Does Political Stability Matter for the UK and the USA? The Time Variant Analysis through Rolling Window Causality Approach

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Abstract: *The study aims to examine the time-varying causality between political stability and economic growth. Secondly, study also evaluates the effect of political stability on economic growth of the United Kingdom and the United States. Therefore, a time-series model is proposed to assess the framework's constancy with time, which assumes that the coefficients are stable throughout time. A rolling window technique has been applied to the dataset from the year 2002 to 2019, respectively. The results indicate that the time-varying positive bidirectional causality is present between political stability and economic growth for a particular subsample, verifying the effect of political stability on economic growth and vice versa. Hence, our results exhibit that the connection between two-series would benefit the economy due to the positive yet significant relationship. Therefore, uncertain political conditions would directly affect the economy's growth rate in terms of tourism, currency value, investment, and other growth factors. Whereas, if the uncertainty regarding the political environment reduces, it would be advantageous for economic development.*

Keywords: Brexit; Political stability; Economic growth; Rolling Window Causality

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Introduction

Several economies have been striving for economic development and growth, but economic development is interlinked with various factors. Thus, other important factors should also be taken into account to achieve economic growth. Past studies have extensively investigated, analyzed, explored, and examined the economic factors in order to enhance the economy (Bashir & Xu, 2014). The economies striving to enhance the economy's performance acknowledge that economic factors are not the only economic development source. Nevertheless, other factors such as political and institutional factors significantly contribute to economic growth. Radu (2015a) ascertained that economic performance cannot be elevated only based on market determinants. But the economic system should include and synchronize with the ongoing changes and enhancement in the country, variation in technology, improvements, along with political policies; as a result, numerous advantages and establishment being signified and altered. The study of Boyer (2011) and Bresser-Pereira (2012) also state that political determinants should be included to examine economic performance and to analyze the impact of government policies on economic prosperity. Economic development and political stability are interlinked as political stability is significant for analyzing the economy's growth rate (Alesina et al., 1996).

Political stability refers to the period of appropriate and favorable political environment that would encourage and interest investors for investment. Also, benefactors and contributors are interested in sourcing their investment into the economy if the political environment is stable, which can be assessed through a satisfactory democratic environment and strong law enforcement systems (Ramadhan et al., 2016). The source of investment can be from local and foreign financiers. Usually, an economy is expected to be politically stable as it favorable for economic growth when development of the economy elevates and uncertainty regarding political situation reduces. Zheng (2012) highlighted that few economies are categorized as stable or adequately stable because of the difference in nationals and external pressures of diverse scale. According to Oh and Reuveny (2010), the extend of political risk of an economy is determined based on the following factors: interstate and intrastate militarized conflict, religious and ethnic tension, political instability, the weak rule of law, civic disorder, low level of democracy, public and private sector corruption, inhospitable investment climate, incapable bureaucracy, and socioeconomic conditions that promote public discontent. Therefore, the country's political condition and political risk factors should be examined for continuous economic development.

Similarly, Radu's (2015b) study argues that political stability (PS) is important for continuous economic progress because PS, economic development can be achieved, or the other way around it can lead to inadequate economic performance. Furthermore, Barro (2013) validates that political environment stability affects economic performance in case of development and growth. Economic development depends on

the policies opt by the government and the process of execution. The policies adopted by the government assist the economy to grow in terms of competencies and abilities, technological advancement, and escalate internal and external funding. Political instability affects the country's economic growth, leading to declining and stagnant economic operations; thus, adversely impacting the investment ratio. Moreover, the investors hesitate to invest in high-risk economies (Tabassam et al., 2016). When the investment ratio decreases, the output, reserves, and consumption of goods and services are affected due to less income, which ultimately reduces the purchasing power. Secondly, unstable political conditions lead to inflation. Higher redundancy causes social distress and insecurity among the masses that result in deceleration/decline, assaults, and ferocity against companies and ministry. This social distress discourages financiers to invest in such economies; as the risk associated with funding becomes high.

Moreover, political instability limits development and improvement; for instance, the current political instability in the UK and the US. Radu (2020) reports that the UK economy will face higher uncertainty due to "Brexit," and the US, because the country has experienced a higher turnover rate in the governance of President Donald Trump. Also, the UK and the US were unable to classify in the survey of 10 politically stable countries as UK on number 14 and the US on number 17.

Due to Brexit, London's international banking hub's financial sector is predicted to face unemployment and reduce funding. Furthermore, as 5000 or more jobs are forecasted to vanish in London alone, there is a forthcoming risk for real estate division due to which the construction sector will be affected, resulting in a sheer drop in housing prices (Jessop, 2017; Sampson, 2017; Taylor-Gooby, 2017). Moreover, Ebell and Warren (2016) highlighted that the financial repercussions would result in greater financial costs for specialists and experts, particularly in the service industry because of Brexit. Secondly, Shahzad et al. (2019) determine that the returns of companies listed on the stock exchange have reduced from the plebiscite. In contrast, the transmission to different markets has been restricted, although accumulated market association affected the 2016 election. Therefore, the risk of post-Brexit exaggeration in the United Kingdom's equity market and the European Union cannot be abandoned. Additionally, it is assumed that in case of unsafe deal of free trade with the European Union, then it could result in increasing the inflation rate that would affect the usage of private companies' product and services but also on the spending of government (Polyzos et al., 2020; Tsuji, 2020; Samitas & Kampouris, 2018; Kariofyllas et al., 2017).

Subsequently, Demiralay (2020) and Garcia (2019) claimed that Brexit is responsible for intense failure of the organizations; particularly the tourism sector e.g. the postponed travel plans of tourists. It has resulted in higher uncertainty causing the sheer drop in earnings and stock prices in the tourism sector; as the demand declines, business operational costs would increase. It was projected that post-Brexit would cause stagnant economic activity leading to an output reduction of 1.9% (2019) while

1.6% (2020). In addition, from 2018, the rate of investment in companies dropped, usage rate has decreased due to slow economic growth in real income, and public debt has persisted more than 85% of gross domestic product (Bulmer & Ouaglia, 2018). Government officials concentrate on Brexit arrangements mainly in managerial and lawmaking alterations. The first preference was to finalize a free trade contract with the European Union, while several forecasters believe it was impossible until 2020. However, an inclusive plan was to escalate production depending on the expected funds to invest in workforce and resources. The party's give significant emphasis in accomplishing Brexit and less on economic policy for the betterment of the region. The government promised to increase investment expenditure up to 3% of gross domestic product and increase budget expenditure. The government has also agreed not to upsurge income taxes, value-added tax, or national insurance costs. Therefore, it is determined that the policies will restrict the loss due to Brexit by intensifying funds and production to sustain development. These are some of the major issues the United Kingdom is going through (Santander, 2019).

