



LUND UNIVERSITY

School of Economics and Management

# Credit Ratings and Investment Decisions in Emerging Markets

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## **Abstract**

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**Keywords:** Credit rating changes, investment decisions, emerging markets, credit rating agencies, tradeoff theory, pecking order theory.

**Purpose:** To empirically investigate if credit rating changes have an impact on investment decisions of companies in the emerging markets, namely on investment and cash flow levels.

**Methodology:** Panel data regressions where the investment level, the change in the investment level and the cash flow level are the dependent variables, which are controlled by independent variables (besides credit rating change) such as leverage, profitability, firm size, GDP, inflation, interest rates.

**Theoretical perspectives:** The theoretical framework consists of previous research on credit ratings and their impact on investment levels, as well as main theories such as tradeoff theory, pecking order theory and main issues connected to Credit Rating Agencies and the emerging markets.

**Empirical foundation:** The study is based on Standard and Poor's historic long-term issuer credit ratings and firms' financials on a sample of 229 firms. The collected data covers a period from 2000 to 2012, amounting to a total of 1145 firm-years.

**Conclusions:** The findings of this study suggest that downgrades have significant negative correlation to the cash flow level of firms. Overall, credit rating changes do not show any other major influence on the investment decisions of companies. However, firm size, interest rates, leverage, profitability and inflation have significant effects on the investment level of companies. Cash flow level seems to have consistent and significant influence on investment and this, together with the minor impact of credit rating changes, leads to the conclusion that companies in the emerging markets rely more on internal funds and Credit Rating Agencies seem to have less important role in these markets than the one they have in the developed markets.

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## 1. Introduction

### 1.1 Background to the study

The main role for the Credit Rating Agencies (forthcoming abbreviated as CRAs) is to secure and guarantee companies' or financial products' creditworthiness, both from lenders' and investors' perspective (Champsaur, 2005). There are several examples of scandals which have affected the reputation of CRAs: Worldcom or Enron, where CRAs rated the companies as "investment grade" just days before they went into bankruptcy; rating of the collateralised debt obligation (CDO) market (Jarrow & Xu, 2010) and the current situation in some of the European countries. The European Central Bank implies that the downgrading of the sovereign credit rating of Greece has contributed to worsen the situation and to spread the problems to adjacent countries with weaker fiscal policy such as for example Ireland, Portugal, Italy and Spain (de Santis, 2012). All this has resulted in a debate regarding how trustful analyses from CRAs really are (Champsaur, 2005).

"There are two superpowers in the world today in my opinion. There's United States and there's Moody's Bond Rating Service. The United States can destroy you by dropping bombs, and Moody's can destroy you by downgrading your bonds." (Cane et. al., 2005: 1066)

This quotation points out the important role that CRAs have had over the years and still have today in many aspects even though the above-mentioned criticism has damaged their reputation. The problems with CRAs involved in crises are not something new to the world. During the Asian crisis the CRAs got criticized for not responding to the economic situation and when they acted it was already too late (Löffler, 2002). CRAs were also blamed for failing to predict Mexico's economic crisis in 1994-1995 and it became obvious that CRAs merely react to the economic situation rather than predict it (Larrain & Reisen, 1997). Moreover, Ferri, Liu and Stiglitz (1999) argue that CRAs tend to behave pro-cyclically, that is, upgrading when the financial conditions are good, and downgrading when the conditions are bad and thus they have worsen the pattern in the global financial markets. There are even some that believe that CRAs were not just a part of the economic crises during 2001-2002 and in 2007-2008 but also contributed to the same by giving high credit ratings

without any deeper analysis (Voorhees, 2012). The following saying was quoted from Wall Street and presented in a report investigating the latest crisis in 2008 which the world has not fully recovered from:

“Everything was investment grade. It didn’t really matter.”  
(Voorhees, 2012: 875)

Even if CRAs’ role in the financial markets during the crisis is difficult to point out, despite many reports, they attract a lot of attention and highlight the weakness in the system and the importance of trust in the market. It is not just for investors and debt holders that the credit rating is important. Credit rating is the second highest concern for deciding the capital structure in a company (Kisgen, 2006). Kisgen found that CEOs put great trust in ratings when they decide the capital structure of a firm. The optimal level of debt and equity in a firm is central for value-maximizing in order to find the balance between costs (benefits) of external financing in the company. By taking credit rating into account, capital structure is affected by changes in ratings (Bo, 2008). A credit rating change affects the cost of capital of a firm and depending on whether it is an upgrade or downgrade, the firm would invest more (due to lower cost of capital) or less (due to higher cost of capital). That is why, credit ratings affect indirectly also the investment behavior of firms and this opens up for a not fully investigated area: *how an up- or downgrading affects companies’ investment decisions*. Gul et. al. (2009) presented the first evidence in this area, to our knowledge, when they concluded that firms have more capital investments after a credit rating upgrade and the other way around with downgrades. This underpins and enhances the quotation about CRAs as “superpowers” where a change in rating can affect the whole company. The two leading theories in capital structure are the pecking order theory and the tradeoff theory, which will be discussed further and used for the analysis.

## 1.2 Previous research

The following studies are examples of research done in similar areas with credit ratings. Klinger and Sarig (2000) focused on the information aspect and concluded that information of better- or worse-than-expected rating of bonds did not affect the

firm's value when Moody's announced it, but that the value of debt increased and a decrease in the value of equity was seen at the same time. Kisgen (2006) focused on the effect that credit ratings have upon firms' capital structure decisions. The research was done in the US market with S&P's long-term domestic issuer credit rating. Kisgen created a central hypothesis for his research referred to as *Credit rating – capital structure hypothesis* or "CR-CS". The theory implies that a firm that is up- or downgraded will issue less debt compared to a firm not near a change in its rating (Kisgen, 2006). There is also research suggesting that firms or the management of a firm not always strive for a better rating since a higher grading is harder to sustain and that a potential downgrading is expensive (more expensive both in terms of cost of debt but also indirectly for managers' and the firms' reputation and the forthcoming business) (Bo, 2008). Kisgen (2006) found that credit ratings directly affect the capital structure of a firm. A firm near a change in the rating issued around one percent less net debt (of total assets) relative net equity annually compared to firms without any changes in their ratings. The decisions regarding capital structure were affected for both up- and downgrading.

The same results with more capital investments in the time after an upgrade were concluded in a different study but with a similar method as Kisgen (Gul et. al., 2009). The authors formulated four hypotheses including up-and downgrading's effect on investments, growth opportunities, shareholders' impact on investments and the role of corporate governance in investment decisions. They found a positive relationship between upgrading and firm's investments. Gul et. al. (2009) also found evidence for that a downgrading results in less investments the following years. Regarding the impact of agency problems they concluded that a higher level of agency problems resulted in less investments even though the firm had been upgraded. Furthermore, they found that better corporate governance negatively affected debt holders to the firm and in times with more investments from investors a firm would only react to an upgrade and the other way around with a downgrade.

Bannier et. al. (2012) investigated the monitoring role of CRAs through credit ratings. They argue that firms reduce (raise) investment around negative (positive) rating events. The investment reaction is independent of changes in performance, investment

opportunities, capital costs or target ratings. They argue that the investment reaction is strongest for firms with high agency conflicts.

Even though these studies are handling credit ratings, there is a great difference between them. Klinger and Sarig (2000) discussed bonds behavior after credit rating change, Kisgen (2006) focused more on how the capital structure is affected by a change in the rating, Gul et. al. (2009) looked at credit rating transitions and investment decisions of companies and Bannier et. al. (2012) investigated the monitoring role of CRAs. These studies and conclusions are focusing on similar objectives but there is nothing, to our knowledge, about the emerging markets and their investment behavior connected to credit rating transitions, which makes this area interesting for research and complementing to the conducted previous research.

### **1.3. Aim and objectives**

There is not much research done outside the US market on the investment behavior after a credit rating change and therefore the need for further investigation is crucial. This is motivating from two perspectives: adding information to a relatively not investigated area but also in a comparing way between results from previous research in the US market and the following study on the *emerging markets*.

The research on credit rating changes and investment decisions in the emerging markets is vital, since companies in these markets are less reliant on market debt (due to less accessibility to external financing) and agency costs are higher due to less transparency. Moreover, it is expected that CRAs have less impact on the companies in the emerging markets but as gatekeepers of the transparency in the markets, they have more job to do in the emerging markets. Therefore, the expectations from this research are that CRAs will have less influence on the investment decisions of companies in the emerging markets than the influence they have in developed markets.

The aim of this paper is to investigate how an up- or downgrading affect company's investment behavior in companies in emerging markets, which will be looked into through different key ratios presented in the methodology chapter. Previous studies

focused on the effects of the sovereign ratings on companies' credit ratings in the emerging markets (Weigel & Gemmill, 2006). The research is also relevant from a time perspective since currently developing countries are the fastest growing markets in the world. Besides, it seems logical that companies in emerging markets face a lot of changes in their credit ratings, which makes this area of the world particularly intriguing to research in this context.

#### **1.4 Research question**

In order to investigate the correlation between up-/downgrading and investment decisions of companies, the following research questions are focused on in this study:

- Do credit ratings influence the investment level of companies after the change in the rating?
- Do credit ratings affect the changes in investment levels after up-/downgrade?
- Do credit rating changes affect the cash flow levels of companies?

A theoretical framework will be outlined to support the choice of these questions. A sample of companies in the emerging markets will be selected and credit rating and financial data will be collected. Furthermore, panel regression analysis will be conducted to investigate the correlation between credit rating changes and investment and cash flow levels.

#### **1.5 Scope and limitations**

The time frame of this study is focused on credit rating changes of companies in the emerging markets between 2000 and 2012. The sample includes 229 non-financial rated companies in the emerging markets. The used credit rating data is Standard and Poor's foreign long-term rating. Local/national long-term ratings are not used since each national rating scale is unique and is designed to serve the specific needs of each local market (1.www.standardandpoors.com). Instead, the foreign long-term rating will make the companies in the sample more comparable to each other since the previous problems are excluded. Ratings from other CRAs such as Moody's and Fitch are not taken into consideration due to lack of access to their credit ratings database.

The sample and the selection procedure will be described further in detail in chapter three, Methodology.

The chosen time frame might not reflect the financial market and the investment grade in a perfect way due to the economic turbulence over the last years. Companies have probably done less investment even if their ratings remained constant in order not to be overoptimistic and risk ending up with future economic problems. Even though, there is a gain in this research in the updated information and also in the perspective that the time frame includes different economic cycles.

## **1.6. Outline**

Chapter two covers the theoretical framework necessary for supporting the general overview of CRAs and the problems they face, the theories for financing rationale and emerging markets. Chapter three includes the methodology of the following research, describing the sample selection; defining variables, econometric techniques and regressions. Chapter four presents the results from the conducted tests. Chapter five elaborates the analysis of the results from the previous chapter. Chapter six concludes, followed by Reference list and Appendix.

## 2. Theoretical framework

### 2.1. Credit Rating Agencies

CRA's fill an important gap in sharing information for both investors and for debt holders. They aim to measure the creditworthiness, in other words companies' ability to meet their debt obligations with a focus on the long-term view (Gonzales et. al., 2004). Credit ratings are used for a number of different market participants such as nations, governments and companies for issuing debt (Frost, 2006), but only reflect the credit risk connected to the product/firm and do not cover other risks such as market – or liquidity risk (de Haan & Amtenbrink, 2011).

The rationality of using CRA's is to reach information economies of scale and to increase the transparency among investors or debt holders. Some of the stronger arguments behind their position in the financial markets are that the ratings are based on information CRA's get from both public and non-public data, their employees and technological framework are highly skilled and they have the right incentives to judge a firm or product without any obligations against the issuer (Masciandaro, 2011).

There are around 150 credit rating agencies in the world (de Haan & Amtenbrink, 2011) but the market is totally dominated by three actors; Standard & Poor's, Moody's and Fitch with a combined market share over 90 percent (Tichy, 2011). The three big agencies (often mentioned as big three) use letters and figures for their ratings, expressed as a scale where, for example, the highest rating for Fitch and S&P is AAA, while the highest for Moody's is Aaa. Credit ratings are separated in two categories: investment-grade and non-investment-grade (speculative). S&P's ratings BBB and above are investment grade, while Moody's puts the line between the two categories at Baa3 (IMF, 2010). This differentiation is essential for institutional investors since most of them have limitations on risk in their portfolios and are often obligated to invest in investment grade bonds. The letter assignment of ratings is depicted in detail in Table 1.

**Table 1. Credit Rating Agencies' Scales**

Fitch	S&P	Moody's	Rating grade description (Moody's)				
AAA	AAA	Aaa	Investment grade	Minimal credit risk			
AA+	AA+	Aa1		Investment grade	Very low credit risk		
AA	AA	Aa2					
AA-	AA-	Aa3					
A+	A+	A1			Investment grade	Low credit risk	
A	A	A2					
A-	A-	A3					
BBB+	BBB+	Baa1				Investment grade	Moderate credit risk
BBB	BBB	Baa2					
BBB-	BBB-	Baa3					
BB+	BB+	Ba1	Speculative grade	Substantial credit risk			
BB	BB	Ba2					
BB-	BB-	Ba3					
B+	B+	B1		Speculative grade	High credit risk		
B	B	B2					
B-	B-	B3					
CCC+	CCC+	Caa1			Speculative grade	Very high credit risk	
CCC	CCC	Caa2					
CCC-	CCC-	Caa3					
CC	CC	Ca	Speculative grade			In or near default, with possibility of recovery	
C	C						
DDD	SD	C		Speculative grade		In default, with little chance of recovery	
DD	D						
D							

*Source: Ganguin & Bilardello (2005), p. 186*

A high natural barrier for other companies to enter is one of the explanations of the low competition in the industry. The need of qualified analysts, well working methodologies and high credibility excludes many competitors since it takes years to reach high credibility and attract the best analysts in the area (Champsaur, 2005). This creates a “catch 22” where the market is excluding for just a few actors which have built credibility over the years. This situation creates a natural “monopoly” (or oligopoly), where the market is completely dominated by three major participants.

The scandals in the last (roughly) ten years with for example Enron and Lehman Brothers have caused problems for the CRAs and their trustworthiness. Some argue that the information which the rating is based upon is not from first hand sources since the CRAs are slow to react and revise information and do not perfectly reflect the financial health of markets (Champsaur, 2005). CRAs also get criticized by having problems to attract the best people in the area due to the high competition in the financial market with better-paid work places as an alternative for the most talented ones. Finally, CRAs are scrutinized with the following quotation:

“...as with a hostage that eventually sympathizes with his or her captors, with close contact comes the potential for an issuer to cloud the judgment of a CRA” (Cane et. al., 2005: 1092)

This is an example of an agent-principal conflict that might influence CRAs’ incentives, which will be discussed more in detail in Chapter 2.1.1.

