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Investment Decisions within the Context of Financialization: Cointegration Evidence from the UK Economy

Summary: Within the context of financialization, this empirical study sheds some light on the distributional aspects of the existing intra-capitalist conflict between financial and industrial capital and its concomitant impact, via investment, on the macroeconomy. In doing so, bounds-test cointegration techniques in conjunction with Granger causality tests provide the econometric framework upon which the respective models are tested. Annual time series were used spanning from 1971 to 2012, for the UK. The empirical evidence is in line with the theoretical exposition insofar as investment decisions by industry are significantly conditioned by industrial profit. Moreover, the distribution of profits between industry and finance, in conjunction with policy objectives, appears to be playing an instrumental role in affecting capital accumulation.

Key words: Financialization, Income distribution, Investment, Cointegration.

JEL: B22, D33, E20.

Many of the advanced capitalist economies are witnessing the worst economic crisis since the Great Depression. The shift from traditional Keynesian policies, towards a more neoliberal, market-based agenda has permeated economic policy in the advanced economies. Ostensibly, the emergence of global finance has severely damaged the post-war international economic and financial system that had been established in Bretton Woods after the end of World War II. Currently, financial institutions have evolved into dominant economic establishments that dictate as well as shape economic policy in many national economies around the globe.

In all likelihood, financialization has increased the size and the fragility of the financial sector. The impact, however, of the growth in financialization on capital accumulation is more convoluted than expected. Given the shift in power relations between capital and labour, income distribution has shifted sharply in favour of capital. The implication of such a development has had both a social as well as an economic impact. In particular, many working class households are finding it difficult to keep up with what are regarded as consumption norms whilst at the same time domestic demand, especially in economies such as the peripheral economies of the Eurozone, has dwindled alarmingly (as demand is wage-led in the world as a whole).

Taking the process of financialization at face value, this paper purports to empirically gauge the extent to which distributional aspects of the existing intra-capitalist conflict between financial and industrial capital affect investment and, through the latter, macroeconomic activity.

The remainder of the paper is organized as follows: Section 1 outlines the key institutional developments that arguably, have contributed to the revival of both global finance and neoliberalism as a dominant dogma in contemporary capitalism. Section 2 argues that the key ideological overtones of heterodox approaches can form a comprehensive framework within which global financialization can be analyzed effectively. It is further argued that the distributional impact of financialization on investment decisions has been the major reason for poor economic growth and macroeconomic stability. Section 3 empirically investigates both short run and long run distributional effects of income on investment as well as any evidence of a causal dimension, whilst Section 4 provides some concluding remarks.

1. Financialization and Macroeconomic Fragility

The new finance-oriented world order of the post-Golden Age era is characterized by a significant move towards global integration of financial markets through liberalization of capital. Yet, this transition has not ensured that the resources and wealth produced amongst nations, social classes or any other group of society can be distributed optimally. The impact of this new economic order with the power of money and finance as the driving force of global capitalism has had deleterious effects on the economic performance of many advanced economies around the world.

Following the Post Keynesian tradition, Hyman Minsky (1982, 1986) argues that the financial practices of the non-financial corporate sector play an instrumental role in conditioning a capitalist economy that is inherently fragile and unstable. Along the same lines of argument, Geoff Harcourt and Claudio Sardoni (1995), claim that imbalances between finance capital and industrial capital can be sources of uncertainty. Thereby, the endogenous determination of money supply in conjunction with the prospect of instability will cause liquidity in the private sector to decrease, thus deteriorating the environment within which investment opportunities can be exploited (Paul Davidson 1978).

The economic prosperity of the post-World War II boom led to high saving volumes that, in conjunction with a rapid growth of debt in the form of corporate, personal, public and national debt, caused the return of a national and international social group of rentiers, whose involvement in economic and political affairs increased considerably (Amit Bhaduri and Josef Steindl 1983; Stephen Marglin 1990; James Crotty and Gerald Epstein 1996; John Smithin 1996; Gerald Dumenil and Dominique Levy 2001, 2004; Engelbert Stockhammer 2010, 2011, 2012). The renewed growth of rentier interests as well as a rentier psychology has important economic, political and ideological implications because it influences the entire system of economic and institutional relations between finance, industry and labour, between global finance and national economies and between states and markets.

Financialization and financial globalization have had a profound impact on the way existing economic actors behave in a rapidly changing economic environment.

