BANK LENDING AND MACROECONOMIC VARIABLES: EMPIRICAL EVIDENCE FROM PANEL DATA

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EMPIRICAL EVIDENCE FROM PANEL DATA

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ABSTRAK

Tujuan kertas penyelidikan ini adalah untuk menentukan kesan pembolehubah makroekonomi terhadap pinjaman bank di negara-negara G7 sepanjang tempoh 2005 hingga 2015. Kajian ini menguji hubungan di antara kadar faedah, pekerjaan, inflasi dan pinjaman bank. Dalam kajian ini digunakan *panel ordinary least square* (POLS) untuk memeriksa kesan pembolehubah makroekonomi terhadap pinjaman bank. Hasil kajian menunjukkan bahawa kadar faedah, pekerjaan dan inflasi mempunyai hubungan yang signifikan terhadap pinjaman bank.

Kata kunci: pinjaman bank, pembolehubah makroekonomi, kadar faedah, pekerjaan, inflasi

ABSTRACT

The aim of this research paper is to determine the impact of macroeconomic variables towards bank lending in the G7 countries over the period 2005 to 2015. This study tests the relationship between interest rate, employment, inflation and bank lending. In this study applied the panel ordinary least square (POLS) to examine the impact macroeconomic variables on bank lending. The findings show that interest rate, employment and inflation have significant impact towards bank lending.

Keywords: Bank lending, macroeconomic variables, interest rate, employment, inflation

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CHAPTER ONE

INTRODUCTION

1.1 Introduction

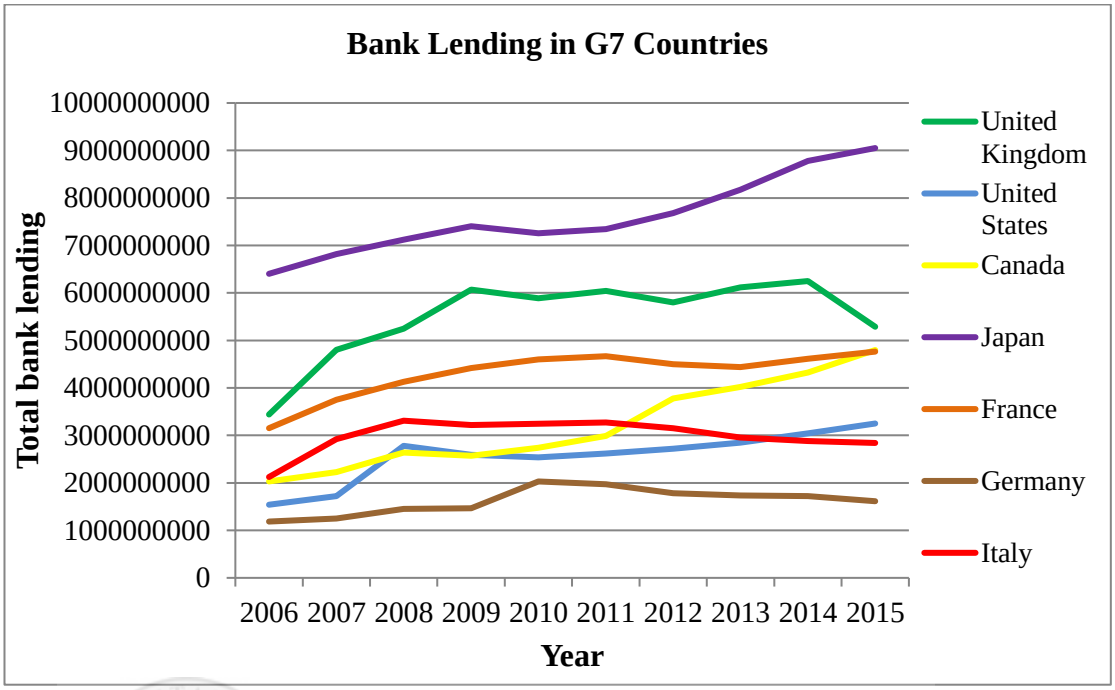
This chapter provides a brief discussion on the bank lending and macroeconomic variables. The chapter begins with the discussion about the background of the study and followed by the problem statement in section 1.2. Then, explanation about the research questions in section 1.3 and in section 1.4 explains the discuss objectives of the study. While, section 1.5 discusses scope of the study and section 1.6 explains the contribution of the study. The organization of the study is discussed in section 1.7. Lastly, the conclusion of this chapter is explained in section 1.8.

1.1.0 Background of The Study

1.1.1 Overview Bank Lending In The G7

On July 2001, the list countries in G7 are Canada, France, Germany, Italy, Japan, United Kingdom and United States (Robert, 2014). As we know, the G7 countries are developed countries and have a sustainable growth. However, as the world economy recovers from the global financial crisis on 2007-2009, the revival of growth in the US, UK, Canada, Italy, German, France, Japan and other industrialized countries has been slow and not acted (Jorgenson, 2013). The aimed for G7 is their bank can raise capital from public and gain confident and permission from them to continue leading on household and businesses (Brown, 2014). The figure 1.1 below shows that the total of bank lending in G7 countries:

Figure 1.1 Total Bank Lending in G7 Countries



Source: Data Stream, 2016.

Figure 1.1 shows that the fluctuations of the volume total bank lending in G7 countries. The higher value of total bank lending is in Japan country. The lower value of total bank lending is in Germany country. However, within the year 2007 to 2008 the volume bank lending shows quite low due to global financial crisis.