As a reflection of the massive critics of CRAs Cane et. al. (2005) argue for *the freedom of speech protection* where the agencies could be compared with newspapers or a meteorologist. They have the idea that CRAs serve the public with information about companies and financial products, but they are not something to build an investment decision upon. The problem with this view is that a CRA is paid by the issuer and can, if the grade is not favorable, just ask another agency to assign a rating. Compare this by using the metaphor with the weather forecast where a person cannot ask another meteorologist for better weather if they do not like the weather, nor does the meteorologist feel any obligations to report good weather (de Haan & Amtenbrink, 2011). This phenomenon is a potential market distinction between developed and emerging markets, where the customer does not necessarily pay for a security with the highest possible quality or accuracy. It is therefore important for CRAs to have a high level of reliability *both* in the results from the rating but also in the rating process itself with independency as a demand (Champsaur, 2005).

CRAs’ ratings are normally viewed from a medium term objective, and they signal in advance if a change in rating is upcoming by using “watch lists”. These lists cover a shorter view on around three months on average and are considered to be a quite strong indicator of a change in the rating (de Haan & Amtenbrink, 2011). According to de Haan and Amtenbrink (2011), there are two main reasons for the implementation of watch lists: first, the higher demand for accurate information regarding the financial market and second, the direct contact with borrowing firms where the CRAs have a monitoring effect on the market. This is also something Boot et. al. (2006) highlight in their study where control is necessary for investors and their decisions. The reason for companies getting on the watch list is when CRAs notice differences in the firms’ characteristics which the rating is based on. Actions are often

required from the management of the firm to reach specific targets set by CRAs in order to maintain their rating. If they fail to perform in the questioned way to meet the targets the firm will be downgraded (Boot et. al., 2006).

### 2.1.1. Agency issues

The principal – agent conflict can occur, on one hand, between the CRAs and the issuer, and on the other hand, between the CRAs and investors. These kinds of conflicts arise from the fact that CRAs are paid by the companies (issuers of corporate bonds) rather than investors, who actually buy/trade with these bonds. It is also important to notice that CRAs' revenues come mainly from rating fees (BIS, 2005). That is why; CRAs have the incentive to act in issuers' interest by assigning a higher credit rating or considering downgrading more slowly than usual in order to give time for the company/issuer to avoid the unfavorable consequences of an eventual downgrading (e.g. – an increase in funding costs or to avoid triggering covenants) (Covitz & Harrison, 2003). CRAs refer to this as “migration policy” – the need to maintain ratings relatively stable, to make gradual changes and keep a track record of ratings in the markets and in this way, keeping agencies' reputations (Gangiun & Bilardello, 2005).

Covitz and Harrison (2003) investigate whether CRAs favor issuer interest (the “conflict of interest hypothesis”) or investor interests (the “reputation hypothesis”). CRAs may have the incentive to please issuers' preferences because they have been approached and paid by these companies. Nevertheless, Covitz and Harrison (2003) argue that CRAs would not feel obligated to give favorable credit rating to companies which have chosen this particular agency since it is common for issuers to choose more than one agency to assign a rating for them (in order to increase their credibility among investors). They also believe that the “reputation hypothesis” dominates the incentives of CRAs.

Having in mind the fact that agencies are keen on maintaining their reputation for the future for providing good services; this could be seen as disciplinary device to manage conflicts of interest (BIS, 2005). Furthermore, CRAs deal with conflicts of interest by making sure that analysts are not compensated on the basis of the ratings they assign and that they do not have any relationship with the company management

or business units' staff. CRAs also try to diversify their revenues in order to be independent of any company that might try to influence its rating based on the eventual financial dependency. In addition, CRAs try to communicate better and more clearly how the conflicts of interest are managed within the agencies themselves and the issuing companies as well.

The conflict that CRAs are paid by issuers and not by investors results from the fact that rating agencies cannot know in advance which investors are interested in the particular corporate bonds and even if they knew, these investors would not pay a part of the fee. In this sense, the issuer is actually the only one available for paying the fee. But this fact does not exclude the possibility that an issuer may try to use his bargaining power in order to get a better rating (Schwarcz, 2002).

Investors rely on rating agencies for reassurance for the risks associated with investing in corporate bonds. However, CRAs are private companies and are not regulated by any major country or government. In this way, CRAs rate only the creditworthiness of the investment, not its economic relevance to the investors in question (Schwarcz, 2002). This is another potential conflict of interest that comes from the economic interest of a CRA in basing the credit rating only on the issuer's creditworthiness, that is, credit ratings are based on the information CRAs get from the rated companies (Frost, 2006).

Apart from the above discussed conflicts of interests, there is another conflict – the one with the CRAs' goal of independence and objectivity to investors. Moreover, CRAs have been criticized that they lack independence, namely because of the reception of large fees for giving high ratings (Tett & Davis, 2007). The fact that CRAs also provide consulting services for a fee, may incur conflicts of interest as well. These consulting services may consist of purchasing “indicative” rating just before issuing an official public rating, accompanied by advice how to improve this eventual rating (Covitz & Harrison, 2003).

The above mentioned criticisms on CRAs may lead to a conclusion that credit ratings do not have any use in companies' investment decisions but this is not the case. Credit ratings could be biased, but the credit rating transitions (i.e. downgrading and

upgrading) could incur more credible results through the investment decisions perspective. The most common result is that there is an asymmetric effect of upgrades and downgrades, that is, investment level is more sensitive to downgrades (due to increased cost of capital), while upgrades do not incur significant impact on investment. This view is supported by Dichev and Piotroski (2001) and Goh and Ederington (1993). Credit rating down- or upgrades carry important information about the economic situation in a firm (Dichev & Piotroski, 2001). On the other hand, rating changes suggest wealth transfers from stockholders to bondholders in the case of downgrading which in its essence is one of the most important principal – agent conflicts (Goh & Ederington, 1993).

### **2.1.2. Information asymmetry**

The logic for the existence of CRAs stems from one of the main imperfections of financial markets – the asymmetric information. CRAs act as intermediaries between investors/creditors and companies and provide each side with useful information for a final decision-making. Companies need credit ratings in order to get easy access to the global capital markets and increase their credibility among creditors. This need is also supported by the fact that investors prefer rated securities and are even often constrained to maintain only investment-grade bonds in their portfolios. CRAs supply market participants with a “system of relative creditworthiness”, that is, the credit rating. Nevertheless, the choice whether to invest in the rated companies or not, remains with the investors (Kräussl, 2003).

Capital markets are not fully efficient since the information does not flow freely between investors and companies. This by itself may lead to underinvestment problems (Myers & Majluf, 1984). In other words, information asymmetry incurs financial constraints, which in turn imply that less investment than the optimal for a firm would occur. John and Nachman (1985) have concluded in their research that credit ratings decrease the levels of underinvestment. They argue that since reputation serves as a signal of firm quality, it helps to reduce information asymmetry. That is why, a firm with good reputation will invest more than it would if the good reputation was not present, thus reducing the underinvestment problem. Moreover, firms with good reputations also receive higher credit ratings and issue bonds at higher prices and thus they have more investment (John & Nachman, 1985). This could be also due

to the fact that firms with agency and information problems perform poorly and creditors can interfere with management and influence investment decisions (Chava & Roberts, 2008).

CRA's rely on the information provided by the issuer. That is a reason why the rating itself is as reliable as the available information. Therefore, ratings do not cover the risk of fraudulent activities conducted by the rated company (Schwarcz, 2002). Another reason why the rating depends on the reputation of the CRA is the "private information hypothesis" developed by Gan (2004). It implies that companies with better private information self select and get higher ratings because of the private information they have disclosed to the rating agencies. Therefore, companies have the incentives to disclose information that puts them in a better position to get a higher rating but this information may be misleading as well. That is why, it is in the interest of companies to provide CRA's with all relevant private information as accurately and unbiased as possible in order to avoid future reputation downfalls.

By applying too strict requirements to avoid downgrades, CRA's could restrict innovation in the market. It is also possible that the concentration in the credit rating industry could incur the same effects on the market. CRA's overcome information asymmetry problems by making their rating methodologies available to the market and in this way, they have increased the transparency of the rating process (BIS, 2005). In order for CRA's to decrease the amount of information asymmetry between companies and investors, they disclose their methodologies so that they are understood better by investors. Since CRA's act as third party providers of opinion, they are especially useful when the information costs for investors are relatively high.

Kuhner (2001) focuses in his study on the question if CRA's have incentives to exaggerate the credit quality of a company during a systematic crisis. The essence of a systematic crisis lies in two main factors: first, investors do not have the ability to distinguish between good and bad debtors; second, investors tend to withdraw their investments. This situation also stems from the market imperfection of information asymmetry.

Overall, economically speaking, using ratings is rational and their growing “popularity” stems from their ability to provide information economies of scale by disclosing private information for companies through credit ratings and thus lowering the information asymmetries between investors and issuers and in turn, increasing companies’ reputations and consequently, their investment levels due to the higher prices of issued securities.

### **2.1.3. Moral Hazard**

The natural continuity of the principal – agent and information asymmetry problems is the moral hazard issue that comes from the fact that management’s interests may not be aligned with shareholders’ interests and the investment activities do not maximize the firm value and may even destroy it if it is in the management’s interests (Jensen & Meckling, 1976).

Having in mind the fact that there is no regulation on the quality of credit ratings, the informational value of the ratings depends on CRAs’ aim to maintain their reputation. But this cannot be an insurance of the correctness of ratings. Moral hazard exists due to the possibility that CRAs use the private information they have from their clients in their own interests and may misrepresent the credit quality of the company they are rating (Celjo-Hörhager & Niessen, 2006).

When self-fulfilling interests are dominating, CRAs have the incentive to produce incorrect ratings. Depending on the degree of these interests, the rating agency gives a rating that either corresponds to the private information about the quality of the debtor or is incorrect. Based on this rating and other information, investors decide whether to invest or to withdraw their funds (Kuhner, 2001).

However, even though the moral hazard of misrepresenting credit quality exists, it is unlikely that CRAs will abuse the private information they have since they have been quite cautious with their reputation among investors especially after the collapse of, for example, Worldcom and Enron. CRAs are also trying to regain the trust of investors after their inability to react adequately to the latest financial crisis from 2007-2008 that was exaggerated by sudden massive downgrades and inaccurate risk

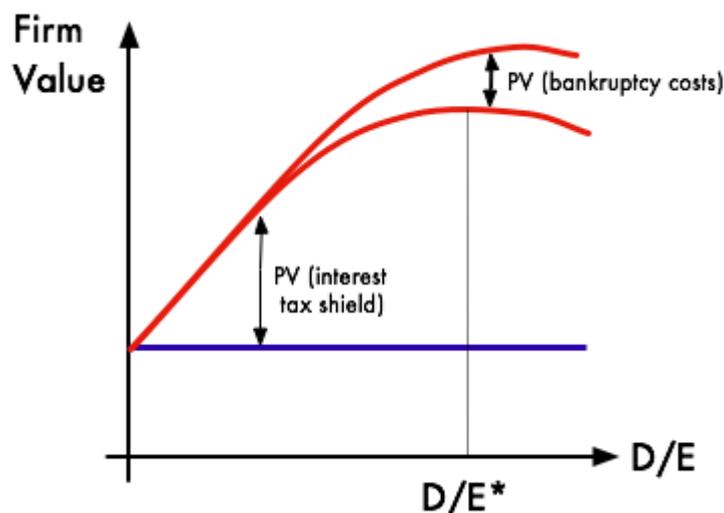
assessment. These factors support the unlikelihood of moral hazardous actions by CRAs.

## 2.2. Theories of financing rationale

### 2.2.1. Tradeoff theory

The tradeoff theory supports the argument that a firm will find the balance between the benefits of debt and the potential bankruptcy costs to end up with an optimal level of leverage for the company. An important purpose of the theory is to explain the fact that companies are financed partly with debt and partly with equity. It states that there is an advantage to financing with debt (tax shields) and there are costs to financing with debt (costs of financial distress, bankruptcy costs). As leverage increases, there is a tradeoff between the interest tax shield and bankruptcy costs that causes an optimal capital structure (Kraus & Litzenberger, 1973). This is depicted by Figure 1.

*Figure 1. The tradeoff theory of capital structure*



*Source: Ogden, Jen & O'Connor (2003), p. 73*

Looking at the information asymmetry problems through the lens of the tradeoff theory, Fama and French (2002) believe that they support the theory's predictions about target leverage of companies and that the level of leverage is mean reverting. They also identify, as a conclusion, the negative relation between leverage and profitability under the tradeoff model.

In some cases, the costs that are incurred by a change in credit rating may evoke investment decisions with which the firm ends up with a totally different capital structure than the optimal one implied by the tradeoff theory, especially during downgrades (Kisgen, 2006). The argument is that if the rating-dependent costs (benefits) are material, managers will balance these costs (benefits) against the costs (benefits) implied by the tradeoff theory when making capital structure decisions. Due to the effect that credit ratings have on reputation, Kisgen (2006) argues that managers might aim at a level of debt that is not optimal for the firm but leads to a debt ratio that increases the chance of an upgrade and thus, capital structure decisions and investment decisions are dependent on credit rating changes.

Furthermore, Graham's survey results show that even though firms have predetermined leverage targets, following these targets is not of major importance for their management (Graham, 2000). This naturally leads to another major theory used to support the capital structure of companies, that is, the pecking order theory.

### **2.2.2. Pecking order theory**

The pecking order theory implies that companies do not have predetermined capital structure and that firms make their investment decisions, as a result of information asymmetry, in the following order: use internal funds, then debt and finally, if the first two are too costly or unavailable, the firm would issue equity. Logically, the firm would issue debt when its projects with positive net present value exceed the amount of the internally generated funds and when the company has exhausted its debt capacity, it would issue equity to show to the market that its management is confident of the future and the investment opportunities (Myers & Majluf, 1984).

