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Deposited in *Repositório ISCTE-IUL*:

2019-03-25

Deposited version:

Post-print

Peer-review status of attached file:

Peer-reviewed

Citation for published item:

Barradas, R. & Lagoa, S. (2017). Financialization and Portuguese real investment: a supportive or disruptive relationship?. *Journal of Post Keynesian Economics*. 40 (3), 413-439

Further information on publisher's website:

10.1080/01603477.2017.1286940

Publisher's copyright statement:

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FINANCIALISATION AND THE PORTUGUESE REAL INVESTMENT: A SUPPORTIVE OR DISRUPTIVE RELATIONSHIP?

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Acknowledgments: The authors are grateful for the helpful comments and suggestions from an anonymous referee, Ana Costa, Ana Santos, Martin Siddiqui, Nuno Teles, Ricardo Paes Mamede, the participants in the INFER International Workshop on European Economic Integration: Present and Future Challenges (ISEG – University of Lisbon, June 2014), the participants in the Research Seminar for PhD in Economics (ISCTE – University Institute of Lisbon, June 2014), the participants in 5th Annual Conference in Political Economy (University of Naples “L’Orientale”, September 2014) and the participants in INFER Workshop on Heterodox Economics (Faculty of Economics – University of Coimbra, April 2015). The usual disclaimer applies.

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ABSTRACT

This paper makes an empirical analysis of the relationship between financialisation and real investment by Portuguese non-financial corporations from 1979 to 2013. In theory, while financialisation leads to a rise in financial investments by non-financial corporations and thus deviates funds from real investment, it also intensifies the pressure for financial payments and therefore restricts the funds available for real investment. We estimate an aggregate investment function including control variables (profitability, debt, cost of capital and output growth) and two measures of financialisation (financial receipts and financial payments). The paper concludes that there is a long-term investment equation, and finds evidence that the process of financialisation has hampered real investment largely as a result of financial payments. The paper also identifies that profitability and debt are both detrimental to real investment.

KEYWORDS

Financialisation, Investment, Vector Error Correction Model

JEL CLASSIFICATION

C22, D20, E22 and E44

1. INTRODUCTION

Mainstream economics advocates that the financial sector plays a crucial role in boosting real investment of non-financial corporations due to the relationship between savings and investments (e.g. Levine, 2005). Nonetheless, the literature on financialisation (Orhangazi, 2008a and 2008b; Hein and van Treeck, 2010; Hein, 2012; Hein and Dodig, 2015; among others) stresses that the development of finance impairs real investment, notably through two channels. Firstly, non-financial corporations are more engaged in financial activities due to the incentives and pressures to generate short-term profits, which diverts funds from productive activities (“crowding out” effect). Secondly, financial markets increasingly require payments to be made by non-financial corporations, thus using up funds that could have been assigned to long-term productive projects.

In light of this, a small body of literature has recently emerged to test the hypothesis that financialisation has negative effects on non-financial corporations' investments, estimating behavioural equations for investment (e.g. Stockhammer, 2004; Orhangazi, 2008a and 2008b; van Treeck, 2008; Demir, 2009; Onaran *et al.*, 2011; Seo *et al.*, 2012; and Tori and Onaran, 2015).

This paper aims to evaluate the impact of financialisation on the real investment of Portuguese non-financial corporations between 1979 and 2013, and contributes to the literature mainly in three ways. First, it focuses on the behaviour of Portuguese non-financial corporations, whereas most studies focus on the USA or the UK. The Portuguese economy is considered to be less financialised than the USA or UK economies and its main agents of financialisation are banks as opposed to financial markets. To use the terminology of Orsi and Solari (2010) and Sawyer (2013), Portugal has a “bank-based” financial system in which banks are the economy's main financing agents. Second, the paper uses a Vector Error Correction Model (VECM) to assess the relationship between financialisation and real investment, which allows a distinction to be made between the short-term and the long-term effects of financialisation. Finally, the model includes both financial receipts and payments of firms and uses aggregate macro data, which is not commonly found in the literature.

In order to assess the macroeconomic relevance of financialisation, we estimate an equation that explains aggregate investment of non-financial corporations; it includes traditional variables (profitability, debt, cost of capital and output growth) and two proxies to capture the two channels of financialisation (financial receipts and financial payments of non-financial corporations).

We identify a disruptive relationship between financialisation and real investment. The statistical evidence in favour of the financial payments channel is stronger than that of the

financial receipts channel. A disruptive relationship is also identified between profitability and real investment and between debt and real investment.

The remainder of the paper is organised as follows. Section 2 reviews the literature on the relationship between the financialisation and investment of non-financial corporations. An investment equation is presented in Section 3 before describing the data and the econometric methodology in Section 4. Section 5 provides the main results and discussion. Finally, Section 6 concludes.

2. THE RELATIONSHIP BETWEEN FINANCIALISATION AND REAL INVESTMENT

Mainstream economics claims that financial institutions and financial markets play a crucial role in promoting the real investment of non-financial corporations. The financial sector and financial markets facilitate the provision of funding (by channelling savings to borrowers through credit and other forms), increase the efficiency in resources allocation by screening and monitoring investments, help to foresee the future economic outcomes and opportunities, reduce market imperfections, reduce transaction costs, and provide risk management services (Levine, 2005). Several empirical studies find a positive association between financial development and economic growth (Levine, 2005; Ang, 2008; Arestis *et al.*, 2015; among others).

In contrast, the literature on financialisation argues that the growth of finance hampers real investment of non-financial corporations in two ways. Firstly, financialisation implies a rise in non-financial corporations' investment in financial assets and thus diverts internal funds from real investment. Secondly, there are strong pressures on non-financial corporations to increase payments, in the form of interest, dividends and stock buybacks, to financial markets and institutions.

Regarding the first channel, Krippner (2005) shows that non-financial corporations have become more engaged in financial activities, as demonstrated by the growing importance of both financial revenues and profits in proportion of revenues and profits from productive activities, respectively. A number of explanations can be provided for this phenomenon. Firstly, firms become focused in current profitability and have shorter planning horizons (short-termism) due to the pressure of shareholders (Crotty, 2005) and the link of managers bonuses to short-term profitability and stock price gains (Tomaskovic-Devey *et al.*, 2015). Consequently, managers favour financial investments that may yield higher and faster returns than investment in real assets, leading to the “crowding out” of real investment – the “management’s preference channel” according with Hein (2012) and Hein and Dodig (2015).

Secondly, firms have been engaging in financial activities to remain economically viable (or even increase their profitability) due to the decrease in profits from real activities and the increase in the cost of external funds since the 1980s (Crotty, 2005; Orhangazi, 2008a and 2008b).

Thirdly, the increase in financial investments tends to increase in periods of uncertainty (Baud and Durand, 2012), because firms favour them until uncertainty dissipates in order to mitigate risk (Soener, 2015). Indeed, Akkemik and Özen (2014) find that the rise in financial investments in Turkish firms is a response to higher macroeconomic uncertainty and risk.

Finally, from the neo-institutionalism perspective of Soener (2015), there are two further reasons that may explain non-financial corporations' greater involvement in financial activities. The first is related to organisational learning whereby imitate competitors that engage in financial activities. The second explanation is associated with an institutional transmission of knowledge and practices between key actors (namely financial executives and independent consultants) and managers. The former actors have a strong *know how* of corporate finance and are able to persuade managers to engage more in financial activities.

