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The Determinants of Stock Market Development: Implications of a Dynamic Panel Data Model

MSc in Finance Thesis

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Abstract

The motivation for writing this thesis has been to evaluate which parameters that affect the stock market development in a country by using a Dynamic Panel Data model with Panel Data from 98 countries between the years 1992-2011. A scoring system called Stock Market Indicator (SDI) is also developed, in which the worlds countries is ranked in order to assess how the 98 selected countries are performing relative to each other. The SDI-score will be calculated using the coefficients of the variables that show a significant relationship with the determinant variable as the weighting parameters.

The econometrical model is constructed based on 16 different Macroeconomic and Sociologic parameters, and their elasticity in relation to the growth in market capitalization is then evaluated using the selected econometrical methodology. Using a Dynamic GMM Panel Data Model, 9 of the selected parameters was found to have a significant relationship with the dependent variable, and was then selected for the SDI-ranking system. Seven of the significant variables in the tests showed the predicted signs, and two variables did not. Gross Domestic Product, Mergers and Acquisitions, Gross Fixed Capital Formation, Domestic Credit to Private Sector, Rule of Law, Political Stability and Mobile Users had a significant, positive impact on the change in market capitalization. Inflation and the Official Exchange Rate showed a significant negative relationship with the determinant, opposite to what we had expected after reviewing previous research.

The SDI-score mainly favored developing countries, as it benefits economies that have seen the largest growth in the selected parameters. It is generally easier to obtain a large percentage increase in a parameter if the previous value is on a very low level. On the other hand, those countries might also be the ones where the most significant future growth is, as the same logic applies to the dependent variable. The top 5 countries in our SDI-score turned out as follows: Mongolia, Papa New Guinea, El Salvador, Kyrgyz Republic, United Arab Emirates. At the other end, Egypt, Tunisia and United Kingdom, turned out as the least attractive countries to invest in.

Keywords: Dynamic Panel Data, Stock Market Development, Developed Countries, Developing Countries, GMM

Contents

1 Introduction

1.1 Background

Africa is considered a continent full of hope according to the Economist in their special report about the emerging countries in their March 2nd 2013 issue. In their research, they included several variables such as Foreign Direct Investment, Mortality Rate, Mobile Phone Users and Imports of Commodities. This made us wonder, what will be the triggering variables on the global scene? Our research will therefore be taken one step further and include all countries with available stock market data. We also want to assess which of the variables that have the highest impact on future growth, and which countries that are currently improving these variables the most. Inspiration was also taken from the Growth Environment Score (GES), mainly developed by Jim ONeill during his time as chairman of Goldman Sachs Asset Management. The GESs main focus is to see how the growth environment looks like for all countries. In essence, it shows which variables that should be developed in a country in order to promote growth. This is where our research differs from earlier research. We want to know which variables that cause growth and by how much. This will be done by conducting empirical research using econometric models. The research will therefore include as many countries as possible, in our case 98 countries, since sufficient stock market data was not possible to find for the remainder of the 214 countries we had data on. After determining the impact each explanatory variable has on market capitalization (our dependent variable), a ranking system will be created to compare each country relative to one another. We are well aware of the fact that those variables will by no means be a safe indicator of the stock market development, but it will hopefully provide a snapshot of where to start looking for interesting investment opportunities. The main goal of this thesis is therefore to look at different Macro- and Socioeconomic variables and their elasticity relative to the market capitalization, which will be used as an indicator of financial development. Due to the difficulties of finding consistent index data from many of the developing countrys stock markets, we have primarily used stock market capitalization as an indicator. There are several variations of stock market indicators such as Market Capitaliza-

tion in relation to GDP, looking at stock market indices and our selected method, focusing on growth in total market capitalization. We chose the latter as this was where we had the most data available and since we are looking for pure growth and not the relationship to GDP.

We are mainly interested in the emerging markets, but we will use data from all available countries in our analysis. After the analysis, we will create a ranking system we have named the Stock Development Indicator (SDI) with a weighting which will be decided upon looking at the elasticity of the explanatory variables as well as the significance of the different variables.

1.2 Research Contribution

There has been a significant research made on specific countries and what causes growth. However, much of this research is focused on smaller samples using between 1-60 countries. Our research also differs in the way that we measure how much impact each variable has on growth on a global level and thus the creation of a comparison system among them when creating our ranking system. Our endogenous as well as exogenous variables are transformed into yearly returns. As mentioned above our main inspiration source has been the Growth Environment Score by Jim ONeill. Therefore, some of the variables included in our test have been taken from ONeills research.

1.3 Purpose

The motivation for writing this thesis is to evaluate which parameters that affect the stock market development in a country. This is done using a Dynamic Panel Data Model with Panel Data from 98 countries from 1992-2011. We aim to find Socioeconomic and Macroeconomic variables that have a significant impact on the growth in the stock market capitalization.

The main questions we want to answer are: (1) *which Macroeconomic and Socioeconomic variables have a significant impact on the stock market capitalization?*; (2) *which countries show the most significant increase in those variables?*

In order to address those issues, we will start with developing a Panel Data set with 16 different variables. We will then run a Dynamic GMM Panel Data

analysis in order to assess which of the variables that prove to have a significant impact on the determinant. We will then develop a ranking system, in which the 98 selected countries will be ranked in relation to one another.

1.4 Delimitations

Our Panel Data Model covers 214 countries from 1960 to 2012, and the major part of the data is found in the World Bank database. There have been difficulties to find data for 2012 for all variables that we wanted to include in our research. We have therefore decided to cut our sample at 2011. In addition, a lot of data was missing before 1980-1990, which made us unable to do a regression for more than 20 years. In addition, many of the less developed countries had no active stock market, and we were therefore not able to run the analysis on those countries. The final regression was made on the 98 countries with an active stock market. We also excluded variables with little data that might be of interest when more data is collected in the future.

1.5 Thesis Outline

The thesis is structured as following: Chapter two will go into the underlying theory behind our research. Here we will present a literature review which includes the theoretical as well as empirical literature. Chapter three will go through the econometrical methodological considerations taken when conducting the analysis. The econometrical approach, including the Static Panel Data Analysis, the Static Fixed and Random Effect Models, the Dynamic Panel Data Analysis and the generalized method of moments will be covered in this section. The methodology behind the point-system will also be presented here. In section four, the logic behind adding the selected variables to the analysis will be explained. In section five the evidence from the Dynamic Panel Data Model will be analyzed and presented as well as the differences between our selected models. The following section will then present the results from the point-system, where a ranking of the top countries will be displayed. We will then round up the thesis by a conclusion and discussion of the results and models in section seven. Lastly we will suggest further research possibilities for the reader.

2 Theory

2.1 Introduction

In this chapter we will review the major microeconomic concepts in order to assess the way Macroeconomic and Socioeconomic variables influence the stock market. The first section (2.2) will review theories about financial markets such as the efficient market hypothesis, the rational expectations theory and the arbitrage pricing theory. In section 2.3 we will review previous research about how Macroeconomic and Socioeconomic variables affect growth and stock markets. We review this research based on their hypotheses, econometric methodologies as well as their conclusions.

2.2 Theoretical Literature

2.2.1 Theory of Asset Pricing

This thesis will look at how Socioeconomic and Macroeconomic variables affect the stock markets. In order to understand how those factors influence the market value, one first need to understand the underlying theories and their implications. Some of the most well-known theories are equilibrium models such as the Capital Asset Pricing Model (CAPM), which is an extension of the pioneering work of Markowitz (1959) in which he developed what is today known as modern portfolio theory, and the Arbitrage Pricing Theory (APT), suggested by Ross (1976). Those models examine the connection between stock market returns and different Macroeconomic variables with the perspective of the Efficient Market Hypothesis (EMH) suggested by Fama (1965) and the rational expectations hypothesis suggested by Muth (1961). In later work, Fama (1970) have made some significant contributions in making the efficient market hypothesis testable. In his work, he lists three information subsets, indicating how efficient a market is: (1) weak form, which mean that the investor cannot make a profit from purely relying on historical prices; (2) semi strong form, where no investor is able to make an abnormal return by using publicly accessible information; (3) strong form, where no investor is able to make an abnormal profit even when they have access to inside information.