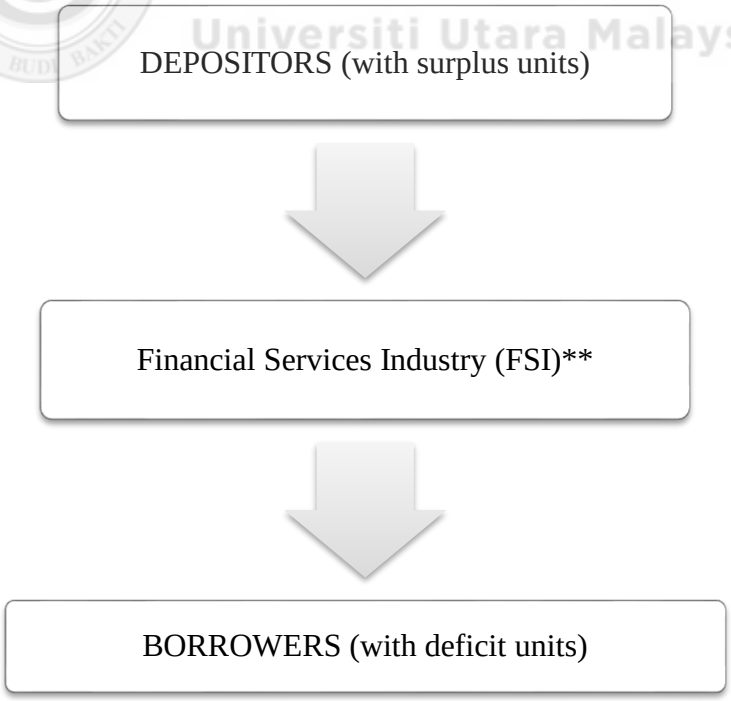
1.1.2 Bank Lending and Financial Intermediation

Bank can be translated in terms of the economic functions it performs, the services it offers its customers or the legal basis its existence. Generally, the banks can be determined by the functions that they perform in the economy. The banks are involved in transferring funds from depositors to borrowers and for paying the goods or services (Rose, 2013). The financial intermediation theory is published by highly ranked economics journals and includes some popular economists. The examples are Keynes (1936), Gurley and Shaw (1955), Tobin (1963, 1969), Baltensperger (1980), Bencivenga and Smith (1991), Allen and Gale (2004a, 2004b), Kashyap, Rajan, and

Stein (2002), Matthews and Thompson (2005) and Stein (2014). Basically, heart of banking business is lending the evidenced by the volume of lending that create bank's assets (Malede, 2014). Banking mostly transforms into liquid assets such as deposits into illiquid assets liked lending (Diamond & Rajan, 1998). Moreover, the transformational process of bank's activity is best influenced by a core of factors are namely macroeconomic levels (Peek & Rosengren, 1995).

The financial services industry includes every individual, household and business in the economy. Individuals and households provide savings to financial institutions which transform them into financial assets. The main function banks are received and lend money to borrower. Banks also act as intermediaries between depositor and borrower. The figure 1.2 below shows the process of intermediation.

Figure 1.2: Process of Intermediation



Source: Howard Choo (2000, p. 4).

1.2 Problem Statement.

Global financial crisis made financial shocks through global banks (Kim, 2014). Supply and demand factors contribute the bank lending fallen sharply across the border during the financial crisis (Takats, 2010). Currently, the banks have to pay interest to depositor or saving account and it increase the cost of the bank. Then the banks have to cover by lend to borrowers and get income from interest. The Post Keynesian economist theory, the bank deposit and loans have important roles in money transmission (Salina & M. Shabri, 2009). The global financial crises in 2008 make the lending rate become more suffered and decrease between the year 2008 and 2009 (Thaker et al., 2014). In the loan pricing theory, bank cannot set the interest rate high all the time to avoid adverse selection and moral hazard (Stiglitz & Weiss, 1981). The higher lending growth will contribute to the financial crises found by Thaker et al. (2014). Kelly (2013) has a prediction that the non-performing loans cases will be increasing after the lending has been expanded rapidly. The banks do not want to lend more if the lending rates become higher (Chodechai, 2004). However, early studies found that interest rate has negative impact towards bank lending liked Alkilani and Kadummi (2015) and Abdul Karim et al. (2010). Furthermore, many previous studies were done in developing countries. The results are not applicable to developed countries due to the different characteristics between developed and developing countries.

Employment is the major factor in lending arrears (Dinh, 2012). The worsening loan quality leads to a fall in decreasing employment numbers (Babaucek, 2005). There is positive effect of bank credit on employment formality but no evidence for total employment from informality and formality (Alejandro & Nestor, 2016). However, the results are some gaps in the current existing literature and

inconclusive although there were previous studied that examine on the macroeconomic variables that influenced the bank lending.

The effect of inflation towards bank lending is an important and complicated issue. It is important for borrowers and lenders. The working of the price system will be distorted in lending of the bank (Umar, 2014). However, the result shows by previous studies is not consistent and uniform in the impact of inflation towards bank lending. There are several studies found that negative relationship between inflation and bank lending such as Bettencourt (2010) and Keho (2009). Besides, there is evidence that inflation have positive relationship with bank lending liked Rababah (2015) and Tomak (2013). Therefore, studies on the bank lending and macroeconomic variables are more essential. This context is relevant to investigate the impact interest rate, total employment and inflation towards bank lending.

1.3 Research Question

In this study, three research questions have come out in order to achieve the objectives of this study. The research questions are as follows:

1. Can interest rate influence the bank lending?

2. What is the relationship between total employment and bank lending?

3. What is the relationship between inflation and bank lending?

1.4 Objective of Study

The objectives of this research such as follows:

1. To investigate the relationship between interest rates and the bank lending.

2. To determine the relationship between total employment and the bank lending.

3. To examine the relationship between inflation and the bank lending.

1.5 Scope of the Study

The study attempts to examine interest rate, total employment and inflation have a significant towards bank lending. The study is based on time series data consisting of bank loans data in G7 countries which are Canada, Germany, France, Italy, Japan, United Kingdom and United States. The data has been collected for 11 years from the year 2005 until 2015. The data gathered are from the Federal Reserves (Feds), Deutsche Bundesbank, International Monetary Fund (IMF), The World Bank, Trading Economic and Data Stream. The dependent variable is total loans, and independent variables are interest rate, total employment and inflation.