In contrast, some authors (e.g. Fazzari *et al.*, 1988; Gertler and Gilchrist, 1994; and Ndikumana, 1999) claim that higher investment in financial assets could be positive for productive investments, especially if non-financial corporations use the returns from financial investments to finance real investments. This could be quite relevant for small corporations that face greater financial constraints (Orhangazi, 2008a and 2008b). Nevertheless, the literature on financialisation generally excludes this hypothesis on the grounds that non-financial corporations usually re-invest financial profits in financial assets or distribute them as dividends to shareholders.

The second channel through which financialisation depresses real investment is associated to the increase in payments to financial markets and institutions. These payments include both interest and dividends, which has experienced an upward trend in the last years due to the increase in the levels of indebtedness of non-financial firms (Orhangazi, 2008a and 2008b). Lower retention ratios and higher interest payments reduce funds available for productive investments and hamper long-term investment projects, including research and development (Aglietta and Breton, 2001; Duménil and Lévy, 2004). This channel is referred to by Hein (2012) and Hein and Dodig (2015) as the “internal means of finance channel”, and is able to explain the “puzzle” of “profit without investment”, that is the downward trend in investment growth accompanied by an upward trend in profits (Cordonnier and Van de Velde, 2014). This “puzzle”, which is explained by the increase in shareholder power, is confirmed for the USA, UK, France, Germany and Italy from the mid-1980s by Stockhammer (2005).

A key element to understand the rise in financial payments by non-financial corporations over the last three decades is the emergence of a new design of corporate

governance that favours shareholder value, commonly referred to as a “shareholder value orientation” (Lazonick and O’Sullivan, 2000; Stockhammer, 2010). Lazonick and O’Sullivan (2000) state that the orientation has changed from one based on profit retention and reinvestment to one of downsizing the labour force and distributing profits to shareholders. In this context, Levy-Orlik (2012) admit that production decisions dominated by the maximisation of shareholder value seek to reduce production costs and increase share prices without regard for technological innovation or the industrial side of the business.

The rise in shareholder value orientation in firms is fundamentally connected to the growing importance of institutional investors in financial markets, who seek constant appreciation in share prices and, thus, press corporations to practice high payout ratios (Orhangazi, 2008a and 2008b). A failure by non-financial corporations to realise the expected financial payments leads to institutional investors walking out, a fall in share prices and probably a takeover.

Managers of non-financial corporations raise short-term payout ratios not only due to shareholder pressure, but also due to their personal interests. There is an incentive for managers to increase share prices in the short-term (notably by distributing a high level of dividends) because their remuneration schemes are based on the short-term evolution of those prices (Orhangazi, 2008a and 2008b).

Some authors (e.g. Orhangazi 2008a and 2008b) emphasise that the rise in financial payments could foster an increase in real investment because it signals that corporations have higher levels of profitability and solvency. This facilitates the access to funding at lower costs, which is important for the realisation of real investments. Kliman and Williams (2015) also conclude for the USA that the rise in both financial payments and purchases by firms has not pressed down productive investment, but this is because firms increased borrowing to support these financial operations.

Despite the increasing amount of theoretical work on the effects of financialisation on investment, empirical studies are limited (Onaran *et al.*, 2011). Nevertheless, a relatively small body of literature has emerged in recent years dedicated to assessing the impact of financialisation by estimating investment equations.

Accordingly, Stockhammer (2004) estimates an investment equation for four countries (Germany, France, UK and USA), from the late 1960s to the early 1990s, using the rentier income of non-financial corporations (interest and dividend income, i.e. receipts from financial investments) as a proxy for financialisation. Other determinants of investment considered are capacity utilisation, profitability and the relative cost of capital. Partial Adjustment Models (PAM) and Autoregressive Distributed Lag (ARDL) models are used in the estimations with annual data. He finds strong support for financialisation causing a slowdown of capital accumulation in the USA and France, some support in the UK and none in Germany. For the

UK, he recognises that financialisation has not been accompanied by a decline in accumulation because the investment rate was already very low in the Golden Age. In the case of Germany, the author argues that “shareholder value orientation” is a recent phenomenon.

Rather than using financial revenues, van Treeck (2008) stresses the role of financial payments in explaining investment by non-financial corporations in the USA, from 1965 to 2004. He uses an ARDL approach that requires fewer theoretical assumptions than the traditional cointegration techniques. The first interesting result is that, without taking into account financial payments of corporations, he obtains a positive but not robust relationship between profit rate and investment for the USA. In France and Germany, no long run relationship is found between profit rate and investment, whereas in the UK the relationship is weak. Most importantly, in a further analysis for the USA, it is established that interest and dividend payments significantly improve the empirical fit of the investment equation and have a negative impact on investment, whereas profit rate has a positive effect. This evidence explains why capital accumulation had a downward tendency in the USA despite an increase in the profit rate.

For the US economy between 1960 and 2007, Onaran *et al.* (2011) focus on the differentiated effects on investment of the rentier and non-rentier profit shares for the overall economy (and not only for corporations). Using an Error Correction Model (ECM) and output as a control variable, results indicate the expected positive effect on investment of the non-rentier profit share and a negative effect of the rentier profit share (dividends and interest). The latter impact results both from the reduction in available funds to invest and the effect of shareholder orientation on investment decisions.

Orhangazi (2008a) studies the investment of non-financial corporations in the USA using not only aggregate data for non-financial corporations, but also firm level data to break the analysis down by sector (manufacturing versus non-manufacturing corporations), industry (durables versus non-durables producers) and dimension (small versus large corporations) – for a similar analysis with firm level data see also Orhangazi (2008b). In order to test the significance of the two channels of financialisation, he uses two proxies: financial profits (i.e. the income in the form of interest and dividends) and financial payments (interest and dividends payments and stock buybacks). In both studies, the control variables used by Orhangazi are real as well as financial determinants of investment, notably output (or sales), level of debt, and cash-flow (or internal funds). Orhangazi (2008a) uses the Ordinary Least Squares (OLS) estimator with the variables in first differences (to ensure stationarity). He finds a negative effect of financialisation on investment, but the variable of financial profits lacks statistical significance. Orhangazi (2008b) uses the Arellano-Bond Generalised Method of Moments (GMM) estimation technique. In relation to financial profits, he finds negative and statistically significant effects on investment for large firms across different sectors, but a positive and

significant effect for small firms. Regarding financial payments, he finds negative and statistically significant effects on investment in both for small and large firms from different industries.

Tori and Onaran (2015) also use firm-level data but to study UK corporations. The authors assess the relationship between financialisation and investment for the listed non-financial corporations between 1985 and 2013. The investment equation is estimated with the Arrelano-Bond GMM estimator and using financial incomes and financial payments as proxies of financialisation. Both variables exert a negative influence on investment, especially in the pre-crisis period and in the manufacturing sector. Financial incomes increase investment in the case of small and medium corporations, as in Orhangazi (2008b).

