The effect of country level governance on GDP growth and stock market correlation

Eelke de Vrees

Erasmus University Rotterdam

Financial Economics

349528ev

Abstract:

In this thesis, I analyzed the effect of the quality of country level governance on the correlation between the GDP growth and the stock market. Country level governance is calculated with the method of (Acemoglu & Johnson, 2005) for both the horizontal level governance and vertical level governance. The results conclude that the higher a government quality measure is, the lower the correlation is between GDP and the Stock market. Different measurements provide roughly the same results, but all also examine a change of sign between different periods.

1. Introduction

Some recent research on the correlation between GDP and stock market have made it clear that this relation is either nonexistent or even negative. These researches of course leads to the question of why this is not the case, and if there are different factors that could explain this absence of correlation. One of the driving forces behind this could be the quality of governance, since this will have effect on both the protection of investors and companies, but is also linked to the quality of equity markets. Some research has already been done to measure the quality of government, but is yet to be linked to the effect on the correlation between GDP growth and the stock market growth. It would be interesting to see if the correlation is affected by the quality of governance, and if this effect is measurable and testable. This thesis will analyze the effect that quality of governance has on the correlation of the GDP and stock markets. Using regression analysis, the results will be easily interpreted and usable for further analysis.

The structure of this thesis is as follows; in Section 1.1 I will review previous research on the relationship of GDP and stock markets. There has been quite some research on the correlation between the stock market and GDP. I will explain what the authors found, and what their conclusion is regarding the correlation in their data sample. Most authors provide their own opinion on the subject and other researches, which I will briefly describe. Further I will explain some measures of quality of governance, how they measure the quality of governance and what the reasoning behind this measurement is. This makes sure that I can get an objective view of quality. Lastly I will explain the (Lin, Massa, & Zhang, 2014) paper, which uses the same sort of government quality measures in a mutual funds environment. This paper will be used as a guideline on how to use government quality measurements as an independent variable.

Section 2.1 describes the uses and sources of the data. For the GDP growth, I used the Worldbank Data bank[1], a very reliable, readily available, and comprehensive source of country-level data. The Worldbank has GDP growth and GDP per capita growth readily available, so no further calculations are needed to get the data I need for this part. For the stock market measurements, I used the lists made by the MSCI[2]. The MSCI lists combines multiple stock markets per country in one comprehensive list and contain around 85% of the equity traded in the countries. After the MSCI lists have been downloaded, returns are calculated in Stata per country and year. After this, the correlations are calculated for the MSCI and GDP lists per country, this will act as the independent variable in the regression. Government quality measurements are taken from datasets provided by their respective authors, which will be explained in the literature review. Government quality data is normalized in the same way as (Lin et al., 2014). Additionally, the data for countries is also split up in 5-year windows, to see if there are indications of time-varying effects. The correlation between the GDP and the stock market is calculated for both the full sample as well as these 5-year windows.

In section 2.2 I explain how the calculation of the correlations is done, and how I used it in the later regressions. Section 2.3 explains the descriptive stats and correlation coefficients of the data previously downloaded. Section 3 has the regression analysis results, these will be tested against the 10%, 5% and 1% levels of significance to see if the quality measurements used had effect on the correlation coefficient. Section 4 does the same regression analysis, except for different measurements of governance, to see if the results are persistent when using other measurements for quality of governance. Section 5 concludes the analysis done in the previous parts, and summarizes results that are found. Section 6 explains some limitations of

[1] http://databank.worldbank.org
[2] https://www.msci.com/

this study and provides some insight in further research that could be done to improve on the subject.

1.1 Literature review

In the Credit Suisse Global Investments Yearbook (Dimson, Marsh, & Staunton, 2010) chapter "The growth puzzle" the authors describe the fact that Gross Domestic Product growth and stock market growth are not correlated. They build on their own study in 2002 (Dimson, Marsh, & Staunton, 2002), where they had compared real equity growth and GDP for 16 countries. Here they found a negative relation for the whole sample from 1901, and also for the later sample from 1951-2000. These results are comparable to those provided by (Siegel, 1998), who found a negative correlation for both developed and emerging countries between 1970-1997 of -0.32, and -0.03 respectively. (Siegel, 1998) then provides two explanations in this paper of why this relationship might be negative. His first reasoning is that the largest firms quoted on markets are multinationals, so for these companies the world economy might be more important when compared to country the company is quoted on. Secondly, the expected GDP growth might already be factored in the stock prices, but due to over optimism they are wrongly priced, and thus lead to lower growth than expected. (Dimson et al., 2002) argue that there might be more to it that just those explanations. Their large dataset rules out the importance of multinationals, which at the start of the dataset, in 1901, were not a huge part of the markets. Further, it's hard to imagine that equity holders can accurately incorporate GDP growth for the coming 100 years in the stock prices. They provide different explanations to this negative correlations, it might be due to measurement problems, such as the fact that the GDP now is still measured rather crude, whilst at the start of the previous century this might have been a very rough estimate at best. Another reason behind the negative correlation they found, is that GDP can grow without that growth spilling over to equity on the stock market. In the 2010 Credit Suisse global investment yearbook

(Dimson et al., 2010), they provide some additional explanations of this phenomenon. When they use GDP per capita, instead of GDP growth, with stock market growth, the correlation is negative, with a value of -0.29 for the full sample, and not significantly from 0 when measured from the 1950s. The authors explain that this negative correlation might be partly due to a growing work force, since when they compare aggregate GDP growth, they find a correlation of 0.51. It is also the case that public companies will only provide a part of GDP growth, especially in those countries that have a lot of privately owned companies. These private companies do contribute to the GDP, but are not quoted on the stock markets. Amongst these facts, they also provide some other reasons why it's hard to make profit based on GDP growth itself, although they do find that higher long-run economic growth is good for investors. The first explanation is that economic growth is a bad predictor for subsequent stock market growth. On the contrary they find that the stock market might be a good indicator of the GDP growth, especially when measures over the long term. The second explanation they provide is that when you invest in a company in an expanding economy, this is seen as being less risky than investing in a country with a contracting economy. This will lead to lower results in the growing economies when they are adjusted for risk. It follows from the simple CAPM, where risk should be rewarded by a higher return. Another reason given in this paper is the fact that there might be restrictions on trading, such as short-selling restrictions. These restrictions make it impossible for investors to follow their constructed investing strategy, leading to certain economies to stay overpriced and thus leading to lower returns in the long term.

As explained in the (Doidge, Karolyi, & Stulz, 2017) paper, the US exhibits a large gap in listings when compared to the rest of the world. Where the rest of the world has increasing number of listings, the number of listings in the US is declining. This paper tries to analyze why the listings are declining, and find that there appears to be less new listings, and a higher

number of involuntary de-listings, such as mergers and acquisitions. This phenomenon has already been described by earlier (Jensen, 1989) where he makes the case that for many sectors, public held companies have outlived their usefulness. The main sectors (Jensen, 1989) focusses on are the low growth, cash rich sectors, such as steel, chemicals and tobacco. The main reason for companies to not be publicly held, is that the agency problem will reduce, making the interests of owners and managers more on one line. Not having many driving forces of the economy on the stock market, is another reason why the stock market and the GDP can exhibit small amounts of correlation.

(Ritter, 2005) describes a different method to examine the relationship between GDP and the stock market, via the dividend change. In his research, there is a much higher correlation between GDP growth and the growth of dividend, than the correlation between GDP growth and stock market growth Sadly, this research is outside the scope of this research, mainly because the Erasmus is not licensed to provide the dataset needed to conduct this research. It does provide some explanations for the correlation between the stock market and the GDP, such as the fact that GDP growth does not necessarily spill over to stock market growth. However, since dividend growth does directly influence the income of investors, it might be a better indicator of wealth in a country.

Besides the research done on the GDP and Stock market correlations and its implications and explanations, there has also been extensive literature on the quality of governance and how to measure this quality. In this thesis, the main measure is provided by (Acemoglu & Johnson, 2005), where they provide a clear way of how to measure different types of quality of government, such as contracting institution (horizontal) and property rights institutions (vertical). They use a collection of instrumental exogenous variables to provide insight in the two types of government quality measures. Contraction institutions measures the ability for companies to have contracts with each other, and how they are protected against the

outstanding party. Property rights institutions measures the quality of protection of companies against the rulers, and how property rights are enforced. They also find some evidence that countries with lower contracting institutions also have less developed stock markets. For property rights institution, they find strong relationships to long-run economic development, investment and financial development.

