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Reconsidering the Investment-Profit Nexus in Finance-Led Economies: an ARDL-Based Approach

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Reconsidering the Investment-Profit Nexus in Finance-Led Economies: an ARDL-Based Approach

Till van Treeck*

Abstract

A simple Post Keynesian growth model is developed, in which financial variables are explicitly taken into account. Different possible accumulation regimes are derived with respect to changes of these variables. Several variants of an investment function are estimated econometrically. The ARDL-based approach proposed by Pesaran et al. (2001) is argued to be superior for this purpose to the traditional cointegration approach. The econometric results are discussed with respect to a remarkable phenomenon that can be observed for some important OECD countries since the early 1980s: accumulation has generally been declining while profit rates have shown a tendency to rise. We concentrate on one potential explanation of this phenomenon which is particularly relevant for the USA and relies on the hypothesis of a high propensity to consume out of capital income. We also give an alternative explanation of the so-called "New Economy boom" in the USA at the end of the 1990s.

Key Words: Investment, Profitability, Financialisation, Time Series Econometrics.

1. Introduction

Since the early 1980s, we can observe a remarkable phenomenon in a number of important OECD countries: while accumulation rates have generally been declining, profit shares and rates have shown a tendency to rise. Although this "investment-profit puzzle" has received "curiously little attention so far" (Stockhammer, 2005-6, p.197)[1], it clearly poses something of a challenge to traditional Post Keynesian theory.

In effect, probably the most distinguishing feature of Post Keynesian growth theories of all provenances[2] is the postulation of a "double-sided relationship between the rate of profit and the rate of accumulation" (Robinson, 1962, p.12). Most famously, the centrepiece of the early Post Keynesian growth models developed by Robinson (e.g. 1962, 1965), Kaldor (e.g. 1956, 1957, 1961) and Pasinetti (e.g. 1974) is the "Cambridge equation": $r = g(r^e)/s_\Pi$, with $r = \Pi/K$ = realised profit rate, $g = I/K$ = accumulation rate, r^e = expected profit rate, and s_Π = propensity to consume out of profits. In equilibrium: $r = r^e$, the accumulation rate is "a function of the rate of profit that induces it". On the other hand, the profit rate is "a function of the rate of accumulation that generates it" (Robinson, 1962, p.48).

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[1] See, however, Duménil and Lévy (2003), Cordonnier (2003), Lavoie (2006, p.20) for discussions of this phenomenon.

[2] The term "Post Keynesian" is used in an inclusive manner, such as proposed by, e.g., Sawyer (1989) or Lavoie (1992). In particular, the Kaleckian tradition is explicitly included.

In the more recent Kaleckian models, the rate of capacity utilisation, which is assumed to be, in the long run, at full, or "normal", level in the early Cambridge models, is endogenised. However, the positive relationship between the accumulation rate and the profit rate is maintained. In the "stagnationist" variant of the Kaleckian growth model, propagated, amongst others, by Rowthorn (1981), Taylor (1985) and Dutt (1984, 1987), investment decisions are positively influenced by retained earnings (following the "principle of increasing risk") and sales expectations (see also Kalecki, 1954; Steindl, 1976). The corresponding general investment function can be written as: $g^i = g(r^e(r,u))$, with u = rate of capacity utilisation. Combining this investment function with a savings function of the form: $g^s = S/K = s_\Pi r$, yields the "canonical Kaleckian model" (Lavoie, 1992), where an increase in the profit share adversely affects capacity utilisation, accumulation and profit rate, *ceteris paribus*.[3] Empirically, however, profit rates have been rising together with profit shares in many countries since the early 1980s.

As shown by Bhaduri and Marglin (1990), the "stagnationist" investment function effectively implies the restrictive assumption of a "strong accelerator effect", if coefficients on both r and u are to be positive. Bhaduri and Marglin (1990) suggest the alternative general investment function: $g^i = g(r^e(h,u))$, with $h = \Pi/Y$ = share of profit in national income. The resulting model allows for different "regimes": aggregate demand can be "stagnationist" ($du/dh < 0$) or "exhilarationist" ($du/dh > 0$), accumulation can be "wage-led" ($dg/dh < 0$) or "profit-led" ($dg/dh > 0$). Notice that, by definition, $r = (\Pi/Y)(Y/Y^*)(Y^*/K) = hu/v$, with Y^* = full capacity output. Therefore, if the full capacity/capital ratio, v, is given, accumulation in the Bhaduri-Marglin investment function effectively depends only on the actual rate of profit (as in the Cambridge model). As a conclusion, a divergence of accumulation and profit rate is at first sight difficult to perceive in this model as well.

In sum, two fascinating questions can be formulated: first, why do firms not invest their profits? Second, how can high (increasing) profit rates be compatible with low (declining) accumulation rates at the macroeconomic level?

In an attempt to propose a potential solution to these puzzles, the paper proceeds as follows: first, section 2 offers a brief survey of some relevant "stylised facts" on growth, profitability and income distribution in France, Germany, the United Kingdom and the United States from 1960 onwards. Particular emphasis in this section and throughout the paper lies on the phenomenon of "financialisation", which can be loosely defined as increasing rentier power or, more specifically, "shareholder value orientation".

A Kaleckian macro model is developed in section 3, extending the previous works by Lavoie (1995) and Hein (2006a). The conditions for a particular accumulation regime are derived, in which financialisation induces a decline in the accumulation rate while increasing the profit rate. The intuition behind this is that a high dividend payout ratio imposed by shareholders on firms has a depressive effect on investment but a high propensity to consume of the recipients of capital income stimulates profits.

An extensive empirical analysis is provided in sections 4 to 6. First, it is argued that the ARDL-based bounds-testing approach recently developed by Pesaran et al. (2001) is particularly well suited for estimation of investment functions and overcomes many problems affecting simple partial adjustment models or the traditional cointegration approach used in previous work on related questions. Estimation of the investment functions from the Cambridge model and the Bhaduri-Marglin model confirms the hypothesis of a breakdown of the investment-profit nexus in the early 1980s for all countries except the UK. For France and the US, where financialisation has been particularly pronounced, data availability also allows estimation of two variants of the investment function proposed in section 3. Given the strong degree of financialisation in the US, the trends of accumulation and distribution in this country are analysed in some greater

[3] This is shown by Blecker (2002) for a simple linear model.

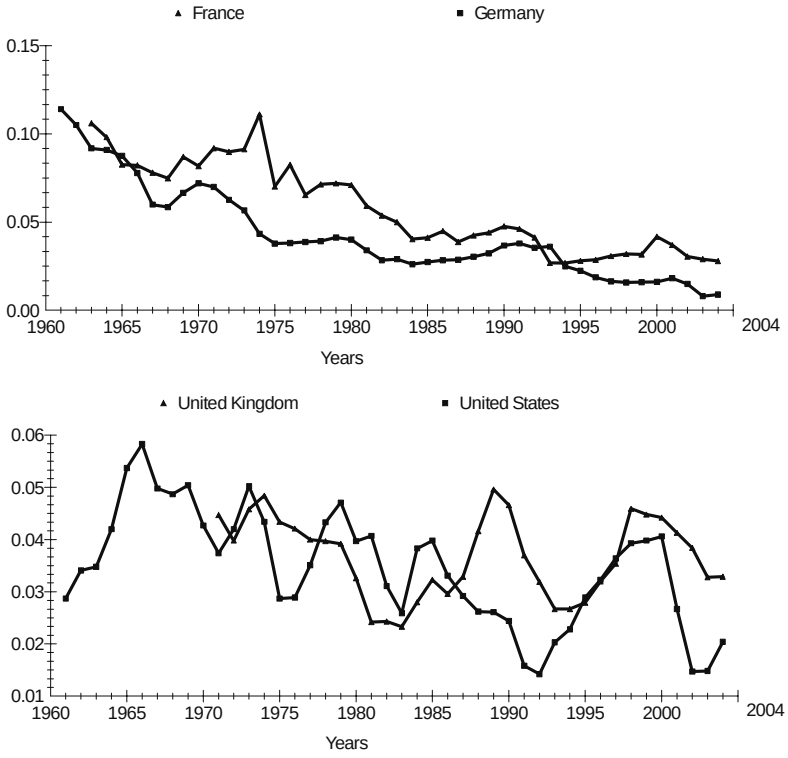
depth and the accumulation regime combining low accumulation and high profitability is indeed found to be empirically relevant for plausible values of the propensity to consume out of capital income.

Some open questions are discussed in section 7, before section 8 concludes.

2. Growth, Distribution, and Financialisation: Stylised Facts

It has become common practice to distinguish three main periods of economic development in the advanced industrialised economies since the Second World War (see, e.g., Boyer, 1990, 2000; Williams, 2000; Setterfield and Cornwall, 2002; Stockhammer, 2005-06): the first three post-war decades have been labelled the "Fordist era"[4], or "Golden Age of Capitalism"[5]. They were characterised by high accumulation and output growth and relatively peaceful social relations between "labour and capital" ("Keynesian compromise"). The years from the late 1960s/early 1970s to the early 1980s were a "period of crises", with a sharp decline in output and capital stock growth, increasingly fierce conflict over the distribution of income, and high rates of inflation. During the years from the early 1980s onwards, which mark the third period,[6] economic growth could be to some extent stabilised, albeit not at rates comparable with those of the Fordist era. A distinguishing feature of this last period is the redistribution of income from wages to profits, which has been (over)compensating the redistribution in the other direction during the Fordist era and the period of crises.

Figure 1: Accumulation Rate*



*Growth rate of business capital stock, Source: OECD Economic Outlook.

Figures 1-2 and tables 1-2 give a more explicit account of the broad periodisation sketched above. Figure 1 and table 1 show that the slowdown in accumulation and out-

[4] The "Fordist growth regime" has been analysed within the French "regulation school", in particular by Aglietta (1976). For a survey, see Boyer and Saillard (1990).

[5] A seminal analysis of the "Golden Age" is Marglin and Schor (1990).

[6] A lucid exploration of economic and social implications of this era is provided by Duménil and Lévy (2001).

put growth since the end of the Golden Age has been particularly pronounced in France and in Germany. In the US, a similar downward trend can be observed, although the picture is more complex in this case. In particular, during the second half of the 1990s, accumulation rates have come close to those of the late Fordist era, but the subsequent recession brought accumulation down to a historical low point of the post-war era. The UK is an exception in some ways because it is the only of the four countries under investigation that has not experienced a declining trend of accumulation and output growth. Of course, the overall macroeconomic performance in this country had been considerably weaker than in the three other countries throughout the Fordist era.

Table 1: Growth of Business GDP

	France	Germany	United Kingdom	United States
1960-74	5.09	4.08	2.94	4.00
1975-84	2.17	2.45	1.51	3.06
1985-04	2.11	2.13	2.73	3.13

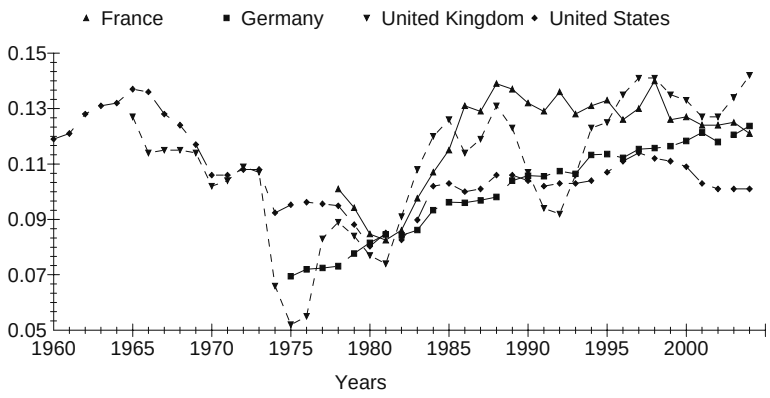
Source: OECD Economic Outlook.

