankiw, 1986; Gittell and Kaen, 2003; Craig et al, 2008)
- 3, High cost of lending to SMEs (Cowling and Mitchell, 2003; Berger and Udell, 2006; Green, 2003)
- 4, The process of lending to SMEs involves high risk

Although SMEs were recognized as an important sector that helps in creating jobs and are the driving force of economic development, but in the process of developing, SMEs face many obstacles, especially the limited access to finance (Thai Binh Dang, 2016). A research by the European Commission (2013, p.1) stated that “one third of the SMEs surveyed did not manage to get the full financing they had planned for during 2013 and 15% of survey respondents saw access to finance as a significant problem for their companies”. SMEs, startups and young companies difficulty in borrowing from the bank due to insufficient collateral to meet the loan conditions (Dang, 2016).

Most start-ups and SMEs when starting to do businesses tend to use their own resources, from family and friends and also from the other external funding sources such as banks. Therefore, in order to develop, expand production and business, SMEs looks to external sources and mainly access bank financing. On the other hand, banks before lending to SMEs they often follow the precautionary principle and risk prevention. One of the requirements of banks when making lending to SMEs is to have collateral. With sufficient collateral, it will be an advantage for SMEs to easily seek loans from credit institutions. In other words, banks are willing to lend to SMEs when they can provide enough collateral (OECD, 2013). However, SMEs are characterized by small scale, lack of capital, poor technical equipment, weak management capabilities, and marketing, etc. Therefore, a lot of SMEs cannot access funds from banks because they do not meet the conditions for collateral. Moreover, banks are often restricted to the types of collateral that they accept (Linda Deelen & Klass

Molenaar, 2004). Many central banks in many countries have the regulations for the type of collateral, and they do not accept some kind of collateral such as stocks, receivables, etc. Especially during the financial crisis, many countries collateral requirement increased significantly, and it affected the ability of SMEs to access credit. Thus it can be said that collateral is great challenge and obstacle for SMEs in the process of accessing finance.

Besides, the difficulty in meeting the requirements on collateral during accessing financing banks, SMEs still have trouble in getting loans from banks due to the problem of information asymmetry. Research by the European Investment Bank (2014) indicated that SMEs are more affected by credit rationing than larger companies since the information asymmetry is more pronounced for SMEs. Information asymmetry is a big and serious problem that exists between SMEs and credit institutions. The existence of information asymmetry which affects the decisions of the bank when lending to SMEs is due to the fact that the banks cannot assess the creditworthiness of SMEs, as well as SMEs lack of relevant information, lack of financial records, credit history, etc. In addition, there is no accounting standard which is applicable to SMEs in the presence of huge accounting data available, it also results to information asymmetry (Julien Liffleur, 2009). The lack of information affects the decision of banks and credit institutions in the process of lending to SMEs. According to Stiglitz and Weiss (1981), asymmetric information can lead to adverse selection moral hazard.

According to research by Thai Binh Dang (2016, p. 145): “The adverse selection occurs when information relating to borrowers, such as the effectiveness of the project, project risk, project plans and so on which are known more by the borrower rather than credit institutions”. In this case, the lenders who are in a relatively disadvantaged position have to increase the interest rate to minimize potential risk of credit loss. The research by Stiglitz and Weiss (1981) pointed out that in order to protect them and to avoid adverse selection banks often raise the cost of bank debt or

limit credit for SMEs when SMEs are not ready to get funds at a higher price. In particular, for the SMEs with weak operations, increasing interest rate makes it difficult for them in accessing finance, and they are not willing to pay higher interest rate. On the other hand, most of the banks choose higher interest rates to avoid the risk of loans or rejecting loan demand of SMEs. Because of the relative weakness of SMEs compared with larger enterprises, banks often choose and prefer to lend to larger enterprises. It is understandable that SMEs become the main targets to which “credit rationing” is administered. Many SMEs have been eliminated from the market because of lack of access to loans. Thus, asymmetric information leads to adverse selection, which makes it difficult for SMEs to access finance.

In essence, information asymmetry also leads to serious complications due to the fact that the banks are not able to fully monitor business activities, purpose of loan using of borrower, etc (Thai Binh Dang, 2016). In addition, the bank can not know exactly when the borrower is available and when to repay the loan. Thus moral hazard leads to bad debt for banks and financial institutions making loans, especially loans for SMEs difficult. In order to reduce the risk in the lending process and get profit, banks and credit institutions have implemented limited credit policy for SMEs. This policy reduces lending to SMEs to avoid moral hazard or banks can reduce lending thresholds for SMEs and collateral requirements from SMEs during the lending process. SMEs also have difficulty to come up with satisfying mortgages to the financial institution. Therefore, financial institutions may not dare to lend any loans to SMEs. To conclude, asymmetric information leads to moral hazard, which would further exacerbate the financing difficulties of SMEs.

Due to the effects of information asymmetry, banks and credit institution spend more time and resources in monitoring SMEs than large enterprises. Banks need to supervise and monitor the actual situation of the borrower to ensure the safety and effectiveness of the loan as well as the prevention of fraud from borrowers. Therefore, the bank desires to achieve much information about the borrowers as much as possible,

but the information related to the borrower will not be easy to achieve. In addition, information relating to borrowers is also very diverse such as financial statements, credit history, cash flows, business operations, etc. In particular, when borrowers are SMEs, it will be very difficult for the bank to obtain full information about them, and moreover, there are difficulties during routine monitoring. Most SMEs have weak accounting systems and non-standard, non-transparency rules, no distinction between company and personal assets, etc. By contrast, large companies have more advantage in aspects such as the credit rating, valuable mortgage, etc. Also, they have relative transparency and accessibility of information. These advantages can effectively translate to total cost reduction in searching for information relating to a transaction object as well as supervision by banks. When the comparison of the cost, benefit, and risk between large companies and SMEs, banks prefer lending to large enterprises, which reduces the loan to SMEs and aggravates the financing difficulty facing SMEs.

Furthermore, many SMEs in the world do not have access to loan from banks because of the lending criteria of the banks (Linda Deelen & Klass Molenaar, 2004). Banks will not provide credit, even to creditworthy borrowers, unless they can recover the debt after a default. And, when assessing credit applications of borrowers, one important criterion for banks is the level of risk of borrowers. Risk prevention is always a characteristic and significant mission of the bank. Banks tend to select clients for loans with low-risk levels. In addition, the bank staffs can avoid work and cooperate with SMEs which has high-risk and requires more time and cost for evaluation and monitoring. A research by Beck and de la Torre (2007) pointed out that commercial banks tend to attribute a high risk to SMEs; therefore, they reluctant to extend credit to them. Thus, the risk is one of the obstacles and challenges for SMEs in the process of accessing finance from banks.

With the above difficulties in accessing bank financing, most scholars agree that the CGSs emerged due to the following reasons (Honohan, 2008, p.3):

- “First, because of differential information, as where the borrower’s creditworthiness is better known by a well-capitalized guarantor than by the lender. The operation of mutual guarantee associations provides an illustration here, as does the guaranteeing of a supplier’s borrowing by the purchaser.

– Second, as a means of spreading and diversifying risk, for example where the lender’s portfolio is geographically concentrated, but the guarantor has a diversified portfolio.

– Third, as a regulatory arbitrage. This can occur when an unregulated firm provides a guarantee allowing the lender to bring an otherwise insufficiently secured loan into compliance with regulatory requirements or other government programs or financial industry risk-rating practices and conventions (as in US mortgage insurance). Another important case of regulatory arbitrage is when the guarantee premium is used to bring the total servicing charge for the loan above a regulated ceiling on lending interest rates and thus closer to a market-determined interest rate.”

Besides, credit guarantee schemes will be considered as a third entity to help lenders transfer and diversify risk (Beck et al., 2010 and Levitsky, 1997b). Furthermore, through support to SMEs, credit guarantee schemes promote economic growth, welfare, and social stability, create jobs, etc.

Credit guarantee system in V4 countries

Credit guarantee system has already been operating in the V4 countries and most countries in the European region. Credit guarantee is an important part of the financial system of the V4 countries. It is used to aid SMEs to overcome obstacles in access to finance by providing guarantee services. Credit guarantee enables banks to unfreeze credit to SMEs, reduce risk, reduce the cost of monitoring and supervision of banks in the lending process (Dang Thai Binh, 2015). At the same time, credit guarantee is a tool for governments to promote the economy of the V4 countries, help overcome the financial crisis in 2008 such as in the case of Hungary. During operation, credit guarantee system of the V4 countries have achieved the following results:

Country	Outstanding guarantees (Million €)						
	2007	2008	2009	2010	2011	2012	2013
<i>Czech RP</i>	451	530	701	943	829	855	661
<i>Hungary</i>	1,481	1,580	1,706	1,575	1,356	1,419	1,327
<i>Poland</i>	na	na	442	385	484	392	1,540
<i>Slovak Rp</i>	128	140	208	196	204	na	na

Source: <http://www.aecm.eu> (European Association of mutual guarantee societies)

Table 3. 1. Outstanding guarantees in the V4 countries

Country	Outstanding guarantees to GDP (%)						
	2007	2008	2009	2010	2011	2012	2013
Czech RP	0.34	0.34	0.49	0.63	0.53	0.56	0.44
Hungary	1.49	1.5	1.87	1.64	1.37	1.46	1.36
Poland	na	na	0.14	0.11	0.13	0.1	0.02
Slovakia	0.23	0.22	0.33	0.3	0.3	na	na

Source: <http://www.aecm.eu>, <http://ec.europa.eu/eurostat> and own elaboration

Table 3. 2. Outstanding guarantees to GDP in V4 countries

Table 3.2 indicates this indicator of V4 Countries has tended to raise particularly credit guarantee system in Hungary with higher indicator than other countries. Besides, according to ACM (European Association of Mutual Guarantee Societies), the country with the indicator of Outstanding Guarantees to GDP more than 1% which means that the credit guarantee system works well and efficiently. Based on Table 2, we can see only Hungary in V4 Countries with the indicator of Outstanding Guarantees to GDP higher than 1%. This demonstrates that other countries in the V4 Countries only operate at a normal level.

Credit guarantee system in Czech RP

In Czech RP, credit guarantee system was established and operated mainly by Czech and Moravian Guarantee and Development Bank–CMGDB. Credit guarantee is

used often in Czech as proved, 66.7% of banks have used guarantee products for more than 5 years (European Bank Coordination Initiative, 2014). CMGDB helps implement the state policy in the economic development objectives and financial support for SMEs. Moreover, it also supports financing specific projects like helping to improve regional technical infrastructure and panel-block apartment houses reconstruction. CMGDB involved in a network of organizations to support SMEs. These institutions received considerable support through the PHARE program of the European Union. It helps CMGDB have adequate financial support to assist SMEs in the best way. Summing up the Czech experience over the 1992-1998 periods, it shows that CMGDB could become an effective instrument for supporting SMEs. Besides CMGDB, credit guarantee system of the Czech Republic has two credit guarantee institutions which focus on supporting export enterprises, these are Export Guarantee and Insurance Corporation (EGIC/EGAP) and Czech Export Bank (CEB). EGAP is focused in supporting large business transactions in excess of over CZK 1 billion, however, it also provides simplified version of bank guarantees for SMEs to ensure against the risk of their calling (European Bank Coordination Initiative, 2014). CEB is a part which is owned by EGAP and the state, provides EGAP bank guarantees issued in regards to an export contract for which funding is provided by a commercial bank (Dang Thai Binh, 2015). In the process of developing one of the successful experiences of credit guarantee system in Czech Republic as shown by the case of CMGDB which succeeded by the application of the Staff motivation. CMGDB carryout financial motivation incentives to encourage staff through the following ways (European Commission, 2006; Thai Binh Dang, 2016):

- Splitting the planned target volumes between banks which is based on their capacity;
- Assigning some certain amount from the bank's annual payroll budget to be disbursed as premium. It depends on the branches' achievement and it will pay as a bonus to branch employees;

- Determining the criteria for assessment of the branches' share of the realization of its plan and achievements, which shall be decisive for the yearly bonus payment.

Credit guarantee system in Poland

Credit guarantee system in Poland was characterized by the credit guarantee funds and Bank Gospodarstwa Krajowego (BGK). The credit guarantee funds have 13 regional funds with 120 million Euro and 47 local funds with 30 millions Euros. The credit guarantee funds have the following characteristics:

(1) National Credit Guarantee Fund

- Independent guarantee activity
- Supporting the development of the system by:
 - Organization of, and supervision over regional and local funds
 - Capital participation in regional & local funds
 - Re-guaranties for regional & local funds

Co-operation with 25 banks having 4 232 branches over the country provides guarantees according to 4 different procedures: Ordinary, Simplified, Portfolio, and Stand-by guarantees –borrower.

(2) Regional funds

Characterized by a heterogeneous, non-standardized product line, lack of transparency and regulation, and low, decreasing activity.

- Capital from 1 to 5 million Euros 30
- Area of activity – at least one province
- Assessment of creditability procedural, based on professional knowledge and tools

(3) Local funds

- Capital from 0.25 to 1 million Euros
- Area of activity - several municipalities or counties
- Assessment of creditability based primarily on local knowledge and networking

Besides credit guarantee funds, Bank Gospodarstwa Krajowego (BGK) plays an important role in promoting SMEs and the Polish economy. BGK is owned by the state and is a tool policy for the Polish government to promote SMEs. BGK implemented many credit guarantee programs for SMEs in which The BGK de minimis portfolio guarantee facility has significance and is one of the programs that are successfully applied. It began operating in 2013 by BGK and the Polish government. The purpose of this program was a reaction to the economic slowdown, and the low efficiency of the existing framework of credit guarantees to provide support to SMEs. BGK performed credit guarantee to 23 commercial banks. European Investment Bank (2014, p. 27) stated that “The program allows SMEs to seek guarantee for working capital and investment loans of up to 3.5 million PLN for the period of up to 27 months (working capital loan) or 99 months (investment loan), with the following key characteristics:

- Simple procedures for SMEs,
- Zero charge for guarantees in the first year of the guarantee, and
- Low commission of 0.5% of the guarantee amount for the second and third year,
- Possibility of getting the financing without own collateral (Formally, the bank may request the collateral for the part of loan not covered by the guarantee.).

The program was designed also to encourage banks to increase their supply of credit, by:

- A risk transfer to the government up to 60% of the loan value,
- Short period of guarantee payout (15 working days),
- No capital charges on the guaranteed amount”

The main reasons for success of the BGK are followings (European Investment Bank, 2014, p. 27):

– “The scope of public intervention should be sufficiently large to make an impact, but adjusted to the current needs of SMEs. State aid regulations should be fulfilled.

- Guarantee fees should be subsidised, as fees set at a level covering all costs are usually unacceptable for the SMEs.
- Guarantee products should complement the operations of commercial banks: terms of guarantee should be unified and standardized to fit commercial banks' centralized structures and standardized credit products.
- A portfolio guarantee scheme is the best choice for low value guarantees as it minimizes bureaucracy and speeds up procedures. However, portfolio guarantees need efficient IT solutions on both public and private side.
- As credit risk assessment is performed by the guarantor only at the level of the portfolio, the portfolio quality should be carefully monitored, and decisions on granting/renewing limits to the participating banks should be based on the assessment of the portfolio quality.
- Unfunded credit risk protection and capital relief is an important incentive for the banks to participate in the programme. A clear recognition by the financial regulator/supervisor is needed in this regard.
- The impact of the program on SME sector should be constantly monitored”.

Credit guarantee system in Slovakia

In Slovakia the use of credit guarantees is relatively small and has two main credit guarantee providers: the Slovak Guarantee and Development Bank; and the Slovak Business Agency focusing on the development of SMEs operating in the fields of infrastructure, environment, renewable energy sources and efficient energy. According to the banks, clients in Slovakia often face excessively restrictive conditions from guarantee providers. Moreover, the cost of using guarantees and the cumbersome administrative burden associated with the products are also important drawbacks.

Although the credit guarantee system of Slovakia is small but it has one outstanding characteristic that other countries can refer and study. This is the diversity of the product guarantees. According to European Commission (2014, pp.1-9) stated that Slovakia has applied the diversity and specific guarantee programs and loan programs, it includes:

Program		Characteristics
Guarantee programme	Bank guarantees for loans	- Providing guarantees to start and expand SMEs - Providing guarantees for financial loans (investing of tangible and intangible assets, reconstruction and upgrade)
	Fast Bank Guarantees	Providing bank loan guarantees to SMEs operating for at least 12 months
Bank loan programs	Slovak Growth Capital Fund	Providing venture capital investment for small and medium enterprises in Slovakia.
	Slovak Development Fund	Providing venture capital investment for SMEs in development phase
	Micro-loan Program	Supporting start-ups and small firms in Bratislava and Trnava regions.
	MICROloans	- Providing a direct loan to start-ups and expanding small entrepreneurs. - Offering short-term and medium-term loans for working capital

Note: Adapted from

<http://ec.europa.eu/DocsRoom/documents/5625/attachments/15/translations/en/renditions/native> ‘Member State policies to facilitate access to finance for SMEs’ (European Commission, 2014, pp.1-9).

Source: Own editing and European Commission (2014, pp.1-9)

Table 3. 3: Credit guarantee programme of Slovakia

3.2. Objectives of credit guarantee schemes

CGSs are applied in many countries around the world, and its objectives are also different from country to country (Nitani & Riding, 2005). However, the general objective of CGSs is to help SMEs overcome obstacles in accessing finance thereby supporting and promoting the development of SMEs. This further promotes the development and stability of the economy, create jobs, etc. A research by Beck et al.

