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**Factors affecting the financial constraints of firms:
Focus on Firm Size and Country Development**

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Abstract

The main purpose of this paper is to analyze different factors which have an impact on the level of financial constraints that companies face. The main factors that are discussed in this paper are the size of firms and the level of country development, measured by institutional development, development of financial markets and economic development. Whited-Wu index is used to calculate the level of financial constraints for firms and the data from financial statements of companies are downloaded from DataStream. The sample consists of almost 3800 firms from 31 countries around the world. Most of our findings are in line with previous research. The size of firms, development of financial markets and economic development all have a significant effect on reducing financial obstacles for companies. The only surprising result is that the level of institutional development of countries does not have a significant effect on the level of financial constraints, which is in contrast to previous research and our expectation.

Keywords: Financial Constraints, Development Indicators, Institutional Development, Financial Markets, Economic development, Market Capitalization

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1. Introduction

1.1 Background

Corporate finance theory suggests that market imperfections, such as those caused by underdeveloped financial and legal systems, constrain firms' ability to obtain funds for their investment projects. Access to funding is one of the main constraints for firms' growth. Relaxing those financial constraints for companies is essential for their development and for the overall growth of the economy. It is not a surprise that the most developed countries are constantly trying to improve the business environment for their firms by implementing a variety of measures and procedures in order to reduce the financial obstacles that those companies face. Even in the more developed part of the world firms are facing troubles in getting access to financing. After the recent financial crisis, banks face stricter regulations and are required to maintain proper leverage ratios and meet certain capital requirements. The Basel Committee on Banking Supervision issued a comprehensive set of reform measures (Basel III), designed to improve the regulation, supervision and risk management within the banking sector. All of these reforms make financial institutions more reluctant when approving credits to their clients.

Small and medium enterprises (SME) are more affected by those imperfections, constraining both their entry and growth. Those firms are considered to be an engine of innovation and growth and an important factor in the overall economic development of the country. Large companies are also expected to be affected by the environment in which they operate, but when it comes to funding those firms have more options as they are large enough to go to foreign financial markets or finance capital expenditures from internal resources, issuance of equity, or debt.

In the thesis we will also measure the impact of institutional, financial and economic development on financial constraints. Better understanding of financial patterns of companies and how they change with country's development has important policy and resource implications. It is important to analyze the political, legal and regulatory variables as they have a great impact on the overall business environment. We will also provide some evidence from the most developed countries and their transition paths, to see how did those countries overcome those problems in the past and see if the same could be applied for the devolving countries today.

1.2 Main objectives

The thesis has two objectives. The first one is to compare financial constraints depending on firm's size. Previous studies have shown that small and medium size enterprises are less likely to have access to formal financing than large firms, but in our thesis we are going to use a rather novel Whited-Wu index when measuring the financial constraints of firms, so it will be interesting to see if we will obtain similar results. We will furthermore offer some arguments from previous research to explain why we expect larger firms to have an easier access to financing.

The second objective is to see whether the level of intuitional, financial and economic development of countries has a significant effect on financial constraints that firms face. The main intuition behind this is that firms which are doing business in more developed countries with more advanced institutions should face less financial constraints. The developed countries such as USA and Western Europe countries have recognized the problems that enterprises (especially SME's) face in terms of getting access to financing and have therefore implemented some direct and indirect measures that are supposed to help overcoming those issues. Each nation has their own support measures that vary in terms of scope, content and execution period, but the success of some large economies in implementing those policies has been recognized as valuable lessons for developing countries. Our empirical results will show whether better institutional, financial and economic development is indeed related to a lower level of financial constraints for companies.

1.3 Main contributions of our thesis

There have been a large number of previous studies (Kaplan and Zingales 1997, Sleuwagen 2001, Love 2003, Aggarwal and Zong 2005, Beck and Demeriguc-Kunt 2006, Beck et al 2008b) that have focused on the field of financial constraints of the firms. Furthermore, there have also been some articles (Desai, Gompers and Lerner 2003, Love 2003, Beck and Demeriguc-Kunt 2006, Beck 2007) which analyzed the connection between country development and the level of financial obstacles for companies. However, our thesis will differ from the previous studies by three points. Firstly, the methodology we used as to evaluate the level of financial constraint of the firms will be different compared to the previous papers. When evaluating the level of the financial constraints, some of the papers used the survey directly answered by the firms about the financial constraints they have faced. However, this method may be subjective. In our paper, we are going to use the Whited-Wu

index which calculates the level of the financial constraints based on the data from the financial reports from each firm, which we consider to be more objective. This method of calculating the financial constraints is also proven to be better than using the investment-cash flow sensitivities or the Kaplan-Zingales index (Whited-Wu, 2006). Secondly, most of the mentioned articles have been published around 10 years ago. With all of the measures that aim to relax financial constraints for firms and with the developing countries trying to catch up with more developed countries, we feel that there have been a lot of changes in the last decade. In our analysis we are going to use recent data and compare it with previous studies to see if we obtained similar results or not. Finally, when evaluating the financial and institutional development of countries, we are going to select a set of indicators from the World Bank database. Most of the World Bank institutional development indicators are from 1996 and onwards, meaning that some of the previous studies that have been using those indicators could only capture the range of approximately 10 years. Our paper, on the other hand, will have a range of almost 20 years which will make the results more trustworthy.

1.4 Structure

The paper consists of six sections, with chapter 1 being the introduction.

Section 2 focuses on the theoretical background. It contains some background information about the problems that will be discussed in the thesis and at the same time presents the literature review of previous articles about those topics. It consists of three sub-sections: the definition of financial constraints, the size effect on the level of financial obstacles and the impact of country development on reducing the financial constraints.

Section 3 explains in detail about the data used for our empirical analysis. This section explains how the countries for the sample were selected, presents different development indicators and the intuition behind their selection and discusses the Whited-Wu index and the data used for determining the level of financial constraints for firms.

Section 4 describes the methodology used in this thesis.

In section 5 we present our empirical data and afterwards make an analysis of the empirical part. The first part of empirical section is analyzing the descriptive statistics of our sample. The second part of empirical analysis is based on the firm level, focusing on how the size of firms affects the level of constraints. The second part analyses what kind of impact do

different aspects of country development (institutions, financial markets and overall economy) have on the level of financial constraints.

Section 6 concludes the thesis.

2. Theoretical background

This chapter presents the main issues that will be analyzed in the paper and provides a review of current literature related to our topic. The first part provides a definition of the financial constraints. Then the difference between financial constraints for small and large firms is analyzed. The final sub-section of theoretical background presents some arguments why better financial and institutional development should lead to increasing the access to financing for enterprises, in combination with some findings from previous studies.

2.1 Definition of financial constraints

Before proceeding into further analysis it is important to provide a definition of financial constraints. Miller and Modigliani (1958) showed that a firm which is doing business in complete markets will be indifferent when making financing policies and capital structure decisions. However, it is evident that in real life firms are operating in incomplete markets and often have limited access to external funding. Aggarwal and Zong (2005) showed that company investment levels are higher when internal cash flows are higher and vice-versa, indicating that most of companies operate in imperfect markets, where external financing is costly to access. Those results are even more significant when we know that their study was conducted on two largest market-based countries (USA and UK) and two largest bank-centered (Japan and Germany) economies. The findings are in line with pecking order theory, that argues that because of the imperfect markets and external financing costs, internal funds are preferred compared to external financing.

Kaplan and Zingales (1997) define firms as financial constrained if they face a wedge between the internal and external cost of funds. Even a small transaction cost in raising external funds would mean that the firm is financially constrained. As the cost of external funds increases compared to internal funds, firm becomes more constrained.

2.2 The size effect on the level of financial constraints

Numerous of articles show that small firms face higher financial obstacles than large firms (Love 2003, Beck and Demirguc-Kunt 2006, Beck et al 2008b). Unlike larger firms which can finance capital expenditures from internal resources, issuance of equity, or debt, smaller firms are restricted in the extent of their internal earnings and the potential for issuing equity (Audresch and Elston, 2002). Beck (2007) show that the difference in financial patterns between small and large firms reflects the different level of constraints they face. The lack of access to specific forms of financing such as export, long-term funding and leasing is much higher for small firms. Small firms use less than 10% of bank finance for their investments compared to more than 20% for large firms (Beck, 2007). Large firms have an advantage of easier access to credit and development funds, while small firms have to use more equity and informal sources of financing. The difference in size is also important when facing some additional financing obstacles such as collateral requirements, bank paperwork, interest rate payments, the need of special connections, and banks' lack of lending recourses. Beck and Demirguc-Kunt (2006) argue that age, size and ownership are the most important factors for financing obstacles. Large, older and foreign-owned firms have easier access to funding.

Smaller firms are also more prone to experiencing credit crunch, especially during recessions. Their credit sources last much shorter compared to large firms, which can have negative implications during the economic downturns (Audretsch and Elston, 2002). Recent financial crisis proved to be fatal for a lot of small business in Europe and USA, showing that even SMEs in the most developed countries are vulnerable to economic fluctuations.

Unlike other credit categories, such as consumer credit or mortgage lending, SME lending is still considered a high-cost lending product. In contrast to other lending products that can be reduced to simple transactions, SME lending often still depends heavily on relationships between borrowers and lenders (Berger and Udell, 1998, 2006). Because of fixed transaction costs and information asymmetries, small firms face higher transaction costs and risk premiums since they are less transparent, have less collateral to offer and often do not have audited financial statements that could provide a better picture of the company and its projected profits (Beck, 2007). Fixed transaction costs in credit assessment, processing and monitoring results in higher lending costs. Beck, Demirguc-Kunt, Laeven and Levine (2008) show that because small firms find it more difficult to access financial services due to greater information and transaction costs, financial development will disproportionately help those

firms. Small firms are less likely to be able to get capital at market interest rates and are therefore a subject to credit rationing (Audretsch and Elston, 2002). USA and some other developed countries have developed a credit scoring technique for small firms. This technique focuses more on personal information of the owner, rather than the small business itself, which can significantly reduce the transaction costs of the loan procedure (Beck, Demirgüç-Kunt, 2006). The empirical results from Frame, Srinivasan and Woosley (2001) suggest that credit scoring lowers information costs between borrowers and lenders and reduce the value of traditional, local bank lending relationships.

It is difficult to analyze the two main purposes of our thesis completely independently since they are often interweaving. We notice that the level of financial and institutional development has different impact depending on the size of firm. Better protection of property rights increases external financing of small firms significantly more than it does for large firms, particularly due to the differential impact it has on bank and supplier financing (Beck et al, 2008b). Also, the higher level of institutional development can help in reducing the gap between small and large firms. This has been noticed in many developed countries where the lack of an effective financial system explains the phenomenon of missing middle (Beck, 2007). Sleuwagen and Goedhuys (2002) article analyzes the problem of “missing middle” in Ivory Coast. Their results are in line with other researches about the undeveloped African countries. The problem of “missing middle” means that there are a small number of large firms producing the largest share of output and a very large number of small firms that struggle to continue with their business. So the structure of firms is fairly dualistic, with a very small number of medium sized companies. The size distribution of firms in most of African countries was formed in the post-independence period. Firstly, the main focus was on large-scale investments by state and foreign investors, which was expected to provide the initial growth of the economy. In the last two decades the attention shifted towards small firms and providing a better environment for their development. However, the results from Sleuwagen et al (2002) and others show that after a decade of structural adjustments, the industrial sector is still bimodal. When analyzing why small firms face difficulties in growing they explain that the absence of well-functioning markets, initial firm size and formal registration, together with persisting efficiency differences have a huge impact on growth constraints. Their results show that very few small firms grow to a large scale, while formally registered large firms have a relatively strong growth as they get older. Love (2003) argues that larger firms in less developed countries will have easier access to funds through external

capital markets or political connections, while smaller firms will be left out. This represents a big problem for developed countries, with large firms crowding out small and medium-sized enterprises thanks to better connections with the regime and because they are in control of huge amounts of available resources. This calls for policies and measures that are less biased against SMEs and one more time stresses out the importance of institutions that will improve the functioning of input and output markets supporting the growth of firms of all sizes in developing countries.