Although there are many studies on bank lending, very few studies discuss on bank lending and macroeconomic variables in G7 countries. This research paper complements existing literatures on bank lending and macroeconomic variables since there is lack of research discussing on that. This aimed to determine the bank lending and macroeconomic variables and also to provide empirical evidence from panel data.

1.6 Contribution of Study

As the main purpose of this study is to identify whether macroeconomic variables have a significant influence to bank lending. This study will contribute to the banking literature on the macroeconomic variables that affect bank lending. This study is expected to extend the boundary of knowledge, specifically in the type macroeconomic variables that influence bank lending. This study also will explain the result of interest rate, total employment and inflation towards bank lending.

1.7 Organization of the Study

The organization of this research paper is as follows. Chapter two will review the previous literature. Chapter three discusses the methodology used to answer the research objectives. Chapter four will report the results and discuss the findings. Lastly, chapter five summaries the research paper and give suggestions for future research.

The study is organized into five chapters. Chapter one provides an introduction of bank lending and macroeconomic variable which includes content background of the study, problem statements, research questions, objectives of the study, scope of the study, contribution of study, organization of the study and conclusion of the chapter one.

Chapter two provides literature reviews related to bank lending and macroeconomic variable. This chapter review of past research and clear objective of the study. Besides that, the literature review and opinion come from previous researchers related to the topic are presented. The literatures were collected from different sources liked books, journals, articles, internet and others.

Chapter three explains the methodology which is data and the method used. In this chapter, researcher briefly explain the method used in order to conduct the study and the research design used in the study and discuss the theoretical framework, research framework and develop hypothesis. Then, explains the selection of data collection, empirical method, analysis model and technical analysis. Lastly in this chapter is the conclusion of chapter three.

Chapter four presents the empirical findings and discussion which are the result of the study. The differences of the result in comparison with the prior empirical evidences are highlighted and the conclusion of this chapter four.

Lastly, chapter five is a conclusion of the study. This chapter highlight the contribution of the study and also explain the limitations while conducting this study. Further, considerations for future research are also included.

1.8 Concluding Remarks

Basically, this chapter discussed the overview of bank lending in G7 countries, problem statement, research question, research objective, contribution of the study, scope of the study and structure of the research.

CHAPTER TWO

LITERATURE REVIEWS

2.1 Introduction

This chapter reviews the previous literatures to give a better understanding on bank lending and macroeconomic variables.

2.2 Literature Reviews

2.2.1 Macroeconomic Variables and Bank Lending

Thaker et al. (2014) studied determinants macroeconomic of bank credit in Malaysia. Their study focuses on the impact of macroeconomic variables towards bank credit from period 1991 to 2011. They found that three macroeconomic variable which are lending rate, consumer price index, and gross domestic product have significant impact towards bank credit. Moreover, there have similarity studies on the relationship between macroeconomic variables and bank lending such as Dimitrios, Angelos and Vasilios (2010), Shahbaz, Shamim and Aamir (2010), Quagliariello (2008) and Pesola (2005).

2.2.2 Interest Rate and Bank Lending

Empirical studies analysing that there are significant impact of interest rate toward bank lending. This can be found in studies such as Thaker et al. (2014), Ladime et al. (2013), Olusanya et al. (2012) and Olokoyo (2011). The result shows negative relationship between interest rate and bank lending. Thus, the raised of interest rate will make the total bank lending become less.

The fluctuation of interest rate can change the volume in bank lending (Goh, Chong & Yong, 2007). There is similar evidence from the studies by Haron et al. (2006) determined that when the interest rate increases, then total lending will decrease. Moreover, the raised of interest rate will attract depositor to save more money. Thus, the decrease and increase in interest rate will affect the borrower, depositor and bank (financial intermediation process).

In generally, the bank must have enough liquidity to run their activities at the same time they want to maximum their profit. Bank cannot set the high interest rate due to their appetite. They should consider the asymmetric information problem and also the risk. Iriana (2003) suggest that she not encourage the bank lend more during the interest rate is high. So, the banks have to monitor their interest rate to make the bank more stabilized.

Furthermore, due to global financial crisis in 2008 to 2009 the lending rate happen a drastic decrease. The performance of bank lending can see when the interest rate drop then the credit risk will be lower (Ewert et al., 2000). This is because the raise of interest rate will contributed from some borrower asymmetric information (Chodechai, 2004). Malede (2014) suggested the bank have to pay more attention on credit risk because it can bring the bank down. Thus, the increasing of interest rate will make the bank loss due to the decreasing on volume bank lending because bank lending is large income in bank.

However, there is also significant impact interest rate towards bank lending with a positive relationship. There is evidence from the studies by Mcconnell et al. (2012). It means the raise of interest rate will increase the volume of the total bank lending. Ibrahim (2006) found that the positive relationship between deposit interest

rate and bank activity. Besides, the supply money will increase due to the money save increase (Mcconnell et al., 2012). Thus, this will give benefit three parties, namely depositor, borrower and bank.

2.2.3 Employment and Bank Lending

Previous studies found that employment have significant impact towards bank lending. The evidences come from the study such as Alejandro and Nestor (2016), Dinh (2012) and Babaucek (2005). There is positive relationship between employment and bank lending. So, the increasing number in employment will rise the total bank lending.