To this end, there is an ongoing theoretical debate on the characteristics of a “finance-led” or “finance-dominated” capital accumulation regime (see for example, Robert Boyer 2000; Till van Treeck 2009; Eckhard Hein 2011; Matthew Bezreh and Jonathan Goldstein 2013). According to Stockhammer (2010) “financialization is the term used to summarize a broad set of changes in the relation between the ‘financial’ and ‘real’ sector which give greater weight than heretofore to financial actors or motives” (p. 2). The majority of contemporary authors view financialization as one of the key elements of a more general shift in social and economic relations from what is known as a Fordist capital accumulation regime to a new “neoliberal” regime (see for instance, David Harvey 2005; Andrew Glyn 2006; Ismail Ertürk et al. 2008; Greta Krippner 2011).

According to Petra Dünhaupt (2013) “the process of financialization can roughly be described as an increasing importance of the financial sector which had an impact on the distribution between wages and profits on the one hand, and retained earnings and financial income in the form of dividends and interests on the other hand” (p. 2). Furthermore, Epstein (2005) implies that in so far as financialization is ubiquitous and pervasive in the operation of the domestic and international economies then financialization is culpable for the transformation of economic actors (households, workers, firms and financial institutions) in terms of how they perceive themselves as well as the goals they pursue and the constraints they face.

What is striking about the new era of financial capitalism is the behaviour of rentiers, private bankers, currency speculators, portfolio investors as well as central bankers in relation to the business activities in which they engage. In particular, their vast accumulation of wealth is primarily held in the form of financial assets or foreign currency reserves, which they use to make profits through lending, holding financial assets and speculating in money and capital markets. Bhadury and Steindl (1983), Crotty and Epstein (1996) and Crotty (2009) claim that the larger these groups become, the more likely it is for financial capitalists to start forming coalitions with sections of industrial and commercial capital. Werner Bonefeld (1995) and Smithin (1996) argue that it was the “revenge of the rentiers” and the politics of money that caused the breakdown of the historically unique compromise between the competing economic interests of capital and labour during the Golden Age.

The liberalization as well as the abolishment of capital controls by many advanced economies since the 1970s has been a major institutional development that has altered financial relations and established an effective mechanism, through which, financial markets have dictated economic policy. Arguably, financial innovation and advances in information and communications technologies have facilitated capital mobility but without any explicit policy directives by governments, capital controls would have prevented the globalization of finance and the increasing integration of national financial markets.

The emergence of neoliberalism as a dominant dogma draws its legitimacy from neoclassical economics and monetarism, as well as from the notion that free and unregulated markets contribute to economic growth, efficiency and prosperity (Smithin 1996; John Eatwell and Lance Taylor 2000; Hene Gabel 2000; Philip Arestis and Santoru Basu 2003; Arestis, Nissanke Machiko, and Stein Howard 2003;

Constantinos Alexiou and Joseph Nellis 2013). According to Simone Bertoli and Francesco Farina (2007) the rise in Continental European labour's shares of income in the 1970s is ascribed to institutional reforms and external shocks as well as the rise in real wages which outpaced labour productivity. Firms' response was to restore profit shares by substituting labor demand by an increase in capital-intensive production (Olivier Blanchard 1997).

In establishing the links between the revival of global finance, economic austerity and rentiers' interests, it is imperative that we consider the framework within which the financial "game" of wealth creation and distribution is taking place. More specifically, the combination of increased capital mobility, currency speculation and financial competition has limited the independence of national, fiscal and monetary policy, hence affecting profoundly the determination financial profit.

Credibility over macroeconomic policy is directly related to the relationship between interest rates, exchange rates, currency demand in the financial markets, financial capitalists' profit expectations as well as capital flights. Macroeconomic management could easily be disrupted by speculative capital movements, due to differences in the patterns of the implemented domestic policies and the resulting changes in the interest and inflation rates among national economies.

2. Financial Income and Industrial Accumulation

The existing literature on the benefits and costs of financial globalization particularly for developing economies has grown significantly in recent years but the emerging evidence is apparently conflicting. According to Ayhan Kose et al. (2009) "there is still little robust evidence of the growth benefits of broad capital account liberalization, but a number of recent papers in the finance literature report that equity market liberalizations do significantly boost growth" (p. 143).

In a contrasting vein, Novica Supić (2008) argues that the post-war economy accommodated the power of the working class whilst Kosta Josifidis, Alpar Lošonc, and Supić (2010) contend that neoliberalism has been nurturing the power of capital. A distinctive feature of neoliberalism has been the polarization of the distribution of income, which manifests itself in wage developments. Wage shares have been dwindling across the EU, Japan and, to a lesser extent, in the United States. According to Anthony Atkinson, Tomas Piketty, and Emmanuel Saez (2010) the Anglo-Saxon economies have, however, witnessed a strong increase of inequality in personal income distribution.