The pecking order theory explains some agency issues such as the debt overhang problem (underinvestment) and the overinvestment problem. In theory, if debt creates potential underinvestment problems, the effect is neutralized by lowering the leverage level, if future growth opportunities are recognized early. Another possible agency problem is the "overinvestment" problem where the conflict is between management and shareholders. The argument is that managers have the incentive to expand the firm even if this means undertaking projects with negative net present value and thus reducing shareholder wealth. Jensen (1986) argues that managers of firms with large

free cash flows (FCFs) have the incentive to invest more (which may lead to overinvestment problems, empire building) and therefore bigger firms tend to have higher level of CF. Management could be restricted by the availability of free cash flow and increased debt financing. The issuance of debt pre-commits the firm to pay cash as interest and principal and thus forcing managers to service these obligations with funds that may have otherwise been used to finance poor investment projects. Therefore, leverage is one mechanism for overcoming overinvestment problems suggesting a negative relationship between debt and investment (Aivazian et. al., 2005).

According to Kisgen (2006), companies may face a tradeoff between equity issuance costs and the cost of eventual change in credit rating. This is in a contradiction with the pecking order theory, since if firms are close to an upgrade, they may issue equity instead of debt in order to keep their chances for a higher rating, while firms that are close to a downgrade would not issue debt just to avoid the higher costs associated with the downgrade, e.g. increased cost of capital (Kisgen, 2006). This contradiction also leads to the conclusion that firms with low leverage prefer and make large equity issues. This phenomenon is characterized as “one deep wound on the pecking order” (Fama & French, 2002).

### **2.3. Emerging markets**

Emerging markets are often associated with rapid business growth and industrialization. According to Morgan Stanley Capital International (MSCI), the seven largest developing and emerging economies by nominal GDP are considered to be China, Brazil, Russia, India, Mexico, Indonesia and Turkey (MSCI Emerging Markets, 2012). Although these countries have the fastest-growing market for most products and services, many investors are reluctant to do business there, mainly due to the fact that they have access to less information about these markets and there is less presence of reliable intermediaries like CRAs, financial analysts and merchant banks (Palepu et. al., 2005). Following this line of thought, businesses there have less access to the creditworthiness of other firms and the corporate governance is also poor in the emerging markets. This leads to that generally emerging markets tend to be less transparent and more risky in the eyes of foreign investors.

Bekaert (1995) has identified some barriers to investment in the emerging markets such as: poor credit ratings, high inflation, the lack of good regulatory framework, the lack of sufficient country funds and the limited size of some stock markets. The increase of integration of these factors may lead to lower diversification benefits of investing in the emerging markets. This, in turn, may lead to reduced interest of international investors in the emerging markets.

According to a study on the determinants of credit spreads in the emerging markets, spreads are determined not only by creditworthiness but also by global factors such as interest rates, S&P 500 returns, oil prices, etc. and this could lead to inadequate risk coverage. In addition, if there is an increase in the above mentioned global factors, the costs of financing in emerging market countries will rise even more, threatening the position of balance of payments (Kamin & Kleist, 1999).

CRA's have a policy of never rating a company above the sovereign, the so called "sovereign ceiling". Although CRA's claim that they have gradually moved away from this practice, it seems that sovereign ratings still remain an important factor of the credit ratings assigned to companies in these markets. Borensztein et. al. (2007) refers to this phenomenon as "sovereign ceiling lite", that is, the sovereign credit rating is not an absolute constraint but can push down the corporate ratings. Therefore, the "sovereign ceiling" is close as a concept to the investment/speculative grade threshold. They also conclude that sovereign ratings may not capture adequately the corporate risk. According to S&P's, the sovereign rating is a key consideration because governments in financial distress may force their private sector to go into default which is risky for investors (1. [www.standardandpoors.com](http://www.standardandpoors.com)). That is why, the sovereign credit risk in emerging markets may constrain attracting new investment to companies that have in reality a reasonable credit risk and stable finances, which cannot be captured by their current credit rating due to the sovereign ceiling.

The results of Krüssl's empirical study (2003) show that CRA's have enormous influence on the size and volatility of emerging markets lending. A negative credit rating announcement might incur reconsiderations on institutional investors' portfolios since they may be forced to reallocate their capital flows. Credit rating

changes may reveal new information about the company and may enhance financial market downturns. This effect is likely to be more significant in emerging markets due to more severe asymmetric information and transparency problems.

Despite the above described difficulties, nowadays every leading company in the world introduces new business activities in emerging markets as part of their core strategy. Nevertheless, emerging market analysis has its own challenges such as inadequate market data, poor visibility on the regulations and government support and lack of reliable market research firms (Brechtbuhl, 2006). The lack of transparency may evoke a more important role for CRAs in the emerging markets as participants who increase the trust between investors and companies in these markets. The above mentioned challenges would influence the following study as well but would make it more relevant in the context of the increasing pivotal future role of countries in the emerging markets.

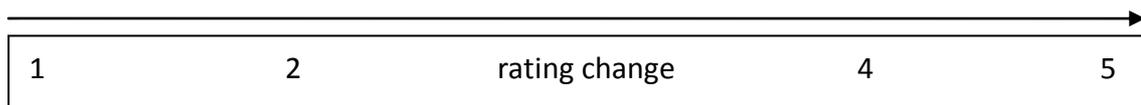
Companies in the emerging markets rely less on external financing because of the limited access to capital markets due to the higher risk investors see in financing these companies. CRAs are not so influential in the emerging markets and investors could not always rely that the company they want to invest in would be rated. That is why, it would be reasonable to expect that credit rating changes would not influence the investment decisions of companies in the emerging markets to the same extent as they do in the developed markets. On the other hand, rated companies in the emerging markets may appear to be more credible and reliable for foreign investors and thus credit rating changes could have greater impact than expected. Nevertheless, the questions whether the investment level in the emerging markets is influenced by changes in credit ratings or not and whether determinants of credit ratings or macroeconomic determinants have greater effects on investment, are yet to be revealed by conducting the following research.

### 3. Methodology

#### 3.1. Methodological approach

The study in this research on the emerging markets and the investment pattern of companies after an up- or downgrading will be based upon the methodologies used in Gul et. al. (2009) and Bannier et. al. (2012). The emerging markets will be investigated with a similar approach as Gul et. al. (2009) in terms of their study on cash flows and ratings. Bannier et. al. (2012) study will be the base for defining the regressions that are going to be tested. Both studies will support the definition of the used variables. This together with existing research and presented theories will become the foundation for the following analysis.

The event window of the study is two years pre- credit rating change and two years post the change. Adding the year of the rating change, the observations for each company are five, which lead to 1145 observations altogether. The choice of the five year period can be motivated by the fact that the study will observe the changes in the investment levels two years after the credit rating transition since the effects would not be simultaneous. The investment level in the years after the rating change will be compared to the investment level prior to the change. The event window of the study is depicted in the following figure:



#### 3.2. Sample and selection procedure

The sample consists of rated companies in the emerging markets derived from the respective category in S&P's *Global Credit Portal* ([www.globalcreditportal.com](http://www.globalcreditportal.com)). In order to avoid self-selection, data from S&P's has been used since their credit ratings, together with Moody's, are voluntary compared to the ones from Fitch (Gul et. al., 2009). In order to create a comparable study for emerging markets and for generalization, S&P's have been used instead of both S&P's and Moody's.

By contacting S&P's office in Stockholm, we obtained access to a free trial of the *Global Credit Portal* for a limited time so that the credit ratings could be collected.

The grading from S&P and the emerging markets is based upon different factors including macroeconomic factors, stability in the political life, legal rights, the conditions in trading processes and feedback from institutional investors (2. www.standardandpoors.com).

The table below (Table 2) describes the process for how S&P divides countries into *Frontier*, *Emerging* or *Developed* countries. In the *Initial Eligibility Criteria* a country needs to fulfill all three criteria. In the second stage, *Additional Criteria*, the countries must at least meet three out of five criteria to be recognized as emerging countries. The difference between an emerging and a developed country is the final stage, where GDP (PPP) per capita is not greater than \$15,000 (1. www.standardandpoors.com).

**Table 2. S&P country classification criteria**

	Frontier	Emerging	Developed
<b>Initial Eligibility Criteria</b>			
Full domestic market capitalization of over \$2.5bn	A minimum of two ✓	✓	✓
Domestic turnover value of over \$1bn		✓	✓
Exchange development ratio of over 5%		✓	✓
<b>Additional Criteria</b>			
Full domestic market capitalization of over \$15bn		✓	✓
Settlement period of T+3 or better		A minimum of three ✓	✓
Sovereign Debt rating of BB+ or above			✓
Non-occurrence of hyperinflation			✓
No significant foreign ownership restrictions			✓
Freely-traded foreign currency			✓
<b>GDP Criterion</b>			
GDP (PPP) per capita of greater than \$15,000			✓

*Source: S&P Dow Jones Indices' Country Classification Consultation, August 2012*

The initial sample in the category from S&P's *Global Credit Portal* consisted of 744 companies from different developing countries in the period 2000 – 2012. The sample includes only companies defined as “corporates” by S&P's, that is, there are no financial institutions. Financial companies are excluded from the study since according to research, their capital structure may be completely different from that of the so-called corporate firms (Michelsen & Klein, 2011) and thus they are not comparable to industrial companies, for example.

The selection procedure consists of three steps:

**Step one:** Companies without any changes in their credit ratings; the ones that have been put on a watch list, defaulted or are subsidiaries of other companies in the list, have been excluded from the initial sample.

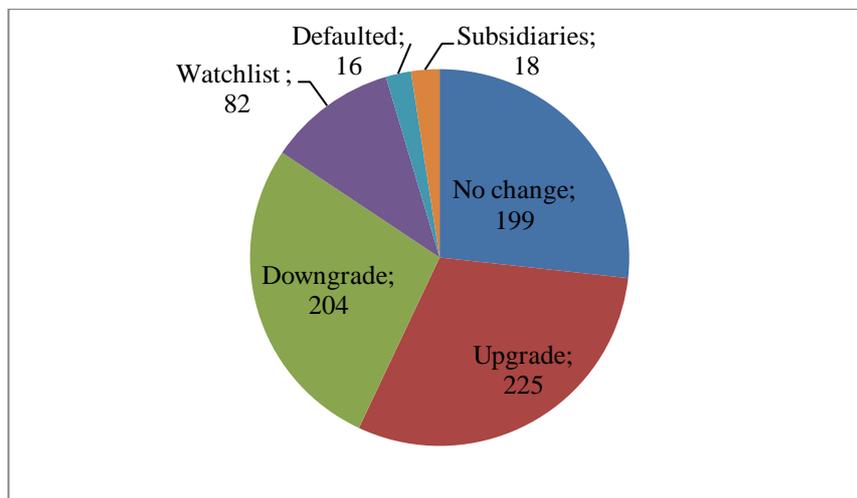
**Step two:** Companies for which there is no financial data in Datastream database or are not recognized as borrowers/issuers in the system are excluded.

**Step three:** Companies with missing essential financial data for the period in Datastream database are excluded.

### 3.2.1. Descriptive statistics of the sample

Out of the initial 744 companies, 199 did not have changes in their credit rating during the chosen period, 82 were put on a watch list and no rated action was taken during the same period, 204 companies were downgraded, while 225 were upgraded, 18 companies were subsidiaries of companies in the list. 14 companies defaulted within the period without having any changes in their rating. Still in the sample there are companies that might have defaulted but had more than one change in their rating before the default. The number distribution of the companies is shown in Figure 2.

**Figure 2. Distribution of companies in the initial sample**

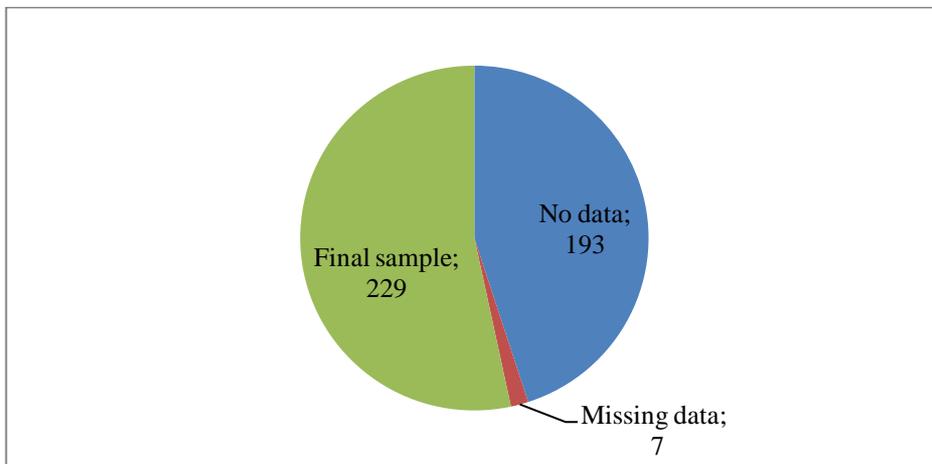


After Step one from the selection procedure, the sample was narrowed down to 429 companies that have been either downgraded or upgraded in the study period. After searching for data from the financial statements of these companies in Datastream database (Step two), it turned out that 193 companies were not either recognized by

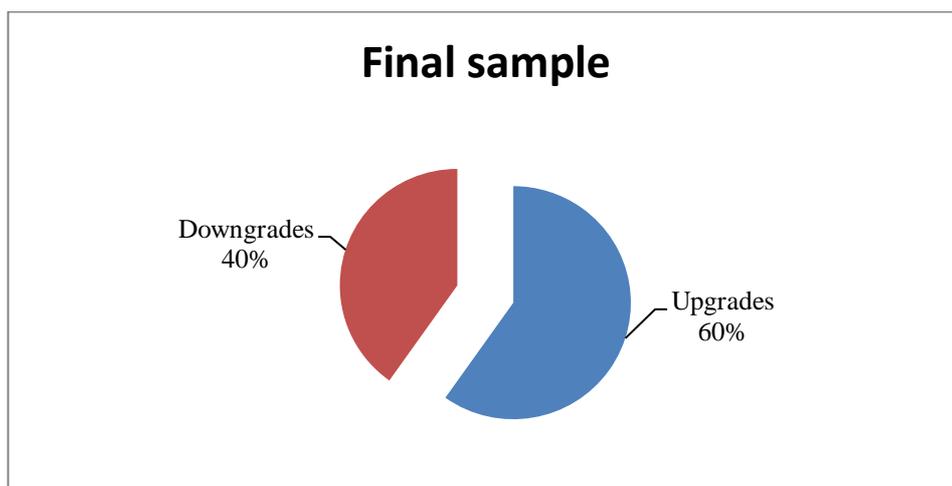
the system or if so, there was no available financial data. The sample was narrowed down to 236 companies after Step two.