Table 2: Profit Share in the Business Sector

	France	Germany	United Kingdom	United States
1960-74	33.29	35.11	30.27	29.83
1975-84	30.21	32.16	29.40	32.40
1985-04	38.34	35.18	32.08	34.05

Source: OECD Economic Outlook.

Figure 2: Rate of profit*



*France: Net operating surplus/net capital stock (non-financial corporations), Source: French National Accounts (INSEE); Germany: Income from property and other/business capital stock, OECD Economic Outlook; UK: Net rate of return, private non-financial corporations, Blue Book (ONS); US: Net operating surplus/private fixed assets, NIPA and Fixed Assets Tables (BEA).

From figure 2 and table 2, it is apparent as an overall trend that private enterprise profitability in terms of profit rates and profit shares first declined from the mid-1960s until the early 1980s, before recovering and peaking in recent years.[7]

Simultaneously and very importantly, since the early 1980s profits have been increasingly distributed to rentiers, as defined in table 3. This trend is very distinct in the US, but only rather weak in Germany. A striking case is France, where the rentier income share has virtually doubled throughout the 1990s. Figure 3 gives some indication

[7] Unfortunately, the quality of the measures of the profit rate as well as the periods for which we were able to construct the series differ.

about the composition of rentier income. In particular, it shows that in France and in the US financialisation has taken the form of a drastic increase in the share of dividend income in total rentier income relative to the share of interest income.

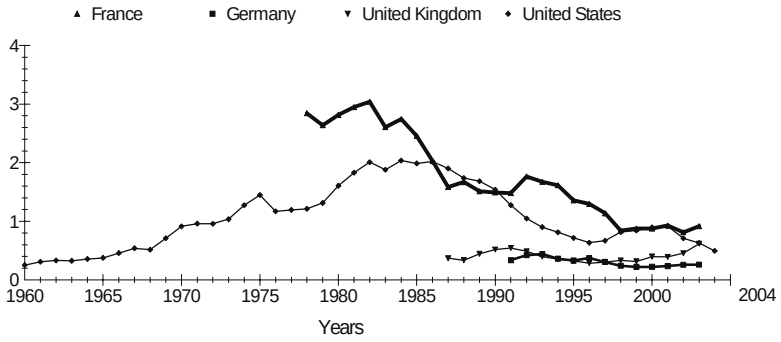
Table 3: Rentier Income as a Share of GDP (in per cent)

	France	Germany	United Kingdom	United States
1960-69		2.98	3.97	14.81
1970-79	6.24	5.02	6.33	22.47
1980-89	10.62	7.83	10.85	38.26
1990-99	21.19	7.43	14.16	33.49

Note: "rentier income is defined as profits realized by firms engaged primarily in financial intermediation plus interest income realized by all non-financial non-government resident institutional units, i.e. the rest of the private economy"; notice that capital gains on financial assets are not considered here.

Source: Power et al. (2004, p.6).

Figure 3: The Interest-Dividend Ratio* as a Measure of Shareholder Value



*France, UK: Net interest payments/net dividend payments, corporations, Source: OECD National Accounts, Vol. II; US: Net interest payments/net dividend payments, domestic businesses, NIPA (BEA).

A further stylised fact is the decline in personal savings rates in recent decades (see figure 4). After being roughly constant, or slightly increasing, until the early 1980s, they have noticeably fallen in France and in the UK during the 1980s before stabilising during the 1990s, only relatively modestly decreased in Germany during the 1990s, and dramatically dropped down in the US since the 1982 recession for becoming close to zero, or even negative, in the very recent past.

Figure 4: Household Savings Rate* as a Share of Disposable Income

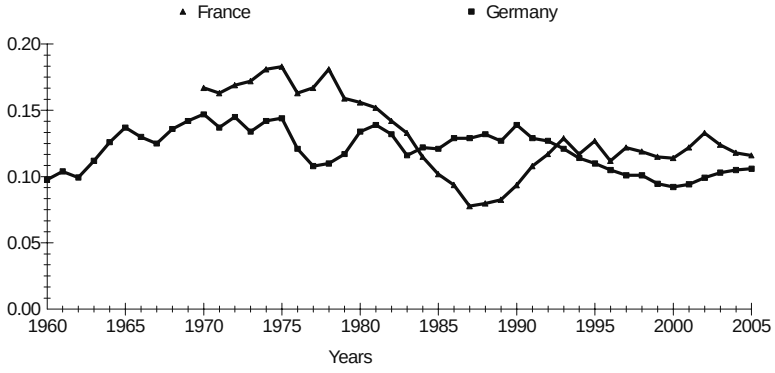
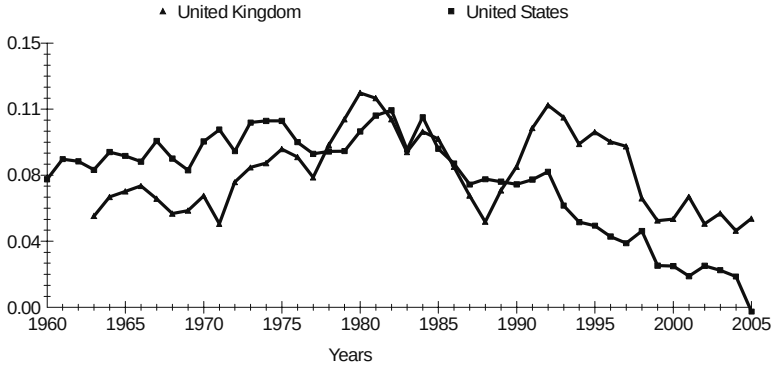


Figure 4 (Cont'd): Household Savings Rate* as a Share of Disposable Income



*Household Savings as a Share of Disposable Income, Source: OECD Economic Outlook.

Confronting these stylised facts with the traditional Post Keynesian models of growth and distribution, one may rather naturally conclude that the high realised rates of profit of the Fordist era are to be explained by high rates of accumulation and that high expected rates of profit brought into existence a virtuous circle of sustained economic expansion. The period of crises is characterised by falling accumulation and profit rates, which is again consistent with basic theory. Marglin and Bhaduri (1990) have argued that the decline of the Golden Age was partly due to a "profit squeeze" faced by firms, that is, economies may have switched from "stagnationism" to "exhilarationism" and from "wage-led growth" to "profit-led growth". First, the decline of the profit share had a direct negative impact on the profit rate from the cost side. This simultaneously deteriorated firms' expectations about the future rate of profit and thus triggered a slowdown of accumulation, which in turn also contributed to the fall of the realised profit rate. The diverging development of accumulation and profitability since the early 1980s, however, does not allow such neat theoretical interpretations. In the next section, the traditional Post Keynesian models are therefore extended by explicitly taking into account the impact of financialisation on accumulation and savings.

3. Introducing Financialisation into Post Keynesian Models of Growth and Distribution

A Simple Kaleckian Macro Model

Our model is set up as follows:[8]

(1) $$r = \left(\Pi / Y\right)\left(Y / Y^*\right)\left(Y^* / K\right) = hu / v,$$

(2) $$\Pi = \Pi^r + i_b K_b + i_s K_s = \Pi^r + INT + DIV,$$

(3) $$INTK = i_b K_b / K,$$

(4) $$DIVK = i_s K_s / K,$$

(5) $$g^s = \left(\Pi - INT - DIV + s_b INT + s_s DIV\right) / K = r - \left(1 - s_b\right) INTK - \left(1 - s_s\right) DIVK,$$

(6a) $$g^i = \alpha + \gamma r - \theta INTK - \phi DIVK, \qquad \alpha, \gamma > 0;\ \theta > 0;\ \phi > 0,$$

[8] For a more complete account of the theoretical underpinnings of the Kaleckian growth model, see Lavoie (1995) and Hein (2006a, b).

(6b) $$g^i = \alpha + \beta u + \tau h - \theta INTK - \phi DIVK, \qquad \alpha, \beta, \tau > 0;\ \theta > 0;\ \phi > 0,$$

(7) $$g^s = g^i.$$

Definition (1) was given above. The profit share can be seen as exogenously given by a constant mark-up applied to unit labour costs.[9] Equation (2) decomposes total profits into profits retained by firms, Π^r, net interest payments, $i_b K_b = INT$, and net dividend payments, $i_s K_s = DIV$. Definitions (3) and (4) are introduced for computational convenience (and for facilitating econometric estimation) and used in the savings and accumulation functions, respectively given by equations (5) and (6).

According to equation (5), an increase in interest and/or dividend payments (related to the capital stock) leads to a decrease in the savings rate: retained profits are saved by definition, while rentiers consume at least part of their income. It is assumed that there are no savings out of labour income.

Two variants of the accumulation function are given in equation (6). The first one can be seen either as an extension of the investment function known from the Cambridge model, or as the effective demand constraint in a Kaleckian model. In the latter case, the rate of capacity utilisation is endogenously determined following $u = rv/h$. In this form, the model is, in fact, similar to Lavoie's (1995) "Minsky-Steindl model". With the investment function given by equation (6b), the model becomes an extension of a linear Bhaduri-Marglin model, close to that developed by Hein (1999, 2004, 2006a). These previous models will be discussed in more detail below. Here, it suffices to note that the crucial innovation of our model is the additional variable *DIVK* in the savings and investment functions. The motivation behind specifying two different investment functions is that they have different respective advantages in the context of econometric estimation and can also be used for robustness checks (see section 6).

In the investment function, *INTK* and *DIVK* both reflect firms' expenditure directed to rentiers and therefore have a negative direct effect on accumulation. However, it is argued here that the two variables proxy rather different mechanisms concerning the governance of firms. In particular, we expect $\phi > \theta$ and argue that the increase in *DIVK* has been a major cause of the slowdown in accumulation in countries experiencing financialisation during the past decades.

Our hypothesis is grounded in an extension of the Post Keynesian theory of the firm in the context of financialisation, close to that developed by Stockhammer (2004, p.723 et seq.). The relevant unit of analysis is the large corporation operating in oligopolistic markets and where ownership and control are separated. It has traditionally been argued that the managements of such firms are typically keen on achieving power and esteem via large market shares requiring high accumulation rates (see, e.g., Galbraith, 1969; Eichner, 1976; Lavoie, 1992). We argue that bondholders and banks (whose influence in corporate governance is proxied by *INTK* in our model) are, in general, mainly concerned about the long-term viability of firms. They are therefore likely to passively accept or even favour a management strategy of "retain and invest" (Lazonick and O'Sullivan, 2000). Quite conversely, an increase in "shareholder value" (proxied by *DIVK* in our model) is seen as favouring strategies of "downsize and distribute" because shareholders are overwhelmingly interested in (short-term) financial returns (see ibid.).

