

Does Country Risks Predict Stock Returns and Volatility? Evidence from a Nonparametric Approach

Tahir Suleman^{*}, Rangan Gupta^{**} and Mehmet Balcilar^{***}

Abstract

We use the k -th order nonparametric causality test at monthly frequency over the period of 1984:1 to 2015:12 to analyze whether aggregate country risk, and its components (economic, financial and political) can predict movements in stock returns and volatility of eighty-three developed and developing economies. The nonparametric approach controls for the existing misspecification of a linear framework of causality, and hence, the weak evidence of causality obtained under the standard Granger tests cannot be relied upon. When we apply the nonparametric test, we find that, while there is no evidence of predictability of squared stock returns barring one case, at times, there are nearly 50 percent of the countries where the aggregate risks and its components tend to predict stock returns and realized volatility.

Keywords: Country risks, returns, volatility, nonparametric higher-order causality.

JEL Codes: C22, G10.

1. Introduction

Stock returns and its volatility, with the latter often associated with uncertainty, are among the most important indicators for practitioners in finance on one hand. This is because it helps them in capital budgeting and portfolio management decisions, which in turn, directly reflect companies' financial health and future prospects (Poon and Granger, 2003; Rapach et al., 2008; Bekiros et al., 2016a). For academics, on the other hand, predictability of financial market movements challenges the idea of market efficiency, and thus, assists in building realistic asset pricing models (Rapach and Zhou, 2013). Hence, predicting returns and volatility is of tremendous importance to both practitioners and academics alike. However, predicting financial market movements is highly challenging, since it inherently comprises of stochastic as well as

^{*} Corresponding author. School of Economics and Finance, Victoria University of Wellington, New Zealand and School of Business, Wellington Institute of Technology, New Zealand. Email: tahir.suleman@vuw.ac.nz.

^{**} Department of Economics, University of Pretoria, Pretoria, 0002, South Africa; IPAG Business School, Paris, France. Email: rangan.gupta@up.ac.za.

^{***} Department of Economics, Eastern Mediterranean University, Famagusta, via Mersin 10, Northern Cyprus, Turkey and Department of Economics, University of Pretoria, Pretoria, 0002, South Africa; IPAG Business School, Paris, France. Email: mehmet@mbalcilar.net.

nonlinear components (Bekiros et al., 2016b). Not surprisingly, a wide array of linear, nonlinear and nonparametric predictive models with variety of predictors related to domestic and international financial, macroeconomic, institutional, behavioural, and financial and economic uncertainty have been used (see Rapach and Zhou (2013) and Aye et al., (2015) for detailed literature reviews in this regard). The empirical evidence of predictability on returns and volatility is, however, mixed.

In the literature, we find a longstanding relationship between country risk and the financial markets. Risk rating agencies like Standard and Poor's, Moody's, Euromoney, Institutional Investor, Economist Intelligence Unit, and the ICRG analyze qualitative and quantitative information regarding alternative measures of political, economic and financial risk into associated composite risk ratings. These agencies provide ratings that reflect the risk inherent in a country and a reliable method of risk assessment. In the literature we find researchers (e.g., Erb, Harvey & Viskanta (1995); Diamonte, Liew & Stevens (1996); Bilson, Brailsford, and Hooper (2002; Hassan, Maroney, Monir El-Sady & Telfah (2003); Suleman & Daglish (2015)) used these ratings as a proxy of country risk e.g., ICRG and IICCR (Institutional Investor Country Credit Rating).

The relationship between country risk and stock market returns was initially examined by Erb, Harvey, and Viskanta (1995) using a country's credit rating from institutional investor's semi-annual survey of bankers. Their results suggest that higher credit risk countries are associated with higher expected returns. They also validate that country credit ratings have considerable predictive power in discriminating between high expected returns and low expected returns countries. Erb, Harvey, and Viskanta (1996) investigated the four country risk components from International Country risk guide and one from Institutional Investors' rating. They examined the relationship between these ratings and future expected returns. They conclude that higher expected returns are associated with higher risk components.

Bilson et al. (2002) extended the political risk literature in two ways. First, they presented a model of return variation that incorporates political risk after taking into account both the global and local influence on returns. Second, they tested the impact of country risk at both individual and aggregated portfolio levels. They found that political risk is important in explaining return variation in the individual emerging markets, particularly in the Pacific Basin, but not in the developed markets. However, economic risk and financial risk are more important for developed markets as compare to political risk. Ramcharran (2003) extended this literature by using the data

from European Credit Ratings to estimate the effect of political, economic and credit risk on equity returns, dividend yield, price-to-earnings ratio and price-to-book ratios from 21 emerging equity markets. For analysis purposes a panel model was used to estimate over a shorter period from 1992 to 1999 and concluded that these ratings has a significant impact on emerging market returns.

Hassan, et al. (2003) used the data from the ICRG of political risk services. They examined the effect of local factors by utilizing the country's political, financial and economic risk on the stock market volatility in the context of ten emerging markets in the Middle East and Africa (MEAF). They used the GARCH-M model by allowing the country's risk shocks in local factors to affect conditional variance. They found that the shocks in the political, economic and financial risk rating transfer the volatility constraints in the MEAF emerging markets. Further, only three out of ten markets significantly determine stock market volatility using political risk. However, five out of ten countries have only three years of data, which might raise questions on the findings.

Most recently Suleman and Randal (2016) proposes a framework for predicting market returns and volatility using changes in the country's political and composite risk. They identify the appropriate lag to calculate changes over, and how the changes should be included in mean and volatility equations. By analysing 47 emerging and 21 developed markets, they find predictive power primarily for volatility of emerging markets. Further, Cermeño and Suleman (2014) studied the link between country risk –measured by economic, financial, political as well as composite risk indexes– and volatility of stock market returns. They used a panel-GARCH model with both asymmetric and GARCH-in-mean effects as an adequate tool to characterize the dynamics of volatility by using the data of five major Latin American markets, over the period February 1992 to December 2015. They found significant and persistent, conditional volatility as well as high, positive and highly significant cross-correlation among these stock markets. Their results confirm higher country risk increases stock market volatility.

Against this backdrop, the objective of this paper is to analyze for the first time in the literature on country risks and stock markets, the role played by aggregate country risk (CR), and its three components: economic risk (ER), financial risk (FR) and political risk (PR) in predicting movements in stock returns and volatility of 83 developed and developing countries. For our purpose, we use the k -th order nonparametric causality test of Nishiyama et al. (2011) at monthly frequency over the period of 1984:1 to 2015:12. This test is developed to incorporate higher-order interrelationships inherently based on a nonlinear dependence structure between the investigated variables in question, i.e., between returns and squared returns (with the latter

measuring volatility) and country risks. Besides squared returns to capture volatility, we also use measure of realized volatility, given that we have daily data on the stock prices of these countries. Our decision to use a nonparametric approach, besides accounting for predictability in returns and volatility, also controls for any possible misspecification of a linear framework of causality, which is likely to (and as we show does) exist in the relationship between stock returns vis-à-vis aggregate and various components of country risks. The remainder of the paper is organized as follows: Section 2 outlines the methodology, while Section 3 discusses the data. Section 4 presents the results of the predictability analysis for returns and volatility, with Section 5 concluding the paper.

2. Methodology

In this section, we briefly describe the methodology proposed by Nishiyama *et al.* (2011), with the test restricted to the case when the examined series follow a stationary nonlinear autoregressive process of order one under the null. Nishiyama *et al.* (2011) motivated the high-order causality by using the following nonlinear dependence between series

$$y_t = g(y_{t-1}) + \sigma(x_{t-1})\epsilon_t \quad (1)$$

where $\{y_t\}$ and $\{x_t\}$ are stationary time series (i.e., returns and the alternative measures of total risk, and its components: economic, political or financial, which are used in turn as predictors) and $g(\cdot)$ and $\sigma(\cdot)$ are unknown functions which satisfy certain conditions for stationarity. In general, x_{t-1} has information in predicting y_t^K for a given integer K . Consequently, the null hypothesis of non-causality in the K^{th} moment is given by

$$H_0: E(y_t^K | y_{t-1}, \dots, y_1, x_{t-1}, \dots, x_1) = E(y_t^K | y_{t-1}, \dots, y_1) \text{ w.p. } 1. \quad (2)$$

where *w.p. 1* is abbreviation for "with probability one". Formally, we say that x_t does not cause y_t up to the K^{th} moment if

$$H_0: E(y_t^K | y_{t-1}, \dots, y_1, x_{t-1}, \dots, y_1) = E(y_t^K | y_{t-1}, \dots, y_1) \text{ w.p. } 1. \quad \text{for all } k = 1, \dots, K \quad (3)$$

For $k = 1$, this definition reduces to non-causality in mean. Nishiyama *et al.* (2011) note that, it is easy to construct the test statistic $\hat{S}_t^{(k)}$ for each $k = 1, \dots, K$. We implement the test for $k = 1$ to test for causality in the 1st moment (non-causality in mean), and for $k = 2$ in the 2nd moment (non-causality in variance). The five percent critical value of the test statistic is 14.38.

Note that our various measures risks are monthly, hence our causality tests must also be based on monthly returns and squared returns. However, given that we have daily data for stock indices of the countries under consideration, we are able to compute a measure of realized volatility, which in turn, allows us to check the robustness of our findings related to the measure of market volatility (squared returns). The measure that we consider is the classical estimator of realized volatility, i.e. the sum of squared daily returns (Andersen and Bollerslev, 1998), expressed as:

$$RV_t = \sum_{i=1}^M y_{t,i}^2 \quad (4)$$

where $y_{t,i}$ is the daily $M \times 1$ return vector and $i = 1, \dots, M$ the number of daily returns.

3. Data

3.1. Stock market

We used data from emerging and developed markets for empirical analysis. The data from the 22 developed and 61 developing markets were used. The stock market data were downloaded from Datastream of Thomson Reuters for both emerging and developed markets for a period of January 1984 to December 2015. All returns are measured in local currency to analyse the impact of political risk on the returns and volatility. Table 1a presents the monthly returns statistics for the developed and emerging markets. We found higher average return of 6.2% and standard deviation of 16.12% for Brazil (a typical characteristic. Overall, the descriptive results shows that the returns and standard deviation are much higher for the emerging markets compared to developed markets. We can observe that average monthly returns of majority of emerging markets are positive except Cyprus, Jordan, Kazakhstan, Ukraine, Vietnam and Zimbabwe. Further, the difference between the minimum and the maximum monthly returns is fairly large, which is further evidence of the higher volatility in the emerging markets. The skewness of the series indicates that the majority of emerging and all of the developed market series are negatively skewed. The kurtosis for the majority of the markets is high showing the distribution of returns has a high peak. This is not surprising as the financial return's distribution has a tendency of be leptokurtic due to volatility clustering (Table 1b)..