The horizontal and vertical measurements will be my main government measure, but there are more ways to measure the quality of governance. The first one is the good government index described by (Morck, Yeung, & Yu, 2000) and later revised by (Karolyi, Lee, & Van Dijk, 2012) which uses the sum of three government indices, taken from the international country risk guide[3] as a single measurement. The measurement used are government corruption, risk of expropriation by the government and the risk of the government repudiating contracts. Where the lowest scores would be the countries with the least respect for private property, and thus a worse quality of government. (Bushman, Piotroski, & Smith, 2004) give some explanation how financial disclosure of companies can explain quality of government. Lower financial disclosure results in outsiders not being able to getting to an accurate representation of the company, in turn making investments riskier. The results provided in (Karolyi et al., 2012) indicate that there is a negative relation between the good government index and the commonality of liquidity. This translates to that the higher the protection of private property is, the lower the commonality of liquidity is. Here they also use the disclosure coefficient by (Bushman et al., 2004) and find a similar, but smaller effect. Lastly, the Anti-Self-dealing (Djankov, La Porta, Lopez-de-Silanes, & Shleifer, 2008) is the coefficient where the amount of legal protection of minority shareholders against expropriation of company insiders. Clearly a higher anti-self-dealing coefficient will lead to more protection, and thus is a measurement of high quality of government. But the anti-self-dealing measurement also is

[3] http://www.prsgroup.com/about-us/our-two-methodologies/icrg

highly correlated with several measurements of the development of stock markets in countries. The last government quality measurement is the Corruption Perception index (CPI) of Transparency International[4]. The CPI started in 1995, and scores each country per year. The list started with 41 countries in 1995, but has been continuously updates and as of 2016 it contains 176 countries. The CPI is calculated by using various sources, and a minimum of 3 sources are needed of a country to have a valid score calculated. The scores ranged from 0-10 in the earlier years, but are now scored from 0 (low quality) to 100 (high quality).

(Lin et al., 2014) uses all these measurements to see if the quality of governance has effect on mutual funds, and the use of semi-public information in decisions regarding the mutual funds. In short, if the quality of governance is low, the quality of pure public information will be low too. This in turn increases the need for semi-public information of mutual funds. Companies might benefit more by withholding information, since the risk of expropriation might be higher in these countries. Evidence also suggests that countries with bad quality governance, there needs to be an improvement of this for the stock market to be able to grow. This paper provides an excellent base to use as a guideline on how to use the government measurements in an analytical environment.

[4] https://www.transparency.org/

2. Data and Methodology

2.1 Data Sample

As explained in the introduction, I needed multiple sources of data. The main data are both finance (stock market) as economic growth (GDP). Since all countries that I need can be downloaded via the WorldBank database, the first 2 datasets that would shrink this number are (Acemoglu & Johnson, 2005) dataset and the MSCI constituents. Since a lot of countries have more than one stock market, the MSCI lists would provide outcome since it makes a single list of these different stock markets, and still contain around 85% of the free-flowing equity per country. These lists are downloaded via DataStream, where both the local currency (LCU) and the dollar list are downloaded. After the stock market data has been downloaded, the next step is to calculate the returns over the past year to use this in our further analysis. For countries using the Euro, the LCU will be denoted in the Euro for all years, even before the formation of the Euro as an official currency. The MSCI currently has lists available for 54 countries, with Venezuela not being supported anymore. The dataset of (Acemoglu & Johnson, 2005)[5] has 206 countries included, however, not all these countries have results of MSCI lists. The MSCI list is a panel data set, and the (Acemoglu & Johnson, 2005) is cross-sectional. To merge these, the countries are matched per their Country_ID, using a one-to-many match in Stata. All countries that have a MSCI list are included for further analysis. Only Germany does not have horizontal or vertical measurements, since the dataset of (Acemoglu & Johnson, 2005) does not have Germany added in their list. Table 1 provides the list of countries, and from what year the results of the MSCI are available. The next step is to add the GDP growth from the Worldbank. The WorldBank dataset has all the data available for the countries that are included in the previous section. For all these countries, the GDP and

[5] http://economics.mit.edu/faculty/acemoglu/data/aj2005

GDP per capita have been downloaded for the period they are also in the MSCI list. Using the method described by Moohawk Kim of the Univeristy of Colorado[6] the data is imported and reshaped to match the dataset. The Country ID made before is used alongside the Year to match and merge the datasets together. Also included is the World GDP and GDP per capita growth. The world measurement is taken to see if the correlation between the world economy and different countries might have a better statistical relevance than those between the countries' GDP growth and stock market itself.

Governance measures are collected via a variety of sources, with the main one being the data of (Acemoglu & Johnson, 2005) of the horizontal and vertical governance measures. This data is readily available from Daron Acemoglu's MIT website. Further measures, which are later used for robustness checks, are Good Governance Index[7] (Karolyi & Wu, ; Morck et al., 2000), Corruption Perception Index (via Transparency International), Financial disclosure[8] (Bushman et al., 2004) and Anti Self-Dealing[9] (Djankov et al., 2008). The horizontal and vertical measurements are calculated in the same way described in (Lin, Massa, & Zhang, 2014). All these government measurements are imported and merged per the countries Country_ID constructed before. All the government measurements are normalized between 0 (best) and 1 (weakest) government, to make the regression analysis easier to understand.

2.2 Methodology

To normalize, or rather scale between 0 and 1, the government measurements, the manipulation is made as follows;

[6] http://spot.colorado.edu/~moonhawk/technical/C1912567120/E220703361/Media/reshape.pdf
[7,8] http://www.mathijsavandijk.com/s/Karolyi_Lee_vanDijk_data.zip

[9] https://scholar.harvard.edu/files/shleifer/files/data_for_web.xls

$$Normalized\ Value = \frac{Measurement - \min(measurement)}{\max(measurement) - \min(measurement)}$$

This will have all the values of the measurements between 0 and 1. For some measurements, the inverse is needed, which is then simply calculated as follows;

$$Inversed\ value = 1 - \ (normalized\ value)$$

The methodology I used are basic regressions, where the dependent variable is the correlation coefficient of the GDP and Stock market. The correlation is calculated for several cases, the first one is the one that calculates the correlation for the whole set of countries and years. Although not used in the later regressions, this will show if the correlations found by other authors are comparable to this dataset, which might be hard, since the correlations coefficients mentioned before vary greatly between datasets. The coefficients I do use in the regressions are the ones calculated per country, I used both full sample as 5 year averages, to see if there might be time varying effects in the analysis. Per country, the correlation is calculated between the GDP growth and the MSCI return. This is done both on all the observations per country available in the dataset, and the 5-year windows starting from 1975, so these periods will be 1975-1979, 1980-1984, 1985-1989, 1990-1994, 1995-1999, 2000-2004, 2005-2009, 2010-2015. The periods will be able to note any time-varying effects that might occur. For the correlations, per country, the correlation coefficients are given by:

$$Correlation(Country) = \frac{covariance(GDP\ growth\ t, MSCI\ Return\ t)}{\sigma_{GDP\ growth}\ \sigma_{MSCI\ return}}$$

$$= \frac{E[(GDP\ growth\ t - \mu_{GDP\ growth})(MSCI\ return\ t - \ \mu_{MSCI\ return})]}{\sigma_{GDP\ growth}\ \sigma_{MSCI\ return}}$$

Where μ is the sample mean for the relevant country, and σ is the standard deviation of the variables for the relevant country. The results are calculated per time t, so only matched pairs

are used in the calculations. The 5-year windows uses the same method, only with restrictions on time t, that these are only used if the observations fall in the correct period.

The independent variable is the government quality measure as described earlier, where I started with the vertical and horizontal measurements from (Acemoglu & Johnson, 2005). As a result, it will be clear to see if a certain government measure has a clear effect on the correlation. Since the quality of government measures are distributed between 0 (strong) and 1 (weak), the expectation would be a negative sign on the independent variable, thus the weaker the quality of government, the worst the correlation is. As control variables I have chosen Revised anti-director rights, creditor rights the natural logarithm of the number of firms and the natural logarithm of the GDP per capita. These measurements will make sure that the relationship between the dependent and independent variable is not a spurious one. The regression will thus have the form of:

$$Correlation(GDP\ growth\ i\ , MSCI\ return\ i) = \beta_0 + \beta_1 * Government\ quality + \beta_2 * Revised\ Anti\ director + \beta_3 * creditor\ rights + \beta_4 \ln(firms) + \beta_5 \ln(median\ GDP\ per\ Capita) + \varepsilon$$

Where the correlation is the coefficient calculated before, β_0 is the intercept, β_1 is the coefficient for the quality of government and all the other variables (β_2, β_3,, β_4 and β_5) are country-specific control variables. The result is a cross-sectional analysis of the effect of government quality on the correlation between GDP growth and MSCI return. The ε denotes the error term, or residual term. These are assumed to be normally distributed, homoscedastic and without serial correlation. Further assumptions of the regression are that the independent and dependent variable are linear dependent and additive. These are not expected to be breached.

