

Who is leading in the Communication Tone? Wavelet Analysis for the Fed and the ECB

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Introduction

We examine the interdependence of the communication tones of the Fed and the ECB, arguably the two most influential CBs.

Communication tools of the CBs can be informative and important in paving the road for sentiment analysis to measure communication tones.

The time and frequency aspect of the interdependence of the tones of the two CBs may carry crucial information regarding the dynamics of the relationship.

Key findings

- The communication tones of the Fed and the ECB are measured using LM and finBERT.
- Wavelet coherence examines the relationship between the Fed and the ECB.
- The findings suggest the leading role or co-movement is varying based on time and frequency domain.
- LM and finBERT results are relatively similar in the medium run.

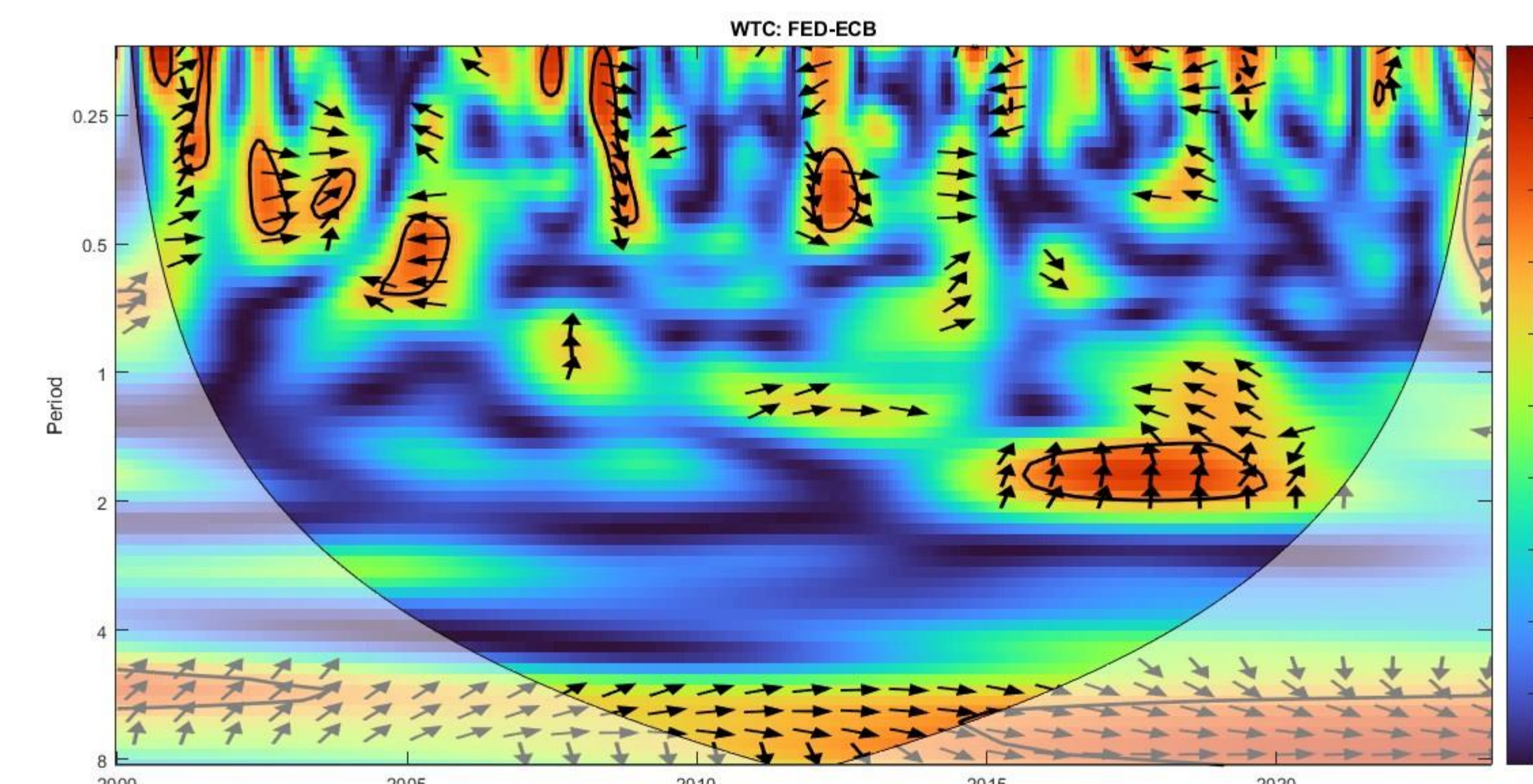
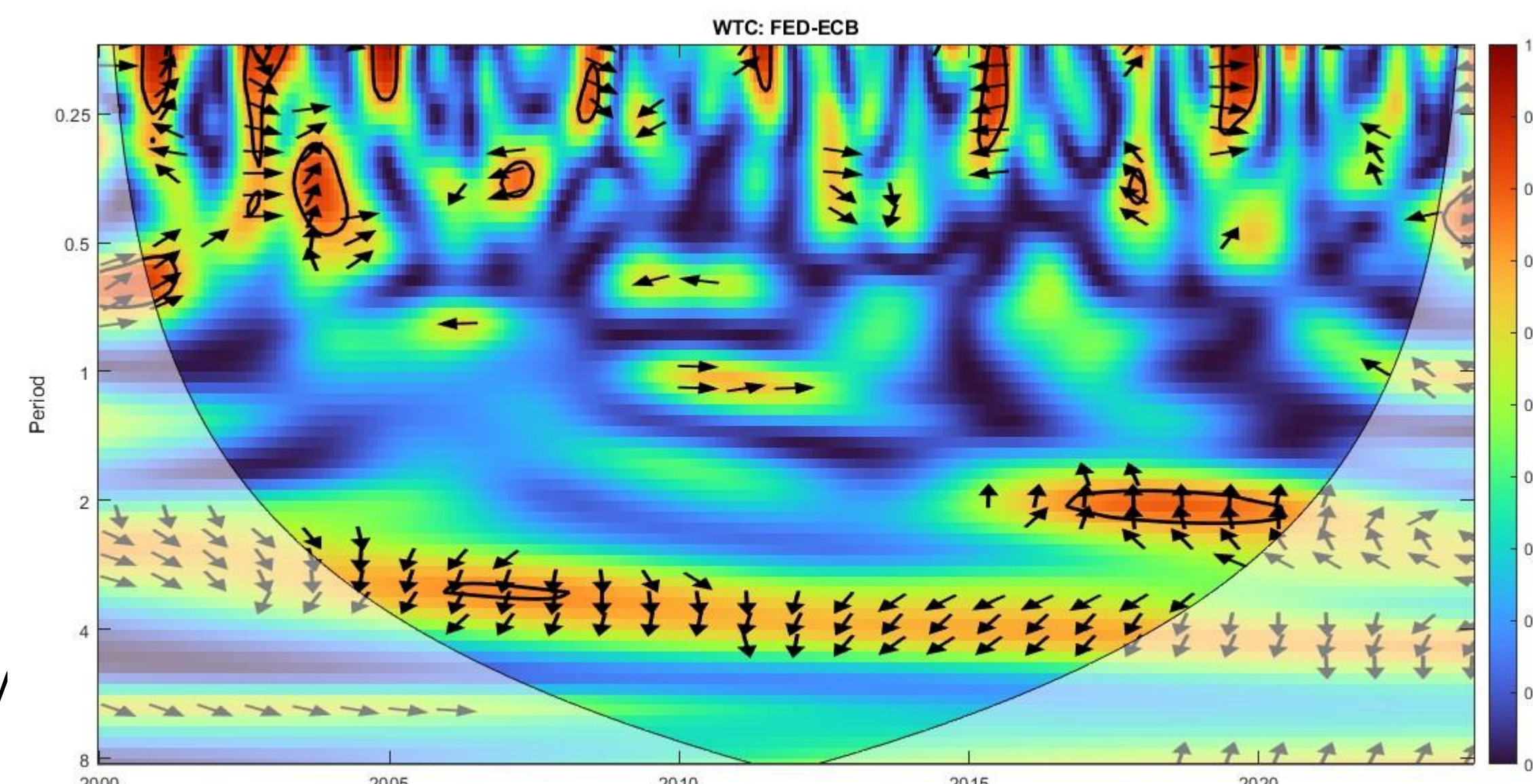
Methods

