



Department for
Business, Energy
& Industrial Strategy

SHARE REPURCHASES, EXECUTIVE PAY AND INVESTMENT

BEIS Research Paper Number 2019/011

July 2019



Acknowledgements

This report has been prepared by PwC for the Department for Business, Energy & the Industrial Strategy in accordance with the tender process of November 2017. The Department would like to thank the project team within PwC, which consisted of Nick Forrest, Ellie Price, Hugh Dance, Saloni Goel, Kavya Saxena, Premal Nanjee, Adam Bassett, Meghana Bhide, Tim Ogier and Tom Gosling for carrying out this research project and producing this report.

PwC were advised by Professor Alex Edmans of London Business School.



© Crown copyright 2019

This publication is licensed under the terms of the Open Government Licence v3.0 except where otherwise stated. To view this licence, visit nationalarchives.gov.uk/doc/open-government-licence/version/3 or write to the Information Policy Team, The National Archives, Kew, London TW9 4DU, or email: psi@nationalarchives.gsi.gov.uk.

Where we have identified any third-party copyright information you will need to obtain permission from the copyright holders concerned.

Any enquiries regarding this publication should be sent to us at: enquiries@beis.gov.uk

Contents

Executive Summary	4
1. Introduction	11
2. Context	13
3. Concepts	19
4. Approach	27
5. Trends and comparisons	34
6. Executive pay and share repurchases	49
7. Share repurchases and investment	71
8. Executive pay and investment	81
9. Conclusion	85
Glossary	90
Appendix A: Literature review	91
Appendix B: Data	102
Appendix C: Econometric analysis	109
Appendix D: Survey	138
Appendix E: Bibliography	147

Executive Summary

This research project has two main aims:

1. To examine the relationship between executive remuneration and motivations to undertake share repurchases. More specifically, to understand whether buybacks are being used to meet earnings per share (EPS) targets in CEO remuneration packages and/or to inflate the value of their share awards rather than to create long-term value for the company.
2. To examine the relationship between share buybacks and corporate investment in the UK and to understand whether there is any evidence that share buybacks are having a detrimental impact on company investment, growth and productivity.

Approach

This study builds on existing academic literature on the determinants and consequences of share buybacks and data on international trends. It expands the evidence base with UK-specific data using econometric, case study and survey techniques to search for any connection between executive pay incentives and share buybacks and between share buybacks and investment.

We employ three broad approaches:

- Large scale econometric analyses, which seek to identify if there is a systematic relationship (whether causal or not) between the presence of certain types of executive incentives and share buybacks, and between share buybacks and investment. We use well-established controls and a variety of model specifications to seek to strip out factors that could distort the conclusions. These analyses will find whether relationships exist on average, but cannot conclude, either positively or negatively, whether a relationship exists or does not exist in any particular case. Moreover, only on rare occasions will the analysis allow us to establish the direction of causality: i.e. if A and B are *correlated*, whether A causes B, B causes A, or both are caused by an “omitted variable” C.
- For executive pay incentives, we also look at individual case studies where large buybacks have been used, to determine whether they successfully triggered EPS targets that otherwise would not have been triggered. These case study analyses cannot conclusively establish the motivation for any buyback, but are suggestive, in that if buybacks were systematically used to hit EPS targets, then we should find evidence that they actually do hit EPS targets on occasion.

- Survey evidence, using well-established academic survey formats, provides some insight into motivations for share buyback activity, but of course self-reported motivations are not conclusive in terms of outcomes. This evidence is tested in more depth in interviews with senior executives.

Each of these types of analysis has validity but, individually, each has shortcomings. Thus, we use the insights from the combination of analyses to draw conclusions. All are based on well-tested and well-established academic study techniques that have been subjected over time to rigorous scrutiny. Moreover, taken together, these different approaches provide a strong evidence base for any conclusions.

Share repurchases

1. In any typical year over the period 2007 to 2017, aggregate share repurchases in the UK totalled between £15bn and £20bn, and they were concentrated in a relatively small number (62¹) of FTSE 350 companies (FTSE 350 companies account for 97% of share repurchases of all UK public companies). However, over this period, all except 35 companies which were in the FTSE 350 in 2017 had undertaken some share repurchase activity. This indicates that most companies that undertake share repurchases do so periodically, rather than every year.
2. Share repurchase activity is both limited and cyclical, responding to economic conditions and market confidence. Since the global financial crisis, share repurchase activity in the UK has stabilised, at around 10% of operating profits for those firms undertaking share repurchases. This is significantly lower than the amount of dividend payments, which is around 40% of operating profits. Share buybacks account for around 23% of all cash returned to shareholders.
3. The level of share repurchases (measured in comparison to market capitalisation) in the UK is broadly comparable to Australia and Canada, but higher than in Germany. The US has a payout ratio for share repurchases which is around three times as much as the UK, but the US stands out in international comparisons. One potential explanation for the US figures is the favourable tax treatment for capital gains combined with a large number of private shareholders who can utilise this favourable tax treatment. This is why the dividend payout ratio is commensurably lower. Overall shareholder payout ratios in the US are similar to those in the UK.
4. Share repurchases are a tool for companies to return capital to shareholders. They are primarily a way of returning excess cash, after a firm has undertaken all its value-enhancing investment opportunities. Specific circumstances will dictate whether share repurchases are the chosen tool, as opposed to increasing dividends, or distributing a special dividend. The existing literature on share repurchases has identified a variety of reasons that might drive companies to carry out a share repurchase. Our survey of 73 senior FTSE 350 executives and

¹ 62 firms had share repurchases larger than 1% of their market capitalisation in 2016.

qualitative interviews found a number of reasons why companies use share repurchases, including: (i) perceptions of undervalued equity; (ii) the flexibility of a share repurchase programme; (iii) concentrating share ownership and reducing the fragmentation of the investor base; (iv) offsetting the dilution from a scrip dividend issue; and (v) for certain investors, a relatively advantageous tax treatment².

5. Share repurchases (as well as dividends) can contribute to optimising capital structure where a company judges that it is under-g geared. In this case, the source of finance for the share repurchase could be new debt finance as well as excess cash.
6. Executives suggest that the level of the share price is an important consideration in making share repurchases, and indeed there is robust evidence in the literature of firms experiencing positive abnormal returns following a share buyback. However, many executives we spoke to were sceptical of such timing or opportunistic motives.

Current debate and relevance for our study

7. Concerns have been expressed to Government about the use of share repurchases and their relationship to both executive pay and investment. Reflecting on these concerns, the Government commissioned this research in November 2017, following the response to the public consultation on the corporate governance reform green paper.
8. Wider concerns about short-termism in general, levels of executive pay, and the relative returns to capital and labour are beyond the scope of this study. However, where our findings have touched on these issues (especially in qualitative interviews with wider stakeholders) we have reported these in the section “other findings on this topic” in Chapters 6.

Interaction between executive remuneration, share repurchases and investment

9. EPS is a frequently used metric in LTIPs (Long-Term Incentive Plans). Its prevalence is declining (down from 62% of FTSE 350 companies in 2012 to 56% in 2016). The executive community is divided on the merits and drawbacks on the use of EPS as a performance metric. While many acknowledge its shortcomings, others value the way it can be related to tangible activity across an entire organisation, capturing both revenue growth, cost performance and therefore profitability. A majority of FTSE 350 companies brought new remuneration policies

² Share repurchases trigger a capital gains tax liability whereas dividends are generally taxed as income. The impact on tax revenues depends on the circumstances of the shareholder and the features of the tax code.

for approval in 2017, and many of these still use EPS. Given that these remuneration policies will endure for a further three years³, and given that the LTIPs awarded under those policies will have performance periods of three or more years, we do not anticipate EPS disappearing from LTIPs in the short term.

10. The concern is that, rather than being driven by the desire to return surplus capital to investors as described above, repurchase decisions may be driven by the desire to increase EPS and thus executive pay. There are two ways in which EPS targets might induce repurchases, the first being of far less concern than the second. The first is that a business has surplus cash, and the EPS target incentivises management to return it to shareholders rather than wasting it on inefficient investment or expenditure. Here, the EPS target encourages efficient use of capital, just as it is typically put in place to encourage efficient operational decisions. The second is that a business does not have surplus cash, and so funds the buyback by cutting valuable research and development (R&D) or investment, or by taking on more debt than is optimal. Since repurchases reduce the number of shares outstanding, they typically increase EPS even if the R&D or investment cuts, or increase in debt, are detrimental to the firm.

Findings of our study

11. The existing academic literature finds some evidence of a correlation between executive incentives and repurchases but not evidence of a systematic causal relationship. The only causal evidence we found in the literature links vesting equity (rather than EPS targets) to repurchases, and finds small magnitudes. Interestingly, one study suggests that firms that just meet performance targets have lower levels of R&D. However, the study did not find differences in repurchases between firms that just meet targets and those that just miss targets.
12. Over the period considered (2007-2017) our econometric analysis found no significant relationship between share repurchases and either the existence of an EPS condition or the proportion of an incentive award linked to that condition within executive pay incentives and share repurchases.
13. Additionally, we carried out a threshold analysis to compare firms' EPS performance had they not repurchased shares to their EPS including the repurchase. This covers the period 2007-2017. The analysis found that:
 - (a) No firms in the sample would have been below the EPS target had they not repurchased shares and above the EPS target with the share repurchase. In other words, no firm successfully used share repurchases to beat its EPS target.

³ Most LTIPs have a three-year duration.

- (b) We then examined 10 firms who missed, but came closest to hitting, their EPS target in the absence of repurchases. These are the firms that would have been most able to use repurchases to hit their EPS target. For nine of those ten firms, the repurchase impact was negligible compared to the EPS shortfall. This is consistent with the evidence cited below that firms rarely repurchase enough shares to materially impact their EPS measure.
 - (c) We found one instance where a firm was very close to its EPS target, while also undertaking one of the largest share repurchases in the dataset, but then it was unable to successfully hit the target.
 - (d) Finally, we did find some weaker evidence (significant only at the 10% level) that firms on course to miss their EPS target conducted more repurchases than those on course to hit it, controlling for other factors. However, as noted in (a) above, no firm in the sample actually succeeded in hitting a target that would otherwise have been missed by virtue of undertaking a share buyback, so it is difficult to conclude that the EPS target was the motivation for the buyback. Moreover, the difference in mean share repurchase amounts between the two groups of firms is driven by larger repurchases undertaken in a small number of firms. In addition, when studying firms' actual EPS (including the effects of any repurchase), firms that ended up just hitting their EPS target did not undertake more repurchases than those that just missed, inconsistent with repurchases being used to hit EPS targets.
14. Our survey of senior executives asked about the importance of factors in making decisions to repurchase shares or pay dividends. The responses were that LTIP targets are one of the least important considerations in decisions to repurchase shares or pay dividends: on a 5 point scale both scored around 1.5, where 1 = not important at all. More important reported factors for determining share repurchases were the share price and the availability of good investment opportunities, both scoring around 3.
15. In our survey responses, 30% of companies adjust their EPS targets contained within LTIPs for share repurchase activity, and most senior executives acknowledge share repurchases should be reviewed by remuneration committees. The qualitative interviews provided further insights into company practices on adjusting targets in general and for share repurchases in particular. Interviewees were generally, but not universally, supportive of adjusting EPS targets for share repurchase activity. But the most common reason given for not adjusting EPS targets for share repurchases is on the grounds of immateriality: i.e. for most companies the level of share buybacks is too small to have a material impact on achievement against the EPS target.

16. Senior executives suggest that investment decisions are made before share repurchase decisions, and investment is higher up the ranking of priorities than share repurchases. Asset managers also suggested they want companies to exhaust all organic value enhancing investments before they return surplus cash to investors. These findings are consistent with existing academic evidence. Thus, to the extent to which any correlation between investment and repurchases exists, the analysis suggests that it is the lack of investment opportunities that drives repurchases, rather than repurchases preventing companies from exploiting investment opportunities.
17. Between 2007 and 2017 we found no relationship between share repurchases and investment. This is consistent with the survey findings that investment decisions are taken independently of share repurchase decisions. Repurchases are then driven by factors (e.g. excess cash and undervalued equity) which are largely unrelated to investment opportunities.
18. We then focus on firms that would have just missed an EPS target in the absence of a repurchase, and thus are particularly likely to cut investment to finance a repurchase. Even when focusing on such firms, we still found no effect on investment. Specifically, these firms did not cut investment more than other firms that would have just met an EPS target in the absence of a repurchase.
19. Overall, while we have used a variety of different research methodologies (literature review, qualitative surveys and interviews, and quantitative econometric analysis), they paint a consistent picture. The evidence does not suggest that repurchases are being used systematically to artificially hit EPS targets, or crowd out investment. (Of course, they may still have these effects in isolated cases).
20. Our analysis does reveal some evidence of a more direct link between EPS conditions in the LTIP and investment. In particular, the presence of EPS conditions in the LTIP is correlated with lower investment. This could indicate that the executive pay structures are encouraging investment cuts. Alternatively, firms entering into a period of reduced investment may be more likely to employ EPS measures to encourage profit discipline. Our study cannot determine which way the causality runs, if there is indeed a causal link. Alternatively, the correlation may arise from a common driver of both factors.
21. The literature review highlighted there is evidence of a direct relationship between executive incentives (particularly vesting equity and performance targets) and cuts in investment. However, we do not find a statistically significant relationship between specific EPS targets and investment, in that firms that just meet EPS targets do not invest less than firms that just miss.