In this context, it is important that we treat the high level of management reward in the Anglo-Saxon countries as a form of profits rather than wages (Stockhammer 2012). Indeed, once we subtract the top 1% of wage earners from the US wage share a sharp decline is observed. Furthermore, median weekly wages in the United States have grown by a mere 2.8% per annum between 1980 and 2005, the bottom quartile of wages fell by 3.1% and the top 10% increased by 21 per cent per annum (Organization for Economic Co-operation and Development 2008).

Proponents of the prevailing economic dogma argue that a decline in the wage share is primarily attributable to changes in technology and only residually to the growing globalized economic environment (see for instance European Commission 2007 and International Monetary Fund 2007).

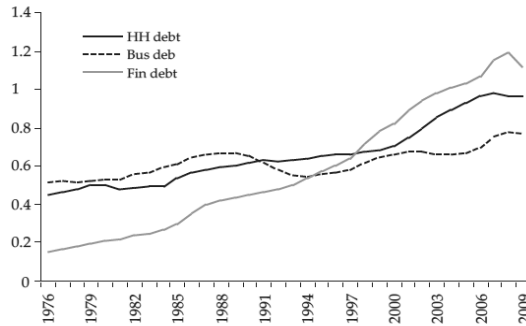
In contrast, political economy thinkers place more emphasis on financial globalization, trade globalization as well as the erosion of trade union power. More specifically, Dani Rodrik (1998), Anne Harrison (2002), and Arjun Jayadev (2007) provide evidence on the effects of capital controls and capital mobility on income distribution. On the other hand, Stockhammer, Ozlem Onaran, and Stefan Ederer (2009) provides econometric evidence, for a number of OECD countries, indicating that financial globalization, trade globalization and the decline in trade union density have been the main forces behind the declining wage share. On a more theoretical note, the International Labour Organization (2008) argues that financial globalization has contributed to the dwindling wage share, whereas Onaran (2009) holds that that financial crisis will have long-lasting distributional effects for several developing countries.

By virtue of the close relationship between wage income - rather than profits - and the propensity to consume, one would expect that income redistribution will have a stifling impact on aggregate demand, which is in line with the Kelckian view on the macroeconomic effects of redistribution. In support of the latter view, Stockhammer, Onaran, and Ederer (2009) report that the global decline in the share of wages since 1980 has contributed to a 4% decline in the share of GDP attributed to consumption, primarily as a result of changes in income distribution.

The data published by the World Bank in the *Financial Structure Data Set* indicate that financial activity has grown faster than real activity. A case in point is the United States' stock market capitalization, which has increased from 58% of GDP in 1988 to 163% in 1999. In particular, the stock market turnover has increased by more than 10-fold in only two decades, i.e. from 33% of GDP in 1988 to 383% in 2008. Finally, in the second half of the 20th century, the ratio of financial and international profits to total corporate profits has risen substantially, from just above 12% in 1948 to a peak of 53% in 2001 (Bureau of Economic Analysis, National Income and Product Accounts, Table 6.16B-D).

What is even more spectacular is that financialization has caused debt levels across different sectors to rise substantially. Figure 1 maps out the debt, as a ratio to GDP, of households, businesses and the financial sector. Debt in the business sector has increased from 52% of GDP in 1976 to 77% in 2009, household debt has accelerated from 45% in 1976 to 96% in 2009 and most impressively is the increase of the debt of the financial sector, from 16% to 111% in 2009.

The notion that financial market activity has increased faster than real activity is illustrated by this graph. It is clear that financial profits account for an increasing share of total profits whilst both households and the financial sector are being exposed to even more debt. It is in this sense that financialization is bound up with a rise in inequality and hence, lack of consumption demand. In the period of financialization the increase in inequality and profits have not been translated into an increase in investment expenditures.



Source: Federal Reserve Statistical Release, Financial Accounts of the United States, Flow of Funds Table D.3.

Figure 1 Debt of Households, Businesses and Financial Sectors (% GDP) - USA

2.1 Distributional Characteristics of the UK: Some Stylized Facts

In view of the preceding analysis, an inspection of some preliminary statistical data will enable us to visualize the trends in income distribution in an advanced economy such as that of the United Kingdom. The demise of Bretton Woods was superseded by an era of wide fluctuations in economic activity as well as a deflationary spiral that affected the distribution of income within the economy.

Table 1 Distribution of Profit and Income Shares (UK)

Periods	π^f/k	π^i/k	$(y-w)/y$	w/y
1965-1975	18.7	81.3	21.3	78.7
1976-1980	22.7	77.3	22.0	78.0
1980-1990	19.3	80.7	25.2	74.8
1991-2002	22.0	78.0	33.8	66.2
2003-2012	23.5	76.5	39.4	60.6

Note: π^f/k and π^i/k denotes shares of financial profit and industrial profit to total capitalist profit respectively; $(y-w)/y$ and w/y denote shares of capitalist profits and wage to income respectively.

