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Business cycle synchronization in Asia-Pacific: New evidence from wavelet analysis

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ABSTRACT

We investigate the synchronization of growth cycles between China, Japan, the United States and other Asia-Pacific countries using wavelet analysis. While we find that the growth cycles of China, Japan, and the United States are synchronized with the other Asia-Pacific economies, the strength of business cycle synchronization fluctuates across frequencies and over time. Overall, China and other Asia-Pacific countries display a high degree of comovement at long-run developments, especially during and following the recent global financial crisis. Likewise, the strength of business cycle synchronization between Japan and most other Asia-Pacific economies increases at long-run fluctuations, however, for the entire sample period of 1993:2–2012:4. Also, the United States and other Asia-Pacific countries mostly experience a high degree of comovement at frequencies linked with fluctuations that range from between two and four years. Our results thus emphasize the importance of examining the strength of business cycle synchronization using a time–frequency framework.

1. Introduction

Many countries in Asia have enjoyed a considerable amount of economic growth in the past few decades. Certainly, the periods of the Asian financial crisis in 1997 and the recent global financial crisis are exceptions. Nevertheless, these countries have attempted to promote economic integration through various agreements in the region, primarily following the Asian financial crisis (Allegret & Essaadi, 2011; Xie, Cheng, & Chia, 2013). These activities have enabled greater regional economic collaboration and also have facilitated growth in these economies (Shin & Wang, 2003; Xie et al., 2013). This is especially the case for China, which has experienced substantial economic development after 1978, when it commenced major economic reforms (Gerlach-Kristen, 2009). Indeed, China has surfaced as the foremost force in this process of global integration in Asia.[1]

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[1] See, for a discussion, Moneta and Rüffer (2009), Fidrmuc and Korhonen (2010), Park and Song (2011), Kim et al. (2011), Burdekin and Siklos (2012), De Grauwe and Zhang (2012), Quah (2012a, 2012b), and Su, Chang, Chang, and Yin (2014).

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Specifically, China has increasingly influenced the economic structure of the world in recent decades. Fidrmuc and Korhonen (2010), for example, indicate that China has altered the allocation of national income in the global economy. As of 2013, its share of global national income came to about 8 percent (World Bank, 2014). Its percentage of world exports and imports has also significantly increased in recent years (see Allegret & Essaadi, 2011; Dufrénot & Keddad, 2014; Kim, Lee, & Park, 2011). Su et al. (2014:228) argue that "the choices and effectiveness of monetary and fiscal policies in East Asian economies will be highly influenced by external factors originating in China." Therefore, China plays a vital role in the global economy and even more importantly in the Asia-Pacific region.

Research also indicates that many Asian economies have enjoyed high intraregional trade in recent decades, with the exclusion of the period of the Asian financial crisis and the latest global financial crisis.[2] The literature attributes some of this increase in trade integration to the amazing growth and influence of China in the region.[3] Moneta and Rüffer (2009:1), for example, note that China has become "a major assembly and processing centre, thereby increasing intra-regional trade and financial flows, while simultaneously strengthening the links between countries within the region." Similarly, Dufrénot and Keddad (2014:188) indicate that China is at the focal point of a "regional supply network that is crucial in promoting intra- and inter-regional trade." Likewise, Athukorala (2011:80) argues that "China's rise in world trade has brought about a notable shift in the division of labor within regional production networks." Indeed, previous studies emphasize the significance of regional production networks in promoting economic integration in Asia-Pacific (Athukorala, 2011; De, 2011; Dufrénot & Keddad, 2014; Kimura, 2006; Yeung, 2009).

Similarly, Japan plays a critically important role in advancing economic integration in the region (Dufrénot & Keddad, 2014; Kim, Kim, & Min, 2013; Park, 2007; Quah, 2012a, 2012b). In particular, Japan promotes regional economic integration via trade and foreign investment (see Capannelli, Lee, & Petri, 2010; Hughes Hallett & Richter, 2009; Kang, Wang, & Yoon, 2002; Kim et al., 2013; Quah, 2012a, 2012b). Hughes Hallett and Richter (2009:208), for example, emphasize that Japan is a "provider of sophisticated manufactures, partner in network trade and a source of investment" in the Asia-Pacific region. According to Kim et al. (2013:309), the yen is the "third-most traded currency" in the world. Nevertheless, the majority of trade in the region is invoiced in US dollars (McKinnon, 2000; McKinnon & Schnabl, 2004a, 2004b; Quah & Crowley, 2010, 2012). McKinnon and Schnabl (2004a:181), for example, note that the US dollar is employed "as the invoice currency for most of East Asian trade even though Japanese trade in the region is as large as that of the USA." Frankel and Wei (1994) and Chow, Kim, and Sun (2007) also provide evidence that the US dollar represents a major force in long-run exchange rate policy in East Asia. Thus, even with the growth of China in the Asia-Pacific, Japan and the US continue to play a key role in the region.