Next steps and avenues for further work

As a UK focused piece of research, we hope this study provides additional insight on the use of share repurchases in the UK and acts as a point of comparison to US studies. Overall our research findings are consistent with the findings from these US studies, even though share buybacks are much less prevalent in the UK.

During the course of our work we identified a number of areas which were not central to our research questions, but which would benefit from further work or renewed scrutiny. These were:

1. We found a correlation between the use of EPS targets and lower investment. Although the effect was large, with investment being around a fifth lower in companies using EPS targets, the results did not demonstrate that EPS targets were causing the reduced investment, and the results were not consistently supported by all of our modelling approaches. It would be premature to draw firm conclusions, but this is clearly an area that warrants further research to shed light on the behavioural impacts of different types of incentive measures. If the use of EPS targets is found to contribute to underinvestment, or other forms of short-termism, then it would strengthen the case for exploring alternatives to EPS as a performance measure. It would also strengthen the case for replacing LTIPs with deferred share awards as a simpler way of aligning executives with long-term shareholder interests, an approach that was supported by a number of the interview participants.
2. Greater reporting and communication around long-term capital use and allocation would allow investors to better understand and scrutinise company investment and capital plans. This is consistent with the improved reporting on capital allocation recommended in the Investment Association's Productivity Action Plan⁴.
3. If there were a mismatch between the returns which executives are targeting and investors require, this could lead to sub-optimal investment levels. We observed views were divided on this topic and many interviewees considered their target returns to be aligned with investors'. This area could be researched in more detail and more transparency could result in better alignment of return requirements.

⁴ Investment Association (2016). Supporting UK productivity with long-term investment: The Investment Association's productivity action plan.

1. Introduction

This research was commissioned by the UK Government in November 2017, following the response to the public consultation on the corporate governance reform green paper.

The topic of share repurchases has received growing prominence in recent years, in particular the suggestion that repurchases may be contributing to excessive executive pay and/or crowding out investment. While these questions have been studied extensively in the US, the applicability of these findings to the UK is uncertain, despite some institutional similarities in the two markets. To date there has been limited study of the relationship between executive pay, share repurchases and investment using UK data.

The objective of the research is therefore to examine the motivations and impact of share repurchases in order to inform whether there is need for government action. Specifically, the purpose of the research is:

1. To examine the relationship between executive remuneration and motivations to undertake share repurchases. More specifically, to understand whether buybacks are being used to meet EPS targets in CEO remuneration packages and/or to inflate the value of their share awards rather than to create long-term value for the company.
2. To examine the relationship between share buybacks and corporate investment in the UK and to understand whether there is any evidence that share buybacks are having a detrimental impact on company investment, growth and productivity.

The research approach we used is a combination of econometric analysis using a bespoke dataset of FTSE 350 companies, analysis of international trends, as well as a short survey and in-depth interviews.

The rest of this report is structured as follows:

- Chapter 2: “**Context**” provides background context of the research, including the Corporate Governance Reform consultation and the public discussion on the possible relationship between share repurchases, executive pay and investment.
- Chapter 3: “**Concepts**” provides explanations of the key concepts which are referred to and examined in the rest of this report.
- Chapter 4: “**Approach**” describes the methodological approach used to undertake this research, including the literature review, analysis of trends and comparisons, econometric analysis, semi-structured interviews and an online survey.
- Chapter 5: “**Trends and comparisons**” sets out trends in share repurchase activity, executive pay and investment, both in the UK and in comparison to other

countries. It also provides brief descriptions of regulatory regimes for each topic and changes or comparisons over time.

- Chapter 6: “**Executive pay and share repurchases**” presents qualitative evidence on the wider motivations for share repurchases and then presents findings of the first research question for this study: “To examine the relationship between executive remuneration and motivations to undertake share repurchases”.
- Chapter 7: “**Share repurchases and investment**” presents the findings of the second research question for this study: “To examine the relationship between share repurchases and corporate investment in the UK and to understand whether there is any evidence that share buybacks are having a detrimental impact on company investment, growth and productivity”.
- Chapter 8: “**Executive pay and investment**” presents additional findings of a possible direct relationship between executive remuneration structures, specifically EPS targets, and reduced corporate investment.
- Chapter 9: “**Conclusion**” summarises our overall findings and possible areas for future research.

2. Context

This chapter provides background context to this research. The research was initiated due to the growing prominence of the public discussion on the possible relationship between share repurchases, executive pay and investment and the lack of dedicated UK-focused studies to date.

The Government's stated ambition is to maintain the UK's world-leading reputation for corporate governance. This is consistent with ambitions for fairness, competitiveness, and attracting investment.⁵ In order to achieve this, the corporate governance framework is updated from time to time.⁶ The corporate governance framework includes the basic structure of legal and regulatory instruments, as well as codes and principles used by company boards to balance the interests of shareholders.⁷

Corporate governance green paper consultation

The November 2016 green paper set out a range of options to update the corporate governance framework in three main areas including executive pay. The Government received 375 formal responses from a cross-section of business and society.

The Government's response, published in August 2017, stated its intention to take the following actions:

1. Invite the Financial Reporting Council (FRC) to revise the UK Corporate Governance Code (the "Code") to:
 - (a) Be more specific about the steps that premium listed companies should take when encountering significant shareholder opposition to executive pay policies and awards
 - (b) Give remuneration committees a broader responsibility for overseeing pay and incentives across their company

"The UK has long been regarded as a world-leader in corporate governance, combining high standards with low burdens and flexibility. It is an important part of what makes the UK such an attractive place for both business and investors. We want to build on these strengths and further enhance our competitiveness."

"This Green Paper is designed to stimulate a debate on a range of options... We want to use responses to the Green Paper to help us understand the strengths and weaknesses of the different options and build a better evidence base before deciding which of them to develop further."

Corporate Governance Reform green paper, 2016

⁵ HMG (2016)

⁶ HMG (August 2017)

⁷ House of Commons (2017)

- (c) extend the recommended minimum vesting and post-vesting holding period for executive share awards from 3 to 5 years
2. Introduce secondary legislation to require quoted companies to:
 - (a) Report annually the ratio of CEO pay to the average pay of their UK workforce
 - (b) Provide a clearer explanation in remuneration policies of a range of potential outcomes from share-based incentive schemes.
3. Invite the Investment Association to implement a proposal it made in its response to the green paper to maintain a public register of listed companies encountering shareholder opposition to pay awards of 20% or more, along with a record of what these companies say they are doing to address shareholder concerns.

Following a commitment in the governing party's June 2017 manifesto, the Government also announced it would commission an examination of the use of share buybacks to: (i) ensure that they cannot be used artificially to hit performance targets and inflate executive pay, and (ii) consider concerns that share buybacks may be crowding out the allocation of surplus capital to productive investment.

In relation to the secondary legislation on pay ratios and remuneration outcomes in point 2 above, the Companies (Miscellaneous Reporting) Regulations 2018 (the Regulations) were published on 11 June 2018. The new requirements apply to financial years beginning on or after 1 January 2019.

Policy and wider commentary

Executive pay has arguably become one of the main drivers of a lack of trust in business in the UK. Critics voice three primary concerns:

1. That executive pay is not linked to performance and encourages short-term behaviour that is to the detriment of the long-term growth of the British economy;
2. That executive pay has become disconnected from the pay of ordinary working people to an extent that is damaging social cohesion; and
3. That shareholders do not have adequate control over executive pay practices, enabling companies to continue with practices against shareholder interests.

Public discussion on executive pay

Polling evidence shows significant public disquiet in relation to executive pay with two-thirds of the UK population believing that executive pay is generally too high.⁸

While much focus on executive pay relates to pay levels and whether they are too high, there is increasing focus on the behaviours encouraged by current pay structures and whether they may be contributing to the UK's poor productivity performance.

Existing initiatives have addressed this question in its wider form (although not specifically in relation to share repurchases). The Investment Association Executive Remuneration Working Group, which was established in 2015 and reported in the summer of 2016⁹, recommended:

1. Greater alignment of pay structures with company strategy
2. Greater flexibility in shareholder guidelines to enable a lesser emphasis on target-based Long-term Incentives Plans (LTIPs), and instead
3. Greater focus on deferred share awards.

These recommendations led to changes to the Investment Association Guidelines in 2016. However, investors still have mixed views on the merits of a move away from target-based LTIPs.

The Purposeful Company Taskforce¹⁰, established by Will Hutton with support of the Bank of England, undertook an extensive study into executive pay practices in the context of UK Corporate Governance Reform. In summary, the report found that while evidence suggests concerns about executive pay levels and shareholder powers are overstated, there is strong evidence that reform of pay structures is required. The report found a range of evidence that current executive pay structures could indeed encourage short-termism (note that short-termism is defined as insufficient investment in tangible or intangible assets, rather than engaging in repurchases).

A tougher position was taken by the BEIS Committee in the report on their Inquiry into Corporate Governance in March 2017. This raised concerns about the growing lack of trust in business by the general public and linked this to executive pay levels which have become so high that it is “impossible to see a credible link between remuneration and performance”. The report proposed a series of reforms including:

1. To require more specific and accurate reporting on executive pay, better engagement between boards and shareholders.

⁸ PwC (2016), “Time to listen”

⁹ Executive Remuneration Working Group, (April 2016), Interim Report, <https://www.theinvestmentassociation.org/assets/files/press/2016/20160421-execremwginterimreport.pdf>

¹⁰ <http://www.biginnovationcentre.com/purposeful-company>

2. An expansion of the role and powers of the Financial Reporting Council (FRC) to monitor and act on poor compliance.
3. The development of a new governance code for the largest private companies.
4. The phasing out of all LTIPs to be replaced with a more simple pay structure, comprising salary, target-based bonus, and payment by means of equity vesting over long periods.

The recommendation on phasing out LTIPs was not taken up by the Government in the BEIS response to the report and to the Green Paper Consultation. However, it did recommend combined longer holding and vesting periods of five years on LTIPs.

Public discussion on share repurchases

The role of share repurchases and assertions or suspicions about a link to executive pay manipulation, crowding out of investment, or other expressions of short-termism or poor governance has received significant attention in the media. For example:

- (a) The non-peer reviewed Harvard Business Review (2014)¹¹ published an article by William Lazonick argued that there is a clear link between share repurchases to the increasing gap between profits and wages. This article has proven influential in shaping current thinking on buybacks though the claims have been disputed:
 - (i) It points out that 91% of net income goes to dividends and buybacks rather than towards investment or wages. However, net income is already after subtracting R&D and wages, as well as certain other forms of investment (e.g. employee training).
 - (ii) It quotes statistics indicating that most repurchases take place when companies are already over-valued. However, most peer-reviewed academic studies show that repurchases are followed by significantly positive long-term returns, both in the US (Ikenberry, Lakonishok, and Vermaelen (1995)) and around the world, including the UK (Manconi, Peyer, and Vermaelen (2018)).
 - (iii) It argues that buybacks have starved firms of funds and prevented them from investing. However, both capital expenditure and R&D have risen over the past decade and are now at the highest levels this millennium. Cash balances have also grown by 50% over the past ten years, contradicting concerns that firms are starved of cash.
 - (iv) It only studies the S&P 500. Buybacks by firms in the S&P 500 have allowed firms below the S&P 500 raise substantial equity capital. These are smaller firms and thus typically have better investment opportunities.

¹¹ Lazonik, W. (September 2014) <https://hbr.org/2014/09/profits-without-prosperity>

A recent peer-reviewed article by Fried and Wang (2019) uses evidence to dispute both the Lazonick claims and other concerns about buybacks.

- (b) The Financial Times (2017)¹² cites high-profile critics of recent share repurchase increases, including former US vice-president Joe Biden and BlackRock founder Larry Fink who contend that “companies have eschewed growth-boosting investments in favour of short-term share repurchases, increasingly financing them with cheap debt rather than earnings”. On the other hand, it also cites Warren Buffett coming to the defence of share repurchases and saying that “buying back shares makes sense when the market is valuing them at less than the intrinsic value of the company, and when the company has no other pressing need for cash”. Berkshire (Buffett’s own company) has a buyback policy that it will repurchase its shares if their price falls below 120 per cent of its stated book value. Since this has not been triggered for several years, Berkshire has not engaged in repurchases.
- (c) The International Corporate Governance Network (ICGN) report on director remuneration¹³ raises concerns about potential abuses which suggests the need for healthy scepticism about share repurchases by boards and investors. This includes ten market pressures on management and pressures exerted by analysts, traders and competition. However, the report does not go so far as recommending government intervention.