The efficient market hypothesis and rational expectations hypothesis are based on the idea of a perfect capital market, which is not to be confused with a perfectly competitive market. According to Grossman and Stiglitz (1980), the stock market is actually not perfectly competitive. The reasons as to why this is true are, amongst others, that there are several sources of imperfections such as the inelastic supply curve, transaction cost, taxes and informational inefficiency. Copeland and Weston (1988) listed the main characteristics of a perfect capital market as follows:

(1) Markets are perfectly competitive, meaning that there are many buyers and sellers, suppliers have homogenous products, no barriers to entry and exit, producers supply goods and services priced at their minimum average cost, firms are price takers and aim to maximize profits;

(2) markets are frictionless as a result of the absence of transaction costs and taxes, all assets are perfectly separable, all assets are perfectly marketable and there are no constraining regulations;

(3) markets are informationally efficient, which mean that information is free and is received by all individuals simultaneously;

(4) all individuals are utility maximizers with rational expectations.

If and when those conditions are met, both the product market and the securities markets are allocatively, operationally and productively efficient. Fama (1995) define an efficient market as "*a market where there is a large number of rational, profit maximizing investors. They are actively competing with each other trying to predict future market values of individual securities, and important current information is almost freely available to all participants.*" In his work, Fama also showed that security prices quickly adjust to new information. As a result of new technology where information is instantaneously available along with a large number of buyers and sellers, securities markets are more efficient than before. Whether the stock markets really are efficient is still widely debated. Many from academia still arguing that the stock markets are indeed absolutely efficient, implying that all available information is accounted for in stock prices. They argue that investors might be able to beat the markets over a short period of time due to sheer luck, but that this should be impossible in the long run. For example, Malkiel (1973) showed that two-thirds of professional portfolio managers have failed to outperform the Standard and Poor's 500 Index over 30 years. At the other end, value investors ar-

gue that an investor who conducts an in-depth analysis of stocks might be able to find stocks that have been overlooked by the market. There are several examples of investors that have been able to achieve superior returns over extended periods. Price and Kelly (2004) analyzed Warren Buffets performance and concluded that his success could not be solely explained by chance (for a more extensive discussion on this topic, see for example, Nicholson (1968), Basu (1977), Rosenberg et (1985)). Despite the criticism, the efficient market hypothesis is generally still seen as a good place to start when it comes to attempting to understand the financial markets according to Beechey (2000).

2.2.2 The Stock Market and Stock Valuation Methods

The stock market consists of several individual stocks. Hence, effects that influence individual companies will also affect the stock market return as a whole. Different economic variables will affect stock prices directly or indirectly, either through the nominator or denominator effects, which they called this as they are influencing the stock prices by effecting the nominator or denominator in the valuation formula. Microeconomic variables such as the price of a commodity influence the stock price of the individual firm, and are seen as variables affecting the idiosyncratic risk. This risk can however be eliminated through diversification. Macroeconomic variables such as interest rates, on the other hand, affect the market as a whole and are the systematic risk of the market. This risk cannot be eliminated through diversification.

There are three major methods to value the stock market: (1) Fundamental Analysis; (2) Technical Analysis and (3) Macroeconomic Analysis. Fundamental Analysis is related to the semi strong, microeconomic version of EHM. It uses publicly available information to value a company based on financial reports and microeconomic information. Common valuation methods are discounted cash flow analysis (DCF) and multiple analyses such as P/E, EV/EBITDA. Technical Analysis, related to the weak efficiency of the EHM, focus on historical stock prices and investor psychology. Technical analysts (also known as a chartists), believe that past prices can be used to achieve a superior return. Macroeconomic Analysis focuses on the semi strong, Macroeconomic version of the EHM. It focuses on

the return of a portfolio instead of analyzing individual stocks, and use publicly available Macroeconomic information to predict future prices of the stock market.

2.3 Empirical Literature

2.3.1 Political Stability and Growth

Looking at how financial liberalization correlates with economic growth, numerous empirical work have found a possible negative correlation between liberalization and growth. Seck (1993) found little effect of the financial liberalization in Africa and its growth rates. Earwell (1996) found that financial liberalization may actually hinder growth and development. Bandiera (2000) concluded that there is a possible relationship between financial liberalization and falling savings rates.

Contrasting previously mentioned studies, several studies have found the opposite to be true. Pill (1997) conducted a cross-sectional analysis of 87 countries over the years 1971-95. He found that financial liberalization might actually stimulate economic growth. Bittlingmayer (1998) conducted empirical research on Germany in the interwar period and found that stock market volatility did not have an explicit negative impact on the stock market return, but that political uncertainty and events had a large impact on the stock market return as well as industry output. Henry (2000) showed that the stock market reacted positively to stock market liberalizations. On average, the market had an abnormal return of 3.3 percent during an eight-month window leading up to the implementation of the initial stock market liberalization. This was confirmed by Bekaert (2004), who concluded that equity market liberalizations led to a one percent increase in growth, meaning that market liberalizations both boost the stock market and the countrys growth at large. Barro (1991) found that political unrest in the form of the amount of assassinations and occurrence of revolutions and military coups significantly reduce a countrys average growth. Also, McGuire (1985) and Barro (1989) were able to show a connection between the level of political rights and economic growth. Alesina and Tabellini (1989) examined the effect of political uncertainty on investment and capital flight. They found that capital flight and excessive government borrowing is more likely to occur in countries with high political uncertainty.

A possible answer to the somewhat diverged result when it comes to the impact

of liberalization and political stability was given by Grossman (1991), who found that the inhabitants of the country was no better off with high political stability and high production if the technology of resurrection also induces the government or ruler to set a lower tax rate. He also found that in countries where the rule of law is weak, there is a higher risk of revolutions as the population has higher incentives to participate in such activities.

Related to the issue of political uncertainty is whether dictatorships are harmful or beneficial to economic growth. Looking at countries such as China, which have had an incredible growth over the recent centuries, one might come to the conclusion that a country might benefit from having a non-democratic government, especially when tough decisions have to be made. The idea behind this theory is that dictatorships are less pressured by interest groups, and are therefore less likely to adhere an opportunistic policy in order to maximize chances of re-election. This would imply that they are expected to be more short-sighted. The empirical evidence of this theory is, however, quite varied. Adelman and Morris (1967), Huntington and Dominguez (1975) and Marsh (1979) have showed a mixed relationship between economic growth and dictatorship. The general conclusion in their work was that a technocratic dictatorship resulted in faster growth compared to democracies, but the opposite was true with a kleptocratic dictatorship.

2.3.2 Technology and Growth

Development in technology is seen as a driving force in the economy. The theory behind typically stem from the neoclassical models, which treat technology as an exogenous given factor, which mean that the rate of the long-run technological growth is given by the exogenous rate of technological change. Important contributors to the neoclassical model are Solow (1956), Cass (1965) and Koopmans (1965). In the empirical literature, it is suggested that the industrial revolution (1760 1830) triggered a significant growth in the average per capita output. According to Maddison (1995), per capita output increased thirteen-fold during the years 1820-1992.

There has not been a general way to measure technological development in the literature, but in their article, ONeill (2005) suggest using penetration of mobile

phones, penetration of PCs and internet usage as indicators of technological development. This is based on the fact that this technology helps transfer broader technology that aid growth as well as measuring the adaption of new technology and access to the internet. In Solows model, the only way to grow per capita output is through technological progress. The neoclassical models come in very handy when attempting to explain the income convergence, but they are limited when it comes to the ability to explain differences in per capita output levels between countries (Ratnasiri, 2009).

Romer (1986) offers an alternative to the neoclassical model. This model takes a different approach by ruling out technology as an exogenous variable. His work has later been followed by Rebelo (1991) and Grossman and Helpman (1991). Here, technological growth is instead explained as the accumulation of knowledge through learning by doing (Romer, 1986) or technological development as a result of research and development (Rebelo, 1991, Grossman and Helpman, 1991). These endogenous growth models seem to perform better than the neoclassical models when it comes to explaining modern growth experiences as they better account for the non-convergence in incomes across countries according to Ratnasiri (2009).