Moreover, the decreasing numbers of employment will make the quality in lending is low. Gambera (2000) states that unemployment is a function of models loan quality. Duygan, Levkov and Montroiol (2010) found that employees in small firms become unemployed due financial crisis in 2008 and 2009. So, the quality of the loan become weak and the total employment become decrease because they lost the job then make bank loss in total bank lending.

2.2.4 Inflation and Bank Lending

Early studies found that the relationship between inflation and bank lending is significant. The evidence was found by several study liked Mohamad Aymen and Chedia (2016), Rababah (2015), Tomak (2013), Li (2009), Bunda and Desquilbet (2008) and Tang (2001). The result shows negative relationship between inflation and total bank lending. So, when the inflation increases the total bank lending will decrease.

Moreover, in the study Bettencourt (2010) states that the increasing of inflation will drop the bank performance. Inflation also will less absorbed saving and lending given capacities of the bank (Nazami & Salehi, 2010). Low inflation is one of the conditions for stable in financial sector liked bank (Umar, Maijama'a & Adamu, 2014). Thus, the bank cannot absorb the shock if inflation becomes stronger.

However, there is also evidence the inflation have positive relationship with bank lending. Similarly with the study Guru (2000) states the inflation have positive relationship with bank profitability. Tan and Floros (2012) also found positive relationship between inflation and bank profitability. So, the bank profitability comes from bank lending and there is positive relationship with inflation.

Czech, Baucek and Jancar (2005) states that the worsening of loan quality because of the increasing inflation pressure. Angelion and Faina (2013) increase inflation will increase bank lending and risk. Thus, the fluctuation in inflation will influence the volume bank lending and also performing of the bank.

Furthermore, inflation make financial system not efficient and it give negative impact to the financial development. There are evidences from the study by Keho (2009), Naceur and Ghazouani (2004), Boyd et al., (2001), Huybens and Smith (1999) and Andress et al., (1999). Thus, the low inflation will help the development in financial system.

2.3 Concluding Remarks

This chapter has explained the impact of macroeconomic variables on bank lending. The discussions highlight previous studies finding on the relationship between interest rate, employment inflation and bank lending.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

The main objective of this study is to examine the hypothesis whether macroeconomic variables has significant effect to bank lending. Section 3.2 describes data collection and sample selection. In section 3.3 discusses the measurement of variables. While, section 3.4 describes the theoretical framework of dependent and also independent variable used. In section 3.5 explain development of hypothesis. Section 3.6 describes the econometric model to be tested. In section 3.7 justify empirical method used and lastly section 3.8 provides a conclusion of the chapter.

3.2 Data Collection and Sample Selection

This study used the quantitative research. Quantitative research is research that use of mass numbers, obtained from data collection, explanations of the data, as well as the emergence of the result. There are several types of data always used in research liked cross sectional, time series and also pooled data (Cameron and Trivedi, 2013). The secondary data are collected for some aimed otherwise the problem in hand (Malhotra, 1999). Secondary data are very practical for the researcher to solve the problem statement and may explain the data more meaningful (Sekaran, 2003). This study is based on secondary data that collected from World Development Indicators (World Bank, 2016), Federal Reserves (Feds, 2016), Deutsche Bundesbank, International Monetary Fund (IMF, 2016), Trading Economic (2016) and Data Stream (2016). The following table shows the data collection of this study in Table 3.1.

Table 3.1 Table Data Description

No	Variable	Definition of Variables	Source of Data
1	TL	Total Lending	Data Stream
2	INT	Interest Rate (Lending rate)	World Bank, 2016 Feds, 2016 Deutsche Bundesbank IMF, 2016 Trading Economic
3	EMP	Total Employment, above 15 ages	World Bank, 2016
4	INF	Inflation Rate	World Bank, 2016

The data used for this study consist of 7 developed countries, G7 countries. The data collected starting from year 2005 until 2015 as presents in table 3.2.

Table 3.2 Sampling of the Study

No.	Name of Countries	Range of the Year	Totals
1	Canada	2005-2015	11
2	France	2005-2015	11
3	Germany	2005-2015	11
4	Italy	2005-2015	11
5	Japan	2005-2015	11
6	United States	2005-2015	11
7	United Kingdom	2005-2015	11
Totals			**77**

3.2.1 Panel data

The data used in this study involves seventy seven balanced panel data in seven different countries in developed countries. Panel data is referred as cross sectional and time series. Moreover, there are combination between time series data and cross section in panel data. In addition, with varies type of substantive variation by panel data the researches can learned different from other studies (Hsiao, 2014). In this study used balance panel data which has the same numbers time series in the unit of cross sectional. The advantages of using panel data can raise the sample of size, it appropriate for the dynamic changes and also it can be allows to study the complex behaviour (Gujarati, 2008).

3.3 Measurement of variables

3.3.1 Dependent Variable

The dependent variable in this study is measured by total bank lending. In this study, the use of total bank lending is to measure the impact of macroeconomic variables on bank lending (Ladime, 2013 and Thaker, 2014). Lending is the core business for all commercial bank in the world. The largest revenue and sources for a bank is loan (Alkilani, 2015). In addition, financial intermediation (financial institutions) acted as channel funds transfer from surplus unit to deposit units (Stein, 2014). Bank lending can be highly volatile and a function of a different of factors (Joseph, 2013).

3.3.2 Independent Variable

The explanations about independent variables used for this study which are the macroeconomic variables as follow:

a) Interest rate

Interest rate is charged by banks as compensation for the default of the loans. Besides, interest rate is income for a bank. The changes in interest rates will give impact in bank lending and also deposit rates. With the official 3 month short-term interest rates playing vital roles as the instruments of monetary policy (Mathai, 2002). In early studied, the relationship between interest rate and bank lending were determined in the studies from Thaker (2014), Malede (2014), Abdkarim (2013) and Iriana (2003).

b) Employment

The employment is measured from the ages above than 15 years old. This variable was obtained from world development indicators (2016). The variable included because decreasing in the number of the total employment will decline the demand for loans.

c) Inflation

This study used consumer price index (CPI) as proxy for inflation. In previous studies, the inflation had been examined to determine the bank lending such as Rababah (2015), Tomak (2013), Keho (2009) and Ghazouani (2004). The financial development acted as vital channel through the inflation can be adversely give impact the growth (Kadir, 2012). The working price system will be distorted in bank lending (Umar, 2014). The inflation will reduce the bank lending due to the time value of money. Thus, inflation will give the impact whole economic activity including depositor, borrower and also the banks.

