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Investment and the rate of profit in a financial context: the French case

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The growth regime prevailing in France since the middle of the 1980s allowed for a recovery of profitability, yet without durable resumption of growth or accumulation of fixed capital. The financialization of this growth regime shows on both the asset and liability sides of the balance sheets. Following a post-Keynesian framework, we analyse and test the main determinants of real investment and financial capital accumulation for non-financial companies in France, based on data from the flow-of-funds accounts. This analysis points to an arbitrage, prevailing between real and financial accumulation, as a key reason explaining the insufficient recovery of investment.

Keywords: finance; investment; profit rate; growth regime

JEL Classifications: G11, E12, E22, C32

Introduction

The 1980s and 1990s have been marked in France by significant structural changes. After a profitability crisis during the 1970s, the share of profit recovered in the second half of the 1980s. Capital's profitability returned to levels close to those prevailing at the end of the 1960s. But this movement did not lead to a lasting recovery of growth and capital accumulation.

Recoveries at the end of the 1980s and 1990s proved short-lived and were followed by significant slowdowns. Beyond a temporary retreat, mass unemployment persisted. This situation, which combined restored capital profitability with limited productivity gains and persistent unemployment, can be considered a new mode of extensive accumulation.

Changes that occurred at the financing level constitute another outstanding feature of the period. Increases in real interest rates at the beginning of the 1980s, end of credit rationing, financial liberalization, development of direct finance, changing norms on equity return and a stock market boom have all deeply changed firms' financial structure and corporate governance. We now have an abundant literature analysing the financialized accumulation regime and the patrimonial capitalism of the 1990s (Aglietta and Rebérioux 2004; Duménil and Levy 2004; Boyer 2000; Stockhammer 2004a).

The article seeks to characterize some features of accumulation regimes during the last 30 years in France by analysing the flow-of-funds accounts of Institut National de la Statistique et des Etudes Economiques (INSEE), which provide consistent stocks and flows data over the 1978–2007 period. Thanks to a precise account of financial assets

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and liabilities as well as capital gains, these data enable us to analyse firms' financial behaviour. The paper investigates the effects of financialization on business behaviour. Specifically, we shall analyse the effects of changes in the leverage ratio and the return on financial investment on the investment behaviour of non-financial firms by making a clear distinction between productive investment and financial accumulation. The theoretical framework is post-Keynesian, drawing in particular on Kalecki (1937, 1954) as well as the analysis by Minsky (1986) of interactions between financial variables and investment leading to periodic crises of over-accumulation and over-indebtedness.

The article starts by summarizing the main tendencies of the last thirty years in France with regard to profitability, real and financial accumulation, and the patrimonial structure of firms. Detailed attention is paid to indicators of financial profitability. We then specify the theoretical framework concerning finance and investment, setting thereby the stage for our presentation of econometric estimates regarding the main behavioural functions for fixed investment and financial accumulation. A final section concludes.

The last two decades in France: settling into a mode of financialized accumulation

We first look at the evolution of productive and financial investments, and their financing, in by non-financial firms in France over the two last decades. This enables us to highlight the main stylized facts of the French mode of financialized accumulation which underlie the econometric work that follows.

A disconnection between profit and investment

At the level of non-financial companies, the gross rate of profit, meaning the ratio of gross profit on last year's productive capital stock, is calculated using non-financial fixed assets except housing and inventories, measured at the replacement cost at the end of the year. This method has the disadvantage of accounting for only 50% of non-financial assets, but is often used because it is closely related to the theoretical concept of capital productivity. From its low point at the beginning of the 1980s, the rate of profit has recovered in the second half of the decade to reach levels close to those of the late 1960s (Duménil and Levy 2004). It maintained these high levels in spite of the economic slowdown at the beginning of the 1990s (Figure 1). This recovery of profitability is explained by the rising shares of profit and the stabilization of capital productivity. The policy of competitive disinflation and the rise of unemployment combined to slow down the growth of real wages. This facilitated the restoration of a high level of the profit share and its subsequent persistence, in spite of the limited growth of labour productivity.

But this restoration of profit rates did not lead to a durable resumption of investment, nor, more generally, of economic activity. The rate of accumulation,[1] measured here as the ratio of net investment on last year's stock of non-financial assets, had significantly declined at the beginning of each of the last two decades (Figure 1). These decreases in the rate of accumulation are consistent with the decline of the growth rate during the two cycles following the 1974 crisis of profitability. In the 1990s, one can observe a disconnection between the accumulation rate and the profit rate, except at the end of that decade, followed by an even more pronounced gap between the two since the beginning of the new century.

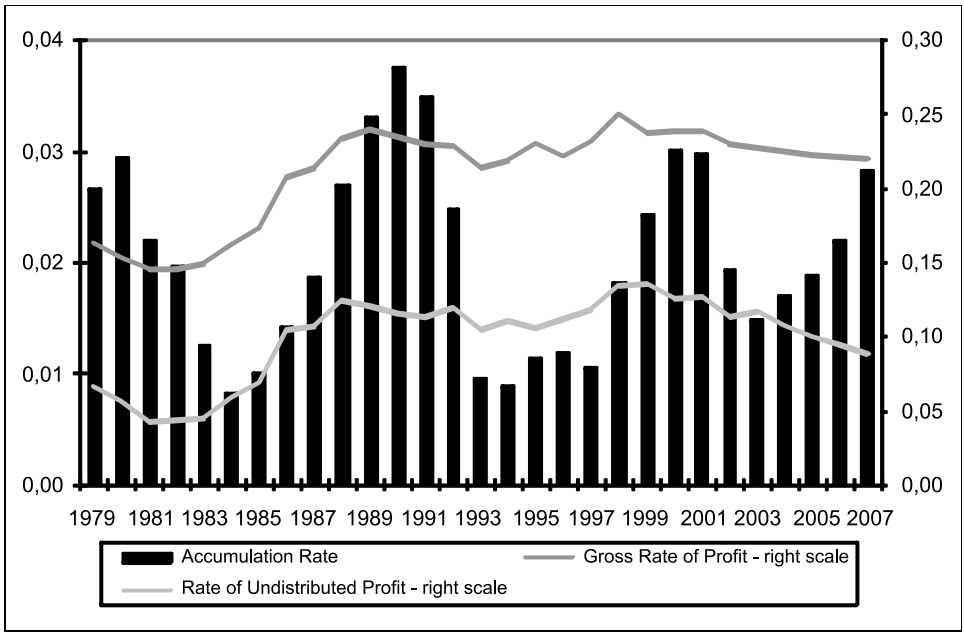

Figure 1. Links between the profit rate and the accumulation rate during the 1990s.
Note: Gross rate of profit = $P/p_kK_{(-1)}$, rate of undistributed profit = $Pu/p_kK_{(-1)}$ with Pu retained earnings, and accumulation rate = $\Delta K/K_{(-1)}$.

The recovery of the rate of profit in France over the last two decades corresponds to an extensive growth regime characterized by weak labour productivity growth and persistent mass unemployment putting downward pressure on real wages (Vidal 2002–2003). The emerging dominance of finance-led capitalism could be one plausible explanation for the weakness of growth in France and other OECD countries. This is the main idea behind the productive investment equations we are about to test.

