School of Economics and Management

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The Impact of Political Risk on Equity Market Performance

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Abstract

This paper investigates the impact of political risk on financial performance. In order to assess the quantitative measure of political risk principal component analysis is performed referring to six indicators, which measure different areas of political environment. We employ several macroeconomic factors as control variables to strenghten the explanatory power of estimation. Panel data methods are used to test the impact of political risk. It turns out that political risk is not priced in equity returns, while results are sensitive to the time span changes. We show that the impact on price-to-earnings ratio is negative and statistically significant implying that investors are willing to pay less for stocks with higher risk. Dividend yields respond positively, but the regression has weak explanatory power. Among macroeconomic variables, GDP turns to have a significant influence on all the financial performance measures. Additionally, the effects of unemployment, exchange rate movements, interest rates and reserves on returns are statistically significant. To conclude, the paper demonstrates the existence of the impact of political risk proxies and various macroeconomic indicators on equity market performance.

Keywords: political risk, stock market, returns, price-to-earnings ratio, dividend yield, macroeconomic factors, panel regression

Contents

List of tables

List of figures

Abbreviations and symbols

AIC	Akaike Information Criteria
AR	Autoregressive Process
ARMA	Autoregressive Moving Average Process
CCR	Credit Country Risk
d.f.	Degrees of Freedom
EGARCH	Exponential GARCH (with leverage effect)
FE	Fixed Effects
GARCH	Generalized Autoregressive Conditional Heteroskedasticity
GJR GARCH	Glosten-Jagannathan-Runkle GARCH (with leverage effect)
GDP	Gross Domestic Product
GLS	Generalized Least Squares
H0	Zero hypothesis
IMF	International Monetary Fund
ICRG	International Country Risk Guide
LSDV	Least Squares Dummy Variables
OLS	Ordinary Least Squares
RE	Random Effects
USD	US Dollar ($)
VAR	Vector Autoregression
WGI	World Governance Indicators
χ^2	Chi squared distribution

1 Introduction

The purpose of this paper is to examine the effect of political environment on main financial indicators. We investigate whether political risk is a priced factor affecting investors' perceptions and sentiments or it is diversifiable and has no impact on stock markets.

The main motivation for our research is that political events are closely linked to economic development. They shape economic environment, change financial risk and can even trigger financial crises. Therefore, it is likely that political movements are reflected in stock prices. Consequently, political risk should be taken into account in financial decision-making and the link between political situation and equity market performance is worthwhile investigating.

Political risk is defined as a risk of investors' losses or decrease in firms' profitability due to political events, government actions or inactions. For instance, Howell and Chaddick (1994) describe political risk as a possibility that political events or circumstances in a given country will affect the business environment in such a way that investors will lose money or reduce marginal profits. The fundamental financial concept is that in equilibrium equity prices should be equal to discounted projected cash flows. Introducing political risk increases the range of possible cash flows as well as discount rates. Consequently, the volatility of returns surges, while returns can either decrease reflecting poor firms' performance or increase due to investors' demand for a higher risk premium. The concept of market efficiency implies that stock prices reflect all available information including the risk related to political fluctuations. The impact of political news depends on investors' perceptions: if the new information leads to an upward revision of investors' expectations, the equity prices should increase and vice versa. On the contrary, globalization makes political risk more diversifiable wiping out the risk premium related to political ambiguity.

Some of the pioneers in exploring the linkage between politics and economics are Nordhaus (1975) and Alesina (1987). Their theoretical political business cycles framework suggests that the popularity of politicians depends on the macroeconomic conditions; thus, the optimal macroeconomic policy is determined by the election cycle. Moser (2007) found that political uncertainty emanating from upcoming elections significantly increased bond spreads in Latin American countries in the sample period from 1992 to 2007. Döpke and Pierdzioch (2006) propose to examine stock market performance instead of macroeconomic variables since

equity prices are in the focus of media coverage related to economic news. Belo, Gala and Li (2013) conclude that during Democratic presidencies U.S. firms with high government exposure tend to have larger returns, while the opposite situation arises during Republican presidencies. Ramcharran (2003) uses panel data of 21 countries to examine the effect of economic and political risk on returns, price-to-earnings ratios (P/E), dividend yields (DY) and price-to-book ratios. The author claims that political risk indicator is positively related to stock returns, while economic risk negatively affects dividend yields. Ultimately, political risk affects economic and financial performance as well as managerial decisions regarding dividends.

One of the biggest issues is that political risk is unobservable and hard to measure; therefore, a reliable proxy is required. Previous research papers suggest several ways to deal with this problem. Some of the studies concentrate on the uncertainty arising from political events such as elections, change of cabinets as well as external and internal conflicts. Another way is to employ indices of political uncertainty provided by financial agencies and research organizations. In this paper we use the World Governance Indicators (WGI) estimated by the World Bank, which measure six areas of political riskiness on a yearly basis. Yearly frequency of the data constitutes the major limitation of the paper since returns are examined in shorter time intervals. However, this issue should not impact the quality of estimations due to the nature of political risk: political environment tends to alter gradually making the monthly variation in risk measures too small to capture possible effects. Influential political events are rare, for instance, elections take place once in a few years. Furthermore, WGI allow us to test six separate areas of political stability and increase the number of observations. A large dataset comprising of 17 periods and 39 cross-sectional units reinforces the reliability of results.

The objective of the paper is to explore the impact of both political risk and macroeconomic factors on stock market performance using panel data technics. We calculate the aggregate political risk indicator by principal component analysis. We start with pooled regressions and then fixed and random effects are introduced. In order to check the validity of our results, we test the significance of initial risk measures and check the sensitivity of results to the exclusion and inclusion of separate variables as well as to changes in time boundaries.

To introduce our research findings briefly, political risk has significant negative impact on price-to-earnings ratio demonstrating that investors are willing to pay less for riskier stocks

and do care about political situation in a given country. The influence on dividend yield is positive and also significant. However, it turns out that returns are not determined by political risk proxies. Among macroeconomic factors five out of six indicators are statistically significant in the regression on returns, namely: GDP per capita, exchange rate movements, interest rates, reserves and unemployment changes.

Our contribution to existing papers is threefold. Firstly, we include into our estimations a large number of countries varying in terms of economic and political development, while most of prior research applies the analysis on one or few countries. Secondly, contrary to many previous papers we take into account macroeconomic factors, which might have influence on returns. Omitting significant variables leads to biased and inconsistent coefficients. Therefore, in order to improve the quality of regressions and the validity of results, we have to find relevant determinants of stock market movements. In turn, the relationship between macroeconomic and financial performance is widely explored by researchers but usually separately from a political risk paradigm. Thirdly, in comparison to previous studies we use a longer time span ranging from 1997 to 2013.

The remainder of the paper contains five parts structured in the following way. Chapter two presents the theoretical background of political risk in a relation to financial markets as well as an investigation of previous studies. Chapter three describes methodology, data collection and description of applied variables. Chapter four presents and discusses the main findings of the empirical analysis. Finally, Chapter five checks the robustness of estimations and Chapter six concludes with a brief discussion of the results.

2 Theoretical Background

The objective of Chapter two is to discuss fundamental issues related to political risk. Firstly, we examine numerous papers and reports to highlight the importance of political risk concept in financial decisions. Secondly, we look through a variety of methods to measure political risk; discuss their advantages and flaws to build a reliable model. We provide a detailed description of six indicators used in our estimations. Finally, we summarize the major findings of previous empirical studies classifying them by the methods of estimation and political risk proxies.

2.1 The Concept of Political risk

In most of financial articles and glossaries political risk is defined as a risk of operating or investing in a country, where political changes, decisions or disruptions might lead to losses. Suleman (2013) describes major sources of political risk. For the wide list of emerging markets political ambiguity emanated from the collapse of communism and execution of market-oriented or democratic reforms. Political risk arises from uncertainty corresponding to the exercise of political power, governmental decisions and their consequences. In addition, non-governmental actors can trigger political events and alter prevalent business conditions.

Research and risk organisations provide with analyses scrutinizing the importance of political risk. Results of the survey annually conducted by the World Bank Group in Figure 1 show that investors are concerned with political risks, especially with regulatory changes and the breach of contract.

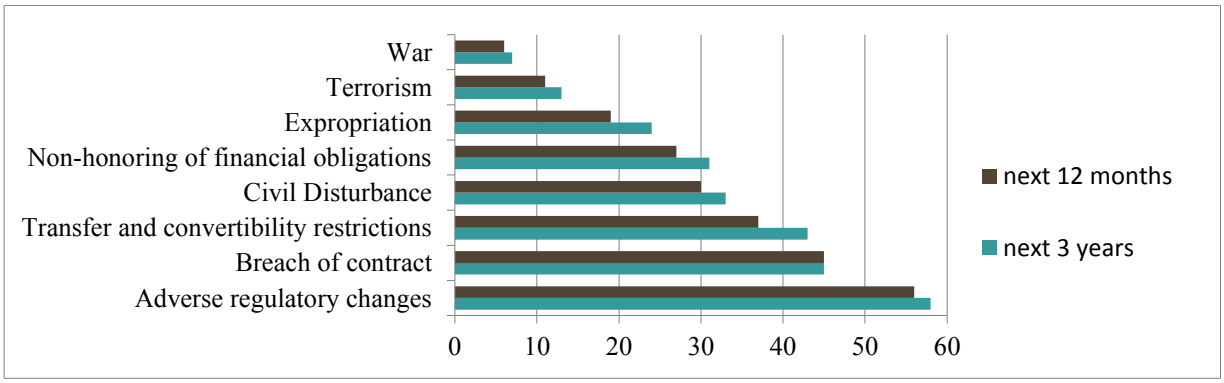

Figure 1: Political risks which are of most concern to investors (developing countries, percent of survey respondents). Source: World Investment and Political Risk 2013, World Bank Group.

In equilibrium, stock prices should be equal to discounted values of future expected cash flows or dividends, while the discount rate reflects the required rate of return. Political uncertainty makes the range of possible cash flows and discount rates wider and, thereby, increase the volatility of returns. The impact on returns itself is unclear and requires special attention. If political risk is diversifiable, investors would not require a significant risk premium. Equity prices should increase if the new information about political situation causes an upward revision of investors' expectations and vice versa (Tan and Gannon (2002)). Suleman (2013) finds out that political risk tends to lower equity returns for emerging countries due to decrease in cash flows. The influence of political risk on P/E multiple and dividend yield is not widely explored in research papers, most of articles focus on returns and their volatility.

2.2 Political Risk Measures

Political risk is unobservable and hard to quantify. All methods to proxy political risk can be broadly categorized into two approaches. The first one basically links political risk to uncertainty arising from specific events such as elections, change of cabinets, external and internal conflicts. Technically, this approach can be performed by constructing dummy variables corresponding to these events. Some studies (e.g. Beaulieu, Cosset, and Essaddam (2005)) argue that stock market promptly reacts on news floats regarding political changes. In addition, Suleman (2012) finds out that terrorist attacks make stock returns lower and volatility higher with a significant leverage effect.

Durnev (2010) claims that the information about elections is exogenous variable, which is well-distributed across countries and time; thereby, it can create a powerful dataset appropriate for estimations. Exogeneity, possibility to build up the data for every country on monthly or daily basis are the major advantages for the dummy variables approach. However, for some countries binary variables might serve a poor proxy not reflecting real political riskiness. In addition, using this method for countries with dissimilar political and economic development might lead to biased results since the impact of the same event might vary to a large extent across the countries.