Public discussion on investment and short-termism

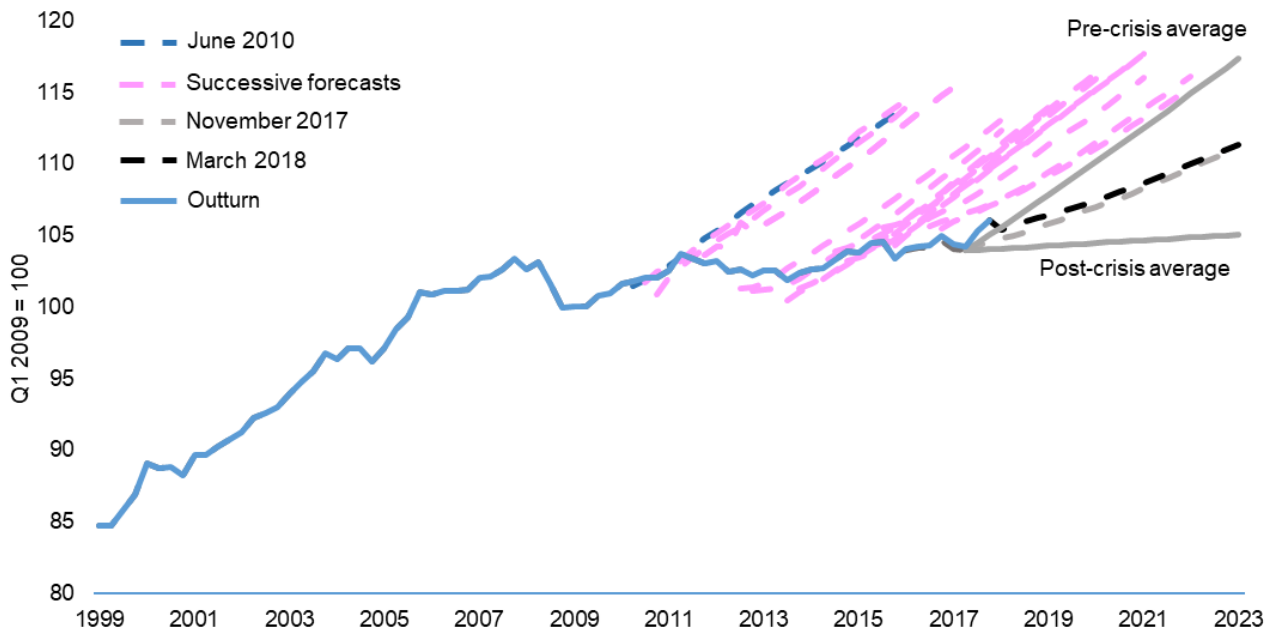
There has been considerable public focus on the low levels of productivity in the UK and the idea that investment and short-termism may be contributing to this.

UK productivity growth has fallen from a 2.1% average annually between 1972-2007 to on average under 0.5% since 2009. Furthermore, British workers produce around 25% less per hour than their counterparts in France and Germany and the gap is widening. In November 2017, the OBR reduced its estimates of long-term productivity growth for the first time.

¹² Financial Times (2017). US buybacks punch below their weight, <https://www.ft.com/content/5550aa1e-fdce-11e6-8d8e-a5e3738f9ae4>

¹³ ICGN (2016). Guidance on Executive Director Remuneration

Figure 2.1: OBR productivity growth (output per hour) – forecast and outturns



Source: OBR Fiscal and Economic Outlook March 2018

In 2012 the Kay review concluded that “short-termism is a problem in UK equity markets, and that the principal causes are the decline of trust and the misalignment of incentives throughout the equity investment chain”. The report did not specifically identify share repurchases as a cause of concern, but it found that equity investment has become increasingly intermediated. Although this is partly due to a desire for greater professionalism and efficiency through specialisation, the report suggests it has also been due to a decline of trust and confidence in the investment chain. This may have contributed to lower than optimal investment.

3. Concepts

This chapter provides explanations of the key concepts which are discussed in the rest of this report, and the basic relationships between them.

Public and private companies

Companies can register in various ways which can be categorised as either “private” or “public”. The shares of public companies are traded publicly, whereas the shares of private companies are not. Public companies can also choose to register on a stock exchange, so that their shares can be traded via that exchange. While public companies can thus be unlisted (not registered on an exchange), this report will, unless stated otherwise, use for brevity the term “public companies” to mean “public listed companies”.

Public companies have to follow the requirements set by the exchange, such as the FCA Listing Rules, and the UK Corporate Governance Code. Furthermore, UK-incorporated public companies that are listed on stock exchanges in London, Europe or New York (defined as “quoted” companies in the Companies Act) are subject to further regulations on corporate governance, including executive pay. UK-listed companies that are not incorporated in the UK are not generally subject to these further regulations, although they typically comply with them on a voluntary basis, and so we do not make a distinction in the summary of the regulatory environment provided below.

As share repurchases are largely a public company phenomenon, we focus our analysis in this report on public companies.

UK company governance

The governance and legislation of executive remuneration, share repurchases and investment has been developed over a number of years, particularly in the 2006 Companies Act, which had the distinction of being the longest Act in British Parliamentary history. This included sections on Director’s responsibilities. Consequently, the broad responsibilities in relation to executive remuneration, share repurchases and investment are set out in Table 3.1.

Table 3.1: Rights and responsibilities of company stakeholders in public companies

Company stakeholder roles	Executive remuneration	Share repurchases	Investment
Shareholders	Approve 3-year executive pay policy and any new pay plans that are long-term or involve payment in shares. Annual non-binding vote on executive remuneration report.	Approval required for substantial share repurchases.	Approval required for investment requiring shareholder action (e.g. acquisition, rights issue). Consulted on large investment decisions.
Board of Directors	Responsibility to appoint RemCo which sets executive remuneration subject to required approvals.	Sets proposed share repurchase programme.	Sets company investment strategy, which may be implemented by executives or managers.
Remuneration Committee	Delegated responsibility to set executive remuneration.	Ensure executive pay is designed to promote long-term success of company	

Source: PwC

Shareholder payouts

Shareholder payouts are payments made by companies to shareholders. Payouts are usually approved by the board of directors (although AGM approval may also be requested) and are made out of company profit once all other payments have been made.

We define “payout” as covering the following:

1. **Dividends:** regular (usually annual dividends) or one-off payments (special dividends) of cash to shareholders;
2. **Scrip dividends:** issue of additional shares to existing shareholders; and
3. **Share repurchases:** payments to shareholders in exchange for their shares.

A share repurchase, or share buyback, occurs when a company buys its own shares from existing shareholders. These shares can then be cancelled, held in treasury to reissue in the future, or used in the business, for example to pay staff with shares. Share repurchases by publicly listed companies are usually managed by a broker and take place through the purchase of shares on the stock exchange (“open market repurchase programmes”). They can also take place through a structured offering to existing shareholders (“tender offers”) where all shareholders who take up the offer receive the same fixed or minimum price. Repurchases by private companies, which usually have a much smaller number of shareholders, take place through direct invitations to sell shares.

The primary motivations for these transactions is the transfer of ownership between shareholders.

It is helpful to clear up some common misperceptions about repurchases. Some commentators view repurchases as a free gift to shareholders, potentially because they are included within the term “payout”. However, a share repurchase is far from a free gift.¹⁴ In return for receiving cash, the shareholder no longer owns her shares, and thus has no claim to the future dividends. A repurchase reduces the amount of dividends that a company needs to pay in the future, potentially freeing up funds for investment. It is similar to a company repaying a loan – in return for receiving cash, the bank has no claim to future interest payments, potentially freeing up funds for investment. In addition, some commentators claim that shareholders “demand” buybacks to allow them to cash in their investment. However, note that shareholders can already sell their shares at any time, to other (new or existing) shareholders, by trading them on an exchange. A shareholder does not need a company to engage in a buyback to be able to sell their shares. It is, however, possible for a repurchase to increase the short-term stock price and allow selling shareholders to sell shares at a higher price.

In perfect markets, where shares are always correctly valued, there are no taxes, and executives are fully aligned with long-term value, repurchases would have no effect on firm value. However, in reality, markets are not perfect and repurchases can affect firm value through the following channels (non-exhaustive):

- *Agency problems.* These occur when executives’ incentives are misaligned with long-term value creation. The effect depends on the specific nature of the agency problem.
 - *Empire-building.* If a firm has surplus cash (i.e. has already taken all its profitable investment opportunities), executives may be tempted to invest in unprofitable opportunities to increase the size of their firm. Using the cash instead for repurchases increases both short-term and long-term value.
 - *Short-termism.* Even if the firm has not taken all its profitable investment opportunities, executives may be tempted to engage in repurchases to boost short-term value at the expense of long-term value. This may occur if they are paid according to short-term performance measures.
- *Underpricing.* If the firm’s shares are currently underpriced, buying back shares creates value for continuing shareholders at the expense of selling shareholders.
- *Taxes.* Repurchases may or may not be a tax efficient way of distributing capital to shareholders, as will shortly be discussed.

¹⁴ Similarly, dividends are not a free gift to shareholders. While the shareholder receives cash today, the value of the firm (over which she has a claim) is now lower. This is similar to withdrawing money from a savings account – while the saver receives cash today, her account balance is now lower.

Although in theory both share buybacks and dividends have the same impact on the overall capital structure of the company, there are three important practical differences:

- Share buybacks will trigger a capital gains tax liability for selling shareholders, whereas dividends are generally taxed as income. Which is most beneficial will depend on the circumstances of the shareholder.
- Dividends are sticky, in that the market expects regular dividends to be maintained or to grow steadily. A dividend cut typically leads to a large stock price fall. In contrast, repurchases are flexible. A company can engage in a large repurchase one year without the market expecting a repurchase the following year.
- Dividends are paid to all shareholders, whereas repurchases only lead to capital being returned to selling shareholders. In a repurchase, a shareholder automatically retains her full investment in the firm absent an active decision to sell their shares during the repurchase. The shareholders who choose to sell are likely the ones with least buy-in to the firm's long-term mission (hence their decision to sell), and so the repurchase concentrates ownership among shareholders with most buy-in. A dividend reduces a shareholder's investment in the firm unless they makes the active decision to use the dividend to buy additional shares.

The effect of payout on capital structure and EPS

Paying dividends and repurchasing shares have identical effects on a company's capital structure – both reduce the amount of cash on the balance sheet. Dividends have no effect on EPS – they do not affect earnings (as they are paid out of earnings), and they do not affect the number of shares outstanding. In contrast, repurchases reduce earnings, as the cash used to repurchase shares no longer earns interest. They also reduce the number of shares outstanding. Note that, contrary to the common assumption, repurchases do not automatically increase EPS, because either effect may dominate. Repurchases increase EPS only if the earnings yield of the stock (EPS divided by the share price) exceeds the post-tax interest rate on the cash used to finance the repurchase. This condition is less likely to be satisfied for firms that generate low earnings, which are typically growth firms with the strongest investment opportunities, as well as for undervalued firms. Thus, a large increase in EPS need not signal that a repurchase was value-destructive. Indeed, the increase in EPS from a repurchase could be legitimate. If a company no longer needs a bank loan (due to having already undertaken all of its good investment opportunities), it repays it. Doing so increases its future EPS because it no longer owes interest. Similarly, if a company no longer needs all its equity (due to having already undertaken all of its good investment opportunities), it buys back some shares. Doing so legitimately increases its future EPS because selling shareholders no longer have a claim on its future profits.

Executive pay policy and structures

This section briefly describes the typical components of executive pay in the UK and the governance structures used to implement this.

The different components of executive pay

Executive compensation packages in the UK are typically split into some, or all, of the following components:

1. **Base salary, pension and benefits** – this includes all benefits typical of most employee compensation schemes, including health insurance.
2. **Bonus (annual and deferred)** – annual bonuses are typically included with performance measures applied over a single year, and typically based mainly on financial measures (such as profit, sales, or cashflow) but with a significant weighting to non-financial measures (such as customer satisfaction, employee engagement, or key strategic priorities).
3. **Long term incentive plan (LTIP)** – these are multi-year pay plans (typically three-year plans) that vest¹⁵ in the third year based on performance over the three-year period. LTIPs aim to reward executives' delivery of long-term shareholder value and are typically paid out in shares.
4. **Deferred matching award (DMA)** – some companies provide executives with the opportunity to invest part of their bonus into shares, which then is matched by an additional LTIP award known as a deferred matching award.
5. **Shares and share options** – shares and options are typically granted within the awards above, although with share options now at much reduced prevalence.

Typically, in the FTSE 350, CEOs are granted an LTIP award each year, and so have up to three outstanding LTIPs due at any one time, due to vest within 1, 2, and 3 years respectively. The LTIPs have the following characteristics:

- (a) Each LTIP has a number of performance conditions that need to be met, but most commonly two or three.
- (b) Each condition is worth some specified fraction of the overall LTIP.
- (c) Commonly used performance metrics include EPS, total shareholder return (TSR) and return on capital employed (ROCE).
- (d) Each LTIP specifies a total award potential, a “threshold” target, and a “maximum” target for each performance condition component. If these targets are met, either a specified fraction or the entirety of the performance condition's component is paid out.

¹⁵ Vesting is the process by which an employee becomes entitled to the benefits of the remuneration award.

- (e) If the firm’s performance falls between these two targets, linear interpolation is typically used to work out the vesting attached to the particular performance condition.
- (f) The remuneration committee has some discretion to finalise the award.

Since each LTIP measures performance typically over a three-year period, CEOs can frequently have as many as nine LTIP targets “in-play” at any point in time.

EPS measures in LTIPs

Where EPS is included as an LTIP target it frequently has a significant weighting, and it would typically apply to between one-third and half of the award. The performance scale is most commonly based on compound annual growth in EPS over the three-year performance period, measured relative to the base year. The following example illustrates an award made in early 2018, which vests in early 2021:

Table 3.2: Illustrative performance scale for EPS growth

EPS compound annual growth from 2017 to 2020	Proportion of award linked to EPS that vests to 2020
Below 5% pa	Nil
5% pa	20%
10% pa or more	100%

Source: PwC

In this example, the proportion of award vesting would vary pro-rata between 5% and 10% pa EPS growth.

