

Bank of England

Cost of Capital and UK Business Investment:

Measurement Challenges and Research Opportunities

Economic Statistics Centre of Excellence Annual Conference at Alliance Manchester Business School

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Road map

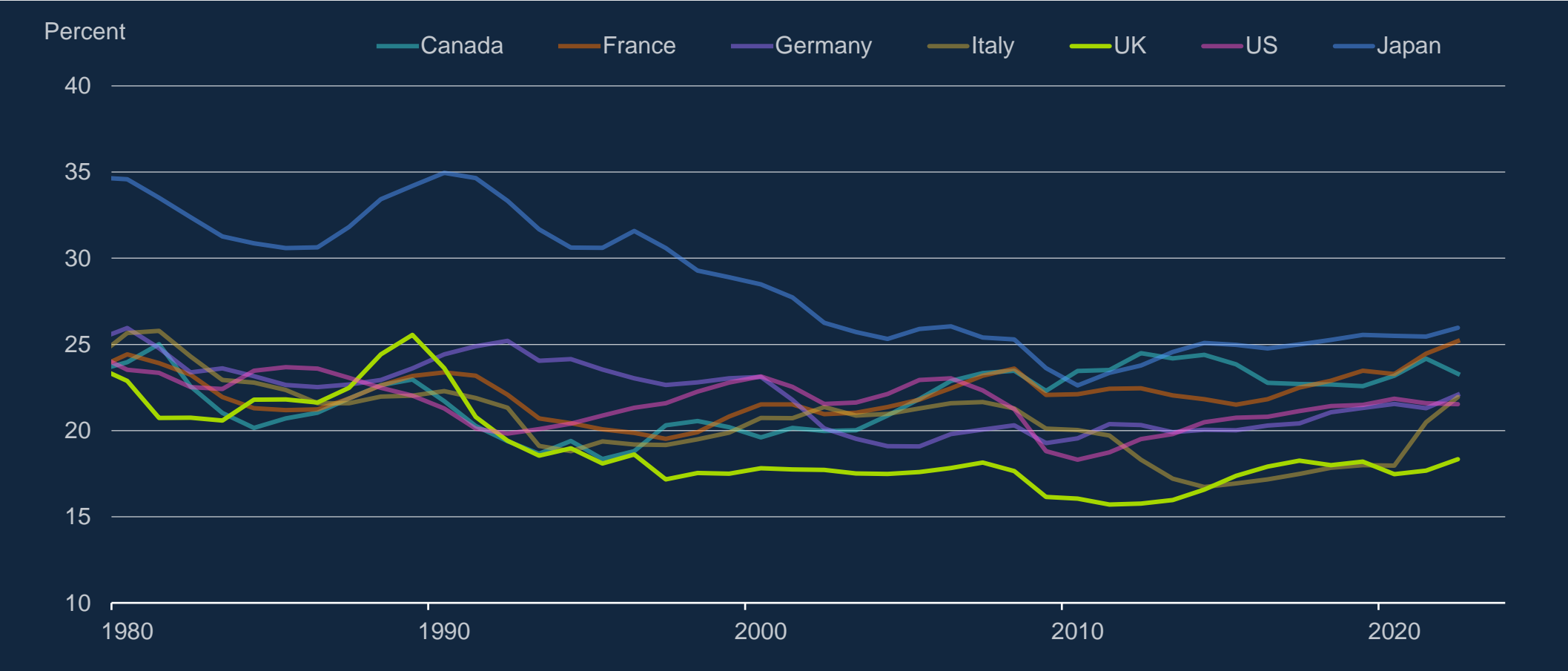
- Setting the stage:
 - UK business investment has under-performed; so has productivity growth
 - Why central banks care:
 - Cyclical demand and supply-side 'speed limit'
 - Interest rates are central to investment theory
 - A new framework:
 - Three actors and analytical perspectives – economic net present value, manager decision-making, and financial investor funding – influence the amount and type of business investment
 - Centrality of the cost of capital:
 - Different measures of the cost of capital (internal funds, hurdle rate, WACC, ROIC)
 - Time series evolution and relevance for business investment
 - Research Opportunities:
 - Firm, manager, and financier – relative roles to affect the cost of capital and UK business investment
 - Cost of capital and marketplace environment – relative roles to affect UK business investment
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Setting the stage and Why central banks care

UK total investment has underperformed international peers

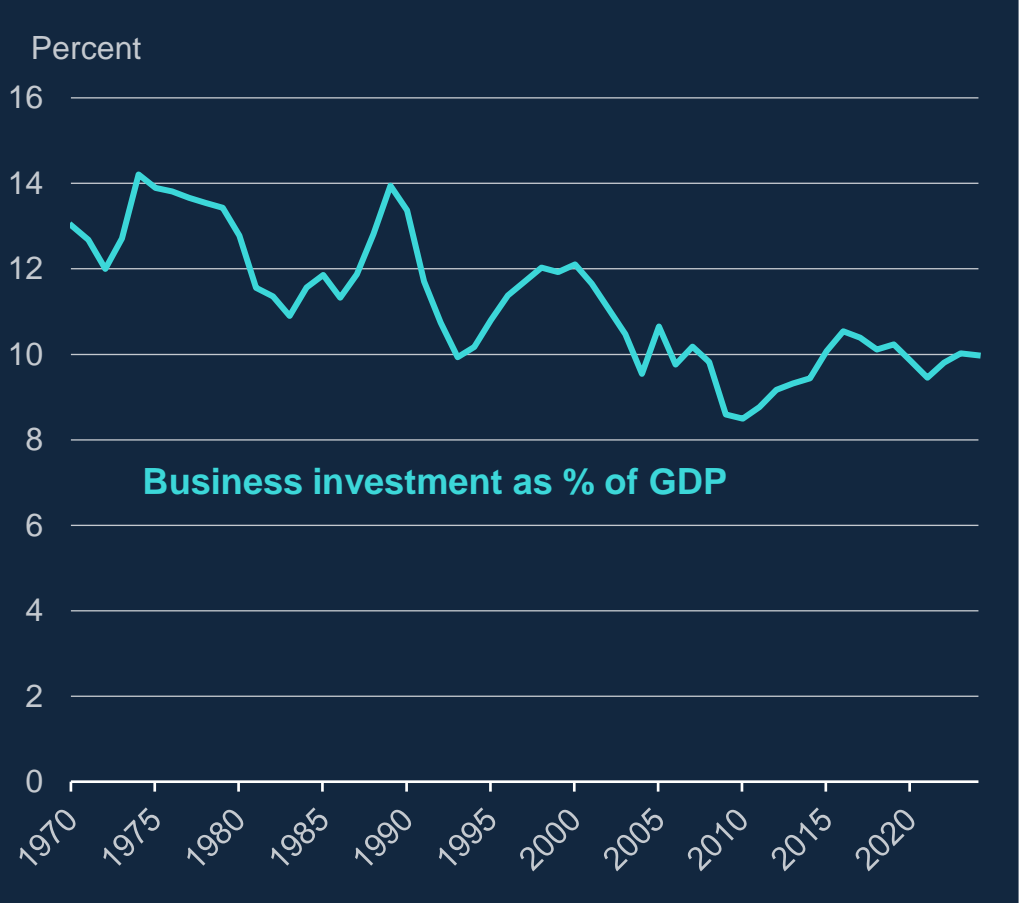
Gross Fixed Capital Formation as % of GDP



Source: World Bank, reproduced from [Alayande and Coyle \(2023\) 'Investment in the UK: Longer Term Trends', Working Paper No. 040, The Productivity Institute](#)
Notes: The lines show the share of nominal GFCF in nominal GDP. Latest observation: 2022.