The means by which "agency costs of outsider equity" (Jensen and Meckling, 1976) have been reduced in recent decades are well known and have been extensively analysed by the New Institutional Economics (NIE) literature. In particular, managements are nowadays disciplined by the threat of "mergers and the market for corporate con-

[9] Formally, $p = (1 + m)wl$, where p = price, m = mark-up, w = unit wage and $1/l$ = labour productivity. Unit labour costs are assumed constant up to full capacity. Then, $h = \prod/pY = 1 - 1/(1+ m)$.

trol" (Manne, 1965), by a competitive "market for managers" (Fama, 1980), by stock-price oriented remuneration schemes, etc..

As recognised by Stockhammer (2004, p.725), it is today taken as a commonplace in the public debate that the enhanced control of management by shareholders since the end of the Fordist era and the period of crises has reduced accumulation and favoured profitability, at least at the firm level: "Among the manifestations of this lack of control over management were the pursuit of market share and growth at the expense of profitability […]" (OECD, 1998, p.17). Yet, as we have recalled in introduction, at the macroeconomic level a *higher* accumulation rate induces a *higher* profit rate, *ceteris paribus*. Clearly, the breakdown of the investment-profit nexus is so interesting because it seems to imply that the demand by shareholders for higher *microeconomic* profitability at the expense of accumulation has been realised even at the macroeconomic level.

Tables 4 and 5 show that our model indeed contains the possibility of an "intermediate case" as one potential explanation of the recent accumulation dynamics in some countries: financialisation simultaneously depresses the accumulation rate and increases the profit rate. Of course, we are particularly interested in the case of rising *DIVK,* which will be most relevant in our estimations for the US, but also to some extent for France, during the period from 1980 onwards (see sections 2 and 6). The conditions for the different accumulation regimes are derived formally in Appendix 1. We consider only cases featuring short-run stability. This requires that $\partial g^i / \partial r < \partial g^s / \partial r$ and $\partial g^i / \partial u < \partial g^s / \partial u$, respectively, and amounts to assuming that $\gamma < 1$ in table 4 and $\beta < h / v$ in table 5. Also, we assume $\partial INTK / \partial DIVK = 0$ and, in table 5, $\partial INTK / \partial h = \partial DIVK / \partial h = 0$. We discuss these assumptions in section 7.

Curiously, while empirically most relevant, the "intermediate case" has received little attention in previous work.

Table 4: Effects of Interest and Dividend Payments in the Extended "Minsky-Steindl Model" (Investment Function Given by Equation (6a))

	"Normal Case"	**"Intermediate Case"**	**"Puzzling Case"**
	$1-s_s < \phi$	$\phi < 1-s_s < \phi/\gamma$	$1-s_s > \phi/\gamma$
$\partial r / \partial DIVK$	–	+	+
$\partial g / \partial DIVK$	–	–	+
	$1-s_b < \theta$	$\theta < 1-s_b < \theta/\gamma$	$1-s_b > \theta/\gamma$
$\partial r / \partial INTK$	–	+	+
$\partial g / \partial INTK$	–	–	+

Table 5: Effects of Interest and Dividend Payments in the Extended "Hein Model" (Investment Function Given by Equation (6b))

	"Normal Case"	**"Intermediate Case"**	**"Puzzling Case"**
	$1-s_s < \phi$	$\phi < 1-s_s < \phi h/\beta v$	$1-s_s > \phi h/\beta v$
$\partial u / \partial DIVK$	–	+	+
$\partial r / \partial DIVK$	–	+	+
$\partial g / \partial DIVK$	–	–	+
	$1-s_b < \theta$	$\phi < 1-s_b < \phi h/\beta v$	$1-s_b > \phi h/\beta v$
$\partial u / \partial INTK$	–	+	+
$\partial r / \partial INTK$	–	+	+
$\partial g / \partial INTK$	–	–	+

Comparisons with Other Theoretical Analyses of Financialisation

As indicated earlier, the models proposed by Lavoie (1995) and Hein (2006a) are not so much models of financialisation, but rather monetary extensions of traditional, "real" Kaleckian growth models.[10] This may also explain why they focus on a comparison between the "normal case" and the "puzzling case" with respect to changes in interest rates (and not so much on the equivalent of our "intermediate case"). In fact, one of the merits of these models is the demonstration that a positive relationship between the interest rate and the profit rate, as postulated by some neo-Ricardian authors,[11] can also be derived within a Kaleckian framework.

Another interesting aspect of these models is that the "leverage ratio", $l = K_b/K$, will be stable only in the puzzling case, but unstable in the two other cases (as in Steindl's paradox of "enforced indebtedness"). Here, entrepreneurs react to an increase in the interest rate by cutting down investment. This can be seen as an attempt to compensate for the increase in the leverage (gearing) ratio associated with a higher interest rate. However, this attempt will be unsuccessful due to the macroeconomic forces underlying the normal case: "internal accumulation is reduced proportionately more than outside saving, so that the gearing ratio increases" (Steindl, 1976, p.118). Conversely, the puzzling case features a positive relationship between the interest rate and the equilibrium accumulation rate. Here, the direct negative effect of the interest rate on investment is weak and, simultaneously, the propensity to consume out of interest income is substantial. Thus, the redistribution of income from firms (which do not consume) to rentiers will considerably increase consumption and thus have a strong indirect effect on investment via its impact on the profit rate (in the "Minsky-Steindl model") or on capacity utilisation (in Hein's model). It can be shown algebraically that only under such conditions will the leverage ratio stabilise at a non-negative, finite level, following a change in the interest rate.

The present paper is not so much interested in the long run behaviour of the model, but rather in understanding the empirical, "medium run" trends of growth and distribution in the recent past. The intuition behind the "intermediate case" is that, although consumption out of capital income is high, the direct negative effect of dividend payments overwhelms the equilibrium rate of accumulation. At the same time, however, shareholders' consumption is high enough for increases in the dividend/capital ratio to drive up the profit rate.

Our account of financialisation is alternative to the idea of a "patrimonial accumulation regime" (Aglietta, 1998, 2000) or a "finance-led growth regime" (Boyer, 2000). In these models, a positive relationship between shareholder value orientation and economic activity is possible via the stimulating effects of (stock market) wealth on consumption.[12]

In a similar vein, Stockhammer (2005-6) considers wealth-based consumption within a Kaleckian model. He also identifies the decline of the ratio of investment to profits as a new macroeconomic stylised fact. However, his algebraic explanation of the "investment-profit puzzle" appears to be somewhat unsatisfactory, as it seems to effectively imply that the growth-profit trade-off, which is postulated at the microeconomic level, also exists at the macroeconomic level (for a discussion, see Appendix 2).

In the present paper, it is argued that consumption out of dividend income (rather than wealth) constitutes a potentially more relevant explanation of either the "puzzling

[10] Hein extends Lavoie's analysis by considering the possibility of an interest-elastic mark-up and experiments with different accumulation functions: one (Hein, 2006b) produces "stagnationist" results, the other (Hein, 2006a) is based on the Bhaduri-Marglin model.

[11] See Sraffa (1960), and, more recently, Panico (1985, 1988) and Pivetti (1985, 1991).

[12] For (critical) discussions of Aglietta's and Boyer's interpretations of financialisation, see, e.g., Plihon (2002), Colletis (2004), Hoang-Ngoc and Tinel (2003), Cordonnier (2003).

case" (which is similar to Boyer's (2000) "finance-led growth regime"), or, more importantly, the "intermediate case" (which is an alternative solution to Stockhammer's "investment-profit puzzle"). A similar argument is developed in the innovative works by Van de Velde (2005) and Cordonnier (2003).

It is certainly an analytical weakness of our model that stock market prices and wealth effects are not explicitly considered. In effect, the strategy "downsize and distribute" may also take the form of share buybacks by corporations, thereby aiming at capital gains for shareholders. However, it is important to recognise that, empirically, dividends and capital gains always benefit the same individuals (shareholders), so that in our simple framework an increase in the propensity to consume out of wealth should be reflected in a higher propensity to consume out of dividends, *ceteris paribus*.

4. ARDL-Based Estimation of Post Keynesian Investment Functions: Advantages and Problems

Estimating investment functions is not an easy task. In effect, some "fundamentalist" Post Keynesians argue that in an uncertain, or "nonergodic", world, investment decisions are overwhelmingly determined by exogenous "animal spirits" of entrepreneurs and can therefore not be expected to follow a stable functional expression (see, e.g., Davidson, 2000, p.15).

In a more optimistic stance, Kalecki noted at the end of his life that "there is a continuous search for new solutions in the theory of investment decisions" (Kalecki, 1971, p.viii). From an empirical perspective, Kalecki was "very much concerned with the lags involved between cause and effect" (Arestis, 1992, p.130). Of course, Kalecki did not have very sophisticated econometric techniques at his disposal and therefore, "for the purposes of analysis, (he) incorporated an average lag between decision and implementation. Clearly, a more empirical-based approach would need to take account of different lags in different circumstances" (Sawyer, 1985, p.53).

A recent innovation in time series econometrics, that appears to precisely fulfil this requirement, is the ARDL-based analysis of (long-run) level relationships advanced by Pesaran et al. (2001, herafter PSS). This approach presents important advantages over simple partial adjustment models (PAMs) or the traditional cointegration approach developed by Engle and Granger (1987) and Johansen (1988, 1991, 1995). Below, the ARDL-based approach is discussed in the context of and applied to different Post Keynesian investment functions.

We estimate the following unrestricted error correction models (ECMs):

$$\Delta g_t = \alpha + \rho g_{t-1} + \lambda^r r_{t-1} + \sum_{i=1}^{p} \varphi_i \Delta g_{t-i} + \sum_{j=0}^{q} \psi^r_j \Delta r_{t-j} + \varepsilon_t, \tag{8}$$

$$\Delta g_t = \alpha + \rho g_{t-1} + \lambda^u u_{t-1} + \lambda^h h_{t-1} + \sum_{i=1}^{p} \varphi_i \Delta g_{t-i} + \sum_{j=0}^{q} \left(\psi^u_j \Delta u_{t-j} + \psi^h_j \Delta h_{t-j} \right) + \varepsilon_t, \tag{9}$$

$$\begin{aligned} \Delta g_t = {} & \alpha + \rho g_{t-1} + \lambda^r r_{t-1} + \lambda^{INTK} INTK_{t-1} + \lambda^{DIVK} DIVK_{t-1} \\ & + \sum_{i=1}^{p} \varphi_i \Delta g_{t-i} + \sum_{j=0}^{q} \left(\psi^r_j \Delta r_{t-j} + \psi^{INTK}_j \Delta INTK_{t-j} + \psi^{DIVK}_j \Delta DIVK_{t-j} \right) + \varepsilon_t, \end{aligned} \tag{10}$$

$$\begin{aligned} \Delta g_t = {} & \alpha + \rho g_{t-1} + \lambda^u u_{t-1} + \lambda^h h_{t-1} + \lambda^{INTK} INTK_{t-1} + \lambda^{DIVK} DIVK_{t-1} \\ & + \sum_{i=1}^{p} \varphi_i \Delta g_{t-i} + \sum_{j=0}^{q} \left(\psi^u_j \Delta u_{t-j} + \psi^h_j \Delta h_{t-j} + \psi^{INTK}_j \Delta INTK_{t-j} + \psi^{DIVK}_j \Delta DIVK_{t-j} \right) + \varepsilon_t. \end{aligned} \tag{11}$$

Equations (8) and (9) are based on linear versions of the traditional investment functions underlying the Cambridge model and the Bhaduri-Marglin model, respectively, and can be considered as "benchmark regressions". Our hypothesis is that in countries recently experiencing financialisation, a long-run relationship between the profit rate and the accumulation rate can be found for the time before, but not after the early 1980s. From equation (9), it may also be possible to gain some insight into whether economies have been wage-led, or profit-led in different periods.

