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Are business and credit cycles synchronised internally or externally?[☆]

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A B S T R A C T

In this study we aim to assess the synchronisation of business and financial cycles at internal and international levels using a long-term series spanning almost half a century that includes multiple countries that account for almost 60% of the global gross domestic product. To identify international tendencies among credit and output cycles, we perform cycle synchronisation calculations based on wavelet analysis. Then, we build clusters to assess the existence of global patterns among cycles. Our results suggest that the pre-crisis period was one of internal synchronisation between financial and output cycles across countries, while the post-crisis period has been marked by international synchronisation. Our findings confirm the existence of one global financial cycle. Additionally, we find that the largest financial cycle is mostly driven by a global factor, which raises doubts about the effectiveness of domestically-conducted macroprudential policy and highlights the need for international cooperation among policymakers.

1. Introduction

For many years, the view of the literature regarding the relationship between financial and macroeconomic spheres has been split between two conceptions. On the one hand, finance and macroeconomics were perceived as having developed along separate paths, with an eminently weak relationship between them (e.g. Modigliani and Miller, 1958).[1] On the other hand, the literature has also emphasized that credit booms and subsequent credit crunches are consequences of the feedback loops that connect the real and financial sectors of the economy (Minsky, 1977; Kindleberger, 1978). Since the recent global financial crisis (GFC), however, the second view has become more prevalent, and the level of connection between these two spheres has entered the scope of interest of both academics and policymakers—particularly central banks. In our paper, we provide an empirical investigation into the relationship between the two spheres at the country level and internationally.

Two primary reasons underline the significance of our choice of focus. First and foremost, whether an economy experiences a strong relationship between business and financial cycles determines how shocks are propagated. Secondly, if a portion of the domestic cycle is significantly determined by external factors, then economic policies—those conducted domestically—will have a lesser degree of influence over it, naturally leading to lower policy effectiveness; in fact, such a situation might call for international coordination among eligible authorities. We try to address these issues by taking the relationship between the cycles into consideration. Consequently, the present research is also motivated to examine the connection between monetary and financial stability policies (most notably the macroprudential ones), as we assume the output cycle to be one of the determinants of the former and the financial cycle to impose restraints on the latter. In this paper, we focus jointly on two dimensions of the aforementioned cycles—internal and international—as we believe they should be investigated simultaneously. Such an approach is justified by the fact that if financial or business cycles are strongly synchronised externally then the global conditions may play a more crucial role in shaping the economic environment in particular countries than do the internal conditions themselves. Moreover, a growing level of international relationships might be interpreted as a part of systemic risk, mostly in the area of global contagion effect. As a result, doubts might be raised about the effectiveness of a domestically-conducted countercyclical approach to macroprudential policy.

Specifically, we rely on almost half a century of data for a sample of countries covering more than 60% of the current global GDP in order to

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[1] The Modigliani and Miller irrelevance theorem is based on the assumption that the relation between debt and equity financing does not affect the value of a firm.

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answer four main questions: (1) What level of internal connection between output and credit cycles is experienced by each of the analysed economies? (2) Do output and credit expansions and contractions occur synchronously across countries which exhibit international synchronisation? (3) Does the degree of synchronisation between internal and external spheres evolve over time? (4) Does any global pattern exist for both of the cycles? These research questions have been explored in the literature to a limited extent. While some researchers have analysed synchronisation based on a smaller number of countries, others have set shorter periods of review than in our research.

In order to address these four questions, we first apply two different measures of financial and business cycle synchronisation. In addition to the standard view of phase synchronisation, namely the concordance index originating from Harding and Pagan (2002), we also propose our own index, which takes into consideration the potential consequences of desynchronisation. Secondly, to investigate international relationships in particular—apart from calculating the cross-country concordance index—we implement a wavelet approach which allows us to address the second and the third research questions. To address the fourth, we combine a clustering approach based on phase synchronisation with principal component analysis.

Our findings suggest that the pre-crisis period was characterized by the historically highest level of internal synchronisation across countries, while the post-crisis period generally witnessed international synchronisation. Additionally, when assessing the bivariate relationships among the United States and the other major economies, we confirm the pattern of relatively stronger synchronisation after the recent global financial crisis. We also highlight the existence of one global credit cycle accounting for almost half of global output and over 55% of global credit to the non-financial sector, while for business cycles, no global pattern is identified. Furthermore, since the global financial crisis, international synchronisation has reached its highest levels historically. Our research has also enabled us to formulate a number of important conclusions regarding macroprudential and monetary policies. In particular, our findings point to the ongoing internal desynchronisation of financial and business cycles since the GFC as a potential problem for coordination of these two policy areas.