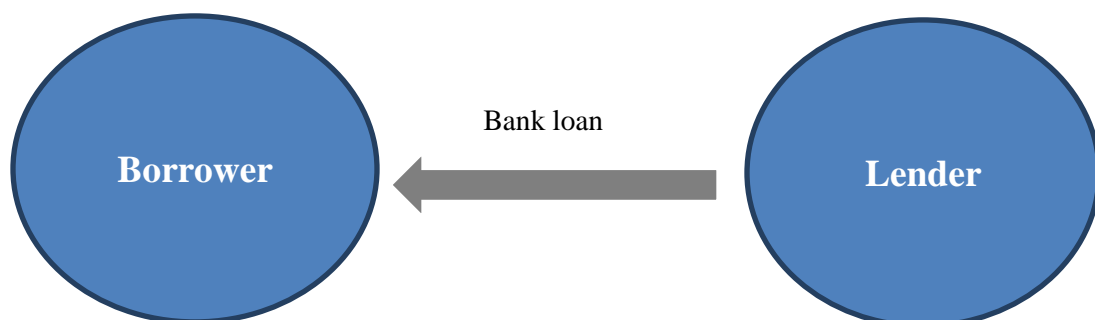
(2008) conducted a survey of 76 credit guarantee schemes in 46 countries indicated that the main objective of the program is to support SMEs. However, most scholars agree that CGSs have multiple objectives, and its goals are classified into the following levels:

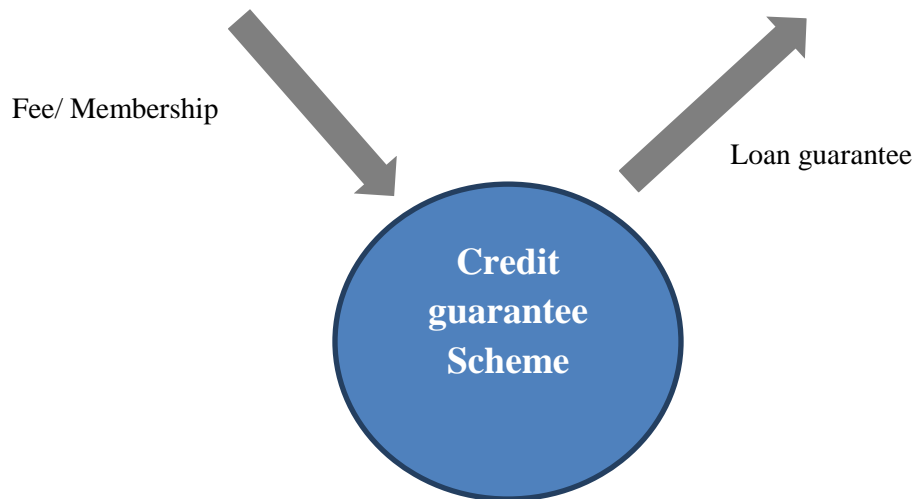
At the macro level, according to research by Ruth-Helen Samujh et al., (2012, p.25), CGSs aim to implement the objectives of the country such as:

- “Welfare and stability of society (Kang & Heshmati, 2008).
- Job creation and retention (Riding & Haines, 2001).
- Accelerating economic growth and decreasing unemployment (Kang & Heshmati, 2008).
- Reducing poverty generally (Roodman & Qureshi, 2006) or selectively, through the expansion of tiny informal sector income-generating projects (Bateman & Chang, 2009).
- Correcting imperfections in the market for small business loans (De la Torre, Martínez, & Schmukler, 2010)”

In addition, CGSs work towards other national objectives such as boosting and developing agricultural industry, industrial development or create favorable environment for investments, etc.

At the micro level, CGSs serve as an intermediary with the objective to support for borrowers and incentive for lenders.





Source: Own editing

Figure 3. 1. The function of credit guarantee schemes

For SMEs, CGSs support them by (Ruth-Helen Samujh et al., 2012, p. 26):

- “Increasing loan availability to SMEs (Nitani & Riding, 2005).
- Ensuring new business formation, development and expansion (Levitsky, 1997b; Nitani & Riding, 2005; Roodman & Qureshi, 2006).
- Improving access to finance for SMEs (Beck, Klapper, & Mendoza, 2010).
- Reducing costs of borrowing (Beck et al., 2010)”

For lenders, the credit guarantee program was designed and built with the objective incentives to (Ruth-Helen Samujh et al., 2012, p. 26):

- “Encourage banks and credit institutions lending to SMEs by loan guarantees in case the borrower fails to pay debts
- Transfer risk and risk diversification, besides the aid in the reduction of information asymmetry issue between banks and SMEs
- Overcoming information asymmetry by involving guarantors in the application and monitoring processes”

3.3. The role of credit guarantee schemes

In many countries around the world, credit guarantee scheme has a significant role and is considered as an effective financial tool. Most countries have identified that

SMEs have a key role in the development of the economy. Therefore, in order to develop the economy, investment and development for SMEs must be a priority. So, credit guarantee scheme was selected as a support tool for SMEs development through helping them overcome obstacles in accessing finance (European Investment Bank, 2014). Facts show that banks and credit institutions are not willing to lend to SMEs due to several reasons such as high risk, lack of collateral, high management costs, information asymmetry, etc. Thus, creating the phenomenon known as the financing gap SMEs face. Research by Green (2003) indicated that credit guarantee schemes have a role in promoting SMEs by assisting them to gain access to formal credit sources. At the same time, the credit guarantee schemes also have an important role in supporting start-ups, women entrepreneur and have a significant role in survival or development of SMEs.

Credit guarantee schemes have been able to create jobs, reduce unemployment; and through the services and training programs, contribute to the development of human capital (Riding and Hanes, 2001; Green, 2003). Since SMEs can access financing through credit guarantee schemes, it helps them increase business scale, savings, and financial capacity. This leads to the stability and growth of the SMEs business activities and generating more stable employment. Further, attract more workers to meet the labor needs of the scale increase, contributing to increased income for employees in SMEs. Besides consulting activities for SMEs to prepare the conditions for the guarantee loans, credit guarantee schemes have helped SMEs to adjust and increase the management capacity of business operators, in financial activities, as well as production management. Through consulting activities, credit guarantee schemes support and promote SMEs better observance of regulations and standards on accounting and finance, which contribute to improving financial management capacity. This is because if SMEs want to get guarantee loans, they must have investment projects, good business plan, a commitment to pay the debt, good management of funds, etc. SMEs also have to abide by the regulations for accounting

and financial reports; they must have a team of professional managers to prepare documents, project planning as prescribed and must be convinced to be able to borrow capital from credit institutions.

Credit guarantee schemes also have a role in the implementation of public objectives such as reducing social tensions, curbing rural-urban migration (the credit guarantee program for farmers, agriculture and rural development). And the credit guarantee schemes aim to promote and develop export businesses through the establishment of the credit guarantee fund for export (Maria Del Carmen, 2004).

In particular, during the 2008 financial crisis, the credit guarantee schemes had an important role in helping countries overcome the crisis. The evidence was that most European countries chose credit guarantees as a tool to deal with the financial crisis. At the same time, the governments used credit guarantees to help SMEs overcome the financial crisis by ensuring that SMEs can gain access to capital from banks to ensure stable production and business activities. A statistic by AECM indicated that since 2007-2009, the volume of guarantee portfolio in the EU 21 countries increased by 22% (AECM, 2013).

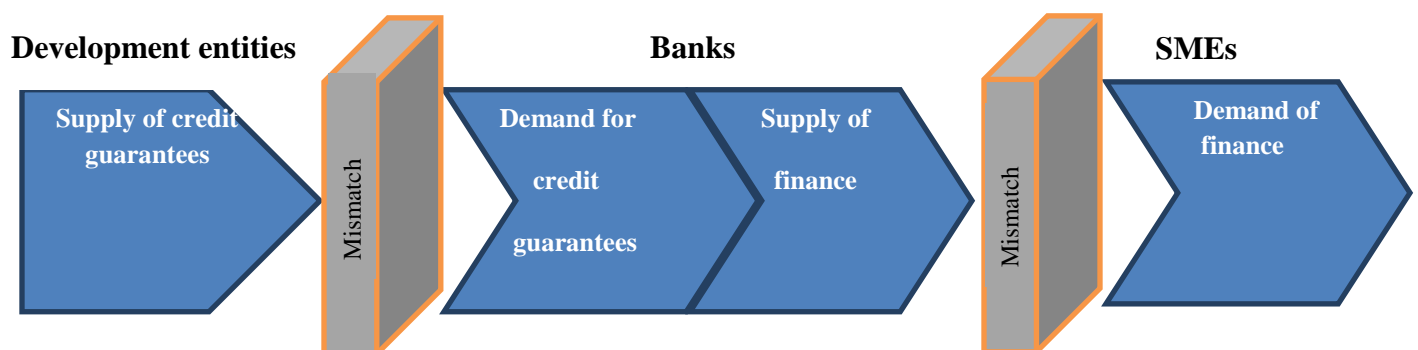
For example, to deal with the financial crisis of 2008, the Hungarian government used the Rural Credit Guarantee Foundation and Garantiqa Creditguarantee Co. Ltd as a policy tool to deal with the crisis. According to Paola Leone et al. (2012) since the financial crisis appeared in 2008, Garantiqa has tried to meet the needs of SMEs' loan. It increased double the volume of the portfolio covered by counter-guarantees from 450 billion to 900 billion HUF in 2009. In addition, Garantiqa has performed simple and quick risk assessment so that SMEs can access the capital more easily. Furthermore, it used the opportunities offered by the European Commission. Based on the permission of the European Commission, the Company implemented temporary state aid program. This program allowed Hungarian authorities to grant subsidies in the form of guarantees for investment loans, operating finance; and its funding concluded by 31 December 2010. During the implementation

of this program, market interest rates could be reduced up to 25% (as calculated by the European Commission). The guarantee covers up to 90% of the amount of mortgage loan or leasing and the guarantees that may be granted to a SME was up to € 2.5 million.

At the same time, during the crisis Garantiqa launched New Hungary Current Assets Loan Program to provide guarantee mortgage loans with lower interest rate than the market. Besides this, a program was implemented by the government to deal with the crisis, which was Széchenyi Card program. This program provided a special credit card in which loans at a discounted interest rate for micro, SMEs. The program aimed to support small enterprises during periods of the financial crisis through Garantiqa.

Thus, the government together with Garantiqa Creditguarantee Co. Ltd and other guarantee organizations have implemented a support for SMEs by providing credit guarantees, credit facilities, and loans with the discounted interest rates. All these policies were to protect enterprises against the impact of the financial crisis on enterprises and the economy, also providing them with favorable conditions for their development. It confirms the credit guarantee system is a significant policy tool of the government to deal with the financial crisis, in order to ensure economic stability and promoting economic development.

On the other hand, credit guarantee also plays an important role for the banking sector. First, credit guarantee schemes are oriented towards market failure (OECD, 2012) by reducing the financial loss suffered by credit institutions in the case of default. According to research by Deelen and Molenaar (2004), although the banks are over-liquid, but they are unable to provide credit to borrowers because of the perceived high risk of potential borrowers. Therefore, credit guarantee plays a role as an intermediary channel to unfreeze credit from the banks to the borrowers.



Source: Cécile et al., (2012) and own elaborate

Figure 3. 2. Credit guarantee plays a role as an intermediary channel to unfreeze credit from the banks to the borrowers

Negussie Efa Gurmessa et al., (2014) pointed out that credit guarantee was not only a channel to provide credit for the economy but also it helped the lenders to change their behavior to SMEs. By providing guarantee services, bank can understand more about SMEs such as their characteristics, business activities, challenges, financial requirements, etc. From which the credit guarantee program strengthens the relationship between banks and SMEs, facilitating banks to unfreeze credit with the low credit risk by diversification and risk transfer to guarantors. When the relationships between SMEs and banks are consolidated and durable, it leads to lending to SMEs with a credit guarantee that would be a new market segment and are more profitable for banks (Beck et al., 2010).

Moreover, credit guarantees play an important role in solving the problem of information asymmetry between lenders and borrowers, especially for SMEs (Negussie Efa Gurmessa et al., 2014). A research by Beck et al., (2010) stated that the asymmetric information issue will be minimized if the guarantor can get a lot of information about the borrower and shares that information with the lender. Besides credit guarantees being a channel to support banks to have more information on SMEs, it also helps banks reduce the time of tracking and collection of information. In addition, when making loan guarantees, credit guarantees reduce the burden for banks on the issue of collateral and help banks reduce costs related to the management of collateral.

3.4. The method to evaluate the effects of the credit guarantee schemes

Credit guarantee has been widely used and for a long time, its effects have drawn the attention of many scholars in the world. Most scholars agree with the views of Levitsky (1997b) that the credit guarantee has three main effects are:

- Financial additionality
- Economic additionality
- Financial sustainability

3.4.1. Assessing financial additionality

First, **financial additionality** is benefited which SMEs and banks can receive when they have participated in credit guarantee schemes:

SMEs	Banks
<ul style="list-style-type: none"> • Access to financial bank, or increasing size or expand maturities of loan • More favorable condition in interest rates or reduction in transaction cost • Reducing of collateral • Faster loan processing 	<ul style="list-style-type: none"> •Diversity and risk transfer, strengthen risk management •Reduce costs related to the management of collateral •Acquisition of expertise in the evaluation of SMEs of lending relationships leading to a progressive reduction in the use of collateral.

Source: Paola Leone et al., (2012)

Table 3. 4. Financial additionality for SMEs and banks by credit guarantee schemes

According to a research by Panetta (2012), financial additionality directly measures the effect of credit guarantee schemes on the relationship between banks and the SMEs. Green (2003) indicated that credit guarantee may improve the loan conditions, which can be taken as another form of financial additionality. These effects may include a longer repayment period, larger loan size, a less stringent collateral requirement, larger loan size, interest rate reduction, faster loan processing time, and providing loans on a more-timely basis.

On the other hand, **economic additionality** reflects the strengthening and prosperity of the entire economy by increasing access to finance of SMEs (Levitsky, 1997; Paola Leone et al., 2012; OECD, 2012). It also reflects the increase of employees, sales, profits, investment, etc of SMEs. Besides, economic additionality reflects benefits that credit guarantee schemes provide at macro-level such as to promote the development of the economy, strengthening competitiveness, etc. Credit guarantee schemes always aim to achieve economic additionality by improvements achieved among the borrowers and in the overall economy.

Therefore, the credit guarantee schemes have been effective and have brought financial additionality and economic additionality but it will be dependent on many factors such as the size, design, how to implement the program. Honohan (2010) indicated that the success of a credit guarantee scheme depends mainly on the design. A credit guarantee scheme has a good design when it ensures the provision of guarantees for SMEs which fail to access financing from the formal credit market. Credit risk assessment, coverage ratio, eligibility criteria, capital funding, the price of guarantees, staff resources, etc are the factors that make a credit guarantee scheme with a good design.

Research by Saadani et al., (2010) pointed out that the outcomes of a credit guarantee scheme should be assessed by three main dimensions: outreach, additionality, and financial sustainability. Among them, the dimension of additionality is the most important factor in assessing the effectiveness of credit guarantee scheme. Therefore, when evaluating the effectiveness and influence of a credit guarantee scheme, we need to assess the dimensions of additionality. However, evaluating the dimensions of additionality is a difficult task (Riding et al, 2007; Levitsky, 1997).

There are many empirical types of research with different methods, which provide convincing evidence of additionality. However, assessing additionality is often limited by lack of data, especially macro data. Jonsson (2009) indicated that additionality assessment has two main approaches. Firstly, by using a method that

compares the group of SMEs which received benefits from guarantee loans to the group of SMEs which received loans from banks. Nevertheless, there is a difficulty in this approach, which is to determine the appropriate control group of SMEs which received guarantee loans and the group which did not receive loan guarantees having similar characteristics. Secondly, by applying credit scoring method for determining firms, which got “additionality” from receiving loan guarantees.

Many researchers have provided positive evidence of financial additionality of credit guarantee schemes in the world. According to Paola Leone et al., (2012), many researchers have used the following methods to overcome the shortage of data when assessing financial additionality:

- Analysis of bank data and using survey of lenders
- Analysis of data of credit guarantee schemes
- Structured and semi-structured interviews with borrowers and lenders
- Analysis of lending activity under credit guarantee schemes.

At the same time, he made assessments of measurable dimension in financial additionality:

Dimension of financial	Effect of credit guarantee schemes
Accessing to credit	<ul style="list-style-type: none"> • Increasing in bank loans to SMEs who previously did not have access to credit • Increase of loan size
Loan condition	<ul style="list-style-type: none"> • Longer repayment period (time) • Lower interest rate
Relationship between banks and SMEs	<ul style="list-style-type: none"> • Reducing in collateral require by banks • More rapid loan processing • Improving borrower graduations

Source: Paola Leone et al., (2012)

Table 3. 5. Measurable dimension of financial additionality

Most studies in the past when assessing the financial additionality often used the increase in the number of guaranteed borrowers and the total value of guarantees. For example, a lot of evidence in many countries during the financial crisis in 2008 indicated that the credit guarantee scheme is an effective tool to support and increase bank loans to SMEs (OECD, 2010). Research by AECM (2010) pointed out that in order to deal with the financial crisis the credit guarantee schemes in the member states guaranteed more than 120,000 for SMEs to access finance. However, evaluation method mentioned above is no longer relevant. The empirical evidence also indicated that the financial additionality is assessed through the guarantee scheme to provide better conditions for SMEs access to finance. For instance, credit guarantee scheme helps longer-term loans, lower interest rate, reducing requirements for collateral, etc.

When researching about the impact of the guarantee program in France, Lelarge et al (2008) used the method of comparison between "Treated Firms" and the control group. This study pointed out that this scheme affected the financial problems of the beneficiary SMEs. At the same time, this study also indicated that it made the increasing volume of loans and reducing interest paid of targeted firms. Another study by Cowling (2010) also used the above method to assess the economic impact of the UK Small Firms Loan Guarantee (SFLG). This study indicated that 79% of SFLG loans were reported to be additional.

Credit guarantee system of Italy is considered to be one of the largest systems in the world and the most effective in operation. Research by D'Ignazio et al., (2012) evaluated the effect of the credit guarantee schemes of Italy in 2008. This study was conducted with a large sample of firms and determined the control group. This study indicated that credit guarantee schemes have great significance in increasing long-term loans and reduce the interest rates of the targeted firms. In addition, Zecchin et al. (2009) and Columba et al., (2010) also used this method to assess the impact on the Guarantee Fund and Mutual Guarantee Italian societies in Italy. Particular, Zecchin et al. (2009) pointed out that the Italian Guarantee Fund reduced borrowing cost of SMEs

and ease financing constraint. This research also indicated that Italian Guarantee Fund has a significant role in promoting the emergence of the national credit guarantee system. Research by Columba et al., (2009) also pointed out the effect of credit guarantee schemes which was decreasing interest rate by 0.2% for SMEs which received guarantee loans. At the same time, Mutual guarantee societies increase in the size of finance, the number of beneficiary SMEs, better credit condition, etc. Besides, research by Bartol et al., (2012) when studying Italian Confidi, indicated that mutual guarantee schemes increased the credit line for SMEs and affected the relationship between SMEs and banks. SMEs received guarantee can improve their creditworthy and credit position. In addition, there are a lot of other methods for assessing financial additionality of credit guarantee schemes (see Appendix I)

3.4.2. Assessing economic additionality

A research by the OECD (2013) indicated that:

“Economic additionality describes the effect of increased access to finance on overall economic welfare, as measured by changes in sales, employment, investment and innovation performance of the small businesses supported. At the aggregate level, the SME financing gap translates into reduced growth and lower economic welfare. Thus, at the macro level, economic additionality is measured by the effects on the competitiveness and economic growth, taking into account both the indirect benefits of CGSs, including knowledge flows, learning and upgrading of financial skills, and their broad opportunity costs”.

