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Research note

A tale of two shocks: What do we learn from the impacts of economic policy uncertainties on tourism?

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ABSTRACT

In this paper, we investigate the impact of the economic policy uncertainties on the tourism demand, by using multiple and partial wavelet analysis. We find that global economic policy uncertainties (EPUs) impact on tourism demand in various levels for different countries. The effect is on peak and stay longer in certain periods; such as GFC or 9/11. More importantly, novel to the literature, the domestic EPUs significantly affect the tourist inflows, indicating that policy holders need to take into account EPU fluctuations in forecasting the short-term and medium term tourism demand.

1. Introduction

Historically, economic and political events have conveyed uncertainties to individuals and firms and forced them to take precautions. Over the last two decades, major economic events including, partisan policy disputes in the U.S., serial crisis in Europe, the 2007–2008 global financial crisis (GFC), and Brexit have raised concerns (as noted by Baker, Bloom, & Davis, 2016) among various actors of the economy. They primarily concerned about the transmission of local and foreign economic policy uncertainty (hereinafter EPU) shocks on both demand and supply side of the economy. Yet, the demand for most of the inelastic products (such as oil, or gas) decrease in the peak of EPUs; one would not think that uncertainties would not affect tourism demand, which is identified as elastic product. In the economic sense, individuals and firms would like to save more for the case of uncertainty and postpone their travel plans further, if they have any (Dragouni, Filis, Gavriilidis, & Santamaria, 2016).

Based on the above backdrop, in this paper, we investigate the impact of economic policy uncertainties on tourist inflows. Empirically, we analyse the dynamic relationship between global (GEPU) and domestic policy uncertainty (DEPU) with tourism inflows using a multiple and partial wavelet analysis. In specific, the lead-lag relationship and vulnerability of tourism demand to combined and isolated impact of GEPU and DEPU is quantified. We try to answer two intriguing questions. Firstly, is there a combined impact of GEPU and DEPU on tourism? Secondly, what is the impact of DEPU on tourism, when the influence of GEPU is eliminated Tourism demand is considered as highly sensitive to the economic changes (Wang, 2009), it is important to unveil as if the tourism is more delicate to economic policy uncertainties so as to draw conclusions and policies accordingly. We attempt to answer the above questions in a time–frequency domain. We have found that the impact of EPUs is much stronger on certain sub-periods; including 9/11 terrorist attacks and global financial crisis (GFC). Both local and global EPUs have strong and negative impact on tourism flows for most of countries in our set, indicating that tourism demand is highly sensitive to economic uncertainties from any direction. Accordingly, policy holders need to consider the both global and local uncertainties when they forecast the tourism demand.

2. Data and methodology

2.1. Data

We use monthly tourist arrival data of six countries from January 1997 until August 2017 obtained from the official statistics departments of each country. The economic policy uncertainty indices are used to proxy for country and world-wide economicl uncertianities,

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and are obtained from www.policyuncertainty.com. This website is created by (Baker et al., 2016) where they have created the county and global EPU indices for many OECD countries. The choice of the specific time periods and countries is purely based on data availability.

2.2. Methodology

Our empirical analysis is fundamentally based on the multi-scale (wavelet) approach. It is crucial to investigate the directionality and dependence structure between tourism inflows and EPUs at both time and frequency scale. The innovative features of this approach is to capture the heterogeneity and extreme events in the information sets. In our empirical settings, we expressed time-frequency base function, identified by the time (Δt) and frequency ($\Delta\omega$). We model the multi-resolution-based continuous wavelet transform (CW) of a time series, $x(t)$ is expressed in the following equation (1).

$$W_x(s,\tau) = \langle x(t), \psi(t)\rangle \equiv \int_{-\infty}^{\infty} x(t)\circ\frac{1}{\sqrt{s}}\psi\left(\frac{t-\tau}{s}\right)dt \tag{1}$$

The scale and location parameters expressed by the symbol s and τ, respectively. The equation $\psi((t-\tau)/s)$ is defined by main wavelet function where the parameter $\circ$, gives the convolution operator. In application, dependence and directionality is widely used in finance and macro-finance area. As reference, we applied multi-scale coherence approach suggested by Torrence and Compo (1998). The multiscale based commoves (CW) between two series we investigate (tourism and EPU)is expressed in the following equation (2).