Estimation of equations (10) and (11) should provide the basis for a direct test of our hypothesised "intermediate case". Unfortunately, appropriate data for *INTK* and *DIVK* were found only for the US and for France. However, this matches well with the impression gained from our review of the stylised facts, according to which financialisation has been particularly pronounced in these two countries.

Our estimation strategy is as follows: first, unrestricted ECMs are estimated, starting with $p = q = 2$ before sequentially dropping regressors with insignificant coefficients. That is, the short-run dynamics of the model are automatically determined following statistical significance. This acknowledges the complexity of investment behaviour and its likely variability over time and across countries.

Second, we are particularly interested in potential long-run level relationships between the dependent and the explanatory variables. The seminal contribution by PSS has been to derive the asymptotic distribution of a test statistic (F_{PSS}-statistic) which is non-standard under the null irrespective of whether the underlying regressors are $I(0)$, $I(1)$, or mutually cointegrated. As is well known, the traditional cointegration approach requires that all variables are homogeneously $I(1)$ and that regressors are not mutually cointegrated. However, it is a theoretically as well as empirically controversial question as to whether the accumulation rate, for example, is $I(0)$ or $I(1)$[13] or whether profits and dividends are cointegrated[14], so that the flexibility of the approach by PSS is of invaluable utility for our matter.

As an illustration, the null hypothesis of no long-run relationship between g, r, *INTK* and *DIVK* in equation (10) is $\rho = \lambda^r = \lambda^{INTK} = \lambda^{DIVK} = 0$. The F_{PSS}-test is based on a pragmatic bounds-testing approach, for the purpose of which PSS have tabulated two sets of critical values, one assuming that all the regressors contain a unit root, the other assuming that they are all stationary. Whenever the F-statistic falls outside the critical value bounds, valid inference can be made without making assumptions about the order of integration of the underlying variables. PSS have also tabulated upper and lower bound critical values for a t-test, the null hypothesis of which is $\rho = 0$ (t_{BDM}-test).[15]

If the null is rejected, estimators of the long-run coefficients can be obtained as $\hat{L}_r = -\hat{\lambda}^r / \hat{\rho}$, $\hat{L}_u = -\hat{\lambda}^u / \hat{\rho}$, $\hat{L}_h = -\hat{\lambda}^h / \hat{\rho}$, $\hat{L}_{INTK} = -\hat{\lambda}^{INTK} / \hat{\rho}$, and $\hat{L}_{DIVK} = -\hat{\lambda}^{DIVK} / \hat{\rho}$ from the OLS estimates from equations (8)–(11), respectively. PSS have shown that the estimated long-run coefficients are T–consistent (super-consistent) and follow the limiting normal distribution, while all the short-run parameters are $\sqrt{T}$ –consistent and have the standard normal distribution.

On the basis of our estimates for the long-run coefficients, we will be able to make conclusions about possible accumulation regimes in terms of tables 4 and 5 for plausible propensities to save out of capital income.

Exact definitions of the data used are reported in Appendix 4, but some remarks should be made here. Notice first that variables are in current prices. This measure also

[13] Nelson and Plosser (1982) have famously argued that most economic time series contain a unit root.

[14] Cointegration in this case may take a non-trivial form; in particular, it may be only temporary and/or non-linear. See Kapetanios et al. (2006) for a related application within a smooth-transition autoregressive (STAR) ECM.

[15] Banerjee et al. (1998) have derived the non-standard distribution for this test, based on the assumption of homogenous $I(1)$ regressors.

underlies Stockhammer's (2005-6) formulation of the "investment-profit puzzle" and is used in previous econometric work, e.g. Stockhammer (2004). It is justified by our focus on the determination of (current) profits by (current) capitalist expenditure, while it may produce a somewhat too negative picture of the slowdown of accumulation in the past decades from a mere productive capacity point of view (inflation has been relatively low and relative prices of investment goods may have decreased). We use yearly observations. As no uniform and reliable measure of capacity utilisation is available at the international level, GDP growth is taken as a proxy. Although certainly not a perfect solution, this is common practice in investment studies. The variables *INTK* and *DIVK* could be constructed for the total business sector for the US, but for France data were available only for non-financial corporations.

An obvious technical problem that typically affects investment function estimations is the relatively small number and low frequency of available observations. This goes somewhat against the spirit of general-to-specific modelling and the asymptotic tests for long-run relationships. Unfortunately, this problem is difficult to overcome and intrinsic to the notion of accumulation regimes associated with historically distinct, relatively short, "eras". In our estimations, these eras are determined by applying the traditional Chow test to several potential breakpoints and then choosing that with the highest test statistic.

Another potential criticism against the ARDL-based approach is that cross-country comparisons are complicated if different lag structures are used for different countries, insofar as regression results may be sensitive to changes in the lag structure. On the other hand, it can be argued that it is precisely the flexibility of general-to-specific modelling that makes the ARDL-based approach fit particularly well into the epistemological principles advocated by many Post Keynesians. In effect, the ARDL methodology is grounded in the "LSE approach" (see, e.g., Hendry, 2000), which Gerrard (2002) calls a "radical methodology" that should be appreciated by Post Keynesians and other sceptics of "conservative, theory-driven, approaches to econometric techniques" (Gerrard, 2002, p.119). In particular, "the LSE approach […] is founded on the presupposition that the nature of the DGP (data generating process, TvT) is not known *a priori* but has to be discovered during the modelling process" (ibid., p.129). Furthermore, general-to-specific modelling implies extensive diagnostic testing, focusing in particular on serial correlation problems. In fact, the LSE approach interprets serial correlation as indicative of a specification problem, requiring that the model be respecified. By contrast, the "conservative approach" often consists simply in adjusting OLS residuals for serial correlation via iterative methods (e.g. Cochrane/Orcutt procedure) or on the basis of theory-led assumptions about the autocorrelation structure (see ibid., p.127).

5. Previous Empirical Analyses of Investment and Financialisation

In fact, the present paper appears to be the first attempt to analyse accumulation regimes econometrically within a Kaleckian model and in the context of financialisation, as defined above.

A widely quoted empirical work on investment equations is Bowles and Boyer (1995). The authors estimate a linear version of the "stagnationist" variant of the Kaleckian investment function containing no financial variables. Without discussing the order of integration of the underlying variables, they estimate a PAM. They include a time trend in their estimations, the meaning of which is difficult to interpret, and encounter problems of autocorrelation. Their period of estimation is 1953-1987, and no sub-sample analysis is conducted. Clearly, this does not match with our periodisation proposed in section 2.

Bhaskar and Glyn (1995) estimate a PAM of a linear variant of the Bhaduri-Marglin investment function, while adding an additional regressor measuring the cost of capital.

The estimation period is 1955-1988. The order of integration of the variables is not discussed, but a test for cointegration is performed. As Stockhammer (2004) notes, "testing for cointegration in a partial adjustment model is meaningless [.] since an *I*(1) variable by definition is […] cointegrated with its lagged value".

Ford and Poret (1991) estimate investment functions based on neoclassical principles in a study for the OECD. They also encounter the notorious problem of the low power of unit root tests, so that "the order of integration of the capital stock cannot be ascertained with confidence" (p.95). The authors experiment with different specifications, but can only hope that "regressions on (the variables') first differences, as long as they are stationary, may yield consistent estimates" (p.95).

In an innovative study, Hein and Ochsen (2003) estimate a linear version of an extended Bhaduri-Marglin investment function similar to that presented in section 3 above. Instead of our variables *INTK* and *DIVK*, the authors include the real long-term interest rate as an additional regressor. They also include a time trend as well as an *AR*(1) adjustment term, containing the first lag of the OLS residual. It was argued above that the "LSE methodology" may be better suited for treating autocorrelation when estimating investment functions. Hein and Ochsen also estimate a personal savings function. It is acknowledged by the authors that the estimated propensities to save out of rentier income are possibly overestimated because their proxy of rentier income (capital stock multiplied with long term real interest rate) may be downward biased.

Another problem faced by Hein and Ochsen (2003) is that many of their estimations yield unstable equilibria. The stability condition of their model is $\beta < h/v$ (as in our extended Bhaduri-Marglin model from section 3 above). The problem of instability may be due to the use of output growth as a proxy for capacity utilisation (on which β is the coefficient) as well as to the difficulty of accurately estimating the capital/full capacity coefficient, *v*, which Hein and Ochsen proxy by the ratio of nominal gross capital stock to nominal GDP. It can be seen from table 5 above that if $\beta > h/v$, the conditions for the different accumulation regimes become essentially nonsensical. Clearly, our version of the model containing equation (6a) as the investment function is not affected by these problems.

Leaving these difficulties aside, the following results derived by Hein and Ochsen (2003) are worth noting as a benchmark for our own analysis of financialisation in the US and in France since the early 1980s: the equivalent of the "puzzling case", as defined in table 5, was prevalent in the US during 1982-1995, while during 1961-1981 an increase in the interest rate led to an increase in capacity utilisation and the profit rate, but had no effect on the accumulation rate. For France, the "puzzling case" is derived for the period 1961-1981, while interest rates had no effects at all on the endogenous variables in the period 1982-1995. Clearly, we would expect the effects of our variable *DIVK* to be rather different for both countries, in particular during the time since the early 1980s. Hein and Ochsen (2003) discuss whether their somewhat surprising results are due to the assumption of an interest-inelastic profit share. In effect, it may well be the case that firms succeed to raise their mark-ups when interest rates (or the dividend payout ratio) increase. This hypothesis, however, is difficult to test econometrically so that in our estimations, we also have to assume $\partial DIVK/\partial h = \partial INTK/\partial h = 0$.

Another, sophisticated, study is Stockhammer (2004). An investment function inspired by the Bhaduri-Marglin model but extended by financial variables is estimated. Many different specifications are used in an attempt to check the robustness of estimation results. Serial correlation problems are taken very seriously and alleviated by the inclusion of the first two lags of the dependent variables as regressors. The price paid for this, however, is that many regressions are to a large extent dominated by the autoregressive terms, with coefficients on the explanatory variables being often little significant. Stockhammer acknowledges the difficulty of ascertaining the order of integration of the variables underlying his estimations and agrees on the usefulness of the ARDL

approach, quoting from Hamilton's (1994, p.562) seminal textbook: "(they) solve many of the problems associated with spurious regression, although tests of some hypotheses will still involve non-standard distributions". However, Stockhammer does not explore the question of non-standard hypothesis testing further when reporting the estimation results from his ARDL model.

Stockhammer (2004) proxies financialisation by a variable *RSNF* ("interest and dividend income/value added" (of non-financial businesses)) and includes this variable in a regression of the accumulation rate on measures of capacity utilisation, the profit share and the cost of capital[16]. He finds "strong support for (the) hypothesis (that financialisation caused a slowdown in accumulation) in the USA and France, some support in the UK, but none in Germany" (p.739). This matches well with our own conjecture, as section 2 above suggests that financialisation has been particularly pronounced in the US and in France.