2.3 Summary Statistics

The first part of the analysis will include summary statistics for the downloaded measurements, to see if my data sample will have comparable results of other papers. In figure 1 the countries are ordered from worst to best quality of government for both the horizontal and the vertical measures. These results are very much alike those reported in (Lin et al., 2014) which comes to no surprise since the datasets used to make these rankings are the same, those of (Acemoglu & Johnson, 2005). A country doesn't have to occur in both measurements, since a single missing variable of the previously mentioned dataset will render a missing value in either the horizontal or vertical measurements. For horizontal, there are 52 countries with valid results, and for vertical 47. The 5 countries that are not included in the vertical index are Croatia, Hong Kong, Morocco, Slovenia and South Africa. It is clear that a high quality of vertical measurement does not necessarily mean the horizontal quality measurement is high too, but roughly it does show that a country will not be on the other part of the scale.

Table 2 shows the summary stats for the whole dataset, for all used variables. The means of the datasets are all within the normal range cited by other papers, with the average GDP growth around 3.44%, and the GDP per Capita Growth 2.35%. These values are nothing too spectacular, but when looking at the MSCI lists, there are some interesting results. The MSCI Dollar list is clearly more stable, with a mean of 12.69%, and median of 8.71%, when compared to the MSCI Local Currency lists, where these values are 33.07% and 9.16% respectively. The minimum and maximum results, although very large, are still what to be expected of equity results. The minimums are mainly of the most recent global financial crisis, with 2009 having the most densely packed, negative results. In fact, when only taking in account the year 2009, the mean of the MSCI dollar list is -52.33%, and when not taking in account 2009, the mean will rise to 15.20%. It is clear that the global financial crisis has had a

major impact in this dataset. This is also apparent when analyzing the same year with GDP growth, where in 2009 the mean of the GDP growth was -1.29%, and excluding this year the mean rose to 3.62%. These minimum results are mostly within range to not be considered outliers for both the GDP growth and MSCI return lists. The maximum results exhibit a less pronounced period of clustered results, which makes a valid explanation about these results a lot harder to make.

Table 3 provides additional insight in the correlations between the used variables. Clearly, and logically the GDP and GDP per capita are highly correlated, but what catches attention is the rather high correlation between the GDP measurements and the MSCI list. As explained earlier, it would be more logically that this correlation was either very small, or even negative, but this is not the case, especially for the GDP per capita results. The correlation between these measurements are around 33%, which seem to come closer to the results found in (Dimson et al., 2010) than any other paper I found. What also catches attention is the higher correlation between the MSCI return list and the World GDP and World GDP per capita growth. This can be because of multinationals that are a huge part of some countries' equity lists, which possibly value the world economy more than the country its' stock is traded on. Table 3b has the correlation coefficients of the GDP growth and MSCI return but noted per country instead of the whole set. Values vary widely between countries, with results as high as 0.852 for Romania and -0.113 for Qatar.

All the government measurements, have a rather high correlation which in this setting is what would be expected. In short, I can assume that these quality measurements all measure, in broad terms, the same effect, namely quality of government. The summary statistics sum up the averages of the measurements, remember that these measurements are normalized between 0 and 1, and thus allow for some rough analyses for the government measures. For most of the measurements, the average is below 0.5, which means that on average, the quality

of government is rather good. This might be because I used the MSCI indices, which tend to be collected for more developed countries first.

Table 4 shows the correlation coefficient of the MSCI list with the Countries' GDP, GDP per capita, the World GDP and GDP per capita, all divided in 5 year windows. The 5-year correlation will allow us to see if there are time varying effects within the dataset. For most periods the results are significantly positive, which as noted before is not what was expected. The correlation with the individual countries' GDP or GDP per capita seems a bit more stable over the year, where the World GDP or GDP per capita has more variance in its' coefficient. This is most notable in the 1985-1989 period, where the world GDP is even negatively correlated with the MSCI returns. As a result, in the regression I do in the next chapter, I've chosen the correlation coefficient of the GDP growth, since this seems the most stable of the 4 I had chosen as a start. Table 4b has these correlation coefficients for every individual country per time period. These 5-year windows do not really show clear results for their respective periods. For example, comparing the 1995-1999 and 2000-2004 period, the latter showed a lot more significant results, even when this period was in the dot com bubble.

3. Results

For the next tables, the regression results have been divided in different categories. The first column will show the results for the correlation between GDP and Stock market growth from the beginning of the relevant countries addition in the dataset. The second column has all the correlations of a 5-year window combined, where the 5-year windows are the same as described in the previous section, allowing more observations to be taken in the regression. The rest of the columns are those 5-year windows taken apart from each other. The problem with these last columns is that for the beginning of the dataset, only a small amount of countries can be in the regression. This leads to a decreased power of statistics, which makes conclusions harder to make. These 5-year windows will however provide insight in the stability of the regressions, and pinpoint which periods might be contrary to earlier conclusions.

The control variables included in the regressions are the anti-director index of (Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1998) with revised and additional values from (Djankov et al., 2008). The second control variable is creditor rights, also from (Djankov et al., 2008). Further variables are the natural logarithm of the number of firms, and the natural logarithm of the median GDP per capita for the years 2005-2014. The years are chosen to have all countries included in the calculation of control variables. These control variables will make sure that the effect of the government quality measurements is not due to a spurious relationship. The first two will capture the effects of quality of government not captured by the government measurements we are interested in. The latter are country specific control variables, which will adjust for differences between wealth and size of the specific countries.

For horizontal measurements, table 4 provides the estimates of the regressions. The results are significantly different from 0 for the full set and for the combined 5-year averages. However,

they are exactly opposite of what I would expect. The assumption that better quality governments leads to higher correlation between GDP and stock market growth is not supported by the regression done. In fact, only the first two periods were negative, but due to its small size these periods are not that high in overall power, and thus not reliable to make any conclusions about the results. What also works against these first two periods is that the third period, without extra included countries, exhibits very different results, here the coefficient switches signs and magnitude. The coefficient is high, especially considering the correlation coefficient can only be between -1 and 1. This means that the government quality has quite some effect on the correlation of the GDP and stock market, even when controlled for size and wealth.

For the vertical measurements, as shown in table 5, the results remain roughly the same as described before. For the whole sample, the sign is positive and significant, as seen in the horizontal measurement. For the individual periods, the results are also somewhat the same, but again, due to their small number of observations, hard to make conclusions.

The R^2 of both regressions is around 0.2 for the correlation over all periods, and a lot lower for the combined 5-year correlations. The individual periods however exhibit R^2 to almost 0.4, but as explained before, the lack of observations make the power of these regressions a lot smaller. The R^2 thus tells us the regression is not a very good fit to the data, but still has some explanatory power. This might not be a bad thing, since very high numbers of R^2 can be the result of a regression being overfitted to the data.

The next table has the two measurements both in the regression. I've done this regression, since as shown in figure 1 and in table 3, a country can be of high quality in one measurement, but rather mediocre in the other. It will also allow to see which of the two measurements has overall higher explanatory power over the other. Clearly the horizontal measurement has more power over the vertical measurement, and is in this setting the only

one that is significant. In some periods, the government measurements have opposites signs, which can be due to the statement I did earlier about the correlation between these two. The R^2 is almost double that of the previous regressions with both the measurements taken individually. Since these measurements are not highly correlated, there is no worry of multi-collinearity when used next together in the regression.

For all models explained in the previous parts, the intercepts of the regressions are strongly negative, and almost always significant at the 10% level. This leads to the conclusion that the correlation between GDP and stock market returns is at base negative, and the combination of government quality measurements and wealth (GDP per capita) are the main reasons of a positive correlation. For the control variables, the natural logarithm of GDP per Capita is the one that is significant in most samples. This leads to the conclusion that wealth is also related to the correlation between GDP growth and stock market return. The higher the wealth in a country is, the higher the correlation.

The regressions have also been done on the GDP per capita, World GDP growth and World GDP per capita growth. For the GDP per capita, the results remain the same, positive and significant when taken the government measures individually and only horizontal significant when taken together. For both the World GPD and World GDP per capita, none of the regression coefficients is significant, undermining my earlier statement that multinational can have an impact on the dataset. These results are not tabulated, since they won't provide additional information over the tabulated results.

Now comes the hard part of understanding why the relationship between the stock market and the GDP growth is not as expected. Following the regression analysis, it can be found that the lower the quality of government, the higher the correlation is, for both the vertical and horizontal measurements. Even when combined, both have a positive sign, although only horizontal measurements are significant. This seems rather odd at first, especially since I

expected that if the quality of government is higher, the correlation between GDP and the stock market should also be higher. A closer correlation however, also means that in contracting economies, the stock market will be negative too, and in higher numbers than if the correlation is weaker. Another explanation might be that for countries with good quality governments, the standard deviations of the GDP can be lower due to their more stable growth over time. Ceteris Paribus, this leads to a lower correlation coefficient described in the section 2.2.