The increase in dividends does not explain this disconnection

One of the fears expressed in economic literature with regard to the return of financial capitalism is that management puts too much emphasis on paying out dividends rather than maintaining adequate self-financing capacity in support of a consistent investment policy (van Treeck 2008; Orhangazi 2008). But an examination of financial burden in the long-run allows us to say that this assumption does not seem to hold for France. This is why we will not test a negative impact of finance on productive investment through the evolution of dividends.

We can illustrate financial burden through two ratios. The first concerns the share of interest paid out of gross profit, which decreased in the second half of the 1990s because of monetary policy changes and the willingness to ensure a better remuneration for financial assets. The other ratio is the share of dividends paid out of gross profit, which by contrast quickly increased during the 1990s in order to ensure a better remuneration to shareholders. The total financial burden, the sum of the two preceding ratios, increased appreciably (Figure 2).

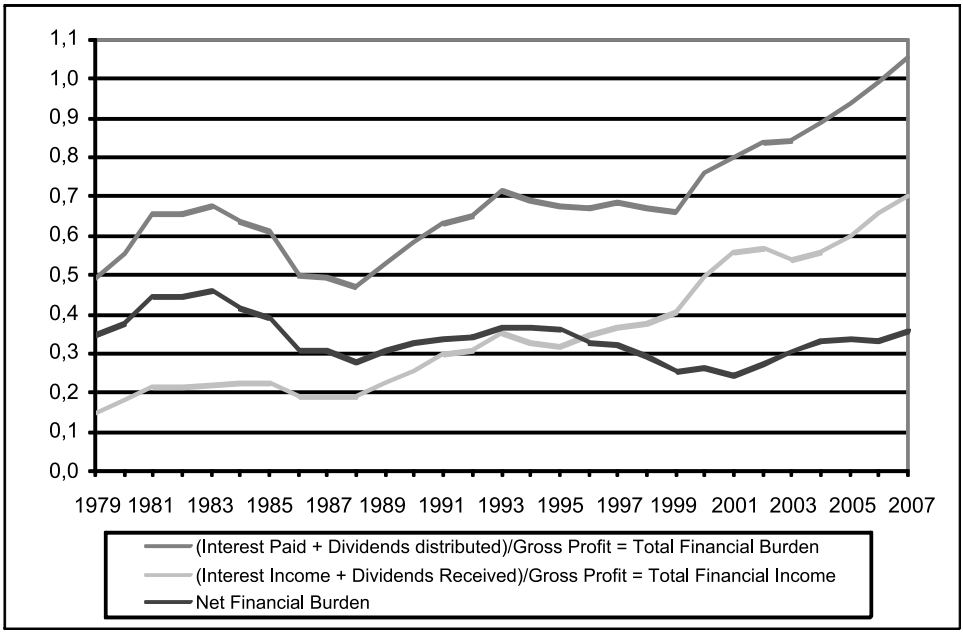

Figure 2. Net financial burden as a percentage of gross profit.

However, it should be noted that important consolidation problems are at play here. To have a more accurate vision of the drain exerted by finance on profits, we also have to consider interest and dividends received by firms have to get a net burden. Results are quite different with this 'consolidated' data (Figure 2): the net financial burden as a percentage of gross profit declined to around 30% by the end of the 1980s, and then remained stable until the end of the period in question. In light of these data, we can conclude that if there was indeed any financial pressure on productive investment, it would have resulted from factors other than merely redistributing profits to shareholders.

Dual financial pressures on investment: shareholder preferences and the financialization strategies of corporations

Econometric tests of financial pressures on firms' activities indicate that these seemed to have rather worked through shareholders' requirements on the financial profitability of firms. As we will see, this involves a complex arbitrage between physical accumulation and a more short-run concern for financial profitability, managed by corporations in particular through their financial strategies. Trying to satisfy the objective of shareholder value maximization, companies face a dual financial pressure. Firstly, their efforts to achieve considerable levels of financial return increase the total cost of capital,[2] which in turn can then impact negatively on productive investment. Secondly, companies tend to manipulate financial leverage and so run an increasing risk of over-indebtedness which may force them to cut back their activity levels especially in the wake of stock-market crashes.

With regard to the first point, we note that the development of the stock markets since the 1980s has led to the growing power of institutional investors in Europe.

These funds try to influence corporate strategy on the basis of conventional return objectives. In other words, the objective of elevated financial returns is implicitly validated by all financial players as a norm which has to be obtained by firms. If this is not the case, investors can use the strategy of 'exit' (Orléan 1999; Aglietta and Breton 2001). Shareholder expectations, pervading financial markets like a conventional agreement, encourage firms to maximize shareholder value by obtaining capital gains on equities that boost firms' ROE (the 'return on equity', measured here as the ratio of net profit after interest payments divided by own funds[3]). Toward that objective, managers deploy several methods to ensure the pursuit of shareholder interests concerning risk and return (Plihon 2002).

One strategy of shareholder value maximization consists of focusing on the firm's principal field of activities. In other words, firms divest themselves of subsidiaries outside of their core business in order to ensure maximum profitability in their own markets. In fact, shareholders prefer asset diversification for the purpose of risk reduction in their portfolio. The productive business is thus subjected to the financial requirements of shareholder preferences. Another method of shareholder value maximization depends on the firm's strategy of external growth carried out through merger-and-acquisition activity. Firms arbitrate between external growth (financial investment) and internal growth (productive investment), thus becoming stakeholders in the functioning of stock markets. The merger–acquisition activities make it possible to benefit from synergies between the amalgamated firms or economies of scale (Plihon 2002). Lastly, companies also resort to operations that make it possible to reduce the capital engaged, in particular debt-financed stock buy-backs.

Consequently, we can observe a growing proportion of financial assets on the asset side of corporate balance sheets, a process termed 'financialization'. This trend is especially evident with regard to the rise of the share of equities in financial assets or total assets. Using INSEE's flow-of-funds data about non-financial companies as accounting framework, Table 1 presents the main variables concerned.

The evolution of the asset structure, as described in the INSEE flow-of-funds accounts, reflects mainly a price effect which can be seen through the SBF 250 index of equity prices and which has revalued equities held by non-financial companies

Table 1. Non financial companies' balance sheet.

Asset	Liability
Non-financial fixed assets (p_kK)	
Other non-financial assets (OK)	
Financial assets (FA)	Financial liabilities (FL)
Monetary assets (M)	Loans (L)
Other assets (OA)	Other liabilities (OL)
Equities (p_eEe)	Equities (p_eE)
Total asset (A)	Net wealth (NW)

Note: Stock variables are measured at the end of the year.
Description of some variables:
Financial assets = FA = monetary assets (M) + other assets (OA) + equities held (p_eEe);
Total assets = A = non-financial fixed assets (p_kK) + other non-financial assets (OK) + financial assets (FA);
Financial liabilities = FL = loans (L) + other liabilities (OL) + equities issued (p_eE);
Own funds = OF = net wealth (NW) + equities issued (p_eE);
Total asset (A) = total loans ($L + OL$) + own funds (OF).
Other non-financial assets (OK) include housing and inventories.