In one specification, Stockhammer (2004) includes the additional variable *RPNF* ("interest and dividend payments/value added"), noting that, "if the significance of *RSNF* were due to its correlation with payments, we should expect payments to have a negative sign and *RSNF* to switch to a positive sign" (p.735). However, while this does not happen, both variables become insignificant, which may be due to the high degree of correlation between them. In our model, the variables included are *net* interest *payments* and *net* dividend *payments* (each related to the capital stock rather than to value added). It is expected that this increases the chances for significant coefficients and that the negative effect of net dividend payments is so large as to overcompensate the positive effect of the profit rate in firms' accumulation decisions.

Stockhammer (2004) does not attempt to interpret his results in the framework of a macro model so that he can make no conclusions about the divergence between macroeconomic accumulation and profit rates.

Duménil and Lévy (2003) and Cordonnier (2003) provide careful and original analyses of the accumulation dynamics in the US and in France over the past decades. However, they do not refer to any econometric evidence.

6. Regression Results

What Happened to the Investment-Profit Nexus? First Lessons from the Traditional Kaleckian Models

Table 6 reports the estimation results for equation (8).[17] Starting with France and Germany, we see that neither the t_{BDM}-test nor the F_{PSS}-test are able to reject the null of no long-run relationship between the accumulation rate and the profit rate for 1980-2004, as expected. In the case of the UK, where accumulation has not slowed down during this period, the long-run coefficient on the profit rate is significant at the 10 per cent level, although this result is hardly meaningful, given the values of the t_{BDM}- and the F_{PSS}-test statistics.

For the US, equation (8) could be estimated over a longer period. Interestingly, the long-run coefficient on the profit rate is highly significant for the period 1965-1982, while it is insignificant for 1965-2004. Somewhat surprisingly, the period 1982-2004 also features a positive long-run relationship between accumulation and profit rate. However, the long-run coefficient on the profit rate is only very weakly significant and it is possible that the estimation results are dominated by the "New Economy Boom" of the late 1990s. Indeed, when a time dummy is included for the short period 1997-2000, the "investment-profit nexus" breaks down, with the time dummy being highly significant and accounting for a temporary increase in accumulation of roughly 1.3 per cent.

[16] The effects of the cost of capital are almost always insignificant and weak.
[17] All estimations are performed with Microfit 4.1.

Table 6: Regression Results for Equation (8)

	France	**Germany**	**United Kingdom**	**United States**			
Period	1980-2004	1980-2004	1980-2004	1965-2004	1965-1982	1982-2004	1982-2004
Constant	-0.003	0.009	-0.003	-0.006	0.005	-0.01	0.009
	(-0.28)	(0.84)	(-0.54)	(-1.18)	(0.81)	(-1.36)	(0.77)
$D_{97\text{-}00}$							0.006
							(3.19)
g_{t-1}	-0.17	-0.20	-0.29	-0.17	-0.64	-0.32	-0.44
	(-1.85)	(-1.75)	(-1.86)	(-2.17)	(-2.98)	(-3.63)	(-5.44)
r_{t-1}	0.06	-0.05	0.11	0.11	0.20	0.22	0.20
	(0.96)	(-0.68)	(2.41)	(2.17)	(2.69)	(2.32)	(0.20)
Δg_{t-1}	0.50	0.40	0.45	0.68	0.50	0.52	0.56
	(2.52)	(1.95)	(2.51)	(5.22)	(2.96)	(4.06)	(5.27)
Δr_t	-0.36		0.16	0.71	0.43	1.05	0.89
	(2.73)		(1.28)	(5.11)	(2.03)	(5.84)	(5.74)
Δr_{t-1}		0.62					
		(2.28)					
Δr_{t-2}				-0.43			
				(-3.13)			
$\mathbf{L_r}$	**0.34**	**-0.25**	**0.39***	**0.71**	**0.31*****	**0.68***	**0.045**
	(0.71)	(0.79)	(1.77)	(1.44)	(3.49)	(1.79)	(0.20)
$\mathbf{L_D}$							**0.013*****
							(3.62)
$\mathbf{t_{BDM}}$	**-1.85**	**-1.75**	**-1.86**	**-2.17**	**-2.98***	**-3.63****	**-5.44*****
$\mathbf{F_{PSS}}$	**4.32**	**1.89**	**3.56**	**2.25**	**4.86***	**11.67*****	**15.12*****
R^2	0.45	0.30	0.65	0.63	0.70	0.79	0.87
$\overline{R}^2$	0.34	0.16	0.58	0.58	0.61	0.75	0.84
χ^2_{Chow}				16.3[.01]	28.8[.00]		
χ^2_{SC}	1.68[.20]	0.20[.65]	14.78[.25]	2.33[.13]	0.06[.81]	0.01[.93]	0.71[.40]

Note: Figures in parentheses are t-values, figures in brackets are p-values. For the critical values of the t_{BDM}-test and the F_{PSS}-test, see PSS, tables CI(iii) and CII(iii), respectively, for k = 1. Significance at the 10%, 5%, and 1% level is denoted by *, **, and ***, respectively.

Equation (9) could be estimated over longer periods for most countries (see table 7). In France, a long-run relationship between accumulation rate, output growth, and profit share is detected for the whole period[18] and the sub-period 1965-1983, but it breaks down in the last sub-period. This is consistent with the results obtained from equation (8). Notice also that the coefficient on the profit share is insignificant (and furthermore of the "wrong" sign) in all periods so that profit-led growth does not seem likely.

As for the US, a strong accelerator effect is indicated for all periods. The coefficient on the profit share is insignificant and has the "wrong sign" for the periods 1965-2004 and 1965-1981, so that "profit squeeze" does not appear as a major cause of the slow-down of accumulation in these periods. However, the large positive coefficient on the profit share for the period 1982-2004 is somewhat surprising, even if it is only marginally significant. Again, the results may be dominated by the investment boom of the late 1990s, although experimentation with a time dummy did not yield substantially different results.

[18] In this regression, the long-run coefficients appear unrealistically high in absolute value. Without the time trend, this problem is corroborated, while sign and significance of the coefficients remain unaffected.

Table 7: Regression Results for Equation (9)

	France			**Germany**		
Period	**1965-2004**	**1965-1983**	**1984-2004**	**1965-2004**	**1965-1982**	**1983-2004**
Constant	-0.03	0.08	-0.002	-0.002	-0.49	0.14
	(1.19)	(1.42)	(-0.005)	(0.18)	(-2.44)	(4.44)
Lin. Trend	-0.20			-0.003		
	(-3.20)			(-2.74)		
g_{t-1}	-0.20	-0.56	-0.28	-0.36	-0.38	-0.65
	(-3.20)	(-1.95)	(-2.51)	(-4.89)	(-5.59)	(-4.92)
u_{t-1}	0.57	0.84	0.25	0.22	0.12	0.40
	(4.97)	(2.65)	(2.82)	(6.44)	(1.73)	(5.14)
h_{t-1}	-0.08	-0.15	-0.008	-0.03	0.14	-0.29
	(-1.37)	(-0.99)	(0.09)	(-0.99)	(2.59)	(-4.52)
Δg_{t-1}	-0.49	0.45			0.39	-0.30
	(-3.52)	(1.68)			(2.24)	(-1.56)
Δu_t	0.32	0.52	0.26	0.12	0.13	0.12
	(3.38)	(2.24)	(3.86)	(4.25)	(3.50)	(2.78)
Δu_{t-1}		0.156				-0.14
		(5.29)				(-2.73)
Δh_t		-0.84				-0.14
		(-2.07)				(-2.73)
Δh_{t-2}	0.30		0.31			-0.14
	(1.95)		(2.45)			(-2.73)
$\mathbf{L_u}$	**2.82*****	**1.49***	**0.83***	**0.61*****	**0.32***	**0.62*****
	(3.84)	(1.49)	(1.60)	(4.26)	(1.58)	(6.26)
$\mathbf{L_h}$	**-0.38**	**-0.27**	**-0.11**	**-0.08***	**0.37*****	**-0.45*****
	(-1.32)	(-0.75)	(-0.26)	(1.15)	(3.85)	(-8.62)
$\mathbf{t_{BDM}}$	**-3.20***	**-1.95**	**-2.51**	**-4.89*****	**-5.59*****	**-4.92*****
$\mathbf{F_{PSS}}$	**10.13*****	**4.41***	**2.28**	**16.74*****	**7.30*****	**10.31*****
R^2	0.67	0.67	0.76	0.69	0.88	0.73
$\overline{R}^2$	0.60	0.51	0.53	0.64	0.83	0.58
χ^2_{Chow}	11.6[.11]	5.52[.13]		13.3[.04]	29.5[.00]	
χ^2_{SC}	0.74[.39]	0.11[.74]	0.09[.76]	0.02[.88]	3.91[.05]	3.16[.08]

As a preliminary conclusion, it emerges that the breakdown of the investment-profit nexus in the period from the early 1980s onwards has been particularly clear in France, while this appears less obvious for the US. Here, inclusion of a time dummy in equation (8) also suggests that accumulation evolved independently of profits during this period, but this hypothesis cannot be substantiated from estimation of equation (9). For both countries, it will be interesting to enquire into the impact of financial variables, as envisaged in equations (10) and (11).

The accumulation dynamics in Germany and the UK are somewhat different, as the profit share exhibits a positive effect on accumulation, at least in some periods. Furthermore, as there has been no slowdown of accumulation in the UK while Germany has witnessed only a relatively weak degree of financialisation, estimation of equation (10) and (11) does not seem as promising as for the two other countries. Note, however, that in the UK, the profit share seems to be positively related to accumulation in 1980-2004, while in Germany this relationship exists during 1985-1982, but breaks down in the early 1980s, as expected.

Table 7 (cont'd): Regression Results for Equation (9)

	United King-dom	**United States**		
Period	**1980-2004**	**1965-2004**	**1965-1981**	**1982-2004**
Constant	-0.04	0.46	-0.07	-0.10
	(-1.77)	(1.73)	(1.53)	(-3.39)
Lin. Trend		-0.001		
		(0.50)		
g_{t-1}	-0.33	-0.31	-0.33	-0.18
	(-3.44)	(-4.75)	(-2.18)	(-3.07)
u_{t-1}	0.06	0.24	0.31	0.11
	(1.03)	(5.92)	(4.02)	(2.60)
h_{t-1}	0.12	-0.94	-0.15	0.24
	(3.13)	(-1.47)	(-1.31)	(3.48)
Δg_{t-1}	0.22	0.64	0.51	0.18
	(1.12)	(4.24)	(2.17)	(3.48)
Δu_t		0.23	0.26	0.18
		(8.19)	(5.25)	(8.02)
Δu_{t-1}				0.13
				(5.74)
Δu_{t-2}		-0.09	-0.08	
		(-3.57)	(-2.02)	
Δh_{t-1}			-.024	
			(-1.57)	
$\mathbf{L_u}$	**0.18**	**0.77*****	**0.95**	**0.62****
	(0.95)	(3.65)	(1.68)	(2.55)
$\mathbf{L_h}$	**0.37***	**-0.30**	**-0.46**	**1.30***
	(1.80)	(-1.42)	(-0.91)	(1.94)
$\mathbf{t_{BDM}}$	**-3.44****	**-4.75*****	**-5.59*****	**-3.07***
$\mathbf{F_{PSS}}$	**8.70*****	**15.26*****	**10.44*****	**13.48*****
R^2	0.66	0.85	0.92	0.94
$\overline{R}^2$	0.59	0.82	0.86	0.92
χ^2_{Chow}		16.32[.04]	26.7[.00]	
χ^2_{SC}	0.59[.44]	1.00[.32]	1.33[.25]	0.47[.49]

Note: Figures in parenthesis are t-values, figures in brackets are p-values. For the critical values of the t_{BDM}-test and the F_{PSS}-test, see PSS, tables CI(iii), CI(iv), CII(iii) and CII(v), respectively, for k = 1. Significance at the 10%, 5%, and 1% level is denoted by *, **, and ***, respectively.

