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Political instability and stock market returns: Evidence from OECD countries

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Abstract

This paper examines the relationship between political instability and stock market returns using quarterly time series data from 1993 to 2013. In this paper, stock market returns are defined as the returns of the general stock market index and banking index for 18 OECD countries. Five different political instability indicators are constructed in order to measure political uncertainty. The empirical part utilizes the EFA, PCA and GARCH-M methodologies. The findings indicate a direct and an indirect impact between the PI indicators and the returns of the Banking Index and the Overall Stock Market Index. The research contributes to the literature by providing empirical evidence to policy makers on the effects that political instability has on stock markets.

Keywords: political instability; stock market returns; GARCH-M.
JEL Classification Codes: C32, C58, G10, G12

1. Introduction

The impact of political instability (PI) on financial market performance has been a significant topic of debate over the last years. The relationship between PI and stock markets has been widely examined in the empirical literature, especially after the recent financial crisis. Diamonte et al. (1996) and Lehkonen and Heimonen (2015), show that a reduction in political risk could lead to higher portfolio and stock returns. Huang et al. (2015) find a positive relationship between international political risks and government bond yields. Smales (2014) uses the Australian federal elections as a proxy for political uncertainty. He shows evidence that this political uncertainty proxy has a significant impact on the uncertainty of the financial markets. Li and Born (2006) and Gemmill (1992) also provide evidence of a strong relationship between the elections and the financial markets. Addoum and Kumar (2016) examine the effects of political climate changes on financial market outcomes. The number of elections, the transition

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between the power of political parties and the political alignment index (PAI) are used as PI variables. They show that the investor demand is influenced by the shifts in the political climate. Moreover, these changes affect the returns of firms and industries that are politically sensitive. Some other studies use as PI variables or as a part of those, terrorism actions and events. That studies shows evidence of a strong negative relationship between terrorism actions/events and financial markets (Jackson, 2008; Chesney at al., 2011).

While the theoretical part of PI has been widely studied the empirical part seems to have space for further research. The multidimensionality of PI is a topic that has not been studied enough. There are only a few studies that examine this issue. For example, Bussiere and Mulder (1999) used various indicators that quantify PI during the crisis episodes of 1994 and 1997 in order to examine the effects of PI on economic vulnerability. Additionally, Jong-A-Pin (2009) examined the impact of 25 different PI indicators on economic growth. However the first study is largely outdated, while Jong-A-Pin's (2009) study – as most PI related studies – provides similar measures for a large set of countries that are being examined all together in a panel. We believe that PI is a very complex issue to be examined in a way that aggregates data for many countries with different characteristics, both market/economy related but also political environment related. Therefore, in this paper we are trying to fill this gap by examining the multidimensionality of PI on a country level with time series data that allow for different PI indicators for each country. We aim to reanalyze the notion of PI and to estimate its impact on the returns and the variance (volatility) of the banking and general stock market indices. In order to achieve this, we construct five different PI indicators by using 27 different PI variables. These variables are mentioned in the corresponding empirical literature of political uncertainty. We apply Exploratory Factor Analysis (hereafter EFA), Principal Components Analysis (hereafter PCA) and the econometric method of GARCH-M, in order to examine for possible negative effects between PI, banking stock returns and overall stock market returns. We use quarterly time series data for 18 OECD countries from 1993 to 2013. By using time series data we can test for possible PI effects on the conditional variance of the banking stock returns and the overall stock market returns. Our results – contrary to most studies that simply quantify the negative effects of PI – show that not all political PI indicators have the same importance with regards to stock market and banking sector returns and volatilities. In fact while in general we find a direct/indirect negative impact of the five PI indicators on the banking and general stock market returns/on the variance of banking and general stock market returns, some PI indicators are non-significant, while some others suggest the possibility of a positive effect coming from some PI indicators. Finally, we also observe that there are different effects from different PI indicators to market stock returns and banking returns which makes the issue even more complicated. Therefore, from this more analytical, country focused time series approach, the current research contributes to the literature by providing to policy makers a deeper understanding of the possible effects that PI has on stock markets producing some new results.

The rest of the paper is organized as follows. Section 2 presents the proposed methodology. Section 3 describes the dataset, and Section 4 reports and analyzes the empirical results. Finally, Section 5 concludes.

2. Methodology

For the empirical part of this paper, we first employ the *EFA*. This statistical technique is used in order to reduce a large set of variables into a smaller set of variables and to indentify the structure of their relationship (Fabriger and Wegener, 2011). Next, we use the *EFA* in order to sort the 27 PI variables and to obtain for each country the most significant variables according to their loadings. Furthermore, we determine the PI indicators (hereafter *PI indicators*) and specify the variables by which each indicator consists. After this variable separation we employ

the *PCA* in order to construct the *PI indicators* from the variables obtained from the *EFA* procedure. These new indicators are constructed from an initial set of variables $(X_j, j = 1,2, \dots, k)$. The *PCA* transforms the data in that way that the greatest variance comes to lie on the first principal component and the second greatest variance on the second principal component. The same procedure is followed for the third greatest variance, and so on.

Before proceeding with our methodology, we test for possible correlations between the *PI indicators*. The coefficients show us how strongly pairs of indicators are related. After this procedure some of the indicators are excluded from the further analysis of specific countries because of their high correlation. For the main empirical part we focus at the uncertainty that *PI indicators* have. Thus we look at the conditional variance of the output. Moreover, if we want to allow uncertainty to affect *stock market* or *banking stock returns* directly, then we estimate the *GARCH-M* model. This model allows us to test if the uncertainty in *the* returns could affect the returns of the *stock market* and *banking* indices and if the *PI indicators* could affect the returns of the indices separately. The econometric model of GARCH-M (1,1) (Engle et al., 1987; Enders, 1995) takes the following form:

$$\Delta log(Y_t) = a_0 + \sum_{i=0}^{p} a_i \Delta log(y_{t-1}) + \gamma h_t + e_t, \quad (1)$$

$$e_t \sim N(0, h_t), \quad (2)$$

$$h_t = b_1 e_{t-1}^2 + b_2 h_{t-1} + \sum_{i=1}^{p} b_i X_{t-1} \quad (3)$$

As in the *GARCH* (1,1) model above, the *overall stock market returns* and *banking stock returns* are modeled as an AR (1) process, including the *overall stock market returns* and *banking stock returns* and the variance of the error term. The variance of the error term (h_t) is an equation of the lagged variance, the lagged squared residuals and the *PI indicators* (X_{t-1}).