$$R_m^2(s) = \frac{|S(s^{-1}W_m^{xy}(s))|}{S\left(s^{-1}|W_m^x|^{\frac{1}{2}}\right)\cdot S\left(s^{-1}|W_m^y|^{\frac{1}{2}}\right)}, \tag{2}$$

where the parameter S is a smoothing operator and the notation $W_m^{xy} = E[W_m^x \widetilde{W}_m^y]$ gives the cross-spectrum. In this model, $0 \le R_m(s) \le 1$ means that our investigated series (Tourism and EPU) is allowed to vary between [-1, 1]. We also proposed an alternative multiresolution based commoves approach defined by Partial Wavelet Coherence (PW). For computation, we consider the PW model specification documented by Aguiar-Conraria, Azevedo, and Soares (2008).

$$R_m^2(s)_{X,Y|Z} = \frac{|Q_{XY}^M|^2}{Q_{XX}^M Q_{YY}^M}, \tag{3}$$

where the model estimated parameters Q_{XY}^M, Q_{XX}^M and Q_{YY}^M are the minors associated with the smoothed cross wavelet transforms. To obtain the decomposed based lead-lag relationship between the Tourism and EPU series, we obtain the phase differences expressed by equation (4).

$$\varphi_{x,y} = \tan^{-1}\frac{\Im\{W_m^{xy}\}}{\Re\{W_m^{xy}\}}, \quad \varphi_{x,y} \in [-\pi, \pi] \tag{4}$$

where the parameters $\Im$ and $\Re$ gives the model imaginary and real parts of the smooth power spectrum respectively. In the empirical analysis, we describe the synchronization vs desynchronization relationships between Tourism and EPU indicated by “black arrows”. We document commoves in a more presentable by different directions of Arrows. At this stage, the arrow detected to the right (left) provides the signal between the Tourism and EPU are positively (negatively) connected. The easiest way to understand the directionality, arrows pointing up (down) with positively connected indicate that the Tourism (EPU) [leads (lag)] to the EPU (Tourism) where is opposite is observed when negative correlation is detected.

3. Findings

The multivariate wavelet coherence (MWC) results are shown in Fig. 1. In a multivariate setting, these figures (a–h) show the regions where both domestic and global EPU significantly explain the growth in tourist arrivals. Horizontal axis in the figures represent the period from January 1997 until August 2017. The vertical axis presented the frequency (in months) from highest (at the top) to lowest (in the bottom) which also reflect the time in months from 2 months to more than 64 months. Monte Carlo simulations is applied for 95% confidence interval, which is presented by black contour in WTC. The area with large (small) co-moves or explanatory power is identified in red (blue) colours.[1] In particular, the estimated parameter of Domestic EPU (DEPU) and global EPU (GEPU) performs more leading in USA, Canada, Italy and UK, in descending order respectively.

The impact of DEPU and GEPU is higher during 1999–2004 in almost all countries with slight deviations. We have observed sole impact of the 9/11, first on the jump in economic uncertainties and later the sharp drop in the tourist flows, within OECD members.

For US and Canada, this effect is more profound in short-to medium-run (2–32 months) for 9/11 period, and then it stretches towards the global financial crisis period in the medium to long-run (16–64 months). The remaining countries shows similar patterns i.e., the impact of DEPU and GEPU is mostly evident during the same periods (9/11 and then global financial crisis sub-periods); however, the significant regions are smaller and are mostly present in the short-to medium-run.

Next, the results of partial wavelet coherence (PWC) for both DEPU (left-panel) and GEPU (right-panel) are presented in Fig. 2. The intention to study partial coherence figures is to address if there are any differences among local and global uncertainties on tourist flows. While rest of characteristics of the maps are same as in MWC, these maps also show the phase angle (phase difference) within a significant region to distinguish the lead-lag relationship between tourism and EPUs. Some interesting findings of the PWC is summarized as: a) Tourism inflows in Australia, Canada, Germany, Italy, UK and USA are impacted by both domestic and global policy shocks. b). Japan (Sweden) has a greater influence of global (domestic) policy shocks. c). Arrow within the significance regions are mostly pointing left-upward which means greater policy uncertainty decreases the tourism. The global uncertainties derive the pre-cautionary saving reactions of the consumers. However, international travellers might also be reluctant to travel due to local uncertainty and resulting fluctuations in prices and quality of the service at destination points.