Besides, Paola Leone et al., (2012) assessed measurable dimension of economic additionality base on:

Dimension of economic additionality	Effect of credit guarantee scheme
Improvements in commercial and economic activity	<ul style="list-style-type: none"> • Increase in investments of firms/sector benefited • Increase in new product developed by firms benefited

	<ul style="list-style-type: none"> • Increase of sales in firms benefited • Increase in performance ratio in firms benefited • Increase in the number of employees
Improvement in income and quality of life	<ul style="list-style-type: none"> • Increase in entrepreneurs' income • Increase in employees' income
Improvement in welfare	<ul style="list-style-type: none"> • Increase in tax income

Source: Paola Leone et al., (2012)

Table 3. 6. Measurable dimension of economic additionality

Assess additionality economy is difficult and challenging because of the lack of macro data, difficulties in defining the model for evaluation, etc. However, there are many studies assessing the impact of economic additionality of credit guarantee schemes in the world. According to research by Oh et al., (2009), credit guarantee schemes in Korea affected the development, the survival, and operation of R & D, investment of the enterprises, etc. This research used propensity score matching to indicate the impact of the guarantee program on the Korean economy in the period 2000-2003 and its impacts on recovery of the economy after the Asian financial crisis. At the same time, this research indicated that the credit guarantee programs in Korea made an increase in the development of companies in sales, employment, wages, etc.

To assess economic additionality of German Guarantee Banks, Schmidt et al., (2010) applied modeling approach. The authors carried out a survey of 1,200 companies and based on statistical data of the German Guarantee Banks to analyze the economic impact of the credit guarantee and make forecasts for the period 2009-2015. This research indicated that credit guarantee increased GDP EUR 3.4 Billion per year and reduce the number of unemployed by 23,200 per year. In addition, a research by Riding et al. (2001), studied the Canadian Small Business Loan Atc (SBLA) which was conducted with 682,682 granted firms and 850,000 firms as the control group in 1995. In this research, the authors used descriptive analysis methods and conducted a survey by telephone to collect data. With this method, the authors wanted to determine

the impact of the loan guarantee program on revenues, profits, employment, etc, and compare with the control group's performance. The results of this study indicated that SBLA has an important influence in financing the start-up of new businesses and extremely efficient means of job creation.

Another method which is also applied by many authors to assess economic additionality is OLS regression model. For example, Book and Sheriff (2005) used OLS regression model to study the effects of the New Principal Guarantee Scheme (NPGS). This study used a questionnaire to collect data of 92 borrowers; at the same time, researched 15 case studies from 1998 to 2000. The result of this research pointed out that NPGS positive impact and meaningful correlation with the annual average level of employment in a local market, increased state tax revenues. Moreover, NPGS affected employment growth of 15 case study firms. Research by Craig et al., (2010) also used the method above to assess the impact of economic additionality of Small Business administration guaranteed lending program. With this study, the authors assessed annual average employment rate during the period from 1991-2001 with a sample of 357,442 firms. The results from this study indicated that this program has a high correlation between employment generation and level of granted loans. Besides, there are many other studies, which applied different methods to assess the economic additionality of credit guarantee schemes around the world (see Appendix II)

3.4.3. Assessing financial sustainability

According to the research by OECD (2013), indicated that:

“Financial sustainability refers to the ability of the scheme to generate autonomously the net resources required for operating. In other terms, it indicates the degree to which the scheme depends on public funds, or the public subsidy component implied in its operation.”

The objective of the credit guarantee scheme is to support SMEs overcome obstacles in finance and promote their development. Therefore, to ensure that the credit guarantee schemes, as well as the credit guarantee institutions, operate

efficiently and for long periods, the guarantors need to be a concern with, and evaluate the sustainability of the credit guarantee scheme. Guarantors should evaluate whether the credit guarantee scheme has the capacity for rational use of resources and ensures the financial autonomy for the duration of its operations. Efficiency and sustainability of the credit guarantee scheme depend mainly on its design. The design of the credit guarantee scheme will affect the structure, how it works and how it's governed. In which, the factors such as targeted firm, coverage ratio, risk management, guarantee fee, etc will determine additionality of the credit guarantee scheme. Besides, the credit guarantee scheme whether financial sustainability, it must minimum default rates, cover the operating costs. At the same time, credit guarantee scheme must have coverage ratio and fee structure suitable for the type of customer, the risk level of the customer. In addition, credit guarantee program should be monitored, clear and certain in its operation; this is also a factor for the stability of the credit guarantee program.

To determine financial sustainability of the credit guarantee scheme, according to Paola Leone et al., (2012), we need to consider the following issues:

Dimension of financial sustainability	Credit guarantee scheme's performance indicator
Quantity and quality of guarantee portfolio	<ul style="list-style-type: none"> • Leverage rate • Default rate • Pay-out rate • Net loss rate • Recovery rate • Guarantee portfolio at risk
Profitability of the business	<ul style="list-style-type: none"> • Return on guarantee and service • Return on investment
Efficiency	<ul style="list-style-type: none"> • Cost to income • Time to issue a guarantee • Time to pay-out claim

Source: Paola Leone et al., (2012)

Table 3. 7. Evaluating financial sustainability of credit guarantee scheme

Evaluating the sustainability of the credit guarantee scheme is done mainly on the annual financial report. These studies often use qualitative methods to assess the performance indicators of the credit guarantee program (Green, 2003; Deelen and Molenaar, 2004; European Commission, 2006; Davies, 2007).

To assess financial sustainability, the default rate is one of the indicators, which is commonly used. This indicator has important significance in pointing out the costs of credit guarantee programs, which have resulted from honoring default. Reduction the default rate of credit guarantee programs can be done by preventing moral hazard in risk sharing, to evaluate creditworthiness and implement the process of monitoring with small-scale borrowers. A research by KPMG (2012) conducted a survey in the 9 largest credit guarantee institutions in Europe and Asia; the credit guarantee program was used as a tool of crisis prevention and support for SMEs. This study indicated that default rate increased in most of the cases during the financial crisis in 2008. According to research by Green (2003), credit guarantee scheme had a low default rate which could imply limited activity and high-risk aversion. In contrast, a credit guarantee scheme with high default rate implied inefficiencies in the scheme that incentives its use for poor credit propositions and will lead to the depletion of the fund if it is not consistently supported through subsidies or sufficient income from investment (Jonsson, 2009).

According to Honohan (2010) and Levitsky (1997), the leverage ratio is one of the important indicators reflecting the level of financial sustainability of a credit guarantee scheme. It evaluates to what extent the credit guarantee scheme can expand its portfolio of guarantees, and it also measures the impact of the endowment of a scheme's own funds on lending activity. A credit guarantee scheme with a high leverage ratio reflects its ability to mobilize a relatively high amount of credit finance for SMEs. A research by Deelen and Molenaar (2004) indicated that well-functioning credit guarantee scheme attains leverage ratio from 5:1 to 10:1. However, there is much evidence to suggest that credit guarantee scheme has a long operating time and

operating in the developed countries can achieve leverage ratio up to 26 times the own fund's value. In some developing countries due to the unstable macroeconomic environment, these countries maintain leverage ratio at 5 times or at most ten times the fund's own value. Nevertheless, a low leverage ratio may reflect a lack of understanding or lack of reputation of the credit guarantee program for borrowers. In this case, banks, as well as borrowers, do not trust the guarantee program which will do guarantee obligations for them. In fact, young credit guarantee schemes usually have a low leverage ratio. A research by Levitsky (1997) indicated that a credit guarantee scheme that has leverage ratio less than 3 after 5 year's operation should raise concerns about its effectiveness. This indicator is diversified across credit guarantee programs around the world, in which there are many programs with a high ratio (above 10) such as SOCAMA and SIAGI (France), German Guarantee Banks (Germany), Confidi (Italy) and Garantiqa (Hungary).

Credit guarantee scheme	Country	Year foundation	2007	2008	2009	2010	2011
SOCAMA	France	1968	28.87	32.27	33.57	31.93	34.6
SIAGI	France	1966	10.39	10.6	11.11	11.6	n.a.
VDB	Germany	1949	15.93	15.56	15.52	13.83	n.a.
AVHGA	Hungary	1991	2.61	2.71	2.86	2.73	2.9
Assoconfidi	Italy	1975	n.a.	n.a.	n.a.	10.24	9.6
Fedartfifi	Italy	1994	7.53	6.87	7.51	n.a.	n.a.
Federconfidi	Italy	1910	5.55	10.64	13.48	n.a.	n.a.
Fincredit	Italy	1992	7.38	29.36	32.11	n.a.	n.a.
Federascomfidi	Italy	1944	12.07	4.38	4.66	n.a.	n.a.
Federfidi	Italy	1971	12.98	21.53	21.28	n.a.	n.a.
Coldiretti	Italy	1944	6.97	7.08	6	n.a.	n.a.
SGR/CESGAR	Spain	1982	9.36	9.19	9.46	9.14	9.1
Romania	FRGC-RLGPE	1994	0.99	1.31	1.54	1.52	1.5
NoBEG	Austria	1969	3.65	3.9	3.48	3.41	3.5
Garantiqa	Hungary	1992	12.63	13.6	16.23	21.11	24
BGK	Poland	1996	n.a.	n.a.	1.02	2.4	2.2
SPGM/SCM	Poturgal	1994	2.24	4.13	6.22	5.93	4.4
FGCR-Rural	Romania	1994	3.16	2.86	3.12	1.07	1.8
AWS	Austria	1955	16.56	16.93	19.15	18.03	17.7
NGF	Bulgari	2005	n.a.	n.a.	n.a.	0.77	1.5

CMZRB	Czech Rep.	1992	2.49	2.72	3.42	4.15	3.7
KredEx	Estonia	2001	6.17	2.99	3.47	4	4.9
ETEAN S.A.	Greece	2004	0.33	0.56	2.06	1.78	3.4
SFGA-ISMEA	Italy	2008	19.43	20.49	n.a.	n.a.	17.4
LGA	Latvia	2005	2.68	2.44	2.44	0.87	0.9
INVEGA	Lithuania	2001	15.17	11.59	12.75	10.83	17.2
Garfondas	Lithuania	1997	4.21	4.09	5.15	4.57	3.8

Source: AECM

Table 3. 8. Leverage ratio of credit guarantee schemes in Europe from 2007-2011

When evaluating financial sustainability, more researchers are also concerned about the capacity of the credit guarantee program in covering its costs. In which, the cost of the guarantee program primarily includes operating expenses and losses from loan default. On the other hand, the income of the credit guarantee scheme comes from guarantee fees, subsidies, revenue from investing in the guarantee fund itself. In which, guarantee fee contributes primary income of credit guarantee scheme, and it ensures sustainability as well as incentives for lenders and borrowers (Beck et al., 2008). At the same time, guarantee fee also needs to ensure covering default risks and limiting government intervention (Graham, 2004). Further, more evidence indicated that guarantee fee if calculated based on the risk level of the borrower can decrease the dependence of the guarantee program.

According to research by Green (2003), if the income of the credit guarantee program just relies on guarantee fee, this is not enough to cover operational cost and losses. Therefore, to ensure sustainability, credit guarantee scheme needs to receive financial support from the government or other forms of support such as co-guarantees, counter-guarantee, support guarantee fee, etc. At the same time, when the credit guarantee scheme received support from the government, they need to implement the objectives set out by the government.

On the other hand, the researchers paid less attention to the costs of credit guarantee schemes (operating expenses, underwriting losses, and provisioning). The researchers often use the method of evaluation and monitoring at the local level without performing comparative analysis method. The scholars mainly focus on

studying the model of credit guarantee schemes, credit guaranteed funds, which have the best performance in funding. According to research by Beck et al., (2010) conducted on 76 credit guarantee schemes across developed and developing countries, private credit guarantee programs have financial activities better and stable than the public schemes. This study also pointed out that private credit guarantee scheme focuses on assessing and managing risk to ensure financial sustainability meanwhile public schemes have other targets than financial sustainability.

In many countries, the credit guarantee scheme is a policy tool to support SMEs; in particular, it assists SMEs overcoming obstacles on credit. Therefore, sustainability is assessed by helping SMEs overcome obstacles in accessing finance and reduction in guarantee premia. Sustainability of a credit guarantee scheme also is evaluated by using public resources to achieve goals such as promoting the development of SMEs, creating more jobs, economic development, etc.

To evaluate the sustainability of a credit guarantee scheme, one of the common methods is applied by using the indicator of fund's deficit. It is developed by Zecchini and Ventura when assessing financial sustainability of Italian Guarantee Fund from 2000 to 2004. This indicator is defined as a number of expenses not covered by revenues divided by the volume of outstanding guarantees. This research indicated that this ratio of Italian Guarantee Fund was 0.0028, which means on average 0, 28% of a guaranteed Euro is paid through public subsidy.

Another study of Deellen and Molenaar (2004) used questionnaires to survey, it wanted to help credit guarantee scheme to achieve financial sustainability at any cost. The author pointed out that credit guarantee schemes need enough income to be independent in finance, from which credit guarantee schemes can provide incentives for efficient management and organization. At the same time, this approach included overly risk-averse, including behavior on the part of the scheme means that only the enterprises which have high creditworthy can achieve loan guarantees. However, it can be applied to enterprises, which have risked such as SMEs, in which case SMEs is the main target of the credit guarantee scheme. Or, it could apply to special objects such as

start-up business, woman entrepreneurs, enterprises which are located in the disadvantaged area; or when the loan guarantee is considered a policy tool to support enterprises.

There are many researchers who used different methods to assess financial sustainability; however, proven and assessment financial sustainability is a difficult task due to lack of specific data and timely data. In particular, when assessing the individual scheme is restricted, where relevant authorities do not produce a separate financial statement. Moreover, difficulties in assessing the credit guarantee scheme which is supported and implement policies of the government. Therefore, when evaluating financial sustainability of the credit guarantee scheme, we need to account for public or private resources used. At the same time, the government, policy-makers, researchers required further studies to evaluate the accuracy of the financial sustainability of credit guarantee schemes.

Chapter IV. Data and analysis

4.1. Introduction

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 in 4.2.

4.2. Testing of Hypothesis

4.2.1. Testing hypothesis 1:

- **H₀**: There is no evidence what indicate that the credit guarantee system contributed to the development of the Hungarian economy
- **H_A**: There is evidence what indicate that the credit guarantee system contributed to the development of the Hungarian economy

To determine if the credit guarantee system contributed to the development of the Hungarian economy, the author used VAR Granger Causality model to test the hypothesis above. 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. The data

of two variables was collected by quarterly from 2000-2014 and used in Eview for the test.

Causality test				
Granger causality	Lags	Guaranteed loans ---> GDP	GDP ---> Guaranteed loans	Test
Guaranteed loans ---> GDP	2	2950342 (0,0000)*	2245038 (0,0000)*	VAR model

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

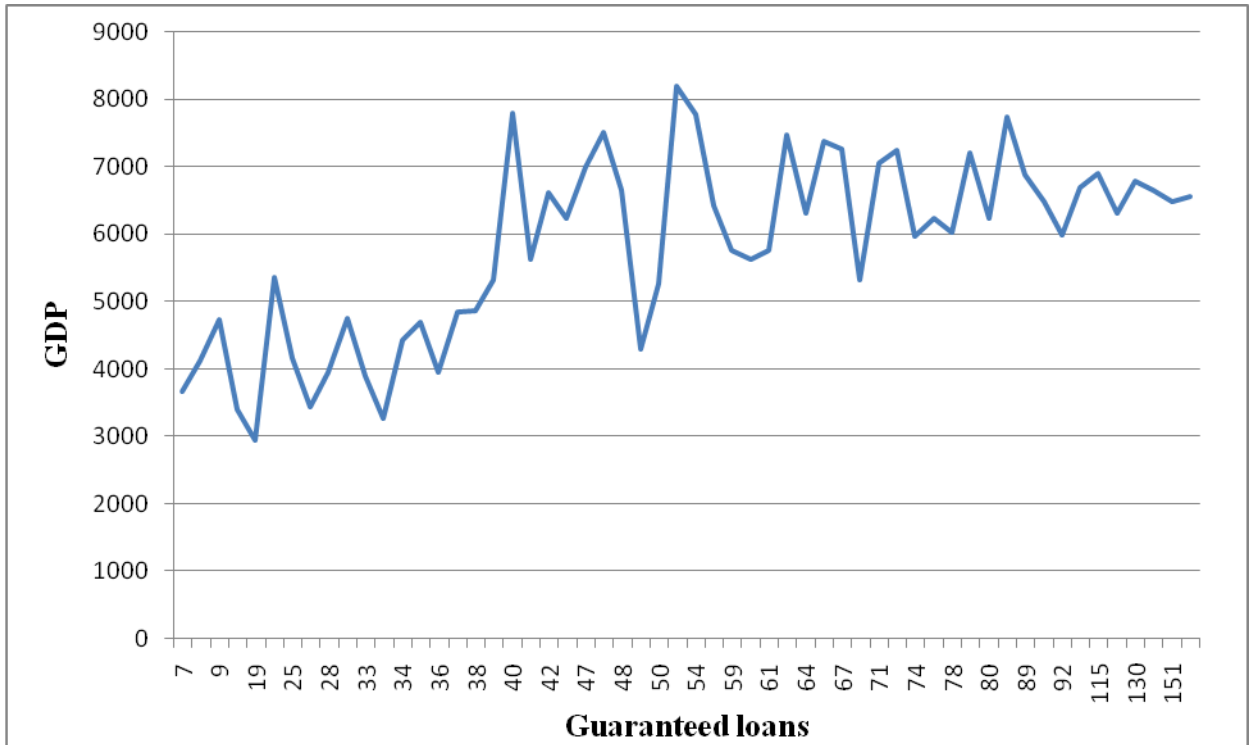
Source: Own edition and calculations (EVIEW)

Table 4. 1. Test H1 by using VAR Granger Causality model

From the table above we can observe 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 reject the hypothesis H_0 and accept hypothesis H_A : There is evidence what indicate that the credit guarantee system contributed to the development of the Hungarian economy.