Alternatively, the United States political conditions are similar to the United Kingdom. Earlier, the US was categorized as one of the safest countries in terms of economy, nevertheless according to the Fragile States Index (FSI) in the year 2018, it was positioned among the fourth spot of the worst countries. The US's status was identified as the political extremism, and the deadlock between the party leaders causing higher social distress, police barbarity, and a higher risk of bloodshed. However, the US economy has become sensitive to a slight change from the past ten years since Donald Trump was elected president. Conversely, when Barack Obama was President, the US was on the 13th spot in worse countries based on the FSI index. In the past few years, the issues about President Donald Trump regarding lawfulness, the competence to govern, and various accusations have negatively affected the economy, globally. Due to such circumstances the increase in the political ferocity, assault, and attacks on ethnic minorities have been amplified, the government's policies and such conditions communicate that culprits are encouraged (Osseiran & Sikorski, 2018). Moreover, the report of Collinson (2020) revealed that President Donald Trump and Joe Biden's election has troubled the economy more and has intensified the crisis due to which the economy might collapse; this will result in employees losing their jobs while the issue of ethnicity and police assault is still unsettled.

Therefore, this study makes the following contribution to the studies based on economic expansion and development. Firstly, the study emphasizes the developed economy of the UK and the US from 2002 till 2019. Subsequently, the study focuses on the current situations in the UK and US that they are facing in terms of politics that affect economic growth. The study concentrates on the developed economies for various reasons. The current challenges these developed economies face have not been addressed, and the influence of such scenarios on economic growth. Hence, the US currency is considered the world's reserve currency. Therefore, the USD's

demand is much higher than other currencies; also, the USD is measured against six world currencies. The British pound is one of them. In accordance with the current issue of Brexit in the UK and the Presidency of Donald Trump and elections, the US economy is under great pressure, which has ultimately affected the currency's price; thus, it is valuable to evaluate the PS situation in a country. The market condition and political situation affect various economies; hence studying whether political stability is essential for economic development, and its effect on developing ones will help policymakers minimize economic and financial risk.

Secondly, the study evaluates government policies that have been apprehended through the Worldwide Governance Indicators (WGI) mediate the link between PS and economic growth-EG. "Worldwide Governance Indicators (WGI) includes voice & accountability, political stability & absence of violence/terrorism, government effectiveness & regulatory quality, the rule of law and control of corruption". In economies with powerful legal systems, financial institutions support the country's economic development in productivity, employment[1] that would attract more investment, and political stability. These factors substantiate investors regarding the increase in the economic development and consumption rate. To the best of our understanding, this study is the first attempt to use these variables to refer to political stability and its effect on economic growth.

Finally, this study applied a novel technique of rolling windows to estimate the results. Various studies working on full sample causalities can produce deceptive results because of the unstable parameter produced by changes in structure (Balcilar et al., 2010). Additionally, the rolling sub-sample results in fixed-size windows hold a robust command in apprehending the unexpected change over time and the advancement of fatality among the two-series. Lastly, the study implements bootstrap causality tests to every single sample and delivers substantial analysis, particularly when the regularity situations involving parameter constancy and stationarity are disrupted (Su et al., 2019).

The other chapters of this study are structured as follows: the past studies and their findings are discussed in the Literature review section. The technique applied and data used for the study are explained in the Methodology section, while the study results are elaborated in the Data analysis section. Finally, the study's findings and practical implications are concluded in the Conclusion section.

Literature Review

This segment discusses the studies on political stability and instability with economic development. Few studies have emphasized political stability with economic prosperity. For instance, the study was conducted in Bangladesh to evaluate the effect of PS on EG from 1984-2009. The results indicated a negative connection between

the variables in the long run, while a positive connection was observed for the short run (Ahmed & Pulok, 2013). Furthermore, Gurgul and Lach (2013) analyzed the influence of political uncertainty on economic progress; the findings indicate political uncertainty leads to government change that reflects a negative image of the country and impacts economic well-being.

Similarly, another study was conducted to evaluate the effect of political uncertainty on economic development by utilizing a panel data framework on the "Economic Community of West African States-ECOWAS". The outcome highlighted that political uncertainty indicates a high level of terrorism which adversely influences economic development (Okafor, 2017). Further, in the case of 169 countries, it was examined that higher political uncertainty is the outcome of a lower GDP growth rate. The results were analyzed through the GMM method covering the duration of 1960-2004 (Aisen & Veiga, 2013).

Moreover, there are also numerous factors other than political stability that influence the enhancement of the economy. A study highlighted that total factor productivity could be used as a medium for transmission through which political uncertainty adversely impacts the growth rate (Aisen & Veiga, 2013). Owing to the prevalence of economic uncertainty, the economy's future prosperity becomes doubtful because it impacts the efficient usage of resources. The usage and government spending for the betterment of the economy decreases, reducing trade's propensity due to continuous political uncertainty in underdeveloped countries. Similarly, Radu (2015a) emphasizes that economic performance cannot be evaluated on the market factors. Therefore, the economy's political condition should also be included; as it significantly contributes to economic development. According to the analysis of CEE countries, it was concluded that a correlation exists among EG and political factors; thus, indicating that political factors have a positive effect on economic development. Similarly, in Romania, it was identified that a stable political situation assists in developing a comprehensible and persistent route towards the sustainable development of the economy (Radu, 2015b).

Subsequently, the significance of a stable political environment for economic growth is unclear, but it is determined that economic prosperity is not just based on economic fundamentals. While the political and institutional factors also have a considerable role. However, the influence of political elements on economic functionality are not explored under certain circumstances. Past studies utilized proxy variables to scrutinize the influence of political and institutional elements on economic development, leading to diverse and differing outcomes. Some proxies were property rights, civil freedom, corruption, bribery, fraud, regime change, democracy, and economic relaxation (Bashir & Xu, 2014). However, these proxies were not suitable enough because of various issues. For instance, investment was not preferred owing to the higher risk associated with capital loss; moreover, political uncertainty causes capital issues and brain drain.

Additionally, political instability hinders the enforcement of property rights, as these are essential to recognize benefits connected with various economic activities. Political instability causes insecurity in economic prospects and political conditions that further make the investors lose confidence to invest in that economy. Hence, it is determined that a stable political and institutional environment is essential for economic prosperity. Briefly, political stability in terms of prosperity and development refers to a particular type of strength; power establishments, the rule of law, efficient government, less corruption and fraud, and a favorable environment encouraging investments locally and overseas.

Therefore, this study emphasizes the political stability of the economic growth of the UK and US. The purpose of the study is to analyze the current issues like Brexit and Donald Trump's presidency impact on economic growth and political conditions within these two developed states.