The second method implements quantitative measures estimated by rating agencies, financial and research organizations. They provide with political risk country-related information on mainly semi-annual and annual basis. These indicators incorporate quantitative (e.g.,

unemployment or military expenditures) and qualitative data (e.g. the presence of internal or external conflict). Some other indicators relate political stability to democracy measures since it is widely accepted that non-democratic countries are more exposed to political imbalances.

One of the widely used indices is International Country Risk Guide calculated by PRS Group. Erb, Harvey and Viskanta (1996) examine various political risk scores using portfolio and cross-sectional approaches and conclude that only ICRG composite index (the aggregation of political, economic and financial risk scores) significantly explains stock returns. This index is calculated on a monthly basis for 140 countries since 1984. Political risk index consists of 12 weighted variables: Government stability, Socio-economic conditions, Investment profile, Internal conflict, External conflict, Corruption, Military in politics, Religious tensions, Law and Order, Ethnic Tensions, Democratic Accountability, Bureaucracy quality. Since the access to ICRG database is limited, we have to find another proxy.

Integrated approach was proposed by Berkman, Jacobsen and Lee (2011). Authors construct the index based on statistics about most influential international political crises during the period 1918-2006. The main limitation of modelling rare disasters is that the dataset is limited since such events happen once in approximately 10-15 years. Therefore, modelling assumptions should include the perceived probability of a disaster rather than historical probability.

In order to examine the response of stock markets on political risk we use World Governance Indicators (WGI) provided by the World Bank Group. These indicators are calculated on a yearly basis for the period 1996-2013 measuring different aspects of political development; their detailed description is presented in the Table 1 below. We use WGI in order to account for different angles of political environment and increase the number of countries used in estimations. The yearly frequency of the data constitutes a considerable limitation of the paper since returns largely vary in short time intervals (i.e. monthly or daily). However, due to the nature of political risk, yearly indicators should not significantly constraint the validity of the results. Political changes are long-term (e.g. elections happen once in few years), thus, the monthly variation in political risk estimations might be too small to capture possible effects.

Table 1: Indicators of political risk

The table contains a brief description of six political risk indicators, which we use in the analysis. Each indicator is measured in units of a standard normal distribution ranging approximately from -2.5 to 2.5. Source: The World Bank Group

WGI	Description
Political Stability and Absence of Violence or Terrorism	Perceptions of the probability that the government will be destabilized or liquidated by violent or unconstitutional means such as terrorism and politically motivated violence.
Control of corruption	Estimate of the extent to which public power is used for private gains. The measure includes both small and large forms of corruption, and the degree of state's "takeover" by elite groups and private interests.
Government effectiveness	Perceptions of the quality of public and civil services, their exposure to political pressures, the quality of formulation and implementation, the governmental commitment to policies and procedures.
Regulatory quality	Measure of the government's ability to formulate and implement reliable policies and regulations.
Rule of Law	Perceptions of the extent to which agents have confidence in law and follow the rules of society. In particular, it measures the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.
Voice and Accountability	Estimate of the extent to which citizens are able to participate in elections and in selecting of the government, estimate of the freedom of expression and association as well as the media.

Summarizing, it is challenging to find a representative and unbiased proxy due to the several reasons. Firstly, a solid indicator should be forward-looking and appropriate for forecasting, while many influential political events are unpredictable. Secondly, endogeneity problem might arise since many indices incorporate information about social development and macroeconomic factors, which can be interrelated with stock market performance. Finally, although political events such as elections are exogenous, they might be of different importance across the countries. Thus, they might have low explanatory power in cross-sectional or panel regressions with the large number of countries included.

2.3 Previous Research

Political environment is an important part of economic decisions. From the late 1980 till now researchers develop theoretical and empirical models in order to take the political component into account. Political country-related risk can hardly be measured precisely; therefore, there is a need for a reliable approach.

According to their purposes, prior studies can be broadly divided into two domains. One part of researchers explores the impact of political risk and events on the performance measures of individual firms. For instance, Beaulieu et al. (2005) investigate the effect of political news on volatility of stock returns in Canada using GARCH regressions. They show that investors do not require a risk premium since political risk does not have a significant impact on returns and can be diversified away. However, political uncertainty increases the riskiness of investments measured by the volatility of stock returns. Girard and Omran (2007) develop a multifactor extension to Capital Asset Pricing Model (CAPM), which takes into account not only standard firm specific measures, such as market-to-book value, firm size and industry, but also country-related risk scores proxied by ICRG indices. Durnev (2010) uses a panel of 47808 firms to scrutinize the influence of elections on the stock-price sensitivity. He concludes that investment is 40% less sensitive to stock prices during election years compared to non-election periods. Besides, elections are the source of uncertainty, which in turn leads to drop in post-election returns.

Other researches focus on country level indicators and they can be categorized according to econometric technics. Most common approaches are GARCH framework, time-series regressions and panel data methods. For example, Cermeño and Suleman (2014) use asymmetric GARCH for four Latin American countries, and report that political risk is priced in stock markets having a positive influence on returns. The effect on volatility is significant and asymmetric; political aggravation tends to have higher impact on volatility than improvements in political conditions. Diamonte, Liew and Stevens (1996) propose that political risk has larger influence on stock returns in emerging markets than in developed ones. Authors also point out that last few years political risk has a decreasing trend in developing counties and, conversely, tends to increase in developed ones. Authors make an assumption that if this tendency continues, the difference in political risk would narrow in future.

Many papers examine one or several countries performance using time-series regressions. Lin and Wang (2004) use dummies for legislative assemblies and power changes as proxies for political risk. They reveal that Taiwan stock market returns and volatility are not significantly determined by legislative assembly effect, while power changes are negatively related to mean returns and positively to volatility. As pointed out by Mei and Guo (2004), political risk measured by elections dummy variables has predictive power on financial crisis. Döpke and Pierdzioch (2004) find no evidence that German stock market returns are higher during liberal than during conservative governments and claim that there is no evidence of the election cycle in German stock market returns. The link between political news and stock returns is investigated by Soultanaeva (2008) in the case of three Baltic countries. The author argues that political news decreases the volatility in Tallinn and Riga and the significant spillovers effects from Russian news can be observed.

Panel dataset allows to substantially increase the number of observations. Ramcharran (2003) uses returns, price-to-equity ratios, dividend yields and price-to-book ratios as dependent variables for the panel of 21 countries. He concludes that political risk has significant and positive influence on stock returns and price-to-book ratio, while dividend yield is explained by economic risk measure. According to Suleman (2013), political risk is priced in both emerging and developed markets, while its influence in emerging markets is stronger. Perotti and Oijen (2001) estimate panel datasets of 22 emerging countries, which experienced privatization periods and find that privatization increases political riskiness, while political risk is a priced factor in almost all regressions.

The detailed classification of previous research papers can be found in the Appendix Table A1. Summarizing existing studies, most of them claim that political risk has significant effect on the volatility of stock returns with the leverage effect, while results related to equity returns are controversial. Political risk is of special concern in case of developing countries, which are generally less stable and have larger cross-sectional and period variation of political risk measures as well as in economic conditions. In current study, we expect political risk to be a significant factor in explaining stock market performance.

3 Data and Methodology

Chapter three describes the methods applied in this paper. It commences with a description of data collection: the set of variables, sources and transformations. The choice of the variables is supplemented by the short review of existing empirical research devoted to macroeconomic determinants of stock market performance. Then, the section presents the panel sample: countries and the time intervals. Finally, it specifies the regression model and describes reliability tests aimed to ensure the validity of estimations.

3.1 Data Description

The set of variables required to analyse the impact of political risk on financial performance can be divided into three groups: dependent variables, political risk measures and control variables. The main sources of data collection are Datastream and the World Bank Group, which provide with standardized country-level information. In the following subchapters we describe the motivation of variables selection, necessary transformations to the raw data and hypotheses about the signs of corresponding coefficients. Table A2 in the Appendix summarizes the set of variables and presents the description and sources of each variable used in our dataset.

3.1.1 Dependent variables

The choice of dependent variables is proposed by Ramcharran (2003): returns, dividend yields and price-to-earnings ratios are scrutinized. Logarithmic returns (R) are based on dollar local indices for each country in order to mitigate the effect of currency depreciation/appreciation that greatly affected equity prices, especially in 1990s. Campbell, Lo and MacKinlay (1997) point out that continuously compound returns are additive; thus, they are more suitable for time-series modelling.

Returns and their volatility are in the focus of research related to political risk. Almost no studies apply P/E and DY as dependent variables. However, Afza and Tahir (2012) argue that price-to-earnings ratio is the measure widely used in valuation models and which most fund managers, investors and market analysts take into account in the decision-making. P/E multiple shows how much investors are willing to pay for a unit of firms earnings and thereby reflects investors sentiments and confidence. Shamsuddin and Hillier (2004) show that P/E

ratio in Australia could be explained by macroeconomic factors such as GDP growth, exchange rate and interest rates.

Dividend policy of the company is usually explored as an indicator of managers' decisions in relation to firm specific variables such as leverage, growth opportunities, profitability and size. We do not include these variables since they are firm-related. This delimitation keeps the interpretation of regressions similar and comparable. Political risk is the fundamental factor, which shapes the economic environment, influences possible cash flows and the availability of debt and thereby it is likely to have an impact on the aggregate dividend yield based on local indices. Dividend yield is a relative indicator representing the ratio of a dividend per share to price per share. Therefore, the interpretation of the coefficients depends on results for regressions on returns and the assumptions about the influence on equity prices. If equity prices are not determined by political risk, then the positive coefficient for DY would mean that companies tend to increase dividend payments or initiate new dividends when facing risky circumstances and vice versa in the case of negative coefficient. If we find out the existence of a political risk premium, a negative coefficient would mean that the dividends either decrease in the level of political risk or their increase is smaller than a simultaneous increase in share prices. Given the fact that companies might be conservative in dividend decisions, we consider the latter case logical and consistent with basic economic considerations.

3.1.2 Political risk measures

The variables of interest are six political risk indicators as well as principal components extracted from them. To simplify the interpretation we rewrote the original scores with the opposite sign, what means that high positive values of them indicate notable political riskiness and vice versa. Thus, all the indicators increase in the level of political risk. Each estimate gives a value measured in units of a standard normal distribution ranging approximately from -2.5 to 2.5.

We expect political risk to have a positive influence on returns, implying that investors should require a risk premium for an increased level of uncertainty. If political risk is diversifiable, it would not influence investors' behaviour making the coefficient insignificant. However, assuming that generally investors prefer to invest in domestic equities, political risk is unlikely to be entirely diversifiable. Moreover, we expect negative influence of political risk

measures on price-to-earnings ratio since investors agree to pay less for stocks with increased level of risk. The influence on dividend yield is controversial and is not well studied in research papers in relation to political risks. Hence, we do not specify a precise hypothesis. For instance, Ramcharran (2003) receives negative significant effect. Huang, Wu and Zhang (2015) examine firms' payout policy under different levels of political uncertainty and conclude that traditional dividend payers are likely to terminate or reduce dividends and historical non-payers are willing to initiate dividends facing periods of high political ambiguity.

