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# Can Greece Jumpstart Growth Without Bank Credit Expansion?

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- We find that bank credit has an important impact on economic activity in Greece, in line with a broad consensus of academic literature on the relation between bank credit and the real economy in developed countries.

- The amplitude of the bank credit cycle has decreased substantially over the past ten years, implying that bank credit creation has been increasingly aligned with real economic activity. We view this as the result of a more stable monetary regime due to EMU.

- Our analysis suggests that a sharp contraction in credit supply from current levels can substantially deepen the economic recession in Greece.

- One necessary condition for a rebound of the Greek economy is, in our view, to ensure that Greek banks continue to have access to ECB liquidity in order to fund their loan portfolios.

- The gradual resolution of the Greek sovereign debt crisis will potentially increase the funding ability of Greek banks, allowing for an "orderly deleveraging" and avoiding large negative effects on the real economy.

- A "forced deleveraging" of the Greek banking system runs the risk of potentially triggering fire sales of profitable assets and a credit crunch, leading to a negative spiral of lower bank credit, lower bank solvency and a deeper recession.

Availability of bank credit is, in our view, an important condition for the Greek economy to come back to a positive growth trajectory after three years of continuing recession. The sharp deceleration of credit growth to the private sector over the past two years – due to the lack of access to international funding markets and the process of deleveraging of the Greek banking system -- has certainly contributed to the sharp contraction in economic activity, over and above the effect of fiscal consolidation. Further deleveraging of the banking sector, combined with the drain in deposits, witnessed over the past eighteen months, and the lack of funding liquidity, other than the ECB emergency funds, may deepen the current recession, throwing the Greek economy into a negative spiral of lower credit supply and lower economic activity.

In this research note, we first briefly review the academic literature on the transmission channels between bank credit and economic activity. We find that there is a broad consensus among researchers that bank credit is an important channel through which financial sector shocks are transmitted into the real economy. We then estimate the relationship between the cyclical component of bank credit (defined as the deviation of credit from its long-run trend) and the cyclical component of GDP in Greece over the past thirty years. We back up our analysis by estimating a dynamic model of credit and GDP growth using data of the past eleven years, thus avoiding structural breaks due to changes in the monetary regime. We find that bank credit has an important impact on economic activity. In particular, for every percentage point decline in real bank credit, real GDP declines by 0.35 percentage points over the next two to six quarters. Our analysis suggests that one necessary condition for a rebound of the Greek economy is to ensure that Greek banks continue to have access to ECB liquidity in order to fund their loan portfolios.

## 1. How is bank credit related to economic activity?

The academic literature on the role of bank credit in propagating financial disturbances to the real economy identifies three main transmission channels: (1) The borrower balance sheet channel; (2) The bank balance sheet channel; and (3) The liquidity channel.[1]

### The borrower balance sheet channel

Theoretical models of the financial accelerator, such as Bernanke and Gertler (1989) and Carlstrom and Fuerst (1997), predict that real and financial shocks are propagated through the borrowers' balance sheet channel to the real economy, amplifying business cycle fluctuations. The financial accelerator works through the cost of borrowing of firms and households, which typically depends inversely on the borrowers' net wealth. Negative shocks to net wealth (for example through an unexpected drop in asset prices) decrease the value of collateral, increase the "external finance premium" and lead to higher cost of borrowing. This, in turn, leads to lower borrowing and lower spending, feeding back to lower economic activity.

### The bank balance sheet channel

The deterioration of banks' balance sheets is an additional channel through which negative shocks to asset prices are amplified. Bernanke and Blinder (1988) show that a tightening of monetary policy impacts on the asset side of banks' balance sheets as it leads to a stronger decline in credit supply. If banks play a special role in providing credit to some borrowers – such as small firms – a reduction of credit may lead bank-dependent borrowers to cancel or delay expenditure. Hence, real and financial shocks are transmitted to the real economy through the bank-lending channel, as a tightening of credit conditions leads borrowers to reduce spending. Kashyap et al (1993), Kashyap and Stein (1995) and Kishan and Opiela (2000) find support of the bank lending channel in the US, whereas Oliner and Rudebusch (1995) and Ashcraft (2006) find less supportive results. Using European data, De Bond (1998, 1999), Favero et al (1999) and Altunbas et al (2002) test the existence of a bank lending channel in Europe and find less support than for the US.

Given the importance of small- and medium size firms in the Greek economy, we expect the bank balance sheet channel to play an important role in transmitting financial shocks to real economic activity.

