# Financialisation, financial development, and investment: evidence from European non-financial corporations

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***Abstract***: This article provides estimations of the effects of different financial channels on physical investment in Europe using the balance-sheets of publicly listed non-financial corporations (NFCs) for the period 1995-2015. The evidence suggests that both financial payments and financial income has an adverse effect on investment in fixed assets. The negative impacts of increasing financial income are non-linear with respect to companies' size: they crowd-out investment in large companies, and have a positive effect on the investment of relatively smaller companies. Similar to the recent literature on finance-growth nexus, we find an inverted U-shaped relationship between financial development and companies' investment. However, in contrast to the conventional literature, we also find that a higher degree of financial development in the country is associated with a stronger negative effect of financial income on investment.

***Keywords****:* financialisation, financial development, non-financial corporations, fixed investment, Europe

***JEL codes****:* C23, G31, D21

## 1. Introduction

The impact of financial markets on investment is an empirically contested area of research. Several prominent contributions assert that financial markets facilitate the financing and the efficient allocation of investment (King and Levine, 1993; Gilchrist and Himmelberg, 1995; Beck *et al*., 2000; Love, 2003; Levine, 2005). In particluar, these studies try to test the strenght of this relationship by employing an index of financial development that aims at capturing the level of development of both intermediaries and financial markets (see Demirgüc-Kunt and Levine, 1996; Beck *et al*., 2010). However, Arestis and Demetriades (1997) warn against the robustness of these results, which do not take into account institutional peculiarities. Moreover, the effect of stock market development on growth is found to be weaker than that of the banking sector (Arestis *et al*., 2001). Recently after the 2007-2008 crisis, the impact of the disproportionate growth of the financial system has been widely questioned (see among others Cecchetti and Kharroubi, 2012; Beck *et al*., 2014; Law and Singh, 2014; Arcand *et al*., 2015). In particular, Law and Singh (2014) and Arcand *et al*. (2015) argue that there is a 'threshold effect' in the relationship between the growth of financial activities and macroeconomic growth; thus the expansion of the financial system is beneficial to growth only up to a point (e.g. the ratio of the financial sector to GDP should not exceed 100 per cent). Cournède *et al*. (2015) in an OECD study and Sahay *et al*. (2015) in an IMF note argue that further financial development in the advanced economies is likely to increase both economic and financial instability.

In the analysis of investment and financial development, non-financial companies' financial activities are not directly taken into account. Back in the 1950s, Robinson (1952:86) stated that "where enterprise leads finance follows", describing a financial system that was merely supporting trajectories already planned by the real economy. In contrast, recent structural changes mark the growing prominence of the 'financial motives' over the traditional purposes of the firm related to investment in fixed assets related to their core activities (Epstein, 2005). Instead of being just a vehicle for more efficient production plans, in the recent decades financial activities have grown more than the financing requirements of the rest of the economy (Krippner, 2005). This new configuration raises the question of how this change affected the investment decisions in the non-financial sector.

The 'financialisation' of the economy is summarized as an ongoing and self-reinforcing economic and social process that manifests itself in the growing prominence and influence of behaviours derived from the financial sector (Epstein, 2005; Carruthers, 2015).

Following van der Zwan (2014), we highlight three main features of this process: a) a new regime of accumulation largely shaped around financial motives, b) the consolidation of the 'shareholder value' as the key principle in corporate governance, and c) the dissemination of practices linked to finance within everyday life (pension schemes, mortgages provision, healthcare etc.). This article aims at contributing to the understanding of the impact of the first two aspects of financialisation on the investment of non-financial corporations (henceforth NFCs).

Since the 1980s, there has been a slow down in investment and growth along with a rise in the interest and dividend payments of the non-financial corporations in advanced economies (Stockhammer, 2004; 2006). Consequently, companies experienced a significant reduction in available internal funds for physical investments. Despite an expanding theoretical literature on the effects of this phenomenon, the empirical evidence is predominantly relegated to a macroeconomic perspective, especially in the case of the impact of financialisation on investment. The origins of the theoretical microeconomic analysis of the relationship between finance and investment can be traced back to the works of Fazzari and Mott (1986) and Ndikumana (1999). Tomaskovic-Devey *et al.* (2015) provide evidence about the negative effect of increased financial investment by non-financial firms on total value added and hence economic growth. Alvarez (2015) focuses on the relationship between financialisation and functional income distribution in the context of French corporations using firm-level data. Akkemik and Özen (2013) analyse the effects of institutional context at the national level on the financialization of Turkish firms, finding that macroeconomic uncertainty has been a key driver of this process. In a similar vein, Soener (2015) identifies the drivers of US firms' financialization at the indutry level, arguing that the specific organizational features of firms can influence their 'likelihood of financializing'. Baud and Durand (2012) analyze financialization at the industry level, in particular highlighting the role of internationalization and financial operations by leading international retailers. To the best of our knowledge, only Orhangazi (2008), Demir (2009), Tori and

Onaran (2018), and Davis (2018) analyse directly the effects of financialisation on investment at the firm level from a microeconomic perspective.

This paper has two novelties. First, it explores the interactions between increasing financial development (henceforth FD, defined conventionally as the financial markets and intermediaries activities in the country) and the effect of financial income and payments on NFCs' investment. Second, it provides the first micro-econometric evidence for a large sample of European NFCs on the effects of increasing financialisation on investment using firm level balance sheet data from Worldscope database. This particular database allows us to build a consistent measure for companies' financialisation regarding both inflows and outflows.

The remainder of the paper is organized as follows. Section 2 discusses the key theoretical and empirical contributions in the literature. Section 3 presents the alternative specifications of the investment functions to be estimated. Section 4 discusses the data and the stylized facts of our sample. Section 5 presents the estimation methodology. Section 6 discusses our estimation results. Section 7 concludes.

## 2. Investment, Liquidity, and Financial Motives

In the earlier 'accelerator investment models' (e.g. Kuh and Meyer, 1955; Evans, 1967) firms' capital expenditure was almost entirely modelled as a function of expected profitability measured by sales. In contrast, the early neoclassical approach modelled the firm's investment decision as a static maximization problem of discounted flows of profits over an infinite time horizon (Jorgenson, 1963; 1971). As an alternative, investment models based on the maximization of the expected cash flows (or market value) in the presence of adjustment costs and expectations, which take the dynamic process explicitly into account, have been proposed (Chirinko, 1993). Within this group, the so-called 'Q model' of Brainard and Tobin (1968), which models investment using the Tobin's Q variable, defined as the ratio of the firm's stock market valuation to its capital replacement cost, has been widely used. However, firm-level empirical analysis has failed to provide evidence of a strong explanatory power of the Q variable (Hayashi and Inoue, 1991; Bond *et al*., 1992). Explanations of this finding focused on the bias of the stock market evaluation due to asymmetric information (Stiglitz and Weiss, 1981) and periodic 'financial bubbles' (Bond and Cummins, 2001; Bond

*et al*., 2004). But more importantly, as argued by Hubbard (1998), the source of financing matter for investment. Empirical evidence shows that cash-flows, i.e. internal funds, are important determinants of investment (Fazzari *et al*., 1988; Blundell *et al*., 1992; Brown *et al*., 2009). Fazzari *et al*. (1988) shows that fluctuations in internal finance, as reflected by cash-flows, are statistically more important than the stock market evaluation in determining investment. Liquidity constraints play a crucial role (Fazzari and Petersen, 1993; Chirinko and Schaller, 1995). The effect of cash flow on investment is significantly positive and robust especially in the case of cash constrained firms (Denis and Sibilkov, 2010), whilst the effects of the stock market evaluation and debt are mixed (Bond and Meghir, 1994; Bond *et al*., 2003; Bloom *et al*., 2007). However, previous findings about the sensitivity of investment to financing contraints have been subject to debate.[1]

A strong strand in the investment literature argues that companies' financing issues mainly derive from different degrees of agency problems (see among others Whited, 1992), and the development of financial markets can relax these constraints (Love, 2003; Pawlina and Renneboog, 2005; Love and Zicchino, 2006; Guariglia and Carpenter, 2008). In particular, Beck *et al*. (2005) find that firms with higher financing obstacles exhibit slower growth, but this relationship is weaker in countries with relatively more developed financial systems, and FD is more effective in alleviating financing constraints especially for smaller firms. However, both the statistical significance and size of the estimates vary widely due to methodological heterogeneity (Valickova *et al*., 2015; Arestis *et al*., 2015).

In the last decades, the integration between the 'financial' and 'real' sides of the economy has increased substantially along with a rising influence of financial markets and financial motives on economic decisions (Epstein, 2005; Tomaskovic-Devey and Lin, 2011). However, the increasing involvement of the NFCs in finance-related activities is analysed primarily as a consequence of a change in the corporate governance (Lazonick and O'Sullivan, 2000). Tomaskovic-Devey *et al*. (2015), discuss the shift in management preferences caused by the rise in hostile take-overs, with the consequence of an alignment between pay structures and shareholders' interests. Knafo and Dutta (2016:771) explain how 'financialized management' and shareholder value have their origin in the US conglomerate movement in 1960s, in which financial markets were used "as a baseline for strategy, and the emphasis on financial transactions as an engine for growth." From the early

1980s onwards, there has been an increased orientation towards maximizing 'shareholder value' (Rappaport, 1999). Both the practices of distributing dividends and boosting share prices through share buyback operations has gained importance in this new era (De Ridder, 2009). Furthermore, firms find investing in reversible short-term financial assets as an attractive alternative to irreversible long-term fixed investment, and thereby the increased availability of financial assets may crowd out physical investment in core activities.[2]

Regarding the firm level effect of finance on investment, Fazzari and Mott (1986) model investment as a function of sales, internal finance, , and interest payments. In another microeconomic investment model, Ndikumana (1999) finds negative effects of both stock and flows of debt. Firm's indebtedness not only reduces the cash flow (via interest payments), but also affects the sustainability of investments. However, these studies do not model the impact of financial revenues, which is an important dimension of firms' current behavior.

To the best of our knowledge, only four empirical papers explicitly analyse the impact of different financial activities on investment from a microeconomic perspective.[3] Orhangazi (2008) has been the first to provide an econometric analysis of the effect of financialisation on the investment behaviour of the NFCs. He analyses a sample of US firms for the period of 1973-2003, and finds a significant and negative effect of financial payments on investment. With respect to the financial incomes, Orhangazi tests whether higher profits from financial activities drive a change in the priorities of the management, in which firms prefer short-term reversible financial investments rather than long-term fixed ones. Demir (2009) estimates investment as a function of the gap between the rates of return of fixed and financial assets for a sample of NFCs in Argentina, Mexico, and Turkey in the 1990s, and finds that increasing returns on financial assets reduces fixed investment of the industrial sector. Tori and Onaran (2018) focuses on the UK NFCs, finding negative effects of both financial payments and incomes on investment, which have been especially strong in the manufacturing sector and in the pre-2007 crisis period. Davis (2018), analyses US firms from 1971 to 2013, and find that while shareholder pressure has a negative effect on companies' investment, the accumulation of financial assets has on average a positive effect on accumulation.

Building on this literature, the next section describes the specifications of different models of investment, which take into account explicitly the effects of both financial income and payments on NFCs' investment, in the context of financial development. This paper aims at combining two strands of literature, namely the one focusing on firms' financing constraints and the one focusing on the non-operating activities of non-financial firms.

## 3. The Specifications of the model

Investment is an intrinsically dynamic process (Bond and Meghir, 1994; Lopez and Mott, 1999), and there is a path dependency which link past and future levels of investment. Therefore, in line with the literature, our specification includes the lagged investment as an explanatory variable (Ford and Poret, 1991; Kopcke and Brauman, 2001; Orhangazi, 2008). Also all other explanatory variables are lagged in order to depict the 'adjustment processes'.

To capture the potential effects of two key financialisation channels, we start from a specification similar to Orhangazi (2008). Equation (1) presents our specification, where the rate of accumulation of capital (investment/capital), $I/K$, is:

$$\left(\frac{\boldsymbol{I}}{\boldsymbol{K}}\right)_{it} = \boldsymbol{\beta_0} + \sum_{j=1}^{2} \boldsymbol{\beta_1}\left(\frac{\boldsymbol{I}}{\boldsymbol{K}}\right)_{it-j} + \sum_{j=1}^{2} \boldsymbol{\beta_2}\left(\frac{\boldsymbol{\pi - CD}}{\boldsymbol{K}}\right)_{it-j} + \sum_{j=1}^{2} \boldsymbol{\beta_3}\left(\frac{\boldsymbol{S}}{\boldsymbol{K}}\right)_{it-j} + \sum_{j=1}^{2} \boldsymbol{\beta_4}\left(\frac{\boldsymbol{\pi_F}}{\boldsymbol{K}}\right)_{it-j} + \sum_{j=1}^{2} \boldsymbol{\beta_5}\left(\frac{\boldsymbol{F}}{\boldsymbol{K}}\right)_{it-j} + \sum_{j=1}^{2} \boldsymbol{\beta_6}\left(\frac{\boldsymbol{TD}}{\boldsymbol{TA}}\right)_{it-j} + \sum_{j=1}^{2} \boldsymbol{\beta_7}(\boldsymbol{Q})_{it-j} + \boldsymbol{\beta_t} + \boldsymbol{\varepsilon_{it}} \quad (1)$$

where $I$ is the addition to fixed assets, $K$ is the net capital stock, $S$ is net sales, $\pi$ is net operating income and $CD$ is cash dividends paid, $F$ is the sum of cash dividends and interest paid on debt, $\pi_F$ is the total non-operating (financial) income as the sum of interest and dividends received by the company, and $Q$ stands for Tobin's Q.[4] $i$ is the firm identifier, $\beta_t$ identifies a set of time-dummies to control for unobservable time-specific effects common to all firms in the different estimations, whilst the standard disturbance term $\varepsilon_{it}$ captures firm-specific fixed effects and idiosyncratic shocks. We also introduce total debt/total assets ratio $\left(\frac{TD}{TA}\right)$ to control for the additional effect of indebtedness on investment.