3.1.3 Control Variables

A number of factors are considered to analyse stock market performance. While the vast majority of previous papers do not use control variables (e.g., Ramcharran (2003), Suleman (2013), Lin and Wang (2004)); we expect that including macroeconomic indicators would strengthen the quality of estimation. Moreover, the influence of these factors constitutes a focus of many research papers. Therefore, they are also a point of interest in this study. The variables we collected are the integration of standard control factors used in previous research papers. Furthermore, by using control variables we account for different economic conditions across developing and developed markets. From statistical perspective, omitting relevant variables has substantial adverse consequences: coefficients become biased and inconsistent, which might lead to the wrong inference (i.e. type I error). Conversely, including irrelevant variables increases the chance of type II error because of overestimated standard errors. Various researches found significance relationship between returns and macroeconomic performance. Therefore, we consider that control variables strengthen the reliability and accuracy of the results.

The set of control variables consists of: the first difference of logarithmic GDP per capita (D_GDP), the first difference of unemployment rate (D_U), inflation rate (INFL), interest rate (IR), the first difference of logarithmic exchange rate (ER), total reserves in a ratio to GDP (TR), money supply in logarithmic first difference (M2), and foreign direct investment in a ratio to GDP (FDI). Data sources are DataStream and the World Bank Group. Detailed descriptions of each variable construction as well as all the sources are shown in the Appendix Table A2. In line with Tangjiprom (2012), the variables can be divided into four domains. First group consists of factors representing general economic conditions: GDP and unemployment. The second one reflects price level, which is represented by inflation rate.

Next group contains variables that reflect the Central Bank policy, namely: interest rate and money supply. Finally, foreign direct investments, reserves and exchange rate cover international activities. This classification is commonly used; however, it should be treated with accuracy. For instance, in few cases when exchange rate is targeted by the Central Bank, it represents monetary policy rather than international activities.

GDP per capita and unemployment are most fundamental variables reflecting country's performance, which are widely used in economic and finance literature. Hess (2003) explores the relationship between stock price and macroeconomic factors at Swiss stock market, and finds out that the output variable is a significant factor explaining stock prices. Another proxy for economic conditions is employment rate (or oppositely, unemployment rate). Rjoub, Türsoy and Günsel (2009) investigate the impact of macroeconomic factors for Istanbul stock market and find out that unemployment rate has positive effect on portfolio returns, but the overall results have weak explanatory power (low R-squared). Singh, Mehta and Varsha, (2011) explore the cointegration relationships between macroeconomic variables and stock returns in Taiwan. They reveal that employment rate is insignificant, whereas GDP is significant determinant of returns. We expect positive coefficient for GDP movements since stock prices usually go in the same direction with economic cycle. We assume unemployment to be negatively related to returns since high unemployment reflects bad economic conditions.

Humpe and Macmillan (2009) examine relationship between macroeconomic variables and stock market movements in US and Japan. They reveal negative influence of inflation on US real stock prices through unexpected changes in the price level. Since we use dollar-based indices, inflation measured by an annual change in customers' prices would cause deterioration of dollar-based equity prices resulting in negative influence on returns.

Interest rates and money supply are traditional instruments used by the Central Bank. Humpe and Macmillan (2009) find that US T-Bond yield and Disco (official discount rate in Japan) are negatively related to stock market returns. Classic asset pricing concept implies that stock prices should be equal to expected discounted cash flows; hence, we presume negative relationship between interest rates and returns. Chancharat, Valadkhani and Havie (2007) use money supply (M2) to study the impact of macroeconomic factors on stock returns in Thailand and found no influence of money supply on stock returns. We use M2 aggregate in the first difference of logarithms in order to check if changes in monetary policy are reflected in stock prices. Theoretically, the effect of money supply might be controversial, but since

Central Bank increases money supply to boost economic growth, we expect positive coefficient in returns regressions.

Next group of variables represents international activities in a given country. Singh et al. (2011) discover a significantly positive relationship between exchange rate and stock prices for Taiwan. Since we use dollar-based returns and an increase in exchange rate measure means devaluation of local currency, we expect negative influence of exchange rate movements on dollar-based returns. In line with Mei and Guo (2004), we include the variable related to reserves position of the country: total reserves (including gold) as a ratio to GDP in current US$. Ray (2012) finds positive significant effect of foreign currency reserves on stock returns. Reserves are used to keep the local currency stable and facilitate debt repayment; hence, they have stabilizing influence on economic conditions. Consequently, we assume them to be positively related to returns. Foreign direct investments reflect the quality of financial system in a given country and can make valuable contributions to the host country's economic growth and development. Adam and Tweneboah (2008) investigate the effects of foreign direct investments in Ghana and find them positively related to the stock price movements.

Table 2: The summary of control variables

The table puts together all the control variables used in estimations and presents expected signs of the coefficients for regression on returns based on both theoretical considerations and results of prior empirical studies.

	Variables	**Hypothesis: effect on returns**
General macroeconomic conditions	GDP per capita [first difference of logarithms]	+
	Unemployment [first difference]	-
Price level	Inflation rate [consumer price index]	-
Monetary policy	Interest rate [deposit rate]	-
	Money supply [first difference of logarithms]	+
International activities	Foreign direct investments [ratio to GDP]	+
	International reserves [ratio to GDP]	+
	Exchange rate to USD [first difference of logarithms]	-

We suppose that applying control variables would enhance the overall explanatory power of regressions and increase R-squared. Inclusion of irrelevant variables leads to inefficient estimators and inflates standard errors, while omission of significant factors causes biases and inconsistency. Therefore, we check the robustness of the results by running regressions with

different sets of control variables and run standard tests of joint redundancy for insignificant factors. The detailed exploration of regression sensitivity to the variables composition is provided in Chapter 5.1.

3.2 Sample

Time dimension contains 17 years of data for 39 countries ranging from 1997 to 2013. The panel dataset is unbalanced and consists of 662 observations (658 in case of P/E). The number of observations is large enough to get robust estimations and the inclusion of both developing and developed countries to the main sample gives more variation in political risk values. According to IMF classification, the sample consists of 23 developing countries and 16 developed ones.

The sample of *developing countries* includes: Argentina, Bangladesh, Brazil, Bulgaria, Chile, Colombia, Hungary, India, Indonesia, Malaysia, Mexico, Peru, Poland, Poland, Russian Federation, Thailand, Tunisia, Turkey, Venezuela, RB Egypt, Arab Rep., China, Ecuador, Kenya, and South Africa. The sample of *developed countries* encompasses: Australia, Austria, Denmark, Estonia, France, Germany, Greece, Italy, Netherlands, Portugal, Slovak Republic, Slovenia, Czech Republic, Spain, Sweden, and United Kingdom.

The main motivation for countries selection is the data availability, especially in case of developing countries, for which many observations were missing. For developed markets we mainly use countries that experienced significant political risk changes across the time. For example, Slovak Republic, Estonia and Slovenia have long history of one-party rule and only recently have been transformed to democratic government system. Greece and Spain have faced political turbulences. Greece highly suffered from economic crisis and Spain experienced uncertainty due to Catalonia possible separation. Some other countries such as Austria, Germany and United Kingdom are examples of stable low risky countries. Therefore, our overall sample seems to be representative and appropriate for estimation.

Including only one group of countries, either developing or developed ones, might lead to incorrect results due to lower variation in political risk measures as well as in returns. Moreover, since we take yearly data for quite long period of time, the one can notice that large groups of countries experienced the same conditions and changes, which might lead to some clustering. For example, the crisis of 1998 was noticeable in Russian Federation and

many post-soviet countries or Asian crisis of 1997-1998 stroked large numbers of countries from out sample. To build up a representative sample, we have to embrace countries from different regions with substantial variations in macroeconomic and political conditions.

However, it might be the case that developing and developed countries respond differently to political risk as well as to macroeconomic factors or the response to political risk can appear significant only in developing markets. In line with many previous studies, we test these hypotheses using dummy variables approach. The regression, estimation output and discussions are presented in Chapter 5.4.

3.3 Estimation Methods

Since six initial indicators of political risk are highly pairwise correlated, we are not able to use all of them in a sole regression. The interpretation also becomes complicated in case of many measures of political risk. In order to reduce the number of factors, we use principal component analysis and extract three first principal components (PC) for political riskiness. Mathematically, principal components estimation is orthogonal linear transformation of initial variables by finding the linear combination of them, which accounts for the largest proportion of their variation. We solve the following maximization problem:

$$\max_x x'\hat{V}x \qquad s.t.\, x'x = 1 \tag{1}$$

where $\hat{V}$ is the 6x6 correlation or covariance matrix for risk indices.

According to Jolliffe (2002), correlation is normalized variable, which is less sensitive to difference in measurement scales of separate indicators. Therefore, we employ correlation matrix instead of covariance one. Solving the equation (1) we obtain 6x1 eigen vector x for the first principal component (PC1). For the sequent principal components we impose additional orthogonality restrictions. According to Field (2009), the number of factors to retain depends on correlation matrix and eigenvalues of each factor. Furthermore, the correlation coefficients between PC and initial indicators have to be high and positive in order for PC to have a meaningful interpretation. We estimate first three principal components and base our decision on these considerations. The estimation and the analysis of PC are shown in the Appendix Table A3. While principal component analysis seems to provide with reliable

estimations in our case, we test the validity of the results by running regressions on individual risk indicators.

The paper implements a panel regression, which allows combining the information both cross-sectionally and across the time and hence, makes the data more generalizable and informative, provides with more degrees of freedom, less collinearity and higher efficiency (Brooks (2008)). The main regression, where all the explanatory variables are included looks as the following:

$$y_{it} = \alpha + \beta_1 PC_{it} + \beta_2 d\_GDP_{it} + \beta_3 d\_U_{it} + \beta_4 INFL_{it} + \beta_5 ER_{it} + \beta_6 IR_{it} + \beta_7 M2_{it} + \\ + \beta_8 TR_{it} + \beta_9 FDI_{it} + u_{it} \quad (2)$$

Equation (2) can be generalized as:

$$y_{it} = \alpha + Z\beta + u_{it} \quad (3)$$

In equations (2) and (3) t=1, 2,…, 17 denotes the time period (i.e. year) and i=1, 2,…, 39 denotes the cross-sectional unit (i.e. country); y_{it} indicates the dependent variable (i.e. returns, DY or P/E), and u_{it} represents the error terms. Z is the set of explanatory variables including risk measures, β is the matrix of coefficients, Coefficients α and β are assumed to be constant both across time and countries.

Firstly, by treating the data as a bigger cross-section, pooled ordinary least squares regressions were run to explore the impact of political risk and macroeconomic factors on R, DY and P/E. Pooled regression assumes no heterogeneity both in time and in cross-sectional dimensions.

According to Hsiao (2006), the widely used approach in the panel data framework is to assume that the effects of observed explanatory variables are identical for cross-sectional (CS) units and over time, and the effect of omitted variables can be decomposed into time and CS specific effects (γ_i, η_t correspondingly):

$$y_{it} = \boldsymbol{\alpha} + Z\boldsymbol{\beta} + \boldsymbol{\gamma_i} + \boldsymbol{\eta_t} + u_{it} \quad (4)$$

In order to test whether the regression is subject to heterogeneity arisen due to country-specific or time-specific reasons we introduce fixed effects and test them for joint significance. Fixed effects model for cross-sectional dimension (time dimension) allows the intercept to change across countries (time) but not across time (countries). Therefore,

mathematically it is equivalent to introducing dummy variables to each cross-sectional unit (time period). Random effects model also allows intercepts to vary periodically or cross-sectionally, but the opposite to fixed effects, random effects model treats γ_i, η_t as the part of error term.