3. Data

Data on the economic and political variables are collected for 18 OECD countries; the time period covers the years from 1993-2013, using quarterly time series data. The countries included in the analysis are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Japan, Italy, the Netherlands, Portugal, Spain, Sweden, United Kingdom and the United States.

We test the hypothesis that PI affects stock returns by estimating time series regressions for *the overall stock market index* (general index of each country) and *the banking index*. Data on the two stock market indices are obtained from Thompson Reuters Datastream. Summary statistics and unit root tests are presented in Table 1 and 2 for the prices and returns of the banking index and the overall stock market index.

The unit root tests in Table 1 and 2 show that the prices of the indices are non-stationary; i.e. they contain a unit root. In contrast to the prices, the returns of the indices are stationary and do not contain a unit root (the null of unit root is clearly rejected in all cases).

The innovation in this paper is that we are using 27 different PI indicators that are mentioned in the literature in order to construct five different PI indicators. The aforementioned variables are presented in Table 3.

Table 1. Summary statistics and unit root tests for Banking Index/Returns.

Countries	*Banking Index-Prices*			*Banking Index-Returns*		
	Mean (St. Dev.)	Min Max	ADF-stat. (p-value)	Mean (St. Dev.)	Min Max	ADF-stat (p-value)
Australia	1.326,45 (560.36)	379,43 2.322,47	-0,32 (0.37)	2,24 (8.16)	-23,82 25,25	-4,43 (0.00)
Austria	310,94 (202.78)	117,46 896,27	-0,53 (0.29)	0,93 (15.88)	-53,96 42,44	-5,04 (0.00)
Belgium	835,78 (481.87)	92,92 1.787,19	0,81 (0.79)	-0,76 (22.49)	-110,22 49,67	-3,83 0,0001
Canada	1.450,79 (765.93)	300,19 2.705,25	-0,18 (0.43)	2,75 (9.60)	-33,22 25,66	-5,98 (0.00)
Denmark	1.790,44 (1073.63)	425,74 4.596,88	-0,71 (0.24)	1,90 (17.88)	-77,72 72,83	-5,89 (0.00)
Finland	175,40 (102.76)	16,99 377,14	0,17 (0.57)	3,83 (15.98)	-51,93 53,29	-3,81 (0.00)
France	460,60 (244.88)	158,70 1.054,48	-0,15 (0.44)	0,78 (19.01)	-66,68 54,87	-4,92 (0.00)
Germany	322,20 (137.02)	146,37 673,94	0,14 (0.56)	-0,22 (17.15)	-54,17 46,49	-4,27 (0.00)
Greece	1.282,15 (958.22)	59,23 3.377,96	0,29 (0.61)	-2,00 (23.26)	-75,04 52,73	-3,26 0,0006
Ireland	2.788,69 (2231.43)	48,89 8.057,36	0,66 (0.75)	-2,50 (30.29)	-175,69 62,41	-4,01 (0.00)
Italy	1.462,02 (719.79)	431,24 2.945,44	0,24 (0.59)	-0,36 (14.92)	-44,24 51,38	-4,55 (0.00)
Japan	322,20 (175.65)	94,43 691,77	-0,64 (0.26)	-1,88 (14.07)	-39,58 35,45	-5,12 (0.00)
Netherlands	2.160,10 (1384.15)	117,65 4.695,06	0,64 (0.74)	-2,59 (21.89)	-141,57 37,74	-3,03 (0.00)
Portugal	145,09 (72.75)	17,84 345,51	0,52 (0.69)	-1,30 (16.40)	-45,32 50,90	-3,71 (0.00)
Spain	283,77 (128.28)	72,41 544,52	-0,45 (0.33)	1,36 (15.33)	-53,84 43,50	-5,00 (0.00)
Sweden	1.642,08 (774.37)	94,42 3.210,01	-0,96 (0.17)	4,06 (16.36)	-41,52 64,81	-4,72 (0.00)
UK	5.555,80 (2303.04)	1.720,19 9.476,01	-0,55 (0.29)	1,02 (12.28)	-28,63 34,00	-4,33 (0.00)
US	235,85 (96.74)	75,71 407,26	0,02 (0.51)	0,52 (13.44)	-59,69 34,58	-4,89 (0.00)

We used the *EFA* method to sort these variables and then the *PCA* method in order to construct the five factor variables for our sample. These five *PI indicators* are named *CORR*, which contains variables that are closely related with corruption; *ELECT*, which contains variables that are closely related with elections and the electoral system; *GOV*, which contains variables that are closely related to the government; *RIOT*, which contains variables that are closely related to riots; and *TERROR*, which contains variables that are closely related to terrorism. For Austria and Germany no data were available for the *TERROR* indicator and for Finland for the *RIOT* indicator, respectively. The Table A1 in the Appendix A gives information about the components for each country by which each *PI indicator* consist.

Table 2. Summary statistics and unit root tests for General Stock Market Index/Returns.

