



**ANKARA YILDIRIM BEYAZIT UNIVERSITY  
INSTITUTE OF SOCIAL SCIENCES  
DEPARTMENT OF BANKING AND FINANCE**

**BASEL III ADOPTION BY G20 MEMBERS IMPACT ON THEIR CREDIT RATING**

**MASTER'S THESIS**

**MOHAMMED KALLOUB**

**JULY, 2017**

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# **Basel III Adoption by G20 Members Impact on Their Credit Rating**

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Assoc. Prof. Dr. Seyfullah YILDIRIM

Manager of Institute

I certify that this thesis satisfies all the requirements as a thesis for the degree of Master of Science in Department of Banking and Finance.

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Assoc. Prof. Dr. Ayhan KAPUSUZOGLU

Head of Department

This is to certify that we have read this thesis and that in our opinion it is fully adequate, in scope and quality, as a thesis for the degree of Master of Science in Department of Banking and Finance.

---

Assoc. Prof. Dr. Ayhan KAPUSUZOGLU

Supervisor

**Examining Committee Members**

Prof. Dr. Nildag Basak Ceylan (AYBU, Banking and Finance) \_\_\_\_\_

Assoc. Prof. Dr. Ayhan KAPUSUZOGLU (AYBU, Banking and Finance) \_\_\_\_\_

Assoc. Prof. Dr. Yeliz YALCIN (GAZI, Econometrics) \_\_\_\_\_

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## ABSTRACT

### Basel III Adoption by G20 Members Impact on Their Credit Rating

Mohammed Kalloub

MSc Department of Banking & Finance

Supervisor: Assoc. Prof. Dr. Ayhan KAPUSUZOGLU

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This study is designed to test the effect of Basel III standards adoption by 27 countries included in Basel III adoption reports (including G20 group members) on their credit rating, in addition to this the study tests some important explanatory variables which have been proven to have an effect on sovereign credit rating, the study includes a data analysis section which follows the past literature in collecting, sorting, and analysing data in order to have a reliable results, depending on BCBS semi-annual adoption reports, along with other macroeconomic indicators published by IMF and World Bank, however the basic indicator for credit rating is Standard & Poor's credit rating due to its high sensitivity, an important finding of the study is the statistical evidence of relationship between adoption of Basel III standards (represented by first and second phases of the accord) and credit rating of the population.

Keywords: Basel III, Credit rating, D-SIB, G20, 1<sup>st</sup> Pillar, G-SIB, Liquidity Coverage Ratio

# Özet

## G20 Üyesi Ülkelerin Basel III Kriterlerini Benimsemelerinin Kredi Dereceleri Üzerindeki Etkisi

Mohammed Kalloub

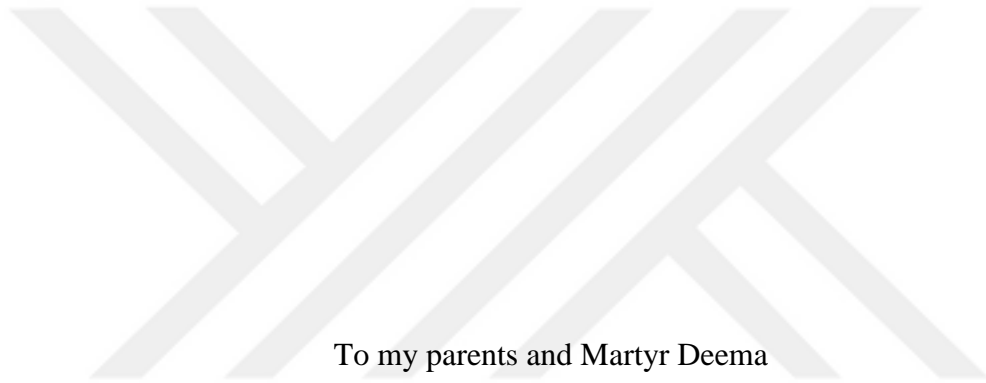
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Bu çalışmada, Basel Bankacılık Denetim Komitesi (BBDK) tarafından hazırlanan benimseme raporunda yer alan ve G20 Ülkelerini de içine alan 27 ülke, Basel III kriterlerinin kredi derecelendirme etkisine göre incelenmiştir. Çalışmada, literatürde daha önce etkisi olduğu ispat edilmiş açıklayıcı değişkenlerin kredi derecelendirmesi üzerindeki etkileri analiz edilmiştir. Bu doğrultuda, BBDK yarıyılık benimseme raporları, IMF ve Dünya bankası tarafından yayınlanmış diğer makroekonomik göstergeler ve yüksek duyarlılık içermesinden dolayı Standard&Poors'un temel göstergeleri kullanılmıştır. Basel III'deki kriterlerin benimsenmesi (birinci ve ikinci etaplar dahil) ve grubun kredi derecelendirmeleri arasındaki bağlantısını ortaya koyan istatistiksel kanıtı çalışmanın en önemli tespitidir.

Anahtar Kelimeler: Basel III, Kredi Derecelendirme, G20, 1nci Etap, G-SIB, D-SIB, Likidite Yeterlik Oranı.



To my parents and Martyr Deema

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## LIST OF ABBREVIATIONS

FDI	Foreign Direct Investment
CR	Credit rating
CRA	Credit Rating Agencies
GDP	Gross Domestic Product
BCBS	Basel Committee on Banking Supervision
NRSRO	Nationally Recognized Statistical Rating Organization
G-SIB	Global Systematic Important Banks
D-SIB	Domestic Systematic Important Banks
LCR	Liquidity Coverage Ratio
IMF	International Monetary Fund
BIS	Bank for International Settlements
LR	Leverage Ratio

## **1. Introduction and problem:**

Banking sector plays the major role in financial performance and economic development for countries as well, in 2009 after the financial crisis the G20 group recommended Basel committee to monitor and work on the financial sector within the G20 group basically, as a result the committee have issued complementary standards for Base II known as Basel III to maintain financial stability, help assessing risks and avoid any expected financial crisis in the future.

As a complementary standards for the previously issued accord Basel II, the new accord similarly contains three major pillars and build on the previous version of standards. Pillar-1 with high focus on increasing the quality and quantity of capital in addition to increasing countercyclical buffers, to work as an absorption base for future losses. However, Pillar 2 is based on risk management and assessment against exposure risks within banking sector. While Pillar 3 contains disclosure requirements for individual banks. Indeed, Pillar 3 in Basel III consists of variety of requirements compared to the same pillar in Basel II, these requirements were designed purposely to provide helpful information for supervisors of banking sector and help them achieve maximum level of financial soundness (Bank for International Settlements, 2012). Variety of studies have been conducted to evaluate Basel III standards and indicate its impact on financial stability. For instance Slovik (2011), employed GDP records and estimations to assess the impacts of Basel III regulatory framework, as a result of the study authors found that the new accord was helpful especially in smoothing economic fluctuations.

On the other hand, credit rating of the country has been a critical issue for many countries, as it enhances financial records and give signs of economic development, these information are helpful for policy makers and investors as well. Peilin Cai (2013), in their article which studied the importance of credit rating and its effect on FDI in 103 countries during the period 1985-2012, found that credit rating has a strong relationship with foreign direct investment FDI, according to the research it was clear that countries with high credit rating are attractive for FDI more than those have lower rating. In addition the study found that a country with high credit rating receives high volume of investments compared to peers, if other's rating becomes higher investments will automatically be shifted to country with better rating. The study concluded that credit rating fosters FDI. Yılmaz Bayar (2014)

employed data collected from turkey during the period 1995-2013 on credit rating and FDI, the study found that credit rating agencies CRA's became a decisive factor for FDI and plays major role in directig investments around the worlds, also they found that during the period FDI and credit rating had a positive relationship in Turkey.

Accordingly, as previous studies show the importance of macroeconomic stability and the importance of credit rating as well. The study is designed to capture the relationship between financial stability factor represented by commitment to Basel II and III accord, and credit rating for countries.

### **1.1 Background and motivations:**

During the last few years changes have occurred to the global financial system along with the global financial crisis in 2009. In the past, bank of international settlements represented by Basel committee was responsible for issuing regulations and monitor financial stability standards. However the last financial crisis has given compelling evidence that the issued standards Basel I and Basel II were not enough to keep prevent financial crisis or even smoothing it up. As a result for this, the global financial system was in need to a complementing standard for the previous version. By the end of 2010 the first guidelines have been issued by Basel committee on banking supervision which included additional requirements to increase the quantity and quality of individuals bank's capital, in addition to this, the proposed requirements also focuses on liquidity and disclosure requirements to enhance supervision and increase monitoring entities ability to predict any financial crisis in the future.

On the other hand, credit rating of a country represents its government ability to repay their liabilities and availability of stable revenue sources. Credit worthiness is a measure of financial soundness and ability to absorb and recover from any financial crisis. However, credit rating is a key component of both financial stability measurements and financial stability tools. It evaluates the current and past events and based on them expectations for a certain economy are given. however and especially for developing countries credit rating can be used as a financial stability tool based on the results of current reports, many studies have been conducted to determine the effect of credit rating, and it was concluded that there is a statistically significant relationship between credit rating and foreign direct investment FDI since it is considered as an attracting factor for

investments from abroad. in the light of the mentioned facts, and since this issue is newly introduced to the global financial system, this study will consider commitment to Basel III requirements as a financial stability tool to determine its effect on credit rating of G20 countries, also the study could be used as a source of feedback for 5 years of implementing the new requirements for decision makers, to assess the effectiveness of the standards and help maintaining sound resilient financial system, the use of Basel III adoption as a determinant variable has many justifying reports and articles, majority of the reviewed literature confirms on the new accord role in maintaining sound financial system, higher ability to absorb fluctuation and long term financial stability.

In the light of past studies which have been conducted to assess the efficiency of the new accord, it has been proven that the new accord has many positive impacts on financial stability and thus can be considered as a determinant of credit rating since it concerns basically with financial soundness and stability.

## **1.2 Literature review:**

Schlickenmaier (2012) argued that Basel III standards are not enough to measure and accurately assess risks and maintain financial stability because of geographic variations between G20 group members. However, this issue is still debatable according to other scholars and there are many writings support the idea of Basel III standards efficiency, on the other hand, Hartlage (2012) tried to assess the liquidity coverage ratio impact on financial stability, and as a result of the study liquidity coverage ratio requirements were an efficient tool to maintain financial stability in many countries especially in terms of liquidity risk managements, but still need improvements as well .

Schwerter (2011), shows that there are still adjustments necessary. Although the development of Basel III is well advanced, providing some stabilizing incentives, there are still issues calling for closer consideration to counter all Basel II drawbacks and systemic risk factors adequately. In addition to this samitas (2014) in his article published in 2014 found that some of the criticism against the proposed measures is justified, as neither economic crises nor contagion are diminished under Basel III. At the same time, the authors' findings support that the stability goal is met, at least in part.

As an aftermath of the financial crisis in 2009, global financial consulting institution started to study reasons and impacts stand behind the previous crisis. One of the most



detailed studies was done by ( Swedish National Audit Office, 2010) to determine the main reasons of the past financial crisis. The study found that lack of supervisory role was one of the main factors which caused the last crisis: within the details of the study it was notably clear that absence of regulatory activities played a major role in 2009 financial crisis. In addition to this, higher risk taking by financial institutions was one of the reasons for financial instability in that period, combined with low level of international cooperation between supervisory authorities.

However, from individual banking perspective, banking sector within that period failed to assess risks accurately and thus failed to make the proper reactions against occurred losses, beside this reason, credit rating agencies failed to report this financial weaknesses as a result of inadequate risk exposure reporting by banks. Arefjevs & Brasliņš( 2013), in their study: Determinants of credit rating –Latvia in their study which has been conducted to assess credit rating determinants in Latvia between 1997 to 2012, examined many macroeconomic variables including GDP per capita, GDP growth, unemployment, inflation, external debt and other economic indicators to assess and explain past observations of credit rating in Latvia and help in predicting credit rating in the future, as a result of the study it has been found that inflation, GDP per capita, GDP growth and governments debt were a determinants of credit rating for Latvia during the period 1997-2012, with regard to methodology of the research an ordinary least squares regression model has been used to indicate the relationship between explanatory variables and dependent variable of the study which is the weighted average of the biggest rating corporations in the world S&P, Fitch and Moody's, Due to Latvia's economic relative stability in the past two decades there was no need to include a dummy variable for past decades. The study became a useful prediction tool for future credit rating as well and has been used to predict rating of the country for the next years with low expectation gaps between the real and the expected values resulted from the model.

Chee, Fah, & Nassir (2014), in their study: Macroeconomic determinants of sovereign credit rating in 2014, the study includes 53 countries and covers an eleven years period from 2000 and 2011 and examines nine macroeconomic variables along with three qualitative variables, the results were consistent with past studies which found a relationship between macroeconomic variables and credit rating. However, the study found that GDP derivative variables have a statistical strong relationship with credit rating,

another distinct finding of the study was economic development and economic freedom's impact on credit rating of the countries, with regard to the methodology used to obtain the study, the authors used the multiple regression model to assess the relationship between variables.

Richard Cantor (1996) in their study which studied the determinants of credit rating, the study measured variety of factors effect on credit rating, which have been taken in consideration during creditworthiness assessment, employing data obtained from international credit rating agencies, the study found that credit worthiness of a country is closely related to six factors including GDP growth stability, per capita income and economic developments. Economic development is a broad term that may include different variables and depends on the explanation of the researcher as well, this term has many indicators which can reflect the meaning of economic development at that time, a country with high economic development at that time is described as financial stability, investment safety and economic freedom. While currently developed economy can stand for stable growth rates and well-structured ruled economy, although this study has been conducted a long time ago but it is still can be valid and applicable for today's modern economies including findings and variables of the study with some amendments on the explanations of variables as it may relatively change from time to. However, economic development is well described by policies have been taken to achieve economic stability, however the study took Moody's and S&P classifications as an indicator of credit rating for the population which included 49 countries from all over the world.