Table 1a: Descriptive Statistics of Monthly Returns

Countries	Start date	Obs.	Mean	Std. Dev.	Skewness	Kurtosis	Minimum	Maximum	Jarque-Bera
Argentina	30/11/1989	320	0.020	0.151	2.515	23.602	-0.496	1.334	5996.55***
Australia	29/2/1984	389	0.005	0.050	-3.464	37.228	-0.541	0.138	19766.31***
Austria	29/2/1984	389	0.003	0.071	-0.731	6.855	-0.365	0.250	275.49***
Bahrain	28/2/2003	161	0.000	0.036	-0.346	4.541	-0.135	0.092	19.13***
Bangladesh	31/1/1996	246	0.006	0.098	0.827	11.518	-0.359	0.645	771.76***
Belgium	29/2/1984	389	0.005	0.056	-1.404	10.296	-0.353	0.228	990.76***
Botswana	31/1/1996	246	0.015	0.048	1.770	14.689	-0.130	0.364	1529.01***
Brazil	29/1/1988	342	0.062	0.161	1.066	6.278	-0.586	0.676	217.88***
Bulgaria	31/1/1996	246	0.001	0.086	0.541	8.918	-0.311	0.491	371.01***
Canada	29/2/1984	389	0.005	0.044	-1.121	7.809	-0.246	0.121	456.37***
Chile	27/2/1987	353	0.012	0.054	0.109	4.704	-0.241	0.172	43.41***
China	31/5/1991	302	0.010	0.116	0.899	6.738	-0.312	0.617	216.42***
Colombia	28/2/1992	293	0.009	0.062	0.075	3.916	-0.209	0.215	10.53***
Croatia	28/2/1997	233	0.002	0.082	-1.521	12.523	-0.540	0.297	970.23***
Cyprus	29/1/1993	282	-0.006	0.107	0.603	7.259	-0.356	0.541	230.23***
Czech	31/12/1993	271	0.003	0.072	0.890	13.174	-0.257	0.525	1204.64***
Denmark	29/2/1984	389	0.007	0.054	-0.475	3.964	-0.196	0.170	29.69***
Egypt	26/2/1993	281	0.012	0.089	0.104	4.102	-0.333	0.319	14.71***
Estonia	27/2/1998	221	0.002	0.092	-0.627	8.147	-0.423	0.406	258.42***
Finland	29/2/1984	389	0.006	0.083	-0.308	5.026	-0.371	0.278	72.68***
France	29/2/1984	389	0.005	0.056	-0.496	4.088	-0.249	0.200	35.13***
Germany	29/2/1984	389	0.005	0.062	-0.889	5.493	-0.287	0.180	151.94***
Ghana	31/1/1996	246	0.009	0.053	0.654	5.858	-0.158	0.251	101.22***
Greece	31/10/1988	333	0.002	0.099	0.349	5.205	-0.327	0.410	74.24***
Hong Kong	29/2/1984	389	0.007	0.078	-1.309	12.099	-0.580	0.283	1452.84***
Hungary	30/8/1991	299	0.008	0.089	0.973	12.238	-0.394	0.611	1110.42***
Iceland	29/1/1993	282	0.004	0.095	-8.763	113.411	-1.255	0.172	146849.80***
India	29/2/1984	389	0.012	0.082	0.267	5.161	-0.273	0.440	80.31***
Indonesia	29/2/1984	389	0.011	0.085	0.859	16.572	-0.379	0.694	3033.38***
Ireland	29/1/1988	342	0.002	0.063	-0.661	4.557	-0.258	0.195	59.43***
Israel	29/5/1987	350	0.010	0.066	-0.575	4.324	-0.233	0.188	44.85***
Italy	29/2/1984	389	0.003	0.065	0.083	3.568	-0.173	0.230	5.68*
Jamaica	31/7/1987	348	0.013	0.073	1.231	7.701	-0.260	0.369	408.26***
Japan	29/2/1984	389	0.001	0.058	-0.335	4.178	-0.236	0.188	29.78***
Jordan	31/7/2006	120	-0.002	0.051	-0.118	6.374	-0.225	0.163	57.18***
Kazakhstan	30/4/2007	111	-0.009	0.102	-1.200	8.034	-0.457	0.275	143.83***
Kenya	28/2/1990	317	0.005	0.065	0.931	10.033	-0.257	0.413	699.20***
Kuwait	31/1/2000	198	0.007	0.053	-0.693	6.523	-0.263	0.184	118.22***
Lithuania	31/1/1996	246	0.001	0.073	-0.726	10.767	-0.436	0.325	639.96***
Luxemburg	28/2/1992	293	0.006	0.052	-1.097	9.351	-0.322	0.184	551.11***
Malaysia	28/2/1986	365	0.007	0.072	-0.627	8.591	-0.418	0.285	499.29***
Malta	31/1/1996	246	0.006	0.048	0.971	5.981	-0.126	0.217	129.71***

Mexico	29/2/1988	341	0.017	0.076	-0.251	5.878	-0.350	0.362	121.29***
Morocco	29/4/1994	267	0.006	0.043	0.297	5.498	-0.167	0.182	73.36***
Namibia	29/2/2000	197	0.011	0.027	-0.059	4.887	-0.088	0.097	29.34***
Netherlands	26/2/1999	209	0.001	0.062	-1.035	5.810	-0.290	0.134	106.07***
New Zealand	29/2/1984	389	0.002	0.059	-0.668	8.546	-0.385	0.226	527.41***
Nigeria	29/2/2000	197	0.008	0.071	-0.586	8.173	-0.366	0.324	230.92***
Norway	29/2/1984	389	0.005	0.068	-1.192	6.584	-0.354	0.150	300.24***
Oman	29/11/1996	236	0.005	0.063	0.017	5.965	-0.250	0.278	86.45***
Pakistan	31/1/1989	330	0.013	0.087	-0.634	7.160	-0.449	0.297	260.13***
Panama	30/9/2008	94	0.004	0.046	-0.933	3.923	-0.144	0.089	16.96***
Peru	28/2/1991	305	0.021	0.103	0.652	7.441	-0.466	0.477	272.22***
Philippine	28/2/1986	365	0.011	0.087	0.094	6.870	-0.342	0.439	228.26***
Poland	31/5/1991	302	0.013	0.106	1.094	12.093	-0.435	0.722	1100.81***
Portugal	29/1/1988	342	0.002	0.059	-0.158	4.452	-0.223	0.218	31.47***
Qatar	30/1/2004	150	0.009	0.088	-0.002	5.757	-0.279	0.372	47.52***
Romania	31/1/1997	234	0.015	0.122	0.264	8.017	-0.504	0.615	248.12***
Russia	31/1/1995	258	0.019	0.131	0.013	5.947	-0.493	0.508	93.37***
Saudi Arabia	27/2/1998	221	0.005	0.074	-0.721	4.812	-0.289	0.180	49.38***
Singapore	29/2/1984	389	0.002	0.070	-1.602	14.329	-0.551	0.207	2246.81***
Slovakia	29/10/1993	273	0.003	0.084	3.127	31.411	-0.369	0.758	9626.42***
Slovenia	29/1/1999	210	0.003	0.051	-0.436	4.554	-0.176	0.128	27.76***
South Africa	29/2/1984	389	0.012	0.059	-1.372	10.353	-0.393	0.169	998.36***
South Korea	29/2/1984	389	0.007	0.078	0.168	5.413	-0.318	0.395	96.24***
Spain	29/2/1984	389	0.006	0.065	-0.549	5.099	-0.297	0.217	90.92***
Sri Lanka	28/2/1985	377	0.011	0.071	0.396	4.205	-0.184	0.310	32.65***
Sweden	29/2/1984	389	0.008	0.066	-0.414	5.063	-0.247	0.291	80.12***
Switzerland	29/2/1984	389	0.006	0.048	-0.943	6.427	-0.267	0.139	248.05***
Taiwan	29/2/1984	389	0.006	0.099	-0.266	7.232	-0.493	0.406	294.89***
Thailand	29/2/1984	389	0.006	0.086	-0.524	5.753	-0.359	0.284	140.62***
Trin & Tob	31/1/1996	246	0.009	0.037	0.835	6.676	-0.130	0.153	167.08***
Tunisia	30/1/1998	222	0.008	0.038	0.469	6.577	-0.143	0.192	126.50***
Turkey	29/2/1988	341	0.027	0.132	0.520	5.757	-0.505	0.578	123.34***
UAE	30/1/2004	150	0.007	0.082	0.177	5.103	-0.261	0.292	28.43***
Uganda	30/9/2004	142	0.011	0.073	-0.787	6.079	-0.330	0.183	70.75***
UK	29/2/1984	389	0.005	0.045	-1.103	8.083	-0.303	0.137	497.66***
Ukraine	30/6/1997	229	-0.001	0.152	-0.345	6.574	-0.634	0.584	126.38***
USA	29/2/1984	389	0.007	0.044	-0.990	6.324	-0.242	0.122	242.59***
Venezuela	28/2/1990	317	0.030	0.124	0.590	7.173	-0.495	0.577	248.43***
Vietnam	29/12/2006	115	0.000	0.108	0.442	5.421	-0.272	0.395	31.83***
Zambia	28/2/1997	233	0.017	0.066	0.815	6.427	-0.180	0.324	139.83***
Zimbabwe	31/12/2010	67	-0.001	0.083	-0.530	5.661	-0.315	0.228	22.89***

Note: Obs. stands for the number of observations; Std. Dev. stands for standard deviation; ***, and * indicates the rejection of the null of normality of the Jarque-Bera statistic at the significance level of 1% and 10% levels respectively.

Table 1b: Descriptive Statistics of Monthly Risk Indices from ICRG

Countries	Political risk		Economics risk		Financial risk		Composite risk	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Argentina	63.24	11.71	30.69	9.26	29.83	9.66	68.22	6.09
Australia	80.41	2.34	38.81	2.06	37.79	4.57	80.05	2.16
Austria	84.39	2.93	39.97	1.71	42.47	4.20	82.78	2.75
Bahrain	72.39	7.50	40.68	3.35	38.97	5.59	76.44	4.77
Bangladesh	56.11	10.76	32.77	4.16	31.89	9.81	62.83	1.39
Belgium	81.19	2.83	39.81	2.62	41.32	3.88	80.57	3.37
Botswana	77.09	4.90	40.78	3.54	40.73	6.55	80.03	2.93
Brazil	64.70	6.19	30.61	6.48	33.09	5.76	68.13	4.32
Bulgaria	66.76	5.19	31.09	5.37	33.40	4.30	69.78	2.82
Canada	83.81	1.66	40.08	2.19	42.43	3.38	83.91	1.76
Chile	72.31	10.59	36.40	6.07	37.66	5.11	77.47	2.95
China	72.06	5.68	38.30	2.93	40.97	7.57	75.51	2.34
Colombia	63.25	4.77	33.51	3.48	36.06	4.32	64.44	4.02
Croatia	71.23	2.63	35.09	2.35	34.79	2.44	71.23	2.63
Cyprus	74.95	7.10	38.20	3.36	39.32	4.92	76.49	6.35
Czech	76.94	2.82	36.82	2.76	38.89	2.29	76.14	1.79
Denmark	84.69	2.50	40.55	2.80	43.01	2.74	84.65	2.57
Egypt	61.77	9.46	31.72	5.15	35.10	8.12	65.49	4.39
Estonia	72.25	3.47	37.64	2.98	32.41	4.85	72.24	3.47
Finland	84.55	3.24	39.80	4.76	39.37	3.87	85.12	3.62
France	78.52	3.56	38.43	2.72	40.55	3.71	76.45	3.59
Germany	83.46	1.69	40.73	2.12	42.46	3.64	83.33	1.55
Ghana	60.68	7.51	29.14	3.09	31.79	5.33	64.77	4.15
Greece	68.32	6.59	33.54	4.03	32.31	3.63	70.44	5.38
Hong Kong	79.00	5.50	41.56	3.98	42.09	2.71	82.29	2.76
Hungary	71.65	4.62	32.55	4.10	34.10	3.65	73.16	2.89
Iceland	78.53	4.98	34.99	5.87	35.65	6.01	77.24	6.18
India	63.10	7.96	32.76	2.72	37.03	6.51	67.94	2.76
Indonesia	61.42	8.47	34.64	4.00	34.87	7.23	63.28	5.96
Ireland	81.28	4.97	39.33	4.20	39.64	4.03	81.44	6.12
Israel	66.71	8.54	36.77	4.12	36.96	5.03	71.36	2.89
Italy	77.10	3.38	37.63	2.35	40.06	3.95	76.12	3.49
Jamaica	65.92	6.63	29.16	3.09	33.58	5.61	68.19	2.69
Japan	85.01	3.54	40.41	2.84	46.49	2.84	82.66	2.36
Jordan	65.76	9.39	34.46	3.71	34.25	7.15	70.57	3.33
Kazakhstan	71.36	3.25	36.71	4.05	35.97	3.23	71.36	3.25
Kenya	60.45	4.72	30.43	2.90	33.57	5.15	62.71	2.26
Kuwait	74.99	11.93	43.33	5.35	41.39	8.21	82.17	3.25
Lithuania	73.04	3.02	36.60	3.15	36.09	3.23	73.04	3.02
Luxemburg	89.40	1.70	41.64	3.48	44.99	3.24	88.87	1.79
Malaysia	75.60	5.08	39.90	2.59	39.98	5.30	77.40	2.50