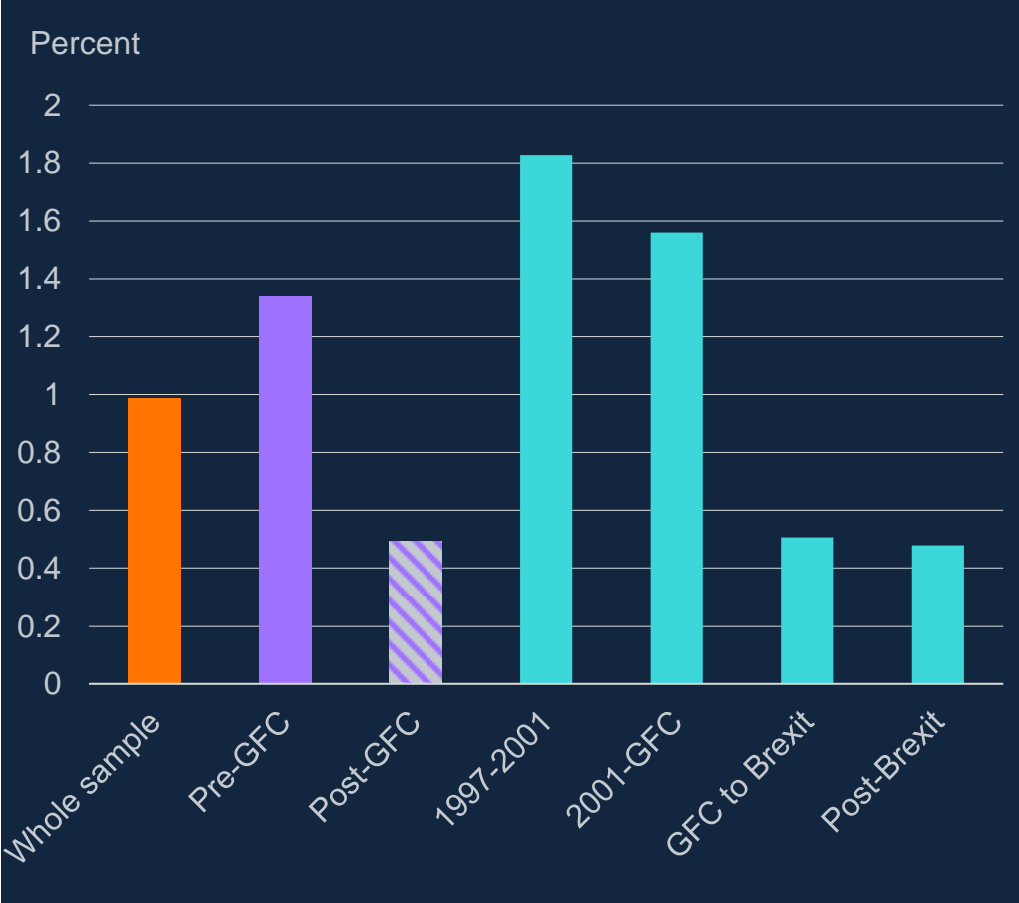
Central bank 'speed limit' influenced by weakness in UK investment & productivity growth

UK Business Investment as % of GDP



Source: ONS, reproduced from [Alayande and Coyle \(2023\) 'Investment in the UK: Longer Term Trends', Working Paper No. 040, The Productivity Institute](#)
Latest observation: 2023 Q4.

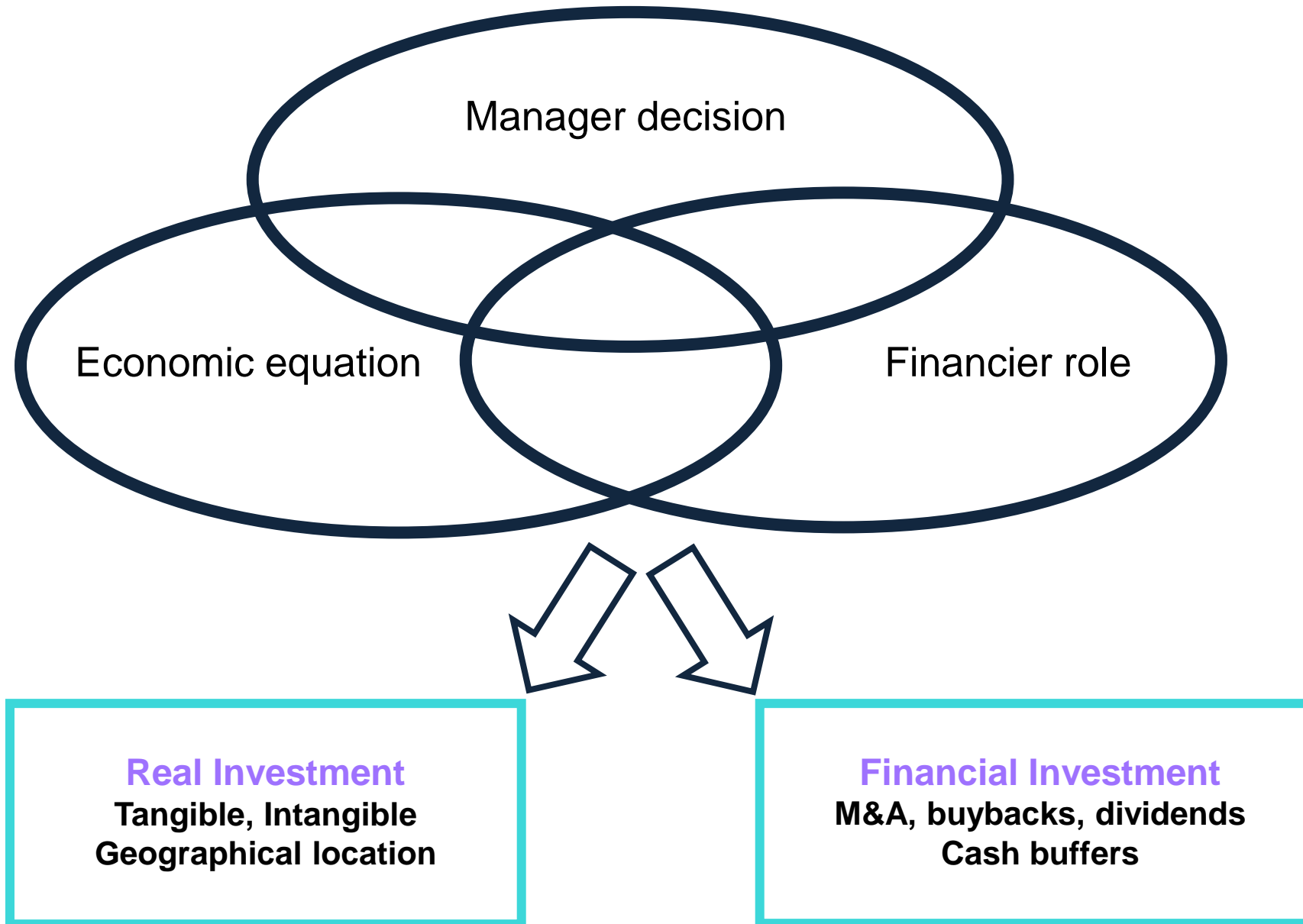
UK multi-factor productivity Average annual growth



Source: ONS and Bank calculations.
Latest observation: 2022.