Demir (2009) is a pioneer in studying the effect of financialisation on investment in emerging countries. He assesses how real investment of private industrial firms is affected by the differential between the rates of return of fixed investment and financial investment (herein return gap) in three emerging countries (Mexico, Argentina and Turkey) during the 1990s and early 2000s, a period of economic liberalisation. The author uses micro data and a GMM dynamic model for each country to conclude that the return gap is an important factor to explain investment in the three countries: an increase in the return of financial investment vis-à-vis fixed investment reduces the investment in fixed capital.

Seo *et al.* (2012) focus on the impact of financialisation on investment in intangible assets, notably in research & development (R&D). They use data for Korean non-financial corporations from 1994 to 2009 and make use of three variables to capture the two aforementioned channels related with financialisation. On one hand, they use total investment in financial assets divided by total assets, and financial investment unrealised gains (i.e. unrealised gains on financial assets, namely on short-term financial instruments, trading securities, available-for-sale securities and other short and long-term securities) divided by total assets. On the other hand, they utilise the sum of dividend payments and stock buybacks divided by total assets. Firm size, return on assets, the debt ratio, cash-flow from operating activities, the ownership structure and a dummy variable for high-tech industries are included as control variables. The estimations for the entire sample and for the subperiods before and after the Asian financial crisis allow the conclusion that financialisation has a negative effect on R&D investment, particularly in the period after the crisis.

In sum, there is already a range of studies on the impact of financialisation on real investment, with the following main differences: they analyse developed economies or emerging economies; the use of micro level data or aggregate data; the consideration of overall investment of non-financial corporations or only investment in R&D; and the use of financial revenues and/or financial payments. Despite the differences, most of these studies find

statistical evidence supporting the theoretical claim that financialisation has a negative impact on real investment of non-financial corporations.

We contribute to the literature in the following three ways. Firstly, while the literature reviewed above focuses mostly on large and highly developed economies, we study a smaller, less developed and more peripheral economy, namely that of Portuguese. This is also relevant because the impact of financialisation varies from country to country, even in the more developed economies. For instance, Stockhammer (2004) suggests that financialisation may have no effect in a “bank-based” financial system, like Germany. The study of Portugal is also interesting because firms are becoming increasingly financialised, as suggested by the increase in financial revenues as a percentage of gross operating surplus (Lagoa *et al.*, 2014). This occurred despite the fact financial markets are less relevant in Portugal, and many corporations are not quoted in the stock market. But even for unquoted corporations, financialisation affects real investment through the two abovementioned channels. Corporations' tendency to prefer financial investment rather than real investment is probably due to the decline in the profitability of real activities and the increased uncertainty from the macroeconomic environment and other sources (e.g. increasing competition from emerging economies). In turn, the increase in financial payments may be linked to a fall in corporations' profitability, leading them to distribute more funds so that shareholders may obtain higher returns in the financial markets. In addition, more indebted corporations have to pay higher interest to banks and financial markets. Finally, even though many corporations are not quoted, they are owned by business groups led by quoted companies and so suffer indirectly from the same type of pressure from financial investors. Other shareholders of non-quoted corporations may also be influenced by an economic culture oriented to short-term financial gains and thus demand high dividends from corporations. Corporate shareholders tend to imitate competitor firms and follow the advice of financial executives and consultants who are of growing importance to corporate decision-making (Soener, 2015).

Secondly, we contribute by measuring the impact of financialisation using two channels: financial receipts and financial payments of non-financial corporations. Only Orhangazi (2008a) has used this approach with aggregate macro data.

Finally, the paper uses a Vector Error Correction Model (VECM), which allows a distinction to be made between the short-term and the long-term effects of financialisation. We expect the long-run effects to be stronger due to the long-run nature of the phenomenon under study. We also analyse how investment reacts dynamically to the financialisation variables by using the Impulse Response Function. This allows us to trace the impact of financialisation on investment taking into account the reaction of other key variables (and not *ceteris paribus*), incorporating the long and short run relationships between variables, and identifying the time profile of the reaction (not only the contemporaneous or lagged effect).

3. FINANCIALISATION AND REAL INVESTMENT: AN ECONOMIC MODELISATION

In what follows, we estimate an equation in which the investment of non-financial corporations depends on the control variables identified in the literature revised above: profitability, level of debt, cost of capital, and output growth. Following Orhangazi (2008a and 2008b), we assume two measures of financialisation, financial receipts and financial payments of non-financial corporations, which assess the relevance of the two channels that are expected to hamper real investment, as described in the previous section.

The long run investment function takes the following form:

$$I_t = \beta_0 + \beta_1 P_t + \beta_2 D_t + \beta_3 CC_t + \beta_4 OG_t + \beta_5 FR_t + \beta_6 FP_t + \eta_t \quad (1)$$

, where I is investment of non-financial corporations, P is profitability, D is the corporate debt, CC is the cost of capital, OG is output growth, FR are financial receipts, FP are financial payments and η_t represents an exogenous investment shock in period t , which is an independent and identically distributed (white noise) disturbance term with zero average and constant variance.

All the variables pertaining to non-financial corporations (investment, profitability, debt, financial receipts and financial payments) are expressed as ratios of the respective gross value added. We adopted this approach rather than using the variables in volume, because it better expresses the relative importance of financialisation.

It is worth noting that we estimate an aggregate investment function, similarly to Stockhammer (2004), Orhangazi (2008a), van Treeck (2008) and Onaran *et al.* (2011). Since the theory of the behaviour of non-financial corporations is microeconomic in nature and we wish to explain a macroeconomic phenomenon, implicitly we have to assume the existence of a representative corporation. However, the use of an aggregate investment function introduces some limitations on the analysis, notably it overlooks the possible heterogeneous behaviour of corporations by sector, industry, dimension or ownership; it permits the study of whether the phenomenon has a macroeconomic impact. But if we find an effect of the financialisation variables, we are unable to say whether this is due only to the impact of large corporations or whether it is a more generalised phenomenon across all corporations. If we do not find any macroeconomic effect of the financialisation variables, we cannot rule out that they affect a subset of corporations, which however is not enough to generate a macroeconomic effect.

Turning now to the expected impact of the variables, profitability and output growth are likely to have a positive influence on investment; the cost of capital and the two variables of

financialisation are anticipated to have a negative effect, and the level of debt has an undetermined effect on investment. Therefore, the coefficients are expected to have the following signs:

$$\beta_1 > 0, \beta_2 \geq 0, \beta_3 < 0, \beta_4 > 0, \beta_5 < 0, \beta_6 < 0 \quad (2)$$

Explaining now the reasons behind each beta sign, profitability could affect investment positively by determining the level of internal funds available for new investments (Stockhammer, 2004). Moreover, capital is attracted by the prospect of future profitability (Kopcke and Brauman, 2001), which given the uncertainty about the future, is largely formed on the basis of past performance, and thus past profitability is a major determinant of investment (Kuh and Meyer, 1955; and Minsky, 1975).

The level of debt may have a positive or negative impact on investment. On one hand, high levels of debt can be a symptom of financial fragility and thus limit new investment due to the difficulty in obtaining additional financing (both new debt and equity). If the debt level is perceived to be unsafe, the rise in debt has a negative effect on investment as future profits may be insufficient to repay debt, and this raises the possibility of bankruptcy. On the other hand, if the debt level is considered to be safe (by managers, banks and financial markets), the rise in debt may have no effect on investment, or it may even be positive as it means more available funds (Orhangazi, 2008a and 2008b) and an easing of credit constraints.