Congdon (2009) Studied the importance of disclosure requirements and their impact on financial stability, although it is hard to predict an exact date for financial crisis, the new accord is expected to be helpful for assessing risks and achieve transparency. According to the study if this happened, credit rating agencies mission will become much easier to assess financial risks, and supervisors mission will become less ambiguous as well. However, with regard to economic development and entrepreneurship, Jul-Larsen (2014), in her master thesis which studied the effects of the new capital and liquidity requirements on economic growth and entrepreneurship, found that Basel III standards came with higher capital requirements, and thus resulted in high cost of debt for small and medium enterprises. But despite of this fact, it reduces financial fluctuations and procyclicality, the study concluded that these requirements provide a stable base for funding despite of

higher costs. From another perspective, the study concluded that these requirements will cause a slowdown in economic growth in the short term, but as it will provide a stable access to funds it is expected to have positive impacts in the longer term. also Federal Reserve Bank of New York (2011), in their staff report of the new accord effects on financial fluctuation, had found that extra liquidity requirements and buffers plays a major role in achieving financial stability and limit the impacts of any financial fluctuations in the future.

Mosko (2016) employed theoretical information of Basel III requirements with information from Albanian banking system, has concluded that the new accord contributes effectively for economic stability and, provides a strong base against fluctuations, the study conducted that, although higher capital requirements may result in a growth slowdown in the short term, it is expected to be reflected positively on the financial system in the long term. In addition to this, European Central Bank (2015) in their stability review report concluded that leverage ratio as one of Basel III requirement works as a monitoring tool to make sure that banking system don't work with extra leverage. According to the report the new required leverage ratio provides financial system with soundness and works as a monitoring tool to insure low dependency on leverage by banks, and thus maximizes expected loss absorbance base.

( Reserve Bank of Newzealand, 2012) the Reserve bank of New Zealand has published their evaluation assessment of Basel III accord, whether the standards should be adopted and applied or not depending on the noticed and expected impacts of the accord, however the study focused basically on the costs and benefits of the capital adequacy ratio required by Basel III. With regard to the study findings, according to cost-benefit study performed by the bank the adoption of Basel III standards is justified and holds various benefits to economic stability since side effects of the high required capital and additional costs will be reduced to zero within 10 years. Also the study found that optimal tier-1 capital is 13% which is a little bit higher than the minimum required capital by Basel III accord, as a concluding remarks of the study the adoption of the accord gives a better position to banks and financial sector as a whole, helps to achieve financial stability and forms a strong base for an economy to absorb financial crisis.

Fender & Lewrick (2016) in their published report by Bank for International Settlements BIS, they have assessed the costs and benefits of implementing Basel III accord, the

authors confirmed on the strong economic base that would be given to the economy although there are some temporary side effects such as low profitability of banking system results from high lending costs, however generally the implementation of the new accord results in a stable and reliable economic system and helpful to enhance crisis absorbing capacity.

Yan, Hall, & Turner(2011), in their paper which has been designed to obtain a cost-benefit analysis of Basel III standards studying the expected impacts on the UK economy, the paper provided a long term cost-benefit analysis on liquidity and capital requirements of Basel accord, one of the most important findings of the study was that the new accord will have a strong positive and long term effect on the UK economy represented by high financial stability and profitability expectations, as a result, the study suggests a high compliance to the proposed standards in order to maximize financial stability and long term profits. European Central Bank (2016) in their review of Basel III adoption impacts on European banks, the study found that implementing leverage ratio LR requirements had several benefits including high absorbing capacity and support the financial soundness of the economy.

Federal Reserve Bank of New York (2011), In their staff report about the long term impacts of Basel III on future financial fluctuations, the study found that the implementation has many benefits especially it decreases financial volatility and supports absorbing capacity for economic shocks. After reviewing past studies conducted to assess the determinants of credit rating and the benefits of Basel III adoptions, the new accord is considered as an effective financial control tool which helps to enhance stability of banking sector and the economy as a whole since banking sector forms the basis for modern economies.

<b>Literature Review Table</b>					
	Study	Author	Study Purpose	Study Frame	Findings
1	Basel III and Credit Risk Measurement: Variations Among G20	SCHLICKEN MAIER, MATT	Assess Basel III efficiency	G20 group	-insufficient to maintain financial stability and may have negative side effects

	Countries				
2	The Basel III Liquidity Coverage Ratio and Financial Stability	Andrew W. Hartlage	Assess Liquidity coverage ratio on financial stability	US Financial System	- liquidity coverage ratio requirements were an efficient tool to maintain financial stability in many countries especially in terms of liquidity risk managements , but still need improvements as well
3	Basel III's ability to mitigate systemic risk	Schwerter, Stefan	Ability of Basel III to mitigate risk and maintain financial stability	Global	Basel III is well advanced, providing some stabilizing incentives, there are still issues calling for closer consideration for drawbacks
4	The Causes of the Global Financial Crisis and Their Implications for Supreme Audit Institutions	Swedish National Auditing Office	causes of the financial in 2008-2009	Global	- lack of supervisory role was one of the main factors which caused the last crisis
5	Determinants of credit rating – Latvia	Arefjevs, Ilja; Brasliņš, Ģirts	study the determinants of credit rating in Latvia during a 15 years period	Latvia 1997-2012	- inflation, GDP per capita, GDP growth and governments debt were a determinants of credit rating for Latvia during the period 1997-2012
6	Macroeconomics Determinants of Sovereign Credit	Chee, Soh Wei; Fah, Cheng Fan;	Determinants of Sovereign Credit Ratings	53 countries 2000-2011	results were consistent with past studies which found a relationship

	Ratings	Nassir, Annuar Md.			between macroeconomic variables and credit rating. However, the study found that GDP derivative variables have a statistical strong relationship with credit rating
7	Determinants and Impact of Sovereign Credit Ratings	Richard Cantor, Frank Packer		49 countries	determinants are six factors including GDP growth stability, per capita income and economic developments
8	THE FAILURE OF NORTHERN ROCK:A MULTI- DIMENSIONAL CASE STUDY	Tim Congdon Charles A.E. Goodhart Robert A. Eisenbeis and George G. Kaufman	importance of disclosure requirements and their impact on financial stability	Global	-the new accord is expected to be helpful for assessing risks and achieve transparency. According to the study if this happened, credit rating agencies mission will become much easier to assess financial risks, and supervisors mission will become less ambiguous as well
9	BASEL III: Long-Term Impact on Economic Performance and Fluctuations	Federal Reserve Bank of New York	Basel accord on Economic Performance and Fluctuations	US economy	liquidity requirements and buffers plays a major role in achieving financial stability and limit the impacts of any financial fluctuations in the future.
10	Effect of Bank	Mosko Aida	Effect of	Albania	new accord contributes

	Capital Requirements on Bank Risk-taking and Financial Stability		capital requirements on financial stability		effectively for economic stability and, provides a strong base against fluctuations
11	Financial Stability Review	European Central Bank	assess the impact of the new leverage ratio	UE countries	-the new required leverage ratio provides financial system with soundness and works as a monitoring tool to insure low dependency on leverage by banks
12	Regulatory impact assessment of Basel III capital requirements in New Zealand.	Reserve Bank of Newzealand	cost-benefit assessment of capital requirements	New Zealand	- Basel III standards is justified and holds various benefits to economic stability since side effects of the high required capital and additional costs will be reduced to zero within 10 years.
13	the macroeconomic impact of Basel III and outstanding reform issues	Fender, Ingo; Lewrick, Ulf	Assessment of Basel III accord	Global	authors confirmed on the strong economic base that would be given to the economy although there are some temporary side effects such as low profitability of banking system results from high lending costs

14	A Cost-Benefit Analysis of Basel III: Some Evidence from the UK	Yan, Meilan; Hall, Maximilian J. B.; Turner, Paul	Assessment of Basel III accord	UK	the new accord will have a strong positive and long term effect on the UK economy represented by high financial stability and profitability expectations
15	The impact of the Basel III leverage ratio on risk-taking and bank stability	European Central Bank	Assessing leverage ratio effect on risk-taking and bank stability	EU Banks	Implementing leverage ratio LR requirements had several benefits including high absorbing capacity and support the financial soundness of the economy
16	BASEL III: Long-Term Impact on Economic Performance and Fluctuations	Federal Reserve Bank of New York	assess the impacts of Basel III on economic performance	US	implementation has many benefits especially it decreases financial volatility and supports absorbing capacity for economic shocks

Table 1.1

### 1.3 Problem and formulation:

In this section of the study a general framework is conducted, including aspects which have been studied by the research. The general outline includes literature review of credit rating importance, effects and criteria used to conduct a sound rating. In addition, the theoretical section includes a review of Basel III requirements and general outlines of the requirements, this part will include commitment evaluation criteria by Basel Committee on Banking Supervision BCBS. The second section of the study includes data analysis of G20 group member's commitment to Basel III standards and their credit rating.



#### **1.4 Research framework:**

In the light of the chart 1, credit rating is a process of collecting data regarding financial stability and government's ability to repay its liabilities, this data includes political and financial measures with different importance weight for each of them according to their effectiveness and how do they affect credit rating. After the process of data collection, the core role of credit rating agencies starts. However, credit rating is a mixture of many variables with different relative weights includes GDP, government policies, economic development and other variables.

Simultaneously, Basel III standards are a new guest in banking sector and financial system as a whole, the new requirements of the accord are expected to help maintaining sound banking system, stable economy and increase banking sectors capability to avoid and absorb future financial crisis. Thus, if happened the new accord is sought to have a relationship with banking system, economy in general and credit rating as well.

Theoretically, due to the nature of the new accord and its concern to financial stability it is expected to have a relationship with credit worthiness measures. As a result, the study will work to assess how strong is the relationship between commitment to Basel III standards by G20 countries and their credit rating.

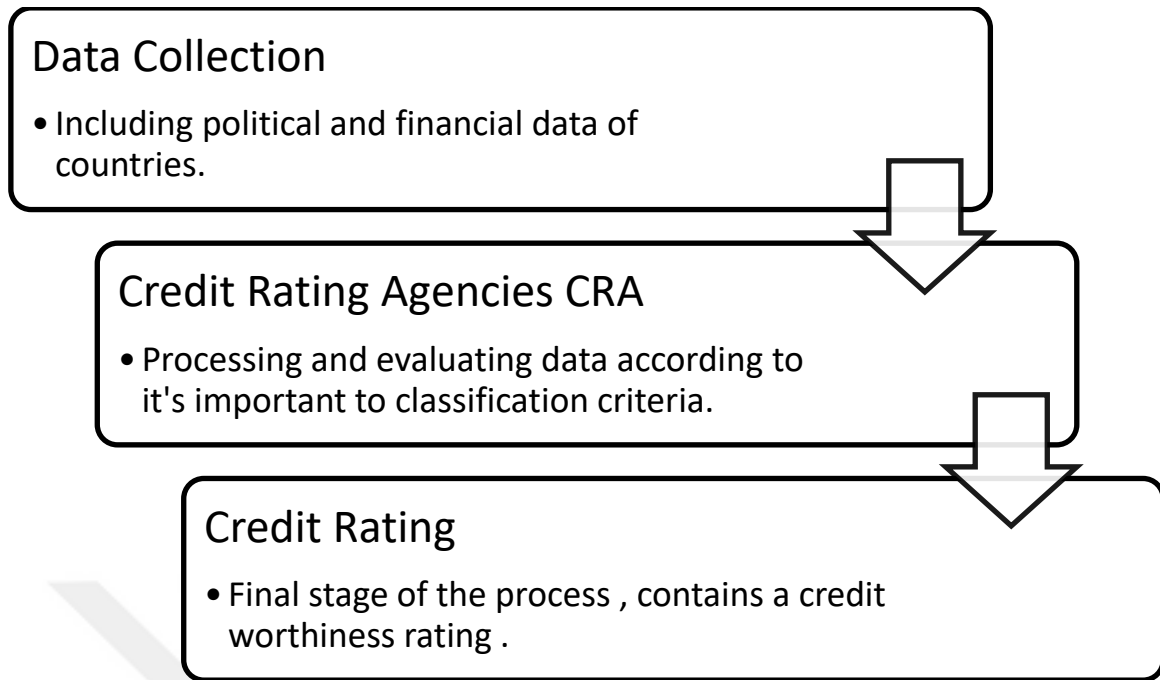


Chart 1.1

### 1.5 Research questions:

In this study, two main questions are expected to be answered:

- What are the main determinants of credit rating for G20 Group between 2011 and 2016?
- What is the impact of Basel III adoption on G20 group members credit rating?

To find the appropriate answer for this question, a detailed study and review of both credit rating and Basel III accord is needed, along with adoption reports to perform data analysis. However, the study assumes the same determinants of credit rating in addition to adoption of Basel accord as a financial stability tool. In addition to the main questions, a set of sub questions is expected to be studied and answered by the research:

- What are the factors which may have effect on credit rating?
- What is the used criterion by Credit rating agencies to conduct a credit rating?
- What is the interpretation of the used symbols in credit rating?
- What are the basics of Basel III accord?
- How is the accord expected to affect financial stability?

- Is there a process to evaluate commitment to the new accord?
- Who is responsible for evaluating adoption of Basel III?
- How often commitment reports are published?

The expected benefits of answering the questions are various and can be helpful for decision makers especially in banking supervision and financial stability, basically the study is designed to capture credit rating criteria and go in the details of the credit rating criteria, the study will take in consideration what had been written with regard to credit rating in the past and in addition to this, it will contain a data analysis to study credit rating determinants.

However, the study will include a review of Basel accord considering different studies; the review will include detailed information about the new accord, expected benefits and adoption reports. Moreover, data analysis section will include information from the periodic publications of Basel committee BCBS about adoption by G20 group members, these reports will be used as a primary tool to identify commitment percentage to the new accord.