Smaller firms can have some alternative ways of obtaining funding such as informal sources, factoring and leasing. However, Beck et al (2008b) show that, although small firms use significantly more informal sources than large firms, those sources of financing fail to relax the constraints that small firms face. Furthermore, their results show that leasing does not fill the financing gap for small firms in undeveloped countries either, mainly because the use of leasing is positively related to the development of financial institutions and equity markets. Another source of financing for small firms is to obtain funding from the government sources or development banks, whose main purpose is exactly to relax financial constraints for those firms. However, empirical results from Beck (2008b) article show that the help from those programs is not significant for increasing the financing for small firms in developing countries. To sum up, his results show that small firms find it difficult to get access to alternative ways of financing in countries with underdeveloped financial and legal systems.

2.3. The impact of institutional, financial and economic development on financial constraints

There have been some previous studies (Desai, Gompers and Lerner 2003, Love 2003, Beck and Demirguc-Kunt 2006, Beck 2007) connecting the level of country development and constraints for firms. Most of them are focusing on overall constraints that inhibit the growth of firms, but there are also some articles that focus solely on financial obstacles. The level of country development is usually presented as either economic, financial market or institutional development, or a combination of those three. In the first part of this sub-section we focus on the impact of institutions and also corruption and legal environment as a part of overall institutional development. After that the focus will be on the financial markets, with a separate part related to the banking market structure. At the end of this chapter, two sub-sections about historical evidence of reducing financial obstacles and measures of handling this issue will be presented.

The level of financial constraints for firms and country development is like a vicious circle - bad business environment will increase the financial obstacles for firms and higher financial constraints will have a negative impact on overall economic development of the country through lower performance of the firms. Gorodnichenko and Schnitzer (2011) used a large sample of firms in 27 transition countries and found that financial constraints restrain the ability of domestically owned firms to innovate and hence to catch up with the more developed economies. They argue that, because of financial restrictions, companies in less developed countries will not have enough resources to invest in innovative activities which can prevent them from adopting better technologies.

Analyzing the financial patterns of firms over the time has to be taken with caution, because there are a lot of factors which could influence the raise of financial obstacles for companies. For example, Love (2003) shows that business cycles can also have an impact on firms funding. Periods of economic booms (high growth of GDP) are associated with less financial constraints for firms and vice versa. Campello, Graham and Harvey (2010) made a survey with 1050 chief financial officers (CFOs) in 39 countries to examine whether the global financial crisis from 2008 had a significant impact on increasing financial constraints for firms in USA, Europe and Asia. They found out that financially constrained firms had to burn down their cash savings and to withdraw the funds from their outstanding lines of credit because of the credit restrictions they faced. Furthermore, most of the constrained companies said that they either had to give up on the pursuit of attractive investments or to cancel ongoing projects because of the increasing financial constraints.

Institutional development

Beck, Demirguc-Kunt and Levine (2005) and Beck (2007) show that firms in countries with higher level of institutional development have significantly lower financial constraints than companies in countries with less developed institutions. Desai, Gompers and Lerner (2003) analyzed the impact of the institutional (political, legal and regulatory) factors on the nature of entrepreneurial activity in Europe. Their results suggest that capital constraints made by the institutional imperfections impact both the entry of firms and their ability to grow, especially in less developed countries. Chan (2009) indicate that corruption can have serious negative impact on growth of financially constrained firms. Results from his article illustrated that one percent increase in bribes is associated with 0.22-0.26 percent decrease in growth for financially constrained firms. Furthermore, firms report less financial constraints in countries

with more effective legal system (Beck and Demirguc-Kunt 2006, Love 2003). This includes laws, regulations and institutions which help creating, registering and enforcing collateral as well as an effective bankruptcy system. Results from Love (2003) showed that the efficiency of legal system, lower risk of expropriation and lower corruption all have important influence in reducing financial constraints for both large and small companies. The results for financial development remained significant even after controlling for firm size, business cycles and legal system development. Furthermore, Beck and Demirguc-Kunt (2006) found out that the level of property rights has a large impact on closing the external financing gap between small and large firms.

There are several reasons why better financial and legal development should relax financial constraints for firms. La Porta, Lopez-de-Silanes, Shleifer, and Vishny(1997) show that the legal protection investors receive determines their willingness to finance companies. Therefore a country with better legal environment, where investors have better legal protection, will reduce the financial constraints for enterprises as investors will be more confident that their invested capital will be safe.

Development of financial markets

Love (2003) show that the level of financial market development has a significant effect on reducing the financial constraints. The cost of capital for firms in countries with low financial development was twice as high as in countries with high financial development. Similarly, Demirguc-Kunt and Maksimovic (2008) results from a large World Bank cross-sectional firm survey database for close to 3000 firms in 48 countries, show that the level of financial intermediary development (measured by private credit) had a significant positive effect on external financing for firms. This benefit is expressed in using more external financing, especially from banks, in countries with better institutional development. They noticed that small firms benefit relatively more from higher level of property rights protection than medium-size and large firms. Higher financial development had a significant effect on external financing for large firms, especially increasing bank and development funds. Small firms benefited from private credit increase by larger use of lease and development funds and lower use of informal sources. Furthermore, Aghion, Fally and Scarpetta (2007) show that financial development matters most for the entry of small firms, especially in sectors that are depending on external financing. In contrast, their findings show that the level of financial development has either no effect or negative effect on entry of large firms. They furthermore

suggest that private credit and stock market capitalization are important for promoting entry and post-entry growth of firms. Furthermore, Gelos and Werner (2002) show that financial liberalization eased the financial constraints for firms in Mexico.

Some interesting results were obtained in the article by Demirguc-Kunt and Maksimovic (2008) where they show that neither the overall stock market development (measured by value traded) nor the level of economic development (measured by GDP per capita) have a significant effect on financing patterns on the country level.

The banking market structure also has a large influence on the availability of financing for firms. Higher competition among the banks and entrance of foreign-owned banks reduces the financial constraints, especially for small firms (Clarke et al, 2003). Foreign-banks can furthermore bring the necessary know-how and introduce new lending techniques. Ryan et al (2014) made a large empirical study using a panel dataset of more than 118.000 SMEs across 20 European countries in order to investigate how does bank market power influence financial constraints that SME firms face. Their findings are in line with the market power hypothesis – increased market power results in higher financial constraints from SMEs. Their results also show that as the economy becomes more bank-based (ex. Germany, Japan) the effect of bank market power on financial constraints will increase. Beck, Demirguc-Kunt and Maksimovic (2004) also find evidence for the relationship between bank concentration and higher financing constraints, but only in economically and institutionally less developed countries. A high level of institutional development, the presence of foreign banks and an efficient credit registry reduce the relation bank concentration and financial constraints. This is a good lesson for policy makers in developing countries - instead of focusing on bank concentration they should try to improve the ownership structure of banking system, the regulatory framework and the overall institutional environment (Beck et al, 2004).

Historical evidence of reducing the financial constraints

The lessons from the development of institutions and financial sector, which led to reducing the financial constraints for SMEs in more developed countries, can be a good guideline for the developing countries. Cull et al (2006) findings suggest that, at end of 19th century and early 20th century, in countries from North Atlantic Core, the intermediary local institutions had a pivotal role in constructing a local information network and providing credit to firms that were too young or small to secure funds from large regional or national institutions. Because those financial institutions were located locally, they could tap into sources of

information that large-scale financial institutions found too costly to exploit. Later, as economy expanded and markets became more advanced those local institutions were either replaced by large national or global banks that found financing local firms to be more profitable than before, or emerged to become one of those large banks themselves.

Although, this historical development of financial institutions show that serviced SMEs was largely demand driven, it cannot be neglected that the role of the government in those countries was also important. Even though there are many controversies with the modern role of government, it can be said without a doubt that providing the a secure property right environment, reducing the level of corruption and establishing important national institutions is crucial in both the development of financial markets and reducing the financial constraints that firms face. It is also important to reduce the wealth inequality and to reduce general poverty in order to encourage the initial growth of SME sector. Furthermore, interventions that address underlying informational and monitoring problems can expand financial services to SMEs (Cull et al, 2006). On the other hand, too much of government involvement, as in some dictatorship regimes can have a large negative impact on the development of SMEs and in that sense the overall growth of the economy. Overall, different aspects of country development have historically had a significant effect on the level of financial constraints for companies, which mean that we can expect that it has a similar effect in our sample.

Proposed measures and policies for reducing financial constraints

Beck and Demirguc-Kunt (2006) suggest that improving institutions and the overall business environment is the best way in reducing financial obstacles for SMEs. However, building institutions is a long term process which can take up to few decades. Thus, some new techniques such as leasing, factoring and credit scoring can be more effective in the short time. However, those techniques are not independent of the country development level, with better financial markets being more likely to adopt the techniques more quickly.

Beck (2007) suggests three sets of measures for reducing financial constraints:

- market developing policies
- market-enabling policies
- market-harnessing

Market developing policies improve state variables and level the playing field between small and large firms. He argues that the lending costs and risk for lenders will be affected by

macroeconomic environment, contractual and informational frameworks, technology and the overall business environment such as physical infrastructure, crime and political instability. Those are the state variables on which lender and borrower cannot affect. Those reforms cannot be implemented in short time, but are crucial for creating a better business environment and reducing financial obstacles for firms.

Another set of measures are market-enabling policies whose main purpose is to relax constraints for small firms, even when there is an absence of institutional development. Those policies are oriented on solving the issues on both the demand and supply side. However, it is more likely that the problem will be on the supply side, with financial institutions finding it unprofitable to lend long-term credits to SMEs. This issue can be solved by either providing incentives for existing banks to develop a long-term relationship with small firms which would bring them profit at later stages, or by fostering the competition with the entrance of new banks. When the global financial crisis in 2008 increased the financial constraints for firms, policy makers undertook similar actions to unfreeze credit markets.

The third set of policies is called market-harnessing and is totally opposite of what we mentioned until now. The market-enabling policies can result in too much competition, with financial institutions approving more credits than it would be rational. Although, the goals of previous measures is to relax constraints for SMEs, there still need to exist a system that will distinguish between better and worse investments. Providing too many credits for firms that will not be able to pay out the debt can result in the collapse of financial markets.

To sum up, policy makers need to strike a balance between market-enabling policies that push financial institutions towards the frontier and market-harnessing policies that prevent them from moving beyond the frontier (Beck, 2007). This article once again strengthens the argument of importance of government policies and country development for relaxing financial constraints for firms.

3. Data

The third part of the thesis describes the data that is used in obtaining the empirical result. It describes how the sample was chosen and provides more information about variables used for our regressions.