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.

First, the author draws GDP's graph based on guaranteed loans to predict the functional form.



Source: Own edition

Figure 4. 1. GDP's graph based on guaranteed loans (Billion HUF)

Base on the graph above we can see GDP depend on guaranteed loans by Linear-Log model, the author selected the following function to test the hypothesis:

$$GDP = C (1) + C (2)*Log (GRT)$$

(GRT: guaranteed loans by credit guarantee system by quarterly from 2000-2013; GDP: gross domestic product at current prices)

The data was analyzed with Eview software, and the following regression function was obtained:

$$GDP = -8771705+ 1348733*Log (GRT)$$

Linear-Log model	
	There is evidence what indicate that the credit guarantee system contributed to the development of the Hungarian economy
R-squared	0.450063
Coefficient	1348733

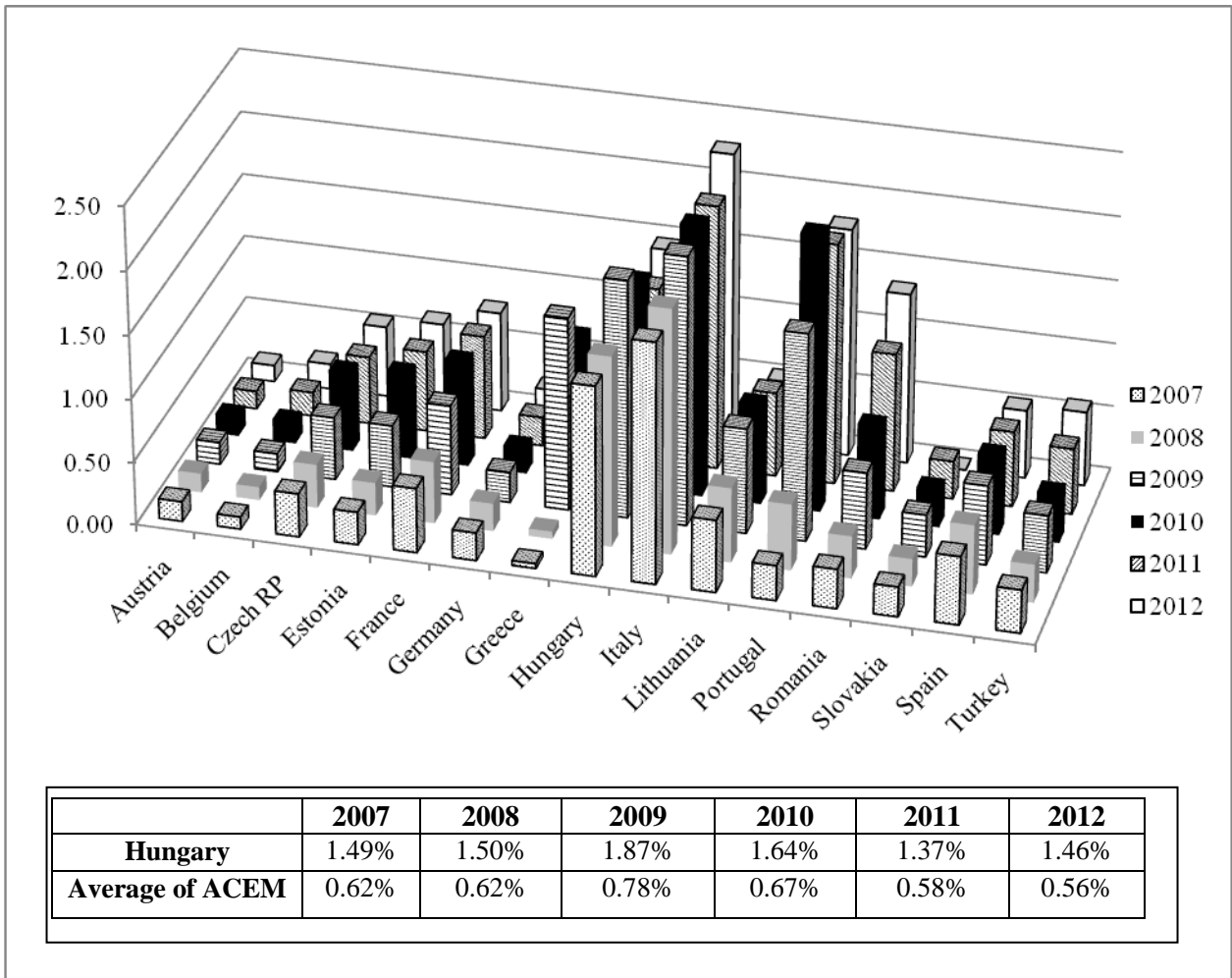
Prob (F-statistic)	0.0000
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Source: Own edition and calculations (EVIEW)

Table 4. 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 H_A is appropriate and acceptable: There is evidence what indicate that the credit guarantee system contributed to the development of the Hungarian economy.

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.



Source: <http://www.aecm.eu>, <http://ec.europa.eu/eurostat> and own elaboration

Figure 4. 2. Outstanding guarantees to GDP in Europe in the period 2007-2012 (%)

Looking at Figure 4.2, 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.

Figure 4.2 shows that for all AECM members the ratio of outstanding guarantees to GDP has trend increasing, in which only Hungary, Italy, Portugal are three countries have increased steadily over the years, stable and have this ratio more than 1% GDP. Remaining countries have a very low index and are less than 1% of GDP. Compared from 2007 to 2012, Italy (1.89%, 1.92%, 2.11%, 2.13%, 2.08%, 2.28%, 2.11%) increased their proportion towards the value of economic activity while Hungary remained stable (1.49%, 1.50%, 1.87%, 1.64%, 1.37%, 1.46%) and Portugal increased rapidly from 0.27% in 2007 to 1.63% in 2009 and maintained this ratio is high 2010 (2.18%), 2011 (1.89%), 2012 (1.8%).

All countries of ACEM used credit guarantee were a tool to avoid and overcome the financial crisis. In the year 2009, almost all numbers increased. The most significant increase can be recorded in Italy (2.11%), Hungary (1.87%), Portugal (1.63%), and Greece (1.51%). We can confirm that the credit guarantee system of Hungary in which the role of Garantiqa has an important impact on the stability and development of the Hungarian economy, especially to help Hungarian economy overcome the financial crisis.

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:

Year	Potential GDP decrease in the lack of credit guarantee system (%)	Potential GDP decrease (Billion HUF)
2000	0.65	8,703
2001	0.77	11,893
2002	0.92	15,964
2003	0.84	16,063
2004	1.19	25,021
2005	0.76	17,099
2006	0.83	20,139

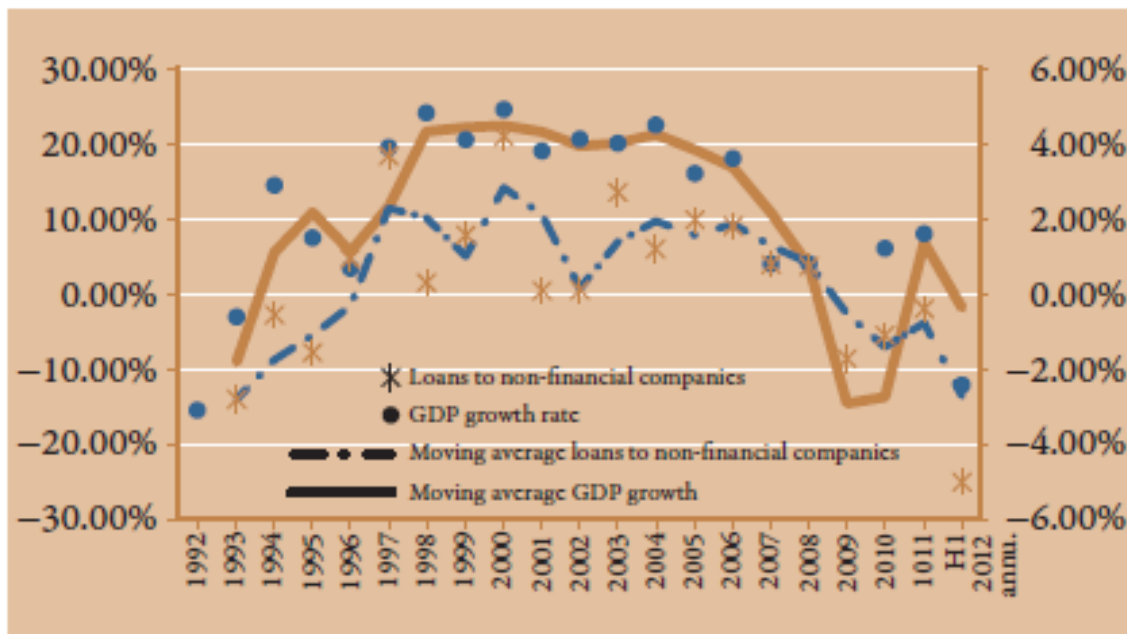
2007	0.97	24,852
2008	1.09	29,381
2009	1.32	34,699
2010	1.16	31,327
2011	0.89	24,937
2012	0.87	24,989
2013	1.01	30,469
Total	13.29	315,538

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

Table 4. 3. 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).

At the same time, the research by Kovács Levente (2012) indicated that economic growth is based on active corporate lending. This research pointed out the correlation of a 2% increase in corporate lending generating a 1% growth in GDP from 1992 to 2012. Figure 4.3 shows the relationship between growth in GDP and corporate lending, and revealing that the actual values and moving averages move together.



Source: Expert estimate by Péter Csillik based on figures of the Hungarian Financial Supervisory Authority and the MNB

Figure 4. 3. Changes in the volume of corporate loans (net of inflation) and GDP growth

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 significant role and is useful financial tool to promote growth and economic development.

4.2.2. Testing hypothesis 2:

- **H₀:** Credit guarantee has no supporting role for SMEs by increasing loan availability to SMEs, improve access to finance for SMEs

- **H_A:** 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 to SMEs, improve access to finance for SMEs, a Linear-Log model was applied using EVIEW.

First, the author draws Loans to SMEs by banks' graph based on guaranteed loans to predict the functional form.



Source: Own editing

Figure 4. 4. Loans to SMEs by banks’ graph based on guaranteed loans

Base on the graph above we can see Loans to SMEs by banks depend on guaranteed loans by Linear-Log model, the author selected the following function to test the hypothesis:

$$LSME = C (1) + C (2)*Log (GRT)$$

(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:

$$LSME = -9419.620+ 2228.756*Log (GRT)$$

Linear-Log model	
	Credit guarantee has a supporting role for SMEs by increasing loan availability to SMEs, improve access to finance for SMEs
R-squared	0.771945
Coefficient	2228.756
Prob (F-statistic)	0.000035

Source: Own edition and calculations (EVIEW)

Table 4. 4. 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 H_A is appropriate and acceptable: Credit guarantee has a supporting role for SMEs by increasing loan availability to SMEs, improve access to finance for SMEs.

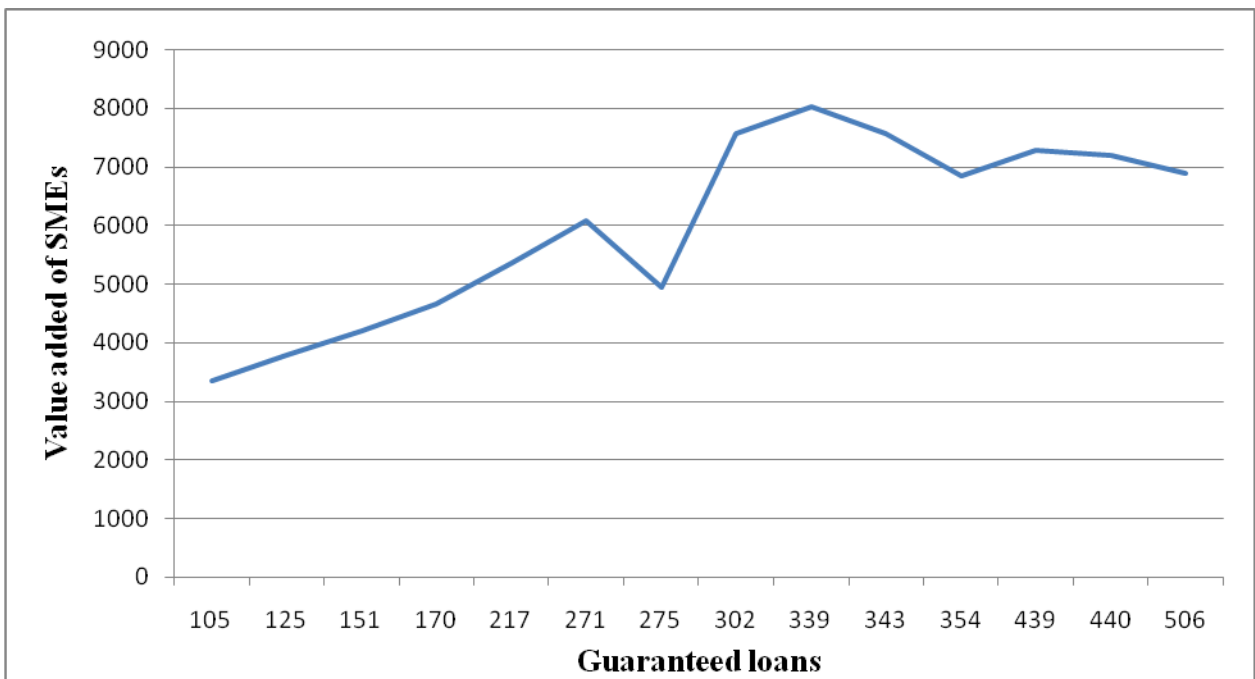
4.2.3. Testing hypothesis 3:

- **H₀**: Credit guarantee has no significant role in increasing value added of SMEs in Hungary

- **H_A**: 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 draws Value added of SMEs's graph based on guaranteed loans to predict the functional form.



Source: Own editing

Figure 4. 5. Value added of SMEs’s graph based on guaranteed loans (Billion HUF)

Base on the graph above we can see Value added of SMEs depend on guaranteed loans by Linear-Log model, the author selected the following function to test the hypothesis:

$$VDS = C (1) + C (2)*\text{Log} (GRT)$$

(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:

$$VDS= -10013.48+ 2875.790* \text{Log} (GRT)$$

Linear-Log model	
R-squared	0.804381
Coefficient	2875.790
Probe (F-statistic)	0.000014

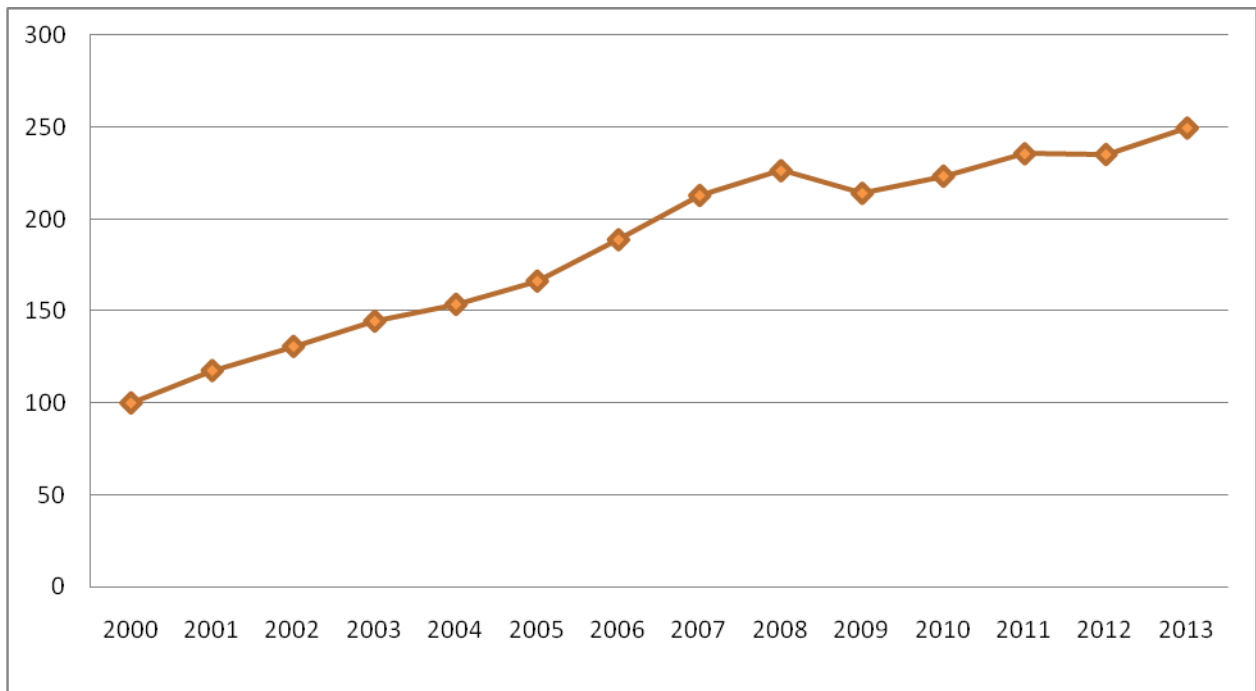
Source: Own edition and calculations (EVIEW)

Table 4. 5. 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.