Framework for analysis:
Centrality of Cost of Capital



'Economist' business investment equation

$$\text{PDV investment} = \frac{E(\text{cash flow}_t)}{(1 + \text{discount rate}_t)^t} + \frac{E(\text{cash flow}_{t+1})}{(1 + \text{discount rate}_{t+1})^{t+1}} + \dots + \frac{E(\text{cash flow}_{t+h})}{(1 + \text{discount rate}_{t+h})^{t+h}}$$

- **Cash flow:** determined by ... market size, growth, competition (domestic and globally)
- **Discount rate:** depends on ... data used and calculation (ex-post vs. ex-ante)
- **Horizon:** determined by... who? And how?
- **Uncertainty:** ... about future cash flows, interest rates and the economic outlook
- **Opportunity cost:** there is always an alternative use of funds (cash buffer, financial investment)

Manager's decision to undertake business investment

- Revenues vs earnings vs returns *relative* to economist benchmark cash flows
 - Managers have inside information; can provide 'guidance'
 - Do prices (market characteristics) or quantities (market size) matter more?
 - Accounting is important: EBITDA, CoGS, tax, depreciation, etc.
- **Cost of capital measures, compare with economist or financier measures**
 - Discount rate/monetary policy rate
 - WACC – ex-poste
 - ROIC – ex-poste
 - Hurdle rate – ex-ante
- Horizon
 - Manager characteristics (tenure, nationality, specialized knowledge)
 - Incentive compensation plans

Financier's decision to finance business investment

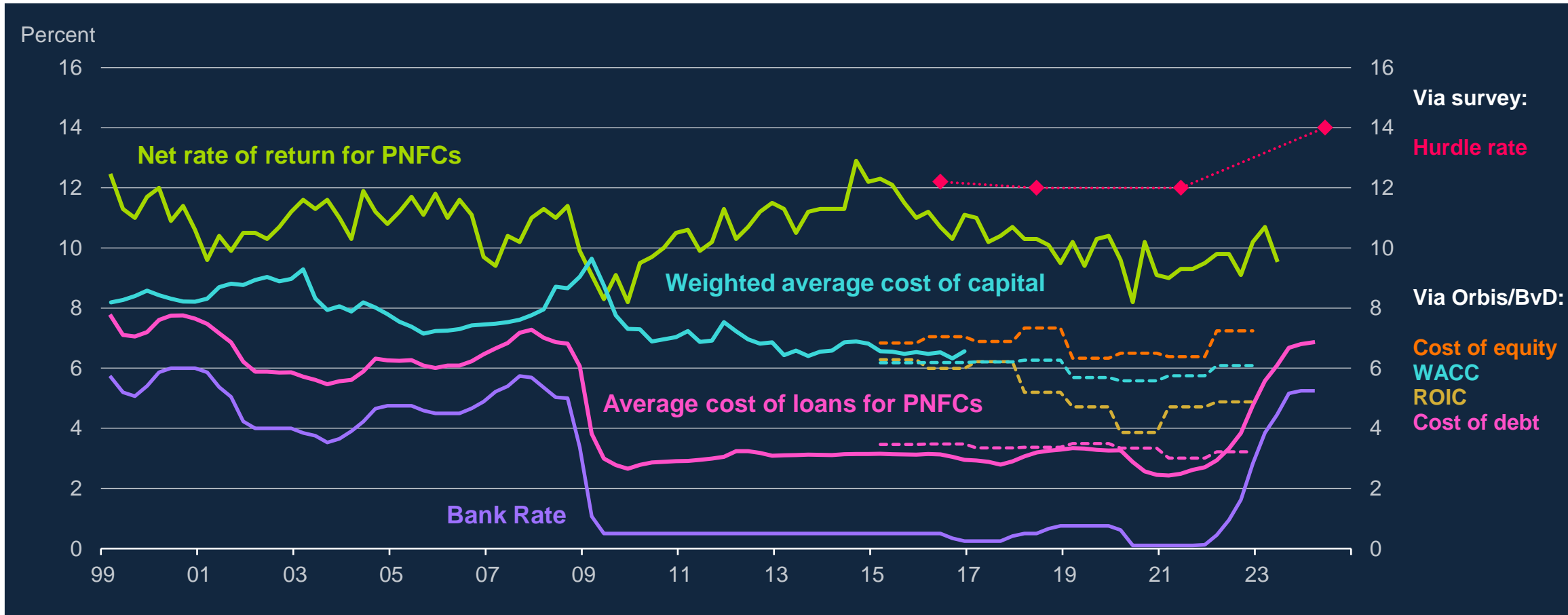
$$\begin{aligned} \text{Expected value on investment (debt)} &= \text{value} * [\text{credit spread} * (1 - \text{probability of default})] \\ \text{Expected value on investment (equity)} &= \text{value} * [\text{risk free return} + \beta(\text{market risk premium})] \end{aligned}$$

- Value of financial exposure *relative to* economist cash flows
 - Who has the information to do this valuation? What factors matter?
- Expected return, *compare with* the '**cost of capital**' (the cost of funding) of the financier
 - Market risk premium or credit spread measures
- Horizon of financier *relative to* managers or economist benchmark
 - Financier as intermediary *versus* as ultimate beneficial owner (concentration in financing)
- Opportunity Cost: There is always an alternative use of funds (cash, deposit, sovereign bonds)



Cost of Capital Measures, Variation, and Dispersion

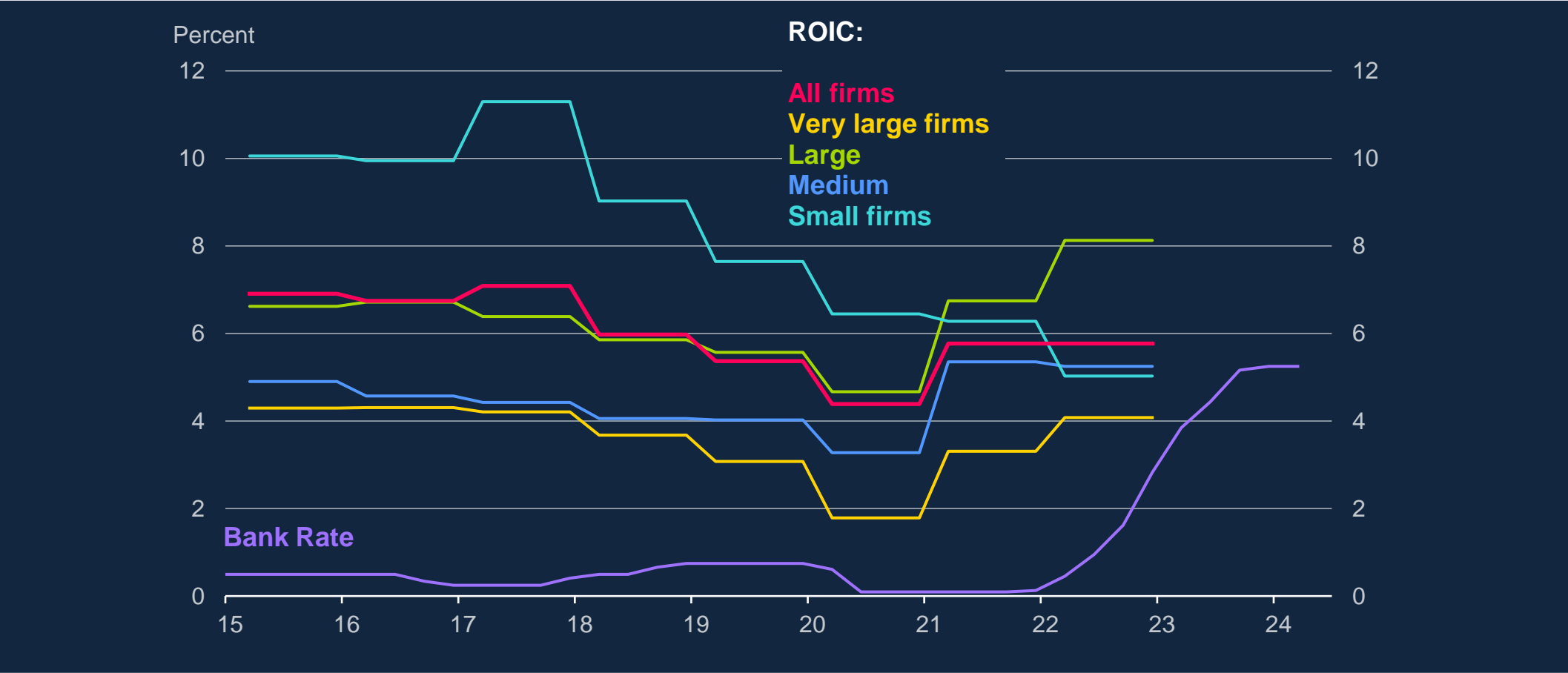
Cost of capital varies by measure, over time, and with differential 'premia'