3.1 Data overview

In order to build the model and obtain the empirical results data was collected from two sources. Financial reports information for firms was collected from DataStream base, while the indicators of country development and real interest rate were obtained from World Bank database. Initially, there were more than 10000 firms available for the 31 countries we have selected. However, after arranging the data and removing the missing variables we obtained a final number of 3789 firms. Financial constraint is the dependent variable, market capitalization, institutional development, development of financial markets and GDP per capita are independent variables, while firm age and interest rate are control variables. However, market capitalization is also a control variable for equations 2-7, while GDP per capita is control variable in equation 1. All the variables from regressions are presented in Appendix 1.

3.2 Choosing the countries

The first step of the empirical part is to select the countries which are going to be included in the sample. The country selection process is based on three conditions:

1. different level of development
2. geographical disparity
3. availability of data

To ensure that the selected sample has diversity and representativeness, we selected approximately the same number of developed and underdeveloped countries. In order to distinguish between different levels of development among the countries Human Development Index (HDI) was used. HDI index is a summary measure of three dimensions: life expectancy, educational quality and standard of living. This measure is used by United Nations Development Program and was preferred to GDP per capita as it offers a more broad insight into the development level of countries. Table 1 presents the selected sample with the total number of observations and firms from each country.

Factors affecting the financial constraints of firms: Focus on Firm Size and Country Development

| Country Name | Rank | HDI index (2013) | Number of observations | %of total observations | Number of firms |
|---|------|------------------|------------------------|------------------------|-----------------|
| Very high human development | | | | | |
| Norway | 1 | 0.943597581 | 1729 | 2,46 | 91 |
| Australia | 2 | 0.932662115 | 1805 | 2,57 | 95 |
| Switzerland | 3 | 0.917394317 | 3097 | 4,41 | 163 |
| Netherlands | 4 | 0.915282799 | 2090 | 2,97 | 110 |
| Singapore | 9 | 0.901305855 | 2508 | 3,57 | 132 |
| Denmark | 10 | 0.900460725 | 1672 | 2,38 | 88 |
| Sweden | 12 | 0.897818202 | 3040 | 4,33 | 160 |
| United Kingdom | 14 | 0.891725911 | 1957 | 2,79 | 103 |
| Japan | 17 | 0.890086070 | 3116 | 4,43 | 164 |
| France | 20 | 0.884325552 | 5130 | 7,30 | 270 |
| High human development | | | | | |
| Russian Federation | 57 | 0.778302805 | 3591 | 5,11 | 189 |
| Malaysia | 62 | 0.772907041 | 4864 | 6,92 | 256 |
| Mauritius | 63 | 0.771001933 | 779 | 1,11 | 41 |
| Turkey | 69 | 0.758635956 | 2223 | 3,16 | 117 |
| Kazakhstan | 70 | 0.757371246 | 684 | 0,97 | 36 |
| Mexico | 71 | 0.755830117 | 2679 | 3,81 | 141 |
| Brazil | 79 | 0.743640439 | 1729 | 2,46 | 91 |
| Peru | 82 | 0.736804544 | 1710 | 2,43 | 90 |
| Thailand | 89 | 0.721925687 | 2888 | 4,11 | 152 |
| China | 91 | 0.719080607 | 1938 | 2,76 | 102 |
| Jamaica | 96 | 0.715343928 | 627 | 0,89 | 33 |
| Medium and low human development | | | | | |
| Indonesia | 108 | 0.684258402 | 3401 | 4,84 | 179 |
| Egypt | 110 | 0.681578149 | 1995 | 2,84 | 105 |
| South Africa | 118 | 0.657753751 | 4161 | 5,92 | 219 |
| Vietnam | 121 | 0.638016545 | 3401 | 4,84 | 179 |
| Morocco | 129 | 0.616709470 | 1007 | 1,43 | 53 |
| India | 135 | 0.585730873 | 3002 | 4,27 | 158 |
| Pakistan | 146 | 0.536534766 | 1140 | 1,62 | 60 |
| Kenya | 147 | 0.535115580 | 608 | 0,87 | 32 |
| Nigeria | 152 | 0.503636046 | 1197 | 1,70 | 63 |
| Tanzania | 159 | 0.488409590 | 494 | 0,70 | 26 |
| Total | | | 70262 | | 3789 |
| Average per country | | | 2266.52 | | 122.23 |

Human Development Index Groups

| | |
|---------------|-------------------|
| Very high HDI | 0.89022993 |
| HighHDI | 0.73535165 |
| Medium HDI | 0.61435225 |
| Low HDI | 0.49323349 |
| World | 0.70157866 |

Table 1: In this table all the countries (31 in total) are presented. The countries are divided into three groups, based on their HDI index. The table offers information about the ranking of each country, their HDI index from 2013, number of observations and number of firms from each country.

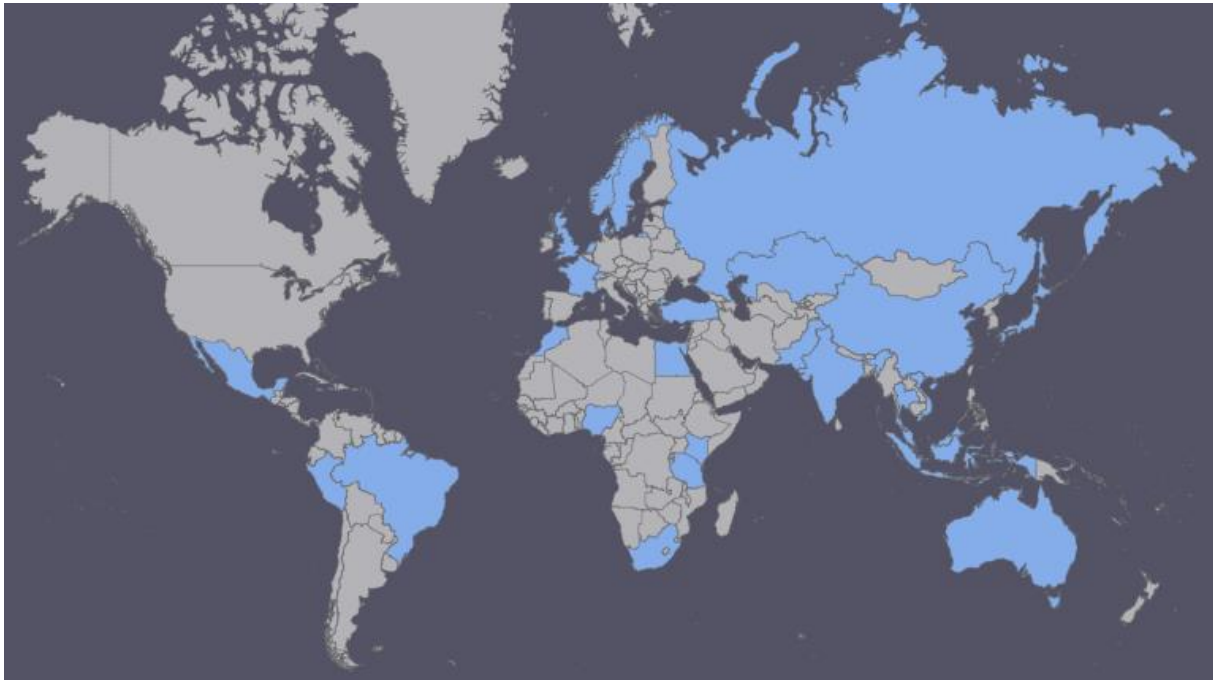


Figure 1 - Geographical disparity of the sample

United Nations originally divides the countries into four groups based on the level of development: very high, high, medium and low. We decided to incorporate the last two groups into one as there was not enough data available for the countries of low human development. In total, 31 countries are selected: 10 with very high HDI, 11 with high HDI and 10 with medium or low HDI.

The second criterion of country selections was geographical disparity. To make our sample more representative we selected countries from different parts of the world. In that way we avoid that some other effects (culture, religion etc.) have a significant influence on our results. Figure 1 illustrates the geographical disparity of the sample.

Finally, in the selection process of countries we were limited by the availability of data. For example, the data for some countries from Latin America was not available in the DataStream and for other there were not enough available information from the financial reports. On the other hand, USA were not selected as they initially had around 13.000 firms which is almost as all the other selected countries combined. Because of the time limitation of this project we decided that it was more convenient to add 4-5 other countries instead.

3.3 Dependent variable – financial constraints

The Whited-Wu index is used for calculating the level of financial constraints for firms. In the process of constructing the index Whited and Wu (2006) started from the model which predicts that external financing constraints affect the inter-temporal substitution of investment today for investment tomorrow through the shadow value of scarce external funds. Generalized method of moments (GMM) then provide fitted values of the shadow value, which is used as the index of financial constraints.

Whited-Wu index is given as:

$$-0,091CF_{it} - 0,062DIVPOS_{it} + 0,021TLTD_{it} - 0,044LNTA_{it} + 0,102ISG_{it} - 0,035SG_{it}$$

- CF_{it} is the ratio of cash flow to total assets
- $DIVPOS_{it}$ is 1 if firm pays cash dividends and 0 otherwise
- $TLTD_{it}$ is the ratio of long term debt to total assets
- $LNTA_{it}$ is the natural log of total assets
- ISG_{it} is the firms three digit industry sales growth
- SG_{it} is the firms sale growth

One of the most important advantages of this approach is the avoidance of serious sample selection, simultaneity and measurement-error problems through structural estimations with a large data set (Whited-Wu, 2006). Whited-Wu index has two advantages compared to Kaplan and Zingales index (KZ index) from 1997, which was often used to calculate the level of constraints. To build the KZ index, a much larger sample is needed, which leaves doubts if the index is truly capturing financial constraints. Furthermore, Tobin's q, which is one of the variables in KZ index, contains a great deal of measurement error. Compared to World Bank database about financial constraints, we believe that the Whited-Wu index provides more objective results of financial constraints as it uses financial reports information rather than surveys.

All the data for constructing the financial constraints was downloaded from Data Stream and have been converted into United States Dollars. Data was downloaded from balance sheets of firms from all industries except from the financial market.

3.4 Independent variables

The two main goals of this thesis are to examine the effects of firm size and country development on financial constraints, and in that sense it is necessary to include independent variables to represent those two factors.

Size

In order to distinguish between different sizes of firms, market capitalization is used. Market capitalization is equal to the number of company's outstanding shares multiplied by the current market price of one share. All the value of market capitalization was converted into USD so that companies from different countries could be compared.

Development indicators

In order to determine the development of each economy, which will be used for the second part of empirical analysis, several indicators from World Bank database were used. We divide those indicators into three groups, depending on what they measure: economic development indicators, financial markets development indicators and institutional development indicators. Similar indicators were used by Beck et al (2006). Most of the indicators are available only from 1996 meaning that this will be the starting year for the data. We measure the level of economic development in the simple way by using historical GDP per capita as the indicator. GDP per capita represents the total market value of all the final products and services, produced during a specific time period and by one person in a country. It evaluates the ability to create wealth by person and is also considered to be the main parameter of standard living of a country. Thus, a higher GDP per capita means the people in a certain country have more wealth and higher ability for consumption which in a way encourages the activities of the companies and stimulate the economic development. It also has been used world widely as the most important and efficient way to measure the development of the local economy.

The level of development of financial markets will be measured by two indicators used in Beck et al (2006) article: Private credit and Value traded. Private credit is the percentage of private credits of the GDP. Value traded is measured as the total volume traded on stock exchanges as a percentage of GDP. The variable for the development of financial markets is then calculated as average from private credit and value traded. It is expected that the better development of financial markets should improve the available options for firms to obtain financing and in that sense reduce their financial constraints.