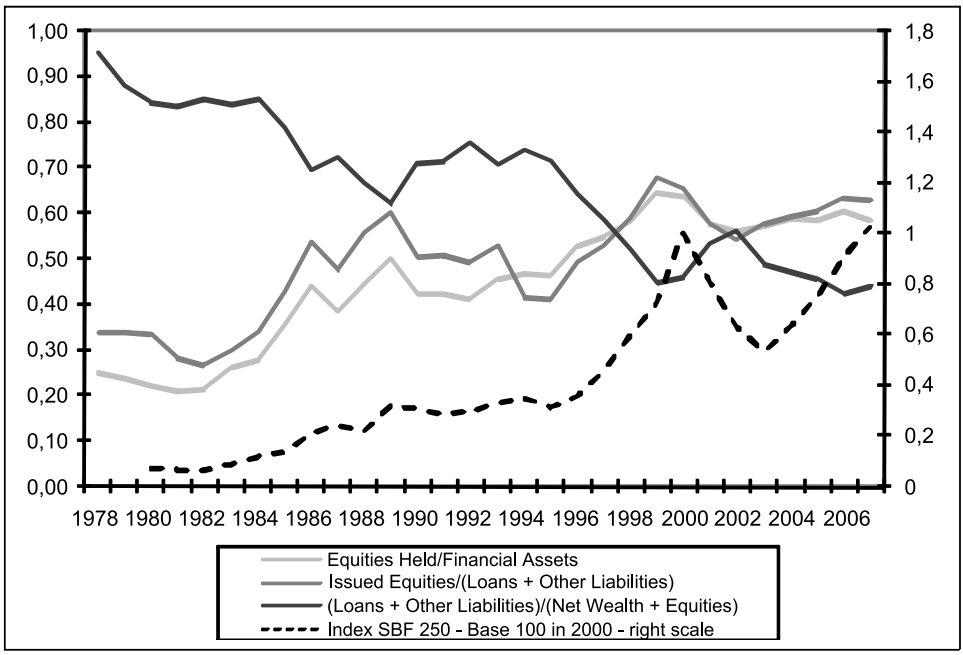

Figure 3. Firms' asset and liability structure and equities prices.

(Figure 3). However, we chose not to separate price and volume effects because, contrary to fixed assets, financial assets are essentially indivisible of their market value. It is, after all, the increase in that value, whatever its objective, which is what constitutes financial accumulation. Finally, the global evolution of firms' balance sheets reflects at the same time the development of firms' equity investment in other firms, including foreign companies, the repurchase of equities and the very favourable trend of equity prices which partly derives from such behaviour and inflates the value of these assets.[4]

We can thus analyse the financial pressure on firms' activities in econometric tests through financial profitability, central measure of the financial convention in the finance-led mode of accumulation. To test our assumptions about the financialization of corporate strategies, we are looking for a positive impact of rising financial profitability requirements on financial investment and a negative one due to the rise of the total capital cost on productive investment. But first we need to define the notion of financial profitability and check its real evolution in order to ensure that these hypotheses are plausible.

We can calculate financial profitability with respect to national accounts' own funds.[5] But this measure is not straightforward at the macroeconomic level. When a simple gross financial rate of profit before financial deduction is used, problems of consolidation appear. Another macroeconomic indicator of financial profitability, suggested by Godley and Lavoie (2001–2002), appears preferable and is well suited to the INSEE flow of funds accounts. The rate of return on equities (*re*) is the sum of distributed dividends and capital gains divided by the value of equities issued by non-financial companies and recorded on the liabilities side. In the same way, the rate of return of equities held by non-financial companies (*ree*) is the sum of received dividends and capital gains divided by the value of equities held on the asset side of

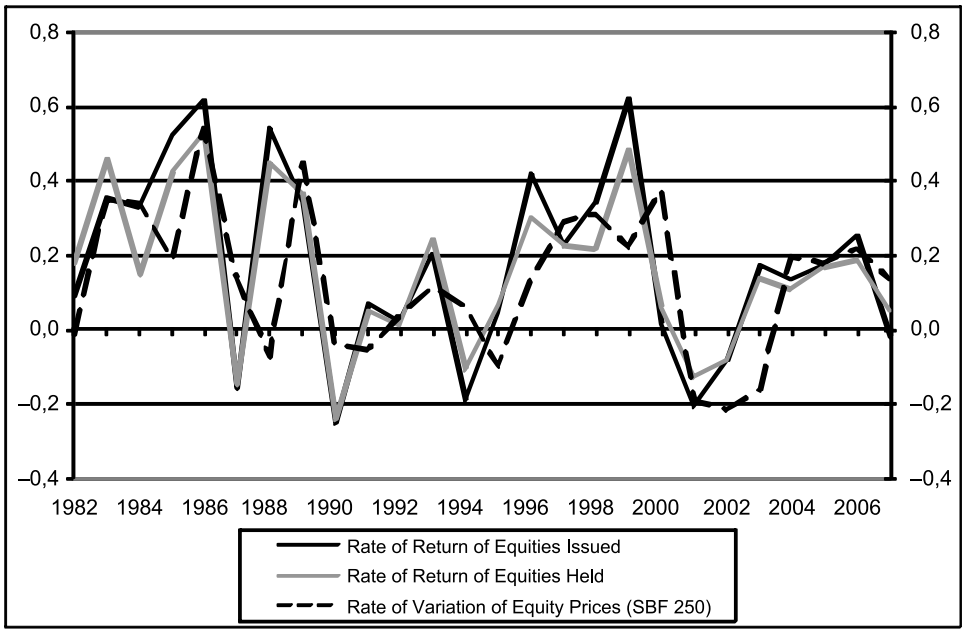

Figure 4. Rate of return on issued and held equities by non-financial companies and rate of variation of equity prices.

non-financial companies.[6] These ratios are close to the stock-exchange ratio Total Shareholder Return (TSR).

The rate of return on equities is highly variable. Fluctuations are mainly determined by capital gains, i.e. by the growth rate of equity prices, the dividend ratio on equities being very stable. The rate of growth of share prices, as measured by the SBF 250 index, appears to be highly correlated with the rate of return on equities. Peaks of financial profitability, with nearly 60% in 1986 and 1999, alternate with negative financial profitability during stock-market crashes, as in 1987 and 2001. Although fluctuations are much larger, a comparison can be made with variations of the ROE calculated for non-financial companies of the SBF 250 (du Tertre and Guy 2008). Indeed, one notes that the average return on equities issued is around 25% over the 1978–1989 period, zero from 1990 to 1995, and finally around 19% from 1996 to 2007. However, the earlier 1980s represent a period when the value of issued or held equities was very low. Given the value reached by these equities in the second half of the 2000s, maintaining such high levels of financial profitability ultimately came to represent a significant (and in the end unsustainable) effort for firms.

… and the question of healthy management

To obtain such elevated levels of financial profitability, as required by the new financial convention, firms had to boost their financial leverage, which makes it possible to multiply the return of own funds via higher levels of debt. This behaviour increased the financial market dependence of firms' activities. We present here some elements to explain what we can see about the debt ratio in econometric tests. Over a long period, financialization on the asset side of the balance sheet allows a reduction of

debt ratio with the inflation of equity prices. Nevertheless, companies face a sudden risk of over-indebtedness in the case of a reversal in financial markets. Their growth strategies have then to be re-examined. This is included in the 'broad credit channel' approach, as explained in the next section. While these points may be difficult to check in an econometric approach, we can nevertheless test two mechanisms: the principle of increasing risk, i.e. a negative effect of indebtedness on fixed investment, and a leverage effect, i.e. a positive long-run effect of debt ratio on financial investment.