### The liquidity channel

The recent global financial crisis has highlighted the role of liquidity in transmitting financial disturbances into the real economy through affecting the ability of banks to extend credit. Here it is important to emphasize the distinction between market liquidity and funding liquidity (see Brunnemeier and Pedersen 2007). Market liquidity refers to the asset side of the bank's balance sheet and measures the ease with which an asset can be traded. Funding liquidity refers to the liability side of the bank's balance sheet and measures the ability of a bank to get funding either through borrowing or through asset sales in order to meet payment obligations. High leverage and high maturity mismatches in a bank's balance sheet are critical elements in transmitting funding liquidity shocks to the real economy. Funding liquidity shortages can force banks to fire-sale long-term assets, creating a downward spiral of lower asset prices and lower capital, i.e. creating a potential solvency problem for banks. During financial crises, decreases in market liquidity and funding liquidity are mutually reinforcing, leading to a downward spiral of lower funding liquidity and a deterioration of banks' balance sheets. This is because aggregate liquidity shortages can force banks to dispose of otherwise profitable assets, resulting in sizeable losses, which lead to a deterioration in their solvency position (Diamond and Rajan 2005). For example, if depositors withdraw their deposits, banks can be forced to refuse to roll over -- or prematurely foreclose -- otherwise profitable loans, leading to a deterioration of their asset quality and solvency position.

Over the past eighteen months, Greek banks have lost EUR 48 bn of deposits due to the sovereign debt crisis, amounting to about 22% of their total deposit base. Nevertheless, credit supply to the private non-bank sector has remained roughly unchanged, despite severe funding difficulties, although the rate of growth of credit in real terms has decelerated, as expected, from 12% y-o-y in 2008 to zero by end-2010.

The second part of our analysis focuses on the relationship between credit growth and economic activity in Greece, in particular on the relationship between the bank credit cycle and the real business cycle. We extract the cyclical component of bank credit and real GDP and investigate the synchronicity of credit booms and busts with business cycle upswings and recessions. A number of important conclusions emerge from this analysis. First, we find that the amplitude of the bank credit cycle has decreased substantially over the past ten years, implying that bank credit creation has been increasingly aligned with real economic activity. We view this as the result of a more stable monetary regime due to EMU. Second, credit creation has significant effects on future economic activity, implying that a sharp contraction in credit supply can substantially deepen the economic recession in Greece.

## 2. Empirical analysis

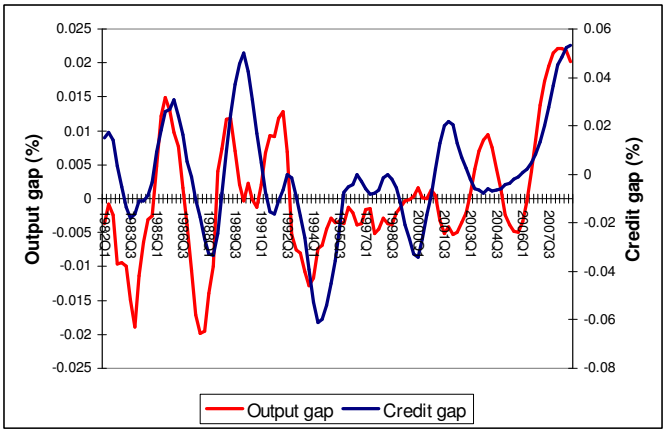
We analyze data on real GDP and bank credit to the private (nonbank) sector for Greece, ranging from 1980:Q1 to 2010:Q4. The data for real GDP are from the OECD database, and we estimate the GDP price deflator by dividing real GDP by GDP in current prices from the OECD. The data for bank credit are from

[1] *See Basel Committee on Banking Supervision (2011).*

the Bank of Greece.[2] Bank credit was deflated with the GDP deflator to account for the effect of inflation. We look at the relationship between the credit cycle and the business cycle. In order to extract the cyclical component of GDP and credit, we apply the band-pass filter of Baxter and King (1999), with a fixed lead/lag length of 2 years. We extract business and credit cycles at a frequency between three and ten years – similar results were obtained with alternative filters, such as the Hodrick-Prescott (1997) filter and different frequencies of 1.5 to 8 years.

**Figure 1** displays the cyclical component of real GDP (the business cycle) and the cyclical component of bank credit (the credit cycle). The cyclical component of real GDP can be interpreted as the deviation of real GDP from its long-run trend, i.e. the "output gap", measured in percentage points of real GDP. Similarly, the cyclical component of bank credit can be interpreted as the deviation of credit from its long-run trend, i.e. the "credit gap", measured in percentage points of total outstanding bank credit to the private sector.

**Figure 1**
**Cyclical components of real GDP and real bank credit**




*Source: OECD, Bank of Greece, Eurobank Research*

Positive values of the credit gap suggest that bank credit has been growing faster than trend for some time, hence credit availability to the economy is high. Positive values of the output gap suggest that GDP growth has exceeded its long-run trend for some time, hence the economy is in a business cycle upswing. The Figures suggest that there is a distinct pattern of business and credit cycles in Greece over the past thirty years.

