# Session 3 – Financial Crisis and Contagion Discussion

ORTEC FINANCE

# Discussion of

- **Short and long term growth effects of financial crises in developing countries**
  *Fredrik Andersson,* Lund University, and Peter Karpestam, Lund University

- **Has the financial crisis changed the business cycle characteristics of PIIGS countries?**
  *Christian Richter,* UEL, and Andrew Hughes Hallett, George Mason University

by Hens Steehouwer, Ortec Finance Research Center

# Andersson at al - I

- Analyzes impact of financial crisis on long and short term economic growth in developing countries.
- Distinguishes between different types of crisis (inflation, currency, banking, debt and stock market) and different types of growth measures (labor productivity, capital accumulation and factor productivity)
- Decomposes data into time horizons with Maximum Overlap Discrete Wavelet Transform and estimate long and short term relations on crisis dummy variables
- Draw several interesting conclusions

# Andersson at al - II

- Results (in general) depend on methodology and therefore some questions and remarks in this area.

- Why has the Maximum Overlap Discrete Wavelet Transform (MODWT) been selected to band-pass filter the data rather than another technique and how sensitive are the results for the choice of filter?

- The MODWT seems to be applied on 35 annual observations (1973-2007). How does this filter perform in small samples, specifically in areas as leakage, phase shifts and accuracy and loss of data at the edges?

- The filter seems to be applied on the (log) growth rates while the latter is also a filter. Is the MODWT a linear filter which would render the order of differencing and band-pass filtering irrelevant?

# Andersson at al - III

- Are the dummy variables 1 or multi period and how are these integrated into the short and long run MODWT framework?

- How are the panel data equations estimated and is this sound from an econometric perspective with on the left hand side MODWT filtered data and on the right hand side the dummy variables and error terms? A Fourier transform analogue seems to be given by
  - *Engle, Robert F., "Band Spectrum Regression", International Economic Review, Vol. 15 No. 1 (February 1974).*

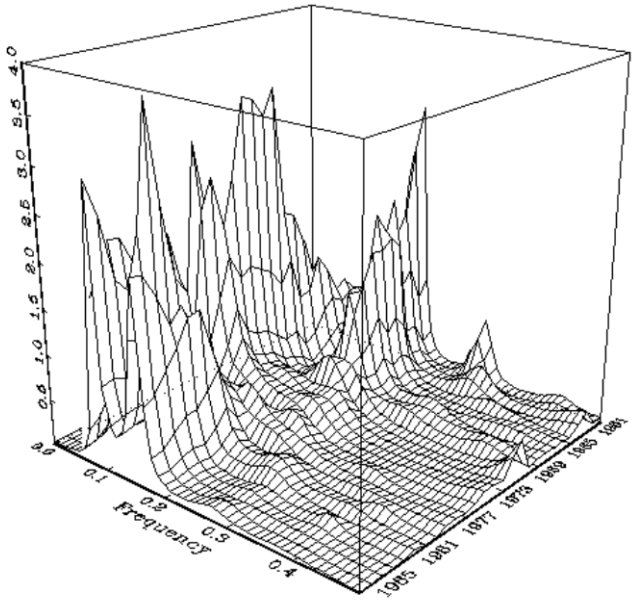
# Richter et al - I

- Analyzes changes in business cycle behavior and convergence between PIIGS countries and Europe
- Does this based on auto spectra and coherence from time varying bivariate spectral densities estimated on quarterly real GDP growth
- Spectral densities are estimated by applying Kalman filter on (V)AR specification with a random walk for each of the AR parameters
- Conclude that there is no general convergence between PIIGS countries and Europe

# Richter et al - II

- In favor of using time varying spectral densities to analyze changes in dynamic behavior of economic and financial time series…
  - *Part III of Steehouwer, H. (2005). Macroeconomic Scenarios and Reality: A Frequency Domain Approach for Analyzing Historical Time Series and Generating Scenarios for the Future. Ph. D. thesis, VU University Amsterdam. http://hdl.handle.net/1871/9058*

Figure 6.7 Rolling window spectral estimates.