Step three excluded seven more companies with missing key data that was necessary for the research. The final sample consists of 229 companies. Out of these 229 companies, 92 were downgraded (40%) and 137 upgraded (60%). Steps two and three can be followed in Figure 3. Figure 4 represents the percentage proportion of up- and downgraded companies in the final sample. A full list of the selected companies is presented in Appendix 1.

**Figure 3. Step two and three**



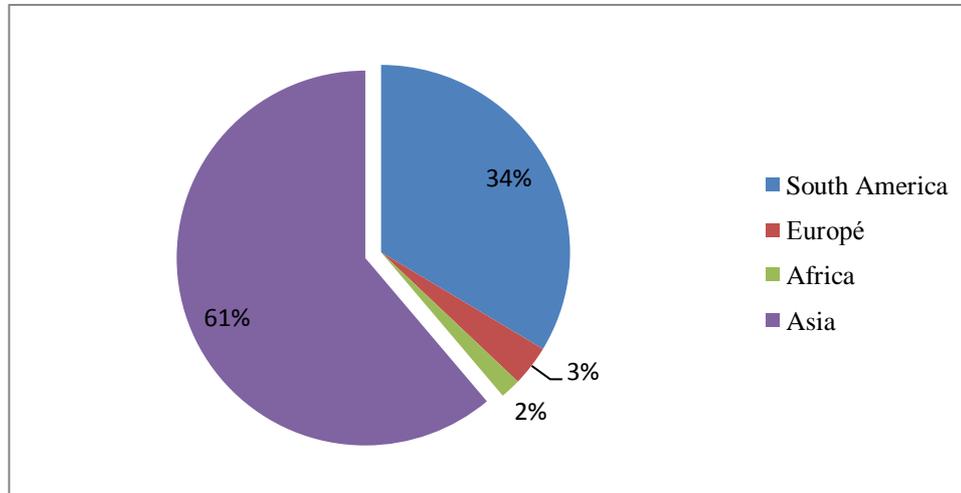
**Figure 4. Percentage proportion of final sample**



The companies in the sample are representatives from 32 countries from emerging markets all over the world. Moreover, the companies are spread over four continents.

The list of the countries and the number of companies from each country can be seen in Appendix 2, while the continent distinction is shown in Figure 5.

*Figure 5. Continent distinction of the companies*



### 3.3. Variables

The use of book values for the selected variables, which were taken from the Datastream database, is done in order to be consistent with previous studies (e.g. Kisgen, 2006). Besides, CRAs assign their credit ratings assessing the risk through the book values of the variables they use in their methodologies (3. www.standardandpoors.com). Moreover, Kisgen (2006) argues that the book value reflects managers' decision-making better and more accurate.

#### 3.3.1. Dependent variables

A dependent variable is what is measured in a test and what is affected during the test. The dependent variable "depends" on the independent variable(s) (Brooks, 2008). Since two of the research questions are if the credit rating transitions affect the investment decisions of companies, the dependent variable is the investment level of each company. The capital investment level in year t is calculated by dividing the capital expenditures (CAPEX) in year t by net property, plant and equipment (PPE) at the beginning of year t (Chava & Roberts, 2008).

To answer the third research question, cash flows (CF) of companies are used as another dependent variable. CF is defined as a revenue or expense that changes a cash

account over a period of time. CF arises from one of three activities – financing, operations or investing (Miller & VanHoose, 2003). For the purpose of this study, CF arising from investing has been taken into account. The choice of CF as dependent variable is motivated by the fact that firms need CF in order to complete their investment activities as a complement to other financing sources such as debt and equity.

### **3.3.2. Explanatory variables**

Explanatory (independent) variables are variables that stand alone and are not affected by other measures. They are used to explain the behavior of the dependent variables (Brooks, 2008). Several variables are used to determine the dependent variable in this study that result in a multiple regression (a regression with more than one independent variable). Control variables and dummy variables are defined in order to make the study more reliable and accurate.

#### **3.3.2.1. Credit rating change variable**

This study will employ two approaches to present the credit rating change. The first approach to the credit ratings for the empirical analysis involves a linear transformation of the ratings from S&P's into numbers, following the models of Kräussl (2006) and Afonso et. al. (2011), in order to capture the effect of the credit rating change. Afonso et. al. (2011) use a scale from 17 (AAA) to 1 (CCC+ to D), while Kräussl (2006) use a scale from 20 (AAA) to 0 (D). Therefore, a lower numerical score corresponds to a lower credit rating or higher credit risk (Afonso et. al., 2011). Since most of the companies in the current sample are below investment grade, Kräussl's scale would depict in more detail the credit ratings and would make the results more reliable. That is why, the empirical analysis will be based on the second mentioned scale, which is shown in Table 3. The numerical scores from 0 to 10 correspond to the speculative grade, while the scores from 11 to 20 correspond to the investment grade.

**Table 3. Linear transformation of credit ratings into numerical scores**

S&P	Moody's	Scale
AAA	Aaa	20
AA+	Aa1	19
AA	Aa2	18
AA-	Aa3	17
A+	A1	16
A	A2	15
A-	A3	14
BBB+	Baa1	13
BBB	Baa2	12
BBB-	Baa3	11
BB+	Ba1	10
BB	Ba2	9
BB-	Ba3	8
B+	B1	7
B	B2	6
B-	B3	5
CCC+	Caa1	4
CCC	Caa2	3
CCC-	Caa3	2
CC	Ca	1
D	C	0

*Source: Kräussl (2006), p. 28*

The second approach to credit rating change is to include a credit rating dummy. This process will be explained in detail under Chapter 3.3.2.3. a).

### **3.3.2.2. Control variables**

Control variables are constant and test the relative impact of independent variables (Brooks, 2008). By including several control variables it is possible to control for firm-specific factors. Kisgen (2006) defines in his study that the dominant determinants of credit ratings are firm size, profitability and leverage. Consequently, this model is followed and these three determinants as control variables are used in this study, adding a fourth one, that is, cash flow as a determinant of investment level. The variables are determined as follows:

- *Leverage* is defined by the ratio Debt/Total capitalization. A higher leverage level is expected to relate to more conservative investment decisions despite the rating changes since companies and management would employ more conservative financing policies in order to avoid increased probability of financial distress and bankruptcy in the future.
- *Profitability* (or return on assets – RoA) is defined as firm's earnings before interest, taxes, depreciation and amortization (EBITDA) divided by total assets at the beginning of the year. Companies in the emerging markets face a lot of challenges in terms of financing investment activities and paying down debt. That is why, profitability is an important control variable since it indicates how effective a company is in using its assets to generate earnings before debt obligations must be paid down.
- *Firm size* is defined by the natural logarithm of total assets. When taken, the logarithm value of total assets makes the variable comparable to the other variables, which are ratios. According to Gul et. al. (2009), the firm size could be a proxy for agency problems and therefore the sign should be mixed. That is, when size is a proxy for capital raising ability, the sign should be positive; when size is a proxy of maturity, the sign should be negative.
- *Cash flow* (CF) variable is collected from Datastream, the category: net *cash flow – investing*. This item reports the aggregate change in the company's cash position that results from any gains (losses) from investment and changes that result from spending on investment in capital assets such as property, plant and equipment (PPE). The natural logarithm of CF is taken into account in the study as a control variable and a determinant of the investment level of a company (Gul et. al., 2009).

A control for the differences between the different countries in the sample is also conducted. The control variables are gross domestic product (GDP), inflation and interest rates for each country in the study period. The rationale for choosing these factors is as follows:

- *GDP* is one of the main indicators of the health of a country's economy. It represents the total value of all goods and services produced in a country over a specific time period. The equation  $GDP = C + I + G + NX$  from macroeconomics (C – consumer spending, I – sum of all businesses spending on capital, G – the sum of government spending, NX – net export, or total exports minus total imports) shows that investment level of companies is quite important for the GDP. If there is low investment level, there will be lower GDP and the other way around (Miller & VanHoose, 2003).
- *Inflation* is an indicator of how well a country manages its monetary policy. High inflation rates may indicate inconsiderate policies, such as excessive borrowing and thus a higher probability of default (Weigel & Gemmill, 2006). Inflation is defined as the rate at which the general level of prices for goods and services is rising, and thus, the purchasing power is falling, which results in paying more across time to acquire the same goods and services. This is a situation where the demand for goods and services exceeds their supply in the economy. Inflation makes it harder for businesses to plan for the future. Inflation causes uncertainty about future prices, interest and exchange rates and thus increases the risk among potential trade partners (Miller & VanHoose, 2003).
- *Interest rates* – higher interest rates increase the burdens of a debt service, decreasing the ability to pay and thus increasing the possibility of default (Weigel & Gemmill, 2006). Interest rates in the emerging markets are high (compared to those in the developed world, which are very low, near-zero in nominal terms and negative in real terms (Dimson et. al., 2012)) due to the higher credit risk and uncertainty in servicing debt obligations (e.g. the average interest rate in the sample of this study is 7.06%).

### 3.3.2.3. Dummy variables

Dummy variables take the value of either one or zero, indicating the presence or the absence of a particular quality (Gujarati & Porter, 2010). The dummy variables are used as explanatory variables and their coefficients can be interpreted as the average

differences in the values of the dependent variable (Brooks, 2008). The definition of four dummy variables is explained in the following sections.

#### **a) Credit rating dummy**

The approach to the credit rating dummy is to separate between upgrades and downgrades in order to investigate which credit rating action influences to a greater extent the investment level of companies. The upgrade dummy assigns zero to the years with downgrade and without any change in the credit rating and one to the years with an upgrade. The downgrade dummy assigns the value of one to the years with downgrade in the credit rating and the value of zero when there is no change or an upgrade.

#### **b) Industry dummy**

The main industries represented in the sample are electric, energy and telecom services. The industry dummy is defined as one for companies in the electric and the energy sector and zero for companies in the telecom services and any other industry with minority representation (e.g. media and entertainment).

#### **c) Country dummy**

There are 32 countries in the final sample. In order to control for potential differences in regulations and accounting standards, a country dummy variable is employed. An alignment of the countries is done by continents. Since companies from Asia dominate the sample, the dummy variable is equal to one for companies from this continent and zero for all of the companies outside Asia.

#### **d) Cross-section fixed and period fixed dummy variables**

Since the data varies between the different companies (cross-section) and within the period from 2000 to 2012, a fixed effect model is conducted to control for residual values that may otherwise distort the results. The use of cross-section and period fixed dummy variables is defined by running Fixed/ Random effects testing/ Redundant fixed effects – likelihood ratio in EViews. If the cross-section/period F and Chi-square are significant, these dummy variables are included in the regression and if they are not significant, they are excluded from the regression and industry and country dummy variables are included instead.

### 3.4. Econometric techniques

Several multiple regressions will be run in order to empirically examine the main research questions of this study. A multiple regression analyzes the relationship between one variable (the dependent variable) and a set of other variables (the independent variables or explanatory variables). The objective is to explain the behavior of the dependent variable in relation to the behavior of the independent variables (Gujarati & Porter, 2010). The data in the sample is both cross-sectional and time-series, where the time-series data refers to the time period in the sample, that is, between 2000 and 2012, while the cross-section refers to the width of the data, which in the case is the 229 firms included. That is why, panel data will be employed to combine both the time-series and cross-section data types. The panel data analysis is based on the data in the sample over the whole analyzed period of the investigated years.

The method of Ordinary Least Squares (OLS), as the most frequently used method in regression analysis (Gujarati & Porter, 2010), is used to estimate the regression models and investigate the linear relationship between the dependent and the explanatory variables. OLS estimators are Best Linear Unbiased Estimators (BLUE), which is why this method has minimum variance (Gujarati & Porter, 2010). The OLS method will be run through the econometrics software program EViews 7.

### 3.5. Regressions

Following the methodology of Bannier et. al. (2012), the base empirical model is as follows:

$$Investment_{it} = \alpha_0 + \beta_0 Ratingchange_{it-1} + \beta_1 X_{it-1} + \eta_i + \mu_t + \varepsilon_{it}$$

Here,  $Investment_{it}$  is the investment level of the company measured by the ratio CAPEX/PPE,  $Ratingchange_{it-1}$  is a vector of variables measured in two different ways (described in Chapters 3.3.2.1 and 3.3.2.3.a),  $X_{it-1}$  is a vector of control variables,  $\eta_i$  is a firm fixed effect,  $\mu_t$  is a period fixed effect and  $\varepsilon_{it}$  is a random error term. The parameter of interest is  $\beta_0$ . It measures the effect of credit rating downgrades or upgrades on the firm's investment level. Since firm-specific fixed effects are included, the identification of  $\beta_0$  is based on those firms that experience a rating

change (Banner et. al., 2012). The above mentioned variables were defined and explained in more detail in the Chapter 3.3.