Countries	*General Stock Market Index-Prices* Mean (St. Dev.)	Min Max	ADF-stat. (p-value)	*General Stock Market Index-Returns* Mean (St. Dev.)	Min Max	ADF-stat (p-value)
Australia	3.593,00 (1199.34)	1.794,00 6.432,80	-0,62 (0.27)	1,31 (6.97)	-33,68 16,47	-4,93 (0.00)*
Austria	1.952,55 (1111.25)	730,96 4.971,37	-0,46 (0.32)	1,53 (12.46)	-43,18 25,21	-4,53 (0.00)*
Belgium	2.563,72 (843.06)	1.127,02 4.591,71	-0,28 (0.39)	1,00 (10.42)	-32,49 24,92	-3,35 (0.00)*
Canada	8.727,21 (3176.17)	3.305,50 14.625,00	-0,78 (0.22)	1,68 (8.27)	-33,10 15,60	-5,16 (0.00)*
Denmark	280,66 (127.34)	82,12 556,56	0,09 (0.54)	2,39 (10.69	-45,89 25,19	-5,19 (0.00)*
Finland	6.213,31 (3461.98)	829,00 16.045,05	-0,75 (0.23)	2,48 (17.19)	-42,02 68,57	-4,11 (0.00)*
France	3.715,07 (1253.98)	1.785,71 6.565,97	-0,43 (0.33)	0,87 (11.25)	-36,30 31,67	-4,26 (0.00)*
Germany	4.845,57 (1837.63)	1.684,21 8.067,32	-0,32 (0.38)	1,92 (13.09)	-45,91 30,09	-4,29 (0.00)*
Greece	2.309,14 (1369.22)	611,16 5.877,90	-0,21 (0.42)	0,11 (16.67)	-47,12 38,28	-3,83 (0.00)*
Ireland	4.325,05 (2030.59)	1.275,28 9.432,84	-0,16 (0.44)	1,26 (12.28)	-45,51 29,54	-3,52 (0.00)*
Italy	1.198,24 (460.97)	446,33 2.058,23	-0,35 (0.36)	0,84 (12.00)	-29,68 39,59	-4,78 (0.00)*
Japan	14.236,56 (4118.01)	8.017,75 22.379,02	-0,96 (0.17)	-0,61 (11.05)	-25,58 22,51	-5,73 (0.00)*
Netherlands	374,47 (138.73)	129,71 675,44	-0,28 (0.39)	1,24 (12.47)	-38,19 33,51	-4,34 (0.00)*
Portugal	7.602,52 (2685.05)	3.187,65 13.384,90	-0,43 (0.33)	0,75 (12.36)	-29,64 37,68	-4,36 (0.00)*
Spain	7.191,65 (3720.31)	230,76 14.974,90	-0,62 (0.27)	0,89 (12.41)	-38,89 39,91	-4,59 (0.00)*
Sweden	759,66 (315.65)	179,63 1.368,99	-0,82 (0.21)	2,30 (12.31)	-34,81 37,23	-3,88 (0.00)*
UK	2.467,17 (576.31)	1.356,35 3.422,92	-0,62 (0.27)	1,07 (8.27)	-30,52 23,04	-4,56 (0.00)*
US	1.064,36 (320.00)	444,27 1.569,19	-0,30 (0.38)	1,56 (8.51)	-25,56 18,95	-4,06 (0.00)*

Note: * indicates the rejection of the null of a unit root for the 95% significance level.

Table 3. Political instability variables.

Number of cabinet changes	Strikes
Number of constitutional change	Guerrilla warfare
Number of legislative elections	Riots
Legislative Effectiveness	Revolutions
Regulatory Quality	Coups D'état
Rule of Law	Number of terrorist incidents per year
Government crises	Number of victims per incident
Purges	CPI index of corruption
Annual number of anti-government demonstrations	Political rights index

Voice and accountability	Civil liberties
Political stability and absence of violence	Control of corruption
Government effectiveness	Degree of openness
Government (% GDP)	Polity scale
Assassinations	

Source: WDI (World Development Indicators), CNTS (Cross National Time Series), Kaufmann et al. (2004), GTD (Global Terrorism Database), Transparency International, Freedom House International, Penn World Tables, Polity IV.

As mentioned in the methodology section, we estimated the correlation technique in order to find the indicator pairs that are related. The *PI indicators* that are correlated are excluded for further analysis. These are *CORR* for Australia, Belgium, Canada, Germany, Greece, Japan, Portugal, UK and the US; and *ELECT* and *GOV* for France and Ireland, respectively.

4. Empirical results

Table 4 and Table 5 presents the estimation results regarding the effects of PI indicators on the banking sector returns and the overall stock market returns, respectively. In both tables the first section presents the mean equation and the second section the variance equation of the *GARCH-M* model. This model allows for testing whether the uncertainty affects *Banking returns / Stock market returns* directly and whether the *PI indicators* affect *Banking returns / Stock market returns* separately.

According to the results of Table 4, the *Bank returns (GARCH)* variable is significant for Finland, Germany and Sweden showing that the uncertainty of *Bank Returns* does itself affects *Bank Returns*, while for the rest of the countries the variable is insignificant showing that the uncertainty of *Bank Returns* does not itself affect *Bank Returns*. This fact, if viewed in conjunction with the fact that some PI indicators are significant means that PI is sometimes more important explaining returns than the inherent uncertainty (volatility from the GARCH model) of the returns themselves. In the mean equation the *PI indicators* that are negative and significant are *ELECT* for Denmark (-27.57) and Germany (-23.68) and *RIOT* for France (-23.32) and Greece (-141.66). Positive and significant are the *GOV* indicator for Belgium (35.38) and Portugal (14.64), *ELECT* for UK (10.86) and *TERROR* for Sweden (29.55). These results, showing that *PI indicators* are affecting *Bank Returns* not only negatively but sometimes with a positive impact indicate that the issue of PI is rather complex and does not provide all necessary information when viewed in aggregation. Therefore, the fact that all PI is not 'bad' for returns, requires from financial analysts to explore further what particular types/characteristics of PI might affect one country compared to another. Furthermore, we tested for possible autocorrelation of higher order by using the Ljung-box test and for possible ARCH effects. The results of Table 2 are very satisfactory and show that there are no signs of autocorrelation and ARCH effects in the data.