All variables are lagged to reflect the time consideration in the investment plans. The operating income minus dividends as a ratio to fixed assets is a measure of the profit rate

based on retained earnings. Dividend payments are deducted in order to reflect the availability of internal funds.[5] The sales/fixed assets ratio is a proxy reflecting capacity utilization[6]. Financial payments/fixed assets and non-operating income/fixed assets are the two measures of the impact of financialisation. Variable descriptions are in Table 1A in the appendix. We expect positive effects of the lagged investment, profit rate, and sales on investment. *F* reflects the financial outflows, while $\pi_F$ reflects the financial inflows. In the light of the microeconomic literature discussed above, the impact of total financial payments (or 'cash commitments') is expected to be negative. In this model cash dividends are conceived both as a reduction of available internal funds, and as reflecting behavioural changes due to the 'shareholder value orientation' (henceforth SVO) as suggested by Lazonick and O'Sullivan (2000). The composite measure for outward financialisation, *F,* is the sum of interest and dividend payments (as a ratio to *K*), capturing a) the liquidity effect of interest payments reflecting the effect of the increase in external means of financing, and b) the additional behavioural effect of the SVO. Not only do NFCs use part of their funds to pay interest and dividend to the financial sector, but they can also more than before pursue non-operating financial investment themselves, thus receiving financial income. We include the sum of interests and dividends received by the NFCs ($\pi_F$) as a ratio to *K* as an explanatory variable[7]. Theoretically, the sign of the effect of financial income on investment is ambiguous. On the one hand, these incomes may have a positive impact on investment in fixed assets by easing the liquidity constraint faced by firms. In particular, this can be the case for relatively smaller companies, which are more likely to experience liquidity restrictions compared to larger corporations. The heterogeneity in the levels of liquidity constraints with respect to firms' size has been widely confirmed in the literature (see Evans and Jovanovic, 1989; Fazzari *et al*., 1988; Chirinko, 1993). On the other hand, financialisation can also be detrimental to physical investment, since the NFCs will be attracted by short-term, reversible financial investment, instead of engaging in long-term, irreversible physical investment. In order to explore the potential different effect of financial payments in small vs. large companies, we estimate an extended version of specification (1) as

$$\left(\frac{I}{K}\right)_{it} = \beta_0 + \sum_{j=1}^{2} \beta_1 \left(\frac{I}{K}\right)_{it-j} + \sum_{j=1}^{2} \beta_2 \left(\frac{\pi - CD}{K}\right)_{it-j} + \sum_{j=1}^{2} \beta_{2.1} \left[\left(\frac{\pi - CD}{K}\right) * D_n\right]_{it-j} + \sum_{j=1}^{2} \beta_3 \left(\frac{S}{K}\right)_{it-j} +$$
$$+ \sum_{j=1}^{2} \beta_4 \left(\frac{\pi_F}{K}\right)_{it-j} + \sum_{j=1}^{2} \beta_{4.1} \left[\left(\frac{\pi_F}{K}\right) * D_n\right]_{it-j} + \sum_{j=1}^{2} \beta_5 \left(\frac{F}{K}\right)_{it-j} \quad (2)$$
$$+ \sum_{j=1}^{2} \beta_{5.1} \left[\left(\frac{F}{K}\right) * D_n\right]_{it-j} + \sum_{j=1}^{2} \beta_6 \left(\frac{TD}{TA}\right)_{it-j} + \sum_{j=1}^{2} \beta_7 (Q)_{it-j} + \beta_t + \varepsilon_{it}$$

where the dummy variable $D_n$ takes the value 1 if the average total assets of company *i* lies in the lower *n* percentile of the distribution, and takes the value 0 otherwise. In our estimations, this size-dummy is interacted with the financial income, as well as the other explanatory variables. In this specification, while $\beta_4$ is the effect of financial income in the larger companies, $\beta_4 + \beta_{4.1}$ capture the effect of financial income in the smaller companies.

In addition, the effect of financial income on the NFCs' investment can differ depending o the degree of FD of the country in which the NFCs are based. This paper analyses th potential non-linearity in the relationship between the development of the financi system and physical investment by estimating the impact of the NFCs financial income o investment at different levels of financial development. The financial system acts as provider of long-term liquidity to finance investment but, when its size and developmer is detached from the requirements of the real-sector, a perverse effect may emerge. In fac (3) NFCs may take advantage of a growing and developing financial system to engage more i non-operating financial activities, causing a negative effect on their core capit accumulation. Equation (3) aims at exploring this additional effect. The variable fo financial income $\left(\frac{\pi_F}{K}\right)$ is interacted with the dummy variable $D_{LFD}$. The latter takes th value 1 if company *i* is located in a country with relatively low level of FD, and takes valu 0 otherwise (i.e. if company *i* is located in a country with higher level of FD):

$$\left(\frac{I}{K}\right)_{it} = \beta_0 + \sum_{j=1}^{2}\beta_1\left(\frac{I}{K}\right)_{it-j} + \sum_{j=1}^{2}\beta_2\left(\frac{\pi - CD}{K}\right)_{it-j} + \sum_{j=1}^{2}\beta_{2.1}\left[\left(\frac{\pi - CD}{K}\right) * D_{nLFD}\right]_{it-j} + \sum_{j=1}^{2}\beta_3\left(\frac{S}{K}\right)_{it-j} +$$
$$+ \sum_{j=1}^{2}\beta_4\left(\frac{\pi_F}{K}\right)_{it-j} + \sum_{j=1}^{2}\beta_{4.1}\left[\left(\frac{\pi_F}{K}\right) * D_{LFD}\right]_{it-j} + \sum_{j=1}^{2}\beta_5\left(\frac{F}{K}\right)_{it-j}$$
$$+ \sum_{j=1}^{2}\beta_{5.1}\left[\left(\frac{F}{K}\right) * D_{LFD}\right]_{it-j} + \sum_{j=1}^{2}\beta_6\left(\frac{TD}{TA}\right)_{it-j} + \sum_{j=1}^{2}\beta_{6.1}\left[\left(\frac{TD}{TA}\right) * D_{LFD}\right]_{it-j} + \sum_{j=1}^{2}\beta_7(Q)_{it-}$$
$$+ \beta_t + \varepsilon_{it}$$

In order to split our sample into countries with low and high financial development, we refer to the index proposed by Demirgüc-Kunt and Levine (1996) also used in Love (2003) and in Love and Zicchino (2006) among others.[8] Even though more disaggregated indices have been introduced (see Beck *et al*., 2010), in our case the traditional version is preferable for two reasons: first, this index is more parsimonious and help us in interpreting the results. Second, in line with the aim of this study, we are interested in taking into account the 'depth' of the financial sector. Although important, the efficiency and stability of the financial system used in other indices are less relevant categories in this respect. If a country has a FD index above (below) the median, it will be considered to have a high-developed (low-developed) financial system.[9]

The fourth specification that will be estimated is an integration of equation (2) and (3). The effects of financial income and financial payments are interacted with both the size-dummy and FD-dummy. For simplicity, the effect of operating income and debt are interacted with just the FD-dummy. This specification allows us to estimate consistently the impact of our variables in different institutional contexts.

$$\left(\frac{I}{K}\right)_{it} = \beta_0 + \sum_{j=1}^{2}\beta_1\left(\frac{I}{K}\right)_{it-j} + \sum_{j=1}^{2}\beta_2\left(\frac{\pi - CD}{K}\right)_{it-j} + \sum_{j=1}^{2}\beta_{2.1}\left[\left(\frac{\pi - CD}{K}\right) * D_{nLFD}\right]_{it-j} + \sum_{j=1}^{2}\beta_3\left(\frac{S}{K}\right)_{it-j} +$$
$$+ \sum_{j=1}^{2}\beta_4\left(\frac{\pi_F}{K}\right)_{it-j} + \sum_{j=1}^{2}\beta_{4.1}\left[\left(\frac{\pi_F}{K}\right) * D_{LFD}\right]_{it-j} + \sum_{j=1}^{2}\beta_{4.2}\left[\left(\frac{\pi_F}{K}\right) * D_{20}\right]_{it-j} + \sum_{j=1}^{2}\beta_5\left(\frac{F}{K}\right)_{it-}$$
$$+ \sum_{j=1}^{2}\beta_{5.1}\left[\left(\frac{F}{K}\right) * D_{LFD}\right]_{it-j} + \sum_{j=1}^{2}\beta_{5.2}\left[\left(\frac{F}{K}\right) * D_{20}\right]_{it-j} + \sum_{j=1}^{2}\beta_6\left(\frac{TD}{TA}\right)_{it-j} \quad (4)$$
$$+ \sum_{j=1}^{2}\beta_{6.1}\left[\left(\frac{TD}{TA}\right) * D_{LFD}\right]_{it-j} + \sum_{j=1}^{2}\beta_7(Q)_{it-j} + \beta_t + \varepsilon_{it}$$

In the case of financial income, the estimated coefficient $\beta_4$ will correspond to the effect of this variable for companies lying in the top 80 per cent of the distribution in terms of total assets, which also are in a country with high FD. The estimated coefficient $\beta_{4.1}$ will be the effect of financial income in the companies in the top 80 per cent of the size distribution but based in countries with low FD. Coefficient $\beta_{4.2}$ will reveal the effect of this variable in relatively smaller companies (i.e. the lowest 20 per cent of the size distribution), irrespective of their location in terms of FD. The remaining two effects are computed as follows. The impact of financial income in companies in the lowest 20 per cent of the size distribution in countries with high FD is equal to $\beta_4 + \beta_{4.2}$. $\beta_4 + \beta_{4.1} + \beta_{4.2}$ is the effect of financial income in relatively smaller companies, in countries with low FD. The same logic applies to financial payments.[10]

The fifth and last specification aims at testing the effects of financial development on NFCs' investment by introducing the non-linearity in its effects using the FD index as a continuous variable. This specification takes into account both the effects of the 'financialization variables' on firm investment and the possible non-linear effects of financial development.

$$\left(\frac{\boldsymbol{I}}{\boldsymbol{K}}\right)_{it} = \boldsymbol{\beta_0} + \sum_{j=1}^{2} \boldsymbol{\beta_1}\left(\frac{\boldsymbol{I}}{\boldsymbol{K}}\right)_{it-j} + \sum_{j=1}^{2} \boldsymbol{\beta_2}\left(\frac{\boldsymbol{\pi - CD}}{\boldsymbol{K}}\right)_{it-j} + \sum_{j=1}^{2} \boldsymbol{\beta_3}\left(\frac{\boldsymbol{S}}{\boldsymbol{K}}\right)_{it-j} + \sum_{j=1}^{2} \boldsymbol{\beta_4}\left(\frac{\boldsymbol{\pi_F}}{\boldsymbol{K}}\right)_{it-j} + \sum_{j=1}^{2} \boldsymbol{\beta_5}\left(\frac{\boldsymbol{F}}{\boldsymbol{K}}\right)_{it-j} + \sum_{j=1}^{2} \boldsymbol{\beta_6}(\boldsymbol{FD})_{it-j} + \sum_{j=1}^{2} \boldsymbol{\beta_7}(\boldsymbol{FD})^2{}_{it-j} + \boldsymbol{\beta_t} + \boldsymbol{\varepsilon_{it}} \quad (5)$$

The terms FD and FD-squared are included to test for the so-called 'threshold effect' of financial development (see Law and Singh, 2014; Arcand *et al*., 2015) in the specific context of NFCs' fixed investment, i.e. to test for the existence of a non-linear 'parabola' relationship between the firm-level investment and country financial development. The signs of the two coefficients for FD and FD-squared will determine whether the relationship is concave or convex.

With equations (1), (2), (3), (4), and (5) we aim at introducing novel models of firm-level investment that a) take into account the inherent irreversibility of physical investment, b) control for the independent effect of profitability and demand, c) highlight the effects of

financialisation, d) make a clear distinction between operating and non-operating activities, and e) treat financial outflows and inflows, i.e. both outward and inward financialisation, as fundamental determinants.

## 4. Data and Stylized Facts

Our sample consists of companies in the following western European countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal, Spain, Sweden, and the UK.[11] The focus on these countries has been informed by the fact that they are the old members of the European Unionand are mature capitalist market economies, hence they can provide a comprehensive picture about the evolution and integration of the investment and financialization process in core European countries. Our data is based on the Worldscope database of publicly listed firms' balance sheets, thus we do not consider non-listed companies. Although analysing non-listed firms could also be interesting, we focus on publicly listed ones for two main reasons: first, the literature recognises publicly listed corporations as those most affected by the process of financialization. Second, the availability and quality of data for the publicly listed companies is higher, thus empirically superior given the purposes of this study. Standardized data on financial payments and, in particular, financial income are difficult to find; our database allows us to have a comprehensive variable for our analysis. Worldscope database has been acknowledged as a valuable source in the literature on firm-level investment analysis (e.g. Cleary 1999; Love, 2003; Pawlina and Renneboog, 2005; Love and Zicchino, 2006). Our data are annual for the period of 1995-2015.

We used annual data for the period of 1995-2015 for all the active public non-financial companies in the countries listed above. We thus exclude financial firms, identified by the primary SIC codes from 6000 to 6799. The primary Standard Industry Classification (SIC) code (variable WC07021) is the one commonly used in the literature to identify companies' main sector of operation. Worldscope provides alternative codes for the identification of the main field of operation of the companies included in the database. We thus checked the consistency between the primary SIC code, the primary Industrial Classification Benchmark (ICB) code (WC07040), and the Thomson Reuters Business Classification (TRBC) code (WC07041) to inform the exclusion of financial companies. We

excluded companies that were classified as non-financial according to SIC, but as financial according to either ICB or TRBC. Only twenty five companies presented this inconsistency, and were thus excluded from our sample.

The identification of companies' effective country of operation is another important aspect, although a consensus about how to assess it has not been reached within the literature on firm-level analysis. We opted for the standard Worldscope variable "Nation code" (WC06027) to identify a company's country. The database's guide explains that this variable identifies the country in which the company is domiciled, meaning the place where corporate principal affairs of business are maintained. In addition, the database potentially provides further information about company's nationality, referring to the geographical distribution of different balance sheet items (e.g. sales, capital expenditure, and operating income). However, data availability about these variables for our set of countries and time period was overall poor, and did not allow us to perform a robustness check in this sense. We thus run a consistency check similar to the one described above, this time using alternative variables from Datastream, namely "LOC" (code local), and "GEOG" (geography group). Only five companies presented an inconsistency, and have been thus excluded.