Source: UK National Accounts, Sector Accounts.

A close inspection of Table 1 suggests that during the 1970s in the UK, industrial profits declined markedly, only to recover partially in the 1980s, before it declined further after that. As far as the share of financial profit is concerned, the picture is rather different, suggesting that financial profits have been increasing considerably throughout the observed period. Additional information is provided on the distribution of income between capital and labour where we can see a pattern of inter-class distribution of income unravelling in favour of capitalists. More specifically, the share of capitalist profits to total income has followed an upward trend throughout the period while in stark contrast, the share of workers' income has experienced a downward trend, the severity of which is more pronounced in the 1990's.

Taking into account the entire picture of profit and income distribution, we observe that finance has increased its income share at the expense of industry since the 1960s, while industry has redistributed income away from labour.

On the empirical front, a number of studies suggest that income from financial wealth, i.e. interest income, dividends and capital gains, has increased dramatically since the 1970s (Georgios Argitis 2001; Argitis and Christos Pitelis 2002; Epstein and David Power 2003; Dumenil and Levy 2004; David Kotz 2007, 2009). In addition, according to Nicholas Kaldor (1982), Mario Pivetti (1985), Carlo Panico (1988), Basil Moore (1989) finance as well as fluctuations in interest rates impact significantly intra-capitalist and inter-class income distribution. The resulting distributional effects are in most cases, attributed to the implementation of austerity policies adopted by respective economies.

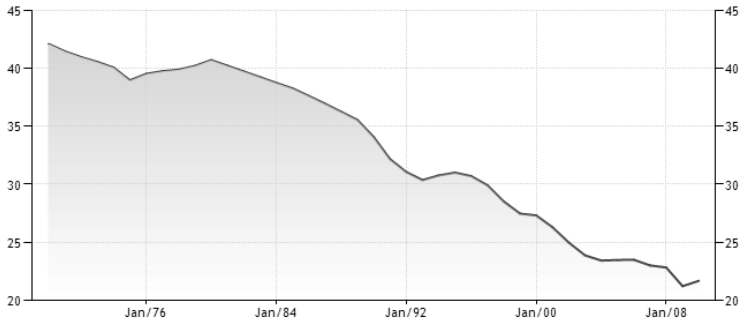
In the same line of argument, Hein (2013) in a study examining the channel through which financialization or finance-dominated capitalism affects macroeconomic performance found that “financialization and neoliberalism have contributed to the falling labour income share since the early 1980s through three main Kaleckian channels: (1) a shift in the sectoral composition of the economy; (2) an increase in management salaries and rising profit claims of the rentiers, and thus in overheads; and (3) weakened trade union bargaining power” (p. 11).

It can be argued, that dwindling industrial profits might have been a disincentive for non-financial businesses to invest in real, long-life assets, when they do not expect high profits, and when they have profitable alternatives to invest in financial markets. Macroeconomic performance however, is mostly set by investment decisions, which are in part determined by the distributional effects of finance. The financial sector, instead of channelling funds towards productive investments, engages in speculative activities in order to boost its short-term profitability.

Let us now turn to examining the unfolding patterns of the contribution of GDP stemming from industry and manufacturing as well as that of employment creation. Figures 2 and 3 map out the value-added contribution of industry as well as that of manufacturing as a percentage of GDP since the 1970s. As can be seen, output has contracted substantially over the entire period and across both sectors.

In addition, a close inspection of the preceding figures suggest that industrial and manufacturing employment has been dwindling rather alarmingly over the entire period, which in conjunction with stagnating wages have driven many households into debt (Barry Cynamon and Stephen Fazzari 2009). According to Aldo Barba and Pivetti (2009), an increase in household debt should be regarded as a substitute for increases in wages.

In view of the above discussion, it has become clear that the lack of industrial growth in the UK can be attributed to some extent to the activities of the financial sector and it may be argued that these have had disastrous consequences for the current macroeconomic environment *per se*, culminating in the 2007/8 global financial crisis.



Source: World Bank, National Accounts Data.

Figure 2 Industry's Value Added as % GDP (UK)



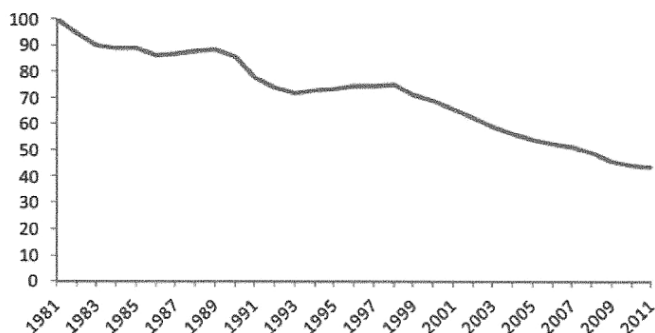
Source: World Bank, National Accounts Data.

