

The Relationship Between Firm Financing and Investment in Productivity in a Very Low Interest Rate Environment



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About PIN

The Productivity Insights Network was established in January 2018 and is funded by the Economic and Social Research Council. As a multi-disciplinary network of social science researchers engaged with public, private, and third sector partners, our aim is to change the tone of the productivity debate in theory and practice. It is led by the University of Sheffield, with co-investigators at Cambridge Econometrics, Cardiff University, Durham University, University of Sunderland, SQW, University of Cambridge, University of Essex, University of Glasgow, University of Leeds and University of Stirling. The support of the funder is acknowledged. The views expressed in this report are those of the authors and do not necessarily represent those of the funders.

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1 Introduction

The Productivity Insights Network has identified business investment behaviour as a ‘gap’ in our understanding of what is driving, or impeding, productivity growth (see McCann, 2018). This report looks directly at this issue, by considering the circumstances in which large firms elect to invest in enhancing their productive capacity (through investment in skills, equipment, processes, etc.) or instead expanding their production (generally by employing more workers, without improving productivity) – and indeed how these strategies are balanced. Crucially, it asks about the role of both firm financing, and the wider interest rate environment, in shaping such decisions. Its key contribution is an original analysis of the relationship between extraordinary monetary policy measures and investment in productivity enhancement at firm level. In exploring this relationship, however, we generate broader insights into the relationship between the credit environment, firm financing and investment strategies more generally.

This research is animated by the question: *how do firm financing strategies shape investment behaviour in a low interest rate environment?* Our model posits two, main forms of firm-level investment:

- *Expanded production: the same technique at a larger scale.* We understand investments that, for example, enable the opening of new sites, securing additional contracts, or increasing the size of the workforce, to be focused on expanded production.
- *Enhanced production: an improved technique at the same scale.* We understand investments in the adoption or development of new technologies, and improving sites and processes of production, as focused on enhanced production.

We contend that the latter constitutes a strategy aimed at producing higher productivity, other things being unequal, and irrespective of whether the investment undertaken is actually successful in this regard. There will always be intervening factors within specific firms or industries, but across the economy as a whole, we can expect productivity growth to result from a significant proportion of (large) pursuing investment strategies focused on enhanced production. The purpose of this project is to look at how decisions to pursue such strategies are shaped by the firms’ level of exposure to financial markets, as measured by length of funding and reliance on debt, which in turn will be affected by monetary policy.

1.1 A very low interest rate environment

In recent years, UK government policy has supported growth through a low interest rate environment; markets for corporate debt have been targeted through extraordinary monetary policies – such as quantitative easing – and a historically low base rate. A desire to maintain low interest rates has long been part of UK economic management, but the perceived necessity of near-zero rates has been a key plank of policy elites’ response to the 2008 financial crisis, and subsequent shocks such as the 2016 Brexit vote and economic implications of the 2020 COVID-19 pandemic. Specifically, several policies have been launched to secure low costs for firms borrowing directly from financial markets since 2008, such as the Commercial Paper Scheme (2009-2010), Commercial Bond Secondary Market Scheme (2009-2016) and the Commercial Bond Scheme (2016-ongoing).

The implications for investment in productivity of this monetary policy environment has not been adequately explored. While interventions have focused in part on securing a long term low interest rate to incentivise investment (Bank of England, 2013), they also risks a deflationary cycle as firms use the cheap funds – in combination with a flexible and lightly regulated labour market – to grow through expanded production rather than enhanced production. They may also be vulnerable to future increases in interest rates (Borio, 2014).