Brooks (2008) points out that random effects are usually more efficient when the sample is randomly taken from the population, while fixed effects are suitable when the sample represents the entire population. While random effects model is generally more efficient, fixed effects assumptions are less strict (random effects require the "new error term" to have zero mean, constant variance and to be independent of all explanatory variables). While ordinary least squares are applied for fixed effects model, random effects require generalized least squares estimator. Our choice between two types of models is based on Hausman test, which checks if the assumptions on the error terms under random effects model are valid.

Major disadvantage of fixed effects model is that it is not parsimonious in terms of degrees of freedom since it is equivalent to adding dummy variables to each cross-sectional or time unit. The number of degrees of freedom is equal to N-k, where N is the sample size and k is the number of independent variables. Therefore, degrees of freedom decrease due to introduction of new variables, t-statistics get higher, and the probability of not rejecting the "wrong" null hypothesis increases (i.e. type II error becomes more probable). The common method to deal with this problem is so-called within estimator. Within estimator produces the same coefficients estimates but with the higher degrees of freedom compare to LSDV, since the model contains fewer variables. Mathematically, within estimator is done by running regressions with demeaned variables: time-mean of observations is subtracted in case of cross-sectional fixed effects and the means across the countries at a single point of time are used for period effects.

Heteroscedasticity problem influences standard errors and therefore, might lead to the wrong inference. White standard errors are larger than ones estimated by OLS, and make hypothesis tests more conservative (the probability of type II error increases). We perform Breusch-Pagan-Godfrey (BPG) test for heteroscedasticity and use White's standard errors if necessary. For conducting BPG test residuals are squared and then regressed on explanatory variables:

$$\hat{u}_t^2 = \alpha_1 + \alpha_2 x_2 + \cdots + \alpha_k x_k \quad (5)$$

where $\hat{u}_t$ are residuals from the regression and $x_2, \ldots, x_k$ are k explanatory variables.

After estimating the equation (5) χ^2 test or F-test for joint significance of coefficients can be performed. If the null hypothesis of joint insignificance (i.e. homoscedasticity) is rejected, then we should account for heteroscedasticity in the model.

Finalizing, the exact specification of the model depends on formal tests for effects significance and properties of the model. In order to verify the statistical quality of estimations, we perform series of robustness checks running regressions with different time spans and varying the set of explanatory variables. If the results are different from those for the main specification, further considerations are needed.

4 Results

This Chapter presents main findings based on the estimation of panel regressions for the whole dataset consisting in 39 countries and 17 periods. All the explanatory variables are used in regressions and principal component analysis is conducted in order to obtain a political risk proxy. Only "the best fit model" is shown in this section. Intermediate estimations and specification tests can be found in the Appendix (Tables A6-A8). Before the estimation we carry data analysis by examining descriptive statistics and correlation matrices, transform variables and adjust for outliers if necessary.

4.1 Principal Components

The estimation of first three principal components is provided in the Appendix A3. As the first step, eigenvalues (i.e. maximum value of the matrix $x'\hat{V}x$ from the optimization problem) and eigenvectors (i.e. vector x, the factor loadings) were calculated. Then, multiplying the loadings with the original risk indicators, we obtained the actual values of principal components. The proportion of variance explained determines "the quality" of PC by measuring the amount of information it captures from all original factors:

$$\frac{VAR[PC]}{\sum_{i=1}^{6} VAR[PoliticalRiskIndicator_i]} \tag{6}$$

The first look at the Table 3 shows that only PC1 obtains the information from original indicators accounting for more than 88% of common variance, while all other indicators explain only tiny part of it (less than 5%). The difference in eigenvalues is also large. Field (2009) points out that, in general, factor loadings greater than 0.3 are considered important, while for the large sample size (more than 600 observations as in our case) loadings should be greater than 0.21. Factor loadings are shown in the Appendix Table A3. This "rule of thumb" is totally consistent with PC1, but not with PC2 and PC3. Moreover, both PC2 and PC3 contain even negative factor loadings, which mean that they are negatively related to corresponding original indicator as shown in the Table 4. From the Table 4 we can see that only PC1 is highly positively correlated with original indicators.

Table 3: Eigenvalues for Principal Components

The table presents main properties of first three principal components, which show how much information from original indicators is carried out by each PC.

	PC1	**PC2**	**PC3**
Eigenvalues	5.301	0.283	0.229
Proportion of the variance explained	0.884	0.047	0.038

Table 4: Correlation coefficients of PC with original political risk indicators

The table shows the correlation coefficients between each PC and original indicators, namely: (1) Political Stability; (2) Control of Corruption; (3) Government Effectiveness; (4) Regulatory Quality; (5) Rule of Law; (6) Voice and Accountability.

	(1)	(2)	(3)	(4)	(5)	(6)
PC1	0.88	0.97	0.97	0.95	0.97	0.89
PC2	0.30	-0.24	-0.24	-0.17	-0.19	0.19
PC3	-0.36	-0.06	-0.13	-0.01	-0.11	0.30

We conclude that PC2 and PC3 are redundant and do not represent the true behaviour of political risk. This result is consistent with the fact that we had to deal with six highly positively correlated original indicators (the minimum pairwise correlation is 0.79). As the result, the first PC is already powerful and can be used as a sole proxy for political risk notably facilitating the interpretations. For further analysis only PC1 is applied.

4.2 Descriptive statistics and general trends

The descriptive statistics presented in the Appendix Table A4 is provided after an adjustment made for a sole outlier. Observations related to Bulgaria in 1997 were excluded since the country faced large economic turbulences such as inflation exceeded 1000%.

The summary statistics for all the risk measures is shown in the Appendix A4 Panel C. Risk measures have negative mean and median and hence non-zero skewness implying that the sample might be slightly biased towards stable countries. Principal component shows larger minimum-maximum gap resulting in higher standard deviation approximately twice as big as the one for separate risk indicators. Hence, in comparison with WGI, PC might carry more country- or time-specific information and thereby might have better explanatory power. Nevertheless, we test all the indicators for significance in the series of robustness tests

provided in Chapter 5.2. Information about the properties of control variables is presented in the Appendix Table A4 Panel B. Macroeconomic variables show relatively good properties, mean-median gaps are quite small, witnessing the absence of severe outliers' impact. Despite of all the transformations involved, skewness and kurtosis are far from those for the normal distribution. Appendix Table A4 Panel A contains the summary statistics for dependent variables. Returns show high maximum and low minimum, but these values are considered as not outlying. Indeed, they lay in much less number of standard deviations from mean-median than those observations omitted for Bulgaria. P/E ratio contained few extreme values and after removing them, the properties of distribution improved significantly (e.g., the kurtosis decreased from 345 to 10).

Summarizing, decisions regarding outliers require special attention. On the one hand, removing observations wipes out country- or time-specific characteristics, but on the other hand, few extreme values might obscure the whole sample leading to wrong inferences. For the data comparability, all the variables were transformed to ratios or logarithmic differences. However, they still do not seem normally distributed. The further differencing complicates the interpretation of the model, while panel dataset usually provides with sufficiently large number of observations (662 and 658 in our main dataset), which asymptotically improve the sample properties.

Correlation matrix for explanatory variables is shown in Appendix Table A5 (Panel A). According to the general "rule of thumb", the near multicollinearity problem might arise if the variables experience pairwise correlation coefficients greater than 0.8 in absolute terms (Brooks (2008)). Since the highest correlation coefficient is 0.73, we do not face severe multicollinearity problems to be adjusted for. Panel B of the Appendix A5 shows correlations between dependent and explanatory variables as a preliminary data analysis. Though correlation does not assume the direction of dependency, the signs show general linear linkage between the variables and should be compared with the signs of estimated coefficients. In our case, the correlations with returns have expected signs: negative for P/E and positive for PC, though the latter has a small value of 0.02. The correlation coefficient for DY is positive. All the signs of correlation coefficients for control variables are in line with our hypotheses related to returns.

Figure 2 and Figure 3 represent time averaged and country averaged behaviour of PC and returns. Returns and political risks are not clearly co-moving, however, some common

patterns can be seen. For instance, Venezuela has the highest average return and the highest political risk averaged for the last three years. In case of significant coefficients, we also estimate regressions omitting Venezuela in order to make sure that the sole country does not obscure the whole sample. Developed countries such as Netherlands, Australia and Austria have relatively low returns and ones of the lowest risk values. Country-averaged political risk tends to increase in time, having a peak in 2009 after financial crisis (with the corresponding drop in returns). It is worth noticing that the overall increase in political riskiness was caused mainly due to Russian Federation, Egypt and Slovenia. Though Slovenia is politically stable with relatively low political risk scores for each year of observation, the average yearly change in risk reaches +0.10, and it constitutes one of the largest increase for the whole sample.