In the variance equation the PI indicators that are negative and significant are *CORR* for Ireland (-325.85), *ELECT* for Greece (-504.26), Japan (-87.04) and Portugal (-616.85), *GOV* for Japan (-57.29) and Portugal (-82.30), *RIOT* for the US (-168.47) and *TERROR* for Japan (-143.02), affecting so the variance of *Bank Returns*. Thus, we conclude first, that the *PI indicators* have a direct effect on *Bank Returns* for Belgium, Denmark, Finland, France, Germany, Sweden and the UK while they do not have an indirect effect on the variance of *Bank Returns*; second, that the *PI indicators* have not a direct effect on *Bank Returns* for Ireland, Japan and the US while they do have an indirect effect on the variance of Bank Returns; and third, the *PI indicators* have both an direct effect on *Bank Returns* and indirect effect on the variance of *Bank Returns* for Greece and Portugal. Thus, again these results suggest that PI is

rather complex and cannot be viewed in isolation of the particularities of every country case.

Similar to Table 4, Table 5 shows that the *Stock Market Returns (GARCH)* variable is significant for Austria, Japan and Portugal showing that the uncertainty of *Stock Market Returns* does itself affect *Stock Market Returns*, while for the rest of the countries the variable is insignificant showing that the uncertainty of *Stock Market Returns* does not itself affect *Stock Market Returns*. In the mean equation the *PI indicators* that are negative and significant are *ELECT* for Denmark (-28.02) and the US (-22.52), *GOV* for Sweden (-5.69) and *RIOT* for Greece (-65.06) and Italy (-121.71). Positive and significant are the *GOV* indicator for Belgium (16.79) and Japan (9.80) and *TERROR* for Greece (57.88). These results are showing that the *PI indicators* can affect *Stock Market Returns* both negatively and/or positively.

In the variance equation the *PI indicators* that are negative and significant are *ELECT* for Belgium (-53.52), *GOV* for Belgium (-60.66) and the UK (-46.32), *RIOT* for the France (-121.22) and Germany (-220.38) and TERROR for Ireland (-86.75) and Portugal (-832.31) affecting so the variance of *Stock Market Returns*. Furthermore, two indicators, the *CORR* for France (90.19) and the *GOV* for Germany (15.95) are positive and significant affecting also the variance of *Stock Market Returns*. Thus, we conclude first, that the *PI indicators* have a direct effect on *Stock Market Returns* for Austria, Denmark, Greece, Italy, Japan, Sweden and the US while they do not have an indirect effect on the variance of *Stock Market Returns*; second, that the *PI indicators* have not a direct effect on *Stock Market Returns* for France, Germany, and Ireland while they do have an indirect effect on the variance of *Stock Market Returns*; and third, the PI indicators have both an direct effect on *Stock Market Returns* and indirect effect on the variance of *Stock Market Returns* for Belgium, Portugal and the UK. Here, again the results of the Ljung-box test of autocorrelation and the ARCH effects test are satisfactory and show that there are no signs of autocorrelation and ARCH effects.

Furthermore, from table 4 and 5 it is possible to compare the effects that each indicator has on each country and among countries. For example, in the mean equation of table 2 the RIOT indicator shows to have a negative impact in France while the other indicators did not have neither a positive or negative impact. If the RIOT indicator is compared among countries then only Greece shows to be negatively affected while other countries are not.[1]

5. Conclusions

The present paper empirically examines the relationship between PI, banking stock returns and the overall stock market returns during the period of 1993-2013 using time series data at country level. We constructed five *PI indicators* from 27 different PI variables that are mentioned in the empirical literature. From the overall results of our study, although we provide strong evidence for the existence of a direct negative relationship between the *PI indicators* and *Bank Returns / Stock Market Returns* and an indirect negative relationship between the *PI indicators* and the variance of the *Banking returns* and the *Overall Stock Market returns* (as most other studies do), there are a few additional outcomes that need to be carefully considered. Particularly, we find that not all PI indicators have negative effects and there are some with non-significant and also sometimes positive results. Thus, not all PI is bad for market and banking returns. Even more, various PI indicators are affecting differently some countries compared to others, while the effect of PI indicators is not always the same for stock market and banking returns. These findings show clearly that the issue of PI is rather complex and

[1] Further to our initial analysis that includes all political instability indicators, the models reported in Tables 4 and 5 were re-estimated with the significant indicators only. The results were not different from the ones reported and therefore, for reasons of economy of space are not reported here. Tables and results are available from authors upon request.

when viewed in aggregation does not provide clear results for particular country cases. We believe that studying PI in a country context allowing for idiosyncrasies for every particular country are of major importance in *understanding* the role of PI on stock market stability and are of great *significance* to investors and market regulators. Obviously, the topic is open for further research in order to understand the deeper effects of PI on returns and examine in particular what are those idiosyncrasies that differentiate the effects for different country cases.

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Table 4. GARCH-M (1,1) estimates of Bank Returns with political instability indicators in mean and variance, dependent variable Bank Returns.

