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Has the U.S. economy really become less correlated with that of the rest of the world?

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Abstract

Cross-country correlation coefficients indicate that the U.S. economy has become less correlated with that of the rest of the world during the last 40 years. However, once adjustments for the lower variability experienced in the U.S. since the early 1980s are made, the cross-country correlation coefficient for output is revealed to have *increased*. A simple time series model is also presented to challenge the widely held view that lower (or higher) volatility causes correlations to be biased downward (or upward). This model could yield higher correlations in an environment with lower variability and vice versa, and empirical evidence, among some of the macroeconomic variables studied in this paper, is provided for the model.

JEL classification: C22; E32; F41

Keywords: Business cycle co-movements; Correlation coefficients; Structural changes in volatility; Stochastic unit roots

1. Introduction

According to cross-country correlation coefficients, the U.S. economy has become less correlated with that of the rest of the world [ROW] during the last 40 years. For instance, Heathcote and Perri (2003) provide empirical evidence that the correlations between the U.S. and the ROW have decreased in recent years for major macroeconomic variables, such as output, consumption, investment, and employment.[1] They build a general equilibrium

[1] Helbling and Bayoumi (2003) find a similar result for the U.S. and other G-7 countries.

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model that attributes the lower correlations to an increase in U.S. financial integration with the ROW. It is also well documented in the literature that the U.S. economy has recently experienced lower volatility. For instance, McConnell and Perez-Quiros (2000) provide strong empirical evidence that a reduction in the volatility of the U.S. output growth occurred in the early 1980s. Their finding is confirmed also in Chauvet and Potter (2001) and Kim and Nelson (1999), among others. McConnell and Perez-Quiros (2000) attribute the lower volatility in GDP to improved inventory control in durable goods manufacturing.

This paper builds on the observation that heteroskedasticity can cause correlation coefficients to be biased, and shows that, once adjustments are made to account for the lower volatility experienced recently in the U.S., there is little convincing evidence that the U.S. economy has become less correlated with that of the ROW. The fact that heteroskedasticity can induce biases in correlation coefficients is already noted in McConnell and Perez-Quiros (2000) and Heathcote and Perri (2004), for instance. This paper makes use of the recently proposed adjustments to correlation coefficients by Forbes and Rigobon (2002), which are robust to heteroskedasticity. Forbes and Rigobon (2002) are interested in testing for contagion of financial crises with the correlation coefficients of stock returns from various countries. Times of financial crisis are usually accompanied by more volatile stock markets. After adjusting for changing volatility, Forbes and Rigobon (2002) find little evidence for contagion during the recent financial crises in Hong Kong, Mexico, and the U.S. This current paper finds that, after adjusting for reduced variability recently experienced in the U.S. economy, the cross-country correlation coefficient for output has *increased*, while the correlation coefficients for consumption and investment have only slightly decreased.

This paper further examines the effects of changing volatility on correlation coefficients and provides a counterexample to the widely held view that lower (or higher) volatility causes the correlation coefficients to be biased downward (or upward). For example, in the framework used in Forbes and Rigobon (2002), the possibility that lower volatility yields higher correlations is not allowed. This paper presents a simple time series model that could yield higher correlations in an environment with lower volatility and vice versa, without employing the adjustments to correlation coefficients suggested by Forbes and Rigobon (2002). The time series model used in this paper is a stochastic unit root [STUR] process, discussed in Granger and Swanson (1997), Leybourne et al. (1996b) and McCabe and Tremayne (1993), among others. An earlier discussion on STUR is also contained in Granger (1987). The STUR test results find that about half of the macroeconomic variables studied in this paper are better characterized as STUR rather than as a standard (fixed) unit root process. The data here employed are presented in the next section.

2. Data

Figs. 1 and 2 show the data series for the U.S. and the rest of the industrialized world, in logarithms and in the differences, respectively.[2] The variables are private

[2] An appendix to this paper has more details on data construction. Heathcote and Perri (2003) use the Hodrick-Prescott-filtered series. The filter approximately eliminates cycles longer than 8 years in length. The first difference filter emphasizes shorter cycles.