From a neo-classical perspective, investment depends negatively on the cost of capital (traditionally measured by the level of real long-term interest rates) on the grounds that investment ultimately depends on the funding or opportunity costs. A higher interest rate may also increase the difficulty in obtaining external finance if financial markets are incomplete (Hein and Vogel, 2008), as credit rationing may be stronger.

Output growth is also expected to be positively related with investment due to the Keynesian acceleration principle (Bhaduri and Marglin, 1990). This principle postulates that capital accumulation increases more than proportionally with the increase in economic activity. Indeed, it is widely recognised that most corporations are more willing to invest in periods of rapid growth than during downturns, justifying investment procyclicality.

Finally, the rise in financial receipts may restrict real investment insofar as non-financial corporations will probably use this income to make further investments in financial assets rather than investing in real activities (the “crowding out” effect). Moreover, the rise in financial payments also constrains real investment by non-financial corporations as it reduces the funds available for financing.

4. DATA AND METHODOLOGY: THE ECONOMETRIC FRAMEWORK

4.1. DATA

We collect annual data from 1979 to 2013 in order to analyse the relationship between financialisation and real investment in Portugal. Data on all variables are available for this period and frequency and are suitable for the study for two reasons. Financialisation became more preponderant in Portugal during the 1990s (Lagoa *et al.*, 2013) and we therefore cover periods of both stable and increasing financialisation; and annual data is a suitable frequency to capture the determinants of investment that is a medium- to long-term decision.

Turning now to the definition of variables, investment rate is measured by the gross fixed capital formation of non-financial corporations divided by the respective gross value added. Gross operating surplus¹ of non-financial corporations divided by the respective gross value added (usually referred to as profit share) is a proxy of profitability. Financial receipts correspond to the sum of interest and dividends and similar payments² received by non-financial corporations divided by the gross value added of those corporations. Financial payments correspond to the sum of corporations' interest payments and distributed income (including dividends) by non-financial corporations divided by their gross value added.

Gross fixed capital formation, gross value added, gross operating surplus, financial receipts and financial payments of non-financial corporations were collected from the Portuguese National Accounts (at current prices and in millions of euros) of *Instituto Nacional de Estatística*.

In order to measure the level of current debt, we use the stock of banking credit to non-financial corporations, available at the Bank of Portugal, divided by the respective gross value added. The total level of debt of non-financial corporations is not available for the entire sample period.

We use the real interest rate (deflated by the GDP deflator) from AMECO database to measure the cost of capital of non-financial corporations. The short-term real interest rate is used between 1977 and 1984 and the long-term real interest rate, which only became available in 1985³, is used in the following years. We opt in favour of this strategy instead of using only

¹ According to the Eurostat, "gross operating surplus can be defined in the context of national accounts as a balancing item in the generation of income account representing the excess amount of money generated by incorporated enterprises' operating activities after paying labour input costs. In other words, it is the capital available to financial and non-financial corporations which allows them to repay their creditors, to pay taxes and eventually to finance all or part of their investment".

² Similar payments to capital owners include withdrawals from the income of quasi-corporations (amounts that entrepreneurs withdraw for their own use from the profits earned by the quasi-corporations belonging to them).

³ According to the AMECO database, the real interest rates are obtained from the difference between the nominal interest rates and the inflation rate measured by the GDP deflator. The short-term interest rates correspond to the interest rates on 6-month deposits and the long-term interest rates correspond to the **weighted** average of public and private bonds over five years.

the short-term real interest rate, because investment is a long-term decision and is therefore more affected by long-term interest rates.

As usual, we use the annual growth rate of gross domestic product to describe the evolution of output growth. This variable was collected from the PORDATA database⁴ (at current prices and in millions of euros) and it was deflated using the GDP deflator (2006=100), also available on the same database.

Table A1 and Table A2 in the Appendix contain the descriptive statistics of the data and present the correlation matrix between variables, respectively. As preliminary evidence on the hypotheses under study, note that financial receipts and financial payments are negatively related with investment. Additionally, it should be noted that the absolute values of all correlation coefficients are lower than 0.8, which is crucial to exclude the existence of severe multicollinearity between the variables (Studenmund, 2005). In addition, the Variance Inflation Factor (VIF) of each variable is smaller than the traditional ceiling of 10 (Table A3 in the Appendix), which is further indication of the inexistence of multicollinearity (Kutner *et al.*, 2004).

4.2. METHODOLOGY

The previous papers studying the impact of financialisation on aggregate investment use PAM and the ARDL Models (Stockhammer, 2004), OLS (Orhangazi, 2008a), or ECM (van Treeck, 2008; and Onaran *et al.*, 2011). In contrast, we use a Vector Autoregressive Model (VAR/VECM) methodology that assumes that all variables are endogenous, which is appropriate for the set of variables under study, and it enables to examine the dynamic reaction of all variables to shocks. If the variables are cointegrated, we can use a VECM to distinguish the short-term and long-term effects of financialisation.

Our methodology involves five stages. First, we carry out unit root tests applying the conventional augmented Dickey and Fuller (1979) (ADF) test and the Phillips and Perron (1998) (PP) test. If all variables are integrated of order one, we use the Johansen (1991 and 1995) test to ascertain whether they are cointegrated – the second stage.

Thirdly, if variables are stationary in levels or integrated of order one but not cointegrated, we estimate the model using a VAR; but if variables are integrated of order one and cointegrated, we use a VECM⁵. A VAR model treats all variables as endogenous and function of the lagged values of all variables in the system. Mathematically, a VAR model with k variables can be represented by:

⁴Please see <http://www.pordata.pt/>.

⁵ Note that if variables are non-stationary but not cointegrated, we should also use a VAR model with differentiated variables.

$$y_t = A_1 y_{t-1} + \dots + A_p y_{t-p} + \mu + u_t \quad (3)$$

, where y_t is a k vector of variables, A_i is a matrix of coefficients to be estimated, p is the number of lags, μ is a vector of k constants and u_t is a vector of k innovations that may be contemporaneously correlated but are uncorrelated with all of the right-hand side variables (u_t is a white noise process). A VECM is a restricted VAR for cointegrated non-stationary variables, which can be written as

$$\Delta y_t = \Pi y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta y_{t-i} + \mu + u_t \quad (4)$$

This model allows the dynamic relationship between variables to be modelled using their differences but imposes an adjustment to the long-term equilibrium. Here, Π and Γ are the matrices containing the long and short-term information, respectively, such that:

$$\Pi = \sum_{i=1}^p A_i - I \quad (5)$$

$$\Gamma_i = - \sum_{j=i+1}^p A_j \quad (6)$$

The long-term matrix Π can also be written as $\Pi = \alpha\beta'$, where α measures the speed of adjustment of the variables towards the equilibrium and β is the matrix of long-term coefficients or the cointegration matrix.

Diagnostic tests are conducted in the fourth stage to assess the adequacy of our results, notably the autocorrelation LM test, the Ramsey's RESET test, the normality test, the heteroscedasticity test and the stability test. We also perform the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMSQ) tests to assess the existence of structural breaks.

