The effects of financialization on investment: Evidence from firm-level data for the UK

Daniele Tori

University of Greenwich

And

Őzlem Onaran

University of Greenwich

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Abstract: This paper estimates the effects of financialization on physical investment in the UK using panel data based on balance-sheets of publicly listed non-financial companies supplied by Worldscope for the period 1985-2013. We find robust evidence of an adverse effect of not only financial payments (interests and dividends) but also financial incomes on the rate of accumulation. The negative impacts of financial incomes from interests and dividends are particularly strong for the pre-crisis period. Our findings support the 'financialization thesis' that the increasing orientation of the non-financial sector towards financial activities is ultimately leading to lower physical investment, hence to stagnant or fragile growth, as well as long term concerns for productivity.

Keywords: Financialization, Investment, Non-financial sector, Firm data, United Kingdom.

JEL classification: C23, D22, G30.

Corresponding Author: Őzlem Onaran: University of Greenwich, Business School, Park Row, Greenwich, London, SE10 9LS, UK, email: o.onaran@greenwich.ac.uk
Daniele Tori: University of Greenwich, Business School, Park Row, Greenwich, London, SE10 9LS, UK, email: d.tori@greenwich.ac.uk

1. Introduction

This paper estimates the effects of financialization on physical investment in the UK using panel data based on balance-sheets of non-financial publicly listed companies for the period of 1985-2013.

In the 1950s Joan Robinson (1952:86) stated that "where enterprise leads finance follows", describing a financial system that was merely supporting trajectories already planned by the productive sector. In contrast, recent structural changes in the functioning of capitalism mark the growing prominence of the 'financial motives' over the traditional productive purposes. The growing importance of finance led to a structural alteration in the sectoral composition of economic systems. In this sense, the picture for the UK economy is emblematic. In the 1970s, the share of manufacturing in value added was equal to 31% whilst the financial activities (Financial Intermediation and Real Estate -FIRE) counted for only 13%, as shown in Figure 1. Since 1991 the share of FIRE has surpassed manufacturing, and as of 2013 the financial sector represents 31.2% of the total value added, whilst that of manufacturing dropped to 9.8%. Instead of being merely a vehicle for more efficient production plans, in the last decades the financial activities have grown disproportionately compared to the financing requirements of the rest of the economy. This new configuration raises the question of how this imbalance affected the accumulation processes in the non-financial sector.

[Figure 1]

The mainstream literature asserts that financial markets facilitate the financing and the efficient allocation of investment (King and Levine, 1993) argue that there is a positive correlation

between financial markets' development and accumulation, growth, and efficiency. The development of financial markets is expected to have a positive impact on growth by fostering increases in total productivity (Beck et al., 2000), directly facilitating the efficient allocation of investment resources (Love, 2003; Beck and Levine, 2004), and alleviating companies' financing constraints (Gilchrist and Himmelberg, 1995), which is in turn expected to allow them to reach higher levels of efficiency and growth (Merton, 1995; Levine, 2005). However, Arestis and Demetriades (1997) warn against the robustness of these results based on cross-country evidence, which do not take into account the 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 crash, the disproportionate growth of the financial system has been questioned in some mainstream contributions as well (Cecchetti and Kharroubi, 2012; Beck et al., 2014). In particular, Law and Singh (2014) argue that there is a 'threshold effect' in the relationship between the extension of financial resources and growth; thus the expansion of the financial system is beneficial to growth only up to a point. Recently, a similar argument has been put forward by an IMF Working Paper with respect to emerging markets (Sahay et al. (2015), which argues that 'too much finance' increases both economic and financial volatility.

The Post-Keynesian literature on 'financialization' illustrates the negative impacts of expanding financial sector on the economic systems (Epstein, 2005), on income distribution and demand (Onaran et al., 2010; Hein, 2013), and in particular on investment (Stockhammer, 2004, 2006; Orhagnazi, 2008a; Dallery, 2009). 'Financialization' is a self-reinforcing socio-economic process, which manifests itself in the growing prominence of behaviours derived from the functioning of the financial sector. A similar argument can be found in the marxist literature, for which the long-term trajectories of the economies gravitate more around the financial sector and less around the productive one (Foster, 2010). Since the 1980s, the slow

down in investment and growth has been lower with respect to previous periods (Crotty, 2005; Palley, 2008; Hein, 2012; Hein and Mundt, 2012). This went along with a rise in the interest and dividend payments and share buybacks of the non-financial corporations (NFCs), which 'punctured' the value generated by NFCs (Duménil and Levy, 2004). As a consequence, companies experienced a significant reduction in available funds for physical investments.[1] Stockhammer (2004) analyzes the twofold nature of financialization, and estimates the effects of companies' financial payments as well as financial incomes on investment using macro data.

Despite an expanding theoretical literature on the effects of financialization on various components of the economic systems, the empirical evidence is predominantly relegated to a macro perspective, especially in the case of physical investment. The origins of the theoretical microeconomic approach to the impact of finance on investment can be traced back to the seminal works of Fazzari and Mott (1986) and Ndikumana (1999). To the best of our knowledge only Orhangazi (2008b) and Demir (2009) analyse directly the effects of financialization on accumulation from a microeconomic perspective.

The novelty of this paper is, firstly, to provide a model of firm-level investment, which extends the Post-Keynesian investment model by Fazzari and Mott (1986) by integrating the effects of financial incomes as well as payments in a coherent fashion. Second, we use the Worldscope database for firm balance sheets, which allows us to build a consistent measure for companies' financial activities regarding both inflows and outflows. Third, we provide the first micro-econometric evidence for the UK on the effects of financialization on investment using firm data. Finally, we compare the explanatory power of the Post-Keynesian model to the mainstream Tobin's Q model.

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 models of investment to be estimated. Section 4 discusses the estimation methodology. Section

5 introduces the data and the stylized facts of our sample. Section 6 presents the estimation results. Section 7 concludes.

2. Accumulation of fixed assets, liquidity, and financialization

In the earlier 'accelerator investment models' (e.g. Kuh and Meyer, 1955; Evans, 1967) the capital expenditure was almost entirely explained by 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 (the capital stock adjusted for inflation and depreciation), has been widely used.[2] 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). Possible mainstream explanations 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). In particular, the

seminal contribution by Fazzari et al. (1988) models firms' accumulation of fixed assets as a function of sales, the cost of capital, and cash-flow, showing that fluctuations in internal finance, as reflected by cash-flows, are statistically more important than the stock market evaluation in determining the level of accumulation. Liquidity constraints play a crucial role in determining investment (Fazzari and Petersen, 1993; Chirinko and Schaller, 1995; Kadapakkam et al.,1998) In conclusion, this alternative body of research suggests that the decision to start a new investment plan is undoubtedly connected to the choice of financing it.

In the specific case of the UK, evidence shows that cash flow always has a signficant positive effect on accumulation, whilst the effects of the stock market evaluation and debt are mixed (Devereux and Schiantarelli, 1990). Furthermore, investment is found to be more sensitive to cash-flow during periods in which companies distribute very few dividends in relation to their normal levels (Bond and Meghir, 1994). From a comparative perspective, internal funds are found to be a stronger and statistically more robust determinant in the UK than in other European countries (Bond et al., 2003; Bloom et al., 2007).

Echoing the prevailing macroeconomic arguments, the mainstream micro-econometric literature on investment argues that the development of financial markets is inversely related to the strength of the cash flow constraint, i.e. countries with less developed financial markets experience lower rates of growth because of an inefficient allocation of capital (Love, 2003; Love and Zicchino, 2006). Pawlina and Renneboog (2005) argues that the involvement of financial institutions through active monitoring can ease cash-flow constraints, and reduce asymmetric information in the case of the UK. Guariglia and Carpenter (2008) argue that cash flow is less important in explaining investment for larger companies since they experience minor asymmetrical credit frictions. However, the evidence in this stream of literature also shows that the volatility of stock market returns decreases the impact of demand on short-run investment, especially for larger companies (Bloom et al., 2007).

In conclusion, similar to the evidence for the US, also the UK firms' investments are cash-flow sensitive; however the mainstream investment literature argues that companies' financing issues mainly derive from agency problems, and the development of financial markets can relax these constraints. Within this body of literature, financial markets enter the analysis just as providers of information about future expected profitability ((Love, 2003; Love and Zicchino, 2006; Pawlina and Renneboog, 2005; Guariglia and Carpenter, 2008; Devereux and Schiantarelli, 1990; Bond et al., 2003), as a 'control variable' (Love and Zicchino, 2006), or as a macroeconomic source of uncertainty (Bloom et al., 2007). Companies' financial flows are not directly taken into account in these analyses. As a result of the transformation of the economies towards a financialized stage in the last decades, the mainstream models of investment may be misspecified due to their neglect of some important factors in the firms' financing and investment decision.