In our paper we are also interested in capturing the relationship between institutional development and the level of financial constraints for companies. To measure the level of institutional development we will use Worldwide Governance Indicators from World Bank. The institutional development variable was constructed as the average of those six indicators.

Governance indicators report on six broad dimension of governance over the period 1996-2013:

- Voice and Accountability;
- Political Stability and Absence of Violence;
- Government Effectiveness;
- Regulatory Quality;
- Rule of Law;
- Control of Corruption

Voice and accountability captures perception of the extent to which citizens are able to participate in selecting their government as well as freedom of expression, freedom of association and free media.

Political stability indicator represents the likelihood of political instability and politically motivated violence, including terrorism. It is fair to assume that companies operating in politically unstable environments will not only be judged by their own performance when applying for funding and that this political risk will be incorporated in the price.

Government effectiveness captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies (World Bank). In the terms of reducing the financial constraints this indicator can be interpreted as how effective the government is in implementing the measures and policies that are supposed to help firms with their financial issues. Moreover the ability of government to avoid political pressure can provide equal conditions for all market participants and a fair distribution of recourses.

Regulatory quality captures the ability of government to formulate and implement policies and regulations that permit and promote private sector development. This factor has several implications on firms. First of all it is important that the government allows private firms to exist and compete on the same level with public firms, which is often not the case in some underdeveloped countries. Also the government should be able to help the private sector with

its support on funds and policies, but at the same time ensure that it does not interfere too much and disrupt the balance of the private market.

Rule of law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence (World Bank). The rule of law is very important for the overall performance of firms and can also affect the level of financial constraints. It is important that firms can be confident that the contracts they sign with financial institutions will be respected but also the other way around - that the inability of the firm to fulfill their obligations will be properly sanctioned.

Finally, the control of corruption shows to what extent the public power is exercised for private gain. Firms in most corrupted countries are expected to pay an amount of money to the people in power in order to proceed with different aspects of their business. This can imply that firms will lose a part of the recourses which could instead be used for gaining profit. To sum up, those six indicators will be combined to make one overall index which will represent the level of institutional development of each country.

3.5 Control variables

Two control variables are used: age and real interest rate. The date when company was founded is used to determine the age of firms. The intuition behind using this control variable is that older companies will face less financial constraints as they have more experience about the market, have a base of loyal customers and suppliers etc. This was confirmed by Beck et al (2006). Real interest rate is the lending interest rate adjusted for inflation as measured by the GDP deflator (World Bank). The main intuition behind using this variable is that companies which operate in countries with higher lending interest rate will face higher financial constraints as they will face more expensive credits.

Our intention was to use two more control variables from the article of Beck et al (2006) – government/private owned and foreign/domestic owned companies. It is expected that firms that are foreign owned will have easier access to external financing and the same can be said for government owned companies which will have funds available directly from the government and will face less risk of bankruptcy than private firms. However, those two control variables were not included in our model as the data was not available from DataStream.

4. Methodology

This section formulates the hypothesis and describes the method used for obtaining the empirical results. It also analyzes different assumptions that need to hold in order for our results to be reliable.

4.1 Hypothesis for empirical analysis

The first purpose of our paper is to see whether size of firms is indeed negatively related to the level of financial constraints for firms from our selected sample. We therefore construct the first hypothesis that we want to test.

Hypothesis 1: The level of financial constraints for firms is negatively correlated with the firm's size

The second purpose of this paper is to check whether different levels of country development are related with the size of financial constraints for companies. The second hypothesis that is tested in the empirical part is presented below.

Hypothesis 2: The level of financial constraints for firms is negatively correlated with the level of country's institutional, financial and economic development

4.2 Choosing the models

The data consists of both time series and cross-sectional elements and this dataset is known as panel data. Since a lot of data is missing from the sample, we have an unbalanced panel data. The time period captures 19 years - from 1996 to 2014. The reason why the time series starts in 1996 is that most of the World Bank indicators that we are using start from that year. There are three types of panel data techniques which we considered - pooled OLS, fixed effects model and random effects model. This section will explain which technique we prefer for our sample and the reasoning behind that.

The simplest way is to pool all the observations together and run the OLS regression model (Brooks, 2008). However, the problem with this approach is that pooled OLS is ignoring the heterogeneity or individuality that exists among different firms and countries. This is obviously not the best model to select for our sample, but we will run the regression anyway in order to compare them with other results.

When taking the heterogeneity of firms and countries into consideration, we then select between the fixed-effect model and the random-effect model for the evaluation. There are three types of fixed-effects models: cross-sectional fixed effects, time-fixed effects and fixed effects for both cross-sectional and time period dimensions. Fixed effect models are used when we expect the average value of dependent variable to change cross-sectionally or over time or both cross-sectionally and over time. On the other hand, in the random effects model the relationship between the explanatory and explained variables is assumed to be the same both cross-sectionally and temporally (Brooks, 2008). In our sample we expect that the average value of the depended variable (financial constraints) changes cross-sectionally. The reason for this is that all the firms have their own attributes and we expect a difference between the countries as well. This means that theoretically we would expect the fixed effects model (cross-sectional) to be the most appropriate for our sample.

In order to prove this empirically, we conducted a Hausman test for all models. In the Hausman test, the null hypothesis is that the random-effect model should be adopted. The alternative hypothesis is that the fixed-effect model should be adopted. When running the Hausman test for the sample, we obtained a statistically significant P-value which indicates that the null hypothesis is rejected and thus, the fixed-effect model should be adopted for evaluating the panel data. We have also considered adding fixed effects form the time dimension. Although we do not expect financial constraints to vary significantly over time, since it is a quite short time period, we estimated the regressions using fixed effects for both cross-sectional and time dimensions. However, the results were better if we only use fixed effects cross-sectionally, so we decided to use that panel technique.

When estimating the fixed effect model, we noticed a problem with the age variable. Since a lot of data was missing for the age of the companies, the inclusion of this variable means that we are losing a lot of observations (without age there are around 35.000, with age approximately 15.000). We faced a selection dilemma – whether to omit an important variable or keep it but lose a lot of observation. This is the reason why we choose to estimate the regressions both with and without the age variable, and to compare the results.

To conclude, in our empirical part we are going to present the results of the regressions between the financial constraints and other variables using the pooled OLS regressions model and the cross-sectional fixed-effect model (both with and without age variable).

4.3 OLS assumptions

Ordinary least squares (OLS) technique is used for this study. OLS has a number of desirable properties which needs to hold in order for the estimated results to be reliable. Brooks (2008) specifies several assumptions in his book and in this section we will run tests to see if those assumptions hold for our sample. If some of the assumptions are violated we will explain what implications it has on our results.

The first assumption is that the average value of the errors is zero. This assumption will never be violated if the constant term is included in the regression (Brooks, 2008). As the constant term is included in all of our regressions, we can say that the first assumption holds for our sample.

After this we test for multicollinearity using the correlation matrix. Commonly used rule of thumb suggests that there is no linear relationship between independent and control variable if the value is not over 0.8 or under -0.8 (Brooks, 2008). Correlation matrix is presented in appendix 1 and shows the correlation among the main variables used in our regressions. The results show that institutional development variable and GDP have a correlation of 0.85 which is a sign of multicollinearity problem. However, those two variables are run together only in the final model when all indicators are tested together. Before that all indicators are tested separately in regressions which do not have a multicollinearity problem.

One more assumption for OLS is that the covariance between the error terms over time is zero. If this assumption does not hold then there is a problem of autocorrelation. However, autocorrelation is more relevant for time series than panel data. Furthermore the time-dimension of our study is quite short and that is the reason why we do not test for autocorrelation (Brooks, 2008).

Finally, it is assumed that the disturbances are normally distributed. The results of Bera-Jarque test show that the p-value is less than 5% which means that residuals are not normally distributed. In other words we have a problem of non-normality. This have to be taken into account when interpreting our results, because we are not going to exclude outliers as that would significantly reduce the size of our sample. Also, Brooks (2008) suggest that this problem does not have a big impact on large samples.

5. Empirical findings

In this section empirical findings are presented and discussed. The first part of this section is presenting the descriptive statistics of the sample. After that the results of firm size effect on financial constraints are analyzed. Finally, the third part of this section is examining whether different types of development have significant effect on firm's external financing.

5.1. Descriptive statistics of the sample.

Before analyzing the empirical results, this section aims to introduce and explain about the descriptive statistics of the sample. Since the tables are too large they are presented in appendix 4. As it can be seen from the tables, the sample consists of 31 countries with 7 variables for each country. Among the 7 variables, the variable of financial constraints is regarded as the dependent variable, while the market capitalization, institutional development, development of financial markets and GDP per capita are considered as the independent variables. The other variables, such as interest rate and age of the firms are set up to be the control variables. For each variable, we show the minimum, maximum, mean and standard deviation respectively.

When it comes to the level of financial constraints, as can be seen from the table 4a in appendix 4, Vietnam has the highest mean of financial constraints (-0.47946) which indicate that the firms in Vietnam in general face more constraints than the other countries in our sample. By contrast, the firms in Brazil face the least financial constraints (-0.69494) compared with other countries. After we compare the financial constraints with the GDP per capita, it can be seen that the countries with higher GDP per capita have the lower financial constraints. This could lead to a general conclusion that firms which operate in more developed countries have easier access to funds for further development compared with less developed countries. Almost all countries which have less financial constraints are developed countries (for example: Netherland, Japan, France, and Sweden). The exceptions, however, are Singapore and Australia which face much higher financial constraints in our sample.

Market capitalization is used to represent the firms' size. Larger market capitalization indicates larger size of the firm. When it is related with the financial constraints, it can be also found that those countries with larger mean of market capitalization often face less financial constraints. For instance, we can compare the Australia with Sweden; both of them are highly developed countries. However in our collected sample, the mean of market capitalization for

Australia (213452) is much smaller than Sweden (2411421). This means that the firms we have collected for Australia are in general smaller than the firms in Sweden. As a result, the financial constraint for Australia (-0.4989064) is much higher than Sweden (-0.6200234).

The other two independent variables are the indicators of institutional development level and the development of financial markets. The higher values for institutional and financial market development level represent the more developed the countries are. So from the table, we can see that Denmark have the highest indicator of the development level (1.832959) while Nigeria obtains the lowest average indicator for the development level (-1.12842). In respect with the financial market, Switzerland shows the highest data (169.522) for the level of financial market which indicates that Switzerland has got more perfect financial market compared with other countries. Norway has got the highest GDP per capita (65640.35) which means a very high development of the economy followed by Switzerland, Denmark etc.

The two control variables are interest rate and age of the firms, as have been mentioned before. The interest rate represents the real interest rate; it is the nominal interest rate minus the inflation rate. Netherland has got the lowest number of interest rate (1.691252) compared with Brazil (43.92556) the highest. In respect with age, among all the firms we have collected, the firms in China (21) have obtained lowest mean of the age compared with the Netherland (88.22) which has got highest mean for the age.