The final step is to analyse the different dimensions of the results of our model. More specifically, we run Granger (1969) causality tests (the fifth stage), which allow us to determine whether the current value of a certain variable can be predicted the past values of the other variables. As a complement to the causality analysis, we study the impulse response functions (IRFs) in order to determine the short and long-term effect in the endogenous variables of an isolated shock on one of them.

5. EMPIRICAL RESULTS AND DISCUSSION

The graphs of variables (Figure A1 to Figure A7 in the Appendix) suggest that all variables are non-stationary in levels. Employing the ADF and the PP tests in levels and in first differences (Table 1)⁶, we conclude that all variables are integrated of order one except for the cost of capital that is stationary in levels according with the PP test, but is non-stationary by the ADF test⁷. However, we assume that the cost of capital has a unit root because the ADF test is more suitable for finite samples (Davidson and MacKinnon, 1999).

[Table 1 around here]

The next step is to determine the optimal lag length of the unrestricted VAR in levels (Table 2). We assume a maximum lag of two because we have a small sample, the data is annual, and the VAR does not satisfy the stability condition for a larger number of lags as at least one root of the characteristic polynomial is outside the unit circle (Lütkepohl, 1991)⁸. The optimal lag number is two by the FPE and AIC criteria, which are preferable in small samples (sixty observations and below) – Liew, 2004.

[Table 2 around here]

Then, we apply the Johansen (1991 and 1995) methodology to determine the existence of cointegration between the variables. We perform the Johansen test for all five standard assumptions regarding the deterministic trend and make our decision based on information criteria (Table 3). The optimal deterministic trend specification depends on the information criteria used; this may be due to the small sample size. The SC criteria selects the deterministic component where level data have no deterministic trend and the cointegrating equation has intercept – the second model (we use a 1% significance level). This is also the most sensible result because there is no significant trend in the levels of some variables (Figure A1 to Figure A7 in the Appendix). Assuming the second model for the deterministic trend and one lag for the model in first differences, the Trace test and the Maximum Eigenvalue test indicate one cointegration equation (see also Table 4).

[Table 3 around here]

[Table 4 around here]

⁶ PP test' results are available upon request.

⁷Unless otherwise stated, empirical results were obtained with Eviews software.

⁸ Result available upon request.

Hence, we estimate a VECM considering one cointegrating vector, the second model for the deterministic trend, and one lag. After, we analyse five diagnostic tests (Table 5). The model's residuals are uncorrelated and homoscedastic, and there is no misspecification by the Ramsey's RESET test. We do not reject the null hypothesis that the residuals are normally distributed using a significance level of 1%, but we reject it for higher significance levels. This is not considered very serious because the central limit theorem guarantees the normality of residuals as our sample has more than thirty observations. Moreover, Hendry and Juselius (2000) recognise that the normality assumption is seldom satisfied in economic applications, which does not invalidate the global robustness of models or the statistical inference.

[Table 5 around here]

The model is stable because it has six eigenvalues equal to unity, one less than the number of variables (Lütkepohl and Krätzig, 2004)⁹. Finally, the plots of the CUSUM and CUSUMSQ tests (Figure A8 in the Appendix) indicate that the coefficients are stable over time and thus confirm the absence of structural breaks. In short, the estimated VECM is well specified.

We choose investment as the dependent variable of the long-term equation given our interest in estimating an investment equation. The long-term relationship is shown in Table 6 and the short-term model is presented in Table 8. Note that we include an exogenous dummy variable for the year 1984 (D_{1984}) in the latter model in order to capture the strong fall of the investment rate in 1984 due to the intervention of the International Monetary Fund (IMF) in Portugal.

[Table 6 around here]

All variables are statistically significant in the long-term equation, with the exception of financial receipts; nonetheless, they exert a negative impact on investment rate, confirming partially the claim of the literature on financialisation. Financial payments are also a negative determinant of investment in the long-term: a 1 pp increase in this variable decreases investment by around 0.5 pp.

Turning now to the control variables, profitability negatively influences investment in the long-term: a 1 pp increase in profitability decreases investment by 0.8 pp. This confirms the “profit without investment” assumption described above. Debt has a small positive influence on investment: a 1 pp rise in this variable increases investment by around 0.08 pp.. This occurs

⁹Result available upon request.

probably because debt permits corporations with limited equity and internal means of finance to undertake investment through credit. Also as expected, the cost of capital exerts a negative impact on real investment: a 1 pp increase in this cost reduces investment by about 0.4 pp.

In contrast, output growth affects positively firms' investment: a 1 pp increase in economic activity raises investment by around 1.3 pp, which shows that investors are more willing to invest when economic growth increases and confirms that investment is procyclical. This is also in line with the acceleration principle as the coefficient of output growth is larger than one.

[Table 7 around here]

Table 7 presents the estimates for the error correction terms, which measure the adjustment of variables to the long-term equilibrium. The most important finding is that the coefficient of investment is statistically significant at a 1% level (the variable is not weakly exogenous) and exhibits a negative value; it confirms that this variable contributes to the convergence to the long-term equilibrium and it is therefore reasonable to be the endogenous variable. The coefficient of investment indicates that 22.5% of the deviation from the long-term equilibrium in one period is automatically corrected in the next period. Moreover, the error correction terms of cost of capital and financial payments are also statistically significant, and their reaction to the long-term relationship helps correct a possible disequilibrium, given the negative values of their error correction terms. Furthermore, output growth and financial receipts also contribute to the correction of a disequilibrium in the long-term relationship, although their error correction terms are not statistically significant.

There are only two variables which are statistically significant in explaining real investment in the short-term: lagged investment and profitability (Table 8). Lagged investment is a relevant determinant of the contemporaneous investment, which demonstrates the level of persistence and inertia of this macroeconomic variable. Profitability has a positive influence on investment in the short-term, contrary to the negative influence in the long-term. The dummy variable for the year 1984 is also statistically significant and negative, proving that other factors not controlled in the model contributed to the strong decline in the investment rate in this year (we suggest it was the IMF's intervention in the country). The non-significance of the financial revenues and financial receipts in the short-term and its significance in the long-run indicates, as expected, that the effect of financialisation is stronger in the long-run.

Given, the error-correction nature of the model, financial payments affect the evolution of investment when there is a disequilibrium in the long-run relationship. For instance, whenever financial payments are too high for the level of investment in the economy, investment decreases.

[Table 8 around here]

Still regarding the short-run dynamics, it is possible to conduct Granger causality tests to gauge how past changes in one variable (with all other variables constant) affect investment. In our model, the causality test is similar to the analysis of the short-run coefficients, because the model only has one lag. Therefore, we confirm that profitability is the only variable that causes investment (Table 9), while financial receipts almost cause investment.

[Table 9 around here]

Thus far we have made a *ceteris paribus* analysis, but now we study how an unanticipated shock in one variable affects investment dynamically, making use of the IRFs. These functions simulate how the economy will react in period t and in the future to a shock in one variable in t allowing all the variables to react (with the short-term and long-term relations operating).

The ordering of variables (i.e. the choice of variables that react in the same year to shocks in other variables) could change the profile of the IRFs (Enders, 2003; and Lütkepohl and Krätzig, 2004). Therefore, we use the generalised IRFs proposed by Koop *et al.* (1996) and Pesaran and Shin (1998), which does not require the ordering of variables, and thus avoids ambiguity arising from the choice of a specific ordering.