Source: Adapted from Saleheen, Levina, Melolinna, and Tatomir (2017), 'The financial system and productive investment: new survey evidence' and Melolinna, Miller, and Tatomir (2018), 'Business investment, cost of capital and uncertainty in the United Kingdom—evidence from firm-level analysis'. Notes: Dashed lines show different measures of cost of capital derived from a cross-section of firms. Survey evidence on businesses' hurdle rates for 2016 is based on Saleheen et al. (2017) and thereafter from the Decision Maker Panel.

50% of UK investment is undertaken by 0.5% of large multinationals. Do returns on capital vary by firm size?

Return on invested capital by firm size

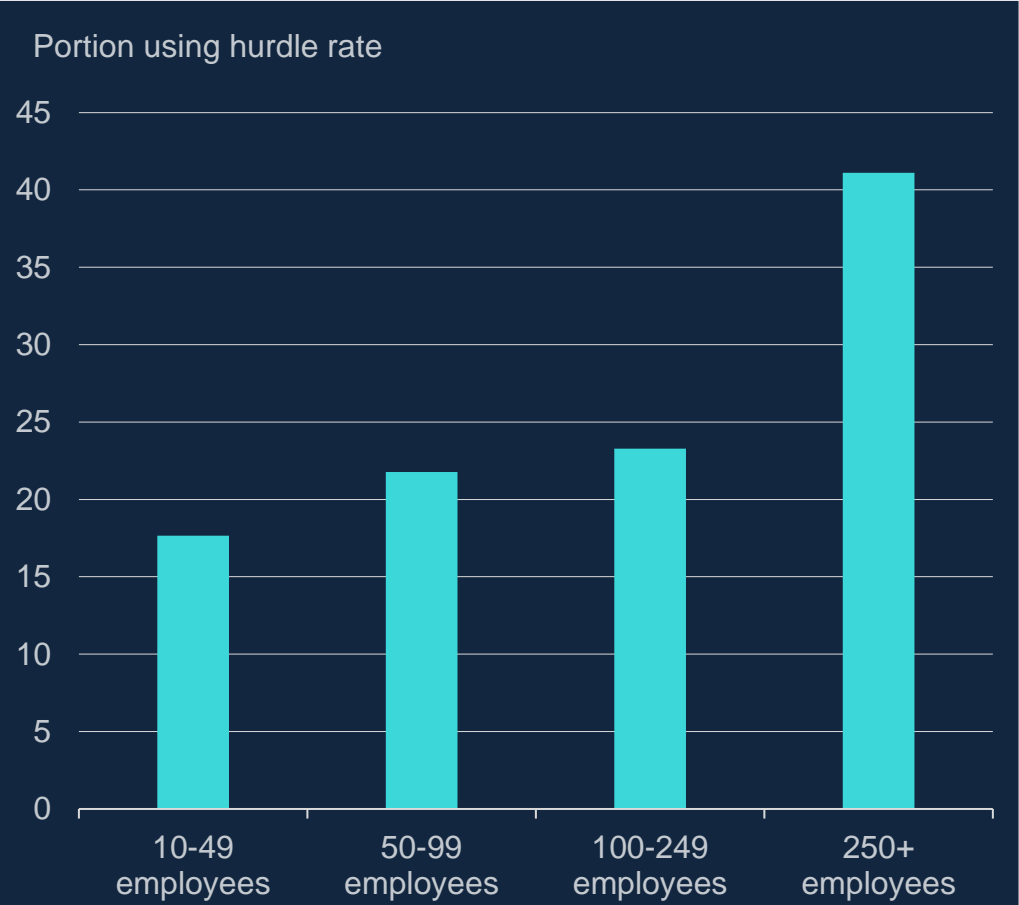




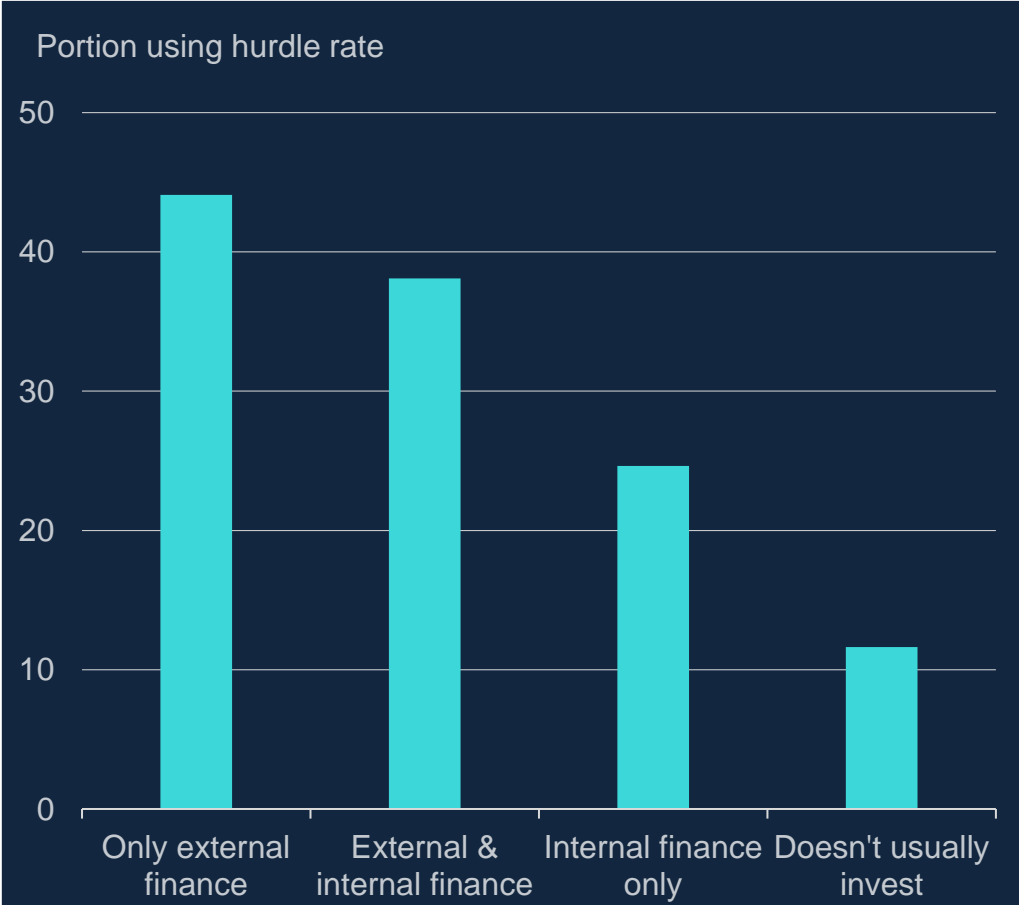
A Focus on Hurdle Rates

Hurdle rates are more common for large and externally financed firms

Percentage of firms using hurdle rates, by size