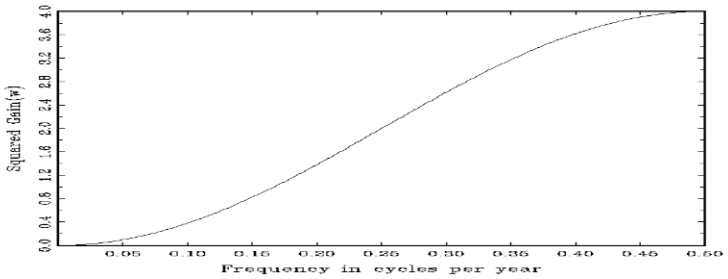


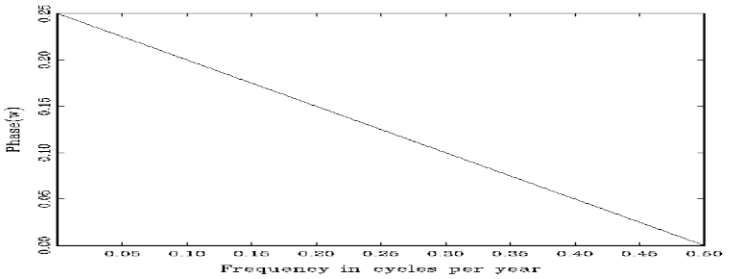
# Richter et al - III

- From this background some methodological questions and remarks

- It is stated that results do not depend on a specific detrending technique. However first order (quarterly) differencing is also a special linear detrending filter with properties deviating from an ideal frequency domain filter. Please relate to the finding of rather high frequency business cycle frequencies (3-4 and ½-1 year cycles)

Figure 5.1 Squared gain (5.2.4) and phase (5.2.5) of the first order differencing filter.



# Richter et al - IV

- Sample of real GDP data seems 1980-2005. How can this reveal information about the impact of the 2008 and subsequent crisis?
- Methodology starts from Wigner-Ville distribution weights and Short Time Fourier Transform (STFT) but then moves to the AR specification. How are these related?
- Specifically, how dos this relate to the Maximum Entropy ("least additional information") justification of using an AR polynomial for estimating spectral densities in small samples?
  - *Burg, J.P. (1967), "Maximum entropy spectral analysis", Paper presented at the 37th Annual International S.E.G. Meeting, Oklahoma City. Reprinted in Childers, D.G. (1978), "Modern Spectral Analysis", IEEE Press, New York.*
  - *Berk, K.N. (1974), "Consistent autoregressive spectral estimates", Annals of Statistics, 2, 489-502.*
  - *Berkowitz, J., I. Birgean and L. Kilian (2000), "On the finite-sample accuracy of non parametric resampling algorithms for economic time series", Advances in Econometrics, 14, 77-107.*

# Richter et al - V

- To what extent is the time varying AR approach with a random walk for every individual AR parameter “too” flexible and leading to very erratic results? How would the results compare to a (symmetrical) rolling window approach?

- Care is needed when eliminating parameters based on statistical significance, especially in small samples. Monte Carlo experiment on spectral density estimation with different estimation techniques in section 4.7 of Steehouwer (2005) yields amongst other things “*Contrary to what one might have expected, the optimization techniques lead to less efficient spectral estimates…. A possible explanation is that a possible efficiency gain because of a smaller number of parameters to be estimated is canceled if in many cases the procedures lead to invalid parameter restrictions.*”