The results show that investment responds negatively to a shock in financial receipts, confirming the formulated hypothesis (Figure 1). This reveals that corporations do not use financial income to finance productive investment, but they probably re-invest it in financial activities.

On the other hand, the response of investment to a shock in financial payments is negative and pronounced, thus reinforcing the argument that pressures for financial payments decrease investment. Therefore, both channels of financialisation have a disruptive dynamic effect on investment, but the negative effect of the channel of financial payments is more vigorous. Note that this conclusion is in line with the long-run equation, but it is contradictory to the Granger causality analysis. This inconsistency can be explained by the fact that Granger causality is only a partial analysis that looks at the short-run effect and with a *ceteris paribus* assumption, whereas the IRFs assume a more general approach that encompasses both the short and long run effects in a dynamic setting.

The level of debt has a negative dynamic effect on investment. Although an increase in debt has, *ceteris paribus*, a positive long-run effect on investment as proved above, when the other variables change, that effect becomes negative. Indeed, a shock in debt produces a

negative dynamic effect on profitability and output growth¹⁰, thus leading to a decrease in investment. This effect is probably explained because indebtedness, which has grown from the 1990s onwards, limits the capacity of non-financial corporations to obtain more credit and equity. In the same vein, this suggests that credit is being used to repay existing credits rather than to make real investments. The unanticipated changes in the remaining variables have the expected impacts on investment.

[Figure 1 around here]

We now move on to check robustness¹¹. To begin with, it is worth noting that the results would not have changed considerably if, as proposed by the AIC criteria in the Johansen test, we had chosen the fourth model (the level data and the cointegration equations have linear trends) – Table 3. The results remain very similar in the long-term except for the variables debt and financial receipts. On the one hand, debt becomes negatively related with real investment, and, on the other hand, financial receipts become statistically significant, but maintain a negative influence on real investment. The short term results and the profile of the generalised IRFs are also quite similar.

In addition, we now use the short-term real interest rate to measure the cost of capital, instead of using a combination of both the short-term and long-term real interest rate as above. However, the short-term real interest rate is stationary in levels (both by the ADF test and the PP test), which prevents the use of a VECM. As an alternative, we apply the ARDL model presented by Pesaran (1997), Pesaran and Shin (1999) and Pesaran *et al.* (2001); this is appropriate when there is a mixture of variables that are integrated of order zero and one. Applying this methodology, we conclude that the variables are cointegrated and statistically significant in the long-term, except precisely the cost of capital. The level of profitability, financial receipts and financial payments continue to negatively influence the investment rate, while the level of debt and output growth continue to exert a positive influence. In the short-term, there are only three statistically significant variables and with positive signs: lagged investment, level of debt and output growth. The error correction term of investment also maintains its negative sign and is statistically significant; this confirms the existence of convergence to the long-term equilibrium.

One limitation of our paper is the small sample. Given the specificity of data needed, it is not uncommon for papers to use samples of a similar length (see for example van Treeck, 2008). The Johansen cointegration test is an asymptotic likelihood ratio test, which in small samples is less reliable (see for example: Cheung and Lai, 1993; and Johansen, 2002).

¹⁰These IRF are available upon request.

¹¹All these results are available upon request.

Therefore, our results should be read with caution. However, the fact we are able to reproduce them with the ARDL model, which has better behaviour in small samples (Pesaran, 1997), shows they are not strongly affected by our sample size.

6. CONCLUSION

The aim of this paper was to analyse whether financialisation supported or disrupted the real investment of non-financial corporations in Portugal between 1979 and 2013, using aggregate macroeconomic annual data. As opposed to conventional economic theory, the literature on financialisation indicates two ways in which the growth of finance reduces real investment. On one hand, the increase in financial investments by non-financial corporations deviates funds from productive investment. On the other hand, the pressure exerted by financial markets on non-financial corporations to raise financial payments also decreases the available funds for financing real investments. In this context, we estimated an investment equation using two independent variables to reflect the two channels of financialisation (financial receipts and financial payments), in addition to the usual explanatory variables (profitability, debt, cost of capital, and output growth).

Having found cointegration between the variables, we estimated a VECM that allows us to distinguish between short-term and long-term effects on investment. Then, we are able to identify that financial payments exert a negative impact on real investment in the long-term, whereas financial receipts do not have a statistical significant effect. Investment also reacts to deviations from the long-term relationship that depend on the variables capturing financialisation. In the short-term, the lagged changes in financial receipts and financial payments do not seem to have a statistically significant effect on investment, indicating that their effect is felt most in the long-run.

In addition, the profile of the IRFs (that combine the short and long-term responses) illustrates that financial receipts and financial payments have a negative impact on real investment, but this effect is more pronounced for the latter variable. Other important findings are related with the variables of profitability and debt. Profitability is negatively related with the real investment in the long-term, suggesting that the puzzle of “profit without investment” also occurred in Portugal. In turn, debt has a negative dynamic impact on investment, which may indicate that the indebtedness of non-financial corporations limits their ability to obtain more funding to support real investments in a context where new debts are used to repay existing ones.

Our findings show that the negative effects of financialisation on real investment are not an exclusive phenomenon of the most developed and financialised economies, like the USA and

UK, but also occur in smaller, less developed, less financialised and more peripheral economies like Portugal.

Future research should analyse the statistical relevance of these two channels using corporation-level data in order to identify the heterogeneity in the behaviour of non-financial corporations by sector, industry and size, as in Orhangazi (2008b). An alternative line of research would be to investigate the determinants of financialisation, following the approach of Akkemik and Özen (2014) and Soener (2015). A further extension of this work would be to evaluate the impact of financialisation on the other components of aggregate demand, namely on consumption and external demand, as in Onaran *et al.* (2011).

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8. APPENDIX

[Table A1 around here]

[Table A2 around here]

[Table A3 around here]

[Figure A1 around here]

[Figure A2 around here]

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Table 1 – *P-values* of the ADF unit root test

Variable	Level			First Difference		
	<i>Intercept</i>	<i>Trend and Intercept</i>	<i>None</i>	<i>Intercept</i>	<i>Trend and Intercept</i>	<i>None</i>
<i>I</i>	0.005	0.019	0.320*	0.003	0.019	0.000*
<i>P</i>	0.180*	0.437	0.796	0.005	0.020	0.000*
<i>D</i>	0.284*	0.454	0.438	0.094	0.193	0.009*
<i>CC</i>	0.144*	0.280	0.203	0.000	0.000	0.000*
<i>OG</i>	0.085	0.118*	0.015	0.000	0.000	0.000*
<i>FR</i>	0.148	0.185*	0.606	0.001	0.007	0.000*
<i>FP</i>	0.137*	0.215	0.345	0.002	0.008	0.000*

Note: The lag lengths were selected automatically based on the AIC criteria and * indicates the exogenous variables included in the test according to the AIC criteria

Table 2 – Values of the information criteria by lag

Lag	LR	FPE	AIC	SC	HQ
0	n.a.	1.6e-20	-25.7	-25.4	-25.6
1	290.9	3.0e-24	-34.4	-31.8*	-33.5
2	74.9*	1.4e-24*	-35.6*	-30.8	-34.0*

