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Low interest rates, low productivity, low growth? A multi-sector case study of UK-based firms' funding and investment strategies in the context of loose monetary policy

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ABSTRACT

Low productivity growth in a low interest rate environment is a perennial problem for both UK monetary policy and the UK economy more generally. Through a comparative case study of eight firms across two economic sectors during 2012–6 we identify two shortcomings in the current productivity literature. The first is the importance of the order in which firms make investment and funding decisions. Investment decisions tend to predate questions of firm financing, implying loose monetary policy does not drive investment, but rather facilitates it. Secondly, we emphasise the importance of investment quality for funding choices. External financing such as credit or stock issues is predominantly used to fund expansionary but not productivity focussed investments. This implies monetary policy may have worsened the UK's productivity problem by facilitating expansionary over productivity enhancing investment strategies. Our findings are broadly consistent with the political economy literature on the UK economy, but we argue that research framed by the 'growth model' concept has not successfully illuminated firm-level dynamics, and relies on mainstream macroeconomics to explain low productivity. We therefore argue for a research agenda that moves beyond aggregate measures and incorporates questions about the *quality* of economic activity.

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Introduction

The UK has experienced persistently low productivity growth since the global financial crisis of 2007-9. The UK had the largest 'productivity puzzle' in the G7 with a total gap of 18.8% in 2016, when comparing labour productivity to pre-crisis trends (ONS 2018), raising concerns at both the Treasury (Javid 2015, Sunak 2020) and the Bank of England (Haldane 2018). The root cause(s) of this puzzle remain unclear (McCann & Vorley 2020), with the role of low interest rates on firm-level decision making being hitherto underexplored. The UK's 'productivity puzzle' coincided with a period of historically low interest rates and sweeping government cuts as part of an austerity agenda. However, with the exception of Pessoa and Van Reenen (2014), prevailing explanations foreground a low business investment rate – coupled with the absence of a coherent industrial strategy – as the principal context of productivity stagnation; this results in the productivity puzzle being conceptualised as secular puzzle of the UK economy (e.g. Harris and Moffat 2017, Coyle 2019).

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We argue that the role of UK monetary policy in shaping investment decisions is under-explored in the literature. Existing research emanating from political economy and heterodox economics associates low productivity with labour market flexibility and low pay (Green and Lavery 2015, Van Doorslaer and Vermeiren 2021), insofar as these conditions disincentivise productive investment in, say, training workers. But while this literature notes the coincidence of low interest rates as an accompanying macroeconomic strategy, it does not investigate this relationship empirically. Meanwhile the 'growth model' literature tends to focus on the implications of monetary policy on aggregate demand through consumer credit rather than investment behaviour (Crouch 2009, Baccaro and Pontusson 2016). Neither literature has devoted attention to how or whether firm-level strategies reflect and reinforce the conditions which give rise to poor productivity outcomes at the aggregate level. There is also a growing literature which locates the productivity puzzle at firm or industry level (Goodridge et al. 2018, Kierzenkowski et al. 2018, Riley et al. 2018) – but this literature has not investigated substantive links to the monetary policy environment.

This paper therefore examines the hitherto under-examined effect of long-term low interest rates on the productivity puzzle via their impact on firm-level investment decisions. The paper is guided by two research questions: firstly, to what extent is low productivity the result of the specific government policy combination pursued by successive UK governments? Secondly, how did firms respond to the low interest rate environment in terms of productivity enhancing investments? The paper suggests that – once the *quality* (as opposed to quantity) of investments funded through the external sources impacted by low interest rates (e.g. bank debt, bonds and stock issues) are considered – the low interest rate environment was potentially an important factor in low productivity outcomes in the UK. Specifically, low interest rates appears to lead to a rebalancing of capital investment towards rapid expansion, with a limited impact on productivity investment, leading to potential malinvestment. These findings draw on data from detailed case study analysis of eight FTSE250 firms from two contrasting sectors (food manufacturing and construction) over the 2012–6 period, utilising new primary data collected from analysis of firm's financial documents and elite interviews with firm owners and managers.

This paper makes two key contributions to understandings of firm financing and investment behaviour. Firstly, it emphasises the importance of decision-making order for funding and investment decisions and provides an alternative reading of the long-standing debate in corporate finance between 'target ratio' (e.g. Modigliani and Miller 1958, Frank and Goyal 2003, Flannery and Rangan 2006) and 'pecking order' models of firm funding decisions (e.g. Myers 1984, Lemmon and Zender 2010). Findings reveal that firm leaderships, specifically the CEO and CFO, will set out funding and investment strategies targeting broad leverage ratios and investment types to pursue. Managers then engage in a process of identifying and evaluating appropriate investment opportunities utilising a pecking order approach to project specific funding evaluations. Secondly, the paper highlights the importance of the *quality* of investments made. Investments focussed on productivity enhancement, as opposed to rapid expansion or growth, are found to be rarely funded through external sources impacted by monetary policy. Monetary policy is found to significantly reduce the cost of capital for firms pursuing strategies of rapid expansion, while more stable productivity focussed firms would have only benefited indirectly. The paper resultantly posits that part of the UK productivity puzzle lies in the policy response to the Financial Crisis and the use of low interest rates to facilitate investment.

These findings, moreover, illuminate a broader point regarding economic governance in the UK. The political economy literature associates very low interest rates with the importance of the finance and housing sector in the UK, which in turn enables a consumption-led economy underpinned by personal debt and housing wealth. But its explanation for the productivity puzzle is thinner, relying on a standard macroeconomics explanation about investment being (mis)allocated to unproductive sectors, with low earnings viewed as a normal – albeit regrettable – feature of this growth model. We do not dispute this account empirically, but viewed from the level of the firm upwards we can tentatively identify firms – even in ostensibly productive and profitable parts of the economy – content to invest via strategies which limit their own productivity growth. Although it is beyond the

scope of this paper, it would be helpful for political economists to focus on firms as active decision makers shaping economic outcomes and take up the question of how firms across all sectors create the political demand for low interest rates as part of an accumulation strategy predicated upon low earnings. Thus questioning whether it is wage demands that are a drag upon productivity, or rather the opposite.

The remainder of this paper has the following structure: Part one reviews extant literature on the UK productivity puzzle and firm funding strategies. Part two provides a methodology and research design. Part three details our empirical findings regarding the relationship between firm funding and investment decisions. Part four develops a model of monetary policy's impact on firm investment and productivity growth before providing concluding comments about the role of economic policy in shaping productivity outcomes.