It is well known that the presence of outliers usually characterizes firm-level data. To prevent biased estimations, we apply a data screening process, by excluding extreme outliers from the sample.[12] Firms should have at least three consecutive observations for the dependent variable (I/K), a condition also required for econometric purposes (Roodman, 2009). We excluded a company's observations where fixed capital was negative or equal to zero or where sales were negative (0.09% of all observations), as well as companies with a permanent negative mean operating income for the whole period (2.2% of all observations). Companies with a rate of accumulation (I/K) higher than 2.5 during the period have been excluded (0.7% of all observations), as well as companies with an increase in sales higher than 200% (0.3% of all observations). These two specific exclusions were informed by the need to avoid considering events of mergers or acquisitions in the companies considered. This procedure is consistent with the one employed in other world-leading publications using the same database (see among others Bloom *et al*., 2004), as well as the key contribution by Love (2003) on the impact of financial development to which our paper presents an alternative in terms of addressing the relevance of financialization. Finally,

observations in the upper and lower 1 per cent of each variable's distribution are excluded. This means that in this step we excluded the observations (not the company). Table 2A in the appendix shows descriptive statistics of our sample. The remaining part of this section presents the stylized facts of our sample.

Figure 1 shows the trends in the additions to fixed assets as a ratio to operating income in both the European aggregate as a whole and selected economies. A common feature of the last twenty years has been a reduction in the reinvestment of the profit of the NFCs in the majority of the countries between 1995 and 2015. Overall, the slowdown in investment has been remarkable in Europe, with a 32 per cent decline in the re-investment rate on average, where NFCs are investing about 33 per cent of their profits as of 2015; this ratio was 50 per cent in 1995. The highest fall is in Sweden (-49 per cent), the UK (-32 per cent), and Italy (-28 per cent).

<Figure1 here>

<Figure 2 here>

The ratio of financial assets to fixed assets clearly increased albeit with some differences (Figure 2): on average in Europe, the ratio increased by 93 per cent; as of 2015 NFCs financial assets are 3.3 times their fixed assets in Europe. Sweden, the UK and Germany experienced the strongest rise in this ratio (423 per cent, 324 per cent, and 285 per cent, respectively).

Figure 3 shows that during 1995-2015 the NFCs' rate of capital accumulation (I/K) has been stagnant around an average value of 24 per cent. At the same time, NFCs' financial payments (dividends plus interests as a ratio to fixed assets) have been increasing significantly. There is also a sharp increase in their non-operating income (as a ratio to fixed assets) before the crisis (173 per cent). The 2007-8 crisis has led to a reversal in the NFCs' financial income, although they are slowly recovering towards the levels of the early 2000s.

<Figure 3 here>

The last part of this section presents the degrees of financial development (FD), based on a widely used index computed for the 14 countries analyzed. The FD index is a combination of standardized measures of five components, namely market capitalization as

a ratio to GDP, total value traded as a ratio to GDP, total value traded as a ratio to market capitalization, ratio of liquid liabilities to GDP, and credit to the private sector as a ratio to GDP.[13] The source of these variables is the Global Financial Development Database (GFDD) of the World Bank. We split the European countries into two groups, as countries with 'high' and 'low' FD, according to their median FD value from 1995 to 2007, excluding the years after the financial crisis. Figure 4 below shows the values of the FD index for the countries included in our analysis.

The countries with relatively highly developed financial systems are the UK, Spain, Sweden, Germany, the Netherlands, and France; countries with relatively low levels of financial development are Ireland, Denmark, Portugal, Italy, Belgium, Austria, and Greece.[14]

<Figure 4 here>

As discussed before, the aggregate index of FD aims at synthetizing the development of a country's financial markets and intermediaries. Figure 5 presents the growth rates of the separate components of the FD index for six major economies in our sample. The first column presents the average growth rates for the aggregate index. Spain experienced the strongest increase in this measure in the period considered, whilst France has the lowest rate of growth in the FD within this group. Looking at the growth rates of the five components, it appears that the main source variation in FD are the changes in the "stock market total value traded as a ratio to GDP" and the "stock market turnover ratio", albeit some differences in across countries. These two elements characterize respectively the 'activity' and 'liquidity' of a country's stock markets. In particular, the stock market total value traded equals to total shares traded on the stock market exchange divided by GDP, whilst share turnover is a measure of stock liquidity calculated by dividing the total number of shares traded over a period by the average number of shares outstanding. In this respect, it is important to highlight how, in the European countries during the period considered, the increase in financial development was mainly driven by components related to the stock market activity, rather than by the development of the financial intermediaries (i.e. the provision of credit).

<Figure 5 here>

To summarize, the stylized facts hint at a) stagnant or declining rates of investment; b) declining rates of reinvestment of profits; c) an increase in the overall importance of financial assets, financial income as well as financial payments both in the European aggregate as well as in the majority of the economies; d) a certain degree of heterogeneity among countries in terms of financial development, in particular related to financial market activity and liquidity. The impact of these trends on investment will be investigated further via econometric estimations below.

## 5. Estimation Methodology

The four specifications presented in Section 3 are estimated using a difference-GMM estimator based on a dynamic panel-data model (Arellano and Bond, 1991). GMM is a powerful tool for analyses based on firm-level 'small time/large observations' sample, and for controlling for endogeneity (Roodman, 2009). This allows us to address dual causality, if rising financial payments and income is also a consequence of the slowdown in investment, as well as the endogeneity created by the inclusion of the lagged dependent variable, which is also needed to address the autocorrelation issue. The final specifications are chosen based on the combination of instruments and a vector of parameters that shows the minimum correlation between the error term and the instruments. The equations to be estimated do not explicitly include firm fixed effects. However, the difference GMM estimator accounts for firm effects by first differencing explanatory variables. Therefore, the estimates are determined by the time dimension of the panel data as is almost exclusively the case in the related literature.

We perform three types of tests on the estimation results. First, we apply the Arellano-Bond test for second-order serial correlation (Arellano and Bond, 1991). Second, we verify the validity of the instruments set through the Hansen test (Hansen, 1982). Third, we incorporate time effects to account for shocks that are common to all firms in a specific year, and test the joint significance of the time dummies by using a Wald test.

In all models, both the lagged dependent variable and all the explanatory variables enters the instrument set as endogenous regressors. Consistently with the structure of the GMM estimator, all the variables in the different specifications are instrumented using the

second and third lags of the specific variables, whilst the year-dummy variables are included in the exogenous set of instruments.

All the variables are in logarithmic form to allow for non-linear relationships between the dependent and the explanatory variables, and to control for heteroscedasticity. Robust standard errors are calculated through a two-step procedure after a finite-sample correction (Windmeijer, 2005).

All the estimations come from weighted regression, with the weight for a firm in a specific country is equal to 1 divided by the number of available observations in that country. This follows an established procedure (see for example Love, 2003), and mitigates the bias in the results coming from the highest data availability for specific countries.

Finally, a general-to-specific estimation procedure is applied, thus dropping from the specification the explanatory variable with the highest level of statistical insignificance at each step to arrive at a specification with only significant variables (Campos *et al*., 2005). By doing this we reach the most parsimonious lag structures for different specifications.

## 6. Estimation Results

This section presents our estimation results based on the four equations discussed in Section 3. First, we discuss our basic findings at the aggregate level. Second, we focus on our findings when the degree of financial development is included as a macroeconomic 'control' variable.

Table 1 presents the estimation results for the aggregate pool of all the 14 European countries based on equation (1) and (2). As can be seen in column 1, the lagged rate of capital accumulation, sales, and net operating profit have positive effects on investment, as expected. Aggregate financial payments (dividends and interest) as well as non-operating financial income ($\pi_F/K$) and indebtedness all have significantly negative effects on investment. These results are robust to the inclusion of Tobin's Q as an additional control variable, which has the expected positive sign. The results indicate that both financial payments and income have negatively affected NFCs' investment in Europe. The results are consistent with previous research for both the US and developing countries (e.g. Orhangazi, 2008; Demir, 2009). Column 2 presents the results for the same specification, but for the period prior to the 2008 financial crisis. Overall, the results are robust, with an increase in the negative effect of financial payments $(F/K)^{15}$.

As already discussed, theoretically the sign of the effect of non-operating income on physical investment is ambiguous. On the one hand, relatively smaller companies may use this additional source of income to partially ease liquidity constraints. On the other hand, the larger and more flexible companies may see short-term and reversible financial investment as an attractive alternative to physical investment. This choice may then come at the expense of long-term physical investment, and thus have an adverse effect on the investment of these large corporations. We explored this possible dual, non-linear effect, by including an interaction dummy variable to account for the potentially different effect of financial income with respect to the size of the company (in terms of total assets). In these alternative specifications as described in Equation (2) in Section 3.3, the coefficient associated with the financial payments variable ($\pi_F/K$) shows the effect for the companies relatively in the top of the distribution. To compute the elasticity for the remaining companies we sum the coefficient for $(\pi_F/K)*D_n$ with the coefficient for $\pi_F/K$, and then check for statistical significance of the new measure with a Wald test.

<Table 1 here>

The evidence suggests that impact of financial income is non-linear with respect to the companies' size. Column 3 of Table 1 presents the results for the specification including a dummy that is 0 if the company lies in the top 80 per cent and 1 if it is in the lowest 20 per cent of the distribution in terms of total assets. There is a statistically significant difference between the large and small companies with respect to the impact of financial income. In particular, top 80 per cent of the companies in terms of size experience a strong negative effect of financial income (-0.12), while for the firms in the lowest 20 per cent of the sample, the effect is positive (0.16). On the contrary, the negative effect of financial payments is stronger in relatively smaller firms (-0.19 vs. -0.05). Financial income crowds-out physical investment for the top 80 per cent of the companies whilst smaller companies' investments suffer more from financial payments. Columns 4 and 5 of Table 1 present results for the same specification, but with two alternative thresholds, namely a 50-50 split, and a split aimed at identifying differences between the top 20 per cent and the remaining 80 per cent of the distribution (this means the opposite of the first split described above). The identification of

a different behavior for relatively smaller companies is confirmed: looking at the coefficients of the interaction dummies in these alternative specifications, it is possible to see that the coefficient for financial payments is still positive for small companies but decreasing in magnitude (0.16, 0.08, and 0.06) as we enlarge the pool of the small companies. At the same time, the companies at the top 20 per cent of the distribution (Column 5) experienced the strongest negative effect of financial incomes on investment (-0.34). The effect of financial payments appears to be particularly negative for firms at the bottom 20 per cent of the distribution (-0.19), and is relatively lower in absolute values in the other two specifications (-0.14).

Table 2 presents the results based on equations (3), (4), and (5)[16]. These estimations provide evidence about the effects of the development of the financial system on European NFCs' physical investment. As discussed before, the conventional arguments suggest that FD is good for companies' investment due to an enhanced allocation of resources (Levine, 2005) and reduced cash-flow constraints (Love, 2003; Love and Zicchino, 2006). However, to the best of our knowledge, the novel features of NFCs' investment behavior, i.e. the impact of their growing non-operational financial activities, has so far not been taken into account in this literature.

Column 1 of Table 2 shows the results for specification (3) for the European pool. Here we interact NFCs' financial income ($\pi_F/K$) with a dummy that takes value 1 if company *i* is based in a country characterized by a low FD index, and zero otherwise. In order to better characterize our specification, this interaction applies also to retained earnings, financial payments, and change in total debt, and the interpretation is the same.

Similar to the results presented in Table 1, the positive effects of the lagged investment, sales, and retained earnings are confirmed. In addition, we find that the effect of retained earnings is significantly stronger in companies operating in an environment with relatively low financial development (0.59 vs. 0.04). This confirms the previous findings on the positive effect of FD in easing NFCs' financing constraint (see especially Love, 2003 and Love and Zicchino, 2006).

<Table 2 here>

With respect to the effect of financial income, for companies based in countries with high FD the effect is highly negative (-0.27). On the contrary, a lower degree of FD is associated with a positive, yet small, effect of financial income on investment (0.08). In addition, the negative effect of financial payments on the NFCs' investment is more than triple in less financially developed, i.e. more financially constrained, countries (-0.22 vs. -0.07). In addition, companies in countries with lower FD experienced a stronger negative effect of indebtedness (-0.09 vs. -0.02).

Column 2 of Table 2 shows the results for the same estimation for the period of 1995-2007. Even though the sign of the various effects is the same, the positive effect of financial income for companies in countries with low FD is higher with respect to the full period (0.12 vs. 0.04). In addition, in the period prior to the crisis, the increase in total debt had a small positive effect on the investment of these companies (0.03).

Column 3 of Table 2 presents the results obtained by estimating equation (4). In this case, we introduce both the size-dummies and FD-dummies, to test for the differences in the impact of financial income with respect to the size of the companies in the context of different levels of FD. The signs of the lagged dependent variable and sales are consistent with what was discussed before. Operating income had a small positive effect for companies in countries with high FD, whilst its effect is larger for companies in countries with low FD. This can be seen as a further confirmation of the higher financial constraint experienced by companies based in an environment with less developed provisions of financial services.

Interestingly, when differentiating by both size and the level of FD at the same time a) the effect of financial income on investment is negative in both large and small companies in countries with high FD, and b) the effect is positive for both small and large companies in countries with low FD; however, the size of the positive effect for large companies is close to zero.

With respect to financial payments, the estimated effect on investment is significant and negative only for large companies, in countries with both low and high levels of FD. In the small companies in both country groups the effect is statistically insignificant; i.e. small companies seem not to suffer from the SVO and from the potential negative impact of the cost of capital.

As before, Column 4 of Table 2 presents the results for the estimation of the same specification for the pre-crisis period. The effect of financial income for large companies in countries with low FD now turns statistically insignificant. This effect is still positive and significant for small companies in countries with low FD. The insignificant effect of financial payments on smaller companies is confirmed also for the period before the 2007 crisis. Furthermore, given the *p-value* of the Wald test (0.329), in this period the effect of debt for companies in countries with low FD is insignificant.

Column 5 of Table 2 presents our results for the estimation of Equation (5), in which we test the presence of a 'threshold' effect of financial development on 'financialized' investment in Europe. To do this, we added the level of Financial Development as a continuous variable[17] at the country level, and its square. The results show that the relationship between financial development and NFCs' investment in our sample is indeed non-linear and concave. This means up to a threshold financial development has a positive effect (the estimated coefficient for FD is equal to 0.295), whilst beyond a threshold the effect is negative (the estimated coefficient for FD-squared is equal to -0.214). Lagged investment, sales, and retained profits maintain the usual signs. Financial payments still negatively affect investment, whilst financial incomes are insignificant. In line with our previous conclusion, these results show that, in a financialized context, financial development and companies' financial incomes have similar non-linear effects.