Note: * indicates the optimal lag order selected by the respective criteria

Table 3 – Number of cointegration relations by type of model specification (at 1% significance level)

Data trend (Test Type)	None (No intercept No trend)	None (Intercept No trend)	Linear (Intercept No trend)	Linear (Intercept Trend)	Quadratic (Intercept Trend)
Trace test	1	1	1	2	3
Maximum Eigenvalue test	1	1	1	1	1

Note: We use only one lag to run this test, because the test is done using the first differences of the variables

Table 4 – The Johansen cointegration test

Cointegration relations	Eigenvalue	Trace statistic	Maximum Eigenvalue statistic
None	0.830	170.604***	58.399***
At most 1	0.714	112.205**	41.261**
At most 2	0.542	70.944	25.773
At most 3	0.456	45.171	20.075

Note: *** indicate statistical significance at 1% level and ** indicates statistical significance at 5% level

Table 5 – Diagnostic tests for VECM estimations

Test	F-statistic	P-value
Autocorrelation test (up to one lag)	45.960	0.597
Ramsey's RESET test	0.006	0.940
Normality test (Jarque-Bera)	26.517	0.022
Heteroscedasticity test	1.846	0.184
Stability (AR root) test	Six eigenvalues	

Note: The Ramsey's RESET test and the heteroscedasticity test were performed in Microfit software

Table 6 – The long-term estimations of investment

Variable	P_t	D_t	CC_t	OG_t	FR_t	FP_t	β_0
I_t	-0.823*** (0.161) [5.112]	0.076*** (0.010) [-7.646]	-0.363** (0.173) [2.095]	1.320*** (0.168) [-7.838]	-0.110 (0.173) [0.637]	-0.519*** (0.064) [8.086]	0.571*** (0.066) [-8.674]

Sample: 1981-2013 (33 observations)

Note: Standard errors in (), t-statistics in [], *** indicate statistical significance at 1% level, ** indicates statistical significance at 1% level and * indicates statistical significance at 5% level

Table 7 – Error correction term estimations

Variable	ΔI_t	ΔP_t	ΔD_t	ΔCC_t	ΔOG_t	ΔFR_t	ΔFP_t
Error Correction Term	-0.225*** (0.070) [-3.236]	0.166 (0.126) [1.320]	-0.463 (0.318) [-1.457]	-0.434** (0.187) [-2.318]	0.144 (0.133) [1.080]	-0.129 (0.084) [-1.537]	-0.761*** (0.219) [-3.483]
Test Weak Exogeneity	10.659 [0.001]	1.819 [0.177]	2.287 [0.130]	5.972 [0.015]	1.379 [0.240]	2.654 [0.103]	10.344 [0.001]

Note: Δ is the operator of the first differences, standard errors in (), t-statistics or p-value in [], *** indicate statistical significance at 1% level and ** indicates statistical significance at 5% level

Table 8 – The short-term dynamic

Variable	ΔI_{t-1}	ΔP_{t-1}	ΔD_{t-1}	ΔCC_{t-1}	ΔOG_{t-1}	ΔFR_{t-1}	ΔFP_{t-1}	D_{1984}
ΔI_t	0.431*** (0.085) [5.080]	0.701*** (0.141) [4.983]	0.003 (0.027) [0.123]	-0.015 (0.075) [-0.200]	0.091 (0.106) [0.861]	0.225 (0.172) [1.312]	0.017 (0.069) [0.249]	-0.089*** (0.011) [-7.942]

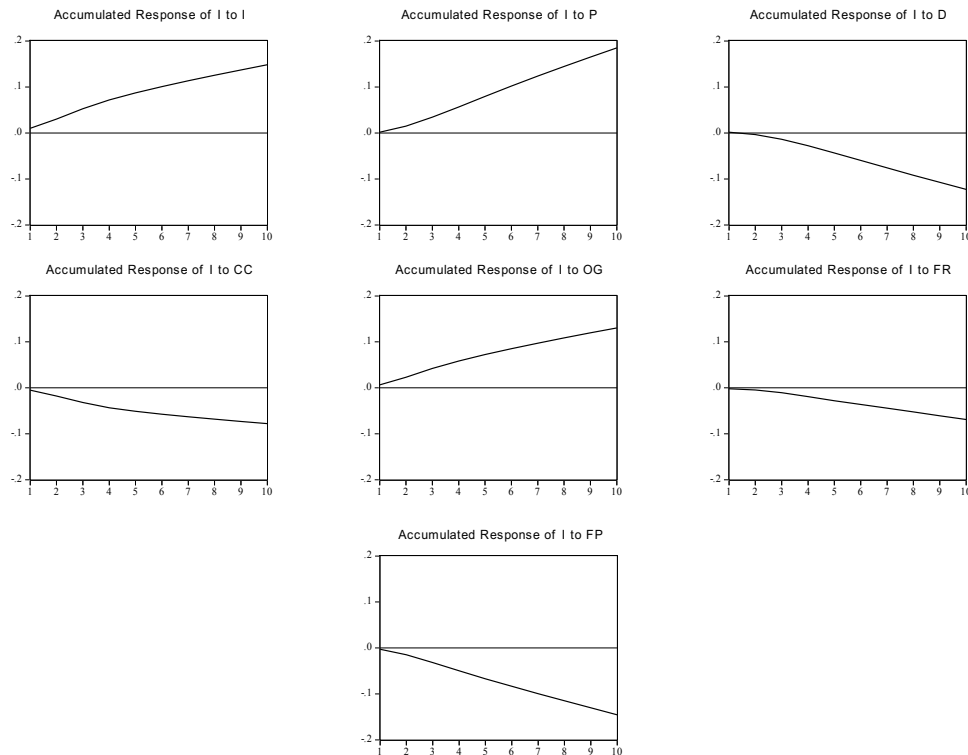
Sample: 1981-2013 (33 obs.); $R^2 = 0.870$; $R^2_{adjusted} = 0.827$; $F\text{-statistic} = 20.095$; $\text{Log Likelihood} = 110.386$

Note: Δ is the operator of the first differences, standard errors in (), t-statistics in [] and *** indicates statistical significance at 1% level

Table 9 – Granger causality tests

Null hypothesis	Chi-square	P-value
$\Delta P_t \rightarrow \Delta I_t$	24.819	0.000
$\Delta D_t \rightarrow \Delta I_t$	0.015	0.902
$\Delta CC_t \rightarrow \Delta I_t$	0.040	0.842
$\Delta OG_t \rightarrow \Delta I_t$	0.741	0.389
$\Delta FR_t \rightarrow \Delta I_t$	1.720	0.190
$\Delta FP_t \rightarrow \Delta I_t$	0.062	0.804

Note: The sign “ \rightarrow ” means that the variable on the left of the sign does not Granger cause the variable on the right, and Δ is the operator of the first differences

Figure 1 – Generalised impulse response functions (accumulated response to one s.d. innovations)