The Post-Keynesian literature offers a more holistic approach to the analysis of the effect of financial markets on investment, where financialized economies are characterized by the "increasing importance of financial markets, financial motives, and financial institutions, and financial elites in the operation of the economy and its governing institutions" (Epstein, 2005:1). A similar argument can be found in the marxists tradition, for which the long-term trajectories of the economies gravitate more around the financial sector and less around the productive one (Foster, 2010). From a simplistic perspective, the NFCs are far from passive players under the control of oversized financial markets. However, financialization is a multifaceted concept, not reducible just to 'quantitative' dimensions (Sawyer, 2014). In addition to (or even partially substituting) physical investments, NFCs can readily accumulate financial assets. The Post-Keynesian literature conceives the firm as a 'battlefield' for different vested interests (Stockhammer, 2006). The most visible type of internal conflict is reflected in shareholders' preference for short-term profitability, which undermines the accumulation of

fixed capital (Dallery, 2009; Hein and van Treeck, 2008). According to the Post-Keynesian theory of the enterprise, there is a 'growth-profit trade-off' within the managerial decision-making process of firms (e.g. Wood, 1975; Lavoie, 1992). The increasing involvement of the NFCs in finance-related activities has to be understood primarily as a consequence of a change in the corporate governance (Lazonick and O'sullivan, 2000; Lazonick, 2009). From the early 1980s onwards, there has been a legitimization of the rule of maximizing the 'shareholder value' (Rappaport, 1999). While the former imperative has been to 'retain and re-invest' earnings in physical long-term investments, under the shareholder rule, to 'downsize plants and distribute earnings' is paramount. The shareholders ultimately bear the risk on investments, which is used to justify a claim on future corporate profits (Lazonick, 2013). The management, instead, has to please the shareholder's requests by distributing dividends and boosting share prices through, among other ways, share buyback operations (De Ridder, 2009). Furthermore, financialization offers a fall back option to firms to invest in reversible short-term financial assets instead of irreversible long-term fixed assets, and thereby financial assets crowds out accumulation. This 'behavioural twist' negatively affected the long-term orientation of the investment plans.

The vast majority of the empirical literature on the impacts of financialization on investment is based on a macroeconomic framework. Stockhammer (2004), van Treek (2008) Orhangazi (2008a) and Arestis, González, and Dejuán (2012) estimate the effects of financialization on investment, building on the theoretical models of Rowthorn (1981), Dutt (1989), and Bhaduri and Marglin (1990), who formalized the seminal work of Kalecki (1954). Stockhammer (2004) estimates the impact of NFCs' financial incomes (interest and dividends received as a ratio to the value added) and financial payments on investment for the cases of Germany, France, UK, and the USA, and finds that financialization, interpreted as a growing 'shareholder value orientation' (henceforth SVO), induces a slowdown in accumulation.

However, for the UK this adverse effect is small, mainly because of an already stagnant accumulation dynamic (Stockhammer, 2004). Van Treeck (2008) decomposes firm's total profits to retained earnings, interest payments, and dividend payments and finds significant negative effects of the 'rentiers' share' - the extraction of firms' internal funds via interest and dividends- on capital accumulation in the USA, and some mixed effects in France, Germany, and the UK. Orhangazi (2008a) finds that the adverse impact of financial incomes and payments exceeds the potential benefits in the USA. Arestis et al. (2012) model investment spending as an alternative to the purchase of the bonds and equities for 14 OECD and find a robust inverse relationship between the return on these financial assets and physical investment.

Regarding firm level Post-Keynesian analysis of the effect of finance on investment, Fazzari and Mott (1986) provide evidence of an independent and positive effect of retained earnings, and a negative effect of the interest payments on investment. This seminal paper by Fazzari and Mott (1986) was particularly a response to the mainstream critiques of the use of liquidity measures to model investment by Jorgenson (1971), among others, who argued that the explanatory power of liquidity measures was ultimately due to their high correlation with output measures. Fazzari and Mott (1986) develop a model with both liquidity and sales measures to compare their independent effects, in which they aim to models the three key components of the Post-Keynesian theory of investment: a positive effect of sales (as a proxy for capacity utilization), a positive and independent effect of internal finance, i.e.'less expensive' retained earnings, and a negative impact of interest expenses.[3] In particular, they introduce a flow measure for interest payments to define a 'committed constraint' on the available cash flow.

In another Post-Keynesian microeconomic investment model, Ndikumana (1999) introduces both flow and stock variables to measure the effects of firms' debt. The author argues that the stock of debt reflects the firm's financing strategies, while the flow of interest payments is

ultimately independent of internal strategic decisions (reflecting external determinants). The ratio of cash-flow to capital, the rate of growth of sales, and Tobin's Q are the other explanatory variables. Ndikumana finds a significant and negative effects of both stock and flows measures of debt. Firm's indebtedness, he argues, not only reduces the cash flow (via interest payments), but also affects the sustainability of investments.

However, the works of Fazzari and Mott (1986) and Ndikumana (1999) do not model the impact of financial revenues, which is an important dimension of financialization. To the best of our knowledge, there are only two empirical microeconomic papers that analyse the effects of financialization on investment from a microeconomic perspective including the financial incomes of NFCs. Orhangazi (2008b) analyses the investment behaviour of NFCs in the USA explicitly taking into account the biunivocal aspect of financialization. In addition to the traditional determinants of investment, the author uses financial incomes and financial payments, as well as the debt level, as explanatory variables. He finds a significant and negative effect of financial payments, and long-term debt on capital accumulation. With respect to the financial payments, the author theorizes a 'crowding-out' effect: higher profits from the financial activities should drive a change in the priorities of the management. However, whereas the effects of financial incomes on investment depend on the firm size and sector, with a significant negative crowding out effect for larger firms, and a positive effect for the smaller firms in the non-durables sector, indicating its dual role as a source of internal finance. In general, he concludes, productive investment does not benefit from the relationship between NFCs and the financial markets. Demir (2009) estimates a portfolio choice model, in which finds that increasing returns on financial assets relative to fixed assets reduces accumulation in the NFCs in Argentina, Mexico, and Turkey is a function of the gap between the rates of return of fixed and financial assets, and a set of country specific control variables (risk and uncertainty measures, level of credit from the banking sector and the level of real GDP). The former

variable captures the market signals for future profitability of non-operating activities and the opportunity cost of fixed investment. The author finds that increasing returns on financial assets reduces fixed investment, as companies prefer to invest in 'reversible' short-term financial assets instead of 'irreversible' long-term fixed assets.

Building on this literature, in the next section we describe the specifications of different models of investment, by comparing a basic model vis-à-vis a full specification which takes explicitly into account the effects of financialization including both financial incomes and payments.

3. Alternative models of investment

Within the Post-Keynesian theory capital accumulation is an intrinsically dynamic process (Kalecki, 1954; Lopez and Mott, 1998. Physical investment is an irreversible phenomenon. Different processes of financing the investment plans overlap in different time-periods, and there is a path dependency that link past and future levels of accumulation, as confirmed by the previous empirical literature (Ford and Poret, 1991; Kopcke and Brauman, 2001; Orhangazi, 2008b; Arestis et al., 2012). Therefore, in all the models to be estimated, we include the lagged investment. Also all other explanatory variables are lagged in order to depict the 'adjustment processes'.