4. Conclusion

In this paper, we investigate the impact of local and global economic policy uncertainties (EPU) on the tourism inflows for the OECD countries using a wavelet analysis. The impact of EPU on tourism flows is quite clear however, it is much stronger during the peak periods of economic uncertainties like 9/11 and GFC. UK, USA and Canada visitors have been affected more from economic uncertainties, compared to rest of the countries, probably due to the relatively higher accommodation, flight and other tourism related costs incurred within these countries. Apart from the global EPU, the local EPUs have negative impact on tourist inflows, indicating that visitors might monitor the economic uncertainties within possible destination markets. This finding is highly intuitive for the policy-holders since they need to take care the EPUs in forecasting the domestic tourism demand.

[1] To estimate the MWC and PWC, the bias corrected version (see Ng and Chan (2012) for details) and CWT version detailed by Grinsted, Moore, and Jevrejeva (2004) of the Matlab software package is used. The detailed computation guideline and estimation procedure is available at the following link: http://www.cityu.edu.hk/gcacic/wavelet/download.htm, for MWC and PWC, and http://noc.ac.uk/marine-data-products/cross-waveletwavelet-coherence-toolbox-matlab for WTC.

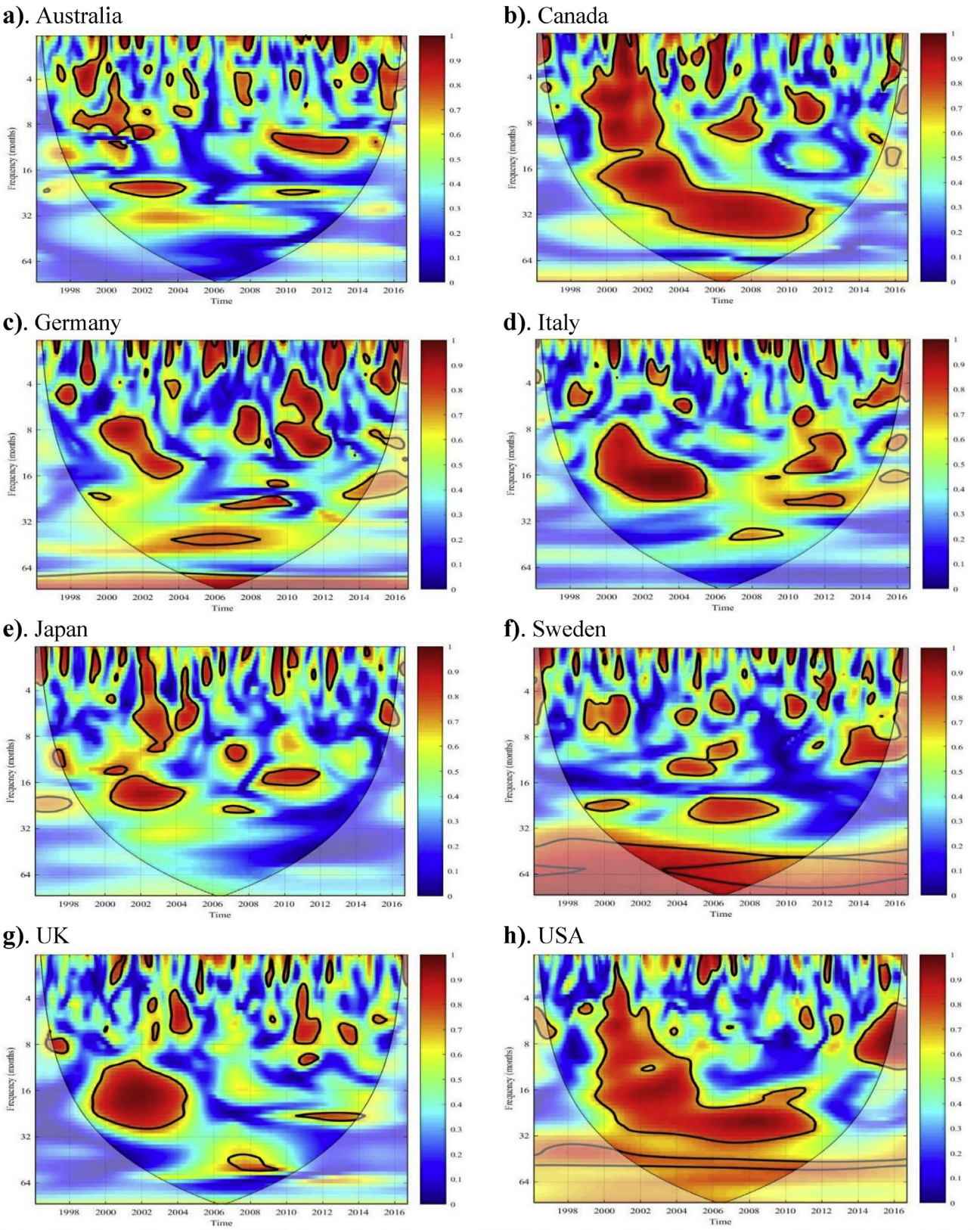


Fig. 1. Multiple wavelet coherence (MWC).
Notes: The three dimension MWC shows the influence of EPU (Local vs Global) on tourism. The MC (Monte Carlo) simulation based significant region (5%) detected by the black contour. The synchronization vs desynchronization area presented by right hand scale.

