Is the reports-based measure of uncertainty stationary? Evidence from a new panel residual augmented least squares unit root test

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Abstract

To avoid spurious inferences, researchers analyzing the dimensions of uncertainty need to determine whether it is nonstationary. The degree of persistence of uncertainty also indicates the duration of the negative impact of an uncertainty shock on the economy. We use the panel residual augmented least squares unit root test of Lee and Tieslau (2019), that allows for heterogeneous structural breaks in both intercepts and slopes of a series, to determine the degree of persistence of the reports-based measure of uncertainty and whether it is nonstationary for 143 countries. This group of countries accounts for 99 percent of the world's gross domestic product (GDP). To assess the robustness of our results we also use recently developed univariate time-series unit root tests that allow for structural breaks and panel unit root tests that accommodate cross-sectional dependence and nonlinearity. Furthermore, an autoregressive wild bootstrap approach is utilised to examine the stationarity of the series. The results are virtually unambiguous in indicating that the reports-based measure of uncertainty is stationary in all countries considered. The results also suggest that uncertainty has a negative impact on the growth rate of GDP. The policy implications of the results are also discussed.

KEYWORDS: Reports-based measure of uncertainty; residual augmented least squares; stationarity; structural breaks; multi-country study

JEL CLASSIFICATION: C22, E60

1. Introduction

A reports-based measure of uncertainty encompasses uncertainty associated with political and economic developments, involving both near-term as well as long-term concerns (Ahir et al. 2018). Uncertainty has been prevalent for several decades and has recently intensified. The key reasons for the recent increase include the Severe Acute Respiratory Syndrome (SARS) outbreak of 2003, the global financial crisis of 2007-2009, the US withdrawal from the Trans-Pacific Partnership (TPP), the Brexit fiasco and the ongoing European immigration crisis. There have also been a series of economic and debt crises in the Eurozone, El Niño, the ongoing trade disputes among several superpowers and the 2020 coronavirus pandemic (Baker et al. 2016; 2020). Due to today's increasingly interconnected world, the importance of uncertainty in policies related to economic decisions is higher than ever before (Al-Thaqeb and Algharabali, 2019). Uncertainty is associated with friction in financing and has recently been an important cause of reduced economic growth in several countries. This is mainly because uncertainty increases the likelihood that individuals and businesses will reduce their investments and spending with the resulting negative impact on economic activity.

In order to strengthen the understanding of uncertainty, numerous papers have recently emerged on different aspects of uncertainty. One of the aspects of uncertainty that has been overlooked in the foregoing empirical studies is the testing of whether the series measuring it is nonstationary. This issue is important for reasons that include the following. First, the degree of uncertainty persistence will determine the size and duration of the negative impact of an uncertainty shock on the financial system and the economy. Hence, the magnitude of the persistence of uncertainty will define the level of remedial actions required by the authorities to ameliorate the negative impacts of an uncertainty shock. Second, neglecting to test whether a series has a unit root can yield misleading empirical evidence. In other words, using standard econometric methods that assume stationary data will be subject to spurious regression when the variable(s) under investigation are nonstationary. For instance, conclusions made from regression results that are based on standard ordinary least squares (OLS) estimates are not reliable if an inaccurate assumption of the stationary properties is adopted (Zerbo and Darné, 2019). Further, if the uncertainty series is difference stationary any inference about convergence of the relative uncertainty series may be inaccurate because there would be no possibility of convergence among the series in this situation (Dawson and Strazicich, 2010). If the uncertainty series is persistent this makes it hard to forecast future values of the uncertainty series simply by relying on its previous trend. Therefore, it will be difficult to use the uncertainty variable as a leading indicator to predict macroeconomic variables and financial markets.

Only a few known studies have examined the persistence of uncertainty. First, Gil-Alana and Payne (2019) used fractional integration methods to show that the news-based measure of uncertainty was mean reverting in the U.S. However, the dimension of news-based measures of uncertainty differs across different countries as local factors play important roles. Moreover, the data sources used for the computation of the news-based measure of uncertainty differs across countries. Hence it cannot be presumed that the results obtained for the U.S. will generalise to other countries. Second, Plakandaras et al. (2019) used a Fourier-based approach to examine the persistence of the news-based measure of uncertainty in 23 countries and the results showed that most of the uncertainty indices are persistent. Although the Fourier-based approach accommodates structural shifts it cannot identify the period when breaks occur. Solarin and Gil-Alana (2021) investigated the persistence of a news-based measure of uncertainty in 23 nations. Using fractional integration techniques, the results show that the series have mean reverting behaviour in all countries. However, the fractional integration technique adopted in the study ignores the possibility of structural breaks. Moreover, the measure of uncertainty has not been tested for a unit root for the vast majority of countries in the world.

Our paper provides two main contributions to the literature on uncertainty. First, we examine the persistence of a reports-based measure of uncertainty in 143 countries, which accounts for 99% of global gross domestic product (GDP). The uncertainty series is constructed based on the number of occurrences of the term “uncertainty” (and its variants) in the Economist Intelligence Unit country reports, which are available on a quarterly basis (Ahir et al., 2018). Previous studies that have used this dataset to estimate the relationship between uncertainty and different variables include Chisadza et al. (2020), Adedoyin et al. (2021) and Nguyen et al. (2021). The use of a reports-based measure of uncertainty has enabled us to investigate a large number of countries. This contrasts with previous studies that have used a news-based measure of uncertainty. By considering substantially more countries than previous studies, we broaden the countries where such inference is available. Second, we use the Lagrange multiplier (LM) based panel unit root test of Lee and Tieslau (2019) that allows for heterogeneous and endogenously determined structural breakpoints in both intercepts and slopes of a variable. Moreover, the breakpoints are allowed to occur in different time periods for each country. Importantly, no nuisance parameters are associated with the break locations for this test, which contrasts with most of the previous panel unit root tests. This is the first application of this test to the reports-based measure of uncertainty. We augment the inference from this method by applying other time series and panel unit root tests to provide robust conclusions. A wild bootstrap test is also used examine the stationarity of the uncertainty series.

The empirical findings are practically unambiguous in demonstrating that the uncertainty series is stationary in the countries considered.

The rest of the paper is organised as follows. Section 2 describes the methodology, which includes both the description of the data as well as the LM panel nonstationarity test that we use. Section 3 presents the empirical findings, while the conclusions of the paper are discussed in Section 4.

2. Data and Methodology

2.1 Data

Although it is straightforward to define the foundations of uncertainty conceptually, it is intrinsically unobservable and its measurement is not straightforward. However, significant steps have recently been made in the estimation of uncertainty, mainly through textual analysis (Deutsche Bank Research, 2018). In this study, we use the dataset provided by Ahir et al. (2018) that computes an uncertainty index through textual analysis. This is based upon counting the frequency that "uncertainty" (and its different variants such as “uncertain”) occur in the quarterly country reports of the Economist Intelligence Unit (EIU).[1] The index is available from the first quarter of 1996 for 143 countries. It covers 37 high-income countries, 39 upper middle-income countries, 35 lower middle-income and 27 low-income countries.[2]

The EIU reports cover important economic and political developments in each nation, in addition to the analysis and forecasts of economic, policy and political conditions. For instance, the index covers uncertainty associated with near-term economic and political

[1] The dataset can be found at https://www.policyuncertainty.com/wui_quarterly.html.
[2] This is based on the World Bank’s classification of economies into four income groups, see: https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups.

developments (e.g. uncertainty arising from the referendum vote for the UK to leave the European Union) and long-term concerns (e.g. uncertainty caused by tensions between South and North Korea or the looming withdrawal of multinational armies in Afghanistan). The series are collated by country-specific groups of experts alongside a central editorial team at the EIU. The raw counts are normalized by the total number of words in each report in order to make the uncertainty index consistent across countries. The higher the value of the uncertainty index the greater the uncertainty (Ahir et al., 2018). One of the advantages of the index is that it is not model specific because its construction does not involve the rigorous estimation of a large-scale model. Further, the dataset is readily available for download to the public.

Descriptive statistics of the uncertainty data for all countries is presented in Table 1. The mean statistics suggest that lower middle-income countries tend to experience the highest degree of uncertainty followed in order by low-income, high-income and upper middle-income countries. Hence, this indicates that uncertainty tends to be lower in advanced economies compared to the rest of the world. The standard deviation of uncertainty is highest in low-income countries followed by lower middle-income, upper middle-income and high-income countries, respectively.

Table 1 about here

We plot graphs of the uncertainty series for each of the four income groups in Figures 1-4. The averages of the uncertainty series in each of the income clusters are displayed in the graphs. The graphs clearly show that all income clusters experienced structural breaks. For instance, there were breaks in 2003Q3 and 2016Q1 in high-income countries and a sharp break occurred in upper middle-income countries in 2018Q1.

Figure 1 about here

Figure 2 about here

Figure 3 about here

Figure 4 about here

Before applying unit root tests, we assess the persistence of the uncertainty series using Hurst's (1951) exponent approach. The Hurst exponent captures the long-term memory of a variable. Values of the Hurst exponent below 0.5 indicate mean reversion while values above 0.5 suggest strong long-term trend persistence. The results, reported in Table 2, are virtually unambiguous in indicating that the reports-based measure of uncertainty is mean reverting.

Table 2 about here

2.2 Unit root test

There are several Dickey Fuller (DF) type and LM-type panel unit root tests available in the literature. Existing panel DF-type tests suffer from nuisance parameter problems in the presence of either level or trend shifts or both, while LM-type tests can suffer from this problem when there are trend shifts (Lee and Tieslau, 2019).[3] However, it is desirable to use a panel unit root test that is free from nuisance parameters otherwise it is not practical to generate critical values for the test that are not reliant on the nuisance parameters of all combinations of break locations.[4] Lee and Tieslau's (2019) LM panel unit root test endogenously determines

[3] A nuisance parameter is one that is not of primary interest however it should be taken into consideration when analysing the parameters that are of primary interest.