Another model which is increasingly used after Barro (1990) published his work is one that attempted to explain divergence of incomes. This kind of models are called AK models, and are assuming a constant return on capital, instead of the assumed increased return of scale, which is assumed in Romers (1986) work. The reason as to why a constant return on capital is more plausible in this model is because that capital is defined as comprising both human and physical capital.

2.3.3 Financial Intermediation Variables and Growth

A lot of the empirical research that has been done on financial growth focuses on finding evidence of the relationship between the financial intermediation variables and the countrys growth. For example, Wallich (1969) found that the degree of intermediation display a positive relationship with growth. In his work, the rate of growth in money-supply had a non-linear relationship with the growth in income. King and Levine (1992) found that many financial indicators had a significant relationship with growth. Schwert (1989) conducted research on how

Macroeconomic variables affected stock market volatility. In his work, he found that most of the fluctuations in stock market prices cannot be explained by the volatility in Macroeconomic variables, even though there were indeed some correlations between the two. He found that output volatility, interest rates and bond volatility appeared to have a slight, positive correlation to each other. He found a more clear relationship between high volatility on the markets and a high financial leverage in the corporate sector. Roubini and Sala-i-Martin (1992) showed that financial repressions have a negative impact on inflation and growth in reserve ratios. Looking at how the development of a country affects the financial markets using a cross-sectional analysis of 40 countries in the years 1960-85, Atje and Jovanovic (1993) found that the general development of a country had large effects on the financial markets. Looking at the opposite, Levine and Zervos (1996) found that a growing stock market had a significant, positive, correlation with a countrys economic growth. Looking at financial indicators and economic efficiency, Odedokun (1996) found that indicators of financial development have a significant relationship with economic efficiency. Using Panel Data with a GMM-estimation, Benhabib and Spiegel (2000) found that indicators of financial development have a correlation with total factor productivity growth and investment. Shallu and Suparn (2012) mention that their research indicates a possible long-run equilibrium between financial progress and economic growth. After running Granger Causality tests they found that especially banks have a big impact in promoting economic growth. Another study that indicates that financial sector development causes economic growth is Khadraoui (2012). One of his findings was that credits to the private sector had a positive relation to GDP. Mehrara (2010) found evidence of exports and FDI Granger Cause GDP in the long-run. The opposite holds also for GDP which Granger cause FDI inflows. When considering governance indicators in different countries, Aisen (2013) found that political instability adversely affects growth. The stability in a country also affects the willingness of privatization and foreign investments. Zhao et al (2013) found evidence of statistically significance to support their hypothesis that privatization and FDI inflow promotes economic growth. A further prediction is that if the country experiences privatization and opening up, then this denationalization causes more economic growth. Zhao et al also describes the large economic growth of China from 1978

until now as a miracle. What caused this miracle seems to be the change from public ownership and closed-door policy to more private ownership and a policy that promotes openness. Bittencourt (2012) have conducted a thoroughly research about what impacts economic growth in Latin America. He highlights the importance of an open, competitive and active financial sector. Bittencourt also mention the importance of not having hyperinflation at any point, which reduces growth significantly. Schumpeter (1912) highlights the importance of financing when developing a capitalistic economy. This means that credits given to an entrepreneur promotes innovations and increases the possibilities of economic growth.

2.4 Summary and Conclusion

The empirical literature showed that improving technology and growth in financial intermediation variables do indeed have a significant effect on growth, which is likely to also affect the market capitalization. Looking at the effect of political stability and liberalization, the result was somewhat diverged. Some empirical literature suggested that one should expect little or no effect on growth as a result of financial liberalization, with some research suggesting the opposite. Research that looked at dictatorships as the liberalization variable suggested that a *technocratic* dictatorship resulted in faster growth compared to democracies, but that the opposite was true with a *kleptocratic* dictatorship. Higher political unrest did however show a significant negative relationship with growth, which is why we chose to focus on indicators looking at political unrest and similar instead of the level of financial liberalization.

3 Method

3.1 Introduction

In this chapter we will outline the econometrical methodology and theory behind our tests. The theory is from Baltagi (2005) unless stated otherwise. We will start with reviewing the basic concepts behind the Panel Data Methodology in section 3.2. The Static Panel Data methodology will then be reviewed in section 3.2.1, and the two major models (fixed and random effects) will be explained in more detail in section 3.2.2 and 3.2.3. Lastly, the Dynamic Panel Data model will be explained in section 3.2.4, where we will also review the Dynamic GMM Panel Data Model in section 3.2.5 which is the model selected in our analysis. We will then explain how our point system is set up and how the ranking system is calculated in section 3.3.

3.2 Introduction to the Econometrical Methodology

In this thesis, the Cross Sectional Time Series Data Model (Panel Data) is used as the main econometric method. Using the definition of Panel Data from Hsiao (2003), Panel Data provides *the possibility of learning an individual parameters behavior by observing others*. Panel data is a form of longitudinal data analysis in which a regression is combined with Time Series Analysis. The Panel is a group of entities which are observed over time, which makes it a cross section of entities. In the Panel Data, yearly time increments were used as most of the used parameters are observed on a yearly basis. By using Panel Data, it is possible to assess what changes occurred during the selected time period. If there are no missing values in the data, meaning that all entities have the same amount of observations during the selected time period, the Panel is considered to be balanced. If there are missing values in the Panel Data, the Panel is considered to be unbalanced Frees (2004). Our study mainly entail unbalanced data, which is due to some countries (mainly less developed countries) do not have the same transparency and data-availability. In order to correct this, unbalanced mathematical adjustments are made to the models automatically by the selected software.

The Panel Data have numerous advantages over conventional cross-sectional

and time-series data. Some of the advantages listed by Hsiao (2003), Baltagi (1995) and Klevmarken (1989) are as follows: (1) Panel Data tests control for heterogeneity, which is one of its most significant advantages. The normal time-series and cross-section tests result in biased results when not controlling for heterogeneity; (2) Panel Data provide more informative data as you are able to add large amounts of data points in the analysis, and also to increase the degrees of freedom and reduce the collinearity amongst the explanatory variables, thereby increasing the efficiency of the estimates; (3) when using longitudinal data, it is possible to analyze effects that is not detectable when using a pure cross sectional or time series data set; (4) Panel Data Models make it possible to conduct more complex behavioral models than when using cross sectional or time series data; (5) Panel Data reduce the difficulties of finding effects in the presence of omitted variables that are correlated with the explanatory variables; (6) Panel Data provide a more accurate prediction of individual outcomes compared only relying on time series data. There are, however, some limitations when using the Panel Data Model: (1) the main problem with the Panel Data is the design and collection of data; (2) the occurrence of cross section dependence, meaning that Macro Panels on countries or entire regions with long time series that do not account for cross country dependence may lead to ambiguous inference; (3) short time series dimension as the general Micro Panel involve annual data over a short period of time.

3.2.1 Static Panel Data Analysis

Static Panel Data can be analyzed using fixed effects (FE) models and random effects (RE) models. The general formula for the Panel Linear Regression is as follows,

$$Y_{it} = a_i + X'_{it}\beta + u_{it}, \quad i \,\epsilon\, \{1, ..., N\} \; and \; t \,\epsilon\, \{1, ..., T\} \tag{1}$$

where i is denoting individuals, countries, regions etc. and t is denoting time. The interpretation of those two variables is that i represents the cross-section dimension and t represents the time-series dimension. β is K $\times$ 1, y_{it} is the dependent variable, X_{it} is an independent variable representing the itth observation of K and

a_i is the intercept for each individual. a_i will absorb the impacts of the time-invariant variables in the equation as well as any heterogeneity in the data. u_{it} is the idiosyncratic errors associated with the model. Most Panel Data Models utilize a one-way error component model for the disturbances,

$$u_{it} = \mu_i + v_{it} \tag{2}$$

where μ_i represents the unobservable, individual-specic, effect. v_{it} represents the disturbance not accounted for in μ_i.