Because EPS growth is measured on a compound growth basis relative to the base year, in practice the vesting is based only on the EPS in the final year. In the example above, EPS in 2018 and 2019 does not affect the vesting of the award – only EPS in 2020. However, because an executive will typically have three awards outstanding at any time, taking mid-2018 as an example an executive would have:

- an LTIP due to vest in early 2019 based on 2018 EPS;
- an LTIP due to vest in early 2020 based on 2019 EPS; and
- an LTIP due to vest in early 2021 based on 2020 EPS.

There are many variations on the above, with some companies using an average EPS figure over a number of years, or targeting a specific EPS figure rather than a compound

growth rate. However, the example above is strongly representative of normal market practice.

The definition of EPS used may be statutory EPS or may be an underlying EPS number, which might be adjusted for a number of items including:

- exceptional items;
- restructuring;
- currency movements.

UK regulation on executive remuneration

Company pay policies and reporting on executive pay is regulated by the Companies Act (2006). By this Act, company directors have the duty to promote the success of the company. Under the current regulations (2013), quoted companies (i.e. UK-incorporated companies listed on stock exchanges in the UK, Europe EEA or New York) must subject their pay policy to the shareholder AGM at least every three years for binding vote. They also have to report on actual pay-outs from awards annually in the format shown below, for shareholder advisory vote.

Table 3.3: Single Total Figure Table for reporting on executive remuneration awarded in a given year, as required in secondary legislation

Single Total Figure Table for the relevant financial year						
	Salary and fees	Taxable benefits	Money/assets based on targets achieved in relevant financial year	Money/assets based on multi-year targets with final vesting targets achieved in relevant financial year	Pension related benefits	Total of the previous columns
Director 1	XXX	XXX	XXX	XXX	XXX	XXX
Director 2	XXX	XXX	XXX	XXX	XXX	XXX

Source: Summarised from http://www.legislation.gov.uk/ukxi/2013/1981/pdfs/ukxi_20131981_en.pdf

Directors' Remuneration Reports are also required to include a very significant amount of additional information relating to the remuneration policy, maximum award levels, actual awards made during the year that will vest in future years, performance targets and measures. The executive pay policies of public companies are also governed through the Listing Rules of the UK Listing Authority (The FCA). These rules require premium-listed companies to apply the corporate governance code, which is governed by the Financial Reporting Council (FRC) and whose provisions apply on a "comply or explain" basis.

The corporate governance code specifies the following principles for executive remuneration:

1. Executive directors' remuneration should be designed to promote the long-term success of the company; and
2. There should be a "formal and transparent procedure" for developing policy on executive remuneration and for fixing the remuneration packages of individual directors.

Companies are also required by the code to establish a remuneration committee which has delegated responsibility for setting remuneration for all executive directors. Shareholders should be invited specifically to approve all new long-term incentives schemes (LTIPs) and significant changes to existing schemes. The "Listing Rules" specify the content of information about LTIPs which has to be disclosed to shareholders.

Investment

Investment is the accumulation of capital to use in production. This includes both physical capital and human capital. Investment enables businesses to expand and become more productive. It is an important source of economic growth at a national level.

In the UK, data on investment is measured at a national level by the Office of National Statistics and at the level of individual businesses in their company accounts.

1. The national data on investment includes "gross domestic fixed capital formation"¹⁶ and "business investment". The ONS also reports aggregate expenditure on R&D.
2. Individual businesses report on capital expenditure (CapEx) in their accounts and may separately report expenditure for R&D. Intangible investments and training are not always captured in company accounts.

The different types of investment are categorised differently for accounting purposes and therefore have a different direct relationship with the performance measures used in executive contracts. This study has focused on CapEx since this is the type of investment for which data is available in a comparable format based on annual accounts. The drawback of this approach is that it omits increasingly important sources of investment from intangible sources (e.g. brands, intellectual property etc.)

Businesses make their investment decisions on the basis of a range of strategic and tactical considerations. Chief of these is the cost of investment compared to the expected return through increased profits, which can be compared to alternative investment options.

¹⁶ Gross domestic fixed capital formation (GDFCF) is a macroeconomic concept used in official national accounts. GDFCF is a component of the expenditure on gross domestic product (GDP), and represents how much of the new value added in the economy is invested in fixed assets and other capital. Business investment does not include investment by central or local government, investment in dwellings, or the costs associated with the transfer of non-produced assets (such as land).

4. Approach

This chapter describes the methodological approach used to undertake this research. The research was conducted by PwC in collaboration with Professor Alex Edmans of London Business School. The main elements were: (1) a review of academic literature on the three topics of study and relationships between them, (2) examination of trends and international comparisons, (3) econometric analysis using a new, bespoke 9-year dataset of data on FTSE 350 companies, (4) qualitative analysis in the form of an online survey and interviews with senior executives.

The topics of share repurchases, executive pay and investment have received considerable study independently from each other. However, there has been more limited study of the specific relationships between them using UK data. Furthermore, the relationships between any pair of variables are complex. Causality may be in either direction (*reverse causality*) or a third, unobserved variable may drive both (*omitted variables*). As an example of reverse causality, rather than the desire to engage in a share repurchase crowding out investment, it may be that a firm first chooses to cut investment, due to a poor economic outlook, and then repurchases with the surplus cash. As an example of omitted variables, rather than EPS targets causing a firm to cut investment, it may be that poor firm performance both leads to low investment and also the imposition of EPS targets to turn the firm around. This makes disentangling the direct impact of share repurchases on executive pay, and share repurchases on investment, challenging.

Therefore, this study aims to expand the UK evidence base using a combined econometric and qualitative approach. Suggestions for future research are outlined in Chapter 9.

Literature review

We supplemented the main academic papers on these topics with a thorough search using databases such as EconLit, JSTOR, and SSRN, as well as using our connections to leading academics in these areas. We critically scrutinised the relevance of the papers according to their methodology, quality of journal, time-frames, and relevance of data and measured outcomes.

The final review covered over 50 studies. Most of these are from the US. This is not so much due to an academic bias towards the US but the fact that repurchases are much rarer outside the US. In many continental European countries, many companies do not have to disclose share buyback authorisations (leading to limited data), or repurchases were illegal until relatively recently.

Wherever possible, we focused our literature review on papers published in the top finance journals. These papers typically take 3-5 years to write and revise, to rule out alternative explanations and to verify the rigour of their results. Such journals only accept a small percentage of submitted papers (typically around 5%) and so provide a stringent quality standard. Our literature review is summarised in Appendix A.

Trends and comparisons

We collected secondary data on our topics of interest from the UK and three comparison countries. This included quantitative data on share repurchases, investment and related outcome variables, and qualitative information on different regulatory regimes. The quantitative data were compared between countries and, within the UK, between companies with different groups of characteristics. We analysed the implications of this information based on our knowledge of economics, finance, remuneration and tax.

Table 4.1: Comparison countries used and the reasons for choice

Comparison country	Reason for choice
US	Prevalent use of share repurchases and significant amount of existing research on share repurchases
Germany	European economy with strong productivity performance
Australia	Full dividend imputation system may alter incentives around shareholder payouts
Canada	Alternative non-EU advanced economy

The quantitative data used were drawn from the ONS, Capital IQ, and PwC’s executive remuneration database. The Capital IQ data was based on companies which were in the FTSE 350 in 2016, after dropping firms in selected industries such as banks, investment trusts, real estate investment trusts and real estate management and development. For more detailed information on data see Appendix B. The qualitative information on regulatory regimes was drawn from original documents of the regulatory entities responsible, and the OECD.

Econometric analysis

The literature review found considerable evidence on the determinants and consequences of repurchases, including the “effect” of executive pay on repurchases and the “effect” of repurchases on investment.

However, disentangling these effects is difficult, since, as outlined at the start of this section, all three variables affect each other, and the relationship between any pair of variables is complex due to reverse causality and omitted variables. In addition, it is difficult to make strong efficiency judgements – cuts in investment may be efficient if investment opportunities are poor. Since most existing research is on US data, we created a new UK bespoke dataset and analysed it based on specifications used in the academic literature. This also enabled us to test relationships in a UK context for comparison with existing US-based research.

Data

We created a bespoke annual panel dataset by merging selected financial variables from Capital IQ with PwC’s executive remuneration database. The key characteristics of the dataset are outlined in Table 4.2 below. We used this dataset to construct further indicators used in the econometric analysis.

Table 4.2: Panel data used for econometric analysis

	Financial variables <i>From Capital IQ</i>	Executive pay variables <i>From PwC’s executive remuneration database</i>
Number of variables	40+	180+
Years covered	2007-2016	2009-2016
Key types of variable used:	<ul style="list-style-type: none"> Financial constraints, such as firm’s cash position Measures of financial performance, such as operating profit and share price EPS performance measures Shares and shareholder details CEO details 	<ul style="list-style-type: none"> CEO salary Package composition details Annual bonus details LTIPs including measures and target ranges Other CEO pay plans

Analysis of the effect of executive pay incentives on share repurchases

We conducted two main types of analysis:

1. General regression analysis documenting the correlation between incentives and repurchases, while controlling for observed variables that are correlated with both. However, this methodology can only document correlation, rather than causation –

there may be reverse causality from repurchases to incentives¹⁷, or omitted variables (that are unobservable, and thus we cannot control for) may drive both.

2. Discontinuity based regression analysis around the executive pay target thresholds aiming to uncover any causal relationship. This compares the repurchase activity of firms just above and below targets for EPS and TSR performance. The rationale is that whether a firm is just above or just below an EPS target is unlikely to be caused by omitted variables.

Within the general regression analysis, we used three main econometric approaches:

- (a) Linear regression analysis to examine the impact of executive pay incentives on the mean level of repurchases.
- (b) Quantile (median) regression analysis to examine the impact of executive pay incentives on the median level of repurchases. This method is more robust to large outliers in the data.
- (c) Logistic regression model to examine the impact of executive pay incentives on the probability of a firm undertaking repurchases.

The general model structure, choice of variables (including control variables), model selection criteria, hypothesis testing procedure and standard error choice are all identical for the first two analyses, with slight variation for the logistic regression case. We used two independent variables: (i) A binary indicator of whether or not the firm had an LTIP containing an EPS target due to vest that year; (ii) The fraction of CEO pay in the LTIP that could come from hitting an EPS target, in the event of a maximum payout.

We control for company characteristics, such as sector, size and CEO details. We also control for time-effects in all cases to capture the effect of common shocks and trends in share repurchases and investment (i.e. interest rate changes and other relevant macroeconomic effects). Our time variable is defined at the semi-annual level, where each firm-year observation is allocated to the semi-annual period in which their financial year is closest to.

Analysis of the effect of executive pay incentives on share repurchases and investment

We examined the relationship between repurchases and investment using two methodologies analogous to the previous section.

1. General regression analysis documenting the correlation between repurchases and investment. This analysis is similar to the model used to estimate the

¹⁷ For example, if repurchases create long-term value, a CEO who has undertaken repurchases might be more willing to accept stringent performance conditions.

correlation between investment and repurchases, simply changing the dependent and independent variables of interest.

2. Discontinuity based regression analysis aiming to document a causal effect of repurchases on investment.

The discontinuity analysis aims to identify a causal relationship by studying whether repurchases by firms that would have been just below the EPS target (rather than repurchases in general, which may be driven by many other factors) lead to cuts in investment. The main caveat is that any relationship may arise from the desire to meet the EPS target directly reducing investment, rather than indirectly reducing investment through encouraging repurchases. In other words, it may be the EPS target rather than the repurchase that is the driver of any investment cut.

Qualitative insight

We complement the econometric analysis with qualitative information on the behaviour and views of company leadership and wider stakeholders (e.g. consumer groups, industry associations and policy think-tanks). The qualitative insight covers both relationships in our study, with a particular focus on identifying the causality of any relationships. The qualitative analysis consisted of semi-structured interviews and a survey.

Interviews

The qualitative interviews provided an opportunity for more in-depth discussion with senior company executives and wider industry stakeholders (e.g. consumer groups, industry bodies and policy think tanks).

Interviewees were targeted at FTSE 350 companies, as this is where the majority of share repurchase activity takes place, but with a spread to reflect a variation in company size, industry and share repurchase history. Most of the company interviews were conducted at C-suite level (primarily CFOs) or with non-executive directors.

The interviews were semi-structured based on a set of core questions around processes and opinions on the link between share repurchases, executive pay and investment.

All interviews were held in anonymity. No views are attributed in this research paper unless the individual has already put these views in public print or agreed to be quoted.

In total we completed 17 qualitative interviews.

Table 4.3: Summary of interviews completed

Interview audience	Interviews completed
UK-listed companies	9
Investors and financial market participants	3
Wider policy stakeholders	5
Total	17

Survey

In addition to the interviews, we carried out a survey to elicit qualitative insight on company demographics, behaviour, and opinions. We drew on previous surveys such as that used in the academic survey by Brav et al. (2005), on the motivation for dividends and repurchases, to guide question design. Previous research, e.g. Brav et al. (2005), found that executives freely admit to cutting investment to maintaining the current dividend level, attenuating concerns that executives will not truthfully acknowledge short-termist behaviour when responding to a survey.

The survey was programmed using specialist Qualtrics software by PwC Research and with a targeted completion time of five minutes. The survey questions are provided in Appendix D.