Low interest rates and low productivity

The Conservative-led coalition government elected in 2010 in the aftermath of the Global Financial Crisis engaged in Bank of England (BoE) led strategies of loose money via quantitative easing, wherein large quantities of long-dated UK government bonds were purchased in order to push down long-term interest rates. This would then increase consumer demand while also reducing firm borrowing costs, incentivising investment (Joyce et al. 2012, Haldane et al. 2016). These policies have been described as an 'expansionary fiscal contraction' (Dellepiane-Avellaneda 2015), as long-term, low interest rates from extraordinary monetary policy, low labour costs from further deregulation of employment, and the disciplinary effects of austerity were expected to result in in firms increasing investment and thereby driving productivity increases in the UK (e.g. Osborne 2010).

Productivity levels measured by GDP per hour have however remained largely stagnant since 2010 (HoC Library 2017, 2020), as has labour productivity per hour. This outcome is a marked change from the last 50 years, wherein labour productivity grew slowly but steadily at an average rate of around 2% per year across the whole economy (ONS 2020). Contemporaneously sluggish productivity growth and the claims of a productivity crisis have a long tradition in the UK; the deliberate weakening of trade unions by the British state over several decades from the 1970s was argued as necessary by state managers due to their alleged role as a drag on productivity; that unions have now been severely weakened and productivity remains low demonstrates they were not the problem (Nolan 2011).

For the most part, an economics-centred literature on productivity focuses on under-investment in the private sector – a problem which has intensified since the Brexit vote in 2016, and onset of the COVID-19 pandemic. The literature often focuses on specific types of investment, such as physical infrastructure or supply chain capacity, which individual firms are not incentivised to invest in directly, and on the specific problem of access to finance for SMEs unable to make the size of investments necessary to scale up innovation. Nevertheless, a more general relationship between low investment and poor productivity outcomes is a recurrent argument (see for instance The Economy 2030 Inquiry 2021; also McCann & Vorley 2020). These changes have occurred alongside a continued unwillingness by successive UK governments to strategically signal investment priorities via development of an industrial strategy which leverages key strengths of the UK economy, or invests in longer-term inputs e.g. skills and training, or research and development (Berry 2020). It is the stubbornness of the UK's 'productivity puzzle' that is the focus of this paper, therefore, particularly the relationship between the long term low interest rate environment and low productivity growth.

It is true that some existing literature *has* examined this relationship and suggests monetary policy practice is relevant to the UK's productivity performance. Green and Lavery (2015) locate monetary policy focused on producing asset price inflation within a specific, regressive approach to post-crisis recovery, and Evemy et al. (2020) find policy-makers increasingly willing to embrace experimental monetary policy to smooth contradictions within debt-led growth. Both of these papers see the disciplining of labour as a central objective of the policy framework encapsulated by extraordinary

monetary policy (see also Berry 2016). More specific analysis of the UK productivity puzzle however has tended avoid questions of government policy impact and take a secular sectoral or a national accounts approach, with the notable exception of Pessoa and Van Reenen (2014) who provide theoretical discussion of the role austerity played in reducing labour costs and thus incentivising labour substitution and capital shallowing (of which there is limited empirical evidence) (Harris and Moffat 2017, Goodridge et al. 2018).

The growing consensus is that the core of the productivity puzzle is falling productivity growth within sectors and firms themselves (Goodridge et al. 2018, Kierzenkowski et al. 2018, Riley et al. 2018). This focus should lead us to pay more attention to the decision making process of firms in general in order to gain a better understanding of the productivity puzzle (see for example Forth and Bryson 2015). Our paper contributes to these debates by offering an examination and analysis of the influence of low interest rates, and therefore deliberate public policy, on decisions relevant to productivity performance at firm level.

In political economy, however, discussion of the UK's relatively poor economic performance continues to be viewed through a 'growth model' lens, which borrows from the macroeconomic discipline a focus on the macro-level features of the economy, with in-built assumptions around how these features are reflected at the micro level (Van Doorslaer & Vermeiren 2021). Much of this literature highlights the failure of the UK growth model, rather than assuming equilibrium, but analysis has concentrated on an over-reliance on volatile finance and housing sectors to facilitate consumption (Hay 2013, Hofman & Aalbers 2019, James & Quaglia 2019). Some political economists have begun to question the value of the growth models lens in framing the political dimension of capitalist management in the UK (Clift & McDaniel 2022) – our own focus on highly politicised monetary policy practice seeks to contribute to this debate. Primarily, however, we seek to broaden the discussion within political economy of UK economic performance by drawing upon business and management studies as well as macroeconomics, allowing us to assess the interaction between firm-level investment strategies and policy-makers' attempts to shape macroeconomic conditions.

Firm funding and investment

Existing literature on funding of firm investments, and thus the impact of monetary policy, is split between, 'trade-off' and 'pecking order' approaches. The former argues firms face a trade-off between different sources of capital due to the tax incentives (Modigliani and Miller 1958, 1963), expected future investment needs (Myers 1977) and agency costs (Jensen and Meckling 1976). The latter suggests firms face a ranked order of funding options – internal, debt, equity – with increasing respective costs (Myers 1977, 1984).

Empirical studies have varied in their results. While several detailed studies of US capital markets have found that firms tend to target a debt/equity ratio, raising debt even when running a cash surplus (Frank and Goyal 2003, Flannery and Rangan 2006, de Jong et al. 2011). Chang and Dasgupta (2009) and Chauhan and Huseynov (2018) have found that this behaviour is not meaningfully distinct from random funding decisions. While studies looking beyond the US imply that that evidence for stable debt/equity targeting does not hold (DeAngelo and Roll 2014). In Europe, for example, operational cash flow and investment needs drive borrowing behaviour (Campbell and Rogers 2018).

This paper also makes two contributions to this debate on firm funding behaviour. The first is the need to distinguish between the *quality* of investments. Existing approaches to firm financing have tended to focus on the *quantity* and *profitability* of firm investment opportunities, with the well-established conclusion that reduced long-term capital costs (such as that caused by QE) will lead to higher overall levels of investment. However, as Schumpeter (1983) and others have pointed out there is no necessary reason why that profitable investments would be productivity enhancing. Our research therefore focuses on the quality of investment decisions – namely whether they aim to enhance productivity or simply expand existing production techniques – to understand the connection between changes in funding environment and firm level productivity outcomes. The second

contribution emphasises the importance of managers as decision makers within the context of radical uncertainty. Managers play an important role gathering PESTLE information available to develop plans and strategies for growth and investment and construct narratives about what is and is not possible and the decisions that must be made (Shackle 1988), thereby shaping investors' perceptions of 'value' and appropriate investment and funding strategies (Froud et al. 2006).