Based on the above mentioned empirical model, the following regressions are defined:

$$1. \text{Investment}_{it} = \alpha_0 + \beta_0 \text{Rating change (numeric)} + \beta_1 \text{Leverage} + \beta_2 \text{RoA} + \beta_3 \text{Firm size} + \beta_4 \text{CF} + \beta_5 \text{Inflation} + \beta_6 \text{GDP} + \beta_7 \text{Interest rate} + \eta_i + \mu_t + \varepsilon_{it}$$

This basic equation aims at understanding which variable influences the most the investment level of companies in the emerging markets. The rating change here is presented by the difference in the numeric credit rating of each company from one year to the next.

$$2. \text{Investment}_{it} = \alpha_0 + \beta_0 \text{Upgrade dummy} + \gamma_0 \text{Downgrade dummy} + \beta_1 \text{Leverage} + \beta_2 \text{RoA} + \beta_3 \text{Firm size} + \beta_4 \text{CF} + \beta_5 \text{Inflation} + \beta_6 \text{GDP} + \beta_7 \text{Interest rate} + \eta_i + \mu_t + \varepsilon_{it}$$

This equation is a variation of the previous one but here the rating change is represented by credit rating dummies for upgrades and downgrades, aiming at extracting more accurate results from the actual change of the credit ratings and comparing them to previous studies that follow the same logic for defining the credit rating change.

$$3. \text{Investment}_{it} = \alpha_0 + \beta_0 \text{Lag(Rating change (numeric))} + \beta_1 \text{Leverage} + \beta_2 \text{RoA} + \beta_3 \text{Firmsize} + \beta_4 \text{CF} + \beta_5 \text{Inflation} + \beta_6 \text{GDP} + \beta_7 \text{Interest rate} + \eta_i + \mu_t + \varepsilon_{it}$$

The equation uses the numeric change in the credit ratings which is lagged in order to see what the influence of the change is one year after the change itself since it is likely that the change will not have simultaneous effect on the investment level of a company.

$$4. \text{Investment}_{it} = \alpha_0 + \beta_0 \text{Lag(Upgrade dummy)} + \gamma_0 \text{Lag(Downgrade dummy)} + \beta_1 \text{Leverage} + \beta_2 \text{RoA} + \beta_3 \text{Firmsize} + \beta_4 \text{CF} + \beta_5 \text{Inflation} + \beta_6 \text{GDP} + \beta_7 \text{Interet rate} + \eta_i + \mu_t + \varepsilon_{it}$$

The equation tests the same effects as Equation three, but uses the rating change dummies instead of the numeric change of the credit rating.

$$5. \Delta \text{Investment}_{it} = \alpha_0 + \beta_0 \text{Rating change (numeric)} + \beta_1 \Delta \text{Leverage} + \beta_2 \Delta \text{RoA} + \beta_3 \Delta \text{Firm size} + \beta_4 \Delta \text{CF} + \beta_5 \Delta \text{Inflation} + \beta_6 \Delta \text{GDP} + \beta_7 \Delta \text{Interest rate} + \beta_8 \text{Industry dummy} + \beta_9 \text{Country dummy} + \beta_{10} \text{Relative year} + \varepsilon_{it}$$

This equation tests the effect of the rating change (numeric credit rating) on the change of the investment level of companies. The change of investment rate is also controlled by the change in the independent variables. Here are added variables for industry, country and year to control for differences between the various companies in the sample.

$$6. \Delta Investment_{it} = \alpha_0 + \beta_0 Upgrade\ dummy + \gamma_0 Downgrade\ dummy + \beta_1 \Delta Leverage + \beta_2 \Delta RoA + \beta_3 \Delta Firm\ size + \beta_4 \Delta CF + \beta_5 \Delta Inflation + \beta_6 \Delta GDP + \beta_7 \Delta Interest\ rate + \beta_8 Industry\ dummy + \beta_9 Country\ dummy + \beta_{10} Relative\ year + \varepsilon_{it}$$

The equation is a variation of Equation five, but this one uses the credit rating dummies in order to compare the different results from these two equations, checking which rating variable incurs more significant results.

$$7. CF_{it} = \alpha_0 + \beta_0 Rating\ change\ (numeric) + \beta_1 Leverage + \beta_2 RoA + \beta_3 Firm\ size + \beta_4 CF + \beta_5 Inflation + \beta_6 GDP + \beta_7 Interest\ rate + \eta_i + \mu_t + \varepsilon_{it}$$

The equation investigates the relationship between credit rating change (numeric) and the CF available for investment, controlling for determinants of the credit rating and country-specific variables.

$$8. CF_{it} = \alpha_0 + \beta_0 Upgrade\ dummy + \gamma_0 Downgrade\ dummy + \beta_1 Leverage + \beta_2 RoA + \beta_3 Firm\ size + \beta_4 CF + \beta_5 Inflation + \beta_6 GDP + \beta_7 Interest\ rate + \eta_i + \mu_t + \varepsilon_{it}$$

This is a variation of Equation seven using the rating change dummies in order to show the differences of the different approaches towards the definitions of credit rating change.

### 3.5.1. Regression assumptions

The regression models in this study must meet some assumptions to be considered reliable. The assumptions of the classical linear regression model must be fulfilled to show that the OLS estimation fulfills its desirable properties (BLUE) (Brooks, 2008).

The assumptions of OLS are:

- There is no correlation between the error term and any independent variable – needed to obtain unbiased estimates of regression coefficients. This assumption will be controlled for with correlation matrix in EViews (Gujarati & Porter, 2010). The correlation matrix can be seen in Appendix 3.

- Homoscedasticity – that is constant variance of the error term associated with cross-sectional data; will be controlled by using White heteroscedasticity – corrected standard errors for all regressions. This is done to obtain efficiency in the OLS estimators, that is, they have a minimum variance and thus generate optimal results. If this assumption is not met, the standard error could be wrong and may cause incorrect statistical conclusion (Brooks, 2008).
- There is no exact co-linearity between the independent variables – that is, no linear relationship between the independent variables in the regression. This will be controlled by a correlation matrix. Correlation values greater than 0.8 indicate co-linearity and if there is such a case the regression model should be reconsidered (Gujarati & Porter, 2010). (Also see Appendix 3)

### **3.6. Reliability and validity**

Reliability is making sure that temporary or random differences in the sample do not influence the results. It is also about producing data in a consistent way over similar samples and anyone following the outlined steps should be able to replicate the same results or findings (Bryman & Bell, 2007).

For gathering the credit ratings of the firms, S&P's Global Credit Portal was used. Since S&P's is one of the three biggest CRAs and most companies are rated by either S&P's or Moody's, the credit portal is a reliable and accurate source of current and historical credit ratings. For collecting the firm-specific financial data, the Datastream database was used. Since Datastream is widely used by academic researchers in the finance field as well as by finance practitioners, it is considered a reliable database. The data from Datastream is derived from the annual reports of each company, which means that the data has been audited and approved. Therefore, the data collected is of high reliability. Nevertheless, the reliability of this study has been additionally strengthened. First, the sample period is between the years 2000 and 2012 aiming at the availability of more data and minimizing the risk of irregular or temporary errors in the data. Second, the selection procedure of the sample was clearly stated and outlined and can be easily replicated in future research.

Validity is considered in terms of whether the used method measures what it is supposed to measure (Bryman & Bell, 2007). Since this study follows the base model

from Bannier et. al. (2012), it can be concluded that the following study measures what it is supposed to.

There is a distinction between internal and external validity (Lundahl & Skärvad, 1999). Internal validity refers to whether there is a causal relationship between the measured variables. The internal validity of this study has been strengthened by concentrating on non-financial firms in the sample, since the investment decisions of financial firms differ from non-financial firms. Besides, firm-specific factors have been controlled for by including control variables. Moreover, the effects of business or credit cycles have been mitigated by using long-term credit ratings.

External validity refers to whether the results of a test are generalized. The countries in the sample are representative of the emerging markets. It is still difficult to generalize results because of differences in laws and regulations and access to debt and equity capital. These differences must be taken into account before generalizing the results to other geographical regions. That is why, in order to minimize such external effects, year and country dummy variables have been included to take into account differences in the time period and differences between the countries in the sample.

## 4. Results

### 4.1. Descriptive results

Table 4 below presents a summary of the statistics of the sample for the major variables included in the study. The median numeric credit rating in the sample is nine, which is equivalent to a rating of BB and this is an indicator that most of the companies in the sample are below investment grade. The minimum and maximum values of the numeric credit ratings also show that there is at least one company that is rated D (0) or AAA (20). The statistics show that the variables vary a lot in terms of minimum and maximum values, which supports the use of cross-section and period fixed dummy variables.

**Table 4. Descriptive statistics of the sample**

	Median	Std.dev.	Min	Max
Numeric rating	9	3.6832	0	20
Capex/PPE	0.1511	0.1730	0	2.1746
Profitability	0.1421	0.2054	-2.0412	4.8303
Leverage	0.4205	0.6444	7.9020	10.4572
Firm size	7.6366	1.2058	4.5574	11.0209
Inflation	4.69	17.2928	-4.86	130.25
GDP	1229133	5548945	-273.9	51116533
Interest rates	2178.9	6.2627	0.46	101.625

### 4.2. Regression results

After running the regression from Equation 1, that is:  $Investment_{it} = \alpha_0 + \beta_0 Rating\ change\ (numeric) + \beta_1 Leverage + \beta_2 RoA + \beta_3 Firm\ size + \beta_4 CF + \beta_5 Inflation + \beta_6 GDP + \beta_7 Interest\ rate + \eta_i + \mu_t + \varepsilon_{it}$ , it turns out that the most significant determinants of the investment level in a company are its CF and its size. The correlation between the CF and the investment level is positive, resulting in the conclusion that the more CF a firm has, the more it invests. The second most significant variable is the size of the firm, but it is negatively correlated to the investment level, which means that the smaller the firm (less assets), the more investment it has.

Although the p-values of GDP and profitability (0.3466 and 0.3847 respectively) are not significant, they influence the investment level to a greater extent than the rest of the variables (excluding the already described ones), since GDP is an indicator of the profitability of the economy of the specific country and the EBITDA/Total assets ratio is an indicator of the profitability of the companies in question. Their p-values are

close to each other, leading to the assumption that the profitability of both the economy and the company more or less equally influence the investment level of companies. The empirical results are shown in Table 5.

The results in Table 6 from Equation 2:  $Investment_{it} = \alpha_0 + \beta_0 Upgrade\ dummy + \gamma_0 Downgrade\ dummy + \beta_1 Leverage + \beta_2 RoA + \beta_3 Firm\ size + \beta_4 CF + \beta_5 Inflation + \beta_6 GDP + \beta_7 Interest\ rate + \eta_i + \mu_t + \varepsilon_{it}$  show a significant result in that a firm with greater cash flow invests more compared to the ones with less cash flow. The second significant variable is the firm size. This outcome has a high explanatory grade in the probability but is negatively correlated. These two results are consistent with the results from Equation 1.

However, the different approach to the credit rating change presentation incurs significance in more independent variables. The test presents results for that the inflation in the specific country affects the investment rate of a company. The relationship is positive which means that higher inflation incurs higher investment. Finally, the leverage level is also significant (p-value of 0.1230) but to a smaller extent. The leverage is negatively correlated to the investment level, that is, the higher the leverage, the smaller the investment level. This result can be seen from the outcomes in Equation 5 and Equation 6 as well. Although the effect of the credit rating change is not significant, it becomes clear that the rating upgrade positively influences to a greater extent the investment level compared to the rating downgrade.

**Table 5. Equation 1 – results**

Observations: 713			
Variable	Coefficient	Std. Error	Prob.
C	0.119751	0.290452	0.6803
Rating change	-0.000396	0.004424	0.9288
Leverage	0.004248	0.010101	0.6743
Profitability	0.037204	0.042759	0.3847
Size	-0.075564	0.039021	0.0534**
CF	0.100717	0.012325	0.0000***
Inflation	0.000878	0.001320	0.5062
GDP	-8.89E-09	9.44E-09	0.3466
IR	0.000150	0.001068	0.8882
R-squared	0.791796	F-statistic	7.670426
Adj. R-squared	0.688569	Prob (F-statistic)	0.000000

\*p=10% \*\*p= 5% \*\*\*p= 1%

**Table 6. Equation 2 – results**

Observations: 878			
Variable	Coefficient	Std. Error	Prob.
C	0.046698	0.304429	0.8781
Upgrade	0.016643	0.017316	0.3369
Downgrade	-0.000797	0.018740	0.9661
Leverage	-0.015010	0.009720	0.1230
Profitability	-0.029338	0.025273	0.2461
Size	-0.078683	0.040027	0.0498**
CF	0.107983	0.012730	0.0000***
Inflation	0.002558	0.001409	0.0698**
GDP	7.09E-09	1.02E-08	0.4854
IR	-0.000437	0.001256	0.7282
R-squared	0.661110	F-statistic	5.207602
Adj. R-squared	0.534159	Prob (F-statistic)	0.000000

\*p=10% \*\*p= 5% \*\*\*p= 1%

Equation 3 aimed at the lagged effects of the credit rating change, that is,  $Investment_{it} = \alpha_0 + \beta_0 \text{Lag}(\text{Rating change (numeric)}) + \beta_1 \text{Leverage} + \beta_2 \text{RoA} + \beta_3 \text{Firmsize} + \beta_4 \text{CF} + \beta_5 \text{Inflation} + \beta_6 \text{GDP} + \beta_7 \text{Interest rate} + \eta_i + \mu_t + \varepsilon_{it}$ . The CF remains the most significant determinant of the investment level of companies with still a positive correlation but a slight difference in the slope. Compared with the results from Equation 1, the lagged rating change makes the size of the firm insignificant which may lead to the conclusion that no matter what the size of the firm is, small and large companies respond in the same way to credit rating change in their investment decisions. The results are depicted in Table 7.

The result of Equation 4,  $Investment_{it} = \alpha_0 + \beta_0 \text{Lag}(\text{Upgrade dummy}) + \gamma_0 \text{Lag}(\text{Downgrade dummy}) + \beta_1 \text{Leverage} + \beta_2 \text{RoA} + \beta_3 \text{Firmsize} + \beta_4 \text{CF} + \beta_5 \text{Inflation} + \beta_6 \text{GDP} + \beta_7 \text{Interest rate} + \eta_i + \mu_t + \varepsilon_{it}$  is shown in Table 8. The lagged rating change presented as dummy variables exerts more effects than the lagged rating change presented in numeric credit ratings (probably due to the larger number of observations taken into consideration). The CF is still a significant determinant of the investment level of a company. What is different in the results from this equation is that the size of the firm is also significant (still negatively correlated). Unlike the results from Equation 2, here the lag in both upgrades and downgrades is negatively

correlated to the investment level, and downgrades seem to have a more significant effect than upgrades.