Source: <https://www.ksh.hu> and elaboration

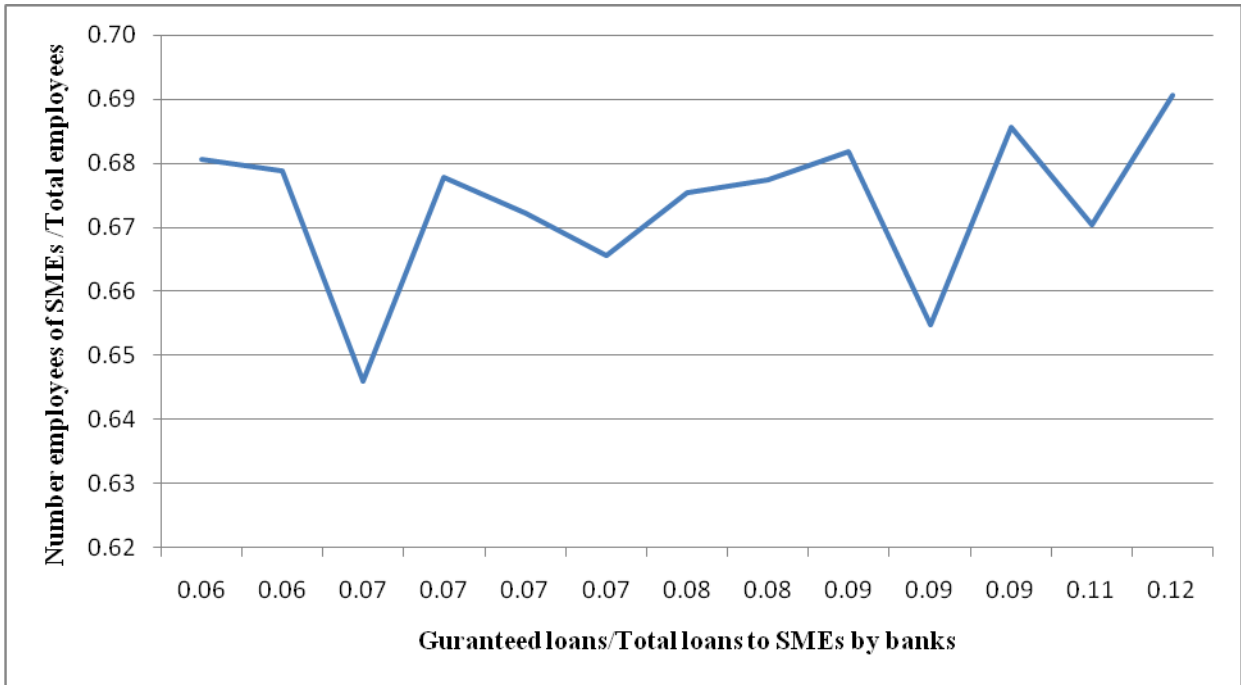
Figure 4. 6. Value added created by SMEs of Hungary (2000=100%)

4.2.4. Hypothesis 4:

- **H₀**: There is no positive correlation between credit guarantee and the increasing employees of SMEs in Hungary.
- **H_A**: 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 draws Number employees of SMEs /Total employees' graph based on guaranteed loans/ Total loans to SMEs by banks to predict the functional form.



Source: Own editing

Figure 4. 7. Number employees of SMEs /Total employees’ graph based on guaranteed loans/ Total loans to SMEs by banks

Base on the graph above we can see Number employees of SMEs /Total employees depend on guaranteed loans/ Total loans to SMEs by banks by Linear-Log model, the author selected the following function to test the hypothesis:

$$ESMTT = C (1) + C (2)*\text{Log} (GRLE)$$

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

Linear-Log model	
	There is a positive correlation between credit guarantee and the increasing employees of SMEs in Hungary
R-squared	0.385291
Coefficient	0.037838
Prob (F-statistic)	0.0236

Source: Own edition and calculations (EVIEW)

Table 4. 6. 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 H_A is appropriate and acceptable: There is a positive correlation between credit guarantee and the increasing employees of SMEs in Hungary.

4.2.5. Testing hypothesis 5

a. Testing hypothesis 5a:

- **H₀**: There is no positive correlation between guarantee loans and sales of SMEs, which received guarantee loans from the credit guarantee institutions in Hungary.

- **H_A**: 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	
Chi-Sq. Statistic	22.560417
Chi-Sq. d.f.	1
Prob.	0.0000

Source: Own edition and calculations (EVIEW)

Table 4. 7. 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	
	There is a positive correlation between guarantee loans and sales of SMEs, which received guarantee loans from the credit guarantee institutions in Hungary
R-squared	0.996506
Coefficient	-0.007716
Prob (F-statistic)	0.0002

Source: Own edition and calculations (EVIEW)

Table 4. 8. 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 H_0 and accept hypothesis H_A : There is a positive correlation between guarantee loans and sales of SMEs, which received guarantee loans from the credit guarantee institutions in Hungary.

b. Testing hypothesis 5b:

H_0 : There is no 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.

H_A : 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 must check Hausman ratio to choose which model (Fixed effect model or Random effect model) will be used.

Hausman Test	
Chi-Sq. Statistic	8.182772
Chi-Sq. d.f.	1
Prob.	0.0042

Source: Own edition and calculations (EVIEW)

Table 4. 9. 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

Fixed effect model	
	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
R-squared	0.926926
Coefficient	0.000693
Prob (F-statistic)	0.000000

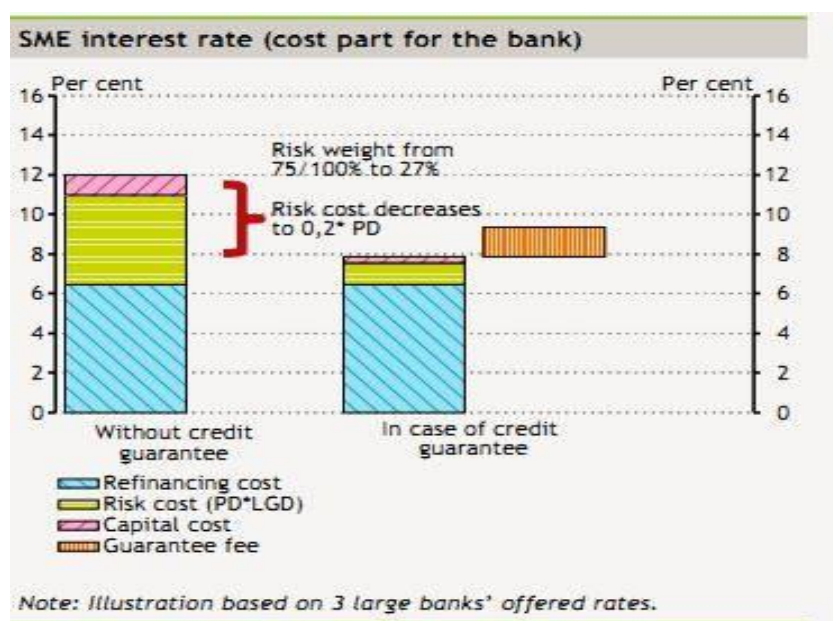
Source: Own edition and calculations (EVIEW)

Table 4. 10. 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 H_0 and accept hypothesis H_A : 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 Report on financial stability (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.



Source: Magyar Nemzeti Bank (2012)

Figure 4. 8. The role of credit guarantee in reducing the interest rates of SMEs

c. Testing hypothesis 5c:

- **H₀:** There is not a positive correlation between guarantee loans and investment of SMEs, which received guarantee loans from the credit guarantee institutions in Hungary.

- **H_A:** 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.

Hausman Test	
Chi-Sq. Statistic	4.567985
Chi-Sq. d.f.	1
Prob.	0.0326

Source: Own edition and calculations (EVIEW)

Table 4. 11. 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

Fixed effect model	
	There is a positive correlation between guarantee loans and investment of SMEs, which received guarantee loans from the credit guarantee institutions in Hungary
R-squared	0.940442
Coefficient	-2.49E-07
Prob(F-statistic)	0.0062

Source: Own edition and calculations (EVIEW)

Table 4. 12. 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 H_0 and accept hypothesis H_A : There is a positive correlation between guarantee loans and investment of SMEs, which received guarantee loans from the credit guarantee institutions in Hungary.

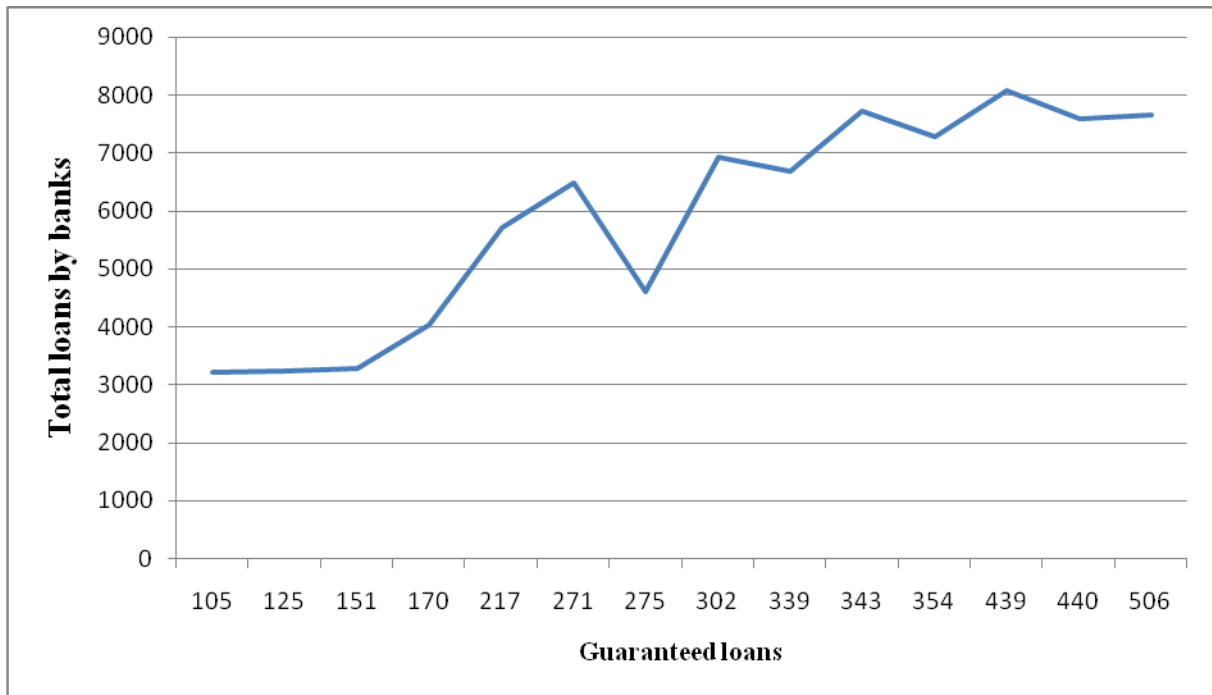
4.2.6. Testing hypothesis 6:

- **H₀**: Credit guarantee cannot provide incentives for the lender by encouraging banks to lend to enterprises.

- **H_A**: 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 draws Total loans by banks' graph based on guaranteed loans to predict the functional form.



Source: Own editing

Figure 4. 9. Total loans by banks' graph based on guaranteed loans

Base on the graph above we can see Total loans by banks depend on guaranteed loans by Linear-Log model, the author selected the following function to test the hypothesis:

$$TL = C (1) + C (2)*\text{Log} (GRT)$$

(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:

$$TL = -13810.44 + 3542.719 * \text{Log} (GRT)$$

Linear-Log model	
	Credit guarantee can provide incentives for the lender by encouraging banks to lend to enterprises
R-squared	0.886449
Coefficient	3542.719
Prob(F-statistic)	0.000001

Source: Own edition and calculations (EVIEW)

Table 4. 13. Test hypothesis H6 by using Linear-Log model

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 H_A : 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.

According to research by the European Commission (Best Reports, 2006), the credit guarantee system in Hungary was evaluated as highly successful practice. Credit guarantee institutions implement the procedure of guarantee issued under special

commitment with the banks. They had been looking for a method to undertake guarantees in bulk, yet in a prudent, risk-sensitive. With this way helps cost-saving for the banks and credit guarantee institutions. Furthermore, conditions of creditworthiness are defined for each specific product initiated by the partner bank. The credit guarantee institutions have applied the software in decision-making in the credit and the guarantee assessment; it helps to save time for the partner banks and credit guarantee institutions.

In addition, the credit guarantee institutions also provide to banks other benefits such as up to date information about the risks of SMEs. Information specific credit of the borrowers in the process of working with credit guarantee institutions will be collecting, that information will be provided to a credit bureau and banks. It will create a large database of SMEs; banks may use this information to assess the risk of SMEs while minimizing the risk of the lending process with SMEs.

Credit guarantee system is a policy instrument of the Hungarian government to support SMEs and the government indirect support credit guarantee institutions through support interest for SMEs. It means that SMEs and banks engage in lending to SMEs, will be entitled to the benefits and minimize the risks due to having the guarantee of credit guarantee institutions. Credit guarantee system has affected the participation of banks in the market segment of SMEs with the policies and mechanisms. Credit guarantee system also affects its banking partners by continuing to implement the policy guarantees and help banks understand and aware more about benefits of this market for lending to SMEs. When banks were aware of the benefits of this market segment, the bank will participate in targeted SME sector and participate in this market segment. Thus, it will create competition among banks in this market segment. The banks will create products and services better, more attractive interest rates for SMEs. Since the competition that will help financial market and lending market is increasingly stable and developing stronger.

Their results of hypotheses show that all the alternal hypotheses were accepted.

H1	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, the 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.	T1	The credit guarantee system contributed to the development of the Hungarian economy
H2	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 obstacle. By providing credit guarantees, the credit guarantee institutions increase to access bank financing for SMEs and reduce their credit constraint.	T2	Credit guarantee has a supporting role for SMEs by increasing loan availability to SMEs, improve access to finance for SMEs
H3	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, credit guarantee institutions promote the development of SMEs.	T3	Credit guarantee has a significant in increasing value added of SMEs in Hungary.
H4	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.	T4	There is a positive correlation between credit guarantee and the increasing employees of SMEs in Hungary.
H5	When SMEs receive loan guarantees from credit guarantee institutions, it will make changing in their status and performances. Meaning that guarantee loans with favorable conditions can promote SMEs increasing sales, increase their R&D and investment and	T5a	There is a positive correlation between guarantee loans and sales of SMEs, which received guarantee loans from the credit guarantee institutions

	<p>hence productivity growth, reduce financial cost.</p> <p>H5a, There is a positive correlation between guarantee loans and sales of SMEs, which received guarantee loans from the credit guarantee institutions in Hungary.</p> <p>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.</p> <p>H5c, There is a positive correlation between guarantee loans and investment of SMEs, which received guarantee loans from the credit guarantee institutions in Hungary.</p>		<p>in Hungary.</p>
		T5b	<p>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.</p>
		T5c	<p>There is a positive correlation between guarantee loans and investment of SMEs, which received guarantee loans from the credit guarantee institutions in Hungary.</p>
H6	<p>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 the risk for the bank, transfer risk to the credit guarantee institutions, reduce costs related to collateral assets, etc.</p>	T6	<p>Credit guarantee can provide incentives for the lender by encouraging banks to lend to enterprises.</p>

Source: Own edition

Table 4. 14. The results of hypotheses

4.3. The performance of credit guarantee system

The operation of credit guarantee system of Hungary mainly based on two main players Garantiqa and Rural Credit Guarantee Foundation. From the start of operations, two organizations above focus towards providing service guarantees for SMEs.

To promote SMEs in developing, enhancing competition, supporting SMEs to comply with the requirements of the European Union; Garantiqa helps SMEs gain easier access to loans and financial resources in the implementation of the service guarantee. The operation of Garantiqa targets 3 main types of customers that are enterprises, local governments, local governmental enterprises and special focus on promoting SMEs. Guarantee service is the core business of Garantiqa; in addition, it also provides additional services such as lease, factoring etc.

Types of customers	Products
Enterprises	Loan and Bank guarantee Factoring Leasing Tender guarantee
Local government	Loan and Bank guarantee Guarantee for European Union subsidies Bond guarantee
Local governmental enterprises	Loan and Bank guarantee Bond guarantee

Source: <http://www.hitelgarancia.hu> and own elaboration

Table 4. 15. Products of Garantiqa Creditguarantee Co.Ltd

Garantiqa's products mainly serve and support for SMEs; besides, it also makes facilitate and opportunities for local authorities to have access financial. At the same time, it reduces the need for a guarantee and to improve the conditions for access to such funds. In addition, it offers special services for enterprises controlled by local authorities with the aim of supporting enterprises of local government can get financial for development and increasing competitiveness.

Moreover, in order to support better for customers, especially SMEs, Garantiqa conducted guarantee for working capital needs. It developed a guarantee linked with a credit card. This service provides full security, cash can be drawn, and suppliers can be

paid from a guaranteed account. It is favorable and safe for customers in payment and ensures the necessary working capital for business operations.

At the same time, to saving cost and time for SMEs and partner banks, Garantiqa has developed a procedure of issuing guarantees under special agreements with banks. First, Garantiqa has applied guarantees in bulk but risk assessment is carried out carefully and saved the cost for partner banks and Garantiqa. And Depending on the product what is offered by the partner banks that conditions on creditworthiness is defined differently.

