



## Credit and business cycles in Greece: Is there any relationship? ☆

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### ABSTRACT

This paper examines the relationship between real output and real credit at business-cycle frequencies in Greece. The Granger causality tests indicate that real credit is important to understanding future movements in real output, given the trade deficit ratio. The impulse response analysis implies that the recovery of the Greek economy requires a positive credit shock which will stimulate real output.

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### 1. Introduction

The recent global financial crisis has questioned the usefulness of economic models to predict and explain the real world. The dominant paradigm of economic modeling, the so-called dynamic stochastic general equilibrium (DSGE) model, has come under severe criticism for its restrictive assumptions of efficient financial markets, rationality and optimizing agents. In this narrow setting, global financial shocks of the type recently observed cannot be accommodated. Thus, this framework is subject to what Caballero (2010) has termed Hayek's pretense-of-knowledge syndrome, since it confuses the precision it theoretically defines with the precision of the real world. A notable feature of the DSGE model is that business cycles occur because the economy is driven by nominal and real shocks and there are rigidities which prevent the agents to adjust instantaneously to them. In other words, in this framework, which does not account for credit markets and financial imperfections, credit shocks do not play any role in explaining aggregate fluctuations. Given the restrictions surrounding this type of model, there are other theoretical attempts which draw attention to financial markets for macroeconomic performance. The early literature has recognized the important role played by credit markets in shaping real outcomes. The Austrian view of business cycles with its roots in the work of Hayek (1929)

emphasizes the role of credit creation in affecting business cycles. A credit expansion by reducing interest rates would increase investment relative to savings. The rising consumer prices as a result of increased consumption, indicates that consumer goods are more profitable than producer goods, thus forcing producers to reassess investment plans. That situation would eventually cause recession. An alternative theory which stresses the importance of financial institutions in understanding business cycles was proposed by Minsky (1982). Financial innovations and periods of economic tranquility will encourage greater risk taking. This will result in excessive leverage and a lower quality of investment during the rising cycle. The overheating economy will bring about a tightening in monetary policy which will eventually cause recession. Brunner and Meltzer (1990), extending the ISLM model to incorporate the credit market, show that credit and asset price shocks are relevant sources of business cycle fluctuations. Some other studies have addressed the relationship between financial markets and the real economy, when financial imperfections are present. Kiyotaki (1998) shows how the credit system becomes a propagation mechanism of business cycles, when the economy is subjected to a temporary productivity shock. Kocherlakota (2000) uses a small open economy version of a neoclassical growth model to show how credit constraints can transform small asymmetric shocks into large movements in real output. Werner (2011) reformulates the quantity equation by substituting credit for money and differentiating the use of credit for real and asset transactions. He argues that bank credit creation will boost nominal income growth, if used in real transactions, or boost asset prices, if used in asset transactions.

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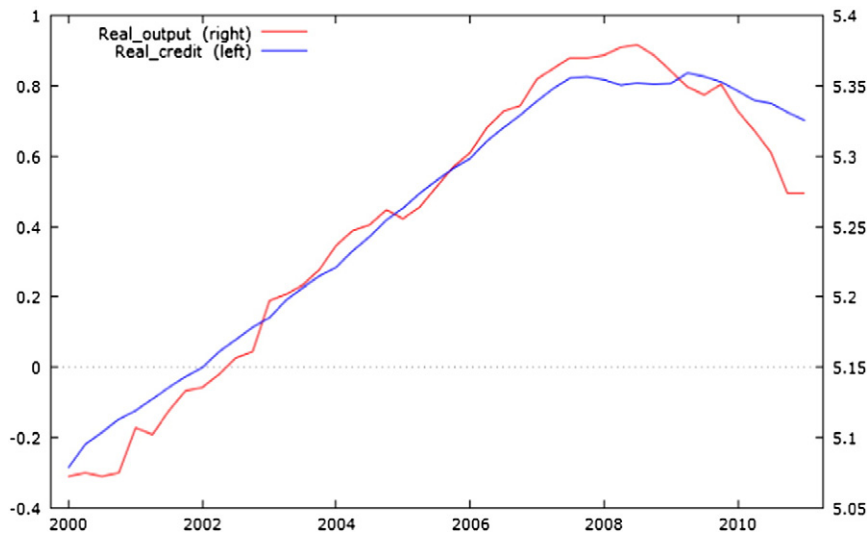


Fig. 1. Real output and real credit (in logs).