Lexicon-based algorithms measure sentiments by word-counting based on the selected dictionary, whereas transformer-based algorithms measure the sentiment of each sentence based on the selected trained texts, such as financial texts. For the lexicon-based algorithm, we used the Loughran and McDonald (2011) Master Dictionary (1993-2021), hereafter LM. For the transformer-based algorithm, we used FinBERT.

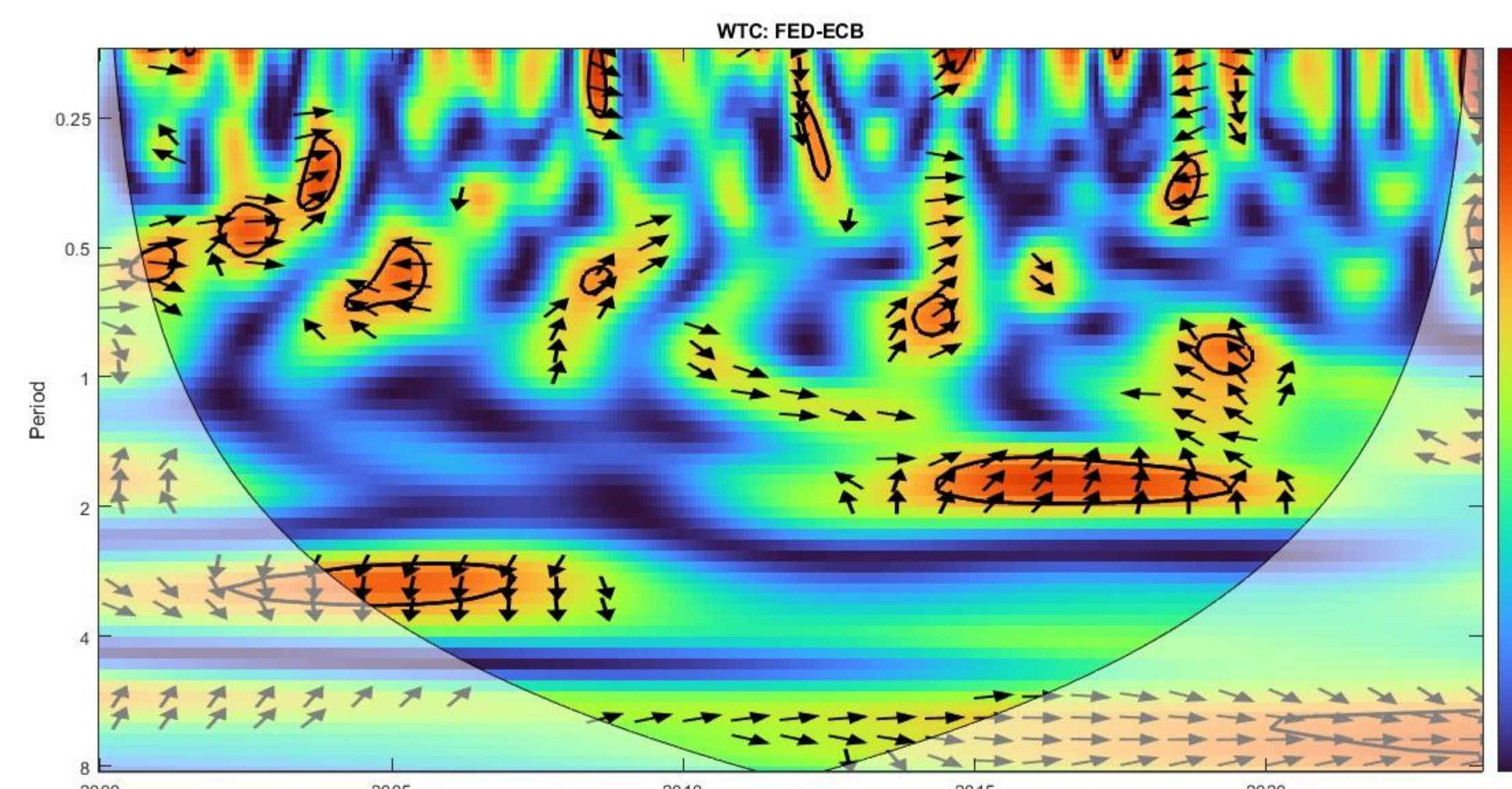