3.2.2 Static Fixed Effects Model

The FE model is used when analyzing the impact of variables that vary over time. It is called a FE regression as it assumes that the factor loads (coefficients) are constant over time, which makes the model somewhat restrictive. In the model, you explore the relationship between the determinant and the explanatory variables within an entity (in our case, each country). In the FE model, it is assumed that something within the country may have a biasing effect on the outcome variables, which we need to control for. This is the reason to why we assume that there is a relationship between the countrys error term and the explanatory variables. Hence, the FE model controls the effects of those time-invariant features from the explanatory variables in order to better evaluate the explanatory variables net effect on the determinant. The second key assumption in the FE model is that the time-invariant effects are unique to each country and thusly should not be correlated with other individual characteristics. If this assumption should not be true, the FE model will not be a suitable choice and another model such as the RE model should be used instead. In order to assess this, a Hausman test is generally used. In the fixed model, the following matrix form equation is used,

$$y_{it} = X'_{it}\beta + D_N\mu_i + v_{it}, \quad i \,\epsilon\, \{1, ..., N\} \; and \; t \,\epsilon\, \{1, ..., T\} \tag{3}$$

where y is the $NT \times 1$ vector observation of the dependent variable, X is the $NT \times K$ matrix observation of the explanatory variables. D contains the matrix

of N individual dummies. Lastly, it is assumed that v_{it} is an independent error term, which is homoscedastic and has zero mean. In addition, the explanatory variables are assumed to be non-stochastic and independent of the error-terms.

With regards to the assumptions above, the OLS estimators in the fixed effects model are the best linear unbiased estimators $BLUE$. The OLS estimator can be written as,

$$\tilde{\beta} = (X'QX)^{-1}X'Q_y \tag{4}$$

with $var(\tilde{\beta}) = \sigma_v^2(X'QX)^{-1}$ and where Q is an idempotent matrix of order NT and rank $NT - N$.

There are some concerns when using the FE model. One of the issues is that those models cannot be used to study time-invariant causes of the determinants. The reason for this is because the time-invariant characteristics of individuals are perfectly collinear with the country. Stated another way, the FE model is designed to study causes of changes within countries when the time-invariant individual-specific characteristics is not relevant to the relationship in question.

3.2.3 Static Random Effects Model

The main difference between the RE model and the FE model is that the differences across entities (i.e. countries) are assumed to be random and uncorrelated with the explanatory variables rather than fixed. This allows the time-invariant variables to be analyzed rather than being absorbed by the intercept as in the FE model, meaning that if differences between the entities are believed to influence the determinant variable, a RE model should be used. An advantage of the RE model is that time-invariant variables such as gender can be added to the model. Those variables are, as mentioned above, absorbed in the FE models. In addition, the loss of degrees of freedom can be avoided using the random model if μ_i is assumed to be random, so that $\mu_i \sim IID(0, \sigma_\mu^2), v_{it} \sim IID(0, \sigma_v^2)$ and μ_i is independent of v_{it}. The standard RE model with individual effects looks as follows,

$$y_{it} = X'_{it}\beta + \mu_i + v_{it}, \quad i \,\epsilon\, \{1, ..., N\} \; and \; t \,\epsilon\, \{1, ..., T\} \tag{5}$$

The equations key difference is that an error term, v_{it} is included in the model. This error term is associated with the variables within each entity. Another distinction is that the error term u_{it} only represents the between-entity errors, which will change with time and do not depend on the individuals characteristics.

In the model, we assume the following,

$$E[\mu_i] = E[v_{it}] = 0 \tag{6}$$

$$E[\mu\mu'] = \sigma_\mu^2 I_N \tag{7}$$

$$E[vv'] = \sigma_v^2 I_{NT} \tag{8}$$

$$E[\mu_j v_{it}] = 0 \; for \; all \; i, \; t \; and \; j \tag{9}$$

$$E[v_{js} v_{it}] = 0 \; if \; t \neq s \; or \; i \neq j \tag{10}$$

$$E[\mu_i \mu_j] = 0 \; if \; i \neq j \tag{11}$$

When using a Random Effects Model, it is possible to use the OLS as the estimator. However, using OLS is not efficient relative to the GLS estimator. This inefficiency stem from an inefficiency weighting of the two LS estimators, as the OLS place too much weighting on the between-unit variation. Therefore, the GLS estimator is generally used when using a random effects model.

In order to compute the GLS estimator, several calculations have to be made.

First, the variance-covariance matrix Ω for the individual i is to be computed,

$$\Omega = E(uu') = \sigma_\mu^2(I_N \otimes J_\tau) + \sigma_v^2(I_N \otimes I_\tau) \tag{12}$$

We then need to find the inverse of the covariance matrix Ω^{-1}, which is a matrix of the dimensions $NT \times NT$.

$$\hat{\beta}_{GLS} = (X'\Omega_n^{-1}X)^{-1}X'\Omega_n^{-1}y \tag{13}$$

The inverse is computed by,

$$\Omega^{-1} = \frac{1}{\sigma_1^2}W + \frac{1}{\sigma_v^2 + T\sigma_\mu^2}B \tag{14}$$

where $W = I_N \otimes (I_T - \frac{J_T}{T})$ is the within-units projection and $B = \frac{J_T}{T} \otimes (I_N - \frac{J_N}{N})$ is the between-units projection.

Inserting the inverse covariance matrix in the GLS estimator will then take the following form,

$$\hat{\beta}_{GLS} = (X'WX + \Theta X'BX)^{-1}(WX + \Theta X'By) \tag{15}$$

3.2.4 Dynamic Panel Data Analysis

As many economic relationships are Dynamic, the Panel Data Model gives an advantage relative to other models as the Panel Data allow for a better understanding of the Dynamics of adjustment and economic behaviors at the individual level. The Dynamic relationships are distinguished from the Static Models by the inclusion of a lagged dependent variable amongst the explanatory variables,

$$y_{it} = \delta y_{i,t-1} + X'_{it}\beta + u_{it}, \quad i \,\epsilon\, \{1, ..., N\} \; and \; t \,\epsilon\, \{1, ..., T\} \tag{16}$$

where δ is a scalar X'_{it} is $1 \times K$ and β is $1 \times K$. It is also assumed that u_{it} is following a one-way error-component model.

$$u_{it} = \mu_i + v_{it} \tag{17}$$

where $\mu_i \sim IID(0, \sigma_\mu^2)$ *and* $v_{it} \sim IID(0, \sigma_V^2)$ independent of one another, and amongst themselves.

There are two general problems when using a Dynamic Panel Data Model: (1) the dependent lagged variable $y_{i,t-1}$ is correlated with the error term u_{it}; (2) the individual estimations may lead to poor finite sample efficiency bias and bias originating from heterogeneity of the cross-section units.

The usual approach to adjust for the lagged dependent variables correlation with the error term is to remove μ_i. This gives the equation,

$$y_{it} - y_{i,t-1} = \delta(y_{it} - y_{i,t-1}) + \beta(X'_{it} - X'_{i,t-1}) + (u_{it} - u_{i,t-1}) \tag{18}$$

Another common method to correct for the correlation with the error term is to use $y_{i,t-2}$ as the lagged dependent variable. This was suggested by Andersen and Hsiao (1981) as $y_{i,t-2}$ is not correlated with the error term u_{it}. The use of $y_{i,t-2}$ have however been criticized by Arellano and Bond (1991) who noted that if $T > 3$, there are better instruments available. Also, since $y_{i,t-2} = y_{i,t-2} - y_{i,t-3}$ is a linear combination of Z, the estimator will be inefficient. Instead, they suggest using a Generalized Method of Moments (GMM) version of the Dynamic Panel Data Estimator.

3.2.5 Generalized Method of Moments

The Dynamic GMM is able to optionally exploit the linear moment restrictions which is a result of the assumption that there is no serial correlation in the error terms. The GMM equation is estimated using the level or first differences of the variables. It includes individual effects, lagged dependent variables and do not have any strictly exogenous variables. The Dynamic GMM estimator is given by,

$$\hat{\Theta} = (\bar{X}' Z A_N Z' \bar{X})^{-1} \bar{X}' Z A_N Z' \bar{y} \tag{19}$$

where $\hat{\Theta}$ is the vector of coefficient approximations of the endogenous and exogenous regressors, $\bar{X}'$ and $\bar{y}$ are the vectors of the differences of all the explanatory variables, Z is the vector of instruments and A_N is a vector used to weight the instruments.