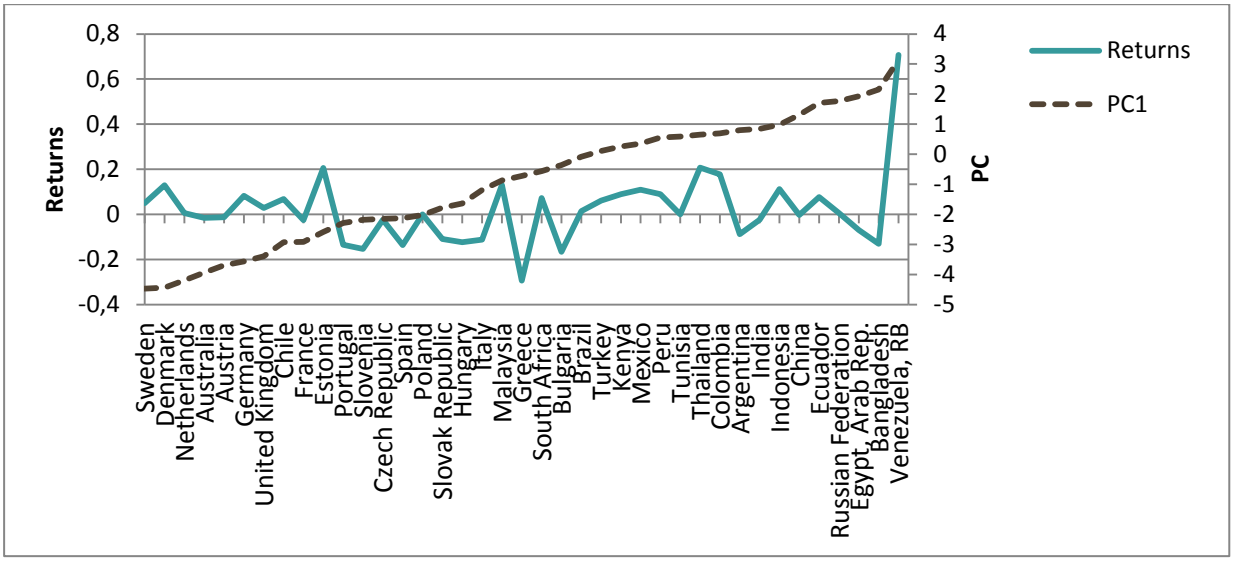

Figure 2: Time-averaged returns (three last years) and principal component

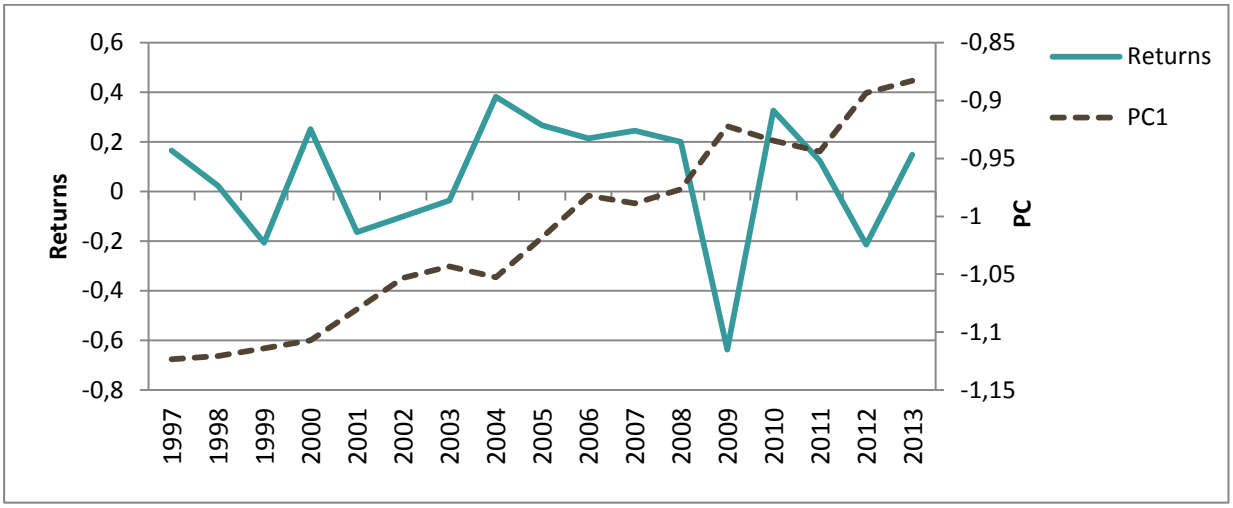

Figure 3: Country-averaged returns and principal component

Figure 3 shows a controversial point to consider: during the world financial crisis in 2008-2009 the link between returns and political risk became reversed. While political risk increases reaching the local peak, returns drop to the lowest point of the entire time span. Since the main hypothesis is that returns and political risk are positively related, this strong reversed movement is likely to influence estimation results. Therefore, in the robustness section we check the significance of political risk explaining returns on various time intervals with included and excluded observations related to crises. Another econometric method to deal with this problem is to introduce the corresponding dummy variables, but it is inappropriate in case of period fixed effects since dummies for each year are already included in specification.

Due to clear country-averaged peaks in returns, that are shown in the Figure 3, we expect period effects to be significant, while time-averaged returns might be well explained by political risk indicator and control variables, which are likely to capture country-related variations. However, we test all the possible combinations of fixed and random effects and base the final decision on corresponding significance tests.

4.3 Estimation results

Pooled ordinary least squares regressions were initially estimated in order to check the influence of political risk and macroeconomic indicators on all the dependent variables. The output tables are provided in the Appendix Table A6. Regression run on returns depicts a decent R-squared, which equals to 0.28. The coefficient for political risk is statistically insignificant and has the negative value. Moreover, coefficients for interest rate and reserves also obtained unexpected signs. GDP, unemployment and exchange rate changes are highly significant on 1% level with predicted signs. Regressions on both P/E and DY have quite low R-squared less than 0.10, but political risk is significant at 1% level. Among the control variables only GDP has an explanatory power.

In order to test whether the dataset is biased by heterogeneity, fixed effects were introduced and tested for significance. If fixed effects (i.e. dummy variables for cross-sectional units or periods) are jointly significant, then the data suffers from heterogeneity problems and pooled regressions are misspecified. The next step is to test whether random or fixed effects should be used to capture the heterogeneity. All estimation outputs for specification tests are shown

in the Appendix Table A7. Random effects usually are preferable since they correct the model by just as much as needed by transforming the data precisely to ensure that there is no cross-sectional (or period) correlation between the error terms. But in the same time random effects have stricter assumptions, which can be checked by running Hausman test. As we can see from the Appendix Table A7, the regression on returns contains heterogeneity only in period dimension and fixed effects should be used. In the regressions run on P/E and DY we should account for heterogeneity in both dimensions. The specification tests conclude that random effects are misspecified for P/E equation; hence, two-ways fixed effects are introduced. For DY we cannot reject zero hypotheses that cross-sectional random effects are well specified, but we reject it for period dimension. Summarizing, both ways fixed effects should be used for regressions on P/E multiple and random-fixed effect combo – for those on DY.

The next step is to ensure that residuals are homoscedastistic. Estimation outputs for regressions on squared residuals are shown in the Appendix Table A8. We reject zero hypothesis about homoscedasticity for returns and do not reject it for P/E and DY. To correct the bias in standard errors caused by heteroscedasticity, White's period covariance method is applied. We rely on BPG test, but we should notice that not rejecting the null hypothesis does not verify us with the homoscedastic residuals: we just know that residuals are not linearly proportional to explanatory variables, while other forms of heteroscedasticity might exist. However, the form of dependency tested by BPG test is the most common and usually the test gives reliable results.

Finalizing, the most suitable specifications are provided in the Table 5. We show R-squared for both methods of estimation – within estimator and LSDV model. The latter is substantially higher due to inclusion of dummy variables. Within estimator is used in order to save degrees of freedom.

All F-statistics approve the joint significance of independent variables. R-squared is decent for regressions on returns; however, the coefficient turns to be very low in case of DY, suggesting that only tiny part of dividend yield's variation can be explained by our set of variables. In DY regression after applying LSDV method to both ways fixed effects, R-squared artificially raises to 0.3523 (0.2840 if to adjust for the number of variables). Moreover, coefficients for M2 and ER turn significant but only on 10% level. We provide estimations both for two-ways fixed effects and fixed-random effects combination. The

choice between them might be intricate, but it does not affect our main interpretations: the coefficient of political risk is significant in both specifications.

Table 5: The summary of results

*The table illustrates final regressions with principal component as a political risk proxy and macroeconomic indicators as additional explanatory variables. Standard errors are in brackets. *, **, *** indicate significance at 10%, 5%, 1% level, respectively. White Period Standard errors were used for returns regression to account for heteroscedasticity. Method of estimation: Panel Least Squares and Panel GLS for DY with RE.*

Dependent variable	R	P/E	DY	DY
Effects Specification	**Period FE** (within)	**Period FE** (LSDV) **CS FE** (within)	**Period FE** (LSDV) **CS RE**	**Period FE** (LSDV) **CS FE** (within)
PC1	0.0037 [0.0070]	-0.0334*** [0.0107]	0.0021** [0.0010]	0.0110*** [0.0031]
INFL	-0.4086 [0.3654]	0.0122 [0.0525]	-0.0018 [0.0149]	-0.0097 [0.0151]
IR	0.4964* [0.2743]	0.0957 [0.0840]	0.0023 [0.0218]	-0.0029 [0.0241]
ER	-0.3107*** [0.1112]	-0.0337 [0.0262]	0.0117 [0.0076]	0.0133* [0.0075]
D_GDP	2.3099*** [0.6742]	0.2856*** [0.1316]	-0.0825** [0.0372]	-0.0623* [0.0377]
D_U	-3.0780*** [0.8745]	-0.4283 [0.2969]	-0.1096 [0.0846]	-0.1179 [0.0093]
FDI	0.2184 [0.1851]	0.1328* [0.0716]	0.0122 [0.0228]	0.0214 [0.0230]
M2	0.1672 [0.1547]	-0.0120 [0.0802]	-0.0139 [0.0093]	-0.0178* [0.0093]
TR	-0.1752* [0.1004]	-0.1139** [0.0562]	-0.0076 [0.0133]	0.0113 [0.0160]
R-squared	0.1484	0.1357	0.0286	0.1576
R-squared (LSDV)	0.4845	0.2142	N.A.	0.3522
Prob(F-statistic)	0.0000	0.0000	0.0250	0.0000
No. of observations	662	658	662	662

Based on the obtained results, the first principal component was significant for price-to-earnings ratio and dividend yield on at least 5% significance level. The sign of the coefficient in case of P/E ratio is negative as predicted approving that investors are willing to pay less for the unit of firms' earnings with an increased level of risk. Positive coefficient for returns gives a sign that political risk is the factor, which is priced and investing in countries experiencing more ambiguous political situation generates higher returns. However, the coefficient for PC

in regressions on returns is not statistically significant even on 10% level. This result is in contrary to many of prior studies, but in line with Beaulieu et al. (2005), who claimed that investors do not require a risk premium for political risk. The sign of the coefficient in the regression on dividend yields is in contrast to Ramcharran (2003) since in our sample political risk and DY are positively related.

The influence of macroeconomic factors is summarized in the Table 6. Changes in GDP per capita, unemployment and exchange rate have statistically significant impact on returns with economically logical signs. Devaluation of the local currency leads to decrease in dollar returns. Returns co-move with economic cycle reflected by GDP changes, which means they increase in booms, while drop in recessions. Unemployment reflects general macroeconomic situation, the raise in this indicator significantly lowers returns and vice versa. The actual signs of the coefficients for interest rates and total reserves are not expectable and require special attention. They might be caused by few outlying countries, where the relationship was reversed due to specific macroeconomic turbulences.

Table 6: Expected and actual impact of macroeconomic factors on returns

This table compares the hypotheses from the section 3.1.3 and actual results we obtained. The right column shows the signs of the correlation coefficients from Appendix Table A5. Only signs of significant estimates are shown.

Area	Variables	Expected effect	Actual effect	Correlation sign
General macroeconomic conditions	GDP per capita	+	+	+
	Unemployment	-	-	-
Price level	Inflation rate	-	*Not significant*	-
Monetary policy	Interest rate	-	+	-
	Money supply	+	*Not significant*	+
International activities	Foreign direct investments	+	*Not significant*	+
	Reserves	+	-	+
	Exchange rate to USD	-	-	-

As for P/E regression, GDP, FDI and reserves obtained significant coefficients at 1%, 10% and 5% level, respectively. GDP and P/E multiple are positively related, which means that during booms investors are willing to pay more for the same stocks and equity prices tend to be overestimated. In the opposite, during recessions, investors are less optimistic resulting in lower price for the unit of firms' earnings. Net inflows of FDI also positively impact P/E, while the effect of reserves is negative. Dividend yields negatively react on GDP movements

and do not respond to any other macroeconomic factors. Since dividend yield is calculated as the dividend per share divided by price per share, this result is the combined effect of political risk on share prices and on dividend payments. As we do not have an evidence that political risk is reflected in equity prices, this outcome means that companies generally tend to increase dividend payments facing periods of high political riskiness and vice versa. However, managerial decisions regarding dividends initiation or omissions should be investigated on companies' level with higher frequency data, which provides with more reliable results.

Summarizing the section, we find evidence that political risk does impact financial indicators such as price-to-earnings ratios and dividend yields. Therefore, investors care about the political performance in a given country, even though they do not require a significant risk premium. With financial globalization and integration reinforced during last several years, investors obtained wide possibilities to diversify their portfolios. These processes tend to wipe out the premium related to political risk. Not less important result is that macroeconomic factors have significant explanatory power on financial performance measures. In the following chapter we present series of robustness checks, which are aimed to prove the reliability of our estimations.

5 Robustness testing

In Chapter five we present a set of robustness checks that verify the quality of our estimations. We test the plausibility of coefficients obtained from regression on returns. Firstly, we control if estimations are sensitive to separate variables inclusion or exclusion as well as to periodic changes in the sample. We test variables for redundancy and run regressions on different time intervals. Then we check whether the results for principal component differ from those for separate indicators of political risk. Finally, we explore plausible differences of political risk effects between developed and developing countries. These specification checks do not find the evidence of spurious inference and demonstrates the steadiness of the results.