Parameter	Australia	Austria	Belgium	Canada	Denmark	Finland	France	Germany	Greece	Ireland	Italy	Japan	Netherlands	Portugal	Spain	Sweden	UK	US
Mean equation																		
constant	0.239	-0.812	**-23.284***	-1.188	7.133	-18.821	**12.245+**	**19.329***	-5.841	4.198	11.231	-1.845	-8.781	-15.636	-1.653	8.459	-1.587	-2.815
	(0.052)	(-0.128)	(-2.159)	(-0.166)	(1.026)	(-1.211)	-1.945	(2.262)	(-0.194)	(0.228)	(0.499)	(-0.224)	(-1.006)	(-0.767)	(-0.159)	(0.456)	(-0.247)	(-0.488)
Bank Returns	0.137	**0.162***	**-0.226+**	-0.068	-0.143	-0.067	0.023	**-0.196+**	0.065	-0.214	-0.027	0.132	0.252	-0.030	-0.114	-0.116	0.109	-0.154
	(0.875)	(2.065)	(-1.731)	(-0.404)	(-0.578)	(-0.527)	(0.218)	(-1.905)	(0.536)	(-0.686)	(-0.186)	(1.143)	(1.604)	(-0.288)	(-0.669)	(-0.585)	(0.624)	(-0.961)
Bank Returns (GARCH)	-0.006	0,01	0.005	0.025	0.002	**0.084+**	0.008	**-0.071****	-0.018	-0.000	0.004	-0.039	0.004	-0.001	0.017	**0.061****	-0.022	0.010
	(-0.114)	(0.594)	(1.284)	(0.764)	(0.507)	(1.966)	(0.724)	(-3.095)	(-0.431)	(-0.163)	(1.094)	(-1.589)	(0.334)	(-0.224)	(1.029)	(2.904)	(-1.428)	(0.438)
CORR		3.361			-0.061	4.458	-8.782			-5.019	1.278		-1.491		-33.307	-18.345		
		(0.542)			(-0.008)	(0.509)	(-1.090)			(-0.503)	(0.118)		(0.206)		(-0.507)	(-0.894)		
ELECT	-7.948	-0.794	2.237	-0.350	**-27.569***	-2.149		**-23.682****	3.076		2.979	3.806	-0.703	12.714	1.105	-5.843	**10.859****	-6.206
	(-1.399)	(-0.073)	(0.239)	(-0.039)	(-2.792)	(-0.346)		(-24.164)	(0.164)		(0.151)	(0.342)	(-0.069)	(0.557)	(0.113)	(-0.788)	(18.552)	(-0.319)
GOV	0.093	-3.271	**35.383****	5.468	-1.476	5.919		4.486	3.183		10.599	6.407	20.106	**14.642***	4.383	-10.269	5.706	3.956
	(0.019)	(-0.466)	(14.376)	(1.041)	(-0.192)	(0.522)		(0.789)	(0.022)		(1.577)	(1.300)	(1.487)	(2.249)	(0.432)	(-1.472)	(1.004)	(0.609)
RIOT	2.344	7.387	7.877	10.078	2.767		**-23.321+**	-83.322	**-141.660***	5.915	-94.756	-22.063	-54.698	-406.369	-21.444	16.398	-1.289	12.473
	(0.370)	(1.142)	(0.839)	(0.496)	(0.443)		(-1.856)	(-1.305)	(-2.917)	(0.248)	(-1.178)	(-0.749)	(-1.412)	(-1.307)	(-0.451)	(1.522)	(-0.059)	(1.049)
TERROR	8.448		-1.805	-4.801	19.136	-10.822	17.545		53.318	12.178	-38.455	15.001	8.524	-63.676	8.778	**29.551***	-4.688	-1.924
	(0.909)		(-0.040)	(-0.353)	(1.445)	(-0.959)	(0.625)		(1.535)	(0.223)	(-0.363)	(2.271	(1.064)	(-1.489)	(0.696)	(2.242)	(-0.329)	(-0.245
Variance equation																		
constant	29.147	**101.649***	**341.730+**	81.117	170,245	**175.799***	85.051	274.771	**398.435****	828.568	167.851	**143.037****	99.145	**645.878****	169.319	106.889	170.362	66.739
	(0.480)	(2.287)	(1.773)	(1.093)	(0.942)	(2.045)	(0.773)	(1.575)	(3.750)	(1.551)	(0.812)	(11.879)	(0.761)	(5.965)	(1.191)	(0.295)	(1.029)	(1.308)
ARCH(1)	0.080	0,073	**0.882***	-0.019	0,422	**-0.087+**	**1.341****	**-0.148+**	**-0.101+**	0.838	0.022	**-0.221****	0.751	**-0.055***	0.099	-0.042	0.605	0.107
	(0.491)	(1.032)	(2.139)	(-0.154)	(0.988)	(-1.938)	(-2.725)	(-1.822)	(-1.849)	(1.164)	(0.334)	(-3.155)	(3.151)	(-2.207)	(0.560)	(90.423)	(1.632)	(1.183)
GARCH(1)	0.566	**0.703****	0.069	0.457	0,102	**0.743****	0.180	0.406	**0.556***	0.358	0.532	**0.962****	-0.012	**0.816****	**0.555+**	-0.002	-0.200	**0.811****
	(0.479)	(7.929)	(0.696)	(0.843)	(0.401)	(4.565)	(1.132)	(0.837)	(2.401)	(1.303)	(1.358)	(12.474)	(-1.019)	(8.736)	(1.675)	(-0.021)	(-0.777)	(6.186)
CORR		40.584			-31.803	-80.735	-6.126			**-325.857+**	-31.167		184.883		-746.573	113.452		
		(1.009)			(-0.179)	(-1.322)	(-0.041)			(-1.908)	(-0.459)		(1.164)		(-0.904)	(0.257)		
ELECT	-22.557	-164.524	-181.902	0.005	-280.839	-41.986		-1.349	**-504.262****		1.588	**-87.049****	24.856	**-616.858****	-44.678	26.637	-23.234	57.156
	(-0.481)	(-1.528)	(-1.265)	(0.001)	(-1.296)	(-1.103)		(-0.005)	(-2.869)		(0.010)	(-22.418)	(0.129)	(4.838)	(-0.319)	(0.213)	(-0.128)	(0.672)
GOV	16.070	-56.818	-307.993	-52.218	106.791	-91.019			-245.187		-0.959	**-57.297****	-119.999	**-82.305****	16.150)	-40.535	-102.505	-69.111
	(0.237)	(-0.979)	(-1.367)	(-1.313)	(1.159)	(-1.057)		-181.002	(-1.200)		(-0.016)	(-10.899)	(-0.694)	(-3.850)	(0.169)	(-0.297)	(-0.619)	(-1.486)
RIOT	12.012	-53.211	-90.742	-0.296	56.784		-157.746	(-1.604)	2895.932	-824.900	-8.018	-111.259	-64.589	32.334	19.946	-43.219	-278.265	**-168.478****
	(-0.183)	(-0.986)	(-0.629)	(-0.002)	(0.369)		(-0.505)	-32.151	(1.192)	(-1.321)	(-0.009)	(-1.114)	(-0.075)	(0.017)	(0.048)	(-0.221)	(-0.657)	(-3.856)
TERROR	-17.930		24.170	-0.136	-14.013	-40.380	107.393	(-0.034)	-7.674	-118.419	-1607.973	**-143.029****	-94.649	25.170	-28.155	-229.109	181.935	11.473
	(-0.270)		(0.078)	(-0.001)	(-0.074)	(-1.174)	(0.157)		(-0.027)	(-0.126)	(-1.163)	(-21.987)	(-0.497)	(0.294)	(-0.266)	(-1.666)	(0.546)	(0.312)
Diagnostics																		
R-squared	0.085	0,045	-0.001	-0.034	0,037	0,109	-0.056	0.143	0.158	-0.158	0,121	0,022	0,133	0,180	0,074	0,298	0,090	0,025
Adj R-squared	0.009	-0,035	-0.084	-0.120	-0,058	0,035	-0.129	0.84	0.088	-0.237	0,035	-0,592	0,047	0,112	-0,017	0,228	0,015	-0,057
DW stat	2.054	1,821	1.362	1.688	1,734	1,939	1.946	1.731	1.827	1.314	1,728	1,987	1,738	1,929	1,893	1,908	1,802	1,550
Ljung-Box (4)	0,417	1,184	2,930	1.278	1,558	1,424	0,458	2.1949	2,061	9,412	3,686	5,398	0,735	1,523	1,445	0,880	5,312	3,398
	(0.981)	(0.881)	(0.570)	(0.120)	(0.816)	(0.84)	(0.977)	(0.700)	(0.725)	(0.152)	(0.45)	(0.249)	(0.947)	(0.823)	(0.836)	(0.927)	(0.257)	(0.493)
Arch (4)	-0,663	0,256	-0,529	-0,364	-0,269	-0,837	0,152	-0,521	0,753	-0,001	-1,241	-1,489	-1,395	-0,100	-0,138	-1,424	0,062	0,531
	(0.509)	(0.799)	(0.598)	(0.717)	(0.788)	(0.406)	(0.879)	(0.604)	(0.454)	(0.999)	(0.218)	(0.141)	(0.168)	(0.919)	(0.891)	(0.159)	(0.951)	(0.597)