Decision Maker Panel



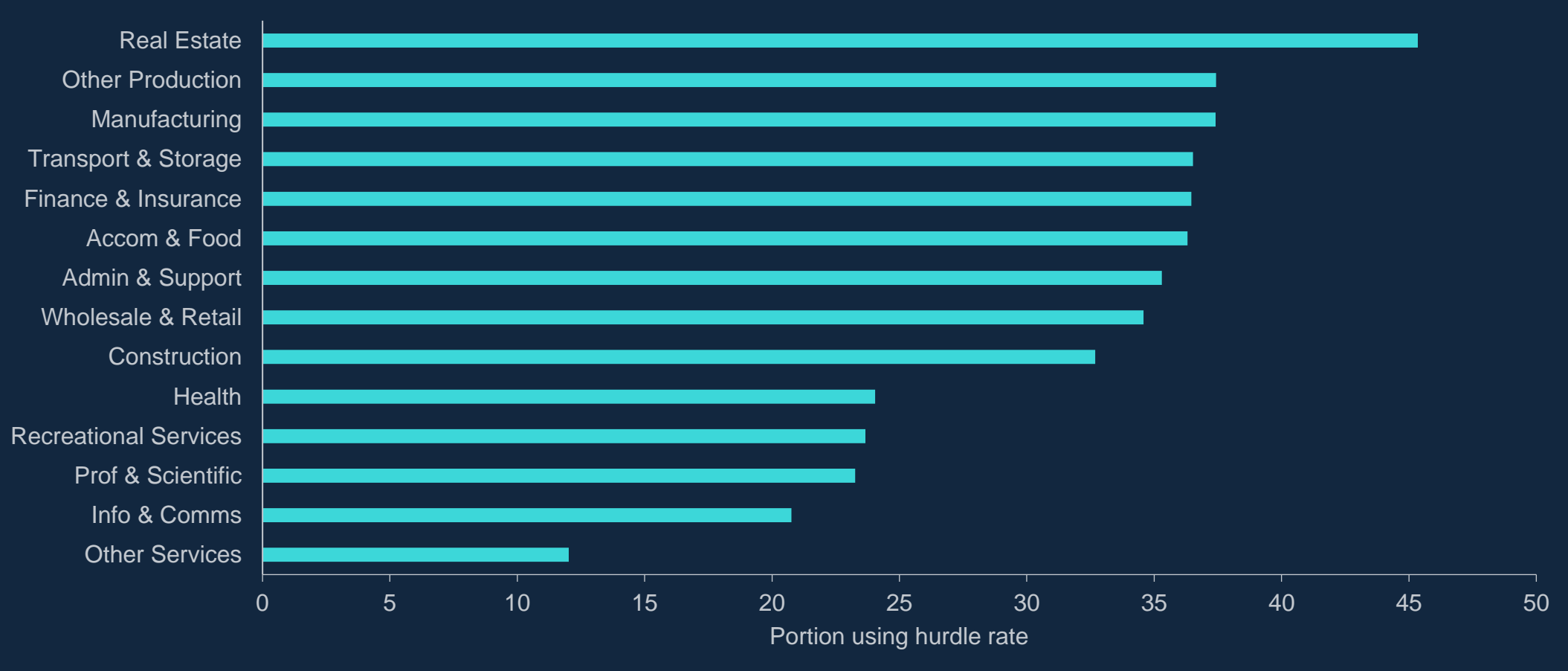
Percentage of firms using hurdle rates, by source of financing
Decision Maker Panel



Source: Decision Maker Panel
Notes: results from March 2024 survey

Hurdle rates are more common among 'tangible investment' sectors

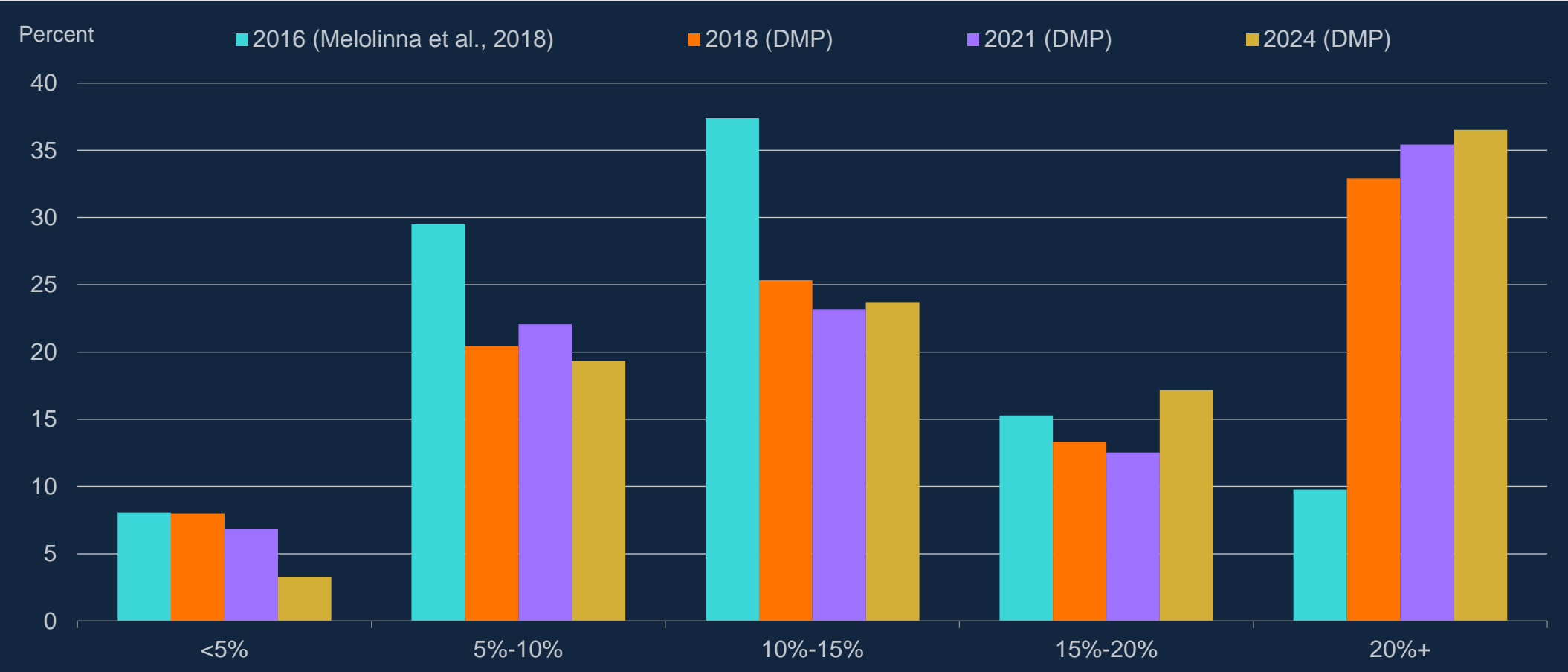
Percentage of firms, by sector, using hurdle rates
Decision Maker Panel



Source: Decision Maker Panel
Notes: results from March 2024 survey

A median hurdle rate measure masks important dispersion, which changes over time, but by much less than the base rate

Survey-implied hurdle rates



Source: Melolinna, Miller and Tatomir (2018), Saleheen, Levina, Melolinna and Tatomir (2017) and Decision Maker Panel
Notes: Melolinna et al. results from the Bank of England Finance and Investment Decisions Survey in 2016. DMP results from 2018, 2021 and March 2024 survey.