The survey was distributed to several hundred senior company contacts (primarily CEOs and CFOs) through the relationship channels of PwC, BEIS and the CBI. We distributed the survey to responders to PwC's annual CEO Survey and from our Customer Relationship Management system to target over two hundred FTSE 350 C-Suite level executives. We also used PwC events to distribute the survey.

We reviewed (and discarded) the responses for (i) duplicates, (ii) fast completes, and (iii) incompletes. We then prepared overall results for each question. The final number of responses accepted was 73. Of these, around a third had repurchased shares in the last three years. We estimate a total electronic response rate was 14%. This is about twice the electronic response rate obtained by Brav et al.

Our approach therefore seeks to combine econometric and qualitative insight to the research questions. In each area we have sought to use best practice academic techniques, as informed from our literature review. In the next chapter we set out broad trends and comparisons in relation to share repurchases, executive pay and investment. This draws heavily on data analysis. In the following three chapters we make full use of all the research techniques to address the research questions. Different readers may place more weight on particular research methodologies and so we do not appraise their relative merit ourselves. Rather, we report all our findings across the different research techniques,

and our conclusions are strengthened when consistently supported by all research techniques.

Interpretation

In interpreting results the reader should therefore consider:

- The **significance** of the results. Normally results that find a relationship between two factors (e.g. buybacks and investment) are deemed statistically significant if there is only a 5% chance of the results having arisen by chance in the absence of a relationship between the factors. Significance can be measured to a less onerous standard, for example 10%, but should be considered less conclusive (for example, tossing just four heads in a row rejects the hypothesis that a coin is unbiased at the 10% confidence level).
- The **internal consistency** of the results. Results that arise from a single model specification or type of analysis should be considered less robust than those that are supported under many different specifications and viewpoints. Cherry-picking of particular results or findings should be avoided.
- The **external consistency** of the results. Results that are consistent with other studies, using different approaches, at different times, or in different (but comparable) countries should be accorded more confidence than those that appear to produce 'rogue' results.
- The **coherence** of the results. Judgement is applied to assess whether results are coherent or not in the context of plausible explanations for the channels by which effects may be carried. For example, if share buybacks are of a size that has a very material impact on EPS target outcomes, then it is **more** coherent to expect that decision making may be distorted by share buybacks than if the impact of a buyback is very small compared with other actions such as cutting costs.

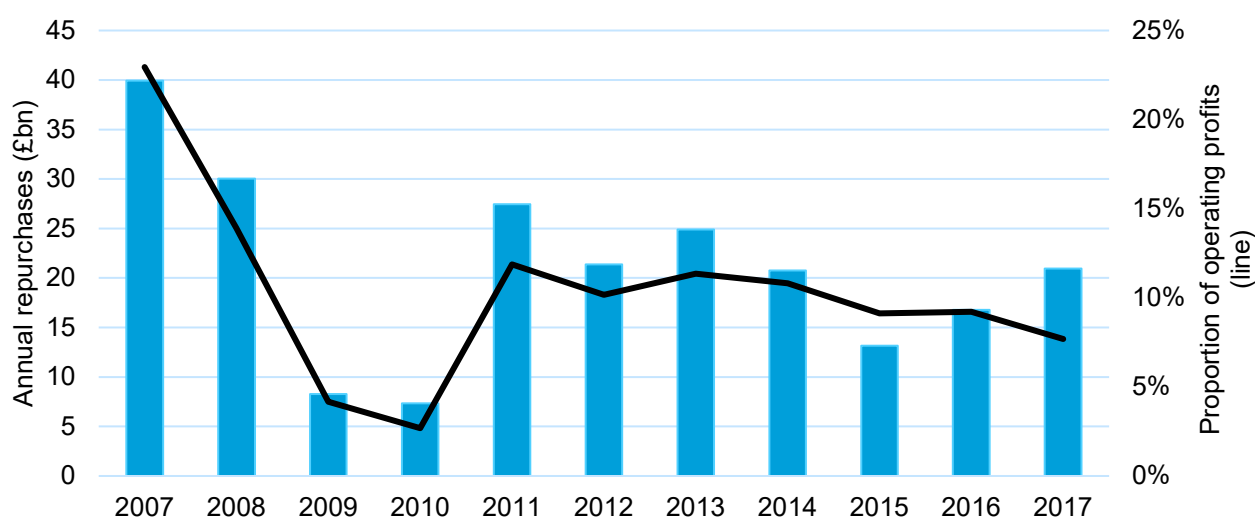
5. Trends and comparisons

This chapter sets out trends in use of share repurchases, executive pay and investment, both in the UK and in comparison to other countries. It also provides brief descriptions of regulatory regimes for each topic and changes or comparisons over time.

Trends and comparisons in use of share repurchases

The amount of UK share repurchases varies considerably over time. Figure 5.1 sets out the total for UK share repurchases over the period 2007 to 2017, as well as the proportion of operating profit (for those firms repurchasing shares).

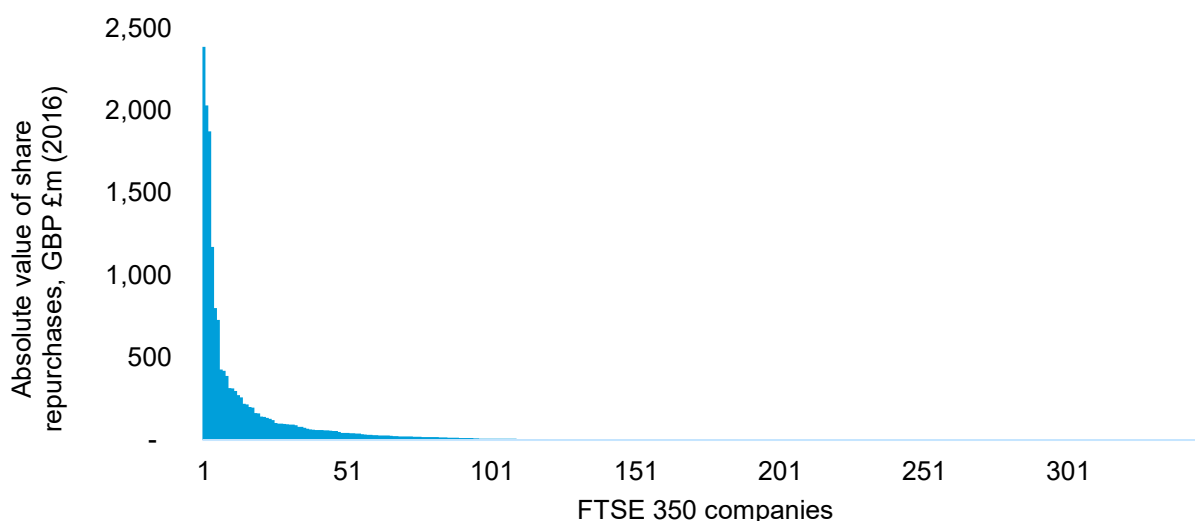
Figure 5.1 Share repurchases in the UK 2007-2017



Source: Capital IQ

Annual UK share repurchases peaked in recent years in 2007 at around £40bn. They fell substantially during the global financial crisis and then recovered from 2011. Note that this shows that repurchases are readily cut in difficult economic conditions, attenuating concerns that firms may cut investment to maintain historic repurchase levels. In recent years they have been broadly stable, but have represented a declining share of operating profits for those companies that have repurchased shares.

Figure 5.2 presents the distribution of share repurchases across all FTSE 350 firms. In 2016, 162 companies conducted share repurchases and out of the ones that did, 62 had share repurchases larger than 1% of market capitalisation. This demonstrates that share repurchase activity is skewed towards a relatively small number of UK companies in any given year.

Figure 5.2: Distribution of share repurchase activity across the FTSE 350¹⁸

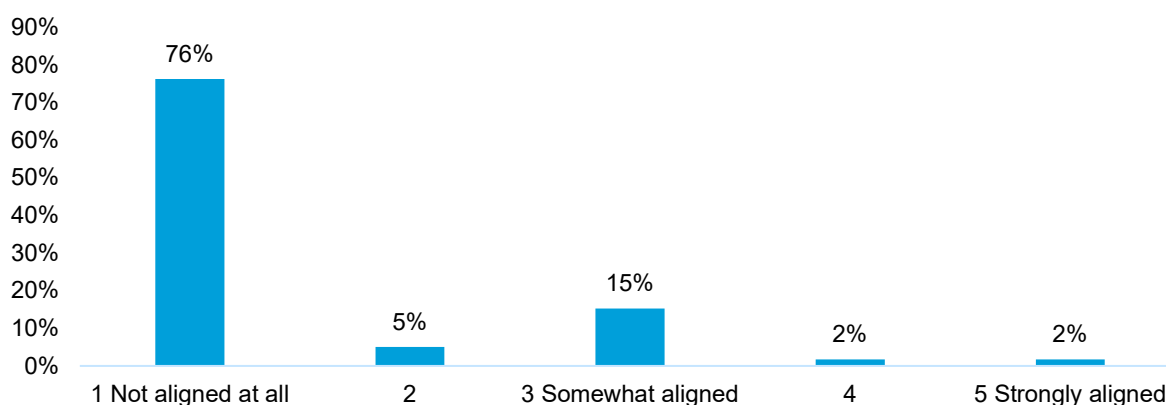
Source: Capital IQ

Share repurchases are evident across all industry sectors. The top five largest share repurchasers in the UK in 2016 were Melrose Industries (£2,389m), HSBC (£2,032m), Carnival (£1,874m), Scottish and Southern Electricity (£1,173m) and Reckitt Benckiser Group (£802m), but the identity of the top five varies from year to year. While some companies are regular repurchasers of shares, others are far more intermittent. One of our interviewees had recently launched a share repurchase programme following a gap of 11 years.

This data is also supported by the results of our survey on company opinions. We asked senior company executives whether the statement “repurchases have become more important to us in recent years” aligned with their views. 76% of companies indicated that it did not align with their views at all, so few consider that share repurchases have become more important in recent years.

¹⁸ FTSE 350 repurchases as a fraction of FTSE All-Share repurchases is around 97% (Source: Capital IQ).

Figure 5.3: To what extent does this statement align with your company's views: "share repurchases have become more important to us in recent years."



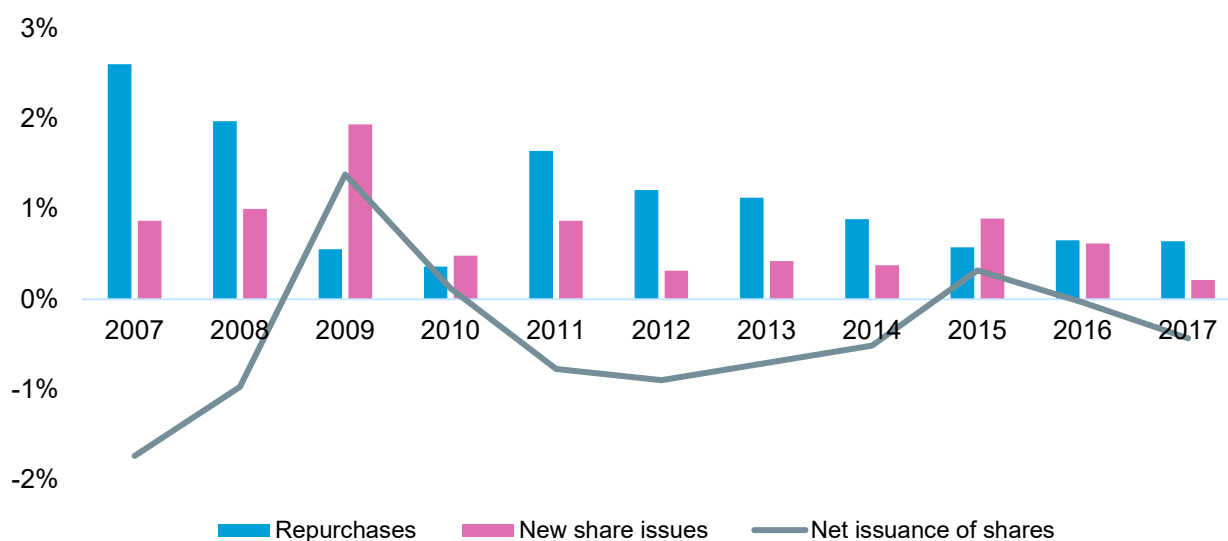
Source: PwC Research Survey Results

Share repurchases represent one flow of returns to investors (alongside dividends). They can also be compared to the issue of new shares through rights issues¹⁹ in order to determine whether share repurchasers also issue shares and therefore have an active management of their share capital, or whether share repurchasers tend to be mature companies who do not issue new equity.

Share repurchases and new share issues are not typically undertaken by the same companies at the same time, but there are few companies (only 5) in our FTSE 350 sample who have not undertaken both new share issues and share repurchases over the period 2007 to 2016. This suggests most companies are both returning capital to shareholders and raising new capital and are therefore dynamically managing their share capital as needs vary.

Figure 5.4 compares total share repurchases and total new equity from rights issues since 2007. The grey line shows the net issuance of shares (issuance – repurchases).