The relationship described above can be summarized as:

$$\frac{I}{K} = \beta_1 \left(\frac{I}{K}\right)_{it-j} \beta_2 + \beta_3 \sum_{j=1}^{2} \beta_3 \left(\frac{S}{K}\right)_{it-j} + \beta_4 \left(\frac{\pi - CD}{K}\right)_{it-j} + \beta_5 \left(\frac{\pi_F}{K}\right)_{it-j} + \beta_6 \left(\frac{F}{K}\right)_{it-j} + \beta_7 FD + \beta_8 FD^2 \quad (5.a)$$

To find the maximum of the parabolic function, i.e. the level at which the relationship between FD and investment turns negative, we simply set the first derivative[18] of equation (5.a) equal to zero (see equation 5.b). Equation (5.c) shows the condition with the estimated coefficients substituting the general parameters.

$$\frac{d\frac{I}{K}}{dFD} = \beta_7 + 2 \cdot \beta_8 FD = 0 \tag{5.b}$$

$$\frac{d\frac{I}{K}}{dFD} = 0.213 + 2 \cdot (-0.197) \cdot FD = 0 \tag{5.c}$$

Solving for FD, we calculate the threshold value of FD index as 0.54. This is the standardized value of FD beyond which the effect of financial development on NFCs' investment turns negative.[19] Converting this standardized value of the FD index to the average level of financial development (which, as described in Section 4, is the average of the level of developments of stock markets and intermediaries), we calculate the threshold value of FD to be 120%. This means that, in the period considered, when the overall FD reached a level above 120% of GDP, it had a negative effect on NFCs' investment. This level is in line with the ones computed by Law and Singh (2014) and Arcand *et al*. (2015).

Next, we dicsuss the economic significance of our estimates. We compute the long-run elasticities by dividing each short-run elasticity by one minus the coefficient of the lagged dependent variable. Multiplying the long-run coefficient by the actual cumulative change in each variable for the estimation period, we get the corresponding economic effect. We compute the economic effects based on elasticities estimated for the period of 1995-2007, thus excluding the impact of the financial crisis, after which financial activities have been severely affected. First, the economic effect based on estimation of the baseline specification (1) will be presented and discussed. Second, we discuss the economic effects for specification (4), which highlight the different patterns arising when the disaggregation in terms of size and financial development are introduced.

Table 3 presents the economic effects based on resutls showed in Table 1 (specification 1).

<Table 3 here>

Sales (capacity utilization) have been the main determinant of accumulation in all countries with high FD, with an average economic effect of 0.26. Among countries with high FD, Sweden had the highest contribution of Sales (0.54), whilst Spain had the lowest one (0.04). Given a higher long run coefficient of operating income for countries with low FD

(0.37), internal funds have been the main determinant in this group. The average economic effect of operating income (excluding Greece for which long run coefficient is positive but the actual cumulative change has been negative) is 0.35, with the lowest value in Portugal (0.06) and the highest one in Belgium (0.53). The comparison of the economic effects of Sales and Operating income in contexts with different levels of FD shows that NFCs' investment are relatively more demand-constrained when FD is high, while relatively more liquidity-constrained in countries with lower level of FD. At the country level, the crowding-out effects of financial incomes on investment (inward financialization), is confirmed for NFCs in countries with high level of FD. With a long run elasticity of -0.37, and an average cumulative change of 1.04 in the period considered, the average economic effect has been equal to -0.38. Sweden and the UK experienced the two highest negative effects (respectively -0.71 and -0.50), whilst NFCs' investment in Spain and France suffered relatively less from crowding-out (respectively -0.26 and -0.16). On the contrary, we found that financial incomes provided additional funds for NFCs based in the group of countries with relatively low FD. However, this positive effect has been small in most of the countries. This is mainly due to an average cumulative change of 0.34, which is three times lower than the changes in countries with high FD. The average positive economic effect has been equal to 0.07, with NFCs' investment in Portugal as the main beneficiaries of financial receipts (0.26). The adverse economic effect of financial payments (outward financialization) is generally present in both countries with high and low FD. However, in this case the NFCs in countries with lower level of FD experienced the strongest negative effect of financial payments (interest plus dividends), with an average effect of -0.18. This effect has been low in general in countries with high FD, (-0.17), with again Sweden and UK being the most negatively affected countries (-0.24 and -0.13 respectively). As it is clear from the last column of Table 3, the effect of the change in indebtedness on investment has been zero in countries with low FD (due to an insignificant estimated elasticity). Also in NFCs experiencing higher level of FD, this effect is not large, though negative in the majority of these countries (the exceptions are Finland and Sweden). This is due to both a small long run coefficient (-0.05) and actual cumulative changes (expect in Sweden and the UK)

Table 4 presents the economic effects based on the results showed in Table 2 (specification 4). The economic impacts of our two financialisation channels (and

indebtedness) also account for the differences in the companies' size and levels of financial development in the country.

<Table 4 here>

Again, sales are the main determinant of NFCs investment in countries with a high level of FD (except Belgium), whilst operating income played a less important role. In countries with lower FD the demand and the internal finance measures have a similar importance for the NFCs' investment. Notwithstanding this, the stronger liquidity constraint experienced by companies in countries with relatively lower FD is confirmed.

Our findings suggest that the negative economic effect of financial payments has been particularly strong for the NFCs in counties with high level of FD. Moreover, there is no positive effect of financial income on small NFCs' investment.

In countries with high level of FD the crowding-out impact of financial revenues on investment has been effective for both the large and small companies. Even though the negative long run elasticities are higher for large companies (-0.36 vs. -0.20), on average, the negative economic effect in the small companies has been similar to that in the large ones (-0.33 vs. -0.31). This is due to the very high increases in small companies' financial income. The highest negative effects in the large companies has been experienced in Sweden and the UK (-0.47 and -0.41, respectively). In countries with a low level of FD, the effect of financial income on the large companies' investment is insignificant. However, small companies' investment benefited from increasing financial income, with Ireland and Belgium at the top. In Austria and Portugal, given an actual reduction in financial income, the economic effect of non-operating income has been negative for the small companies as well.

To summarize, whilst the effect of financial payments has been similarly negative for almost all the countries analysed, the impact of financial income is more varied. In fact, in countries in which financial markets and intermediaries are highly developed, the NFCs' increasing engagements in financial investment had an adverse effect on their investment in fixed capital.

The results based on the specifications including financial development and different financialisation channels are, to the best of our knowledge, one of the novelties of this paper. Even though our results indicate that a more developed financial system is easing NFCs'

financial constraints, the inclusion of financial activities allowed us to uncover another effect that is not discussed in the literature: in fact, a more developed financial system is at the same time enabling NFCs to engage in financial activities (receiving financial income), which are crowding-out their core business, namely physical investment.

### 6.1 Robustness tests

We estimated the different specifications using different measures for the operating income, which appear to be the less robust variable across the results (also at country level). First, we deducted depreciation from the operating income. Second, after-tax operating income has been used to control for a potential bias generated by different taxation systems in Europe. Third, earnings before interest and taxes (EBIT) as well as earnings before interest, taxes, depreciation and amortization (EBITDA) were used as measures of profitability. In general, all these alternative measures did not add explanatory power/significance to the estimated specifications and, in most of the cases, introduced collinearity with respect to the other control variables (especially in the case of 'sales over fixed capital', which turned insignificant).

As previously discussed, the phenomenon of share buybacks could be another interesting aspect of firms' financial activities. Hence, we also performed an estimation including the value of companies' share buybacks as an additional explanatory variable. The estimated coefficients for share buybacks were statistically insignificant across different specifications. Given the reduction in the sample due to lack of data for this variable, the explanatory power of the estimated models was also not adequate.[20]

With respect to the effect of debt, we used also the alternative variables of only short-term debt, or only long term debt instead of total debt. They were never significant. We also included total debt over fixed capital as an explanatory variable to overcome the multicollinearity issues when interacting this variable with firms' size. Again, this variable was insignificant, and reduced the significance of the financial payments variable in the baseline specification. With respect to the selection of the sample itself, the comparison of weighted regressions and single country estimations have been important steps to check for the overall consistency of our results. As expected there is a positive effect of lagged investment, sales and retained earnings in each country. The negative crowding-out effect of

financial income is a robust significant finding in all countries. Even though a straight comparison between estimates may be statistically distorted, we find the strongest negative effect of non-operating income in the NFCs in Sweden and France (-0.17 and -0.13 respectively). Financial payments have a negative effect on the NFCs' investment in all countries apart from Italy and Sweden, where we did not find a significant effect. Overall, these single country estimations confirm our previous findings of a negative impact of both financial income and payments on NFCs' investment based on the pool of European firms. In addition, the negative effect of financial income is common to all countries with different levels of FD.

Table 3A summarizes the additional robustness test that we implemented. The first column presents the results for the estimation of our baseline model (Equation 1) excluding Tobin's Q as an explanatory variable. We confirm that our results are robust to the exclusion of this variable.

Columns two of Table 3A presents an estimation of the baseline specification with the disaggregation of the aggregate financial payments variable used in the main regressions. In fact, interest and dividends payments may capture different mechanisms: dividend payments are a non-required expenditure (SVO), whereas interest payments are obligatory and reduce internal funds directly. We find a negative albeit insignificant effect of the two variables. We thus opt for the aggregate measure, also for reasons of comparability with previous studies (in particular see Orhangazi, 2008).

Column three and four present the results for a robustness test performed on the interacted measure of FD. While in the results provided in Table 3 financial development was used as a binomial variable, here the two financialisation variables are interacted with the continuous measure of FD ($FD_c$) at the country level for the pre-crisis period. These results confirm once again how financial development has been an institutional driver for European NFCs' financialization, exacerbating the negative effects of both financial incomes and payments on firm-level investment. Contrary to what was found with the specification using the binomial variable to reflect FD, here the interacted variable accounting for the financial constraints is not statistically significant.

Columns five and six of Table 3A present estimations of the baseline specification (without Tobin's Q) with the variables in levels as opposed to logs. The ~~previous~~ baseline

results about the negative effects of financialisation on investment presented previously are valid also when variables are measured in levels. On top of the heteroskedasticity issues discussed in Section 4, we nevertheless decided to employ the log-log specification for three main reasons: a) this specification allows for more meaningful interpretation of effects as elasticities (percentage change), which is also useful for the computation of economic effects; b) it allows for direct comparison with previous micro-level studies about financialisation and in particular with Orhangazi (2008); c) this form proved to be the more robust (especially in terms of auto-correlation and Hansen tests) across the different specifications and interactions. Tis In fact, our conclusion about the interactions between the FD index and our financialization variables are not robust when specifications with variables in levels are employed. This might be due to the fact that the variable distribution resulting from the log transformation fit better to the macro-variables that compose the Index of Financial Development. Notwithstanding this issue, the evidence from our log-log approach remains relevant even if the results in levels appear to be less robust.

Finally, the last column of Table 3A presents the results for our baseline specification for the pre-crisis period, with an alternative method of dealing with outliers. In this case, we excluded the upper and lower 2% of the distributions for each variable used in the estimations. We find that our main results are robust to our preferred, and widely used cleaning process (i.e. excluding the top and bottom 1% of the distribution).

Another driver for the negative relationship between NFCs financial activities and investment could be 'optimal assets allocation', for which we should witness an increase in financial activities in declining industries with decreasing opportunities for profitability but not in growing ones. If this is the case, what we identified as 'financialization' could simply reflect transfers of capital from less to more profitable sectors of the economy rather than a negative effect of financialization on investment in the declining industries. To explore the plausibility of this mechanism we introduced a sectoral dummy to our baseline estimation (Equation 1), a similar exercise to the one with the size-effects. Using the SIC classification, we identified eight sectors to test for differences in the effects relative to other sectors in separate estimations. If the company is part of sector '*x*', the (sectoral) dummy variable will be equal to 1, and 0 otherwise. As before, if significant, the estimated coefficient for the sector will be equal to the sum of the interacted and the non-interacted coefficients.

The results for these estimations are presented in Table 4A. Overall, our evidence seems not to support an 'optimal assets allocation' process.[21] In fact, looking in particular at the estimated effects of financial incomes on investment, even though this is more negative in 'Agriculture, Foresting and Fishing' (full period), 'Mining' experienced a positive effect of financial incomes on investment (both in the pre-crisis and in the full periods). In addition, we do find evidence of an enhanced crowding-out effect of financial incomes in Wholesale, and in the Services sectors (both only for the pre-crisis period). For what concerns the effects of financial payments at the sectoral level, 'Agriculture, Fishing and Foresting', 'Mining', and 'Transportation Communication, Electric, Gas and Sanitary Services' are the sectors showing an even more negative effects of this channel on NFCs' investment. This results at the sectoral level partially support the results discussed above about the aggregate sample, and do not suggest the presence of a spurious relationship between NFCs' financialization and investment.

Finally, with respect to what we described as 'size effect' (see Table 1), another possibility could have been to interact the firm size variable itself with the explanatory variables. This approach imposes linearity on the size interaction but a quadratic term could have been included to make the specification more general. We explored this possibility but we did not find significant results for the interacted variables, and this could be due to the different distribution of total assets in the countries considered. As discussed before regarding the different effects of financial incomes with respect to size, the positive effect on investment seems to be economically relevant for a relatively small fraction of firms.

## 7. Conclusions

This paper provides a novel framework of modeling the impact of financialisation on investment, and presents new micro-econometric evidence on the relationship between financial development and firm-level investment in Europe, using data of publicly listed NFCs. In particular, the focus is on three aspects. Firstly, even though higher income from financial activities can relax NFCs' cash-flow constraint, they can adversely affect investment by crowding-out physical investments. Secondly, increasing financial payments for external finance and orientation towards the shareholders (i.e. rising interest and dividend payments) may reduce the NFCs internal funds, and thus investment. Thirdly, even though

financial development may allow efficient allocation of investment resources, it can also suppress investment in fixed assets. In this respects, our analysis shows how financial development can be understood as an 'institutional driver' for speculative pressures in the European non-financial corporate sector, especially for relatively larger companies.

Our findings for Europe provide at least two key insights on the relationship between means of financing and NFCs' investment. First, at the aggregate level, the increasing reliance on external financing, shareholder value orientation and the substitution of fixed investment by financial activity, has a fundamental negative impact on investment of the NFCs in the last decades. The decreasing availability of internal funds constrains the investment decision. On the one hand, the increase in financial payments (interest and dividend payments) have a negative effect on investment. On the other hand, the negative crowding-out effects of financial activities on investment more than offset the gains from relaxing the cash-flow constraint. Financial income has a positive effect on investment only for the small companies, but a significant negative effect in the large companies. This can be due to the need for additional sources of financing by the relatively more cash constrained companies, especially in contexts in which the financial system is relatively 'less developed'. It has to be noted that larger companies create the vast majority of capital, and the crowding-out of physical investment of these companies by financial activity is a substantial drag on the investment performance and productivity of the European countries.