Methodology

Considering the hypothetical technique, the connection between PS and EG are endogenous variables. Therefore, through assigning specific variables on the right side in the model of regression, the endogeneity of most variables severely disturbs the exogeneity hypothesis of a regression function. The issue can be avoided by stipulating VAR frameworks on a network of variables; as no such conditional factorization is proposed in the theoretical VAR model. Thus, the estimations of connection between political stability and economic growth series is applied based on the bivariate VAR framework. Moreover, the study will also validate if the stable political environment is the key factor for economic growth. The consideration encourages the thought of revised causality tests for the purpose to examine the course of causalities between political stability and economic growth series.

Full-Sample Causality Test

The test of Granger causality proposes a hypothesis that fundamental series are stationary. Considering the Toda and Phillips (1993), if the stationary assumption does not hold, the Wald and Likelihood Ratio (LR) method might hold non-standard asymptotic distribution. The altered Wald estimation introduced by Toda and Yamamoto (1995) satisfactorily applies in achieving standard asymptotic distribution by the results of augmented VAR techniques with I(1) variables. Advance Granger non-causality tests based on the bivariate VAR model have been applied. The problem with the standard causality test is that it might produce specification bias and non-asymptotic critical estimations particularly when working with a small sample size. It is

proved that the Toda and Yamamoto (1995) test holds size that is not correct in less and average samples (Shukur & Mantolos, 1998). In addition, the purpose of applying the residual based bootstrap (RB) method and critical results is the result obtained by Shukur and Mantalos (2004) Which curtained developments in the case of power and size properties. Irrespective of cointegration properties the exceptional showcase of residual based bootstrap technique has been used by numerous studies (Mantalos, 2000; Balcilar et al., 2010). Furthermore, when working with a small sample size the advanced Likelihood ratio technique displays improved size and power properties (Shukur & Mantalos, 2000). This study is based on the residual based bootstrap advanced Likelihood ratio test to examine causalities between political stability and economic growth.

The bivariate VAR procedure is as follows:

$$\begin{bmatrix} PS_{1t} \\ EG_{2t} \end{bmatrix} = \begin{bmatrix} \emptyset_{10} \\ \emptyset_{20} \end{bmatrix} + \begin{bmatrix} \emptyset_{11}(L) & \emptyset_{12}(L) \\ \emptyset_{21}(L) & \emptyset_{22}(L) \end{bmatrix} \begin{bmatrix} PS_{1t} \\ EG_{2t} \end{bmatrix} + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \end{bmatrix} \quad t = 1,2 \dots., T \qquad (1)$$

The PS_{1t} and EG_{2t} denote political stability and economic growth, respectively. $\varepsilon_t = (\varepsilon_{1t}, \varepsilon_{2t})$ represents the white noise process that have zero mean and covariance matrix. $\sum (L) = \sum$, i, j =1, 2 and L is the lag operator illustrated as . $p + 1 \; k = 1 \; \phi ij$, $k \; L \; k \; xt = xt - k$.

Thus, the equation (1) proposes that the null hypothesis states that political stability does not granger cause economic growth. It is verified by implementing the limitation for $\phi 12$, $k = 0$ k=1, 2, …, p. Similarly, the null hypothesis considers that economic growth does not granger cause political stability that is evaluated by limiting for $\phi 21$, $= 0$ k=1, 2, …, p. Therefore, for the full sample causality technique we depend on the residual based bootstrap focusing on the p values and advanced Likelihood ratio estimations. The p-value is a statistical measure that estimates the probability of obtaining results as extreme as the observed ones in the sample, assuming the null hypothesis to be true. Considering significant causality drawn from political stability to economic growth can be verified when the initial null is excluded; thus, indicating that improvement or enhancement of economy can be achieved through political stability that would open pathways for advancement of technology and increase in investment for development of economy. Alternatively, if the next null hypothesis is rejected, it indicates that economic growth can forecast the change in political environment.

Test for Parameter-Stability

The causality test of a full sample is usually directed towards an individual causal connection between political stability and economic growth in the sample dataset because of the consideration that parameters are persistent during the time. However,

the projected results can be changed and the connection might exhibit uncertainty if the fundamental series display structural breaks (Balcilar & Ozdemir, 2013).

Comparatively, the technique applied to study the short term parameter constancy Sup-F, Mean-F and Exp-F are used. The study uses the Lc technique to study long-term parameter constancy (Nyblom, 1989; Hansen, 2002). These assessments are estimated based on the sequence of LR statistics that intends to assess the parameter constancy besides the substitute of an individual structural change at an undefined duration. Andrews (1993) suggests that the assessment for short-term parameter constancy demands 15% reduction from both ends of samples. Therefore, the study utilizes the sample in the proportion of 0.15, 0.85 and so on.

Sub-sample rolling-window estimation

Balcilar, Ozdemir and Arslanturk (2010) consider that the rolling_window bootstrap method assists in excluding pre-test bias and conquers the parameter incoherency. Utilizing this technique is beneficial in the following ways: initially, the rolling_window permits for alteration in the causalities among the variables. Due to the fundamental theoretical evaluation the positive connection between PS and EG along with the probable modifications in development ratio between series through government effectiveness, rule of law and other measures can examine the connection by rolling window method. Another advantage is that in the existence of structural breaks the rolling evaluation can apply appropriate estimates for analyzing uncertainty within diverse subsamples.

The technique of rolling_window is centered on the fixed size sub samples rolling chronologically from the start till the end of the sample. Therefore, the exhibited fixed size rolling_window comprises l observations, the complete sample can be divided into T- l subsamples, such as τ l +1, τ- l,..., T for τ= l, l +1,...,T. Probable time variants in the causality between political stability and economic growth can be recognized automatically through computing the p value by bootstrap of observed Likelihood ratio statistic rolling through T- l subsamples. The effect of political stability on economic growth is estimated by $N_b^{-1}\Sigma_{k-1}^{p}\widehat{\emptyset}_{21,k}^{*}$, in which N_b denotes the number of bootstrap repetitions. Similarly, the effect of political stability on economic growth is estimated through $N_b^{-1}\Sigma_{k-1}^{p}\widehat{\emptyset}_{21,k}^{*}$. $\widehat{\emptyset}_{21,k}^{*}$ and $\widehat{\emptyset}_{21,k}^{*}$ it represent the bootstrap calculation from the VAR method. The confidence intervals of 90% are calculated when the lower and upper limits are equivalent to 5th and 95th quantiles of every individual $\widehat{\emptyset}_{21,k}^{*}$ and $\widehat{\emptyset}_{21,k}^{*}$, (Balcilar, Ozdemir & Arslanturk, 2010).