5.2. Firm size and the level of financial constraints

The main purpose of this part is to examine the effect of firm size on the level of financial constraints. As we already stated in the theoretical background section, we expect that the size of company will be negatively correlated with the level of financial constraints for those firms. After running the regressions for our panel data, the results are presented in table 2.

$$\text{Equation 1: } FC_{it} = \alpha_i + \beta_0 MC_{it} + Y_0 Age_{it} + Y_1 Interestrate_{it} + Y_2 GDP_per_capita_{it} + \varepsilon$$

The dependent variable in our model is financial constraint; market capitalization is the independent variable, while age, interest rate and GDP per capita are control variables. GDP per capita was used to control for the differences among countries in the sample. As it has already been explained in the Methodology section, we will run 3 types of regressions – Pooled OLS, Fixed cross-sectional effects and fixed cross-sectional effects without the age variable. Then the regressions will be compared in order to determine the one that is most suitable for our data. We have first run the model for all 31 countries and then we have

divided the countries into 3 groups based on their development level (same as in Table 1). The model for all countries should tell us whether the size effect is significant in general, while the grouping of countries based on the development level should show us if the gap between financial constraints for small and large firms is smaller in the most developed countries.

| All countries | Pooled effect | Fixed effect | Fixed effect (without age) |
|------------------------------|----------------------------|----------------------------|----------------------------|
| Total panel observations | 14705 | 14705 | 33786 |
| Cross-sections | 1287 | 1287 | 3360 |
| MC | -6.18E-10*** (3.13E-11) | -6.24E-11*** (1.74E-11) | -8.78E-11*** (2.35E-11) |
| Age | 0.000315*** (1.97E-05) | NA (NA) | NA (NA) |
| Interest_rate | 0.000475*** (7.71E-05) | 0.000387*** (0.000100) | 0.000704*** (9.11E-05) |
| GDP_per_capita | -4.24E-07*** (4.00E-08) | -1.31E-06*** (5.65E-08) | -1.51E-06*** (6.15E-08) |
| R-squared | 0.060975 | 0.775890 | 0.683781 |
| Akaike info criterion | 1.695580 | 2.953513 | 2.282055 |
| Prob(F-statistic) | 0.000000 | 0.000000 | 0.000000 |
| Durbin-Watson stat | 0.371969 | 1.453816 | 1.667320 |

***significant at 1% level; **significant at 5% level; *significant at 10% level.

Table 2: The regression results for the implication of the firm's size on the financial constraints using pooled OLS estimation, fixed-effect estimation and fixed-effect (without age) estimation. The three control variables are Age, Interest rate and GDP per capita respectively.

After comparing the R squared, Akaike info criterion and Durbin-Watson stat for each model we see that fixed effects with age variable have got the best results. This means that we decided to include the age variable even if that means losing a lot of observations. Only for the countries with medium and low HDI results were better with fixed effects without the age variable. However, we included the age variable even there so that it is possible to compare the results with other groups of countries, which was the main point of dividing the countries into three groups at first place. This means that for interpretation of results concerning the effect of size on constraints we will only interpret the numbers from the model with fixed effects (including age).

When analyzing the results for all countries we can see that market capitalization is negatively correlated with the level of financial constraints. This is in line with our expectations and with results from previous articles. The value is very small, but this represents a change in market capitalization of only 1 USD. Much higher impact on financial constraints is expected if the market capitalization increases by 100.000 or one million USD. The results for age variable are not available due to lack of data for the date of companies foundation. Interest rate is positively correlated with the level of financial constraints which is a surprising result. Finally higher GDP per capita is linked to lower financial constraints, which is expected.

We obtain similar results even when the sample is divided into three groups of countries according to their level of development. Tables with those results are available in appendix 3, with table 3a presenting results for countries with very high HDI, table 3b countries with high HDI and table 3c countries with medium and low HDI. Size is negatively correlated for all three groups, as well as GDP per capita. Interest rate coefficient is positive for very high and medium and low group, and is negative for high development countries. When comparing the countries with very high HDI with those with medium and low HDI we notice that the size coefficient is higher for less developed countries. This could indicate that the difference between large and small firms is larger in less developed countries, which has already been discussed in the theoretical framework section. However, the size effect is smaller in countries with high HDI than in those with very high HDI which raise a doubt about those findings.

5.3. The impact of country development on financial constraints

This part of the empirical section focus on county development and its effect on reducing the financial obstacles for companies. The development of countries is measured by 3 aspects – institutional development, development of financial markets and economic development. First the regressions are run with each of those indicators separately and at the end all of the indicators are combined together. Finally, all the results are compared in order to draw the right conclusion about the significance of each development indicator.

Institutional development

When analyzing the institutional development, first the regression with 6 governance indicators is estimated (equation 2). Afterwards, those six indicators are replaced with INST_DEV variable which is the average of them (equation 3).

Equation 2: $FC_{it} = \alpha_i + \beta_0VoiceandAcc_{it} + \beta_1Polstability_{it} + \beta_2Governmenteff_{it} + \beta_3RegQuality_{it} + \beta_4RuleofLaw_{it} + \beta_5Corruption_{it} + Y_0MC_{it} + Y_1Age_{it} + Y_2Interestrates_{it} + \varepsilon$

Equation 3: $FC_{it} = \alpha_i + \beta_0INST_DEV_{it} + Y_0MC_{it} + Y_1Age_{it} + Y_2Interestrates_{it} + \varepsilon$

| All countries | Pooled | Fixed effects | Fixed effects (without age) |
|---------------------------------------|----------------------------|----------------------------|-----------------------------|
| Total panel (unbalanced) observations | 14750 | 14705 | 33786 |
| Cross-sections included | 1287 | 1287 | 3360 |
| MC | -6.12E-10*** (3.09E-11) | -7.09E-11*** (1.77E-11) | -1.03E-10*** (2.37E-11) |
| Age | -0.000332*** (1.99E-05) | NA NA | NA NA |
| Interest_Rate | 0.000160* (8.56E-05) | 0.000786*** (0.000101) | 0.000953*** (9.14E-05) |
| Voice and acc | 8.12E-05 (0.002366) | -0.020235*** (0.003027) | -0.009781*** (0.003149) |
| Pol Stability | -0.032891*** (0.002340) | 0.015905*** (0.002002) | 0.010367*** (0.001974) |
| Government eff | 0.003151 (0.004742) | 0.001157 (0.7884) | -0.004829 (0.003791) |
| Reg Quallity | 0.015568*** (0.004201) | -0.026092*** (0.003676) | -0.025318*** (0.003622) |
| Rule of Law | 0.072058*** (0.004261) | 0.011379** (0.005258) | -0.002929 (0.004900) |
| Corruption | -0.050904*** (0.004640) | 0.001336 (0.004095) | -0.035709*** (0.003397) |
| R - squared | 0.082630 | 0.769715 | 0.679272 |
| Prob F - statistics | 0.000000 | 0.000000 | 0.000000 |
| Akaike info criterion | -1.718231 | -2.925653 | -2.267603 |
| Durbin-Watson stat | 0.390816 | 1.434554 | 1.657814 |

***significant at 1% level; **significant at 5% level; *significant at 10% level.

Table 3: The regression results for the implication of different institutional development's indicators on the financial constraints using pooled OLS estimation, fixed-effect estimation and fixed-effect (without age) estimation. The three control variables are firms' size, age and interest rate respectively.

Table 3 shows that in both cases the cross-sectional fixed effects model is the best choice, so we will only focus on those results. In the case of equation 2, size remains negative with probability 1% while interest rate is positive with the same significance level. Voice and accountability and regulatory quality are negatively correlated with the financial obstacles for firms, which is line with our expectations. The surprising results are that political stability and rule of law variables have a positive sign. Coefficients for government effectiveness and corruption are both positive as well but are not significant.

| All countries | Pooled | Fixed effects | Fixed effects (without age) |
|---------------------------------------|----------------------------|----------------------------|-----------------------------|
| Total panel (unbalanced) observations | 14705 | 14705 | 33786 |
| Cross-sections included | 1287 | 1287 | 3360 |
| MC | -6.23E-10*** (3.14E-11) | -7.41E-11*** (1.78E-11) | -0.628845*** (0.001903) |
| Age | -0.000349*** (2.01E-05) | NA NA | NA NA |
| Interest_Rate | -0.000440*** (7.75E-05) | 0.000901*** (0.000100) | 0.001107*** (9.03E-05) |
| INST_DEV | -0.003666*** (0.000998) | 0.010178*** (0.003704) | 0.0021826*** (0.004063) |
| R - squared | 0.054642 | 0.766967 | 0.677839 |
| Prob F - statistics | 0.000000 | 0.000000 | 0.000000 |
| Akaike info criterion | -1.688858 | -2.914471 | -2.263439 |
| Durbin-Watson stat | 0.371133 | 1.421521 | 1.649748 |

***significant at 1% level; **significant at 5% level; *significant at 10% level.

Table 4: The regression results for the implication of institutional development on the financial constraints using pooled OLS estimation, fixed-effect estimation and fixed-effect (without age) estimation. The three control variables are firms' size, age and interest rate respectively.

When we run the regression 3, we see that the coefficient for institutional development is positive, which would mean that firms operating in countries with worse institutions face less financial constraints. This result is not logical and is in contrary to our expectations and previous research, so the final conclusion about the institutional development will be drawn after running the regression with other development indicators.

Development of financial markets

Two models are used to determine the effect of financial market development on financial constraints. First model consists of domestic credit and value traded as one of the control variables (equation 4), while in the second model those two variables are replaced with FIN_MAR variable which represents the average of them (equation 5).

Equation 4: $FC_{it} = \alpha_i + \beta_0 Dom-credit_{it} + \beta_1 Value_traded_{it} + Y_0 MC_{it} + Y_1 Age_{it} + Y_2 Interestrate_{it} + \varepsilon$

Equation 5: $FC_{it} = \alpha_i + \beta_0 FIN_MAR_{it} + Y_0 MC_{it} + Y_1 Age_{it} + Y_2 Interestrate_{it} + \varepsilon$

| All countries | Pooled | Fixed effects | Fixed effects (without age) |
|---------------------------------------|----------------------------|----------------------------|-----------------------------|
| Total panel (unbalanced) observations | 14555 | 14555 | 33412 |
| Cross-sections included | 1282 | 1282 | 3326 |
| MC | -6.23E-10*** (3.12E-11) | -6.50E-11*** (1.76E-11) | -9.16E-11*** (2.35E-11) |
| Age | -0.000344*** (1.95E-05) | NA NA | NA NA |
| Interest_Rate | -0.000632*** (8.35E-05) | 0.000495*** (0.000105) | 0.001012*** (9.31E-05) |
| Dom-credit | -5.19E-05*** (1.90E-05) | -0.000414*** (2.71E-05) | -0.000340*** (2.66E-05) |
| Value_traded | -7.48E-05*** (1.61E-05) | -0.000143*** (1.23E-05) | -0.000139*** (1.16E-05) |
| R - squared | 0.058269 | 0.773304 | 0.682965 |
| Prob F - statistics | 0.000000 | 0.000000 | 0.000000 |
| Akaike info criterion | -1.691156 | -2.939381 | -2.279489 |
| Durbin-Watson stat | 0.372699 | 1.458810 | 1.653459 |

***significant at 1% level; **significant at 5% level; *significant at 10% level.

Table 5: The regression results for the implication of domestic credit and value traded on the financial constraints using pooled OLS estimation, fixed-effect estimation and fixed-effect (without age) estimation. The three control variables are firms' size, age and interest rate respectively.

