
Capital Mobility as a Reason for Credit Booms in the Eurozone

Submitted 02/09/2020, 1st revision 30/09/2020, 2nd revision 17/10/2020, accepted 31/10/2020

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Abstract:

Purpose: The main goal of the paper is to establish the importance of capital mobility for the occurrence of the credit booms in some EMU countries, which contributed to the so-called Eurozone crisis in the previous decade. In particular, a causal relationship between foreign capital inflows and expansions of credit to the private sector in five advanced “periphery” Eurozone economies (Portugal, Italy, Ireland, Greece, and Spain) in 1996–2016 is examined.

Design/Methodology/Approach: A threshold method for identifying credit booms, and the Granger causality test were applied to investigate the relationship between foreign capital inflows and expansion of credit to the private sector in the PIIGS countries. We used data of an annual frequency over the years 1996–2016 and discuss the effects of using different measures for both capital inflows and credit expansion.

Findings: The results allowed the authors to identify and measure credit booms in the PIIGS countries from 2006 to 2011. It has been shown that one of the reasons for the over-indebtedness of households and companies in these countries was the inflow of cheap and easily accessible capital, especially in the form of portfolio investments.

Practical Implications: The results of the research can be used to assess the importance of the free movement of capital for financial stability in Eurozone countries.

Originality/Value: The study contributes to a better understanding of the functioning of the Economic and Monetary Union as regards the links between capital flows in the financial market and the emergence of credit booms.

Keywords: Credit booms, capital flows, EMU countries.

JEL codes: E44, E51, G21.

Paper type: Research article.

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1. Introduction

The free movement of capital was envisaged back in the Treaty of Rome as one of the four freedoms of the Single European Market (SEM), in addition to the free movement of the labour force, goods and services. This freedom, however, was not introduced as quickly as, for example, liberalisation of the movement of goods. As no binding deadlines were agreed, it took a long time before the free movement of capital was implemented. The member states of the European Economic Community (EEC) were afraid to open their economies to an uncontrolled movement of funds (Janicka, 2006). The breakthrough came with the adoption of Council Directive 88/361/EEC of 24 June 1988 which established a schedule of full liberalisation of capital movements within the Community. Under this directive, the member states were obliged to implement full liberalisation of the movement of capital as of 1 July 1990³.

Liberalisation of capital movement should contribute to the smooth functioning of the SEM, supplementing the other abovementioned freedoms. It should also boost economic progress, making possible effective capital investments and promoting the euro as an international currency, which strengthens the position of the EU as an international exchange partner. Besides this, it was necessary for the development of the Economic and Monetary Union (EMU) and the introduction of the euro.

The free movement of capital between countries means that entities from these countries can freely make international payments to any account, resulting from both the current and capital transactions (Oręziak, 1999b). In consequence, all entities operating in the European Union, have gained full freedom to ‘move’ and transfer funds, which includes, for example, making payments for goods and services, making investments, and the free transfer of assets to other member states. Thus, the free movement of capital should enable, *inter alia*: direct investments, purchase and sale of real estate in other member states, purchase and sale of securities and transactions involving them, taking loans, granting loans, sureties and guarantees as well as personal capital flows.

The abovementioned benefits from the liberalisation of capital mobility do not always occur in practice. Moreover, the liberalisation of capital movements may also bring risks, in particular in the case of less competitive countries. Large capital inflows could trigger an excessive, sharp increase in credit to the private sector, and in macro- and micro-fluctuations or even in financial crises (Mendoza and Terrones, 2008; Arena *et al.*, 2015). Although this phenomenon is observed more frequently in developing and low-income countries, it may also occur in advanced economies (Hernandez and Landerretche, 2002). Thus, the purpose of the study is to determine the significance of capital mobility for the occurrence of credit booms in some EMU countries, which contributed to the so-called Eurozone crisis in the previous decade.

³Four countries, *i.e.* Greece, Spain, Portugal and Ireland, were granted a transition period to implement the provisions of the directive.

The countries that were most affected by the financial crisis of 2007+ were selected for in-depth analysis, namely: Portugal, Italy, Ireland, Greece, and Spain (referred to as the PIIGS countries). The research hypotheses assume that, in the period of 1996–2016, foreign capital inflows contributed to excessive expansion of credit to the private sector in the PIIGS countries.

A “threshold method” for identifying credit booms, and the Granger causality test were applied to investigate the relationship between foreign capital inflows and the expansion of credit to the private sector in PIIGS countries. The data included in the analysis comes from the IMF’s International Financial Statistics (IFS), the World Bank Global Financial Development Database, the European Central Bank, and the European Commission, and covers the period of 1996–2016.

The paper is structured as follows. In the first part, a critical review of the literature on capital mobility and credit booms was conducted. The second section describes the research methods. This is followed by a discussion of the research results. The paper concludes with the most important research findings.

2. Potential Benefits and Risks of Capital Mobility

The potential benefits of the liberalisation of capital movements mainly result from the opportunity, available for households, enterprises, and governments, to raise funds on international financial markets under more favourable conditions than on the domestic market. The benefits include a reduced cost of capital for companies and governments, but also the creation of the opportunity to raise capital abroad in the event of a shortage of domestic capital. An opportunity is also created to make more profitable investments abroad than on the domestic market (Oręziak, 1999a; Levine, 2001). In this way, the free movement of capital should support optimisation of capital allocation, i.e. the movement of capital to undertakings that are the most profitable (Feldstein, 2000).

Using funds available on the international financial market is particularly popular among the developing countries, less economically developed ones and those undergoing economic transformation or affected by economic recession. All of them have relatively limited domestic capital resources. Wealthy and ageing societies have more savings; hence their countries often have a higher current account surplus. This surplus may be temporarily ‘made available’ to economies suffering from a shortage of funds (Fischer and Reisen, 1992). The liberalisation of capital movements by such countries may contribute, in particular, to the inflow of foreign direct investment (FDI), and thus, acceleration of economic growth and improvement of the society’s standard of living, if foreign capital is profitably invested from the point of view of the capital-importing country. The benefits of FDI include not only the inflow of funds, but also of new technologies, knowledge, new forms of production organisation, etc. FDI leads to a higher degree of competition on the market, which should ultimately bring about the improvement of efficiency in the operations of

domestic companies and better use of the available domestic resources (Loungani and Razin, 2001; Nair-Reichert and Weinhold, 2001; Havranek and Irsova, 2011; Hansen and Rand, 2006).