2 Methods

The project sought to answer its research question via a mixed-methods investigation into FTSE250 companies in the UK (that is, those publicly listed firms ranked from 101st to 350th in terms of market capitalization). In common with FTSE100 firms, FTSE250 firms provide detailed accounts of their investment strategies in their annual reports and financial records (which are available via the FAME database (Bureau van Dijk, 2019)). They are also large enough to be able to benefit directly from monetary policy (and respond to changes in monetary policy) – recent market interventions by public authorities have been designed to mainly benefit large firms who can access corporate bond markets (see Bank of England, 2014). However, our focus on FTSE250 firms means we assessed the financing and strategies of firms small enough to be representative of most UK firms employing large numbers of people – in other words, the FTSE250 is composed of ‘Goldilocks’ firms, at least from this project’s perspective.

2.1 Sample

As a small-scale study, it was necessary to sample the population of FTSE250 firms. We utilised the FAME database to categorise FTSE250 firms in terms of their financing structure and approach to productivity growth. Our first step, however, was to determine a time range in which we would study firm financing and investment strategies. Although we are interested in the influence of extraordinary monetary policy conditions since the 2008 financial crisis, we determined that since the Brexit vote in 2016 had created additional and significant macroeconomic uncertainties – which may well prove to be temporary, other things being equal – the range 2012 to 2016 was the most appropriate five-year period for our study. Firms included in the FTSE250 in 2016 therefore constituted our population.

To produce our sample, we excluded firms from the following sectors: Financial Services, Banks, Equity Investment Funds, General Financial, and Life Insurance. These were excluded because their financial activities and accompanying business strategies for increasing productivity are qualitatively different from the rest of the FTSE250; essentially, these sectors of the economy do not produce value, but rather manage, extract, or appropriate value. We also excluded sectors with fewer than three firms in the FTSE250, and controlled for overseas sectors and data quality, leaving 76 viable firms remained across nine sectors.

It should be noted that we merged several sectors, as the firm descriptions in the FAME database were not meaningfully distinct. Firstly, construction, materials, and household goods and home construction were merged (hereafter: construction). Secondly, food production, and beverages were merged (hereafter: food). Finally, general industrial and industrial engineering were merged. We then selected for comparison the two sectors with highest and lowest capital intensity (on a consistent basis): construction, and food. Within each of these two sectors, we calculated average funding ratios for each firm (adjusted current liabilities : non-current liabilities : equity) and selected the firms with most and least equity, and most and least non-current liabilities, leaving four firms for each sector. Although the project is based predominantly upon publicly available data and documents, we do not name the sampled firms, in order to maintain the anonymity of interviewees engaged in the final stage of the research.

The sampling process was itself a useful research exercise which has informed our findings. It should be noted, however, inherent limitations which we would hope to overcome in a future, larger-scale study. Due to data limitations, we did not account for working capital and turnover when assessing funding needs, and generally speaking the FAME database contains errors

and gaps (at the time of analysis – it now appears to have been corrected and updated). It is also possible that construction, given the diversity of business models present within the sector (simply, from conventional building firms to project management firms which organise and finance construction by other firms), represents a ‘unicorn’ sector, problematising generalisability. This could not be controlled for in sampling, and we do not believe it compromises our approach, but was considered further as we developed our findings.

2.2 *Main research phase*

Our approach to sampling allowed for a method of comparison based on both ‘most different’ and ‘most similar’ criteria. We were both able to compare firms with significantly different funding ratios *within* sector (helping to identify how funding strategy shapes investment decisions) and those with similar funding ratios *across* sectors (helping to identify the relationship between particular funding strategies and investment decisions). Overall, our approach enabled us to construct a stratified sample of firms for further investigation in the second phase (Flyvbjerg, 2006). The sample for each sector contains a firms with funding strategies focused on equity, long-term debt, short-term debt, and a more balanced strategy (relative to other firms in the same sector).

Accordingly, the main phase of the project involved reviewing the eight selected firm’s annual reports from 2012 to 2016, identifying the investment strategy which each adopted over the period. Investments which expand production, such as the opening of new sites, securing additional contracts, or increasing the size of the workforce, were coded as expanded production. Investments that are discussed in terms of investing in new technologies, or developing improved sites of production will be coded as enhanced production.