Our empirical findings can be summarized as follows:

1. Credit cycles in Greece had historically a larger amplitude than the business cycle.[3] The cyclical component of bank credit has fluctuated by between 8-10% during the pre-EMU period, compared to business cycle fluctuations of about 3.5% of GDP. Also, volatility of credit has been much larger than volatility of economic activity. In particular, during the pre-EMU period, volatility of the cyclical component of bank credit in Greece has been on average 3 times higher than volatility of the cyclical component of GDP, compared to 4 times in Spain, 3.6 times in Ireland, 3 times in Italy and 2.5 times in Portugal. This was, in our view, the result of large fluctuations in money supply due to FX interventions of the Bank of Greece, periodic currency devaluations and large swings in the rate of inflation during the pre-EMU period. Large devaluations have led to increased cost of imports, hence higher credit demand by importers and imported inflation has led to general increases in credit demand.
2. However, both the amplitude of credit cycles and their relative volatility have decreased significantly over the past ten years, likely as a result of increased monetary stability due to EMU. Volatility of cyclical credit has declined markedly, from 3 x volatility of cyclical GDP to 2 x volatility of cyclical GDP. This compares to 3.6 x in Spain, 3.7 x in Portugal, 2.8 x in Ireland and 2 x in Italy.
3. Over the past business cycle upturn since around 2003, credit growth has accelerated above trend due to strong growth of the economy and a low interest rate environment. As a result, the credit gap – defined as the per cent deviation of credit from its long-run trend– has widened to about 5% at the peak of the cycle, in line with a widening output gap. The sharp deceleration of credit growth over the past two years due to the sovereign debt crisis and the deepening recession has stabilized the credit gap but has not led to a credit crunch, suggesting that bank credit is still supporting real economic activity in Greece.

The critical question is whether, a further decline in bank credit to the private non-bank sector will likely deepen the economic recession, as suggested by the theoretical models reviewed above. In fact, the simple correlation between cyclical credit and cyclical GDP is 57%, suggesting that for every percentage point decline in the credit gap, the output gap is expected to shrink by 0.57%. Hence, if the credit gap (currently 5% of total credit) were to close as a result of further deleveraging of the Greek banking sector, real GDP would decline by around 3% relative to potential (0.57 x 5%).

### 3. Dynamic analysis of interaction between credit and economic activity

The above analysis of cyclical components is subject to three types of error: First, estimates of the cyclical component of output and credit may be wrong due to error in the estimates of long-run trend growth of the economy and the banking system. Second, the simple correlation between cyclical components of credit and

[2] *From 1980 to 1997, bank credit data refer to loans to the private sector (domestic enterprises and households) from domestic MFIs including the Bank of Greece. After 1997, the bank credit data reported by the Bank of Greece include securitised loans and corporate bonds.*

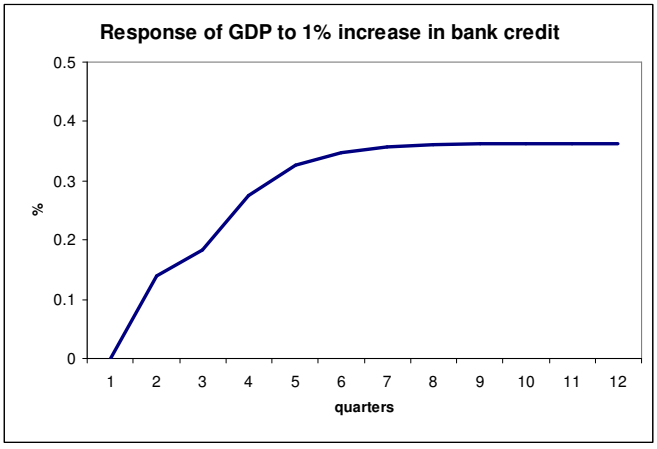
[3] *This is in line with empirical findings from other developed countries, see Haldane (2010).*

GDP disregards the dynamic relationship between the variables. Third, the relationship between bank credit and GDP may have changed as the result of a structural break due to Greece's participation in EMU.

A simple dynamic model of the interaction between bank credit and GDP is a vector autoregression in quarterly growth rates of the variables. We estimate the model using quarterly data since 2000:Q1 in order to avoid structural breaks due to changes in the monetary regime. We choose a VAR(2), as suggested by the Schwartz criterion. The estimates are reported in Table 1 of the Appendix. The effect of an increase in real bank credit by one percentage point on real GDP over time is plotted in Figure 2. Our results suggest that a one percentage point increase in real credit leads to an increase in real GDP by 0.14% after two quarters and 0.35% after six quarters.

Over the past two and a half years, Greek banks have continued to provide credit to the real economy despite the global financial crisis and the country's sovereign debt crisis, which practically excluded Greek banks from access to international funding markets.