**Table 7. Equation 3 – results**

Observations: 531			
Variable	Coefficient	Std. Error	Prob.
C	-0.290953	0.386749	0.4525
Rating change (Lag)	-0.003430	0.004632	0.4596
Leverage	0.006450	0.011802	0.5851
Profitability	0.036816	0.048795	0.4511
Size	-0.022824	0.051918	0.6605
CF	0.097254	0.016009	0.0000***
Inflation	0.000617	0.001792	0.7309
GDP	-3.10E-09	1.23E-08	0.8022
IR	-0.000248	0.001072	0.8172
R-squared	0.857070	F-statistic	7.821408
Adj. R-squared	0.747490	Prob (F-statistic)	0.000000

\*p=10%, \*\*p= 5%, \*\*\*p= 1%

**Table 8. Equation 4 – results**

Observations: 713			
Variable	Coefficient	Std. Error	Prob.
C	0.121682	0.290247	0.6752
Upgrade (Lag)	-0.013215	0.015748	0.4018
Downgrade (Lag)	-0.021539	0.016933	0.2040
Leverage	0.004357	0.010092	0.6661
Profitability	0.033773	0.042743	0.4298
Size	-0.074206	0.039000	0.0577**
CF	0.099964	0.012358	0.0000***
Inflation	0.000906	0.001327	0.4952
GDP	-8.62E-09	9.45E-09	0.3623
IR	0.000113	0.001063	0.9152
R-squared	0.792500	F-statistic	7.654672
Adj. R-squared	0.688969	Prob (F-statistic)	0.000000

\*p=10%, \*\*p= 5%, \*\*\*p= 1%

The results from Equation 5,  $\Delta Investment_{it} = \alpha_0 + \beta_0 \Delta Rating\ change\ (numeric) + \beta_1 \Delta Leverage + \beta_2 \Delta RoA + \beta_3 \Delta Firm\ size + \beta_4 \Delta CF + \beta_5 \Delta Inflation + \beta_6 \Delta GDP + \beta_7 \Delta Interest\ rate + \beta_8\ Industry\ dummy + \beta_9\ Country\ dummy + \beta_{10}\ Relative\ year + \epsilon_{it}$ , show strong significance of the change of CF level, which is positively correlated

with the change in investment level. This means that the greater the change in CF, the greater the change in investment level will be, that is, less CF leads to less investment. The change in inflation is also important for the change in the investment level, which is also positively related. The results show that the change in leverage of the firm is important determinant of the change in the level of investment after a credit rating transition. The correlation is negative, which means that the greater the change in leverage is, the less the change in the investment level will be. This seems logical since when a company takes on more debt, it would restrict its investment activities in order to be able to service its debt obligations and avoid the probability of financial distress and bankruptcy.

Altogether there are few results with clear significance at the highest level, which can be observed in the R-squared test where there is just 13 percent of the variability that is explained by the dependent variables. The test is done without any correction with cross-section fixed and period fixed dummies since the result is robust without them. The results can be seen in Table 9.

The test in Table 10 is done with the change in investment level as dependent variable and the rating transition is presented as dummy variables:  $\Delta Investment_{it} = \alpha_0 + \beta_0 Upgrade\ dummy + \gamma_0 Downgrade\ dummy + \beta_1 \Delta Leverage + \beta_2 \Delta RoA + \beta_3 \Delta Firm\ size + \beta_4 \Delta CF + \beta_5 \Delta Inflation + \beta_6 \Delta GDP + \beta_7 \Delta Interest\ rate + \beta_8 Industry\ dummy + \beta_9 Country\ dummy + \beta_{10} Relative\ year + \varepsilon_{it}$ . The test is also done without any correction with cross-section fixed and period fixed dummies since the result is robust without them. This test incurs similar results as those from Equation 5, showing that the changes in CF level, inflation and leverage are important for the change in investment level of a company. This leads to that in terms of the change in investment level, there is no difference in the results in the way the credit rating change is presented and that of all the independent variables, the CF and leverage levels have exactly the same explanatory power to the change in the investment level. Upgrades and downgrades have positive relation to the change in the investment level and downgrades incur more significant effects than upgrades.

**Table 9. Equation 5 – results**

Observations: 626			
Variable	Coefficient	Std. Error	Prob.
C	-0.020667	0.019575	0.2915
Rating change	0.001920	0.005831	0.7420
$\Delta$ Leverage	-0.024672	0.010119	0.0150***
$\Delta$ Profitability	-0.012840	0.025545	0.6154
$\Delta$ Size	-0.023030	0.048377	0.6342
$\Delta$ CF	0.103645	0.012116	0.0000***
$\Delta$ Inflation	0.004370	0.001701	0.0104***
$\Delta$ GDP	9.44E-09	1.57E-08	0.5476
$\Delta$ IR	-0.002578	0.002010	0.2001
Industry	-2.14E-05	0.010495	0.9984
Country	0.004058	0.010963	0.7114
Relative year	0.002014	0.004698	0.6683
R-squared	0.130478	F-statistic	8.375942
Adj. R-squared	0.114901	Prob (F-statistic)	0.000000

\*p=10%, \*\*p= 5%, \*\*\*p= 1%

**Table 10. Equation 6 – results**

Observations: 626			
Variable	Coefficient	Std. Error	Prob.
C	-0.016242	0.020239	0.4226
Upgrade	0.012991	0.018722	0.4880
Downgrade	0.018095	0.019278	0.3483
$\Delta$ Leverage	-0.024651	0.010106	0.0150***
$\Delta$ Profitability	-0.013687	0.025568	0.5926
$\Delta$ Size	-0.024131	0.048390	0.6182
$\Delta$ CF	0.103743	0.012118	0.0000***
$\Delta$ Inflation	0.004517	0.001711	0.0085***
$\Delta$ GDP	9.26E-09	1.57E-08	0.5552
$\Delta$ IR	-0.002768	0.002021	0.1712
Industry	-0.000518	0.010507	0.9607
Country	0.004259	0.010963	0.6978
Relative year	-0.002405	0.007099	0.7349
R-squared	0.131584	F-statistic	7.740228
Adj. R-squared	0.114584	Prob (F-statistic)	0.000000

\*p=10%, \*\*p= 5%, \*\*\*p= 1%

The results from Equation 7,  $CF_{it} = \alpha_0 + \beta_0 \text{Rating change (numeric)} + \beta_1 \text{Leverage} + \beta_2 \text{RoA} + \beta_3 \text{Firm size} + \beta_4 \text{CF} + \beta_5 \text{Inflation} + \beta_6 \text{GDP} + \beta_7 \text{Interest rate} + \eta_i + \mu_t + \varepsilon_{it}$

indicate a significant positive relationship between the size of the firm and its CF available for investing. This result is in line with the results of Gul et. al. (2009), who concluded that firms with higher CF and lower growth opportunities (that is large firms) adjust their investment less. The overall results are depicted in Table 11.

The test in Table 12 is based upon Equation 8:  $CF_{it} = \alpha_0 + \beta_0 Upgrade\ dummy + \gamma_0 Downgrade\ dummy + \beta_1 Leverage + \beta_2 RoA + \beta_3 Firm\ size + \beta_4 CF + \beta_5 Inflation + \beta_6 GDP + \beta_7 Interest\ rate + \eta_i + \mu_t + \varepsilon_{it}$ . Credit rating downgrade is significant (about 90 percent significance) independent variable with a negative correlation to CF level, that is, the more a firm is downgraded, the less CF available for investing the firm will have. The size of a firm is significant, similar to the result from Equation 7, which once again supports the fact that this result is in line with the results from Gul et. al. (2009). Secondly, there is a high level of significance in that firms with higher profitability (EBITDA/Total assets) have a better cash flow available for investment. The interest rate of the specific countries is also significant, with a negative correlation to the level of CF in the firm, which means that the higher the interest rate, the smaller amount of CF for investing a firm will have.

**Table 11. Equation 7 – results**

Observations: 713			
Variable	Coefficient	Std. Error	Prob.
C	-2.441885	1.073190	0.0233
Rating change	-0.016697	0.016416	0.3096
Leverage	0.037188	0.037487	0.3217
Profitability	-0.178947	0.158635	0.2599
Size	1.151524	0.135030	0.0000***
Inflation	0.004788	0.004898	0.3288
GDP	2.78E-08	3.50E-08	0.4272
IR	-0.004963	0.003961	0.2109
R-squared	0.967697	F-statistic	60.80555
Adj. R-squared	0.951782	Prob (F-statistic)	0.000000

\* $p=10\%$ , \*\* $p=5\%$ , \*\*\* $p=1\%$

**Table 12. Equation 8 – results**

<b>Observations: 713</b>			
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>Prob.</b>
<b>C</b>	-0.993138	0.945239	0.2938
<b>Upgrade</b>	0.042789	0.053787	0.4266
<b>Downgrade</b>	-0.093971	0.058118	0.1064*
<b>Leverage</b>	0.003934	0.030207	0.8964
<b>Profitability</b>	0.204611	0.078121	0.0090***
<b>Size</b>	0.980453	0.118187	0.0000***
<b>Inflation</b>	0.006051	0.004371	0.1667
<b>GDP</b>	-1.14E-08	3.15E-08	0.7177
<b>IR</b>	-0.006789	0.003895	0.0818*
<b>R-squared</b>	0.955231	<b>F-statistic</b>	57.28632
<b>Adj. R-squared</b>	0.938556	<b>Prob (F-statistic)</b>	0.000000

\* $p=10\%$ , \*\* $p=5\%$ , \*\*\* $p=1\%$

Overall, the F-statistic in all results from the equations is significant, which indicates that there is a link between investment level (or CF) and one or more of the explanatory variables. The R-square explains between 66% and 85% of the test in equations 1 to 4 and 95 – 96% in equations 7 and 8. The R-square in equations 5 and 6 is 13% and it can be concluded that the change in the investment level is not influenced by the change in credit ratings to such an extent as the investment level itself is affected. As described in Chapter 3.3.2.3. d), cross-section fixed and period fixed dummy variables have been used to make the results robust in all the regressions except those from Equation 5 and 6 (since the results were robust without the need of using these dummy variables).

## 5. Analysis

The conducted regressions show that *downgrades* have significant influence *only* on CF levels and the correlation is negative. This means that the lower the credit rating becomes, the less CF is available for investing in a firm and this influences the investment decisions of the company. Having in mind the consistent results that CF level is the major determinant of the investment level and that there is a significant negative correlation between downgrades and CF, it could be concluded that companies in the emerging markets (as outlined in the theoretical framework) indeed rely more on internal financing and CRAs are not as important market participants as they are in the developed markets. This could imply that CRAs would not face the same scrutiny in the emerging markets as they do in the developed ones, which may also imply that CRAs may not be so concerned about their reputation and therefore, they may have less incentive to give higher ratings. In this way, the credit ratings may be more accurate and there would be fewer agency issues.

Unlike previous research on developed markets, this research on emerging markets did not lead to significant overall correlation between credit rating changes and investment decisions. As a whole, consistent with previous research, downgrades seem to have stronger effect on investment level and CF, while upgrades do not incur such strong results. However, determinants of credit ratings such as leverage, firm size and profitability, do show some significant effects on the dependent variables. This still does not imply that credit rating changes influence the investment level of companies.

Overall, it can be seen from the above shown results that credit rating downgrades are negatively correlated to investment level and CF and positively correlated to the changes of the investment levels, while upgrades are negatively correlated to investment level and positively correlated to the level of CF and the changes in the investment levels. This means that firms have less investment after a change in their credit rating irrespective of whether it is a downgrade or upgrade. Therefore, it can be concluded that, firms are cautious with their investment no matter if the rating change is positive or negative, since the signal to the market can be mixed. As for the correlation between the changes in investment level and credit ratings transitions, the

positive relationship means that there are more changes in investment level with the credit rating changes. This is consistent with Bannier et. al. (2012) who show that managers have an interest in pursuing their target rating level via capital structure choices and also via capital expenditures. It may hence be conceivable that a rating change brings the firm's rating level further away from its target level, so that the firm tries to offset this move by in- or decreasing its investment rate. Even if there are associations between the credit rating changes and capital investments, it does not mean that it is the credit rating changes that drive the investment adjustments. An alternative explanation is that the credit rating upgrades/downgrades usually are followed by better performance, which may lead to higher investments in the future (Gul et. al., 2009).

To investigate the first research question whether credit ratings influence the investment level of companies after rating change, regressions where the investment level is the dependent variable were run. Looking at the results of these regressions, they showed that the level of CF in the firm seems to be the most important determinant (positive correlation). Following the pecking order theory, the result that the higher the CF, the higher the investment level seems logical since the more CF a firm has, the more it will use it to invest and will avoid using external financing such as debt and equity, which may be unavailable for companies in the emerging markets due to greater credit risk and lower credit ratings (speculative grade).

Another determinant that appears to be significant is the size of the firm which is negatively correlated with the investment level of the firm. At first consideration, this result does not seem logical since smaller firms do not have the resources or the access to resources to invest more than bigger firms. But at second consideration, having in mind that the research is conducted on companies in the emerging markets, it can be concluded that the majority of companies in these markets are smaller ones compared to the ones in the developed markets and even smaller companies have the incentive to invest more in order to survive the challenges of the emerging markets.

Other determinants that matter are the leverage of the firm (negative correlation) and the inflation (positive correlation). The negative correlation between leverage and investment level can be interpreted so that the higher the leverage, the smaller the

amount of investment. This result is consistent with previous studies on leverage and investment such as Lang et. al. (1996) and Aivazian et. al. (2005). Emerging markets, as described in the theoretical framework of this study, are the fastest growing markets nowadays, which lead to the conclusion that companies in these markets have high growth opportunities. Despite that fact, previous research finds that firms with large debt commitments invest less irrespective of the nature of their growth opportunities (Lang et. al., 1996). That is why, a negative empirical relation between leverage and investment may arise even in regressions that control for growth opportunities because managers reduce leverage in anticipation of future investment opportunities (Aivazian et. al., 2005). Myers (1977) argued that leverage could have a negative effect on investment because of an agency problem between shareholders and bondholders. If managers work in the interest of shareholders, they may give up some positive net present value projects due to debt overhang. The theory of Jensen (1986) also suggests a negative relationship between leverage and investment, but his arguments are based on agency conflicts between managers and shareholders. He argues that firms with free cash flow but low growth opportunities may invest (that is, overinvest) in projects with negative net present value. However, this strategy is costly to managers, especially if the capital market takes into account the potential opportunism. Therefore, managers have the incentive to pre-commit and increase leverage and pay out cash as interest and principal (Aivazian et. al., 2005). These theories suggest a negative relationship between leverage and investment. Therefore, the results in this study are consistent with the above described results from other studies.

Inflation is positively related to investment level, meaning that the higher the inflation, the higher the investment level. Since inflation discourages savings due to the fact that money is worth more at present than in the future, logically there will be more investments. On the other hand, the result seems illogical since less savings reduce the economic growth because the economy needs a certain level of savings to finance investments which boost economic growth. It should be kept in mind that inflation will not persist unless accompanied by sustained increase in money supply since it is a monetary phenomenon (Miller & VanHoose, 2003). The uncertainty associated with inflation increases the risk related to investment and production activity of firms and markets since firms find it difficult to decide how much to

produce due to the inability to predict the demand for their products. Nevertheless, the positive correlation between inflation and investment level in this study may be explanatory and correct because the companies in the sample are from the emerging markets, where high inflation is something that countries in these markets face at a daily basis and more or less they have adapted to this phenomenon.