For the calculation of rolling window, the reflection of frameworks in sub samples and precision of parameter assessment are two different objectives (Su et al., 2019). A large window size can be used to enhance the precision but the reflection of the model decreases. Comparatively, a small size can also enhance reflection of the model but it decreases precision rate. According to Pesaran and Timmerman (2005), the Monte

Carlo simulation is proposed which determines that the window size should be bigger than 20, when there are rapid changes in the likelihood.

Data

To analyze the influence of PS on EG quarterly data has been obtained from the UK and the US for the year 2002 till 2019. The selection of the years entirely depends upon the availability of data and the recent issues faced by these economies. Variables named as political stability are defined through voice and accountability, political stability and absence of violence/terrorism, government effectiveness, regulatory quality, rule of law and control of corruption. While economic growth was referred to as gross domestic product/capita. The data of political stability factors for UK and the US was acquired from The WGI's available at: www.govindicators.org. While, the data for EG refer by GDP/capita was obtained from WBD Indicator.

Data Analysis

The data utilized for analysis was monthly data from 2002:01-2019:12 acquired from two different sources named as World Bank Development Indicator and The Worldwide Governance Indicators. Initially, it can be seen from Table 1a that the volatility of EG is wider than PS according to the kurtosis value of 5.068 and a greater standard deviation of 0.119. The outcome indicates that economic growth is more volatile than political stability. Secondly, mutual factors can affect the functioning of PS and EG as both variables are interlinked. Additionally, the two series are not normally distributed based on the J-B values for the UK and the USA both. Similarly, in the case of the USA, the volatility of PS is more than EG with the kurtosis value of 4.140 and higher standard deviation of 0.154. The results exhibit that political stability is more volatile than economic growth. Similarly, for the USA both variables are connected with one another and similar factors must be influencing the growth and stability of the variables.

Table 1a: Descriptive statistics for PS and EG of UK

UK		
	PS	EG
Mean	4.065	28.603
Median	4.082	28.622
Maximum	4.239	28.763
Minimum	3.878	28.210
Std. Dev.	0.086	0.119
Skewness	(0.449)	(1.446)
Kurtosis	2.444	5.068
Jarque-Bera	3.204	36.342
Probability	0.201	-
Observations	69	69

Table 1b: Descriptive statistics for PS and EG of USA

USA		
	PS	EG
Mean	4.065	30.367
Median	4.113	30.346
Maximum	4.207	30.536
Minimum	3.621	30.194
Std. Dev.	0.154	0.089
Skewness	(1.485)	0.089
Kurtosis	4.140	2.267
Jarque-Bera	29.096	1.634
Probability	-	0.442
Observations	69	69

At first, we applied Augmented Dickey-Fuller test (ADF) proposed by Dickey and Fuller (1981) and Phillips-Perron test (PP) (Phillips & Ouliaris, 1990), to explore the stationarity of return series in logarithm. As depicted in Table 2(a), both the variables are stationary at level in case of UK. While, Table 2(b) exhibits that initially the time series were non-stationary due to which we had to move on to the first difference. Due to the mixed results and higher non-stationary properties, rolling window technique is applied.

Table 2a: Univariate unit root of UK

Variables	Levels		First Differences	
	ADF	PP	ADF	PP
PS	-4.37945	0.0008	-4.42044	0.004
EG	-3.15433	0.0279	-3.50226	0.0484

Table 2b: Univariate unit root of USA

Variables	Levels		First Differences	
	ADF	PP	ADF	PP
PS	-2.49745	0.1206	-3.07161	0.0336
EG	-0.33911	0.9127	-2.38354	0.1502

As both political stability and economic growth are I(0), the full sample causal relation between the variables can be tested for the UK and the US. The bivariate VAR models of political stability and economic growth are denoted as equation 1. Based on the analysis, the lag length form on the political stability and economic growth is 3 for both the countries. The full sample causality outcomes produced by the residual-based bootstrap modified likelihood ratio causality test are exhibited in Table 3a and b. Based on the p-value of bootstrap, PS does not Granger cause EG; while EG does not Granger cause PS. Hence, these results are contradictory from some of past studies by Williams (2019), Londregan and Poole (1990), Cox and Weingast (2018); it affirmed that a causal connection exists between political stability and economic growth.

Table 3a: Full-sample Granger Causality Tests (UK)

Tests	H0: PS does not Granger Cause EG		H0: EG does not Granger Cause PS	
	Statistics	p-value	Statistics	p-value
Bootstrap LR Test	2.382	0.390	2.106	0.330

Table 3b: Full-sample Granger Causality Tests (US)

Tests	H0: PS does not Granger Cause EG		H0: EG does not Granger Cause PS	
	Statistics	p-value	Statistics	p-value
Bootstrap LR Test	2.018	0.360	3.124	0.300

According to Balcilar and Ozdemir (2013), there is a prior lapse owing to which structural variation is not present in the time series and a single causal connection exists within the entire sample time. Due to structural variation, the parameters in the stated VAR frameworks are measured by utilizing the complete sample of economic growth and political stability which changes with the duration. The causal relation between economic growth and political stability might be uncertain. Thus, the full sample causality assessment with a perception of parameter fidelity and no causal relation during the entire sample time is no longer consistent. The above outcomes are determined to be insignificant (Zeileis, Leisch, Kleiber, & Hornik, 2005).

Consequently, one can take steps to assess the stability of parameters and detect the occurrence of structural changes. The Sup-F, Mean-F, and Exp-F tests are introduced by Andrews (1993), Andrews and Ploberger (1994) to study the time-based

stability of parameters in the stated VAR frameworks generated by economic growth and political stability. The Nyblom (1989) and Hansen (1992) Lc assessment is applied to check all the inclusive VAR model parameters. The findings generated are exhibited in Table 4(a) and (b). Sup-F checks under the null hypothesis of parameter fidelity; conversely, a one-time severe deviation in parameters exists in the first row. The findings confirm one-time severe deviation in the PS, EG, and VAR system, all at the 1% level. Mean-F and Exp-F evaluate under the null hypothesis that the parameters mirror modification against the probability that the parameter might change progressively in the second and third rows. The outcomes indicate the equations from PS, EG, and VAR systems that may progress with the period. The LC statistics when compared with others the parameters work on a random walk process introduced by Gardner (1969), revealing the parameters' reliability in the entire VAR models calculations. Therefore, the findings deliver a vigorous confirmation that the parameters of the estimated VAR model utilize a full sample dataset that displays short term instability (Li et al., 2017).