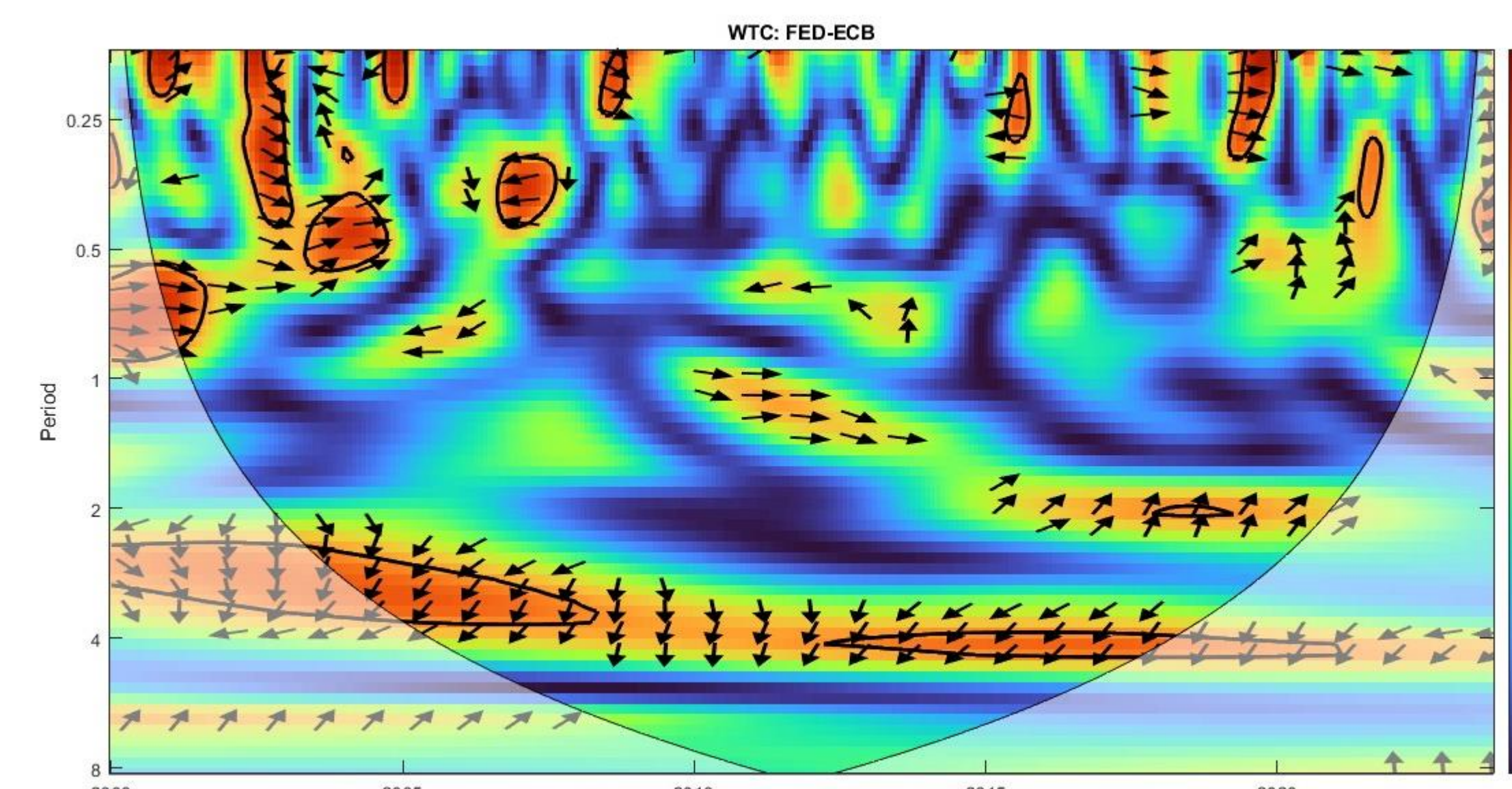
Wavelet coherence (WTC) methodology presents wavelet coherence, which is similar to a traditional correlation in a localized form, to measure strength of the relationship in time frequency space, phase relationship to explore the lead/lag positions, time-domain to take into account the time dynamics of the relationship, frequency-domain to interpret the relationship in terms of the frequency-scale, such as short- or long-run.