The Panel GMM has become very popular recently, for two main reasons. (1) GMM is less hypothesis consuming than the other Panel Data Methods. Other methods have for a long time been based on strong assumptions about the underlying data. These assumptions have proven to sometimes be very unrealistic. In his paper, Hansen (1982) set up a flexible tool that is applicable to a large number of models, which are only relying on mild and quite likely assumptions defined by a function of moments; (2) GMM also provide a framework for inference. Some of todays best-known estimation methods such as GLS, $2SLS$ and Maximum Likelihood are seen as special cases of the GMM estimator (Ahn and Schmidt, 1992).

Arellano and Bond (1991) suggested the use of two estimators when conducting the GMM-analysis, the one-step and two-step estimators. Using this setup, the two-step estimator offer the best estimates of the models coefficients. The two-step model does however have a tendency to underestimate the standard errors of the estimations, and therefore offer a false sense of accuracy in certain settings. The general practice is therefore to base the hypothesis on the one-step estimators statistics while using the two-step model to estimate the coefficients (Yartey, 2008). This is the method used in this thesis.

The one-step model is set up as following,

$$A_N = \left(\sum_{i=1}^{N} Z_i' H Z_i \right)^{-1} \tag{20}$$

where H is a $T-2$ matrix.

The two-way model swaps the H-term with an estimated variance-covariance matrix formed on the residuals of a preliminary consistent estimate of Θ. The optimal A_N is given by,

$$A_N = \sum_{i=1}^{N} Z_i'(\Delta v_i)(\Delta v_i)Z_i \tag{21}$$

where Δv_i are the residuals from the initial approximation of Θ.

When using GMM, it needs to be assumed that no second order serial correlation exists in the first differences of the error term. This is because the specific construction of the instruments, which are lagged, will be rendered invalid should this assumption not be true. Due to the $y_{i,t-1}$ term, first order autocorrelation is expected and is therefore not a sign of miss-specification. The specification test generally used in the GMM-estimation is the Sargan test, based on his instrumental estimation test developed in Sargan (1958). The Sargan test evaluates the validity of the set of instruments and is able to determine the validity of the GMM-assumptions of predeterminacy, endogeneity, and exogeneity. When testing for first- and second order autocorrelation, the Arellano-Bond test for zero autocorrelation in first-differenced errors is commonly used. In this test, the null-hypothesis is that there is no autocorrelation. Hence, should the null-hypothesis be true for the second-order test, there is serial correlation in the model which will result in the GMM-assumption of no second-order autocorrelation not to be fulfilled which will render the GMM-model useless Arellano and Bond (1988).

Another common violation is heteroscedasticity, which occurs when the standard deviations of a variable vary over time. As the error terms are assumed to be consistent over time in the Panel Data setting, this need to be accounted for in the model. The selected method to correct for any eventual heteroscedasticity in the model is to use Whites heteroscedasticity-consistent estimator.

3.2.6 Conclusion

This section has dealt with the econometric theory used in the thesis, where the Panel Data Model was selected as the main econometric tool. The models outlined in this section were the Static Panel Data Models and the Dynamic Panel Data Models. The main advantage of the Panel Data Models is that they enable you to model the heterogeneity across countries and individual groups. The Static Panel Data Models outlined was the Random Effects (RE) and Fixed Effects (FE) mod-

els. When discussing the Dynamic Panel Data, the GMM-estimator was outlined as the preferred method, as it enables the analyst to obtain more efficient and optimal estimators with fewer assumptions than when using the Static Panel Data models.

3.3 Point System Methodology

3.3.1 Introduction

In order to get a clear view of the different countries prospects we have created a point system based on the findings in the econometrical analysis. The aim of this system is to get a clear view of the countries with the best prospects of growth with a one year perspective.

3.3.2 Building the Point System

The point system will include the variables that we have found to be significant in the analysis. The variables will be weighted based on the elasticity of the explanatory variables in relation to the determinant market size. We will set up a ranking of all countries and the weightings of the variables will be made using the following formula:

$$\delta_{vc} = \omega_v \left(\phi \frac{(actual\ observation\ -sample\ minimum)}{(sample\ maximum\ -\ sample\ minimum)} \right) \tag{22}$$

where δ_{vc} is the point given to the country on a specific variable (i.e. the sub-index), $\omega_v = coefficient \times significance\ level$ is the weighting given to the variable based on the econometrical analysis and ϕ is the multiplier used.

In order to get the total score, the simple formula $\delta_{c_{tot}} = \frac{\sum_{v=1}^{p} \delta_{vc}}{n}$ have been used.

4 Measuring Financial Development and Growth; Variable and Data Issues

4.1 Introduction

Measuring financial development is a key concern for central banks, investment management firms and other financial institutions interested in emerging markets. To get an overview of the financial development worldwide, we have covered 98 countries, emerging as well as developed countries. Some of the countries are not that well exploited and sufficient relevant data have not been possible to find. To measure financial development in these countries we have specified 16 variables of which includes macroeconomic, technology development, governance, and human development indicators as well as inflow and outflow of capital, as we find relevant.

4.2 Measuring the Performance of the Stock Markets

To measure the performance of the stock market, we have used a total of 16 variables. All of the variables are listed below and have shown evidence of having an impact on economic growth from a number of different research publications. In all cases we have used market capitalization as dependent variable. The full Panel consists of 98 countries and the countries we are interested in are those with a stock exchange with possibilities for international investments.

4.2.1 Market Capitalization of Listed Companies

Market Capitalization is defined as the share price times the number of outstanding shares. The variable used includes all listed domestic companies at the end of the year in the countrys stock exchanges. Some companies are however excluded, such as investment companies, mutual funds and collective investment vehicles. According to Zafar (2013), there are many researchers suggesting that the performance of the stock market is an accurate reflection of a countrys economic performance. He also mentions numerous factors that have an impact on the stock market performance. Some of the factors are the expansion of the countrys economic activities, strength in the exchange rate, decrease in lending interest

rates, improvement in recovery of outstanding loans, rescheduling and payment of foreign debts, mergers and acquisitions, the relationship with neighboring countries, investor friendly policies and a strong regulatory framework. In emerging economies, legal, economic and political factors also play a significant role. Garcia (1999) has scrutinized the determinants of stock market performance and he has found that real income, the savings rate, financial intermediary development and stock market liquidity are important determinants. Similar research has been done by Yartey (2008), who suggests that income level, gross domestic investment, the banking sector development, private capital flows, stock market liquidity, political risk, law and order, and the quality of the bureaucracy are important determinants.

4.2.2 Inflation

The inflation is generally measured by the consumer price index, which reflects the annual percentage change in the cost to the average consumer who acquires a basket of selected goods and services. According to Mohanasundaram (2012), high inflation erodes the benefit of higher return from the equity market. There is evidence of that inflation has a strong positive relationship with the equity market, which also applies to the market capitalization. In his research, Mohanasundaram is receiving a correlation between inflation and the Indian stock exchange Sensex of 0.80 and between inflation and market capitalization of 0.84.

4.2.3 Foreign Direct Investment

The definition of foreign direct investment is the net inflows of investment to acquire a lasting management interest in an enterprise. These investments need to be 10 percent or more of voting stock. The investment must also take place outside the investors own economy. Foreign direct investments are the sum of equity capital, reinvestment of earnings, other long-term capital and short-term capital as shown in the balance of payments. For a developing country, a major source of investment inflow is foreign direct investments. According to research from Raza et al (2012), FDI is showing a mixed behavior in economic development. There is, however, a positive impact of stock market performance on economic growth. Those countries with a well-established financial market can achieve more from FDI

than those without. When comparing developed countries with developing, FDI inflow can have a significant positive impact over economic growth in developing economies. There are also mixed opinions in the impact of the banking sector to the stock market performance. For example, Zafar (2013) claim that the development of the banking sector has no significant impact on stock market performance.

4.2.4 Gross Fixed Capital Formation

Gross fixed capital formation, as defined by the World Bank, includes various land improvements like fences, ditches and drains, but also plant, machinery and purchases of equipment. The index was previously called gross domestic fixed investment. It also includes the construction of roads, railways, schools, offices, hospitals etc. and is an indicator of economic improvements. The contribution capital formation bring to the overall growth may be more limited than was initially thought according to Maddison (1991). He is, however, still suggesting that there is a good reason to estimate it since economies devote a growing proportion of GDP to investment in capital goods through the process of economic advancement.