We were of course aware of the possibility of both expanded and enhanced production in a single instance of investment – let alone with a particular firm’s investment strategy – as the two forms are not necessarily mutually exclusive. The overlapping nature of investment strategies is often expressed qualitatively in annual reports produced by firms, wherein explanations are given for investment decisions. As such, a statistical model to group investment strategies would not be methodologically beneficial at this stage.

2.3 *Interviews*

The documentary research was supplemented by semi-structured elite interviews with financial and operational executives who served the selected firms during the period 2012-2016. In general, they were identified via firms’ public records or individuals’ public LinkedIn profiles – in one case an interviewee was identified via advice from a company secretary. As indicated above, all of the interviews were conducted on the basis that interviewees would remain anonymous. Due to the implications of the COVID-19 pandemic, all interviews were conducted via online communication platforms or by telephone – conversation recordings were then transcribed verbatim by a professional transcription service.

The purpose of the interviews was, on the one hand, to sense-check findings arising from the main research phase, and to further interrogate some of the logic behind funding and investment decisions as presented in company statements. However, interviews were also the main method in which we were able to interrogate the influence of the monetary policy environment on these decisions. Such considerations may be referred to in public statement, but their specific role in shaping financing decisions (which in turn, we suppose, shapes investment) is rarely articulated explicitly.

We conducted six interviews in this regard, with five of the selected firms represented among interviewees (three construction sector firms, and two food sector firms). It is also worth noting

that two potential interviewees approached shared their perspective on their firms' financing and investment strategies via a brief email conversation, having declined to be interviewed. (Both represented food sector firms, partially corrected the slight imbalance between sectors regarding the formal interviews.) These emails have informed our findings, but not to the same extent as the conventional interviews undertaken.

3 Sector summaries

This section presents findings from the documentary analysis of the selected firms in each sector, and as such constitutes the core research outcomes. The next section highlights the key findings relevant across the two sectors studied, incorporating additional data generated by the interviews.

3.1 Food

In the food sector, firms' underlying funding model does not appear to impact the investment strategy; instead the relationship appears to be between the type of investment strategy and the type of funding. Three of the firms selected were engaged in productivity-enhancing investment strategies, and one was engaged in an expanded production strategy. The former was financed primarily by cash flow (primarily equity), supplemented by long term debt. The latter was financed by long term debt. This implies that a very low interest rate environment was not a key factor driving productivity enhancing investments – although it may have been a key factor in driving expansionary, low margin investments. It is also worth noting that the productivity enhancing firms also tend to be engaged in workforce rationalisation, and therefore do not appear to be driven by the abundance of cheap labour evident during this period in the UK economy.

There is a potential intervening variable worth noting. The three firms engaged in productivity-enhancing investment strategies belonged to sub-sectors with high value-added margins (in terms of earnings before interest, tax and amortisation; EBITA) of 10-15 per cent. The other firm, engaged in expanded production, operated in a sub-sector with a lower value-added margin of 6 per cent. This of course indicates the difficulty of comparing firms even within the same sector, but also might suggest that it is the business environment, and investment opportunities to particular firms which arise, rather than the credit environment which drives whether firms engage in investment for enhanced or expanded production. However, one of the three firms in a high-margin sub-sector, pursuing enhanced production, also operated in low-margin sub-sector too – and invested heavily in this part of their business to secure higher margins through productivity enhancements.

All three firms engaged in productivity enhancing investment strategies, while generally relying on cash flow for investment, were also attempting to repay and extend the maturity of the debt. This move may have been marked by initial expansions of debt to supplement some investments, but the trend was for a reduction in gross debt (although net debt may have increases as cash reserves were used to invest). The firm engaged in expanded production, on other hand, steadily grew and extended its debt in order to facilitate this strategy.

Finally, it is helpful to consider the shifting composition of debt for some firms in the food sector. Short-term debt held by these firms was predominantly trade credit, carrying no interest rate, which was apparently used to fund ongoing operations. This credit was a structural feature of some firms' accounts as they sought to realise revenue in order to pay for costs of production; accordingly, our measure of short-term might suggest a shortening of debt horizons for some firms, but in practice does not tell us a great deal about their relationship with financial institutions.