After considering the determinant factors of credit rating, data analysis section will be conducted to identify the impact of Basel III commitment on credit rating, the result of the study will be helpful for decision makers especially in developing countries in the future, since credit rating enhancement is a priority for them to achieve economic growth and increase foreign direct investment.

## **2. History of credit Rating:**

Credit rating agencies have been introduced a long time ago, although hundred years before investment decision was not complicated as today's, but since investors are in continuous need for information on risks and expected gains, credit rating agencies have found its permanent place in finance world. As in 1860, the series of global agencies started by Henry Poor who had published his first report on –History of Railroads and Canals in USA. On the other hand Standard Statistics had their first publication on corporate bond and sovereign debt in 1906. Consequently, Standard Statistics merged with Poor and became Standard and Poor's which then has been acquired by McGraw-Hill in 1966, however Standard and Poor's is well known of their S&P 500 index.

Also John Moody was one off the first leaders in credit rating and financial services world , in 1900 he had started his business up by publishing the manual of industrial securities, and by 1903 Moody's became well known in the US and started to get higher market share (Moody's, 2016).

Nationally Recognized Statistical Rating Organization (NRSRO) has been established in 1975, employing developed methods of data analysis , was created to provide trusted data for financial institutions , as a result of softening capital and liquidity requirements for financial institutions , thus concerned financial institutions was in a serious need for trusted , professionally collected and analysed data.

And in 1907 John Knowles Fitch had established Fitch publishing; typically they started by publishing financial information and statistics, printing the Fitch bond book. However, Fitch was the first corporation who has introduced the AAA through D rating system which became the base for rating scales later on with some slight changes sometimes. A clear explanation of the symbols had been conducted by Japan Credit Rating Agencies including main symbols and their explanations.

Long term Issuer Rating Scale	
AAA	Represents the highest level of certainty of an issuer to fulfil its financial obligations.
AA	A very high level of certainty to fulfil financial obligations.
A	A high level of certainty to fulfil financial obligations.
BBB	An adequate level of certainty to fulfil financial obligations, this category is expected to diminish in the future.
BB	Level of certainty is not in danger, but expected not to continue with the same soundness in the future.
B	Low level of certainty to meet financial obligations.
CCC	There are a signs of uncertainty to meet financial obligations and possibility of default.
CC	A high default risk.
C	A very high default risk.
LD	Limited default, when part of the financial obligations is honoured but others are not.
D	Default, when all financial obligations are in effect of default.
a + or – sign me be added to the basic classification to indicate relative standing.	

Table 2.1 Source: Japan Credit Rating agency 2008

## 2.1 Types of credit Rating:

According to prepared reports and final data produced within a credit rating agency, credit rating can be divided mainly into two main categories as follow.

Rating of Corporate issuers:

Basically this rating gathers information on public issuers and develops their reports using publicly used data and confidential data if available. However, this kind of reports can be produced either on the demand of the issuer or as a part of the credit rating agency's

natural work. In many countries investment laws may prohibit trading with unrated securities, thus many issuers are likely to ask credit rating agencies to evaluate their securities for public which in other words refers to solicited rating. On the other hand credit rating agencies can start their own ratings without being asked to do this (unsolicited rating) ( Japan Credit Rating Agency, 2008).

## 2.2 Structured Finance Products:

In addition to their role in monitoring and evaluation corporate issuers, credit rating agencies also has been concerned with Structured Financial Instrument<sup>1</sup>, thus collecting data and issuing reports on structured finance product became a part of the CRA’s daily work since their major concern is to provide wide range of financial consulting services for both issuers and investors.

Credit Rating Categories	
Corporations, etc.	<p>Creditworthiness of corporations or similar entities as given below, and creditworthiness of financial instruments such as securities (excluding asset securitization products and other structured financial instruments) that are issued by the relevant corporations or similar entities:</p> <ul style="list-style-type: none"> <li>(i) (Industrial) Corporations, etc.</li> <li>(ii) Financial Institutions, etc. (including insurance companies)</li> <li>(iii) Public Sector Entities</li> <li>(iv) Medical Institutions, Educational Institutions, etc.</li> <li>(v) Sovereign and Overseas Public Sector Entities, etc.</li> </ul>
Structured Finance Products, etc.	<p>Creditworthiness of those as given below:</p> <ul style="list-style-type: none"> <li>(i) Asset Securitization Products</li> <li>(ii) Other Structured Finance Products as given below: <ul style="list-style-type: none"> <li>• Securities issued by investment companies or the relevant companies, or loans to the relevant companies</li> <li>• ABCP program (limited to types with the bank’s full support)</li> <li>• Repackaged products (limited to single-credit financial products with the credit situation of their underlying assets being deemed effectively the same as the credit situation of the relevant financial products)</li> <li>• Securities issued by companies associated with project finance or the relevant companies, or loans to the relevant companies</li> <li>• Securities issued by companies associated with shipping finance or the relevant companies, or loans to the relevant companies</li> <li>• Other products similar to the above</li> </ul> </li> </ul>

Source: Japan Credit Rating Agency 2008

<sup>1</sup> Different type of financial securities, well known by including specific assets serve as a collateral

### **2.3 Credit Rating importance:**

In today's modern world investment decision has been radically altered , as a result of globalization and information asymmetries investment decision became a big deal and acquired much importance that it had before, thus credit rating has played a major role in helping investors take sound decisions with minimal expected risks, for instance as a first benefit of credit rating, it reduces information asymmetry between purchasers and sellers and give both parties right information of risks combined with financial instruments, however (JPMorgan, 2006) quarterly report had been conducted to measure relationship between bond spread and credit rating, obviously the relationship was statistically strong and revealed that bond spread has a strong relationship with credit rating, typically credit rating found its permanent place and consideration in any investment decision.

However, benefits of credit rating are not limited to information asymmetry , but also can extend to foster Foreign Direct Investment FDI, credit rating by default reflects signs about how stable and healthy an economy is, including probabilities of default and recovery willingness in addition to government performance, indeed credit rating has a notable effect on FDI due to the factors which have been included in the assessment and the fact that credit rating reflects the major concern of foreign investors represented by stability status of an economy.

In addition to this , credit rating promotes maintaining a high level of capital market transparency, by collecting and employing useful information in a systematic basis to translate it into real values of credit worthiness of a country, sometimes investors and stake holders in general might be unable to translate exposed data to employ it for their interests, here the potential of credit rating comes and its importance becomes clear, since it plays crucial role in timely and clearly information exchange (Elkhoury, 2008) .

Moreover, credit rating has facilitated investor's decisions as it gives information on risks combined with an investment opportunity and expected returns of such an investment , the introduction of credit rating was a result of a critical need of both investors and issuers to help them make sound decisions and make them aware of potential risks. Typically and as it is always supposed to be, credit rating agencies and their reports give neutral reports of a certain financial instrument and default risks, investors too seek for unbiased information, such as those information given by issuers or brokers whose main concern is to sell

financial instruments and maximize their wealth. Moreover, although credit rating might reflect negative signs of a specific entity, it gives them a chance to identify and overcome their weaknesses in the longer term.

Nevertheless, as credit ratings are inclusive and globally tracked by investors, it contains information on various countries and financial instruments as well, which widens the horizon for an investors and increase number of alternative investments available for them. The benefits come from this facts are not limited for risk identification it is also enables investors to weight benefits against expected risks. Credit rating also enhance comparability between variety of financial instruments in different time horizons and different places at the same time, since credit rating agencies have always gave easy to understand unified reports, it became much easier for individual investors make comparisons and identify their relevant choice easily.

Moreover, credit rating agencies have been always a vital tool for on-going control and continuous supervision, as they publish credit rating and progress reports on a regular basis. These reports can be used efficiently to monitor and evaluate investments in different areas, it also can give useful information on worthy future investment opportunities (Rai, 2011).

#### **2.4 Disadvantages and pitfalls of Credit Rating CR:**

In finance and investment world the one who knows information more, is the one who have a distinct advantage over others, no matter how inappropriate it looks some confidential information might not be exposed to public or sometimes these information might be overlooked by investigators, however all information are likely to affect investment decision regardless of its confidentiality or its relative importance to investigators, investors and sellers of financial instruments. Moreover, rating is not a guarantee of soundness , although credit rating takes in consideration several facts including past records , present performance and other useful information , it still doesn't form a guarantee against any future default , and despite of the a good performance would be reported by a credit rating , probabilities of future default will be still existing.

In addition to this, credit rating might be biased by individual and public policy behaviours, and can be used as a tool against certain entities. For instance, a credit rating can be employed politically to serve a certain group's agenda. Moreover, though it doesn't



happen frequently, due to the fact that many credit rating agencies are existing around the world and each of them may follow different standards give different weight to variables and follow various procedures for analysing data, may result in different ratings for the same item or entity. However, having different credit grades for the same item puts many question marks on the reliability of such ratings and raises a critical doubt about the correctness of information.

## **2.5 Credit rating agencies and procedures:**

though it seems at first glance that credit rating agencies perform the same tasks with identical steps, a detailed examination of each agency's rating criteria reveals numerous differences between their assessment criteria, for instance Elkhoury (2008) indicated that credit rating agencies have different scopes of their evaluations according to information used in assessment process, examples of variation between them can be described as follows :

Standard and Poor's rating aims mainly to capture the future probability of default, no matter when will it happen, but rather they focus mainly on the probability itself. While on the other hand Moody's and Fitch's as well, rating focuses mainly on two main factors which are Probability of Default and Expected Recovery Rate RE (Elkhoury, 2008).

### Procedures and methods

Importance of credit rating: credit rating aims mainly to assess the government probability to default on its obligations, taking in considerations both debts in local currency and foreign currencies, in addition to this it takes in consideration the willingness and ability of a specific government to repay its obligations on time (Elkhoury, 2008). However the main factor has been taken in consideration to assess credit risk is Probability of Default PD: represents the likelihood to fail repaying debts over a time horizon by specific borrower.

### Factors affect credit rating - past studies:

Changes in credit worthiness of specific country undergo to variety of reasons, and each one of them has its own relative effect compared to other factors. However, within the last few years many studies have been conducted to determine main decisive elements of credit rating for countries. Basically credit rating can be attributed to macroeconomic factors such as GDP growth , Inflation rate and governmental policies etc., many studies had had

findings in common and agreed on the following variables as a determinant for credit rating :

Development level : indicates how an economy is well established and designed to absorb any financial crisis, recently many scholars had classified economic development as one of the most determinant factors of credit rating especially after the global financial crisis in 2009 . Mellios(2004), According to their study have classified development level as the first significant component in credit rating, though others may have considered it less significant, none of them has denied its importance. Generally information obtained from different studies and rating agencies reveals that they all agree on the importance of economic development importance but the only variation among them comes from the fact that rating agencies give different weights to it.

Regulatory quality: represents a very significant factor when classifying credit worthiness of a certain country, however regulatory quality includes all financial regulations, government policies and political stability, it forms the third important determinant of credit worthiness on a 13-variables scale (Mellios, 2004) . Recently regulatory framework became another term to identify prudential policy and financial stability standards represented by Basel II and Basel III, in fact regulatory quality has been a crucial factor to determine credit rating, furthermore it became much important factor of financial stability especially after the issuance of Basel III standards. However regulatory quality is expected to play much important role in the coming years since it cause changes to other variables and determinants as well in the longer term. (Packer, 1996) Found a significant statistical relationship between credit rating and six variables including economic development and regulatory quality.

Macro-economic factors: represented by GDP growth and Inflation are the main effective variables after regulatory quality and economic development (Mellios, 2004), according to the same study the fourth effective factor on credit worthiness was economic growth represented by growth in GDP, in fact GDP growth alone reflects many facts about a specific country. For instance, high records of GDP indicates relatives stability, low debt burden and gives signs of government's ability to face any insolvency problems in the future.

Money Supply, money supply volume can help in determining the general government attitude towards development and its future plans, a high volume of money supply gives signs on expansion plans by governments and thus it indicates a high potential for economic growth in this country. On the other hand, a shortage in money supply indicates a shrinking government policy and high probabilities of such a country to suffer economic hardships in the future.

Inflation rate too, found to have a notably effect on credit rating for governments. In fact, high inflation rate gives a clear information and future possibilities to have economic problems, economic instability and a balance deficit. however, a low inflation rate gives a compelling evidence that a country is maintaining a stable monetary policy, which in turn reflects an economic soundness. According to (Mellios, 2004), inflation rate is one of the effective factors on credit worthiness, and this was explained by the signs have been sent by inflation on economic soundness, and future economic instability that might be witnessed due to high inflation rates.

Net investment inflows, though it seems at first glance that net investment inflows is an impact of credit rating , a detailed examination reveals that there is a relationship between net investment and credit rating (Mellios, 2004). However, in the past it was thought that investment inflows is consequence of credit rating but according to many studies have been conducted to assess the relationship between credit rating and net investment inflows, it became clear that a change in credit rating for a specific country can be attributed to net investment inflows. Typically, net investment includes also Foreign Direct Investment FDI and findings of the studies are applicable for FDI as well.

Competiveness, represented by the real exchange rate of local currency also found to have a strong relationship with credit rating or at least plays a notable role in determining credit worthiness, economic competitiveness conventionally is a term refers to an economy's ability to compete internationally. However, level of competitiveness is measured by effective exchange rate, which can be calculated by adjusting nominal rate to changes of inflation between home country and outside the country.

Balance of payments with its three main components found to have a relationship with credit rating according to Mellios (2004), a positive balance of payment for a country indicates the level of economic healthiness. Usually balance of payment is the difference

between inflows and outflows of an economy. These inflows and outflows include imports, exports, foreign investment and any other payments.