To analyse the potential effects of financialization, we start with a basic investment model based on Fazzari and Mott (1986). Next, by progressively enriching this basic version, we present our final model of 'financialized investment'. Equation (1) presents the basic model, where the rate of accumulation, *I/K*, is:

$$\left(\frac{I}{K}\right)_{it} = \beta_0 + \beta_1 \sum_{j=1}^{2} \left(\frac{I}{K}\right)_{it-j} + \beta_2 \sum_{j=1}^{2} \left(\frac{\pi - CD}{K}\right)_{it-j} + \beta_3 \sum_{j=1}^{2} \left(\frac{S}{K}\right)_{it-j} + \beta_4 \sum_{j=1}^{2} \left(\frac{i_D}{K}\right)_{it-j} + \beta_t + \varepsilon_{it} \qquad (1)$$

where I is the addition to fixed assets, K is the net capital stock, π is operating income, CD are cash dividends, $(\pi - CD)$ identifies the retained earnings, S is net sales, i_D is the interest expenses on debt; all variables are normalized by K in order to control for firm size.[4] i is the firm index. β_t identifies a set of time-dummies to control for unobservable time-specific effects common to all firms, whilst the standard disturbance term ε_{it} captures firm-specific fixed effects and idiosyncratic shocks. All variables are introduced in first and second lags to reflect the time consideration in the investment plans. The retained earnings/fixed assets ratio is a measure of the profit rate, the sales/fixed assets ratio is a proxy reflecting capacity utilization,[5] whilst interest expenses reflect the firm-level cost of capital. We expect positive effects of the lagged accumulation rate, retained earnings, and sales on investment. In contrast, we expect the impact of interest payments (or 'cash commitments') to be negative.[6]

In this basic model cash dividends are conceived as simply a reduction of available internal funds. However, in developed financialized capitalist systems the distributed dividends may have a further effect. In fact, cash dividends paid are not just an extraction of liquidity from the company's retained operating income, but they may also reflect behavioural changes due to the SVO as suggested by Lazonick and O'Sullivan (2000) and Lazonick (2009). Thus, equation (2) introduces this further effect of cash dividends payments as a ratio to *K (CD/K)*:

$$\left(\frac{I}{K}\right)_{it} = \beta_0 + \beta_1 \sum_{j=1}^{2} \left(\frac{I}{K}\right)_{it-j} + \beta_2 \sum_{j=1}^{2} \left(\frac{\pi - CD}{K}\right)_{it-j} + \beta_3 \sum_{j=1}^{2} \left(\frac{S}{K}\right)_{it-j} + \beta_4 \sum_{j=1}^{2} \left(\frac{i_D}{K}\right)_{it-j} + \beta_5 \sum_{j=1}^{2} \left(\frac{CD}{K}\right)_{it-j} + \beta_t$$
$$+ \varepsilon_{it} \qquad (2)$$

In light of the macroeconomic Post-Keynesian literature, we expect an adverse effect of CD/K on investments.

Furthermore, not only do NFCs use part of their funds to pay interest and dividend to the financial (or banking) sector but, given increasing waves of financial liberalization, NFCs they can also more than before pursue non-operating financial investment themselves, thus receiving financial incomes. Therefore, in equation (3) we include the sum of interests and dividends received by the NFCs (π_F) as a ratio to K as an additional explanatory variable[7]:

$$\left(\frac{I}{K}\right)_{it} = \beta_0 + \beta_1 \sum_{j=1}^{2} \left(\frac{I}{K}\right)_{it-j} + \beta_2 \sum_{j=1}^{2} \left(\frac{\pi - CD}{K}\right)_{it-j} + \beta_3 \sum_{j=1}^{2} \left(\frac{S}{K}\right)_{it-j}$$
$$+ \beta_4 \sum_{j=1}^{2} \left(\frac{i_D}{K}\right)_{it-j} + \beta_5 \sum_{j=1}^{2} \left(\frac{CD}{K}\right)_{it-j} + \beta_6 \sum_{j=1}^{2} \left(\frac{\pi_F}{K}\right)_{it-j} + \beta_t + \varepsilon_{it} \qquad (3)$$

Theoretically, the sign of the effect of financial incomes on investment is ambiguous. On the one hand, they may have a positive impact on the accumulation of fixed assets by easing the liquidity constraint faced by firms. In particular, this can be the case for smaller companies, which are more likely to experience liquidity restrictions compared to larger corporations. On the other hand, financial activities can also be detrimental to physical accumulation, since NFCs will be attracted by short-term, reversible financial investment, instead of engaging in long-term, irreversible physical investment.

Finally, equation (4) below presents our general model of financialized investment:

$$\left(\frac{I}{K}\right)_{it} = \beta_0 + \beta_1 \sum_{j=1}^{2} \left(\frac{I}{K}\right)_{it-j} + \beta_2 \sum_{j=1}^{2} \left(\frac{\pi - CD}{K}\right)_{it-j} + \beta_3 \sum_{j=1}^{2} \left(\frac{S}{K}\right)_{it-j} + \beta_4 \sum_{j=1}^{2} \left(\frac{F}{K}\right)_{it-j} + \beta_5 \sum_{j=1}^{2} \left(\frac{\pi_F}{K}\right)_{it-j} + \beta_t$$
$$+ \varepsilon_{it} \quad (4)$$

Here we introduce a composite measure for outward financialization, *F,* which is the sum of interest and dividend payments (as a ratio to K)*,* capturing a) the liquidity effect of interest payments, and b) the additional behavioural effect of the SVO. In brief, *F* reflects the financial outflows, while π_F reflects the financial inflows.

Furthermore, in order to test the different effect of financial payments in small vs. large companies, we estimate an extended version of Model (4) as:

$$\left(\frac{I}{K}\right)_{it} = \beta_0 + \beta_1 \sum_{j=1}^{2} \left(\frac{I}{K}\right)_{it-j} + \beta_2 \sum_{j=1}^{2} \left(\frac{\pi - CD}{K}\right)_{it-j} + \beta_3 \sum_{j=1}^{2} \left(\frac{S}{K}\right)_{it-j} +$$
$$+ \beta_4 \sum_{j=1}^{2} \left(\frac{F}{K}\right)_{it-j} + \beta_5 \sum_{j=1}^{2} \left(\frac{\pi_F}{K}\right)_{it-j} + \beta_6 \sum_{j=1}^{2} \left(\frac{\pi_F}{K} \cdot D_{TA25}\right)_{it-j} + \beta_7 D_{TA25 it-j} + \beta_t + \varepsilon_{it} \quad (4\ a)$$

where the dummy variable D_{TA25} takes the value 1 if the average total assets of company *i* lies in the lower 25 percentile of the distribution, and takes the value 0 otherwise. The dummy is interacted with the financial incomes. While β_5 is the effect of financial incomes in large companies, $\beta_5 + \beta_6$ captures the effect of financial incomes in smaller companies.

With equations (4) and (4a) we aim at introducing a full model of firm-level investment that is coherent with the Post-Keynesian tradition of investment analysis, and that a) takes into account the inherent irreversibility of physical investment, b) controls for the independent effect of profitability and demand, c) highlights the effects of financial relations, d) makes a clear distinction between operating and non-operating activities, and e) treats financial outflows and inflows, i.e. both outward and inward financialization, as fundamental determinants.[8] This model builds on previous literature and aim at extending the current empirical analysis about the financialization of investment.

4. Data and stylized facts

We extracted our data from the Worldscope database of publicly listed firm's balance sheets, which contains standardized accounting information about not only investment, sales, profits, interest and dividend payments but also companies' financial incomes. Standardized data on financial payments and, in particular, financial incomes are difficult to find; our database allows us to have a comprehensive variable for our estimations. Worldscope database has been acknowledged as a valuable source in the literature on firm-level investment analysis (e.g. Cleary 1999; Pawlina and Renneboog, 2005; Love, 2003; Love and Zicchino, 2006).

We use data for all active and inactive, publicly listed NFCs in the UK (thus excluding financial firms identified by the primary SIC codes from 6000 to 6799).[9] Our data are annual for the period of 1985-2013.[10] We found a high correlation between our variables and the corresponding macroeconomic data.[11] Tables 3A and 4A in the Appendix provide summary statistics for the total economy and manufacturing sector.

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 outlier observations from the sample. First, we select firms that have at least three consecutive observations for the dependent variable, which is also required for econometric purposes (Roodman, 2009).[12] Second, we drop all the companies with a permanent negative mean operating income. Finally, we exclude observations in the upper and lower 1% of each variable's distribution.[13]

Next we present the stylized facts of our sample. As can be seen in Figure 2, the rate ofaccumulation of fixed assets in the UK's NFCs decreased substantially during the early 1990s, and has only partially recovered, albeit not back to its peak level, with further declines during the Great Recession.

[Figure 2]

Overall, the rate of accumulation has remained stagnant around an average of 0.25 for the whole period. Compared to the peak in 1988 (0.32), the rate is lower (0.26) in2013. The stagnation in the manufacturing sector (dashed line) is stronger, as it has not recovered much after the 1990s recession, with the rate of accumulation being the same in 2013 as in 1985 (0.22).

Figure 3 shows the trends in the rate of accumulation and the operating income (as a ratio to K). From the start of the recovery in 1992 onwards, the rate of accumulation increases along with the operating income; however the rise in operating income is stronger with respect to investment. Furthermore, from 2004 on, investment stagnates despite an increasing profit rate.