The graphical analysis shows that non-financial companies' debt, measured as a percentage of own funds, was significantly reduced in two successive waves (Figure 3), first at the end of the 1980s, when profit margins were restored, and then again at the end of the 1990s with the stock market boom. A third wave seems to have started at the beginning of the 2000s. This can be verified irrespective of the indicator used: debt in a strict sense or in a broad sense, expressed as a percentage of total assets or of own funds. As explained above, the equity boom plays a crucial role here, as shown with the evolution of the SBF 250 index of equity prices. We can see that in growth periods, such as 1988–1990 and 1998–2001, the debt ratio increases, which partly reflects the leverage effect tested thereafter.

A post-Keynesian analysis framework

Finance and investment: a controversial matter

The traditional post-Keynesian theory of the investment function is based on a positive relation between investment and the rate of profit (Kalecki 1937, 1954). More precisely Kalecki analysed this relation in terms of a profit accelerator. In chapter 9 of his book *Theory of Economic Dynamics* (1954), entitled 'Determinants of investments', he clearly argued:

> another factor which influences the rate of investment decisions is the increase of profit per unit of time. A rise in profits from the beginning to the end of the period considered renders attractive certain projects which were previously considered unprofitable and thus permits an extension of the boundaries of investment plans in the course of the period. (Kalecki 1954, 97).

He debated this question with Tinbergen who was in favour of a demand accelerator effect. However, more recent Kaleckian models introduced a short-term effect of the rate of capacity utilization, making investment decisions positively influenced by profit and sales expectations (Taylor 1985, among others).

But these basic relations do not fit well with observed facts which show a kind of disconnection between profit and investment, as already emphasized in the previous section. Introducing financial variables in the model may help explain the dynamics of investment in a period of increasing financialization. This question has been debated intensely in the existing literature for a long time, and not only in post-Keynesian theory.

The existence of a link between the flow-of-funds structure and investment contrasts with the Modigliani–Miller theorem (1958), which stresses the neutrality of financial sources on companies' investment. Movements recorded in companies' financial structure and the increasing share of equities during the last 20 years suggest, on the contrary, that a powerful financial leverage has been in effect. The strategic dimension of finance has been dismissed with the assumption of perfect information. This central assumption has been questioned by the neo-Keynesian theory. It leads to

a widening effect of monetary policy on economic activity, via investment and the 'broad channel of credit'. Brainard and Tobin (1968) were the first explicitly considering these effects. Bernanke and Blinder (1988) have developed a macroeconomic model where firms can arbitrate between banking credit and bonds, but only in terms of rates of interest.

Tobin's q ratio rests on the idea that a company can grow in two ways, either by organic growth or by external growth. However, empirical analyses have difficulty establishing a clear link between Tobin's q and the rate of accumulation. In the case of France, Epaulard (1993) distinguished two periods in her sample, justified by transformations carried out in French financial markets, to establish a stable link between the rate of accumulation and Tobin's q ratio. For countries of the G7, Ashworth and Davis (2001) show that Tobin's q is far from playing a systematic role.

Post-Keynesian theories give a lot of attention to the linkage between capital accumulation and finance at the macroeconomic level. The approach is rooted in Kalecki's (1943) principle of increasing risk. He underlined that firms face growing risk on their own funds when more investment is financed by debt. Consequently, the debt ratio appears as an important determinant of the investment, considering that a high level of debt might induce financial fragility and have a negative effect on investment.

The introduction of Tobin's q ratio triggered debate within the post-Keynesian perspective. Some retained such a variable (Davidson 1972; Godley and Lavoie 2001–2002). Others are more divided, as various versions of Taylor's (2004) models suggest. Kaldor himself, who introduced the 'valuation ratio' as a strategic variably well before Tobin, would probably have doubted its influence on investment decision (Godley and Lavoie 2001–2002). On the whole, the role of Tobin's q ratio does not seem to be clearly established, both at the theoretical and empirical levels.

Minsky's notion of Financial Instability Hypothesis (Minsky 1986) constitutes a main reference. According to his reasoning, financial risks increase in an endogenous way when the economy, especially a highly financialized one, is in expansion mode. An economic boom in a given sector, generally an innovating one, leads to an acceleration of productive investment. The increase in profits validates expectations and induces companies to increase their debt, with euphoria-driven price gains of financial assets fuelling this process of leveraging. This goes on as long as expectations are fulfilled, but firms underlyingly increase their financial fragility in the process. But when a reversal occurs on profits expectations, financial markets seize up and spread illiquidity which can render insolvent the most speculative firms. Only deep cuts of investment spending makes it possible to reconstitute financing capacity of firms and so possibly avoid instances of insolvency (Brossard 1998).

Theoretical and empirical attempts have tried to capture the impact of 'shareholder power' or the 'financial profitability convention' on investment within a broad post-Keynesian framework. Boyer (2000) has presented a small macroeconomic model where a financial convention, representative of the profitability requirement imposed by shareholders, has a negative impact on investment. Although the model lacks accounting consistency, it gives an illuminating view of a finance-led growth regime. In a more applied work Stockhammer (2004a) proposed an investment function with a financialization effect which is captured by the ratio of interest and dividend income in the value added of non-financial firms. He found a negative effect of financialization on the rate of accumulation in France and the USA. More recently, van Treeck

(2008) estimated the long-run relationship of investment functions for the USA which included a variable representing the degree of shareholder value orientation of the firms. The proxy used for this is net dividend payments made by firms (as a percentage of the capital stock) which appeared to have a strongly negative effect, jointly with net interest payments.

The difficulty with empirical modelling is that neither 'shareholder power' nor 'financial profitability norm' are directly observable and can only be captured indirectly by proxy indicators. Although interesting, the indicators used by Stockhammer and van Treeck raise two kinds of problems. They ignore capital gains (or losses) which play a major role in a finance-led regime. Nor do they take into account the problems of financial profitability and of financial assets which are also key issues.

The 'stock-flow consistent models of Godley and Lavoie (2001–2002, 2006) and Taylor (2004), both using the framework of flow-of-funds accounts, are better fit to study the impact of finance on accumulation and to analyse the sustainability of various financial accumulation regimes. Adjustments of relative asset prices are at the core of these models, and financial profitability, measured as the rate of return on equities, is one of the main determinants of the demand for financial assets. However, Godley and Lavoie's models do not introduce financial profitability in the investment function. Instead they use the valuation ratio or Tobin's q ratio with a positive effect. Although this question is highly debated, we prefer to introduce the financial rate of return as a direct determinant of investment which seems a more straightforward way to describe the impact of financialization on productive investment. The financial rate of return would play negatively as high financial profitability typically induces more financial investment at the expense of productive investment.

To summarize, the Kaleckian investment function with its traditional determinants, profit accelerator, debt ratio with a negative effect of increasing risk and a possible short-term effect of the rate of capacity utilization, can be enlarged with a negative effect of the financial rate of return:

$$\frac{I}{K_{-1}} = f\left(\Delta R, \frac{L}{L+OF}, ree, U\right) \tag{1}$$

with I/K_{-1} = accumulation rate, $R = \frac{\mathrm{P}}{(p_k K)_{-1}}$ = total rate of profit, P = gross profit, $\frac{L}{L+OF}$ = debt ratio, L = total loans, OF = own funds, ree = financial rate of return = rate of return on equities held and U = rate of capacity utilization.