Second, our results suggest that, even though at low levels of financial development, an increase in financial development has a positive effect on investment through enhanced resource allocation, in countries with high levels of financial development a perverse effect dominates. Financial development further aggravates the adverse effects of both inward and outward financialisation at high levels of financial development. The growth of financial markets and intermediaries delinked from the financing requirements of the NFCs is incentivizing the latter to heavily engage in non-operating activities, ultimately leading to stagnant levels of investment. We present robust evidence of a negative effect of financial development (as measured by the FD index) on NFCs' investment via an amplified crowding-out effect of financial income. When companies' financial (non-operating) activities are taken into account, the virtuous cycle between FD and investment described in Love and Zicchino (2006) is not confirmed. On the contrary, our results suggest that higher level of FD may

induce NFCs to accumulate more financial assets, receive non-operational income, and use this liquidity to buy additional financial assets as opposed to physical assets related to their core business. Our finding at the microeconomic level highlight a further mechanism through which financial development beyond a threshold may negatively affect investment behavior, in line with some new reservations put forward in the more recent macroeconomic literature (e.g. Arcand *et al*., 2015).

The effects of financialisation differ with respect to the size of the firm as well as the level of financial development in the country. Our results show a negative effect of interest and dividends payments, in particular for large companies in all countries, irrespective of the level of financial development. However, a strong negative effect of financial income on investment characterizes NFCs in countries with high levels of FD, whilst this impact is slightly positive, albeit economically negligible, for the NFCs in countries with low FD. The positive effect is becoming considerable for smaller NFCs, but only in countries with low FD. On the contrary, increasing financial income is crowding-out physical investment in all NFCs within an environment of high FD, irrespective of their size. These findings challenge the conventional idea that 'every additional fund is good for investment'. Our results confirm previous evidence of the negative effect of financialization on investment (see among others Stockhammer, 2004; Orhangazi, 2008). In addition, our results are in line with, and give strength to, the analyses in which the crowding-out effect of financial activity is not limited to fixed investment but also puts negative pressure on economic growth, tax contribution (Tomaskovic-Devey, *et al*. 2015), and employment levels (Lin, 2016). More importantly, our results challenge the conventional evidence about the absolute positive effect of financial development on investment. In particular, when the 'financialized' behaviour of corporations is taken into account, the results presented in Love (2003) are not only disproved, but overturned.

The results from our analyses provide support to the theoretical arguments regarding the negative effects of financialisation and confirm previous empirical findings at the macro and microeconomic levels in the literature for the US economy. The increasing interrelations between the financial markets and the NFCs are progressively reducing fixed capital accumulation, and thus economic growth. These results contrast with the conventional arguments regarding the beneficial effects of financial liberalization and financial deepening.

Our analysis focuses on the broad evolution of the European financial structure in different countries as a potential 'institutional' determinant of the firm-level financialization-investment nexus. Notwithstanding the limitations of the conventional methodology based on the FD index and the subsequent country grouping, our results reiterate how taking into account indicators of the broad institutional context in which the investment decisions of NFCs take place is paramount in analysing the process of financialization in future research (Roberts and Kwon, 2017).

The financialisation of the European economic and social system has been favoured by a political processes aimed at the deregulation (liberalization) of financial markets and at the reduction of tax rates for corporations (Bieling, 2013). As we have seen, financialisation had a fundamental role in depressing NFCs' investment in Europe. To reach a stable and vigorous dynamic of investment, a de-financialisation of the non-financial sector is desirable. This would require an extended regulation of companies' non-operating financial activities along with financial regulation. In addition, the estimated robust connection between past and present rates of investment (i.e. the 'hysteresis' of the investment processes) increases the potential effectiveness of de-financialisation economic policies.

Given the negative effect of excessive financial development on NFCs' investment, the recommendation for countries with low levels would be to not intensify the de-regulation of financial markets and/or intermediaries, to avoid the negative effect associated with high levels of FD. In addition, a wider interpretation of fiscal policy can be effective in reversing the financialization-led investment depletion. Apart from the re-regulation of the financial side of our economies (both at the macro and at the micro levels), the reform of a financialized productive system needs coordinated public investments. In fact, the public sector can act as the catalyst and driver of a new phase in which NFCs' objectives are essentially brought back to productive and stable accumulation. The main reason behind the missing link between profits and accumulation can be traced back to the consistent rise in the 'financialization-inequality mix' (Stockhammer, 2015). The various waves of liberalization and privatisation of large part of the economics systems fostered the emergence of behaviours detached from the objectives of equality and prosperity. The evidence speaks in favour of a vast programme of public investment that can sustain and provide a sustainable direction to the private initiative (Onaran, 2016).

Notwithstanding the above considerations, at the (broader) level of analysis of the political projects guiding the recent development of European financial capitalism, an issue of critical reassessment of the process of European (financial) integration remains (Bieling 2003, 2013). In fact, the project of European economic integration has been informed by a set of concepts about the functioning of economic systems for which 'the market' is portrayed as the primary driver of growth, economic stability, and prosperity. Although this belief has proven to be too optimistic, especially after the 2007-8 financial meltdown and its consequences on European economies, supporters of this view are still strong. Reversing financialization of the socio-economic system in general, and of NFCs accumulation in particular, would require an extensive socio-political 'de-financialization reform package', which goes beyond the unconventional monetary and/or fiscal policies.

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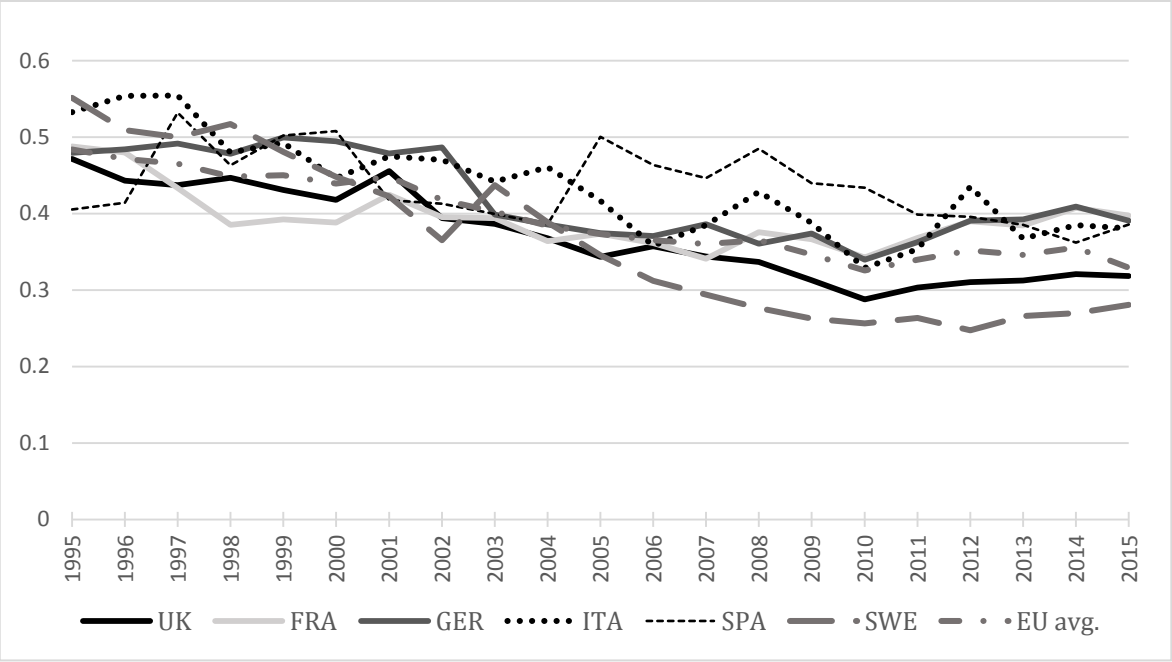
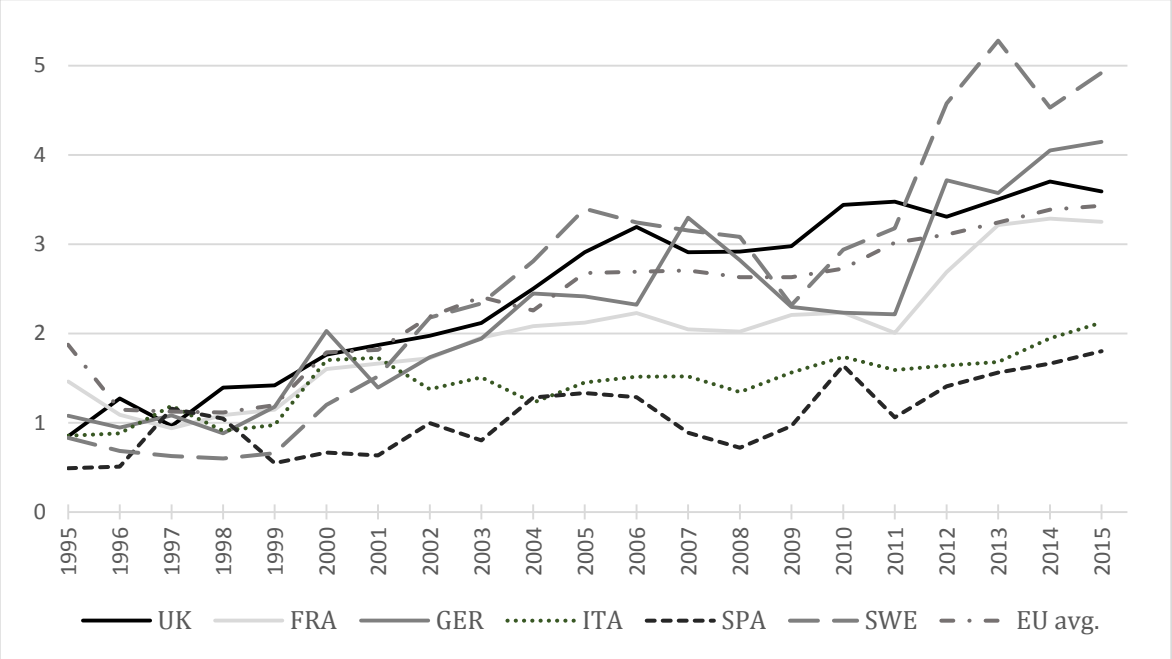
## Figures and Tables

**Figure 1.** Additions to fixed assets/operating income (I/π), NFCs, Europe14 and selected countries, 1995-2015




*Source: authors' calculation based on Worldscope data*

**Figure 2.** Financial assets/fixed assets (FA/K), NFCs, Europe14 and selected countries, 1995-2015

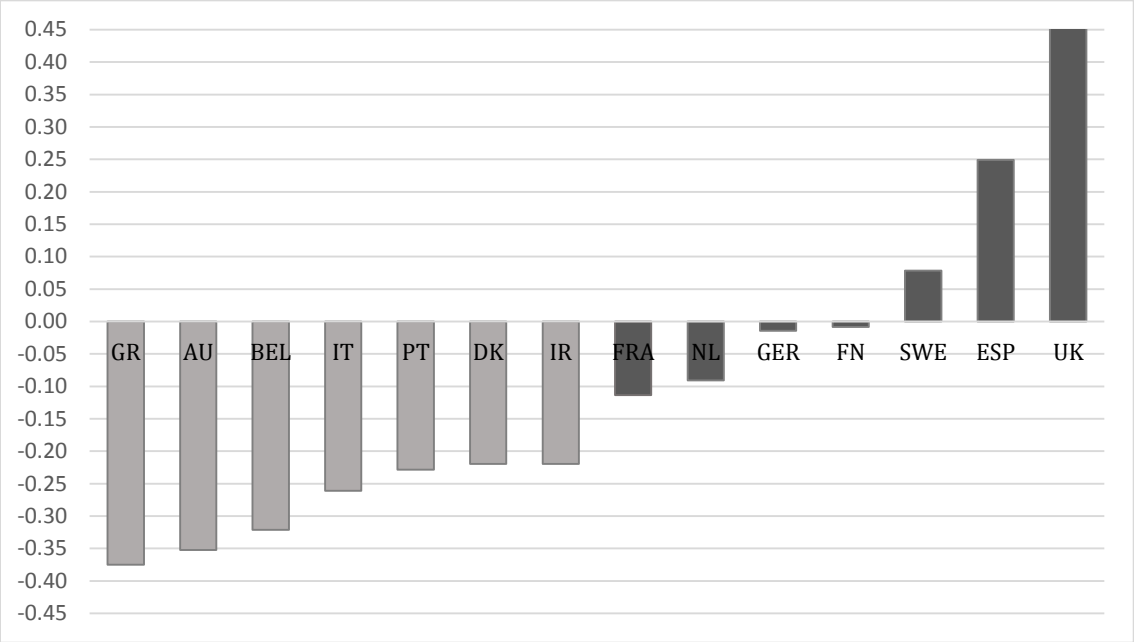



*Source: authors' calculation based on Worldscope data*

**Figure 3.** Investment/Fixed Assets (I/K), total financial payments/fixed assets (F/K), and total financial profits/fixed assets (πF/K, RHA), NFCs, Europe, 1995-2015


*Source: authors' calculation based on Worldscope data*

**Figure 4**. Financial development index (average values, 1995-2007)




*Source: authors' calculation based on World Bank data, Global financial development database* (GFDD)

**Figure 5**. Financial development, average percentage change by component, by country (1995 -2007)

| | Financial Development (aggregate) | Domestic credit to private sector to GDP | Liquid liabilities to GDP | Stock market capitalization to GDP | Stock market total value traded to GDP | Stock market turnover ratio |
|---|---|---|---|---|---|---|
| France | 92.23% | 22.70% | 17.46% | 220.84% | 426.96% | 77.95% |
| Germany | 71.85% | 4.81% | 67.15% | 164.70% | 318.73% | 68.14% |
| Italy | 177.98% | 79.95% | 11.97% | 199.45% | 880.37% | 372.99% |
| Spain | 260.95% | 159.94% | 81.67% | 264.78% | 1542.85% | 462.25% |
| Sweden | 113.63% | 24.92% | 8.62% | 110.48% | 398.36% | 170.89% |
| United Kingdom | 167.80% | 66.73% | 122.14% | 23.78% | 519.15% | 577.44% |
| Mean | 147.41% | 59.84% | 51.50% | 164.00% | 681.07% | 288.28% |
| Median | 140.72% | 45.83% | 42.31% | 182.07% | 473.05% | 271.94% |