[4] One means to circumvent this problem is to impose the restriction that the breakpoints occur simultaneously for panel members. However, such a restriction is not practical (Lee and Tieslau, 2019).

heterogenous breakpoints in both the intercept and trend of a series and is free from nuisance parameters as is desirable. It starts with the following data generating process (DGP):

$$y_{it} = Z_{it}^{'}a_i + e_{it} \text{ with } e_{it} = \rho_i e_{it-1} + \varepsilon_{it,} \; i = 1,...\text{N}; \; \text{t} = 1,...\text{T}, \tag{1}$$

where y is the series under investigation, i denotes each cross-section, t represents each time period, with e_{it} and ε_{it} being error terms. There following assumptions are associated with the specification in equation (1). ε_{it} follows the classical assumptions of a zero mean and constant variance. The null hypothesis is that there is a unit root for all i, that is, H_0: $\rho_i = 1$ for all $i = 1, \dots, N$ while the alternative is H_1: $\rho_i < 1$ for at least one i. Z_{it} is a vector of exogenous (deterministic) terms that are potentially different for each i. In our application the dummy variables that can accommodate shifts in both level and trend are also included in Z_{it}. A model that allows for both intercept and trend breaks can be specified with:

$$Z_t = \left[1, t, D_{1t}, DT_t^*\right]', \tag{2}$$

where, $D_{it} = 1$ for $\text{t} \geq T_{Bi} + 1$ and 0, otherwise, and $DT_{it}^* = t - T_{Bi}$ for $\text{t} \geq T_{Bi} + 1$ and 0 otherwise. T_{Bi} represents the single time period location of the breaks for each i. To allow for multiple (R) break dates, additional dummy variables can be introduced into the model, thus:

$$Z_{it} = \left[1, t, D_{i1t}, \dots, D_{iRt}, DT_{i1t}^*, \dots, DT_{iRt}^*\right]', \tag{3}$$

where, $D_{itr} = 1$ for $\text{t} \geq T_{Bir} + 1, r = 1, \dots, R$ and 0, otherwise, and $DT_{itr}^* = t - T_{Bir}$ for $\text{t} \geq T_{Bi} + 1$ and 0 otherwise. T_{Bir} represents the break date in period r for each i.

This test is applied in two steps. The first step involves detrending the series under investigation such that:

$$\tilde{y}_{it} = y_{it} - \tilde{\psi}_i - Z_{it}\tilde{\delta}_i, \tag{4}$$

where the de-trending coefficient $\tilde{\delta}_i$ is generated from the specification using the first differences of y_{it} and Z_{it} which are Δy_{it} and ΔZ_{it}, respectively. $\tilde{\psi}_i$ is the restricted maximum likelihood estimate (MLE) of ψ_i, where $\tilde{\psi}_i = y_{i1} - Z_{i1}\tilde{\delta}$. The second step yields the unit root test statistics for each i using the following specification:

$$\Delta y_{it} = \delta_i^{'}\Delta Z_{it} + \phi_i \tilde{y}_{it-1} + e_{it,}\ i = 1,\dots,N;\ t = 1,\dots,T, \tag{5}$$

where ΔZ_{it} includes a point (impulse) dummy variable, $B_{it} = \Delta D_{it}$. This impulse dummy does not impact the test's asymptotic distribution however it must be included in the test equation. To correct for autocorrelation and heterogeneously distributed innovations, the regression is further augmented with lagged terms, thus:

$$\Delta y_{it} = \delta_i^{'}\Delta Z_{it} + \phi_i \tilde{y}_{it-1} + \sum_{p=1}^{p} d_{ip}\ \Delta\tilde{y}_{it-p} + e_{it,}\ i = 1,\dots,N;\ t = 1,\dots,T. \tag{6}$$

The univariate LM nonstationarity test statistic for the i^{th} cross sectional unit is the t-statistic for the null hypothesis $\phi_i = 0$ in equation (6). In contrast to Amsler and Lee's (1995) specification with breakpoints in the intercept, the distributions of the test statistics with breakpoints in the slopes are dependent on the nuisance parameters, λ_{ir^*}, which denote the portion of sub-samples in each regime, where, $\lambda_{i1*} = T_{Bi1}/T, \lambda_{ir*} = (T_{Bir} - T_{Bi,r-1})/T, r = 2,\dots,R,$ and $\lambda_{i,R+1*} = (T - T_{BiR})/T$ (Lee and Tieslau, 2019). Nevertheless, based on the method of Park and Sung (1994), it is possible to eradicate the reliance of the test statistic on the nuisance parameters through the following transformation:

$$\tilde{y}_{it}^{*} = \begin{cases} \dfrac{T}{T_{Bi1}} \tilde{y}_{it} \quad \text{for } t \le T_{Bi1}, \\ \dfrac{T}{T_{Bi2} - T_{Bi1}} \tilde{y}_{it} \ \text{ for } \ T_{Bi1} < t \le T_{Bi2}, \\ \vdots \\ \dfrac{T}{T - T_{BiR}} \tilde{y}_{it} \ \text{ for } \ \le T_{BiR} < t \le T. \end{cases} \tag{7}$$

We then use $\tilde{y}_{it-1}^{*}$ to replace $\tilde{y}_{it-1}$ in equation (6) to give:

$$\Delta y_{it} = \delta_i^{'} \Delta Z_{it} + \phi_i \tilde{y}_{it-1}^{*} + \sum_{p=1}^{p} d_{ip} \ \Delta \tilde{y}_{it-p} + e_{it,} \ i = 1,\ldots,N; \ t = 1,\ldots,T, \tag{8}$$

We denote $\tilde{\tau}_i^{*}$ as the t-statistic for the null hypothesis $\phi_i = 0$ applied to equation (8). The asymptotic distribution of this test statistic is:

$$\tilde{\tau}_i^{*} \rightarrow -\frac{1}{2}\left[\sum_{r=1}^{R+1} \int_0^1 \underline{V}_i(r)^2 \, dr \right]^{-1/2}. \tag{9}$$

Where $\underline{V}_i$ is the term that represents the forecast of the process $V_i(r)$ on the orthogonal complement of the space, which is covered by a trend function expressed through the interval $r \in [0,1]$, whereby $V_i(r) = W_i(r) - rW_i(1)$, and $W_i(r)$ represents a Wiener process for $i = 1,,\ldots,R.$

The important characteristic of the specification in equation (9) is that the distribution is not reliant on the nuisance parameter λ. Therefore, the transformed test statistic, $\tilde{\tau}_i^*$, does not rely on the nuisance parameter in the trend breakpoint specification, even though information on the breakpoint location is needed in the construction of the test statistic. As a result of the transformation, the test's asymptotic distribution is only dependent on the number of breakpoints in the slope because the distribution is expressed as the aggregate of *R* exogenous stochastic terms.

Under the scenario of one breakpoint in the trend (*R*=1), the distribution of the test is similar to the untransformed test with $\lambda = 1/2$, irrespective of where the breakpoints are located. Likewise, with two trend breaks (*R*=2), the distribution is similar to that of the untransformed test with $\lambda_1 = 1/3$ and $\lambda_2 = 2/3$. An analogous argument applies to the general multiple (*R*) break case, that is, the distribution is similar to that of untransformed test with $\lambda_r = r/(R+1), r = 1,\dots,R.$ Hence, new critical values are not required for each combination of possible break points. On the contrary, separate critical values are only needed for each R, being the number of break dates.

3. Empirical findings

Prior to unit root testing we seasonally adjust our quarterly data series using the X-12 Auto Regressive Integrated Moving Average (or X-12-ARIMA) method developed by the United States Bureau of the Census. In Table 3 we first report the following panel unit root tests that do not account for structural breaks: the ADF-Fisher Chi-square Maddala and Wu (1999), PP-Fisher Chi-square Maddala and Wu (1999), Breitung (2000) and Im et al. (2003) tests. The null hypothesis of all four tests is that the series are nonstationary for all countries whereas the alternative is that at least one country's series is stationary. For three of the tests the null hypothesis is rejected for all four country groupings, however, the Breiting (2000) test does not reject the null for three of the four income groupings. That is, all four tests unambiguously suggest at least one country's series is stationary for the lower middle-income country grouping. However, for the other three country groupings the evidence is ambiguous because the Breiting test indicates all countries' series in these three groups are nonstationary whereas the other three tests suggest at least one country's series is stationary.

Table 3 about here

The above panel tests do not allow for cross-sectional dependence or nonlinearity. Not accounting for cross-sectional dependence, when it is present, can lead to inaccurate inference (Pesaran, 2007). Moreover, the parameter estimates will be biased asymptotically, when using a linear testing framework if there is nonlinearity (Hamilton, 2011). To address these issues, we report the Pesaran (2007) and Cerrato et al. (2011; 2013) panel unit root tests in Table 4. The Pesaran (2007) test allows for cross-sectional dependence, while the Cerrato et al. (20011; 2013) test accommodates both cross-sectional dependence and nonlinearity. The null hypothesis of both tests is that all series in the panel are nonstationary. The results of both tests indicate that at least one country's series is stationary for all four country groupings. However, the above tests do not indicate how many countries' series are nonstationary.

Table 4 about here

Hence, we report the Im et al. (2005) panel unit root test and corresponding univariate unit root tests for each country to provide an indication of how many countries series are nonstationary in Table 5. The version of the test we report does not accommodate structural breaks and uses the procedures in Meng et al. (2013) to generate univariate LM output (with no breaks).[5] The results for high-income countries are given in Panel A and the panel test rejects the null that all series for high-income countries are nonstationary at the 1% level. The univariate version of test suggests that most high-income countries' uncertainty series are stationary. The results for upper middle-income countries, lower middle-income countries, and low-income countries are reported in the other panels of Table 5 and the panel test results indicate at least one countries' uncertainty series is stationarity in each group. The corresponding time series results suggest most countries in these groups have uncertainty series that are stationary.

Table 5 about here

To accommodate possible structural breaks, we apply Lee and Tieslau's (2019) panel unit root test and Lee et al's (2012) corresponding time-series test. The results of these LM tests that allow for one structural break in both intercepts and trends are reported in Table 6. The results for high-income countries are given in Panel A. Lee and Tieslau's (2019) panel test rejects the null that all countries' series in the high-income group are nonstationary at the 1% level. To indicate how many of these countries' series are stationary we refer to Lee et al's (2012) univariate version of the test. This test's results reject the null of nonstationary for all high-income countries at the 1% significance level suggesting all countries' series in this group are stationary. We note that 8 (19%) of the identified breakpoints occurred in the late 2000s, which was a period coinciding with the global financial crisis and its aftermath. Another 6 (14%) of the breaks occurred in 2016 and 2017, which was at the time of Brexit and the U.S elections and their aftermaths.

[5] This involves the untransformed version of the Meng et al. (2013) tests.

Table 6 about here

Panel B of Table 6 reports the results for upper middle-income countries. The LM panel statistic rejects the null that all countries' series are nonstationary at the 1% level suggesting at least one country's series is stationary. The univariate LM unit root test rejects the nonstationary null for all upper middle-income countries at the 1% significance level indicating that the series is stationary for all countries in this group. We find that 11 (28%) of the breakpoints occur in the early 2000s, which was a period that includes the 2001 recession and the start of wars involving several countries. Another 14 (36%) of the breakpoints occur during the early part of the 2010s, which was a period of economic crises in several upper middle-income countries including Brazil, Russia, Turkey and Venezuela.

We report the results for the lower middle-income countries in Panel C of Table 6. The LM panel statistic rejects the null that all countries' series are nonstationary at the 1% level while the corresponding univariate test rejects the nonstationary null for all upper middle-income countries at the 1% significance level. This suggests that all upper middle-income countries' series are stationary. We observe that 7 (20%) of the breakpoints occur in the early 2000s, which coincided with the stock market downturn of 2002. Another 17 (49%) breaks take place towards the beginning of the 2010s, which was a period of economic crises and conflicts in many middle-income countries, including Ukraine and Nigeria.