A last point concerning financial investment has to be discussed. In spite of its importance in the financialized accumulation regime, as shown in the previous section, this question is little analysed in the existing literature. There are few studies dealing with firms' assets demand whereas those about households are numerous. This is understandable because of the hybrid nature of financial assets, especially of equities held by firms. However, as explained above, the rise of financial assets reflects new behaviour by firms since the 1980s, crystallized around mergers and acquisition, taking financial stakes in support of domestic or foreign investment activities, and share buy-backs to preserve control or increase share prices. The translation of this behaviour at the macroeconomic level is not straightforward and presents new territory yet to be explored.

The rate of financial accumulation $\frac{p_e \Delta Ee}{(p_e Ee)_{-1}}$, defined as the rate of growth of equities held by firms, may be explained by four main determinants. The first one is the financial rate of return, as higher expectations of financial profitability induce greater accumulation of financial assets. Secondly, the total rate of profit can, as an indicator of firms' global performance, exert a positive influence on their financial accumulation. The third determinant is the leverage effect which, as we saw in the previous section, increases the reliance of firms on external funds and so motivates them to accelerate their financial investment. This effect can be captured by a positive influence of the debt ratio. Finally, the rate of interest on credit exercises a negative influence by reducing investment demand or by inducing greater diversification into other asset categories whose rate of returns had thereby been rendered more attractive.[7] On the whole, the financial investment function can be summarized as:

$$\frac{p_e \Delta Ee}{(p_e Ee)_{-1}} = f(ree, R, \frac{L}{p_k K}, rltr) \tag{2}$$

with $\frac{p_e \Delta Ee}{(p_e Ee)_{-1}}$ = financial rate of accumulation = rate of growth of equities held by firms, $R = \frac{P}{P_k K_{-1}}$ = total rate of profit, *rltr* = long term real interest rate.

Real and financial investment: empirical specifications

Fixed capital accumulation

Analysing the accumulation of capital from a Kaleckian point of view, we use as main determinants the total rate of profit with a positive profit's accelerator effect ($a_1 > 0$) and a debt ratio with the negative effect of increasing risk ($a_2 < 0$). The debt ratio used is the share of loans in total liability, which is comprised of the sum of loans and own funds as measured in the flow of funds.

The possibility of a demand effect through a traditional demand accelerator ($a_3 > 0$) or a short term effect of the capacity utilization rate will be examined. Lastly, the credit cost, measured by the long term real interest rate, is also introduced with a negative effect on the capital accumulation ($a_4 < 0$).

The introduction of non-standard financial variables tries to describe the impact of the financial profitability norm imposed by shareholders on fixed capital accumulation. The variable used is the rate of return on equities which seems more appropriate than the traditional q ratio of Tobin. The sign of the coefficient is expected to be negative ($a_5 < 0$). Booms of financial profitability would support financial accumulation at the expense of fixed investment.

The following medium-run specifications will be estimated:

$$Log\ K = a_0 + a_1\ R + a_2 \frac{L}{L + OF} + a_5\ ree \tag{3}$$

$$Log\ K = a_0 + a_3\ Log\ Y + a_2 \frac{L}{L + OF} + a_5\ ree \tag{4}$$

$$Log\ K = a_0 + a_1\ R + a_4\ rltr + a_5\ ree \tag{5}$$

with $a_1 > 0$, $a_2 < 0$, $a_3 > 0$, $a_4 < 0$ and $a_5 < 0$, $R = \frac{P}{(p_k K)_{-1}}$ = total rate of profit, $\frac{L}{L+OF}$ = share of loans (L) in total liability (L+OF, with OF = own funds = firms' net wealth + equities issued), Y = firms' gross value added, *rltr* = real long term interest rate, *ree* = rate of return on equities held.

Two remarks can be added. First, using a vector error correction model, we will obtain a more traditional determination of the rate of accumulation as $\Delta Log\ K = \frac{\Delta K}{K_{-1}}$. Second, as we will show, the statistical properties of the rate of return on equities, *ree*, and of the capacity utilization rate preclude us from including these variables in the estimation of the long run equation. We can only use them as short term variables.

Financial accumulation

Financial accumulation is analysed with two kinds of specifications. The first one focuses on the financial rate of accumulation, measured by the ratio of newly purchased equities to previously issued stock. It is determined by four variables: (a) the rate of return on equities held which is expected to play positively as higher financial profitability leads to an increase in financial assets ($b_2 > 0$); (b) the total rate of profit which also has a positive influence as improved economic situations gives firms more room to develop a financial accumulation ($b_1 > 0$); (c) the debt ratio, measured as the ratio of total loans on own funds, which corresponds to a leverage effect and has a positive effect on financial accumulation ($b_3 > 0$); and, finally, (d) the credit cost, measured as the long term real rate of interest, which, on the contrary, is expected to play a negative role ($b_4 < 0$). In this case, the financial rate of accumulation could be formalized by:

$$\frac{p_e \Delta Ee}{(p_e Ee)_{-1}} = b_0 + b_1\ R + b_2\ ree + b_3 \frac{L}{OF} + b_4\ rltr \tag{6}$$

with b_1>0, b_2>0, b_3>0, b_4<0, $p_e\Delta Ee$ = new purchased equities, *rltr* = long run real interest rate, $\frac{L}{OF}$ = ratio of loans to owns funds.

The other specification we wish to estimate involves the study of new equities purchased with the same determinants and the same expected sign of coefficients:

$$p_e \Delta Ee = b_0 + b_1\ R + b_2\ ree + b_3\ (\frac{L}{p_k K}) + b_4\ rltr \tag{7}$$

with b_1>0, b_2>0, b_3>0, b_4<0, $\frac{L}{p_k K}$= ratio of loans and fixed capital assets (debt structure).

As was the case with the fixed capital accumulation, the statistical properties of the equities' rate of return do not allow us to include this variable in the estimation of the long-run equation, but only as a short-term variable.

Econometric results

Data

The following results have been obtained for non-financial companies in France between 1978 and 2005, with annual data to respect the coherence of flow-of-funds accounts established by the INSEE. Almost all the data are estimated in accordance with the new 2000 base. However, in order to dispose of a large sample of data, we had to use two bases for financial accounts: the 1995 one from 1978 to 2003, and the 2000 one from 1995 to 2005. Thanks to an analysis of the overlapping period, it appears clearly that the studied variables are only a little affected by the choice of base, in level as in evolution.