Opening up to international capital transfers also stimulates the development of the domestic financial market. It is subject to strong competitive pressure from international financial institutions, which should support the process of strengthening and modernisation of domestic financial institutions (Fry, 1997). The benefits of the free movement of capital, enumerated in the literature, also include greater possibilities of diversification of investments for domestic and foreign investors, and stimulating governments to conduct a disciplined monetary and fiscal policy (Pierdzioch, 2004; Clark and Hallerberg, 2000).

Empirical studies on recent crises (the Asian crisis, the global financial crisis, the PIIGS countries crisis) indicate that the abovementioned benefits from liberalisation of capital movements do not always occur in practice, or do occur, but to a limited extent (Herzer, Klasen and Nowak-Lehmann, 2008; Agosin and Machado, 2005). Capital is often directed for non-productive use (consumption—Greece, Portugal) (Fouskas and Dimoulas, 2013) or sectors with low productivity (Ireland, Spain) (Lains, 2008; Ó Riain, 2014; Dellepiane, Hardiman and Las Heras, 2013). Besides this, capital is often moved to the financial system of a given country (stock exchange, banking sector) and is of speculative character. The risk results from the ease and speed of making such transactions (or deposits) and withdrawing from them (Stiglitz, 2000; Lane, 2013; Dailami, 1999; Demir, 2009; Thalassinou and Thalassinou, 2006).

It has turned out that liberalisation of capital movements may bring not only benefits but also risks, in particular in case of less competitive countries as compared to the capital exporters (Janicka, 2008; Gabriele *et al.*, 2000). A country which implements liberalisation of capital movements opens up to the impact of any external shocks. Foreign capital inflows may also have a destabilising effect on its economy (Stiglitz, 2000). This is due to the fact that international capital flows can be quickly and strongly affected by both the economic situation of a given country and the situation in its close and distant environment. The negative consequences for the economy can be mainly caused by a sudden and mass outflow of capital. If the country has its own currency, this can sharply weaken its exchange rate. The investors dispose of assets denominated in the domestic currency and the sales revenue is usually transferred abroad. In order to prevent capital outflow, the need may arise to maintain the exchange rates at a relatively high level, which will surely have an impact on the internal economic competitiveness. The member states of a monetary union (such as the Eurozone countries), however, cannot respond to such shocks through their monetary policy instruments because they have been deprived of their own independent monetary policy and their own currency (Amri *et al.*, 2016; Thalassinou and Dafnos, 2013).

One of the main opponents of full liberalisation of capital movements is J.E. Stiglitz, co-author of asymmetric information theory. Stiglitz (2004) not only invalidates the main assumptions that provide the basis for the neoclassical theory which underlies the liberalisation processes, but also points out the impossibility of applying the conclusions from theories on the free movement of goods to the free movement of capital. A similar opinion is held by Rodrik (1998), who points out that “there is a fundamental difference in how the market functions in these two areas”. According to him, although commodity markets can hardly be considered as functioning in compliance with the neoclassical model, they are, to a large extent, effective and predictable. The financial markets are fundamentally different (they are characterised, e.g. by the asymmetric information phenomenon or the mismatch of maturity of liabilities, often short-term, and assets, often long-term). Therefore, any search for a common theoretical basis of the commodity and financial markets is groundless (Janicka, 2010). It should be noted, however, that J.E. Stiglitz is against full liberalisation of capital movement of a certain type, i.e. short-term capital flows. He claims that they contribute to destabilisation of financial markets, and in contrast to FDI, have no impact on improvement of the economic situation of the country which implements liberalisation. The increased risk of disturbances in its financial system is not compensated by the benefits of liberalisation.

The arguments presented by Stiglitz (2000; 2004) are as follows:

- 1) the theoretical assumptions underlying the liberalisation processes (*inter alia* informational efficiency of the financial market) are so idealistic that they are not reflected in reality;
- 2) there is no conclusive evidence on the relationship between the degree of capital flow liberalisation and economic growth;
- 3) the assumption that the country at the lower turning point of a business cycle will support domestic demand with foreign funds is incorrect because then the country’s creditworthiness will worsen and a natural behaviour of investors is to withdraw from such market (in particular from short-term investments);
- 4) countries are encouraged to liberalise capital movements due to the fact that such opening should contribute to the expansion of their capital base. A frequent problem is, however, the transfer of capital abroad (e.g. to parent companies, i.e. foreign owners of enterprises and financial institutions). As a result, a depletion of the capital base of a given country can be observed;
- 5) due to its high mobility, the inflow of short-term capital hinders the conduct of stable macroeconomic policy;
- 6) liberation of capital movements, in the context of imperfect regulation of the financial market and weak supervision over the financial system, may lead to an outbreak of a currency crisis or a financial crisis. This argument was confirmed by the causes of the recent global financial crisis (2007+).

It is worthwhile to emphasise that Stiglitz mainly analyses the risks resulting from capital inflows to a given country. The capital outflows threatening the stability are, according to him, a consequence of the previous episodes of excessive capital inflows. In the context of macroeconomic balance, liberalisation of capital movements generates specific risks in respect of (Molle, 2000; Janicka 2010):

- a depletion of the domestic capital base, including stability of the country's foreign exchange reserves;
- more intense fluctuations in the foreign capital inflows to the domestic market;
- disturbances in the process of achieving external and internal balance, among other things, through an impact on nominal and real exchange rates, and thus on the country's competitiveness on the international market, and through an impact on the interest rate levels and interest on Treasury securities issued to finance the budget deficit and the public debt;
- threats to the stability of the country's financial system.