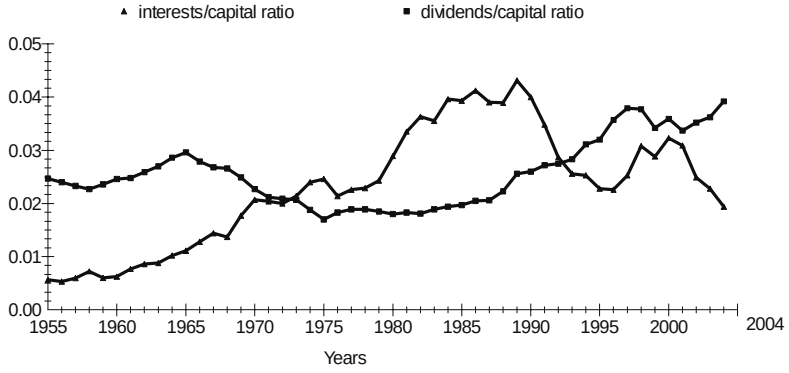
It is not attempted to speculate over whether particularly economies have been profit-led or wage-led in particular periods of time. In effect, Appendix 3 shows that our estimates are affected by the problem of potentially unstable equilibria, encountered also by Hein and Ochsen (2003).

Is our "Intermediate Case" Realistic? Evidence for the US and First Signs for France

In this subsection, particularly focus is on the US economy, where financialisation has led to a number of remarkable changes over the past decades.

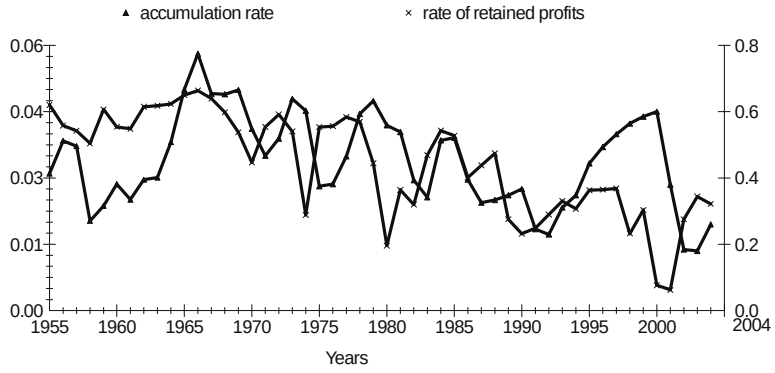
Figure 5 shows that dividends have replaced interests as the major part of firms' expenditure directed towards rentiers in the early 1990s.

Figure 5: Net Interest and Dividend Payments Related to the Capital Stock, USA*



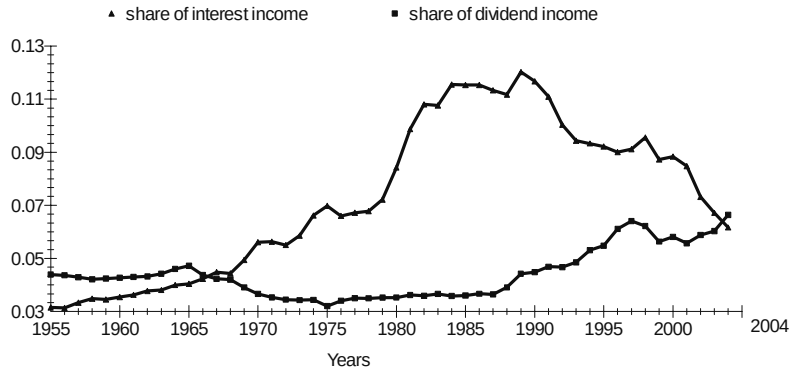
*Net private interest (dividend) payments/fixed assets of non-residential businesses, Source: NIPA tables (BEA).

Figure 6: Accumulation and Retained Profits, Private Corporations, USA*



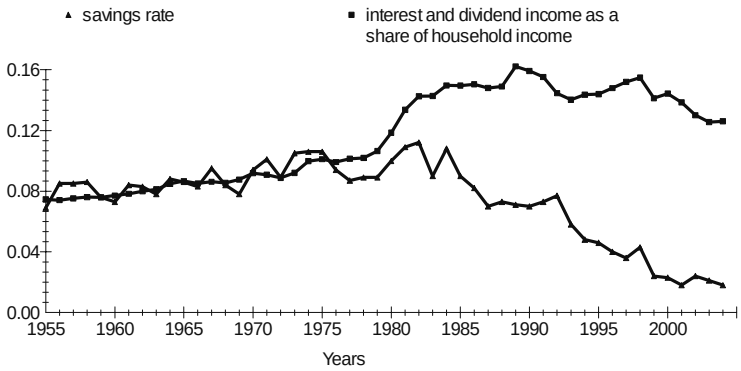
*Net capital formation/fixed assets (left scale) and profits after tax + net interest and dividend payments/net operating surplus, Source: NIPA tables (BEA).

Figure 7: Interest and Dividend Income as a Share of Household Income, USA*



*Net interest (dividend) payments by businesses and government/net interest and dividend payments by businesses and government + compensation of employees, Source: NIPA (BEA).

Figure 8: Rentier Income Share and Household Savings Rate, USA*



*Net interest + net dividend income/household income (defined as in figure 7) and household net savings as a share of household disposable income, Source: NIPA (BEA).

Figure 6 is particularly interesting because it gives direct support to the Kaleckian argument according to which retained profits are the major source of accumulation, with a notable exception being the investment boom in the late 1990s. Notice that private corporations have distributed almost 100 per cent (!) of profits to rentiers in recent years.

Table 8: Regression Results for Equation (10)

	France		**USA**		
Period	**1980-2004**	**1980-2004**	**1965-2004**	**1965-2004**	**1980-2004**
Constant	0.04	0.03	-0.01	0.02	0.007
	(2.67)	(2.11)	(2.18)	(2.89)	(0.97)
Lin. Trend		-0.002			
		(-3.63)			
$D_{97\text{-}00}$				0.005	
				(2.32)	
g_{t-1}	-0.41	-0.53	-0.53	-0.56	-0.84
	(-2.91)	(-4.63)	(-4.52)	(-5.09)	(-5.85)
r_{t-1}	0.19	0.18	0.18	0.20	0.50
	(-0.64)	(3.19)	(2.56)	(3.10)	(3.01)
$INTK_{t-1}$	-0.64	-0.72	-0.28	-0.33	-0.47
	(-2.92)	(-4.19)	(-3.97)	(-4.70)	(-2.72)
$DIVK_{t-1}$	-1.57	0.62	-0.29	-0.50	-0.61
	(-3.20)	(0.87)	(-2.70)	(-3.70)	(-2.49)
Δg_t			0.41	0.40	0.23
			(3.92)	(4.10)	(1.67)
Δr_{t-1}			0.59	0.54	0.70
			(4.93)	(4.72)	(6.02)
$\Delta INTK_t$			0.67	0.46	0.92
			(2.76)	(1.87)	(4.96)
$\Delta INTK_{t-1}$					0.92
					(4.96)
$\Delta DIVK_t$	-0.94	0.14	-0.56	-0.44	-1.17
	(-1.93)	(0.29)	(1.95)	(-1.02)	(-3.54)
$\Delta DIVK_{t-1}$					-1.09
					(-3.22)
$\mathbf{L_r}$	**0.46****	**0.35*****	**0.33*****	**0.36*****	**0.60*****
	(2.31)	(3.08)	(3.14)	(3.82)	(3.39)
$\mathbf{L_{INTK}}$	**-1.55*****	**-1.35*****	**-0.54*****	**-0.58*****	**-0.58****
	(-2.84)	(-4.33)	(-3.07)	(-3.61)	(-2.86)
$\mathbf{L_{DIVK}}$	**-3.84*****	**1.17**	**-0.55*****	**-0.89*****	**-0.73****
	(-4.11)	(0.84)	(-3.19)	(-4.06)	(-2.81)
$\mathbf{L_D}$				**0.01****	
				(2.22)	
$\mathbf{t_{BDM}}$	**-2.91****	**-4.63*****	**-4.52****	**-5.09*****	**-5.85*****
$\mathbf{F_{PSS}}$	**3.31**	**6.97*****	**9.70*****	**12.36*****	**11.13*****
R^2	0.41	0.66	0.77	0.81	0.94
$\overline{R}^2$	0.26	0.55	0.71	0.75	0.89
χ^2_{Chow}			11.5 [.24]		
χ^2_{SC}	0.00[.98]	2.25[.13]	0.11[.74]	0.03[.87]	0.12[.91]

Note: Figures in parenthesis are t-values, figures in brackets are p-values. For the critical values of the t_{BDM}-test and the F_{PSS}-test, see PSS, tables CI(iii), CI(iv), CII(iii) and CII(v), respectively, for k = 3. Significance at the 10%, 5%, and 1% level is denoted by *, **, and ***, respectively.

Figure 7 is essentially the counter side to figure 5 with the noteworthy additional information that dividends (received from private businesses and government) are today more important a source of income for households than interests. Hence, it is very tempting to infer from the trajectories of the two graphs in figure 8 that shareholders have drastically reduced their savings rate since the early 1980s.

The estimation results for equation (10) in table 8 are very interesting. First, consider the case of the US. The fit of the regression over the whole period is substantially improved as compared to the estimation results from equation (8). There is also strong evidence of a long-run relationship and all long-run coefficients are highly significant.

While the Chow tests indicate that there may not have been a structural break in the early 1980s, including a time dummy for the period 1997-2000 again improves the fit and allows for some interesting interpretations. While in the first regression the coefficients on *INTK* and *DIVK* take virtually identical values, the coefficient on *DIVK* massively increases when controlling for the "New Economy Boom", during which dividend payments exceptionally do not seem to depress accumulation. In conjunction with figure 6, this seems to confirm the interpretation by Duménil and Lévy (2003, p.7) according to which the "long boom was financed by the unusual inflow of foreign capital".