Rural Credit Guarantee Foundation also provides services similar Garantiqa (bank loans, bank guarantees, factoring, leasing) but it provides additional services (Instant guarantee, guarantee plus, farmer card and project guarantee) to meet specific financial needs:

Standard product	Bank loans Bank guarantees Factoring Leasing
Special product	Instant guarantee Guarantee plus Farmer card Project guarantee

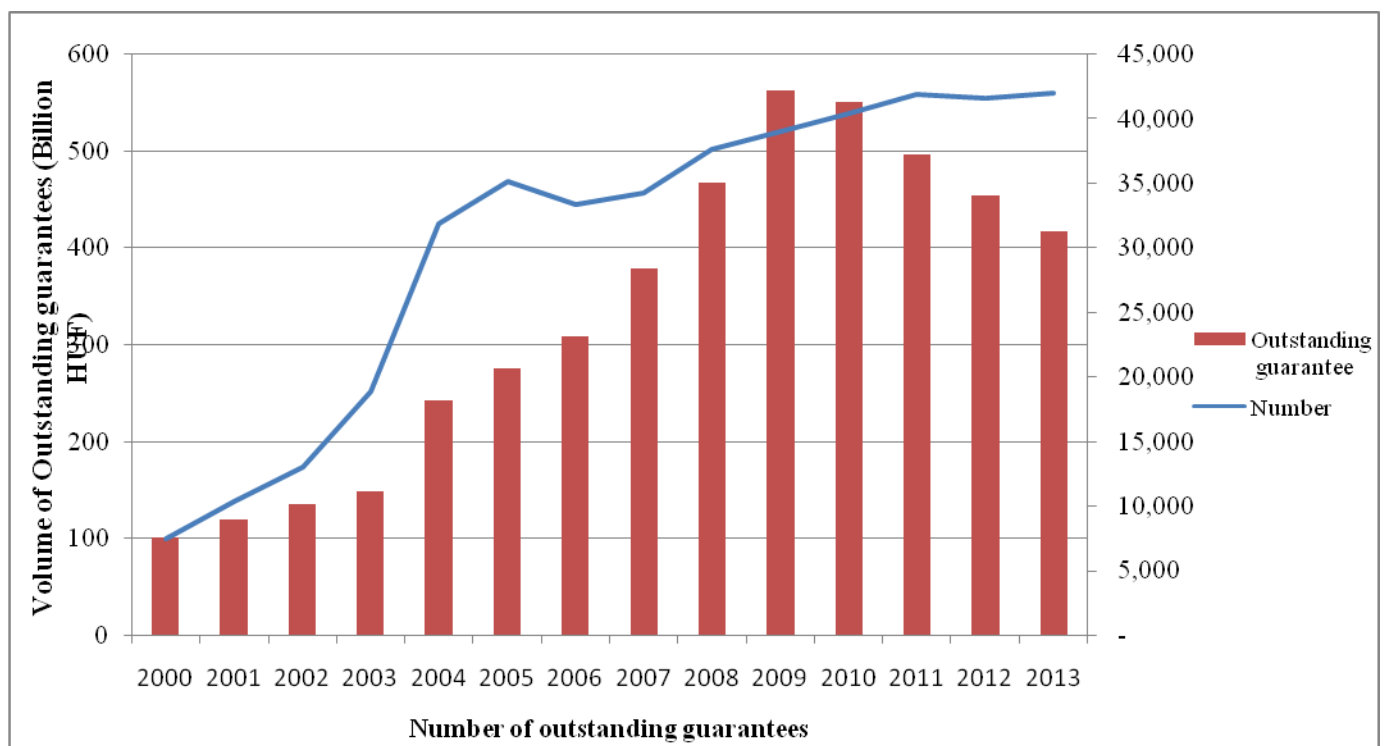
Source: www.avhga.hu

Table 4. 16. Products of Rural Credit Guarantee Foundation

At the same time, Garantiqa can guarantee for SMEs only as regards commitments with the duration of no more than 25 years. Meanwhile, Rural Credit guarantee Foundation provides credit guarantees to support small farmer, family enterprises, sole proprietorships, as well as to promote the agricultural sector and rural.

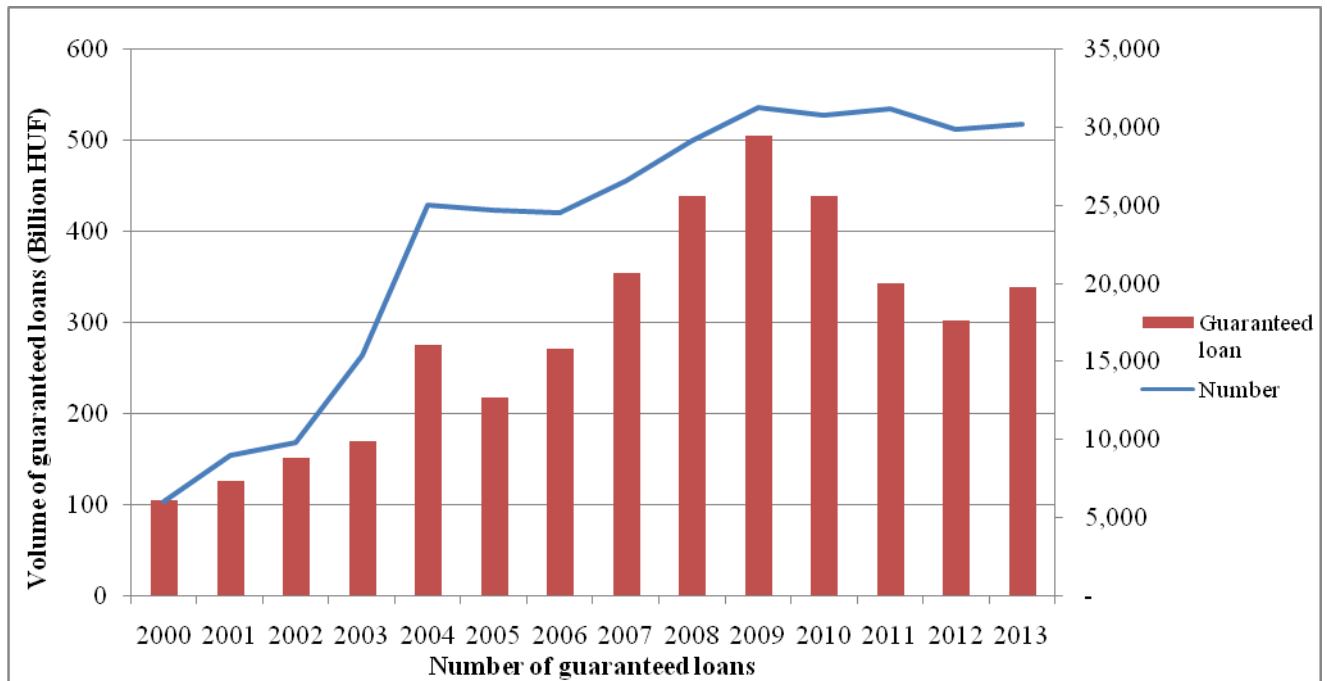
In the process of developing, the performance of 2 organizations is expressed through the following indicators:

Results of operations of credit guarantee system of Hungary are evaluated firstly related to two indicators: outstanding guarantees and guaranteed loan. From 2000 to 2013, the system has achieved outstanding guarantees 427,040 cases with a total value of 4659.44 billion HUF and guaranteed loan: 251,303 cases with a total value of 2,835 billion HUF. Both indicators are increasing in value and number; especially they tend to increased rapidly during the financial crisis of 2008-2010.



Source: www.avhga.hu, <http://www.hitelgarancia.hu/>, and own elaboration

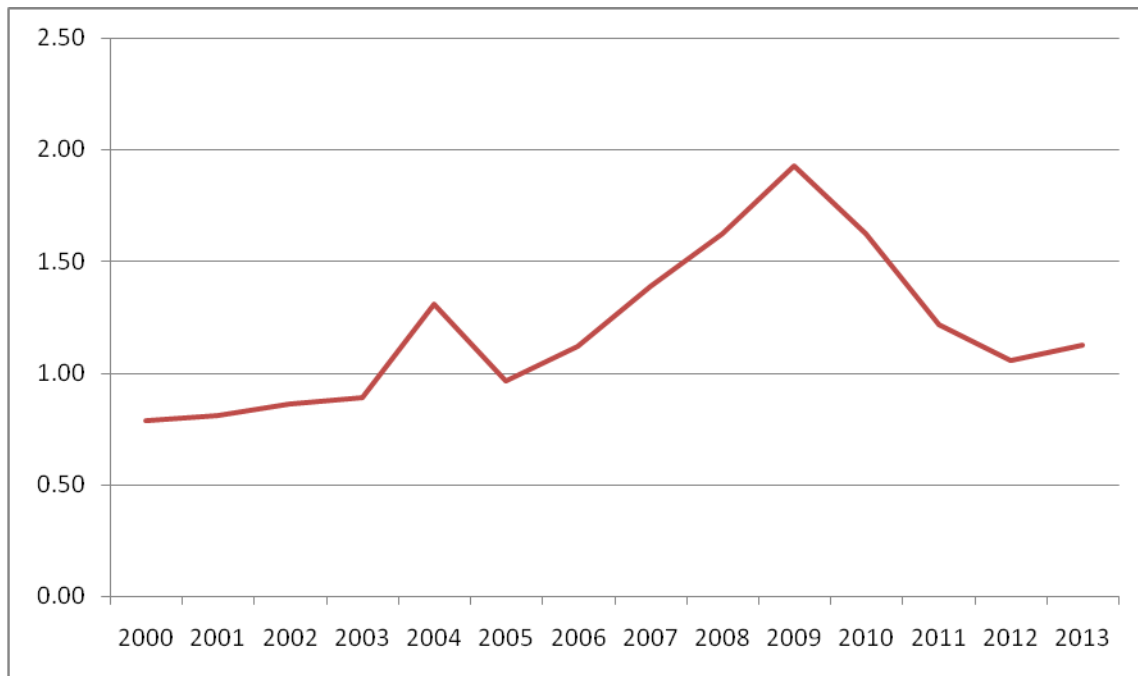
Figure 4. 10. Evolution of credit guarantee system's outstanding guarantee



Source: www.avhga.hu, <http://www.hitelgarancia.hu/>, own elaboration

Figure 4. 11. Evolution of credit guarantee system's guaranteed loan

In the financial crisis, the ratio of outstanding guarantees averaged over 526.8 billion HUF/year (near 39,019 cases/year). And the ratio of guaranteed loan averaged over 461.46 billion HUF/year (30,413 cases/year). That proves credit guarantee system of Hungary has an important role in helping enterprises to access capital from banks that help enterprises stabilize and develop, especially SMEs.



Source: www.avhga.hu, <http://www.hitelgarancia.hu/>, own calculations

Figure 4. 12. The indicator of guaranteed loan to GDP (%)

Besides, the efficiency of the credit guarantee system is also evaluated by the indicator of guaranteed loan to GDP. Based on Figure 4.12, we can see that this indicator tends to increase over the years especially increased during the period of financial crisis. This index also indicated that operation of credit guarantee system grows and development along with the growth of the economy of Hungary. Through supporting and promoting SMEs development, credit guarantee system indirectly promotes the development of the economy.

To evaluate the performance of a credit guarantee system, we can concern profit and lose of credit guarantee institution. Rural Credit Guarantee Foundation had good business results and profit in the period from 2000-2013. Profit of Rural Credit Guarantee Foundation was quite stable, but during 2009-2011 profit downward trend due to it increased level of risk connected with the Great Financial Crisis.

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Garantiqa	2.47	1.25	1.39	1.00	1.46	1.62	1.65	1.58	0.58	-1.93	-6.77	-3.48	-2.74	5.73
AVGHA	0.69	1.12	1.18	1.63	2.03	1.97	1.94	1.40	1.41	0.66	0.82	0.78	1.39	1.75

Source: www.avhga.hu, <http://www.hitelgarancia.hu/>, own calculations

Table 4. 17. Profit/loss of Garantiqa and AVHGA (Billion HUF)

From 2000-2007 Garantiqa's profit tends to increase and stabilize. However, during the period of financial crisis, the results of Garantiqa are not as expected, it continuously loss in the period from 2009 to 2012. The losses of Garantiqa in this period were due to the following reasons: Impact of financial crisis to enterprises, especially SMEs, it leads to defaults Proportion of guarantee and redemptions of Garantiqa rose (average of 3.0 to over 6%). The second cause is the rate of coverage of counter guarantees undertaken by the State was increased to 85% in 2011, which may contribute to an increase in the Company's risk-assumption activity. The third reason is Garantiqa performed reduction from 1.7 to 2.2% pa to 0.5-1% pa (from 2012); it made the income of the Garantiqa decreased. In addition in 2010 appeared a number of unplanned Expenditures (e.g. the special bank tax), it increased the total costs and make the company losses. However, with the change in management, cut unnecessary costs, quality and risk of the guarantee portfolio was carried out, developed a new debtor-rating system etc. These activities made profit for Garantiqa was highest so far 5.73 billion HUF in 2013.

To support better for SMEs, Garantiqa conducted to issue a high number and value of guarantees for SMEs. It is assessed by coverage ratio. By the surety guarantee the Company commits to deliver the payment obligations instead of the debtor (or subsidized party) towards the financial institution (or the disbursing party), if the debtor (or subsidized party) fails to comply with its payment obligation. The maximum rate of the surety guarantees 80%. The formula of the state counter guarantee regulates the yearly Budget Act. An amendment to the Budget Act that took effect on 20 June 2011 led to a considerable improvement in the conditions under which Garantiqa

performs the guarantee assumption activity that largely defines its operations, as the extent of the counter guarantee rose from 70% to 85% in the case of SME products. The higher extent of the counter guarantee also applies in the case of new investment loan contracts. To deal with the financial crisis, Garantiqa applied this ratio up to 90%.

While Rural Credit Guarantee Foundation, its guaranteed amount varies depending on the overall amount of the loan to which the guarantee is connected. In particular, the maximum of coverage ratio decrease when the value of the amount covered by the guarantee increase. The lower limit of the guarantee is set at 20% of the value of the contract.

Guaranteed amount (HUF)	Coverage ratio (%)
0-150,000,000	Over 80
150,000,000-400,000,000	Over 80
400,000,000-1,000,000,000	Up to 50

Source: www.avhga.hu

Table 4. 18. Coverage ratio of AVHGA

In addition, operation efficiency of the credit guarantee institution is assessed through the default rate ratio.

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Garantiqa	2.95	3.84	2.94	3.05	1.86	2.19	3.37	3.04	4.25	6.06	8.29	8.61	8.41	8.14
AVHGA	3.84	5.57	5.12	4.23	3.30	3.57	3.87	3.72	3.61	3.75	4.10	4.44	4.48	4.18

Source: www.avhga.hu, <http://www.hitelgarancia.hu/>, own calculations

Table 4. 19. Default rate of AVHGA and Garantiqa

This indicator reflects the level of risk in the operation of a credit guarantee organization. Looking at table 4.19, we can see that in the period from 2000 to 2013 this indicator of AVHGA is quite low and averages 4.13% per year. This indicator of AVHGA tends quite stable over time. For Garantiqa, this indicator is low and stable until 2008 but due to the impact of the financial crisis and Garantiqa also performed

bulk and great guarantee value for SMEs, it made this indicator was higher than previous period.

4.4. Benefits and costs of credit guarantee system

4.4.1. Benefits of credit guarantee system

SMEs have recognized as an important role both in Europe and Hungary, especially in the economy and the labor market (László Demeter, 2010). Therefore, Hungarian government offers many supporting programs for SMEs including credit guarantee. Credit guarantee system is used as useful tool to support and promote SMEs of Hungary. Credit guarantee system of Hungary was established in the early 90's with two main entities Garantiqa and Rural Credit Guarantee Foundation. While Rural Credit Guarantee Foundation has 100% state capital, Garantiqa also has one part from the state and ones from commercial banks. Therefore, when evaluating the benefits of Hungary's credit guarantee system, it assesses the effectiveness of the government capital's usage in credit guarantee activities. However, evaluating the benefits of the credit guarantee system is not simple (Meyer, 1996). The benefits of credit guarantee system can assess via the quantified factors and uncountable factors. During the operation, Hungarian credit guarantee system brings the following benefits:

Firstly, there are more benefits of credit guarantees for SMEs. Credit guarantee system of Hungary mainly supports SMEs in the agricultural sector (Rural Credit Guarantee Foundation), production, trade and services (Garantiqa). By providing underwriting services, credit guarantee system offers the benefits to SMEs as getting loans from banks, increasing the number of SMEs with a lower cost and longer loan term. Also, SMEs can apply the guarantee loans for a period of 25 years. In addition, it reduces barriers to collateral in the loan process for SMEs (Collateral requirement 10-30% depending on loan amount and credit rating)

Distribute by	Guaranteed loans	
	Number	Value
<i>SIZE</i>	<i>100</i>	<i>100</i>
Micro enterprises	74.8	39
Small enterprises	20.5	31.6
Medium-size enterprises	4.7	29.4
<i>MATURITY</i>	<i>100</i>	<i>100</i>
Short term loan	75.0	46.0
Medium term loan	16.8	25.3
Long term loan	8.2	28.7
<i>TYPE OF GUARANTEE</i>	<i>100</i>	<i>100</i>
Direct guarantee	0.7	13.4
Counter-guarantee	99.2	81.4
Co-guarantee	0.1	5.2
<i>ECONOMIC SECTOR</i>	<i>100</i>	<i>100</i>
Agriculture	4.6	5.5
Industry & construction	28.3	37.9
Tourism	4.1	3.3
Trade & other services	63.0	53.3

Source: Own elaboration based on Garantiqa's data

Table 4. 20. Allocation of guarantee of Garantiqa from 2000-2013 (percentage)