Table 3.3 Summary of variables and measurements

Variables	Measurement	Definitions	Previous studies
Total Bank Lending	Total bank lending taken from yearly statistical on Data Stream	TL	Thaker et al. (2014), Ladime et al. (2013), Dimitrios, Angelos and Vasilios (2010), Shahbaz, Shamim and Aamir (2010) and Quagliariello (2008)
Interest Rate	Average interest rate (yearly)	INR	Thaker (2014), Malede (2014), Abdkarim (2013) and Iriana (2003)
Total Employment	This study used the total employment above 15 ages to examine the relationship between employment and bank lending	EMP	Alejandro and Nestor (2016), Dinh (2012) and Babaucek (2005)
Inflation Rate	This study used consumer price index (CPI) as proxy for inflation	INF	Rababah (2015), Tomak (2013), Keho (2009) and Ghazouani (2004)

3.4 Theoretical framework

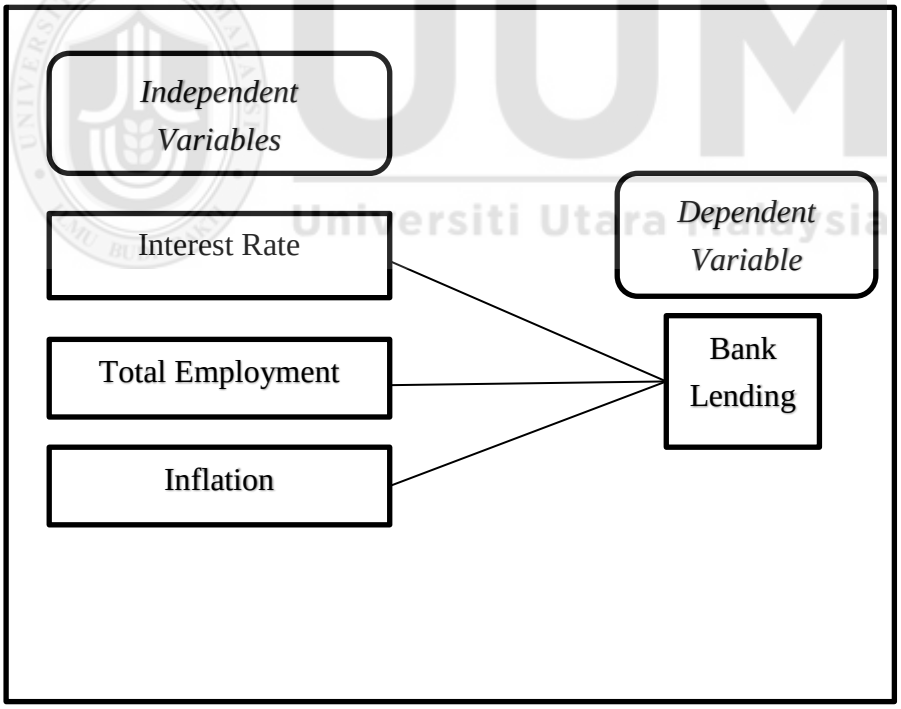
This study is use secondary data that taken from the empirical study. The variable into two categories namely:

a. Independent variable consists of 3 kinds of variable:

1. Interest rate (INT)
2. Total employment (EMP)
3. Inflation rate (INF)

b. Dependent variable consists of total bank lending.

Figure 3.1 Theoretical Framework



3.5 Hypothesis Development

The researcher is going to examine the relationship between interest rate, total employment, inflation and bank loans in G7 countries.

H_1: There is a significant relationship between interest rate and bank lending.

H_2: There is a significant relationship between total employment and bank lending.

H_3: There is a significant relationship between inflation and bank lending.

3.6 Econometric Model

The regression model aims to examine and predict how the relationship between independent variables and dependent variable. The econometric model is show below:

$$TL_{it} = \beta_0 + \beta_1 INT_{it} + \beta_2 EMP_{it} + \beta_3 INF_{it} + \varepsilon_{it}$$

Where:

TL	: Total Bank Lending
β_0	: Constant
β_1, β_2, β_3	: Coefficient of the Parameters
INT	: Interest Rate
EMP	: Total Employment
INF	: Inflation
ε	: Error Term

3.7 Empirical Method

This study employed the several method E-view software versions 8.0 to test the relationships between macroeconomic variables and bank lending liked inflation rate, total employment and interest rate. The analysis will divide into 4 parts, namely:

i. Descriptive statistics

ii. Correlation

iii. Diagnostic test

iv. Panel Ordinary Least Square (POLS).

3.7.1 Descriptive Statistics

The descriptive statistics consist of a process of transforming a large of raw data into a table with the frequency distribution and also percentages which are important part of the data (Denscombe, 1998). The descriptive statistics are used to describe and summarize data in a study (Trochim, 2000). Moreover, descriptive statistics also discover and measure the cause and impact the relationships among variables (Cooper and Schindler, 2000).

3.7.2 Correlation

A correlation is a single number that describes the degree of relationship between two variables (Trochim, 2000). Besides, the correlation is obtained from valuing the variations in one variable as other variable also different variations (Sekaran, 2013).