As such, these movements have caused the Asia-Pacific economies to become extensively integrated in the region.[4] This process of greater trade integration in Asia may have influenced the comovement of growth cycles between the countries.[5] Recently, the region also has been experiencing even greater financial integration (Rana, 2007; Xie et al., 2013). Hence, higher financial integration may also impact business cycle synchronization in the Asia-Pacific region.[6] As such, a considerable amount of empirical literature has been devoted to understanding business cycle synchronization in Asia.[7] Most of these studies have investigated the causes of synchronization of growth cycles in Asia.[8] However, the literature overall has not measured the strength of business cycle synchronization in the region across frequencies and over time.

In particular, previous research has studied the synchronization of growth cycles in the Asia-Pacific region using the time-domain; this framework nevertheless provides no information about the frequency domain (see Aguiar-Conraria, Martins, & Soares, 2012). Moreover, a linear approach undervalues the strength of comovement of growth cycles between countries as it places trivial "weight on sharp movements during recessions (Herrerias & Ordóñez, 2014:161)." Kim, Kose, and Plummer (2003), for example, distinguish between "secular and cyclical components" to study the dynamics of business cycles in Asia. Allegret and Essaadi (2011) also emphasize the importance of separating growth cycles at different frequencies in East Asia. The strength of the comovement of growth cycles in Asia may vary across different frequencies as "different economic policies may cause divergence between business cycles" as argued by Fidrmuc and Korhonen (2010:301). It is possible for example that the synchronization of growth cycles may be high at long-run developments, whereas there may be a low degree of comovement between the growth cycles at short-run fluctuations for a particular sample period.

[2] See, among others, Choe (2001), Shin and Wang (2003), Shin and Sohn (2006), Moneta and Rüffer (2009), Allegret and Essaadi (2011), Park and Song (2011), Kim et al. (2011), Sharma and Mishra (2012), De Grauwe and Zhang (2012), and Dufrénot and Keddad (2014).

[3] See, for example, Shin and Sohn (2006), Moneta and Rüffer (2009), Allegret and Essaadi (2011), Park and Song (2011), Kim et al. (2011), Su et al. (2014), and Dufrénot and Keddad (2014).

[4] According to Petras and Veltmeyer (2001:11), global integration represents the "widening and deepening of the international flows of trade, capital, technology and information within a single integrated market." The literature also examines the impact of globalization, among other areas, on economic growth and the type of exchange rate regime a country implements (see Berdiev, Kim, & Chang, 2012; Chang, Berdiev, & Lee, 2013; Dreher, 2006).

[5] Theoretically, the association between trade integration and business cycle synchronization is uncertain (see, for a discussion, Crosby, 2003). However, Frankel and Rose (1998) find that economies with greater trade relations experience higher business cycle synchronization.

[6] Likewise, the relationship between financial integration and business cycle comovement is uncertain (see Gong & Kim, 2013; Park & Shin, 2009; Shin and Sohn, 2006; Xie et al., 2013).

[7] See Loayza, Lopez, and Ubide (2001), Choe (2001), Crosby (2003), Shin and Wang (2003), Shin and Wang (2004), Kumakura (2006), Sato and Zhang (2006), Shin and Sohn (2006), Rana (2007), Plummer and Wignaraja (2006), Zhang and Sato (2008), Moneta and Rüffer (2009), Gerlach-Kristen (2009), Park and Shin (2009), Hughes Hallett and Richter (2009), Fidrmuc and Korhonen (2010), Lee and Azali (2010), Allegret and Essaadi (2011), Kim et al. (2011), Quah (2012a, 2012b), Quah and Crowley (2010, 2012), Xie et al. (2013), Gong and Kim (2013), and Dufrénot and Keddad (2014).

[8] Most of these studies provide evidence that trade significantly influences the synchronization of growth cycles in Asia. Allegret and Essaadi (2011) provide a detailed literature review on business cycle synchronization in Asia.