Figure 3 Manufacturing's Value Added as % GDP (UK)



Source: World Bank, National Accounts Data.

Figure 4 Industrial Employment (UK)



Source: The UK Office for National Statistics, Labour Force Survey, Bank of England.

Figure 5 Manufacturing Employment (1981=100, UK)

3. Empirical Investigation

3.1 The Model

In view of the preceding analysis, it is envisaged that a combination of decreasing industrial profits and pessimistic expectations about future demand might have contributed to the mediocre industrial investment activity and hence, economic growth. The latter provides a heterodox empirical platform upon which our hypothesis will be tested. In particular, the hypothesis that income redistribution towards finance at the expense of industry might have been a factor that contributed to the slowdown of capital accumulation can be econometrically tested using the following specification:

$$c = f(\pi^i, ad, l^c). \quad (1)$$

Equation (1) states that business' capital stock denoted by c is a function of industry's profit share, π^i , aggregate demand denoted by ad and labour cost denoted by l^c . The inclusion of industry's profit share in the model reflects industry's accumulations which, apart from gauging the receipts from industrial investment, industry's profit share, also captures the financial distributional effect as well as the importance of industrial profits as a source of internal finance.

The distributional effects that arise from the activity of the financial sector are likely to adversely impact on the industry's investment decisions. According to Michael Kalecki (1971) internal and external finance in conjunction with low interest rates affect, through the channel of aggregate demand, investment and hence, employment and growth. In our model the latter is captured by the insertion of aggregate demand. Finally, labour cost purports to capture the distributional effects of income. Following our theoretical exposition, the partial derivatives are envisaged as follows:

$$f_{\pi^i} > 0, f_{ad} > 0, f_{l^c} < 0.$$

Given the nature of the specification, it can be sustained that this equation differs considerably from the neoclassical investment equations (see for instance Dale

Jorgenson 1971; Robert Chirinko 1993). It can also be thought of as a Post Keynesian investment function in a sense that it explores the impact of aggregate demand and profit share on the industry's investment decisions (Fazzari and Tracy Mott 1986-87; Marglin and Bhadury 1990; Fazzari 1993; Alexiou and Christos Pitelis 2003; Alexiou 2010).

Assuming a linear relationship between the variables, a generic long-run model is expressed as follows:

$$c_t = \beta_0 + \beta_1 \pi_t^i + \beta_2 ad_t + \beta_3 l_t^c + \varepsilon_t, \quad (2)$$

where, β_0 is the constant; β_1 , β_2 and β_3 are the slope coefficients; ε is the error term satisfying the usual assumptions, and the subscript t stands for time.

For the econometric analysis annual time series data have been collated for the United Kingdom spanning from 1971-2012 (see sources and definitions of variables in the Appendix).

3.2 Methodological Framework

The present study employs cointegration techniques and error correction modelling (ECM). More specifically, the econometric methodology consists of the following steps: I check the series to determine the order of integration. The Augmented Dickey-Fuller (ADF), the Phillips-Perron (PP) and the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) tests has been extensively used in empirical studies when determining the order of integration. After establishing the order of integration we proceed to the testing for cointegration of the series utilizing the bounds testing approach within the ARDL framework¹. In recent years, on the univariate front, cointegration techniques such as those by Robert Engle and Clive Granger (1987) and Park Phillips and Bruce Hansen (1990) have been applied. As for multivariate cointegration, Soren Johansen's (1988) and Johansen and Karerina Juselius' (1990) full information maximum likelihood procedures are extensively used in empirical studies. A relatively new procedure, the autoregressive distributed lag (ARDL), introduced originally by Hashem Pesaran and Yongcheol Shin (1999) and further extended by Pesaran, Shin, and Ron Smith (2001) and Paresh Narayan (2005), also deals with single cointegration. This method is thought to have certain econometric advantages over other single cointegration procedures. More specifically, endogeneity problems and inability to test hypotheses on the estimated coefficients in the long-run associated with the Engle-Granger method are avoided; the long and short-run parameters of the model are estimated simultaneously; all variables are assumed to be endogenous; it also obviates the need to establish the order of integration amongst the variables, i.e., the Pesaran, Shin, and Smith (2001) method could be implemented regardless of whether the underlying variables are I(0), I(1), or fractionally integrated.