Malta	77.01	5.74	38.38	4.21	37.26	3.86	78.17	2.11
Mexico	69.22	6.13	33.15	4.68	36.38	6.16	72.71	3.14
Morocco	66.34	9.82	33.85	3.32	35.25	6.96	72.01	2.72
Namibia	73.72	8.04	36.68	3.90	36.70	6.55	76.48	2.90
Netherlands	85.52	3.20	41.57	2.09	42.07	4.34	83.66	2.85
New Zealand	81.12	2.44	37.69	2.73	37.83	6.62	79.74	1.84
Nigeria	55.77	7.51	31.51	5.15	34.05	10.66	60.69	4.46
Norway	89.23	2.49	44.89	2.74	46.34	1.34	90.51	1.71
Oman	75.00	8.07	39.94	4.86	40.34	5.49	80.41	2.88
Pakistan	54.80	6.13	32.08	2.03	31.67	6.66	57.95	2.81
Panama	66.15	8.97	36.44	1.36	32.53	5.38	73.02	1.16
Peru	60.27	13.24	32.31	7.15	32.80	10.14	70.43	2.08
Philippine	63.10	11.06	34.57	4.35	33.90	8.39	70.29	1.85
Poland	69.81	11.18	33.13	6.20	33.95	7.09	75.37	1.65
Portugal	76.17	4.73	36.44	3.34	37.36	4.15	75.50	4.15
Qatar	71.85	9.35	41.12	6.73	35.51	6.00	77.86	4.88
Romania	62.34	7.48	29.37	4.99	30.98	6.88	67.01	4.21
Russia	67.35	8.34	36.42	6.72	38.19	7.18	70.07	7.69
Saudi Arabia	72.32	8.71	40.13	4.77	40.65	7.87	77.82	3.80
Singapore	85.72	3.89	43.64	3.89	44.80	2.78	87.67	2.12
Slovakia	74.36	2.27	36.01	3.37	36.53	1.87	74.13	1.86
Slovenia	75.00	4.81	36.66	2.89	35.80	4.52	75.01	4.81
South Africa	67.75	5.83	34.62	2.14	35.53	4.58	69.93	2.37
South Korea	77.83	5.13	40.09	3.15	41.77	4.77	79.73	2.04
Spain	75.11	4.14	37.31	2.72	38.37	3.29	74.92	4.79
Sri Lanka	57.37	8.58	31.61	3.17	32.00	6.56	62.06	2.15
Sweden	84.54	2.06	41.07	3.51	40.91	3.73	85.26	1.84
Switzerland	90.11	2.49	43.41	1.80	47.27	2.51	88.99	1.84
Taiwan	82.93	1.94	42.45	1.99	45.82	2.40	82.72	1.35
Thailand	69.66	5.15	37.42	2.91	39.39	4.86	70.69	3.32
Trin &Toba	71.17	8.32	36.73	4.81	39.32	6.65	77.59	2.89
Tunisia	65.93	8.63	33.64	3.47	33.07	5.77	70.28	4.02
Turkey	58.60	6.29	29.87	3.88	30.20	5.45	61.24	4.38
UAE	74.04	11.09	42.76	3.50	37.61	7.63	82.01	2.70
Uganda	53.53	11.64	27.75	8.84	29.98	8.28	61.76	2.36
UK	80.79	3.46	36.98	2.71	42.08	5.06	79.56	3.76
Ukraine	64.94	5.47	31.76	5.16	35.18	4.77	64.90	5.56
USA	80.52	4.37	38.13	2.16	40.10	7.43	77.23	2.85
Venezuela	62.94	5.65	31.67	5.50	36.62	6.67	61.45	5.82
Vietnam	61.19	10.98	29.36	6.87	31.07	9.11	68.73	2.68
Zambia	56.72	9.65	27.27	5.36	27.33	8.36	62.83	6.16
Zimbabwe	49.05	7.95	23.01	6.75	25.77	3.60	44.59	6.44

Note: The Index of political risk and composite risk is between 0 and 100 and between 0 and 50 for economic and financial risk. A higher value represents a lower risk in a country. The table includes mean which is the average risk rating, and Std. Dev. Which is standard deviation.

3.2. Country risk

Political risk is a qualitative measure and for analysing its contribution to financial data, we need to quantify it. A number of institutions such as the Bank of America, Business Environment Risk Intelligence, Economist Intelligence Unit, Euromoney, Institutional Investor, Standard and Poor's Rating Group, Political Risk Service Group, Coplin-O'Leary Ratings system and Moody's Investment Service offer country-by-country analysis of political risk. However, few of these agencies or institutes provide quantitative analysis and most of them are on a semi-annual or annual basis. Since January 1984, the ICRG has been compiling economic, financial, political and composite risk ratings for over 90 countries on a monthly basis. As of December 2014, these four risk ratings were available for a total of 140 countries. This study employs political risk indices developed by the ICRG and compiled by the PRGS Group¹.

According to the ICRG, their risk ratings have been cited by experts at the IMF, World Bank, United Nations, and other international institutions as a standard against which other ratings can be measured. The ICRG has been acclaimed by publications such as Barron's and The Wall Street Journal for the strength of its analysis and rating system. For example, Howell and Chaddick (1994) found that ICRG indices are more reliable and are able to predict risk better than other major political risk information providers. Hoti and McAleer (2005) examined the qualitative comparison of the country risk rating system used by seven leading agencies and found that ICRG is the best one to forecast the political, financial and economic risk. More recently, Bekaert, Harvey, Lundblad, and Siegel (2014) found that risk ratings from ICRG predict the political events well and that political risk ratings provided by ICRG can be used as an alternative to political events.

We used the data from ICRG for the period of January 1984 to December 2015 for both emerging and developed markets. ICRG provide four types of indices including political risk index, economic risk index, financial risk index and composite risk index. The composite risk is the weighted average of all the three risks (political, economic and financial risk) and calculated as: $composite = 0.5 * (political\ risk + economic\ risk + financial\ risk)$. Political risk compounds the degree of political uncertainty in a given country and consists of twelve components, whereas financial and economic risk consists of five subcomponents each. The maximum number of 100 reflects the lowest risk, and a score of zero is the highest risk. We also use economic risk which is a measure of assessing a country's current economic strengths and weaknesses. The economic risk

¹ The PRS Group, Inc in East Syracuse, New York has published its International Country Risk Guide which has provided financial, political and economic risk ratings for 140 countries since 1984.

consists of five components which include per capita GDP, the real GDP growth rate, inflation, and fiscal and current account balances expressed as a percentage of GDP. The rating of economic risk is between 0 and 50 and a high rating indicates sound economic conditions whereas a low rating demonstrates weak economic conditions in the country. The overall aim of the financial risk is to provide a measure of a country's ability to finance its official, commercial, and trade debt obligations. This also consists of five subcomponents like economic risk which is external debt as a percentage of GDP, foreign debt as percentage of export of goods and services, current accounts as a percentage of goods and services, net liquidity in a month, and exchange rate stability against the US dollar. The financial risk fluctuates between 0 and 50, a high rating display a low level of external exposure and vice versa.

The descriptive statistics of monthly political risk, financial risk, economic risk and composite risk for the emerging and developed markets are presented in Table 1a. Majority of the emerging markets are with low average political risk, (means high political risky countries) such as Zimbabwe, Uganda and Pakistan. The highest political rating is for Switzerland for developed markets (average rating of 90). For the economic risk the lowest score is for Vietnam, Zambia, and Zimbabwe. Whereas, developed markets are with high rating confirming good conditions in these markets. Similar results found for the financial risk majority of the emerging markets are with low score compared to the developed. The composite risk is lowest for Zimbabwe and Pakistan. Overall we find higher standard deviation for emerging markets than developed markets. This shows that there is more uncertainty in emerging markets. Since our methodology requires stationary data, and the country risk-ratings were non-stationary, we work with the first-differences of their natural logs to ensure that the ratings are mean reverting.²

4. Empirical Results

Though our objective is to analyse the k -th order causality running from the various risk measures on stock returns and volatility of the 83 countries, for the sake of completeness and comparability, we also conducted the standard linear Granger causality test based on a VAR(1) model. The results have been reported in Table 2a. The decision to use a model of order one is to be not only consistent with the lag-length choice of the Nishiyama et al., (2011) test, but also, we are in line with the stock returns predictability literature (see Rapach et al., 2005). As can be seen, barring seven cases under the aggregate country risk, four under economic risks, ten under

² Complete details of the unit root tests are available upon request from the authors.

financial risks and six under political risks, there is no evidence of causality running from the various risks on stock returns of the 83 economies at the conventional 5 percent level of significance. The names of the countries which show predictability have been summarized in Table 2b.