8. APPENDIX

Table A1 – Descriptive statistics of the data

	<i>I</i>	<i>P</i>	<i>D</i>	<i>CC</i>	<i>OG</i>	<i>FR</i>	<i>FP</i>
Observations	35	35	35	35	35	35	35
Mean	0.256	0.358	1.199	0.023	0.023	0.065	0.245
Median	0.259	0.373	1.337	0.023	0.022	0.057	0.232
Maximum	0.311	0.405	1.757	0.109	0.079	0.121	0.465
Minimum	0.189	0.236	0.696	-0.062	-0.032	0.033	0.154
Standard Deviation	0.036	0.044	0.356	0.035	0.028	0.023	0.081
Skewness	-0.245	-1.359	-0.184	0.045	0.108	0.839	1.186
Kurtosis	1.778	3.765	1.461	3.731	2.552	3.029	3.838

Table A2 – The correlation matrix between variables

	<i>I</i>	<i>P</i>	<i>D</i>	<i>CC</i>	<i>OG</i>	<i>FR</i>	<i>FP</i>
<i>I</i>	1						
<i>P</i>	-0.284*	1					
<i>D</i>	0.165	-0.500***	1				
<i>CC</i>	-0.568***	0.546***	-0.192	1			
<i>OG</i>	0.440***	0.087	-0.563***	-0.262	1		
<i>FR</i>	-0.330*	0.299*	0.195	0.521***	-0.440***	1	
<i>FP</i>	-0.058	-0.762***	0.446***	-0.235	-0.297*	-0.054	1

Note: *** indicates statistical significance at 1% level, ** indicates statistical significance at 5% level and * indicates statistical significance at 10% level

Table A3 – The diagnostic for multicollinearity

Dependent Variable	$R^2_{adjusted}$	Tolerance Value	VIF
<i>I</i>	0.464	0.536	1.866
<i>P</i>	0.720	0.280	3.571
<i>D</i>	0.564	0.436	2.294
<i>CC</i>	0.464	0.536	1.866
<i>OG</i>	0.556	0.444	2.252
<i>FR</i>	0.300	0.700	1.429
<i>FP</i>	0.611	0.389	2.571

Figure A1 – The plot of investment (% of gross value added)

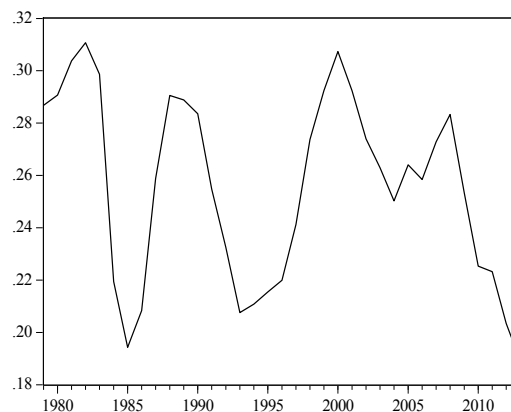


Figure A2 – The plot of profitability (% of gross value added)



Figure A3 – The plot of debt (% of gross value added)

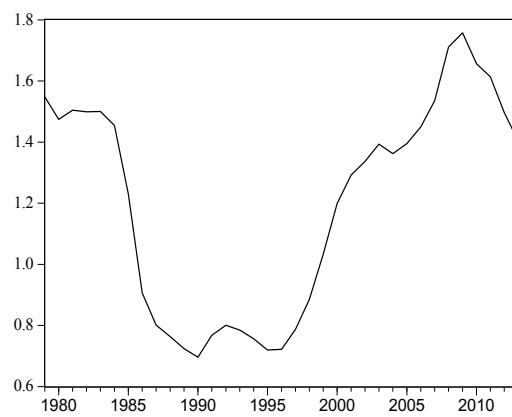


Figure A4 – The plot of cost of capital (%)

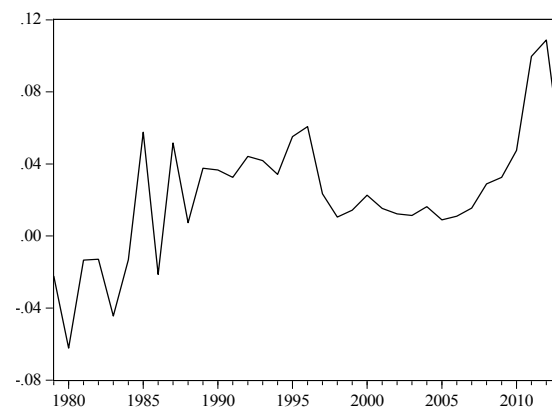


Figure A5 – The plot of output growth (annual growth rate)



Figure A6 – The plot of financial receipts (% of gross value added)

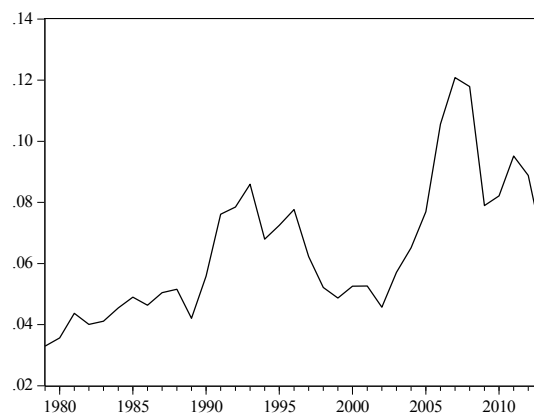


Figure A7 – The plot of financial payments (% of gross value added)

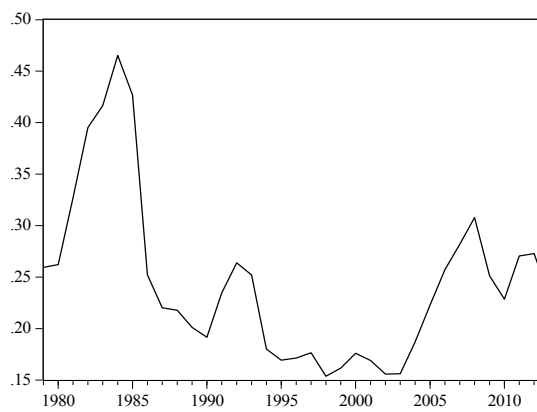
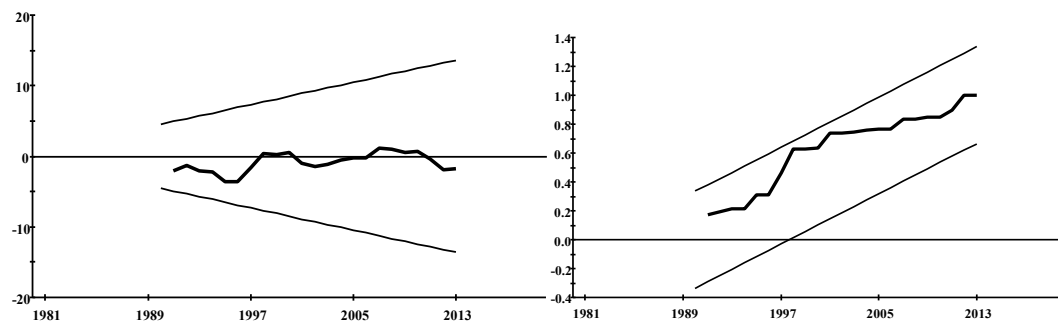


Figure A8 – CUSUM and CUSUMQ tests

The plot of cumulative sum of recursive residuals

The plot of cumulative sum of squares of recursive residuals



Note: The straight lines represent critical bounds at 5% significance level and were obtained in Microfit software