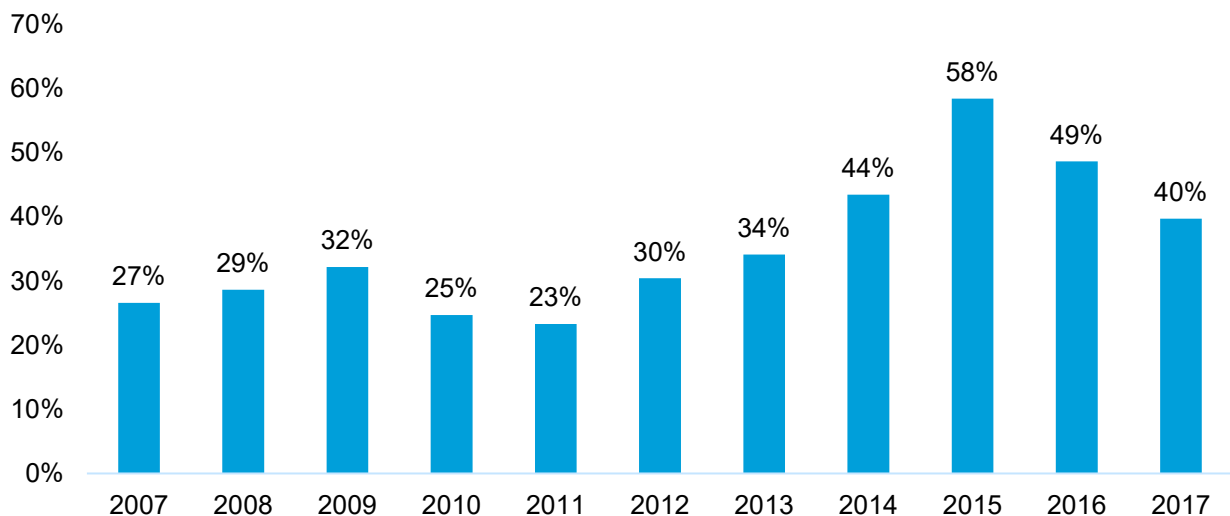
¹⁹ This excludes new share issues at IPO for newly listed corporations.

Figure 5.4: Comparison of share repurchases with new share issues in the UK

Source: Capital IQ. All units are expressed as a percentage of average market capitalisation.

In recent years net issuance of shares has mostly been negative, indicating that more shares are being repurchased than are issued. However, the average net value is less than 1% of market capitalisation. In terms of impact on EPS, as described in Chapter 4, the positive impact of reduced number of shares on EPS is offset by the increased interest cost arising from increased net debt on the balance sheet. Which effect dominates depends on how the earnings yield compares to the company's net of tax interest cost. However, the impact on EPS is always less than the proportion of shares repurchased, because of the offsetting loss of interest or investment return on the cash remitted to shareholders. This immediately shows that the size of share buybacks that are typical in the UK market are likely to increase EPS by significantly less than 1% on average. Such a change in EPS will typically change the pay-out from an LTIP by the order of just a few percentage points, unless the change makes the difference of crossing the minimum payment threshold.

Comparing share repurchases to dividends, UK firms pay out a significantly larger proportion of their income in dividends (with an average of 36% compared to average repurchases of 11%).

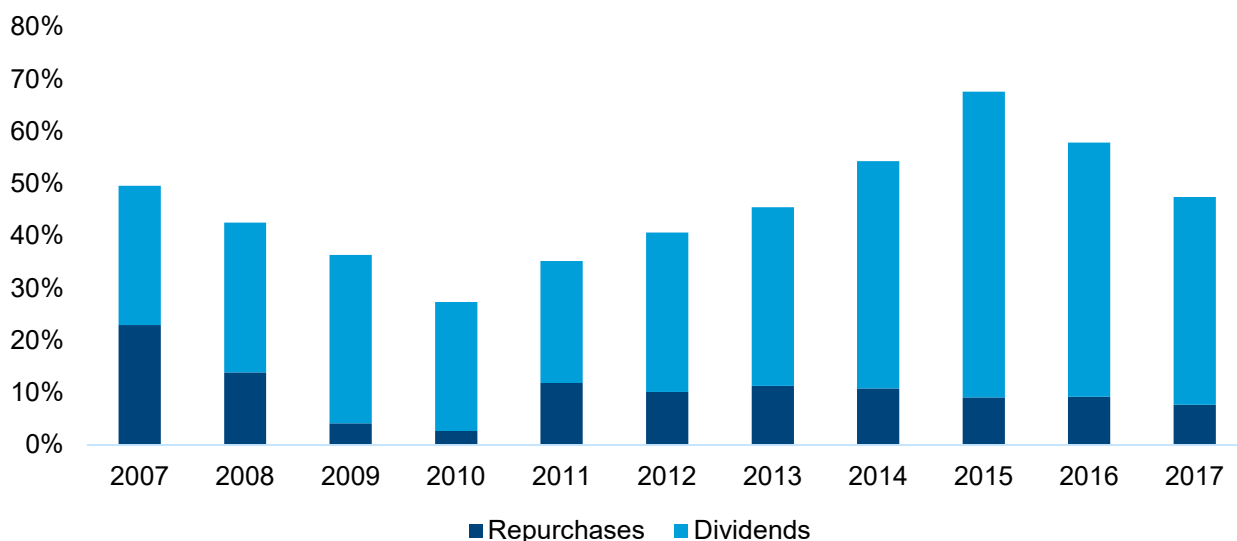
Figure 5.5: Dividends as a proportion of operating income (FTSE 350)

Source: Capital IQ

After a reduction during the period of the financial crisis, the proportion of operating income paid as dividends rose to a recent peak in 2015 of 58%. Notably, dividends as a proportion of operating income rose slightly in the financial crisis, whereas Figure 5.1 showed that repurchases fell significantly. This illustrates an advantage of repurchases over dividends – their flexibility – and attenuates concerns that they crowd out investment.

Overall, the increase in dividends has more than offset the recent gradual decrease in share repurchases. Total shareholder payouts as a proportion of operating income (consisting of both share repurchases and dividends) peaked in 2015, as shown in Figure 5.6. The most striking feature of Figure 5.6 is that repurchases are small compared to dividends. This is consistent with our subsequent econometric analysis, which shows that repurchases were too small to allow any firm, within our sample period, to hit an EPS target that it would have missed otherwise.

Figure 5.6: Total UK shareholder payouts as a proportion of operating income



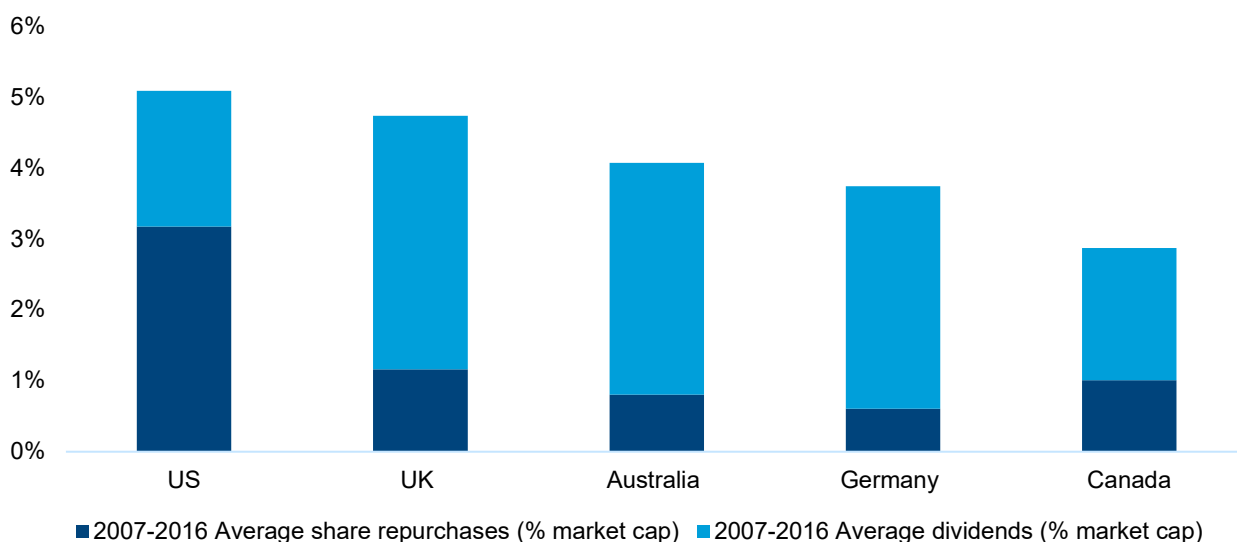
Source: Capital IQ

International comparisons

In this section, we compare share repurchases by firms in the UK to other advanced economies, namely US, Germany, Canada and Australia.

Figure 5.7 provides a comparison of total shareholder payouts as a percentage of market capitalization across the five countries examined. This is based on the annual average over 2007-2016. The UK has the second highest percentage of total payouts, after the US. Canada has the lowest percentage of total payouts, however the percentage of share repurchases is only slightly less than in the UK.

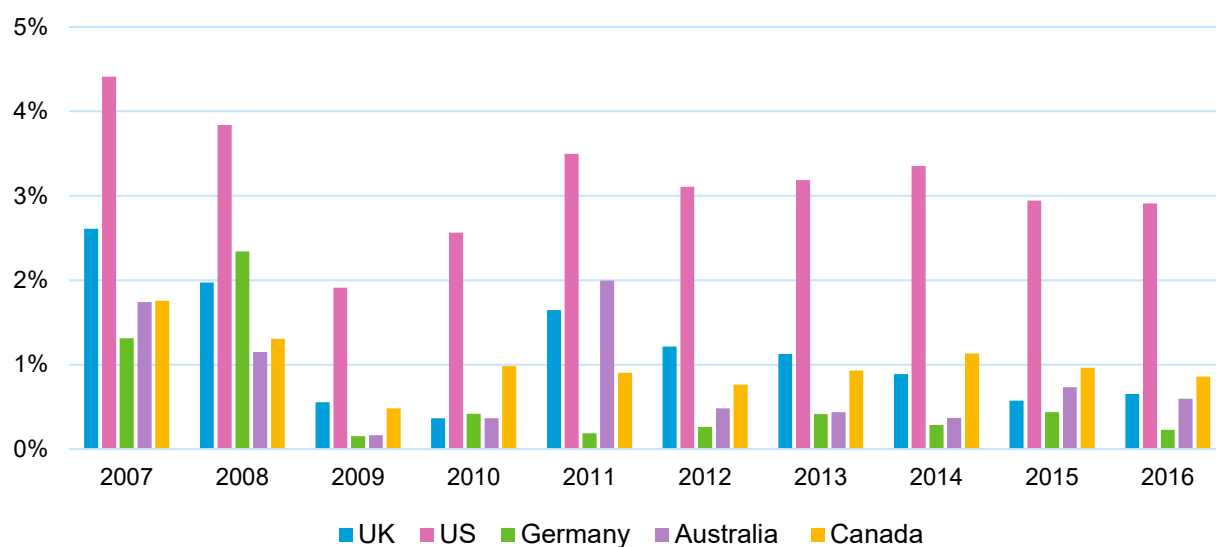
Figure 5.7: Comparison of total shareholder payouts by country, 2007-2016 average



Source: Capital IQ

Figure 5.8 provides a comparison of share repurchases as a percentage of market capitalisation in the UK compared to the US, Germany, Australia and Canada. All countries followed the cyclical pattern observed in the UK.

Figure 5.8: Repurchases as a proportion of market capitalisation

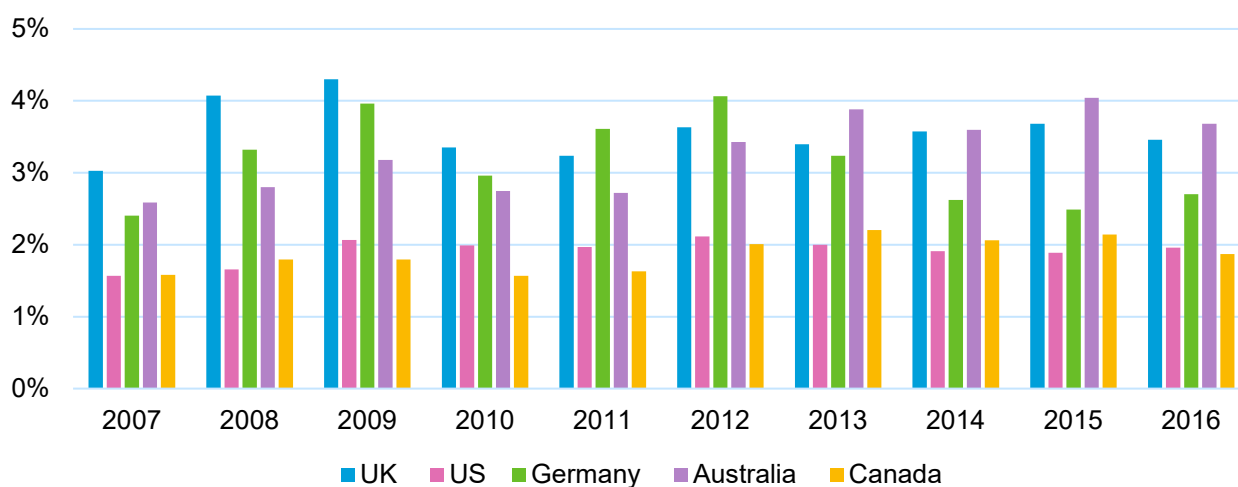


Source: Capital IQ. Figures for both repurchases and market capitalisation are for the whole market.