Panel D of Table 6 reports the results for low-income countries. The LM panel unit root test rejects the null that all countries' series are nonstationary at the 1% level. The univariate LM unit root test rejects the null of nonstationary for 26 of the 27 low-income countries at the 1% significance level and for the remaining country (Central African Republic) at the 10%

level of significance. We note that 7 (26%) of the breakpoints occur in the late 2000s, which coincided with the global financial crisis of 2007-2009. Another 10 (37%) of the breaks are in the early 2010s, which was when El Niño, that affected the agricultural output of several low-income countries, began.

The results of the LM tests that allow two structural breaks in both intercepts and trends are reported in Table 7. The results for high-income countries are given in Panel A, for upper middle-income countries in Panel B, lower middle-income countries in Panel C and low-income countries in Panel D. Both panel and univariate LM unit root tests reject the nonstationarity null hypothesis for all nations in each country grouping at the 1% significance level. This unambiguously suggests that all countries' series in all country groupings are stationary.

Table 7 about here

For high-income countries 17 (20%) of the breakpoints occur in the late 2000s and another 15 (18%) of the breaks take place in 2016 and 2017. For the upper middle-income countries 23 (29%) of the breaks are in the early 2000s and 23 (29%) of the breakpoints occur towards the beginning of the 2010s. For lower middle-income countries 24 (34%) of the breakpoints take place in the early 2000s while 29 (41%) of the breaks are at the start of the 2010s. For low-income countries 7 (26%) of the total breakpoints occur in the late 2000s and another 10 (37%) of the total breakpoints take place around the start of the 2010s.

While the panel LM test statistics allowing for breaks do not allow for cross-sectional dependence the univariate LM tests for each country are not subject to the problem of cross-sectional dependence.[6] Hence, the combination of univariate and panel test results that allow for structural breaks provide overwhelming evidence for the stationarity of the series for all countries. This is reinforced by the inference from the panel unit root tests that account for cross-sectional dependence (if not allowing for structural breaks) discussed above.

The presence of heteroskedasticity has not been considered by the foregoing unit root tests.[7] One consequence of heteroskedasticity is that estimates become inefficient. The results of a wild bootstrap unit root test that accounts for both heteroskedasticity and cross-sectional dependence are reported in Table 8. We use the autoregressive wild bootstrap approach of Smeekes and Urbain (2014) and Friedrich et al. (2020). The autoregressive wild bootstrap approach performs better than other available wild bootstrap techniques, including the dependent wild bootstrap of Shao (2010) and the block wild bootstrap of Shao (2011), when there is heteroskedasticity in the data (Smeekes and Urbain, 2014; Friedrich et al. 2020). Our panel and univariate wild bootstrap test results suggest most countries' series are stationary.

Table 8 about here

The reports-based measure is not the only uncertainty measure available, a news-based uncertainty measure, which is called economic policy uncertainty, is also available.[8] For the sake of robustness, we also examine the stationarity of the news-based measure of uncertainty. Figure 5 plots the average of the monthly news-based uncertainty series for 19 countries for the period January 1997 to March 2021.[9] Table 9 reports five of the tests (both panel and

[6] Although there is a version of the LM test that provides for cross sectional dependence, it exhibits size distortion and loss of power (Lee and Tieslau, 2019).
[7] We thank a referee for bringing the issue of heteroscedascity to our notice.
[8] The dataset can be found at https://policyuncertainty.com/all_country_data.html
[9] We have not included Hong Kong, Mexico, Singapore and Sweden in the analysis because of data constraints.

univariate) discussed above being: the persistence test; the LM stationarity test with 0, 1 and 2 structural breaks and the wild bootstrap unit root test. The results indicate that the news-based measure of uncertainty is stationarity for most countries.

Figure 5 about here

Table 9 about here

Lastly, we look at the impact of uncertainty on the GDP growth rate using the reports-based uncertainty measure for all four income groups as well as the economic policy uncertainty dataset. We use the augmented mean group method of Eberhardt and Teal (2010), which allows for cross-sectional dependence to estimate the long run impact of uncertainty on the GDP growth rate, in Table 10. The reported results show that uncertainty has a negative and significant impact on the GDP growth rate.

Table 10 about here

The results from the various unit root tests reported above provide virtually unambiguous evidence that uncertainty is stationary for all 143 countries that we examine. The results are consistent with the findings of Gil-Alana and Payne (2019) if they do not agree with those of Plakandaras et al. (2019). As our results are far more comprehensive in terms of the number of countries and variety of tests that we consider we feel confident in our overwhelming finding of stationarity. One possible reason for the stationarity of the reports-based measure of uncertainty is that some factors that cause it only have short-term impacts. These factors include changes in oil prices, changes in stock market prices and currency volatility. Hence, the shocks arising from these factors should be temporary and are unlikely to persist for substantial periods of time. Another justification is based on the premise that the issues that trigger uncertainty happen frequently. For instance, trade disputes and economic downturns are usually experienced by countries on a frequent basis. This means that the pattern of uncertainty is likely to be similar over a long period of time, which implies that the series is not dependent on time. Therefore, the mean values (and variances) of the uncertainty measures are likely to remain largely unchanged over a long period of time, which will yield stationary series.

4. Conclusion

Despite the rise in uncertainty across the globe, several aspects of the issue have not been adequately examined, including whether the series measuring uncertainty is stationarity. One important reason for examining whether uncertainty is stationary is because it indicates the duration of the negative impact of an uncertainty shock on an economy. The aim of this paper is to use a variety of unit root tests, including Lee and Tieslau's (2019) residual augmented least squares unit root test that allows for breaks in both intercept and trend, to examine whether the reports-based measure of uncertainty is stationary for 143 countries. Panel unit root tests that allow for both cross sectional dependence and nonlinearity and time-series tests that can provide inference for each individual country have also been employed. The results almost unambiguously suggest that the reports-based measure of uncertainty is stationary in the countries considered. The reports-based measure of uncertainty is not only rising in advanced economies it is also increasing in middle-income and low-income countries. One implication of our finding that the reports-based measure of uncertainty is stationary is that the duration of the negative impact of an uncertainty shock on the economy will unlikely have long lasting effects on these countries. That is, the stationarity of this series implies that the negative effect of economic uncertainty shocks will be temporary in all 143 countries. This is partly because the internal dynamics of these economies will push the economy back to its initial position. This suggests no need for the prolonged use of fiscal and monetary policies to stimulate aggregate demand during an uncertainty-induced recession as the situation is likely to be transient.

Developing countries, which are usually characterized as having fewer effective policies to address negative shocks of uncertainty (compared with more developed nations), can imitate the types of policies that developed countries have successfully used to reduce the negative effects of shocks arising from economic uncertainty. If there are significant differences between developed and developing countries, the policies can be localised.

The findings also imply that inferences obtained from the estimation (including OLS) of standard regressions involving the reports-based measure of uncertainty will be valid provided the other variables in the model are also stationary. This is because the absence of nonstationary series should ensure spurious results are avoided. Moreover, the finding that the uncertainty series is stationarity for all 143 countries has implications for forecasting future trends using this series.

Future papers can build upon our work by considering the stationarity of different components of the reports-based measure of uncertainty in the countries under investigation. We cannot conduct such an analysis because such datasets are currently unavailable. Assessing whether different components of the reports-based measure of uncertainty are stationary will shed more light on the dynamics of uncertainty in the selected countries.

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Table 1: Descriptive statistics

Panel A: High-income countries				Panel B: Upper middle-income countries			
Country	Mean	Median	Standard deviation	Country	Mean	Median	Standard deviation
Australia	0.136	0.096	0.135	Albania	0.103	0.078	0.122
Austria	0.141	0.094	0.153	Algeria	0.119	0.086	0.111
Belgium	0.176	0.116	0.234	Argentina	0.326	0.286	0.226
Canada	0.213	0.112	0.236	Armenia	0.077	0.000	0.114
Chile	0.218	0.164	0.196	Azerbaijan	0.090	0.000	0.131
Croatia	0.193	0.142	0.176	Belarus	0.110	0.095	0.112
Czech Republic	0.202	0.142	0.190	Bosnia and Herzegovina	0.177	0.118	0.163
Denmark	0.145	0.103	0.173	Botswana	0.163	0.114	0.154
Finland	0.108	0.075	0.136	Brazil	0.073	0.000	0.134
France	0.189	0.139	0.147	Bulgaria	0.270	0.202	0.259
Germany	0.214	0.171	0.173	China	0.124	0.086	0.163
Greece	0.072	0.000	0.163	Colombia	0.253	0.146	0.297
Hong Kong SAR	0.144	0.111	0.152	Costa Rica	0.149	0.115	0.138
Hungary	0.269	0.196	0.303	Dominican Republic	0.144	0.077	0.218
Ireland	0.128	0.079	0.152	Ecuador	0.294	0.260	0.238
Israel	0.107	0.091	0.102	FYR Macedonia	0.246	0.164	0.249
Italy	0.192	0.168	0.133	Gabon	0.106	0.000	0.180
Japan	0.138	0.122	0.117	Georgia	0.195	0.137	0.240
Korea	0.292	0.252	0.242	Guatemala	0.252	0.184	0.249
Kuwait	0.175	0.120	0.183	Iraq	0.228	0.151	0.285
Latvia	0.100	0.094	0.098	Islamic Republic of Iran	0.108	0.077	0.111
Lithuania	0.122	0.104	0.126	Jamaica	0.219	0.178	0.188
Netherlands	0.121	0.089	0.144	Jordan	0.087	0.060	0.111
New Zealand	0.159	0.115	0.170	Kazakhstan	0.156	0.130	0.123
Norway	0.156	0.106	0.173	Lebanon	0.047	0.000	0.091
Oman	0.182	0.119	0.196	Libya	0.152	0.102	0.145
Panama	0.161	0.125	0.160	Malaysia	0.076	0.000	0.106

Poland	0.179	0.151	0.150
Portugal	0.079	0.000	0.115
Qatar	0.193	0.170	0.172
Saudi Arabia	0.154	0.111	0.141
Singapore	0.109	0.085	0.102
Slovak Republic	0.159	0.125	0.147
Slovenia	0.137	0.100	0.145
Spain	0.135	0.105	0.150
Sweden	0.155	0.121	0.151
Switzerland	0.178	0.119	0.158
Taiwan Province of China	0.153	0.110	0.155
United Arab Emirates	0.246	0.206	0.198
United Kingdom	0.194	0.157	0.184
United States	0.191	0.160	0.163
Uruguay	0.183	0.075	0.203

Mexico	0.272	0.249	0.184
Namibia	0.052	0.000	0.104
Paraguay	0.098	0.069	0.127
Peru	0.170	0.107	0.170
Romania	0.175	0.146	0.147
Russia	0.214	0.168	0.191
South Africa	0.083	0.071	0.099
Sri Lanka	0.209	0.148	0.206
Thailand	0.082	0.035	0.110
Turkey	0.306	0.263	0.197
Turkmenistan	0.147	0.116	0.139
Venezuela	0.085	0.071	0.094