*Source: authors' calculation based on World Bank data, Global financial development database* (GFDD)

**Table 1.** Estimation results, EU 14, dependent variable (I/K)[22]

| Variable | (1)[I] | (2)[II] | (3 - D20)[III] | (3b -D50)[IV] | (3c – D80)[V] |
|---|---|---|---|---|---|
| $(I/K)_{t-1}$ | 0.299*** | 0.321*** | 0.306*** | 0.368*** | 0.363*** |
| | (0.050) | (0.042) | (0.050) | (0.035) | (0.037) |
| $(I/K)_{t-2}$ | -0.059** | | -0.057** | | |
| | (0.024) | | (0.028) | | |
| $(S/K)_{t-1}$ | 0.303*** | 0.225*** | 0.219**[*] | 0.228**[*] | 0.217*** |
| | (0.074) | (0.081) | (0.055) | (0.057) | (0.055) |
| $(S/K)_{t-2}$ | 0.596*** | 0.350** | 0.416** | 0.204* | 0.234** |
| | (0.207) | (0.177) | (0.181) | (0.108) | (0.115) |
| $[(\pi - CD)/K]_{t-1}$ | 0.030*** | 0.005 | 0.034*** | 0.001 | 0.001 |
| | (0.010) | (0.012) | (0.010) | (0.016) | (0.025) |
| $[(\pi - CD)/K]_{t-1} * D_n$ | | | 0.045 | 0.049** | 0.058** |
| | | | (0.031) | (0.021) | (0.026) |
| $(\pi_F/K)_{t-1}$ | -0.070*** | -0.071** | -0.067** | -0.061* | -0.156** |
| | (0.026) | (0.029) | (0.029) | (0.035) | (0.035) |
| $(\pi_F/K)_{t-2}$ | -0.032** | -0.031* | -0.047** | -0.057** | -0.187*** |
| | (0.015) | (0.018) | (0.020) | (0.024) | (0.024) |
| $(\pi_F/K)_{t-1} * D_n$ | | | 0.098** | 0.090** | 0.184** |
| | | | (0.042) | (0.037) | (0.080) |
| $(\pi_F/K)_{t-2} * D_n$ | | | 0.176** | 0.107*** | 0.227*** |
| | | | (0.073) | (0.038) | (0.087) |
| $(F/K)_{t-1}$ | -0.122*** | -0.155*** | -0.049*** | -0.056*** | -0.065*** |
| | (0.046) | (0.059) | (0.018) | (0.018) | (0.018) |
| $(F/K)_{t-2}$ | -0.112*** | -0.099** | | | |
| | (0.043) | (0.045) | | | |
| $(F/K)_{t-1} * D_n$ | | | -0.141** | -0.086** | -0.078** |
| | | | (0.063) | (0.025) | (0.027) |
| $\Delta(TD/TA)_{t-1}$ | -0.031*** | -0.025** | -0.016* | -0.020** | -0.018** |
| | (0.010) | (0.012) | (0.009) | (0.009) | (0.009) |
| $(Q)_{t-1}$ | 0.117* | 0.155** | 0.149*** | 0.159** | 0.150** |
| | (0.067) | (0.067) | (0.033) | (0.066) | (0.067) |
| *Number of Observations* | 25726 | 12551 | 25726 | 25726 | 25726 |
| *Number of Firms* | 2881 | 2201 | 2881 | 2881 | 2881 |
| *Number of Instruments* | 36 | 29 | 36 | 36 | 36 |
| *p-value Hanses test* | 0.749 | 0.345 | 0.159 | 0.554 | 0.544 |
| *p-value A-B test (AR 2)* | 0.607 | 0.348 | 0.445 | 0.383 | 0.275 |
| *Time effects* | *yes* | *yes* | *yes* | *yes* | *yes* |
| *p-value Wald test for time effects* | 0.001 | 0.000 | 0.003 | 0.001 | 0.000 |
| *p-value* $[(\pi - CD)/K]_{t-1} + [(\pi - CD)/K]_{t-1} * D_n$ | | | 0.009 (0.034) | 0.002 (0.050) | 0.021 (0.059) |
| *p-value* $(\pi_F/K)_{t-n} + (\pi_F/K)_{t-n} * D_n$ | | | 0.041 (0.160) | 0.008 (0.079) | 0.008 (0.068) |
| *p-value* $(F/K)_{t-n} + (F/K)_{t-n} * D_n$ | | | 0.003 (-0.190) | 0.000 (-0.142) | 0.000 (-0.143) |

**Table 2**. Estimation results, aggregate European 14, dependent variable $(I/K)_t$[23]

| | (1)[I] | (2)[II] | (3)[III] | (4)[IV] | (5)[V] |
|---|---|---|---|---|---|
| $(I/K)_{t-1}$ | 0.304*** | 0.372*** | 0.326*** | 0.328*** | 0.381*** |
| | (0.043) | (0.038) | (0.040) | (0.042) | (0.035) |
| $(I/K)_{t-2}$ | - 0.054** | | - 0.050** | | |
| | (0.022) | | (0.021) | | |
| $(S/K)_{t-1}$ | 0.238*** | 0.184*** | 0.210*** | 0.218*** | 0.212*** |
| | (0.053) | (0.082) | (0.049) | (0.082) | (0.068) |
| $(S/K)_{t-2}$ | 0.176** | | 0.192** | 0.096** | 0.090*** |
| | (0.085) | | (0.080) | (0.044) | (0.032) |
| $[(\pi - CD)/K]_{t-1}$ | 0.037** | 0.011* | 0.038*** | 0.015* | 0.028** |
| | (0.016) | (0.005) | (0.009) | (0.009) | (0.012) |
| $[(\pi - CD)/K]_{t-1} * D_{LFD}$ | 0.556** | 0.221* | 0.451** | 0.275** | |
| | (0.218) | (0.118) | (0.201) | (0.132) | |
| $(\pi_F/K)_{t-1}$ | - 0.156*** | - 0.132*** | - 0.142*** | - 0.158*** | -0.020 |
| | (0.038) | (0.038) | (0.035) | (0.042) | (0.020) |
| $(\pi_F/K)_{t-2}$ | - 0.111*** | - 0.099*** | - 0.101*** | - 0.083*** | |
| | (0.029) | (0.026) | (0.027) | (0.030) | |
| $(\pi_F/K)_{t-1} * D_{LFD}$ | 0.180*** | 0.167*** | 0.148*** | 0.162*** | |
| | (0.043) | (0.046) | (0.037) | (0.050) | |
| $(\pi_F/K)_{t-2} * D_{LFD}$ | 0.163*** | 0.187*** | 0.150*** | 0.140** | |
| | (0.048) | (0.049) | (0.045) | (0.055) | |
| $(\pi_F/K)_{t-1} * D_{20}$ | | | 0.081*** | 0.104** | |
| | | | (0.031) | (0.047) | |
| $(F/K)_{t-1}$ | - 0.068*** | - 0.081* | - 0.062*** | - 0.107* | -0.076* |
| | (0.026) | 0.044 | (0.020) | (0.060) | (0.042) |
| $(F/K)_{t-1} * D_{LFD}$ | - 0.152*** | - 0.050 | - 0.143*** | - 0.079** | |
| | (0.054) | (0.036) | (0.052) | (0.031) | |
| $(F/K)_{t-1} * D_{20}$ | | | 0.078* | 0.287 | |
| | | | (0.047) | (0.204) | |
| $\Delta(TD/TA)_{t-1}$ | - 0.016** | - 0.030*** | - 0.015** | - 0.029*** | |
| | (0.007) | (0.008) | (0.007) | (0.009) | |
| $\Delta(TD/TA)_{t-1} * D_{LFD}$ | - 0.070*** | 0.056*** | - 0.072*** | 0.048** | |
| | (0.025) | (0.021) | (0.028) | (0.021) | |
| $(Q)_{t-1}$ | 0.182*** | 0.157** | 0.170*** | 0.113*** | |
| | (0.031) | (0.034) | (0.031) | (0.033) | |
| $(FD)_{t-1}$ | | | | | 0.213** |
| | | | | | (0.106) |
| $(FD)^2_{t-1}$ | | | | | -0.197** |
| | | | | | (0.092) |
| *Number of Observation* | 25726 | 14672 | 25726 | 14672 | 14795 |
| *Number of Firms* | 2881 | 2330 | 2881 | 2330 | 2453 |
| *Number of Instruments* | 46 | 44 | 48 | 44 | 32 |
| *p-value Hanses test* | 0.281 | 0.494 | 0.237 | 0.378 | 0.314 |
| *p-value A-B test (AR 2)* | 0.244 | 0.496 | 0.239 | 0.413 | 0.489 |
| *Time effects* | *yes* | *yes* | *yes* | *yes* | *yes* |
| *p-value Wald test for time effects* | 0.002 | 0.000 | 0.003 | 0.000 | 0.005 |
| *p-value* $[(\pi - CD)/K]_{t-1} + [(\pi - CD)/K]_{t-1} * D_{LFD}$ | 0.008 (0.593) | 0.049 (0.232) | 0.019 (0.489) | 0.028 (0.290) | |
| *p-value* $(\pi_F/K) + (\pi_F/K)_{t-1} * D_{LFD}$ | 0.013 (0.176) | 0.001 (0.123) | 0.075 (0.055) | 0.123 | |
| *p-value* $(F/K)_{t-1} + (F/K)_{t-1} * D_{LFD}$ | 0.000 (-0.220) | 0.027 (-0.131) | 0.000 (0.235) | 0.009 (-0.186) | |
| *p-value* $(TD/TA)_{t-1} + (TD/TA)_{t-1} * D_{LFD}$ | 0.001 (-0.086) | 0.182 | 0.003 (-0.087) | 0.329 | |
| *p-value* $(\pi_F/K) + (\pi_F/K)_{t-1} * D_{20}$ | | | 0.002 (-0.162) | 0.065 (-0.137) | |
| *p-value* $(\pi_F/K) * D_{20} + (\pi_F/K)_{t-1} * D_{LFD}$ | | | 0.000 (0.379) | 0.000 (0.406) | |
| *p-value* $(F/K)_{t-1} + (F/K)_{t-1} * D_{20}$ | | | 0.702 | 0.328 | |
| *p-value* $(F/K)_{t-1} * D_{20} + (F/K)_{t-1} * D_{LFD}$ | | | 0.293 | 0.302 | |

**Table 3.** Economic effects by country, disaggregation by level of Financial D evelopment1995-2007.

| | | S/K | | | π/K | | | $\pi_F$/K | | | F/K | | | ΔTD/TA | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Country | FD | Long-run Coefficient | Actual cumulative Change | Economic Effect | Long-run Coefficient | Actual cumulative Change | Economic Effect | Long-run Coefficient | Actual cumulative Change | Economic Effect | Long-run Coefficient | Actual cumulative Change | Economic Effect | Long-run Coefficient | Actual cumulative Change | Economic Effect |
| Germany | HD | 0.293 | 0.747 | 0.219 | 0.018 | 2.911 | 0.052 | -0.368 | 1.319 | -0.485 | -0.129 | 0.442 | -0.057 | -0.048 | 0.029 | -0.001 |
| Spain | HD | 0.293 | 0.135 | 0.040 | 0.018 | 0.536 | 0.010 | -0.368 | 0.713 | -0.262 | -0.129 | 0.517 | -0.067 | -0.048 | 0.391 | -0.019 |
| Finland | HD | 0.293 | 1.227 | 0.360 | 0.018 | 1.140 | 0.021 | -0.368 | 0.771 | -0.284 | -0.129 | 1.017 | -0.131 | -0.048 | -0.300 | 0.014 |
| France | HD | 0.293 | 0.783 | 0.229 | 0.018 | 1.003 | 0.018 | -0.368 | 0.423 | -0.156 | -0.129 | 0.508 | -0.065 | -0.048 | 0.050 | -0.002 |
| The Netherlands | HD | 0.293 | 0.614 | 0.180 | 0.018 | 0.412 | 0.007 | -0.368 | 0.789 | -0.290 | -0.129 | -0.044 | 0.006 | -0.048 | 0.070 | -0.003 |
| Sweden | HD | 0.293 | 1.830 | 0.536 | 0.018 | 1.391 | 0.025 | -0.368 | 1.927 | -0.709 | -0.129 | 1.866 | -0.241 | -0.048 | -0.051 | 0.002 |
| UK | HD | 0.293 | 0.842 | 0.247 | 0.018 | 1.273 | 0.023 | -0.368 | 1.367 | -0.503 | -0.129 | 1.029 | -0.133 | -0.048 | 0.233 | -0.011 |
| Belgium | LD | 0.293 | 0.509 | 0.149 | 0.369 | 1.428 | 0.527 | 0.196 | 0.387 | 0.076 | -0.209 | 0.727 | -0.152 | 0.000 | 0.042 | 0.000 |
| Denmark | LD | 0.293 | 0.714 | 0.209 | 0.369 | 0.675 | 0.249 | 0.196 | 0.183 | 0.036 | -0.209 | 1.226 | -0.256 | 0.000 | 0.108 | 0.000 |
| Greece | LD | 0.293 | -0.211 | -0.062 | 0.369 | -0.284 | -0.105 | 0.196 | 0.099 | 0.019 | -0.209 | -0.301 | 0.063 | 0.000 | 0.289 | 0.000 |
| Ireland | LD | 0.293 | 1.315 | 0.385 | 0.369 | 1.333 | 0.492 | 0.196 | -0.015 | -0.003 | -0.209 | 0.910 | -0.190 | 0.000 | -0.049 | 0.000 |
| Italy | LD | 0.293 | 0.861 | 0.252 | 0.369 | 1.050 | 0.387 | 0.196 | 0.276 | 0.054 | -0.209 | 0.575 | -0.120 | 0.000 | -0.012 | 0.000 |
| Austria | LD | 0.293 | 0.067 | 0.020 | 0.369 | 1.004 | 0.370 | 0.196 | 0.168 | 0.033 | -0.209 | 1.273 | -0.266 | 0.000 | 0.055 | 0.000 |
| Portugal | LD | 0.293 | 0.749 | 0.219 | 0.369 | 0.165 | 0.061 | 0.196 | 1.300 | 0.255 | -0.209 | 0.514 | -0.107 | 0.000 | 0.455 | 0.000 |
| *Europe* | | 0.847 | 0.727 | 0.616 | 0.000 | 1.003 | 0.000 | -0.150 | 0.693 | -0.104 | -0.374 | 0.733 | -0.274 | -0.037 | 0.093 | -0.003 |