Table 4a: Parameter Stability Test (UK)

Tests	PS Equation		EG Equation		VAR (1) System	
	Statistics	p -value	Statistics	p -value	Statistics	p -value
Sup- F	291.098***	0.000	154.197***	0.000	32.880***	0.000
Mean- F	27.446***	0.000	19.524***	0.000	10.289***	0.048
Exp- F	141.763***	1.000	73.207***	1.000	12.726***	0.000
Lc^b					1.124***	0.177

"Notes: We calculate p-values using 2000 bootstrap repetitions; Hansen–Nyblom parameter stability test for all parameters in the VAR (1) jointly. ***Significance at 1%."

Table 4b: Parameter Stability Test (US)

Tests	PS Equation		EG Equation		VAR (1) System	
	Statistics	p -value	Statistics	p -value	Statistics	p -value
Sup- F	252.623***	0.000	47.211***	0.000	105.377***	0.000
Mean- F	67.405***	0.000	7.7485***	0.015	40.678***	0.000
Exp- F	122.529***	1.000	19.713***	0.000	48.796***	0.000
Lc^b					0.9036***	0.277

"Notes: We calculate p-values using 2000 bootstrap repetitions; Hansen–Nyblom parameter stability test for all parameters in the VAR (1) jointly. ***Significance at 1%."

Depending on the mentioned parameter stability assessments, it can be stated that the nonexistence of any full-sample causality between PS and EG is not reliable. The rolling windows technique is used to evaluate and confirm a causal connection between political stability and economic growth for the structural variations interpretation. Unlike the full sample causality test, this technique examines the causal

association between the variables more precisely because of the time difference, un-like subsamples. The residual-based bootstrap and modified likelihood ratio approach are applied for the test of subsamples' causality to assess the connection between the political stability and economic growth. The null hypothesis test suggests that po-litical stability does not granger cause economic growth ~~and the other way around~~. The Likelihood ratio p-value of bootstrap can be calculated through VAR models mentioned as Equation 1 through applying the rolling subsample dataset comprising the data of 24 months. After trimming 24 months of data from the start of the entire sample, these rolling calculations shift from 2002 to 2007:01.

Figure 1a: A bootstrap p-value of rolling test statistic that PS does not Granger cause EG.
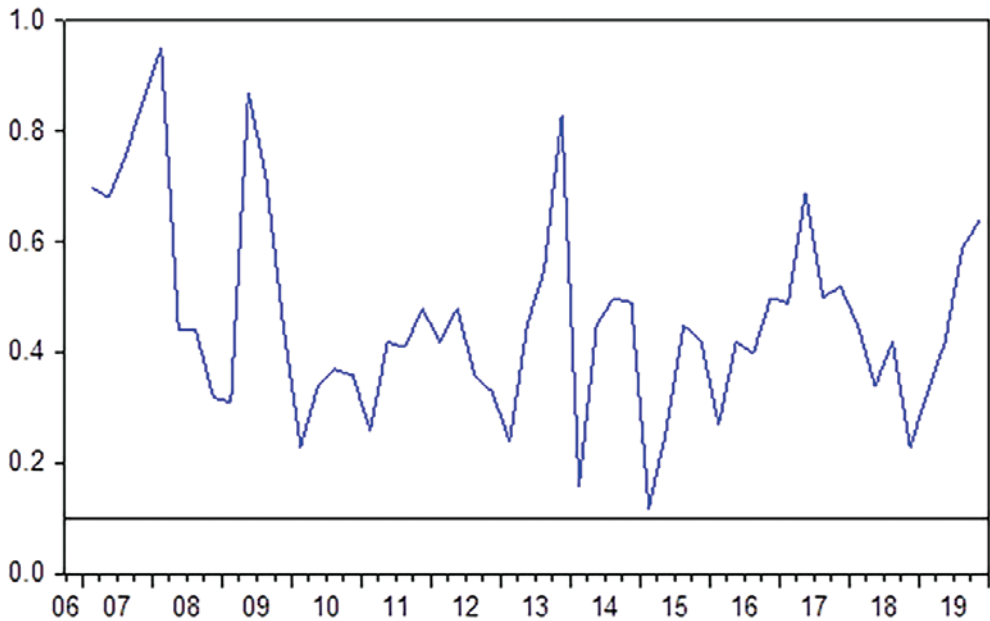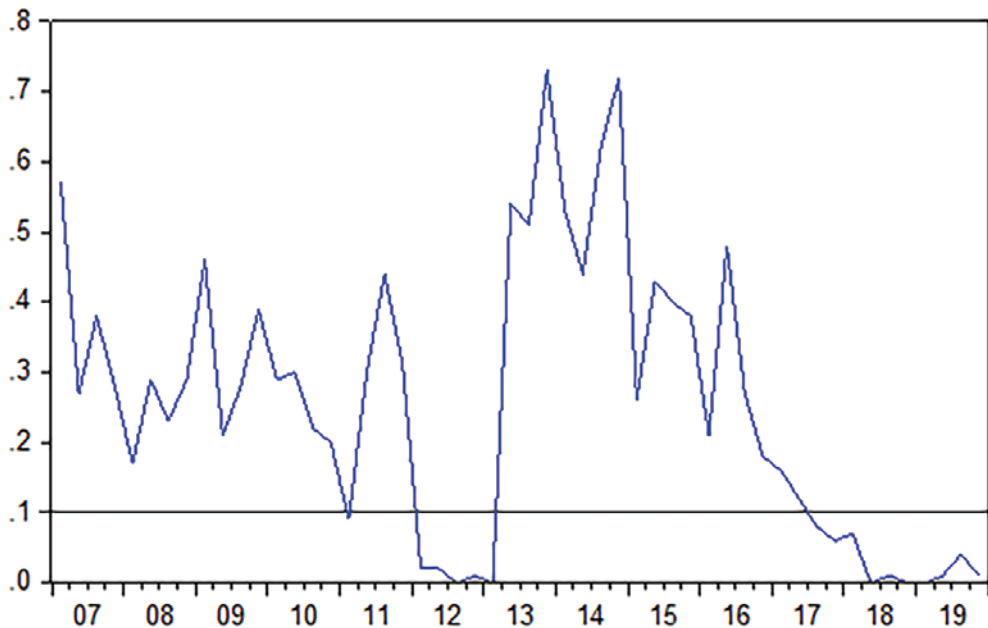
Figure 1b: A bootstrap p-value of rolling test statistic that PS does not Granger cause EG.

Furthermore, Figure 1(a) and (b) exhibit that the null hypothesis of political stability does not Granger cause economic growth; hence, the null hypothesis is rejected at the 10% significance level in many subsample datasets, comprising 2007 to 2019. While Fig. 2(a) and (b) indicate that the two subsamples duration 2007 to 2019 from PS to EG have a positive relationship for the UK, while a negative relationship is observed for the US from 2015 to 2019.