## 2.6 Credit rating from agencies point of view Standard & Poor's as an instance:

Though sometimes credit rating process might seem simple and has no complexity at first glance, this idea will be radically altered if we have a closer look at a specialized firm's credit rating methodology's standards. A detailed examination of their rating criteria reveals that credit rating is a multi-step, scientific and professional process based on specific steps. However, usually credit rating agencies base their work on certain number of factors. Eventually, majority if not all credit rating agencies have main mutual characteristics. For instance Moody's, Standard & Poor's S&P and Fitch generally share the same standards but the only difference between them, is the relative weight allocated for each factor of them. As an example we will have a detailed look on S&P's credit rating methodology and each factor's sub-categories. The table below indicates classification based on the five scores:

Political and Economic Profile												
Flexibility profile	category	Superior	Ext. strong	Very Strong	Strong	M. Strong	Intermediate	Mod. weak	Weak	Very Weak	Ext. Weak	Poor
Category	score	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
Extremely Strong	1-1.7	aaa	aaa	aaa	aa+	aa	a+	a	a-	bbb+	NA	NA
Very Strong	1.8-2.2	aaa	aaa	aa+	aa	aa-	a	a-	bbb+	bbb	bb+	bb-
Strong	2.3-2.7	Aaa	aa+	aa	aa-	a	a-	bbb+	bbb	bb+	bb	b+
Mod. Strong	2.8-3.2	aa+	aa	aa-	a+	a-	bbb	bbb-	bb+	bb	bb-	b+
Intermediat	3.3-	aa	aa-	a+	a	bbb+	bbb-	bb+	bb	bb-	b+	b

e	3.7											
Moderately weak	3.8-4.2	aa-	a+	a	bbb+	bbb	bb+	bb	bb-	b+	b	b
Weak	4.3-4.7	a	a-	bbb+	bbb	bb+	bb	bb-	b+	b	b-	b-
Very Weak	4.8-5.2	NA	bbb	bbb-	bb+	bb	bb-	b+	b-	b	b-	b-
Extremely Weak	5.3-6	NA	bb+	bb	bb-	b+	b	b	b-	b-	ccc	ccc

Table 2.2 Source: (Standard & Poor's, 2011)

However, credit rating criteria contains five main factors (Scores) according to Standard and Poor's (Standard & Poor's, 2011) credit rating methodology divided mainly into:

- 1- Political Score.
- 2- Economic Score.
- 3- External Score.
- 4- Fiscal Score.
- 5- Monetary Score.

Key Rating Factors	Scores assigned from 1-6 1 is the strongest and 6 is the weakest
Institutional Effectiveness and political risks	Political score
Economic structure and growth prospects	Economic score
External position	External score
Fiscal flexibility and fiscal performance with debt burden	Fiscal score
Monetary flexibility	Monetary score

Table 2.3 Source: (Standard & Poor's, 2011)

1-Political Score: Political score measures basically the effect of political situation and policy maker's ability to maintain economic growth and enhance financial stability. In fact, political factors are one of the most complicated aspects of credit rating, as it contains both quantitative and qualitative data which makes it harder to measure the effect of each factor

separately and accurately. However, political score in turn analyses five main sub-categories as below:

- a) Effectiveness and stability: which measures the effectiveness, predictability, and stability of policy making by a series of steps represented by: **First**, tracking past sovereign experience in managing political and financial crisis. **Second** measuring a government's ability and willingness to apply reforms in order to at least maintain financial stability if not increasing economic quality of their economic system, **Third** measuring the predictability of policy maker's decisions as a response for expected future fluctuation and to what extent these reactions would be effective to maintain financial stability. **Fourth**, identifying the potential challenges for the political system, expectations for conflicts and other political issues may arise from religious and ethnic motives.
- b) Accountability and transparency of institutions, which aims mainly to analyse how healthy and correct making decision is, usually measured by **First**, checking the presence of balance and accountability between institutions vertically and horizontally. **Second**, level of accountability in the country and corruption level. **Third**, levels of contracts enforcement by government and to what extent the rule of law are respected by government and citizens in the country especially in the area of private property. However, enforcement of law is a main concern for investors as they basically seek to maintain and secure their interest, which cannot be done unless law rules are respected in the country. **Fourth**, level of media independency from decision makers and effective institutions, this section includes also making sure of statistical and information centres independency and neutrality especially when it comes to economic records and essential information for investors.
- c) Government's debt payment culture, aims basically to measure a government's willingness to default on their debt even if they have the financial capabilities to repay it, sometimes governments may find it easier or realize that they are on the edge bankruptcy thus the decision becomes between maintaining their contracts or default on it, this factor can be addressed by three main steps starting with. **First**, assessing amount of debt for other governments and government owned entities. **Second**, information and conflicts over past contracts and debts signed by previous

administration, such a conflict on past events triggers a numerous question marks on government's willingness to pay or fulfil their obligations made by their previous administration. **Third**, stable debt policy of the government especially of a previous default on their commercial debt had happen before.

- d) External security risks, initially adjusts the overall political score depending on conflict status. Typically, in a country with high probabilities of a war or political instability will have lower classification and thus the overall political score will go down. However, if a war is expected to rag with a country in the long term, but probabilities for a war to start in the country territories are low within the coming three years, the score will fall one or two categories under the initial score.
- e) Effect of external organizations on policy making, membership in international organizations, military alliances and trading unions doesn't have only benefits for the country, but also it carries obligations for the country. Being a part of a credited and respected international institution increases trust with government and policy making process and enhances transparency as well, as membership of international organizations requires efforts from countries to prove their importance by showing higher degrees of transparency and accountability. Participating in supranational union or program gives higher credibility, effectiveness and predictability of a specific country and thus its score will be adjusted one degree better. On the other hand if the government doesn't fulfil its commitments towards internal and external parties virtually its score will be one degree worse.

Assessing sovereign political risk		
Score	Primary Factors : Effectiveness- stability – predictability of policy making	Secondary Factors: transparency – accountability of institutions
1	-proactive policymaking, with very strong record in managing past financial crisis. - ability to apply reforms the maintain financial stability - predictable responses to future crises and high level of stability in government institutions	-extensive balance between institutions. -neutral enforcement of contracts. - Free flow of information throughout society. - Timely and reliable information.

2	<ul style="list-style-type: none"> <li>-Generally strong but past record is a little bit lower than level -1-.</li> <li>- Weaker ability to implement reforms.</li> <li>- Frequent changes in governmental institutions.</li> </ul>	<ul style="list-style-type: none"> <li>-lower degree of balance between institutions.</li> <li>- Neutral enforcement of contracts.</li> <li>-free flow of information throughout society.</li> <li>-</li> </ul>
3	<ul style="list-style-type: none"> <li>polycymaking stability is not guaranteed</li> </ul>	<ul style="list-style-type: none"> <li>-Evolving checks and balance between institutions</li> <li>-free flow of information with some decisions not fully discussed and debated.</li> <li>-less timely and unreliable information.</li> </ul>
4	<ul style="list-style-type: none"> <li>-policy choices weakens and decreases chances for long term stability</li> <li>-reduced predictability of future reactions</li> </ul>	<ul style="list-style-type: none"> <li>- More uncertain checks.</li> <li>-relatively weak transparency.</li> </ul>
5	<ul style="list-style-type: none"> <li>-choices are likely to weaken capability and willingness to maintain financial stability</li> <li>-high and risky challenges for public institutions.</li> <li>- it is difficult to predict future responses</li> </ul>	<ul style="list-style-type: none"> <li>- UN assured enforcement of contracts</li> <li>-impaired transparency due to moderate corruption or interference by political institutions.</li> </ul>
6	<ul style="list-style-type: none"> <li>-weak political institutions.</li> <li>-notable risk especially with regard to political institutions.</li> </ul>	<ul style="list-style-type: none"> <li>- Disrespect of law</li> <li>-questionable transparency due to high level of political corruption or notable information gap.</li> <li>-</li> </ul>

Table 2.4 Source: (Standard & Poor's, 2011)

## 2- Economic Score:

Historically, It has been proved that diversified, stable and wealthy countries with a sustained economic growth has a strong income source in addition to increasing of fiscal



policy flexibility. An economy holds these characteristics have the potential to produce higher wealth level and generate more revenues to fulfil their obligations. However an economic score is measured primarily by three terms as below:

- a) Income levels, the most prominent factor to determine income level by credit rating agencies and others who work in the same field, usually use GDP per capita of income levels; a country with high GDP per capita reveals higher creditworthiness as they have a wealthy source of revenues to bear their credit burden. Generally, to determine economic score, GDP per capita is first calculated and then translated into US Dollars to enable comparability between different countries. In case of fluctuating records, then the GDP per capita most likely will be calculated as the average of the past 3 years. However, when it comes to determine the economic score, exchange rates are usually taken in considerations as currency's exchange rate might be over or under-valued, in this case the economic score will be one category better or worse according to exchange rate fluctuations.
- b) Economic growth prospects, expectation for economy and growth trends are dominant factors to determine growth prospects, generally the real GDP per capita trend growth is used to determine growth score. A country is one category higher if growth trends are significantly higher than their counterparts in the same class of GDP per capita. The term -trend growth- refers to the expected sustainable growth rate of GDP per capita without taking in considerations other externalities such as inflation and other economic dislocations.
- c) Economic diversity and volatility, primarily assess the exposure to single cyclical industry threats, a country is most likely one category worse than the initial class if they have a single cyclical exposure for certain industry. Generally an industry accounts for more than 20% of GDP causes a single cyclical exposure to this industry's risk. However adjustments are less likely to be done for score if the government maintains above 50% of GDP in form of liquid assets. Economic diversity of a country is a crucial component of a good economic score, as narrowly structured economies have the potentials for high fluctuations more than diversified economies.

Assessing Economic score						
GDP per capita	over \$35000	\$25000-\$35000	\$15000-\$25000	\$5000-\$15000	\$1000-\$5000	below \$1000
initial score	1	2	3	4	5	6
Positive adjustments-one category up				Negative adjustments-one category down		
-Undervalued currency. -extra ordinary economic growth.				- overvalued currency. -below average economic growth. - Economic growth attributed to increase in domestic credit.		

Table 2.5 Source: (Standard & Poor's, 2011)

### 3- External score:

Aims basically to measure country's ability to generate money from abroad which is necessary to meet their obligations for both internal and external entities, it also relates to all transactions made by residents and non-residents as they affect the exchange rate of specific country's currency. As S&P method of measuring external score, they focus mainly on three factors as below:

- a) Status of local currency in international transactions, passes through many steps to get the best assessment of the currency, the **first** step measures the degree of a certain currency is used internationally; a country with a widely used currency is most likely to have a good score of external liquidity. However, if a currency is widely used internationally, it means: credibility of the issuing country and their policies, financial stability and large open markets. **Second** step is to assess the currency's classification in terms of being used as a reserve currency, generally a currency which accounts for more than 3% of world's total allocated foreign exchange reserves, is most likely to have a better external score.
- b) External liquidity, basic measure of external liquidity is the ratio of –Gross external financial needs- to the sum of current account receipts and usable f. exchange reserves. While gross external financial needs refer to the average expected financial needs for the current year and forecasts for the coming two to three years, generally credit rating agencies depend on reports published by local government and credited international institutions if available, of data is not available, credit rating agencies usually obtain their own assessments by measuring the international

investment position and compare the targeted company to other countries classified in the same category.

- c) External indebtedness, a good and widely used measure for external indebtedness is the ratio of -narrow net external debt- to current account receipts, while the term – narrow- refers to restricted measures while defining external debt. Typically, narrow external debt is calculated by subtracting the most liquid external assets from the public and financial sectors for two reasons. Public sector assets are usually more liquid than those for non-financial private sector assets; the second reason is related to the fact that most of financial institutions manage external assets and liabilities and can be easily transferred from domestic to foreign accounts.

Assessing External score							
		Sovereign with reserve currency	sovereign with actively traded currency	other measures			
				gross external financial needs			
				below 50%	50-100%	100-150%	over 150%
narrow net external debt	below 50%	1	1	1	1	1	2
	0-(50)%	1	1	1	1	2	3
	0-50%	1	2	1	2	3	4
	50-100%	2	2	2	3	4	5
	100-150%	2	3	3	4	5	5
	150-200%	3	4	4	5	5	6
	above 200%	3	4	5	6	6	6
positive adjustment factors				negative adjustment factors			
following factors affect initial score by one category : - sovereign shows a stronger external position -actively traded currency with consistent current account				Following factors affect initial score by one categories: - country is exposed to external risk. -country is exposed to volatilities with regards to trade. -material data inconsistencies. -a 10% CAR current account deficit. Following factors affect initial score by two categories:			

	- a 20% CAR or more current account deficit.
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Table 2.6 Source: (Standard & Poor's, 2011)

#### 4- Fiscal Score

Is mainly constructed on the analysis of sovereign deficits and debt burden, it also considers fiscal flexibility, long term fiscal records and potential risks that may arise from contingent liabilities, in order to assess the fiscal score of a country, credit rating agencies usually divide it into two separate parts, and the overall fiscal score is the average of the two parts. However the main assessed segments are divided as below:

- a) Fiscal performance and flexibility: this segment is quite complicated to measure and requires considerable efforts. first of all credit rating agencies obtain an initial or primary score for the changes in the nominal general governments debt as a percentage of GDP, then the primary score undergoes to adjustments by one to two categories better or worse depending on a specific criteria. On the other hand, fiscal flexibility measures a government's ability to absorb and maintain financial stability aftershocks and economic downturns and restore fiscal balance. Typically a fiscal flexibility score can be one category enhanced by one of these conditions:
  - ability of government to generate revenues from taxes in the short term.
  - Ability to decrease expenditures in the short term despite of the social, political and economic effects.
  - Availability of liquid assets to mitigate effects of economic cycle.
 Conversely the following conditions weaken the fiscal performance and flexibility by one category:
  - Governments revenue source is unstable.
  - Government is unable to raise taxes.
  - Deficit in basic services and infra-structure.
- b) Debt Burden: concerned basically with measuring sustainability of public debt level. Debt burden is measured by debt amount, costs related to debt, debt structure and ability to obtain funds, this score doesn't only reflect the debt burden, but also it measures the expected risks related to contingent liabilities. Debt burden score is determined initially by two main factors. The first one is debt level and usually

- analysed by:
- net government debt as a percentage of GDP.
  - Interest expenditures as a percentage of government revenues.