Methodology and research design

The focus of the study is *quality* (as opposed to *quantity*) of firm level investments, necessitating nuance of definition. Productivity was defined as unit labour productivity for two reasons. Firstly, labour productivity is the central concern of UK policy makers due to its implications for increased living standards and inflation (see Evemy et al. 2020). Secondly, this definition is a holistic one, including within it changes in total factor productivity (Smith 2003, Grifell-Tatjé et al. 2018).

Productivity *enhancing* investments are those aimed at improving overall labour productivity of the firm, or output per unit of labour. These investments take the form of improvements in overall production techniques or switching to more capital-intensive production methods but do not necessarily increase overall production. *Expansionary* investments, by contrast, are those that increase the scale of production or total output but do not necessarily increase output per unit of labour – for example opening a new factory directly copying existing production methods (see Appendix 1 for a technical account). These are not mutually exclusive categories; investment can both increase the scale of operations and make them more productive. The purpose of the distinction is to qualitatively distinguish between the different dynamics of investment to investigate questions of productivity growth.

Disentangling the productivity enhancing and expansionary components of investment raised certain methodological challenges. Firstly, changes in scale, capital efficiency and profitability can be easily measured through growth in assets and measures such as EBITA[1] and ROCE.[2] Meanwhile, productivity focussed investments are difficult to quantify from firm level data. Real productivity growth entails producing a greater volume of output with lower worker (or capital) input. Output is however measured by prices, meaning if higher real productivity leads to lower prices, it will reduce nominal productivity (see Lewis et al. 2018, Lewis and Bell 2019). This makes ex post quantitative measurement of real productivity improvements problematic. Secondly, investment is an exploratory process made on expectations about future outcomes that may prove false (Hayek 1937, 1945, see also Chiles et al. 2007). In the case of a scalar investment this would still result in company asset growth, which are simply less profitable than expected. On the other hand productivity-focussed investments would involve small changes in asset values as machinery is replaced as existing machinery depreciates or intangibles such as training is expensed rather than capitalised. The paper therefore argues that in order to disentangle and analyse the productivity enhancing aspect of firm investment decisions – it is necessary to shift focus from quantitative measures and move towards a qualitative focus on investment purpose and objectives. In short, we need to ask what are firm decision makers attempting to achieve when they make investments? And how do they fund them?

This study utilised a comparative case study of eight FTSE250 firms from 2012–6 to investigate the relationship between investment quality and funding type. Firms were purposively sampled from the FTSE250 index as these companies were large enough to benefit from the prevailing low interest rate environment (Bank of England 2013, pp. 361–9), and have business strategies that were more reflective of the majority of firms which comprise the UK economy compared to FTSE100 firms, which are more akin to holding companies. The period 2012–6 was deliberately selected as it captures a relatively continuous phase of business investment in the UK between two major external investment shocks. While QE and related asset purchases were introduced in spring 2009, business investment remained relatively flat until 2011 (ONS 2022), due to the legacy of the Global Financial Crisis and the subsequent impact of the Eurozone Crisis, which did not resolve until mid-2012. In

2016 business investment flattened out as the UK began the process of exiting the European Union (ibid.). 2012–6 was therefore a period of both extraordinary low interest rates and one where UK firms were making sustained investments. The interesting question, however, is what were firms' investing in?

Firms were selected utilising the 'difference principle' to maximise variation in the sample and draw out common patterns for theorisation from diverse contexts (Eckstein 1992, Flyvbjerg 2006). Two sectors were selected – Food and Beverage Manufacturing and Construction – based on capital intensity and productivity. Food and Beverage Manufacturing is one of the most capital-intensive sectors in the UK, with one of the highest rates of overall productivity growth since 2010 (DEFRA 2020, ONS 2020, Department for International Trade 2021). Construction is one of the least capital-intensive sectors in the UK and has reported productivity rates between 20% and 15% below the UK average (ONS 2019). Within each sector we selected firms based on capital structure[3] in order to compare the impact of firms underlying funding strategies[4] on investment decisions while controlling for sectoral differences. This range of cases facilitated within and between sector comparisons when identifying trends; enabling us to ascertain whether a pattern is due to the particularities of one sector or firm or if it holds across a variety of circumstances – and thus indicative of a more general trend.

Data collection comprised documentary analysis of annual reports, and elite interviews with firm directors form both sectors to identify investment strategies adopted, investments made, the purpose of these investments and relevant funding operations. This resulted in a generation of rich primary data on firm level decision-making and the relationship between investment *quality* and firm funding. [5] We coded annual reports for all firms from 2012 to 2016 using a structured coding approach across two categories at two levels. The first identified the primary overall investment and funding strategies of the firm each year. These were coded at the document level. Within each document we then coded each identifiable investment and funding operation, matching them where possible (see Appendix 2). This analysis was used to conduct an initial within and between sector comparison to identify trends and patterns of funding and investment behaviour across different firm types. Initial comparative analysis was complemented by online-interviews in the summer of 2020 with eight of the firms' directors[6], allowing us to triangulate and elaborate on our initial comparative analysis and add explanatory narratives to our results. Directors were identified through Companies House records and selection was predicated on company board membership for at least two years in the 2012–6 period.

The relationship between firm funding and investment decisions in each sector

This section summarises the investment and funding decisions of the eight firms in our sample.

Food and beverage manufacturing

The food and beverage manufacturing sector is characterised by a focus on converting agricultural commodities into finished goods at low margins for mass market consumption. Firms seek to adopt highly mechanised production methods to reduce waste and increase margins. This strategy was not always possible given the nature of some products, leading some firms to pursue lower margin, scalar strategies. One director noted 'it was much easier and more flexible to have one long line, with bits of automation for packaging […] but mostly people doing the assembly along the line' (interview, Director, Firm D). The range of business strategies pursued was therefore quite diverse. Firm A and Firm C pursued predominantly productivity focussed UK investment strategies, while firms B & D pursued generally expansionary focussed strategies, (see Table 1 and Table 2 for full case summary).

As highlighted by Table 3, Firm A's business model had a strong focus on margins. From 2012 to 2014, after significant losses due to a product recall, this was achieved through the sweating of

Table 1. Average food and beverage manufacturing sector key financials for 2012–6.