Panel C: Lower middle-income countries

Country	Mean	Median	Standard deviation
Angola	0.124	0.080	0.137
Bangladesh	0.166	0.136	0.169
Bolivia	0.108	0.077	0.132
Cambodia	0.183	0.125	0.188
Cameroon	0.159	0.139	0.143
Côte d'Ivoire	0.186	0.159	0.157
Egypt	0.129	0.097	0.168
El Salvador	0.066	0.000	0.127
Ghana	0.249	0.215	0.226
Honduras	0.172	0.115	0.206
India	0.193	0.172	0.164
Indonesia	0.215	0.172	0.188

Panel D: Low-income countries

Country	Mean	Median	Standard deviation
Afghanistan	0.161	0.089	0.231
Benin	0.172	0.130	0.190
Burkina Faso	0.307	0.249	0.280
Burundi	0.178	0.121	0.182
Central African Republic	0.102	0.060	0.153
Chad	0.088	0.064	0.103
Democratic Republic of the Congo	0.090	0.000	0.129
Eritrea	0.210	0.158	0.170
Ethiopia	0.186	0.118	0.219
Guinea	0.151	0.086	0.169
Guinea-Bissau	0.241	0.190	0.228
Haiti	0.103	0.079	0.108

Kenya	0.150	0.092	0.183	Liberia	0.147	0.101	0.203
Kyrgyz Republic	0.172	0.118	0.198	Madagascar	0.140	0.113	0.145
Lao P.D.R.	0.217	0.168	0.183	Malawi	0.167	0.139	0.136
Lesotho	0.295	0.261	0.213	Mali	0.234	0.123	0.276
Mauritania	0.187	0.152	0.176	Mozambique	0.128	0.098	0.172
Moldova	0.175	0.142	0.157	Nepal	0.216	0.158	0.202
Mongolia	0.109	0.075	0.155	Niger	0.292	0.232	0.218
Morocco	0.119	0.097	0.122	Rwanda	0.063	0.000	0.084
Myanmar	0.139	0.090	0.174	Sierra Leone	0.106	0.089	0.135
Nicaragua	0.127	0.100	0.150	Tajikistan	0.162	0.124	0.161
Nigeria	0.292	0.246	0.240	Tanzania	0.203	0.165	0.191
Pakistan	0.205	0.104	0.262	The Gambia	0.325	0.219	0.313
Papua New Guinea	0.140	0.111	0.134	Togo	0.111	0.075	0.135
Philippines	0.243	0.210	0.238	Uganda	0.132	0.108	0.165
Republic of Congo	0.270	0.234	0.259	Yemen	0.417	0.243	0.411
Senegal	0.233	0.224	0.164				
Sudan	0.142	0.098	0.140				
Tunisia	0.198	0.111	0.266				
Ukraine	0.146	0.117	0.146				
Uzbekistan	0.253	0.222	0.203				
Vietnam	0.074	0.063	0.088				
Zambia	0.306	0.209	0.318				
Zimbabwe	0.203	0.124	0.220				