The arguments raised by opponents of full liberalisation of capital movements can be mainly placed within Keynesian theory. They point out uncertainty as to the possibility to satisfy the investment needs of the country, or its ability to achieve external and internal balance regarding the liberation of capital movements. The key argument of the neoclassical theory, namely optimal capital allocation, has been denied. Optimal allocation works from the point of view of capital owners, rather than the country – the capital recipient.

Particularly risky to the financial stability is the “hot” portfolio capital. It carries the following threats (Reisen and Soto, 2002; Boyd and Smith, 1992):

- can significantly increase economic trend fluctuations, because it flows in broad streams during the economic boom periods (and in particular, a boom in the financial and real estate markets) and dries up at the time of a recession,
- creates false economic incentives when it is easily available,
- deprives of investment opportunities when it becomes scarce,
- can destabilise the financial system, because its inflow leads to excessive lending expansion, and flight reduces asset prices, collateral value, and thus solvency of the banks,
- can lead to speculative bubbles occurring in the markets of various assets, e.g. real estate, shares and bonds.

3. Capital Flows as a Driver of Credit Booms

As has already been shown, large capital inflows are among the main potential drivers of excessive sharp increases in credit to the private sector in emerging market as well as in advanced economies, next to such factors as: total factor productivity gains, financial reforms, fixed exchange rate regimes, low quality of financial institutions and expansionary monetary and fiscal policies (Mendoza and Terrones, 2008;

Decressin and Terrones, 2011; Dell’Ariccia *et al.*, 2012; Arena *et al.*, 2015; Calderón and Kubota, 2012).

A common feature of credit booms is the phenomenon of so-called capital bonanzas associated with the low price and availability of capital on international markets (Reinhart and Reinhart, 2008). Its inflow to the receiving country leads to a growth in consumption and investments, and thus GDP. Under boom conditions, the economy often develops beyond the production capacity, which is conducive to inflationary pressure and the loss of international price competitiveness through a nominal or real appreciation of the exchange rate. This may favour the allocation of funds in the non-tradable sectors characterised by lower productivity, which further aggravates the loss of competitiveness. The real estate sector is this sector of the economy where foreign capital is often allocated (Tillmann, 2012). Capital inflows (often in the form of FDI) are conducive to price increases in this segment, accompanied by the so-called wealth effect, which also stimulates consumption and investments in the economy. At the same time, the conditions of easily available funds and economic growth may lead to the occurrence of expectations of further increases in the prices of houses and apartments, which provides incentives to increase demand. The price growth in the real estate market is due to the relatively long investment cycle, because of which growing demand is not equally quickly followed by supply (Amri *et al.*, 2016).

Keynesian theory, from which the optimal currency area (OCA) theory is derived, assumes that uncertainty about the future under the conditions of adaptability of expectations causes the alternate occurrences of optimistic and pessimistic expectations about the future economic trend. Such expectations become self-fulfilling prophecies (De Grauwe, 2013). Optimistic (pessimistic) expectations about the future economic situation cause an increase (decrease) in consumption and investments, which improves (worsens) the economic situation. This calls for the need to conduct counter-cyclical monetary and fiscal policy. Similarly, Hyman Minsky, a representative of the post-Keynesian school, pointed out that adaptability of expectations gives rise to a trend that, in a period of economic upturn, banks are inclined to underestimate risks and take on risk on a larger scale, which from time to time leads to a serious bank crisis (Minsky, 1986).

In contrast to Keynesian theory, the New Classical Synthesis (NCS), whose assumptions provided the basis for the structure of the Eurozone management system, makes the rational-expectations assumption. The adoption of such an assumption implies that the participants of economic life know the most probable course of future economic events and adapt their decisions thereto. In the world of NCS assumptions, there are no unstable credit booms as the rational-expectations assumption means that the participants of economic life contract only such amounts of loans that they will be able to repay out of their future incomes (Sławiński, 2015).

The recent global financial crisis failed to confirm the adequacy of such assumptions. The crisis in the Eurozone was directly caused by unstable credit booms, which

occurred because of too optimistic expectations of households regarding the future economic trend, the level of their future incomes, and therefore, their ability to repay the contracted loans (Liapis *et al.*, 2013).

In the case of the Eurozone, an important factor that favoured the transfer of the financial crisis to the real sphere and, further, to the sphere of public finance, is the functioning of big pan-European banks (as a matter of fact, financial conglomerates) and re-orientation of these banks towards the granting of mortgage loans on a large scale. According to Sławiński and Tymoczko (2013), the big pan-European banks should be blamed for putting Europe in trouble. The unstable credit booms were largely financed from cross-border loans granted by these banks. In a situation where housing loans were financed by the banks from short-term interbank loans, their supply began to grow much faster than the GDP, which is faster than the households' ability to repay them. This led to a debt crisis and recession resulting, among other things, from the fact that households were forced to repay housing loans which prevented them from affording other goods and services (Sławiński, 2015; Thalassinos *et al.*, 2016; 2015). A consequence of the recession was fiscal crises in several countries participating in the EMU, which contributed to the so-called Eurozone crisis (Liapis *et al.*, 2013). In the case of Greece, Portugal and Ireland, the fall in investors' confidence in the solvency of their governments was so sharp that all three countries lost their ability to take out loans on the financial markets. These countries would have had to declare bankruptcy, had it not been for loans obtained from other Eurozone countries and the IMF. If the ECB had not announced that, if necessary, it would intervene on the Eurozone bond market, the governments of Spain and Italy would probably also have lost their ability to take out loans in the financial markets.