As stated before, the results do not seem persistent over time, in fact, they can vary a lot between time periods, even changing signs between periods. This was not to be expected, since I was convinced that a valid measurement of quality will lead to a stable result over the years. It could be due to flee-to-security behavior, where if the market is risky as a whole, investors rather take the fewest risk, also known as low-beta investing. The most notable period was the 2000-2004 period, where both measurements flip the sign when compared to the previous period. If this was due to the dot com bubble, it would be expected that these results would also appear in the recent financial crisis, but this is not noticeable in the regressions. This makes conclusions about the effect of quality of government hard to make.

4. Robustness Tests

In this part I will make the same regressions as before, but instead of using the horizontal and vertical measures I will change these to other measurements I have explained before. As shown before, most government measurements are very correlated with each other, so expected is that the results will stay roughly the same. It will still provide additional insights, since although the measurements are closely related, they still measure a different part of government quality. The results can show which parts of quality matters in this study.

Tables 8 to 11 provide the results for the additional quality measurements. The first additional government analyzed is the Corruption Perception Index of Transparency International. I took the median of the values per country, to allow for more observation, and make the measurement static. The results of the CPI are close to those described before with the horizontal and vertical measurements. There is a positive and significant result for the whole sample, and the R^2 is 15%, roughly the same as the vertical and horizontal measurements described before.

For all the other government measurements, the results are not that strong compared to the horizontal and vertical index. All but one coefficient of government measure is non-significant, so there is not a relationship between these government measurements and the correlation. This is also shown in the R^2, which for the full sample is below 10% for all measurements. This is not expected from table 3, where the correlations between the government measurements seems to be rather high. These results are thus not able to make any conclusions about government quality and the correlation between the GDP growth and stock market growth.

5. Conclusion

Results provided in this thesis show that the quality of government is negatively related with the correlation between GDP and stock market growth. The measurements with the most power are those of calculated according to the (Acemoglu & Johnson, 2005) paper. Both the contracting institution (horizontal) as the property rights institution (vertical) measurements give the same results. The results of the regression give that lower quality governments have higher correlations between GDP and Stock market. Using different methods of quality give roughly the same results, but with lower explanatory power. The best alternative quality measurement is the Corruption Perception index of Transparency International. The results here are that the lower the corruption in a country, the lower the correlation is. This gives us reason to believe that a higher level of government transparency, the better informed the investor is, leading to higher returns. To conclude, in countries with less quality of government, the correlation is higher between GDP and stock market. These results are not apparent when using the Financial Disclosure, Anti-Self-Dealing or Good-government index. These regressions have non-significant results of the government measure.

The results are not persistent over time, something expected to be the case. The most notable period is the period of the dot com bubble (2000-2004), where the signs of the measurements seem to flip compared to the previous period. In the later periods, where the global financial crisis has a major impact this reversal is not the case. Disregarding this period however yield somewhat persistent results, expect for the first two periods. The first two periods however have very few countries available with data, so here the overall power is not that high.

The reason behind the relationship between government quality and the correlation of GDP and stock market is difficult to grasp. It might be the case that higher quality of government exhibit higher long run stock market returns, and more stable GDP returns, which leads to the

less correlation for these countries. Also in contracting economies, the stock markets might react less pronounced in these countries compared to those with worse quality of governments.

6. Discussion

Among others, using more countries and a longer period, thus increasing the number of observations, will always increase the power of statistics. However, since one of the main data limitations is the availability of MSCI lists, this data would be hard to collect, especially for lesser developed countries. This seems to be the major drawback of this paper, the lack of observations, mostly for developing countries, arguably the most interesting countries to analyze.

The second thing that comes to mind is why I didn't use the growth of the dividends as described in (Ritter, 2005) to calculate the correlation between economic growth and equity growth. The most obvious answer would be that the Erasmus does not have the MSCI subscription of dividends on Datastream. However, I also think that the results would remain roughly the same, since an effect on the equity market would also affect the dividends.

Another thing that might improve the study is the use of time-varying government quality measurements. So far, the only measurement that is not static is the Corruption Perception Index, although for completeness I made it static to allow for more observations in the regressions. The problem with the static nature of the government measures is that if a country is making moves to be of higher quality, this will have effect on the GDP and stock market (dependent variables) but not on the independent variables used to analyze this.

Lastly, I think that double sorting countries might also increase the quality of the research. Very roughly, most developed countries are considered high-quality governments, and thus may behave differently from the developing or BRIC countries. This might allow for between

group comparisons, a panel data technique to see if the results might be because of the previously mentioned sort. The disadvantage however is the amount of observations needed for reliable assumptions and conclusions.

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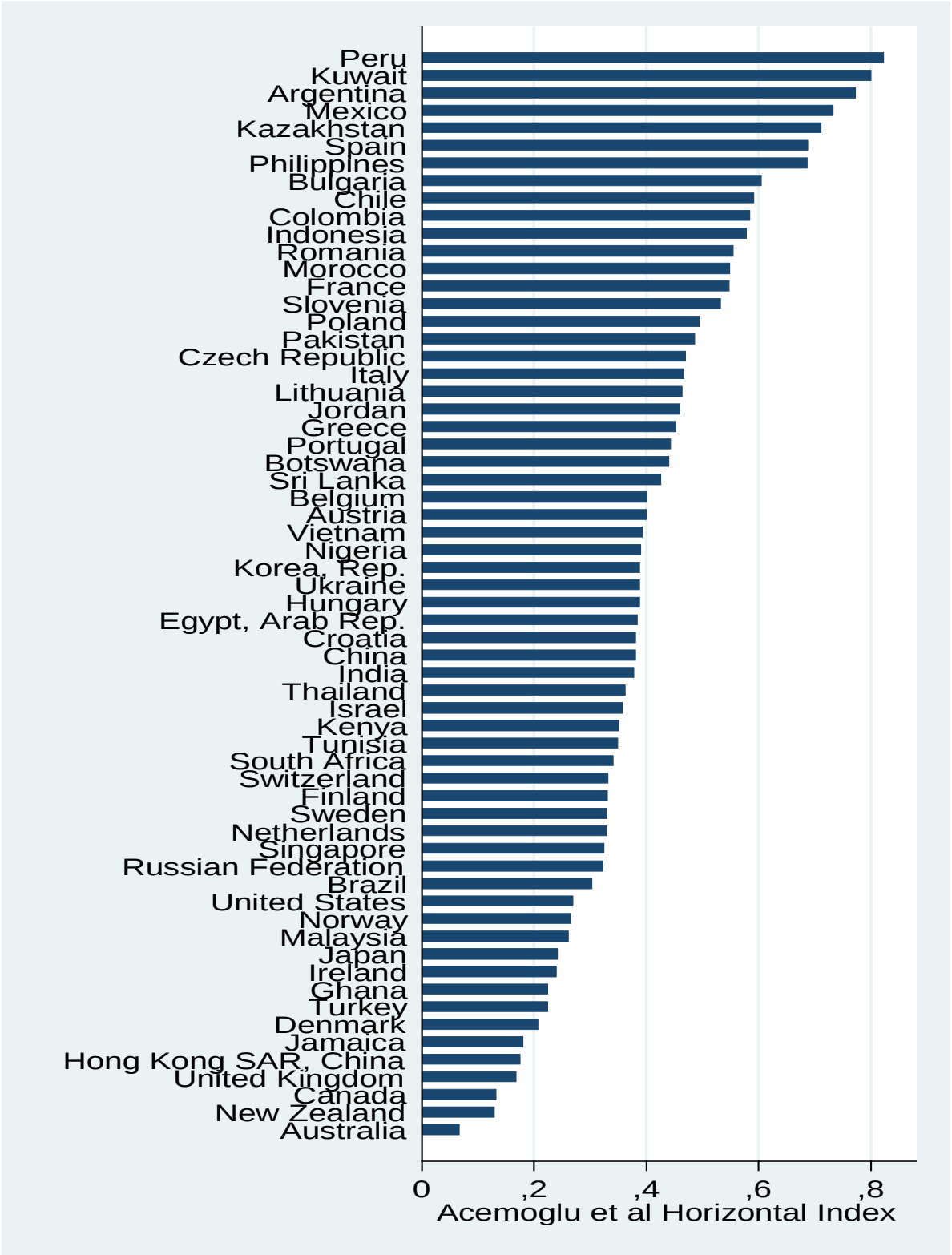
A. Appendix