4.2.5 GDP

Gross Domestic Product is the sum of all residents' production within the countrys economy, plus taxes and minus subsidies that are not included in the value of the products. Deduction for depreciation of fabricated assets have not been made nor depletion and degradation of natural resources. Franses and Mees (2011) have tested if Chinese and US news of national accounts figures affect the stock market. The research indicates that four of eight Asian stock indexes react to US news, while only two of eight Asian stock indexes react on Chinese news. They also found that US stock market returns do not react significantly to either US news or to Chinese news.

4.2.6 Exports of Goods and Services

All goods and market services provided to the rest of the world is included in the Exports of Goods and Services Data. Excluded are Compensation of Employees, Investment Income and Transfer Payments. Research made by Usman et al (2012)

shows that Export has a significant positive relation to economic growth. They conclude that enhanced economic growth is dependent of internationalization of trade and financial development in the country.

4.2.7 Official Exchange Rate

The national authority determines an exchange rate which is made the official exchange rate. This rate could also be determined in the legally sanctioned exchange market. Kogid et al (2011) showed that growth in exchange rate causes economic growth. They say that stable long-term economic growth requires stable trade and stable foreign exchange markets. The results show that if the real exchange rate increased by 1 percent, then the real GDP increased by 7.6 percent. They also tested how the nominal exchange rate affected the real GDP and got an 8.8 percent increase. However, only the coefficient of the real exchange rate was significant. The real exchange rate has therefore a positive significant impact on the real GDP in the long run.

4.2.8 Domestic Credit to Private Sector

Financial resources provided to the private sector is included in the domestic credit to the private sector. These could be loans, purchases of non-equity securities, and trade credits and other accounts receivables. Some countries could include credit to public enterprises claims. Quartey (2007) test the long-run Dynamic Relationship between a group of variables including domestic credit to the private sector, which shows a positive and significant effect on the stock market capitalization as a share of GDP. The short-run effect of domestic credit to the private sector was shown to be positive, but highly insignificant.

4.2.9 Control of Corruption

There are cultural differences in how to approach corruption. In for example Asia, corruption is part of the fixed costs while in Africa it is a variable cost. When the corruption is part of the fixed costs, the governance structure is based on relationships. Corruption and violent criminality are often correlated, but many involved in a corrupt governance structure are not evil. According to Reja (2012),

corruption is an emotional disorder and difficult to cure. Bolgorian (2011) has tested the Corruption Perception Index and used market capitalization data for 46 countries. A positive correlation has been detected between the Corruption Perception Index and stock market development.

4.2.10 Cash Surplus/Deficit

The cash surplus or deficit is measured as revenue and grants minus expense and the net acquisition of nonfinancial assets. The former overall budget balance is closely correlated with the cash surplus and deficit data. According to Roley (1988), the potential effects of the federal deficit that stem from discretionary fiscal policy on the stock market depends on several factors. One of the factors that has been proven to be amongst the most significant factors is the current condition of the economy. During a recession, raised output and corporate cash flows from stimulative fiscal actions are likely to boost stock prices.

4.2.11 Rule of Law

There is a wide agreement amongst empirical researchers that the Rule of Law should be considered a key factor of economic development. For example, Curott (2010) found that countries that put emphasis on securing the Rule of Law are considerably more productive than countries who did not. Rule of Law and economic development goes conjointly, but which one that causes the other is yet to be determined in the empirical research. When deducting these, Curott mean that Rule of Law and the security of private property are major causes of economic growth. Econometric studies also support the economic theory implying that Rule of Law is an important determinant of economic growth. See, for example, the study made by Alesina and Tabellini (1989) mentioned in the previous chapter.

4.2.12 Political Stability/Absence of Violence

The political instability is regarded by economists to create a serious drawback of economic growth. It may also lead to switching policies more frequently and thus create volatility in Macroeconomic indicators. Aisen (2012) has analyzed

the impact of political instability on economic growth. They found that political instability significantly reduces economic growth.

4.2.13 Merger and Acquisition Transactions

The act when two organizations bring their businesses together, generally by offering stockholders from one company securities in exchange for the surrender of their stock, is defined as a merger and the act when an organization purchases a second organization is defined as an acquisition. The acquirer has thereby acquired ownership rights over its assets, stocks, operations, business lines and products. Ly (2011) has looked into various deal and bidder specific characteristics and have identified a large number of determinants that significantly create abnormal returns. Research show a positive impact on the financial performance when considering companies in Greater China that engage in Merger and Acquisition activities with a target company from Mainland China.

4.2.14 Internet Users

Internet users is defined by all people with Internet access in a country. When the usage of Internet increase, Bogan (2008) concludes that the market participation rate increases. They also find that the stock transaction costs decreases when using the Internet and that computer usage increases the probability of owning stock.

4.2.15 Mobile Cellular Subscriptions

The Mobile Phone variable we are using includes post-paid and pre-paid subscriptions of mobile phones and the subscriptions have access to the public telephone network. According to Williams et al (2012), the impact of 3G penetration on GDP growth is 0.15 percentage points when 10 percent of the 2G users switch from 2G to 3G. They have also researched how much the impact would be if there would be a doubling of mobile data. Since the penetration of 3G connections, there has been a massive growth in the use of mobile data, and the impact on GDP will be 0.5 percentage points if it doubles. In developing markets the impact

of mobile phones is expected to be a 4.2 percentage points increase in the long run when there is an increase of 10 percentage points in the mobile penetration.

4.2.16 Compensation of Employees

An additional variable that we want to test is how the level of employee compensation affect the stock market development. This variable show how much of total expenses is paid out as salaries to employees, but there have not been any significant amount of research targeting on this topic. We expect that an increase in employee compensation would indicate an improved Socioeconomic environment. Hence, we expect this variable to have a positive correlation with the stock market.

4.2.17 Data on the Financial Variables

The data we have used consists of 249 069 data points, and have been found on the World Bank, CIA - World Fact Book, Standard and Poor's Capital IQ, Thomson Reuters DataStream and Thomson Reuters Eikon. The base used in the research is to cover the 98 countries, listed on World Bank, from year 1992 to 2011. The variables used have been transformed into returns, using the following formula:

$$r_{variable} = \frac{x_t - x_{t-1}}{ABS(x_{t-1})} \tag{23}$$

This formula has been applied to be able to study the growth impact on the dependent market capitalization variable. This formula is applied to all data except Rule of Law, Political Stability and Absence of Violence and Control of Corruption. These indicators are based on 30 underlying data sources that report the perception of a large number of surveys. They are estimated in ranges from approximately -2.5 to +2.5, where +2.5 show the best governance performance. To apply the returns formula to these datasets we had to make some modifications. Since the range is not fixed to -2.5 or +2.5 we have applied

$$v_{new} = v_{old} + ABS(x_{min}) \tag{24}$$

Where v_{new} is the new value, v_{old} is the old value and $ABS(x_{min})$ is the absolute value of the year minimum value. The final step is the calculation of the yearly returns.

$$v_{final,t} = \begin{cases} -\frac{v_{new,t-1}-v_{new,t}}{\frac{x_{max}+ABS(x_{min})}{2}} & if\ v_{new,t} < v_{new,t-1} \\ \frac{v_{new,t}-v_{new,t-1}}{\frac{x_{max}+ABS(x_{min})}{2}} & if\ v_{new,t} > v_{new,t-1} \end{cases} \tag{25}$$

Where $v_{final,t}$ is the final value which we use in the regression, $v_{new,t}$ is the new value from the preceding step at time t, $v_{new,t-1}$ is the new value from the preceding step at time *t-1* and x_{max} is the year maximum value.

4.3 Summary and Conclusion

The variables used in the research have been carefully selected by running several different regressions and reading up on previous research. The sixteen variables listed above have been the most significant variables and therefore used. Since we have been looking for growth impact to the dependent market capitalization variable, all of the variables have been transformed into returns. We have used several different sources to find data but the source that covers the most is the World Bank and therefore used unless stated otherwise.