Firm	Revenue	Profit (Margin)	Nominal output per worker	Capital structure		
				Equity (%)	Long term liabilities (%)	Short term liabilities (%)
Firm A	£1.3bn	£85.4m (8.51%)	£390,000	19	44	37
Firm B	£0.2bn	£29.2m (14.52%)	£248,000	76	07	18
Firm C	£1.2bn	-£0.98m (3.13%)	£297,000	39	31	30
Firm D	£1.2bn	£52.8m (3.42%)	£99,000	41	26	33

labour and capital as the firm 'rationalised' production process, reducing both labour and fixed capital deployed by 10% while maintaining output, increasing free cash flow and output per worker by 10% (Figure 1). Thereby improving its net debt position by £200 m while refinancing an existing £550 m of US$ Private Placement Notes (swapped into £) at longer maturities. Before changing strategy in 2016 towards productivity enhancing investment. Through both a £170 m active investment in productivity improving technologies funded from free cashflow and a £100 m acquisition of a lower productivity firm, funded in part from a £88 m stock issue – reducing overall revenue per worker but where efficiency gains were expected in future years.

Firm B – despite having a diametrically opposed capital structure to firm A and being a fraction of its size – had a similar business model and funding strategy but with a strong focus on expansion with limited productivity gains. Firm B used strong internal cash flow and short-term use of a £35 m standing bank revolving credit facility to double production capacity over five years through a £55 m investment in new production sites and expanded production lines. But only improving average productivity by 3% through the rationalising of production processes.

Firm C was a highly mechanised, focusing on margin growth and high yield investments through innovation and efficiency gains while targeting a debt to EBITDA[7] ratio of 2x. The 2012–6 period saw it divest £640 m (including £190 m in losses) from three branches of its operations, cutting its size by 50%, to reallocate funds and invest £89 m in smaller higher margin business opportunities and that generated the same net profit but with a smaller capital outlay, increasing average output per worker by 40% and reducing net debt by £140 m.

Firm D pursued a strategy of continuous expansion both domestically and abroad. In 2012-3 this comprised £170 m in acquisitions to enter new food markets or gain market share, funded by an £80 m debt facility and a £69 m rights issue in 2012, but with a strong internal cash flow allowing for a simultaneous £40 m reduction in net debt. A strategic review in 2014 saw Firm D pivot away from acquisitions to £140 m direct investment in new production sites to meet rising demand, utilising £95 m of bank lending facilities borrowing capacity and £45 m in US$ Private Placement Notes and a continued strong cash flow. Firm D doubled in size between 2011 and 2016, though operating

Table 2. Average construction sector key financials for 2012–6.

Firm	Revenue	Profit (% margin)	Nominal output per worker	Capital structure		
				Equity (%)	Long term liabilities (%)	Short term liabilities (%)
Firm W	£7.8bn	−£46.6m (−1.15%)	£230,000	28	22	50
Firm X	£2.8bn	£17.7m (1.33%)	£189,000	26	17	57
Firm Y	£1.5bn	£213.0m (16.40%)	£761,000	72	03	25
Firm Z	£0.6bn	£101.9m (17.53%)	£934,000	52	23	25

Table 3. Firm summaries, food and beverage manufacturing sector.

Firm	Sector (sub-sector)	Investment strategy	Funding strategy	Investment decisions	Financing decisions
Firm A	Food and Beverage Manufacturing (Beverage Manufacturing)	Productivity Enhancing	– Refinance existing debt at longer horizons	– Productivity Enhancing Divestment (2012-5) – Investment in new machinery and production sites (2015-6) – Acquisition of a foreign firm (2014, 2015)	– Internal cash flow – Refinancing of Private Placement Notes (2013, 2015) – Rights issue (2015)
Firm B	Food and Beverage Manufacturing (Beverage Manufacturing)	Expansionary	– Target to minimise total debt (All new debt repaid within 12 months)	– New Production site, doubling production capacity (2012–6) – Rationalisation of production and distribution network (2012–6)	– Internal cash flow – Short term use of Revolving Credit Facility (2012–6)
Firm C	Food and Beverage Manufacturing (Food Manufacturing)	Productivity Enhancing	Target debt to EBITDA ratio of 2x. (PPN covenant not to exceed 3x)	– New high margin business investment (2014) – Continuous investment in production techniques (2012–6) – Investment in new University R&D centre (2014)	– Divest from 50% of business (2012–6) – Repay Private Placement Notes (2012–4) – Expansion of Private placement notes (2014–6)
Firm D	Food and Beverage Manufacturing (Food Manufacturing)	Expansionary	Target debt to EBITDA ratio of 2–2.5x. - Refinance existing debt at longer horizons	– Acquisition of four firms in adjacent markets (2012–3) – Investment in four new production sites (2014–6)	– Rights issue (2012) – Expansion of Revolving Credit Facilities (2015–6) – Expansion of Private Placement Notes (2015–2016)

and profit margins remained constant with Firm D continuing to rely on labour intensive, low productivity, production techniques and generating increased profit through scale.

Construction

Tier 1 construction firms such as those in the FTSE250 function as project management firms rather than production firms (Interview, Construction Director), despite the construction industry as a whole being focussed towards the production of fixed capital assets. This differs between sub sectors, with significant implications for how they fund their operations (See Table 4 for full case summaries). One director noted:

> … a house builder is laying out cash, five, six years ahead of developing sites and building houses and then they get the money back [so] there's a lot of working capital. In a construction company […] it's negative working capital, it still has to be very carefully controlled, but actually project finance is effectively paid for by the client. (interview, Director, Firm W)

Housebuilding firms therefore rely on high levels of equity to fund operations, while general construction firms tend to utilise short-term liabilities (advance payments for projects) and fund

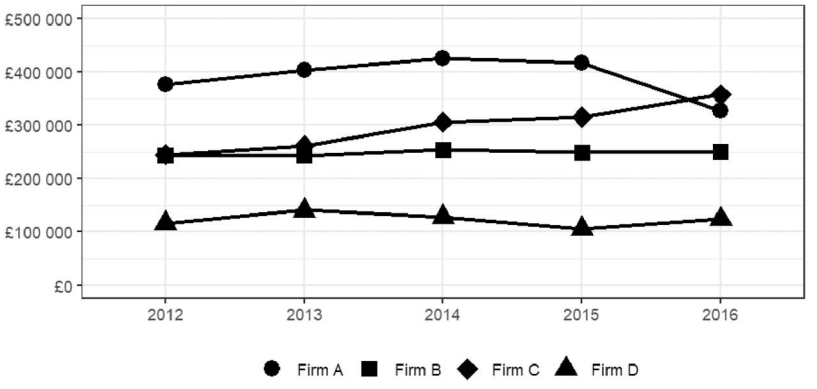

Figure 1. Nominal output per worker 2012-6, food and beverage manufacturing sector.