Country	Year	Country	Year	Country	Year
Argentina	1989	**Hungary**	1996	**Philippines**	1989
Australia	1971	**India**	1994	**Poland**	1994
Austria	1971	**Indonesia**	1989	**Portugal**	1989
Bahrain	2007	**Ireland**	1989	**Qatar**	2007
Bangladesh	2011	**Israel**	1994	**Romania**	2007
Belgium	1971	**Italy**	1971	**Russian Federation**	1996
Bosnia and Herzegovina	2012	**Jamaica**	2010	**Saudi Arabia**	2007
Botswana	2010	**Japan**	1971	**Singapore**	1971
Brazil	1989	**Jordan**	1989	**Slovenia**	2004
Bulgaria	2007	**Kazakhstan**	2007	**South Africa**	1994
Canada	1971	**Kenya**	2004	**Spain**	1971
Chile	1989	**Korea, Rep.**	1989	**Sri Lanka**	1994
China	1994	**Kuwait**	2007	**Sweden**	1971
Colombia	1994	**Lithuania**	2010	**Switzerland**	1981
Croatia	2004	**Malaysia**	1989	**Thailand**	1989
Czech Republic	1996	**Mauritius**	2004	**Trinidad and Tobago**	2010
Denmark	1971	**Mexico**	1989	**Tunisia**	2006
Egypt, Arab Rep.	1996	**Morocco**	1996	**Turkey**	1989
Estonia	2004	**Netherlands**	1971	**Ukraine**	2008
Finland	1983	**New Zealand**	1983	**United Arab Emirates**	2007
France	1971	**Nigeria**	2004	**United Kingdom**	1971
Germany	1971	**Norway**	1971	**United States**	1971
Ghana	2010	**Oman**	2007	**Venezuela, RB**	1994
Greece	1989	**Pakistan**	1994	**Vietnam**	2008
Hong Kong SAR, China	1971	**Peru**	1994	**Zimbabwe**	2012

Table 1 Countries included in the research with the year they appear in the MSCI list


Peru
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Mexico
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Philippines
Bulgaria
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Colombia
Indonesia
Romania
Morocco
France
Slovenia
Poland
Pakistan
Czech Republic
Italy
Lithuania
Jordan
Greece
Portugal
Botswana
Sri Lanka
Belgium
Austria
Vietnam
Nigeria
Korea, Rep.
Ukraine
Hungary
Egypt, Arab Rep.
Croatia
China
India
Thailand
Israel
Kenya
Tunisia
South Africa
Switzerland
Finland
Sweden
Netherlands
Singapore
Russian Federation
Brazil
United States
Norway
Malaysia
Japan
Ireland
Ghana
Turkey
Denmark
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Hong Kong SAR, China
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Acemoglu et al Horizontal Index

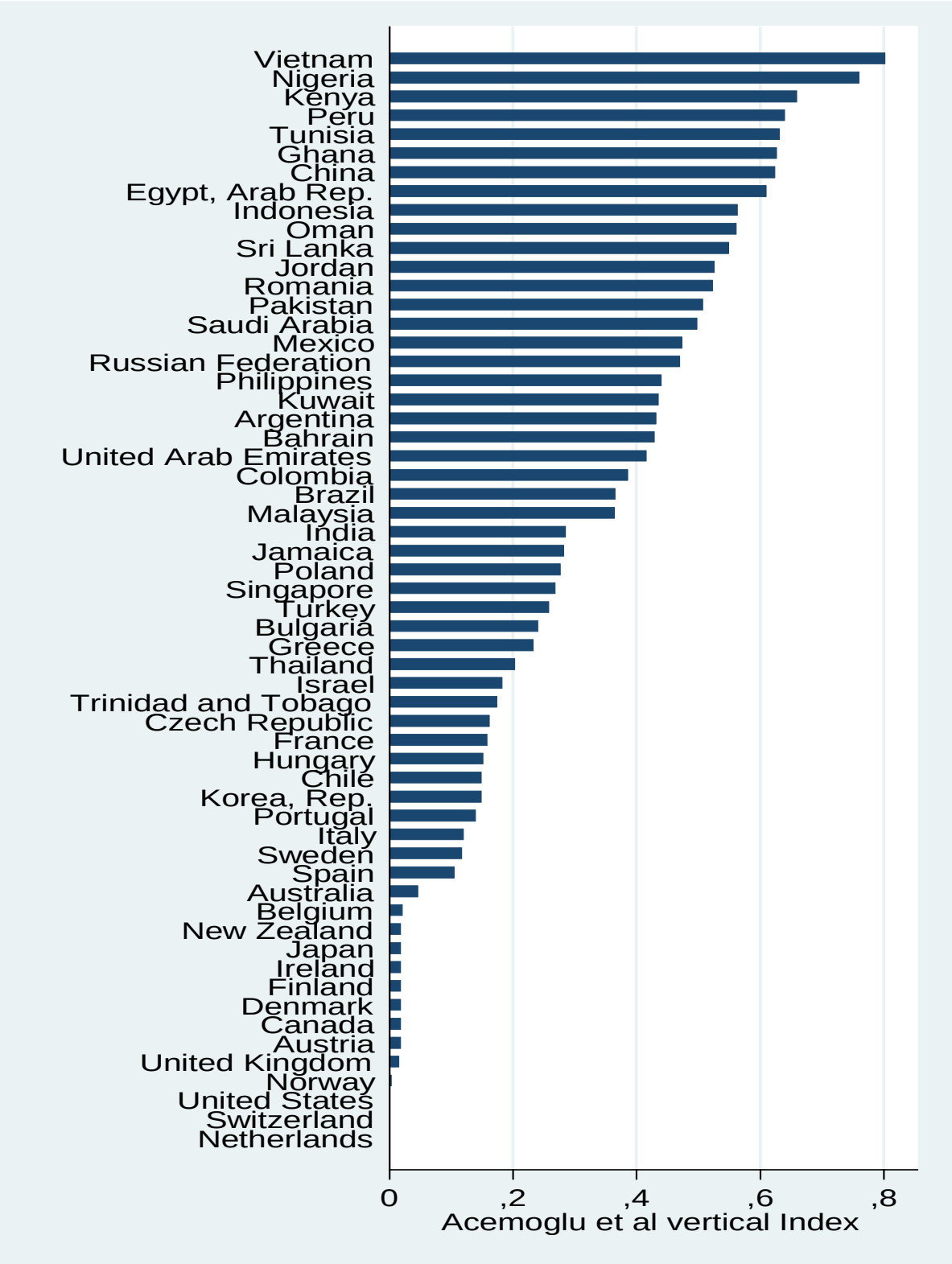

Figure 1Horizontal and vertical measurements per country calculated using the data provided by (Acemoglu & Johnson, 2005) and methods by (Lin et al., 2014).

	N	Mean	Std. dev.	Variance	Minimum	Median	Maximum
GDP Growth	1778	3,439396	3,550291	12,60457	-14,8	3,390706	33,73578
GDP per Capita Growth	1778	2,346256	3,413901	11,65472	-16,7637	2,381274	30,34224
World GDP growth	1778	2,968634	1,390309	1,932959	-1,70053	2,957988	6,465183
World GDP per capita growth	1778	1,534645	1,349439	1,820986	-2,8882	1,497264	4,404174
MSCI Return $	1778	12,69499	44,91726	2017,56	-83,8741	8,713234	769,965
MSCI Return LCU	1778	33,06835	494,3475	244379,5	-83,1584	9,157366	19929,4

	N	Mean	Std. dev.	Variance	Minimum	Median	Maximum
Horizontal Index	58	0,416813	0,17215	0,029636	0,067719	0,389235	0,822586
Vertical Index	55	0,292615	0,234446	0,054965	0	0,257788	0,801661
Anti-Self-Dealing	56	0,568824	0,262084	0,068688	0	0,608466	1
Financial Disclosure	36	0,25438	0,297913	0,088752	0	0,130796	1
Good Government	37	0,335948	0,288552	0,083262	0	0,254407	1
Corruption Perception	61	0,44233	0,270163	0,072988	0,071429	0,363095	0,940476

Table 2 Descriptive Statistics. For the government measurements, only one year is selected, since these (except the CPI) are constant.