Table 2a: Linear Granger Causality Test of Stock Returns

Country	CR	ER	FR	PR
Argentina	0.017	0.635	1.303	0.679
Austria	0.458	0.802	0.935	0.005
Australia	0.000	0.051	0.101	0.384
Bahrain	0.000	0.355	0.318	0.988
Bangladesh	2.323	0.05	0.973	5.667*
Belgium	0.831	3.56	0.716	0.672
Botswana	3.767	0.981	2.475	0.894
Brazil	0.168	0.009	0.151	3.004
Bulgaria	2.166	3.86	0.308	0.108
Canada	0.124	0.036	0.855	0.06
Chile	8.412*	0.425	2.86	10.879*
China	2.393	1.026	14.029*	0.974
Colombia	1.403	0.891	1.831	0.079
Croatia	5.927*	0.573	9.562*	0.101
Cyprus	0.602	0.314	1.249	0.341
Czech Republic	0.02	1.196	0.477	0.004
Denmark	0.022	0.081	0.369	0.265
Egypt	1.122	0.907	0.062	0.111
Estonia	0.371	0.263	0.373	0.004
Finland	1.493	2.702	0.571	0.05
France	0.064	0.081	0.518	0.199
Germany	0.942	0.003	0.245	1.405
Ghana	0.029	0.838	0.249	0.045
Greece	2.567	0.767	1.649	0.009
Hong Kong	0.095	0.402	0.017	0.234
Hungary	0.171	0.083	0.441	2.435
Iceland	4.41*	3.948*	4.975*	0.213
India	1.365	0.001	3.205	0.532
Indonesia	0.285	0.01	0.725	1.746
Ireland	0.002	0.04	0.981	0.029
Israel	2.15	0.483	0.403	1.712
Italy	3.83	0.717	1.885	1.427
Jamaica	0.002	0.01	0.08	0.01
Japan	0.15	0.03	1.975	0.000
Jordan	14.337*	14.691*	1.033	0.854
Kazakhstan	0.192	0	0	4.764*
Kenya	0.184	0.673	0.38	0.049
Kuwait	0.026	0.222	0.552	0.585
Lithuania	1.664	0.126	4.816*	1.496
Luxembourg	0.416	0.224	0.182	1.53
Malaysia	2.166	0.089	10.436*	0.087
Malta	1.436	1.073	0.173	1.267
Mexico	13.233*	0.73	12.365*	6.203*
Morocco	1.965	0.279	0.62	2.694
Namibia	0.013	0.007	0.15	0.188
Netherlands	3.251	2.479	3.229	0.229
New Zealand	3.142	0.021	2.872	1.504
Nigeria	0.112	0.019	0.644	0.176

Norway	0.147	0.713	0.104	0.434
Oman	0.302	0.007	4.462*	0.35
Pakistan	0.199	1.206	3.043	1.304
Panama	0.698	0.895	0.143	0.139
Peru	0.483	0.803	5.223*	0.747
Philippines	1.277	0.719	1.569	0.059
Poland	0.619	1.799	0.909	3.878
Portugal	1.909	0.741	2.46	0.157
Qatar	0.368	0.016	2.323	0
Romania	0.007	0.431	0.393	0.414
Russia	3.01	1.335	9.909*	0.224
Saudi Arabia	1.042	0.88	0.354	0.004
Singapore	0.457	0.308	0.343	0.075
Slovakia	0.88	0.61	0.358	2.319
Slovenia	0.399	0.15	0.241	0.273
South Africa	0.143	0.2	0.089	0.171
South Korea	0.454	0.065	0.662	0.027
Spain	0.67	2.015	0.048	0.485
Sri Lanka	0.158	0.006	0.963	0.73
Sweden	0.547	0.094	4.744*	0.567
Switzerland	0.029	0.044	0.002	0.122
Taiwan	1.764	3.668	0.922	0.059
Thailand	0.516	0.93	2.401	0.719
Trinidad & Tobago	5.251*	1.516	0.072	3.534
Tunisia	0.106	0.347	0.646	2.236
Turkey	2.428	0.36	3.809	0.119
UAE	0.632	0.265	0.395	0.311
Uganda	0.001	0.39	0.044	0.813
United Kingdom	2.137	5.358*	0.576	1.725
Ukraine	3.035	12.587*	3.636	5.503*
United States	4.625*	1.209	0.218	4.159*
Venezuela	2.156	0.006	1.371	3.65
Vietnam	0.121	0.001	0.005	0.954
Zambia	0.835	0.044	0.622	1.197
Zimbabwe	0.022	0.028	0.000	0.107

Note: Value in cell is the F -statistic and * represents rejection of the null of non-causality from various measures of risk on stock returns at the significance level of 5%; CR: Aggregate country risk; ER: Economic risk; FR: Financial risk; PR: Political risk.

Table 2b: Summary Linear Causality Test

	CR	ER	FR	PR
Returns	Chile Croatia Iceland Jordan Mexico Trinidad & Tobago United States	Iceland Jordan United Kingdom Ukraine	China Croatia Iceland Lithuania Malaysia Mexico Oman Peru Russia Sweden	Bangladesh Chile Kazakhstan Mexico Ukraine United States

Note: See Notes to Table 2a.

Next, to motivate the use of the nonparametric causality approach, we statistically investigate the possibility of nonlinearity in the stock returns, and in its relationship with the measure of the geopolitical risk. To this end, we apply the Brock et al., (1996, BDS) test on the residuals of the

stock returns equation in the various VAR(1) models of stock returns and the four risk measures (i.e., aggregate and three of its components). As reported in Table 3, the results provide ample evidence of the rejection of the null of *i.i.d.* residuals at various embedded dimensions (m), for all cases considered. These results provide strong evidence of nonlinearity in the relationship between stock returns and measures of risks. This means that, the results based on the linear Granger causality test cannot be deemed robust and reliable.

Table 3: Brock et al.,'s (1996, BDS) Test of Nonlinearity on residuals for the stock returns equation in a VAR (1) model of stock returns and the measure of risk

Country/ Ratings	Dimension				
	2	3	4	5	6
ARGENTINA					
CR	4.854***	5.552***	5.703***	5.917***	6.531***
ER	4.727***	5.493***	5.626***	5.849***	6.493***
FR	4.6***	5.524***	5.672***	5.901***	6.424***
PR	4.906***	5.52***	5.623***	5.81***	6.39***
AUSTRIA					
CR	2.556**	3.424***	3.406***	3.811***	3.979***
ER	2.582**	3.519***	3.532***	4.007***	4.199***
FR	2.565**	3.537***	3.535***	3.933***	4.126***
PR	2.562**	3.462***	3.511***	3.934***	4.089***
AUSTRALIA					
CR	1.390	4.025***	-8.002***	-4.944***	-3.343***
ER	4.394***	-10.139***	-4.896***	-2.780**	-1.725*
FR	-4.537***	43.769***	-5.086***	-2.879**	-1.785*
PR	-4.711***	7.566***	-10.757***	-6.819***	-4.767***
BAHRAIN					
CR	1.929*	2.412**	3.706***	2.704**	-1.915*
ER	2.036**	3.550***	5.215***	2.921**	-1.963*
FR	1.830*	2.311**	-3.357***	-2.014**	-1.285
PR	-0.746	-5.338***	-4.443***	-2.709**	-1.798*
BANGLADESH					
CR	5.149***	5.872***	6.113***	5.996***	5.914***
ER	5.026***	5.849***	6.113***	5.914***	5.771***
FR	4.758***	5.76***	6.098***	6.01***	5.886***
PR	4.902***	5.656***	5.956***	5.854***	5.843***
BELGIUM					
CR	1.767*	2.27**	2.057**	2.722**	2.639**
ER	2.163**	2.661**	2.372**	3.004**	2.887**
FR	1.998**	2.43**	2.176**	2.817**	2.735**
PR	2.432**	2.888**	2.717**	3.462***	3.476***
BOTSWANA					
CR	2.806**	3.65***	3.618***	3.472***	3.725***
ER	2.996**	3.805***	3.817***	3.73***	4.049***
FR	2.217**	3.231***	3.352***	3.257***	3.525***
PR	3.278***	4.087***	4.075***	3.954***	4.248***
BRAZIL					
CR	6.5***	10.379***	12.832***	14.757***	16.612***
ER	6.381***	10.25***	12.686***	14.578***	16.393***
FR	6.461***	10.324***	12.781***	14.708***	16.557***
PR	6.331***	10.142***	12.509***	14.398***	16.162***

BULGARIA						
	CR	2.398**	3.337***	4.727***	5.906***	6.512***
	ER	2.753**	3.576***	4.92***	5.999***	6.524***
	FR	2.522**	3.293***	4.66***	5.758***	6.267***
	PR	2.549**	3.229***	4.642***	5.823***	6.418***
CANADA						
	CR	-3.945***	-11.049***	-5.405***	-3.051***	-1.865*
	ER	-8.162***	-10.931***	-5.233***	-2.918**	-1.794*
	FR	-5.031***	10.662***	-7.889***	-4.830***	-3.221***
	PR	2.841**	-2.550**	-10.866***	-6.971***	-4.894***
CHILE						
	CR	3.466***	5.056***	6.082***	7.023***	7.587***
	ER	3.775***	5.439***	6.475***	7.418***	8.065***
	FR	3.634***	5.408***	6.346***	7.324***	8.008***
	PR	4.099***	5.663***	6.624***	7.446***	8.017***
CHINA						
	CR	2.343**	4.06***	5.384***	6.318***	6.861***
	ER	2.657**	4.223***	5.344***	6.219***	6.89***
	FR	2.225**	4.201***	5.523***	6.514***	7.2***
	PR	2.312**	3.953***	5.202***	6.138***	6.765***
COLOMBIA						
	CR	-1.962*	-11.060***	-5.632***	-3.296***	-2.086**
	ER	2.490**	-10.723***	-5.478***	-3.170***	-2.021**
	FR	2.175**	5.394***	5.814***	-4.284***	-2.876**
	PR	1.767**	2.133**	2.864**	3.434***	3.735***
CROATIA						
	CR	7.113***	7.672***	8.943***	10.156***	11.146***
	ER	6.702***	6.977***	7.959***	8.96***	9.899***
	FR	7.32***	7.553***	8.476***	9.346***	10.295***
	PR	6.8***	7.079***	8.088***	9.106***	10.102***
CYPRUS						
	CR	3.551***	5.274***	6.776***	7.681***	8.409***
	ER	3.355***	5.162***	6.682***	7.588***	8.258***
	FR	3.642***	5.286***	6.761***	7.671***	8.431***
	PR	3.292***	4.919***	6.489***	7.418***	8.1***
CZECH REPUBLIC						
	CR	4.331***	5.093***	5.067***	4.977***	5.021***
	ER	4.42***	5.161***	5.006***	4.81***	4.731***
	FR	4.206***	5.001***	4.996***	4.942***	5.019***
	PR	4.322***	5.063***	5.044***	4.967***	5.016***
DENMARK						
	CR	2.272**	2.342**	2.618**	2.819**	2.788**
	ER	2.283**	2.333**	2.616**	2.837**	2.814**
	FR	2.251**	2.271**	2.513**	2.682**	2.626**
	PR	2.285**	2.332**	2.633**	2.849**	2.85**
EGYPT						
	CR	-1.386	7.801***	-5.172***	-3.090***	-2.070**
	ER	-4.381***	-3.578***	-5.138***	-3.132***	-2.143**
	FR	2.262**	1.390	-4.633***	-2.737**	-1.798*
	PR	-5.594***	-3.729***	-5.099***	-3.029***	-2.024**
ESTONIA						
	CR	3.587***	4.696***	5.117***	5.169***	5.216***
	ER	3.623***	4.725***	5.168***	5.267***	5.31***
	FR	3.542***	4.708***	5.154***	5.231***	5.345***
	PR	3.429***	4.628***	5.148***	5.302***	5.357***
FINLAND						