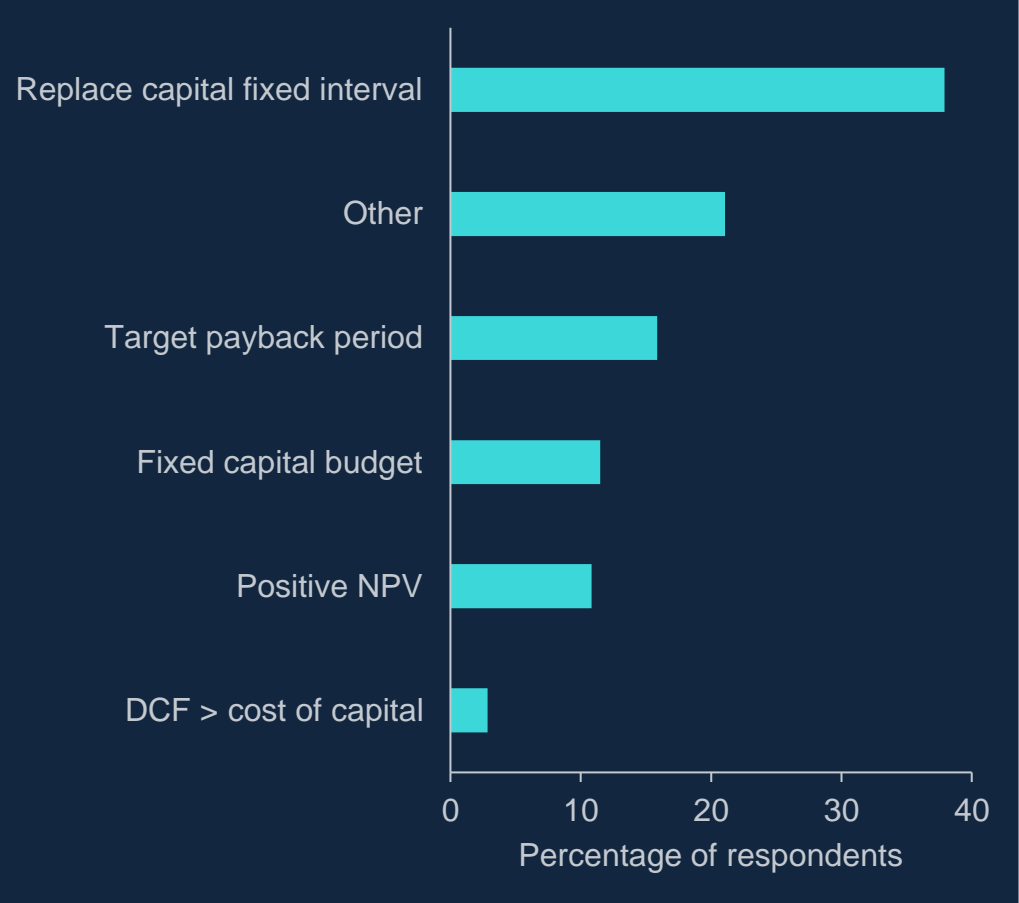
Implications for business investment

Cost of Capital vs other drivers

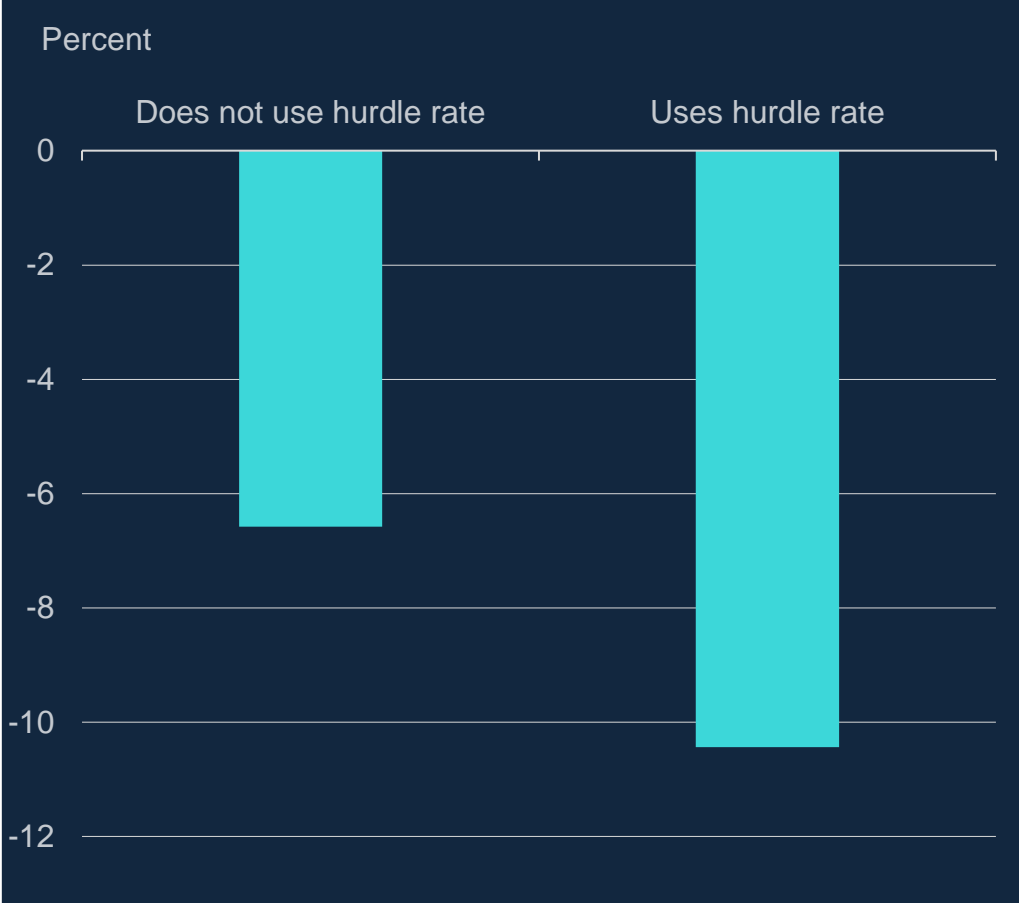
A look at current research

On hurdle rates, cost of capital, and investment in this hiking cycle

Alternatives to hurdle rates

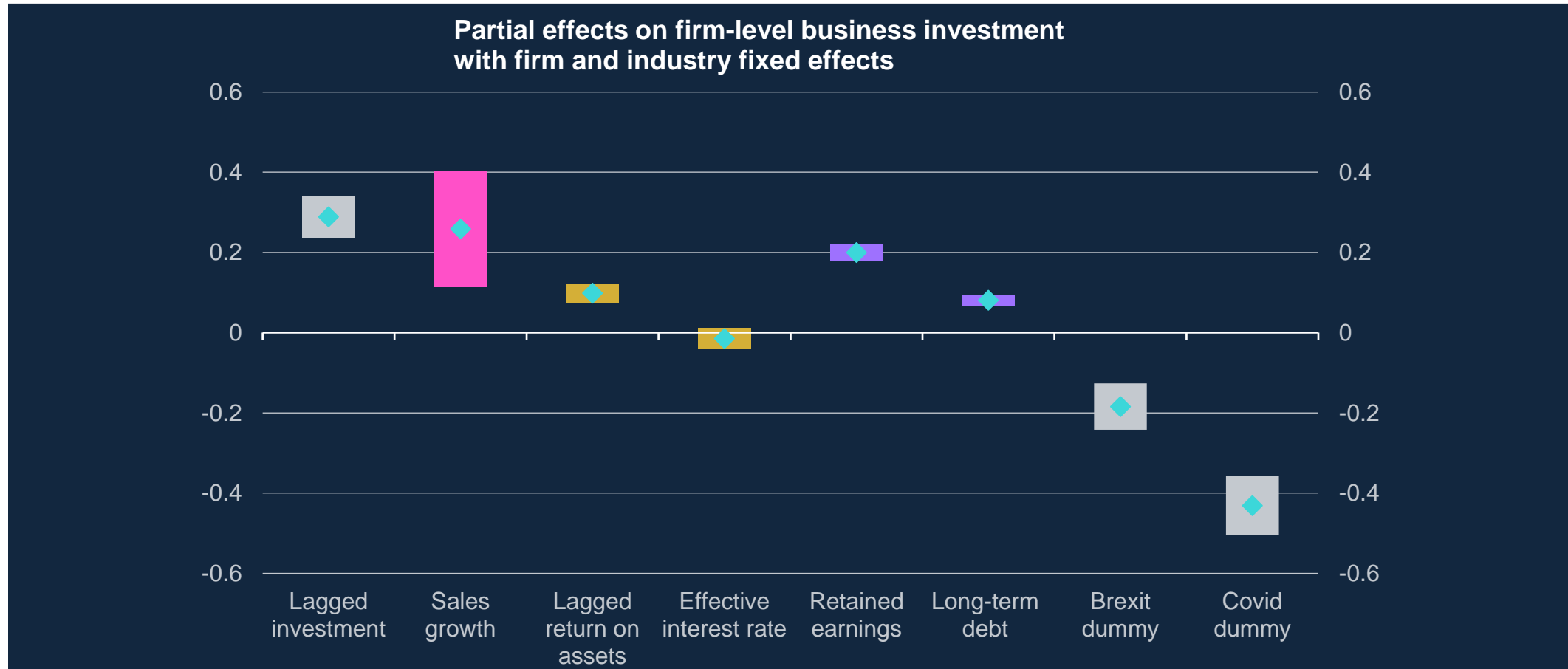


Interest rate sensitivity of investment



Source: Decision Maker Panel