As in 2015, various events took place, such as African-American worshippers being shot dead in Charleston Church then again in December at San Bernadino, California, 14 people were shot dead while 21 were injured. In 2016, Donald Trump won the election, termed "the biggest political upset in US history". However, in 2017, President Trump restricted the visas for people willing to travel to the US related to certain Muslim majority countries. Moreover, President Trump fired the FBI director James Comey in 2017, which affected Trump's reputation because the President was blamed for influencing the inquiry about alleged collusion with Russia for influencing the 2016 election results. In the same year, in August, Trump was frequently criticized for the higher rate of violence prevailing in the country. In April 2018, China imposed 25% tariffs on several US products and the US took the same measures in return. While President Trump was charged with misusing the authority and obstruction of Congress in 2019. It was published that the President's trial began in

the coming month (BBC, 2019). The mentioned events tarnished the political leader's image, and the President's policies pushed the political condition towards instability, affecting the economy's growth. Therefore, the study's findings confirm that such events negatively affected economic growth due to political conditions within the US economy from the period 2015 to 2019, respectively.

While the UK political stability adversely affected economic growth due to various reasons in 2013, 2016, and 2018. In 2013 Prime Minister David Cameron suggested a referendum to exit from the European Union after the coming election (BBC, 2018). The announcement penetrated the investors' fear about the political uncertainty leading the investor to reconsider the investment decision. Secondly, Boris Johnson imposed restrictions on the unlimited and unrestricted ratio of immigrants because of which skilled and unskilled labor percentage decreases along with the issue of Brexit. As the UK completely relies on foreign workers, among which the ratio of EU workers is the highest. The uncertainty among employees increased owing to such restrictions, resulting in the decrease in production and aggregate demand because of which the entrepreneurs and businesses had to face loss (Simionescu et al., 2017; Taylor-Gooby, 2017). According to Dhingra et al. (2016), it was predicted that such limitation on immigrants would be in favor of illegal immigrants as it would upsurge the burden on social facilities such as educational institutes and hospitals that would be a huge pressure on resources for nation concluding that the economy would suffer. In 2018 the political uncertainty again escalated because of the leading ministers and Boris Johnson's resignation as a tool to protest against the government policy for a free trade area with the EU. Correspondingly, an increased rate in hate crimes was witnessed in England and Wales during 2018. Alternatively, Simionescu et al. (2017) state that restrictions on immigration, the technical jobs, and professional jobs will be offered to the locals that would reduce the percentage of employment and improve the productivity ratio, and it would promote free trade. The well-being of the economy is measured when its currency value is evaluated. The British pound gained strength since the slight downturn in 2018 indicated that people believe the uncertainty regarding politics somehow has reduced. Thus, it is indicated that political stability enhances economic growth.

Figure 2a: Bootstrap estimates of the sum of the rolling-window coefficients for the impact of PS on EG.
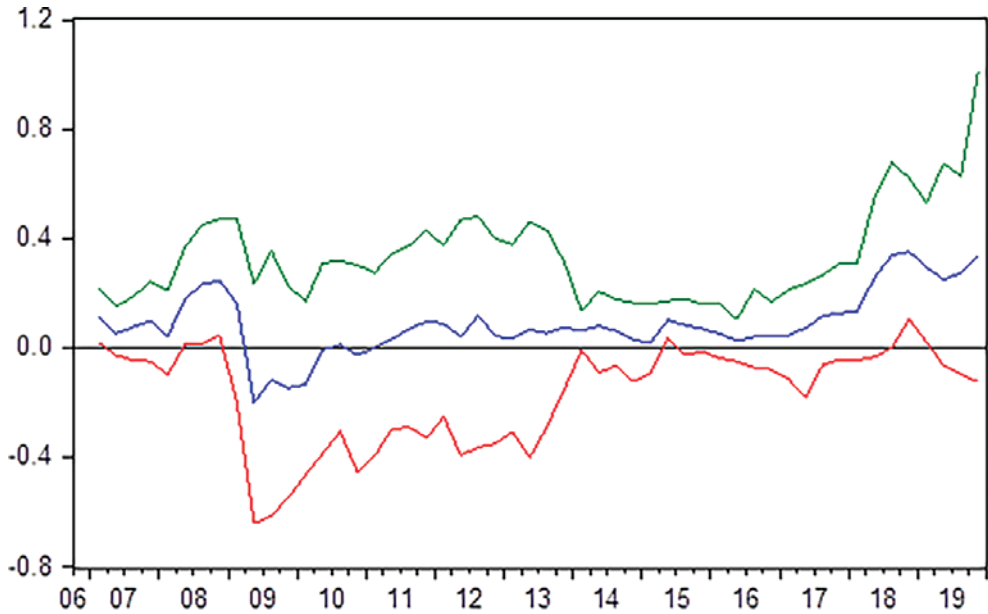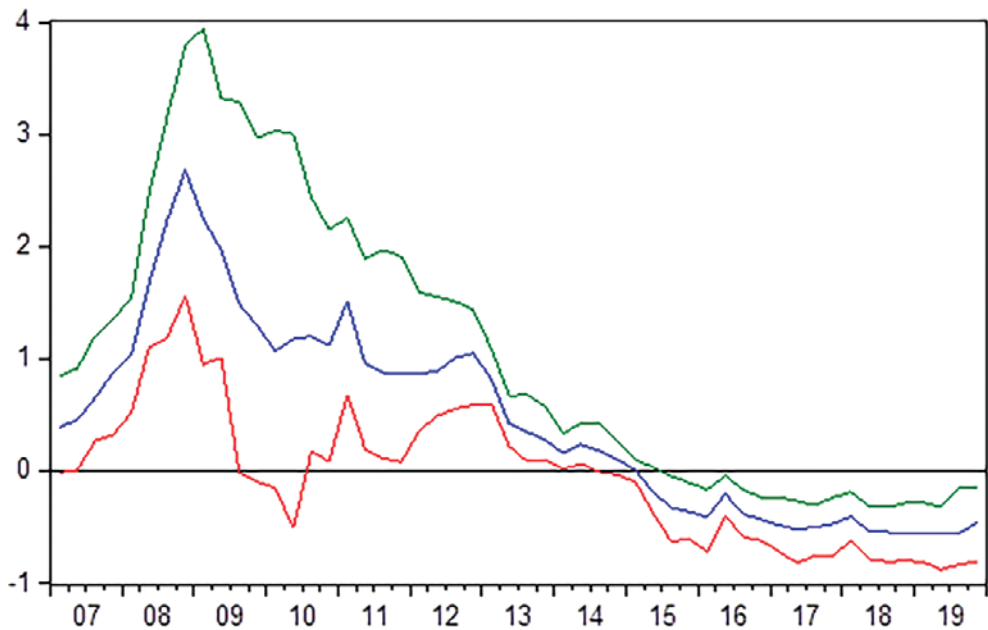

Figure 2b: Bootstrap estimates of the sum of the rolling-window coefficients for the impact of PS on EG.