In contrast, firms' long-term debt – important for investment – was predominantly financial debt, with both short- and long-term components. Rotating Credit Facilities, while technically having long-term maturities, have short-term interest rates, and were used at will. Private Placement Notes are long term maturities with fixed term interest rates, and, crucially, are not raised in the UK, but rather the US. The implications of monetary policy for the potential for productivity-enhancing investment become more complex as firms operate financially across borders, both to adjust their interest rate exposure and utilise hedging operations to off-set interest rate changes. The table below summarises the use of different forms of debt among the selected firms.

Table 1: Debt composition and use among selected firms in food sector, 2012 to 2016

	Investing for enhanced production		Investing for expanded production	
	Operating in high-margin sub-sector		Operating in high- and low-margin sub-sectors	Operating in low-margin sub-sector
	Firm 1	Firm 2	Firm 3	Firm 4
Trade Credit (Short Term, no interest rate)	Consistent	Consistent	Decreasing	Increasing use
Overdraft (Short term, variable interest rate)	Negligible use	Negligible use	Negligible use	Negligible use
Revolving Credit Facility (RCF; long-term, variable interest)	Primary debt source, with dedicated facilities for projects	Unused	Increasing use	Increasing use, with some debt transferred into PPNs when facility nears capacity
Private Placement Notes (PPNs; long-term, fixed interest via swaps)	Unused	Primary debt source	Decreasing use, with steady repayment and replacement by RCF funds	Increasing use

Source: Authors' analysis of selected companies' public statements

3.2 Construction

The picture in the construction sector is more complex. All four selected firms were engaged in a process of investing for expanded production, albeit with a variable focus on increasing productivity (and margins) alongside expansion. In common with the food sector, however, firms' underlying funding model does not appear to have a direct impact on investment strategy. The relationship appears to be the other way around, with the investment strategy driving funding decisions.

In this case, we were able to identify four investment strategies (with one firm adopting different strategies at different points in the study period): ‘expansionary enhancement’ and ‘enhanced expansion’ alongside expansion and enhancement. These are summarised in the table below:

Table 2: Financing of investment strategies among selected firms in construction sector, 2012 to 2016

	Funding source	Investment strategy
Enhanced production	<ul style="list-style-type: none"> • Cash flow • Divestment 	Firm 1 (2014-2016): Sought to restore underlying profitability through a focus on business efficiencies, training of key leadership and productivity management through technology.
Expansionary enhancement (Expansion with a strong focus on productivity gains)	<ul style="list-style-type: none"> • Cash flow • Stock issue • Long-term debt 	Firm 2: Sought to steadily expand with a given debt/EBITA ratio but with a focus on securing and increasing ROCE and operating margins through long term strategic planning and technological innovation.
Enhanced expansion (Expanded production with a limited focus on productivity gains)	<ul style="list-style-type: none"> • Cash flow 	Firm 3: Sought to grow steadily and was able to secure larger returns through arbitrage over short turn over land values
	<ul style="list-style-type: none"> • Cash flow • Divestment • Stock issue • Stock placement • Long-term debt 	Firm 4: Sought to grow rapidly into adjacent business through acquisitions to both increase turnover and generate ‘synergies’
Expanded production	<ul style="list-style-type: none"> • Cash flow • Divestment • Long- and short-term debt 	Firm 1 (2012-2014): Sought to grow rapidly into adjacent business through contracts and acquisitions, to both increase turnover and secure long-term demand and profitability.