To implement the ARDL approach, Equation (2) is transformed to a conditional error correction version of the capital stock and its determinants:

¹ It should be stressed that during the estimation process the Johanses approach was also utilized to double check the robustness of our results.

$$\Delta c_t = \beta_0 + \sum_{i=1}^p \beta_{1i} \Delta c_{t-1} + \sum_{i=1}^p \beta_{2i} \Delta \pi_{t-1}^i + \sum_{i=1}^p \beta_{3i} \Delta ad_{t-1} + \sum_{i=1}^p \beta_{4i} \Delta l_{t-1}^c + \beta_5 c_{t-1} + \beta_6 \pi_{t-1}^i + \beta_7 ad_{t-1} + \beta_8 l_{t-1}^c + \varepsilon_t. \quad (3)$$

The first part of Equation (3) has β_1, \dots, β_4 representing the short-run dynamics of the model, whereas the second part with β_5 , and β_8 represents the long-run relationship, Δ is the first difference operator and p is the optimal lag length.

Next, the joint hypothesis that the long-run multipliers of the lagged level variables are all equal to zero, against the alternative that at least one is non-zero, will be tested. If a cointegrating relationship exists, then the null hypothesis should be rejected. The long-run relationship amongst the variables is tested by means of a bounds testing procedure coined by Pesaran, Shin, and Smith (2001). This procedure is based on the F -test or Wald-statistics and is the first stage of the ARDL cointegration method. A joint significance test that implies no cointegration is also performed. The F -test used for this procedure by performing the Wald test has a non-standard distribution, whose asymptotic critical values are provided by Pesaran, Shin, and Smith (2001). Further research on this area, however, has produced evidence on the basis of which the critical values are inappropriate whenever the sample size is small, or in other words when annual macroeconomic variables are involved (Narayan 2005).

A number of regressions have been estimated in an attempt to obtain the optimal lag length for each variable. Once a long-run relationship is established, the long-run estimates can be obtained using the following ARDL specification:

$$c_t = \beta_0 + \sum_{i=1}^p \beta_{1i} \Delta c_{t-1} + \sum_{i=0}^q \beta_{2i} \Delta \pi_{t-1}^i + \sum_{i=0}^q \beta_{3i} \Delta ad_{t-1} + \sum_{i=0}^q \beta_{4i} \Delta l_{t-1}^c + u_t. \quad (4)$$

The order of lags in the ARDL model are selected by either the Akaike (AIC) selection criterion or the Schwartz Bayesian Criterion (SBC) before the selected model is estimated by ordinary least squares. From this, the lag length that minimizes SBC is selected. Finally, the speed of adjustment to equilibrium level after a shock is captured by the error correction representation which is conveyed in the following form:

$$\Delta c_t = \beta_0 + \sum_{i=1}^p \beta_{1i} \Delta c_{t-1} + \sum_{i=1}^p \beta_{2i} \Delta \pi_{t-1}^i + \sum_{i=1}^p \beta_{3i} \Delta ad_{t-1} + \sum_{i=1}^p \beta_{4i} \Delta l_{t-1}^c + \lambda EC_{t-1} + \varepsilon_t, \quad (5)$$

where λ is the speed of adjustment; EC is the error correction component, defined as:

$$EC = c_t - \beta_0 - \sum_{i=1}^p \beta_{1i} \Delta c_{t-1} - \sum_{i=0}^q \beta_{2i} \Delta \pi_{t-1}^i - \sum_{i=0}^q \beta_{3i} \Delta ad_{t-1} - \sum_{i=0}^q \beta_{4i} \Delta l_{t-1}^c. \quad (6)$$

Given the order of integration of the underlying variables, an exploration of the causal dimension through Granger Causality tests will provide an indication as to the nature of causality between the variables.

3.3 Empirical Findings

Unit Roots

Even though the ARDL methodology does not require pre-testing for unit roots, the standard unit roots tests - ADF, PP and KPSS - have been employed to ensure that the variables are not $I(2)$, in which case, the computed F -statistic for the existence of a cointegration relationship would have been invalid (Peasaran, Shin, and Smith 2001). A quick inspection of the results displayed in Table 2 below suggests that we can treat the underlying time series as $I(1)$ variables.

Table 2 Unit Root Tests

Variables	c	π^j	ad	f^c
ADF				
Levels	-0.451	-0.273	-0.886	-2.112
First difference	-4.203*	-4.543*	-3.552*	-4.916*
PP				
Levels	-0.979	-1.214	-0.973	-1.670
First difference	-4.898*	-3.993*	-4.054*	-4.565*
KPSS				
Levels	0.136**	0.137**	0.324**	0.187**
First difference	0.159**	0.146**	0.376**	0.189**

Notes: (*) significant test at the 5% level, i.e. variables are integrated of order one, $I(1)$. (**) asymptotic critical values for the KPSS test at 5% level. Null hypothesis under KPSS is that the series is stationary.