Table 4. Firm summaries, construction sector.

Firm	Sector (sub-sector)	Investment strategy	Funding strategy	Investment decisions	Financing decisions
Firm W	Construction (General Construction)	Expansionary (2012–3) Productivity Enhancing (2014–2016)	Debt restructuring and expansion (2012–4) Debt reduction (2014–6)	– National and Global acquisitions (2012–3) – Special Purpose Investment Vehicle (2014) – Rationalisation of core business (2014–6) – Investment in university partnerships (2014–6)	– Divestments from: – EU Rail Division (2012–6) – Facilities Division (2014) – Consultancy (2015) – SPV (2016) – Replaced RCF with US PPNs and convertible bond (2013)
Firm X	Construction (General Construction)	Expansionary	Targeted debt expansion from 0x EBITDA to 1x EBITDA	– Acquisition of firm with potential 'synergies' in adjacent industries (2012–6)	– Expansion of Bank Credit Lines inc. a FLS loan (2013) – Rights Issues (2014 & 2015) – Divestments – Expansion of Private Placement Notes
Firm Y	Construction (House Builder)	Expansionary	Short term borrowing to cover operational costs	– Continuous growth in construction sites, doubling the firm size over five years (2012-6)	– Internal cash flow
Firm Z	Construction (House Builder)	Expansionary	Reduce long term debt (2012-3) Expand both equity capital (IPO in 2014) and bank debt (2016)	– Continuous growth in construction sites – Investment in new construction techniques	– Internal cash flow – Repay all long term debts (2012–3) – Rights Issue through IPO (2013) – Bank credit facilities inc. a subsidised FLS loan and a GBB loan. (2013–6)

operations through a negative working capital position.[8] This finding suggests credibility and confidence is pivotal to Tier 1 general construction firms such as Firm W and X, due to low barriers to entry. Positive relationships with both customers and sub-contractors are pivotal and costly to build, meaning growth tends to be through merger and acquisition rather than organic development (interview, Director, Firm W).

The general construction sector is also heavily financialised; advance payments from clients are invested in other businesses or financial assets. One director noted:

> … the construction industry, [is] a bank … if you look at [Firms W]'s balance sheet, there is a huge amount of advance payments where people have, effectively, lent us money against our future commitment to do work.' (Interview, Director, Firm W)

This large inflow of cash necessitates strategic decisions to be made:

> … what do you do with that cash? Because, if you believe that your level of activity is not going to go to zero, that cash is a permanent endowment. Therefore, some of it – not all of it, clearly – could be invested in income-producing activities because, if it's not, then you're not using the capital that you have available to you, to best effect. (Interview, Director, Firm W)

Construction firms tended to invest in parallel businesses such as housebuilding, construction consultancy as well as financial assets. This strategy also works to increase the credibility of the firm through an underlying asset book which can be used to back construction contracts. It does however create a risk of maturity mismatch as construction firms 'borrow' short (advance payments on construction) and 'lend' long (investments in long-term businesses) which can cause a crisis when construction contracts start to dry up. This began to happen in 2012-6.

Firm W began 2012–4 with a focus expansion by maintaining its UK market leader position and expansion into new overseas opportunities – but in reality barely maintained a consistent order book of £13bn while divesting from unprofitable European businesses.[9] With Surplus funds increasingly invested in various financial projects such as a growing £150 m portfolio in PFI investments, and established a $150 m Special Purpose Investment vehicle in 2014. A decline in domestic orders and due to two poorly integrated acquisitions created significant losses, forcing a strategic change by 2014. A newly-appointed CEO changed focus to rationalisation of the core business, and cost saving exercises, reducing staff levels by 15%, including a £1 m reduction in R&D despite a new narrative focus on R&D partnerships with universities and expanded training programmes. Overall increasing revenue per worker by 60%, largely through efficiency gains and termination of /divestment from unprofitable business (Figure 1). Firm W divested £1.4bn from its secondary business and the SPV to cover the losses and generate cash flow for the restructuring but remained tied into £220 m long-term debt positions established in 2013 as part of the attempted expansion.

Firm X, by contrast, actively sought to use the low interest rate environment to double in size through a £520 m series of acquisitions to generate '*synergies*' (interview, Director, Firm X) which failed to materialise as output per worker remained flat (Figure 1.). By 2014 Firm X had overshot its new debt to EBITDA target of 1x and utilised £520 m of rights issues and cash from strategic investments to fund future acquisitions. Firm X went from a net cash position of £129 m to a net debt position of £99 m, between 2012 and 2016, before entering a period of loss driven restructuring in 2017 (Figure 2).

Firm Y – a predominantly equity funded mid-market housebuilder – engaged in a process of rapid expansion, utilising a strong cash position to drive an increase from £310 m to £650 m in annual land acquisitions to produce mid-market homes, doubling its turnover. This growth was driven by a generalised increase in demand in the sector with rising nominal productivity largely driven by the rapid rise in house prices. The general funding strategy was to use land credit[10] to secure a landbank of building sites that were redeemed through internal cash flow. The overarching investment strategy was one of rapid construction of houses using established techniques, resulting in minimised costs and a doubling of the firm's size between 2012 and 5.

Firm Z – a mid-to-upper market housebuilder – sought to maintain a steady rate of above market organic growth while investing in new production techniques[11] to maintain their market advantage, seeing an increase in nominal productivity of 60% compared to Firm Y's increase of 47%. Initially this strategy was funded through cash flow and an IPO in 2013 alongside the repayment of £152 m in long-term loans. Firm Z then took advantage of low interest rates to expand its bank debt by

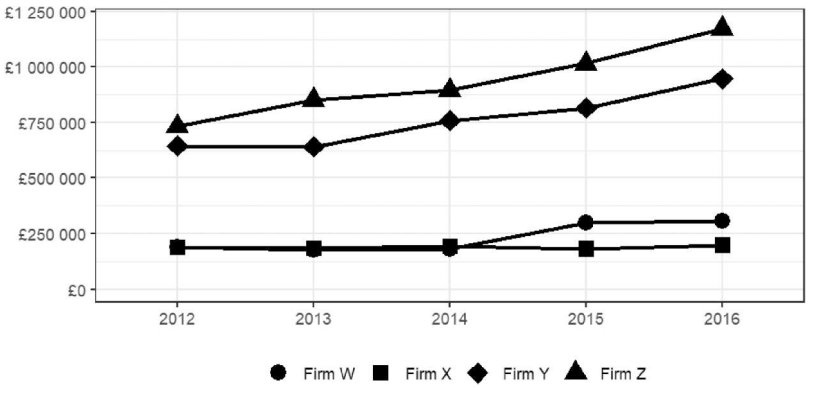

Figure 2. Nominal output per worker 2012-6, construction sector.