Once again the cross-sectional fixed effect model was selected as most appropriate one, based on the results from table 5 and 6. Results from equation 4 show that both the domestic credit and value traded have negative coefficients, which suggest that they are negatively correlated with the level of financial obstacles for firms. Those results are consistent with the findings from previous articles and the significance level of 1% strengthens them even more.

| All countries | Pooled | Fixed effects | Fixed effects (without age) |
|---|----------------------------|----------------------------|--------------------------------|
| Total panel (unbalanced) observations | 14555 | 14555 | 33412 |
| Cross-sections included | 1282 | 1282 | 3326 |
| MC | -6.24E-10*** (3.13E-11) | -6.77E-11*** (1.76E-11) | -9.53E-11*** (2.35E-11) |
| Age | -0.000344*** (1.95E-05) | NA | NA |
| Interest_Rate | -0.000637*** (8.32E-05) | 0.000555*** (0.000105) | 0.001009*** (9.31E-05) |
| FIN_MAR | -0.000129*** (1.71E-05) | -0.000378*** (2.24E-05) | -0.000355*** (2.01E-05) |
| R - squared | 0.058233 | 0.771890 | 0.682508 |
| Prob F - statistics | 0.000000 | 0.000000 | 0.000000 |
| Akaike info criterion | -1.691255 | -2.933298 | -2.278106 |
| Durbin-Watson stat | 0.372756 | 1.449252 | 1.650427 |

***significant at 1% level; **significant at 5% level; *significant at 10% level.

Table 6: The regression results for the implication of financial markets on the financial constraints using pooled OLS estimation, fixed-effect estimation and fixed-effect (without age) estimation. The three control variables are firms' size, age and interest rate respectively.

Coefficients for market capitalization and interest rate remain the same as from previous regressions (negative and positive, respectively).

In model 5 FIN_MAR is used as the representative of development level of financial markets. Results from table 6 indicate that the coefficient for this variable is -0.000378 and highly significant. This confirms our results from the previous model – the development of financial markets is indeed important in reducing the financial constraints for firms.

Economic development

The level of economic development is measured by GDP per capita and the regression is presented in equation 6.

$$\text{Equation 6: } FC_{it} = \alpha_i + \beta_0 \text{GDP_per_capita}_{it} + Y_0 \text{MC}_{it} + Y_1 \text{Age}_{it} + Y_2 \text{Interestrates}_{it} + \varepsilon$$

After running the regression using equation 6 the results from table 7 were obtained. Once again, cross-sectional fixed effects model have the best results for R – squared (0.77589) and Akaike info criterion (-2.953513) and was therefore selected as the most appropriate for interpreting the results of economic development. The coefficient for GDP is negative and highly significant which is consistent with our expectations.

| All countries | Pooled | Fixed effects | Fixed effects (without age) |
|---------------------------------------|----------------------------|----------------------------|-----------------------------|
| Total panel (unbalanced) observations | 14705 | 14705 | 33786 |
| Cross-sections included | 1287 | 1287 | 3360 |
| MC | -6.18E-10*** (3.13E-11) | -6.24E-11*** (1.74E-11) | -8.78E-11*** (2.35E-11) |
| Age | -0.000315*** (1.97E-05) | NA NA | NA NA |
| Interest_Rate | -0.000475*** (7.71E-05) | 0.000387*** (0.000100) | 0.000704*** (9.11E-05) |
| GDP per capita | -4.24E-07*** (4.00E-08) | -1.31E-06*** (5.65E-08) | -1.51E-06*** (6.15E-08) |
| R - squared | 0.060975 | 0.775890 | 0.683781 |
| Prob F - statistics | 0.000000 | 0.000000 | 0.000000 |
| Akaike info criterion | -1.695580 | -2.953513 | -2.282055 |
| Durbin-Watson stat | 0.371969 | 1.453816 | 1.667320 |

***significant at 1% level; **significant at 5% level; *significant at 10% level.

Table 7: The regression results for the implication of economic development on the financial constraints using pooled OLS estimation, fixed-effect estimation and fixed-effect (without age) estimation. The three control variables are firms' size, age and interest rate respectively.

All the indicators together

After analyzing the development indicators separately, in this part we run the regression with all indicators together in order to see whether the results remain the same. The regression is presented in equation 7, bellow.

$$\text{Equation 7: } FC_{it} = \alpha_i + \beta_0 MC_{it} + \beta_1 Age_{it} + \beta_2 Interest_rate_{it} + \beta_3 INST_DEV_{it} + \beta_4 FIN_MAR_{it} + \beta_5 GDP_per_capita_{it} + \varepsilon$$

All the results are presented in table 8, with cross-sectional effects model (including age variable) being selected as the most appropriate. The result for institutional development is once again positive, but in this model it is not significant even at 10% significance level. The

coefficients for financial market development and economic development remain negative and highly significant. Market capitalization remains negative and highly significant, while the interest rate is positive but not significant enough. Age is negative and significant for pooled model, but there is not enough data available for the cross-sectional fixed effects model.

| All countries | Pooled | Fixed effects | Fixed effects (without age) |
|---------------------------------------|----------------------------|----------------------------|-----------------------------|
| Total panel (unbalanced) observations | 14555 | 14555 | 33412 |
| Cross-sections included | 1282 | 1282 | 3326 |
| MC | -6.11E-10*** (3.11E-11) | -5.66E-11*** (1.73E-11) | -7.22E-11*** (2.34E-11) |
| Age | -0.000338*** (2.01E-05) | NA NA | NA NA |
| Interest_Rate | -0.000658*** (8.33E-05) | 0.000270 (0.000105) | 0.000753*** (9.31E-05) |
| INST_DEV | 0.020662*** (0.001870) | 0.002115 (0.003631) | 0.011461*** (0.004036) |
| FIN_MAR | -5.32E-05** (2.37E-05) | -0.000316*** (2.22E-05) | -0.000284*** (2.01E-05) |
| GDP per capita | -1.15E-06*** (8.07E-08) | -1.29E-06*** (5.98E-08) | -1.47E-06*** (6.58E-08) |
| R - squared | 0.071342 | 0.779706 | 0.688010 |
| Prob F - statistics | 0.000000 | 0.000000 | 0.000000 |
| Akaike info criterion | -1.704998 | -2.967890 | -2.295468 |
| Durbin-Watson stat | 0.375503 | 1.482516 | 1.670182 |

***significant at 1% level; **significant at 5% level; *significant at 10% level.

Table 8: The regression results for the implication of institutional, financial and economic development on the financial constraints in the use of pooled OLS estimation, fixed-effect estimation and fixed-effect (without age) estimation. The three control variables are firms' size, age and interest rate respectively.

After analyzing all the results for development indicators, both separately and together we can make some final conclusions. The only surprising result is the coefficient sign of institutional development. The reason behind this is that 4 out of 6 governance indicators (political stability, government effectiveness, rule of law and corruption) that are incorporated into the institutional development variable are positive. However, we fail to accept these results, because the INST_DEV variable was not significant when FIN_MAR and GDP variables were included into the regression. This means that institutional development does not have a significant effect on the level of financial constraints for companies. On the other hand, both

development of financial markets and economic development have a significant effect on reducing financial obstacles for firms.

6. Conclusion

This paper provides further evidence about the factors affecting financial obstacles for firms, using a large sample from 31 countries around the world. The first factor that was analyzed is the firm size. It has once more been proved that smaller firms generally face higher level of financial constraints and vice versa. Those results hold even for the most developed countries, indicating that the process of relaxing financial constraints for SME is still not finished. However, the difference between the level of financial obstacles for small and large firms was lower in countries with very high and high level of development which could indicate that the measures and procedures which have been implemented for some time now, have brought some improvements for this issue. Overall, it is certain that SME still need support in this area. Financial constraints need to be relaxed for those firms in order to compete with larger companies and to be able to grow.

The other part of the empirical analysis was focusing on the development level of countries and its effect on financial constraints for companies. It was interesting to see whether higher level of development is related to lower financial constraints for firms and vice versa. Our results indeed prove that countries with better financial markets and overall economy have a better environment for their firms, in sense of having lower financial constraints. Our results from this section further strengthens results from previous researches and offers a guideline for policy makers in their attempt of offering a better business environment for companies. Better development of financial institutions and higher life standard are important for relaxing the level of financial obstacles for companies. This is of course a long term process of country development on all aspects, which has already begun in most of the countries.

The unexpected results were obtained for the impact of institutional development on reducing the financial constraints. The results are showing that higher level of institutional development for countries is related to higher level of financial obstacles for firms. Those results are significant when the institutional variable is run separately but is not significant when it is estimated together with other development indicators. Either way those results are surprising as it is expected that better development of institutions (especially rule of law, political stability and reduced corruption) would result in lower financial constraints for firms. The reasons behind those results could be different. A sample with different countries could

have resulted in different results for this indicator. However, we feel that a sample of 31 countries, with diversity in the level of development, should be large enough to prove a point. The second possible explanation could be in the choice of indicators. For the purpose of describing the institutional development of countries six governance indicators from World Bank are the most appropriate ones to use. However, it is possible that a different approach in measuring the level of institutional development would result in different findings. On the other hand, if we accept that financial constraints are lower in countries with worse institutions it could have some different implications. Companies in less developed countries nowadays have more options to obtain funding as there are several banks and institutions that are specialized in providing funds for companies in only those regions. As it was mentioned already in our paper, the World Bank and other supporting programs lend huge amounts of money to those regions in order to relax funding problems for their firms. This could result that companies in less developed regions actually face less financial constraints as they have access to funding from different sources, while companies in more developed countries are left to the rigorous system of markets with fair competition. However, it makes sense to refuse this possibility as results for both the development of financial markets and economy indicate opposite findings. In that sense it is fair to accept the results from institutional development from equation 7 which indicate that there is no significant relationship between the level of institutional development and financial constraints for our sample.

6.1. Suggestions for future research

We conclude our paper with some suggestions for future research related to our topic. Those suggestions are results of some limitations that we faced during writing this project and obtaining the data for empirical part. We suggest using the Whited-Wu index for calculating the level of financial constraints but also:

- Including more control variables such as: foreign/domestic and government/private ownership and similar;
- Expanding the sample with more countries from low development group and USA;
- If the results for institutional development is still positive or insignificant - offering some explanation along with empirical evidence;
- Analyzing whether the difference between financial constraints for small and large firms is changing over time

As countries are constantly developing new measures and procedures for reducing this problem it is important to often update the data and results in order to see whether those reforms have a positive effect on relaxing financial constraints for companies in different regions.