Source: Authors.

Cointegration Tests

On the basis of the bounds framework to cointegration, the F -statistics should be compared to the critical values generated for specific sample sizes. Each variable in Equation (4) is taken as a dependent variable in the calculation of the F -statistics. The results displayed in Table 3 confirm the existence of an equilibrium relationship in the case of one and two lags at the 0.01 and 0.05 levels of significance, respectively. For reasons of economy of space and clarity of presentation, the investment function is written as $F_c(c|\pi^j, ad, f^c)$. The notation does not change when the investment function is normalized with respect to each and every one of the independent variables. Moreover, in our effort to ensure that the independent variables can be treated as long-run forcing variables, we tested for other possible cointegration relationships. Clearly, as can be observed in Table 3, there is only one cointegrating relationship, whether or not one or two lags are imposed, and all the independent variables can be treated as long-run forcing variables for the capital stock.

Since there is evidence of a cointegrating relationship, the long-run model using the ARDL specification was estimated (see Table 4). In an attempt to find the optimal length of the level variables of the long-run coefficients, lag selection criteria based on AIC, and SBC were employed. The yielded evidence suggests that there is a strong correlation between capital stock and the rest of the independent variables over the same period. In addition, the short term elasticities are found to be statisti-

cally significant at the 5% level reflecting thereby the existing relationship between the scrutinized variables.

Table 3 Bounds Test for Cointegration

	F-statistic	
	Alternative lag lengths	
	1	2
$F_c(c \setminus \pi^i, ad, I^c)$	5.14**	7.11*
$F_{\pi^i}(\pi^i \setminus c, ad, I^c)$	2.57	2.68
$F_{ad}(ad \setminus c, \pi^i, I^c)$	3.98	3.25
$F_{I^c}(I^c \setminus c, ad, \pi^i)$	2.11	3.16

Note: (*), (**) denote the presence of cointegration at the level of 0.01 and 0.05, respectively. For $n = 41$ and $k = 4$, the two associated pairs of critical values are 3.967-5.455 and 2.893-4.0, for 0.01 and 0.05, respectively. The critical values were obtained from Narayan (2005, p.1988, case III).

Source: Authors.

Table 4 ARDL Estimation Results

Variable	Cons.	π^i	ad	I^c
Coefficient	1.822	0.021	0.172	-0.015
t-statistic	0.897	3.562**	4.032**	-2.561*

A Diagnostics

	Statistic
Serial correlation	0.767
Normality	0.876
Heteroscedasticity	0.952

Notes: (*) and (**) denote significant test at both 5% and 1% level.

Source: Authors.

As for the coefficient of EC_{t-1} , this is found to be statistically significant - confirming the existing long-run relationship between the variables (see Table 5). More specifically, the negative and strongly significant error correction component indicates a relatively speedy adjustment, i.e. about 51% of the disequilibria of the previous month's shock, adjusts back to the long run equilibrium in the current month.

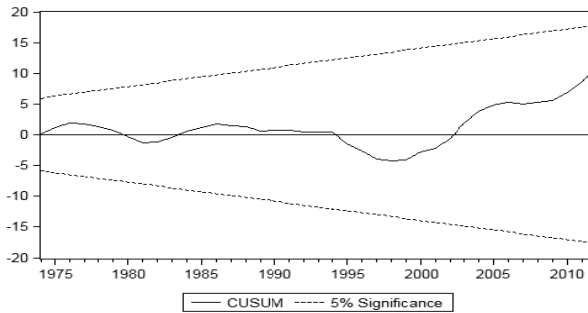
Table 5 The Error Correction Model

PANEL A: error correction estimation. Δc_t is the dependent variable							
Variable	Cons.	Δc_{t-1}	$\Delta \pi_t^i$	$\Delta \pi_{t-1}^i$	Δad_{t-1}	ΔI_t^c	EC_{t-1}
Coefficients	0.56	0.24	0.72	0.32	0.15	-0.13	-0.61
t-statistic	0.90	2.63*	2.62*	4.61**	5.73**	-2.98*	-4.73**
PANEL B: diagnostic tests							
R ² adjusted		0.778			SIC		106.83
F-statistic		18.946			AIC		115.24
Durbin-Watson		1.983			RSS		0.0091

Notes: (*) and (**) denote significant test at both 5% and 1% level.