[Figure 3]

Figure 4 shows the ratio of investment (addition to fixed assets) to operating income; i.e. the rate of reinvestment, and the stock of financial assets as a ratio to fixed assets. There has been a clear decline of the operating income devoted to the enlargement of their core activities from 80-90% in the 1980s to 40-50% in the last decade. Despite the partial recovery of investments since 1992, the rate of reinvestment continued to decline. In sharp contrast, the stock of financial assets increased substantially, reaching 90% as a ratio to fixed capital in the late 1980s, and a level more than three times the fixed assets before the crisis in 2008.[14] The financial crisis in 2008 has led to only a slight fall in the value of the financial assets. As shown in figure 5, the substantial involvement in the accumulation of financial assets resulted in increasing non-operating income for the NFCs, which again declined briefly after the 2007-2008 crisis, and then totally recovered in 2013.[15]

[Figure 4]

[Figure 5]

Finally, Figure 6 shows the financial payments of the NFCs in the form of interests on debt and dividends paid to the shareholders, which have increased substantially since the mid-1990s. From 1985 to 2008 financial payments ($CD + i_D$) as a ratio to total fixed capital increased from 16% in 1985 to 42% in 2008. The financial exposition of NFCs entails a significant reduction of internal funds. After the Great Recession interest paid on debt diminishes, whereas dividends paid maintain their increasing trend after a brief period of fall.

[Figure 6]

In conclusion, the stylized facts show a) a stagnant rate of accumulation b) a declining rate of re-investment of operating income c) an increase in the overall degree of financialization in terms of financial assets, incomes as well as payments.

5. Estimation methodology

Equations 1-4 presented in Section 3 are estimated using a dynamic panel-data model including two lags of the accumulation rate as explanatory variables. As explained in section 3, investment is an intrinsically dynamic phenomenon.

In dynamic panel data models, the unobserved panel-level effects are correlated with the lagged dependent variables. As a consequence, standard estimators (e.g. Ordinary or Generalized Least Squares) would be inconsistent. Therefore, we estimate our models using a difference-GMM estimator (Hansen, 1982; Holtz-Eakin et al., 1988; Arellano and Bond, 1991). This methodology is suitable for analyses based on a 'small time/large observations' sample.[16]

GMM is a powerful estimator for analyses based on firm-level data mainly for three reasons (Roodman, 2009). First, GMM is one of the best techniques to control for all sources of endogeneity between the dependent and explanatory variables, by using internal instruments, namely the lagged levels of the explanatory variables, which allows us to address dual causality, if rising financial payments and incomes is also a consequence of the slowdown in the capital accumulation.[17] The instrument set consists of instruments that are not correlated with the first difference of the error term, but correlated with the variable we are estimating.[18] Second, by first-differencing variables, this estimator eliminates companies' unobservable fixed effects. Third, GMM can address autocorrelation problems. We apply two tests to assess the appropriateness of the instrument sets, and lag structures. First, we check for second-order serial correlation with the Arellano-Bond test (Arellano and Bond, 1991). Second, we verify the validity of the instruments sets through the Hansen test (Hansen, 1982) which takes the orthogonality between instruments and regressions' residuals as the indicator of consistency between estimated and sample moments.[19] In all models, the lagged dependent variable enters the instrument set as endogenous while all other explanatory variables enter as predetermined regressors. Consistently, the instrument sets include the second and third lags of the lagged dependent variable, and the first and second lags of the other lagged explanatory variables. We test the joint significance of the time dummies using a Wald test.

All the variables are in logarithmic form to allow for non-linear relationships between the dependent and the explanatory variables. Furthermore, the logarithmic scale enables us to reduce the disturbances coming from the presence of heteroskedasticity.

Our estimation procedure for each model is based on a 'general-to-specific' strategy, where we arrive at a model with only significant variables (Campos et al., 2005). Robust standard errors are calculated through a two-step procedure after a finite-sample correction (Windmeijer, 2005).

6. Estimation results

This section presents our estimation results. Column 1 of Table 1 shows the estimated coefficients for Model (1). As expected, the lagged level of accumulation, sales, and retained earnings have positive effects on investment, while interest expenses have a significant negative effect. Our results for the UK are in line with the findings of Fazzari and Mott (1986) for the USA.

Column 2 shows the results for Model (2). We find a significant negative impact of *CD* reflecting the SVO. Thus, the distribution of dividends not only decreases available liquidity but also has a further negative behavioural effect on accumulation.

Column 3 shows the results for Model (3). Income from the NFCs' financial operations has an adverse effect on accumulation, along with a negative effect of interest expenses. Cash dividend payments do have a negative but statistically insignificant effect.

Finally, Column 4 shows the results for the general model extended with a variable reflecting aggregated shareholder/lenders value orientation as in Model 4. In addition to the 'financial puncturing' due to the external funding (banking sector and shareholders), total financial incomes in the form of interests and dividends received have a significant and negative impact on physical accumulation as well.[20] Thus, financial investment crowds–out physical investment. All other variables have the expected signs.

In column 5 we present an extended version of model 4 including the stock market evaluation (Tobin's Q) to test the robustness of our results to the inclusion of this widely used variable in the mainstream literature.[21] Tobin's Q has a statistical significant and positive effect, and the estimated signs and even magnitudes of the other coefficients remain robust.

[Table 1]

Finally, Column 6 of Table 1 presents the results for Model (4 a), a revised version of Model (4) in order to capture the different effect of financial incomes with respect to the companies' sizes.

$$\left(\frac{I}{K}\right)_{it} = \beta_0 + \beta_1 \sum_{j=1}^{2} \left(\frac{I}{K}\right)_{it-j} + \beta_2 \sum_{j=1}^{2} \left(\frac{\pi - CD}{K}\right)_{it-j} + \beta_3 \sum_{j=1}^{2} \left(\frac{S}{K}\right)_{it-j} +$$

$$+ \beta_4 \sum_{j=1}^{2} \left(\frac{F}{K}\right)_{it-j} + \beta_5 \sum_{j=1}^{2} \left(\frac{\pi_F}{K}\right)_{it-j} + \beta_6 \sum_{j=1}^{2} \left(\frac{\pi_F}{K} \cdot D_{TA25}\right)_{it-j} + \beta_7 D_{TA25_{it-j}} + \beta_t + \varepsilon_{it} \qquad (4\text{ a})$$

As expected, financial incomes have a significant positive effect on physical accumulation in the smaller companies, with an elasticity of 0.11. This finding is in line with the microeconomic evidence for the USA (Orhangazi, 2008b). The effect of financial incomes in the large companies is still negative.

Next, we test the robustness of our results. First, we estimate model 4 for the pre-crisis period of 1985-2007 only. The Great Recession affected both the real and financial sides of the economies. As we have seen in section 5, financial incomes experienced a sudden fall in 2008. Column 1 in Table 2 presents the results. The signs of the coefficients of both financial incomes and payments are negative also for this period. Furthermore, the coefficient of financial incomes is more than double compared to that in the full period.

Second, we control also for another break in the UK economy, namely the early 1990s recession,[22] and estimate our model for the period 1992-2007. The results reported in Column 2 in Table 2 are similar to the ones based on the estimation for the 1985-2007 period. The only main difference is a stronger negative effect of the financial payments.

[Table 2]

Third, we estimated our final model using the raw-dataset to check the robustness to the inclusion of the outliers for the period of 1985-2013. As can be seen in Column 3 of Table 2, the results are robust. [23] [24]

Fourth, we performed a robustness check by excluding the public services, transportation, and utilities sectors (primary SIC codes from 4011 to 4971 and 9111) with a high degree of governmental involvement, since these companies may behave differently. As can be seen in Column 4 of Table 2, our estimation results are again robust.[25]

Next we estimated Model (4) for the manufacturing sector only (primary SIC codes from 2011 to 3999). Table 3 presents the results for different periods.

[Table 3]

We focus on manufacturing companies for two reasons. First, our results are better comparable with other findings since a considerable part of the empirical analyses about firm-level investment is based on manufacturing. Second, as we have seen, the share of the manufacturing sector in the UK economy has decreased sharply (Figure 1). It is worthwhile to test if financialization has led to a finance-led deindustrialization. The results in Column 1 in Table 3 are similar to the ones for the whole NFCs sample. Outward financialization, as well as financial incomes, had adverse effects on accumulation also in the manufacturing sector. As before, the magnitudes of these adverse impacts increase for both the pre-2008, and the intra-crises periods (Columns 2 and 3).