The paper is organized as follows. In the second section, we present a brief overview of related literature on financial and business cycles and their relationships. The third section provides details on the data and methodology implemented in this article. In the fourth section, we discuss our findings, while the last section concludes.

2. Literature review

As the present study focuses on financial and business cycle synchronisation, we address several aspects of a wide range of literature. Firstly, we follow the streams of research on business and financial cycles in order to calibrate our measures of synchronisation. Accordingly, we base these measures on the findings of research employing different lengths of financial and output cycles, as the former have been identified to be as much as four times longer, with greater amplitude of fluctuations (Claessens et al., 2011; Aikman et al., 2015; Borio, 2014). While the definition of a business cycle or an output cycle is self-explanatory, the literature is unclear on the definition of a financial cycle. Still, most researchers generally agree that it is associated with fluctuations in credit variables and property prices (Schularick and Taylor, 2012; Drehmann et al., 2012). However, for the purposes of macroprudential policy, it is advisable to pay attention to some relative measure, such as credit-to-GDP (BCBS, 2010). The reason behind that relates to the positive deviations of credit-to-GDP from its long-term trend of being identified as a promising indicator of financial crises (Borio, 2014). The literature consensus for the business cycle, in turn, confirms that it is well indicated by output gap (e.g. Burns and Mitchell, 1946). However, incorporating information about credit variables might significantly improve estimation of business cycles (Borio et al., 2013). This approach is the most reasonable, given that the relationship between the financial sector and the real economy is taken into consideration, was proved during the GFC and is addressed in this paper.

Secondly, as mentioned above, we take on board a macro-finance relationship, most notably on the basis of a cyclical approach. This kind of subject could be analysed either from an empirical point of view or theoretically. In this paper, we consider internal synchronisation in both advanced and emerging economies. When analysing the breakdown of countries by stages of development, Claessens et al. (2011) point out that advanced economies face a higher degree of synchronisation between business and financial cycles. They conclude that these economies are characterized by well-developed financial markets; thus, the fluctuations of credit or real estate markets are more important for the real economy than when they take place in emerging markets. In our view, these conclusions to some extent can be explained by economic policy dependence. In developed countries, economic policies are more independent than in emerging markets, where internal conditions and efficacy of policy instruments are strongly influenced by the international environment. Widening the scope of our research on this issue to encompass the overall theoretical landscape, the literature confirms (i) the large contribution of the financial sector to economic fluctuations (Odedokun, 1996); (ii) the greater impact of output on credit than vice versa (Krznar and Matheson, 2017); and (iii) the financial variables that improve predictions of real economic activity (Kishor and Koenig, 2014). These findings strongly support the research problem taken on in this research. As previously mentioned, as we rely mostly on credit variables, we follow the literature supporting the significant role of the banking sector in the financial system (Beck et al., 2000; Beck and Levine, 2002; Levine, 2014). Additionally, banking crises generate large disruptions in the real economy, as was confirmed during the GFC, in terms of the permanent loss in global output potential (Ball, 2014; Cecchetti et al., 2009). Thus, ensuring proper prudential regulations has become a key concern of policymakers since the GFC (Lorenzoni, 2008; Bianchi, 2011; Aikman et al., 2015). However, policymakers should consider both the internal linkages—most notably between financial sector and real economy—and potential international spillovers (Houston et al., 2012; Jeanne, 2014).

Against this backdrop, the literature indicates that one of the most important factors that influence both financial and business cycles is the international environment, particularly in terms of interconnectedness. In this area, the literature focuses mostly on business cycles and finds, among other things, an increasing level of synchronisation across countries in the euro area (Bekiros et al., 2014) or 'old EU countries' (Gomez et al., 2012). However, the latter study asserts that this is not the rule for all of the countries, as some of them—particularly Greece and Ireland—have recorded a lower level of synchronisation. Gachter et al. (2012) also conclude that business cycles of individual countries became more synchronised during the financial crisis, an idea which emerged from the similarity of their recession timing. The highest level of synchronisation during the GFC also reflects the financial globalization issues, as it can contribute to a rapid build-up of credit or leverage, most notably in financially developed countries (Mendoza and Quadrini, 2010).

Regarding indirect references in the literature, we also address to some extent the role of external factors in general. From that perspective, Acemoglu et al. (2015) found that the level of economic linkage differentiates the pass-through process of external shocks to the economy. The role of international connectedness was also investigated by Peltonen et al. (2015), who proved that incorporating a network measure of the banking sector in early warning models improves their results and

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