3.7.3 Diagnostic test

Diagnostic test were employed on the data that explained in the current section. This study conducted several tests before the regression analysis liked multicollinearity test was applied.

a) Multicollinearity Test

Multicollinearity are frequently confront statistical phenomenon are highly correlated with two or more independent variables in the multiple regression (Sekaran, 2013). If an independent variable has a tolerance value more than 0.1 and variance inflation factor (VIF) are less than 10, the multicollinearity problem does not exist (Hair, 2010).

3.7.4 Panel Ordinary Least Square (POLS)

Panel Ordinary Least Square (POLS) is a method of standard linier regression with the focuses of minimize the distinction between the observed responses in some arbitrary dataset and the responses predicted by the linear approximation of the data. The POLS is most common statistical method use for the application of vary disciplines for the regression analysis (Hair, 2010). The regressions provide the result predictable of dependent variable and independent variables (DeCoster, 2004). The equation for POLS show below:

$$Y_{i,t} = \alpha + \beta X_{i,t} + \varepsilon_{i,t}; \; i = 1,2,..., N; \; _{t + 1,2,..., T}$$

3.8 Concluding Remarks

This chapter has defined the data employed in this study and explained the sample selection to examine the hypothesis whether macroeconomic variables has significant effect to bank lending. The sample consists of 7 countries in developed countries. Balanced panel data is utilized in this study. In this sense, panel data provides several advantages can be controlled in the regression analysis. The next chapter were presents the results of the analysis and the findings.

CHAPTER FOUR

EMPIRICAL FINDING AND DISCUSSION

4.1 Introduction

This chapter provided the main finding of the empirical tests. Firstly, this chapter begins with descriptive statistics of the variables in section 4.2. Next, section 4.3 described the correlation test in this study. In section 4.4 explained the diagnostic test for this study. Furthermore, regression analysis was described in section 4.5. While, in section 4.6 were discussed about the finding in this study. Lastly, the conclusion of this chapter was explained in section 4.7.

4.2 Descriptive Analysis

Table 4.1 presents summary of descriptive statistics for the dependent variable and independent variables that was used in this study. It is also including information about mean, standard deviation, median, minimum and maximum.

Table 4.1 Summary of descriptive statistics

Details	TL	INT	EMP	INF
Mean	22.6131	1.0473	17.4522	0.1726
Median	21.8924	1.1939	17.2049	0.4700
Maximum	27.6959	2.0919	18.8176	1.5041
Minimum	20.5848	-0.6932	16.6217	-2.3026
Std. Dev.	2.0486	0.7100	0.67312	1.0236
Observations	77	77	77	77

Notes: TL: total bank lending, INT: interest rate, EMP: total employment, INF: inflation.

In table 4.1 above, all the series for the variables were transformed into log form. The dependent variable for this study is total bank lending and the independent variables are interest rate, total employment and also inflation. In addition, the

transformation into log made the estimated elasticities. Furthermore, the results show all variables comprise 77 observations. The table 4.1 above shows that the mean for bank lending is 22.6131 and median 21.8924. The maximum value of bank lending data is 27.6959 and the minimum value of bank lending data is 20.5848.

4.3 Correlation

In table 4.2 below shows the correlation between the variables are used in this study:

Table 4.2 Correlation

Correlation Probability	TL	INT	EMP	INF
TL	1			

INT	-0.4630***	1		
	0.0000	-----		
EMP	0.2506**	-0.0181	1	
	0.0279	0.8759	-----	
INF	-0.3698***	0.1892*	-0.0919	1
	0.0009	0.0994	0.4267	-----

*Notes: * indicates significant at 0.10 level, ** indicates significant at 0.05 level and *** indicates significant at 0.01 level.*

In table 4.2 shows the Pearson correlation coefficients. The correlation function is to measure the strength of relationships between the variables for this study. Furthermore, if the correlation coefficients are more than 0.80, it might lead to multicollinearity problem between the variables (Gujarati, 2003). However, the interpretation of a correlation coefficient are depends on the purposes of the study. Thus, in table 4.2 shows that all correlation coefficients in this study are less than

0.80. Moreover, the table indicates that the correlation coefficient between total bank lending and total employment is positive (r=0.2506) and significant (p-value=0.0279) at 0.05 level. Similarly, the correlation coefficient amongst the inflation and interest rate is positive (r=0.1892) and significant (p-value=0.0994) at 0.10 level. This shows that an increase or decrease in bank lending would be followed by an increase or decrease in total employment respectively. It is also shows same with the variables between inflation and interest rate. While, the correlation coefficient amongst bank lending and inflation is negative (r= -0.3698) and significant (p-value=0.0009) at 0.01 level. Lastly, the table above presents that the correlation coefficient between bank lending and interest rate is negative (r= -0.4630) and it significant (p-value=0.0000) at 0.01 level.

4.4 Diagnostic Test

4.4.1 Multicollinearity Test

In multicollinearity test, if the independent variable value shows a variance inflation factors (VIF) has less than 10, the multicollinearity problem non-existence (Montgomery, 2007). The result in table 4.3 shows that all of the VIF values are below the than 10. Therefore, the problem multicollinearity does not exist and not affect the regression analysis as table 4.3 below:

Table 4.3 Multicollinearity test

Variable	VIF
INT	1.037113
EMP	1.008515
INF	1.045601

4.5 Resgression Analysis

This study shows the results on panel data regression of the interest rate, total employment and also inflation on the total bank lending are shows in table 4.4 as below:

Table 4.4 Regression Analysis

Variable	Coefficient	t-Statistic	Prob.
INT	-1.1757	-4.2217***	0.0001
EMP	0.6639	2.2920**	0.0248
INF	-0.5458	-2.8138***	0.0063
R-squared	0.3442		
Adjusted R-squared	0.3173		
F-statistic	12.7719		
Prob(F-statistic)	0.0000		