Assessing fiscal score						
Change in general government's debt as a percentage of GDP	below 0%	0-3%	2-4%	3-5%	4-7%	higher than 6%
initial score	1	2	3	4	5	6
Positive Adjustment factors			negative adjustment factors			
following factors affect initial score by one category : <ul style="list-style-type: none"> <li>- Government with high liquid assets accounts for more than 25% of GDP.</li> <li>- Government is able to increase revenues in the short term by more than 3% of GDP.</li> </ul>			following factors affect initial score by one category : <ul style="list-style-type: none"> <li>- Volatile revenue base.</li> <li>- Limited ability to increase revenues in the short term.</li> <li>- Deficit in primary services and infrastructure.</li> </ul>			

Table 2.7 Source: (Standard & Poor's, 2011)

#### 5-Monetary score:

Mainly measures monetary authority's ability to maintain sustainable economic growth and absorb major financial crisis in the future, since monetary policy is a vital tool for maintaining financial stability. However, a monetary policy can be a barrier for achieving economic growth and thus decreasing credit worthiness. However a monetary score is initially obtained by analysing the following factors:

- a) Government ability to use monetary policy and exchange rate tools, a government ability to use these tools is built basically on government capability to control currency in the domestic market, which sometimes may have conflict with government efforts to maintain certain exchange rates.
- b) Credibility of the monetary policy and inflation trends, it has been clearly known that credible institutions conduct an effective monetary policy, however objectively measuring credibility in numbers is a big deal. Thus credit rating agencies considers variety of factors such as:

- Operational independence.
  - Effectiveness of monetary policy.
  - Low and stagnant inflation is an efficient tool as well.
- c) Monetary policy effectiveness, evaluated through:
- Government's ability to issue long term fixed-rate local bonds and financial instruments.
  - Existence of an active money market and developed financial system.
  - The usage of local currency in financial operations.

Assessing Debt Burden						
		Debt level				
		Net general government debt as a percentage of GDP				
cost of debt	government interest expenditures	below 30%	30-60%	60-80%	80-100%	above 100%
	below 5%	1	2	3	4	5
	5-10%	2	3	4	5	6
	10-15%	3	4	5	6	6
	above 15%	4	5	6	6	6
Positive adjustment factors			negative adjustment factors			
<p>following factors affect initial score by one category :</p> <ul style="list-style-type: none"> <li>- Government refinancing needs are expected to be covered by official funding in the next two to three years</li> </ul>			<p>following factors affect initial score by one category :</p> <ul style="list-style-type: none"> <li>- More than 40% gross debt is dominated by foreign currency.</li> <li>- Debt service profile undergoes to significant variations.</li> <li>- A large share of banking sector's balance sheet is a central government debt.</li> </ul>			

Table 2.8 Source: (Standard & Poor's, 2011)

### 3. Basel III introduction:

At the end of 2010, Basel committee on banking supervision BCBS had published its reforms and standards related to liquidity and capital as a response for the global financial crisis, however the initial purpose of issuing these reforms can be attributed to the huge effect of banking sector during crisis in 2009. Decision makers all over the world realized the importance of banking system and the need for stable banking sector as well, thus G20 group after the severe financial crisis has delegated Basel Committee to work on new reforms to maintain financial stability and increase banking sector's ability to absorb any expected crisis in the future.

Banking sector failure in 2009 can be mainly attributed to two main reasons: the **first** reason is that banking sector before 2009 financial crisis depended mainly on excessive off balance sheet leverage, in other words they had built their operations using external sources which meant a limited ability to absorb losses and assessing risks inaccurately. The **second** reason is the low quality and quantity of capital used by banks during and before the 2009 crisis, low quality and quantity initially leads to lower capabilities of loss absorbency by banking sector.

Basel committee in their final reforms had put in consideration the need for strong financial base to avoid financial crisis as much as possible as a first priority, then it works on strengthening banking sector's ability to bear financial crisis if happened. However, both decision makers and BCBS realized that financial stability way passes only through stable banking system, and any weakness of the banking sector doesn't only affect the sector, but also it will be reflected on all sectors within the country as well. Generally, Basel iii standards strengthen Basel ii rather than replacing it, whereas Basel ii focused mainly on assets side, Basel iii was mainly centred on regulating capital ratios and liquidity requirement.

Similar to Basel ii, Basel iii consists of three pillars as below:

- Pillar 1, one of the new Basel accord, focuses mainly on capital requirements and gives details of different kinds of capital and virtually the required percentages for each.

- Pillar 2, concerned basically with the process by which banks should review their capital adequacy, in addition this pillar is useful for supervisors and decision makers to evaluate banking sector's capital adequacy and risk assessment.
- Pillar 3, concentrates on disclosure requirements for banks, as it requires banks to publish certain information on their risks, capital and risk management. Implementing pillar 3 will not enhance only risk management for banking sector, but also it will increase comparability between banking sectors and their risk management effectiveness.

Basel Committee on Banking Supervision Reforms- Basel III		
Pillar 1	Capital	<p><b>Quality and level of capital:</b> Minimum required capital will be raised to 4.5% and then to 6% gradually.</p> <p><b>Capital loss absorption:</b> Allows the conversion or write off to common stocks if the bank is seen to be insolvent.</p> <p><b>Capital conservation buffer:</b> Increases the total equity by minimum 2.5% of RWA. Represents a sufficient base of loss absorption.</p> <p><b>Countercyclical Buffer:</b> Ranges between 0-2.5percent, can be enforced during periods of credit growth.</p>
	Risk coverage	<p><b>Securitisation:</b> requires bank to make more detailed credit analysis for securitisation exposure.</p> <p><b>Trading book:</b> Notably higher capital for derivative activities</p> <p><b>Counterparty credit risk:</b> Requires more strict measure for counterparty risk exposure.</p>
	leverage ratio	Non-risk based leverage measurement, helps to maintain reasonable off-balance sheet leverage rates.



Pillar 2	Risk management and supervision	Generally, Basel III accord is a complimentary part in terms of risk management and supervision.
Pillar 3	Disclosure requirements	Enhances detailed disclosure of balance sheet components, thus helping to maintain a consistent and effective supervision.
Liquidity	global liquidity standards	1- Liquidity coverage ratio. 2- Net stable funding ratio.

Table 3.1 Source: (Bank for International Settlements, 2012)

However, Basel iii standards are built mainly on Basel ii pillars, working on different dimensions to ensure financial soundness and increase loss absorbency ability of banking systems, since a strong and stable banking system is a crux for sustainable economic growth. To make sure of banking soundness and stability, Basel iii accord works as a complimentary tool for past version of the accord and assumes enhancements in different areas within the financial system. These areas are described by Basel Committee on banking supervision (BCCS, 2011) as below:

### **3.1 Pillar (1), strengthening the global capital framework:**

Basel accord aims to strengthen capital framework through increasing capital quality and quantity to meet any expected risk in the future. However, to achieve this purpose Basel committee suggested enhancements in these areas:

- a) Raising quality and transparency of capital base, after the financial crises it was clear that major failures came from lack of capital quality and majority of losses and write-downs came from retained earnings. As a result for this the new accord seeks to improve capital quality by identifying the new capital components and minimum adoption rates for each component. Eventually, these capital categories are divided basically into three kinds. Tier 1 and tier 2 with specific percentage for each. As illustrated in (BCCS, 2011), Tier 1 capital includes all of the following:
  - 1- Common shares issued by the bank.
  - 2- Share premium, additional amount gained on the sale of common stocks.
  - 3- Retained earnings, reserves kept for future plans.
  - 4- Other comprehensive income.
  - 5- Common shares issued by subsidiaries.

6- Any adjustment made on Tier 1 capital.

On the other hand, an additional category can be derived from tier 1 capital called additional Tier 1 capital and includes:

- 1-Instrument issued by the bank and meets the criteria of Tier 1 equity.
- 2-Premiums resulted from the sale of additional Tier 1 instruments.
- 3- Instruments issued by subsidiaries.
- 4- Adjustments made on additional tier 1 capital.

However, the committee has determined minimum levels of capital of tier 1 capital and a future plan for implementing these changes from 2013 up to 2020 gradually, while the minimum required capital in 2013 was 4.5% , raised to 5.5% currently and expected to jump to 6% in 2017. The table below illustrates the primary components of minimum capital requirements in 2013 as written in Basel iii accord (BCCS, 2011).

<b>Components</b>	<b>Tier 1 ratio</b>	<b>Total Tier 1 ratio</b>	<b>Total capital ratio</b>
Minimum	4.5% <sup>2</sup>	6%	8%
Capital conservation buffer	2.5%	2.5%	2.5%
total	7%	8.5%	10.5%

Table 3.2 Source: (BCCS, 2011)

- b) Enhancing risk coverage, as a result of the financial crisis, banking sector became in need to increase risk coverage. In 2009 the committee completed and issued reforms to enhance risk coverage as a complement for Basel ii accord, this reform includes raising required capital for trading book and securitization exposure, stressed Value at Risk (VaR) capital requirement, and high supervision standards compared to Basel ii. However these enhancements was implemented in 2011 and expected to help identifying risks combined with banking sector. Reforms were mentioned in BCBS manual guide (BCCS, 2011) for Basel iii accord as below:

<sup>2</sup> 4.5% of Risk weighted assets RWA. If A= Tier 1 equity, B= RWA. then , common equity tier 1 ratio = A/B

- 1- Require banks to determine their capital requirements using stressed inputs to achieve maximum conservatism and to help identifying procyclicality.
  - 2- Banks will undergo to capital charges for potential market to market losses associated with counterparties. As Basel ii didn't address such a risk related to counterparties default, Basel ii reforms assure and put in consideration failure of other competitor's impact, as it formed a great source of loss for banks during the financial crisis.
  - 3- Introduce modified standards for collateral management.
  - 4- In order to measure the interconnectedness between banks and other financial institutions, committee supports the payment and settlements system and international organization of securities to issue controlling rules for financial market infrastructure.
  - 5- Increasing competitors credit risk management in different aspects to ensure comparability and assess risks result from interconnectedness between banks.
- c) Supplementing risk based capital requirements with leverage ratio, in order to increase the quality and quantity of capital, the new accord has been issued with amendments to limit the effect of off-balance sheet leverage effect. a new leverage ratio requirements have been issued to achieve the following:
- 1- Constrain leverage in banking sector, which would be helpful to lower the expected effects of leverage during periods of financial fluctuation.
  - 2- Provide a transparent and simple measure of risk. However the measure is designed to be a credible measurement tool and takes in consideration accounting differences between countries.
- d) Reducing procyclicality and promoting countercyclical buffer, which aims to make banking system ready for financial fluctuations and increase their ability to expect any financial crisis in the future, as a result the committee had issued many measures to accurately measure any expected fluctuation and increase financial stability. These measures have four main goals as follow:
- 1- Impede any expected procyclicality of minimum capital requirement, as a result of failure in assessing complex trading activities before crisis occurs. However, accurate estimation is impossible to be done without changing

minimum capital requirements, thus to smooth cyclical out, the new accord assumes amendments to be done based on long term expectations of financial stress.

- 2- Promote forward looking provisioning, as a countercyclical buffer provisions for provisions against expected financial fluctuations is highly recommended by Basel accord, however the committee is advocating a change in accounting standards towards the expected loss approach. In addition to this they frequently update supervision standards to achieve maximum accuracy of risk assessment. Finally, the committee allocates incentives in the capital requirements to enhance provisions.
  - 3- Building buffers by conserving capital, reducing financial stress has been a main goal for decision makers relating to banking sector, as the new accord introduces new requirements; the ability of individual banks to meet any procyclicality became higher than before as the absorbance base became larger.
  - 4- Minimizing excess credit growth, because low volume of credit puts a question marks on the banks performance since it threatens bank's ability to generate profits and pay its liabilities back, also a very high volume of credit triggers suspicions of financial soundness as it is usually accompanied with high risks.
- e) Addressing systematic risks and interconnectedness, after the financial crisis in 2009, decision makers and Basel Committee have realized that, systemic important financial institutions SIFIs have to be monitored carefully and need special standards if needed. As a result, Basel committee assumes that SIFIs are likely to maintain specific standards beyond those designed for ordinary institutions, simply because of their relative importance for the system as a whole.

### **3.2 Introducing a global liquidity standard:**

Though minimum capital requirements are a crucial component in financial stability, alone they are not sufficient unless they accompanied with liquidity standards. Until the financial crisis in 2009, there were no harmonised standards on liquidity, and as a response for the financial crisis, the committee has issued standards on minimum liquidity requirements, in

order to maintain soundness of banking sector all over the world. During the financial crisis, although many banks kept a sufficient level of capital, they faced serious challenges in terms of liquidity, and were unable to pay their liabilities off. As a result of clear liquidity standards for banking sector, Basel committee has developed two liquidity standards to achieve specific objectives.

The first goal is to ensure the short term liquidity sufficiency, represented by enough liquidity to survive one month under financial stress periods. However, this goal is closely related to liquidity coverage ratio LCR. The second goal is to ensure the long term liquidity, by suggesting incentives for banks to rely on stable resources for their on-going operations. This goal can be assured by net stable funding ratio NSFR.

#### 1- Liquidity Coverage Ratio:

Aims basically to promote stability over a thirty-day stress period, and assure that individual bank has the ability to pay off its current liabilities which can arise during one month period. However the minimum liquidity coverage ratio LCR is represented by the following equation:

$$100\% \leq \frac{\text{Stock of high quality liquid assets}}{\text{Net cash outflows over a 30 – day period}}$$

#### High Quality Liquid Assets HQLA:

according to Basel iii accord annex (Basel Committee on Banking Supervision BCBS, 2011) , high quality liquid assets fall into two categories, level 1 and level two.