To investigate the second research question whether credit ratings affect the changes in investment levels after up-/downgrade, tests where the dependent variable is the change in the investment level were conducted. The major determinant of the investment level change is the change in CF, which is positively correlated to investment. This result is consistent with the results from the whole study. Another important determinant is the leverage level, which is negatively correlated to investment. As mentioned above, these results are consistent with previous research on the impact of leverage on investment and this makes the results from this study more reliable and valid. Additionally, inflation (positively correlated) also turned out to be major determinant of the change in investment level. These results add more value to the similar results from the first research question and make the research consistent.

The regressions investigating the level of CF as dependent variable answer the third research question, that is, whether credit rating changes affect the cash flow levels of companies. Apart from the significant influence of downgrades on CF level, the results lead to the conclusion that the size of the firm (positively correlated) is another important determinant of CF, while profitability (positively correlated) and interest rates (negatively correlated) are also important to a certain extent.

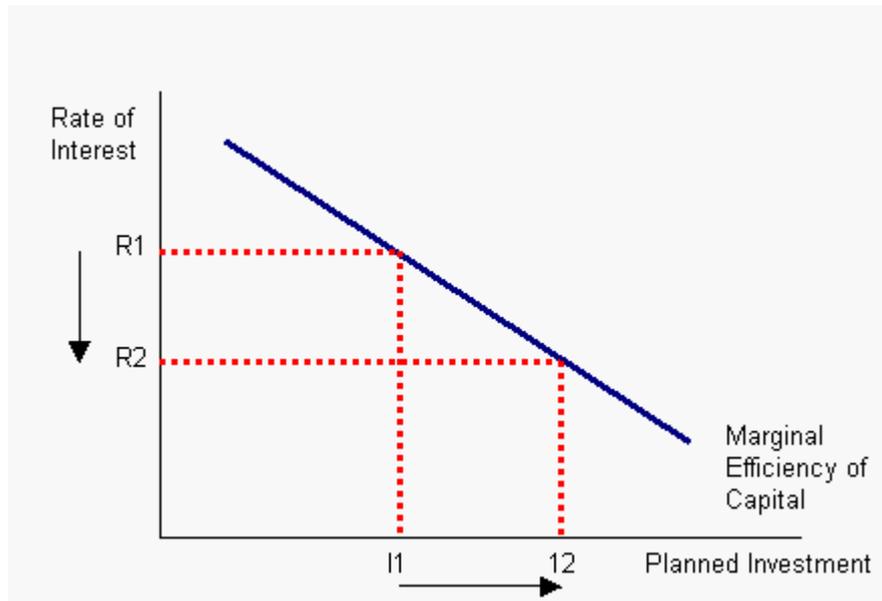
The size of the firm once again turns out to be important determinant in this study, but this time the size has a positive relation to the level of CF in a firm, that is, the bigger a firm is, the higher the level of CF will be. This result is consistent with Jensen's free cash flow hypothesis and the agency cost associated with it. The result also coincides with the results of Bannier et. al. (2012) who find out that larger firms are able to deal better with exogenous shocks, as they may be equipped with higher level of CF. Higher level of CF is, on the other hand, associated with larger agency problems. Therefore, the positive relation between the level of CF of a firm and its size

(compared to the negative relation between the size and the investment level of a firm), similar to the results of Gul et. al. (2009), may be due to the fact that the associations between the credit rating transitions and capital investments are less pronounced in firms with larger agency problems. Moreover, according to Gul et. al. (2009) the positive sign of the variable for size is a proxy for the capital raising ability of the firm.

According to the results of the third research question, the profitability of a firm is also important determinant of the level of CF. Profitability is positively related to the level of CF in a firm, which means that the higher the return on assets, the higher level of CF of a firm will be. High return on assets results from higher profits that lead to higher CF in turn. This result is a straightforward consequence of increased revenues that lead to increased level of CF that is available for investing in a firm. The result is also consistent with previous result from Gul et. al. (2009), who argue that credit rating transitions may change firms' bargaining powers in the financial markets.

The negative correlation between interest rates and the level of cash flow implies that the lower the interest rates are, the higher the level of CF in a firm will be and the other way around. When interest rates are high, obtaining debt becomes expensive and thus companies have less CF to invest since the high interest rates make it difficult for firms to cover their expenditures and their products become less competitive in the domestic and international markets. Consequently, if the interest rates are low, more investment takes place in the economy as a whole which is reflected by more production and thus more CF for investing for firms. The negative correlation that results in this study is consistent with the Keynesian theory of investment (assuming that the planned investment of a company is the CF available for investment). The theory focuses on the importance of interest rates in investment decisions and implies that a fall in the rates should decrease the cost of investment and, as a result, planned investment projects on the margin may become worthwhile. The negative relationship between investment and the interest rate is depicted in Figure 6. The correlation between the two variables is represented by the marginal efficiency capital investment (MEC) curve. A decrease in the interest rate from R1 to R2 incurs an expansion of the planned investment (Davidson, 2011).

**Figure 6. The Keynesian theory of investment**



*Source: Davidson (2011), p. 86*

As a whole, the coefficient estimates on the control variables CF and size are largely consistent with Chava & Roberts' (2009) research examining capital expenditures, at least in terms of signs. Moreover, the significance of explanatory variables such as leverage, profitability, inflation, interest rates follow the results in Kisgen's (2006) research that managers are concerned with ratings-triggered costs (benefits) to the firms and the effects of regulations on bond investors.

### **5.1. Limitations**

The data in this study covers a period from 2000 to 2012. Therefore, the results of the study are restricted to this time frame and it is possible that they are driven by events such as the crisis from 2007-2008. It is also possible that the sample may not be homogenous due to differences in the rules and regulations between the countries that may affect the investment decisions of companies in different ways. Although country and period dummy variables have been included in this study, it should be noted that these variables might not have accounted for all differences and their effects on the investment decisions of companies.

## 6. Conclusion

This paper examined whether credit rating changes influence the investment decisions of companies in the emerging markets. The study was inspired by limited previous research on the topic but it was also influenced by similar studies and expanded the empirical scope in the afore mentioned.

The study was based on panel data regressions where the investment level was the dependent variable and it was controlled by a number of independent variables. Unlike previous research, this one added the change in the investment level and the cash flow level of firms as dependent variables. The findings suggest that credit rating changes do not affect the investment level of companies, while in terms of CF as dependent variable, *downgrades* have significant negative influence on CF levels, leading to the conclusion that companies in the emerging markets rely more on internally generated funds to finance their investments and CRAs do not have such an important role in the emerging markets as they have in the developed markets. This may be a signal of fewer agency issues between CRAs, investors and companies in the emerging markets, less incentive for assigning better ratings and thus, a higher accuracy of credit ratings.

Apart from this result, variables such as leverage, firm size and profitability are important determinants of investment decisions. Firms have less investment immediately after a change in their credit rating irrespective of whether it is downgrade or upgrade but the results suggest that credit rating upgrades/downgrades are followed by better performance, which may lead to higher investments in the future. In addition, CF turns out to be a major determinant of the investment level of companies with a positive correlation, strengthening the conclusion that companies in the emerging markets rely less on external financing (due to its unavailability or inaccessibility because of higher implied credit risk) and rely more on internal financing which they use for their investment decisions. The findings also suggest that global factors such as inflation and interest rates play an important role in the investment decisions of companies in the emerging markets.

As a suggestion for further research, we propose a study that focuses on credit rating changes and investment decisions in the seven biggest countries in the emerging markets by nominal GDP, that is, China, Brazil, Russia, India, Mexico, Indonesia and Turkey. Further research should concentrate on the influence of more macroeconomic factors than only GDP, inflation and interest rates, and specific political risks and the adequacy of natural resources. Another suggestion is a focus on a longer time perspective in terms of research period (to incorporate problems in the 1990s such as the Asian and Mexican crisis) and wider event window (since credit rating changes might affect the investment decisions of a company in a longer period than two years after the transition). Moreover, it would be valuable to conduct the current empirical model using credit ratings from another CRA (e.g. Moody's or Fitch) and see if there are any differences between the impacts of rating considerations from different CRAs. Apart from the suggested studies on credit rating changes and investment decisions and in the light of the results of the conducted research, we believe that it is highly relevant also to propose a study on the question why cash flow is so important for companies in the emerging markets and what determines its significance.

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## Appendix

### Appendix 1: List of companies in the sample

<b>Issuer Name</b>	<b>Foreign Long-Term Rating</b>	<b>Country</b>	<b>Up-down grading</b>
Abu Dhabi National Energy Co. PJSC	A	United Arab Emirates	u
AEI	BB-	Cayman Islands	u
AES Gener S.A.	BBB-	Chile	u
ALCOA Aluminio S.A.	BBB-	Brazil	u
Aldar Properties PJSC	B+	United Arab Emirates	d
Alrosa OJSC	BB-	Russia	d
Amazonia Celular S.A.	BB+	Brazil	u
America Movil S.A.B. de C.V.	A-	Mexico	u
Aracruz Celulose S.A.	BB	Brazil	d
ASAT Holdings Ltd.	D	Hong Kong	d
Asia Aluminum Holdings Ltd.	D	China	d
Atrium European Real Estate Ltd.	BBB-	Jersey	u
Avago Technologies Finance Pte. Ltd.	BBB-	Singapore	u
Axiata Group Bhd.	BBB	Malaysia	u
Axtel S.A.B. de C.V.	B-	Mexico	d
Baoshan Iron & Steel Co. Ltd.	A-	China	u
Bavaria, S.A.	BB+	Colombia	u
Bharti Airtel Ltd.	BB+	India	u
BorsodChem Rt	B+	Hungary	d
Braskem S.A.	BBB-	Brazil	u
BRF Brasil Foods S.A.	BBB-	Brazil	u
Camuzzi Gas Pampeana S.A.	CCC-	Argentina	d

Carnival Corp.	BBB+	Panama	u
C.A. La Electricidad De Caracas	B-	Venezuela	d
C.N. Transelectrica S.A.	BB+	Romania	u
Central Telecommunications Co. (OJSC)	BB	Russia	u
CESP-Companhia Energetica de Sao Paulo	BB	Brazil	u
Chaoda Modern Agriculture (Holdings) Ltd.	CC	China	d
Cheung Kong (Holdings) Ltd.	A-	Hong Kong	d
China Forestry Holdings Co. Ltd.	CCC-	Cayman Islands	d
China Fishery Group Ltd.	B+	Hong Kong	u
China Glass Holdings Ltd.	B+	China	u
China Lumena New Materials Corp.	B+	Cayman Islands	d
China Medical Technologies Inc.	D	China	d
China Mobile Ltd.	AA-	Hong Kong	u
China Petroleum & Chemical Corp.	A+	China	u
China SCE Properties Group Ltd.	B-	Cayman Islands	d
Chinese Estates Holdings Ltd.	B+	Hong Kong	d
Chunghwa Telecom Co. Ltd.	AA	Taiwan	d
CITIC Pacific Ltd.	BB+	Hong Kong	u
CLP Holdings Ltd.	A-	Hong Kong	u
CNOOC Ltd.	AA-	Hong Kong	u
Coca Cola Embonor S.A.	BB+	Chile	d
Coca-Cola Femsa S.A.B. de C.V.	A-	Mexico	u
Comision Federal De Electricidad	BBB	Mexico	u
Companhia de Saneamento Basico do Estado de Sao Paulo	BB+	Brazil	u
Companhia Siderurgica Nacional	BBB-	Brazil	u
Compania Anonima Nacional Telefonos de Venezuela	B-	Venezuela	u
Compania de Petroleos de Chile COPEC S.A.	BBB	Chile	d

Compania de Transporte de Energia Electrica en Alta Tension TRANSENER S.A.	CCC	Argentina	d
Compania General de Electricidad S.A.	BR	Chile	d
Compania Sud Americana de Vapores	B-	Chile	d
Comstar United TeleSystems (JSC)	BB	Russia	u
Copamex S.A. de C.V.	B+	Mexico	d
Corporacion Durango, S. A. B. de C. V.	D	Mexico	d
Corporacion GEO S.A.B. de C.V.	BB-	Mexico	d
Corporacion Interamericana de Entretenimiento, S. A. B. de C. V. y Subsidiarias	CCC	Mexico	u
Cosan S.A. Industria e Comercio	BB	Brazil	d
Country Garden Holdings Co. Ltd.	BB	Cayman Islands	d
Cyfrowy Polsat S.A.	BB-	Poland	u
Cyrela Brazil Realty S.A. Empreendimentos e Participacoes	BB	Brazil	d
Datang International Power Generation Co. Ltd.	BBB-	China	d
Desarrolladora Homex S.A.B. de C.V.	B+	Mexico	d
Desc Automotriz, S.A. de C.V.	B+	Mexico	d
Diagnosticos da America S.A.	BB	Brazil	u
Dogus Holding A.S.	BB	Turkey	u
DP World Ltd.	BB	United Arab Emirates	d
Duke Energy International Geracao Paranapanema S.A.	BBB-	Brazil	u
Ecopetrol S.A.	BBB-	Colombia	u
Electricity Generating Authority of Thailand	BBB+	Thailand	u
Eletrobras-Centrais Eletricas Brasileiras S.A.	BBB	Brazil	u
Emaar Properties PJSC	BB	United Arab Emirates	d
Emirates Telecommunications Corp. (Etisalat)	AA-	United Arab Emirates	u
Empresa Distribuidora Y Comercializadora Norte S.A.	CCC-	Argentina	d
Empresa Nacional de Electricidad S.A. Chile	BBB+	Chile	u

Empresas Iansa S.A.	B+	Chile	u
Empresas ICA S.A.B. de C.V.	BB-	Mexico	u
Energisa S.A.	BB	Brazil	u
Energisa Sergipe-Distribuidora de Energia S.A.	BB	Brazil	d
Enersis S.A.	BBB+	Chile	u
ENN Energy Holdings Ltd.	BBB-	Cayman Islands	u
Eregli Demir ve Celik Fabrikalari T.A.S.	B	Turkey	d
Eurasian Natural Resources Corp. PLC	BB-	Kazakhstan	d
Evraz Group S.A.	B+	Russia	d
Far EasTone Telecommunications Co. Ltd.	A-	Taiwan	u
Fibria Celulose S.A.	BB+	Brazil	d
Federal Grid Co. of the Unified Energy System	BBB	Russia	u
Formosa Chemicals & Fibre Corp.	BBB+	Taiwan	u
Formosa Petrochemical Corp.	BBB+	Taiwan	u
Formosa Plastics Corp.	BBB+	Taiwan	u
Franshion Properties (China) Ltd.	BB+	Hong Kong	d
G Steel Public Co. Ltd.	D	Thailand	d
Gazprom Neft JSC	BBB-	Russia	u
Gazprom OAO	BBB	Russia	u
Genting Bhd.	BBB+	Malaysia	d
Gerdau S.A.	BBB-	Brazil	u
GITI Tire Pte. Ltd.	B-	China	d
Globe Telecom Inc.	BB+	Philippines	u
Golden Telecom Inc.	BB+	Russia	u
Grupo Bimbo S.A.B. de C.V.	BBB	Mexico	u
Grupo Iusacell S.A. de C.V.	D	Mexico	d
Grupo KUO S.A.B. de C.V.	BB	Mexico	u