Increased lending in the southern countries of the Eurozone was supported by the transfer of capital through the banking system from the northern and central countries, *inter alia* from Germany. This was an effect of operation of the previously mentioned big pan-European banks on the financial markets of the peripheral countries, which invested their surplus funds deposited by customers from the northern and central Eurozone countries. Another channel used for capital transfers were securities markets, in which the big pan-European banks also actively operated, offering their customers from the northern and central countries of the EMU, among other things, financial instruments through which funds were transferred to the economies (*inter alia* to the real estate market) and public budgets of the peripheral countries. Such transfers took place when the customers from the northern and central countries of the Eurozone were ensured higher rates of return on their invested funds in relation to the instruments financing the domestic economy or the domestic budget deficit.

The process of economic and monetary integration in the EU, accompanied by liberalisation in the area of capital movements, led to a considerable reduction in the premium risk for less-wealthy member states and easing of barriers that limit lending to domestic business entities and the public. The decline in real interest rates caused,

among other things, a feeling of increased wealth among households commonly believing that their future income would increase (Woreta *et al.*, 2010). At least in some countries, this factor played the role of an important catalyst for the credit expansion.

4. Data and Methods

A credit boom, in general, is an episode characterised by an excessive, sharp increase in credit to the private sector that collapses because it becomes unsustainable in the short and medium term. A characteristic feature of this phenomenon is a higher growth rate of credit than during typical business cycle expansion (Mendoza and Terrones, 2008; Sa, 2006).

A large number of studies have developed different approaches to identify credit booms. Their common feature is distinguishing a credit boom based on a comparison of the time course of a specific measure of credit (e.g. private credit to GDP ratio, real credit per capita) to its non-linear trend in a given country. A credit boom occurs when credit significantly exceeds (more than a given “boom threshold”) its long-run trend. The methods differ, however, in the details, e.g. whether the “boom threshold” is country-specific or which time-series filtering technique is used to separate a time series into trend and cyclical components (Gourchinas, Valdes and Landarretche, 2001; Tornell and Westermann, 2002; Mendoza and Terrones, 2008; 2012).

In this study, we follow the approach developed by Mendoza and Terrones (2008; 2012). It uses the Hodrick-Prescott filter (HP filter) to split a credit time series (y_t) into country-specific trend (τ_t) and cyclical components (c_t) according to formula (Hodrick and Prescott, 1997):

$$\min_{\tau_t} \left[\sum_{t=1}^T (y_t - \tau_t)^2 + \lambda \sum_{t=2}^{T-1} [(\tau_{t+1} - \tau_t) - (\tau_t - \tau_{t-1})]^2 \right] \quad (1)$$

where: λ – a smoothing parameter, $\lambda = 100$ (value commonly used for annual data); t – time.

The HP filter has become a standard method of detrending in the business cycle literature (Ravn and Uhlig, 2002), as it can be applied to nonstationary time series. The cyclical component in country i on date t is: $c_{i,t} = y_{i,t} - \tau_{i,t}$, while $\sigma(c_i)$ denotes the standard deviation of the cyclical component in country i . A credit boom episode is a period (\hat{t}) in which credit exceeds its country-specific long-run trend by a critical (threshold) value:

$$c_{i,t} \geq \phi \cdot \sigma(c_i) \quad (2)$$

where:

ϕ – boom threshold factor. Following Arena *et al.* (2015), we used $\phi = 1.65$ as it falls in the 5% tail of the standardised normal distribution. As a robustness check, we conducted a sensitivity analysis for a more stringent factor of $\phi = 1.75$ (Mendoza and Terrones, 2008).

The duration of credit booms is calculated as: $t^e - t^s$, where:

t^s – the starting date of the credit boom, such that $t^s < \hat{t}$ and yields the smallest difference $|c_{i,t} - \varphi^s \sigma(c_i)|$;

t^e – the ending date of the credit boom, such that $t^e > \hat{t}$ and yields the smallest difference $|c_{i,t} - \varphi^e \sigma(c_i)|$;

φ^s, φ^e – the starting and ending boom thresholds, respectively. Following Mendoza and Terrones (2008), we assumed that both the starting and ending thresholds are equal to one standard deviation of the cyclical component ($\varphi^s = \varphi^e = 1$).

As a measure of credit, we use:

Y_{1_cpc} – real credit per capita: the logarithm of the sum of claims on the private sector by deposit money banks and other financial institutions (the end-of-year observation) deflated by the corresponding end-of-year consumer price index (CPI) in relation to population (data source: IMF International Financial Statistics);

Y_{2_GDP} – the logarithm of private credit by deposit money banks and other financial institutions to GDP (data source: World Bank, The Global Financial Development Database).

To establish the causality relationship between capital inflows and credit expansion to the private sector in PIIGS countries, the Granger causality test was used. Granger causality is based on the assumption that if, given the past values of y , past values of x are significant predictors of the current value of y , then x exerts a causal influence on y (Lopez and Weber 2017). According to Granger (1969), the following equation can be applied to test causal relationships between stationary time series (whether CF causes y):

$$y_{it} = \alpha + \gamma_1 y_{i,t-1} + \dots + \gamma_L y_{i,t-L} + \beta_1 CF_{i,t-1} + \dots + \beta_L CF_{i,t-L} + \varepsilon_{it} \quad (3)$$

where:

$y_{i,t}$ – expansions of credit to the private sector (measured as a growth rate of Y_{1_cpc} or Y_{2_GDP}) in country i at time t ,

$CF_{i,t}$ – measure of capital inflows to country i at time t . Capital inflows are measured as foreign liability flows: portfolio investment inflows (CF_1) and alternatively as the total capital inflows (i.e. foreign direct investment, portfolio flows, and other investments liabilities, CF_2), in constant prices, using data from IFS. As several recent studies have highlighted substantial differences in the behaviour of gross versus net inflows (Amri *et al.*, 2016; Forbes and Warnock, 2012), as a robustness check, we used both measures of capital inflows in net and gross terms;

$\alpha, \gamma_1, \dots, \gamma_L, \beta_1, \dots, \beta_L$ – regression coefficients,

t – time, L – lag order, ε_t – random component.