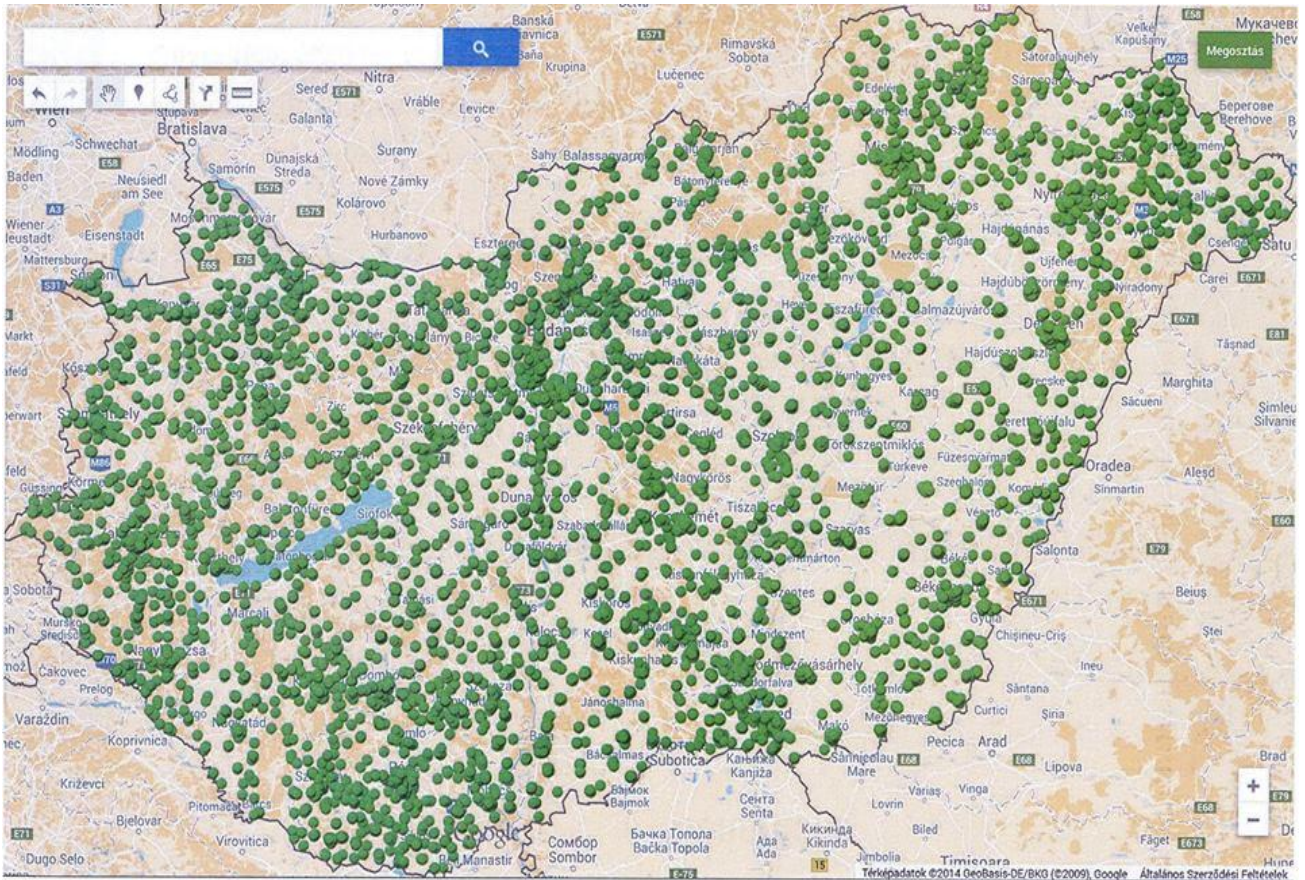
The credit guarantee system for SMEs brings visible benefits for the economic destination of loans with a guarantee. From table 4.20, it can be seen that micro and small enterprises take advantages from underwriting activities, 74.8% of enterprises' loan guarantees are micro-enterprises. Through this result expressed that the government's policies as well as guarantee organizations are focused on accelerating and facilitating access to finance for micro and small enterprises. Because micro-enterprises accounted for the bulk (94.6% in 2003) of the total number of enterprises in Hungary. Furthermore, micro-enterprises is also characterized by low competitiveness, out-up-date technology, weak management capacity, difficulties in accessing capital, etc. Therefore, focusing on supporting SMEs, especially for micro-enterprises can borrow from banks; it represents the right policy of credit guarantee organizations and Hungarian government. Based on statistics in 2013 showed that SMEs occupied 99.9% of Hungarian enterprises, 71.2% of labors and contributed 53.2% of economic value

added. Thus, promoting SMEs through credit guarantees services is boosting the economy of Hungary.

The credit guarantee institution also provides benefits for SMEs when making loans that are guaranteed in terms of loans. For example, in the period of 2000-2013, the value of loan guarantees for medium and long term reached 54% corresponding to 25% of SMEs (Garantiqa). Besides, with the credit guarantee institution's policy, SMEs can borrow the capital with a maximum term of 25 years and no limit on the value of the loan. These policies facilitate SMEs access to capital for production, developing and long-term business plan.

Secondly, a credit guarantee for SMEs could decrease financial cost while performing loan guarantee. SMEs are supported on guarantee fees as well as interest from the state with its guaranteed loans. At the same time, Rural Credit Guarantee Foundation and Garantiqa participated in many programs by Hungarian government as well as the European Union, so they bring more benefits for SMEs.

Moreover, the scope of the credit guarantee system's operation covers the entire Hungarian national territory and the other aspects of the Hungarian economy. Garantiqa focuses on promoting SMEs in industry and construction, trade and services but Rural Credit Guarantee Foundation also contributes to the development especially of those regions with a higher number of small farmers. Thus, the operation of credit guarantee system ensures SMEs have access to capital from banks not only in all sectors but also in all regions of Hungary.



Source: avhga.hu

Figure 4. 13. Geographical coverage of current portfolio of AVHGA

Hungarian policy makers always understand the importance of supporting SMEs to develop the national economy. In particular, they are aware of the benefits of the credit guarantee system for SMEs and the economy. Therefore, credit guarantee system is always used in the set of effective policy instruments to promote SMEs and the economy:

1. Facilities provided by Garantiqa Hitelgarancia Zrt
2. Guarantee schemes of Rural Credit Guarantee Foundation
3. Products of Start Equity Guarantee Pte Ltd
4. Guarantee cooperatives
5. New Hungary Portfolio Guarantee Programme

Besides, credit guarantee system is an appropriate tool of Hungarian government to support enterprises to match the EU legislation. Because the state's support for enterprises must comply with regulations of European Union. To overcome these requests of European Union, credit guarantee institutions will provide guarantee services in the same market conditions by applying guarantee fees at a level that would not alter the functioning of the open market. In particular, credit guarantee was chosen by Hungarian government to deal with the financial crisis in 2008. Rural Credit Guarantee Foundation took advantages of the opportunity provided by EU regulations concerning state aid to increase the guarantee services for SMEs. Thus, AVHGA provided specific guarantees for the loans by commercial banks to farms and young farmer with market conditions. At the same time, AVHGA conducted temporary state aid. The Framework Law also allowed for aid not in excess of the cash equivalent in subsidies (500,000€ per enterprise). Besides, the financial crisis affecting the access of SMEs loans because the support of the European Union was already available could no longer be realized due to reduced availability to the banks of the financial resources required for the loans to be disbursed. To solve that problem, AVHGA negotiated with the Agency for Agricultural and Rural Development to assist SMEs in getting information on access to loans from banks. It also contacted with final beneficiaries to help them become familiar with guarantee instruments.

For Garantiqa, it used the opportunity provided by the European Commission for state aid. Garantiqa implemented the program which was designed based on the provisions of the temporary assistance program of the state. It allowed Hungarian government to implement support in the form of guarantees for investment loans, operating finance and financial leases. At the same time, Garantiqa could cover up 90% of the amount of the mortgage loan or leasing and up to 2.5€ million per SMEs. Moreover, Garantiqa carried out New Hungary Current Assets Loan Programme, it provided the possibility of granting mortgage loans with lower interest rate than market rate.

In addition, credit guarantee system brings many benefits for banks. First, credit guarantee shares risk with the banks in the lending process, thus reducing bad debt, especially SMEs and help secure and stabilize of banking system. At the same time, credit guarantee helps banks to unfreeze credit to enterprises and reducing capital requirements during the guarantee loan. Moreover, in the process of providing guarantee services, credit guarantee organizations collect and evaluate information on SMEs. This will be useful information when credit guarantee organizations share information of SMEs in the credit information system. It will help the database of SMEs and credit activities of SMEs growing and abundant. It will be helpful for banks in the evaluation process of lending to SMEs.

Benefits of credit guarantee system are also reflected in the creation of jobs, social welfare, increase the competitiveness of SMEs, or provide consultancy services for SMEs, etc. All these things were mentioned by the author in literature review and operational analysis of credit guarantee system.

4.4.2. Costs of credit guarantee system

To ensure financial sustainable of a credit guarantee institution, costs are concerned. In which, the operation of credit guarantee institution has been satisfactory from the point of analysis costs and revenues. However, in the case of credit guarantee organization is public, profit is not necessarily too much attention. Credit guarantee organization may offset the cost (capital) which is invested by the state through promoting economic development. According to research by Zucchini and Ventura (2007) pointed out that the level of financial sustainability of credit guarantee organization can evaluate by the following formula:

$$L + A + I = F + O + S$$

Where:

L: loan losses

A: administration expenses

I: public debt service cost (cost of use of borrow capital)

F: guarantee fees

O: other income

S: the amount of public subsidy to cover any losses

Most of the cost of credit guarantee program from underwriting losses, this cost often larger than management cost. In which, losses of credit guarantee organization depend on the scope of activities and the total volume of credit supported by them. Losses come from non-repayment of guarantee of loans. Operation of credit guarantee system of Hungary is better when compare to other systems in the region. Default rate ratio of credit guarantee system of Hungary is low, averaging 4.13% for Rural Credit Guarantee and 4.78% for Garantiqa in the period from 2000 to 2013 (Table 4.19). This rate corresponds to credit guarantee system of Hungary made loan guarantees for 30,413 cases per year and help SMEs could borrow capital from banks with 461.46 billion HUF. Besides losses, other cost is given by operating expenses. This cost in orders to maintain the operation of credit guarantee institution, it also depends on the level of activity of credit guarantee institution.

Moreover, another cost that we need to consider that the cost of capital which was invested by state in credit guarantee organization. However, to assess this cost often difficult and complexity when this resource is used in the operation of credit guarantee institutions to promote SMEs and the economy. And the establishment and capital investment in the credit guarantee institution to search for profit is not the ultimate goal of Hungarian government. The objectives which the Hungarian government wants to achieve in credit guarantee activity is to promote the development of SMEs and the Hungarian economy.

CHAPTER V. Conclusions and recommendations

5.1. 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 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 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 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:

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

Source: own editing

Table 5. 1. Theses statements

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 credit guarantee system 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 avoid 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.

5.2. 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.

5.3. Limitations

This study was carried out successfully, but it has a number of limitations, which includes time, inadequate financial resources, geographical limitations, data limitations and language. The research data was limited because the data was provided mainly by credit guarantee institutions, which have some security restriction issues as a result, the author could not get as much as the desired data. Due to this restriction, the data obtained by the author may not represent the sample of SMEs, which received guarantee. And because of the limit of time, the author does not have condition to collect the data from the SMEs which do not receive credit guarantee. This implies that the author cannot compare the effects of the credit guarantee system for SMEs which received loan guarantees and SMEs which not receive loan guarantees. Besides, due to

limited time in this study, the author has not done an assessment for the financial sustainability of the credit guarantee system as well as the assessment for each credit guarantee institution of Hungary.

Moreover, due to limited time and language, the author cannot implement the survey on the credit guarantee demand for SMEs as well as identifying the factors affecting the credit guarantee demand for SMEs. Therefore, this study may be more successful if the author has more time, and other resources to gather a lot more data and do the survey on a larger scale (see Appendix XXI).

However, due to the above reason, it was impossible. In addition, the research was expected to be completed within the specified time limit. The time available for the study could not allow the author to carry out an extensive research on the subject.

Lastly, the research was limited by financial resources, which in one way or another, hindered the research on the sense that, the operations and activities of the research were to be constrain within the limit of the financial resources available. Moreover, since the resources were not adequate for extensive research, the research had to be limited accordingly because this research has several activities and operation, which involve a lot of logistics, all of which require resources to facilitate.

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Appendix I: Methodology and findings in assessing financial additionality of credit guarantee schemes

Author	Year	Methodology	Findings
Bennett et al.	2005	Qualitative analysis	<ul style="list-style-type: none"> • In some markets such as Poland, there was a dramatic increasing in competition in providing services to SMEs (quality and lending cost) • The banks provided a number of special products for SMEs (e.g Chile and Poland)
Boocock and Shariff	2005	Logistic regression analysis	<ul style="list-style-type: none"> • There was no additional financing to the firm which was received guarantee • Interest rate is lower
Anuchitworawong, et al.	2006	OLS regression	<ul style="list-style-type: none"> • Interest rate is lower • Guaranteed loans are higher financial cost
Benavente et al.	2006	Decision model	<ul style="list-style-type: none"> • Higher quality enterprises can increase access to credit
Busetta and Presbiterio	2006	Descriptive analysis, probit regression; OLS regression model	<ul style="list-style-type: none"> • There was an important correlation between local firms' financing access and the MGI guarantees • Decreasing cost of credit • The process of bank selecting and making loan decisions faster
Larraín and Quinoz	2006		<ul style="list-style-type: none"> • Increasing a loan for micro firm
Unicredit Banca	2006	Descriptive analysis	<ul style="list-style-type: none"> • More faster banking selection process • Enhancing borrower's reputation

Uesugi et al.,	2006	Probit regression and OLS regression	<ul style="list-style-type: none"> • Guaranteed firms received more credit than non- guaranteed firms
GAO	2007	Descriptive analysis	<ul style="list-style-type: none"> • The additionality of loans accessed at a low degree by SBA assistance • Improved dimension and maturity of loans and higher interest rates than conventional loans to small firms
Riding et al.,	2007	Logistic regression-based model	<ul style="list-style-type: none"> • Additional credit to guaranteed firms
Brash and Gallagher,	2008	Descriptive analysis	<ul style="list-style-type: none"> • Improved access to finance • Decreasing interest rate
Wilcox and Yasuda,	2008	IV/Two-stage Least Squares model	<ul style="list-style-type: none"> • Expanding of loan size • Loans guarantees acted as a complement to non-guaranteed loans: loan guarantees in city banks also increased their non-guaranteed lending • Guaranteed loans for regional banks acted as substitutes for non-guaranteed loans.
Cowan et al.	2008	Regression analysis	<ul style="list-style-type: none"> • Improving total amount of banking loan
Columba et al.,	2009	Multivariate OLS regression and maximum likelihood, Probit regression	<ul style="list-style-type: none"> • SME that received credit guarantees have a significant lower interest rate than other SMEs • Reduce the volume of bad loans • The size of the mutual guarantee institution determines the improvement in interest rates offered to members
Zecchini and Ventura	2009	Extensive econometric tests OLS and IV	<ul style="list-style-type: none"> • Financial additionality • Lower debt cost

		regression model	
BIS	2010	Descriptive analysis	<ul style="list-style-type: none"> • Improved access to credit
Cowling	2010	OLS regression	<ul style="list-style-type: none"> • Decreasing of credit limited for small enterpries

Source: Paola Leone et al. (2012) and own elaboration

Appendix II: Methodology and findings in assessing economic additionality of credit guarantee schemes

Author	Year	Methodology	Findings
Riding and Haines,	2001	Descriptive analysis	<ul style="list-style-type: none"> • Created more job with low costs • Credit guarantee programe played an important role in supporting the start-up to access credit
Bradshaw,	2002	Descript analysis	<ul style="list-style-type: none"> • Guaranteed firms increased employment than non-guaranteed loan • Increased State tax revenues
Boocock and Shariff,	2005	Multivariate OLS regression	<ul style="list-style-type: none"> • Guaranteed firms have increased employee • There was significant positive relationship between guarantee loans and annual level of employment in a local market • Increased State tax revenues

Anuchitworawong	2006	Pooled cross-section data	<ul style="list-style-type: none"> • There was positive relationship between employment and total loan amount in the firm which received guaranteed loan
Benavente et al.,	2006	Decision model.	<ul style="list-style-type: none"> • After 5 years, the firms which received support by FOGAPE increased sales and profit
Oh et al.,	2006	Chained-multilateral index number approach	<ul style="list-style-type: none"> • During Asian financial crisis, guaranteed firms maintained their size, and increased their survival rate, but they did not increase their R&D and investment and hence productivity growth. • Guarantees prefer to lower productivity enterprises
Usugi et al.,	2006	Probit regression and OLS regression	<ul style="list-style-type: none"> • Increased investment of guaranteed firms, than non- guaranteed firms. • ROA of guaranteed firm increased more than non- guaranteed firm • The business results of the guaranteed firms increased significantly.
Hancock et al.,	2007	Different OLS regression	<ul style="list-style-type: none"> • Guaranteed loans less impacted by capital pressure on bank than non-guaranteed loans • Guaranteed loans contributed to increasing economic growth rates, employment, wages and salaries.

Riding et al.,	2007	Logistic regression-based model	<ul style="list-style-type: none"> • Total and incremental employment creation • Guaranteed loans had positive impact on economic welfare.
Brash and Gallagher,	2008	Descriptive analyses and multivariate OLS regression	<ul style="list-style-type: none"> • There was no correlation between guarantee loans and increasing sales or employment of the firms which received guaranteed loan
Zecchini and Ventura,	2009	OLS and IV regression model	<ul style="list-style-type: none"> • There was no significant impact of Public funded schemes on Italian economy, or on promoting entrepreneurship
Craig et al.,	2010	Cross-section generalized least square regression model	<ul style="list-style-type: none"> • There was a high correlation between employment creation and level of guaranteed loans (in less financially developed markets)
Schmidt and Van Elkan,	2010	Macroeconomic forecast model	<ul style="list-style-type: none"> • Increased investment • Guaranteed loans had positive impact on German economy (public net financial surplus, GDP, tax revenue, social security)

Source: Paola Leone et al., (2012) and own elaboration

Appendix III: Methodology and findings in financial sustainability of credit guarantee schemes

Author	Year	Method	Findings
Riding and Haines,	2001	Descriptive analysis	<ul style="list-style-type: none"> • The newer enterprises have a higher Default rates • Default rates are based on the portfolio of guaranteed so costs of guarantee have a positive relationship with the level of the guarantee provided
Bennett et al.,	2005	Qualitative analysis.	<ul style="list-style-type: none"> • A few credit guarantee schemes have been obtained sufficient credit information of borrowers • The credit guarantee program will become more effective and grow with the participation of outside stakeholders
Boocock and Shariff,	2005	Descriptive analysis	<ul style="list-style-type: none"> • Organizations and banks faced deficit problems operating expenses when they participate in cooperation with CGCs
Benavente et al.,	2006	Decision model.	<ul style="list-style-type: none"> • The firms which were received public guarantees to have lower default rate • Credit guarantee funds were almost gaining financial sustainability • Commissions charged and

			guarantees paid almost balanced
Shim,	2006	Descriptive analysis	<ul style="list-style-type: none"> • There was an inverse correlation between profitability and degree of guarantee coverage. • Fee income cannot cover payments net of recovery • Credit guarantee schemes has low profitability
Beck et al.,	2008	Correlation analysis and multivariate regression model	<ul style="list-style-type: none"> • The government has a significant role in providing fund and management credit guarantee institutions. But it has less in risk assessment and recovery. • In the case of higher default rates, the government will intervene in credit decisions • Credit guarantee schemes are using risk assessment tool with higher default rates • There was not relationship between loan losses and portfolio approach, timing of payout, eligibility criteria and governance structure
Cowan et al.,	2008	Regression analyses	There was no significant difference between default rates of Partial Credit Guarantee and respect to the rest of credit market
Lelarge et al.,	2008	Difference-in-differences	• Besides the factors of interest rate and coverage ratios, the responsibility