Figure 5.8 shows there is consistently a significantly larger percentage of repurchases in the US than the UK and other countries. Indeed, the UK has similar amounts of repurchases as a proportion of market capitalisation compared to Canada and Australia, but Germany has consistently lower than all countries studied. However, this is likely because German firms typically rely more on bank financing and less on equity financing, so surplus cash may first be used to pay down debt.

Many of the reasons often provided for why the US has high levels of share repurchases are similar to those provided in other advanced economies (e.g. lower and later taxation of capital gains compared to dividends), so the particularly high levels of share repurchases in the US are more likely to be due to the combination of (i) particularly advantageous long-term capital gains rates of tax (at 15%); (ii) deeper direct equity ownership, meaning that a larger portion of private shareholders can benefit from these beneficial tax arrangements.

In relation to dividends, the UK has levels of dividend payout that are comparable (or slightly higher) to Germany and Australia while Canadian and US firms have lower dividend payouts in each year. This is set out in Figure 5.9.

Figure 5.9: Dividends as a proportion of market capitalisation

Source: Capital IQ. Figures for both dividends and market capitalisation are for the whole market.

The profile of dividend payouts over time in Figure 5.9 is much more stable than for share repurchases across all countries.

Overall, it is therefore the US and not UK that stands out as an anomaly among advanced economies in terms of amount of share repurchases, but much of this difference is offset by lower dividends.

Regulation and policies for share repurchases in the UK

The legal framework on share repurchases is determined by the Companies Act (2006). This specifies the conditions under which both public and private companies can repurchase shares, including processes to follow and limitations on timing and quantity of shares repurchased.

UK public companies must fund repurchases out of profits or the proceeds of selling shares and not out of share capital except under specified circumstances. Companies must go through a process of shareholder approval, authorisation and notification (to registrars) in order to repurchase shares. These rules are less strict for private companies.

Policy development around share repurchases in the UK investors has increasingly focused on the potential for EPS to be inflated through the use of share repurchases. Indeed, recent updates to some shareholder guidelines state that EPS targets should generally be restated if a share repurchase is undertaken. For example, BlackRock's guidelines say: "Companies using EPS should exclude the potential short-term effects of share repurchases and acquisitions"²⁰, and the Investment Association Guidelines reflect similar sentiments²¹. By way of comparison, our survey found that only 30% of

²⁰ BlackRock (2017), "Our Approach to Executive Remuneration in Europe, Middle East and Africa"

²¹ Investment Association (2017), "The Investment Association Principles of Remuneration"

respondents said that they adjusted executive compensation targets when share repurchases had taken place. This is discussed further in chapter 6.

Our interviews with UK companies found that they view communication with shareholders (and markets) on share repurchases as very important. However, relatively few companies have published an official policy on share repurchases.

The most prominent example of a publicly articulated share repurchase policy is Next Plc. Their six rules for considering share repurchases are set out in Box 5.1.

Box 5.1: Next “Six Rules” for considering share repurchases over the long term

1. Share buybacks must be earnings enhancing and make a healthy Equivalent Rate of Return (see below).
2. Only use the cash the business does not need. Next has always prioritised investment in the business over share buybacks.
3. Use surplus cash flow, not ever-increasing amounts of debt. We have never allowed our share buyback programme to threaten our investment grade credit status and will not do so going forward.
4. Maintain the dividend at a reasonable level through growing dividends in line with EPS. Next will continue to increase dividends in line with EPS.
5. Be consistent. Next has been buying shares every year for more than 10 years, reducing the shares in issue by more than 50%.
6. For share buybacks to be an effective use of shareholder cash, the core business must have the prospect of long term growth.

The Next 2013 Annual Report also states that:

“The only reason share buybacks can deliver long term value is because they permanently reduce the number of shares in issue and so increase the amount of profit attributable to each share (EPS)...Essentially there are two measures we look at. The first is the earnings enhancement of a buyback when compared to the enhancement to earnings from keeping the cash in the bank and earning interest. The second is the comparison between the earnings enhancement of a buyback compared to the return that would have to be achieved from investing the cash in an alternative investment, the equivalent rate of return (ERR).”

The final sentence stresses that repurchases will only be undertaken if there are no superior investment opportunities. Next plc also provides worked examples of the mathematics used to calculate ERR and a graph of ERR against share price which is used to inform the threshold ERR above which the company would be enthusiastic about share repurchases.

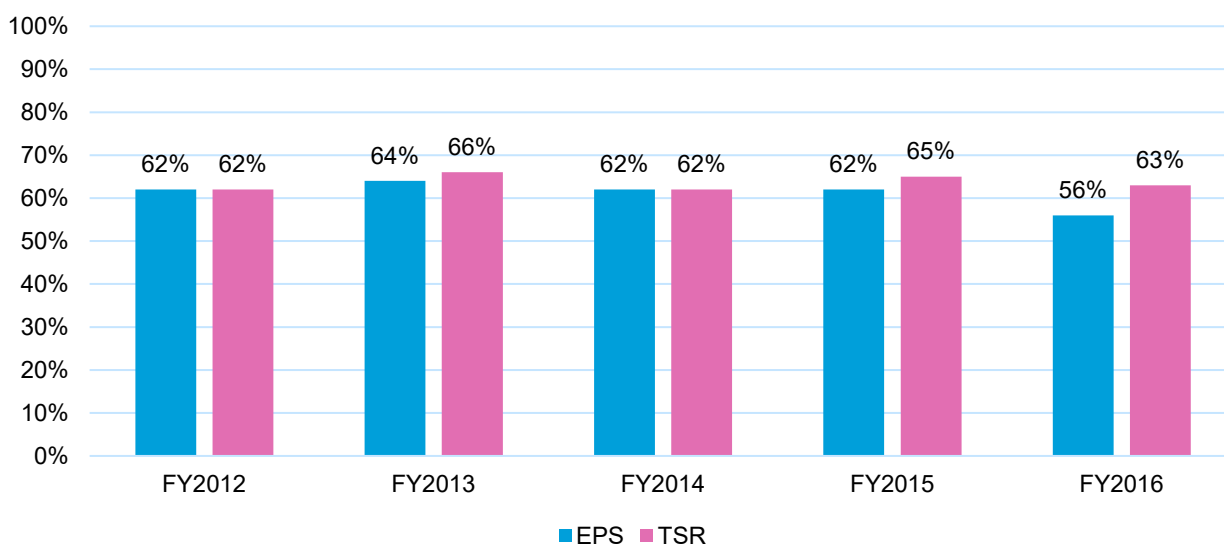
Trends and comparisons in executive pay

Trends in UK executive pay structures

Performance based compensation schemes took off in the UK after the Greenbury report (1995)²² which proposed challenging performance criteria for executives.

Following the introduction of 'say-on-pay'²³ in the UK in 2002/3, performance conditions have become universally adopted within long-term incentive plans. Figure 5.10 shows that the prevalence of EPS and TSR performance conditions has remained relatively stable over the last five years in the UK. Both measures are consistently used within at least around 60% of all LTIPs, with the exception of EPS targets which were less popular in FY2016. It is too early to say whether this reflects a trend in reduced popularity in EPS. However, anecdotally PwC have seen more cases of investors pushing companies to adopt TSR measures in place of EPS.

Figure 5.10: Proportion of UK firms with EPS and TSR related LTIPs out of total number of firms with LTIPs



Source: PwC Executive Remuneration Database

As part of its post-financial crisis review of remuneration practices in banks, the Prudential Regulation Authority highlighted the use of TSR, EPS, and ROE measures in LTIPs as being potentially negative features in plan design, as they can encourage excessive leverage. This was supported by the observation that pre-crisis increased leverage enhanced ROE measures, and within the UK banking sector some of the best relative TSR performers were those banks that were found to have unsustainable leverage profiles. The

²² Directors' remuneration - report of a study group chaired by Sir Richard Greenbury
Final report of the Study Group on Directors' Remuneration as published on 17 July 1995

²³ "Say-on-pay" is where a firm's shareholders have the right to vote on the remuneration of executives.

PRA only allows their use as part of a “balanced scorecard of financial and non-financial metrics”.²⁴

Comparison to the US regulatory structures on executive pay

There are many institutional similarities between the US and the UK which have led to convergence in executive pay practices, and which mean that many findings from the US should be transferable to the UK.

These include compulsory ‘say-on-pay’ regimes and giving shareholders at least a non-binding vote on executive pay practices (the UK has also had a binding vote since 2013). Large levels of institutional ownership of large companies and well-established and prominent proxy-voting agencies are also common to both. There remain, however, some differences that must be taken into account:

1. Changes in accounting standards in the early part of the century resulted in options being fully expensed which led to a decline in the use of options and greater use of shares as opposed to options in both the US and the UK. However, while option use declined very significantly in the UK, with less than 20% incidence in the FTSE 350 today, options without further performance conditions remain common in the US.
2. “Say on pay” was adopted in the UK in 2002/3 as compared with 2011 in the US. Say on pay most notably led to the introduction and toughening of performance conditions on LTIPs. The entirety of a typical UK CEO’s incentive package would have had performance conditions attached from this date. In the US the usage of performance conditions also increased from 2002, rising from below 20% in 2002 of companies to 70% by 2012, but unlike in the UK, performance conditions typically only apply to part of the LTIP package.

Therefore, repurchase incentives arising from compensation in the US pre-2011 may be less dominated by performance targets on LTIPs than by the share price. By contrast, performance conditions have likely created stronger incentives in the UK since the early 2000s.

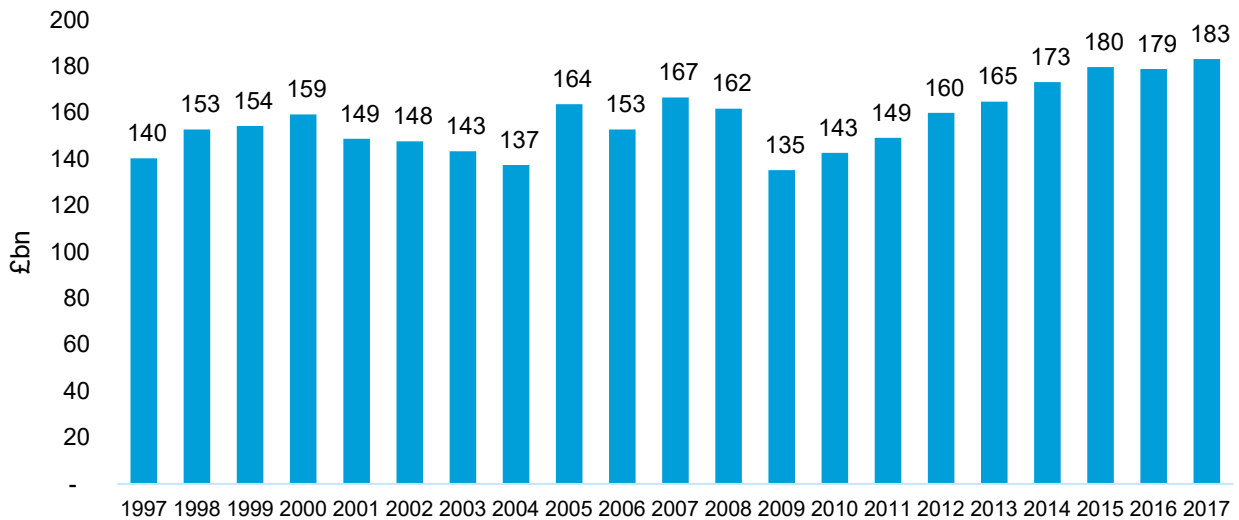
Investment

Investment in the UK

This section explores changes in aggregate business investment in the UK over time. Figure 5.11 shows investment, measured by GDFCF, over the last 15 years. In the post-financial crisis period, investment took a number of years to recover. Investment growth also slowed considerably from 2015. However, this may be because intangible investment is becoming increasingly relevant.

²⁴ PRA (2016), “The PRA’s expectations on remuneration” CP33/16

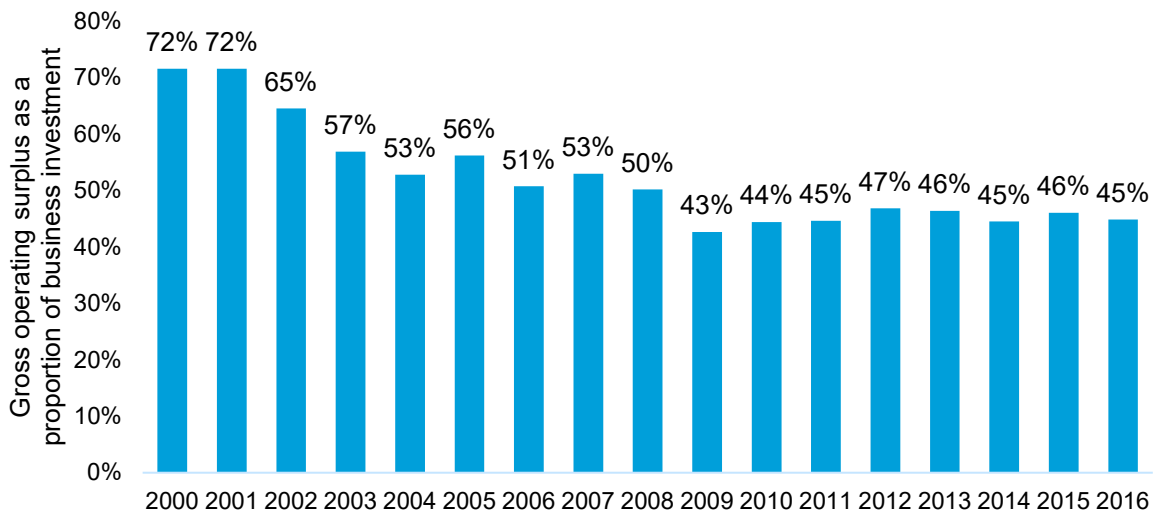
Figure 5.11: UK gross domestic fixed capital formation



Source: ONS

The weakness in investment is further evidenced in Figure 5.12, which shows business investment as a proportion of gross operating surplus²⁵. In the early 2000s, this proportion was over 70% but has fallen over time, as businesses are investing a smaller proportion of their operating surplus (with this measure stabilising at around 45% in recent years).