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Appendices

Appendix 1: Table with regression variables

| Variables | Description |
|-------------------------|--|
| FC_{it} | Financial Constraints, at time t for cross-sectional unit t. |
| $VoiceandAcc_{it}$ | Voice and Accountability represents the extent which a country's citizens are able to participate in selecting their government ,at time t for cross-sectional unit t. |
| $Polstability_{it}$ | Political stability indicates the durability and integrity of a current government regime, at time t for cross-sectional unit t. |
| $Governenteff_{it}$ | Government effectiveness captures the quality of public services, the quality of the civil service and the degree of its independence from political pressures, at time t for cross-sectional unit t |
| $RegQuality_{it}$ | Regulation quality defines the ability of the governments to implement series of regulations and policies that permit and promote private sector development, at time t for cross-section unit1. |
| $RuleofLaw_{it}$ | The legal principle that law should govern a nation and primarily refers to the influence and authority of law within society, at time t for cross-sectional unit t |
| $Corruption_{it}$ | Corruption measures the abuse of bestowed power or position to acquire a personal benefit at time t for cross-sectional unit 1. |
| MC_{it} | Market capitalization in our thesis represents the size of the firms, at time t for cross-sectional unit 1. |
| Age_{it} | Age represents the time since the firms founded, at time t for cross-sectional unit 1. |
| $Interest_rate_{it}$ | Interest rate in our thesis is the real interest rate which an investor expects to receive after allowing for inflation, at time t for cross-sectional unit 1 |
| $INST_DEV_{it}$ | INST_DEV is the combination of the institutional indicators which represents the degree of the country's institutional development, at time t for cross-sectional unit 1. |
| $Dom-credit_{it}$ | Domestic credit refers to lending or credit that a country or territory's central bank makes available to borrowers within the same territory, at time t for cross-sectional unit 1. |
| $Value_traded_{it}$ | Value traded refers to the local value of shares traded during the period, at time t for cross-sectional unit1,at time t for cross-sectional1 |
| FIN_MAR_{it} | FIN_MAR is calculated as the combination of domestic credit and value traded, it represents the development of the financial markets. |
| $GDP_per_capita_{it}$ | GDP per capita represents the level of the economic development within one country. |
| α_i | The intercept term, varying across-section |
| B_i | Coefficient |
| Y_i | A vector of coefficients |
| ϵ | The error term, varying over time and across-section |

Appendix 2: The correlation matrix table

| | FC | MC | AGE1 | INTEREST_RATE | INST_DEV | FIN_MAR | GDP |
|---------------|-----------|-----------|----------|---------------|----------|----------|----------|
| FC | 1.000000 | | | | | | |
| MC | -0.164102 | 1.000000 | | | | | |
| AGE1 | -0.164094 | 0.025124 | 1.000000 | | | | |
| INTEREST_RATE | -0.046739 | -0.005750 | 0.018574 | 1.000000 | | | |
| INST_DEV | -0.079885 | 0.020593 | 0.329016 | -0.110452 | 1.000000 | | |
| FIN_MAR | -0.076387 | 0.007106 | 0.202857 | -0.304002 | 0.678909 | 1.000000 | |
| GDP | -0.135652 | 0.032574 | 0.298852 | -0.145484 | 0.851287 | 0.696073 | 1.000000 |

Appendix 3: Impact of firm's size on the level of financial constraints

3a: Countries with very high HDI

| Very high HDI | Pooled effect | Fixed effect | Fixed effect (without age) |
|------------------------------|----------------------------|----------------------------|----------------------------|
| Total panel observations | 7589 | 7589 | 12040 |
| Cross-sections | 726 | 726 | 1245 |
| market capitalization | -3.59E-09*** (9.01E-11) | -5.66E-10*** (1.02E-10) | -2.28E-10** (1.03E-10) |
| Age | 0.000209*** (2.02E-05) | NA (NA) | NA (NA) |
| Interest rate | 0.000777*** (0.000132) | 0.000149** (0.000208) | 0.000299* (0.000252) |
| GDP | -4.15E-07*** (6.51E-08) | -1.11E-06*** (5.30E-08) | -1.27E-06*** (6.58E-08) |
| R-squared | 0.200597 | 0.836132 | 0.717545 |
| Akaike info criterion | 1.867850 | 3.261852 | 2.339424 |
| Prob(F-statistic) | 0.000000 | 0.000000 | 0.000000 |
| Durbin-Watson stat | 0.357981 | 1.641564 | 2.015905 |

***significant at 1% level; **significant at 5% level; *significant at 10% level.

Table 3a: The regression results for the implication of firms' size on the financial constraints using pooled OLS estimation, fixed-effect estimation and fixed-effect (without age) estimation for the very high HDI developed countries. The three control variables are age, interest rate and GDP per capita respectively.

3b: Countries with high HDI

| High HDI | Pooled effect | Fixed effect | Fixed effect (without age) |
|------------------------------|----------------------------|----------------------------|----------------------------|
| Total panel observations | 4764 | 4764 | 12987 |
| Cross-sections | 372 | 372 | 1073 |
| market capitalization | -1.70E-10*** (2.84E-11) | -2.54E-11* (1.36E-11) | -4.21E-11* (2.74E-11) |
| Age | -4.93E-05* (5.07E-05) | NA (NA) | NA (NA) |
| Interest rate | 0.001378*** (9.01E-05) | -5.08E-05* (0.000118) | 0.000753*** (0.000147) |
| GDP | -1.48E-05*** (4.28E-07) | -9.36E-06*** (3.28E-07) | -6.52E-06*** (3.40E-07) |
| R-squared | 0.243015 | 0.852707 | 0.617168 |
| Akaike info criterion | 2.001223 | 3.482812 | 2.046991 |
| Prob(F-statistic) | 0.000000 | 0.000000 | 0.000000 |
| Durbin-Watson stat | 0.272570 | 1.350657 | 1.527322 |

***significant at 1% level;**significant at 5% level;*significant at 10% level.

Table 3b: The regression results for the implication of firms' size on the financial constraints using pooled OLS estimation, fixed-effect estimation and fixed-effect (without age) estimation for the high HDI developed countries. The three control variables are age, interest rate and GDP per capita respectively.

3c: Countries with medium & low HDI

| Medium and Low HDI | Pooled | Fixed effect | Fixed effect (without age) |
|------------------------------|----------------------------|----------------------------|----------------------------|
| Total panel observations | 2352 | 2352 | 8759 |
| Cross-sections | 189 | 189 | 1042 |
| market capitalization | -1.08E-08*** (6.80E-10) | -2.63E-09*** (6.99E-10) | -1.98E-09*** (2.46E-10) |
| Age | 0.000851*** (8.32E-05) | NA (NA) | NA (NA) |
| Interest rate | 0.000249* (0.000352) | 0.000605** (0.000278) | 0.000271** (0.000116) |
| GDP | -9.18E-06*** (1.11E-06) | -1.64E-05*** (1.49E-06) | -1.43E-05*** (5.93E-07) |
| R-squared | 0.186084 | 0.553199 | 0.781777 |
| Akaike info criterion | 1.683856 | 2.124586 | 2.867689 |
| Prob(F-statistic) | 0.000000 | 0.000000 | 0.000000 |
| Durbin-Watson stat | 0.837428 | 1.492794 | 1.487695 |

***significant at 1% level; **significant at 5% level; *significant at 10% level.

Table 3c: The regression results for the implication of firms' size on the financial constraints using pooled OLS estimation, fixed-effect estimation and fixed-effect (without age) estimation for the medium and low HDI developed countries. The three control variables are age, interest rate and GDP per capita respectively.

Appendix 4: Descriptive statistics**Table 4a: Descriptive statistics for financial constraints and market capitalization**

| Countries | Financial constraints | | | | market capitalization | | | |
|----------------------|-----------------------|--------------|--------------|---------------|-----------------------|------------------|--------------------|--------------------|
| | Minimum | Maximum | Mean | St. Deviation | Minimum | Maximum | Mean | St. Deviation |
| Nigeria | -0,75 | -0,30 | -0,56 | 0,09 | 183 | 25842811 | 720737,531 | 2613707,693 |
| Kenya | -0,73 | -0,38 | -0,57 | 0,08 | 1488 | 5717048 | 249212,667 | 574702,5645 |
| Australia | -1,00 | -0,18 | -0,50 | 0,13 | 147 | 8360249 | 213451,879 | 767097,6663 |
| Brazil | -0,94 | -0,37 | -0,69 | 0,10 | 331 | 204265172 | 4581903,42 | 15005663,8 |
| China | -0,92 | -0,33 | -0,66 | 0,09 | 7834 | 263081880 | 2709425 | 11402684,37 |
| Denmark | -0,85 | -0,33 | -0,61 | 0,10 | 139 | 124979639 | 3776898,91 | 13398798,02 |
| India | -0,95 | -0,22 | -0,55 | 0,10 | 76 | 49376626 | 653820,19 | 3148687,943 |
| Indonesia | -0,96 | -0,26 | -0,59 | 0,10 | 273 | 34633307 | 1142219,48 | 3544541,135 |
| Japan | -0,86 | -0,28 | -0,66 | 0,08 | 2072 | 37481492 | 1109013,32 | 2634237,134 |
| Norway | -0,99 | -0,36 | -0,62 | 0,08 | 560 | 7094807 | 554975,257 | 886523,5103 |
| Pakistan | -0,76 | -0,36 | -0,57 | 0,06 | 418 | 2458838 | 174875,709 | 298549,4579 |
| Singapore | -0,92 | -0,27 | -0,56 | 0,09 | 1191 | 14702237 | 236193,839 | 947546,0394 |
| Uk | -0,92 | -0,22 | -0,62 | 0,14 | 130 | 214126776 | 8030149,45 | 20934651,79 |
| South Africa | -0,92 | -0,25 | -0,65 | 0,09 | 16 | 111640026 | 2334098,69 | 5434614,381 |
| Tanzania | -0,65 | -0,38 | -0,53 | 0,08 | 3686 | 1441311 | 171971,95 | 260532,8621 |
| Vietnam | -0,72 | -0,29 | -0,48 | 0,07 | 76 | 1995238 | 25715,1661 | 97911,19529 |
| Peru | -0,90 | -0,37 | -0,61 | 0,08 | 617 | 23182762 | 785906,762 | 1776591,103 |
| Egypt | -0,81 | -0,35 | -0,59 | 0,08 | 599 | 20164169 | 509522,206 | 1424302,604 |
| France | -0,98 | -0,14 | -0,63 | 0,12 | 312 | 200627674 | 4125200,96 | 12973985,87 |
| Netherlands | -0,94 | -0,01 | -0,67 | 0,12 | 774 | 252453596 | 10332086,3 | 27589090,01 |
| Russia | -0,95 | -0,35 | -0,66 | 0,12 | 860 | 313753473 | 6434365,46 | 18663587,41 |
| Mexico | -1,00 | -0,38 | -0,66 | 0,09 | 1415 | 2,182E+09 | 5626972,41 | 67302293,54 |
| Sweden | -0,86 | -0,19 | -0,62 | 0,10 | 277 | 129575109 | 2411421,34 | 8052130,904 |
| Malaysia | -1,00 | -0,19 | -0,57 | 0,09 | 92 | 22218897 | 512593,676 | 1724850,707 |
| Switzerland | -0,94 | -0,32 | -0,65 | 0,10 | 4491 | 263492813 | 5442322,54 | 22958915,09 |
| Thailand | -0,92 | -0,29 | -0,56 | 0,09 | 24 | 23067157 | 551103,586 | 1896583,85 |
| Jamica | -0,70 | -0,27 | -0,51 | 0,10 | 165 | 243806 | 64268,6667 | 64976,03203 |
| Morroco | -0,81 | -0,38 | -0,59 | 0,08 | 2989 | 18831933 | 1412488,04 | 4653150,971 |
| Kazakstan | -0,79 | -0,44 | -0,59 | 0,10 | 1877 | 10795293 | 1099119,74 | 2180322,053 |
| Mauritus | -0,68 | -0,30 | -0,55 | 0,09 | 313 | 813374 | 99227,3204 | 139467,2511 |
| Average total | -0,87 | -0,29 | -0,60 | 0,09 | 1114,1667 | 152292068 | 2203042,049 | 8445023,232 |