When making conjectures about possible accumulation regimes in terms of table 4, the coefficient on the dummy variable is difficult to interpret. Therefore, and despite the result of the Chow test, the regression was also run separately for the sub-sample 1980-2004. Again, it is seen that the coefficient on *DIVK* by far exceeds that on *INTK* in absolute value. On the basis of this last regression, table 9 shows that the "intermediate case" obtains for very plausible propensities to consume out of dividend (and interest) income. In fact, our heuristic interpretation of figure 8 above is supported by recent evidence from a careful study by Maki and Palumbo (2001) for the Federal Reserve Bank. The authors construct a rich dataset by combining household-level data from the Survey of Consumer Finances and aggregate data from the Flow of Funds Account. They report that the savings rate of households in the highest income quintile has dropped from 8.5 [4.9] to -2.1 [-4.4] per cent from 1992 to 2000 (numbers in brackets are savings rates excluding benefit pension plans and nonprofit organisations). Noting further that the richest income quintile held between 80 and 90 percent of corporate equity in the 1990s (Maki and Palumbo, 2001, p.24), it can be concluded that the "intermediate case" is a perfectly realistic scenario, if the analysis proposed here bears any resemblance to the functioning of actual economies. Duménil and Lévy (2003, p.22) summarise the nature of this accumulation regime to the point: "This is really a spending spree within the richest fraction of the population, the same people who benefit from the new flows of income and the rise of the stock market."

Table 9: Effect of an Increase in the Dividend Payments/Capital Ratio on the Rate of Profit and the Accumulation Rate (1980-2004)

	"Normal Case"	**"Intermediate Case"**	**"Puzzling Case"**
	$1-s_s < 0.73$	$0.73 < 1-s_s < 1.22$	$1-s_s > 1.22$
$\partial r / \partial DIVK$	–	+	+
$\partial g / \partial DIVK$	–	–	+
	$1-s_b < 0.58$	$0.58 < 1-s_b < 0.97$	$1-s_b > 0.97$
$\partial r / \partial INTK$	–	+	+
$\partial g / \partial INTK$	–	–	+

Table 10: Regression Results for Equation (11)

	France		**USA**	
Period	**1980-2004**	**1980-2004**	**1965-2004**	**1982-2004**
Constant	0.0004	0.003	0.02	0.02
	(0.003)	(0.29)	(1.88)	(1.88)
Lin. Trend		-0.001		
		(-2.81)		
g_{t-1}	-0.22	-0.37	-0.35	-0.51
	(-2.32)	(-3.85)	(-4.76)	(-6.82)
u_{t-1}	0.35	0.24	0.18	0.13
	(4.78)	(3.21)	(7.61)	(1.72)
h_{t-1}	0.038	0.07	-0.11	0.13
	(1.47)	(2.80)	(-0.32)	(5.12)
$INTK_{t-1}$	-0.17	-0.41	-0.15	-0.23
	(-1.20)	(-2.80)	(-2.66)	(-1.83)
$DIVK_{t-1}$	-0.51	0.19	0.13	-0.32
	(-1.74)	(0.54)	(-1.69)	(-1.99)
Δg_{t-1}	-0.20	-0.15	0.38	0.98
	(-1.43)	(-1.29)	(1.67)	(7.87)
Δu_t	0.27	0.19	0.15	0.17
	(5.14)	(3.77)	(10.98)	(12.67)
Δu_{t-2}			-0.27	-0.07
			(-2.39)	(-6.32)
Δh_t			0.81	0.81
			(-1.89)	(-1.89)
Δh_{t-1}			-0.11	-0.88
			(-2.70)	(-2.01)
$\Delta INTK_t$			0.47	0.47
			(3.60)	(3.60)
$\Delta INTK_{t-1}$			0.15	
			(0.94)	
$\Delta INTK_{t-2}$				0.51
				(3.92)
$\Delta DIVK_t$				-0.44
				(-1.52)
$\Delta DIVK_{t-2}$			0.43	
			(1.89)	
$\mathbf{L_u}$	**1.60****	**0.64****	**0.52*****	**0.26*****
	(2.21)	(2.25)	(3.91)	(3.57)
$\mathbf{L_h}$	**0.17**	**0.18****	**-0.03**	**0.24***
	(1.27)	(2.64)	(-0.31)	(1.84)
$\mathbf{L_{INTK}}$	**-0.76****	**-1.09*****	**-0.41*****	**-0.46***
	(-2.31)	(-3.09)	(-3.45)	(-1.88)
$\mathbf{L_{DIVK}}$	**-2.31****	**0.51**	**-0.38****	**-0.62****
	(-2.06)	(0.50)	(-2.04)	(-2.09)
$\mathbf{t_{BDM}}$	**-2.32**	**-3.85***	**-4.76****	**-6.82*****
$\mathbf{F_{PSS}}$	**6.91*****	**9.42*****	**17.51*****	**30.49*****
R^2	0.77	0.84	0.94	0.98
$\overline{R}^2$	0.69	0.76	0.91	0.96
χ^2_{Chow}			17.3[.24]	
χ^2_{SC}	6.21[.83]	0.84[.98]	0.87[.35]	6.21[.01]

Note: Figures in parenthesis are t-values, figures in brackets are p-values. For the critical values of the t_{BDM}-test and the F_{PSS}-test, see PSS, tables CI(iii), CI(iv), CII(iii) and CII(v), respectively, for k = 4. Significance at the 10%, 5%, and 1% level is denoted by *, **, and ***, respectively.

Finally, notice that the results summarised in table 9 potentially give an original explanation to the phenomenon of the so-called "New Economy Boom". It may be the case that the investment boom observed in this short period was due simply to a temporary shift from the "intermediate case" to the "puzzling case" as defined in table 4. A propensity to consume out of dividend income of 1.22 may, of course, be somewhat unrealistic, but the simplicity of our model (as well as the short time series used for estimations) should also be reason of some caution when interpreting the exact values of the parameter estimates (see section 7).

The results for France do not allow such clear conclusions. Although the signs of all coefficients are as expected, their magnitudes appear somewhat unrealistic. When including a linear time trend as a robustness check, the coefficient on *DIVK* even becomes positive. These oddities may reflect a problem of the data used: while the accumulation rate is that of all non-financial businesses, the variables *INTK* and *DIVK* could only be constructed for non-financial corporations.

The estimation results for equation (11), reported in table 10, confirm the results from table 8. In the case of the US, it is seen that in the last sub-period the positive effect of the profit rate on the accumulation rate is equally distributed between the rate of capacity utilisation and the profit share. The coefficient on *DIVK* is again strongly negative and by far exceeds that on *INTK* in absolute value in this period.

In the case of France, similar problems occur as in the previous regression, but when estimation is performed without a time trend, all coefficients are of the "correct" sign, albeit with somewhat unrealistic absolute values.

Due to the problem of potentially unstable equilibria (see Appendix 3), we again restrain from speculating over specific accumulation regimes on the basis of table 10. However, we can comfortably conclude from tables 9 and 10 that the US economy has been "finance-led" in some form rather than profit- or wage-led in the past two decades.

7. Some Open Questions and Directions for Future Research

Admittedly, our model is somewhat simplistic and could be extended in a number of ways. Although we have been able to provide elements of one potential explanation of the "investment-profit puzzle" for the US, which is clearly most advanced in the process of financialisation, our results need to be substantiated and more knowledge is to be generated about the accumulation dynamics in other countries. The following extensions, amongst others, should therefore be explored but this would above all require more and better data. In general, data availability clearly is a problem when attempting to analyse the relationship between financialisation, accumulation and profitability.

First, government activity and the foreign sector should be included into the analysis. Clearly, public budget deficits, as well as export surpluses could contribute to a breakdown of the investment-profit nexus (see Kalecki, 1942).

Furthermore, the possibility of both a positive and a negative propensity to save out of labour income should be considered. As noted by Duménil and Lévy (2001, p.594), the ratio of debt to disposable income of US households has been rising from around 65 per cent in the mid 1980s to approximately 100 per cent in the late 1990s. This may have contributed to a declining propensity to save especially of lower-income groups, which may even become temporarily negative in times of generalised "consumption sprees". However, a likely effect of household indebtedness would be that the savings rate eventually needs to increase again in the long-run. One could also analyse interactions between the dividend/capital ratio and the interest/capital ratio. It may in effect be necessary for firms to finance dividend payments partly by bank credit, so that interest payments (and their negative effects on accumulation) would in part be an indirect ef-

fect of dividend payments. Again, the long-run debt effects of such corporate strategies would have to be taken into consideration. On the other hand, one would also need to analyse the effects of capital gains and losses resulting from households' portfolio decisions and firms' stock market interventions for investment and savings. Taken together, these extensions would aim at developing a stock-flow consistent, dynamic framework (in the spirit of Lavoie and Godley, 2001-2).

Moreover, the interaction between rentiers' interest and dividend claims and the share of profit in national income should be analysed in more detail. In fact, it may well be the case that firms succeed to raise their mark-ups when facing increased interest rates (see Hein 2006a,b for a theoretical discussion) or dividend claims.

It appears also important to explicitly analyse the effects of financialisation at an international level. As argued earlier, the hypothesised prevalence of the "puzzling case" during the "New Economy Boom" in the US may have been possible only thanks to the influx of foreign capital. But, such capital inflows obviously result in the longer term in increased dividend payments from the US to shareholders in foreign countries (see, e.g., Duménil and Lévy, 2003). This could in the future have depressing feedback effects on accumulation in the US. Such considerations would have to be taken into account within a structuralist analysis of the world economy.

Finally, one would have to consider the impact of technological change on the cost of investment measured in current prices and how the evolution of relative prices, reflected in changes in the full capacity/capital ratio (v in equation (1)), affects accumulation and profits.[19]

8. Concluding Remarks

In their famous analysis of the decline of the Golden Age, Marglin and Bhaduri (1990, p.184-5) argued that higher profitability was a pre-condition for the recovery of investment and growth in the developed industrialised countries. The essential conclusions of their analysis were "(a) to recognise the present need for profitability, (b) the ultimate desirability of making accumulation independent of profitability, and (c) to provide a bridge from here to there."

Ironically, it appears today that financialisation may play a role in "making profitability independent of accumulation". More specifically, consumption out of capital income seems to have increasingly replaced investment as a source of macroeconomic profits, particularly in the US.[20] The increasing profit share and rentier income share do not seem to have favoured accumulation, growth and, most importantly, the development of the average standard of living during the past decades.[21] The experience of the so-called "New Economy Boom" in the US was at most a (short) exception in this respect and may be interpreted in terms of our model as a temporary shift to the "puzzling case".

While these conclusions are primarily relevant for the US, further research is necessary for better understanding the "investment-profit puzzle" at an international level.

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[19] Aglietta (2000), amongst others, argues that the dynamics of accumulation are significantly affected by the declining costs of investment due to innovations in information technology and the increasing importance of human capital relative to physical capital.

[20] With reference to a traditional dictum, one could argue that "capitalists (still) get what they spend", but their expenditure involves less positive externalities for society than during the Golden Age.

[21] In the US, the average real income of households in the lower 90 per cent income fractile seems in fact to be stagnating since the 1970s, while the highest income decile has enjoyed substantial income and wealth gains, to a large extent thanks to distributed profits and capital gains. See Duménil and Lévy (2004, in particular p.120, figure 10).