5 Evidence From Dynamic Panel Data Models

5.1 Introduction

The empirical testing was done using a Dynamic Panel Data analysis using a Difference GMM model. The empirical analysis has primarily been conducted using STATA and EViews. This model does not provide us with an intercept, but provides us with the most statistically significant and fitting estimates when looking at the autocorrelation- and Sargan-tests. Other models that were considered were the Fixed or Random Static Panel Data Model, but as we found a very significant correlation between the lagged dependent variable (used as an explanatory variable in the Dynamic Model) and the determinant, indicating that the dependent (market capitalization) is depending on its own past realization, we concluded that the Dynamic Panel Data model would provide us with the best estimates.

The variables were selected based on research done by the authors, and the motivation behind the selection is listed in the previous chapter. The testing was divided into Macroeconomic- and Socioeconomic variables. We chose to divide them as they significantly differ from one another. We did however include GDP in both models as previous research have found a strong relationship between GDP growth and stock market growth, and it relates both to the Macroeconomic- and Socioeconomic variables.

5.2 Model 1

The base test was done using all selected variables in the Dynamic GMM Model. The first test (Table 5.1) did not perform too well in the Sargan test or the test for second order autocorrelation, as the model proved to have second order autocorrelation on the $p < 0.10$ level. Should this be the case in Model 2, the base assumption of the GMM-test would not be met; hence the model would not be useful without first correcting for this in the estimation. The Sargan test was significant on the $p < 0.10$ level, which indicates that there might be autocorrelation in the model. Using robust standard errors followed by running the Arellano and Bonds test for autocorrelation would therefore be a more suitable approach. Our second test (Table 5.2) performed well both in the Sargan test and the test for

second order autocorrelation.

After the initial testing, the least significant variables which failed to satisfy the 90 percent confidence interval was removed from the tests.

5.3 Model 2

After removing the insignificant variables, model 2 was developed. This is the model which we will use in our ranking system. In this test, both the Macroeconomic- and Socioeconomic variables performed well in the Sargan- and second order autocorrelation tests, and the GMM assumptions are therefore true in both Model 2 tests. Seven of the significant variables in the tests showed the expected signs and two variables showed unexpected coefficients. Gross Domestic Product (GDP), Mergers and Acquisitions (MNA), Gross Fixed Capital Formation (GFCF), Domestic Credit to Private Sector (DCP), Rule of Law (RULE), Political Stability (POL), Mobile Users (MOB) having a positive impact on the change in Market Capitalization and Inflation (INFL) and the Official Exchange Rate (EXCH) showing a negative correlation. The two negative variables were the ones not showing the expected signs.

GDP was found to affect the growth in Market Capitalization by 0.55 in Table 5.1 and 0.65 in Table 5.2. As it did not show the exact same coefficient, we used an average of the two in the point system model. MNA proved to have a positive impact on growth by 0.011 on the 95 percent significance level, indicating that an increased MNA activity has a very weak, but significant, effect on the growth in Market Capitalization. Gross Fixed Capital Formation was also found to be significant with a coefficient of 0.34, meaning that this is the second most influential of the Macroeconomic variables in our test. The last significant Macroeconomic variable was domestic credit to the private sector, with a coefficient of 0.014. Looking at variables with a negative impact, an increase in Inflation proved to have a slight negative effect of -0.0055 on the stock market. The Exchange Rate had a negative effect of -0.02, indicating that an increasing exchange rate has a larger impact on the growth of the Market Capitalization than Inflation, even though the effect was quite small.

Looking at the Socioeconomic variables, an increase in Rule of Law had the

largest impact on the growth of the stock market with a coefficient of 1.26. Political Stability also had a significant positive effect of 0.22. Our technological indicator, Mobile Phone Users per 100 persons, also showed a significant positive relationship with the stock market growth with a coefficient of 0.43. Internet Users did not show a significant relationship with the dependent variable in model 2 and was therefore removed from this model, despite it being significant on the 90 percent-level in model 1. Other variables not showing a significant relationship was Foreign Direct Investments, Exports of Goods and Services, Compensation of Employees, Life Expectancy and Corruption.

Table 5.1. Macroeconomic Determinants of Stock Market Development
Dependent Variable: Stock Market Capitalization
Estimation Method: Dynamic Panel Data - Difference GMM

Variable	Model 1	Model 2
Lagged dependent	-0.468084	-0.475828
	(-56.42322)***	(3.547572)***
GDP	0.554327	0.546629
	(3.707638)***	(3.707638)***
M&A	0.0017928	0.011419
	(2.792196)***	(1.976090)**
INFL	-0.004629	-0.005506
	(-3.239017)***	(-3.293470)***
GFCF	0.335120	0.335120
	(4.236999)***	(4.236999)***
DCP	0.010756	0.013681
	(5.091213)***	(5.271570)***
EXCH	-0.016504	-0.020212
	(-2.202512)***	(-3.00015)***
FDI	0.001178	
	(1.580596)	
TRADE	-0.138617	
	(-1.368126)	
No. Of Observations	848	848
Sargan Test	11.069	6.430
	[0.0863]*	[0.2666]
1st order autocorrelation	-7.4850	-7.8859
	[0.0000]***	[0.0000]***
2nd order autocorrelation	-1.9566	-1.4650
	[0.0504]*	[0.1429]

Notes: (i) T-statistics are in parentheses and P values in squared bracket.
(ii) ***, ** and * indicate significant at 1, 5, and 10 percent level respectively
(iii) Sargan test: chi2 and Prob > chi2 in squared bracket.

Table 5.2. Socioeconomic Determinants of Stock Market Development
Dependent Variable: Stock Market Capitalization
Estimation Method: Dynamic Panel Data - Difference GMM

Variable	Model 1	Model 2
Lagged dependent	-0.573997	-0.478007
	(-20.46535)***	(19.09916)***
GDP	0.89327	0.651556
	(5.246471)***	(4.287383)***
RULE	0.891322	1.260693
	(2.820059)***	(5.227901)***
POL	0.615395	0.216013
	(2.312952)***	(2.734607)***
MOB	0.627421	0.425299
	(3.807570)***	(2.837322)***
IU	0.111925	
	(1.660146)*	
EC	0.139560	
	(-0.844717)	
LIFE	3.012321	
	(1.233057)	
CORR	-0.238239	
	(1.323944)	
No. Of Observations	612	814
Sargan Test	9.421	3.613
	[0.2238]	[0.4609]
1st order autocorrelation	-10.184	-10.537
	[0.0000]***	[0.0000]***
2nd order autocorrelation	-1.1195	-0.1497
	[0.2629]	[0.8810]

Notes: (i) T-statistics are in parentheses and P values in squared bracket.
(ii) ***, ** and * indicate significant at 1, 5, and 10 percent level respectively
(iii) Sargan test: chi2 and Prob > chi2 in squared bracket.

6 Results From the Point-System

When developing the point system, we can see that the variables that have the largest impact are Rule of Law followed by GDP and Mobile Subscriptions. This means that the country with the best improvement in these variables will most likely be located at the top of the list. In Table 6.1 we find Mongolia, Papua New Guinea and El Salvador in the top, all of which have a geographical location next to or close to either a BRIC or Next-Eleven country.

In Table 6.1 below the returns from year 2010 to 2011 is listed for the top 4 countries, which the points are calculated from in Table 6.2.

Table 6.1. 2011 RETURNS

COUNTRY	MCAP	GDP	EXCH	INFL	GFCF	M&A	MOB	POL	RULE	DCP
Mongolia	0,44	0,41	-0,07	-0,07	1,14	-0,33	0,15	0,00	0,00	0,30
Papua New Guinea	-0,08	0,36	-0,13	0,40	0,21	0,00	0,23	-0,01	0,00	-0,10
El Salvador	0,30	0,08	0,00	3,35	0,15	-	0,07	0,00	0,01	-0,02
Kyrgyz Republic	1,09	0,29	0,00	1,07	0,10	-0,67	0,18	-0,01	-0,01	-

The points for the top 4 countries are listed in Table 6.2 below and which the final scores were calculated from. Some of them have a negative impact on growth and that is listed in the regression output in Table 5.1 and Table 5.2.