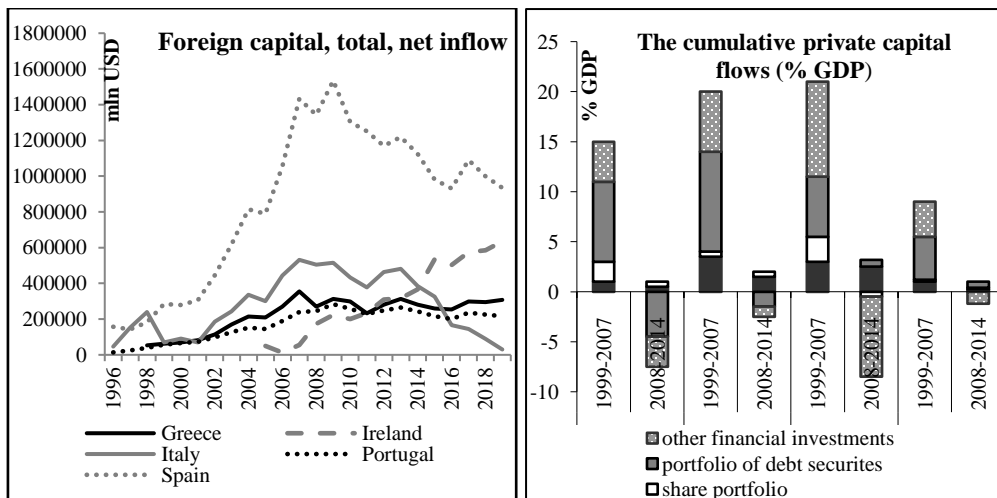
We estimated separate time-series regression equations for different credit and capital inflow measures. In order to determine the existence of causality, an *F*-test was performed, in which the null hypothesis assumes that all coefficients on the lags of variable *CF* (β_1 to β_L) are jointly zero (causality from *CF* to *y* does not exist). Due to the fact that the Granger test is sensitive to the number of lags that may affect the direction of causality (Gujarati, 2001), we included 1 to 3 lags in the estimations. Verification of the stationarity of the variables was performed using the augmented Dickey-Fuller (ADF) unit root test.

It should be noted that the analysis covers a relatively short period, which entails certain limitations in drawing final conclusions. Furthermore, it neglects other macroeconomic and political reasons for the PIIGS countries to be more intensely exposed to the financial friction. It was assumed, though, that the study methods proposed are able to establish a short-term relationship between foreign capital inflows and the dynamics of credit to the private sector in the PIIGS countries, and thus allow the verification of the research hypothesis.

5. Results and Discussion

From 1996 to 2007, the PIIGS countries experienced a very dynamic increase in private capital inflows to their economies (Figure 1). Significantly, until 2007, the capital inflows to these countries consisted mainly of investments in debt instruments and flows within the banking sector, while the capital inflow in the form of foreign direct investment (FDI) was less significant.

Figure 1. Foreign capital inflows to PIIGS countries

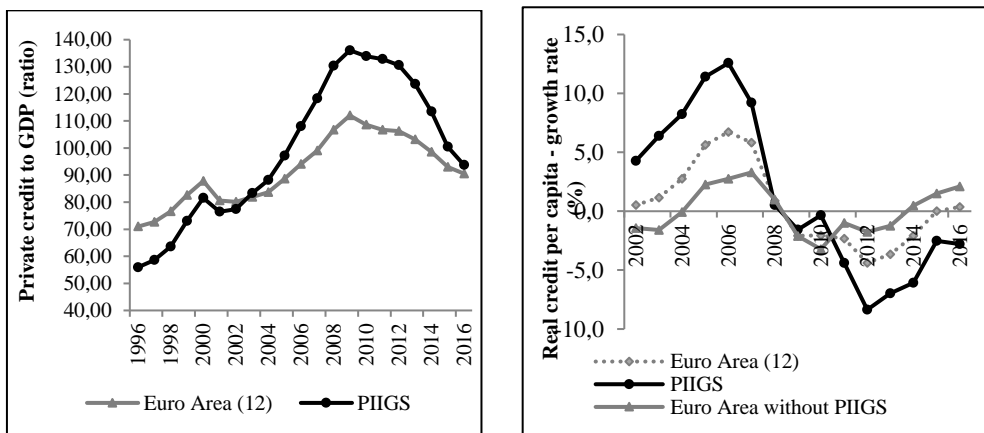


Source: Own study based on the IMF IFS database (<https://data.imf.org/?sk=4C514D48-B6BA-49ED-8AB9-52B0C1A0179B>) and ECB data (<https://sdw.ecb.europa.eu/reports>).

After 2007, the balance of capital flows in the PIIGS countries deteriorated. Greece, Spain, Portugal and Italy experienced a relatively sustained downward trend in foreign capital inflows. This was mainly due to a decrease in the inflow of debt portfolio investments and other financial investments into these economies. Among the PIIGS countries, Ireland was an exception to this rule, with a return to an upward trend of private foreign capital inflows to the economy after 2010.

The dynamic growth of foreign capital inflow to the PIIGS countries at the beginning of the 21st century contributed to the reduction of risk premiums, reduction of real interest rates and easing of other barriers limiting lending to domestic business entities in these economies. As a result, the inflow of foreign capital to the PIIGS countries was accompanied by a dynamic increase in household and corporate debt (Figure 2). In 2009, the level of private debt as a share of GDP was on average around 136% of GDP in these countries, more than double the 1996 level (55% of GDP). Moreover, while in 2002 the private sector debt in the PIIGS countries was similar to the average in 12 Eurozone countries (80% of GDP), in 2009, it was already more than 30 percentage points higher than the Eurozone-12 average (136% of GDP *versus* 112% GDP).

Figure 2. Level and dynamic of private debt in Euro Area (12 countries)



Source: Own study based on the IMF IFS database (<https://data.imf.org/?sk=4C514D48-B6BA-49ED-8AB9-52B0C1A0179B>) and on The Global Financial Development Database (<https://www.worldbank.org/en/publication/gfdr/data/global-financial-development-database>).