5.1 Sensitivity to variables set

Lu and White (2014) argue that researchers can test the structural validity by adding and removing regressors. Initially we tested regression for redundant variables including all the insignificant factors from the Table 5 as redundant (results are shown in the Appendix Table A9). F-statistics equals to 0.15 implying that zero hypothesis about joint insignificance is not rejected. Hence, principal component, money supply, inflation and FDI are not value-adding in the regression.

Secondly, we run new regressions changing the set of regressors. We run regressions with pairwise combinations of political risk and one of the control variables. Then, we include all the significant variables from the core specification as well as PC. The sensitivity of regression to the set of factors might be the sign of multicollinearity problem, misspecification, and lack of the economic base. Results are presented in the Table 7. Principal component is significant only in the second case, probably due to the bias in standard errors caused by omitting highly significant regressors D_GDP and D_U (columns 3 and 4, Table 7).

Regression seems to be quite stable in terms of coefficients signs and absolute values. Noteworthy, only IR and TR change the signs of coefficients turning to be in line with our assumptions and economic theory in restricted samples. The coefficient for PC reverses its

sign in the third regression; but the hypothesis about its zero-value is still not rejected. Adjusted R-squared grows in the last regression with all the explanatory variables included.

Table 7: The sensitivity to set of variables

*The table below illustrates the estimation results with various sets of variables. The period fixed effects were used (LSDV estimator). *, **, *** indicate significance on 10%, 5%, 1% level respectively. The dependent variable is R. Method of estimation: Panel Least Squares. White standard errors & covariance (d.f. corrected).*
The number of observations: 662.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
PC1	0.0054	0.0122***	-0.0034	0.0052	0.0089	0.0046	0.0010
ER		-0.4654***					-0.3619**
D_GDP			3.2012***				2.4807***
D_U				-6.1620***			-3.0678***
IR					-0.2326		0.3195**
TR						0.0635	-0.1463
Adjusted R^2	0.4029	0.4264	0.4666	0.4358	0.4038	0.4023	0.4816

To conclude, the "core" regression on returns shows the signs of structural validity since the results do not react enormously on inclusion or exclusion of separate variables demonstrating the steadiness of the main regression. We did not obtain the evidence that insignificance of political risk was caused by misspecification arising from the set of regressors.

5.2 Regressions with WGI

We control whether the regression results with principal component substantially differ from those for the WGI. If estimations resemble in terms of coefficients and their p-values, the principal component comprises an informative measure and the "core" regression is valid. The output is presented in the Table 8, and it can be clearly seen that columns do not considerably differ since coefficients are close to those for principal component. Like in regressions with PC, GDP, exchange rate and unemployment are highly significant at 1% level, and their coefficients have economically interpretable signs. R-squared for LSDV estimator is around 50% in every specification, which is only little bit higher than in principal components specification.

Table 8: Regressions with WGI

*This table illustrates the estimation results using separate political risk measures. Indicators in regressions are the following: (1) Political Stability, (2) Regulatory Quality, (3) Voice and Accountability, (4) Control of Corruption, (5) Rule of Law, (6) Government Effectiveness. The number of observations: 662. Standard errors are in brackets. *, **, *** indicate significance on 10%, 5%, 1% level, respectively. Dependent variable: R. Method of estimation: Panel Least Squares. Effect specification: Period Fixed Effects (LSDV estimator). White standard errors & covariance (period, d.f. corrected) are used.*

	(1)	(2)	(3)	(4)	(5)	(6)
WGI	0.0164 [0.0135]	0.0030 [0.0189]	0.0118 [0.0169]	0.0014 [0.0144]	0.0088 [0.0158]	0.0065 [0.0167]
INFL	-0.4148 [0.3710]	-0.3967 [0.3653]	-0.4088 [0.3655]	-0.3949 [0.3731]	-0.4090 [0.3673]	-0.4058 [0.3724]
D_GDP	2.2972*** [0.6663]	2.3379*** [0.6876]	2.2986*** [0.6867]	2.3467*** [0.6790]	2.3086*** [0.6738]	2.3235*** [0.6797]
D_U	-3.0930*** [0.8836]	-3.0439*** [0.8852]	-3.0836*** [0.8987]	-3.0393*** [0.8771]	-3.0658*** [0.8837]	-3.0706*** [0.8789]
IR	0.4638* [0.2720]	0.5093* [0.2848]	0.4929* [0.2806]	0.5103* [0.2822]	0.4978* [0.2788]	0.5023* [0.2791]
ER	-0.3102*** [0.1115]	-0.3010*** [0.1159]	-0.3115*** [0.1130]	-0.3090*** [0.1129]	-0.3111*** [0.1126]	-0.3098*** [0.1124]
M2	0.1639 [0.1586]	0.1722 [0.1574]	0.1670 [0.1589]	0.1735 [0.1593]	0.1654 [0.1554]	0.1687 [0.1574]
TR	-0.1782** [0.0894]	-0.1615* [0.0977]	-0.1943* [0.1101]	-0.1614 [0.1041]	-0.1747* [0.1021]	-0.1670* [0.0935]
FDI	0.2505 [0.1786]	0.1967 [0.1996]	0.2297 [0.1895]	0.1880 [0.1753]	0.2150 [0.1792]	0.2028 [0.1749]
R-squared	0.5047	0.5038	0.5041	0.5038	0.5040	0.5039

Again, the misspecification of the main estimations or incompetence of principal component cannot be documented. Returns are not sensitive to any dimension of political risk, measured by World Bank.

5.3 Sensitivity to time span

In order to check the sensitivity of our sample to time dimension we run the regressions on three time spans:

- 2000-2013, since 1997-1999 is a period of Asian Financial crisis and default in Russia, which influenced many Post-Soviet countries from our sample.
- 2000-2007, since the financial conditions and macroeconomic policy substantially changed after financial crisis of 2008-2009.
- 2000-2007 and 2010-2013. We omit both the turbulences of the end of 20th century and the World Financial crisis impacting returns in 2008 and 2009.

Period fixed effect capture some time-specific characteristics, but financial crises still constitute the outlying movements in the sample resulting, for instance, in reversed relationship between political risk and returns. Therefore, we suggest that PC can turn significant for the restricted samples.

Table 9: Estimation on three time intervals

*The table presents regressions, which include three different periods: 2000-2013; 2000-2007, 2010-2013. *, **, *** indicate significance on 10%, 5%, 1% level, respectively. The dependent variable: R. Method of estimation: Panel Least Squares. Period Fixed Effects are used (LSDV estimator). White standard errors & covariance (period, d.f. corrected) are used.*

	2000-2013	**2000-2007**	**2000-2007, 2010-2013**
PC1	0.0125	0.0186*	0.0130*
D_GDP	1.9016***	1.7401***	0.4468**
D_U	1.7169**	-3.2729*	-4.2066***
M2	0.2086	0.1246	0.3122***
FDI	0.1842	0.5620**	0.3005*
INFL	-0.2292	-0.5568	-0.3170
ER	-0.1337	-0.0895	-0.1141
IR	0.0437	0.2878	0.0609
TR	-0.0704	-0.0870	0.0770
Adjusted R-squared	0.5518	0.3765	0.4027
No. of observations	546	312	468

As can be seen from the Table 9, our hypothesis is valid. After removing outlying years, we obtained statistically significant coefficient for political risk, but only at 10% level (the second and the third columns). Although we decreased the sample size, the number of observations is large enough to obtain trustworthy results. Therefore, we conclude that results are quite sensitive to periods of financial turbulences and this influence is not fully captured

by period dummy variables from fixed effects specification. Moreover, the significance and absolute values of coefficients changed substantially sustaining our suggestions.

5.4 The difference between country groups

Prior studies in general claim the existence of distinction between developing and developed markets in terms of political risk and economic performance (for instance, Diamonte et al. (1996)). They argue that both returns and uncertainty measures are more volatile in establishing markets enhancing influence of political risk. This discrepancy is depicted in the Figure 2 from Chapter 4.1.2. Since fixed effects tests do not show significant cross-sectional heterogeneity, probably, due to large number of countries included, we specify the model to account for country groups. We introduce dummy variables taking the value 1 if the observation is related to developing country and 0 otherwise. In addition, we include the interaction term D_{it}*$PC_{it,}$ which accounts for differences in political risk measures. The regression specification becomes the following:

$$R_{it} = \alpha + \gamma_1 D_{it} + \gamma_2 D_{it} PC_{it} + \beta_1 PC_{it} + \beta_2 d\_GDP_{it} + \beta_3 d\_U_{it} + \beta_4 INFL_{it} + \beta_5 ER_{it} + \beta_6 IR_{it} + \beta_7 M2_{it} + TR_{it} + \beta_9 FDI_{it} + u_{it} \quad (7)$$

In the equation above, the effect of political risk on returns for developing countries is captured by the sum (γ_2+β_1), and consequently by β_1 for developed countries. The estimation output is shown in the Table 10. Both the dummy variable and the interaction term are not statistically significant, thus, the difference between developed and developing countries is not observable for our dataset. New variables have not notably impacted the results: the same macroeconomic indicators such as GDP, unemployment and exchange rate obtain an explanatory power on returns. However, inflation turns to be highly significant with negative sign of the coefficient as expected. Interest rate still has a positive coefficient, which contrasts with most of prior studies and economic theory. We showed that INFL is negatively related to returns and significant at 5% level.

Overall, adjusted for the number of factors R-squared does not increase substantially after adding new variables and now accounts for 48% of returns variation, suggesting that re-specification does not significantly enhance the quality of estimations.

Table 10: The difference between developing and developed countries

*The table below presents the results from the regression, which accounts for differences between developed and developing countries. Standard errors are in brackets. *, **, *** indicate significance on 10%, 5%, 1% level respectively. The dependent variable: R. Method of estimation: Panel Least Squares. Period Fixed Effects are used (LSDV estimator). White diagonal standard errors & covariance (for periods, d.f. corrected).*
Number of observations: 662.

Variables	Coefficient	Variables	Coefficient
C	-0.0371 [0.0580]	D_U	-2.9449*** [1.1098]
PC1	-0.0110 [0.0172]	IR	0.5352** [0.2271]
D	0.0318 [0.0577]	ER	-0.3159*** [0.100038]
D*PC	0.0265 [0.0206]	M2	0.1582 [0.1175]
INFL	-0.4383** [0.1849]	TR	-0.1356 [0.1251]
D_GDP	2.3138*** [0.4505]	FDI	0.2629 [0.2838]
Adjusted R- squared			0.4844
R-squared			0.5054

Our findings are in the contrary with the most of previous studies, where the distinction between two groups of countries was mostly significant. However, our result might be in line with the predictions of Diamonte et al. (1996) who claimed that the gap between developed and developing countries related to political risk would narrow in the future.

6 Conclusions

The goal of this paper was to explore stock market performance with regard to political risk measures and macroeconomic indicators. After investigating previous studies, we found that a vast majority of them explore political risk influence within one or few countries and do not complement the research with macroeconomic factors. The current study fills this gap by increasing the sample size to 39 countries as well as applying additional explanatory variables. In total, we use eight macroeconomic indicators, which represent a country general performance, price level, international activities and monetary policy. The main limitation of the data is that both political risk measures and some macroeconomic indicators are available only on the yearly basis, while returns are usually investigated in shorter time horizons. However, the essence of political risk is long-term, which weakens the rigidity of this constraint.