	CR	2.458**	3.55***	4.662***	5.749***	6.543***
	ER	2.292**	3.435***	4.62***	5.679***	6.467***
	FR	2.519**	3.663***	4.711***	5.809***	6.575***
	PR	2.519**	3.663***	4.711***	5.809***	6.575***
FRANCE						
	CR	4.008***	5.811***	6.351***	6.864***	7.203***
	ER	3.975***	5.747***	6.287***	6.802***	7.159***
	FR	3.887***	5.71***	6.219***	6.688***	7.039***
	PR	3.761***	5.581***	6.116***	6.623***	6.935***
GERMANY						
	CR	2.684**	4.354***	5.026***	5.53**	5.907***
	ER	2.301**	4.172***	4.876***	5.347***	5.696***
	FR	2.437**	4.193***	4.879***	5.306***	5.63**
	PR	2.196**	3.972***	4.732***	5.273***	5.683***
GHANA						
	CR	4.057***	5.029***	5.55***	5.737***	5.66**
	ER	3.788***	4.769***	5.273***	5.484***	5.418***
	FR	4.154***	5.117***	5.643***	5.82***	5.798***
	PR	4.11***	5.037***	5.56***	5.76***	5.729***
Greece						
	CR	-0.839	6.959***	-4.615***	-2.789**	-1.852*
	ER	3.811***	14.390***	-4.545***	-2.698**	-1.784*
	FR	1.157	-9.322***	-4.717***	-2.830**	-1.863*
	PR	5.340***	3.875***	-5.074***	-3.068***	-2.063**
HONG KONG						
	CR	2.605**	3.159***	4.108***	4.579***	4.877***
	ER	2.671**	3.254***	4.218***	4.694***	4.999***
	FR	2.608**	3.131***	4.064***	4.542***	4.83***
	PR	2.611**	3.161***	4.064***	4.517***	4.815***
HUNGARY						
	CR	2.221**	2.69**	3.103	3.429***	3.95***
	ER	2.169**	2.557**	2.936**	3.239***	3.729***
	FR	2.209**	2.629**	3.005***	3.283***	3.781***
	PR	2.215**	2.797**	3.367***	3.776***	4.346***
ICELAND						
	CR	2.817**	4.533***	9.416***	42.274***	-3.293***
	ER	5.887***	6.789***	24.226***	126.413***	408.239***
	FR	2.646**	2.359**	13.034***	-3.761***	-2.506**
	PR	0.080	-4.465***	-5.913***	-3.567***	-2.323**
INDIA						
	CR	-3.448***	-2.704**	-9.874***	-6.128***	-4.180***
	ER	7.072***	9.455***	-8.597***	-5.211***	-3.485***
	FR	-5.006***	-10.800***	-5.466***	-3.209***	-2.049**
	PR	3.446***	7.898***	-7.196***	-4.281***	-2.807**
INDONESIA						
	CR	4.48***	4.874***	5.423***	6.035***	6.841***
	ER	4.36***	4.819***	5.368***	5.995***	6.822***
	FR	4.204***	4.749***	5.348***	6.028***	6.824***
	PR	4.614***	5.017***	5.565***	6.109***	6.882***
IRELAND						
	CR	2.698**	3.499***	4.325***	5.05***	5.657***
	ER	2.759**	3.525***	4.32***	5.016***	5.602***
	FR	2.777**	3.613***	4.459***	5.318***	5.964***
	PR	2.782**	3.579***	4.396***	5.129***	5.736***
ISRAEL						
	CR	2.911**	3.078***	3.64***	4.122***	4.658***

	ER	2.864**	3.11***	3.69***	4.177***	4.728***
	FR	2.762**	2.889***	3.361***	3.825***	4.371***
	PR	2.928**	3.043***	3.614***	4.137***	4.722***
ITALY						
	CR	2.225**	3.121***	4.256***	5.05***	5.464***
	ER	2.104**	2.792**	3.944***	4.766***	5.237***
	FR	2.055**	2.838**	4.049***	4.903***	5.376***
	PR	2.177**	2.769**	3.923***	4.731***	5.106***
JAMAICA						
	CR	4.968***	6.462***	7.293***	8.171***	8.832***
	ER	4.931***	6.42***	7.245***	8.118***	8.775***
	FR	4.943***	6.412***	7.237***	8.104***	8.757***
	PR	4.966***	6.474***	7.306***	8.184***	8.85***
JAPAN						
	CR	1.698*	2.28**	2.548**	2.535**	2.499**
	ER	1.658*	2.161**	2.447**	2.471**	2.449**
	FR	1.780*	8.220***	23.043***	-5.898***	-4.151***
	PR	1.646*	2.175**	2.45**	2.466**	2.44**
JORDAN						
	CR	1.957*	3.814***	4.532***	5.104***	5.47***
	ER	1.685*	3.152***	3.852***	4.32***	4.585***
	FR	2.74**	4.796***	5.556***	6.251***	6.663***
	PR	2.601**	4.59***	5.244***	5.923***	6.271***
KAZAKHSTAN						
	CR	3.466***	3.537***	3.35***	3.594***	3.573***
	ER	3.206***	3.318***	3.165***	3.395***	3.374***
	FR	3.195***	3.313***	3.161***	3.391***	3.378***
	PR	3.235***	3.424***	3.265***	3.504***	3.624***
KENYA						
	CR	5.417***	5.832***	6.012***	6.385***	6.585***
	ER	5.387***	5.812***	5.983***	6.359***	6.61***
	FR	5.544***	5.98***	6.109***	6.421***	6.591***
	PR	5.509***	5.925***	6.105***	6.484***	6.661***
KUWAIT						
	CR	2.787**	9.475***	-6.496***	-3.889***	-2.644**
	ER	1.736*	2.873**	3.074***	2.94**	2.528**
	FR	-1.820*	-5.078***	-7.487***	-4.552***	-3.186***
	PR	-1.930*	-1.919*	-6.774***	-4.059***	-2.772**
LITHUANIA						
	CR	3.819***	4.109***	4.768***	5.279***	5.656***
	ER	3.915***	4.273***	4.869***	5.409***	5.798***
	FR	3.904***	4.379***	5.006***	5.478***	5.785***
	PR	3.513***	3.711***	4.296***	4.878***	5.208***
LUXEMBOURG						
	CR	2.818**	4.213***	4.688***	5.313***	5.279***
	ER	2.568**	4.047***	4.476***	5.06***	5.03***
	FR	2.481**	3.997***	4.402***	5.011***	4.979***
	PR	2.885**	4.092***	4.55***	5.121***	5.045***
MALAYSIA						
	CR	5.36***	7.763***	9.712***	11.161***	12.468***
	ER	5.537***	7.977***	9.81***	11.227***	12.554***
	FR	5.24***	7.244***	9.103***	10.508***	11.786***
	PR	5.479***	7.951***	9.817***	11.257***	12.591***
MALTA						
	CR	4.61***	6.022***	7.028***	7.786***	8.506***
	ER	4.517***	5.912***	6.948***	7.719***	8.436***

	FR	4.524***	5.995***	7.099***	7.902***	8.67***
	PR	4.737***	6.262***	7.407***	8.219***	8.904***
MEXICO						
	CR	5.017***	5.786***	6.885***	7.996***	9.242***
	ER	5.877***	6.686***	7.643***	8.679***	9.886***
	FR	6.001***	6.792***	7.516***	8.516***	9.678***
	PR	5.966***	6.971***	7.956***	8.941***	10.05***
MOROCCO						
	CR	2.017**	2.875**	3.192***	3.281***	3.4***
	ER	2.029**	2.866**	3.218***	3.318***	3.512***
	FR	2.027**	2.828**	3.208***	3.288***	3.445***
	PR	1.866*	2.656**	2.97**	3.084***	3.259***
NAMIBIA						
	CR	3.698***	4.228***	4.084***	3.731***	3.433***
	ER	3.783***	4.292***	4.128***	3.772***	3.459***
	FR	3.783***	4.292***	4.128***	3.772***	3.459***
	PR	3.644***	4.145***	4.046***	3.716***	3.418***
NETHERLANDS						
	CR	2.753**	3.837***	3.903***	4.01***	3.844***
	ER	2.953**	3.865***	3.971***	3.936***	3.642***
	FR	2.449**	3.481***	3.736***	3.928***	3.757***
	PR	2.906**	3.888***	4.12***	4.051***	3.691***
NEW ZEALAND						
	CR	4.425***	5.562***	6.471***	7.455***	8.575***
	ER	4.446***	5.277***	6.071***	6.946***	7.909***
	FR	4.645***	5.697***	6.533***	7.44***	8.472***
	PR	4.171***	5.188***	6.005***	6.919***	7.956***
NIGERIA						
	CR	2.552**	2.555**	2.58**	2.625**	2.749**
	ER	2.585**	2.619**	2.639**	2.683**	2.797**
	FR	2.69**	2.627**	2.712**	2.755**	2.873**
	PR	2.484**	2.566**	2.597**	2.687**	2.867**
NORWAY						
	CR	1.993**	3.094***	3.647***	4.116***	4.229***
	ER	2.243**	3.428***	4.05***	4.574***	4.799***
	FR	2.098**	3.217***	3.781***	4.268***	4.39***
	PR	1.978**	3.051***	3.627***	4.131***	4.276***
OMAN						
	CR	3.937***	4.903***	5.622***	6.46***	6.765***
	ER	3.872***	4.909***	5.565***	6.389***	6.69***
	FR	4.359***	5.195***	6.068***	6.836***	7.074***
	PR	3.86***	4.963***	5.616***	6.436***	6.74***
PAKISTAN						
	CR	3.134***	2.654	2.624	3.031***	3.256***
	ER	2.997**	2.497	2.553	3.038***	3.309***
	FR	3.014***	2.792	2.769	3.037***	3.107***
	PR	3.194***	2.724	2.678	3.061***	3.274***
PANAMA						
	CR	2.524**	2.749**	2.807**	2.757**	2.043**
	ER	2.658**	2.988**	3.029**	2.845**	2.097**
	FR	2.625**	2.947**	3.052**	2.902**	2.112**
	PR	2.46**	2.778**	2.901**	2.826**	2.172**
PERU						
	CR	3.489***	3.963***	4.998***	5.898***	6.524***
	ER	3.325***	3.866***	4.893***	5.824***	6.467***
	FR	3.016***	3.477***	4.305***	4.99***	5.487***

	PR	3.521***	4.013***	5.083***	5.998***	6.64***
PHILIPPINES						
	CR	2.076**	2.939**	3.64***	4.814***	5.614***
	ER	2.148**	2.908**	3.575***	4.723***	5.527***
	FR	2.497**	3.146***	3.864***	5.012***	5.793***
	PR	2.396**	3.264***	3.983***	5.131***	5.932***
POLAND						
	CR	5.472***	6.132	7.225***	8.066***	9.009***
	ER	5.248***	5.863	7.045***	7.835***	8.662***
	FR	5.372***	6.164	7.213***	8.041***	8.84***
	PR	5.094***	5.884	7.007***	7.977***	9.029***
PORTUGAL						
	CR	3.444***	3.545***	3.609***	3.942***	3.822***
	ER	3.649***	3.811***	3.889***	4.232***	4.101***
	FR	3.507***	3.594***	3.664***	3.928***	3.821***
	PR	3.753***	3.837***	3.89***	4.209***	4.069***
QATAR						
	CR	5.206***	5.531***	6.467***	7.032***	7.68***
	ER	5.201***	5.489***	6.399***	6.939***	7.547***
	FR	4.961***	5.444***	6.521***	7.172***	7.853***
	PR	5.224***	5.51***	6.435***	6.983***	7.598***
ROMANIA						
	CR	3.603***	4.624***	5.521***	5.816***	6.372***
	ER	3.644***	4.709***	5.62***	5.924***	6.509***
	FR	3.533***	4.636***	5.514***	5.812***	6.368***
	PR	3.769***	4.719***	5.485***	5.7***	6.201***
RUSSIA						
	CR	6.806***	8.408***	9.719***	10.952***	12.307***
	ER	7.074***	8.705***	10.068***	11.295***	12.467***
	FR	6.333***	8.078***	9.144***	10.237***	11.411***
	PR	7.146***	8.767***	10.107***	11.33***	12.561***
SAUDI ARABIA						
	CR	6.237***	6.773***	6.856***	7.365***	7.753***
	ER	6.076***	6.703***	6.799***	7.332***	7.764***
	FR	6.048***	6.748***	6.961***	7.547***	8.003***
	PR	6.065***	6.853***	7.033***	7.586***	7.997***
SINGAPORE						
	CR	3.581***	4.644***	5.414***	6.327***	7.029***
	ER	3.489***	4.578***	5.342***	6.248***	6.911***
	FR	3.485***	4.54***	5.343***	6.259***	6.961***
	PR	3.397***	4.47***	5.252***	6.114***	6.744***
SLOVAKIA						
	CR	4.848***	4.689***	4.723***	5.142***	5.519***
	ER	4.695***	4.55***	4.638***	5.078***	5.508***
	FR	4.43***	4.262***	4.366***	4.813***	5.238***
	PR	4.64***	4.331***	4.403***	4.814***	5.207***
SLOVENIA						
	CR	1.591	2.322**	2.268**	2.353**	1.984*
	ER	-2.933**	-1.948*	-4.807***	-2.864**	-1.988*
	FR	-1.720*	-5.289***	-4.417***	-2.541**	-1.747*
	PR	1.522	2.231**	2.063**	2.107**	1.759*
SOUTH AFRICA						
	CR	2.057**	3.067***	3.822***	4.551***	5.304***
	ER	2.226***	3.283***	4.104***	4.856***	5.629***
	FR	2.175**	3.206***	3.974***	4.694***	5.464***
	PR	2.194**	3.255***	4.02***	4.769***	5.543***