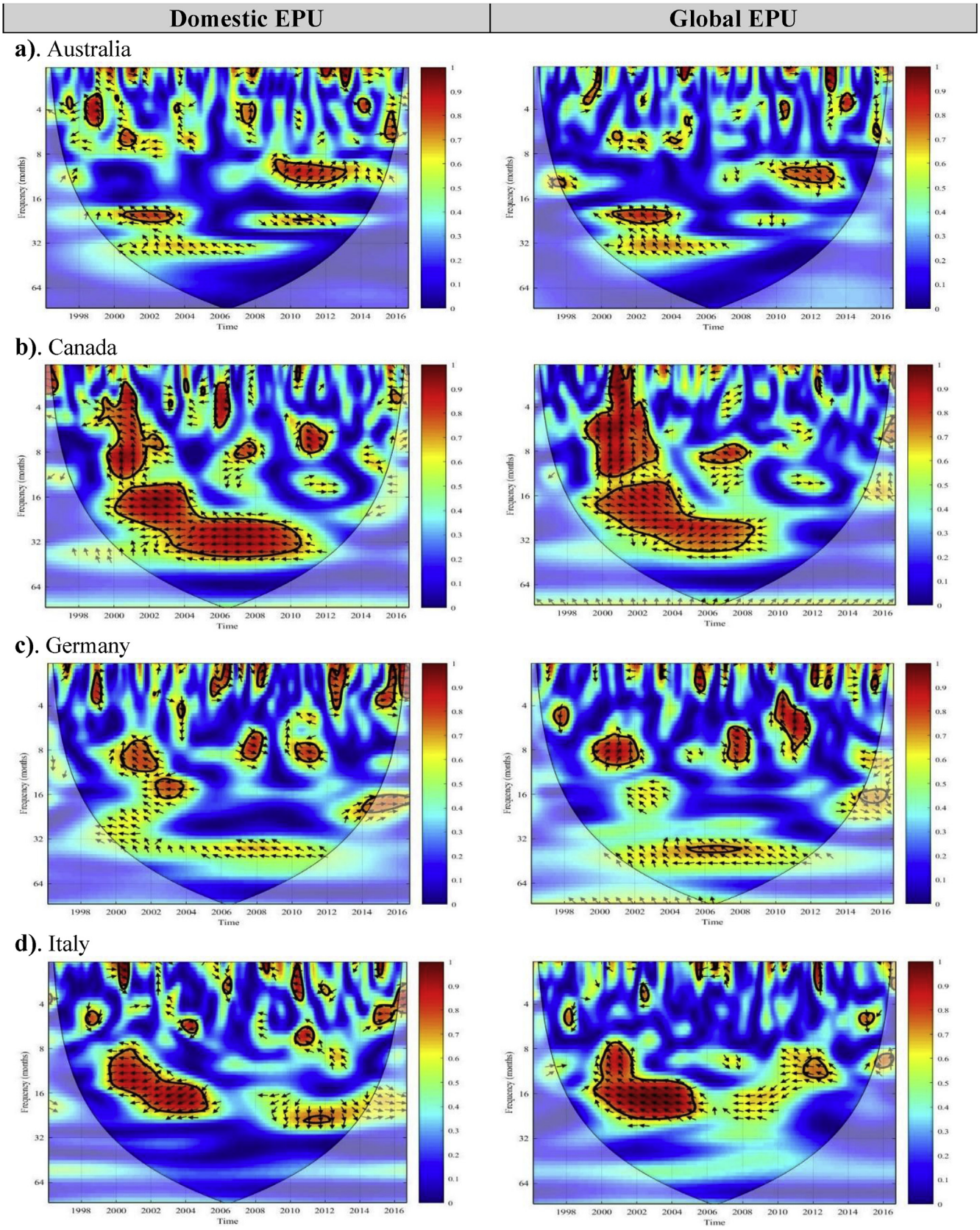
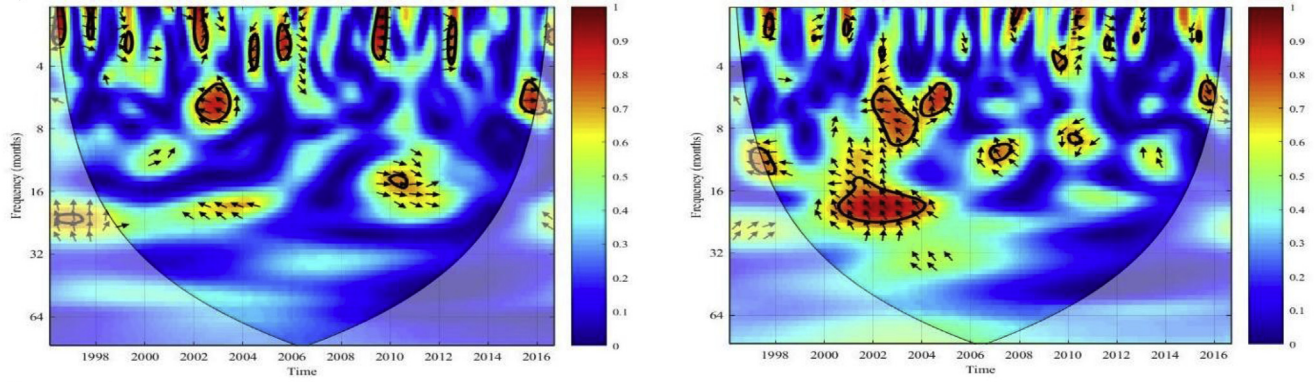