We adopted six indicators of political environment capturing such areas as violence, corruption, bureaucracy, freedom of speech, rules of law and regulatory quality. To combine all these areas, political risk was proxied by the principal component, which accounts for all the individual indicators. Since our dataset captures both time and cross-sectional observations, panel methods were used to estimate the responses of returns, price-to-earnings ratios and dividend yields on the explanatory variables. A two-way fixed effects model was chosen for price-to-earnings ratios, period fixed effects were applied to returns and a fixed-random effects combination was most suitable for dividend yields. In order to make valid inferences, we checked for multicollinearity as well as for heteroscedasticity and based the core specification on formal tests.

Results show that political risk is a significant factor in explaining variations of price-to-earnings ratios and dividend yields. The negative coefficient for price-to-earnings ratio is economically logical since, other things equal, investors are willing to pay less for the unit of firms' earnings when facing more risk. The positive coefficient for dividend yields implies that political risk generally boosts dividend payments in relation to share price. However, no relation between returns and principal component as well as WGI was found, indicating that a political risk premium is wiped out, probably, due to the possibility to diversify portfolios. Moreover, among the macroeconomic factors, GDP, unemployment and exchange rate

appeared to be significant and have expected signs explaining returns. While total reserves and interest rates are statistically valid, the signs of coefficients contradict with our hypotheses.

Additionally, we strengthened our conclusions with series of robustness checks. First of all, we tested if the estimation output for the principal component as a measure of risk did not differ from that of WGI. Secondly, we found that the results were sensitive to period dimension changes, since during crises the relationship between risk and returns became inversed. After removing some observations related to turbulences of 1997-1998 as well as the latest financial crisis in 2008-2009, the coefficient of political risk proxy turned significant at the 10% level. Finally, we investigated whether the influence of political risk varied significantly among groups of countries and we did not find evidence that developing countries were more subject to political factors than developed ones.

Overall, our findings partially support previous research and theoretical frameworks. However, not all obtained coefficients were statistically significant and had the expected signs. The R-squared coefficient shows that there should be some other unobserved factors, which significantly explain stock market performance. The results obtained in relation to political risk influence on returns are similar to Beaulieu et al. (2005) and in contrast to Suleman (2013), Ramcharran (2003) and Erb et al. (1996).

Considering prior papers as well as our own results, limitations and delimitations of the current study, several areas of further research can be carried out. First of all, higher frequency data can be applied since there is almost no research, which studies the combined effect of political risks and macroeconomic indicators. Secondly, there are few studies related to management's decisions in relation to political risks, for instance, in case of dividend payments. Therefore, moving from country-level data to companies specific variables might complement to existing research. Finally, due to data unavailability our sample lacks most recent developments reflecting current political circumstances. In particular, the influence of specific events such as the Ukraine crisis, sanctions related to Russia as well as Islamic State disturbances can be investigated further in future research.

Summarizing, this study accomplishes our objectives and contributes to previous research. At the same time, it comes up with new research questions and unexamined areas, which should be scrutinized in details.

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Appendix

Table A1: Previous Research

The table presents the classification of prior empirical studies according to their purposes, approaches to model political risk and econometric methods. It reflects sample characteristics and the brief description of results.

Authors	**Political risk proxy**	**Methods**	**Period, frequency, markets**	**Results**
Firm level				
Beaulieu et al. (2005)	Political news	GARCH	1990- 1996 Monthly data Canada	No effect on mean returns, positive influence on volatility.
Girard, Omran (2007)	ICRG	Multifactor extension to CAPM (cross-section of stock returns)	1997-2001 Yearly data 5 Arabic countries	Model with both country and firm risk scores has better explanatory power. Risk positively affects returns.
Durnev (2010)	Elections	Panel data methods	1980- 2006 Yearly data 47808 firms, 79 countries	Elections decrease investment-to-price sensitivity and this drop worsens post-election returns.
Country level				
Events as a proxy of political risk				
Mei, Guo (2004)	Elections	Probit and switching regression analysis	1994-1997 Yearly data 22 emerging countries	Political risk has predictive power on financial crisis.
Döpke, Pierdzioch (2004)	Elections, surveys on politicians' popularity.	AR OLS VAR	1960-2002 Quarterly data Germany	No evidence of political cycles, stock prices influence politics and not in reverse.
Lin, Wang (2004)	Dummies for legislative assemblies and power changes	AR (3) EGARCH (1,1), GJR GARCH	1984-2003 Daily data Taiwan	Market returns and volatility are not significant for the assembly effect, power changes are negatively related to mean returns and positively to volatility.

Soultanaeva (2008)	Political news	ARMA, Multivariate GJR GARCH	2001-2007 Monthly data Riga, Tallinn and Vilnius	Political news decreases the volatility in Tallinn and Riga. There are spillovers effects among countries and with Russia.
Indices as a proxy of political risk				
Diamonte, Liew, Stevens (1996)	ICRG	Portfolio approach	1985-1995 Quarterly data 130 countries	Political risk is more important determinant in emerging than developed markets.
Erb, Harvey, Viskanta (1996)	ICRG, CCR	Time-series and cross-sectional regressions	1979-1995 Monthly data 117 countries	Positive influence of ICRG risk measures on returns.
Perotti, Oijen, (2001)	ICRG CCR	Panel data methods	1988-1995 Semi-annual and monthly 22 emerging countries	Privatization increased political riskiness, while political risk is a priced factor in almost all regressions. Improvements in political risk increase stock returns.
Ramchararran (2003)	ICRG, Euromoney	Panel data methods	1992-1999 Monthly data 21 countries	Political risk has significant positive impact on equity returns and on price-to-book ratio. Economic risk negatively affects dividend yield.
Suleman (2013)	ICRG	GARCH, EGARCH (1,1)	1984-2012 Monthly data 74 countries	Political risk is priced in both emerging and developed markets, while the influence on emerging markets is higher. Positive impact on volatility. Decrease in political risk has positive effect on volatility.
Cermeño, Suleman (2014)	ICRG	Panel-GARCH process (asymmetric)	1993-2013 Monthly data Brazil, Chile, Mexico, Peru	Positive influence on returns and volatility with significant leverage effect.

Table A2: Variable Description

The table provides with the description and sources of all the variables used in estimations. It is divided into three parts; dependent variables, political risk measures, and control variables.

Variable	Description	Source
Dependent variables		
R	$ln(\frac{P_t}{P_{t-1}})$ Logarithmic dollar returns based on local indices for each country.	DataStream
DY	Dividend yield for each country based on local index	DataStream
P/E	Price to earnings ratio for each country based on local index	DataStream
Political risk measures		
Pol. Stab., Contr. of Corr., Gov. eff., Reg. Qual., Rule of Law, Voice and Acc.	Proxies of political riskiness described in details in the section 2.2. Measurement: units of standard normal distribution ranging approximately from -2.5 to +2.5 increasing in level of risk.	World Governance Indicators
PC1, PC2, PC3	Three principal components for political risk indicators.	Our calculations
Control variables		
D_GDP	First differences of logarithmic GDP per capita in constant prices (2005 $ US).	World Bank
D_U	Change in unemployment rate, the ratio to total labour force.	World Bank
INFL	Inflation rate, annual change in consumer prices.	World Bank
ER	Logarithmic change in the nominal exchange rate (Local currency units per $US), as proposed in ICRG database. An increase means depreciation of local currency.	DataStream
FDI	Net Inflows of Foreign Direct Investments as a ratio to GDP (both in Local Currency Units).	World Bank
TR	Total reserves (including gold) in current US$ in a ratio to GDP (in current US$).	World Bank
IR	Deposit interest rate (yearly).	World Bank
M2	Money supply (first difference of logarithms). Money and quasi money in local currency units.	World Bank, DataStream

Table A3: Principal Component Analysis

Panel A: The table below contains estimation of eigenvalues and eigenvectors for first three principal components.

	PC1	**PC2**	**PC3**
Eigenvalues $x'\hat{V}x$	5.301	0.283	0.229
Proportion of variance explained	0.884	0.047	0.038

	PC1	**PC2**	**PC3**
Eigenvectors	0.384	0.677	-0.618
	0.419	-0.322	0.001
	0.420	-0.325	-0.145
	0.414	-0.203	0.111
	0.423	-0.225	-0.099
	0.388	0.491	0.758

Panel B: The table below is the correlation matrix for PC and separate risk indicators.

Probability	POL. STAB.	CONTR. OF CORR.	GOV. EFF.	REG. QUAL.	RULE OF LAW	VOICE AND ACC.
POL. STAB.	1.00					
CONTR. OF CORR.	0.79	1.00				
GOV. EFF.	0.81	0.96	1.00			
REG. QUAL.	0.79	0.90	0.92	1.00		
RULE OF LAW	0.83	0.95	0.96	0.92	1.00	
VOICE AND ACC.	0.78	0.82	0.80	0.83	0.82	1.00
PC1	0.88	0.97	0.97	0.95	0.97	0.89
PC2	0.30	-0.24	-0.24	-0.17	-0.19	0.19
PC3	-0.36	-0.06	-0.13	-0.01	-0.11	0.30

Table A4: Descriptive Statistics

Panel A: The following table contains descriptive statistic of political risk measures. They are the following: (1) Political Stability; (2) Control of Corruption; (3) Government Effectiveness; (4) Regulatory Quality; (5) Rule of Law; (6) Voice and Accountability.

	(1)	(2)	(3)	(4)	(5)	(6)	PC1
Mean	-0.07	-0.42	-0.59	-0.58	-0.42	-0.46	-1.04
Median	-0.19	-0.23	-0.55	-0.61	-0.39	-0.64	-0.93
Maximum	2.39	1.49	1.19	1.64	1.79	1.68	3.23
Minimum	-1.67	-2.55	-2.36	-2.08	-2.00	-1.83	-4.71
Std. Dev.	0.89	1.00	0.84	0.81	0.93	0.85	2.05
Skewness	0.41	-0.47	-0.14	0.31	-0.01	0.47	-0.06
Kurtosis	2.13	2.16	2.09	2.33	1.93	2.14	1.86
Sum	-44.98	-277.77	-387.57	-382.53	-277.85	-302.91	-689.80
Sum Sq. Dev.	519.77	666.40	470.20	438.77	569.08	482.84	2775.47
Observations	662	662	662	662	662	662	662

Panel B: The table below shows descriptive statistic of explanatory variables except political risk measures.

	INFL	IR	ER	FDI	D_GDP	D_U	M2	TR
Mean	0.06	0.07	0.03	0.03	0.02	0.00	0.13	0.14
Median	0.04	0.04	0.01	0.03	0.03	0.00	0.11	0.11
Maximum	0.96	0.80	1.24	0.51	0.21	0.08	1.88	0.54
Minimum	-0.01	0.00	-0.33	-0.16	-0.16	-0.04	-0.42	0.00
Std. Dev.	0.10	0.08	0.14	0.04	0.04	0.01	0.14	0.11
Skewness	5.18	4.77	2.97	4.78	-0.73	0.98	1.32	1.42
Kurtosis	37.13	34.92	20.53	44.00	6.95	8.91	8.92	4.92
Sum	41.86	45.45	19.09	22.35	15.88	0.12	81.43	89.94
Sum Sq. Dev.	6.40	4.78	13.68	1.29	0.89	0.11	9.87	7.50
Observations	662	662	662	662	662	662	662	662

Panel C: The descriptive statistic of dependent variables is provided in table below. P/E multiple is shown before and after adjustments for outliers described in the Section 4.2

	R	DY	P/E	P/E before adj.
Mean	0.06	0.03	0.16	0.17
Median	0.13	0.02	0.15	0.15
Maximum	1.31	0.35	0.78	6.18
Minimum	-1.78	0.00	-0.12	-1.74
Std. Dev.	0.40	0.03	0.09	0.28
Skewness	-0.71	5.36	1.77	15.24
Kurtosis	4.84	54.20	10.35	345.47
Sum	41.40	19.89	106.84	112.09
Sum Sq. Dev.	106.73	0.43	4.79	50.59
Observations	662	662	658	663

Table A5: Correlation Analysis

Panel A: The table below provides the check for multicollinearity. The highest values are highlighted. We do not find an evidence of multicollinearity problems in our set of the variables.