Notes: Values of t-statistics are in parentheses. Bold figures indicate statistical significant coefficients, ** denotes statistical significance at the 1% level ($p<0.01$), * denotes statistical significance at the 5% level ($p<0.05$), + denotes statistical significance at the 10% level ($p<0.1$)

Table 5. GARCH-M (1,1) estimates of Stock Market Returns with political instability indicators in mean and variance, dependent variable Stock Market Returns.

Parameter	Australia	Austria	Belgium	Canada	Denmark	Finland	France	Germany	Greece	Ireland	Italy	Japan	Netherlands	Portugal	Spain	Sweden	UK	US
Mean equation																		
constant	-0.383	**18.53****	-4.961	6.950	**15.349****	14.073	1.155	4.888	**-31.792**+	-0.668	**25.255**+	6.289	0.614	10.492	1.913	**23.202**+	1.402	7.267
	(-0.118)	(6.204)	(-1.068)	(1.449)	(2.720)	(0.855)	(0.219)	(0.681)	(-1.689)	(-0.103)	(1.902)	(1.010)	(0.051)	(0.299)	(0.275)	(1.731)	(0.368)	(1.627)
Stock Market Returns	0.026	0.048	0.040	0.223	0.041	0.012	0.189	-0.078	**0.225****	0.004	0.020	0.117	-0.144	-0.142	-0.066	0.002	0.092	-0.015
	(0.133)	(0.399)	(0.282)	(1.605)	(0.319)	(0.074)	(1.229)	(-0.622)	(2.654)	(0.027)	(0.126)	(0.957)	(-0.492)	(-0.837)	(-0.430)	(0.011)	(0.789)	(-0.086)
Stock Market Returns (GARCH)	-0.009	**-0.143****	0.006	-0.062	-0.003	-0.002	0.007	-0.008	0.031	-0.005	0.035	**-0.113***	0.006	**-0.206**+	0.009	0.0145	0.007	-0.002
	(-0.206)	(-4.934)	(0.336)	(-1.527)	(-0.348)	(-0.115)	(0.490)	(-0.275)	(1.038)	(-0.340)	(0.925)	(-2.002)	(0.340)	(-1.779)	(0.845)	(0.454)	(0.754)	(-0.060)
CORR		**15.795***			-6.962	-8.785	-1.997			2.661	-3.519		-14.662		-58.281	-28.855		
		(2.047)			(-1.027)	(-0.576)	(-0.297)			(0.507)	(-0.537)		(-0.912)		(-0.984)	(-1.539)		
ELECT	-7.744	-7.158	9.953	3.627	**-28.021****	5.994		0.899	10.151		-9.962	5.175	-9.632	22.375	2.719	-3.307	**8.153***	**-22.523****
	(-1.524)	(-1.443)	(1.411)	(0.795)	(-4.607)	(0.598)		(0.054)	(0.804)		(-0.839)	(0.547)	(-0.876)	(0.715)	(0.414)	(-0.463)	(2.367)	(-3.747)
GOV	5.319	-7.723	**16.791**	0.553	-3.651	-9.514		-0.502	25.262		1.475	**9.806***	17.166	8.662	8.677	**-5.690***	0.049	-0.205
	(1.482)	(-0.898)	(3.479)	(0.187)	(-0.686)	(-0.467)		(-0.095)	(0.294)		(0.380)	(2.139)	(1.448)	(1.254)	(1.256)	(-2.311)	(0.013)	(-0.041)
RIOT	-3.957	-1.346	6.055	-16.575	5.650		4.254	-22.951	**-65.067**+	5.228	**-121.712***	-12.884	-87.888	-210.876	-13.513	11.684	-13.553	-0.638
	(-0.487)	(-0.256)	(0.689)	(-1.266)	(1.137)		(0.376)	(-0.666)	(-1.824)	(0.447)	(-2.146)	(-0.475)	(-1.194)	(-0.990)	(-0.563)	(0.583)	(-0.974)	(-0.103)
TERROR	6.259		-31.491	-0.137	3.956	-21.683	5.578		**57.886***	4.320	-82.918	2.949	8.167	-34.324	8.768	15.274	-1.544	-6.692
	(1.010)		(-11.654)	(-0.014)	(0.445)	(-0.928)	(0.210)		(2.143)	(0.271)	(-1.228)	(0.376)	(0.665)	(-0.778)	(0.621)	(0.821)	(-0.362)	(-0.825)
Variance equation																		
constant	11.259	68.302	21.354	55.538	32.659	190.596	13.162	5.548	231.302	59.374	131.236	91.79	128.996	128.369	63.019	133.464	29.596	21.275