*Notes: * indicates significant at 0.10 level, ** indicates significant at 0.05 level and *** indicates significant at 0.01 level.*

In table 4.4 above shows the results of panel ordinary least square (POLS). All the independent variables are significant to total bank lending as shows in the table. T-statistic in table shows that all results for independent variables are higher than ±1.96 means that the results are significant. The all t-statistic results present that this study can reject the null hypothesis. The r-square was about 34.42%, it means that the 34.42% variation in total bank lending explained by factors (independent variables) included in the model to test the period. Moreover, the p-value of f-statistic is significant at 1% level of significance. The regression coefficient shows 1% increase in interest rate will decrease the total bank lending by 1.17%. While, the regression coefficient shows 1% increase in total employment will increase the total bank lending by 0.66%. Furthermore, the regression coefficient shows 1% increase in inflations will decrease the total bank lending by 0.54%. Thus, there is significant

impact between independent variables and dependent variable for panel ordinary least square (POLS).

4.6 Discussion Finding

4.6.1 Interest Rate and Bank Lending

The regression analysis shows that the impact interest rate towards bank lending is significance. The relationship is negative between interest rate and bank lending. The t-statistic result for interest rate is -4.2217 with 1% of level significance. The regression coefficient shows 1% increase in interest rate will decrease the total bank lending by 1.17%. There are evidence that interest rate has negative relationship with bank lending and significant found in the early studies liked Rababah (2015), Malede (2014), Ladime (2013) and Olusanya (2012). Banks might face difficulty in getting loans if the interest rate high. Hence, this scenario will directly impact on bank profitability and economy overall.

4.6.2 Employment and Bank Lending

The regression analysis shows that the relationship between employment and bank lending is positive and significant. The t-statistic result for employment is 2.2920 with 5% of level significance. This result shows the regression coefficient shows 1% increase in total employment will increase the total bank lending by 0.66%. This is because the unemployment rate is the major factor in lending arrears (Dinh, 2012). Then, the worsening loan quality leads to a fall in unemployment (Babaucek and Jancar, 2005). In order to increase bank lending (banks profitability), the bank should increase number of employment. Perhaps banks need to enhance increase employee, sales, marketing, and credit departments to get more loans.

4.6.3 Inflation and Bank Lending

As regression analysis reveals that the impact inflation towards bank lending is significant. The t-statistic result for employment is -2.8138 with 1% of level significance. The regression coefficient shows 1% increase in inflations will decrease the total bank lending by 0.54%. The result shows negative relationships between inflation and bank lending. Besides, there is an evidence that inflation have negative relationship with bank lending liked Mohamad Aymen and Chedia (2016), Li (2009), Bunda and Desquilbet (2008) and Tang (2001). The increasing rate in inflation will contribute high non-performing loans and it will reduce the volume in the bank lending. Thus, the higher of inflation will reduce the saving deposit in bank and the bank does not have enough capital to lend the funds which means the volume bank lending will decrease.

Table 4.5 Summary of Hypothesis Testing

No.	Objectives	Hypothesis	Findings
1.	To examine the relationship between interest rates and the bank lending	There is a significant relationship between interest rate and bank lending	Supported the theory
2.	To determine the relationship between total employment and the bank lending	There is a significant relationship between total employment and bank lending	Supported the theory
3.	To investigate the relationship between inflation rates and the bank lending	There is a significant relationship between inflation rate and bank lending	Supported the theory

4.7 Concluding Remarks

This chapter has reported the findings and discussions of the study. Furthermore, early of this chapter discusses the summary descriptive analysis of all variables and follow by explains in correlation. This chapter also reported the diagnostic test and regression analysis. Moreover, this chapter shows the summary results of hypothesis in this study. Lastly, the discussions result for this study from regression analysis.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.1 Introduction

This chapter consists of the whole presentation of this study from previous chapter. Section 5.2 presents the summary of findings in this study. While, in section 5.3 discusses on implications of the study. Section 5.4 identifies the limitation in this study. Lastly, in section 5.5 consists of conclusion with recommendation for the future research.

5.2 Summary of findings

In this study investigate the impact of macroeconomic variables towards bank lending in G7 countries. The data was collected from 7 countries which are developed countries in the world and the data was collected from the year 2005 to 2015. The samples 7 countries are Canada, France, Germany, Italy, Japan, United Kingdom and United States. The main focus was to determine whether macroeconomic variables affect the bank lending in G7 countries. In generally, the asset and revenues of the bank comes from lending of the bank. The study finds that interest rate, total employment and inflation have relationships with the bank lending in G7 countries.

The result for interest rate is consistent with the studies by Rababah (2015), Malede (2014), Ladime (2013) and Olusanya (2012) which they conclude that interest rate has negative relationship with bank lending and significant. Furthermore, the regression coefficient shows that 1% increase in interest rate will

decrease the total bank lending by 1.17%. So, if the banks increase their lending rate then the volume of bank lending will increase.

The result for total employment is consistent with the studies (Dinh, 2012) and (Babaucek and Jancar, 2005) which they conclude that total employment has positive relationship with bank lending and also significant. Moreover, the result indicates the regression coefficient shows 1% increase in total employment will increase the total bank lending by 0.66%. So, when the numbers of total employment increase then the volume of bank lending will increase. Basically, the bank requirement for borrower applying the loans is payslip or working which means bank wants to mitigate default risk. Thus, the banks can lend the funds if the borrower is working.

The results for inflation is consistent with the studies Mohamad Aymen and Chedia (2016), Li (2009), Bunda and Desquilbet (2008) and Tang (2001) which they conclude that inflation has negative relationship with bank lending and significant. The regression coefficient shows 1% increase in inflations will decrease the total bank lending by 0.54%. Thus, the higher of inflation will reduce the saving deposit in bank and the bank does not have enough capital to lend the funds which means the volume bank lending will decrease.