£200 m and utilised several subsidised loan schemes, including the Bank of England's Funding for Lending Scheme [FLS] and the Get Britain Building [GBB] loans provided by the Homes and Communities Agency to fund expansion alongside growing cash flows.

Three features of firm behaviour

Three features of firm behaviour are particularly relevant for exploring the relationship between low interest rates and productivity. Firstly, the lack of a direct link between a firm's structural engagement with finance and its approach to investment. Secondly, the two-step nature of firm investment and funding decisions, beginning with a strategic decision about funding and investment appetites, followed by a process of identifying and evaluating specific investment opportunities. Thirdly, the manner in which firms ration funding by investment quality, with external equity only raised to fund acquisitions, and funding for productivity focussed investments limited to internal cash flow.

Capital structure and investment quality

The first finding of this study was the lack of a direct connection between how a firm funded its operations and its funding and investment decisions in 2012-6. The general financial trend was for firms to either reduce or refinance their overall debt levels at longer maturities – locking in the low interest rates. While expansionary investments, whether rapid internal growth or acquisitions – were common across all firm types with a similar variation in focus on productivity levels.

Where there was some similarity however was in how these firms sought to improve their productivity. Firms with relatively low equity levels (less than a ⅓) sought to drive productivity growth through divestment and sweating assets (Firms A & W, with Firm X purising a similar strategy from 2017). Maintaining output while reducing the capital deployed as they focussed on reducing debt levels. Firms with relatively high levels of long-term bank debt were more likely to pursue higher productivity through new technologies (Firms C & Z). While firms with low levels of long-term debt – funding operations either from cash flow or short-term credit – sought to expand rapidly and rationalise their production chains (i.e. Fims B, D and Z) albeit with limited impact on nominal productivity.

What became apparent in interviews with Directors however was that this correlation between underlying funding sources and productivity was as a result of overarching business strategies rather than a response to funding costs. Firms' strategic leadership, specifically the CEO and CFO, tended to set out the general investment and funding appetites of the firm. These tended to include an appetite for the general type of investment and funding that the leadership were

seeking to make. For example Firm C's commitment to high productivity outcomes was the result of a longstanding strategy of automation.

> […] our margin for our foods business is about 20%. Good margins for the rest of the [sector] would be 10%. That's not just us having a fancy [brand] package. We've invested in automation for 20 years, so if you were to go to [our site], this is the biggest [product] factory in the UK. We are making 55,000 tonnes a year; you'll find two people in the hall. (interview, Director, Firm C)

While Firm X's decision to engage in rapid expansion was driven by change in strategic leadership:

> I think the attitude of the board did change … .from 2011 onwards. … influenced by a change in the board structure [and] a change in financial leadership as well. And probably a change at non-executive level and a sort of, 'come on, we need to grow this business' rather than the business just doing a steady year on year. (interview, Director, Firm X)

Meanwhile, firm level funding decisions could range from a specific leverage ratio target (Firms C, D and X) to a general desire to either leverage or deleverage (Firms W and Z). These decisions were driven more by general rules of thumb and business culture rather than calculated targets:

> … in North America they would say, 'Four times, four and a half times, why would you not go higher on leverage? That's what makes more sense.' But you find people in Europe would not be comfortable at that level at all, pushing three they'd have been uncomfortable … I think while people would push it as a strategy, nobody's very comfortable at that level. (Interview, Director, Firm D)

In short – at the strategic level – firms do engage in debt targeting (Frank and Goyal 2003, Flannery and Rangan 2006, DeAnglo and Roll 2014), but it appears to be driven by underlying business strategies and norms, as much as perceived trade-offs in the cost of capital (see also Graham and Harvey 2001) and this is not directly connected to any specific investment strategy.

The impact of monetary policy on investment strategy was thus relatively muted. Investment strategies instead driven by assessments of the business environment, the strategic approach to growth adopted by business leaders and perceived opportunities, rather than a change in interest rates or the availability of cheap credit:

> … we felt, and it was more self-help … rather than monetary policy, but we felt we would be better off cashing in our chips, if you like and selling the continental Europe investment at potentially a high point in the market. And that would allow us to deleverage a little bit the group, but also then give us the funds in order to build what we felt was a higher growth opportunity in the UK'. (Interview, Director, Firm C)

With the impact of interest rates on consumer credit and consumer demand being the primary concern for most firms, not the cost of credit to themselves:

> I don't think interest rates were driving things for us. But obviously, when the economy's performing, everything's performing, and revenue is growing … there wasn't something that I'd say was a direct impact of us looking at interest rates and saying, 'Right, what will we do?'. (Interview, Director, Firm D)

And:

> 'The significance for us was not in relation to our own financing, it was in relation to the availability of mortgage funding'. (Interview, Director, Firm Y)

The only exception was Firm X, which explicitly used the low interest rate environment to grow rapidly through acquisitions. The most common response taken by firms was to hold debt constant – or reduce it – while locking in long-term low interest rates by refinancing at longer horizons.

This ambivalence towards monetary policy breaks down, however, when the relationship between a *specific* investment decision and the *specific* funding sources used is examined. At this level of analysis, firms appear to adopt a 'pecking order' approach to funding and discriminate between both investment and funding quality. The argument being that while monetary policy does not drive a particular investment strategy, it does play an important role in *facilitating* certain types of investments over others.

Investment quality and funding source

The firms in this study made funding and investment decisions in two steps. The first as outlined above sets broad funding decisions regarding existing capital, leverage and refinancing decisions, and the general appetite for different sources of funding for new investments. The second step is for firm managers to seek out investment opportunities of the appropriate size and quality that matches the investment strategy. These are then evaluated in terms of their expected profitability and the cost of securing funding. In short, there are two sets of funding decisions shaping a firm's balance sheet; the restructuring of capital towards a target ratio and the allocating and raising of funding according to the specific expected returns of an investment opportunity (interviews, Directors, Firm C, D & X; see also Jensen and Meckling 1976, Myers 1977).

At the specific investment level firms engaged in a pecking order approach. Both in terms of funding order – with an overwhelming preference for internal cashflow, followed by debt instruments and finally raising new capital – and in terms of investment *quality* – with external funds only used for expansionary investments regardless of their potential for productivity enhancement. It is this second *qualitative* pecking order that is of particular interest when assessing the impact of monetary policy on firm level investment.