- 1- Level 1 category includes: cash, Federal Reserve and certain marketable securities. However, these assets are the highest quality liquid assets can be held by a bank.
- 2- Level 2 assets are divided into two sub categories as below:
  - 2A category: consists of certain government securities, covered bonds and corporate debt securities.
  - 2B category: contains lower rated corporate bonds and residential mortgage backed securities.

Generally and according to liquidity standard, level 2 securities are not expected to form more than 40% of the total HQLA, and 2B category is not expected to account for more than 15% of level 2 as well.

Total Net Cash Outflows:

Is the denominator of LCR, represents expected short term outflows minus total expected cash inflows. Typically, expected cash outflows are calculated by multiplying the outstanding balance of different kinds of liabilities by their probabilities to occur. Similarly, net cash inflows are calculated by multiplying the outstanding different categories of receivables by their probabilities to occur.

Banks are expected to maintain 100% of LCR in periods of financial stability, thus during periods of procyclicality the ratio may increase eventually for more than 100%. The rationale stands behind this standard, that thirty days period is relatively sufficient time for management to assure fulfilling obligations through additional funding methods. However an exception may happen, but the main idea of this standard is to have high quality liquid assets to meet short term obligation.

## 2- Net Stable Funding Ratio NSFR:

According to BCBS periodic publication (Basel Committee on Banking Supervision, 2014), Net stable funding requirement aim basically to maintain a stable funding base in the longer term along with liquidity coverage ratio in the short term. Definition of NSFR according to the committee: is the amount of available stable funding relative to the required stable funding, and the ratio must at least equal 100%.

$$100\% \leq \frac{\text{Available amount of stable funding}}{\text{Required amount of stable funding}}$$

## 3- Leverage Ratio Requirements :

as a result of excess dependency on off-balance sheet leverage and its critical consequences on banking sector, Basel committee has issued a simple leverage

non- risk based measure to work along with capital risk based measures, which intend to:

- Restrict the components of leverage.
- Reinforce the leverage non risk based measurement.

However, leverage ratio is described by (Basel Committee on Banking Supervision, 2014) as the capital measure relative to exposure measure.

$$\text{Leverage ratio} = \frac{\text{Capital measure}}{\text{exposure measure}}$$

Where:

capital measure: is tier 1 capital as defined in Basel accord. Exposure measure: is the sum of 1- on-balance sheet exposures, 2- derivative exposure, 3- securities financing transactions exposure, 4- off-balance sheet items.

However, the committee will continue to test the minimum requirements as 3% until the end of 2013, and then the rate will rise to 10% until the end of 2017. Along with minimum quarterly disclosure of leverage ratio, regardless of the frequency of publishing their financial statements.

### **3.3 Pillar (2), Risk Management and Supervision.**

Both Basel II and III accords share the same components and emphasize on risk management and capital adequacy requirements. Typically, there are varieties of risks required to be assessed according to (Basel Committee on Banking Supervision, 2001), these risks are 1) credit risks, 2) market risks, 3) interest risk, 4) liquidity risk. As a tool to achieve this purpose. Pillar 2 is built initially on four key principles illustrated as below:

- a) Banks should have a process to measure their capital adequacy relative to their risk profile.  
a common methods used to fulfil this criteria is to use regulatory ratios and requirements , making comparisons ,expectations for the industry, concentration on credit risk and using other quantitative and qualitative measures.
- b) Supervisors should monitor banks internal assessment for their capital adequacy, and take the relevant supervisory actions if the results are not satisfying.

Generally, bank management is responsible for monitoring activities and issuing reports regarding their commitment to Basel accord. On the other hand, supervision authority is not expected to play the management role, with limited executive tasks. However, supervision process includes variety of methods to insure financial soundness of individual bank such as:

- field examination and inspections.
  - Off-site review of bank performance.
  - Discussions and interviews with bank management.
  - reviewing reports prepared by external auditors.
  - assessing periodic reports.
- c) Supervisors should expect banks to operate with more than the minimum required rates and have the ability to require banks to hold capital beyond minimum levels, both supervisors and individual banks anticipations rests on the following:
- working with higher than minimum required rates.
  - capital ratio is expected to change according to market risks and during periods of financial fluctuation.
  - raising capital is hard during periods of financial stress.
  - a bank working below the minimum requirements, forms a serious challenge for supervision authorities.
- d) Supervisors should seek to intervene to make sure that capital will not fall below the minimum requirements. Supervisory authorities usually expect banks to maintain at least the minimum requires ratios by Basel accord, and if a supervisory authority is suspicious of bank's inability to meet minimum requirements they can apply one or more of these responses (Basel Committee on Banking Supervision, 2001):
- increase monitoring frequency.
  - requiring improvements in monitoring environment.
  - ask the bank to prepare ad apply risk assessment.
  - requiring bank to hold minimum capital beyond the required in pillar 1
  - restricting payment of dividends.
  - forcing bank to increase capital immediately.
  - requiring the senior manager or the board to be replaced if necessary.



### 3.4 Pillar (3), Disclosure Requirements.

In pillar 1 the accord requires banks to adopt minimum capital and liquidity requirements, as a result in pillar 3, banks are required to disclose information about their commitment to Basel iii accord, in order to help supervisors assess expected risk and help making ramifications in advance. As the reform uses templates, it enhances comparability between different financial institutions. According to (Basel Committe on Banking Supervision, 2015) disclosure requirement has five main principles listed as below:

- Disclosure should be clear for stake holders and supervisors :  
A key attribute for the required disclosure is to be understandable and interpretable as well, with simple language and highlighted important points.
- *Should be comprehensive:*  
it is expected to describe bank’s main activities, expected risks and significant changes. In addition it should include qualitative and quantitative terms to assess different risks.
- *Meaningful to users:*  
it should figure out the most serious challenges and risks for individual bank, in other words it must add value to stake holders and provide stake holders and supervisors with relevant and timely information.
- *Should be consistent over time:*  
in order to identify trends of the banks and enable stake holders to make comparisons with other counterparties if needed.
- *Comparability across banks:*  
details and format of the disclosure should be presented in a way to enhance comparability between banks.

Basel III phases								
Phase		2013	2014	2015	2016	2017	2018	2019
Capital	leverage ratio	3%	10%	10%	10%	10%	-	-
	minimum capital	3.5%	4%	4.5%				
	capital conservation				.625%	1.25%	1.875%	2.5
	common + conservation capital	3.5%	4%	4.5%	5.125%	5.75%	6.375%	7%
	minimum Tier 1	4.5%	5.5%	6%				6%

	Minimum Total		8%					8%
	Total+ conservation		8%		8.62%	9.25%	9.87%	10.5%
liquidity	liquidity coverage ratio- Minimum			60%	70%	80%	90%	100%
	NSF							100%

Table 3.3 Source: (Bank for International Settlements, 2012)

### 3.5 Basel iii adoption evaluation criteria:

After the issuance of Basel iii accord, according to issuers the mission has just started, banking regulation has entered a new stage consists of timely and consistent supervision activities for countries who agreed on Basel iii in 2010 in particular G20 group members. The committee conducts its adoption reports in a regular semi-annual basis as described in BCBS adoption report (Basel Committee on Banking Supervision, 2012) . However, evaluation criteria consists of four main descriptions for the level of commitment by the included countries of the report, these levels are illustrated as below:

- 1- **Draft regulation not published**, represents the lowest level of commitment to Basel standards, and occurs when no formal law or suggested rules had been issued to public.
- 2- **Draft regulation published**, a slightly higher degree of commitment, occurs when a draft is being discussed or being available to public.
- 3- **Final rule Published**, when the regulation had been approved but was not applied yet by banks.
- 4- **Final rule in force**, when regulations are already applied on banks.

#### 4. Data:

Data is the most crucial part of any study being conducted, since it will confirm the correctness of the theoretical part of the study by examining the hypothesis. According to past studies and information available by credit rating agencies the study will basically use variables considered by researchers and credit rating agencies for the intended period 2011-2016, however these variables are generally macroeconomic measurements conducted by trusted global institutions such as World Bank and International Monetary Fund. These data include for instance Inflation, GDP growth and other macroeconomic factors.

#### 4.1 Scope:

The study contains 27 countries including G20 countries in addition to other countries included in BCBS adoption report, and covers the period between 2011 ( the date of the first adoption report of Basel III) until 2016 depending on availability of data.

	GDP per Capita(current US\$)-2015	Imports of goods and services (current US\$)-2015	Exports of goods and services (current US\$)-2015	Surface area (sq. km)
Argentina	13431.87834	69245451780.14	64485724928.2	2780400
Australia	56310.96299	284024461269.66	265116066228.5	7741220
Belgium	40324.02777	369793833869.36	377392591771.1	30530
Brazil	8538.589975	254224353001.29	231471940845.8	8515770
Canada	43248.52991	524778441350.74	488962574436.4	9984670
China	8027.68381	2045761371722.20	2431263708293.9	9562911
France	36205.5681	759631806587.56	726319174891.9	549087
Germany	41313.31399	1318897637795.28	1573460130863.9	357380
Hong Kong	42327.83996	616205268453.78	623434170128.2	1105
India	1598.259034	470906734599.48	417794748984.4	3287259
Indonesia	3346.487039	179676465687.51	181798904136.6	1910931
Italy	29957.80432	491459512920.04	547498759454.4	301340
Japan	34523.70077	787151612494.54	772993953821.9	377962
Korea	27221.52405	536567188919.32	632459493925.5	100280
Luxembourg	101449.9682	102668958633.69	123591549295.8	2590
Mexico	9005.024265	428616413558.55	404394624218.4	1964380

Netherlands	44299.76809	537831873128.54	618709105023.8	41540
Russia	9092.580536	282298187808.90	393130148270.2	17098250
Saudi Arabia	20481.74532	250506400000.00	218024266666.7	2149690
Singapore	52888.74467	438002691300.55	516670133837.6	719
South Africa	5723.973357	99812131139.83	96645792348.9	1219090
Spain	25831.58231	367606742819.12	397461461683.5	505940
Sweden	50579.67365	202458829246.83	225987666829.1	447420
Switzerland	80945.07922	343372842431.65	421947125306.4	41290
Turkey	9125.68759	221400230330.25	200726668952.2	785350
UK	43875.96961	836368163284.42	777282887707.9	243610
United States	56115.71843	2786284000000.00	2264313000000.0	9831510

Table 4.1 Source: (World Bank, 2015)

#### 4.2 limitations of the study:

Data frequency and availability: with regard to data and their frequencies, the main challenge for the study was how to establish a well-balanced dataset with similar frequencies. Credit rating observations and adoption reports were taken in a semi-annual basis, however some other explanatory variables were only available in annual basis. to overcome this problem and depending on past literature. Armesto, engemen, & owyang, (2010) in their article for analysing data with different frequencies, they illustrated two main methods to overcome data mismatching frequencies which are: data aggregation and data interpolation. Both methods follows the same concept but are different in their result, data aggregation converts frequent data to less frequent data by aggregating the most frequent until it matches with other variables, while data interpolation depends on the most frequent data to fill missed ones, e.g. taking the start and the end of the year's average to find the semi-annual observation. In data analysis process I used data interpolation process to match observations and keep observations as high as possible, instead of aggregating data and minimizing number of observations to the half. On the other hand, last observations of the variables for the latest years were not published yet that's why during data collection, some indicators has shown duplication in the last two observations (1 out of 10) as an indicator for the unissued observations.

Converting credit ratings into grades:

in order to capture the maximum number of changes in credit rating among the group, it is decided to depend on S&P credit rating scale since it is the most frequent and up to date credit rating within the big three credit rating agencies according to past studies (Periklis, 2015). in the past literature there were variety of converting scales for credit rating, for instance the 1-9 scale, 1-24 and 1-21 scales. The low scaled measure's main disadvantage is that it fails to capture all changes in values for the credit rating, so that by considering the scope and the time period of the data, it is found that a wide range scale can result in more reliable results of the study. So the study considered a wide-scale of the 1-21 scale by dividing each 1 into 3 degrees in order to capture Negative, Stable and Positive status of the rating (Appendix-1).

Converting adoption reports into meaningful values:

another issue in the study was how to convert Basel III adoption reports into reliable values, by considering the nature of the reports we can divide them into 3 eras, the first era starts in 2011 contains four semi-annual reports and each country has its own commitment evaluation out of 4, the second era contains also four semi-annual reports and evaluates countries out of 16, the last era contains 3 semi-annual reports and evaluates commitment to the standards out of 68. In order to have logical results of the reports it is decided to consider Switzerland and the European group as a base and ideal countries for the population. Based on Switzerland performance other countries performance has been evaluated out of 10 points, e.g. if a country achieves less than 10 it means that its commitment is relatively lower than the base country, while if the score exceeds 10 it means that commitment is higher than the base country.

#### **4.3 Explanatory variables:**

Depending on literature and credit rating agencies evaluation criteria, here is a list of the considered variables by the study with justification from literature:

- 1- **Basel III adoption:** after the financial crisis in 2009 , the mission of Basel standards was mainly limited for maintaining financial stability and keeping financial soundness generally and in banking sector in particular , after having a

detailed look on the literature and conducted studies, and linking the theoretical aims of the new accord to credit worthiness, it is believed that adoption of the accord is in need to be examined to identify the relationship between commitment and credit rating. However, Jul-Larsen (2014) in their study of expected costs of the new accord, they concluded that Basel III standards play a major role in reducing fluctuations, despite of the higher capital requirements which may increase the costs of the firm. In addition to this , Federal Reserve Bank of New York(2011) in their staff report of the new accord effects on financial fluctuation, had found that extra liquidity requirements and buffers plays a major role in achieving financial stability and limit the impacts of any financial fluctuations in the future. Also Mosko(2016) in her study which employed theoretical information of Basel III requirements with information from Albanian banking system, found that Basel III standards increase economic stability and, provides a strong base against fluctuations, the study also found that, despite of higher capital requirements result in a growth slowdown in the short term, it is expected to be reflected positively on the financial system in the long term.