Finally, we present the economic significance of our estimates in Table 4.[26] 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.

Sales (capacity utilization) have been the main determinant of accumulation while retained profits had a lower impact. Financial payments, i.e. outward financialization (the composite variable for interest payments and SVO) had a substantial negative impact on physical investment. The rate of accumulation would have been 8.5% higher without the rise in financial payments. Financial incomes, inward financialization, had an adverse effect as well, leading to a decline in the accumulation rate by 3.6%. The negative impact of outward financialization during the pre-crisis phase (1985-2007) is substantially larger (-11.4%), due to a higher long-run coefficient.

[Table 4]

Unsurprisingly, the 2008 crisis has strongly reduced the financial incomes of NFCs. The cumulative increase in financial incomes before the financial crisis is much higher (1.233) than the increase in the full period (0.751).[27] Additionally, the long-run elasticity of financial income is stronger in this period (-0.109). Hence, in the pre-crisis phase financial incomes have had a larger negative impact on accumulation. The accumulation rate would have been 13.5% higher without an increase in financial incomes.

Also in the manufacturing sector, the sharp rise in financial payments reduced the rate of accumulation by 13.5% from 1985 to 2013, and by almost 20% before the crisis. The 2008 financial crisis led to a decrease in the financial incomes of manufacturing, which in turn had a positive economic impact on the rate of accumulation in manufacturing companies by 10.2%. Given the higher elasticities, financial payments had the strongest negative economic effects in both time periods.

7. Conclusion

This paper presents empirical evidence on the effects of financialization on firm-level investment in the publicly listed NFCs in the UK based on a dynamic panel data model. Our results show that financialization, depicted as the increasing orientation towards external financing, and the internal substitution of fixed accumulation by financial activity, had a fundamental role in suppressing investment in the NFCs in the UK. This is even more evident in the period before the financial crash, and especially for the manufacturing sector. The availabilty of internal funds constrain the investment decision. On the one hand, the increase in financial payments for external finance and to favor the shareholders (interest and dividends) reduce the NFCs internal funds, and thus accumulation. On the other hand, the negative crowding-out effects of financial investment on accumulation more than offset the gains from relaxing the cash-flow constraint. Financial incomes have a positive effect on investment only for the smaller companies.

In the UK NFCs, the rate of accumulation would have been 8.5% higher without the rise in interest and dividend payments in 2007 compared to 1985, and 3.6% higher without the crowding-out effect of increasing financial incomes.[28] The negative effects of financialization have been stronger in the pre-crisis period. The physical accumulation in manufacturing sector suffered even more experiencing a finance-led deindustrialisation. In particular, for the pre-crisis period in manufacturing we find that the adverse effects of financial payments and financial incomes almost entirely offset the positive impacts due to increasing sales and retained profits.

These results for the UK provide support to the theoretical arguments regarding the negative effects of financialization and confirm previous empirical findings at the macro and microeconomic levels for other countries. The increasing interrelations between the financial

markets and the non-financial companies are progressively reducing fixed capital accumulation, and thus growth. These results contrast with the mainstream arguments regarding the beneficial effects of financial deepening (e.g. King and Levine, 1993; Beck et al., 2000; Levine, 2005).

To reach a stable and vigorous dynamic of physical investment, a de-financialization of the non-financial sector is desirable. This requires an extended regulation of companies' non-operating financial activities along with financial regulation. The robust evidence of investment irreversibility and the connection between past and present levels of physical accumulation increases the potential effectiveness of de-financialization economic policies.

Clearly our analysis does not exhaust the need for a deeper analysis about financialization of the NFCs, and further research is needed to assess the multifaceted feature of this phenomenon. In particular, the investigation of the determinants of companies' 'financial accumulation', as well as the sources of businesses' financial assets are important questions for future research.

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Figures and Tables

Figure1. Value added in the financial and manufacturing sectors as a ratio to total value added in the UK (%)
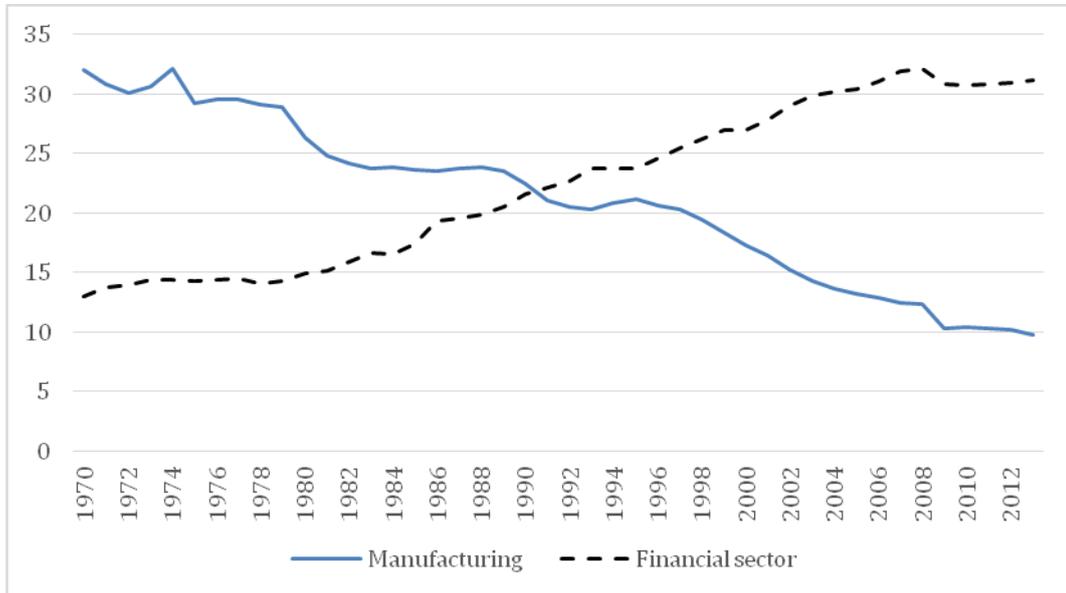
Source: OECD.

Figure 2. Rate of accumulation (*I/K*) in NFCs in all sectors and in Manufacturing in the UK
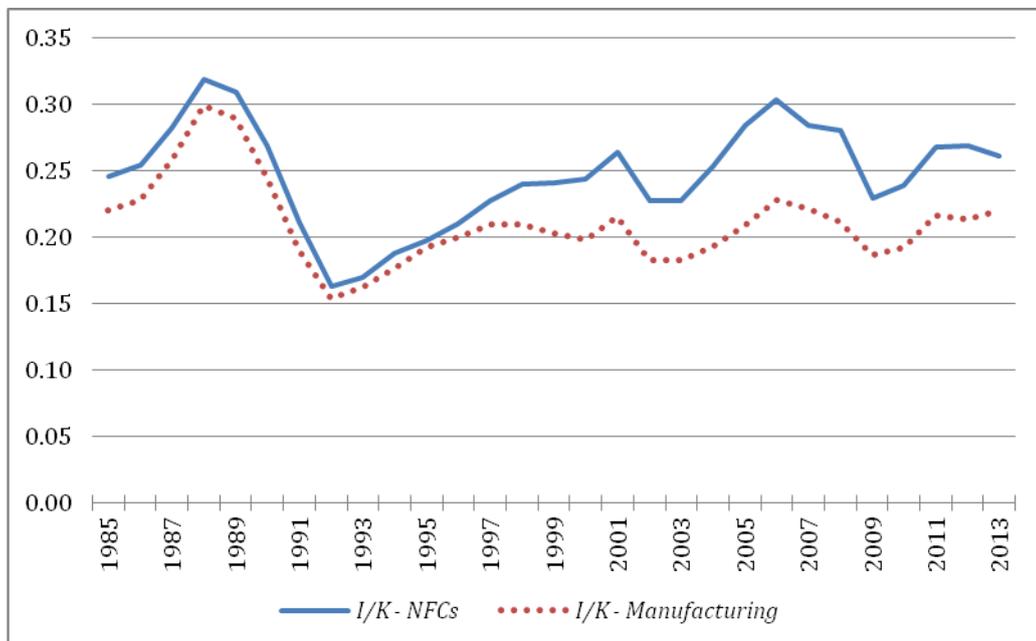
Source: authors' calculation based on Worldscope data.