Grupo Televisa S.A.B.	BBB+	Mexico	u
Grupo TMM, S. A. B.	B-	Mexico	u
HannStar Display Corp.	B	Taiwan	d
Herbalife Ltd.	BB+	Cayman Islands	u
Hidroelectrica Piedra del Aguila S.A.	B-	Argentina	d
Hon Hai Precision Industry Co. Ltd.	A-	Taiwan	u
Hongkong Land Holdings Ltd.	A-	Hong Kong	u
Huaneng Power International Inc.	BBB	China	d
Hutchison Whampoa Ltd.	A-	Hong Kong	d
Impsat Fiber Networks Inc.	D	Argentina	d
Indian Oil Corp. Ltd.	BB+	India	d
Industrias Penoles S.A.B. de C.V.	BBB	Mexico	u
Infosys Ltd.	BBB+	India	u
Irkutskenergo, AO EiE	B-	Russia	d
JBS S.A.	BB	Brazil	u
Kaisa Group Holdings Ltd.	B+	Cayman Islands	d
Kazakhtelecom JSC	BB	Kazakhstan	u
Kazanorgsintez OJSC	D	Russia	d
Kimberly-Clark de Mexico S.A.B. de C.V.	A-	Mexico	u
Korea Electric Power Corp.	A+	Korea, Republic Of	u
Korea Gas Corp.	A+	Korea, Republic Of	u
KT&G Corp.	A-	Korea, Republic Of	u
Kuwait Projects Co. (Holding) K.S.C.	BBB-	Kuwait	d
LG Chem Ltd.	A-	Korea, Republic Of	u
LG Electronics Inc.	BBB-	Korea, Republic Of	d
LG Uplus Corp.	BBB-	Korea, Republic Of	u
LUKoil OAO	BBB-	Russia	u

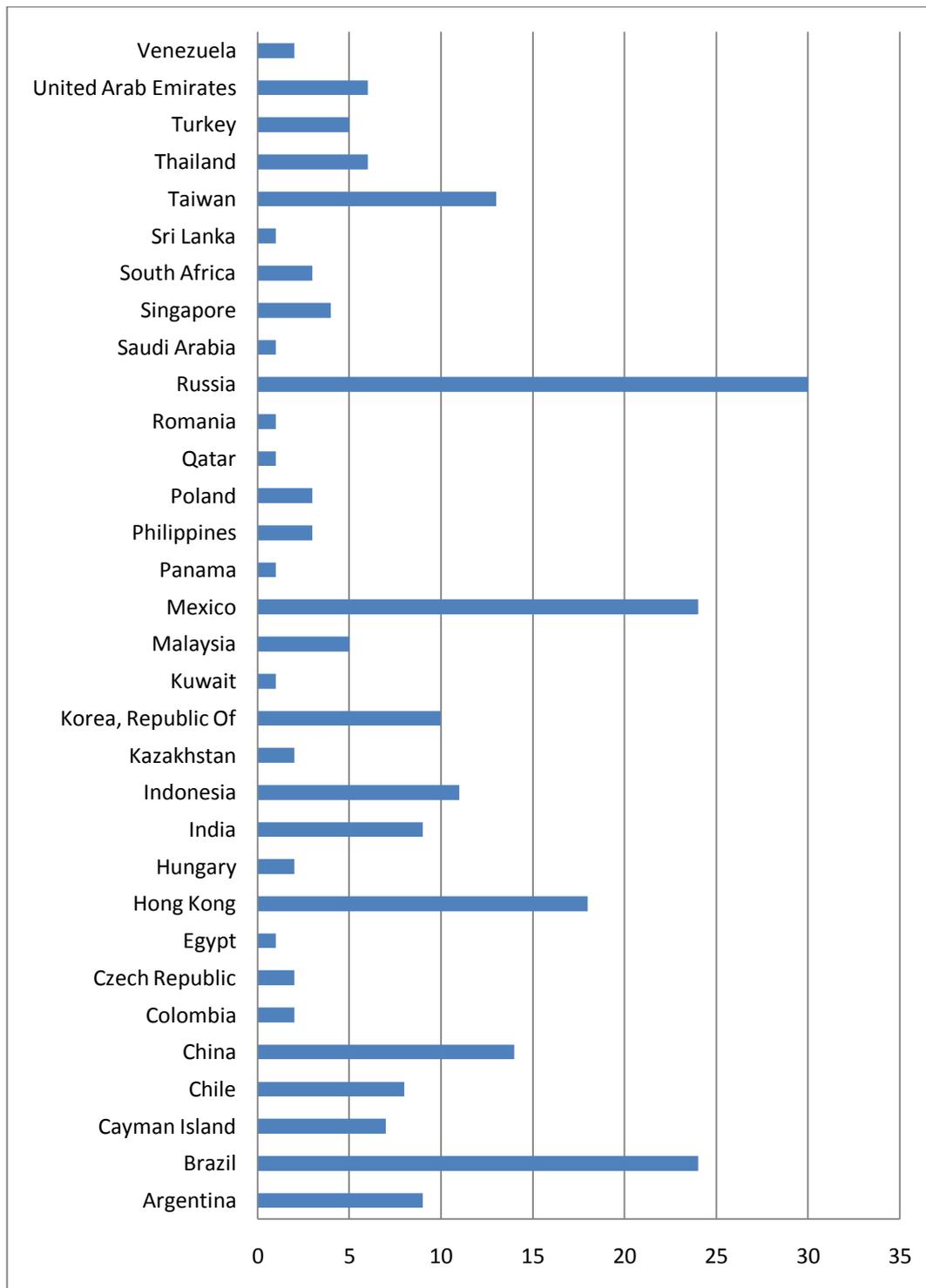
Macronix International Co. Ltd.	B	Taiwan	d
Magyar Telekom PLC	A	Hungary	u
Mitsui & Co. (Hong Kong) Ltd.	A-	Hong Kong	u
MMC Norilsk Nickel OJSC	BBB-	Russia	u
Mobile TeleSystems (OJSC)	BB	Russia	u
Mondi Group	BBB-	South Africa	u
Moscow City Telephone Network (JSC)	BB	Russia	u
Mosel Vitelic Inc.	CCC+	Taiwan	d
Mosenergo (AO)	BB	Russia	u
MRS Logistica S.A.	BB+	Brazil	u
MTR Corp. Ltd.	AAA	Hong Kong	u
Nan Ya Plastics Corp.	BBB+	Taiwan	d
National Central Cooling Co. PJSC	CC	United Arab Emirates	d
Netia S.A.	B	Poland	d
NHPC Ltd.	BBB-	India	u
Nine Dragons Paper (Holdings) Ltd.	BB	China	d
North-West Telecom (JSC)	BB-	Russia	u
Nutrinvestholding OJSC	D	Russia	d
NTPC Ltd.	BBB-	India	u
OAO TMK	B+	Russia	u
Oil Company Rosneft OJSC	BBB-	Russia	u
OJSC Novorossiysk Commercial Sea Port	BB-	Russia	d
Open Joint Stock Co. Trade House Kopeyka	B+	Russia	u
Orascom Telecom Holdings S.A.E.	B	Egypt	u
Pabrik Kertas Tjiwi Kimia Tbk (P.T)	D	Indonesia	d
Parkson Retail Group Ltd.	BB+	Cayman Islands	u
Pepsi-Gemex, S.A. de C.V.	BBB-	Mexico	u

Petrol Ofisi A.S.	BB-	Turkey	u
Petroleo Brasileiro S.A. - Petrobras	BBB	Brazil	u
Petroleos Mexicanos	BBB	Mexico	d
Power Assets Holdings Ltd.	A+	Hong Kong	u
PT Arpeni Pratama Ocean Line Tbk.	B+	Indonesia	d
PT Berau Coal Energy	BB-	Indonesia	u
PT Hanjaya Mandala Sampoerna Tbk.	BB+	Indonesia	u
PT Indosat Tbk.	BB+	Indonesia	u
PT Matahari Putra Prima Tbk.	B+	Indonesia	u
PT Mobile-8 Telecom Tbk.	D	Indonesia	d
PT Perusahaan Gas Negara (Persero) Tbk.	BB+	Indonesia	u
PT Telekomunikasi Indonesia Tbk.	BB+	Indonesia	u
PT Vale Indonesia Tbk	BB+	Indonesia	u
PT XL Axiata Tbk.	BB	Indonesia	u
PTT Aromatics and Refining Public Co. Ltd.	BBB	Thailand	u
PTT Exploration and Production Public Co. Ltd.	BBB+	Thailand	u
Qatar Telecom (Qtel) Q.S.C.	A	Qatar	u
Ranhill Bhd.	B-	Malaysia	d
Ratchaburi Electricity Generating Holding Public Co. Ltd.	BBB+	Thailand	u
Reliance Industries Ltd.	BBB	India	u
Ritek Corp.	B	Taiwan	d
Road King Infrastructure Ltd.	BB-	Hong Kong	d
Rostelecom OJSC	BB+	Russia	u
RusHydro (OJSC)	BB+	Russia	d
Samsung Electronics Co. Ltd.	A	Korea, Republic Of	u
San Miguel Corp.	BB-	Philippines	d
Sappi Ltd.	BB-	South Africa	d

Sasol Ltd.	BBB	South Africa	d
Satelites Mexicanos S.A. de C.V.	B	Mexico	u
Saudi Basic Industries Corp.	A+	Saudi Arabia	u
SAZKA a.s.	D	Czech Republic	d
Shinsegae Co. Ltd.	BBB+	Korea, Republic Of	d
Siliconware Precision Industries Co. Ltd.	BB+	Taiwan	u
Singapore Post Ltd.	A+	Singapore	d
Singapore Telecommunications Ltd.	A+	Singapore	d
Sino-Forest Corp.	CCC-	China	d
Sistema (JSFC)	BB	Russia	u
SK Corp.	BBB-	Korea, Republic Of	u
SK Innovation Co. Ltd.	BBB	Korea, Republic Of	u
Southern Telecommunications Co. (OJSC)	B+	Russia	u
Sri Lanka Telecom PLC	B+	Sri Lanka	d
STATS ChipPAC Ltd.	BB+	Singapore	u
Tata Consultancy Services Ltd.	BBB+	India	u
Tata Power Co. Ltd.	BB-	India	d
Tata Steel Ltd.	BB	India	u
Telecom Argentina S.A.	B-	Argentina	d
Telefonica de Argentina S.A.	B	Argentina	u
Telefonica Holding de Argentina S.A.	B+	Argentina	u
Telefonos de Mexico S.A.B. de C.V.	A-	Mexico	u
Telekom Malaysia Bhd.	A-	Malaysia	u
Telemar Norte Leste S.A.	BBB-	Brazil	u
Telemig Celular S.A.	BB	Brazil	u
Titan Petrochemicals Group Ltd.	CC	Hong Kong	d
TNK-BP International Ltd.	BBB-	Russia	u

Total Access Communication Public Co. Ltd.	BB+	Thailand	u
TOM Group Ltd.	BB-	Hong Kong	d
Towngas China Co. Ltd.	BBB	Cayman Islands	u
Turkcell Iletisim Hizmetleri A.S.	BB+	Turkey	u
TVN S.A.	B+	Poland	d
Universal Robina Corp.	BB	Philippines	u
Uralsvyazinform (OJSC)	BB-	Russia	u
Vale S.A.	A-	Brazil	u
Vestel Elektronik Sanayi Ve Ticaret A.S.	B-	Turkey	d
Vimpel-Communications JSC	BB	Russia	d
Vitro S.A.B. de C.V.	D	Mexico	d
VolgaTelecom (OJSC)	BB	Russia	u
Wan Hai Lines Ltd.	BB+	Taiwan	d
Wimm-Bill-Dann Foods OJSC	BB+	Russia	u
Xignux S.A. de C.V.	BB+	Mexico	u
Xinhua Finance Ltd.	B-	China	d
YPF S.A.	B+	Argentina	d
YTL Power International Bhd.	BBB	Malaysia	u
Zapadoceska Energetika a.s.	BBB+	Czech Republic	d

## Appendix 2: Country representation of companies



### Appendix 3: Correlation matrix

Correlation t-Statistic Probability	CAPEX_PPE	DEBT_TOT_CAPITAL	EBITDA_TOT_ASSETS	GDP	INFLATION	IR	LOG_CF	RATING_CHANGE
CAPEX_PPE	1.000000							
	----							
	----							
DEBT_TOT_CAPITAL	-0.003647	1.000000						
	-0.107953	----						
	0.9141	----						
EBITDA_TOT_ASSETS	0.053352	-0.090594	1.000000					
	1.581316	-2.692402	----					
	0.1142	0.0072	----					
GDP	-0.046717	0.035449	-0.012378	1.000000				
	-1.384218	1.049851	-0.366395	----				
	0.1666	0.2941	0.7142	----				
INFLATION	-0.063724	0.026813	0.060759	-0.141063	1.000000			
	-1.889893	0.793879	1.801639	-4.217248	----			
	0.0591	0.4275	0.0719	0.0000	----			
IR	0.011985	-0.011380	0.106409	-0.083237	0.295403	1.000000		
	0.354752	-0.336842	3.167406	-2.472176	9.151539	----		
	0.7229	0.7363	0.0016	0.0136	0.0000	----		
LOG_CF	0.093943	-0.024697	0.033072	-0.208130	-0.165643	-0.139157	1.000000	
	2.792821	-0.731188	0.979374	-6.298007	-4.971251	-4.159136	----	
	0.0053	0.4649	0.3277	0.0000	0.0000	0.0000	----	
RATING_CHANGE	-0.033840	-0.226650	0.068466	-0.061057	-0.267289	-0.268221	0.303085	1.000000
	-1.002149	-6.887463	2.031171	-1.810499	-8.209731	-8.240587	9.413262	----
	0.3165	0.0000	0.0425	0.0706	0.0000	0.0000	0.0000	----