	GDP Growth	GDP per Capita Growth	World GDP growth	World GDP per capita growth	MSCI Return $	MSCI Return LCU
GDP Growth	1					
GDP per Capita Growth	0,915***	1				
World GDP growth	0,377***	0,413***	1			
World GDP per capita growth	0,372***	0,403***	0,984***	1		
MSCI Return $	0,331***	0,350***	0,381***	0,375***	1	
MSCI Return LCU	-0,0112	-0,0161	0,0288	0,021	0,147***	1
N	1823					

	Horizontal Index	Vertical Index	Anti-Self-Dealing	Financial Disclosure	Good Government	Median Corruption Perception
Horizontal Index	1					
Vertical Index	0,430**	1				
Anti-Self-Dealing	0,374**	0,251	1			
Financial Disclosure	0,282	0,505**	0,326	1		
Good Government	0,590***	0,897***	0,142	0,624***	1	
Median Corruption Perception	0,513***	0,809***	0,302*	0,663***	0,918***	1
N	63					

*Table 3 Correlations * p<0.05, ** p<0.01, *** p<0.001*

Country	Correlation Coefficient	Observations	Country	Correlation Coefficient	Observations
Argentina	0,332	27	**Lithuania**	-0,0138	6
Australia	0,188	45	**Malaysia**	0,569**	27
Austria	0,301*	45	**Mauritius**	0,682*	12
Bahrain	0,780*	9	**Mexico**	0,578**	27
Bangladesh	0,315	5	**Morocco**	-0,00219	20
Belgium	0,455**	45	**Netherlands**	0,566***	45
Bosnia and Herzegovina	0,377	4	**New Zealand**	0,272	33
Botswana	0,289	6	**Nigeria**	0,26	12
Brazil	0,411*	27	**Norway**	0,253	45
Bulgaria	0,604	9	**Oman**	-0,02	9
Canada	0,423**	45	**Pakistan**	0,175	22
Chile	0,627***	27	**Peru**	0,591**	22
China	0,438*	22	**Philippines**	0,351	27
Colombia	0,514*	22	**Poland**	0,175	22
Croatia	0,584*	12	**Portugal**	0,376	27
Czech Republic	0,659**	20	**Qatar**	-0,113	9
Denmark	0,436**	45	**Romania**	0,852**	9
Egypt	0,401	20	**Russia**	0,363	20
Estonia	0,745**	12	**Saudi Arabia**	0,358	9
Finland	0,584***	33	**Singapore**	0,591***	45
France	0,342*	45	**Slovenia**	0,764**	12
Germany	0,357*	45	**South Africa**	0,590**	22
Ghana	0,134	6	**Spain**	0,492***	45
Greece	0,403*	27	**Sri Lanka**	0,481*	22
Hong Kong SAR, China	0,640***	45	**Sweden**	0,572***	45
Hungary	0,469*	20	**Switzerland**	0,279	35
India	0,0474	22	**Thailand**	0,545**	27
Indonesia	0,446*	27	**Trinidad and Tobago**	0,728	6
Ireland	0,581**	27	**Tunisia**	0,419	10
Israel	0,491*	22	**Turkey**	0,257	27
Italy	0,29	45	**Ukraine**	0,726*	8
Jamaica	0,0769	6	**U.A.E.**	0,482	9
Japan	0,570***	45	**U.K.**	0,396**	45
Jordan	0,407*	27	**U.S.A.**	0,563***	45
Kazakhstan	0,775*	9	**Venezuela, RB**	0,466	14
Kenya	0,124	12	**Vietnam**	0,578	8
Korea, Rep.	0,552**	27	**Zimbabwe**	0,0236	4
Kuwait	0,559	9			

*Table 3b Correlation Coefficients per country * p<0.05, ** p<0.01, *** p<0.001*

Period	GDP growth	GDP Growth per Capita	World GDP growth	World GDP growth per capita	N
1974-1979	0,485***	0,550***	0,556***	0,553***	85
1980-1984	0,389***	0,384***	0,320**	0,323**	93
1985-1989	0,105	0,102	-0,430***	-0,439***	114
1990-1994	0,211**	0,209**	0,350***	0,356***	180
1995-1999	0,226***	0,285***	0,074	0,0766	240
2000-2004	0,391***	0,380***	0,659***	0,659***	251
2005-2010	0,547***	0,598***	0,716***	0,716***	308
2011-2014	0,322***	0,339***	0,525***	0,520***	439

Table 4 Correlation Coefficients between GDP measurements and MSCI return ($) per 5-year period

Country	1975-1979	1980-1984	1985-1989	1990-1994	1995-1999	2000-2004	2005-2009	2010-2015
Argentina				0,316	0,900*	0,37	0,894*	0,564
Australia	0,281	0,649	-0,825	0,196	-0,36	0,755	0,948*	-0,622
Austria	0,00485	-0,020	-0,362	0,771	0,166	0,18	0,862	0,296
Bahrain							0,873	0,468
Bangladesh								0,315
Belgium	0,681	0,741	-0,396	0,624	0,388	0,622	0,932*	0,421
Bosnia								0,377
Botswana								0,289
Brazil				-0,189	0,711	0,934*	0,887*	0,762
Bulgaria							0,999*	0,00574
Canada	0,798	0,636	-0,662	0,337	-0,177	0,672	0,911*	0,724
Chile				0,696	0,787	0,822	0,959**	0,655
China					-0,013	0,522	0,546	0,697
Colombia					0,593	0,543	0,515	0,381
Croatia							0,688	-0,368
Czech Republic					-0,501	0,698	0,883*	0,171
Denmark	0,974**	0,67	-0,0018	0,709	-0,661	0,739	0,853	0,481
Egypt					-0,511	0,841	0,112	0,415
Estonia							0,926*	0,371
Finland		1	-0,0186	0,852	-0,099	0,954*	0,817	0,186
France	0,539	-0,444	-0,377	0,72	0,474	0,902*	0,926*	0,128
Germany	0,476	0,900*	-0,396	0,427	0,256	0,52	0,866	0,253
Ghana								0,134
Greece				0,635	0,0609	0,00041	0,641	0,556
Hong Kong	0,949*	0,654	0,225	0,476	0,667	0,907*	0,69	0,923**
Hungary					0,714	0,373	0,895*	-0,00462
India					-0,457	0,15	-0,469	0,915*
Indonesia				0,336	0,786	0,937*	0,980**	0,548
Ireland				0,888*	0,859	-0,205	0,890*	0,126
Israel					-0,257	0,838	0,375	0,534
Italy	0,637	-0,084	-0,575	0,746	-0,246	0,328	0,885*	0,433
Jamaica								0,0769
Japan	0,824	0,907*	-0,425	-0,17	0,56	0,888*	0,921*	-0,32
Jordan				0,393	-0,566	0,817	0,565	-0,0741
Kazakhstan							0,992	0,511
Kenya							0,432	0,0326
Korea, Rep.				0,0806	0,75	0,757	0,782	0,938**
Kuwait							0,657	0,457
Lithuania								-0,0138
Malaysia				-0,263	0,778	0,784	0,84	0,647
Mauritius							0,639	0,791
Mexico				-0,252	0,561	0,85	0,976**	0,389
Morocco					-0,551	-0,0568	-0,172	0,516
Netherlands	0,973**	0,866	-0,445	0,688	0,584	0,682	0,961**	0,255
New Zealand		1	0,542	0,537	-0,109	0,193	0,595	-0,888*
Nigeria							-0,219	0,185
Norway	-0,285	0,616	0,0928	0,147	0,774	0,954*	0,887*	-0,65
Oman							0,693	-0,583
Pakistan					-0,286	0,501	0,345	-0,543
Peru					0,333	0,712	0,931*	0,757
Philippines				0,757	0,758	0,851	0,928*	0,218
Poland					0,224	0,892*	0,461	0,188
Portugal				0,174	0,794	0,209	0,879*	0,425
Qatar							0,323	-0,0092
Romania							0,949	0,305
Russia					-0,436	0,834	0,944*	0,696
Saudi Arabia							0,804	0,0365
Singapore	0,718	0,607	0,86	0,497	0,856	0,789	0,723	0,892*
Slovenia							0,773	0,532
South Africa					0,522	0,643	0,941*	0,743
Spain	-0,282	-0,265	0,428	0,484	0,667	-0,0689	0,824	0,363
Sri Lanka					0,349	0,724	0,941*	0,336
Sweden	0,237	0,659	0,845	0,804	-0,843	0,967**	0,875	0,658
Switzerland		0,756	-0,711	0,578	0,188	0,521	0,984**	0,817*
Thailand				0,484	0,899*	0,505	0,465	0,229
Trinidad and Tobago								0,728
Tunisia							1,000***	-0,0988
Turkey				0,115	0,0638	0,52	0,624	0,705
Ukraine							1	0,5
U.A.E.							0,66	-0,415
U.K.	0,677	-0,58	0,231	0,1	0,706	-0,00303	0,916*	-0,0169
U.S.A.	0,722	0,754	-0,86	0,451	0,764	0,748	0,848	0,272
Venezuela					0,766	0,969**	-0,364	
Vietnam							1	0,557
Zimbabwe								0,0236

Table 4b Correlation Coefficients between GDP measurements and MSCI return ($) per 5-year period and per country. Observations are either 5 for all the periods except the last where it is 6. Those that have different observation numbers are denoted here: Bahrain 2005 N = 3. Bosnia 2010 N=4. Czech Republic 1995 N=4. Egypt 1995 N=4. Finland 1980 N=2. Hungary 1995 N=4. Kuwait 2005 N=3. Morocco 1995 N=4. New-Zealand 1980 N=2. Oman 2005 N=3. Qatar 2005 N=3. Romania 2005 N=3. Russia 1995 N=4. South-Africa 2005 N=3. Switzerland 1980 N=4. Tunisia 2005 N=4. Ukraine 2005 N=2. U.A.E. 2005 N=3. Venezuela 2005 N=3. Vietnam 2005 N=3. Zimbabwe 2010 N=4.