*Note*: *The economic effects are based on estimated elasticities in Table 1, Column 2.*

**Table 4.** Economic effects by country, disaggregation by level of financial development (FD) and by size, 1995-2007.

| | | | S/K | | | (π-CD)/K | | | $\pi_F$/K | | | F/K | | | ΔTD/TA | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Country | FD | SIZE | Long-run Coefficient | Actual cumulative Change | Economic Effect | Long-run Coefficient | Actual cumulative Change | Economic Effect | Long-run Coefficient | Actual cumulative Change | Economic Effect | Long-run Coefficient | Actual cumulative Change | Economic Effect | Long-run Coefficient | Actual cumulative Change | Economic Effect |
| Germany | HD | LARGE | 0.467 | 0.747 | 0.349 | 0.022 | 2.911 | 0.064 | -0.359 | 1.093 | -0.392 | -0.159 | 0.358 | -0.057 | -0.043 | 0.029 | -0.001 |
| | | SMALL | | | | | | | -0.204 | 1.755 | -0.358 | 0.000 | 0.466 | 0.000 | | | |
| Spain | HD | LARGE | 0.467 | 0.135 | 0.063 | 0.022 | 0.536 | 0.012 | -0.359 | 0.588 | -0.211 | -0.159 | 0.569 | -0.091 | -0.043 | 0.391 | -0.017 |
| | | SMALL | | | | | | | -0.204 | 1.444 | -0.294 | 0.000 | 0.287 | 0.000 | | | |
| Finland | HD | LARGE | 0.467 | 1.227 | 0.573 | 0.022 | 1.140 | 0.025 | -0.359 | 0.720 | -0.258 | -0.159 | 1.261 | -0.201 | -0.043 | -0.300 | 0.013 |
| | | SMALL | | | | | | | -0.204 | 1.193 | -0.243 | 0.000 | 0.891 | 0.000 | | | |
| France | HD | LARGE | 0.467 | 0.783 | 0.366 | 0.022 | 1.003 | 0.022 | -0.359 | 0.449 | -0.161 | -0.159 | 0.412 | -0.066 | -0.043 | 0.050 | -0.002 |
| | | SMALL | | | | | | | -0.204 | 1.760 | -0.359 | 0.000 | 0.933 | 0.000 | | | |
| The Netherlands | HD | LARGE | 0.467 | 0.614 | 0.287 | 0.022 | 0.412 | 0.009 | -0.359 | 0.684 | -0.245 | -0.159 | 0.189 | -0.030 | -0.043 | 0.070 | -0.003 |
| | | SMALL | | | | | | | -0.204 | 1.070 | -0.218 | 0.000 | -0.745 | 0.000 | | | |
| Sweden | HD | LARGE | 0.467 | 1.830 | 0.854 | 0.022 | 1.390 | 0.031 | -0.359 | 1.310 | -0.470 | -0.159 | 1.670 | -0.266 | -0.043 | -0.051 | 0.002 |
| | | SMALL | | | | | | | -0.204 | 2.417 | -0.493 | 0.000 | 2.129 | 0.000 | | | |
| UK | HD | LARGE | 0.467 | 0.842 | 0.393 | 0.022 | 1.273 | 0.028 | -0.359 | 1.154 | -0.414 | -0.159 | 1.004 | -0.160 | -0.043 | 0.233 | -0.010 |
| | | SMALL | | | | | | | -0.204 | 1.715 | -0.350 | 0.000 | 1.381 | 0.000 | | | |
| Belgium | LD | LARGE | 0.467 | 0.509 | 0.238 | 0.432 | 1.428 | 0.616 | 0.000 | 0.394 | 0.000 | -0.277 | 2.232 | -0.618 | 0.000 | 0.042 | 0.000 |
| | | SMALL | | | | | | | 0.604 | 1.849 | 1.117 | 0.000 | 1.885 | 0.000 | | | |
| Denmark | LD | LARGE | 0.467 | 0.714 | 0.333 | 0.432 | 0.675 | 0.291 | 0.000 | -0.724 | 0.000 | -0.277 | 1.209 | -0.335 | 0.000 | 0.108 | 0.000 |
| | | SMALL | | | | | | | 0.604 | 0.325 | 0.196 | 0.000 | 1.284 | 0.000 | | | |
| Greece | LD | LARGE | 0.467 | -0.211 | -0.099 | 0.432 | -0.284 | -0.123 | 0.000 | 0.052 | 0.000 | -0.277 | -0.279 | 0.077 | 0.000 | 0.289 | 0.000 |
| | | SMALL | | | | | | | 0.604 | 0.926 | 0.560 | 0.000 | -0.264 | 0.000 | | | |
| Ireland | LD | LARGE | 0.467 | 1.315 | 0.614 | 0.432 | 1.333 | 0.575 | 0.000 | 0.578 | 0.000 | -0.277 | 0.518 | -0.143 | 0.000 | -0.049 | 0.000 |
| | | SMALL | | | | | | | 0.604 | 3.674 | 2.219 | 0.000 | 1.727 | 0.000 | | | |
| Italy | LD | LARGE | 0.467 | 0.861 | 0.402 | 0.432 | 1.050 | 0.453 | 0.000 | -0.048 | 0.000 | -0.277 | 0.475 | -0.131 | 0.000 | -0.012 | 0.000 |
| | | SMALL | | | | | | | 0.604 | 0.990 | 0.598 | 0.000 | 1.503 | 0.000 | | | |
| Austria | LD | LARGE | 0.467 | 0.067 | 0.031 | 0.432 | 1.004 | 0.433 | 0.000 | 0.210 | 0.000 | -0.277 | 1.064 | -0.294 | 0.000 | 0.055 | 0.000 |
| | | SMALL | | | | | | | 0.604 | -0.681 | -0.411 | 0.000 | 2.205 | 0.000 | | | |
| Portugal | LD | LARGE | 0.467 | 0.749 | 0.350 | 0.432 | 0.165 | 0.071 | 0.000 | 1.261 | 0.000 | -0.277 | 0.555 | -0.153 | 0.000 | 0.455 | 0.000 |
| | | SMALL | | | | | | | 0.604 | -0.205 | -0.124 | 0.000 | 0.179 | 0.000 | | | |
| *Europe* | | LARGE | 0.997 | 0.727 | 0.725 | 0.053 | 1.003 | 0.054 | -0.179 | 0.560 | -0.100 | -0.077 | 0.802 | -0.062 | -0.025 | 0.093 | -0.002 |
| | | SMALL | | | | | | | 0.242 | 1.302 | 0.315 | -0.270 | 0.990 | -0.268 | | | |

*Note: the economic effects for single countries are based on estimated elasticities in Table 2, specification 4. The economic effects for Europe are based on estimated elasticities in Table 1, Column 3, specification 2.*

## Appendix

**Table 1A.** Variables notations, definitions, and codes.

| *Symbol* | *Variable* | *Definition* | *Worldscope Code* |
|---|---|---|---|
| $I$ | Investment | Addition to fixed assets | WC04601 |
| $K$ | Capital stock | Net fixed capital stock | WC02501 |
| $S$ | Sales | Net sales | WC01001 |
| $\pi$ | Net profit rate | Operating income-depreciation | WC01250-WC04051 |
| $F$ | Financial Payments | Interest + cash dividends paid | WC01251+ WC04551 |
| $\pi_F$ | Non-operating profit | Non-operating profit from interest and dividends | WC01266+ WC01268 |
| $FA$ | Financial assets | Cash, other investment, short-term investment | WC02003+ WC02250+ WC02008 |
| $Q$ | Average Tobin's Q | (Market share price*common share outstanding + total liabilities)/total assets | $\frac{\text{WC08001} + \text{WC03551}}{\text{WC02999}}$ |
| $TD$ | Total debt | sum of long-term and short-term debt | WC03255 |
| $FD$ | Financial Development | Standardized average of Stock market and financial intermediaries development over GDP | Index1 + Findex1 |

**Table 2A**. Summary statistic for the aggregate sample (Europe)

| *Variable* | *Mean* | | *Std. Dev.* | *Observations* | |
|---|---|---|---|---|---|
| $I/K$ | overall | 0.25 | 0.20 | N = | 25726 |
| | between | 0.16 | 1.10 | n = | 2881 |
| | within | 0.14 | -0.44 | T-bar = | 15.9 |
| $S/K$ | overall | 13.49 | 28.98 | N = | 25726 |
| | between | 33.92 | 0.06 | n = | 2881 |
| | within | 15.60 | -281.82 | T-bar = | 15.6 |
| $(\pi - CD)/K$ | overall | 0.66 | 2.50 | N = | 25726 |
| | between | 2.10 | -17.98 | n = | 2881 |
| | within | 1.93 | -74.66 | T-bar = | 15.1 |
| $\pi_F/K$ | overall | 0.032 | 0.12 | N = | 25726 |
| | between | 0.056 | 0.89 | n = | 2881 |
| | within | 0.10 | -0.86 | T-bar = | 15.8 |
| $F/K$ | overall | 0.46 | 3.41 | N = | 25726 |
| | between | 2.79 | 85.69 | n = | 2881 |
| | within | 2.59 | 85.19 | T-bar = | 15.1 |
| $I/\pi$ | overall | 0.38 | 0.26 | N = | 25726 |
| | between | 0.22 | 0.97 | n = | 2881 |
| | within | 0.18 | -0.25 | T-bar = | 15.2 |
| $FA/K$ | overall | 2.44 | 13.77 | N = | 25726 |
| | between | 9.86 | 0.10 | n = | 2881 |
| | within | 10.48 | -317.04 | T-bar = | 15.6 |
| $Q$ | overall | 1.54 | 0.99 | N = | 25329 |
| | between | 0.71 | 0.34 | n = | 2864 |
| | within | 0.73 | -3.43 | T-bar = | 15.7 |

*Source: authors' calculation based on Worldscope data*
*N* = number of total observations, *n*= number of groups, *T-bar* = average time period

**Table 3A**. Estimation results, robustness test, dependent variable $(I/K)_t$[24]

| | (1)[I] | (2)[II] | (3)[III] | (3b)[IV] | (4)[V] | (4b)[VI] | (5)[VII] |
|---|---|---|---|---|---|---|---|
| $(I/K)_{t-1}$ | 0.304*** | 0.357*** | 0.398*** | 0.400*** | 0.298*** | 0.298*** | 0.362*** |
| | (0.058) | (0.034) | (0.034) | (0.035) | (0.018) | (0.018) | (0.036) |
| $(I/K)_{t-2}$ | -0.058** | -0.055** | | | | | |
| | (0.029) | (0.025) | | | | | |
| $(S/K)_{t-1}$ | 0. 293*** | 0. 239*** | 0.233*** | 0.241*** | 0.003*** | 0.004*** | 0.325*** |
| | (0.079) | (0.059) | (0.067) | (0.067) | (0.001) | (0.001) | (0.065) |
| $(S/K)_{t-2}$ | 0. 622** | | | | | | |
| | (0.247) | | | | | | |
| $[(\pi - CD)/K]_{t-1}$ | 0.036*** | 0.027*** | 0.037*** | 0.037*** | 0.003 | 0.005 | 0.026** |
| | (0.010) | (0.009) | (0.011) | (0.011) | (0.003) | (0.004) | (0.011) |
| $[(\pi - CD)/K]_{t-1} \times FD_c$ | | | -0.012 | | | | |
| | | | (0.023) | | | | |
| $(\pi_F/K)_{t-1}$ | -0.066** | -0.042** | -0.051** | -0.054** | -0.090*** | -0.140*** | -0.049** |
| | (0.028) | (0.018) | (0.024) | (0.023) | (0.035) | (0.052) | (0.023) |
| $(\pi_F/K)_{t-2}$ | -0.034** | | | | | | |
| | (0.017) | | | | | | |
| $(\pi_F/K)_{t-1} \times FD_c$ | | | -0.101* | -0.118** | | | |
| | | | (0.057) | (0.057) | | | |
| $(F/K)_{t-1}$ | -0.127*** | | -0.104*** | -0.103*** | -0.005*** | -0.012* | -0.082** |
| | (0. 046) | | (0.032) | (0.033) | (0.001) | (0.007) | (0.044) |
| $(F/K)_{t-2}$ | -0.117*** | | | | | | |
| | (0. 049) | | | | | | |
| $(F/K)_{t-1} \times FD_c$ | | | -0.085** | -0.084* | | | |
| | | | (0. 042) | (0. 044) | | | |
| $(i/K)_{t-1}$ | | -0.015 | | | | | |
| | | (0. 012) | | | | | |
| $(CD/K)_{t-1}$ | | -0.017 | | | | | |
| | | (0. 018) | | | | | |
| $\Delta(TD/TA)_{t-1}$ | -0.032*** | | | | | | |
| | (0. 012) | | | | | | |
| $(FD_c)_{t-1}$ | | | -0.986*** | -1.051*** | | | |
| | | | (0. 187) | (0. 198) | | | |
| Number of Observation | 22771 | 21833 | 17696 | 17696 | 39123 | 21191 | 18250 |
| Number of Firms | 2666 | 2665 | 2561 | 2561 | 3214 | 2730 | 2702 |
| Number of Instruments | 31 | 30 | 32 | 30 | 32 | 24 | 24 |
| *p-value* Hanses test | 0.531 | 0.236 | 0.354 | 0.380 | 0.250 | 0.181 | 0.233 |
| *p-value* A-B test (AR 2) | 0.578 | 0.055 | 0.189 | 0.171 | 0.397 | 0.910 | 0.733 |
| Time effects | *yes* | *yes* | *yes* | *yes* | *yes* | *yes* | *yes* |
| *p-value* Wald test for time effects | 0.001 | 0.000 | 0.003 | 0.000 | 0.001 | 0.003 | 0.001 |