	(0.539)	(1.333)	(0.539)	(0.863)	(0.931)	(0.532)	(0.488)	(0.555)	(0.982)	(0.955)	(0.522)	(1.099)	(0.873)	(0.545)	(0.826)	(0.899)	(1.476)	(0.996)
ARCH(1)	**0.380****	-0.103	0.201	-0.073	-0.106	-0.106	**0.161****	**-0.123****	**-0.188****	**0.299***	0.243	-0.194	0.131	**-0.161****	0.060	0.128	**0.685****	0.236
	(2.537)	(-1.534)	(1.034)	(-0.331)	(-0.991)	(-1.364)	(159.319)	(-4.839)	(-3.057)	(2.117)	(0.863)	(-1.308)	(0.347)	(-3.307)	(0.573)	(0.629)	(2.608)	(1.569)
GARCH(1)	**0.426**+	0.568	**0.590****	0.434	0.534	0.567	**0.620****	**1.087****	0.322	**0.555****	0.002	0.227	0.590	0.404	0.520	0.403	**0.374***	**0.745****
	(1.684)	(0.977)	(2.943)	(0.609)	(1.357)	(0.833)	(4.982)	(2122.842)	(0.586)	(2.682)	(0.004)		(1.185)	(1.444)	(1.300)	(0.795)	(2.330)	(5.321)
CORR		26.041			-36.139	-3.008	**90.195**+				-19.925	-121.393	-0.977		-1.994	4.143		
		(0.454)			(-0.863)	(-0.022)	(1.780)				(-0.530)	(-1.379)	(0.204)	(-0.006)		(-0.005)	(0.019)	
ELECT	37.155	-50.219	**-53.529**+	-62.089	2.562	-2.889		-8.711	-132.542		-114.569	32.028	-0.004	-6.559	-16.052	38.712	24.788	-26.898
	(0.988)	(-0.827)	(-1.845)	(-0.858)	(0.061)	(-0.021)		(-0.133)	(-0.655)		(-0.583)	(0.216)	(-0.002)	(-0.030)	(-0.240)	(0.504)	(1.335)	(-1.231)
GOV	-5.230	33.406	**-60.662**+	14.466	146.509	-5.555		**15.950***	35.716		17.262	-6.277	-0.797	12.039	11.975	-138.028	**-46.329**+	-10.387
	(-0.262)	(0.307)	(-1.696)	(0.565)	(1.209)	(-0.025)		(2.504)	(0.023)		(0.306)	(-0.121)	(-0.006)	(0.315)	(0.189)	(-1.090)	(-1.816)	(-0.436)
RIOT	27.141	-44.671	34.908	8.693	10.426		**-121.229***	**-220.385****	78.831	-43.625	515.438	-0.971	-66.310	-3.956	-51.383	-39.712	52.792	-51.679
	(0.623)	(-0.505)	(0.498)	(0.587)	(0.318)		(-2.003)	(-4.550)	(0.227)	(-0.658)	(0.614)	(-0.003)	(-0.071)	(-0.002)	(-0.201)	(-0.441)	(0.560)	(-1.636)
TERROR	-25.547		175.859	-19.653	3.692	-43.450	-109.979		2.969	**-86.755***	97.849	-6.435	-182.941	**-832.315****	-71.080	1.504	23.601	-9.793
	(-0.575)		(1.215)	(-0.227)	(0.092)	(-0.136)	(-0.869)		(0.008)	(-2.049)	(0.229)	(-0.526)	(-1.134)	(-2.687)	(-1.190)	(0.012)	(0.889)	(-0.169)
Diagnostics																		
R-squared	0.056	0.144	-0.004	0.039	0.137	0.052	-0.026	-0.023	0.121	0.005	0.018	0.112	0.112	0.073	0.054	0.106	-0.039	0.011
Adj R-squared	-0.022	0.073	-0.088	-0.040	0.052	-0.027	-0.096	-0.093	0.047	-0.062	-0.079	0.038	0.025	-0.005	-0.039	0.018	-0.125	-0.071
DW stat	1.631	1.669	1.859	2.221	1.909	2.154	2.177	1.845	2.165	1.791	1.817	1.969	1.819	1.602	2.086	1.984	1.897	1.847
Ljung-Box (4)	0.855	1.645	3.377	4.244	3.341	1.768	26.786	1.127	1.738	2.459	0.699	8.269	1.599	3.438	1.579	1.930	1.804	1.131
	(0.931)	(0.801)	(0.497)	(0.374)	(0.503)	(0.778)	(0.141)	(0.890)	(0.784)	(0.652)	(0.951)	(0.142)	(0.809)	(0.487)	(0.813)	(0.749)	(0.772)	(0.889)
Arch (4)	-1.407	0.488	-1.262	-0.735	-1.161	0.607	-1.161	-0.751	1.369	-0.554	-1.003	-1.495	0.100	0.019	-1.095	0.015	-0.218	-0.905
	(0.164)	(0.627)	(0.211)	(0.466)	(0.249)	(0.546)	(0.247)	(0.455)	(0.175)	(0.581)	(0.319)	(0.139)	(0.920)	(0.984)	(0.277)	(0.988)	(0.828)	(0.368)