Notes: results from March 2024 survey

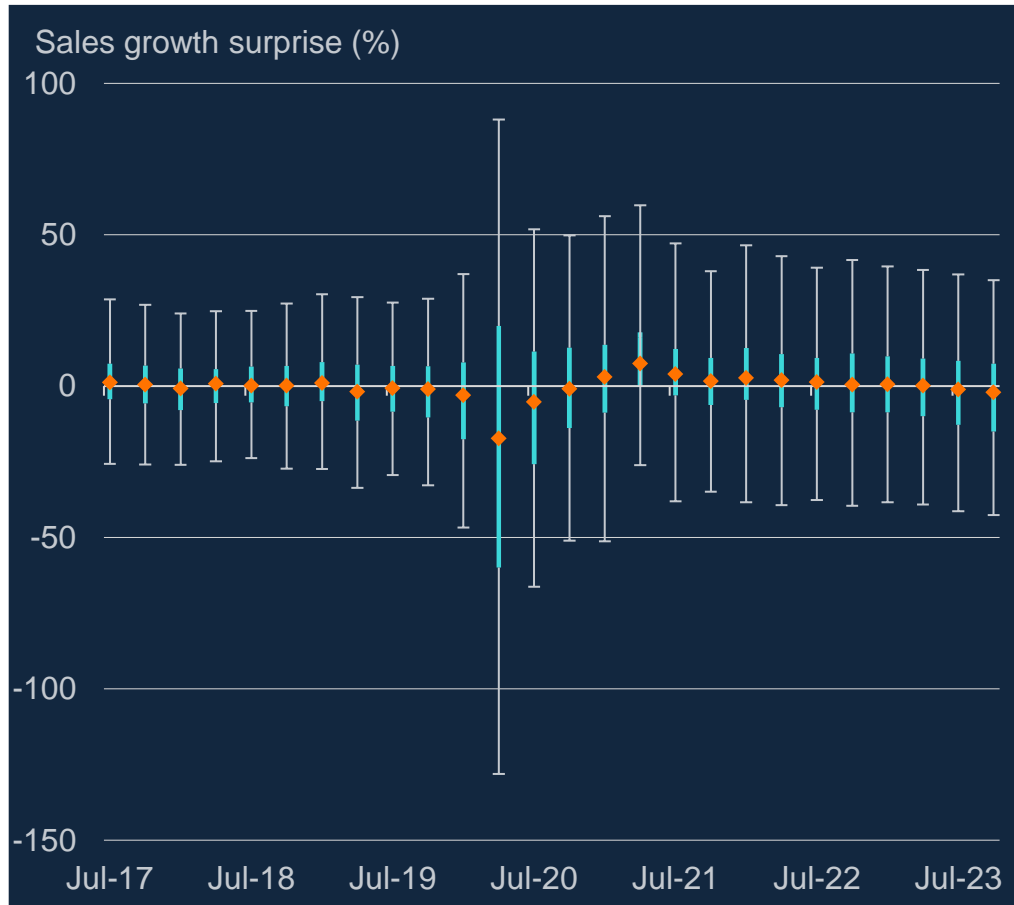
Firm and marketplace characteristics vs cost of capital measures as drivers of UK investment



Source: Carella, Chen, and Shao (2023), 'Enhancing Business Investment in the United Kingdom'. Notes: Diamonds denote the point estimate from Specification 2 of Table 4 in Carella et al. (2023) and ranges show the reported 95% confidence interval.