- 2- **Political Index:** after considering past studies and studying credit rating criteria of international agencies, it was found that political stability is a major determinant factor of credit rating. As evidence, credit rating agencies considers political stability as one of the main five determinants of their classifications of credit worthiness.
- 3- **GDP Growth:** many conducted studies found that the GDP growth is a main determinant factor of a country's credit rating, (Reusens P, 2016) ; (Montes, 2014); (Mellios, 2004); (Afonso, Gomez, & Rother, 2010) in their studies of determinants of credit rating, found a very strong positive statistical relationship between GDP growth and credit worthiness countries in the period between 2002-2015. Also Periklis(2015), master thesis study named: Determinants of Credit Rating, which focused mainly on the Euro zone, found that GDP growth rate was a decisive factor to determine credit rating of three main international credit rating agencies.
- 4- **Inflation:** Inflation too was a negative determinant after regulatory quality and economic development according to (Mellios, 2004). However Inflation rate represents macroeconomic index by which, many other factors can be known due to the indirect relationship between them, for instance inflation and exchange rate

and foreign debt. (Periklis, 2015); (Rowland, 2004); (Afonso, Gomez, & Rother, 2010) Also found that Inflation rate plays a significant role in determining credit rating, according to the research there where a significant statistical relationship between credit rating and many factors including inflation rate.

- 5- **Current Account:** as concluded in many researches current account balance reflects an important index for credit rating. Afonso, Gomez, & Rother(2010) in their journal article found that current account balance is one of the most influencing factors of credit rating, the study evaluated determinants of credit rating during a 10 years period from 1995 and 2005 using two models which are the linear model and ordered response model. According to results from both, authors found a strong relationship between credit rating and current account. also (Rowland, 2004) found that there is a positive relationship between country's trade openness and its credit rating, however country's trade openness can be measured by variety of means including exports, imports ,current account balance and economic freedom index .
- 6- **Government Debt to GDP:** basically majority of studies which were conducted to examine the determinants of credit rating found that government debt ratio has a negative relationship with credit rating , and even considered as one of the main 3 determinants of credit rating, Reusens(2016) in their study which covered the period between 2002-2015 found that government debt has a strong relationship with credit rating, in addition master thesis for (Periklis, 2015); (Rowland, 2004) confirmed the same result by employing data for the same period within the Euro zone .
- 7- **Economic freedom index:** this variable has been studied by majority of researches which were obtained to identify credit rating determinants, theoretically economic freedom has a positive relationship with credit ratings, (Afonso, Gomez, & Rother, 2010); (Garcia, valle, & marin, 2014) have used this variable in their studies, however economic freedom index can be used as an index for economic development as well.
- 8- **Corruption control index:** many studies in the last decades have been obtained to identify determinants of credit worthiness, majority of these researches had a mutual feature which is the presence of governance and corruption control as one of the determinants of credit rating, (Periklis, 2015), (Montes, 2014) included

government control and efficiency in their studies, this pushes me to include this index in my study since it was considered by many researches before.

- 9- **Foreign reserves:** represents a very decisive factor according to past studies which have been conducted to assess the relationship between credit rating and other independent factors, unsurprisingly majority of studies have had a mutual feature, which was the presence of foreign reserves in analysis process and results as well, after obtaining the analysis it was clear that foreign reserves have a positive relationship with credit rating. (Periklis, 2015); (Rowland, 2004); (Afonso, Gomez, & Rother, 2010) have concluded the same, with regard to the effect of foreign reserves on credit rating , the mentioned studies agreed on the positive relationship between foreign reserves and credit rating.

Definition of explanatory variables and expected signs:

Variable name	Definition	Source	Supporting literature	sign
Basel III adoption	Basel committee conducts its adoption reports in a regular semi-annual basis as described in BCBS adoption report, consists of four main adoption categories.	Basel Committee on Banking Supervision	(Jul-Larsen, 2014) (Federal Reserve Bank of New York, 2011) (Mosko, 2016)	+
Political Index	Political Risk Index ranked from low to high risk (highest is the most stable , Lowest is the least stable). The PRI is the overall measure of risk for a given country	Political Risk Service group-PRS	(Standard & Poor's, 2011)	+
GDP Growth	Annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2010 U.S. dollars. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus	World Bank	(Reusens P, 2016) (Montes, 2014) (Afonso, Gomez, & Rother, 2010) (Periklis, 2015)	+



	any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources.			
Inflation (CPI)	Consumer price indices (CPI) are presented in base years 2005 and, in addition, are measured in annual growth rate. The changes in CPI are normally used to assess price changes associated with the cost of living	UNCTAD	(Mellios, 2004) (Periklis, 2015) (Rowland, 2004) (Afonso, Gomez, & Rother, 2010)	-
Current Account	Current account balance is the sum of net exports of goods and services, net primary income, and net secondary income. Data are in current U.S. dollars.	International Monetary Fund	(Afonso, Gomez, & Rother, 2010) (Rowland, 2004)	+
Government Debt to GDP	Debt is the entire stock of direct government fixed-term contractual obligations to others outstanding on a particular date. It includes domestic and foreign liabilities such as currency and money deposits, securities other than shares, and loans.	International Monetary Fund	(Reusens P, 2016) (Periklis, 2015) (Rowland, 2004)	-
Economic freedom	Fundamental right of every human to control his or her own labor and property. In an economically free society,	heritage.org- Economic Freedom Index	(Garcia, valle, & marin, 2014) (Afonso, Gomez, & Rother, 2010)	+

	individuals are free to work, produce, consume, and invest in any way they please.			
Corruption control	Reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. High record represents higher transparency.	Transparency International	(Periklis, 2015) (Montes, 2014)	+
Foreign reserves	Total reserves comprise holdings of monetary gold, special drawing rights, reserves of IMF members held by the IMF, and holdings of foreign exchange under the control of monetary authorities. The gold component of these reserves is valued at year-end (December 31) London prices. Data are in current U.S. dollars.	World Bank	(Afonso, Gomez, & Rother, 2010) (Periklis, 2015) (Rowland, 2004)	+

Table 4.2

#### 4.4 Explanation of Methodology:

Using macroeconomic indicators employed by previous studies such as GDP growth, government debt to GDP and political stability, the impact of these indicators is being assessed by the study including the effect of Basel III adoption on the credit rating of 27 countries between 2011 and 2016.

$$S\&P_{i,t} = \alpha_0 + \beta BSI_{i,t} + \beta ECO\_FREE_{i,t-1} + \beta CACC_{i,t-1} + \beta CORR_{i,t-1} \\ + \beta GDP_{i,t-1} + \beta DEBT_{i,t-1} + \beta INF_{i,t-1} + \beta POLST_{i,t-1}$$

Where:

<b>S&amp;P:</b>	Standard & Poor's CR is the dependant quantitative variable.
<b>BSI:</b>	Basel III adoption indicator obtained from BCBS semi-annual reports.
<b>ECO-FREE:</b>	Economic freedom index.
<b>CACC:</b>	Current Account.
<b>CORR:</b>	Corruption control index.
<b>GDP:</b>	GDP growth rate.
<b>DEBT:</b>	Government debt to GDP.
<b>INF:</b>	Inflation rate.
<b>POLST:</b>	Political Stability Index.

By employing Eviews-8 software to check validity of data and results of the regression analysis, including correlation test, specification test, unit root test and least squares regression test to assess the relationship between dependent and explanatory variables. Due to the nature of the population and since they have the world's highest GDP's and financial stability, including a dummy variable for bankruptcy is unnecessary especially none of this countries faced a bankruptcy case within the last 15 years.

#### **4.5 Tests:**

##### **4.5.1 Auto correlation test:**

First of all, it is important to assess the correlation between variables before passing them to the regression model, in order to have the maximum correctness of analysis results we can see that the correlation matrix is a symmetric matrix. The upper half of the matrix is mirrored by the lower half of the matrix. all the values of the correlation coefficient are between plus 1 and minus 1. It's almost impossible for the coefficient to be exactly plus 1 or minus 1. This means that in the real world no variable will have a stable relationship with another variable at all times. If the coefficient is positive, a rise in the value of one variable will show a corresponding rise in the value of the other variable. The closer the value of a coefficient is to 1, the closer the relationship between the two data variables in question is. If the value of the coefficient is positive or negative but it is very little (for example 0.0001234), this means that there may be little to no relationship between the two variables in question.

## Correlation Matrix of the Variables

Correlation	BSL	ECO_FR EE	CURREN T_ACC	CORR_C TRL	FRESER VES	GDP_GR TH	GOV_DE BT_TO_ GDP	INFL	POL_ST
BSL	<b>1.000000</b>								
ECO_FREE CURRENT_A CC	<b>0.120294</b>	<b>1.000000</b>							
CORR_CTRL	<b>0.182438</b>	<b>-0.108167</b>	<b>1.000000</b>						
FRESERVES	<b>0.209790</b>	<b>0.839072</b>	<b>-0.046566</b>	<b>1.000000</b>					
GDP_GRTH GOV_DEBT_ TO_GDP	<b>0.146954</b>	<b>-0.247403</b>	<b>0.381125</b>	<b>-0.192635</b>	<b>1.000000</b>				
INFL	<b>0.013145</b>	<b>-0.112028</b>	<b>0.096581</b>	<b>-0.221769</b>	<b>0.398877</b>	<b>1.000000</b>			
POL_ST	<b>0.098085</b>	<b>0.132512</b>	<b>-0.062390</b>	<b>0.305268</b>	<b>0.075575</b>	<b>-0.310703</b>	<b>1.000000</b>		
	<b>-0.144554</b>	<b>-0.567545</b>	<b>-0.063127</b>	<b>-0.534893</b>	<b>-0.104199</b>	<b>0.001405</b>	<b>-0.223010</b>	<b>1.000000</b>	
	<b>0.178099</b>	<b>0.921240</b>	<b>-0.041199</b>	<b>0.848859</b>	<b>-0.143011</b>	<b>-0.015565</b>	<b>0.185175</b>	<b>-0.566266</b>	<b>1.000000</b>

Table 4.3

Taking the results of correlation matrix and in the light of interpretation table for correlation between variables.

Correlation interpretation	
Correlation	Interpretation
<b>0 - .1</b>	None or very weak
<b>.1 - .3</b>	Weak
<b>.3 - .5</b>	Moderate
<b>.5 - .7</b>	Strong
<b>.7 - 1</b>	Very strong

Table 4.4

We can witness that there is a very strong relationship between Political stability, Economic freedom and Corruption control variables, due to the nature of the population and due high political stability, and economic freedom, these variable seem to be identical and have a very strong linear relationship between each other. Thus it is seen to exclude two variables (corruption control, economic freedom) and keep political stability as an indicator for the correlated variables. The proposed equation of the regression analysis becomes as follow:

$$S\&P_{it} = \alpha_0 + \beta BSL_{it} + \beta CACC_{it-1} + \beta GDP_{it-1} + \beta DEBT_{it-1} + \beta INF_{it-1} + \beta POLST_{it-1} + \epsilon_{it}$$

#### 4.5.2 Hausman specification Test:

Hausman test is sometimes known as model misspecification test, especially in panel data analysis this test helps to choose between fixed Effects model and Random effects model, null hypothesis dictates that the preferred test is the random effects model, while the alternative hypothesis suggests the fixed effects model.

$$H = (b_1 - b_0)' (\text{Var}(b_0) - \text{Var}(b_1))^\dagger (b_1 - b_0),$$

Interpreting results of the test is quite clear and easy, if the p-value of the test is lower than .05 we reject the null hypothesis (fixed effect is preferred), if P-value is greater than .05 we accept the null hypothesis (random effect is preferred).

Correlated Random Effects - Hausman Test

Equation: EQUATION

Test period random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Period random	<b>10.089934</b>	<b>7</b>	<b>0.1835</b>

Table 4.5

When we consider the result of Hausman test, since the p-value is greater than .05, we don't have a sufficient evidence to reject the null hypotheses which stands for the random effect model, that's why the study considered a least squares-random period effect as a regression model.

#### 4.5.3 Stationary Test -Unit root test:

In this part of the study, the used test is Levin-Lin-Chu unit root test, A series is determined to be stationary if the mean and autocovariances of the series do not depend on time. Any series that is not stationary is said to be nonstationary.

an example of a nonstationary series is the random walk:

$$y_t = y_{t-1} + \epsilon_t$$

where  $\epsilon$  is a stationary random disturbance term. The series  $y$  has a constant forecast value, conditional on  $t$ , and the variance is increasing over time.

Standard inference procedures do not apply to regressions which contain an integrated dependent variable or integrated regressors. Therefore, it is important to check whether a series is stationary or not before using it in a regression. The unit root tests that EViews provides generally test the null hypothesis  $H_0: \rho = 1$  against the one-sided alternative  $H_1: \rho < 1$ . In some cases, the null is tested against a point alternative. In contrast, the KPSS Lagrange Multiplier test evaluates the null of  $H_0: \rho < 1$  against the alternative  $H_1: \rho = 1$ .