On the empirical side, there are a few recent papers which have studied the relationship between credit and real economy. [Lown and Morgan \(2004\)](#) examine the role of bank lending standards in explaining business cycles in the United States. They demonstrate that shocks to credit standards explain variations in banking lending and real output. [Helbling et al. \(2010\)](#) investigate the role of credit shocks in explaining global business cycles. They show that credit market shocks are as important as productivity shocks in explaining movements in real output in the G-7 countries. [Zhu \(2011\)](#) examines the credit–output link using time and frequency-domain methods. He demonstrates that the cyclical relationship between the two variables is weak in the United States, relatively weak in Japan, and strong in the euro area.

Given that no work has been done in analyzing the credit–output link in Greece, this paper aims to fill in the gap and examines the role of credit in explaining business cycles in Greece during the last decade. In this period, the country has joined the euro area with the risk premium of the Greek economy, as reflected in the spread between Greek and German long-term interest rates, initially disappearing and then soaring dramatically as a result of the eruption of Greek debt crisis at the end of 2009. We investigate the credit–output relationship at business-cycle frequencies with three empirical methods, including cross correlation, regression and simulation analysis. If credit cycles are driving business cycles, then the severe credit constraint which the Greek economy has experienced during the implementation of the adjustment programs may be one of the forces which are responsible for the collapse of the real economy.

## 2. The stylized facts

In [Fig. 1](#), we plot the levels of real output and real credit from 2000:Q1 to 2011:Q1. The real output is measured by the real GDP and the real credit is measured by the aggregate claims on the private sector, households and firms, by domestic financial institutions discounted by the consumer price level.<sup>1</sup> On inspection, we observe that both variables have steadily increased up to the fourth quarter of 2008, and then, as a result of the global financial crisis and the subsequent eruption of the Greek debt crisis, they have gradually declined. In [Fig. 2](#), we plot the cyclical components of real output and real credit, which are derived after applying the Hodrick–Prescott

<sup>1</sup> The real GDP and the consumer price index are obtained from OECD Main Economic Indicators, and the aggregate claims on private sector are obtained from the Bank of Greece.

(HP) filter with a smoothing parameter of 1600 to the logarithms of real GDP and real credit. The plot shows that Greece has experienced two mild recessions, one prolonged boom and the current collapse. In particular, the first recession lasted from the second quarter of 2001 to the fourth quarter of 2002, with the real output dropping cumulatively by 6.33%, and the second recession lasted from the third quarter of 2004, after the termination of the Olympic games, to the first quarter of 2006, with the real output dropping cumulatively by 6.18%. From the third quarter of 2006 to the end of 2009, the Greek economy has experienced a real output boom, accompanied by a real credit boom. The real output has cumulatively increased by about 26% and the real credit has cumulatively increased by 112%. Since then, the eruption of Greek debt crisis and the subsequent implementation of the adjustment programs have brought about a substantial decline in real output and real credit of about 15% and 35% respectively. In [Fig. 3](#), we plot the demeaned growth rates of real output and real credit. The two variables have moved close together during the last decade.

## 3. Empirical analysis

To get a clearer view of the role of real credit in propagating the business cycle fluctuations in Greece, we will examine the credit–output relationship at business-cycle frequencies, using cross correlation, regression and simulation analysis. We have computed the cyclical components of the two variables, using the HP filter and the first-difference (FD) filter.<sup>2</sup> The HP filter despite its desirable properties (removes unit root trend components, it has no phase shift and, for an appropriate choice of its smoothing parameter, closely approximates the optimal filter that isolates only components having business cycle frequencies) does not avoid distortions that are caused by rapidly changing weights at the ends of the sample. Thus, as a robustness test to the choice of the business cycle filter, we will present additional evidence with the FD filter. Before analyzing the credit–output link, we test whether the variables used in the analysis are stationary processes in order to avoid the spurious regression problem. For the cyclical component of real output, the asymptotic p-value of

<sup>2</sup> A flexible trend for cyclical components of real output and real credit, such as a quadratic trend, has been also used. The results have remained the same as those obtained with the HP filter and they are available upon request. The band-pass filter proposed by Baxter and King would constitute a better choice, but its application, for an appropriate choice of its parameters, will reduce significantly the present sample size to about 20 observations.

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