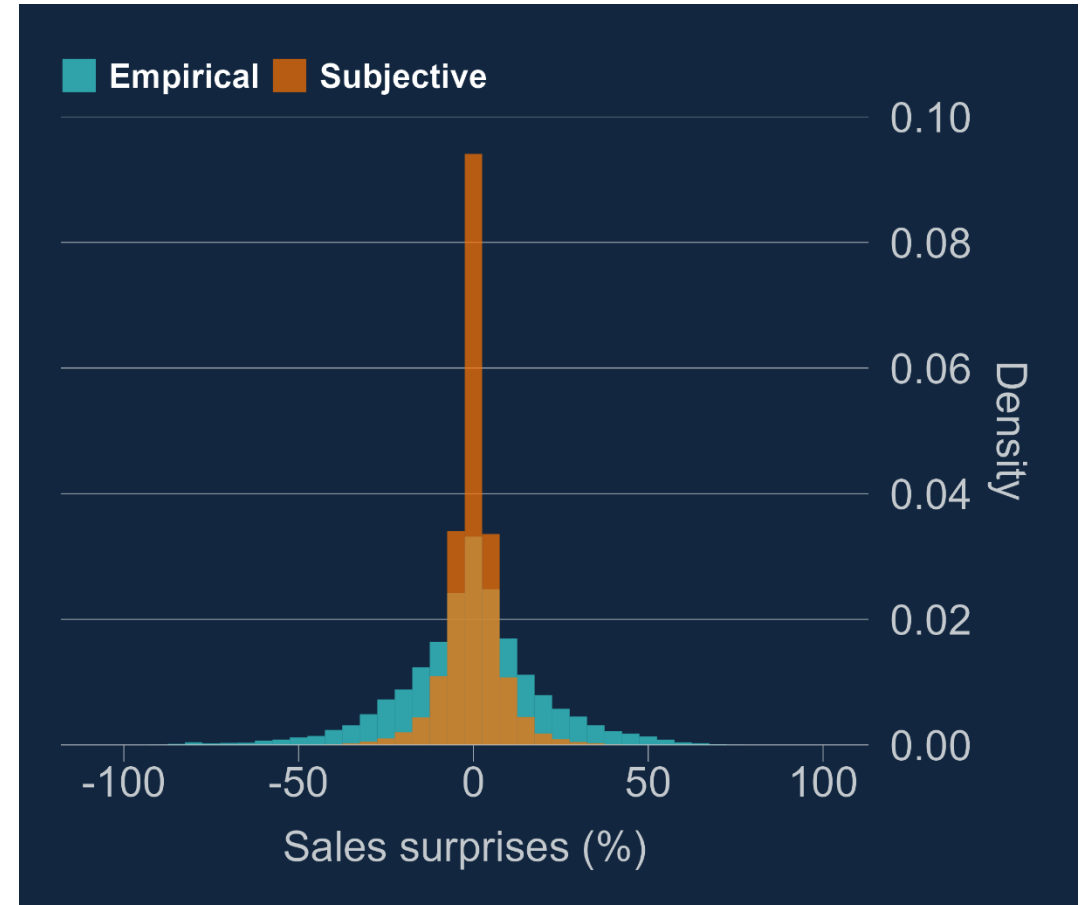
Sales matter for UK investment, in a 'surprising' way

Cyclicality of sales surprises



Source: Alati, Fischer, Froemel and Ozturk (2024), 'Firms' Sales Expectations and Marginal Propensity to Invest'. Notes: Chart shows the median sales growth surprises in each quarter (orange diamond), the interquartile range (blue bar) and the minimum and maximum points of the distribution, omitting outliers (values that are 1.5*IQR above the upper quartile/below the lower quartile).

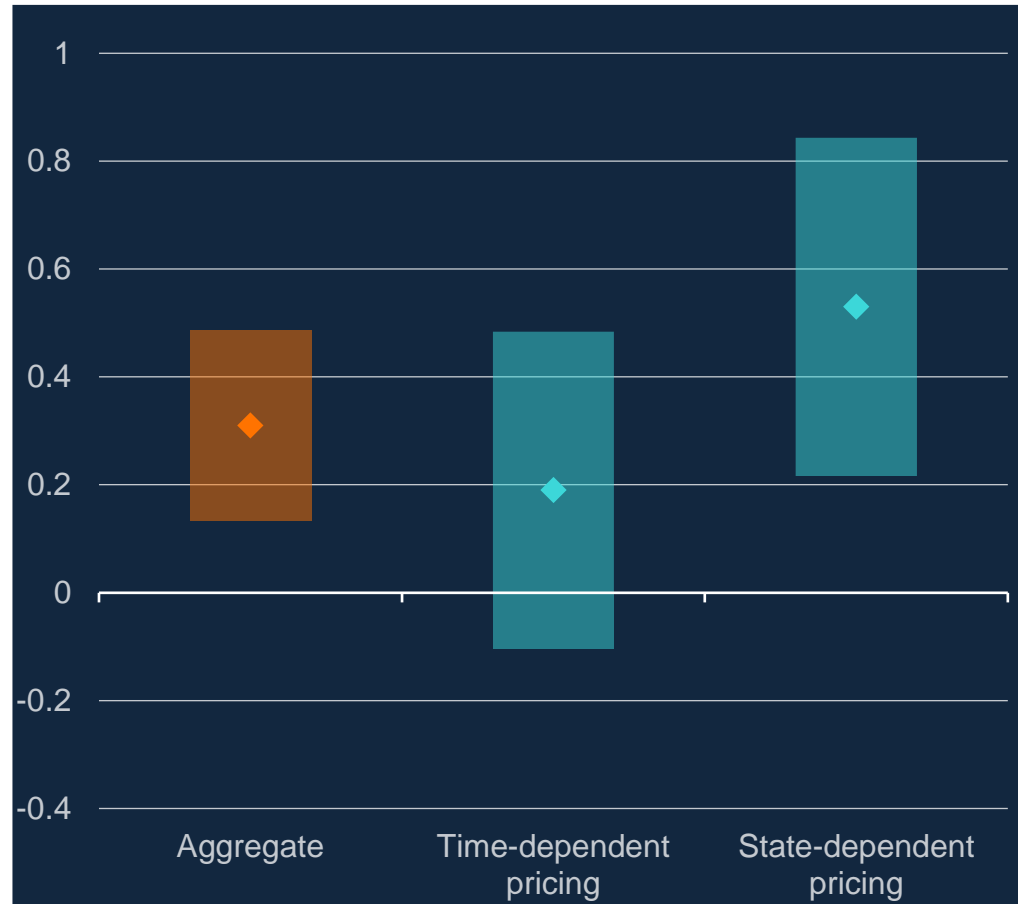
Histogram of sales growth surprises



Source: Alati, Fischer, Froemel and Ozturk (2024), 'Firms' Sales Expectations and Marginal Propensity to Invest'. Notes: Realised sales growth surprises (aqua) along with a hypothetical distribution of sales growth forecast errors (orange) that follows firms' subjective probability distributions (i.e. a histogram of sales growth surprises obtained by taking independent draws from firms' subjective probability distributions).

Sales surprises and the marginal propensity to invest

Gross investment response to a 1% unexpected sales surprise



- A measure of a firm's marginal propensity of invest
 - A 1% unexpected sales surprise increases gross investment by 0.31%.
 - The effects are stronger for firms using state-dependent pricing (more attentive to the environment)
 - Uncertainty increases a firm reaction to sales growth surprises – consistent with gaining more information and learning from the surprise.
- On cost of capital?
 - No statistical finding for financial constraints to explain firm investment

Source: Alati, Fischer, Froemel and Ozturk (2024), 'Firms' Sales Expectations and Marginal Propensity to Invest'. Notes: Regression coefficients in diamonds and confidence intervals in shaded areas. All firms are shown in orange, and the sample split by firms that, in the DMP, reported using time-dependent and state-dependent pricing are in aqua.

Cost of Capital and Business Investment: Measurement and Research Opportunities

COC Measurement

- Firm: Ex-post WACC and ROIC vs. ex-ante hurdle rate; dispersion vs averages
- Financial markets: Bank hurdle; equity hurdle and ownership concentrations
- Managers: Accounting vs economic measures, internal vs external incentives

Implications for Business Investment

- Firm characteristics: Size, ownership (financial and foreign)
 - Manager characteristics: Quality, tenure, ICP
 - Product market characteristics: Global exposure, competition, tax, uncertainty
 - Financial market characteristics: Concentration, public, private
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