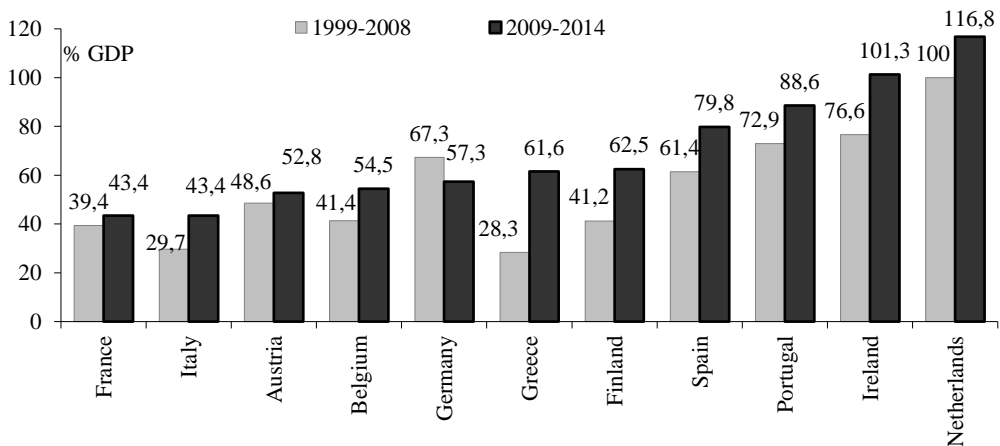
An increase in the bank debt of the private sector (households and enterprises) expressed in relation to GDP was observed in the vast majority of the Eurozone countries (the only country which noted a decline in this type of debt was Germany) (Figure 3). The PIIGS countries, however, were distinguished by a greater increase in private credit among the euro area countries. The biggest increase in private sector debt was noted in Ireland as well as in Greece and Spain. In the latter country, the highest level of debt was noted in 2009 and amounted to 173.1% in relation to GDP,

i.e. in 1996, it was 69.7%. In Ireland, a rise from 67% in 1996 to 174% in 2009 was observed, in Greece – from 28% to 99%, respectively (The Global Financial Development Database).

This was due to the fact that between 2002 and 2007, the average annual growth rate of private debt in the PIIGS countries was almost six times higher than in the other seven Eurozone-12 countries (Figure 2). Moreover, in the Eurozone-12 average as well as in PIIGS countries, the growth rate of credit to the private sector increased each year from 2002. In 2002, the average annual growth rate in the PIIGS countries was around 5%, but in 2008, it was already 12.5%.

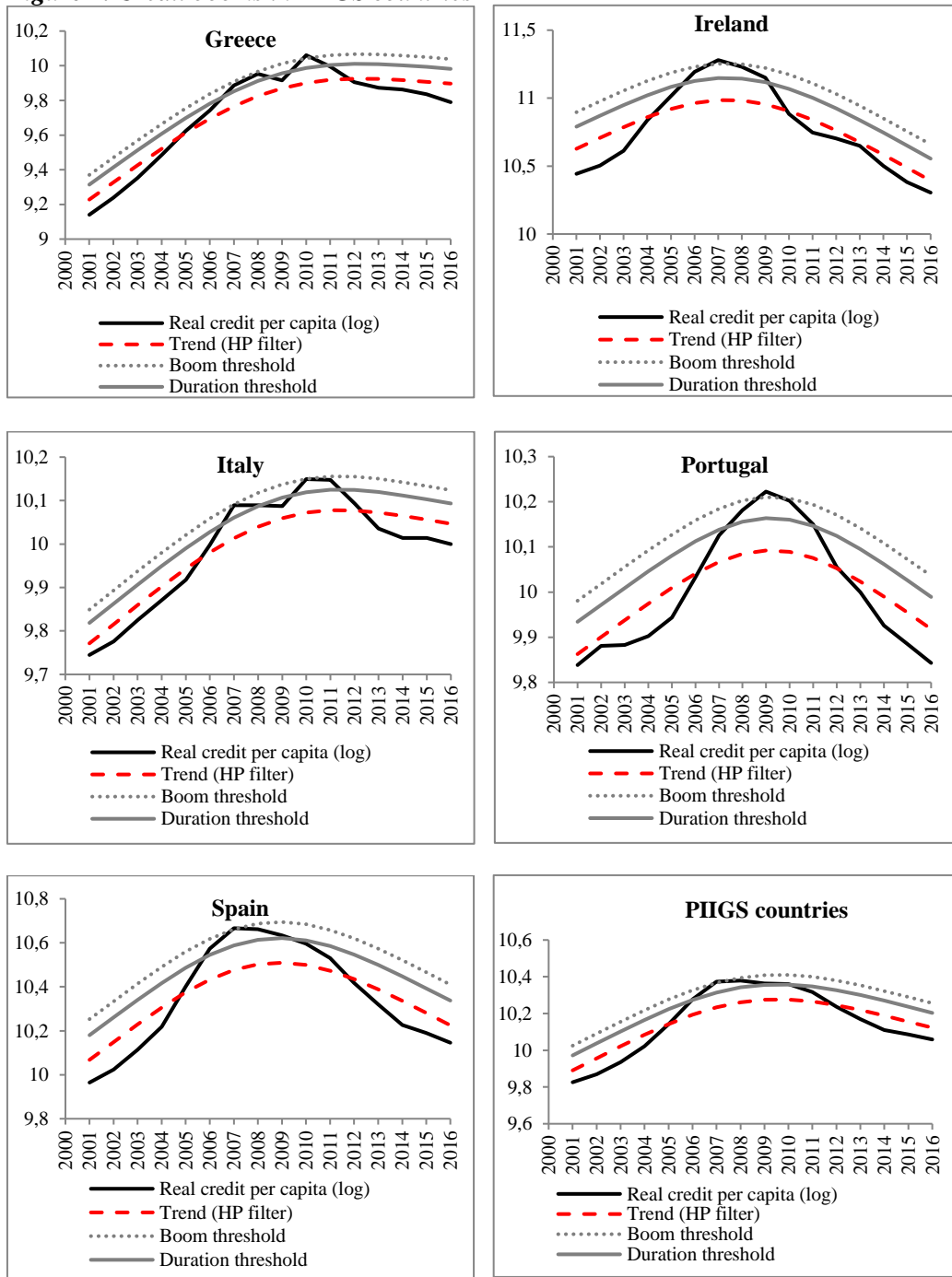
After 2008, there was a sharp credit crunch in all 12 Eurozone countries, with much deeper falls in the PIIGS countries. In this group of countries, the average annual private credit growth rate in 2008–2016 ranged from -9% to -1%. By comparison, in the remaining seven Eurozone countries, the private credit growth rate ranged between -3% and +1%. As a result, in 2016, the average private debt in the PIIGS countries reached a level similar to the average in the Eurozone (12 countries). However, this level was higher than the debt level at the beginning of the 21st century. In all Euro Area countries (with the exception of Germany), the average household debt in the period 2009–2014 was higher than the level observed before the financial crisis in the period 1999–2008. The highest level was noted in the Netherlands, which was closely followed by the countries most affected by the economic crisis (Ireland, Portugal, Spain). Moreover, the highest growth of average debt in the period 2009–2014 in relation to the average level from before the crisis period was noted in Greece, followed by the other PIIGS countries (Figure 3).