**Table 4A.** Estimation results, evidence at 1-digit sector disaggregation, dependent variable $(I/K)_t$[25]

| Variable | Agriculture, Fishing and Foresting | | Mining | | Construction | | Manufacturing | |
|---|---|---|---|---|---|---|---|---|
| | Pre-crisis | Full period | Pre-crisis | Full period | Pre-crisis | Full period | Pre-crisis | Full period |
| $(I/K)_{t-1}$ | 0.374*** (0.035) | 0.393*** (0.032) | 0.381*** (0.032) | 0.392*** (0.031) | 0.371*** (0.035) | 0.395*** (0.031) | 0.361*** (0.031) | 0.389*** (0.032) |
| $(S/K)_{t-1}$ | 0.227*** (0.069) | 0.185*** (0.053) | 0.250*** (0.063) | 0.199*** (0.054) | 0.216*** (0.068) | 0.179*** (0.052) | 0.229*** (0.031) | 0.196*** (0.051) |
| $[(\pi - CD)/K]_{t-1}$ | 0.027** (0.012) | 0.041*** (0.009) | 0.024** (0.012) | 0.040*** (0.009) | 0.027** (0.012) | 0.041*** (0.009) | 0.027** (0.012) | 0.040*** (0.009) |
| $(\pi_F/K)_{t-1}$ | -0.018 (0.021) | -0.013 (0.017) | -0.034* (0.020) | -0.023 (0.017) | -0.017 (0.021) | 0.014 (0.017) | -0.056 (0.049) | -0.058* (0.032) |
| $(\pi_F/K)_{t-1} \times SECTOR$ | -0.120 (0.162) | -0.113*** (0.040) | 0.189** (0.092) | 0.211*** (0.069) | 0.117 (0.160) | -0.110 (0.398) | 0.062 (0.074) | 0.071** (0.034) |
| $(F/K)_{t-1}$ | -0.090** (0.043) | -0.019 (0.028) | -0.078** (0.028) | -0.010 (0.028) | -0.093** (0.043) | -0.016 (0.026) | -0.129** (0.060) | -0.028 (0.026) |
| $(F/K)_{t-1} \times SECTOR$ | -0.676 (0.530) | -0.034 (0.106) | -0.734 (0.635) | -0.208 (0.277) | -0.063 (0.156) | -0.058 (0.222) | 0.105 (0.103) | -0.020 (0.055) |
| Number of Observation | 15741 | 27566 | 15741 | 27566 | 15741 | 27566 | 15741 | 27566 |
| Number of Firms | 2456 | 2962 | 2456 | 2962 | 2456 | 2962 | 2456 | 2962 |
| Number of Instruments | 27 | 34 | 27 | 34 | 27 | 34 | 27 | 34 |
| *p-value* Hanses test | 0.450 | 0.333 | 0.340 | 0.403 | 0.597 | 0.517 | 0.652 | 0.436 |
| *p-value* A-B test (AR 2) | 0.252 | 0.155 | 0.234 | 0.122 | 0.264 | 0.132 | 0.211 | 0.140 |
| Time effects | *yes* | *yes* | *yes* | *yes* | *yes* | *yes* | *yes* | *yes* |
| *p-value* Wald test for time effects | 0.002 | 0.002 | 0.000 | 0.000 | 0.003 | 0.001 | 0.000 | 0.000 |
| *p-value* $(\pi_F/K) + (\pi_F/K)_{t-1} * S$ | / | 0.001 (-0.126) | 0.003 (0.055) | 0.004 (0.188) | / | / | / | 0.213 |
| *p-value* $(F/K) + (F/K)_{t-1} * S$ | 0.004 (-0.766) | / | 0.002 (-0.812) | / | 0.231 | / | 0.749 | / |

**Table 4A continued.** Estimation results, evidence at 1-digit sector disaggregation, dependent variable $(I/K)_t$,

| Variable | Transportation, Communications, Electric, Gas, and Sanitary Services | | Wholesale Trade | | Retail Trade | | Services | |
|---|---|---|---|---|---|---|---|---|
| | Pre-crisis | Full period | Pre-crisis | Full period | Pre-crisis | Full period | Pre-crisis | Full period |
| $(I/K)_{t-1}$ | 0.364*** (0.037) | 0.393*** (0.031) | 0.363*** (0.036) | 0.389*** (0.033) | 0.379*** (0.034) | 0.389*** (0.033) | 0.367*** (0.033) | 0.403*** (0.032) |
| $(S/K)_{t-1}$ | 0.217*** (0.067) | 0.211*** (0.056) | 0.228*** (0.086) | 0.191*** (0.058) | 0.220*** (0.069) | 0.197*** (0.055) | 0.209*** (0.068) | 0.166*** (0.050) |
| $[(\pi - CD)/K]_{t-1}$ | 0.027** (0.012) | 0.033*** (0.010) | 0.036* (0.020) | 0.035** (0.020) | 0.035*** (0.011) | 0.039*** (0.009) | 0.036*** (0.011) | 0.041*** (0.009) |
| $(\pi_F/K)_{t-1}$ | -0.017 (0.023) | 0.033** (0.023) | -0.020 (0.026) | -0.019 (0.017) | -0.043* (0.022) | -0.020 (0.023) | -0.030 (0.025) | -0.016 (0.019) |
| $(\pi_F/K)_{t-1} \times SECTOR$ | -0.028 (0.075) | -0.177* (0.095) | -0.636* (0.348) | -0.199 (0.317) | 0.033 (0.075) | 0.127 (0.281) | -0.168** (0.084) | -0.039 (0.116) |
| $(F/K)_{t-1}$ | -0.084* (0.045) | -0.078 (0.081) | -0.038 (0.044) | -0.022 (0.033) | -0.063 (0.039) | -0.036 (0.030) | -0.052 (0.049) | -0.014 (0.036) |
| $(F/K)_{t-1} \times SECTOR$ | -0.079 (0.186) | -0.219* (0.125) | -0.548 (0.429) | -0.093 (0.259) | -0.059 (0.043) | 0.393 (0.564) | 0.058 (0.061) | -0.022 (0.063) |
| Number of Observation | 15741 | 27566 | 15741 | 27566 | 15741 | 27566 | 15741 | 27566 |
| Number of Firms | 2456 | 2962 | 2456 | 2962 | 2456 | 2962 | 2456 | 2962 |
| Number of Instruments | 27 | 34 | 27 | 34 | 27 | 34 | 27 | 34 |
| *p-value* Hanses test | 0.549 | 0.391 | 0.378 | 0.235 | 0.532 | 0.325 | 0.456 | 0.135 |
| *p-value* A-B test (AR 2) | 0.251 | 0.146 | 0.175 | 0.132 | 0.216 | 0.128 | 0.194 | 0.163 |
| Time effects | *yes* | *yes* | *yes* | *yes* | *yes* | *yes* | *yes* | *yes* |
| *p-value* Wald test for time effects | 0.004 | 0.001 | 0.005 | 0.001 | 0.000 | 0.000 | 0.004 | 0.001 |
| *p-value* $(\pi_F/K) + (\pi_F/K)_{t-1} * S$ | / | 0.155 | 0.042 (-0.656) | / | 0.514 | / | 0.009 (-0.198) | / |
| *p-value* $(F/K) + (F/K)_{t-1} * S$ | 0.355 | 0.043 (-0.297) | / | / | / | / | / | / |

## Endnotes

[1] See Kaplan and Zingales (1997) and the responses by Fazzari *et al*. (2000), Almeida and Campello (2007), and Hadlock and Pierce (2010).

[2] Another channel in which financialization affects the 'real' economy is via its pressures on labour market institutions (Darcillon, 2015), and the wage share (Alvarez, 2015; Kohler *et al.*, 2018). There is evidence that financialization reduced both workers' bargaining power and wage levels.

[3] For a comprehensive survey of the empirical literature on financialization and investment see Davis (2017).

[4] We use the approximate average measure for Tobin's Q suggested by Lindenberg and Ross (1981) and Chung and Pruitt (1994:71. See Table 1A in the Appendix for a detailed description. This measure is used also in Love and Zicchino (2006), who use the same database as in this paper. Although this variable showed variability in terms of explanatory power, we decided to include it given that this can provide a good comparison with the mainstream literature, testing the role of asset prices on investment while taking into account NFCs' financialization and countries' financial development. Moreover, the average value of Tobin's Q for the period considered is 1.5, providing an interesting argument against the claim that the fall in investment could be the cause of financialization, rather than the consequence. In fact, such a high value of Tobin's Q reveals that investment opportunities have been far from scarce for the European NFCs in our sample.

[5] This follows the principle of cash flow accounting to measure retained earnings.

[6] Output/potential output, $\frac{Y}{Y*}$, is equal to $\frac{\left(\frac{Y}{Y*}\right)}{\left(\frac{Y*}{K}\right)}$, where $\left(\frac{Y*}{K}\right)$ is potential output as a ratio to capital stock, which is a measure of technology. With constant technology in the short run, time effects capture the technological change. Thus, $\frac{Y}{K}$ is often used as a measure of capacity utilization due to a lack of data for $Y*$.

[7] Interest and dividends do not exhaust the spectrum of non-operating financial incomes of NFCs. Krippner (2005) shows how capital gains account for a considerable part of NFCs financial profits. However, as also recognised by Orhangazi (2008) with respect to Compustat database, also in Worldscope data on the NFCs' capital gains are not available.

[8] The FD index is the sum of Index 1 and Findex 1 from Demirguc-Kunt and Levine (1996). Index 1 summarizes the stock market development and is the sum of (standardized indices of) market capitalization to GDP, total value traded to GDP, and turnover (i.e. total value traded/market capitalization). Findex1 account for the financial intermediary development and is the sum of (standardized indices of) ratio of liquid liabilities to GDP (i.e. M3/GDP), and ratio of domestic credit to private sector to GDP. These indices are computed by using a simple standardization formula.

[9] Using Index1 and Findex1 separately to distinguish different financial channels within the 'bank based' vs. 'market-based' economic systems is not helpful when employing an endogenous money approach.

[10] Given that smaller companies are relatively more liquidity constrained, we could also expect these firms to value the flexibility derived from the opportunity of financial investments, such that there is a trade-off with fixed investment for small firms as financial investment opportunities increase. This is reflected by the level of financial development in our estimations.

[11] Given restricted data availability for the NFCs in Luxembourg, we exclude this country.

[12] Love (2003), Guariglia and Carpenter (2008), Love and Zichino (2006), Chirinko *et al*. (1999) and Orhangazi (2008) follow similar strategies to exclude the outliers.

[13] See Beck *et al*. (2010) for a discussion and standard application of these measures.

[14] The classification described above is relative, and conditional on both the standardization process and the average level of FD computed among the countries included in the sample.

[15] Interest and dividend payments may capture different mechanisms: dividend payments are a discretionary expenditure, whereas interest payments are obligatory. We provide results for an alternative specification in the Appendix, in which we disaggregate the measure for financial payments. Here we find that both interest and cash dividends payments have a negative albeit insignificant effect on investment. In addition, the value of the Hansen test shows that the available instruments for these variables are inappropriate. We thus opted for a model that include the aggregate measure of financial payments. This is also allowing for a more precise comparison between our results for this specification and the ones by Orhangazi (2008).

[16] Weighted regression (w=1/total country obs.). I and II specifications based on Equation (3), III and IV specifications based on Equation (4), two-step difference-GMM estimations. Coefficients for the year dummies are not reported. Robust corrected standard error in parenthesis. * significant at 10%, ** significant ant 5%, *** significant at 1%.

[17] The methodology to obtain this measure is the same as in the analysis using the median levels of financial development. In this case, we employ the continuous measure of the index.

[18] The derivative shows the instantaneous rate of change in the value of $\frac{I}{K}$ as $FD$ changes, *ceteris paribus*. Because of the nature of curvilinear relationships, the rate is itself continuously changing throughout the interval from $FD_{t-i}$ to $FD_t$ .

[19] In mathematical terms, $if\ FD > 0.54 \rightarrow \frac{d\frac{I}{K}}{dFD} < 0$ and $if\ FD < 0.54 \rightarrow \frac{d\frac{I}{K}}{dFD} > 0$.

[20] The literature about 'buybacks', or share repurchase, is quite focused on the US, in which reporting standards seems to produce more informative evidence about this relatively new practice. We also explored alternative 'indirect' ways to gather information about share buybacks, e.g. trough outstanding shares figures or share price volatility. However, we could not find a consistent method to isolate the measurement of this phenomenon from the various other reasons (both micro and macro) as in the analysis due to which the number and price of shares may change. This would require a totally different approach to the estimation proposed in this work. In addition to the above, the decision to buy back shares

(thus reducing the amount of outstanding equity) could also be related to an aim to modify the capital structure of the company (i.e. the relative proportions of equity and debt) for purposes that might differ from increasing share prices. Moreover, when a company repurchases its own shares, on the one hand there is a reduction in the supply of shares and, on the other hand, the value of the company's assets decrease when cash is used to buy back them. When a company repurchase shares at market price, these two effects can offset each other, thus not affecting the share price.

[21] We also performed robustness tests based on a further (2-digit) disaggregation of the different sectors, however this exercise did not add further information to what was previously discussed. These results are available upon request. The only partial evidence resulted from this exercise could also be due to the fact that the sectoral composition differs with respect to countries, and our sample is not able to reflect this feature. We believe that sectoral data could be better fit for this purpose.

[22] Weighted regression (w=1/total country obs.). Specifications I (full sample) and II (period 1995-2008) are based on Equation (1), specification III is based on Equation (2), two-step difference-GMM estimations. Coefficients for the year dummies are not reported. Robust corrected standard error in parenthesis. ***** significant at 10%, ****** significant ant 5%, ******* significant at 1%. The magnitudes of the significant interacted coefficients are listed in parenthesis next to the relative p-values.

[23] Weighted regression (weight=1/total country obs.). Specifications I (full sample) and II (period 1995-2008) are based on Equation (3), specification III and IV (period 1995-2008) are based on Equation (4), specification V is based on equation (5a). Two-step difference-GMM estimations. Coefficients for the year dummies are not reported. Robust corrected standard error in parenthesis. ***** significant at 10%, ****** significant ant 5%, ******* significant at 1%. The magnitudes of the significant interacted coefficients are listed in parenthesis after the relative p-values.

[24] Weighted regression (weight=1/total country obs.). Specifications I (full sample) and II (period 1995-2008) are based on Equation (3), specification III and IV (period 1995-2008) are based on Equation (5a), specifications V, VI, and VII are based on equation (1). Two-step difference-GMM estimations. Coefficients for the year dummies are not reported. Robust corrected standard error in parenthesis. ***** significant at 10%, ****** significant ant 5%, ******* significant at 1%. The magnitudes of the significant interacted coefficients are listed in parenthesis next to the relative p-values.

[25] Weighted regression (weight=1/total country obs.). All the specifications are based on Equation (1). Two-step difference-GMM estimations. Coefficients for the year dummies are not reported. Robust corrected standard error in parenthesis. ***** significant at 10%, ****** significant ant 5%, ******* significant at 1%. The magnitudes of the significant interacted coefficients are listed in parenthesis next to the relative p-values.