Source: Authors’ analysis of selected companies’ public statements

The research shows that, for the construction sector, strong cash flow and market demand is the key driver for scalar expansion, with cash flow being the central source of capital for investment. Debt financing is used to a lesser extent, and coincides with expansionary strategies more than enhancing strategies (although this is not a direct relationship). The scale of long-term debt as a means of funding expansion increased over the study period, as firms’ focus shifted away from enhancement towards simple expansion (most obviously in the case of the firm which shifted strategy markedly throughout the period). Organic growth and contracts were largely paid for out of operational cash flow (with Firm 1 in 2012-2014 being an exception) while acquisitions were more often funded through long-term debt.

Fresh equity capital through stock issue or stock placement appears to be tied to the expansionary investment strategy as a correlate of debt financing. Firms 2 and 4 began to reach their debt tolerance at different points, and thus sought to improve their position by issuing fresh stock to deleverage or invest in additional projects or acquisitions. In a similar vein, divestment to reinvest was also used as a means of supplementing debt financing by releasing capital from underperforming businesses.

Table 3: Debt composition and use among selected firms in construction sector, 2012 to 2016

	Expansionary enhancement	Enhanced expansion		Enhanced production, then expanded production
	Housing sub-sector		Infrastructure sub-sector	
	Firm 2	Firm 3	Firm 4	Firm 1
Trade and Land Credit (short Term, no interest rate)	Increasing use	Increasing use	Consistent	Consistent
Overdraft (short term, variable interest rate)	Negligible use	Fluctuating use (no meaningful distinction in balance sheet)	Increasing use	Decreasing use
Other short-term loans	Unused	Fluctuating use (no meaningful distinction in balance sheet)	Unused	Decreasing use
Revolving Credit Facility (Long term, variable interest)	Increasing use	Fluctuating use (no meaningful distinction in balance sheet)	Increasing use	Decreasing use
Private Placement Notes (long Term, fixed interest via swaps)	Unused	Unused	Increasing use	Increasing Use
Other Bonds	Unused	Unused	Schuldschein loan (used to pay off RCF)	Increasing use
Other Long Term Loans	'Get Britain Building' and LIFF loans	Unused	Funding for Lending Scheme Loan	Some use
Stock Placement and Issue	A single issue	Decreasing use (repayment of preference shares)	Used twice to fund acquisitions in addition to and at a similar scale to long-term debt	Unused

Source: Authors' analysis of selected companies' public statements

In terms of the potential impact of the monetary policy environment on financing – and therefore investment strategy, according to our initial model – we again find that a firm's sub-sectoral location may be an important intervening variable (albeit in terms of industry, rather

than margins). The two housing-focused firms funded their expansion through the increased use of trade and land credit to fund their larger operations, with one also showing a steady increase in long term debt, scaling with the increases in EBITA and turnover. Meanwhile, for the two infrastructure firms, the strategy was to steadily lengthen the term of their debt either shifting it from short-term facilities such as RCF and overdrafts to longer term PPNs or convertible bonds, or as part of a larger expansion in borrowing to fund expansionary investments.

The pattern that emerges appears to be one of *predetermined* debt strategies or tolerances, rather than a reaction to monetary policy. Most of the selected firms appear to have borrowed in order to meet a given debt profile determined by a targeted EBITA/debt or gearing ratio set by the company leadership. And Firm 4, which had relatively little bank debt in 2012, increased its debt as a new chief executive sought to rapidly expand, setting a target gearing ratio as part of a new efficient capital strategy. In short, the relative cost of credit – which monetary policy ostensibly seeks to influence – does not appear to have been a central driver of financing decisions. Instead, it is the company leadership which determined both the desirable funding ratio and the direction of the investment strategy. The table above summarises the use of different forms of debt among the selected firms.

It is necessary to note that, as indicated in Section 2, significant variability in funding stride due to operational needs is a feature of the construction sector – again, this is related to sub-sectoral location. The housing firms were predominantly funded by long-term sources (equity or long-term debt), plus large long-term payables in the form of land credit. These firms had a large amount of current assets in housing stock and development work in progress with long turnovers of up to three years. This longer turnover also means significantly higher margins. The infrastructure firms, on the other hand, had almost no assets with large short-term liabilities, as they were funded through negative working capital, which is highly cash generative. This negative working capital was then invested in side projects such as financial investments in joint ventures, construction services businesses or house-building. However, this structure also means that they operated with much lower margins in their core business, and are in theory independent of external financing (in the short run). This structure of large cash inflows, matched by operational liabilities, which are then matched by long-term asset investments, meant that these firms actually had similar funding structures to banks.