Figure 3. Household debt in the selected Eurozone countries (average value for the periods 1999–2008 and 2009–2014) as % of GDP



Source: Own work based on EBC data (<https://sdw.ecb.europa.eu/reports>).

Figure 4. Credit booms in PIIGS countries



Note: Calculations for boom threshold factor $\phi = 1.65$.

Source: Own study based on IMF IFS database (<https://data.imf.org/?sk=4C514D48-B6BA-49ED-8AB9-52B0C1A0179B>).

After 2000, all PIIGS countries experienced above-average growth rates of private credit (proxy by Y_{1_cpc}), which is characteristic of a credit boom (Figure 4). The PIIGS countries, however, differed due to the duration of the credit expansion and credit fluctuations during the peak period. In Greece, the credit boom occurred in 2006–2011, with the peak of the credit boom in 2010. In Ireland, a period of above-average credit expansion occurred between 2005 and 2009, with the peak in 2007. In Italy, it was the period from 2006 to 2012, with peaks in 2007 and 2010, in Portugal – 2007–2011 (2009 peak), and in Spain – 2006–2010 (2007 peak). After 2012, the level of credit was below the trend function values in all PIIGS countries.

As a robustness check, we conducted a sensitivity analysis for a more stringent boom threshold factor of $\phi=1.75$ (Mendoza and Terrones, 2008). This did not affect the above findings. The calculations were also carried out using another measure of credit Y_{2_GDP} (private credit to GDP, calculation on request). The change in the credit measure resulted in a shift of the period of above-average credit growth rate by 2 years on average ($t+2$). Moreover, there were no confirmed peaks meeting the conditions of the credit boom for Italy, Portugal, or Spain. However, it should be borne in mind that the period of above-average credit expansion was identified by reference to a trend established on the basis of changes observed between 1996 and 2016. The analyses are therefore of a short-term nature.

The presented data show that in the first decade of the 21st century, the period of dynamic inflow of foreign capital into the PIIGS countries co-occurred with a period of above-average credit growth. After 2008, both foreign capital inflows and credit collapsed. Furthermore, credit booms display some similarities across the PIIGS economies: they were similar in magnitude across these countries and followed surges in capital inflows.

Countries that are members of the Eurozone are expected to have a stronger link between capital flow surges and credit booms since they cannot follow independent monetary policies (Amri *et al.*, 2016). The Granger causality test was used to verify the occurrence of a cause-and-effect relationships between foreign capital inflows to the PIIGS countries and the occurrence of credit booms in those countries. The ADF test proved that both variables measuring the level of credits (Y_{1_cpc} , Y_{2_GDP}) and variables relating to foreign capital inflows (CF_1 to CF_4) are non-stationary and have a unit root (Table 1). Therefore, the growth rates of these variables were used to verify the cause-and-effect relationships.

Table 1. Results of ADF unit root test, p-value

Specification		Portugal	Italy	Ireland	Greece	Spain
Y_{1_cpc} - real credit per capita	L	0.526	0.921	0.576	0.981	0.093
	FD	0.007	0.044	0.005	0.021	0.034
Y_{2_GDP} - credit to GDP	L	0.125	0.773	0.526	0.472	0.251
	FD	0.001	0.038	0.036	0.001	0.009
CF_1 - gross portfolio investment (liabilities)	L	0.689	0.152	0.148	0.963	0.466
	FD	0.001	0.0001	0.001	0.001	0.001
CF_2 - gross total capital flow(liabilities)	L	0.279	0.322	0.520	0.906	0.467
	FD	0.001	0.001	0.004	0.001	0.001
CF_3 - net portfolio investment	L	0.464	0.864	0.340	0.874	0.567
	FD	0.004	0.001	0.011	0.002	0.001
CF_4 - net total capital flow	L	0.305	0.658	0.050	0.369	0.460
	FD	0.001	0.003	0.009	0.001	0.004

Notes: L - level; FD - first difference.

Source: Own study.

Among the PIIGS countries, the closest cause-and-effect relationships between capital inflows and the level of credits per capita (Y_{1_cpc}) were recorded in Greece (Table 2). For this country, all forms of capital inflows considered (CF_1 to CF_4) can be considered as a cause of credit booms in terms of Granger causality ($p < 0.05$). These results do not depend on the number of lags included in the regression function but are sensitive to how credits are measured. In the case of Y_{2_GDP} , the growth rate of credit to the private sector was mainly dependent on net capital flows. Both net portfolio flows (CF_3) and net total capital flows (CF_4) can be considered to be the cause, in terms of Granger causality, of the growth rate of credit to the private sector in that country (Y_{2_GDP}).