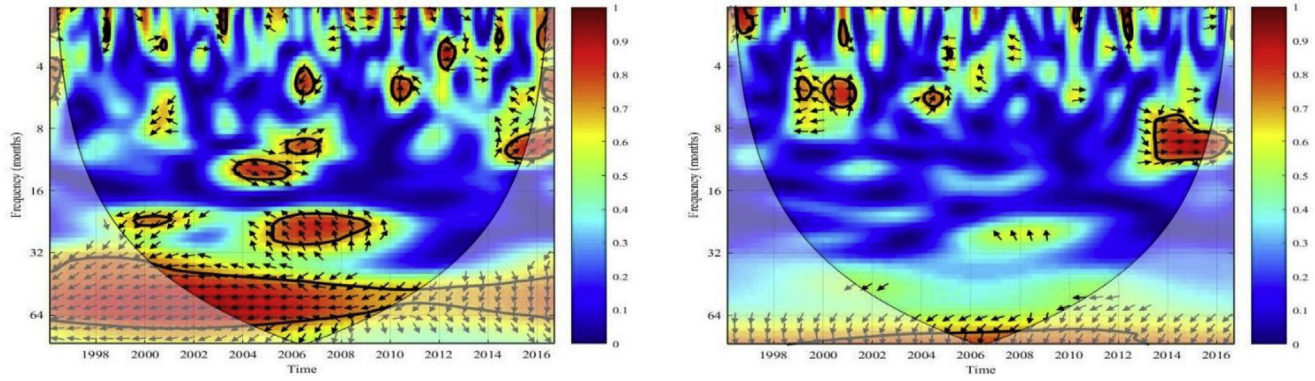