K is the *fixed capital stock* (INSEE data AN11 – AN1111); R is the total rate of profit which reports the *profit* earned during the present period on the past *stock of fixed capital* (INSEE data B2); *rltr* is the long-run real *interest rate*, i.e. the inflation-adjusted average long-run interest rate French financial markets (OECD data); *ree* is the rate of return on equities held presented above (ratio of INSEE data D421 resources plus PF3 stock revaluations and PF3 stocks, lagged once); $\frac{L}{(L+OF)}$ is the debt ratio of share of *loans* and *loans* plus *own funds* (Ratio of INSEE data PF4 stocks and PF5 stocks plus B90 stocks: 'own funds' in French National Accounts corresponds to the notion of total common equity in private accounts, and is measured as *issued equities* plus *net wealth*, the latter measuring the difference between assets and liabilities valorized at market value); Y corresponds to the *gross value added* of non-financial companies (INSEE data B1); U is the INSEE *capacity utilization rate*; p_eEe is the stock of *equities held* (INSEE data AF5 Stocks); $p_e\Delta Ee$ is *new equities held* (INSEE data AF5 Flows); $\frac{p_e\Delta Ee}{(p_eEe)_{-1}}$ is a rate of financial accumulation which reports the *equities bought* during the present period on the past *stock of equities held*; $\frac{L}{OF}$ corresponds to the debt ratio of loans and *own funds*; $\frac{L}{p_kK}$ is the debt ratio of loans and fixed capital assets.

Method for econometric tests

The econometric relations estimated are the results of vector error correction models. This method was selected, because many variables are non-stationary in terms of their level, but stationary in terms of their first difference. The ADF unit root tests are given in an appendix. The corresponding results clearly show that the majority of the tested variables in our models are integrated of order 1. Only financial profitability and the capacity utilization rate are stationary.

For each specification, we estimate the number of cointegrating relation starting from the two tests suggested by Johansen (1988): the Cointegration Trace Test and the Maximum Eigenvalue Test. However, considering the restricted size of our sample, these cointegration tests are known to reject in an excessive way the assumption of absence of cointegrating relations. Also, to avoid this problem, we weight the statistics obtained through the cointegration tests by a coefficient of small sample bias correction (as made, for example, by Fischer, Köhler, and Seitz (2004) or by Fernandez-Corugedo, Price, and Blake (2003)) for the construction of Vector Error Correction

Table 2. Cointegration Trace tests.

Equation.	Number of CE	Eigenvalue	Trace statistic	Critical value at 5% level	Critical value at 10% level
(a)	At most 1	0.189	7.25*	20.26	17.98
(b)	At most 1	0.400	12.27*	15.49	13.43
(c)	At most 1	0.329	10.07*	12.32	10.47
(d)	At most 1	0.428	22.28**	35.19	32.27
(e)	At most 1	0.476	23.89*	35.19	32.27
(f)	At most 1	0.334	11.92**	20.26	17.98

Notes: * Indicates significance at 5% level; ** indicates significance at 10% level. The Trace statistics are all weighted by Reinsel–Ahn small sample adjustment.

Table 3. Cointegration Eigenvalue tests.

Equation.	Number of CE	Eigenvalue	Maximum Eigenvalue statistic	Critical value at 5% level	Critical value at 10% level
(a)	At most 1	0.189	4.83*	15.89	13.90
(b)	At most 1	0.400	11.74*	14.26	12.29
(c)	At most 1	0.329	8.77*	11.22	9.47
(d)	At most 1	0.428	11.74**	22.30	20.05
(e)	At most 1	0.476	14.24*	22.30	32.27
(f)	At most 1	0.334	8.93**	15.89	13.90

Note : * Indicates significance at 5% level; ** indicates significance at 10% level. The Maximum Eigenvalue statistics are all weighted by Reinsel–Ahn small sample adjustment.

Models (VECM) relating to other subjects. We resort with this intention to the coefficient of Reinsel and Ahn (1992). The results are presented respectively in Table 2 and Table 3. For each VECM tested, the tests indicate the presence of one relation of cointegration, at the 5% level for all the equations of investment, as for the equation of financial accumulation (e), and at the 10% level for the two others, (d) and (f).

In spite of the single cointegrating relation for each specification, the VECM are estimated by a maximum likelihood method, as suggested by Johansen (1988) (as is done for example by Fernandez-Corugedo, Price, and Blake [2003] with 31 periods). Indeed, one chose not to use the Engle and Granger method for two main reasons. First, as Muscatelli and Hurn (1992) explain it, this last method suffers precisely from a small sample bias, whereas it is, on the contrary, more powerful than others for the large samples ('super-consistent' estimator). Thus, they demonstrate through an example[8] that the Johansen method is more robust for the estimate of cointegration equation than that the Engle and Granger method because of the small sample size.

Second, some of the variables we want to test are stationary in level: such is the case for the key variable *ree* (rate of return on equities). Consequently, we have to test them as I(0) exogenous variables, which is only possible with the maximum likelihood method. Indeed, Bourbonnais (2005, 289) explains that with exogenous variables, 'we cannot apply the OLS method, because we have identification problems similar to those we find … in simultaneous equations models. It is advisable to use a maximum likelihood method'.[9] Thus, the estimated equations are such as in equation (8) below, derived from the equation proposed by Johansen and Juselius (1990):

$$\Delta y_{1,t} = \alpha(y_{1,t-1} + a_1 + a_2 y_{2,t-1} + a_3 y_{3,t-1} + \ldots) + (A_1 \Delta y_{1,t-1} + A_2 \Delta y_{2,t-1} + \ldots) + Bx_t + \varepsilon_t \quad (8)$$

where y_1 is the explicate variable, the y_i are all I(1) endogenous variables and x_j is a vector of I(0) exogenous variables. The coefficient α measures the speed of adjustment of the endogenous variable toward the equilibrium and must be significantly negative, Δ is the operator of first difference, while a_1, a_2,…, A_1, A_2,… and matrix B represent econometric coefficients.

As soon as the models are estimated in one stage using the Johansen method, all the variables introduced into the y_i vector as endogenous variables are necessarily and automatically included in first difference form in the error correction model. However, in the tables containing our tests results, we do not present insignificant results, to facilitate the reading. This explains partly why short-run variables do not entirely correspond to the difference of long-run variables as in equation (8), but only in the presentation. Moreover, as explained above, I(0) exogenous variables are introduced into our specifications. Those are not, by definition, present in the cointegration equations, which explains another part of the apparent shift between the short and long run variables of in our tables.

Lastly, the ordinary tests of normality, autocorrelation, and heteroscedasticity of the residuals are carried out and presented. For each equation, the Jarque–Berra test confirms that the hypothesis of normality cannot be rejected. The White test makes it possible to reject the heteroscedasticity in the residuals, and the absence of autocorrelation is confirmed by the LM test. The lag structure is chosen by minimizing SIC (Schwarz) and AIC (Akaike) criteria. For the different models, we specified alternatively no lag or one lag for short-run variables, so that certain equations in Tables 4 and 5 only present constant and/or exogenous variables.

Fixed capital accumulation

Results of different specifications are given in Table 4. For all our models, the R^2 seems quite acceptable. Coefficients have the expected signs and are significant.

A first equation contains a Kaleckian relation connecting the accumulation rate and the total rate of profit with a profit accelerator mechanism. For example, according to equation (a), corresponding to equation (3) in the previous section, a one-point increase of the rate of profit implies a 0.2% increase of the accumulation rate while the negative impact of the debt ratio reflects an effect of increasing risk.

The profit accelerator effect is completed with the long-term real interest rate (equation (c) corresponding to equation (5) in the previous section). In accordance with a traditional negative impact of the cost of credit on capital accumulation, the interest rate has a significant and negative effect.

