Referee report for

"Random Matrix Theory and the Evolution of Business Cycle Synchronisation, 1886-2006"

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May 13, 2008

Comment

The paper clarifies previous results by a working paper: Bordo and Helbing (2003). While this previous work uses simple statistical tools to show an increased synchronization of main world economies during over a century, the present paper analyzes a similar dataset, with more sophisticated techniques, showing that this convergence has not been gradual.

I suggest the author to revise the arguments of the whole exposition: the (partial) novelty of the paper seems to rely on random matrix theory applied to macro–economic data, not on its contribution to economic history.

Is the contribution of the paper potentially significant?

I suggest the author to put more emphasis on the new methodology, rather than on a comparison with Bordo and Helbing (2003) and references therein. The old results would be instead a good ground for the new method, since the new results are not in sharp contrast with them. Slight differences, if corroborated by other historical data, would show the efficiency of the new method.

Random matrix theory has already been extensively tested on financial data (much more frequent than macroeconomic ones), maybe then that a more detailed discussion is needed to highlight that the properties of the model are even more indicated for short datasets, where some correlations

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may simply depend on noise. This point is already present in the beginning of Section 2, but I think it should be the main message of the paper.

Finally, as long as the paper relies only on a non–econometric analysis of the data, and does not include robust estimation[1], at one possible side, nor economic interpretation, at the other, it seems more suitable for a journal of applied techniques to real world phenomena (e.g. Physica A) than for an economic journal.

Is the analysis correct?

The methodology is correct, it relies on stable mathematical results and has already been applied to economics. However, in my opinion, the relation (only suggested at page 7) between correlation matrices and hierarchical clustering should be better specified.

Minor points

Page 3: In "The authors conclude that 'using three different methodologies that there is...", "that" is repeated.

Page 7: Kaufman and Rousseeuw (1990) is not listed in the references.

References

[1] Bordo, M., and T. Helbing, (2003) "Have National Business Cycles Become More Synchronised?", National Bureau of Economic Research Working Paper 10130, NBER, Cambridge, MA.

[2] Kaufman, L., and P. J. Rousseeuw, (1990) "Finding groups in data. an introduction to cluster analysis", Wiley Series in Probability and Mathematical Statistics. Applied Probability and Statistics, New York.

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[1]As an example, the Monte Carlo method discussed at the beginning of page 7 is not properly justified