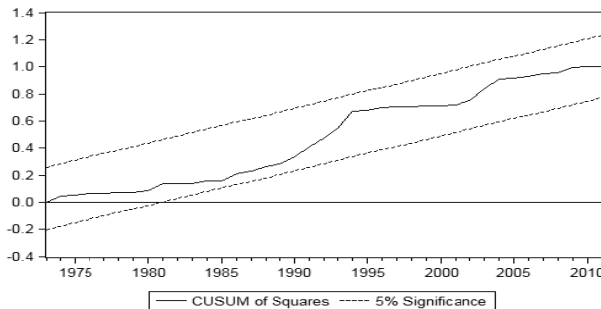
Source: Authors.

In addition, Pesaran and Bijan Pesaran (1997) argue that it is extremely important to ascertain the constancy of the long-run multipliers by testing the above error-correction model for the stability of its parameters. The commonly used tests for this purpose are the cumulative sum (CUSUM) and the cumulative sum of squares (CUSUMQ), both of which have been introduced by Robert Brown, James Durbin, and Evans James (1975). Figures 6 and 7 display the results of CUSUM and CUSUMQ tests, respectively. In both figures the dotted lines represent the critical upper and lower bounds at the 5% level of significance. A visual inspection of the figures reveals that there is no evidence of parameter instability as the CUSUM and the CUSUMSQ lie within the upper and lower bounds.



Source: Authors.

Figure 6 CUSUM Test



Source: Authors.

Figure 7 CUSUMSQ Test

The results in Table 6 suggest that in the long run, all the variables of Equation (4) are Granger-caused implicitly via the error correction term the capital stock, thereby confirming the equilibrium suggested by the bounds testing procedure. Turning to the short-run, the results suggest the presence of first, a bidirectional causality running from industrial profit share to capital stock and vice versa; second, a unidi-

rectional causality from aggregate demand to capital stock as well as to industrial profit share; and finally, from labour cost to capital stock.

Table 6 Granger Causality Tests

		F-statistics			
Dependent		Independent variables			
	Δc	$\Delta \pi^i$	Δad	ΔI^c	EC_{t-1}
-	Δc	2.61*	3.88**	5.34**	-19.67**
Δc	-	-	4.34**	3.12**	-
$\Delta \pi^i$	2.17*	-	-	2.13*	-
Δad	0.25	0.44	-	-	-
ΔI^c	0.24	0.56	0.53	-	-

Note: (*) denote a significant test at both 1% and 5% respectively.

Source: Authors.

By and large, all variables are significant and bear the expected signs. The statistical significance of the lagged dependent variable reflects the autoregressive nature of the growth of capital stock, suggesting the time lag involved between investment decision and investment expenditure. The industrial profit share appears to be an important determinant of industry's investment decisions. Current and lagged industrial profits might reflect industry's interests in expected profits and available internal funds respectively. The distribution of profits between industry and finance emerges, therefore, as a channel through which finance and monetary policy are likely to affect capital accumulation. A permanent implementation of a restrictive monetary policy generates financial constraints and pessimistic profit expectations.

The growth rate of aggregate demand exerts a significant positive impact on investment decisions. Macroeconomic policies that stimulate demand will have a strong, positive impact on capital accumulation with feedback effects on the macro economy. Finally, changes in the current cost of labour alter industry's profit expectations and hence negatively influence investment decisions.

4. Concluding Remarks

The empirical findings reported above are generally in line with the theoretical arguments developed in this study. In particular, the evidence obtained suggests that investment decisions by industry are significantly conditioned by industrial profit. Moreover, the distribution of profits between industry and finance, in conjunction with policy objectives, appears to be playing an instrumental role in affecting capital accumulation. The extant limited access to finance is bound to have adversely affected investment and, through this, aggregate demand. This in turn has negatively impacted many economies pushing some towards stagnation and long term mediocre economic growth.

The persistent implementation of neoliberal policies in the UK as well as in the majority of the EU governments has created a "rentier-type-led" low growth situation destabilizing the macroeconomic environment and the productive base of the economy. In this context, it is imperative that policies are designed to increase and sustain demand so that capacity is restored to full employment levels.

The effectiveness of economic policy however, will heavily depend on financial market restructuring. Regulation and control of global financial markets is urgently needed in so far as financial capital is to be channelled towards productive investment, through which an economic environment conducive to growth and employment creation is to be envisaged.

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Appendix

Sources and Definitions of Variables

k is gross trading profits: UK national accounts, survey of current business.

c is gross capital stock: AMECO.

π^f is interest payments by the non-financial corporate sector: UK national accounts, survey of current business.

$\pi^i = k - \pi^f$ (authors' calculations).

w is wage income paid by the non-financial corporate sector: UK national accounts, survey of current business.

$y = k + w$ (author's calculations).

l^c is compensation of employees: OECD national accounts.

ad is aggregate demand: AMECO database.

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