The usual accelerator effect, which considers the impact of expected variations of demand, is also significant – see theoretical equation (4) and estimated equation (b). According to those equations, a 1% increase of firms' gross value added generates a 0.2% increase of the accumulation rate and a 1.5% in investment.[10] Similarly, in the short-run, the demand effect is captured through the capacity utilization rate with a usual positive effect – estimated equation (c).

Lastly, we examine the impact of the rate of return on equities held, *ree* – see equations (3) to (5) above. For econometric reasons, *ree* can only be tested as a short-run vari-

Table 4. Fixed capital accumulation (French non-financial companies, 1980–2005).

Cointegration equations

Equation	Log K_{-1}	Constant	R_{-1}	$rltr_{-1}$	Log Y_{-1}	$(L/(L+OF))_{-1}$
(a)	1	0.30	0.21			−0.24
	t-stat	(10.7)	(2.7)			(−5.1)
(b)	1	0.36			0.17	−0.44
	t-stat	(4.5)			(8.9)	(−5.9)
(c)	1		0.52	−0.59		
	t-stat		(6.7)	(−6.1)		

Error correction models

Equation		Speed of adjustment	ΔLog K_{-1}	ΔR_{-1}	$\Delta(L/(L+OF))_{-1}$	Constant	*ree*	*U*
(a)	ΔLog *K*	−0.04					−0.02	
		(−16.9)					(−2.1)	
(b)	ΔLog *K*	−0.20			−0.35	0.04	−0.05	
		(−4.5)			(−1.9)	(6.2)	(−3.0)	
(c)	ΔLog *K*	−0.03	−0.30	−0.23			−0.02	0.002
		(−5.4)	(−1.8)	(−1.5)			(−2.1)	(6.3)

Validation tests

	(a)	(b)	(c)
R^2	0.58	0.59	0.65
Jarque–Bera	2.80	6.98	7.43
	(0.83)	(0.42)	(0.28)
White	28.01	55.48	70.68
	(0.26)	(0.64)	(0.52)
LM	9.26	3.83	6.24
	(0.41)	(0.92)	(0.72)

Notes: T-statistics are in parenthesis and significant at 5% level for the results of the estimations. For the validation tests, p-values are in parentheses. Insignificant coefficients in the error correction models are not presented. *K* = fixed capital stock, *R* = economic rate of profit, *rltr* = long-run real interest rate, *ree* = rate of return on equities held, *L*/(*L*+*OF*) = share of loans in loans plus own funds, *Y* = gross value added of non financial companies, *U* = capacity utilization rate (INSEE).

able. As expected, this impact is negative in all the estimated equations. The coefficient seems small. But we must also keep in mind that this indicator of financial profitability is subject to important fluctuations, which significantly increase its impact on the rate of accumulation. According to equation (a), a 10-points increase of the rate of return on equities implies about a 1.7% fall in productive investment. This negative coefficient reflects the presumption that the boom in stock markets and the increase of financial profitability since the 1980s have both contributed to slow down fixed capital accumulation.

On the whole, these results confirm those obtained in other investment studies applied to France (see Villieu (2000) for a synthesis). Usual variables appear significant, although traditional problems underlined in the existing literature remain. The negative impact of financial profitability seems to confirm Stockhammer's (2004a) previous results. We take it as a sign of robustness that the indicators used in these two studies to catch the impact of financialization, the rate of return on equities held versus the share of capital income in the value added, are not the same.

If one accepts the idea of a rate-of-return convention in financial markets, then an increase in *ree* involves higher requirements of financial return, then a rise of financial investment since it implies an increasing financialization of investment strategies (especially with a renewal of merger–acquisition activities, as seen above). It means that the increase of the total capital cost can limit productive investment in growth period.

Financial accumulation

Financial accumulation is a less explored territory from an econometric point of view. The demand for equities by firms is studied here through two different specifications: the financial rate of accumulation $\frac{p_e \Delta Ee}{(p_e Ee)_{-1}}$, equation (d), and the new equities purchased $p_e \Delta Ee$, equations (e) and (f);[11] see equations (6) and (7) above. The R^2 of all the models are globally acceptable. This statistic is, however, weak for equation (e), but the structure of this equation is closed to equation (f). This finding is interesting as another robustness check for equation (f), insofar as sign and coefficient do not

Table 5. Financial accumulation (French non-financial companies, 1981–2005).

Cointegration equations

Equation	$(p_e \Delta Ee/(p_e Ee)_{-1})_{-1}$	Constant	R_{-1}	$rltr_{-1}$	$(L/OF)_{-1}$
(d)	1 t-stat	−0.19 (−6.4)	0.72 (7.2)	−0.86 (−5.7)	0.23 (7.0)
Equation	$\text{Log}(p_e \Delta Ee)_{-1}$	Constant	R_{-1}	$rltr_{-1}$	$(L/p_k K)_{-1}$
(e)	1 t-stat	−2.85 (−9.5)	8.42 (7.3)	−4.55 (−2.6)	2.62 (6.2)
(f)	1 t-stat	−1.17 (−3.3)	12.69 (8.2)	−12.86 (−4.4)	

Error Correction Models

Eq.		Speed of adjustment	$\Delta(p_e \Delta Ee/(p_e Ee)_{-1})_{-1}$	$\Delta rltr_{-1}$	*ree*
(d)	$\Delta(p_e \Delta Ee/(p_e Ee)_{-1})$	−0.57 (−2.5)	−0.36 (−1.9)	0.78 (2.4)	0.07 (2.3)
Eq.		Speed of adjustment	$\Delta\text{Log}(p_e \Delta Ee)_{-1}$	$\Delta rltr_{-1}$	*ree*
(e)	$\Delta Log(p_e \Delta Ee)$	−0.39 (−2.9)			1.07 (3.4)
(f)	$\Delta Log(p_e \Delta Ee)$	−0.39 (−2.9)	−0.43 (−2.7)	16.59 (2.7)	1.25 (3.7)

Validation tests

	(d)	(e)	(f)
R^2	0.51	0.37	0.59
Jarque–Bera	10.85 (0.21)	5.62 (0.69)	8.19 (0.22)
White	112.94 (0.66)	30.35 (0.87)	62.77 (0.38)
LM	15.73 (0.47)	22.97 (0.11)	7.94 (0.54)

Notes: T-statistics are in parenthesis and significant at 5% level for the results of the estimations. For the validation tests, p-values are in parentheses. Insignificant coefficients in the error correction models are not presented. R = economic rate of profit, $rltr$ = long-run real interest rate, *ree* = rate of return on equities held, $p_e Ee$ = equities held, $p_e \Delta Ee$ = new issued equities, $p_e \Delta Ee/(p_e Ee)_{-1}$ = rate of financial accumulation, L/OF = share of loans in own funds, $L/p_k K$ = ratio of loans and fixed capital assets.

really change between the two equations. All the coefficients are significant and have the expected signs (see Table 5).

In both cases, the demand for equities by firms would be strongly influenced by the rate of return on equities. An effect of financial affluence, caught through an economic profitability variable, can also be added as an exogenous variable. For example, a 30-points increase of ree in equation (d) as between 1999 and 2000 implies a 2.1% raise of the financial rate of accumulation, $\frac{p_e \Delta Ee}{(p_e Ee)_{-1}}$. These results confirm the assumption of the financialization of firms' strategies.