As outlined above, fresh equity – other than firm Z's IPO in 2014 – was used to fund acquisitions, while debt, bank or otherwise, would be drawn on to fund either large expansion projects or acquisitions (depending on the sector). Meanwhile investments focussed on productivity enhancement were solely funded from internal cash flow. This occurs for three reasons. Firstly, expansionary investments tend to be inorganic 'step changes' involving a large capital outlay, raising questions of tax efficiency:

> … if [a firm is] going to acquire another business, if they're going to expand, or if they're going to build a new factory, they might then look at what's the most efficient way to finance that? Most finance directors are looking at their weighted average cost of capital. Because debt is tax deductible, it always tends to be cheaper than equity. Equity is usually your most expensive part of capital. So, people will usually try to gear up their business.' (interview, Director, Firm W)

Meanwhile productivity focussed investments tend to seen as a 'business as usual' and thus should be funded internally:

> [Productivity improvement] is business as usual. Therefore, it's part of the budget process. Therefore … .it's regarded by the markets as disorderly to raise external capital for business as usual. You're supposed to be generating cash flow, not raising money, but, if you do something which is not business as usual, then you're entitled to raise money to do it. […] Therefore, if you're doing something which is out of the budget – and you don't budget acquisitions, normally – then you've got to work out how you're going to finance them. Therefore, that has inevitably been going to the credit markets. (interview, Director, Firm W)

Secondly in contrast to easily forecastable increased revenue from expansion, productivity enhancement is hard to measure:

> Certainly to the investor community, in particular with public companies, if you were to […] fundraise [and] say 'it's to expand our business and we're going to be putting in new machinery and we're going to be doing this and we're going to be doing that'. I don't think they'd see that. If you say 'we're going to go into markets and we've got mergers and acquisitions or we're buying this business because it's going to produce this', I think [investors] understand it. […] I think the problem is with productivity, it's always very difficult to really actually finally measure it. (interview, Director, Firm X)

And finally productivity enhancement through experimentation and R&D into new techniques is highly speculative and thus a risky activity to fund externally

> I think as business leaders we're very reluctant to go and spend money on R&D or new technology or improving facilities unless we've got the capital structure to do it, within the firm, rather than going out and borrowing money to do it that you then think is going to increase productivity. (interview, Director, Firm X)

In short, *all* participating directors affirmed that the *productivity enhancing* quality of an investment is not a factor in determining the use of external funds. It is the *expansionary* quality of the investment that is key.

This is not to say expansionary investments funded by external sources cannot be productivity enhancing. In principle expansion can bring efficiencies of scale through process rationalisation (as was attempted by Firm B), or can include incorporation of new production techniques as part of new product lines (as the case of Firm C) or an acquisition can bring 'synergies' (as was attempted by firms A & X). Rather (1) there is no necessary reason why expansion would also provide productivity gains; (2) of the four cases where productivity gains were an aspect of an investment only one (Firm C) coincided with improved output per worker. Implying that on average investments focussed on expansion (and thus potentially funded by external debt/capital) will in general have lower productivity outcomes compared to investments focussed on securing productivity gains.

Implications

The combination of two-level decision making and qualitative pecking orders offers a potentially insightful re-reading of the UK's productivity puzzle by incorporating monetary policy and firm financing into larger UK growth model debates, particularly the relationship with productivity growth. Put simply, we argue low interest rates, especially in an environment with a loose labour market, *incentivises* expansionary investments while at best *facilitating* productivity focussed investments.

If firms make their overarching investment strategy prior to engagement with the funding environment, but taking into account expected demand patterns and underlying business conditions, a rise in demand from cheaper consumer credit plus a low marginal cost of labour will incentivise some firms to switch to an expansionary investment strategy (that may or may not have a productivity enhancing element). A strategy that would then be facilitated by the low external funding costs when individual investments are assessed.

Meanwhile firms that continue to pursue a productivity focused strategy will still benefit from a relaxed credit environment through higher free cash flow due to demand and low labour costs (assuming no reciprocal uptick in other input costs). But this will not necessarily translate into increased productivity investments as individual assessments will be assessed against the underlying cost of capital, determined by the cost of capital in previous periods. (i.e. before the reduction in interest rates), even if the total pool of funds available is increased. While this may change over time as firms refinance and lock in the lower interest rates, increasing the number of viable productivity focussed investments, the overall impact will still be weighted towards expansionary investments with their questionable improvements in productivity.

While this goes some way in explaining the within and between firm differences in productivity outcomes (e.g. Kierzenkowski et al. 2018, Riley et al. 2018). At the national level the overall change in productivity will depend on which sectors expand as a rapid growth in higher productivity sectors may still lead to net gains in aggregate productivity. The fundamental questions for state managers, then, are; what is being invested in? And, which sectors are expanding, and how? In short, what is the *quality* of the investments made by firm level decision makers?

This illustrates how monetary policy tools are at best blunt instruments for enhancing productivity and raise the potential for capital misallocation. Within the UK context we can conclude that the UK policy mix of cheap credit and cheap labour (e.g. Crouch 2009, Green and Lavery 2015) potentially plays a key role in the ongoing productivity puzzle. As firms use the loose funding environment to fund often low margin expansionary investments, that may prove unprofitable as funding and labour costs increase. Firms would then risk a sudden contraction in business investment as they attempted to recoup losses and deleverage in a higher wage and funding cost environment. The exact nature of this adjustment would depend on prevailing economic conditions and the extent of low productivity sector growth.

Finally this highlights some of the limitations of the 'growth model' literature's focus on aggregate demand (i.e. Baccaro and Pontusson 2016). The central argument of this paper is that the *quality* of economic activity – in particular investment activity – and the role of firm level economic

decision makers is integral to explanations of economic development. There is a need to take a more disaggregated approach that situates firm level actors as active agents (rather than passive responders) in creating economic outcomes (Shackle 1988) and which takes into account how the qualities of different economic interventions (monetary policy, fiscal policy etc.) intersect with decision making processes.

Conclusions

This paper has investigated how firms responded to the low interest rate environment of 2012–6 through the lens of investment *quality*. Two key findings are prominent. Firstly, by distinguishing between strategic and investment specific funding decisions we can identify two contrasting patterns of decision making with firms. At the strategic level, the decision to pursue a particular type of investment strategy is made largely independent of monetary policy and the cost of credit. Investment opportunities that meet this strategy are then evaluated in light of the cost of capital, including the cost of credit. This finding suggests monetary policy *facilitates*, rather than *drives*, investment behaviour.