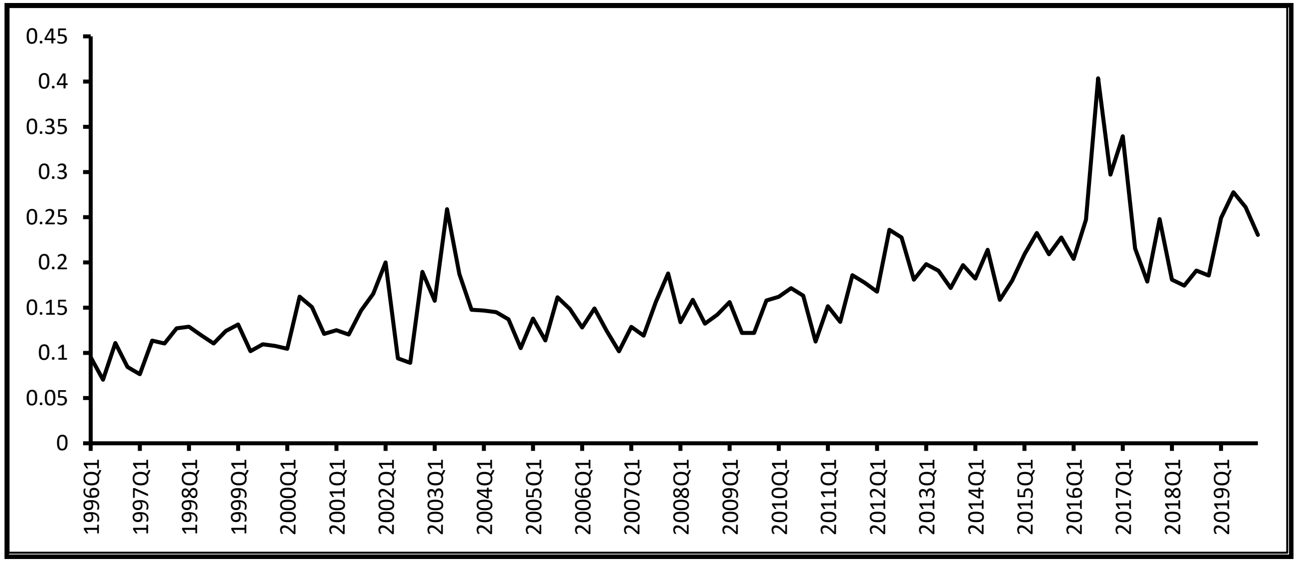

Figure 1: Uncertainty in high-income countries

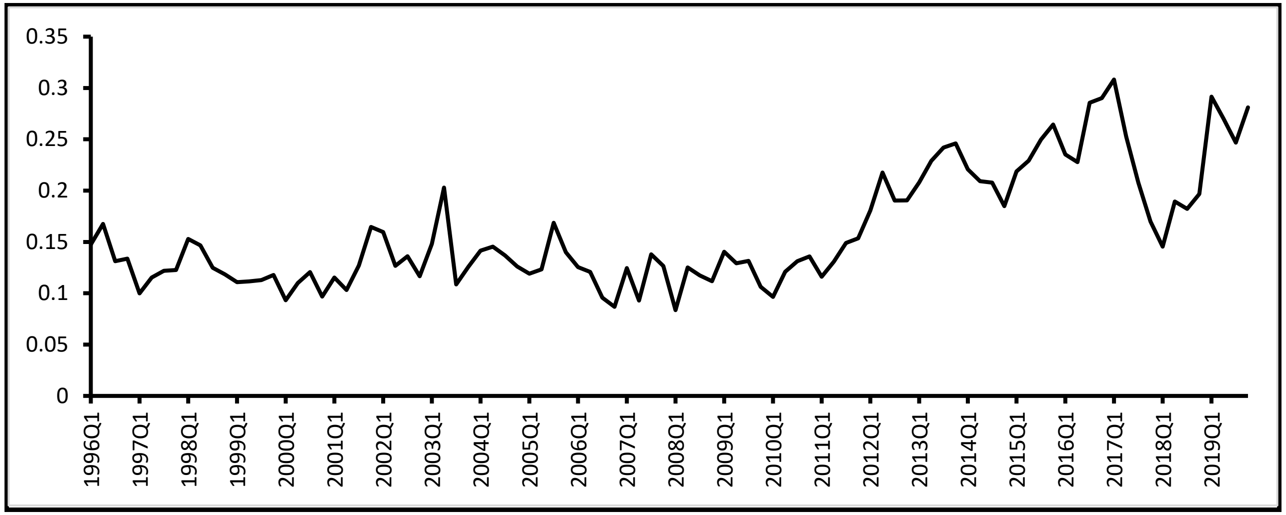

Figure 2: Uncertainty in upper middle-income countries

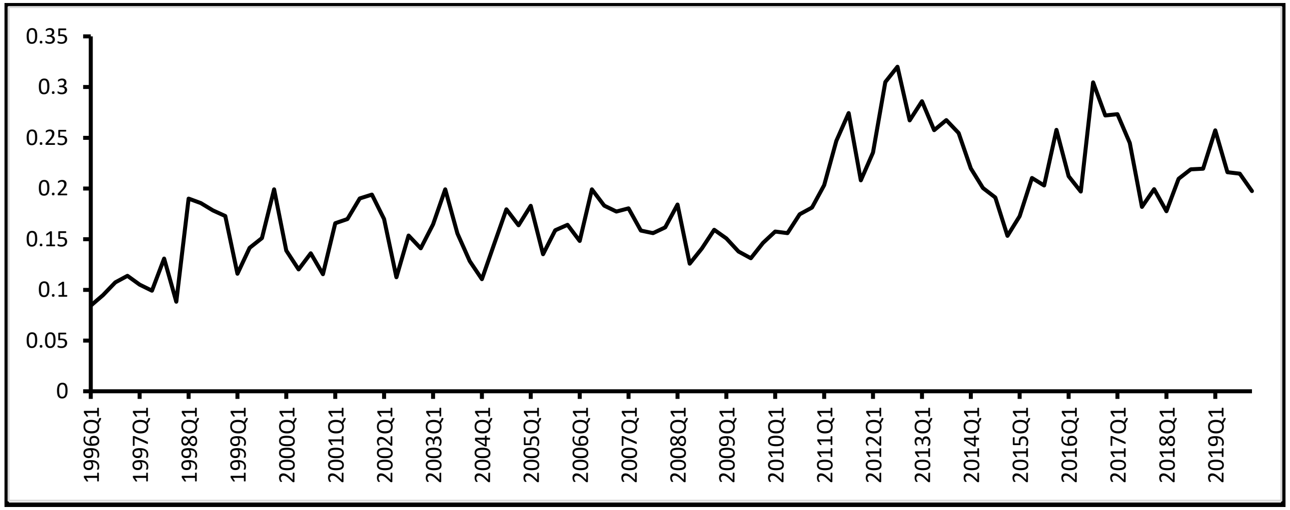

Figure 3: Uncertainty in lower-income countries

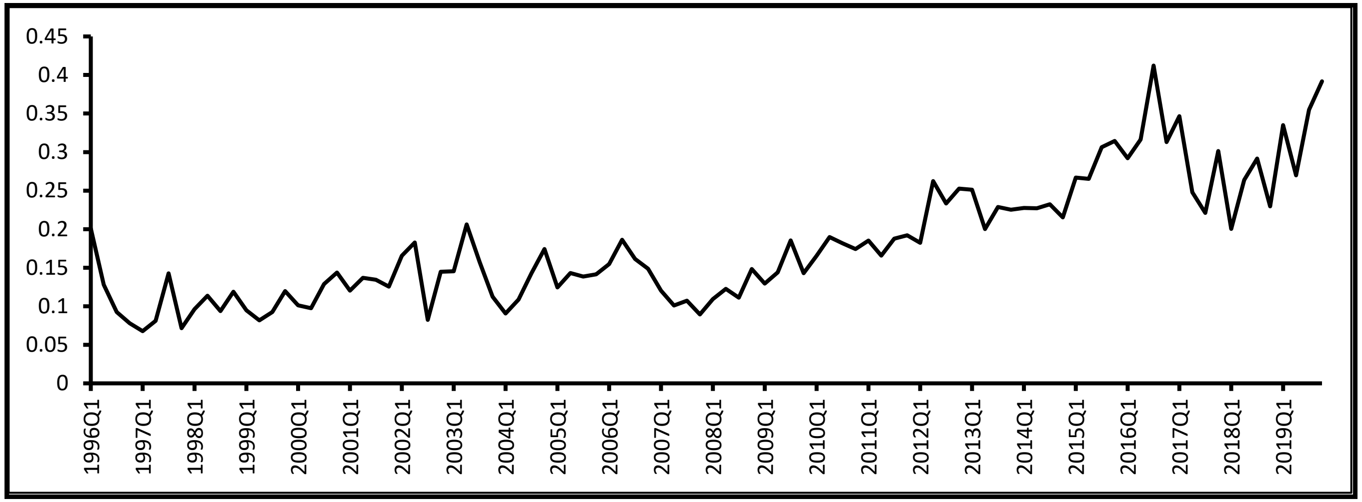

Figure 4: Uncertainty in low-income countries

Table 2: Persistence test

Panel A: High-income countries		Panel B: Upper middle-income countries		Panel C: Lower middle-income countries		Panel D: Low-income countries	
Country	Hurst exponents	Country	Hurst exponents	Country	Hurst exponents	Country	Hurst exponents
Australia	0.619	Albania	0.503	Angola	0.412	Afghanistan	0.496
Austria	0.770	Algeria	0.661	Bangladesh	0.536	Benin	0.560
Belgium	0.504	Argentina	0.555	Bolivia	0.578	Burkina Faso	0.504
Canada	0.385	Armenia	0.434	Cambodia	0.673	Burundi	0.430
Chile	0.427	Azerbaijan	0.333	Cameroon	0.539	Central African Republic	0.462
Croatia	0.319	Belarus	0.465	Côte d'Ivoire	0.574	Chad	0.474
Czech Republic	0.305	Bosnia and Herzegovina	0.331	Egypt	0.598	Democratic Republic of the Congo	0.427
Denmark	0.573	Botswana	0.467	El Salvador	0.535	Eritrea	0.524
Finland	0.770	Brazil	0.453	Ghana	0.669	Ethiopia	0.451
France	0.451	Bulgaria	0.403	Honduras	0.645	Guinea	0.491
Germany	0.826	China	0.403	India	0.470	Guinea-Bissau	0.519
Greece	0.585	Colombia	0.564	Indonesia	0.582	Haiti	0.441
Hong Kong SAR	0.527	Costa Rica	0.464	Kenya	0.909	Liberia	0.541
Hungary	0.479	Dominican Republic	0.464	Kyrgyz Republic	0.835	Madagascar	0.407
Ireland	0.406	Ecuador	0.468	Lao P.D.R.	0.934	Malawi	0.502
Israel	0.432	FYR Macedonia	0.547	Lesotho	0.469	Mali	0.871
Italy	0.379	Gabon	0.506	Mauritania	0.838	Mozambique	0.756
Japan	0.321	Georgia	0.565	Moldova	0.532	Nepal	0.730
Korea	0.517	Guatemala	0.491	Mongolia	0.487	Niger	0.665
Kuwait	0.577	Iraq	0.579	Morocco	0.645	Rwanda	0.432
Latvia	0.450	Islamic Republic of Iran	0.405	Myanmar	0.438	Sierra Leone	0.466
Lithuania	0.437	Jamaica	0.421	Nicaragua	0.640	Tajikistan	0.437
Netherlands	0.424	Jordan	0.557	Nigeria	0.638	Tanzania	0.597
New Zealand	0.420	Kazakhstan	0.374	Pakistan	0.514	The Gambia	0.916
Norway	0.443	Lebanon	0.486	Papua New Guinea	0.505	Togo	0.309

Oman	0.639	Libya	0.338	Philippines	0.591	Uganda	0.213
Panama	0.503	Malaysia	0.470	Republic of Congo	0.504	Yemen	0.472
Poland	0.358	Mexico	0.495	Senegal	0.456		
Portugal	0.503	Namibia	0.693	Sudan	0.497		
Qatar	0.424	Paraguay	0.406	Tunisia	0.372		
Saudi Arabia	0.436	Peru	0.555	Ukraine	0.371		
Singapore	0.444	Romania	0.457	Uzbekistan	0.434		
Slovak Republic	0.506	Russia	0.488	Vietnam	0.406		
Slovenia	0.448	South Africa	0.482	Zambia	0.359		
Spain	0.575	Sri Lanka	0.380	Zimbabwe	0.525		
Sweden	0.778	Thailand	0.554				
Switzerland	0.473	Turkey	0.421				
Taiwan Province of China	0.498	Turkmenistan	0.492				
United Arab Emirates	0.514	Venezuela	0.660				
United Kingdom	0.650						
United States	0.679						
Uruguay	0.714						

The whole sample of data, 1996Q1-2019Q4, is used for estimation.

Table 3: First generation panel unit root tests

Test	Maddala and Wu (1999) ADF-Fisher Chi Square	Maddala and Wu (1999) PP-Fisher Chi Square	Breitung (2000)	Im et al. (2003)
High-income countries	221.569*** (0.000)	1147.83*** (0.000)	-0.724 (0.235)	-8.8229*** (0.000)
Upper middle-income countries	217.442*** (0.000)	902.255*** (0.000)	-0.361 (0.359)	-8.327*** (0.000)
Lower middle-income countries	171.256*** (0.000)	890.141*** (0.000)	-2.126** (0.017)	-7.103*** (0.000)
Low-income countries	125.110*** (0.000)	679.345*** (0.000)	2.661 (0.996)	-5.695*** (0.000)

The bandwidth selection is based on the Newey-West automatic and Bartlett kernel. Since we are dealing with quarterly data the maximum lag has been set at four. T-statistics have been used to determine the lag length. ***, **, * represents the rejection of the null hypothesis at the 1%, 5% and 10% levels, respectively. ADF is augmented Dickey Fuller, while PP is Phillips-Perron.

Table 4: Panel unit root tests allowing for cross sectional dependence

Sample	Pesaran (2007)	Cerrato et al. (2011; 2013)
High-income countries	-55.934*** (0.000)	-32.430*** (0.000)
Upper middle-income countries	-44.525*** (0.000)	-30.096*** (0.000)
Lower middle-income countries	-48.270*** (0.000)	-27.332*** (0.000)
Low-income countries	-37.046*** (0.000)	-21.317*** (0.000)

The Pesaran (2007) test includes an intercept and trend and the critical values can be found in Table II(c). The Cerrato et al. (2011) test includes an intercept and the critical values are given in Table 14 in Cerrato et al. (2011). Since we are dealing with quarterly data the maximum lag has been set at four. T-statistics have been used to determine the lag length. ***, **, * represent the rejection of the null hypothesis at the 1%, 5% and 10% levels, respectively.

Table 5: LM test with no structural break

Panel A: High-income countries

Country	LM test	Truncation Lag
Panel	-18.878***	
Australia	-2.357	4
Austria	-2.903*	4
Belgium	-3.112**	3
Canada	-2.497	4
Chile	-2.901*	1
Croatia	-3.395**	2
Czech Republic	-6.301***	0
Denmark	-3.670***	1
Finland	-3.379**	1
France	-3.401**	2
Germany	-5.865***	0
Greece	-3.277**	3
Hong Kong SAR	-3.660***	3
Hungary	-4.073***	3
Ireland	-3.457**	3
Israel	-6.828***	0
Italy	-1.894	4
Japan	-4.648***	1
Korea	-3.289**	3
Kuwait	-2.026	4
Latvia	-2.640	4
Lithuania	-2.887*	4

Panel B: Upper middle-income countries

Country	LM test	Truncation Lag
Panel	20.001***	
Albania	-2.383	4
Algeria	-6.300***	0
Argentina	-5.401***	0
Armenia	-4.428***	1
Azerbaijan	-4.368***	0
Belarus	-2.081	4
Bosnia and Herzegovina	-2.531	4
Botswana	-4.785	3
Brazil	-2.211	4
Bulgaria	-1.400	4
China	-3.111**	3
Colombia	-3.372**	3
Costa Rica	-2.790*	2
Dominican Republic	-4.545***	3
Ecuador	-4.779***	3
FYR Macedonia	-2.655	2
Gabon	-2.481	4
Georgia	-5.142***	2
Guatemala	-4.340***	3
Iraq	-2.297	2
Islamic Republic of Iran	-2.390	3
Jamaica	-1.010	4

Panel C: Lower middle-income countries

Country	LM test	Truncation Lag
Panel	-18.911***	
Angola	-6.975***	0
Bangladesh	-2.397	4
Bolivia	-4.579***	1
Cambodia	-4.888***	0
Cameroon	-3.328**	1
Côte d'Ivoire	-2.170	4
Egypt	-8.615***	0
El Salvador	-3.560**	0
Ghana	-2.807	1
Honduras	-1.987	4
India	-2.409	2
Indonesia	-1.140	4
Kenya	-2.849	4
Kyrgyz Republic	-2.727	4
Lao P.D.R.	-3.013**	4
Lesotho	-2.474	4
Mauritania	-3.175**	2
Moldova	-2.738	4
Mongolia	-6.246***	0
Morocco	-2.381	2
Myanmar	-2.698	4
Nicaragua	-2.103	4

Panel D: Low-income countries

Country	LM test	Truncation Lag
Panel	-21.477***	
Afghanistan	-3.374**	4
Benin	-4.462***	3
Burkina Faso	-2.606	4
Burundi	-3.317**	2
Central African Republic	-1.689	4
Chad	-4.260	1
Democratic Republic of the Congo	-1.546	4
Eritrea	-7.664***	0
Ethiopia	-4.888***	0
Guinea	-1.334	4
Guinea-Bissau	-4.329***	1
Haiti	-1.913	4
Liberia	-5.909***	0
Madagascar	-2.342	4
Malawi	-1.965	4
Mali	-2.299	2
Mozambique	-2.189	4
Nepal	-2.517	4
Niger	-1.283	2
Rwanda	-2.283	4
Sierra Leone	-3.967***	1
Tajikistan	-4.439***	3

Netherlands	-5.263***	0	Jordan	-2.073	4	Nigeria	-1.870	4	Tanzania	-2.037	4
New Zealand	-3.368***	3	Kazakhstan	-7.012***	0	Pakistan	-2.408	4	The Gambia	-2.711	4
Norway	-4.159***	3	Lebanon	-3.318**	4	Papua New Guinea	-3.380**	3	Togo	-2.493	3
Oman	-5.372***	0	Libya	-6.712***	3	Philippines	-3.855***	1	Uganda	-4.630***	0
Panama	-1.704	4	Malaysia	-2.915*	4	Republic of Congo	-3.359**	4	Yemen	-4.151***	3
Poland	-3.807***	1	Mexico	-1.449	4	Senegal	-3.029*	1			
Portugal	-3.486**	2	Namibia	-6.493***	0	Sudan	-1.923	4			
Qatar	-3.565**	2	Paraguay	-5.001***	3	Tunisia	-2.245	2			
Saudi Arabia	-3.484**	2	Peru	-3.220**	4	Ukraine	-5.222***	3			
Singapore	-2.815*	4	Romania	-5.221***	0	Uzbekistan	-3.786***	3			
Slovak Republic	-3.889***	2	Russia	-2.632	4	Vietnam	-3.392**	2			
Slovenia	-4.086***	1	South Africa	-2.260	4	Zambia	-3.577**	1			
Spain	-1.761	4	Sri Lanka	-3.377**	1	Zimbabwe	-2.201	4			
Sweden	-3.242**	4	Thailand	-0.830	4						
Switzerland	-2.697	2	Turkey	-2.009	4						
Taiwan Province of China	-2.632	4	Turkmenistan	-2.433	1						
United Arab Emirates	-2.453	4	Venezuela	-2.350	4						
United Kingdom	-2.798*	4									
United States	-1.622	4									
Uruguay	-1.929	4									

Since we are use quarterly data the maximum lag length is set to four. T-statistics have been used to select the optimal lag length. *** and ** represent rejection of the null hypothesis at the 1% and 5% levels, respectively.