	INFL	IR	ER	FDI	D_GDP	D_U	M2	TR
INFL	1.00							
IR	0.73	1.00						
ER	0.52	0.50	1.00					
FDI	-0.08	-0.09	-0.07	1.00				
D_GDP	-0.08	-0.13	-0.25	0.14	1.00			
D_U	0.01	0.07	0.06	-0.12	-0.55	1.00		
M2	0.42	0.40	0.20	-0.02	0.27	-0.18	1.00	
TR	-0.02	-0.07	-0.06	0.16	0.22	-0.03	0.10	1.00
PC1	0.39	0.20	0.35	0.15	0.00	-0.19	0.35	0.26

Panel B: The table below depicts the correlation between dependent and explanatory variables.

	R	DY	P/E
PC1	0.02	0.08	-0.14
INFL	-0.07	0.07	-0.10
IR	-0.05	0.04	-0.10
ER	-0.21	0.12	-0.13
FDI	0.09	-0.09	0.10
D_GDP	0.50	-0.23	0.21
D_U	-0.35	0.09	-0.13
M2	0.13	-0.02	-0.04
TR	0.01	-0.08	-0.03

Table A6: Pooled regressions

Returns regression

Dependent Variable: R
Method: Panel Least Squares
Sample: 1997 2013
Periods included: 17
Cross-sections included: 39
Total panel (unbalanced) observations: 662

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.024709	0.034147	-0.723616	0.4696
PC1	-0.001225	0.007935	-0.154395	0.8773
M2	0.014201	0.132329	0.107319	0.9146
D_GDP	4.672451	0.490510	9.525694	0.0000
D_U	-3.784545	1.274704	-2.968960	0.0031
IR	0.510238	0.245343	2.079695	0.0379
ER	-0.339381	0.114912	-2.953400	0.0033
TR	-0.349959	0.137203	-2.550668	0.0110
INFL	-0.191463	0.213984	-0.894751	0.3713
FDI	0.223460	0.320066	0.698169	0.4853

R-squared	0.279183
Adjusted R-squared	0.269233
AIC	0.715741
F-statistic	28.05877
Prob(F-statistic)	0.000000

P/E regression

Dependent Variable: P/E
Method: Panel Least Squares
Sample: 1997 2013
Periods included: 17
Cross-sections included: 39
Total panel (unbalanced) observations: 658

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.149247	0.008197	18.20730	0.0000
PC1	-0.005684	0.001904	-2.985745	0.0029
M2	-0.039385	0.031778	-1.239378	0.2157
D_GDP	0.559266	0.117771	4.748747	0.0000
D_U	-0.034049	0.307491	-0.110732	0.9119
IR	0.025203	0.058902	0.427874	0.6689
ER	-0.030285	0.027622	-1.096413	0.2733
TR	-0.041633	0.032897	-1.265562	0.2061
INFL	0.007160	0.051293	0.139588	0.8890
FDI	0.088647	0.076751	1.155005	0.2485

R-squared	0.083202
Adjusted R-squared	0.070469
AIC	-2.142021
F-statistic	6.534195
Prob(F-statistic)	0.000000

DY regression

Dependent Variable: DY
Method: Panel Least Squares
Sample: 1997 2013
Periods included: 17
Cross-sections included: 39
Total panel (unbalanced) observations: 662

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.039864	0.002464	16.17561	0.0000
PC1	0.001797	0.000573	3.138624	0.0018
M2	0.003113	0.009550	0.325949	0.7446
D_GDP	-0.186535	0.035401	-5.269203	0.0000
D_U	-0.112216	0.091997	-1.219771	0.2230
IR	-0.028216	0.017707	-1.593525	0.1115
ER	0.008956	0.008293	1.079883	0.2806
TR	-0.015305	0.009902	-1.545613	0.1227
INFL	0.005839	0.015444	0.378054	0.7055
FDI	-0.013543	0.023100	-0.586265	0.5579

R-squared	0.078807
Adjusted R-squared	0.066092
AIC	-4.541675
F-statistic	6.197579
Prob(F-statistic)	0.000000

Table A7: Fixed and Random Effects Tests

	Returns regression	P/E regression	DY regression
Redundant Fixed Effects Test	**Redundant Fixed Effects Tests** Test cross-section and period fixed effects Effects Test / Statistic / d.f. / Prob. Cross-section F: 0.850571 (38,598) 0.7248 Cross-section Chi-square: 34.847405 38 0.6160 Period F: 16.203818 (16,598) 0.0000 Period Chi-square: 238.420476 16 0.0000 Cross-Section/Period F: 5.889616 (54,598) 0.0000 Cross-Section/Period Chi-square: 282.322111 54 0.0000	**Redundant Fixed Effects Tests** Test cross-section and period fixed effects Effects Test / Statistic / d.f. / Prob. Cross-section F: 3.477529 (38,594) 0.0000 Cross-section Chi-square: 132.173708 38 0.0000 Period F: 2.581548 (16,594) 0.0007 Period Chi-square: 44.234394 16 0.0002 Cross-Section/Period F: 3.195372 (54,594) 0.0000 Cross-Section/Period Chi-square: 167.803623 54 0.0000	**Redundant Fixed Effects Tests** Test cross-section and period fixed effects Effects Test / Statistic / d.f. / Prob. Cross-section F: 4.972947 (38,598) 0.0000 Cross-section Chi-square: 181.786469 38 0.0000 Period F: 3.673805 (16,598) 0.0000 Period Chi-square: 62.068920 16 0.0000 Cross-Section/Period F: 4.675634 (54,598) 0.0000 Cross-Section/Period Chi-square: 233.166412 54 0.0000
Hausman Test for Period Effects	**Correlated Random Effects - Hausman Test** **Test period random effects** Test Summary / Chi-Sq. Statistic / Chi-Sq. d.f. / Prob. Period random: 29.275014 9 0.0006	**Correlated Random Effects - Hausman Test** **Test period random effects** Test Summary / Chi-Sq. Statistic / Chi-Sq. d.f. / Prob. Period random: 21.369545 9 0.0111	**Correlated Random Effects - Hausman Test** **Test period random effects** Test Summary / Chi-Sq. Statistic / Chi-Sq. d.f. / Prob. Period random: 33.565730 9 0.0001
Hausman Test for CS Effects	No heterogeneity in cross-sectional dimension.	**Correlated Random Effects - Hausman Test** **Test cross-section random effects** Test Summary / Chi-Sq. Statistic / Chi-Sq. d.f. / Prob. Cross-section random: 39.166756 9 0.0000	**Correlated Random Effects - Hausman Test** **Test cross-section random effects** Test Summary / Chi-Sq. Statistic / Chi-Sq. d.f. / Prob. Cross-section random: 16.872442 9 0.0508

Table A8: Heteroscedasticity Tests

Returns regression

Dependent Variable: RESID_R_SQ
Method: Panel Least Squares
Sample: 1997 2013
Periods included: 17
Cross-sections included: 39
Total panel (unbalanced) observations: 662

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.082346	0.016215	5.078364	0.0000
PC1	0.014123	0.003768	3.748115	0.0002
D_GDP	-0.070403	0.232926	-0.302253	0.7626
D_U	0.571914	0.605312	0.944826	0.3451
IR	-0.504087	0.116505	-4.326757	0.0000
ER	0.062312	0.054568	1.141919	0.2539
INFL	0.759649	0.101614	7.475857	0.0000
M2	0.111462	0.062838	1.773784	0.0766
FDI	-0.067495	0.151988	-0.444080	0.6571
TR	-0.096301	0.065153	-1.478089	0.1399

R-squared	0.182870
Adjusted R-squared	0.171591
Akaike criterion	-0.773711
F-statistic	16.21275
Prob(F-statistic)	0.000000

H0: rejected. Heteroscedasticity

P/E regression

Dependent Variable: RESID_SQ_PE
Method: Panel Least Squares
Sample: 1997 2013
Periods included: 17
Cross-sections included: 39
Total panel (unbalanced) observations: 658

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.005167	0.001541	3.353350	0.0008
PC1	0.000438	0.000358	1.223033	0.2218
D_GDP	0.005211	0.022140	0.235389	0.8140
D_U	-0.059974	0.057804	-1.037533	0.2999
IR	-0.018109	0.011073	-1.635463	0.1024
ER	-0.002752	0.005193	-0.530028	0.5963
INFL	0.012596	0.009642	1.306315	0.1919
M2	0.004335	0.005974	0.725720	0.4683
FDI	0.013829	0.014428	0.958481	0.3382
TR	-0.001099	0.006184	-0.177783	0.8589

R-squared	0.016367
Adjusted R-squared	0.002705
Akaike criterion	-5.484782
F-statistic	1.198010
Prob(F-statistic)	0.293166

H0: not rejected. No heteroscedasticity

DY regression

Dependent Variable: RESID_SQ_DY
Method: Panel Least Squares
Sample: 1997 2013
Periods included: 17
Cross-sections included: 39
Total panel (unbalanced) observations: 662

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000547	0.000336	1.627004	0.1042
PC1	8.81E-05	7.82E-05	1.127175	0.2601
D_GDP	-0.002198	0.004832	-0.454937	0.6493
D_U	-0.008340	0.012557	-0.664201	0.5068
IR	-0.000292	0.002417	-0.120889	0.9038
ER	0.001704	0.001132	1.505363	0.1327
INFL	-0.000851	0.002108	-0.403825	0.6865
M2	-0.000765	0.001304	-0.586576	0.5577
FDI	0.004023	0.003153	1.275992	0.2024
TR	5.23E-05	0.001352	0.038714	0.9691

R-squared	0.009067
Adjusted R-squared	-0.004612
Akaike criterion	-8.524614
F-statistic	0.662858
Prob(F-statistic)	0.742877

H0: not rejected. No heteroscedasticity

Table A9: Test for redundant variables

The table below contains the test for redundant variables, which is a joint significance test estimated by F-statistics and likelihood ratio. Both p-values imply that zero hypothesis should not be rejected and tested coefficients are considered jointly insignificant.

Dependent variable: R

Variables tested for redundancy: PC, M2, INFL, FDI

	Value	df	Probability
F-statistic	1.7163	(4, 653)	0.1446
Likelihood ratio	6.9237	4	0.1400
F-test summary:	Sum of Sq.	df	Mean Squares
Test SSR	0.5566	4	0.1391
Restricted SSR	53.4928	657	0.0814
Unrestricted SSR	52.9363	653	0.0811
LR test summary:		Value	df
Restricted LogL		-106.6346	657
Unrestricted LogL		-103.1728	653