			<p>of governments and donors play a critical role in supporting banks and credit institutions better in monitoring and monitoring</p> <ul style="list-style-type: none"> • There was relationship between default rate and the extension of guarantee.
Columba et al.,	2009	Multivariate OLS regression and maximum like hood	<ul style="list-style-type: none"> • With an effective MGI in selecting and peer-monitoring, it will increase the number of affiliated firms • Mutual Guarantee institution with a larger scale will help diversify risk, better management, but it can lead to weaknesses in monitoring and supervision
Zechini and Ventura	2009	OLS and IV regressions model	<ul style="list-style-type: none"> • The credit guarantee system in Italy had default ratio is lower than banking system and it worked better than other countries in European • Although loan default and operating costs are low, they can not be covered by the guarantee fee • To minimize moral hazard issue, the principle of mutual responsibility is necessary and important

Source: Paola Leone et al., (2012) and own elaboration

Appendix IV: Testing H1 by VAR Granger Causality

VAR Granger Causality/Block Exogeneity Wald Tests

Date: 02/17/16 Time: 10:22

Sample: 1 56

Included observations: 54

Dependent variable: GDP			
Excluded	Chi-sq	df	Prob.
Guaranteed loans	29.50342	2	0.0000
All	29.50342	2	0.0000

Dependent variable: Guaranteed loans			
Excluded	Chi-sq	df	Prob.
GDP	22.45038	2	0.0000
All	22.45038	2	0.0000

Appendix V: Testing hypothesis H1 by Linear-log model

Dependent Variable: GDP

Method: Least Squares

Date: 03/23/16 Time: 14:24

Sample: 156

Included observations: 56

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-8771705.	2197980.	-3.990803	0.0002
Log (Guaranteed loans)	1348733.	202884.6	6.647783	0.0000
R-squared	0.450063	Mean dependent var		5812192.
Adjusted R-squared	0.439879	S.D. dependent var		1354992.
S.E. of regression	1014093.	Akaike info criterion		30.53195
Sum squared resid	5.55E+13	Schwarz criterion		30.60428
Log likelihood	-852.8946	Hannan-Quinn criter.		30.55999
F-statistic	44.19302	Durbin-Watson stat		1.112099
Prob (F-statistic)	0.000000			

Appendix VI: Testing hypothesis H2 by Linear-log model

Dependent Variable: Loans to SMEs by banks

Method: Least Squares

Date: 04/20/16 Time: 11:18

Sample: 2000 2013

Included observations: 14

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Log (guaranteed loans)	2228.756	349.7021	6.373298	0.0000
C	-9419.620	1952.126	-4.825313	0.0004
R-squared	0.771945	Mean dependent var		2977.124
Adjusted R-squared	0.752941	S.D. dependent var		1245.109
S.E. of regression	618.8824	Akaike info criterion		15.82527
Sum squared resid	4596186.	Schwarz criterion		15.91657
Log likelihood	-108.7769	Hannan-Quinn criter.		15.81682
F-statistic	40.61893	Durbin-Watson stat		1.410127
Prob(F-statistic)	0.000035			

Appendix VII: Testing hypothesis H3 by Linear-log model

Dependent Variable: Value added of SMEs

Method: Least Squares

Date: 04/20/16 Time: 10:57

Sample: 2000 2013

Included observations: 14

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Log (guaranteed loans)	2875.790	409.3940	7.024504	0.0000
C	-10013.48	2285.342	-4.381611	0.0009
R-squared	0.804381	Mean dependent var		5982.186
Adjusted R-squared	0.788079	S.D. dependent var		1573.854
S.E. of regression	724.5216	Akaike info criterion		16.14046
Sum squared resid	6299178.	Schwarz criterion		16.23176

Log likelihood	-110.9832	Hannan-Quinn criter.	16.13201
F-statistic	49.34366	Durbin-Watson stat	0.781294
Prob (F-statistic)	0.000014		

Appendix VIII: Testing hypothesis H4 by Linear-Log model

Dependent Variable: Y

Method: Least Squares

Date: 03/09/16 Time: 14:14

Sample: 2000 2013

Included observations: 14

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.764213	0.034610	22.08069	0.0000
Log (X)	0.037838	0.014410	2.625766	0.0236
R-squared	0.385291	Mean dependent var		0.673630
Adjusted R-squared	0.329408	S.D. dependent var		0.012262
S.E. of regression	0.010041	Akaike info criterion		-6.223604
Sum squared resid	0.001109	Schwarz criterion		-6.136689
Log likelihood	42.45343	Hannan-Quinn criter.		-6.241469
F-statistic	6.894645	Durbin-Watson stat		1.130131
Prob(F-statistic)	0.023585			

Y: Number employees of SMEs /Total employees

X: Guaranteed loans by credit guarantee system/ Total loans to SMEs by banks

Appendix IX: Testing hypothesis H5a by Random effect model

Dependent Variable: Net sales

Method: Panel EGLS (Cross-section random effects)

Date: 02/16/16 Time: 10:08

Sample: 2012 2014

Periods included: 3

Cross-sections included: 50

Total panel (balanced) observations: 150

Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	928813.2	296771.6	3.129724	0.0021
Guaranteed loans	-0.005389	0.001924	-2.801132	0.0058

Effects Specification			
		S.D.	Rho
Cross-section random		2067665.	0.9933
Idiosyncratic random		169810.3	0.0067
Weighted Statistics			
R-squared	0.044228	Mean dependent var	37523.61
Adjusted R-squared	0.037770	S.D. dependent var	185291.7
S.E. of regression	181758.7	Sum squared resid	4.89E+12
F-statistic	6.848642	Durbin-Watson stat	1.687899
Prob(F-statistic)	0.009792		
Unweighted Statistics			
R-squared	-0.092118	Mean dependent var	792262.4
Sum squared resid	8.92E+14	Durbin-Watson stat	0.009249

Appendix X: Testing hypothesis H5a by Fixed effect model

Dependent Variable: Net sales

Method: Panel Least Squares

Date: 02/16/16 Time: 10:06

Sample: 2012 2014

Periods included: 3

Cross-sections included: 50

Total panel (balanced) observations: 150

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	987774.9	52179.90	18.93018	0.0000
Guaranteed loans	-0.007716	0.001985	-3.886609	0.0002

Effects Specification			
Cross-section fixed (dummy variables)			
R-squared	0.996506	Mean dependent var	792262.4
Adjusted R-squared	0.994741	S.D. dependent var	2341623.
S.E. of regression	169810.3	Akaike info criterion	27.18724
Sum squared resid	2.85E+12	Schwarz criterion	28.21085

Log likelihood	-1988.043	Hannan-Quinn criter.	27.60310
F-statistic	564.6796	Durbin-Watson stat	2.849358
Prob(F-statistic)	0.000000		

Appendix XI: Testing Hausman ratio for hypothesis H5a

Correlated Random Effects - Hausman Test

Equation: Untitled

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	22.560417	1	0.0000

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
Guaranteed loans	-0.007716	-0.005389	0.000000	0.0000

Cross-section random effects test equation:

Dependent Variable: Net sales

Method: Panel Least Squares

Date: 02/16/16 Time: 10:09

Sample: 2012 2014

Periods included: 3

Cross-sections included: 50

Total panel (balanced) observations: 150

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	987774.9	52179.90	18.93018	0.0000
Guaranteed loans	-0.007716	0.001985	-3.886609	0.0002

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.996506	Mean dependent var	792262.4
Adjusted R-squared	0.994741	S.D. dependent var	2341623.
S.E. of regression	169810.3	Akaike info criterion	27.18724

Sum squared resid	2.85E+12	Schwarz criterion	28.21085
Log likelihood	-1988.043	Hannan-Quinn criter.	27.60310
F-statistic	564.6796	Durbin-Watson stat	2.849358
Prob(F-statistic)	0.000000		

Appendix XII: Testing hypothesis H5b by Random effect model:

Dependent Variable: Interest paid

Method: Panel EGLS (Cross-section random effects)

Date: 02/16/16 Time: 10:26

Sample: 2012 2014

Periods included: 3

Cross-sections included: 50

Total panel (balanced) observations: 150

Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1501.784	3161.435	-0.475032	0.6355
Guaranteed loans	0.000476	5.88E-05	8.095769	0.0000

Effects Specification		S.D.	Rho
Cross-section random		19141.11	0.8444
Idiosyncratic random		8217.472	0.1556

Weighted Statistics			
R-squared	0.296938	Mean dependent var	2538.646
Adjusted R-squared	0.292188	S.D. dependent var	10001.61
S.E. of regression	8414.516	Sum squared resid	1.05E+10
F-statistic	62.50783	Durbin-Watson stat	1.177371
Prob (F-statistic)	0.000000		

Unweighted Statistics			
R-squared	0.271977	Mean dependent var	10552.09

Sum squared resid

6.66E+10 Durbin-Watson stat

0.185243

Appendix XIII: Testing hypothesis H5b by Fixed effect model

Dependent Variable: Interest paid

Method: Panel Least Squares

Date: 02/16/16 Time: 10:21

Sample: 2012 2014

Periods included: 3

Cross-sections included: 50

Total panel (balanced) observations: 150

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-7010.908	2525.094	-2.776494	0.0066
Guaranteed loans	0.000693	9.61E-05	7.214740	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.926926	Mean dependent var	10552.09
Adjusted R-squared	0.890019	S.D. dependent var	24778.79
S.E. of regression	8217.472	Akaike info criterion	21.13040
Sum squared resid	6.69E+09	Schwarz criterion	22.15401
Log likelihood	-1533.780	Hannan-Quinn criter.	21.54626
F-statistic	25.11567	Durbin-Watson stat	1.784201
Prob(F-statistic)	0.000000		

Appendix XIV: Testing Hausman ratio for hypothesis H5b

Correlated Random Effects - Hausman Test

Equation: Untitled

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	8.182772	1	0.0042

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
Guaranteed loans	0.000693	0.000476	0.000000	0.0042

Cross-section random effects test equation:

Dependent Variable: Interest paid

Method: Panel Least Squares

Date: 02/16/16 Time: 10:28

Sample: 2012 2014

Periods included: 3

Cross-sections included: 50

Total panel (balanced) observations: 150

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-7010.908	2525.094	-2.776494	0.0066
Guaranteed loans	0.000693	9.61E-05	7.214740	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.926926	Mean dependent var	10552.09
Adjusted R-squared	0.890019	S.D. dependent var	24778.79
S.E. of regression	8217.472	Akaike info criterion	21.13040
Sum squared resid	6.69E+09	Schwarz criterion	22.15401
Log likelihood	-1533.780	Hannan-Quinn criter.	21.54626
F-statistic	25.11567	Durbin-Watson stat	1.784201
Prob(F-statistic)	0.000000		

Appendix XV: Testing hypothesis H5c by Random effect model

Dependent Variable: Fixed tangible asset ratio

Method: Panel EGLS (Cross-section random effects)

Date: 02/18/16 Time: 11:15

Sample: 2012 2014

Periods included: 3

Cross-sections included: 50

Total panel (balanced) observations: 150

Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	50.53669	3.894593	12.97611	0.0000

Guaranteed loans	-1.18E-07	6.46E-08	-1.827431	0.0696
Effects Specification				
			S.D.	Rho
Cross-section random			24.59553	0.9127
Idiosyncratic random			7.609080	0.0873
Weighted Statistics				
R-squared	0.021558	Mean dependent var		8.359604
Adjusted R-squared	0.014947	S.D. dependent var		7.758455
S.E. of regression	7.700254	Sum squared resid		8775.499
F-statistic	3.260890	Durbin-Watson stat		1.419838
Prob(F-statistic)	0.072983			
Unweighted Statistics				
R-squared	-0.041806	Mean dependent var		47.54334
Sum squared resid	100264.6	Durbin-Watson stat		0.124269

Appendix XVI: Testing hypothesis H5c by Fixed effect model

Dependent Variable: Fixed tangible asset ratio

Method: Panel Least Squares

Date: 02/18/16 Time: 11:12

Sample: 2012 2014

Periods included: 3

Cross-sections included: 50

Total panel (balanced) observations: 150

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	53.84628	2.338145	23.02949	0.0000
Guaranteed loans__	-2.49E-07	8.90E-08	-2.796220	0.0062

Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0.940442	Mean dependent var		47.54334
Adjusted R-squared	0.910362	S.D. dependent var		25.41482
S.E. of regression	7.609080	Akaike info criterion		7.161046
Sum squared resid	5731.912	Schwarz criterion		8.184662
Log likelihood	-486.0785	Hannan-Quinn criter.		7.576909

F-statistic 31.26498 Durbin-Watson stat 2.145162
 Prob(F-statistic) 0.000000

Appendix XVII: Testing Hausman ratio for hypothesis H5c

Correlated Random Effects - Hausman Test

Equation: Untitled

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	4.567985	1	0.0326

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
Guaranteed loans	-0.000000	-0.000000	0.000000	0.0326

Cross-section random effects test equation:

Dependent Variable: Fixed tangible asset ratio

Method: Panel Least Squares

Date: 02/18/16 Time: 11:16

Sample: 2012 2014

Periods included: 3

Cross-sections included: 50

Total panel (balanced) observations: 150

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	53.84628	2.338145	23.02949	0.0000
Guaranteed loans	-2.49E-07	8.90E-08	-2.796220	0.0062

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.940442	Mean dependent var	47.54334
Adjusted R-squared	0.910362	S.D. dependent var	25.41482
S.E. of regression	7.609080	Akaike info criterion	7.161046
Sum squared resid	5731.912	Schwarz criterion	8.184662
Log likelihood	-486.0785	Hannan-Quinn criter.	7.576909
F-statistic	31.26498	Durbin-Watson stat	2.145162
Prob(F-statistic)	0.000000		

Appendix XVIII: Testing hypothesis H6 by Linear-log model

Dependent Variable: Total loans by banks

Method: Least Squares

Date: 04/20/16 Time: 11:26

Sample: 2000 2013

Included observations: 14

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Log (guaranteed loans)	3542.719	366.0283	9.678810	0.0000
C	-13810.44	2043.263	-6.759010	0.0000
R-squared	0.886449	Mean dependent var		5894.804
Adjusted R-squared	0.876986	S.D. dependent var		1846.920
S.E. of regression	647.7756	Akaike info criterion		15.91653
Sum squared resid	5035358.	Schwarz criterion		16.00782
Log likelihood	-109.4157	Hannan-Quinn criter.		15.90808
F-statistic	93.67937	Durbin-Watson stat		1.680768
Prob (F-statistic)	0.000001			

Appendix XIX: Questionnaire “Determine the factors that affect the demand for credit guarantee of SMEs in Hungary”

1. Types of your company:

- The Hungarian Limited Liability Company (LLC, KFT)
- The Hungarian Limited Partnership (LP, BT)
- The Hungarian General partnership, or unlimited partnership (GP, KKT)
- The Joint stock (JSC)
- Limited by shares (RT)

2. Sector of your company

- Manufacturing
- Agriculture, forestry and fishing
- Construction
- Wholesale and retail trade; repair of motor vehicles and motorcycles

- Real estate activities Transport and storage
- Public administration and defence, compulsory social security
- Tourist Other

3. Operation time of your company:

- < 1 year From 1-3 years
- From 3-5 years From 5-10 years
- > 10 years

4. Staff numbers of your company:

- 0-9 10- 49
- 50-249 > 249

5. How much was turnover of your company in 2014?

- 0-49.9 million HUF 50-99 million HUF
- 100-249.9 million HUF > 250 million HUF

6. Does your company currently need external financing?

- Yes No

If yes, it is for:

- Requirement Business start up
- Temporary working capital Long-term working capital
- Investment Export finance
- Financing growth Other

Please answer the following questions by indicating your answer with (x) in the applicable box according to the following scale:

- 1- Not at all
- 2- To a lesser degree
- 3- To a fair degree
- 4- To a high degree
- 5- Totally

7. Your company operate in different sectors so its borrowing demands is different.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
8. Your company can fully use its own	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>

capital without bank loans during operation.					
9. The start-up businesses have higher borrowing demand than the enterprises have long operating time.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
10. Your company has operation duration than 3 years can finance its operations with its own capital so they have less demand to borrow from banks.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
11. Your company has operation duration than 5 years can finance its operations with its own capital so they have less demand to borrow from banks.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
12. Your company has operation duration than 10 years can finance its operations with its own capital so they have less demand to borrow from banks.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
13. Your company always have enough collateral to bank loans.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
14. Providing credit guarantees for bank loans to SMEs without collateral are essential needs for today's SMEs.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
15. When lending the banks has always focused on collateral assets (fixed assets) of enterprises	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
16. Your company often has demand of credit guarantees in expanding production scale business	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
17. Your company has demand for long-term capital and long-term investment	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
18. The companies in different sectors have demand credit guarantee to reduce short-term investment costs.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
19. Your company has demand of credit guarantees to increase competitive pressure in domestic and export.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>

20. Have you heard about credit guarantee institutions?

Yes No

If you heard, what degree would you rate with following statement?

20.1. The credit guarantee institutions help SMEs reduce financing costs in the lending process in banks.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
20.2. The credit guarantee institutions provide credit guarantee services will reduce the requirement of collateral for enterprises than when they borrow loans from bank.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
20.3. I believe the credit guarantee institutions in Hungary will support well for SMEs to access to bank loans.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
20.4. SMEs can borrow loans from banks through the credit guarantee institutions with low borrowing costs.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
20.5. Currently, the credit guarantee institutions in Hungary support well the needs of SMEs's borrowing demand from banks due to high level of reliability.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
20.6. The credit guarantee institutions support well to SMEs to access loans from banks due to high legal.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
20.7. The credit guarantee institutions support well to SMEs to access loans from banks due to simple and fast procedure.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>

21. Has your company used banking financial?

Yes No

If yes, what are the main obstacles in accessing banking financial of your company?

21.1. Not enough collateral	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
21.2. Banks demanding audited financials	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
21.2. Banks demanding a business plan	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
21.3. Interest rates are too high	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>

21.4.Procedures are too time consuming	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
21.5.Other	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>

22. Does your company need any credit guarantee services?

Yes

No

If yes,

22.1.I am very interested in the credit guarantee services	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
22.2.I want to use credit guarantee services	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>

Author's dissertation related publications

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