Table 6.2. 2011 POINTS

COUNTRY	MCAP	GDP	EXCH	INFL	GFCF	M&A	MOB	POL	RULE	DCP
Mongolia	6,04	9,89	1,00	1,07	10,00	0,60	5,18	6,79	8,76	10,00
Papua New Guinea	2,83	9,10	0,25	1,89	4,02	1,03	6,39	6,16	8,99	2,54
El Salvador	5,12	4,42	1,83	7,06	3,63	-	3,91	7,04	10,00	3,93
Kyrgyz Republic	10,00	7,93	1,88	3,06	3,34	0,17	5,55	6,37	7,76	-

Table 6.3. 2011 POINT SYSTEM

RANK	COUNTRY	SCORE	RANK	COUNTRY	SCORE
1	Mongolia	2,65	50	Jamaica	1,86
2	Papua New Guinea	2,44	51	Peru	1,86
3	El Salvador	2,43	52	Germany	1,86
4	Kyrgyz Republic	2,39	53	Uruguay	1,83
5	United Arab Emirates	2,24	54	Canada	1,81
6	Estonia	2,20	55	Sweden	1,81
7	Argentina	2,19	56	Ireland	1,81
8	Nepal	2,17	57	Lithuania	1,81
9	Zambia	2,16	58	Malaysia	1,81
10	Bolivia	2,13	59	Latvia	1,79
11	New Zealand	2,13	60	Tanzania	1,79
12	Georgia	2,11	61	Switzerland	1,79
13	Belgium	2,10	62	Ukraine	1,78
14	Netherlands	2,07	63	Korea, Rep.	1,77
15	Colombia	2,06	64	Denmark	1,77
16	Montenegro	2,06	65	Oman	1,77
17	Chile	2,06	66	Qatar	1,76
18	Kuwait	2,06	67	Jordan	1,75
19	Ecuador	2,04	68	Singapore	1,74
20	Austria	2,03	69	Iceland	1,74
21	Israel	2,03	70	India	1,74
22	Bangladesh	2,02	71	Namibia	1,72
23	Serbia	2,02	72	France	1,72
24	Slovenia	2,00	73	China	1,71
25	Spain	2,00	74	Portugal	1,71
26	Fiji	1,98	75	Morocco	1,71
27	Italy	1,98	76	Panama	1,69
28	Poland	1,97	77	Armenia	1,69
29	Ghana	1,97	78	Hong Kong SAR, China	1,68
30	Mexico	1,96	79	Thailand	1,68
31	Guyana	1,94	80	Nigeria	1,66
32	Mauritius	1,93	81	Romania	1,66
33	Lebanon	1,93	82	United States	1,66
34	Finland	1,93	83	Kenya	1,64
35	Sri Lanka	1,93	84	Bulgaria	1,64
36	Brazil	1,91	85	Cote d'Ivoire	1,62
37	Philippines	1,91	86	Hungary	1,61
38	Vietnam	1,91	87	Turkey	1,61
39	Botswana	1,91	88	Japan	1,61
40	Australia	1,91	89	Croatia	1,60
41	Costa Rica	1,91	90	Saudi Arabia	1,54
42	Russian Federation	1,90	91	Malawi	1,54
43	Kazakhstan	1,90	92	Greece	1,53
44	South Africa	1,89	93	Pakistan	1,46
45	Czech Republic	1,88	94	Malta	1,46
46	Norway	1,88	95	Venezuela, RB	1,32
47	Luxembourg	1,87	96	United Kingdom	1,31
48	Macedonia, FYR	1,87	97	Tunisia	0,90
49	Indonesia	1,87	98	Egypt, Arab Rep.	0,69

7 Conclusion and Discussion

The main goal for this thesis has been stated in the first chapter of this thesis. The aim was to assess which of the selected Macroeconomic and Socioeconomic parameters that are likely to affect the stock market in the investigated country. We also aimed at creating a ranking system (SDI) in order to rank the different countries analyzed in the thesis.

When conducting the econometrical analysis, we started off with 16 variables, did extensive testing and then used the 9 significant variables to create our point system. Our findings are in line with previous research of how the variables affect the stock market and the general growth in a country on all variables except for inflation and the exchange rate, which have generally shown a positive relationship with stock market returns in previous research. The variables that was found to have the most significant impact on the determinant variable (market capitalization) were the change in: Gross Domestic Product, Official Exchange Rate, Inflation, Gross Fixed Capital Formation, Mergers and Acquisitions, Mobile Users, Political Stability, Rule of Law and Domestic Credit to Private Sector. The Dynamic Panel Data Model provide us with seven variables that have a positive impact on the market capitalization and two variables that have a negative impact on the market capitalization. Change in Inflation and Official Exchange Rate are the two variables that have a negative impact. Inflation turned out to have a negative correlation to the stock market development, which somewhat contradicts the findings by Mohanasundaram (2012). A possible explanation for this is that we used the change in the variable instead of the actual level of inflation. A large change in the inflation-rate might be a result of hyperinflation, which have shown to severely reduce the economic growth for a long time. It did however not prove to have a very strong negative impact in our tests, even though there was a negative correlation. An increasing Exchange Rate also showed a negative relationship, contradicting previous findings by Kogid et al (2011). Our hypothesis of why this might be true, is that it will be more expensive for other countries to trade with the country, hence decreasing the exports which might in turn have a negative impact on the stock market development. On the other hand, exports of goods and services did not show a significant relationship with the stock market

capitalization. We conclude that more research on this relationship is needed in order to draw any general conclusions on whether the relationship is positive or negative. We did however still include this parameter in our point system.

The major part of the variables had a positive impact, with Rule of Law as the variable with the largest impact on the growth in market capitalization. If an investor wants to invest in a country, we conclude that a detailed study of how laws are set up and followed in a country should be of major interest to investors. They must be transparent, protect fundamental rights and justice should be delivered by competent representatives. Rule of Law is followed by the Gross Domestic Product as the variable with the second highest impact on the market capitalization. We therefore come to the same conclusion as previous research, increasing economic development is closely correlated to growing stock markets. If the Mobile Users increases in a country, both our research and previous research indicates that it will have a positive impact on both market capitalization and the gross domestic product. One likely explanation for this is that if people have the possibility to talk to each other and use mobile applications, it might lead to an increase in small businesses and a wider geographic connection to other companies and people. The Gross Fixed Capital Formation is a component of the GDP and demonstrates how much of the new added value that is invested. If investments are made in fixed assets, it will lead to a higher domestic market capitalization and would be positive for the financial development. Political Stability also had a positive relationship with the determinant, which support the previous research by Barro (1991). At last we have two more variables with a similar level of impact on the determinant. These two are Domestic Credit to Private Sector and Mergers and Acquisitions, which showed a slight but significant impact on the dependent variable. The general conclusion from our models is that both Macroeconomic- and Socioeconomic variables play an important role in the fluctuations in the market capitalization. Surprisingly, the tested Socioeconomic variables seem to play a more important role than the Macroeconomic variables in how the stock market develops, as their elasticity was significantly higher than the Macroeconomic ones.

We then calculated the Stock Development Index score for the selected countries, using the variable coefficients as weights and constructed a table over all 98 countries. At the top of the list we find Mongolia, followed by Papua New Guinea,

El Salvador and Kyrgyz Republic right after. These 4 countries were the countries that had the highest development during 2011 in terms of our selected variables that affect financial development.

The findings of this thesis have some valuable implications, as it show the major importance of having a stable political environment in order to promote stock market growth. It also promotes less developed countries as great potential investment opportunities, even though the findings is by no mean a safe indication of future growth.

7.1 Suggested Further Research

This thesis used stock market capitalization as the determinant variable, which is set up of all listed equities in a country. In order to gain a more in-depth insight into which sectors that benefit the most from the different variables, additional testing using different sectors market capitalization as the determinant would be of interest. Another possibility is to analyze developing markets in different regions by excluding the remainder countries in the Panel Data, gaining a more detailed insight into how the different regions benefit from the selected variables. Including more variables in order to explain more of the stock price movements could also be a positive extension on the subject. In addition, many variables are newly developed, and do not have enough data at the moment, and could therefore not be included in our model. An extension of the analysis with those variables included should be possible within a few years, and could help provide additional insight into what creates stock market growth.

As mentioned in the previous section, more research on how the exchange rate and inflation affects the stock market, preferably including exports as another explanatory variable, could be of interest. Here, a Granger Causality Test could also be conducted in order to assess whether inflation, exchange rates and exports might Granger Cause one another.

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