Figure 3. Rate of accumulation (*I/K*) and operating income (*π/K*) in NFCs, the UK
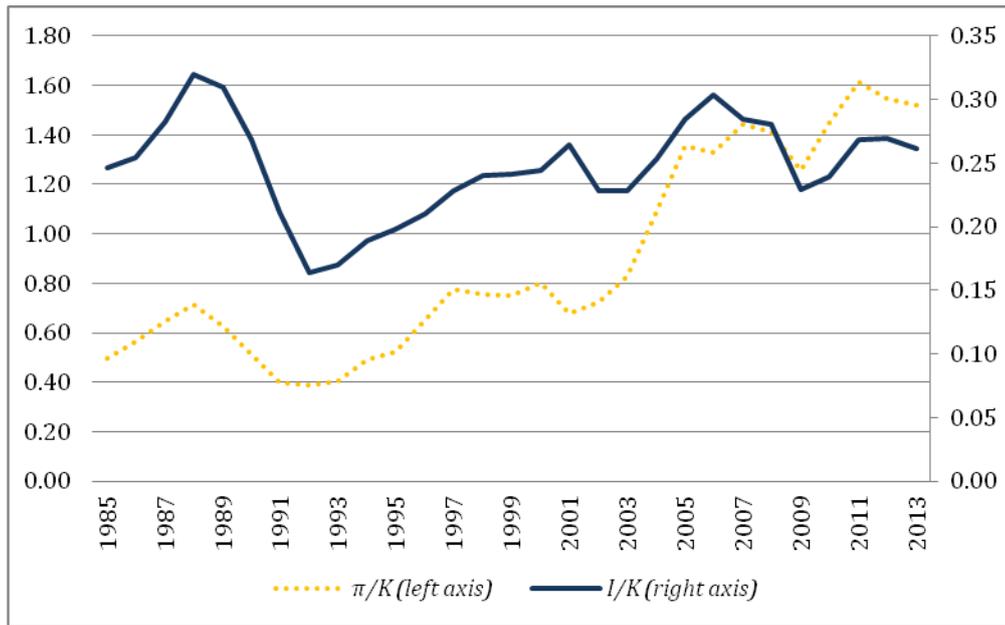
Source: Authors' calculation based on Worldscope data.

Figure 4. Investment/Operating income (*I/π*), and financial assets/fixed assets (*FA/K*) in NFCs, the UK
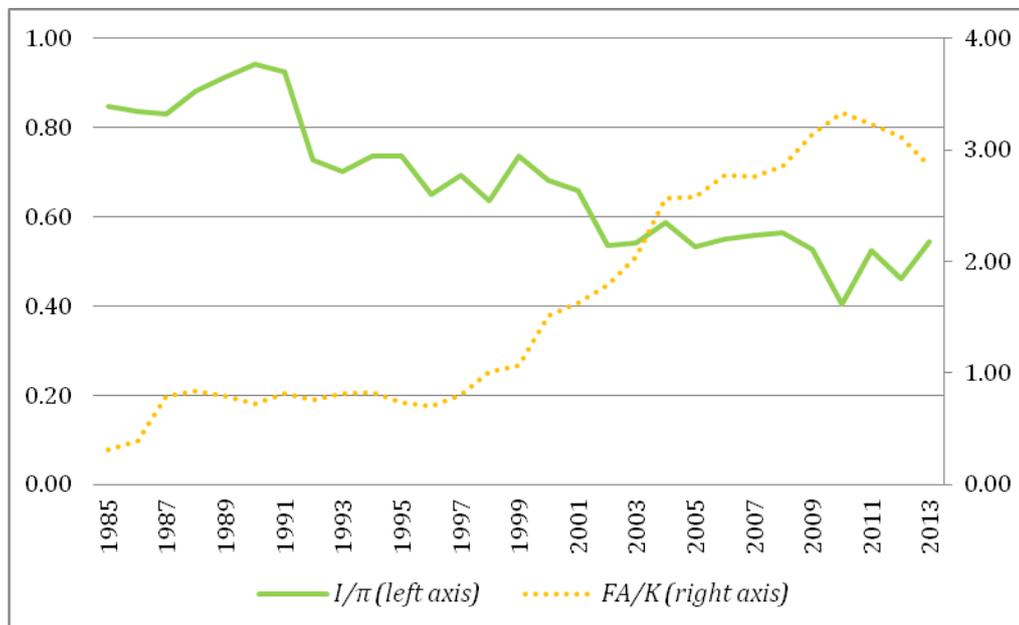
Source: Authors' calculation based on Worldscope data.

Figure 5. Investment/Operating income (*I/π*), and non-operating income (*π_F/K*) in NFCs, the UK
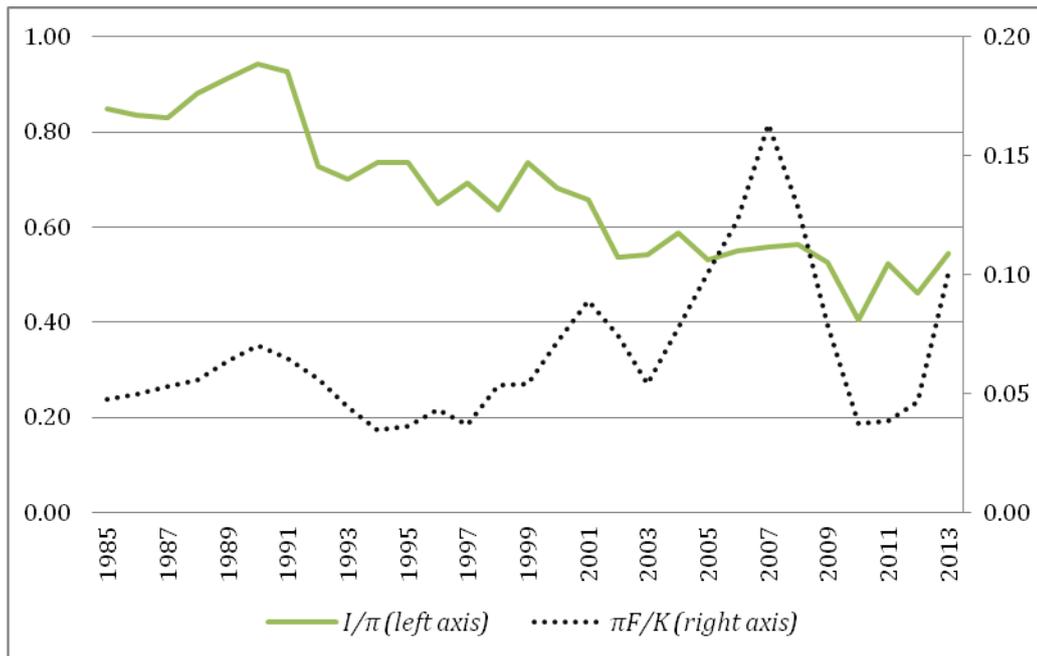
Source: Authors' calculation based on Worldscope data.

Figure 6. Cash dividends/fixed assets (*CD/K*), and interest paid on debt (*i_D /K*) in the NFCs, the UK
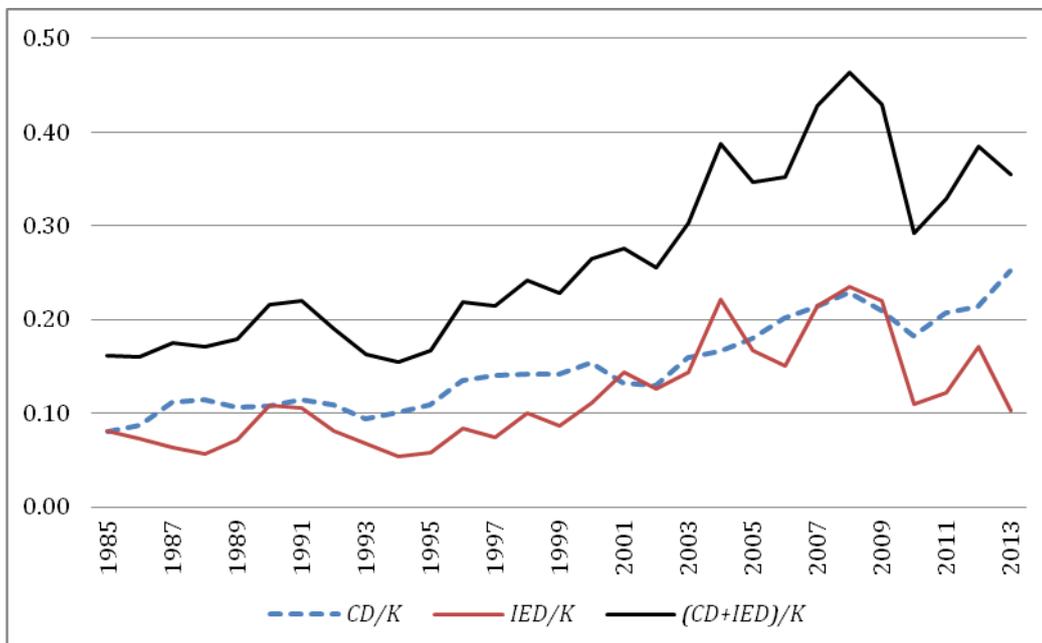
Source: Authors' calculation based on Worldscope data.