SOUTH KOREA						
	CR	2.395**	3.664***	4.52***	5.423***	6.221***
	ER	2.377**	3.621***	4.469***	5.397***	6.185***
	FR	2.362**	3.563***	4.428***	5.362***	6.191***
	PR	2.306**	3.54***	4.377***	5.3***	6.077***
SPAIN						
	CR	2.771**	3.069***	3.27***	3.747***	4.183***
	ER	2.934**	3.169***	3.351***	3.782***	4.194***
	FR	2.799**	3.116***	3.326***	3.813***	4.266***
	PR	2.745**	3.132***	3.381***	3.88**	4.329***
SRI LANKA						
	CR	3.036***	3.879***	4.518***	5.076***	5.375***
	ER	3.035***	3.808***	4.389***	4.92**	5.187***
	FR	2.938**	3.909***	4.562***	5.134***	5.488***
	PR	3.146***	3.939***	4.553***	5.113***	5.402**
SWEDEN						
	CR	3.088***	4.384***	5.822***	6.495***	6.983***
	ER	3.175***	4.468***	5.942***	6.629***	7.123***
	FR	2.909**	4.014***	5.331***	5.853***	6.282***
	PR	3.208***	4.454***	5.897***	6.575***	7.096**
SWITZERLAND						
	CR	4.242***	4.586***	4.947***	5.26***	5.531***
	ER	4.197***	4.545***	4.931***	5.246***	5.51***
	FR	4.2***	4.539***	4.898***	5.22**	5.485***
	PR	4.225***	4.549***	4.926***	5.223***	5.507***
TAIWAN						
	CR	7.169***	8.657***	10.03***	11.083***	12.029***
	ER	7.137***	8.504***	9.872***	10.83***	11.72***
	FR	7.224***	8.704***	10.072***	11.045***	12.049***
	PR	7.409***	8.91***	10.258***	11.268***	12.217***
THAILAND						
	CR	3.342***	5.989***	7.354***	8.162***	8.794***
	ER	3.469***	6.06***	7.421***	8.232***	8.893***
	FR	3.552***	6.201***	7.581***	8.419***	9.125***
	PR	3.36***	6.027***	7.465***	8.377***	9.129***
TRINIDAD & TOBAGO						
	CR	4.355***	4.626***	4.55***	4.68***	5.105***
	ER	4.568***	5.013***	5.066***	5.179***	5.571***
	FR	4.781***	5.266***	5.318***	5.493***	5.924***
	PR	4.593***	4.998***	4.945***	5.184***	5.703***
TUNISIA						
	CR	0.734	-3.660***	-4.166***	-2.659**	-1.792*
	ER	1.598	-3.822***	14.806***	-2.641**	-1.800*
	FR	2.157**	2.878**	-4.489***	-2.879**	-1.949*
	PR	0.977	2.457**	4.554***	-3.643***	-2.580**
TURKEY						
	CR	-2.072**	-4.575***	-5.990***	-3.576***	-2.250**
	ER	3.560***	-4.150***	-5.622***	-3.339***	-2.135**
	FR	7.567***	8.603***	-6.997***	-4.280***	-2.781**
	PR	-3.806***	-10.175***	-5.048***	-2.846**	-1.749*
UAE						
	CR	4.26***	4.051***	3.681***	3.469***	3.34***
	ER	4.497***	4.178***	3.809***	3.566***	3.438***
	FR	4.156***	3.819***	3.475***	3.216***	3.106***
	PR	4.505***	4.214***	3.812***	3.618***	3.51***
UGANDA						

	CR	3.144***	4.532***	5.089***	5.471***	5.787***
	ER	3.305***	4.778***	5.382***	5.766***	6.043***
	FR	3.069***	4.434***	4.956***	5.336***	5.633***
	PR	3.137***	4.497***	5.083***	5.543***	5.768***
UKRAINE						
	CR	3.511***	1.832*	1.116	0.535	0.188
	ER	2.125**	0.829	-0.026	-0.179	0.047
	FR	2.397**	1.055	0.085	-0.376	-0.631
	PR	4.713***	3.007***	2.168**	1.253	0.518
UNITED KINGDOM						
	CR	3.771***	4.757***	5.501***	6.018***	6.436***
	ER	3.792***	4.652***	5.429***	5.884***	6.312***
	FR	3.54***	4.363***	5.051***	5.501***	5.893***
	PR	3.6**	4.616***	5.352***	5.856***	6.27***
UNITED STATES						
	CR	3.152***	4.507***	5.214***	5.998***	6.496***
	ER	3.327***	4.696***	5.339***	5.993***	6.446***
	FR	3.211***	4.63***	5.276***	5.843***	6.218***
	PR	3.263***	4.695***	5.352***	6.066***	6.465***
VENEZUELA						
	CR	4.11***	4.729***	5.612***	6.576***	7.551***
	ER	3.837***	4.526***	5.412***	6.213***	7.193***
	FR	3.997***	4.642***	5.607***	6.533***	7.634***
	PR	3.798***	4.232***	4.915***	5.64***	6.441***
VIETNAM						
	CR	4.363***	5.921***	6.804***	7.663***	8.678***
	ER	4.413***	6.085***	6.961***	7.795***	8.843***
	FR	4.42***	6.099***	7.001***	7.846***	8.898***
	PR	4.094***	5.399***	6.163***	6.872***	7.735***
ZAMBIA						
	CR	4.149***	5.196***	6.22***	6.674***	6.999***
	ER	4.481***	5.406***	6.449***	6.894***	7.173***
	FR	4.366***	5.339***	6.35***	6.787***	7.09***
	PR	4.047***	5.027***	5.959***	6.402***	6.609***
ZIMBABWE						
	CR	-3.741***	-2.199**	-0.934	-0.468	-0.312
	ER	-1.921*	-1.782*	-0.673	-0.319	-0.197
	FR	-3.604***	-1.706*	-0.699	-0.321	-0.202
	PR	-2.596**	-1.895*	-0.781	-0.351	-0.228

Note: See Notes to Table 2a. m stands for the number of (embedded) dimension which embed the time series into m -dimensional vectors, by taking each m successive points in the series. Value in cell represents BDS $\hat{\alpha}$ -statistic; *, **, and *** indicates rejection of *i.i.d.* residuals at 10, 5 and 1 percent level of significance respectively.

Given the strong evidence of nonlinearity in in the relationship between stock returns and country-specific measures of aggregate, economic, financial and political risks, we now turn our attention to the nonparametric k -th order test of causality. We can make the following observations from Table 4a: (1) There is evidence of aggregate, economic, financial and political risks in predicting stock returns for 43, 38, 38 and 45 cases at the 5 percent level of significance, which in turn, are many more than picked up under the misspecified linear model; (2) As far as prediction of volatility, as measured by squared returns, is concerned, Chile is the only case for which economic risks show evidence of causality; (3) However, when we look at realized

volatility based on sum of squared returns of daily data over the number of trading days in a month, there is much stronger evidence of predictability. We find that aggregate and political risks predict realized volatility in 41 countries, economic risks in 34 countries and financial risks in 33 countries. The names of the countries which show predictability for returns, squared returns and realized volatility have been summarized in Table 4b.

Table 4a: Nishiyama et al.,’s (2011) k -th Order Test of Causality

COUNTRY	CR	ER	FR	PR
ARGENTINA				
Returns	27.087*	19.32*	22.919*	27.616*
Squared returns	2.784	4.525	9.550	4.004
Realized volatility	7.706	7.555	7.006	7.496
AUSTRA				
Returns	53.82*	42.522*	57.483*	53.775*
Squared returns	3.546	4.410	6.310	7.753
Realized volatility	59.11*	47.881*	50.868*	56.251*
AUSTRALIA				
Returns	53.864*	39.004*	49.801*	55.552*
Squared returns	11.889	10.082	4.083	5.449
Realized volatility	23.136*	15.387*	20.757*	26.723*
BAHRAIN				
Returns	15.695*	14.918*	14.326	15.135*
Squared returns	6.681	4.385	4.892	6.473
Realized volatility	40.805*	39.421*	32.63*	40.16*
BANGLADESH				
Returns	5.448	4.895	7.662	7.347
Squared returns	4.190	3.851	3.042	3.575
Realized volatility	6.483	3.027	4.759	7.689
BELGIUM				
Returns	54.744*	52.037*	50.335*	52.671*
Squared returns	4.517	4.888	5.929	3.506
Realized volatility	35.297*	35.002*	40.67*	43.93*
BOTSWANA				
Returns	21.556*	20.683*	13.965	20.953*
Squared returns	4.448	5.446	5.864	5.264
Realized volatility	17.305*	17.365*	27.48*	19.726*
BRAZIL				
Returns	3.892	2.916	2.239	3.323
Squared returns	6.069	4.227	8.778	12.455
Realized volatility	52.916*	48.869*	50.608*	45.71*
BULGARIA				
Returns	0.393	0.53	0.354	0.58
Squared returns	4.277	6.545	4.514	2.385
Realized volatility	5.412	2.783	2.868	3.676
CANADA				
Returns	24.613*	22.503*	24.26*	24.947*
Squared returns	2.443	4.223	1.705	1.595
Realized volatility	39.228*	28.804*	39.112*	34.23*
CHILE				
Returns	1.594	78.828*	1.307	1.52