Table 6: LM test with one structural break

Panel A: High-income countries			
Country	LM test	Break Point	Truncation Lag
Panel	-44.959***		
Australia	-7.639***	2009Q1	3
Austria	-6.077***	2002Q1	0
Belgium	-5.607***	2014Q1	0
Canada	-5.010***	2016Q4	3
Chile	-5.567***	2016Q2	1
Croatia	-7.695***	2005Q1	4
Czech Republic	-6.705***	2009Q4	3
Denmark	-6.916***	2011Q4	2
Finland	-6.145***	2002Q2	3
France	-5.755***	2001Q3	3
Germany	-6.697***	2011Q1	0
Greece	-6.726***	2000Q3	3
Hong Kong SAR	-9.188***	2000Q2	0
Hungary	-5.464***	2001Q3	0
Ireland	-5.337***	2012Q2	3
Israel	-7.679***	2009Q2	1
Italy	-7.867***	2004Q1	0
Japan	-6.897***	2014Q2	0
Korea	-7.545***	2003Q1	2
Kuwait	-4.365**	2016Q2	0
Latvia	-8.365***	2005Q4	0
Lithuania	-6.000***	2016Q4	0
Netherlands	-6.405***	2012Q3	0
New Zealand	-6.790***	2015Q4	3
Norway	-6.618***	2004Q3	3

Panel B: Upper middle-income countries			
Country	LM test	Break Point	Truncation Lag
Panel	-39.599***		
Albania	-5.653***	2016Q4	3
Algeria	-7.252***	2003Q3	0
Argentina	-6.414***	1999Q2	0
Armenia	-6.789***	2013Q4	3
Azerbaijan	-5.659***	2015Q2	3
Belarus	-5.933***	2003Q4	0
Bosnia and Herzegovina	-5.077***	2015Q2	4
Botswana	-5.217***	1999Q1	3
Brazil	-5.885***	2016Q4	3
Bulgaria	-5.663***	2005Q4	4
China	-7.351***	1999Q4	3
Colombia	-4.768***	1998Q3	3
Costa Rica	-8.337***	2016Q2	0
Dominican Republic	-6.951***	2011Q2	3
Ecuador	-5.893***	2006Q4	3
FYR Macedonia	-5.736***	2011Q4	3
Gabon	-7.345***	2016Q4	3
Georgia	-7.438***	2013Q2	0
Guatemala	-6.825***	2015Q1	3
Iraq	-4.761***	2002Q2	3
Islamic Republic of Iran	-6.251***	2015Q1	4
Jamaica	-6.645***	2012Q4	1
Jordan	-7.349***	2008Q2	0
Kazakhstan	-7.145***	2013Q1	0
Lebanon	-7.609***	2007Q4	3

Oman	-5.886***	2013Q3	0	Libya	-5.916***	2015Q3	0
Panama	-7.099***	2008Q4	1	Malaysia	-5.570***	2003Q2	0
Poland	-6.399***	2015Q2	0	Mexico	-4.777***	1999Q3	0
Portugal	-9.149***	2015Q4	0	Namibia	-6.678***	2003Q3	2
Qatar	-6.036***	2010Q2	2	Paraguay	-6.497***	2007Q4	1
Saudi Arabia	-6.686***	2009Q1	3	Peru	-6.469***	2012Q4	3
Singapore	-8.875***	2002Q3	0	Romania	-5.667***	2005Q4	0
Slovak Republic	-5.163***	2004Q2	0	Russia	-7.162***	2009Q3	4
Slovenia	-7.317***	2015Q3	0	South Africa	-6.470***	2005Q4	0
Spain	-7.976***	2000Q2	0	Sri Lanka	-5.256***	2001Q3	4
Sweden	-5.581***	2016Q1	0	Thailand	-6.329***	2003Q2	4
Switzerland	-7.487***	2011Q1	4	Turkey	-7.065***	2015Q3	4
Taiwan Province of China	-7.901***	2012Q3	0	Turkmenistan	-5.274***	2010Q2	0
United Arab Emirates	-5.516***	2015Q3	3	Venezuela	-5.872***	2004Q3	0
United Kingdom	-7.174***	2007Q1	0				
United States	-5.143***	2017Q1	4				
Uruguay	-4.833***	2008Q2	0				

Panel C: Lower middle-income countries				Panel D: Low-income countries			
Country	LM test	Break Point	Truncation Lag	Country	LM test	Break Point	Truncation Lag
Panel	-42.518***			Panel	-34.466***		
Angola	-7.229***	2005Q1	0	Afghanistan	-7.835***	2013Q2	4
Bangladesh	-7.122***	2014Q3	3	Benin	-6.885***	2012Q4	3
Bolivia	-7.906***	2008Q2	0	Burkina Faso	-6.711***	2007Q1	3
Cambodia	-6.515***	2013Q2	0	Burundi	-6.799***	2007Q3	3
Cameroon	-5.858***	2017Q2	0	Central African Republic	-3.773*	2004Q3	4
Côte d'Ivoire	-7.483***	2010Q3	4	Chad	-7.868***	2015Q3	2
Egypt	-5.443***	2011Q3	4	Democratic Republic of the Congo	-6.579***	2016Q1	4
El Salvador	-9.102***	2008Q4	3	Eritrea	-8.146***	2010Q3	0
Ghana	-5.815***	2008Q4	0	Ethiopia	-5.765***	2005Q3	0

Honduras	-8.536***	2014Q2	0	Guinea	-5.415***	2015Q1	0
India	-5.579***	2014Q1	4	Guinea-Bissau	-5.150***	1999Q4	4
Indonesia	-7.183***	2005Q2	0	Haiti	-6.746***	2008Q4	1
Kenya	-6.425***	2015Q2	4	Liberia	-7.859***	2015Q3	3
Kyrgyz Republic	-5.870***	2005Q2	4	Madagascar	-6.803***	2008Q2	3
Lao P.D.R.	-6.988***	2000Q4	0	Malawi	-7.937***	2006Q2	0
Lesotho	-5.564***	2012Q2	3	Mali	-4.860***	2014Q1	4
Mauritania	-8.058***	2008Q3	0	Mozambique	-5.207***	2016Q1	2
Moldova	-8.535***	2015Q2	0	Nepal	-5.267***	2012Q2	3
Mongolia	-9.162***	2016Q1	3	Niger	-5.558***	2003Q2	3
Morocco	-6.896***	2008Q1	2	Rwanda	-7.496***	2013Q1	0
Myanmar	-6.387***	2011Q3	0	Sierra Leone	-6.613***	2015Q2	0
Nicaragua	-8.172***	2008Q2	0	Tajikistan	-7.946***	2006Q2	0
Nigeria	-5.348***	1998Q2	3	Tanzania	-6.586***	2001Q3	0
Pakistan	-5.518***	2012Q2	4	The Gambia	-5.923***	2008Q4	4
Papua New Guinea	-6.173***	2015Q4	0	Togo	-5.845***	2016Q1	3
Philippines	-6.535***	2010Q2	0	Uganda	-6.557***	2002Q4	0
Republic of Congo	-8.007***	2003Q1	0	Yemen	-5.880***	2016Q1	3
Senegal	-7.709***	2014Q3	1				
Sudan	-5.685***	2007Q4	0				
Tunisia	-5.379***	2012Q2	0				
Ukraine	-6.806***	2006Q4	3				
Uzbekistan	-4.963***	2010Q3	4				
Vietnam	-6.730***	2004Q3	0				
Zambia	-6.795***	2014Q2	0				
Zimbabwe	-5.988***	2000Q3	4				

See notes to Table 5.

Table 7: LM test with two structural breaks

Panel A: High-income countries

Country	LM test	First Break Point	Second Break Point	Truncation Lag
Panel	-53.527***			
Australia	-8.411***	2010Q2	2013Q4	0
Austria	-6.748***	2001Q3	2015Q2	0
Belgium	-7.215***	2013Q4	2015Q3	0
Canada	-6.092***	2004Q2	2009Q2	3
Chile	-7.779***	2005Q2	2008Q2	0
Croatia	-7.963***	2002Q4	2008Q3	4
Czech Republic	-7.561***	2016Q1	2016Q4	0
Denmark	-7.920***	2007Q2	2015Q1	2
Finland	-6.478***	2001Q3	2002Q2	3
France	-8.513***	2001Q4	2003Q4	0
Germany	-7.535***	1999Q1	2011Q1	0
Greece	-8.088***	2015Q1	2016Q3	2
Hong Kong SAR	-10.188***	2000Q2	2016Q2	3
Hungary	-6.968***	1999Q4	2000Q3	0
Ireland	-6.732***	1999Q3	2002Q1	0
Israel	-8.674***	2003Q3	2013Q1	0
Italy	-8.230***	2004Q1	2008Q1	0
Japan	-8.360***	2009Q2	2014Q1	0
Korea	-8.021***	2002Q2	2003Q1	2
Kuwait	-7.277***	2005Q1	2013Q3	0
Latvia	-9.327***	2006Q1	2014Q1	0
Lithuania	-8.655***	2001Q4	2004Q3	0
Netherlands	-6.833***	2008Q1	2015Q1	0