Table 1. Estimation results based on Models (1), (2), (3), and (4); dependent variable $(I/K)_t$; Estimation period 1985-2013

| Variable	(1)[I]	(2)[II]	(3)[III]	(4)[IV]	(5)[V]	(6)[VI]
$(I/K)_{t-1}$	0.366*** (0.028)	0.343*** (0.028)	0.410*** (0.037)	0.374*** (0.033)	0.353*** (0.033)	0.383*** (0.032)
$[(\pi - CD)/K]_{t-1}$	0.086*** (0.014)	0.094*** (0.012)	0.092*** (0.015)	0.081*** (0.014)	0.071*** (0.014)	0.079*** (0.014)
$[(\pi - CD)/K]_{t-2}$	-0.048** (0.022)					
$(S/K)_{t-1}$	0.267*** (0.052)	0.256*** (0.049)	0.209*** (0.059)	0.277*** (0.050)	0.278*** (0.051)	0.263*** (0.050)
$(i_D/K)_{t-1}$	-0.056*** (0.012)	-0.058*** (0.012)	-0.046*** (0.014)			
$(CD/K)_{t-2}$		-0.030** (0.013)	-0.017 (0.014)			
$(F/K)_{t-1}$				-0.058*** (0.018)	-0.052*** (0.018)	-0.060*** (0.017)
$(\pi_F/K)_{t-2}$			-0.034* (0.018)	-0.030* (0.017)	-0.031* (0.017)	-0.020** (0.009)
$(\pi_F/K) * D_{25,t-1}$						0.131*** (0.034)
$(Q)_{t-1}$					0.116** (0.053)	
Number of Observations	11057	9850	7247	9224	9061	8923
Number of Firms	1338	1172	989	1195	1184	1158
Number of Instruments	34	36	36	36	38	38
p-value Arellano-Bond test (AR2)	0.850	0.250	0.070	0.114	0.079	0.096
p-value Hansen test	0.962	0.570	0.687	0.545	0.259	0.767
Time effects	yes	Yes	Yes	yes	yes	Yes
p-value Wald test for time effects	0.000	0.000	0.000	0.000	0.000	0.000

All estimations I, II, III, and IV are based on Equations (1),(2),(3), and (4) respectively. Estimation V is based on Equation (4) plus Tobin's Q. Estimation VI is based on Equation (4), with separate effect estimated for companies in the upper 75 percentile vs. the ones in the 25 lower percentile in terms of total assets. Two-step difference-GMM estimations. Coefficients for the year dummies are not reported. Robust corrected standard errors in parenthesis. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 2. Estimation results based on Model (4) for different time periods, sectors, and sample; dependent variable $(I/K)_t$

Variable	(1) [I] 1985-2007	(2) [II] 1992-2007	(3) [III] Raw-sample	(4) [IV] Excluding Public Utilities, Transportation, and Services
$(I/K)_{t-1}$	0.388*** (0.037)	0.383*** (0.036)	0.349*** (0.031)	0.355*** (0.031)
$[(\pi - CD)/K]_{t-1}$	0.083*** (0.017)	0.083*** (0.017)	0.079*** (0.013)	0.069*** (0.014)
$(S/K)_{t-1}$	0.217*** (0.060)	0.213*** (0.061)	0.264*** (0.066)	0.275*** (0.051)
$(F/K)_{t-1}$	-0.082*** (0.025)	-0.095*** (0.025)	-0.051** (0.020)	-0.065*** (0.019)
$(\pi_F/K)_{t-2}$	-0.067*** (0.020)	-0.069*** (0.020)	-0.038** (0.017)	-0.033* (0.017)
Number of Observations	6882	6637	10081	8381
Number of Firms	1061	1048	1371	1080
Number of Instruments	30	27	36	36
p-value A-B test (AR2)	0.257	0.178	0.065	0.102
p-value Hansen test	0.498	0.458	0.180	0.718
Time effects	yes	yes	yes	yes
p-value Wald test for time effects	0.000	0.000	0.000	0.000

I Specification based on Equation (4) period 1985-2007, II specification based on Equation (4) period 1991-2007, III specification based on Equation (4) using the raw sample, IV specification based on Equation (4) by excluding companies in the public sectors (utilities and services). Two-step difference-GMM estimations. Coefficients for the year dummies are not reported. Robust corrected standard errors in parenthesis. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 3. Estimation results based on Model (4) for the manufacturing sector; dependent variable $(I/K)_t$

Variable	(1) [I] 1985-2013	(2) [II] 1985-2007	(3) [III] 1991-2007
$(I/K)_{t-1}$	0.347*** (0.040)	0.364*** (0.045)	0.364*** (0.044)
$[(\pi - CD)/K]_{t-1}$	0.047*** (0.018)	0.032* (0.019)	0.033* (0.020)
$(S/K)_{t-1}$	0.311*** (0.098)	0.212* (0.110)	0.171* (0.103)
$(F/K)_{t-1}$	-0.115*** (0.037)	-0.163*** (0.038)	-0.173*** (0.042)
$(\pi_F/K)_{t-2}$	-0.051*** (0.024)	-0.088*** (0.028)	-0.085*** (0.028)
Number of Observations	3700	2875	2792
Number of Firms	456	424	420
Number of Instruments	36	30	27
p-value A-B test (AR2)	0.261	0.188	0.152
p-value Hansen test	0.364	0.629	0.728
Time effects	yes	yes	yes
p-value Wald test for time effects	0.000	0.000	0.000

I specification based on Equation (4) for the manufacturing sector, II specification based on Equation (4) the manufacturing sector for period 1985-2007, III specification based on Equation (4) the manufacturing sector for period 1991-2007. Two-step difference-GMM estimations. Coefficients for the year dummies are not reported. Robust corrected standard errors in parenthesis. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 4. Economic effects based on estimation results in Table 1,Table 2, and Table 3

	ALL SECTORS					
Variable	Long-run coefficient	Actual cumulative change	Economic effect	Long-run coefficient	Actual cumulative change	Economic effect
	1985-2013			1985-2007		
$(\pi - CD)/K$	0.129	0.741	**0.096**	0.136	0.831	**0.113**
S/K	0.442	1.082	**0.479**	0.355	1.031	**0.366**
F/K	-0.093	0.917	**-0.085**	-0.134	0.849	**-0.114**
π_F/K	-0.048	0.751	**-0.036**	-0.109	1.233	**-0.135**
	MANUFACTURING					
$(\pi - CD)/K$	0.072	0.586	**0.042**	0.050	0.876	**0.044**
S/K	0.476	0.791	**0.377**	0.333	0.756	**0.252**
F/K	-0.176	0.766	**-0.135**	-0.256	0.771	**-0.198**
π_F/K	-0.078	**-1.303**	0.102	-0.138	**0.654**	-0.091

All the results are based on estimations of Model (4). The long-run coefficient is equal to the estimated coefficient for the variable divided by 1 minus the coefficient of the lagged dependent variable. The economic effect is obtained by multiplying the long-run coefficient with the actual cumulative change of the variable.

Appendices

Table 1A. Variables definition, 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
π	Profit	Operating income	WC01250
i_D	Interests paid	Interest expenses on debt	WC01251
CD	Dividends paid	Cash dividends paid	WC04551
π_F	Financial profit	Non-operating income from interests and dividends	WC01266 + WC01268
Q	Average Tobin's Q	(Market share price * common share outstanding + total liabilities)/total assets	$\dfrac{\text{WC08001} + \text{WC03351}}{\text{WC02999}}$
FA	Financial Assets	Cash, other investment, short-term investment, other current assets	WC02003 + WC02250+ WC02008+ WC0214

A more detailed and updated guide about the variables is available at the link: https://blogs.cul.columbia.edu/business/files/2014/02/Worldscope-Data-Definition-Guide-Issue-14.2.pdf (last accessed 27/04/2015).

Table 2A. Correlations between ONS macroeconomic data and Worldscope sample data.