	Squared returns	1.838	22.045*	7.836	7.416
	Realized volatility	13.611	12.214	12.921	13.755
CHINA					
	Returns	18.797*	15.313*	20.741*	17.195*
	Squared returns	3.352	2.711	4.733	4.460
	Realized volatility	19.043*	19.043*	24.671*	20.261*
COLOMBIA					
	Returns	18.842*	13.501	12.585	20.503*
	Squared returns	5.560	7.125	5.353	4.645
	Realized volatility	16.37*	10.584	16.137*	17.794*
CROATIA					
	Returns	11.43	20.08*	13.675	29.168*
	Squared returns	7.641	2.854	8.337	7.583
	Realized volatility	12.238	10.055	11.62	11.382
CYPRUS					
	Returns	11.53	11.984	11.156	11.72
	Squared returns	4.511	4.023	6.313	5.470
	Realized volatility	18.332*	17.294*	17.152*	17.473*
CZECH REPUBLIC					
	Returns	5.864	5.167	3.113	5.308
	Squared returns	4.747	3.311	4.519	4.596
	Realized volatility	13.446	9.574	15.787	8.868
DENMARK					
	Returns	9.627	9.406	9.135	9.804
	Squared returns	5.666	2.890	3.532	6.750
	Realized volatility	12.99	12.7	11.899	12.521
EGYPT					
	Returns	10.858	11.382	7.713	10.986
	Squared returns	4.093	4.744	2.715	5.309
	Realized volatility	12.649	12.45	12.823	21.858*
ESTONIA					
	Returns	14.578*	14.669*	13.726	14.663*
	Squared returns	3.413	3.793	7.651	5.528
	Realized volatility	10.531	13.139	8.686	12.433
FINLAND					
	Returns	26.743*	27.271*	22.498*	26.952*
	Squared returns	5.016	6.170	4.895	5.743
	Realized volatility	41.353*	46.212*	34.429*	42.01*
FRANCE					
	Returns	16.957*	14.902*	16.497*	14.942*
	Squared returns	2.457	3.535	7.418	7.337
	Realized volatility	8.577	9.059	8.259	8.756
GERMANY					
	Returns	18.268*	23.116*	24.507*	27.424*
	Squared returns	5.652	4.248	4.269	4.767
	Realized volatility	42.207*	40.611*	45.461*	44.351*
GHANA					
	Returns	30.628*	21.811*	26.789*	27.101*
	Squared returns	3.002	1.358	5.325	2.935
	Realized volatility	1.322	0.907	1.133	1.082
Greece					
	Returns	19.745*	16.603*	15.474*	19.307*
	Squared returns	3.212	3.726	5.406	4.691
	Realized volatility	20.98*	24.098*	17.577*	20.241*

HONG KONG				
Returns	25.188*	18.756*	23.815*	24.685*
Squared returns	6.063	4.012	4.923	4.969
Realized volatility	26.346*	25.805*	28.042*	28.707*
HUNGARY				
Returns	12.112	6.417	8.766	12.292
Squared returns	6.674	7.619	2.966	4.612
Realized volatility	5.476	4.106	4.71	5.558
ICELAND				
Returns	6.56	5.415	5.26	5.59
Squared returns	5.174	2.990	3.858	5.595
Realized volatility	11.866	11.184	11.7	11.285
INDIA				
Returns	45.519*	39.684*	45.146*	45.18*
Squared returns	1.752	4.126	4.028	2.527
Realized volatility	20.509*	18.13*	21.658*	27.975*
INDONESIA				
Returns	0.986	0.64	1.131	0.938
Squared returns	1.857	9.496	4.407	8.060
Realized volatility	38.253*	27.558*	36.448*	34.219*
IRELAND				
Returns	41.633*	32.815*	33.563*	33.782*
Squared returns	3.537	8.160	2.118	3.396
Realized volatility	15.561*	14.653*	15.458*	14.987*
ISRAEL				
Returns	23.951*	21.15*	23.327*	23.369*
Squared returns	4.680	3.399	4.809	3.504
Realized volatility	34.549*	24.856*	32.449*	27.84*
ITALY				
Returns	17.275*	13.315	16.496*	17.722*
Squared returns	2.859	2.681	3.957	3.155
Realized volatility	51.293*	42.445*	52.465*	54.325*
JAMAICA				
Returns	0.932	0.586	0.707	0.854
Squared returns	9.915	6.665	2.396	3.561
Realized volatility	8.878	5.811	8.603	9.121
JAPAN				
Returns	28.274*	24.502*	21.265*	27.941*
Squared returns	7.412	6.455	7.664	5.033
Realized volatility	26.984*	24.479*	25.346*	25.446*
JORDAN				
Returns	12.903	9.482	11.122	13.301
Squared returns	2.132	2.319	2.682	5.665
Realized volatility	1.199	1.226	1.285	1.622
KAZAKHSTAN				
Returns	13.125	13.387	16.291*	14.86*
Squared returns	7.865	3.348	2.744	2.459
Realized volatility	14.089	13.744	16.478*	17.531*
KENYA				
Returns	24.319*	18.842*	21.925*	24.085*
Squared returns	3.151	6.668	3.547	4.640
Realized volatility	16.401*	13.148	19.011*	17.488*
KUWAIT				
Returns	1.831	1.911	2.452	1.881

	Squared returns	4.485	3.306	3.241	4.294
	Realized volatility	13.914	14.269	13.431	13.79
LITHUANIA					
	Returns	29.544*	22.316*	21.763*	26.606*
	Squared returns	2.371	3.635	2.736	4.250
	Realized volatility	1.522	1.641	1.453	1.444
LUXEMBOURG					
	Returns	2.29	2.219	2.952	2.106
	Squared returns	5.139	2.052	3.440	2.965
	Realized volatility	10.122	10.137	10.96	10.622
MALAYSIA					
	Returns	31.851*	28.383*	31.62*	31.59*
	Squared returns	3.505	2.575	4.936	6.976
	Realized volatility	30.298*	25.979*	33.673	26.899*
MALTA					
	Returns	29.351*	21.056*	19.06*	24.149*
	Squared returns	3.367	5.452	4.694	4.559
	Realized volatility	3.527	1.871	4.076	2.591
MEXICO					
	Returns	2.684	1.522	3.134	1.304
	Squared returns	6.610	3.572	6.805	2.073
	Realized volatility	4.38	3.95	4.323	4.569
MOROCCO					
	Returns	16.867*	8.229	13.027	16.93*
	Squared returns	2.362	5.624	4.739	5.396
	Realized volatility	46.049*	37.295*	35.815*	41.565*
NAMIBIA					
	Returns	32.588*	36.092*	18.795*	32.16*
	Squared returns	5.878	4.915	3.765	5.911
	Realized volatility	31.547*	32.573*	27.406*	28.626*
NETHERLANDS					
	Returns	38.406*	38.107*	35.084*	38.241*
	Squared returns	5.521	6.358	3.245	3.580
	Realized volatility	22.338*	21.432*	18.203*	25.026*
NEW ZEALAND					
	Returns	15.197*	11.053	13.994	15.359*
	Squared returns	5.956	5.621	6.631	6.811
	Realized volatility	14.172	12.955	14.329	13.224
NIGERIA					
	Returns	3.247	3.136	2.691	2.593
	Squared returns	3.282	4.759	4.583	4.474
	Realized volatility	17.972*	19.018*	17.848*	16.462*
NORWAY					
	Returns	13.935	13.895	6.946	13.842
	Squared returns	4.178	2.023	3.315	5.560
	Realized volatility	38.038*	31.747*	31.747*	21.356*
OMAN					
	Returns	2.747	2.398	2.398	2.736
	Squared returns	2.753	4.353	4.353	3.522
	Realized volatility	11.549	10.754	10.586	11.518
PAKISTAN					
	Returns	4.001	2.383	3.681	4.012
	Squared returns	5.983	3.742	2.132	3.321
	Realized volatility	0.157	0.062	0.077	0.558

PANAMA				
Returns	8.353	6.851	6.48	5.803
Squared returns	5.190	2.961	7.059	3.663
Realized volatility	6.276	7.203	7.162	6.662
PERU				
Returns	2.896	2.806	2.959	3.107
Squared returns	4.995	3.907	5.237	7.952
Realized volatility	3.624	3.737	3.852	3.617
PHILIPPINES				
Returns	25.525*	20.155*	24.053*	25.667*
Squared returns	2.236	3.960	3.839	1.492
Realized volatility	9.647	8.627	9.214	9.626
POLAND				
Returns	12.857	8.685	7.016	11.957
Squared returns	1.982	4.783	7.130	3.721
Realized volatility	3.093	1.615	1.832	3.026
PORTUGAL				
Returns	10.446	9.712	10.116	10.213
Squared returns	8.143	6.164	3.047	4.297
Realized volatility	1.605	1.548	1.548	1.578
QATAR				
Returns	2.49	4.621	38.32*	7.255
Squared returns	5.232	4.790	5.639	2.654
Realized volatility	0.21	8.049	7.835	0.176
ROMANIA				
Returns	3.203	2.073	2.684	3.727
Squared returns	5.326	3.980	4.604	4.743
Realized volatility	11.638	11.159	10.851	12.265
RUSSIA				
Returns	34.207*	31.965*	32.917*	34.25*
Squared returns	2.691	3.959	3.402	3.274
Realized volatility	14.835*	11.489	12.803	13.582
SAUDI ARABIA				
Returns	3.263	2.303	3.25	3.159
Squared returns	5.167	3.865	4.001	3.905
Realized volatility	9.045	7.461	9.781	10.795
SINGAPORE				
Returns	20.437*	20.339*	20.057*	20.794*
Squared returns	5.892	6.723	5.253	3.022
Realized volatility	8.145	7.154	8.269	8.282
SLOVAKIA				
Returns	1.696	2.07	1.239	1.855
Squared returns	4.027	3.540	4.598	4.739
Realized volatility	16.073*	9.486	10.947	80.417*
SLOVENIA				
Returns	18.467*	11.306	16.285*	18.321*
Squared returns	4.515	4.922	9.141	9.870
Realized volatility	14.547*	14.741*	13.934	14.863*
SOUTH AFRICA				
Returns	81.498*	58.131*	58.519*	83.344*
Squared returns	4.867	3.440	5.932	6.825
Realized volatility	34.688*	21.179*	29.061*	25.533*
SOUTH KOREA				
Returns	78.691*	75.731*	77.007*	79.241*

	Squared returns	1.999	2.501	6.632	4.572
	Realized volatility	0.52	0.486	0.536	0.518
SPAIN					
	Returns	10.708	7.888	8.005	10.357
	Squared returns	3.369	5.012	4.164	2.149
	Realized volatility	30.389*	28.552*	28.266*	30.779*
SRI LANKA					
	Returns	18.306*	9.212	17.7*	18.291*
	Squared returns	3.245	6.677	2.703	1.761
	Realized volatility	18.642*	17.928*	17.211*	20.939*
SWEDEN					
	Returns	27.962*	24.631*	26.844*	27.129*
	Squared returns	4.860	1.950	6.486	3.442
	Realized volatility	0.631	0.595	0.622	0.636
SWITZERLAND					
	Returns	8.384	4.746	9.109	9.885
	Squared returns	3.794	3.529	10.486	1.882
	Realized volatility	3.578	2.868	2.914	3.667
TAIWAN					
	Returns	15.897*	10.776	16.89*	17.296*
	Squared returns	8.359	4.662	3.983	7.585
	Realized volatility	41.396*	39.095*	40.114*	40.104*
THAILAND					
	Returns	5.152	3.719	5.295	5.192
	Squared returns	6.139	5.479	4.204	7.707
	Realized volatility	18.624*	9.9	30.493*	19.686*
TRINIDAD & TOBAGO					
	Returns	40.596*	40.218*	40.839*	39.48*
	Squared returns	5.310	3.353	4.344	7.052
	Realized volatility	10.622	9.353	10.922	10.93
TUNISIA					
	Returns	17.371*	14.456*	7.635	17.433*
	Squared returns	4.018	2.939	3.304	4.462
	Realized volatility	51.737*	37.429*	21.39*	53.255*
TURKEY					
	Returns	5.951	4.526	5.925	5.509
	Squared returns	3.015	2.971	3.230	2.431
	Realized volatility	59.305*	53.541*	51.882*	57.992*
UAE					
	Returns	3.666	3.707	3.846	5.158
	Squared returns	4.380	3.840	3.540	3.865
	Realized volatility	11.675	8.907	11.225	11.815
UGANDA					
	Returns	3.89	4.22	3.785	3.757
	Squared returns	4.728	3.218	6.761	3.575
	Realized volatility	20.838*	41.294*	8.368	18.852*
UKRAINE					
	Returns	3.996	1.221	5.065	2.862
	Squared returns	11.853	12.824	9.202	6.759
	Realized volatility	11.007	10.357	10.599	10.9
UNITED KINGDOM					
	Returns	20.612*	17.53*	20.552*	20.886*
	Squared returns	2.124	4.516	3.764	3.186
	Realized volatility	52.34*	28.618*	37.342*	37.635*