**Figure 2**
**Impulse response function**




*Source: Eurobank Research*

Real credit growth to the private non-bank sector decelerated from 12% y-o-y in 2008 to zero by end 2010, becoming slightly negative during the first half of 2011. Based on the estimates of the VAR, this deceleration of bank credit has cut in our view about 4% of GDP growth over the past two years. If the stock of outstanding bank credit declines by, say 10% from current levels, we expect the recession to deepen by another 3.5% over the next two years, making it practically impossible for the Greek economy to rebound in 2012.

## 4. Conclusions

Availability of bank credit to private firms and households is a necessary condition for the rebound of the Greek economy from the ongoing recession. This view is supported by a broad consensus of academic research regarding the role of banks in the real economy and our own research regarding the relationship between bank credit and economic growth in Greece. Greek banks have supported the real economy over the past two years despite their severe funding difficulties in international money markets due to the sovereign debt crisis. The reliance of Greek banks on ECB emergency loans has been of paramount importance so far in order to avoid a credit crunch, given that Greek banks have been loosing deposits over the past eighteen months as a result of the escalation of the Greek sovereign debt crisis and fears of a disorderly restructuring of Greek sovereign debt.

Our analysis of the cyclical component of credit suggests that bank credit has grown at a higher rate on average than trend growth over the past business cycle, leading to an excess credit supply of roughly 5% of outstanding credit to the private non-bank sector. Hence, reaching a final "equilibrium" in terms of credit creation is not far of sight for the Greek banking system but this restoration of equilibrium will probably come at the cost of even lower economic activity and a deeper recession. Our estimates suggest that a decline in bank credit by 5% (just enough to restore equilibrium) will depress real GDP by about 1.5-2% over the next two years.

The deleveraging of the Greek banking system seems to be a necessary implication of the deepening recession, given that lower economic activity leads to both lower demand and lower supply of bank credit. Our own empirical estimates suggest that for every percent decline in real GDP, bank credit creation declines by 1.3 percent after one quarter and by 1.7 percent in the long term (see Table 1 of Appendix). However, the speed and nature of deleveraging of the banking sector plays an important role on how economic activity will be affected, as lower credit creation feeds back into lower economic activity. A natural way of reducing the current dependence of Greek banks on ECB liquidity would be to relate deleveraging to the pace at which depositors regain confidence in the Greek banking system. The EU council decisions of July 21 regarding the second Greek bailout seem to have helped to increase depositors' confidence, partly reversing the deposit outflows of the past few months. The gradual resolution of the Greek sovereign debt crisis will potentially increase the funding ability of Greek banks, allowing for an "orderly deleveraging" and avoiding big negative effects on the real economy. A "forced deleveraging" runs the risk of potentially triggering fire sales of profitable assets and a credit crunch, leading to a negative spiral of lower bank credit, lower bank solvency and a deeper recession.

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**Appendix**

Table 1: VAR(2) estimates. Quarterly growth rates of real GDP (DGDP_GR) and real bank credit (DC_GR).

Vector Autoregression Estimates
Date: 08/01/11 Time: 14:38
Sample: 2000Q1 2010Q4
Included observations: 44
Standard errors in ( ) & t-statistics in [ ]

| | DGDP_GR | DC_GR |
|---|---|---|
| DGDP_GR(-1) | 0.313081 | 1.322273 |
| | (0.13256) | (0.27640) |
| | [ 2.36174] | [ 4.78393] |
| DGDP_GR(-2) | 0.436721 | 0.285729 |
| | (0.12383) | (0.25819) |
| | [ 3.52673] | [ 1.10665] |
| DC_GR(-1) | -0.043778 | -0.043812 |
| | (0.07576) | (0.15797) |
| | [-0.57782] | [-0.27734] |
| DC_GR(-2) | 0.136525 | 0.257631 |
| | (0.06722) | (0.14016) |
| | [ 2.03096] | [ 1.83812] |
| C | -0.001985 | 0.014111 |
| | (0.00259) | (0.00539) |
| | [-0.76748] | [ 2.61678] |
| R-squared | 0.549599 | 0.599952 |
| Adj. R-squared | 0.503404 | 0.558922 |
| Sum sq. resids | 0.001760 | 0.007653 |
| S.E. equation | 0.006719 | 0.014008 |
| F-statistic | 11.89739 | 14.62209 |
| Log likelihood | 160.3471 | 128.0167 |
| Akaike AIC | -7.061232 | -5.591669 |
| Schwarz SC | -6.858483 | -5.388920 |
| Mean dependent | 0.005635 | 0.030098 |
| S.D. dependent | 0.009534 | 0.021093 |

| | |
|---|---|
| Determinant resid covariance (dof adj.) | 8.36E-09 |
| Determinant resid covariance | 6.57E-09 |
| Log likelihood | 289.6315 |
| Akaike information criterion | -12.71052 |
| Schwarz criterion | -12.30502 |

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