Variable	Correlations 1997-2013	Correlations 1997-2007
K	0.86	0.74
π	0.94	0.91
S	0.75	0.77
i_D	0.18	0.73
CD	0.91	0.83
Interest income	-0.54	0.57
Dividend income	0.10	0.62

Macroeconomic data from ONS, United Kingdom Economic Account. Available at http//www.ons.gov.uk/ons/rel/naa1-rd/united-kingdom-economic-accounts/index.html (last accessed 27/04/2015).

Table 3A. Summary statistics, NFCs, the UK; all sectors

Variable	Mean		Std. dev.	Min.	Max.	Observations
(I/K)	0.246	overall	0.202	0	1.5	N = 21265
		between	0.164	0.003	1.295	n = 1732
		within	0.149	−0.707	1.490	$T\text{-}bar$ = 12.3
(S/K)	11.894	overall	20.494	0.0983	177.082	N = 20838
		between	21.203	0.107	174.737	n = 1719
		within	11.232	−75.392	150.924	$T\text{-}bar$ = 12.1
$(\pi - CD/K)$	0.568	overall	1.078	−0.860	8.334	N = 20250
		between	1.141	−0.324	8.132	n = 1711
		within	0.678	−4.450	7.944	$T\text{-}bar$ = 11.8
(π_F/K)	0.068	overall	0.359	0	28.891 5.667	N = 18405
		between	0.251	0	25.706	n = 1609
		within	0.301	−3.186		$T\text{-}bar$ = 11.4
(F/K)	0.280	overall	0.451	0	3.461	N = 21052
		between	0.397	0	3.019	n = 1726
		within	0.291	−1.801	3.363	$T\text{-}bar$ = 12.2
(Q)	1.518	overall	0.874	0.361	6.700	N = 21254
		between	0.639	0.391	6.502	n = 1732
		within	0.640	−1.692	6.311	$T\text{-}bar$ = 12.3

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

Table 4A. Summary statistics, NFCs, the UK; manufacturing sector

Variable	Mean		Std. dev.	Min.	Max.	Observations
(I/K)	0.211	overall	0.161	0	1.5	N = 8267
		between	0.116	0.005	0.932	n = 615
		within	0.127	−0.434	1.455	$T\text{-}bar$ = 13.4
(S/K)	7.186	overall	10.889	0.102	159.9	N = 8237
		between	9.773	0.107	72.615	n = 614
		within	7.029	−44.204	133.952	$T\text{-}bar$ = 13.4
$(\pi - CD/K)$	0.413	overall	0.758	−0.853	8.182	N = 8087
		between	0.762	−0.132	7.742	n = 614
		within	0.520	−3.795	7.315	$T\text{-}bar$ = 13.2
(π_F/K)	0.043	overall	0.171	0	5	N = 7049
		between	0.134	0	2	n = 577
		within	0.122	−1.365	4.184	$T\text{-}bar$ = 12.2
(F/K)	0.225	overall	0.323	0	3.461	N = 8230
		between	0.265	0	2.815	n = 615
		within	0.219	−1.308	3.138	$T\text{-}bar$ = 13.4
(Q)	1.510	overall	0.833	0.364	6.687	N = 8252
		between	0.632	0.440	6.502	n = 614
		within	0.588	−1.699	6.304	$T\text{-}bar$ = 13.4

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

Endnotes

[1] In contrast, some authors of the Marxian tradition (e.g. Lapavitsas, 2009; Kliman and Williams, 2014) argue for a reversed causality, i.e. financialization of the economy should be understood as a consequence, and not as a cause of the slowdown in the capital accumulation.

[2] Tobin's Q is expected to reflect the present discounted value of expected future profits under a perfect market hypothesis (Hayashi, 1982), assuming that the source of financing is ultimately irrelevant (Modigliani and Miller, 1958).

[3] The paper provides a response to the mainstream critiques of the use of liquidity measures to model investment by Jorgenson (1971).

[4] Variables definitions are in Appendix Table1A. In our version of the model by Fazzari and Mott (1986) we add the lagged rate of accumulation as an additional explanatory variable. Secondly, we do not need a variable for the gross plant value, since we already control for the companies' size by scaling each variable as a ratio to fixed capital.

[5] Output/potential output is potential output as a ratio to capital stock, which is a measure of technology. With constant technology in the short time period, the technological change is captured by time effects (which we control for). Thus, it is often used as a measure of capacity utilization, in particular due to a lack of data for *. Profit rate and sales are standard variables in the firm level investment literature. However, econometrically, there may be issues of correlation between the first two. Therefore, we estimated alternative models to show that the effects of retained operating income and sales are robust and positive in many different specifications. Results are available upon request.

[6] In our version of the model by Fazzari and Mott (1986) we add the lagged rate of accumulation as an additional explanatory variable, thus providing a dynamic representation of the investment process. Secondly, we do not need a variable for the gross plant value, since we already control for the companies' size by scaling each variable as a ratio to fixed capital.

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

[8] We also extended the model with total debt/fixed capital, and change in or the square of this ratio, but we did not find any statistically significant effects. Results are available upon request. An extended model with share buybacks was not feasible due to lack of data.

[9] Standard Industry Classification (SIC) code, 1994 version.

[10] The choice of the time-period is due to data availability.

[11] We compare our sample with data from the Office for National Statistics (ONS) in Appendix Table2A. Macro data for detailed variables are available only for 1997-2013. ONS does not provide a disaggregation for publicly listed and private companies.

[12] This is the accepted lower threshold for a GMM estimator (see Roodman, 2009)

[13] We follow Chirinko et. al. (1999) and Orhangazi (2008b) for defining the outliers. Our estimations are robust to the inclusion of the outliers.

[14] We employ a comprehensive definition of financial assets (see the Appendix, Table 1A).

[15] Milberg and Winkler (2009) argue that the accumulation-financialization link is blurred by the increase in off-shoring. This is not a problem in our case, since all our data are provided on a consolidated basis (parent company plus subsidiaries). Moreover, the non-operating dividend incomes come from financial activities.

[16] The full period is 29 years, but the average period for which all the variables are available is 6-9 years.

[17] The use of a GMM estimator allows us to address a dual causality, if financialization of the economy (rising financial payments and incomes) is also a consequence of the slowdown in the capital accumulation as suggested by Lapavitsas, (2009).

[18] The final estimates come from the combination of instruments and a vector of parameters that shows the minimum correlation between the error term and the instruments.

[19] Hansen test takes the orthogonality between instruments and regressions' residuals as the indicator of consistency between estimated and sample moments. We tested and confirmed the presence of heteroskedasticity in our sample by using the White/Koenker and the Breusch-Pagan/Godfrey/Cook-Weisberg tests. All these tests reject the homoscedasticity of our error terms. As argued by Roodman (2009), Hansen's-J test is preferred to the Sargan test in the presence of heteroskedasticity in the error terms. However, the Hansen test (as the Sargan test) is sensitive to the total number of instruments. Therefore, we use only the first and second lags of our variables as instruments. Furthermore, all instruments are 'collapsed', thus having an instrument for each variable and lag distance.

[20] Financial income is significant only at the second lag, indicating a longer time lag for this impact to become effective.

[21] We use the approximate average measure for Tobin's Q suggested by Chung and Pruitt (1994:71), who define it as a compromise between "analytical precision and computational effort based on the well-established procedure by Lindenberg and Ross (1981). Tobin's Q is treated as endogenous based on the Hansen-test.

[22] We refer to the data from Office for National Statistics (ONS) in order to define the time periods.

[23] Furthermore, we checked the robustness of our results by excluding firms with a logarithmic change in sales higher than 1 (only 5 firms excluded). The estimated coefficients are robust.

[24] However, this model presents a borderline value for the Arellano-Bond second order autocorrelation test.

[25] Furthermore, we run a robustness check on equation (4) by excluding firms (only 5) with a dloglogarithmic change in the levels of sales higher than 1 (only 5 firms excluded100%). The estimated coefficients are robust to this exclusion. Results are available upon request.

[26] The economic effects for 1992 and 2007 are very similar to the 1985-2007. Results are available upon request.

[27] The actual change of financial incomes is positive even if we take into account the financial crisis. This is due to the recovery of interest and dividends incomes since 2009.

[28] Milberg and Winkler (2009) argue that the accumulation-financialization link is blurred by the increasing in off-shoring activities from advanced to developing economies. Our results are robust to this critique. This is not a problem in our case, since all our data are provided on a consolidated basis (parent company plus subsidiaries). Moreover, the non-operating dividend incomes comes from financial, thus non-physical, investment in subsidiaries activities.