4 Key findings

This section draws out and summarises the key findings from our comparative analysis within and between the food and construction sectors, finessed via interviews with individuals who served as executives of the selected firms during the study period.

4.1 *The relationship between funding and investment strategy*

Although the picture is highly complex – and our sample of sectors/firms is necessarily small – the project's key finding is perhaps that operational cash flow served as the main source of investment funding. However, this varied significantly between firms. This is consistent with our finding, discussed in the previous section, that rather than firms' financing strategy driving their investment strategy, it is generally the latter which drives the former. Interviewees confirmed the perception that cash flow is a better indicator of the business environment the firm is operating in, and therefore informs view of the benefits of investment, as well as funding it. The funding strategy appears to be a secondary decision, with financing determined by the type of investment engaged in.

In terms of debt financing, it is clear that scalar, low-margin firms tended to fund their operations through short-term liabilities, whereas firms focused on productivity enhancement tended to fund operations through longer-term liabilities. The main exception to this pattern is equity funded firms, which, as reported by one of our interviewees, are ‘very much masters of their own destiny’ (director, food sector firm), and as such more able to choose between expanded and enhanced production investment strategies. The table below summarises these relationships.

Table 4: Relationship between funding and investment strategy in selected food and construction sector firms, 2012-2016.

	Equity	Long-term debt	Mixed	Short-term debt
Food	Expanded (enhanced)	Enhanced	Enhanced (expanded)	Expanded
Construction	Expanded (enhanced)	Enhanced (expanded)	Expanded (enhanced)	Expanded

Source: Authors’ analysis of selected companies’ public statements, informed by interviews with key executives.

4.2 *The influence of monetary policy and very low interest rates*

The research has not produced any evidence that firms (in either sector) respond directly to monetary policy changes, or explicitly build investment strategies to take advantage of very low interest rates. This is of course consistent with the finding that cash flow is the main consideration, and source of funding, for investment. (It may be that the aggregate impact of monetary policy changes on the economy shapes the business environment firms are operating in, but the research is not designed to detect any such effect.)

However, this does not mean that low interest did not facilitate certain forms of financing. It is clear that the use of external financing to fund investment is more strongly associated with expanded production investment strategies rather than productivity-enhancing investment strategies. Among the selected firms, both expansion- and enhancement-focused firms engaged in the refinancing of existing debt at longer terms to fund investment. Enhancement-focused firms also utilised deleveraging and ‘divesting to reinvest’ (as described a food sector firm director). Expansion-focused firms were more likely to use low long-term borrowing costs to, for example, acquire other firms and new production facilities.

Accordingly, low interest rates directly facilitated scalar, often lower-margin, investments and acquisitions, but did not directly facilitate productivity enhancing investment. One caveat to this is that some of the selected firms sponsor defined benefit pension funds – and interest rates will have a direct impact on the fund’s solvency, and therefore the contributions required by the sponsoring employer.

4.3 *Investor expectations and scale*

The interviews produced two, key explanations for *why* external finance is associated with expanded rather than enhanced production investment strategies: investor expectations and scale.

According to company executives, productivity-enhancing investments are seen as ‘business as usual’ – with seeking efficiencies seen as a routine part of business activity – and so should be funded by ‘internal’ cash flow. Such processes, and their outcomes, are also more difficult to quantify. On the other hand, expansion is seen as more exceptional, and so can be funded from external finance. The implication is that, other things being equal, firms which are already performing well are more likely to be able to invest in enhancing productivity (and, in combination with the findings above, monetary policy will not alter this dynamic directly).