Fig. 2. Partial wavelet coherence.
Note: See note to Fig. 1.

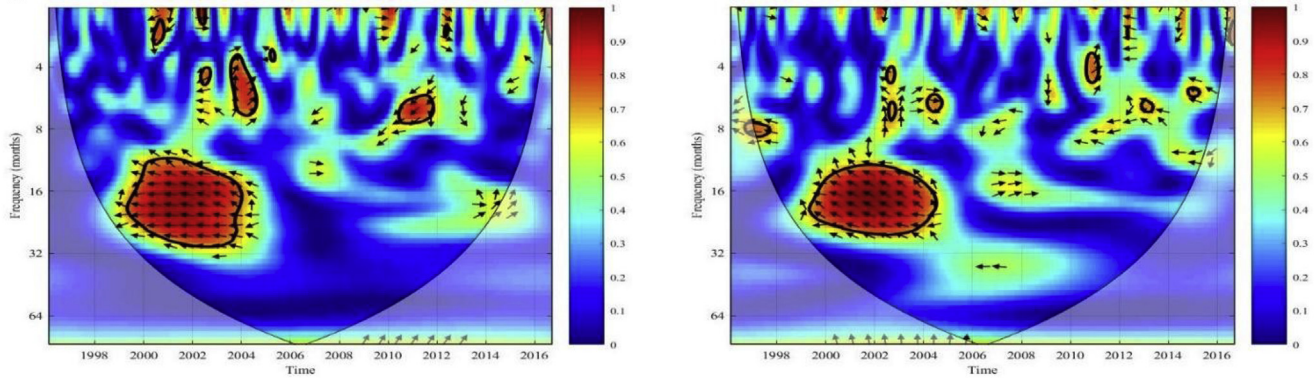
e). Japan



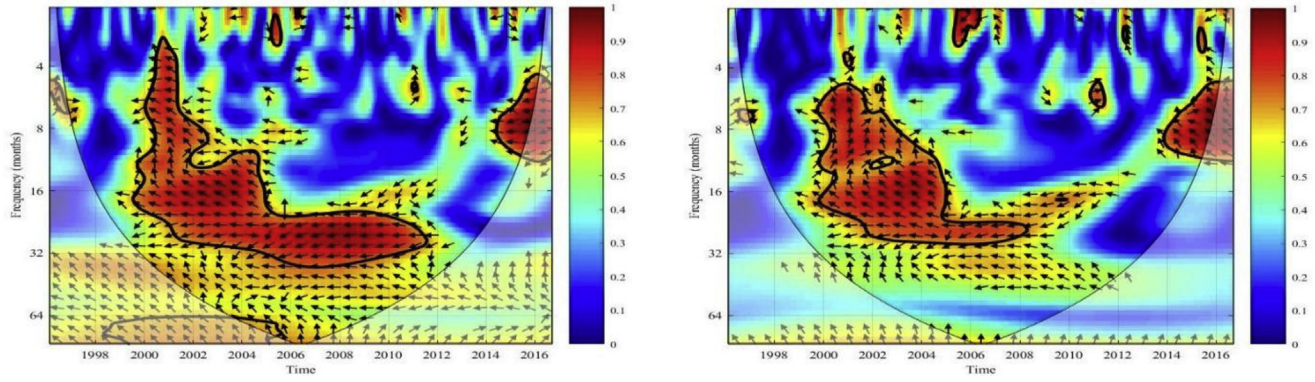
f). Sweden



g). UK



h). USA



Note: See note to Figure 1

Fig. 2. (*continued*)

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