The real interest rate has a negative impact on financial investments in the medium-run, which corresponds to the idea that money-market assets or other interest-bearing assets become more attractive than equities when the interest rate rises. According to equation (d), a decline by 50 basis points of the real interest rate generates a 0.43 % increase of the financial rate of accumulation in the medium-term. Lastly, the debt ratio of non-financial companies could have a positive influence on the demand for equities, which expresses the leverage effect. Equation (d) indicates that a 5-points increase of $\frac{L}{OF}$ implies a 1.15-point increase of the rate of financial accumulation. Higher debt ratio permit investing in various financial strategies mentioned above, above all mergers and acquisitions. Firms can then obtain a better market evaluation, thereby achieving a rise in financial profitability measured as *ree* (which included capital gains).

Conclusion

The article has focused on the determinants of investment in the framework of the growth regime which prevailed in France since the middle of the 1980s and on the role played by finance. The analysis has been made at the level of non-financial companies with annual data from flow-of-funds accounts of INSEE. The main features of this growth regime have been a recovery of profitability with persistent mass unemployment and without a resumption of growth or fixed capital accumulation. Financialization can be read in the balance sheet structure of firms, through the rising shares of equities, both on the asset side as well as on the liability side. In the context of declining interest rates since the middle of the 1980s, the boom of equities prices, stopped by two crises in 1987 and 2001, boosted both own funds and financial assets of corporations, while subjecting financial profitability to large cyclical fluctuations.

Financial profitability is mainly determined by capital gains, i.e. fluctuations of equity prices. In that respect, a high and sustainable norm for the financial rate of profit seems difficult to satisfy. Furthermore, it can hardly be argued that the net financial burden has increased. After an increase at the beginning of the 1980s due to the rise in interest rates, the net financial burden as a percentage of gross profit declined in the middle of the 1980s. That ratio has remained rather stable since, thanks to the rise of financial assets and the sustained growth of financial income.

Following a post-Keynesian framework, we have analysed the main determinants of fixed investment and financial accumulation econometrically. In accordance with Kaleckian principles, fixed capital accumulation appeared largely driven by the total rate of profit with a profit accelerator mechanism and a negative impact of the debt ratio reflecting an effect of increasing risk. The long-term real interest rate also has a negative influence due to a traditional credit cost effect. Lastly, a demand factor is also

present with the usual accelerator mechanism or the positive influence of the capacity utilization rate in the short run.

Beyond this relatively standard investment function, the financial rate of profit, i.e. the rate of return on equities held, seems to exercise a negative effect. In that respect, the stock market boom and the increase of financial profitability might both have contributed to slowing down fixed capital accumulation to the benefit of financial accumulation.

Indeed, firms' demand for equities, which reflects their financial accumulation and is scarcely studied in the economic literature, is rather strongly influenced by the rate of return on equities. Because of the leverage effect, the debt ratio of firms' influences has a positive effect on their financial accumulation process while the real interest rate has a negative impact. The arbitrage between real and financial accumulation could be a major factor contributing to the insufficient recovery of investment, which is in turn a key reason for weak growth and employment in France, as in many other European countries.

These first results confirm Stockhammer's (2004a, 2004b) previous work about the negative impact of financialization on investment in the French case, although the indicator used to capture shareholders' pressure is not the same. The non-standard financial variables we have proposed, the financial rate of accumulation and the financial rate of return, could be used in other countries, especially the United States, to give a complementary vision of the finance-led growth regime.

Notes

1. The concept of investment used here is also net of housing investment and inventories, parallel to our measure of non-financial fixed assets.
2. The total cost of capital is measured by the balanced sum of shareholders' expectations about financial profitability and the average rate of interest on a firm's debt.
3. Own funds in the ROE are specified as in consolidated accounts, i.e. the sum of provisions and total common equities.
4. Once again, these data, especially equities held by no-financial companies, should be interpreted cautiously, because they are not consolidated at the macroeconomic level and include equity stakes in other domestic companies.
5. The notion 'own funds' is defined in French National Accounts, hence also throughout this paper, as the sum of net wealth and issued equities. Net wealth corresponds to the difference between assets and liabilities valorized at market value.
6. Definition of the *re* and *ree* ratios:
   The rate of return on issued equities, *re*, is defined as:

$$re = \frac{CG + DD}{(p_e E)_{-1}} = \frac{E_{-1}\Delta p_e + DD}{(p_e E)_{-1}} = \frac{\Delta p_e}{(p_e)_{-1}} + \frac{DD}{(p_e E)_{-1}}$$

   with DD = distributed dividends, CG = capital gains on issued equities, p_e = equities price and E = number of issued equities.
   The rate of return on equities held, *ree*, is defined as:

$$ree = \frac{CGe + RD}{(p_e Ee)_{-1}} = \frac{Ee_{-1}\Delta p_e + RD}{(p_e Ee)_{-1}} = \frac{\Delta p_e}{(p_e)_{-1}} + \frac{RD}{(p_e Ee)_{-1}}$$

   with CGe = capital gains on equities held, RD = received dividends, Ee = number of equities held.
7. The number of equities held Ee is not calculated directly in this equation. It could be calculated in a broader macroeconomic model like those of Godley and Lavoie (2001–2002, 2006) where equity price p_e is determined by the adjustment of issued equities and demand of equities.

8. To that end, Muscatelli and Hurn (1992) introduce an example about the demand for money in the United Kingdom with a specification which comprises only one cointegrating relation.
9. Our translation.
10. Since $\Delta K/K = 0.17\Delta Y/Y$ according to the medium run equation; $\Delta I/I \approx 0.17\ \Delta Y/Y\ (K/I) \approx 0.015$
11. In these last ones, the explicate variable used is $\log(p_e \Delta Ee)$, with $p_e \Delta Ee$ always positive in the INSEE data in our sample period.

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Appendix:Augmented Dickey-Fuller test

Table A.1

	Unit root tests: ADF method				
	Level		First differences		
Series	T(ADF)	Specification	T(ADF)	Specification	Process
Log K	−2.18	inter.; trend	−4.23	inter.	I(1)
R	−2.43	inter.	−2.52	–	I(1)
Log (Y)	−2.33	inter.; trend	3.8	inter.	I(1)
$L/(L + OF)$	−2.25	inter.; trend	−3.98	–	I(1)
L/OF	−2.72	inter.; trend	−2.94	–	I(1)
L/p_kK	−3.51	inter.; trend	−3.45	inter.	I(1)
U	−3.21	inter.			I(0)
ree	−4.89	inter.; trend			I(0)
rltr	−2.98	inter.; trend	−6.99	inter.; trend	I(1)
$p_e\Delta Ee$	−3.33	inter.; trend	−7.34	–	I(1)
$p_e\Delta Ee/(p_eEe)_{-1}$	−0.58	–	−8.26	–	I(1)

Note: Tests are made for the 1978–2005 period. Considering the small sample, the maximum value of the number of lags of the dependent variable is alternately 0 or 1. All coefficients are significant at 5% level. Critical values are given in McKinnon (1996). Lags are all equal to one. The use of the automatic Schwartz (SIC) criterion with our relatively short period sample yields sometimes exaggerated and implausible lags.