Table 4b: Descriptive statistics for institutional development and financial market development

| Countries | Institutional development | | | | Financial market dev. | | | |
|----------------------|---------------------------|-------------|-------------|-------------|-----------------------|--------------|--------------|---------------|
| | Minimum | Maximum | Mean | Standard | Minimum | Maximum | Mean | St. Deviation |
| Nigeria | -1,01 | -1,25 | -1,13 | 0,07 | 4,61 | 21,67 | 9,02 | 4,87 |
| Kenya | -0,82 | -0,62 | -0,72 | 0,06 | 12,76 | 16,95 | 14,46 | #REF! |
| Australia | 1,50 | 1,69 | 1,58 | 0,05 | 53,85 | 137,87 | 91,60 | 22,03 |
| Brazil | -0,11 | 0,12 | 0,01 | 0,07 | 20,11 | 45,32 | 35,40 | 13,59 |
| China | -0,60 | -0,42 | -0,51 | 0,05 | 60,08 | 165,25 | 96,22 | 30,10 |
| Denmark | 1,77 | 1,91 | 1,83 | 0,04 | 24,73 | 136,59 | 96,22 | 36,86 |
| India | -0,38 | -0,08 | -0,26 | 0,06 | 23,53 | 67,41 | 46,52 | 12,87 |
| Indonesia | -0,93 | -0,35 | -0,62 | 0,20 | 13,16 | 40,37 | 22,88 | 7,07 |
| Japan | 0,94 | 1,31 | 1,14 | 0,11 | 113,23 | 167,01 | 131,50 | 15,58 |
| Norway | 1,65 | 1,81 | 1,72 | 0,05 | 40,26 | 100,69 | 60,42 | 18,53 |
| Pakistan | -1,18 | -0,75 | -0,98 | 0,14 | 10,92 | 78,70 | 29,87 | 18,90 |
| Singapore | 1,39 | 1,58 | 1,50 | 0,04 | 68,99 | 149,64 | 98,62 | 17,51 |
| Uk | 1,31 | 1,66 | 1,50 | 0,12 | 76,70 | 263,05 | 141,36 | 43,30 |
| South Africa | 0,19 | 0,43 | 0,33 | 0,07 | 69,40 | 158,15 | 110,37 | 24,05 |
| Tanzania | -0,65 | -0,32 | -0,47 | 0,10 | 1,93 | 8,98 | 5,87 | 2,62 |
| Vietnam | -0,58 | -0,42 | -0,51 | 0,05 | 19,95 | 64,78 | 43,09 | 14,24 |
| Peru | -0,44 | -0,20 | -0,30 | 0,07 | 9,97 | 17,30 | 14,19 | 2,17 |
| Egypt | -0,91 | -0,26 | -0,50 | 0,19 | 18,39 | 46,72 | 29,33 | 8,40 |
| France | 1,15 | 1,27 | 1,21 | 0,04 | 48,97 | 115,38 | 78,98 | 16,11 |
| Netherlands | 1,63 | 1,91 | 1,73 | 0,09 | 84,08 | 196,55 | 129,82 | 28,09 |
| Russia | -0,86 | -0,60 | -0,74 | 0,06 | 4,54 | 56,35 | 29,13 | 17,66 |
| Mexico | -0,30 | 0,06 | -0,12 | 0,09 | 9,49 | 20,28 | 14,21 | 3,42 |
| Sweden | 1,68 | 1,83 | 1,76 | 0,05 | 69,76 | 156,89 | 104,13 | 19,45 |
| Malaysia | 0,20 | 0,49 | 0,36 | 0,08 | 66,82 | 156,87 | 89,22 | 25,09 |
| Switzerland | 1,69 | 1,83 | 1,74 | 0,04 | 124,27 | 265,13 | 169,52 | 34,18 |
| Thailand | -0,34 | 0,33 | -0,03 | 0,27 | 63,61 | 110,25 | 85,45 | 13,61 |
| Jamica | -0,11 | 0,10 | 0,00 | 0,06 | 6,95 | 16,42 | 12,81 | 2,43 |
| Morroco | -0,40 | 0,11 | -0,22 | 0,16 | 14,33 | 48,52 | 31,65 | #REF! |
| Kazakstan | -0,86 | -0,42 | -0,65 | 0,11 | 2,59 | 33,71 | 15,18 | 9,06 |
| Mauritus | 0,59 | 0,83 | 0,74 | 0,07 | 22,58 | 55,87 | 38,34 | 9,35 |
| Average total | 0,17 | 0,45 | 0,31 | 0,09 | 38,69 | 97,29 | 62,51 | #REF! |

Table 4c: Descriptive statistics for GDP per capita and interest rate

| Countries | GDP | | | | Interest rate | | | |
|----------------------|-----------------|-----------------|-----------------|----------------|---------------|--------------|-------------|---------------|
| | Minimum | Maximum | Mean | St. Deviation | Minimum | Maximum | Mean | St. Deviation |
| Nigeria | 273,85 | 3005,51 | 1170,57 | 950,20 | -42,31 | 25,28 | 4,57 | 15,96 |
| Kenya | 398,41 | 1245,51 | 702,13 | 297,30 | -8,13 | 21,10 | 8,75 | 8,14 |
| Australia | 19496,64 | 67524,76 | 37920,88 | 17345,44 | 1,03 | 7,62 | 5,13 | 1,89 |
| Brazil | 2810,70 | 12576,20 | 6687,61 | 3286,61 | 18,37 | 78,79 | 43,93 | 14,51 |
| China | 703,12 | 6807,43 | 2713,94 | 2051,26 | -2,28 | 7,34 | 2,90 | 2,96 |
| Denmark | 30743,00 | 64181,00 | 47071,81 | 12117,78 | 4,64 | 6,59 | 5,60 | 0,69 |
| India | 410,82 | 1539,61 | 876,04 | 430,50 | -0,60 | 9,19 | 5,74 | 2,40 |
| Indonesia | 470,20 | 3551,42 | 1800,35 | 1059,72 | -24,60 | 12,32 | 3,54 | 8,11 |
| Japan | 30967,29 | 46679,27 | 37313,24 | 4586,44 | 1,84 | 3,85 | 2,96 | 0,58 |
| Norway | 34105,92 | 100818,50 | 65640,35 | 25754,92 | 18,37 | 78,79 | 2,21 | 5,51 |
| Pakistan | 447,96 | 1275,30 | 790,26 | 306,66 | #NA | #NA | #NA | #NA |
| Singapore | 21576,87 | 55182,48 | 34644,58 | 12192,17 | #NA | #NA | #NA | #NA |
| Uk | 22426,95 | 48322,67 | 35129,86 | 7851,21 | #NA | #NA | #NA | #NA |
| South Africa | 2425,32 | 7830,51 | 4932,16 | 1718,88 | #NA | #NA | #NA | #NA |
| Tanzania | 217,15 | 694,77 | 412,51 | 136,69 | -16,65 | 14,01 | 5,49 | 6,95 |
| Vietnam | 337,05 | 1910,51 | 895,86 | 527,31 | -5,62 | 10,49 | 2,81 | 3,80 |
| Peru | 1925,23 | 6661,59 | 3538,57 | 1665,99 | 12,23 | 31,15 | 19,93 | 4,63 |
| Egypt | 1088,63 | 3314,46 | 1907,14 | 794,12 | -0,56 | 11,99 | 4,70 | 4,17 |
| France | 22466,17 | 45417,49 | 33919,45 | 8172,06 | 4,44 | 6,13 | 5,06 | 0,47 |
| Netherlands | 25958,15 | 56630,85 | 40301,16 | 11055,43 | 0,26 | 4,45 | 1,69 | 1,20 |
| Russia | 1330,75 | 14611,70 | 6861,50 | 4791,38 | -18,95 | 69,28 | 3,19 | 17,87 |
| Mexico | 6879,67 | 10307,28 | 7650,03 | 1858,82 | -0,81 | 9,77 | 3,17 | 2,61 |
| Sweden | 26969,24 | 60430,22 | 43218,62 | 11855,35 | #NA | #NA | #NA | #NA |
| Malaysia | 3228,60 | 10538,06 | 6431,83 | 2539,14 | -3,90 | 11,78 | 3,15 | 4,05 |
| Switzerland | 37813,23 | 87998,44 | 58996,11 | 17518,82 | 0,87 | 4,75 | 2,87 | 1,11 |
| Thailand | 1831,90 | 5778,98 | 3382,88 | 1360,45 | 1,25 | 13,57 | 5,01 | 3,04 |
| Jamica | 2600,60 | 5463,76 | 4214,03 | 872,28 | 6,41 | 20,29 | 14,50 | 4,57 |
| Morroco | 1275,88 | 3092,61 | 2112,93 | 693,43 | 9,89 | 14,00 | 11,78 | 1,17 |
| Kazakstan | 1130,11 | 13609,75 | 5517,23 | 4348,97 | #NA | #NA | #NA | #NA |
| Mauritus | 3593,24 | 9202,52 | 5821,82 | 2041,31 | 4,67 | 18,30 | 11,24 | 4,19 |
| Average total | 10196,76 | 25206,77 | 16752,52 | 5339,36 | -1,67 | 20,45 | 7,50 | 5,02 |

Table 4d: Descriptive statistics for age variable

| Countries | Age | | | |
|----------------------|--------------|---------------|--------------|---------------|
| | Minimum | Maximum | Mean | St. Deviation |
| Nigeria | #NA | #NA | #NA | #NA |
| Kenya | #NA | #NA | #NA | #NA |
| Australia | 20,00 | 62,00 | 40,80 | 17,34 |
| Brazil | 15,00 | 132,00 | 60,53 | 26,79 |
| China | 12,00 | 33,00 | 20,85 | 4,18 |
| Denmark | 14,00 | 168,00 | 83,83 | 41,81 |
| India | 27,00 | 170,00 | 73,00 | 54,02 |
| Indonesia | 18,00 | 98,00 | 37,58 | 12,91 |
| Japan | 8,00 | 121,00 | 50,13 | 24,34 |
| Norway | 9,00 | 201,00 | 68,92 | 46,47 |
| Pakistan | 34,00 | 36,00 | 35,00 | 1,01 |
| Singapore | #NA | #NA | #NA | #NA |
| Uk | 3,00 | 171,00 | 39,60 | 43,46 |
| South Africa | 3,00 | 130,00 | 48,53 | 32,01 |
| Tanzania | #NA | #NA | #NA | #NA |
| Vietnam | #NA | #NA | #NA | #NA |
| Peru | 18,00 | 147,00 | 58,71 | 29,22 |
| Egypt | 4,00 | 111,00 | 36,19 | 25,40 |
| France | 12,00 | 272,00 | 59,79 | 41,98 |
| Netherlands | 20,00 | 362,00 | 88,22 | 68,42 |
| Russia | 20,00 | 189,00 | 64,38 | 48,62 |
| Mexico | 3,00 | 128,00 | 47,17 | 29,10 |
| Sweden | 8,00 | 192,00 | 47,82 | 40,14 |
| Malaysia | 7,00 | 79,00 | 37,67 | 21,11 |
| Switzerland | 4,00 | 496,00 | 87,04 | 69,94 |
| Thailand | 19,00 | 139,00 | 40,06 | 17,31 |
| Jamica | #NA | #NA | #NA | #NA |
| Morroco | 41,00 | 87,00 | 74,00 | 16,44 |
| Kazakstan | #NA | #NA | #NA | #NA |
| Mauritus | #NA | #NA | #NA | #NA |
| Average total | 14,50 | 160,18 | 54,54 | 32,36 |