*Table 5 Reports the regression with as independent variable the calculated between GDP growth and MSCI return ($). Regression with horizontal (contracting government) measurement as government quality index. Government quality index is calculated as the average of 3 indices, and normalized between 0 (strong) and 1 (weak) to allow for easier understanding of its relation to the correlation. P-values are denoted in parentheses. * p<0.05, ** p<0.01, *** p<0.001.*

Sample Period	Constant	Horizontal Index	Anti-director Index	Creditor rights	ln firms	ln GDP per capita	Adj. R^2	N
All Years	-0,451	0,501**	0,0358	0,00613	0,0289	0,0487*	0,202	59
	(0,079)	(0,004)	(0,139)	(0,792)	(0,201)	(0,036)		
Combined Correlations	-0,297	0,363	0,0619*	-0,00370	-0,0224	0,0449	0,010	294
	(0,374)	(0,078)	(0,037)	(0,898)	(0,455)	(0,129)		
1975-1979	11,17	-2,147*	0,0121	-0,0307	-0,174	-0,871	0,155	16
	(0,075)	(0,031)	(0,955)	(0,768)	(0,489)	(0,111)		
1980-1984	2,790	-1,462	-0,350	-0,0600	0,370	-0,158	0,196	19
	(0,637)	(0,139)	(0,164)	(0,597)	(0,196)	(0,764)		
1985-1989	-5,720	1,617	0,279	0,171	0,0828	0,317	0,228	19
	(0,372)	(0,127)	(0,292)	(0,172)	(0,780)	(0,576)		
1990-1994	-0,921	0,662	-0,0622	0,0211	0,0599	0,111	0,054	32
	(0,308)	(0,145)	(0,310)	(0,748)	(0,413)	(0,179)		
1995-1999	-2,219*	1,123	0,200*	0,00908	-0,112	0,165*	0,136	47
	(0,015)	(0,052)	(0,011)	(0,913)	(0,152)	(0,037)		
2000-2004	0,634	-0,107	0,0313	-0,0373	0,0156	-0,00794	-0,098	47
	(0,301)	(0,783)	(0,550)	(0,517)	(0,770)	(0,882)		
2005-2009	-0,987*	0,437	0,0378	-0,0385	-0,0145	0,161***	0,251	55
	(0,026)	(0,128)	(0,338)	(0,324)	(0,691)	(0,000)		
2010-2015	-0,597	0,610	0,0856	0,00204	-0,0669	0,0553	0,016	59
	(0,307)	(0,115)	(0,125)	(0,970)	(0,198)	(0,294)		

*Table 6 Reports the regression with as independent variable the calculated between GDP growth and MSCI return ($). Regression with vertical (property rights institution) measurement as government quality index. Government quality index is calculated as the average of 3 indices, and normalized between 0 (strong) and 1 (weak) to allow for easier understanding of its relation to the correlation. P-values are denoted in parentheses. * p<0.05, ** p<0.01, *** p<0.001*

Sample period	Constant	Vertical Index	Anti-director Index	Creditor rights	ln firms	ln GDP per capita	Adj. R^2	N
All Years	-0,761	0,424*	0,0259	-0,0338	0,0283	0,101**	0,219	52
	(0,061)	(0,035)	(0,246)	(0,087)	(0,175)	(0,006)		
Combined Correlations	-0,669	0,443	0,0469	-0,0350	-0,0405	0,103*	0,008	271
	(0,244)	(0,120)	(0,130)	(0,204)	(0,190)	(0,047)		
1975-1979	3,493	-0,369	-0,0270	0,0384	-0,0212	-0,268	-0,492	15
	(0,685)	(0,856)	(0,930)	(0,784)	(0,954)	(0,740)		
1980-1984	2,340	-1,906	-0,420	0,00343	0,591	-0,206	0,102	18
	(0,736)	(0,306)	(0,145)	(0,976)	(0,085)	(0,750)		
1985-1989	-5,183	3,441	0,291	0,133	-0,0998	0,357	0,265	18
	(0,450)	(0,072)	(0,293)	(0,245)	(0,752)	(0,575)		
1990-1994	1,849	-1,125	-0,0878	-0,0423	0,0342	-0,0936	0,060	31
	(0,223)	(0,133)	(0,159)	(0,524)	(0,645)	(0,501)		
1995-1999	-0,568	-0,223	0,161	-0,0826	-0,167*	0,0920	0,050	44
	(0,703)	(0,769)	(0,055)	(0,317)	(0,046)	(0,487)		
2000-2004	-1,018	1,035*	0,0344	-0,0287	0,0151	0,132	0,024	44
	(0,265)	(0,030)	(0,493)	(0,566)	(0,760)	(0,107)		
2005-2009	-1,238	0,404	0,0196	-0,0743*	-0,0218	0,210**	0,295	49
	(0,075)	(0,227)	(0,614)	(0,034)	(0,542)	(0,001)		
2010-2015	-1,256	0,669	0,0608	-0,0394	-0,0769	0,150	0,005	52
	(0,233)	(0,198)	(0,299)	(0,442)	(0,161)	(0,113)		

*Table 7 Reports the regression with as independent variable the calculated between GDP growth and MSCI return ($). Regression with both vertical (property rights institution) and horizontal (contracting government) measurement as government quality index. Government values are standardized between 0 (strong) and 1 (weak) to allow for easier understanding of its relation to the correlation. P-values are denoted in parentheses. * p<0.05, ** p<0.01, *** p<0.001*

Sample period	Constant	Vertical Index	Horizontal Index	Anti-director Index	Creditor rights	ln firms	ln GDP per capita	Adj. R-squared	N
All Years	-0,971*	0,319	0,440**	0,0354	-0,00899	0,0280	0,0995**	0,340	52
	(0,012)	(0,087)	(0,004)	(0,091)	(0,648)	(0,146)	(0,004)		
Combined Correlations	-0,819	0,359	0,306	0,0496	-0,0179	-0,0344	0,102*	0,012	271
	(0,161)	(0,216)	(0,152)	(0,109)	(0,550)	(0,270)	(0,049)		
1975-1979	8,885	1,581	-2,522*	0,0642	-0,0424	-0,317	-0,629	0,056	15
	(0,238)	(0,394)	(0,037)	(0,797)	(0,717)	(0,331)	(0,353)		
1980-1984	3,619	-0,940	-1,213	-0,363	-0,0556	0,431	-0,253	0,115	18
	(0,606)	(0,644)	(0,301)	(0,211)	(0,660)	(0,238)	(0,695)		
1985-1989	-6,195	2,676	0,959	0,245	0,180	0,0265	0,394	0,248	18
	(0,383)	(0,203)	(0,409)	(0,387)	(0,171)	(0,940)	(0,543)		
1990-1994	1,441	-1,484*	0,886	-0,0702	-0,00347	0,0733	-0,104	0,164	31
	(0,317)	(0,046)	(0,053)	(0,236)	(0,958)	(0,317)	(0,427)		
1995-1999	-1,092	-0,594	1,204*	0,165*	-0,0119	-0,139	0,0836	0,126	44
	(0,453)	(0,429)	(0,044)	(0,041)	(0,890)	(0,084)	(0,510)		
2000-2004	-0,866	1,142*	-0,349	0,0332	-0,0492	0,00717	0,134	0,021	44
	(0,350)	(0,021)	(0,350)	(0,509)	(0,370)	(0,886)	(0,102)		
2005-2009	-1,479*	0,324	0,393	0,0227	-0,0513	-0,0193	0,214**	0,312	49
	(0,038)	(0,333)	(0,162)	(0,556)	(0,176)	(0,587)	(0,001)		
2010-2015	-1,566	0,514	0,650	0,0748	-0,00268	-0,0774	0,148	0,039	52
	(0,138)	(0,320)	(0,112)	(0,200)	(0,961)	(0,151)	(0,112)		

*Table 8 Regression with Corruption Perception Index of Transparency international as government quality measure. The CPI is taken as the median value of the relevant country for the values collected, and standardized between 0 (strong) and 1 (weak) to allow for easier understanding of its relation to the correlation. P-values are denoted in parentheses. * p<0.05, ** p<0.01, *** p<0.001*