Appendix 1: Effects of Changes in *INTK* and *DIVK* on the Endogenous Variables

Making use of the equilibrium condition given by equation (7), the endogenous variables of the model containing equation (6a) as the investment function are

$$(A1.1) \quad r^* = \left[\alpha + INTK\left(1 - s_b - \theta\right) + DIVK\left(1 - s_s - \phi\right)\right]/\left(1 - \gamma\right),$$

$$(A1.2) \quad g^* = \left\{\alpha + INTK\left[\gamma\left(1 - s_b\right) - \theta\right] + DIVK\left[\gamma\left(1 - s_s\right) - \phi\right]\right\}/\left(1 - \gamma\right),$$

with the condition for short run stability being $\partial g^i / \partial r < \partial g^s / \partial r \Leftrightarrow \gamma < 1$.

The effects of changes in *DIVK* and *INTK* on the endogenous variables are ambiguous:

$$\partial r / \partial DIVK = \left[\left(1 - s_s - \phi\right) + \left(1 - s_b - \theta\right)\partial INTK / \partial DIVK\right]/\left(1 - \gamma\right),$$

$$\partial g / \partial DIVK = \left\{\gamma\left(1 - s_s\right) - \phi + \partial INTK / \partial DIVK\left[\gamma\left(1 - s_b\right) - \theta\right]\right\}/\left(1 - \gamma\right),$$

$$\partial r / \partial INTK = \left[\left(1 - s_b - \theta\right) + \left(1 - s_s - \phi\right)\partial DIVK / \partial INTK\right]/\left(1 - \gamma\right),$$

$$\partial g / \partial INTK = \gamma\left(1 - s_b\right) - \theta + \partial DIVK / \partial INTK\left[\gamma\left(1 - s_s\right) - \phi\right]/\left(1 - \gamma\right).$$

Assuming $\partial INTK / \partial DIVK = 0$, the conditions for different accumulation regimes are obtained as reported in table 4 in the text.

With the accumulation function given by equation (6b), the equilibrium values of the endogenous variables are

$$(A1.3) \quad u^* = \left[\alpha + \tau h + INTK\left(1 - s_b - \theta\right) + DIVK\left(1 - s_b - \phi\right)\right]/\left(h / v - \beta\right),$$

$$(A1.4) \quad r^* = \left\{h / v\left[\alpha + \tau h + INTK\left(1 - s_b - \theta\right) + DIVK\left(1 - s_b - \phi\right)\right]\right\}/\left(h / v - \beta\right),$$

$$(A1.5) \quad g^* = \frac{h / v\left(\alpha + \tau h\right) + INTK\left[\beta\left(1 - s_b\right) - \theta h / v\right] + DIVK\left[\beta\left(1 - s_b\right) - \phi h / v\right]}{h / v - \beta},$$

with short-run stability condition $\partial g^i / \partial u < \partial g^s / \partial u \Leftrightarrow \beta < h / v$.

The marginal effects of increases in *INTK* and *DIVK* on the endogenous variables of the model are given by:

$$\frac{\partial u}{\partial DIVK} = \frac{\left[\left(1 - s_s - \phi\right) + \left(1 - s_b - \theta\right)\partial INTK / \partial DIVK + \left(\tau - u / v\right)\partial h / \partial DIVK\right]}{h / v - \beta},$$

$$\frac{\partial r}{\partial DIVK} = \frac{\left\{h / v\left[\left(1 - s_s - \phi\right) + \left(1 - s_b - \theta\right)\partial INTK / \partial DIVK\right] + \partial h / \partial DIVK\left(\tau h - \beta u\right) / v\right\}}{h / v - \beta},$$

$$\frac{\partial g}{\partial DIVK} = \frac{\beta\left[\left(1 - s_s\right) + \left(1 - s_b\right)\frac{\partial INTK}{\partial DIVK}\right] - \phi h / v + \frac{\partial h}{\partial DIVK}\frac{\left(\tau h - \beta u\right) / v}{v} - \frac{\partial INTK}{\partial DIVK}\theta h / v}{h / v - \beta},$$

$$\frac{\partial u}{\partial INTK} = \frac{\left[\left(1-s_s-\theta\right)+\left(1-s_b-\phi\right)\partial DIVK/\partial INTK+\left(\tau-u/v\right)\partial h/\partial INTK\right]}{h/v-\beta},$$

$$\frac{\partial r}{\partial INTK} = \frac{\left\{h/v\left[\left(1-s_s-\theta\right)+\left(1-s_b-\phi\right)\partial DIVK/\partial INTK\right]+\partial h/\partial INTK\left(\tau h-\beta u\right)/v\right\}}{h/v-\beta},$$

$$\frac{\partial g}{\partial INTK} = \frac{\beta\left[\left(1-s_b\right)+\left(1-s_s\right)\frac{\partial DIVK}{\partial INTK}\right]-\theta h/v+\frac{\partial h}{\partial INTK}\left(\tau h-\beta u\right)/v-\frac{\partial DIVK}{\partial INTK}\phi h/v}{h/v-\beta},$$

Table 5 in the text shows the corresponding accumulation regimes, based on the assumptions $\partial INTK/\partial DIVK = \partial INTK/\partial h = \partial DIVK/\partial h = 0$.

Appendix 2: Stockhammer's (2005-6) "Investment-Profit Puzzle"

Stockhammer's starting point is very similar to that of the present paper: "So we notice an interesting puzzle in macroeconomic trends: the ratio of investment to profits […] shows a declining trend. […] (p.197)."

The theory of "shareholder value orientation" at the firm level is constructed around the following objective function:

(A3.1) $U = U(g,r) = I^{1-\beta}R^{\beta}$,

where I is investment, R is profits and β is a measure of shareholder influence. A " growth-profit trade-off " is postulated at the firm level and given as

(A3.2) $R = I - tI$.

Maximising equation (A3.1) subject to equation (A3.2) yields

(A3.3) $I^* = \left[\left(1-\beta\right)I_R(Y)\right]/t$, with $\partial I_R/\partial Y = \gamma$,

(A3.4) $R^* = \beta I_R$,

where I_R is the profit-maximising level of investment. The equilibrium value of investment is positively related to output, but an increase in the technologically given parameter t, as well as larger shareholder influence negatively affect the firm's investment activity: $\partial I^*/\partial Y > 0$, $\partial I^*/\partial t < 0$, $\partial I^*/\partial\beta < 0$.

Assuming that the economy exists of n identical firms, an aggregate investment function is derived from adding up that of all individual firms. Total savings are obtained as savings out of profits minus autonomous consumption minus consumption out of (stock market) wealth. Stock market wealth is postulated to be a linear function in profits. Then, the effect of an increase in shareholder influence on equilibrium output is ambiguous, but Stockhammer argues that it is unlikely that "a strong (positive) effect of shareholder power on asset prices *and* a strong wealth effect [.] offset the direct (negative) effect the increase of shareholder power has on investment."

When explaining the declining *macroeconomic* trend of the "investment-profit ratio", it is made use again of equations (A3.3) and (A3.4), which were introduced, however, as *microeconomic* characterisations of a given firm's investment behaviour and "growth-profit trade-off". Dividing equation (A3.3) by equation (A3.4) yields

(A3.8) $I^* / R^* = (1-\beta)/t\beta$, with $\partial(I^* / R^*)/\partial\beta = -1/(t\beta)^2 < 0$.

Stockhammer concludes: "The increase in shareholder power will unambiguously decrease investment per profit" (p.211). Clearly, our model offers an alternative answer to the "Kaleckian question" (how can high profits be compatible with low investment?) because here macroeconomic profits are determined by capitalist expenditure, and not by the *microeconomic* "growth-profit trade-off". A more complete treatment of the "investment-profit puzzle" would have to combine these two approaches and analyse how exactly the microeconomic "growth-profit trade-off" postulated by Stockhammer may feed through to the macroeconomic relationship between growth and profitability.

Appendix 3: The problem of instability in Bhaduri-Marglin type models

	Equation (9): Stability if $s_\Pi \frac{h}{v} - \beta > 0$ *		**Equation (11):** Stability if $\frac{h}{v} - \beta > 0$	
	Period	$s_\Pi \frac{h}{v} - \beta$	**Period**	$\frac{h}{v} - \beta$
France	1965-2004	$0.23\, s_\Pi - 2.82 <$ **0**	1980-2004	$0.31 - 1.60 <$ **0**
	1965-1983	$0.17\, s_\Pi - 1.49 <$ **0**		
	1984-2004	$0.33\, s_\Pi - 0.83 <$ **0**		
Germany	1965-2004	$0.17\, s_\Pi - 0.61 <$ **0**		
	1965-1982	$0.14\, s_\Pi - 0.32 <$ **0**		
	1983-2004	$0.22\, s_\Pi - 0.62 <$ **0**		
United Kingdom	1980-2004	$0.32\, s_\Pi - 0 >$ **0**		
United States	1965-2004	$0.20\, s_\Pi - 0.77 <$ **0**	1965-2004	$0.20 - 0.52 <$ **0**
	1965-1981	$0.13\, s_\Pi - 0.95 <$ **0**	1982-2004	$0.32 - 0.26 >$ **0**
	1982-2004	$0.32\, s_\Pi - 0.62 <$ **0**		

* for a derivation of this stability condition, see, e.g., Hein (2004, p.196).

Note: The values for β are obtained from tables 7 and 10 in the text, respectively. Insignificant coefficients are set equal to zero. Values for h and v are calculated from OECD, Economic Outlook No. 78. The capital/full capacity ratio, v, is proxied by the ratio of nominal gross capital stock to nominal GDP, as in Hein and Ochsen (2003). Given that $s_\Pi \leq 1$, all estimated equilibria are unstable, except in the case of the UK (1980-2004) for equation (9) (where the estimated long-run coefficient on GDP growth is insignificant) and in the case of the US (1982-2004) for equation (11). Hein and Ochsen (2003) experience the same problem in their estimations: only four out of twelve equilibria are stable, and in three of the four cases this is due to β being set equal to zero.

Appendix 4: The Data Set

Accumulation rate (g_t)	Rate of growth of business capital stock[1]; Rate of growth of net capital stock, non-financial businesses[2]; Investment net of consumption of fixed capital[4]/fixed assets, non-residential businesses[5]
Profit rate (r_t)	Income from property and other/business capital stock[1] (for Germany); Net operating surplus/net capital stock, non-financial corporations[2]; Net rate of return, private non-financial corporations[3]; Net operating surplus[4]/private fixed assets[5]
Output Growth (u_t)	Growth Rate of real GDP[1 2 4]
Profit Share (h_t)	Profit share in the business sector[1]; Net operating surplus/(net operating surplus + compensation of employees), non-financial businesses[2]; Net operating surplus/(net operating surplus + compensation of employees)[4]
Interest/Capital Ratio ($INTK_t$)	Net interest payments/net capital stock, non-financial corporations[2;] Net interest payments, domestic businesses[4]/non-residential capital stock[5]
Dividend/Capital Ratio ($DIVK_t$)	Net dividend payments/net capital stock, non-financial corporations, current prices[2]; Net interest payments, private corporations[4]/non-residential capital stock[5]

Note: Variables are in current prices. Where possible, regressions were run with data from a single data source. For equation (9), which was estimated for all countries, data from the OECD Economic Outlook data base were used.

Sources: [1]OECD, Economic Outlook No. 78; [2]French National Accounts (INSEE); [3]Blue Book (Office of National Statistics, UK); [4]NIPA Tables (Bureau of Economic Analysis, USA); [5]Fixed Assets Tables (Bureau of Economic Analysis, USA); author's calculations.

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