Wavelet Analysis

LM and finBERT for speeches



LM and finBERT for extended speeches



Results

ECB leading

- in-phase mid2002-2003 (over 0-0.45 years of cycles) : rise of the communication with the public
- 2008 (0.1-0.3): ECB increases its policy rate for price stability despite concerns over economic stagnation
- out of phase 2015 (0-0.4): full-scale implementation of the QE to fight with prolonged period of low inflation.

FED leading

- in-phase mid2000-mid2001 (0-0.25 and 0.5-0.7) and mid2003-mid2004 (0.3-0.5): Greenspan era of Fed
- in-phase 2011 (0-0.2): sovereign debt crisis in the PIIGS
- out of phase mid2017-2016 (0.4-0.45): Fed continues tighten, whereas ECB continues QE

Two significant regions in the medium run (period between 1 and 4)

- between 2006 and 2008 the ECB leads out of phase over around 3.5 years of cycles: mixed period of the Fed due to rising inflation risks and then the recession of the US economy and the contractionary monetary policy period of the ECB.
- between mid-2016 and mid-2020 the Fed leads either in-phase or out of phase over 2-2.5 years of cycles: mixed period of the Fed and the ECB's MRO hitting 0% level period first time ever with large-scale quantitative easing; the Fed applies more assertive policies together with the high growth rate before Covid-19 pandemic.
- No significant region in the long run (period below 4)

Findings suggest that there is no static leading role assigned either to the Fed or the ECB, on the contrary the leading role is changing over the time horizon.

Conclusions

- Such dynamic relationship is also observed in terms of the frequency dimension such that the leading role is varying over the frequency domain.
- The visual inspection reflects that there are some minor similarities in the short run and major similarities in the medium run, a result that offers support to the LM-lexicon approach as a useful complementary tool to the transformer-based alternatives.
- The findings regarding the medium run suggest the leading role of the ECB during the (pre-)crisis period of the US and the leading role of the Fed during the QE period of the ECB.
 - The GFC crisis affects the Fed losing its leadership, whereas reviving inflation back to target level affects the ECB losing its leadership.
 - This finding is, in a way, in line with the study of Bohl et al. (2023), which suggests that it is the unemployment expectations for the Fed speeches while it is the inflation expectations for the ECB speeches in influencing their tone
- The findings in the medium run seem to be consistent with the narrative of the macroeconomic dynamics for both CBs.
 - Our findings underscore the importance of counter-cyclical leadership such that CBs may undertake proactive communication role during the periods their counterpart is facing economic challenges.
- It is observed that independence of the communication tones depicted with blue area is very common in the wavelet coherence visualizations.
 - This is suggesting relatively different communication strategies followed by the two CBs
- In conclusion, we can argue that the examination of the interdependence of the communication tones of the two CBs are informative.