5.3 Implications of study

There is valuable information and implication provides for policymakers to look insight from this study. Firstly, the interest rate must be monitor to encourage the borrower get loans with low rate besides increase the volume of bank lending. Furthermore, the bank can mitigate their default risk if the policymakers control the

lending rate. Moreover, the policymakers must ensure the interest rate under control because the interest rate is determined by surplus units and deficit units.

Lastly, the total employment is the main factors in lending arrears. This is because the quality of lending can be determined from the volatility the number of total employment. Thus, the assets and revenue of the bank will decrease if the quality of the lending is worst.

5.4 Limitations

There are several limitations in this study. The limitation of this study is on the data collection. The data has collected from each G7 countries and each bank's annual report from year 2005 to 2015, it is difficult to get full data from every banks for every country. This is because some of central bank for G7 countries is not provide the total bank lending.

Secondly, the limitation in this study is limited for financial institutions and only focuses in banking sector. Then, the limitation is due to the time constrained for this study, is covered only period from 2005 until 2015. Generally, get a more comprehensive conducted then the better results can be obtains.

5.5 Recommendations and Future Research

There are several recommendations for future research. Firstly, it would be interesting to study the relationships between macroeconomic variables and bank lending in emerging countries or Asian countries. It might be different or same impact between developed countries and developing countries.

Secondly, the researcher can extend length of the period to get a better result. Besides, the researcher can expand their study not only focuses in financial institutions. They will cover the non-financial institutions.

5.6 Concluding Remarks

This chapter consists of the whole presentation of this study from previous chapter. This chapter also explain summary of findings in this study. While, discusses on implications of the study. Moreover, this chapter identifies the limitation in this study. Lastly, this chapter consists of conclusion with recommendation for the future research.

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APPENDIX

APPENDIX A

RELATIONSHIP BETWEEN INTEREST RATE, TOTAL EMPLOYMENT, INFLATION AND BANK LENDING

Covariance Analysis: Ordinary

Date: 10/20/16 Time: 21:49

Sample: 2005 2015

Included observations: 77

Correlation Probability	LNTL	LNINT	LNEMP	LNINF
LNTL	1			

LNINT	-0.4630	1		
	0.0000	-----		
LNEMP	0.2506	-0.0181	1	
	0.0279	0.8759	-----	
LNINF	-0.3698	0.1892	-0.0919	1
	0.0009	0.0994	0.4267	-----

APPENDIX B

MULTICOLLINEARITY TEST

Variance Inflation Factors

Date: 10/20/16 Time: 21:55

Sample: 1 77

Included observations: 77

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
LNINT	0.077552	3.322896	1.037113
LNINF	0.037626	1.075729	1.045601
LNEMP	0.083915	687.8816	1.008515
C	25.71102	690.9671	NA

APPENDIX C

COMMON EFFECT MODEL

Dependent Variable: LNTL
Method: Panel Least Squares
Date: 10/20/16 Time: 21:52
Sample: 2005 2015
Periods included: 11
Cross-sections included: 7

Total panel (balanced) observations: 77

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNINT	-1.1757	0.2785	-4.2217	0.0001
LNEMP	0.6639	0.2897	2.2920	0.0248
LNINF	-0.5458	0.1940	-2.8138	0.0063
C	12.3513	5.0706	2.4359	0.0173
R-squared	0.3442	Mean dependent var		22.6131
Adjusted R-squared	0.3173	S.D. dependent var		2.0486
S.E. of regression	1.6927	Akaike info criterion		3.9411
Sum squared resid	209.1585	Schwarz criterion		4.0628
Log likelihood	-147.7308	Hannan-Quinn criter.		3.9898
F-statistic	12.7719	Durbin-Watson stat		0.4117
Prob(F-statistic)	0.0000			

APPENDIX D

RELATIONSHIP BETWEEN INTEREST RATE, TOTAL EMPLOYMENT, INFLATION, INDUSTRIAL PRODUCTION INDEX AND BANK LENDING.

Covariance Analysis: Ordinary
Date: 10/24/16 Time: 05:15
Sample: 2005 2015
Included observations: 77

Correlation Probability	LNTL	LNINT	LNEMP	LNINF	LNIPI
LNTL	1				

LNINT	-0.4630	1			
	0.0000	-----			
LNEMP	0.2506	-0.0181	1		
	0.0279	0.8759	-----		
LNINF	-0.3698	0.1892	-0.0919	1	
	0.0009	0.0994	0.4267	-----	
LNIPI	-0.1641	0.3603	0.0356	0.2564	1
	0.1538	0.0013	0.7583	0.0244	-----

APPENDIX E

COMMON EFFECT MODEL

Dependent Variable: LNTL
Method: Panel Least Squares
Date: 10/24/16 Time: 05:16
Sample: 2005 2015
Periods included: 11
Cross-sections included: 7
Total panel (balanced) observations: 77

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNINT	-1.2261	0.2964	-4.1364	0.0001
LNEMP	0.6541	0.2918	2.2418	0.0281
LNINF	-0.5675	0.1994	-2.8457	0.0058
LNIPI	1.6080	3.1122	0.5167	0.6070
C	5.1212	14.8926	0.3439	0.7319
R-squared	0.3466	Mean dependent var		22.6131
Adjusted R-squared	0.3103	S.D. dependent var		2.0486
S.E. of regression	1.7012	Akaike info criterion		3.9633
Sum squared resid	208.3858	Schwarz criterion		4.1155
Log likelihood	-147.5883	Hannan-Quinn criter.		4.0242
F-statistic	9.5495	Durbin-Watson stat		0.4159
Prob(F-statistic)	0.0000			