Secondly, by focussing on investment *quality* we can identify a pecking order of funding based on the *qualities* of investments, rather than simply the cost of capital. While in general firms follow a pecking order of funding streams with a preference for internal funding over external, only expansionary investments are funded by external means. Implying that monetary policy predominantly impacts the number of expansionary investments made, with heavily mediated impact on productivity focussed investment. The implication of this is that the specific policy mix of the UK government is a potentially key factor in explaining the UK productivity puzzle. With significant implications for the future pattern of UK economic development.

The purpose of our research however – in both methodological design and findings – is not to seek to offer sweeping comparative generalisations. Rather, this paper has revealed a particular element of the relationship between loose monetary policy, investment and funding strategy, and productivity outcomes that offer the foundations for more sustained future study based on the qualitative content of economic activity.

While this paper has clearly demonstrated the importance of considering how different actors, in particular firm level decision makers, respond to economic stimulus in shaping the quality of investments. This in turn raises more questions about implications of government policy that will need to be addressed. Firstly, there are questions of how firms should develop their business strategies in periods of loose monetary policy. Can firms be encouraged to prioritise longer-term, productivity-enhancing investment, when low interest rates enables an accumulation strategy which forgoes productivity? To what extent does an aggregate-level productivity puzzle impinge upon profitability at firm level? Secondly, there are related questions of how labour can and should respond to these varied strategies. If firms are responding to the macroeconomic environment, should industrial struggle be focused on the firm level, or the political realm? If low interest rates are contributing to a jobs-rich expanded production model, as well as holding down the cost of living through the impact on borrowing costs, can we expect labour to lead advocacy for a higher-productivity growth model? Finally, and of particular importance, is the question of how the state should act in order to promote quality of investment, increased productivity, and equitable outcomes for labour. There is clearly a question around the alignment of macroeconomic policy, industrial policy, and corporate governance regimes. But this gives rise to more specific dilemmas on, for instance, investment in training for workers which business may not be willing to support (and fund via taxation), the prospect of restricting access to credit in the short-term in the hope of private enterprises reorienting their business models, and the sectors which should be targeted to support higher productive performance across the economy as a whole.

The existing political economy literature on the UK economy offers only a limited guide in this regard. This is, in part, an analytical problem: a literature inspired by the 'growth model' conception,

with notable exceptions, tends to focus on macroeconomic issues, relying on mainstream macroeconomics to explain links between the macro level and practices at the industry or firm level. This means we have an incomplete picture of, for instance, the development and persistence of zero or limited earnings growth in the UK. It is also a problem, however, in terms of advocacy. Granting greater weight empirically to firm-level strategies would allow political economists to make more substantive contributions to debates around, for instance, the ostensible trade-off between higher pay and higher employment, the role and purpose of industrial policy, and the impact of specific monetary policy decisions. This paper does not offer definitive answers in this regard, but instead aims to point towards new avenues for research which can fill these gaps.

Notes

1. Earnings Before Interest, Taxes, and Amortisation.
2. Return on Capital Employed.
3. measured as a ratio of fixed assets to turnover.
4. measured as a ratio of current liabilities : non-current liabilities: equity.
5. We acknowledge that a study of this size cannot explore every facet of the relation between loose monetary policy, investment and funding strategy, and productivity outcomes, nor do we seek to do so. Rather, this study deliberately focuses on a small number of firms over a specific period of time in order to generate findings at a highly granular level in order to develop theoretically rich accounts of firm investment behaviour (Flyvbjerg, 2006).
6. three from the Food and Beverage Manufacturing sector and five from the Construction sector.
7. Earnings before interest, taxes, depreciation, and amortisation.
8. current liabilities less current assets
9. No figures provided in company reports.
10. A form of secured borrowing against land.
11. No figures given in reports.

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Appendices

Appendix 1 – Technical note

This study uses a simple representative model of the firm as the heuristic basis for its distinction between productivity enhancing and expansionary investments. Where real output [Y] is a function of Labour [L] and Capital [K] deployed, the technological techniques (total factor productivity) employed in production [A] and optimal capital intensity of the production technique [α] such that:

$$Y = AK^{\propto}L^{1-\propto}$$

An investment is expansionary to extent that it aims to increase Y and productivity enhancing to the extent that it aims to increase labour productivity $\left(\frac{Y}{L}\right)$. Where labour productivity is

$$\frac{Y}{L} = A\left(\frac{K}{L}\right)^{\propto}$$

Implying that:

- Productivity enhancing investments are those that aim to increase $\left(\frac{Y}{L}\right)$ but not necessarily Y. By either (a) improving the technological techniques used by a firm [A], switching to a more capital intensive production method [α] or simply increasing capital intensity $\left(\frac{K}{L}\right)$.
- Expansionary investments are those that aim to increase Y but not necessarily $\left(\frac{Y}{L}\right)$. For example, by increasing both capital [K] and labour deployed [L] in equal measure .

Expansionary and Productivity enhancing investments are therefore qualitatively distinct dynamics but not exclusionary. I.e. an investment can be both expansionary and productivity enhancing – increasing Y and $\left(\frac{Y}{L}\right)$.

Appendix 2 – Coding Schema:

I. Document Level Coding

Overall Investment Strategy

[This is primarily based on the report's executive summaries such as the Chairman's introduction and the CEO's and COO's summaries but includes reflection on the narrative developed throughout the document.]

What is the overall investment strategy set out in this document?

1: Expansion with no productivity enhancing component
2: Expansion with a secondary productivity enhancing component
3: Both expansion and productivity enhancement, where neither is primary
4: Productivity enhancement with a secondary expansionary component
5: Productivity enhancement with no expansionary component.

Funding Sources:

[This is primarily derived from the CFO's summary and analysis of the financial account sections of the report]

0: None Identified
1: Internal cashflow
2: Revolving bank lending facilities
3: Bank loans
4: Private placement notes
5: Bond Issue
6: Stock Issue
7: Government subsidised lending schemes

II. Within document coding

[for each identified investment]

Enhancing:

Is this investment leading to improved labour productivity?

0: NO
1: YES

Expansionary:

Is this investment increasing the scale of production?

0: NO
1: YES
Investment focus:
What is the objective of this investment?
1: Expansion with no productivity enhancing component
2: Expansion with a secondary productivity enhancing component
3: Both expansion and productivity enhancement, where neither is primary
4: Productivity enhancement with a secondary expansionary component
5: Productivity enhancement with no expansionary component.
Investment funding:
What funding sources did the firm utilise in this investment?
0: None Identified
1: Internal cashflow
2: Revolving bank lending facilities
3: Bank loans
4: Private placement notes
5: Bond Issue
6: Stock Issue
7: Government subsidised lending schemes