Furthermore, a stable political environment increases the tourism that brings foreign currency and boosts economic development (Demiralay, 2020). Other factors such as technological advancement, skilled labor force, employment rate, trade, and others depend on the country's political situation; as these factors substantially enhance economic growth. Higher uncertainty related to political stability adversely affects the economic performance that causes a decrease in growth rate. Similarly, in the US since 2015, political instability has increased, which indicates that the economy is under great pressure along with the economic growth. Secondly, in the UK, the political situation was a bit on and off due to Brexit's influence on economic growth. Due to policies and predicted measures, the political instability has reduced and hence improved the economic growth. Overall, Fig. 2(a) and (b) exhibits the sub-sample rolling in both the constructive and adverse effects of political stability and economic growth.

Figure 3a: Bootstrap p-value of rolling test statistic testing the null that EG does not Granger cause PS.
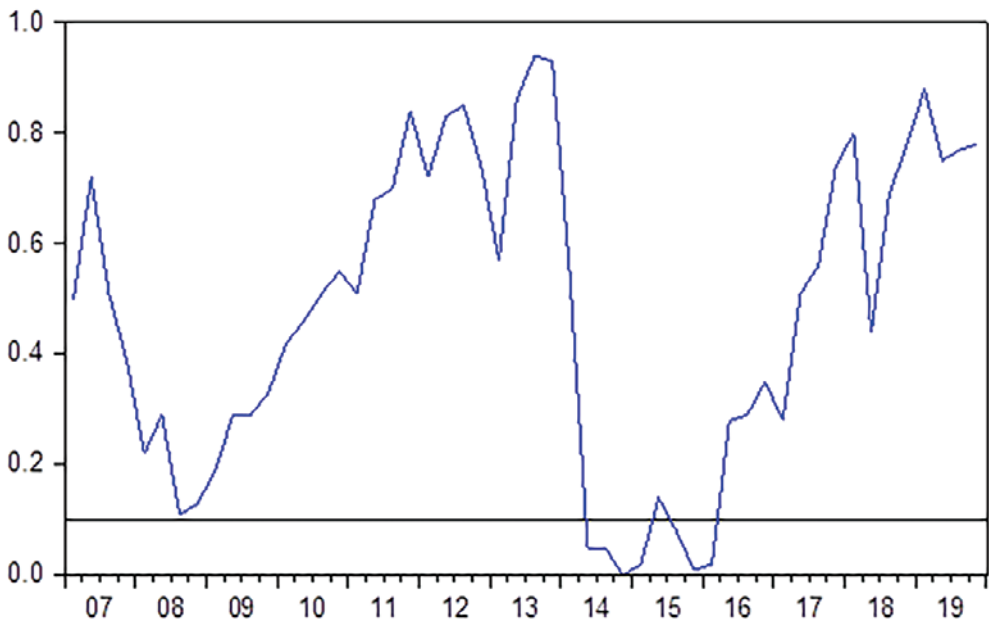
Figure 3b: Bootstrap p-value of rolling test statistic testing the null that EG does not Granger cause PS.
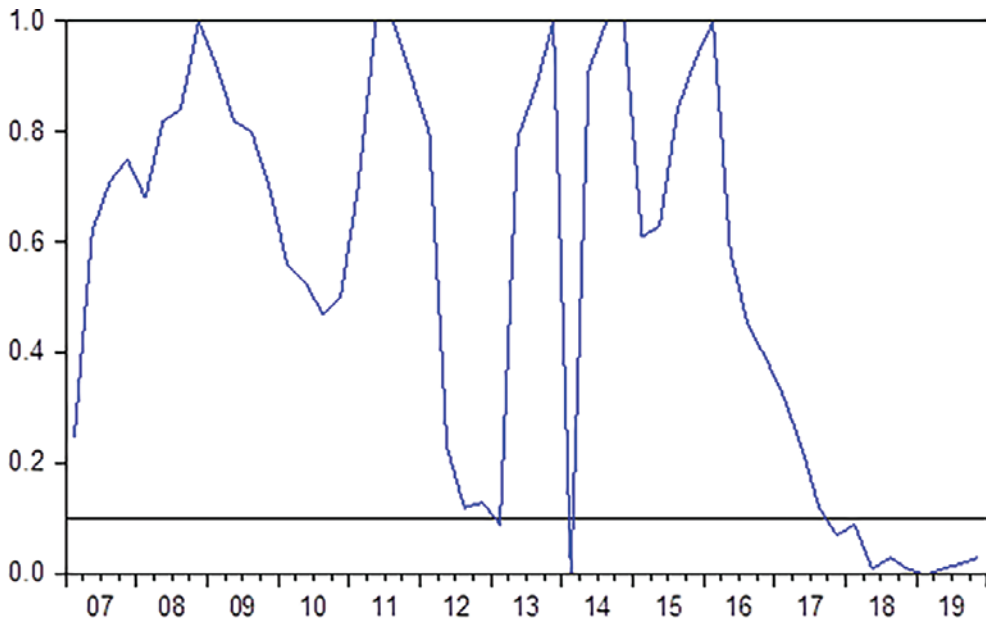

Figure 3(a) and (b) exhibit the rolling bootstrap p-values of the Likelihood ratio statistic with the H_0; the table indicates that EG does not Granger cause PS. Fig. 3(a) indicates that the H_0 is not-accepted in subsamples for the duration from 2013:10 to 2014:10 and 2015:01-2015:08 for the UK. While for the US, the H_0 is not-accepted in subsample from 2013:10-2013:11 and 2017:03-2019 and onwards. Figure 4(a) represents a promotional effect of EG on PS in a few sub-periods, significant for UK economic development. For the US, Figure 4(b) exhibits a positive relation between EG and PS, nevertheless, a negative relation is observed between the variables in 2011-2012 and 2016-2019 onwards. It is stated that growth can lead to political instability where political institutions are weak (Paldam, 1998). According to Cox and Weingast (2018), a higher rate of economic growth can enhance political stability by reducing the likelihood of a change in government, which in turn helps to lower uncertainty and instability. This can further stimulate investment in development, contributing to economic growth. The chances of a political leader or party depend upon the economic performance and growth of the economy by evaluating the percentage of investment.