	Variable	Test	Statistic	prob.	conclusion
1	SP	Levin, Lin & Chu	-4.37537	0.0000	1(1)*
2	BSL	Levin, Lin & Chu	13.9108	0.0000	1(0)
3	CACC	Levin, Lin & Chu	5.00717	0.0000	1(0)
4	DEBT_GDP	Levin, Lin & Chu	17.2744	0.0000	1(2)
5	FRSV	Levin, Lin & Chu	4.94486	0.0000	1(0)
6	GDP_GRTH	Levin, Lin & Chu	17.2744	0.0000	1(0)
7	INFL	Levin, Lin & Chu	8.45476	0.0000	1(0)
8	POL_ST	Levin, Lin & Chu	8.50949	0.0000	1(0)

\*At

level

**Table 4.6**

Where :

1(0) means: no unit root process at level

1(1): no unit root process at 1st difference

1(2): no unit root process at 2nd difference

#### 4.6 General results:

Following a scientific approach to get the most accurate results which assumes low correlation between explanatory variables, a primary tests have been doe to check correlation between explanatory variables of the study, basically a very high correlation was found between political stability, corruption control and economic freedom variables, thus two secondary variables have been excluded and political stability variable has been kept in order to get a reliable results for the study and low correlation between variables as well. Table 4.3

Meanwhile unit root test, after applying Levin-Lin-Chu unit root test on the population's variables, the population doesnt suffer from stationarity problems, depending on the p-value of the Levin-Lin-Chu unit root test we have sufficient evidence to reject the null hypotheses of the test, which assumes a common unit root process. Table 4.6

After performing the required tests of the analysis to measure the relationship between explanatory variables and credit rating factor, results included as a restricted model which includes all significant variables and ignores insignificant variables from the model, however Hausman specification test result was against the alternative hypothesis, in other words it supports the null hypothesis for random effect as a preferred model for analysis. Table 4.5

After applying regression analysis-Least squares random effect model, the regression gives a strong statistical evidence for a relationship between credit rating and 6 variables out of 7 included in the model, these variables are: Basel III adoption, Government to GDP, Foreign reserves, Inflation and Political stability. While on the other hand Current account variable was found to have no statistical relationship with credit rating of the population between 2011 and 2016.

Variable abb.	Variable name	Coefficient	Std. Error	t-statistic	p-value
C	Constant	-23.31511	4.356958	-5.351236	0.0000
BSL	Basel III adoption	0.487039	0.151722	3.210080	0.0015
CACC	Current account	-0.001951	0.003074	-0.634705	0.5262
DEBT_GDP	Government Debt to GDP	-0.046561	0.007956	-5.852709	0.0000
FRSV	Foreign Reserves	0.003742	0.000633	5.909113	0.0000

GDP_GRTH	GDP growth	-0.586958	0.173020	-3.392437	0.0008
INFL	Inflation	-0.065167	0.006168	-10.56497	0.0000
POL_ST	Political Stability	1.004539	0.047171	21.29567	0.0000

**Table 4.7**

## 5. Conclusion and Suggestions

After performing the required tests and making sure of data validity we can notice that as expected, majority of these variables are determinants of credit rating to the G20 group members, in addition to this and according to data analysis there was a strong statistical evidence that commitment to Basel III standards had a positive effect on 27 countries credit rating in the period from 2011-2016. Also current account indicator is not a determinant for credit rating for the 27 countries between 2011 and 2016, although it was found that current account is a decisive factor in determining credit rating in many past studies, this difference of determinants could be attributed to homogeneity of the population which has a clear example of differences between different studies results. another issue is, although GDP growth was a decisive determinant of credit rating in all past studies, it has a negative sign which contradicts with literature, this bias can refer to the homogenous population of countries which has the highest GDP levels in the world and has a relatively low stable GDP growth which limits the ability to detect any relationship between dependent and independent variables.

Based on the results of the analysis I have some recommendations for decision makers and researchers in the future:

- 1- Since Basel III adoption has a strong statistical evidence on its relationship with credit rating, it is a good chance for other countries who don't adopt the standards yet to enhance or at least maintain their credit rating stability by committing to Basel accord as long as it doesn't threaten economy and financial stability.
- 2- By implementing the new accord requirements, credit rating is expected to have positive movements along time, according to (Yılmaz Bayar, 2014) credit rating works as a buffer for the FDI which will have a general favourable effect on the whole economy.



- 3- According to adoption reports issued by BCBS, and taking the study results in consideration there are some specific standards which are generally adopted by countries, these standards adoption are found to be helpful for decision makers in order to enhance their economic position and they include the first and second stage requirements of the accord, these requirements are:
  - a) Definition of minimum capital requirements, the relevant level varies depending on the economic status of the country, the Reserve Bank of New Zealand specified the level on 13% which is higher than the minimum required rate required by BCBS.
  - b) Capital conservation buffer
  - c) Liquidity coverage ratio LCR adoption which is consistent with (Hartlage, 2012) findings with regard to impacts of liquidity coverage ratio assessment report
  - d) Leverage ratio disclosure requirements has proven that it is has a positive impact as a control tool on banking sector according to (Congdon, 2009)
  - e) D-SIB requirements
- 4- Depending on the results of the analysis, credit rating determinants vary from era to another and from geographic zone to another depending on common economic characteristics. However, studies which are conducted globally have a little bet differences with those conducted regionally. A clear example from past studies is the GDP growth in Latvia was not a determinant of credit rating, while in other studies it was, this is also applied for my study when it comes to GDP growth and current account that's why these differences and similarities must be taken in consideration while obtaining similar studies.
- 5- For homogeneous populations in terms of level of GDP and other macroeconomic indicators, these macroeconomic indicators may result in a bias for future studies.
- 6- I highly recommend my colleagues and researchers to obtain similar results concerning other countries which are adopting Basel III but were not included in BCBS regular commitment reports.

## APPENDICES

### Appendix-1

<b>AAA</b>	<b>60</b>	<b>BB+</b>	<b>30</b>
AAA neg	59	BB+ neg	29
AA+ Pos	58	BB pos	28
AA+	57	BB	27
AA+ neg	56	BB neg	26
AA pos	55	BB- pos	25
AA	54	BB-	24
AA neg	53	BB- neg	23
AA- pos	52	B+ pos	22
AA-	51	B+	21
AA- neg	50	B+ neg	20
A+ pos	49	B pos	19
A+	48	B	18
A+ neg	47	B neg	17
A pos	46	B- pos	16
A	45	B-	15
A neg	44	B- neg	14
A- pos	43	CCC+ pos	13
A-	42	CCC+	12
A- neg	41	CCC+ neg	11
BBB+ pos	40	CCC pos	10
BBB+	39	CCC	9
BBB+ neg	38	CCC neg	8
BBB pos	37	CCC- pos	7
BBB	36	CCC-	6
BBB neg	35	CCC- neg	5
BBB- pos	34	CC	4
BBB-	33	C	3
BBB- neg	32	DDD	2
BB+ pos	31	DD	1

## Appendix-2

### Correlation Analysis:

Covariance Analysis: Ordinary

Date: 06/24/17 Time: 18:41

Sample (adjusted): 10/01/2011 4/01/2016

Included observations: 270 after adjustments

		Correlation	t-Statistic	Probability
BSL	BSL	1.000000	-----	-----
CACC	BSL	0.199142	3.326723	0.0010
CACC	CACC	1.000000	-----	-----
DEBT_GDP	BSL	0.104833	1.725701	0.0856
DEBT_GDP	CACC	-0.073132	-1.200434	0.2310
DEBT_GDP	DEBT_GDP	1.000000	-----	-----
FRSV	BSL	0.154256	2.555879	0.0111
FRSV	CACC	0.378498	6.694331	0.0000
FRSV	DEBT_GDP	0.074017	1.215045	0.2254
FRSV	FRSV	1.000000	-----	-----
GDP_GRTH	BSL	0.011579	0.189575	0.8498
GDP_GRTH	CACC	0.103693	1.706722	0.0890
GDP_GRTH	DEBT_GDP	-0.323696	-5.600658	0.0000
GDP_GRTH	FRSV	0.410004	7.359043	0.0000
GDP_GRTH	GDP_GRTH	1.000000	-----	-----
INFL	BSL	-0.155052	-2.569384	0.0107
INFL	CACC	-0.062581	-1.026508	0.3056
INFL	DEBT_GDP	-0.228237	-3.837702	0.0002
INFL	FRSV	-0.103478	-1.703143	0.0897
INFL	GDP_GRTH	0.004005	0.065570	0.9478
INFL	INFL	1.000000	-----	-----
POL_ST	BSL	0.180430	3.003049	0.0029
POL_ST	CACC	-0.038008	-0.622667	0.5340
POL_ST	DEBT_GDP	0.186040	3.099713	0.0021
POL_ST	FRSV	-0.143616	-2.375725	0.0182
POL_ST	GDP_GRTH	-0.034540	-0.565777	0.5720
POL_ST	INFL	-0.573701	-11.46659	0.0000
POL_ST	POL_ST	1.000000	-----	-----

### Appendix-3

#### Unit root test results :

##### Individual Tests:

Null Hypothesis: Unit root (common unit root process)  
Series: D(SP)  
Date: 06/24/17 Time: 19:09  
Sample: 10/01/2011 4/01/2016  
Exogenous variables: Individual effects  
User-specified lags: 1  
Newey-West automatic bandwidth selection and Bartlett kernel  
Total (balanced) observations: 105  
Cross-sections included: 15 (12 dropped)

Method	Statistic	Prob.**
Levin, Lin & Chu t*	4.37537	0.0000

Null Hypothesis: Unit root (common unit root process)  
Series: BSL  
Date: 06/24/17 Time: 18:50  
Sample: 10/01/2011 4/01/2016  
Exogenous variables: Individual effects  
User-specified lags: 1  
Newey-West automatic bandwidth selection and Bartlett kernel  
Total (balanced) observations: 216  
Cross-sections included: 27

Method	Statistic	Prob.**
Levin, Lin & Chu t*	13.9108	0.0000

\*\* Probabilities are computed assuming asymptotic normality

Null Hypothesis: Unit root (common unit root process)  
Series: CACC  
Date: 06/24/17 Time: 18:55  
Sample: 10/01/2011 4/01/2016  
Exogenous variables: Individual effects  
User-specified lags: 1  
Newey-West automatic bandwidth selection and Bartlett kernel  
Total (balanced) observations: 216  
Cross-sections included: 27

Method	Statistic	Prob.**
Levin, Lin & Chu t*	5.00717	0.0000

Null Hypothesis: Unit root (common unit root process)

Series: D(DEBT\_GDP,2)  
 Date: 06/24/17 Time: 18:57  
 Sample: 10/01/2011 4/01/2016  
 Exogenous variables: Individual effects  
 User-specified lags: 1  
 Newey-West automatic bandwidth selection and Bartlett kernel  
 Total (balanced) observations: 162  
 Cross-sections included: 27

Method	Statistic	Prob.**
	-	
Levin, Lin & Chu t*	17.2744	0.0000

Null Hypothesis: Unit root (common unit root process)

Series: FRSV  
 Date: 06/24/17 Time: 18:58  
 Sample: 10/01/2011 4/01/2016  
 Exogenous variables: Individual effects  
 User-specified lags: 1  
 Newey-West automatic bandwidth selection and Bartlett kernel  
 Total (balanced) observations: 216  
 Cross-sections included: 27

Method	Statistic	Prob.**
	-	
Levin, Lin & Chu t*	4.94486	0.0000

Null Hypothesis: Unit root (common unit root process)

Series: GDP\_GRTH  
 Date: 06/24/17 Time: 18:59  
 Sample: 10/01/2011 4/01/2016  
 Exogenous variables: Individual effects  
 User-specified lags: 1  
 Newey-West automatic bandwidth selection and Bartlett kernel  
 Total (balanced) observations: 216  
 Cross-sections included: 27

Method	Statistic	Prob.**
	-	
Levin, Lin & Chu t*	8.21387	0.0000

Null Hypothesis: Unit root (common unit root process)

Series: INFL  
 Date: 06/24/17 Time: 19:01  
 Sample: 10/01/2011 4/01/2016  
 Exogenous variables: Individual effects  
 User-specified lags: 1  
 Newey-West automatic bandwidth selection and Bartlett kernel  
 Total (balanced) observations: 216  
 Cross-sections included: 27

Method	Statistic	Prob.**
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Levin, Lin & Chu t\*

8.45476

0.0000

Null Hypothesis: Unit root (common unit root process)

Series: POL\_ST

Date: 06/24/17 Time: 19:02

Sample: 10/01/2011 4/01/2016

Exogenous variables: Individual effects

User-specified lags: 1

Newey-West automatic bandwidth selection and Bartlett kernel

Total (balanced) observations: 192

Cross-sections included: 24 (3 dropped)

Method	Statistic	Prob.**
Levin, Lin & Chu t*	8.50949	0.0000

## Appendix -4

### Equation Estimation:

Dependent Variable: SP

Method: Panel EGLS (Period random effects)

Date: 06/24/17 Time: 18:34

Sample (adjusted): 10/01/2011 4/01/2016

Periods included: 10

Cross-sections included: 27

Total panel (balanced) observations: 270

Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-23.31511	4.356958	-5.351236	0.0000
BSL	0.487039	0.151722	3.210080	0.0015
CACC	-0.001951	0.003074	-0.634705	0.5262
DEBT_GDP	-0.046561	0.007956	-5.852709	0.0000
FRSV	0.003742	0.000633	5.909113	0.0000
GDP_GRTH	-0.586958	0.173020	-3.392437	0.0008
INFL	-0.065167	0.006168	-10.56497	0.0000
POL_ST	1.004539	0.047171	21.29567	0.0000

#### Effects Specification

	S.D.	Rho
Period random	0.000000	0.0000
Idiosyncratic random	5.551398	1.0000

#### Weighted Statistics

R-squared	0.835864	Mean dependent var	47.26296
Adjusted R-squared	0.831479	S.D. dependent var	13.55154
S.E. of regression	5.563085	Sum squared resid	8108.352

F-statistic	190.6059	Durbin-Watson stat	0.320301
Prob(F-statistic)	0.000000		

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Unweighted Statistics

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R-squared	0.835864	Mean dependent var	47.26296
Sum squared resid	8108.352	Durbin-Watson stat	0.320301

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Hausman Test:

Correlated Random Effects - Hausman Test

Equation: Untitled

Test period random effects

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Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Period random	10.089934	7	0.1835

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