Panel B: Upper middle-income countries

Country	LM test	First Break Point	Second Break Point	Optimal Lag
Panel	-48.648***			
Albania	-9.347***	1999Q2	2002Q2	3
Algeria	-7.514***	2000Q1	2012Q3	0
Argentina	-7.436***	1999Q2	2009Q1	0
Armenia	-7.140***	2001Q1	2015Q2	0
Azerbaijan	-6.798***	2009Q2	2015Q2	0
Belarus	-7.662***	2007Q1	2014Q2	0
Bosnia and Herzegovina	-7.424***	2010Q3	2013Q1	4
Botswana	-7.028***	1999Q1	2007Q1	0
Brazil	-7.800***	2015Q1	2016Q4	3
Bulgaria	-7.771***	2003Q4	2008Q4	4
China	-8.211***	1999Q1	2011Q2	0
Colombia	-6.253***	2013Q2	2016Q3	0
Costa Rica	-9.679***	2006Q1	2016Q2	0
Dominican Republic	-7.803***	2013Q3	2016Q4	3
Ecuador	-7.802***	2007Q1	2008Q2	0
FYR Macedonia	-7.078***	2000Q4	2012Q1	0
Gabon	-9.469***	2009Q1	2016Q4	3
Georgia	-8.157***	2013Q1	2013Q4	0
Guatemala	-8.370***	2009Q2	2013Q4	0
Iraq	-9.433***	2002Q1	2002Q4	3
Islamic Republic of Iran	-7.872***	2005Q3	2013Q1	0
Jamaica	-7.570***	2004Q4	2012Q4	1
Jordan	-8.195***	2006Q3	2010Q3	0

New Zealand	-8.248***	2016Q1	2017Q2	0	Kazakhstan	-8.353***	2009Q1	2013Q1	0
Norway	-8.069***	2008Q1	2010Q3	3	Lebanon	-8.322***	2002Q4	2004Q1	3
Oman	-10.751***	2016Q1	2017Q1	0	Libya	-7.736***	2006Q3	2015Q3	0
Panama	-7.352***	2006Q3	2016Q2	1	Malaysia	-7.620***	2001Q3	2004Q2	0
Poland	-7.683***	2003Q3	2015Q2	0	Mexico	-5.932***	2001Q2	2008Q1	0
Portugal	-10.582***	2006Q1	2015Q4	0	Namibia	-7.769***	2015Q2	2016Q2	3
Qatar	-7.410***	2016Q2	2017Q2	0	Paraguay	-7.418***	2001Q2	2002Q4	1
Saudi Arabia	-7.309***	2000Q2	2008Q4	3	Peru	-7.242***	2010Q3	2012Q4	0
Singapore	-9.233***	2002Q2	2007Q3	3	Romania	-6.128***	2009Q1	2012Q4	0
Slovak Republic	-6.258***	2003Q4	2017Q1	0	Russia	-7.251***	2001Q4	2012Q3	0
Slovenia	-9.401***	2000Q2	2015Q3	0	South Africa	-7.650***	2002Q2	2010Q3	0
Spain	-9.341***	1999Q1	2013Q1	0	Sri Lanka	-7.240***	2000Q4	2014Q4	0
Sweden	-6.890***	2004Q4	2016Q3	0	Thailand	-8.364***	2000Q2	2015Q3	4
Switzerland	-8.654***	2004Q3	2013Q4	0	Turkey	-7.403***	2008Q1	2015Q1	1
Taiwan Province of China	-8.791***	2004Q1	2012Q3	0	Turkmenistan	-6.250***	2002Q4	2004Q3	0
United Arab Emirates	-7.057***	2007Q3	2012Q3	1	Venezuela	-6.632**	2002Q3	2013Q1	0
United Kingdom	-7.887***	1999Q3	2005Q1	0					
United States	-6.510***	2008Q4	2017Q1	2					
Uruguay	-6.663***	2014Q4	2016Q4	0					

Panel C: Lower middle-income countries					Panel D: Low-income countries				
Country	LM test	First Break Point	Second Break Point	Optimal Lags	Country	LM test	First Break Point	Second Break Point	Optimal Lags
Panel	-51.357***				Panel	-41.483***			
Angola	-7.698***	2001Q1	2012Q1	0	Afghanistan	-8.610***	2013Q1	2014Q4	0
Bangladesh	-8.444***	2014Q1	2017Q1	3	Benin	-8.127***	2012Q4	2015Q2	0
Bolivia	-8.625***	1998Q2	2003Q3	0	Burkina Faso	-7.225***	2003Q1	2011Q1	4
Cambodia	-7.160***	2012Q1	2017Q2	0	Burundi	-8.582***	2007Q3	2012Q4	0
Cameroon	-9.086***	2000Q4	2004Q2	0	Central African Republic	-7.179***	2014Q2	2016Q4	4
Côte d'Ivoire	-7.637***	2007Q4	2012Q4	3	Chad	-9.059***	2003Q4	2015Q3	2

Egypt	-8.937***	2011Q2	2013Q2	0
El Salvador	-9.292***	2003Q1	2012Q2	0
Ghana	-6.552***	2014Q4	2016Q4	0
Honduras	-9.820***	2008Q3	2014Q2	0
India	-7.263***	2005Q4	2010Q1	0
Indonesia	-7.586***	2001Q4	2011Q3	0
Kenya	-8.240***	1999Q3	2015Q1	0
Kyrgyz Republic	-7.636***	2001Q2	2005Q1	3
Lao P.D.R.	-7.807***	2002Q1	2012Q4	0
Lesotho	-6.425***	2005Q3	2012Q2	3
Mauritania	-8.832***	2002Q1	2014Q2	0
Moldova	-9.105***	1999Q2	2015Q3	0
Mongolia	-10.399***	2009Q2	2016Q1	0
Morocco	-7.584***	2003Q2	2014Q4	2
Myanmar	-7.424***	2000Q4	2011Q4	4
Nicaragua	-8.083***	2011Q1	2016Q1	0
Nigeria	-6.220***	2005Q2	2007Q3	4
Pakistan	-8.057***	2012Q4	2014Q3	0
Papua New Guinea	-7.956***	2009Q1	2015Q4	0
Philippines	-9.556***	2010Q3	2011Q4	0
Republic of Congo	-12.184***	2002Q1	2003Q2	0
Senegal	-8.252***	2009Q1	2016Q4	0
Sudan	-6.867***	2002Q1	2006Q2	0
Tunisia	-9.325***	2010Q3	2014Q4	0
Ukraine	-7.051***	2003Q1	2003Q4	0
Uzbekistan	-6.874***	1998Q3	2002Q2	3
Vietnam	-7.957***	2003Q1	2010Q3	0
Zambia	-8.612***	2003Q3	2014Q2	0

Democratic Republic of the Congo	-9.460***	1999Q3	2015Q1	4
Eritrea	-8.559***	2007Q4	2012Q4	0
Ethiopia	-6.755***	2016Q1	2017Q2	1
Guinea	-6.718***	2010Q3	2012Q3	4
Guinea-Bissau	-6.037***	1999Q4	2016Q1	0
Haiti	-7.250***	2002Q4	2003Q3	0
Liberia	-8.336***	2001Q4	2015Q3	0
Madagascar	-6.724***	2011Q4	2017Q2	0
Malawi	-7.745***	2006Q2	2014Q3	0
Mali	-7.345***	2008Q4	2011Q4	4
Mozambique	-10.255***	2008Q3	2011Q1	0
Nepal	-6.910***	2011Q1	2013Q1	3
Niger	-6.447***	2006Q3	2009Q3	0
Rwanda	-9.179***	2010Q2	2016Q1	0
Sierra Leone	-7.713***	2007Q2	2014Q4	3
Tajikistan	-8.668***	2004Q3	2009Q4	0
Tanzania	-7.342***	2001Q3	2015Q1	0
The Gambia	-7.341***	2013Q4	2016Q4	4
Togo	-7.464***	2006Q2	2016Q2	0
Uganda	-7.175***	2015Q2	2017Q1	0
Yemen	-7.241***	2012Q2	2016Q1	3

Zimbabwe	-8.242***	2000Q1	2010Q3	0

See notes to Table 5.

Table 8: Wild bootstrap test

Panel A: High-income countries		Panel B: Upper middle-income countries		Panel C: Lower middle-income countries		Panel D: Low-income countries	
Country	Test statistics	Country	Test statistics	Country	Test statistics	Country	Test statistics
Panel	-2.405*** (0.000)	Panel	-2.423*** (0.000)	Panel	-2.225*** (0.000)	Panel	-1.165*** (0.006)
Australia	-1.470*** (0.000)	Albania	-0.382 (0.728)	Angola	-1.311*** (0.002)	Afghanistan	-0.723 (0.196)
Austria	-0.412 (0.816)	Algeria	-0.858* (0.097)	Bangladesh	-0.756 (0.233)	Benin	-0.860* (0.078)
Belgium	-1.133*** (0.008)	Argentina	-0.888* (0.080)	Bolivia	--1.320*** (0.003)	Burkina Faso	-1.307*** (0.000)
Canada	-2.093*** (0.000)	Armenia	-1.375*** (0.001)	Cambodia	-0.963** (0.037)	Burundi	-0.976** (0.042)
Chile	-1.265*** (0.003)	Azerbaijan	-0.818* (0.099)	Cameroon	-1.028** (0.017)	Central African Republic	-0.292 (0.820)
Croatia	-1.891*** (0.000)	Belarus	-0.695 (0.324)	Côte d'Ivoire	-2.6318*** (0.000)	Chad	-0.468 (0.767)
Czech Republic	-1.383*** (0.005)	Bosnia and Herzegovina	-0.721 (0.225)	Egypt	-0.520 (0.724)	Democratic Republic of the Congo	-0.951* (0.048)
Denmark	-0.305 (0.932)	Botswana	-1.280*** (0.002)	El Salvador	-2.544*** (0.000)	Eritrea	-0.704 (0.314)
Finland	-0.920* (0.052)	Brazil	-0.815* (0.086)	Ghana	-1.319*** (0.003)	Ethiopia	-0.978** (0.042)
France	-1.893*** (0.000)	Bulgaria	-2.514*** (0.000)	Honduras	-0.511 (0.753)	Guinea	-0.574 (0.558)
Germany	-1.222*** (0.004)	China	-2.821*** (0.000)	India	-1.254*** (0.005)	Guinea-Bissau	-0.950* (0.048)
Greece	-0.689 (0.252)	Colombia	-2.588*** (0.000)	Indonesia	-0.462 (0.600)	Haiti	-0.584 (0.443)
Hong Kong SAR	-1.266*** (0.003)	Costa Rica	-2.447*** (0.000)	Kenya	-1.318*** (0.003)	Liberia	-0.894* (0.069)
Hungary	-1.236*** (0.004)	Dominican Republic	-0.846* (0.075)	Kyrgyz Republic	-1.406*** (0.001)	Madagascar	-1.591*** (0.000)
Ireland	-0.547 (0.557)	Ecuador	-1.547*** (0.001)	Lao P.D.R.	-1.353*** (0.002)	Malawi	-0.977** (0.042)
Israel	-1.890*** (0.000)	FYR Macedonia	-0.487 (0.669)	Lesotho	-0.576 (0.571)	Mali	-0.663 (0.259)
Italy	-0.413 (0.934)	Gabon	-0.751 (0.204)	Mauritania	-0.894* (0.069)	Mozambique	-1.241*** (0.003)
Japan	-1.134*** (0.008)	Georgia	-1.494*** (0.000)	Moldova	-0.806 (0.110)	Nepal	-1.044** (0.015)
Korea	-0.797* (0.085)	Guatemala	-1.183*** (0.007)	Mongolia	-2.512*** (0.000)	Niger	-0.907* (0.052)
Kuwait	-0.645 (0.346)	Iraq	-0.663 (0.252)	Morocco	-2.227*** (0.000)	Rwanda	-0.909* (0.053)
Latvia	-1.264*** (0.003)	Islamic Republic of Iran	-2.344*** (0.000)	Myanmar	-2.528*** (0.000)	Sierra Leone	-0.647 (0.379)
Lithuania	-0.826 (0.141)	Jamaica	-2.118*** (0.000)	Nicaragua	-0.763 (0.200)	Tajikistan	-2.075*** (0.000)
Netherlands	-2.094*** (0.000)	Jordan	-2.528*** (0.000)	Nigeria	-0.563 (0.455)	Tanzania	-1.198*** (0.004)
New Zealand	-1.075** (0.016)	Kazakhstan	-0.835 (0.135)	Pakistan	-1.260*** (0.002)	The Gambia	-0.853 (0.083)
Norway	-1.256*** (0.004)	Lebanon	-0.831* (0.099)	Papua New Guinea	-1.204*** (0.003)	Togo	-1.291*** (0.001)