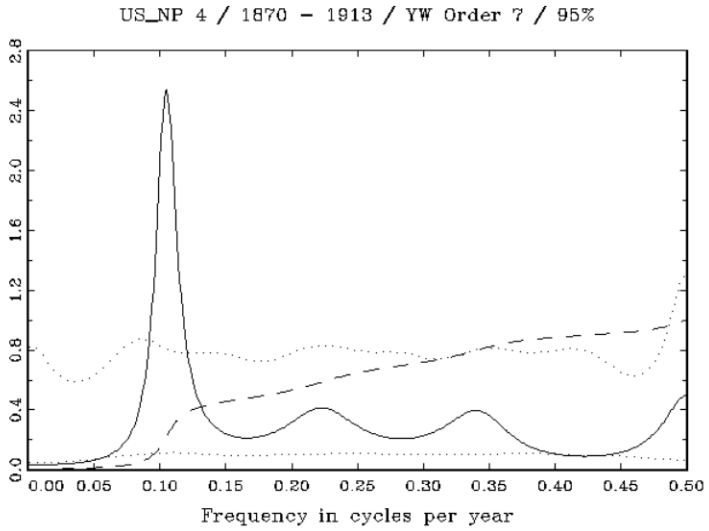
# Richter et al - VI

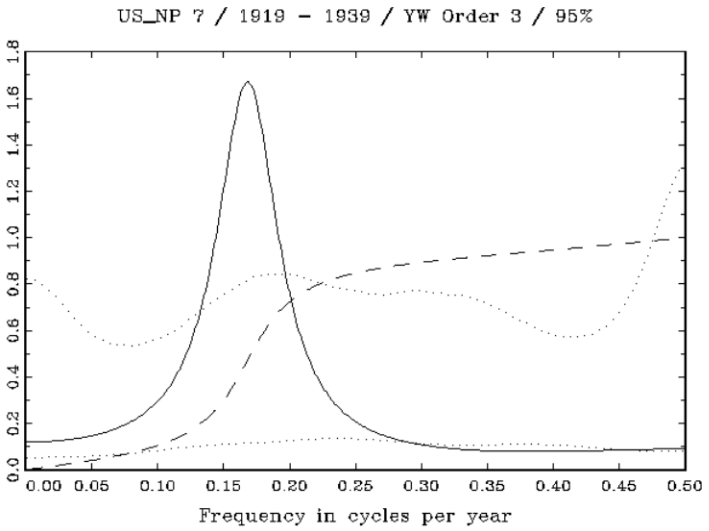
- From the raw 3D results it is not always easy to grasp the general picture of the changes that occur over the samples. One suggestion might be to focus on specific frequencies and show in 2D how peak frequencies, peak power, coherence and phase change over time.

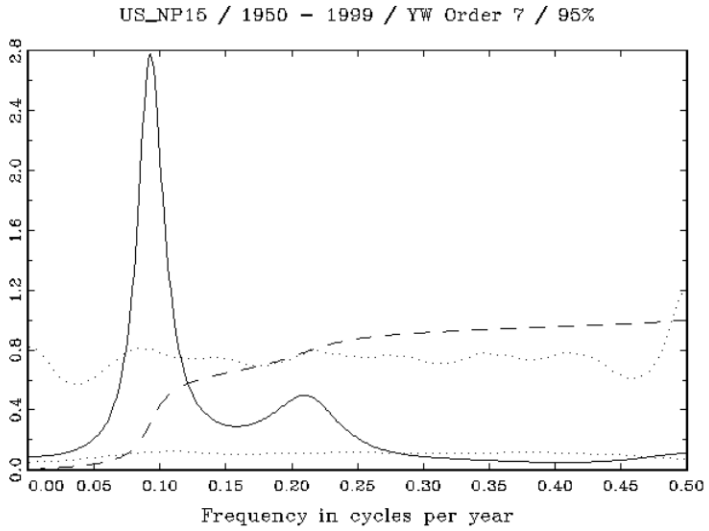
- Some stylized facts from Steehouwer (2005) on 1950-1999 sample
  - SF 77: During the postwar period, the international coherence between the Juglar business cycle fluctuations in the NL, UK and US as measured by their national product coherence has on average increased from 72% to 99% (+27%).
  - SF 78: During the postwar period, the international coherence between the Kitchin business cycle fluctuations in the NL, UK and US as measured by their national product coherence has on average increased from 72% to 82% (+10%).

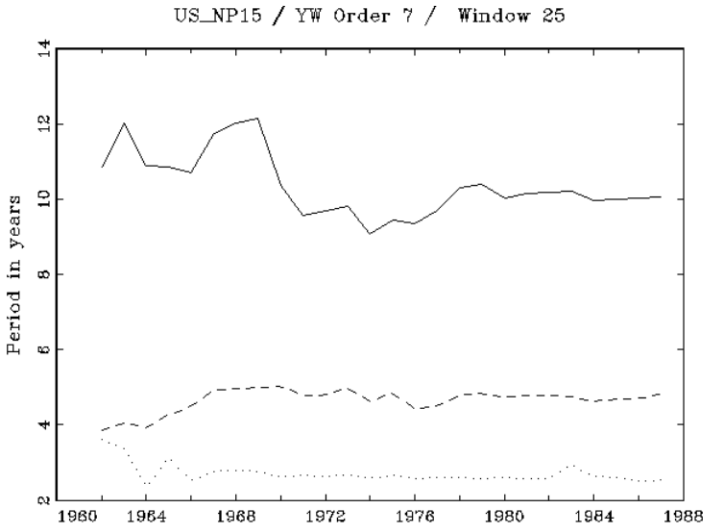
# Example US versus NL real GDP

Figure E.2 Static and dynamic estimates of the spectral density of the stochastic component of a National Product index for the US for various sub-periods. The static estimates also show the 95% white noise confidence interval. The phase is the expected lead over the NL.



# Example US versus NL real GDP – cont