Notes: Values of t-statistics are in parentheses. Bold figures indicate statistical significant coefficients, ** denotes statistical significance at the 1% level (p<0.01), * denotes statistical significance at the 5% level (p<0.05), + denotes statistical significance at the 10% level (p<0.1)

Appendix A.
Components of political instability indicators.

Table A1. Components of political instability indicators for each country.

COUNTRY	*GOV*	*CORR*	*TERROR*	*ELECT*	*RIOT*
Australia	Regulatory Quality Rule of Law Government effectiveness	Control of corruption CPI index of corruption	Number of victims per incident Number of terrorist incidents per year	Number of cabinet changes Number of legislative elections Government crises	Strikes Riots Assassinations
Austria	Government crises Government effectiveness	Rule of Law CPI index of corruption Voice and accountability		Number of cabinet changes Number of legislative elections	Riots Strikes Annual number of anti-government demostrations
Belgium	Government effectiveness Voice and accountability Control of corruption	Civil liberties CPI index of corruption	Number of terrorist incidents per year Number of victims per incident	Number of legislative elections Number of cabinet changes Guerrila warfare	Riots Annual number of anti-government demostrations
Canada	Voice and accountability Regulatory Quality Rule of Law Control of corruption Government effectiveness	CPI index of corruption Purges	Number of terrorist incidents per year Number of victims per incident	Number of legislative elections Number of cabinet changes	Annual number of anti-government demostrations Riots
Denmark	Government effectiveness Rule of Law	Control of corruption CPI index of corruption	Number of terrorist incidents per year Number of victims per incident	Number of cabinet changes Number of legislative elections Government crises	Annual number of anti-government demostrations Riots
Finland	Government effectiveness Regulatory Quality Rule of Law CPI index of corruption Civil liberties Political rights index	Control of corruption Voice and accountability	Number of terrorist incidents per year Number of victims per incident	Annual number of anti-government de-mostrations Number of legislative elections	
France	Rule of Law Voice and accountability Government crises	Regulatory Quality Civil liberties Control of corruption	Number of terrorist incidents per year Number of victims per incident	Number of cabinet changes Number of legislative elections	Annual number of anti-government demostrations Assassinations
Germany	Government effectiveness Regulatory Quality Voice and accountability Civil liberties	Control of corruption Rule of Law CPI index of corruption		Number of constitutional changes Number of cabinet changes Number of legislative elections	Revolutions Strikes Riots
Greece	Legislative Effectiveness Civil liberties	Voice and accountability Control of corruption	Number of terrorist incidents per year Number of victims per incident	Number of legislative elections Number of cabinet changes	Riots Annual number of anti-government demostrations

	Political rights index Purges	Government effectiveness CPI index of corruption			Strikes
Ireland	Rule of Law Government effectiveness Regulatory Quality	CPI index of corruption Control of corruption	Assassinations Number of terrorist incidents per year Number of victims per incident	Number of cabinet changes Number of legislative elections	Annual number of anti-government demostrations Government crises
Italy	Rule of Law Government effectiveness Voice and accountability	CPI index of corruption Regulatory Quality	Revolutions Assassinations Number of terrorist incidents per year	Number of cabinet changes Government crises Number of legislative elections	Riots Annual number of anti-government demostrations Purges
Japan	Regulatory Quality Government effectiveness Voice and accountability	Control of corruption CPI index of corruption Civil liberties	Assassinations Number of victims per incident	Number of legislative elections	Strikes Guerrila warfare Annual number of anti-government demostrations Riots
Netherlands	Government effectiveness Rule of Law Voice and accountability	Regulatory Quality Control of corruption CPI index of corruption	Number of terrorist incidents per year Number of victims per incident	Number of legislative elections Number of cabinet changes Government crises	Annual number of anti-government demostrations Riots
Portugal	Voice and accountability Rule of Law Regulatory Quality Government effectiveness	Control of corruption Coups D'etat Purges	Number of terrorist incidents per year Number of victims per incident Assassinations	Legislative Effectiveness Number of legislative elections	Political rights index Annual number of anti-government demostrations Riots Government crises
Spain	Legislative Effectiveness Civil liberties Voice and accountability Rule of Law Government effectiveness	Political rights index Control of corruption Regulatory Quality	Revolutions Number of victims per incident Assassinations	Number of cabinet changes Number of legislative elections	Purges Strikes
Sweden	Regulatory Quality Rule of Law Government crises Government effectiveness	Voice and accountability CPI index of corruption Control of corruption	Number of terrorist incidents per year Number of victims per incident Assassinations	Number of cabinet changes Number of legislative elections Number of constitutional changes	Strikes Annual number of anti-government demostrations
United Kingdom	Government effectiveness Regulatory Quality Voice and accountability	Control of corruption CPI index of corruption	Revolutions Guerrila warfare Number of terrorist incidents per year Number of victims per incident	Number of legislative elections Number of cabinet changes Government crises	Riots Assassinations Annual number of anti-government demostrations Strikes
United States	Voice and accountability Government effectiveness Rule of Law Regulatory Quality	CPI index of corruption Control of corruption	Guerrila warfare Number of terrorist incidents per year Number of victims per incident	Number of cabinet changes Number of legislative elections Government crises	Strikes Riots Annual number of anti-government demostrations Assassinations