Similarly, since productivity enhancement tends to be incremental, achieving it does not require external funding to the same extent. Investment strategies focused on expanded production, on the other hand, tend to involve large, single expenditures.

“I believe that what differentiates investments funded from external finance from those that are funded by retained profit can be very crudely summarised as:

[1] The nature of the investment; [that is,] is it ‘step change/inorganic’ or ‘business as usual’?

[2] The financial scale of the investment and the consequent pressure on liquidity.

Essentially, significant capital projects and/or major mergers and acquisitions are more likely to be funded externally, whereas optimising existing operational efficiency and effectiveness will, and should be, supported by retained profits and/or budgeted spend that sits within the annual business plan.”

(From personal correspondence with food sector firm director)

5 Conclusion: research summary and policy implications

5.1 A revised model

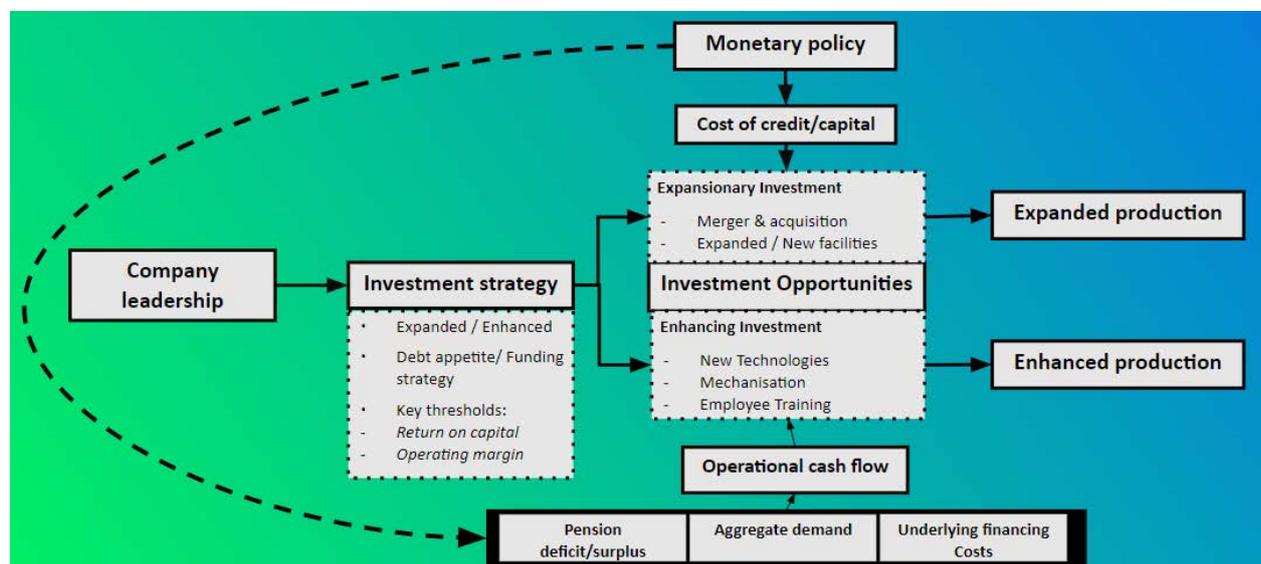
Our initial model assumed that it was the cost of funding that determined investment strategies:



Yet the research suggests that the investment and funding strategies are set in general terms before considering the cost of funding. Firms then look for investment opportunities that meet their criteria, before assessing the cost of funding to determine viability. Our revised model can therefore be summarized as:



In this revised model, monetary policy does not have a direct influence on investment decisions. Of course, this does not mean there is not a relationship between funding strategy and investment strategy. The figure below hypothesises a more complex set of relationships in this regard:



Interest rates clearly play a role in the function and availability of some of the components of this model, but further research is required to establish the relationship between a very low interest rate environment on investment in productivity. It is worth noting that the firms studied have been operating in a low interest rate environment in the UK since the 1990s, and may to some extent 'take for granted' an otherwise unusually low cost of credit. We can speculate counter-factually that the impact of monetary policy on productivity would only become clearer if monetary policy outcomes were to become more volatile. Interestingly, although the research found no evidence that the abundance of cheap labour evident in the 2012-2016 period shaped firms' investment strategies in relation to productivity, one interviewee suggested that labour market tightening since 2016 meant that workforce skills had become a more important consideration recently, with positive implications for productivity growth. A similar process may become evident in relation to capital, if credit were more expensive.