UNITED STATES				
Returns	20.675*	20.727*	22.799*	21.434*
Squared returns	4.258	4.813	4.025	3.870
Realized volatility	49.418*	56.574*	48.035*	49.911*
VENEZUELA				
Returns	4.912	3.875	2.877	5.476
Squared returns	4.366	2.903	4.500	2.020
Realized volatility	14.543*	13.741	12.618	13.407
VIETNAM				
Returns	0.722	1.693	1.18	1.463
Squared returns	3.356	7.103	5.705	3.258
Realized volatility	0.126	0.094	0.081	0.22
ZAMBIA				
Returns	19.809*	18.286*	22.088*	18.387*
Squared returns	4.594	5.759	3.537	2.600
Realized volatility	10.953	8.329	8.338	8.553
ZIMBABWE				
Returns	1.139	3.998	2.823	0.696
Squared returns	3.296	3.389	2.728	4.309
Realized volatility	6.945	5.521	5.982	4.801

Note: See Notes to Table 2a; * represents rejection of the null of non-causality due to risk measures on stock returns, squared returns and realized volatility at the 5% level of significance, which has a critical value of 14.380.

Table 4b: Summary of the Nishiyama et al., (2011) test:

	CR	ER	FR	PR
Returns	Argentina	Argentina	Argentina	Argentina
	Australia	Australia	Australia	Australia
	Austria	Austria	Austria	Austria
	Bahrain	Bahrain	Belgium	Bahrain
	Belgium	Belgium	Canada	Belgium
	Botswana	Botswana	China	Botswana
	Canada	Canada	Finland	Canada
	China	Chile	France	China
	Colombia	China	Germany	Colombia
	Estonia	Croatia	Ghana	Croatia
	Finland	Estonia	Greece	Estonia
	France	Finland	Hong Kong	Finland
	Germany	France	India	France
	Ghana	Germany	Israel	Germany
	Greece	Ghana	Ireland	Ghana
	Hong Kong	Greece	Italy	Greece
	India	Hong Kong	Japan	Hong Kong
	Israel	India	Kazakhstan	India
	Ireland	Israel	Kenya	Israel
	Italy	Ireland	Lithuania	Ireland
	Japan	Japan	Malaysia	Italy
	Kenya	Kenya	Malta	Japan
	Lithuania	Lithuania	Namibia	Kazakhstan
	Malaysia	Malaysia	Netherlands	Kenya
	Malta	Malta	Philippines	Lithuania
	Morocco	Namibia	Qatar	Malaysia
	Namibia	Netherlands	Russia	Malta
	Netherlands	Philippines	Singapore	Morocco
	New Zealand	Russia	Slovenia	Namibia
	Philippines	Singapore	South Africa	Netherlands

	Russia Singapore Slovenia South Africa South Korea Sri Lanka Sweden Taiwan Trinidad & Tobago Tunisia United Kingdom United States Zambia	South Africa South Korea Sweden Trinidad & Tobago Tunisia United Kingdom United States Zambia	South Korea Sri Lanka Sweden Taiwan Trinidad & Tobago United Kingdom United States Zambia	New Zealand Philippines Russia Singapore Slovenia South Africa South Korea Sri Lanka Sweden Taiwan Trinidad & Tobago Tunisia United Kingdom United States Zambia
Squared returns		Chile		
Realized volatility	Australia Austria Bahrain Belgium Botswana Brazil Canada China Colombia Cyprus Finland Germany Greece Hong Kong India Indonesia Israel Ireland Italy Japan Kenya Malaysia Morocco Namibia Netherlands Nigeria Norway Russia Slovakia Slovenia South Africa Spain Sri Lanka Taiwan Thailand Tunisia Turkey Uganda United Kingdom United States Venezuela	Australia Austria Bahrain Belgium Botswana Brazil Canada China Cyprus Finland Germany Greece Hong Kong India Indonesia Israel Ireland Italy Japan Malaysia Morocco Namibia Netherlands Nigeria Norway South Africa Spain Sri Lanka Taiwan Turkey Uganda United Kingdom United States	Australia Austria Bahrain Belgium Botswana Brazil Canada China Colombia Cyprus Finland Germany Greece Hong Kong India Indonesia Israel Ireland Italy Japan Kenya Morocco Namibia Netherlands Nigeria Norway South Africa Spain Taiwan Tunisia Turkey United Kingdom United States	Australia Austria Bahrain Belgium Botswana Brazil Canada China Colombia Cyprus Egypt Finland Germany Greece Hong Kong India Indonesia Israel Ireland Italy Japan Kazakhstan Kenya Malaysia Morocco Namibia Netherlands Nigeria Norway Slovakia Slovenia South Africa Spain Sri Lanka Taiwan Thailand Tunisia Turkey Uganda United Kingdom United States

Note: See Notes to Table 2a.

In sum, our results indicate that while aggregate risk and its various components is a quite strong predictor of returns and realized volatility, when we allow for nonlinearity. From a general perspective, we highlight the importance of accounting for possible misspecifications in a linear model, which in turn, might lead to erroneous inferences.

5. Conclusions

There exists a literature which has shown that country risks affect stock market returns and volatility. Against this backdrop, the objective of this paper is to analyze the role played by aggregate risks, as well as its components, namely economic, financial and political, in predicting movements in stock returns and volatility of 83 developed and developing economies. For our purpose, we use the k -th order nonparametric causality test of Nishiyama et al., (2011) at monthly frequency over the period of 1984:1 to 2015:12. This test is developed to incorporate higher-order interrelationships inherently based on a nonlinear dependence structure between the investigated variables in question. Besides squared returns to capture volatility, we also use measure of realized volatility, given that we have daily data on the stock prices of these countries. Our decision to use a k -th order nonparametric approach, besides allowing us to for higher-order predictability, controls for the misspecification of a linear framework of causality, which as we show does exist in the relationship between stocks returns and the various measures of country risks. Hence, the weak evidence of causality obtained under the linear Granger tests cannot be relied upon. When we apply the nonparametric test, we find that, while there is no evidence of predictability of squared stock returns except for Chile, at times, there are nearly 50 percent of the cases where the aggregate risks and its components tend to predict stock returns and realized volatility. Hence, our results highlight the importance of modelling nonlinearity in causal relationships between the stock markets and credit risks to avoid drawing incorrect conclusions. As part of future research, given that the stock returns depict skewed distributions, one could apply nonparametric quantiles-based test of causality as in Balcilar et al., (2016), which has an advantage over the conditional-mean based test of Nishiyama et al., (2011), in the sense that the causality-in-quantiles method covers the entire conditional distribution of stock returns and volatility. In addition, it would be interesting to see if our results hold over an out-of-sample period, since in-sample predictability (as conducted here), does not necessarily guarantee forecasting gains (Rapach and Zhou, 2013).

References

- Andersen, T. G., & Bollerslev, T. (1998). Answering the skeptics: Yes, standard volatility models do provide accurate forecasts. *International economic review*, 885-905.
- Aye, G. C., Balcilar, M., & Gupta, R. (2015). International stock return predictability: Is the role of US time-varying? *Empirica*, DOI: 10.1007/s10663-015-9313-3.
- Balcilar, M., Bekiros, S., and Gupta, R. (2016). The role of news-based uncertainty indices in predicting oil markets: a hybrid nonparametric quantile causality method. *Empirical Economics*, DOI: 10.1007/s00181-016-1150-0.
- Bekiros, S., Gupta, R., and Kyei, C. (2016a). On economic uncertainty, stock market predictability and nonlinear spillover effects. *North American Journal of Economics and Finance*, 36, 184-191.
- Bekiros, S., Gupta, R., and Majumdar, A. (2016b). Incorporating Economic Policy Uncertainty in US Equity Premium Models: A Nonlinear Predictability Analysis. *Finance Research Letters*, 18(1), 291-296.
- Bilson, C. M., Brailsford, T. J., & Hooper, V. C. (2002). The explanatory power of political risk in emerging markets. *International Review of Financial Analysis*, 11(1), 1-27.
- Brock, W., Dechert, D., Scheinkman, J., and LeBaron, B. (1996). A test for independence based on the correlation dimension. *Econometric Reviews*, 15 197–235.
- Cermeño, R., & Suleman, M. T. (2014). Country Risk and Volatility of Stock Returns: Panel-GARCH Evidence for Latin America. Available at SSRN 2482038.
- Diamonte, R. L., Liew, J. M., & Stevens, R. L. (1996). Political risk in emerging and developed markets. *Financial Analysts Journal*, 52(3), 71-76.
- Erb, C. B., Harvey, C. R., & Viskanta, T. E. (1996). Political risk, economic risk, and financial risk. *Financial Analysts Journal*, 52(6), 29-46.
- Erb, C. B., Harvey, C. R., & Viskanta, T. E. (1995). Country risk and global equity selection. *The Journal of Portfolio Management*, 21(2), 74-83.
- Hassan, M. K., Maroney, N. C., El-Sady, H. M., & Telfah, A. (2003). Country risk and stock market volatility, predictability, and diversification in the Middle East and Africa. *Economic Systems*, 27(1), 63-82.
- Nishiyama, Y., Hitomi, K., Kawasaki, Y., and Jeong, K., (2011). A consistent nonparametric Test for nonlinear causality - specification in time series regression. *Journal of Econometrics* 165, 112-127.
- Poon, S-H, and Granger, C. W. J. (2003). Forecasting Volatility in Financial Markets: A Review. *Journal of Economic Literature*, 41(2), 478-539.

- Ramcharran, H. (2003). Estimating the impact of risks on emerging equity market performance: Further evidence on data from rating agencies. *Multinational Business Review*, 11(3), 77-90.
- Rapach, D. E., Wohar, M. E., and Rangvid, J. (2005). Macro Variables and International Stock Return Predictability. *International Journal of Forecasting*, 21(1), 137–166.
- Rapach, D. E., Wohar, M. E., and Strauss, J. (2008). Forecasting Stock Return Volatility in the Presence of Structural Breaks, in *Forecasting in the Presence of Structural Breaks and Model Uncertainty*, David E. Rapach and Mark E. Wohar (Eds.), Vol. 3 of *Frontiers of Economics and Globalization*, Bingley, United Kingdom: Emerald, 381–416.
- Rapach, D. E., and Zhou, G. (2013). Forecasting stock returns. *Handbook of Economic Forecasting*, 2(Part A), Graham Elliott and Allan Timmermann (Eds.), Amsterdam: Elsevier, 328-383.
- Suleman, M. T., and Daglish, T. C. (2015). Political Uncertainty in Developed and Emerging Markets. Available at SSRN 2647888.
- Suleman, M. T and Randal, J. (2016). Dynamics of Political Risk Rating and Stock Market Volatility. Available at SSRN 2315645.