Similarly, in the UK, the economy is financially strong; even during the financial crisis, the country exhibited growth (Bangham, 2019). Gradually, the UK's wealth has reached £12.8 trillion because of the government's policies. Therefore, Brexit's blow did not damage the economy, neither the UK categorization as a politically

stable country affected the economy. Accordingly, the government announced the most appropriate and suitable policies for its people. Thus, the growth of the US economy was affected by the events such as the march of 1000 people on the streets of New York in 2011 for the cause of "Occupy Wall Street" because of the income inequality and impact of wealth in politics indicated that policies of the government were not appropriate; thus, Figure 4(b) demonstrates the negative impact. In 2016, the election in the US and Donald Trump Presidency impacted economic growth adversely which significantly increased the political instability. While in 2019, President Trump was accused of misusing the authority, and the obstruction of Congress negatively affected the US's economic performance (Pruitt, 2019).

Figure 4a: Bootstrap estimates of the sum of the window coefficients for the impact of EG on PS.

Figure 4b: Bootstrap estimates of the sum of the window coefficients for the impact of EG on PS.
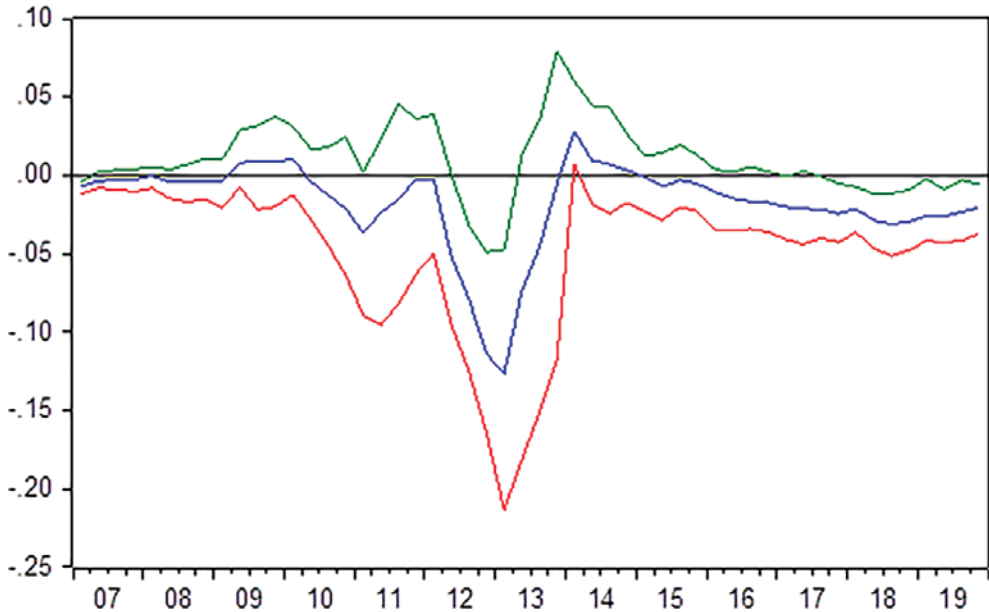
The findings of the sub-period rolling window indicated the following: firstly, there is a causal relation between PS and EG. Subsequently, political stability and policies adopted by the government significantly contribute to EG. Thirdly, a strong financial background assists economic growth and sustains political stability. The association between PS and EG for the UK and US is bidirectional. A slight glitch in one of the variables has a massive effect on other variables. In the UK crisis, because of Brexit and the US because of the recent election, Trump's policies and other events significantly affected economic growth, categorizing the economies as politically unstable. Economic prosperity increases the chances of political stability by reducing the risk of government failure. The results indicate that the investment risk has been reduced, and the investment within these countries would be safe. Correspondingly, these funds are used purposely to strengthen the tourism sector, research, and development, technological enhancement, and training of employees to boost the economic performance and growth rate. Moreover, the policies adopted and planned by the government significantly influence the image and growth of the economy. The above stated events mostly hints towards the inappropriate policy government opted to portray the unstable political situation.

Conclusion

Recently, the link between PS and EG has been of significant importance. The study intends to emphasize the cause and effect relation between the UK and the US's political stability and EG by utilizing the data for the duration 2002-2019 analyzed through the rolling window technique. The data of the variables were acquired from two sources named the WGIs' (2020) and the WB. The rolling window technique proposes a hypothetical framework that assumes that the connection between political stability and economic growth are endogenous variables. The study results indicate that political stability granger-cause economic growth and economic growth also granger-cause political stability. It means a stable political environment promotes economic growth. Investors determine that investing in such countries would be safe, improve infrastructure, and strengthen the tourism industry, friendly trade policies, and others. These factors enhance economic performance and increase government revenue owing to which the government becomes eligible to allocate better and more resources for technological advancement, research and development. Secondly, economic growth increases political stability as it reduces the chances of government failure and increases internal and external investment. Political instability exists in the UK due to the Brexit issue. Nevertheless, on account of strong financial background and economic growth, the economy was not much affected by such conditions, and the political conditions are far better. While in the US, the instability prevailed faster and disrupted economic performance because of the government's inappropriate policies. It resulted in portraying the country's negative image to investors, due to which the process of economic development was stagnant and immobile. Similarly, government policymakers are responsible for planning and implementing such laws and policies to increase the economic growth rate. Correspondingly, the government should focus on substantial workforce, modification of technology, respect cultural differences, effectiveness of economic and social establishments, and foreign trade policies for the efficient performance of the economy. Moreover, when the economy (UK) is expected to experience many job losses the government should encourage entrepreneurs and small businesses with government support to provide employment opportunities and reduce the gap between the employment and unemployment rate.

Data Sharing Policy:

Declarations

Conflicts of interest/Competing interests

There is no conflict of interest/Competing interests

Availability of data and material

The data that support the findings of this study are available from the corresponding author upon reasonable request[2].

Code Availability

The computer program results are shared through the tables in the manuscript.

Authors' Contributions

Sajid Ali: writing – original draft, writing – review & editing, methodology, formal analysis
Syed Ali Raza: conceptualization, writing – original draft, writing – review & editing, supervision
Maiyra Ahmed: writing – original draft, writing – review & editing, data curation

NOTES

[1]   When a company has a strong track record of creating jobs and providing opportunities for its em-
       ployees, it can demonstrate its ability to generate revenue and contribute to the local economy. This
       can be attractive to investors who are looking for companies that are likely to be successful in the
       long term.
[2]   WGI-Home. (2021). Retrieved 11 January 2021, from http://info.worldbank.org/governance/wgi/
       GDP per capita (constant LCU) | Data. (2021). Retrieved 11 January 2021, from https://data.world-
       bank.org/indicator/NY.GDP.PCAP.KN

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