Oman	-0.717 (0.306)	Libya	-0.680 (0.294)	Philippines	-1.439*** (0.001)	Uganda	-0.662 (0.332)
Panama	-1.136*** (0.008)	Malaysia	-1.013** (0.021)	Republic of Congo	-2.075*** (0.000)	Yemen	-0.852* (0.083)
Poland	-0.709 (0.275)	Mexico	-0.458 (0.812)	Senegal	-1.032** (0.022)		
Portugal	-1.172*** (0.004)	Namibia	-1.801*** (0.000)	Sudan	-2.097*** (0.000)		
Qatar	-1.023** (0.017)	Paraguay	-1.555*** (0.000)	Tunisia	-2.014*** (0.000)		
Saudi Arabia	-0.997** (0.026)	Peru	-0.718 (0.317)	Ukraine	-1.481*** (0.000)		
Singapore	-0.536 (0.695)	Romania	-0.918* (0.051)	Uzbekistan	-1.315*** (0.002)		
Slovak Republic	-1.006** (0.017)	Russia	-0.341 (0.969)	Vietnam	-1.104*** (0.008)		
Slovenia	-1.449*** (0.001)	South Africa	-0.893* (0.083)	Zambia	-0.863* (0.071)		
Spain	-1.007** (0.017)	Sri Lanka	-1.105** (0.011)	Zimbabwe	-0.625 (0.364)		
Sweden	-2.528*** (0.000)	Thailand	-1.151*** (0.007)				
Switzerland	-0.703 (0.245)	Turkey	-0.462 (0.762)				
Taiwan Province of China	-0.948* (0.055)	Turkmenistan	-1.146*** (0.004)				
United Arab Emirates	-1.664*** (0.000)	Venezuela	-1.006** (0.028)				
United Kingdom	-0.667 (0.371)						
United States	-2.221*** (0.000)						
Uruguay	-2.321*** (0.000)						

***, ** and * represent rejection of the unit root null hypothesis at the 1%, 5% and 10% levels, respectively, p-values are in parentheses. The number of bootstrap replications is 1999. The test equations include an intercept and trend. Since we are dealing with quarterly data the maximum lag has been set at four. T-statistics have been used to determine the lag length.

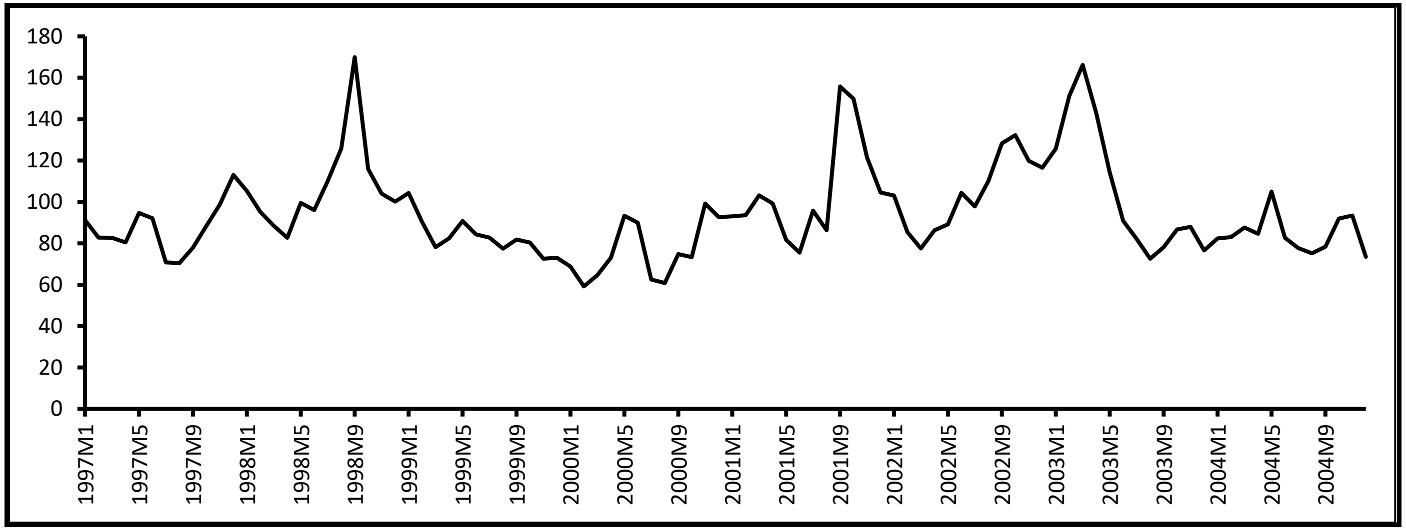

Figure 5: Economic policy uncertainty in selected countries

Table 9: Tests on economic policy uncertainty data

Panel A: Persistence test

Country	Hurst exponents
Australia	0.668
Brazil	0.749
Canada	0.570
Chile	0.560
China	0.541
Colombia	0.425
France	0.492
Germany	0.404
Greece	0.402
India	0.402
Ireland	0.458
Italy	0346
Japan	0.344
Netherlands	0.681
Russia	0.474
South Korea	0.345
Spain	0.450

Panel B: LM test with no structural break

Country	LM test	Truncation Lag
Panel	-18.778***	
Australia	-7.325***	0
Brazil	-5.694***	0
Canada	-3.201**	4
Chile	-3.310**	3
China	-2.659	3
Colombia	-3.972***	4
France	-3.521**	4
Germany	-5.021***	4
Greece	-5.747***	1
India	-3.472**	2
Ireland	-4.666***	4
Italy	-4.470***	3
Japan	-4.015***	3
Netherlands	-4.307***	2
Russia	-6.001***	1
South Korea	-4.505***	4
Spain	-3.651***	4

Panel C: LM test with one structural break

Country	LM test	First Break Point	Truncation Lag
Panel	-38.647***		
Australia	-4.486***	2009M8	2
Brazil	-5.155***	2003M2	7
Canada	-4.992***	2015M7	5
Chile	-5.227***	2017M1	11
China	-6.557***	2016M1	4
Colombia	-5.576***	2006M1	0
France	-6.217***	2011M2	7
Germany	-5.221***	2012M9	8
Greece	-5.622***	2002M8	8
India	-6.442***	2011M5	7
Ireland	-8.717***	20021M2	9
Italy	-4.775***	2001M8	8
Japan	-7.557***	2001M5	8
Netherlands	-7.388***	2010M4	7
Russia	-6.756***	2004M1	8
South Korea	-5.767***	2002M5	5
Spain	-6.556***	2015M11	10

Panel D: LM test with two structural breaks

Country	LM test	First Break Point	Second Break Point	Optimal Lag
Panel	-44.557***			
Australia	-6.194***	2000M4	2012M11	7
Brazil	-6.557***	1999M7	2010M8	1
Canada	-5.997***	2000M12	2018M8	5
Chile	-5.918***	2009M12	2015M6	6
China	-5.244***	2008M7	2013M7	8
Colombia	-5.998***	2008M11	2014M6	8
France	-4.554**	1998M12	2007M9	7
Germany	-5.080***	2014M10	2018M10	6
Greece	-6.122***	2005M09	2009M10	2
India	-5.593***	2013M8	2017M8	2
Ireland	-4.591**	2005M9	2016M10	1
Italy	-5.038***	2013M11	2015M3	5
Japan	-5.092***	2006M10	2008M8	1
Netherlands	-4.469**	2009M7	2017M4	6
Russia	-5.506***	2009M8	2013M3	1
South Korea	-6.393***	2001M12	2017M4	0
Spain	-5.478***	2007M10	2013M10	1

Panel E: Wild bootstrap test

Country	Test statistics
Panel	-1.215*** (0.004)
Australia	-0.662 (0.375)
Brazil	-0.816 (0.123)
Canada	-0.813 (0.136)
Chile	-0.926* (0.059)
China	-0.571 (0.537)
Colombia	-0.572 (0.631)
France	-1.113*** (0.008)
Germany	-0.705 (0.272)
Greece	-0.899* (0.056)
India	-1.125*** (0.009)
Ireland	-0.982*** (0.034)
Italy	-0.571 (0.629)
Japan	-1.197*** (0.004)
Netherlands	-0.839 (0.112)
Russia	-0.435 (0.655)
South Korea	-1.097*** (0.008)
Spain	-0.675 (0.299)

United Kingdom	0.469	United Kingdom	-2.902*	4	United Kingdom	-4.587***	2017M9	11	United Kingdom	-4.255***	2006M5	2008M10	0	United Kingdom	-0.572 (0.389)
United States	0.361	United States	-4.491***	3	United States	-4.974***	2013M12	0	United States	-4.099*	2000M4	2013M3	7	United States	-0.450 (0.734)

Since we are dealing with monthly data the maximum lag has been set at twelve. See notes to Table 2, Table 5 and Table 8 for other details.

Table 10: Determinants of GDP growth rate, augmented mean group estimator

Independent variable	High-income countries	Upper middle-income countries	Lower middle-income countries	Low-income countries	Economic policy uncertainty data
Uncertainty	-0.003** (0.040)	-0.005** (0.011)	-0.004*** (0.000)	-0.009*** (0.000)	-0.026*** (0.030)

*** and ** indicate significance at 1% and 5% levels and p-values are in the parentheses.