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Is the financial cycle a leading indicator of real output during expansions and contractions? A quantile analysis for Greece☆

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1. Introduction

Forecasting real output is an important task to both public and private sectors. Since the future evolution of real output affects spending and tax policies, governments are interested in forecasting output growth for evaluating fiscal sustainability. As for the private sector, predicting output growth is crucial to consumption and investment decisions.

The empirical literature before the global financial crisis 2007–2008 has used a number of economic indicators, namely the term spread, the real money growth, the real interest rate, to predict real output (Chauvet & Potter, 2013). The nature of the crisis led to the search of other indicators reflecting financial risk in order to improve real output forecasting. Swings in perceptions and attitudes about financial risk are reflected on the financial cycle, which is defined in terms of movements in credit and housing prices. These variables tend to co-vary with each other, confirming the significance of credit in the financing of construction and the purchase of property (Borio, 2012). In addition, empirical results show that house prices register significant declines during credit crunch episodes and credit growth falls sharply during housing price busts. Thus, cycles in credit and housing prices tend to accentuate each other resulting from the high sensitivity of housing activity to credit conditions.

The macro-financial linkages have been explored for different economies with alternative empirical methods. Davig and Hakkio (2010) consider the effects of financial distress on the economic activity of U.S., using a regime-switching model. Their findings show that when the financial distress is elevated, the economic activity is low, whereas a low level of financial distress implies an expansion of output growth. Claessens, Kose, and Terrones (2012) examine the relation between different episodes of business and financial cycles for a large number of advanced and emerging economies from 1960 to 2007. It has been observed that recessions accompanied with financial busts are longer and deeper than other recessions stabilized by government policies. In addition, recoveries associated with financial booms are associated with stronger output growth. Drehmann, Borio, and Tsatsaronis (2012) apply turning-point analysis and the band-pass filter to identify the financial cycles in advanced economies using quarterly data from 1960 to 2011. Their findings have indicated that financial crises such as banking crises are closely related to peaks in the financial cycle. Also, housing price cycles and credit volumes are noticeably longer than business cycles. Balfoussia and Gibson (2015) consider the effects of financial conditions on three alternative measures of real economic activity, namely the industrial production, the volume of real retail and the Purchasing Managers' index, in euro area and in particular for Greece, using vector autoregressive (VAR) analysis. The Granger causality results indicate a unidirectional causality from the financial conditions index to the real variables for the euro area and for Greece. In addition, the cumulative impulse response of real variables to a change in financial conditions implied by a positive shock in the ECB's targeted longer-term refinancing operations (TLTROs) are significantly positive, sizable and long-lasting. This evidence suggests that the TLTROs

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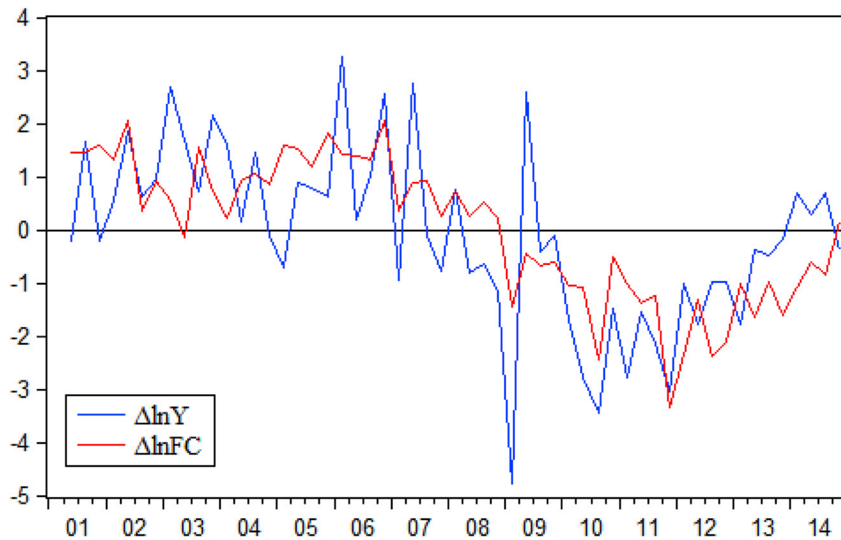

Fig. 1. Growth rates of real output and financial cycle.

constitute an effective transmission mechanism of monetary policy for euro area as a whole and for Greece in particular. Rünstler and Vlekke (2016) follow a multivariate time-series analysis for the estimation of the cyclical components in credit, housing prices and real output. Their analysis shows that credit and housing prices display medium-term cycles with duration more than the two to eight years of standard business cycles. Furthermore, credit and residential property price cycles are weakly correlated with the regular business cycles, but are strongly correlated with medium-term GDP cycles more than eight years. Krznar and Matheson (2017) explore the link between the financial cycle and business cycle in Brazil using Bayesian analysis. The credit cycle and the cycle in a financial conditions index consisted of four financial prices are used to approximate the financial cycle. The results suggest that the credit growth lags the business cycle, while the financial conditions index leads the real output growth.

Since the late 1980s, has begun the gradual deregulation and liberalization of the Greek financial system, following a very long period of extensive government intervention in the sector of financial services. Interest rates deregulation, abolition of direct credit controls, liberalization of cross-border capital flows, and other institutional and regulatory measures have established the contemporary Greek financial system which has been fully integrated into the single European financial area. In the new financial setting, banks have remained the main source of funding for households and firms.[2] After the eruption of the Greek debt crisis in 2009, banks have experienced liquidity constraints which severely affected the availability of funds to the private sector. A major sector of the real economy which affected by the adverse financial conditions have been the property market that heavily relied on banking finance.

In the light of these developments, an interesting research question which is addressed by the present study is whether changes in the Greek financial cycle, which is parsimoniously described in terms of changes in credit and property prices, have information content about expansions and contractions of real output growth during the period 2001–2014. If financial conditions lead the performance of the real economy, then by taking into account this information the forecast of real output growth will be improved and a surveillance mechanism of the Greek financial system that aims to identify potential risks early on will be better design.

In this context, the main contributions of the present study are twofold. First, we broaden our limited knowledge about the link between real and financial variables during the business cycle extracting information from a debt-ridden country which has experienced periods of economic expansions and contractions. Second, in contrast to the existing literature which examines the mean effects of financial conditions on economic activity, we consider whether changes in the financial cycle have affected the entire conditional distribution of output growth using a quantile analysis which constitutes an improvement over the existing literature. The quantile analysis allows for the possibility that movements in the financial cycle may have different impact at the lower and upper tails of the conditional distribution of real output growth, reflecting respectively its contractions and expansions, than at the mean or the median.

The main finding of this research is that changes in the financial cycle have information content for forecasting real output growth in the upper and lower tails of its conditional distribution. The rest of the paper is organized as follows. Section 2 presents some stylized facts of the Greek economy. Section 3 discusses the model and methodology. Empirical analysis is presented in Section 4, while the last section concludes.

2. The stylized facts

In the decade preceding the recent global financial crisis, the Greek economy has experienced a rapid economic growth and easy

[2] During the last two years, new financial instruments have been introduced which will further facilitate the direct channel of funding from investors to sound productive firms (Capital Market Commission, 2017).

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