Table 2. Granger causality test results, p-value

Country	Lag	Y_{1_cpc} growth rate (real credit per capita)				Y_{2_GDP} growth rate (credit to GDP)			
		Portf. Inv.	Total CF	Net Portf. Inv.	Net total CF	Portf. Inv.	Total CF	Net Portf. Inv.	Net total CF
Portugal	L1	-	-	-	-	-	-	-	-
	L2	-	-	0.094	-	0.003	-	0.079	-
	L3	-	-	-	-	-	-	-	-
Italy	L1	0.021	-	0.032	-	-	-	-	-
	L2	0.098	-	-	-	-	-	-	0.049
	L3	0.003	0.005	0.027	0.026	-	-	-	-
Ireland	L1	-	-	0.081	-	-	-	-	-
	L2	-	-	-	-	0.077	0.095	-	-
	L3	-	-	-	-	-	-	0.020	-
Greece	L1	0.001	0.006	0.001	0.007	-	0.053	-	0.014
	L2	0.005	0.051	0.004	0.024	-	-	0.056	0.065
	L3	0.023	0.044	0.004	0.002	-	-	0.091	-
Spain	L1	-	-	-	-	-	-	-	-
	L2	-	-	-	-	0.098	-	-	-
	L3	-	-	-	-	0.011	0.039	0.021	0.094

Notes: Table shows only values meeting the condition of $p < 0.10$.

Source: Own study.

Cause-and-effect relationships between capital inflows and credit per capita were also observed in Italy. For this country, the private sector credit growth rate (Y_{1_cpc}) depended on capital inflows in the form of portfolio investment, both gross and net. The results, however, were sensitive to the use of another capital measure. For variable Y_{2_GDP} only the impact of variable CF_4 (net total capital flow) on credit growth was statistically significant.

In Spain, no statistically significant links between capital inflows and credits measured using variable Y_{1_cpc} were found. On the other hand, all forms of capital inflows can be considered as a cause in terms of Granger causality (taking into account a 3-year lag) for growth of credit measured in relation to GDP (Y_{2_GDP}). In Portugal, only portfolio investment capital inflows can be considered as a cause of credit expansion (for variables Y_{1_cpc} and Y_{2_GDP} , taking into account a 2-year lag). A similar situation also occurred in Ireland.

The results of the calculations indicate that in all PIIGS countries, the cause-and-effect relationship between the increase in foreign capital inflows and the increase in credit to the private sector was confirmed (Table 2). The results indicate that capital inflows can explain rapid credit growth in the PIIGS countries, which confirms the research hypothesis. These results are consistent with a number of empirical studies indicating that surges in capital inflow are a good predictor of rapid credit expansion in emerging as well as in advanced economies (Calderon and Kubota, 2012; Mendoza and Terrones, 2008; Amri *et al.*, 2016).

The results, however, are sensitive not only to the number of lags included in the regression function (which is an inherent feature of the Granger causality test), but also to the selection of measures representing credits and capital inflows. These conclusions are in line with observations by Amri *et al.* (2016) that the existence and strength of the links between foreign capital inflows and domestic credit dynamics depends on the way in which the measurement of both capital surges and credit booms is carried out.

In terms of the composition of the inflows, the results of the calculations show the special role of capital inflows in the form of portfolio investments in the generation of credit booms in the Eurozone countries. It was confirmed that between 1996 and 2016, capital inflows in the form of portfolio investments, both gross and net, in the PIIGS countries could be considered to be a cause of private sector credit growth in terms of Granger causality. Similarly, Furceri *et al.* (2012) found that surges in net portfolio and debt inflows have the largest effect on credit growth to the private sector. Lane and McQuade (2014) indicate that growth of credit (measured as a ratio to GDP) in a sample of European countries in 1993–2008 was positively correlated with large portfolio debt inflows. In general, net portfolio and debt investment stand out as the most important credit boom drivers in advanced economies.

6. Summary

One of the causes of the Eurozone crisis was a rapid inflow of foreign capital and a large increase in lending in the peripheral countries, closing the development gap in relation to the central and northern EMU countries. An important role in this process was played by the free movement of capital and progressive integration of the financial market, which are key elements in the creation of an economic and monetary union.

The growing household debt in Europe was an important driver of economic growth until 2007. On the other hand, the debt overhang, and the collapse in demand (as a result of the financial crisis followed by the economic crisis) were an important obstacle hindering the return to growth. Both the banks and the borrowers, to an insufficient extent, noticed and assessed the risk that the Eurozone economy (as well as the global economy) may enter a serious downward trend of the business cycle. That is why one of the lessons learned during the recent financial crisis is that excessive optimism associated with the expected future economic growth and the inflow to the financial market and the economy of 'cheap' and easily available capital lead to the occurrence of speculative bubbles, irrational and wrong investment decisions and over-indebtedness of households and enterprises.

As a result of this lesson, changes are needed in the legal and market environment, associated with the sphere of providing the households and enterprises with access to bank loans and with the sphere of cross-border capital movements that would reduce the risk of subsequent excessive credit booms. Some institutional and legal changes in this respect have already been implemented, among others, in the field of EU legislation on responsible lending and borrowing. They are reflected in the review and amendments to directives on the loan market. This mainly applies to the Directive on credit agreements for consumers (Directive of the European Parliament and of the Council 2008/48/EC of 23 April 2008), as well as the directive on credit agreements for consumers relating to residential immovable property, generally referred to as the Mortgage Credit Directive (Directive of the European Parliament and of the Council 2014/17/EU of 4 February 2014). In addition, the European Commission carries out assessments of legal regulations in terms of preventing the over-indebtedness of households.

In order to ensure economic and financial stability in the Eurozone countries, especially the less competitive ones, it is also necessary to better identify the mechanisms linking the free movement of capital to the over-indebtedness of businesses and households. Further, in-depth analyses could include an investigation of the relationship between different forms of capital inflows and credits in different economic sectors.

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