Sample period	Constant	Corruption Perception index	Anti-director Index	Creditor rights	ln firms	ln GDP per capita	Adj. R-squared	N
All Years	-1,043*	0,451*	0,0317	-0,0208	0,0375	0,111**	0,154	58
	(0,030)	(0,016)	(0,202)	(0,351)	(0,127)	(0,005)		
Combined Correlations	-0,199	0,134	0,0490	-0,0390	-0,0369	0,0565	0,002	286
	(0,747)	(0,565)	(0,107)	(0,161)	(0,280)	(0,255)		
1975-1979	12,42	-2,243	-0,0171	-0,0178	-0,242	-0,972	-0,206	15
	(0,212)	(0,171)	(0,949)	(0,887)	(0,497)	(0,261)		
1980-1984	6,123	-2,347	-0,367	-0,0634	0,141	-0,389	0,222	18
	(0,406)	(0,072)	(0,190)	(0,581)	(0,693)	(0,551)		
1985-1989	1,529	-1,625	0,445	0,0259	-0,362	-0,168	0,154	18
	(0,842)	(0,221)	(0,137)	(0,830)	(0,347)	(0,807)		
1990-1994	2,156	-0,936	-0,0964	-0,0163	-0,0628	-0,0799	0,062	31
	(0,175)	(0,103)	(0,124)	(0,803)	(0,472)	(0,522)		
1995-1999	-2,513	0,553	0,199*	-0,0681	-0,136	0,232	0,101	46
	(0,129)	(0,392)	(0,014)	(0,399)	(0,146)	(0,080)		
2000-2004	0,333	0,106	0,0284	-0,0918	0,0127	0,0208	-0,055	46
	(0,783)	(0,824)	(0,625)	(0,128)	(0,853)	(0,829)		
2005-2009	-1,603*	0,483	0,0247	-0,0574	0,00676	0,220**	0,230	54
	(0,048)	(0,120)	(0,537)	(0,120)	(0,867)	(0,001)		
2010-2015	-0,996	0,513	0,0571	-0,0433	-0,0533	0,109	0,002	58
	(0,345)	(0,210)	(0,302)	(0,386)	(0,328)	(0,204)		

*Table 9 Regression with Financial disclosure measurement as government quality index. Financial disclosure gives a measurement of how accurately investors can examine a company. Government values are standardized between 0 (strong) and 1 (weak) to allow for easier understanding of its relation to the correlation. P-values are denoted in parentheses. * p<0.05, ** p<0.01, *** p<0.001*

Sample period	Constant	Financial Disclosure	Anti-director Index	Creditor rights	ln firms	ln GDP per capita	adj. R-sq	N
All Years	-0,367	0,0401	0,0645	-0,0124	-0,0137	0,0606	0,034	36
	(0,335)	(0,700)	(0,063)	(0,628)	(0,651)	(0,071)		
Combined Correlations	-0,0676	0,103	0,0533	-0,0148	-0,0509	0,0445	-0,011	232
	(0,901)	(0,463)	(0,244)	(0,641)	(0,237)	(0,355)		
1975-1979	4,469	-1,060	-0,206	0,104	0,193	-0,365	-0,073	17
	(0,423)	(0,131)	(0,369)	(0,323)	(0,404)	(0,476)		
1980-1984	-2,552	-0,745	-0,378	0,0790	0,315	0,303	-0,048	20
	(0,698)	(0,358)	(0,183)	(0,514)	(0,270)	(0,615)		
1985-1989	-2,327	0,200	0,358	0,0536	-0,0781	0,0899	0,082	20
	(0,707)	(0,791)	(0,181)	(0,637)	(0,767)	(0,874)		
1990-1994	0,970	-0,379	-0,153	-0,0248	0,0266	0,00611	0,072	31
	(0,458)	(0,163)	(0,085)	(0,701)	(0,784)	(0,960)		
1995-1999	-1,685	0,455	0,213	0,00670	-0,206*	0,167	0,070	36
	(0,173)	(0,183)	(0,058)	(0,935)	(0,042)	(0,120)		
2000-2004	0,0790	0,0326	0,0501	-0,105	0,0229	0,0400	-0,079	36
	(0,938)	(0,908)	(0,583)	(0,134)	(0,780)	(0,650)		
2005-2009	-0,637	-0,0861	0,0167	-0,0382	-0,0931*	0,172**	0,317	36
	(0,269)	(0,585)	(0,743)	(0,325)	(0,049)	(0,001)		
2010-2015	-0,244	0,338	0,0917	-0,00652	-0,0499	0,0297	-0,097	36
	(0,851)	(0,347)	(0,431)	(0,941)	(0,632)	(0,791)		

*Table 10 Regression with Anti-self-dealing measurement as government quality index Anti-self-dealing gives the measurement of protection of minority shareholder against the company. Government values are standardized between 0 (strong) and 1 (weak) to allow for easier understanding of its relation to the correlation. P-values are denoted in parentheses. * p<0.05, ** p<0.01, *** p<0.001*

Sample period	Constant	Anti-Self Dealing	Anti-director Index	Creditor rights	ln firms	ln GDP per capita	adj. R-sq	N
All Years	0,0223	-0,0249	0,0243	-0,0253	0,0233	0,0332	0,065	60
	(0,933)	(0,832)	(0,392)	(0,280)	(0,330)	(0,167)		
Combined Correlations	0,118	0,00228	0,0505	-0,0335	-0,0368	0,0293	-0,002	302
	(0,701)	(0,986)	(0,127)	(0,226)	(0,219)	(0,308)		
1975-1979	4,543	-0,889	-0,107	0,0153	-0,0853	-0,270	-0,085	17
	(0,418)	(0,142)	(0,620)	(0,881)	(0,731)	(0,604)		
1980-1984	-1,305	0,284	-0,320	0,0643	0,324	0,147	-0,103	20
	(0,850)	(0,691)	(0,255)	(0,615)	(0,316)	(0,823)		
1985-1989	-2,136	0,169	0,342	0,0742	-0,0299	0,0519	0,082	20
	(0,735)	(0,796)	(0,188)	(0,527)	(0,918)	(0,931)		
1990-1994	-0,287	0,0461	-0,0833	-0,0112	-0,0118	0,101	-0,010	33
	(0,724)	(0,890)	(0,280)	(0,873)	(0,879)	(0,231)		
1995-1999	-0,968	-0,332	0,173*	-0,0848	-0,169*	0,142	0,097	48
	(0,213)	(0,345)	(0,041)	(0,301)	(0,033)	(0,066)		
2000-2004	0,237	0,371	0,0609	-0,0456	0,0220	-0,00650	-0,018	48
	(0,673)	(0,150)	(0,313)	(0,444)	(0,694)	(0,906)		
2005-2009	-0,771	0,242	0,0483	-0,0521	-0,0151	0,141***	0,225	56
	(0,059)	(0,175)	(0,264)	(0,153)	(0,677)	(0,000)		
2010-2015	0,345	-0,148	0,0422	-0,0429	-0,0555	0,0125	-0,045	60
	(0,558)	(0,567)	(0,499)	(0,405)	(0,293)	(0,811)		

*Table 11 Regression with Good government measurement as government quality index. Good government measurements uses 3 indices of government corruption by the ICRG to make one index of government measurement. Government values are standardized between 0 (strong) and 1 (weak) to allow for easier understanding of its relation to the correlation. P-values are denoted in parentheses. * p<0.05, ** p<0.01, *** p<0.001*

Sample period	Constant	Good Government	Anti-director Index	Creditor rights	ln firms	ln GDP per capita	adj. R-sq	N
All Years	-1,054	0,278	0,0734*	-0,00767	-0,0167	0,118*	0,078	37
	(0,128)	(0,204)	(0,029)	(0,754)	(0,549)	(0,046)		
Combined Correlations	-1,354	0,536	0,0667	-0,00591	-0,0615	0,155	0,005	237
	(0,177)	(0,084)	(0,135)	(0,851)	(0,133)	(0,072)		
1975-1979	14,96	-2,726	-0,229	0,0728	0,243	-1,321	-0,123	17
	(0,112)	(0,180)	(0,347)	(0,479)	(0,338)	(0,121)		
1980-1984	9,335	-3,781*	-0,435	0,0392	0,408	-0,770	0,185	20
	(0,234)	(0,039)	(0,088)	(0,699)	(0,118)	(0,277)		
1985-1989	-0,964	-0,516	0,327	0,0619	-0,0453	-0,0306	0,083	20
	(0,906)	(0,775)	(0,218)	(0,568)	(0,865)	(0,967)		
1990-1994	2,058	-0,589	-0,133	-0,0283	0,0188	-0,0968	0,014	32
	(0,452)	(0,422)	(0,139)	(0,669)	(0,847)	(0,688)		
1995-1999	-4,580*	1,358	0,230*	0,0252	-0,212*	0,416*	0,148	37
	(0,042)	(0,057)	(0,033)	(0,748)	(0,023)	(0,029)		
2000-2004	-1,293	0,550	0,0772	-0,0886	-0,00152	0,155	-0,062	37
	(0,495)	(0,363)	(0,394)	(0,198)	(0,984)	(0,333)		
2005-2009	-2,290*	0,549	0,0516	-0,0260	-0,105*	0,305**	0,344	37
	(0,033)	(0,103)	(0,301)	(0,487)	(0,019)	(0,001)		
2010-2015	-1,855	0,817	0,0957	0,00469	-0,0545	0,171	-0,077	37
	(0,437)	(0,283)	(0,401)	(0,956)	(0,576)	(0,395)		