It is also worth acknowledging that, even if our findings are relevant to the UK, they certainly should not be assumed to be generalisable beyond the UK. We would suggest that, unlike market-based systems such as the UK, countries with bank-based corporate finance systems are more likely to see a positive relationship between credit availability and productivity-enhancing investments. Of course, these countries also tend to prioritise skills and training more than countries such as the UK.

5.2 Implications for productivity and policy

The research suggests that very low interest rates (irrespective of wider macroeconomic impacts) do not drive productivity growth, insofar as they do not encourage firms to make productivity-enhancing investments. Indeed, in incentivising or enabling expansionary investment strategies – not designed to or founded upon productivity growth – the use of monetary policy to stimulate growth in the period since the financial crisis may in fact have contributed to the UK's poor productivity performance in recent years. The opportunity to

refinance long-term debt at low cost is a key part of the environment in which firms choose to expand rather than enhance their productive capacity.

Should we expect monetary policy to support productivity growth? It is not clear that we should. Yet the Bank of England certainly sees addressing ‘the productivity puzzle’ as part of its mission, as evidenced by Chief Economist Andy Haldane’s consistent interest in productivity (see for example Haldane, 2017), and his appointment as Chair of the Industrial Strategy Council. There are few reasons to believe that credit policies, from very low interest rates to more targeted schemes to improve credit availability for firms, have strengthened incentives to invest in productivity (although they may have supported employment growth, which many would deem a more important objective).

Insofar as enhanced production investment strategies are funded by cash flow rather than external finance, it may be that productivity gains are more likely to arise from policies that support cash revenues rather than reducing credit costs. This might suggest that supporting aggregate demand in the economy through fiscal policy is more likely to produce better productivity outcomes (without jeopardising employment, other things being equal).

The Bank of England’s remit is monetary policy, not fiscal policy. Yet both ‘quantitative easing’ (Berry, 2016) and ‘monetary financing’ (Berry *et al.*, 2020) arguably represent the fiscalisation of monetary, insofar as they implicitly or explicitly support government borrowing and spending. It is worth considering whether productivity growth, as well as macroeconomic stabilisation, should be an objective of such measures. Of course, the government could itself choose to use fiscal policy in this manner, irrespective of monetary policy.

If cash, rather than credit, better incentivises productivity enhancement, this finding raises questions for the extent and nature of industrial policy in the UK. Would the cash income arising from industrial policy subsidies enable enhanced production investment strategies, in the same way that other sources of cash appear to do? If so, it would suggest that subsidy schemes such as the Industrial Strategy Challenge Fund will be more effective than cheap credit schemes such as the British Business Bank in producing positive productivity outcomes. This is not to suggest that that productivity should be the only objective, or even the main objective, of industrial policy, or that public investment banks could not provide forms of credit which support productivity more so than current sources of debt financing are able to (see Berry, 2020 and Berry *et al.*, 2021 for further discussion).

It should be noted, finally, that debt financing is associated with productivity-enhancing investment in many countries – with many seeing a positive impact of low interest rates in this regard (Coulter, 2020). One of the explanations may be the greater range of stakeholders involved in corporate stewardship, and/or the more long-termist investment horizon upheld by shareholders (see Driver, 2021). The lack of appetite among shareholders for productivity-enhancing investments, among the UK firms in our sample, was reflected in the interview data.

For more information about this research, please contact Craig Berry at craig.berry@mmu.ac.uk

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