Figure: 5.12: UK business investment as a proportion of gross operating surplus



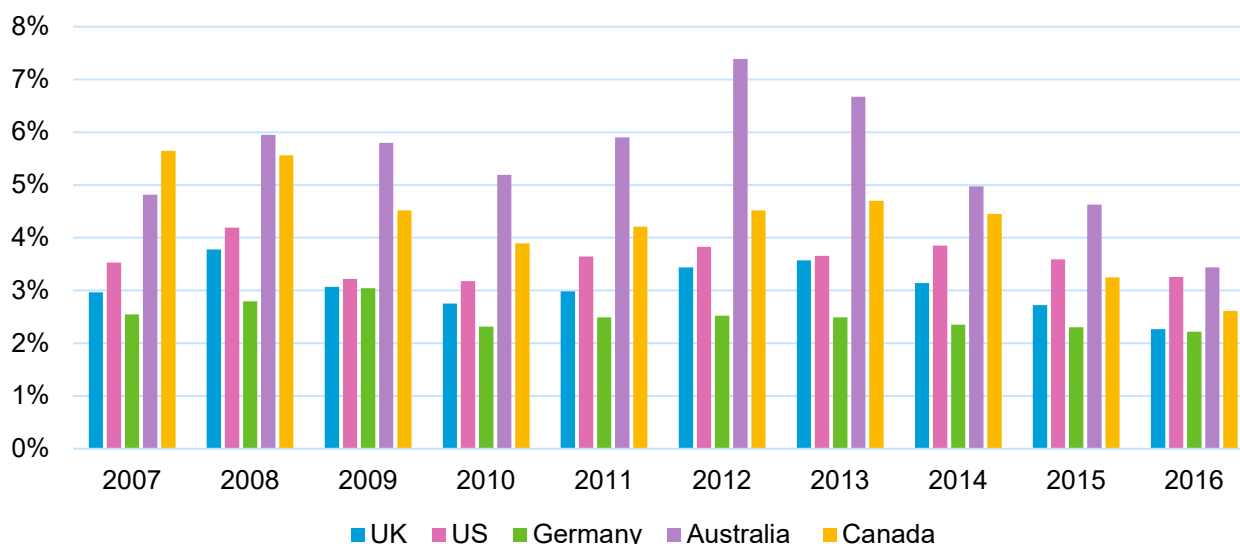
Source: ONS

²⁵ Gross operating surplus is officially defined as the balance between Gross Value Added and labour costs paid by producers. In effect, it is equal to the sum of gross trading profits and income earned through the ownership of buildings (rental income).

Comparison of UK investment to other countries

In this section, we compare investment by UK firms to those in other countries. The measure used is CapEx as a percentage of total assets. This is compared for public companies in the main public equity market.

Figure 5.13: Capital expenditure as a proportion of total assets



Source: Capital IQ

In Figure 5.13, the UK and US have comparable levels of business fixed investment, though recently the levels have been much lower for UK and falling over time. However, compared to Australia and Canada, the UK has lower investment. The average of percentage investment for UK is 3.1% while Australia and Canada have 5.5% and 4.3% respectively.

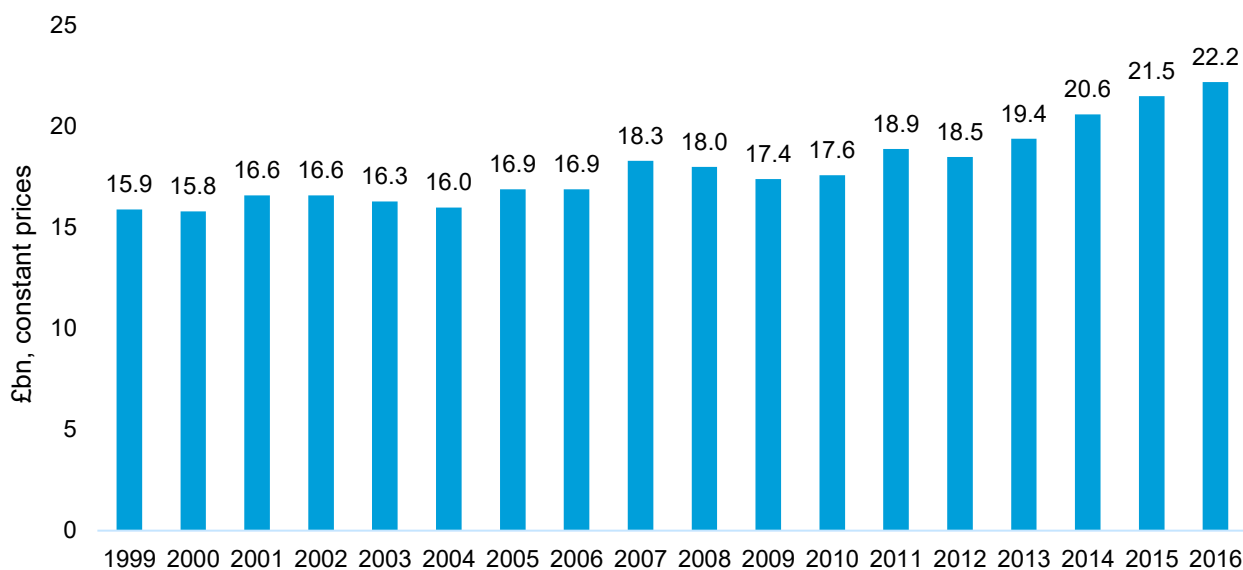
While the UK performs reasonably badly on this measure of investment, there are increasing concerns that CapEx measure is not capturing the importance of investment in the modern age²⁶. Value and productivity enhancing investment is no longer just in fixed tangible assets, but in staff, R&D, intellectual property and many successful growth companies (e.g. Facebook, Google) have not required substantial capital infrastructure.

Trends in UK expenditure on R&D

Our analysis has focused on capital expenditure since this is the type of investment for which data is most readily available at firm level from company accounts. Figure 5.14 shows trends in UK business expenditure on R&D.

This shows that expenditure on R&D showed modest growth from 1999 to 2010, but has since expanded by £4.6 billion to £22.2 billion in 2016, and seems little influenced by share repurchase and cash holding trends.

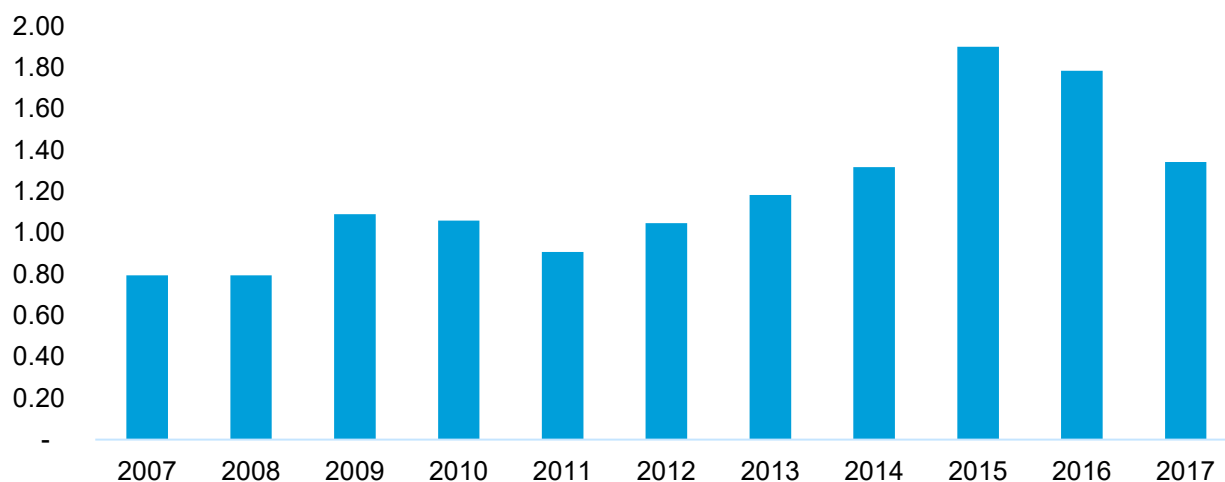
²⁶ IMF (2018), "Measuring the digital economy"

Figure 5.14: Real R&D expenditure in the UK, 1999 to 2016

Source: ONS

Trends in cash holdings

During the same period that UK CapEx has gradually decreased, the amount of cash held by firms has increased, as set out in Figure 5.15.

Figure 5.15: Ratio of cash and equivalent to operating surplus in FTSE 350 firms

Source: Capital IQ

The increase in cash and equivalent holdings in 2009 coincides with the fall in share repurchase activity (Figure 5.1) and fall in investment (Figure 5.11).

Cash and equivalent holdings have increased by over 50% since 2007, as a proportion of operating surplus. This suggests that UK firms may be choosing to hold cash rather than to invest, so it could be a lack of suitable investment opportunities rather than lack of

finance or using up cash for buybacks which may explain weak UK investment performance.²⁷

Conclusions

The key findings from this chapter which are relevant to the research question are:

1. In any typical year over the period 2007 to 2017, aggregate share repurchases in the UK totalled between £15bn and £20bn and they were concentrated in a relatively small number (62²⁸) of FTSE 350 companies (and FTSE 350 companies account for 97% of share repurchases). However, over this period most companies (all except 35 companies which were in the FTSE 350 in 2017) had undertaken some share repurchase activity. Repurchases are flexible and readily cut in difficult economic conditions.
2. The levels of share repurchases in the UK (as measured in proportion to operating profits) are significantly lower than in the US, broadly comparable to Australia and Canada, but significantly higher than in Germany, which tends to rely more on bank financing. The US has a commensurately lower dividend payout, so overall shareholder payouts are little different between the US and the UK.
3. In the UK, dividends form a greater percentage of payouts to shareholders. They are also a more steady and less flexible form of shareholder payout. Share repurchase activity in the UK has stabilised, at around 10% of operating profits for those firms undertaking share repurchases. This is significantly lower than the amount of dividend payments which is four times higher at around 40% of operating profits.
4. Capital investment has exhibited weak growth in the UK for some years, although R&D has trended up over the last two decades. During the financial crisis, each of share repurchases, investment and R&D expenditure all fell and then recovered. This suggests all are impacted by broader economic confidence and market conditions. We have not analysed other intangible investments which are often directly expensed and therefore difficult to identify. Such investments are increasingly contributing to value and productivity gains.
5. Reductions in capital expenditure have coincided with rising corporate cash holdings, suggesting UK firms may be choosing to hold cash rather than to invest, so it could be a lack of suitable investment opportunities rather than lack of finance or using up cash for buybacks which may explain weak UK investment performance.

²⁷ Fried and Wang (2018) find that cash holdings in US S&P 500 firms have similarly rose by 50% between 2007 and 2016 and conclude that buybacks are unlikely to have crowded out investment.

²⁸ 62 firms had share repurchases larger than 1% of their market capitalisation.

6. Executive pay and share repurchases

This chapter presents the findings on the first research question for this study: “To examine the relationship between executive remuneration and motivations to undertake share repurchases.” More specifically, we seek to understand whether buybacks are being used to meet EPS targets in CEO remuneration contracts and/or to inflate the value of their share awards rather than to create long-term value for the company.

Findings of the literature review

This section summarises the literature on managerial motivations for share repurchases due to executive compensation. For further detail please refer to the complete literature review in Appendix A.

Although it is very difficult to show a causal relationship from executive incentives to repurchases, due to reverse causality and omitted variables, two main channels can be studied. These are: incentives due to equity and incentives from performance targets.

Incentives from equity

Early studies link equity to repurchases and so can only document correlations. In a still unpublished paper, Jolls (1998) shows that the likelihood of repurchasing is positively related to executive options as a proportion of total outstanding shares. Geiler and Renneboog (2016) similarly find that executive options in the UK are associated with higher repurchases and lower dividends.

Edmans, Fang and Huang (2017) document causality by studying not equity, but vesting equity – the amount of equity that is scheduled to vest in a given quarter. This amount depends on equity grants made several years prior (which are now vesting in the current quarter) and so are unlikely to be driven by reverse causality or omitted variables. They find that vesting equity is positively associated with repurchases (as well as M&A). In addition, firms that repurchase shares, in years when the CEO has significant equity due to vest, subsequently underperform their benchmarks over the long term.²⁹ The results are statistically significant, however the magnitudes are not large: a one standard deviation increase in vesting equity is associated with a 1.2% increase in the probability of a firm repurchasing shares in a given quarter (or an increase of \$1.54m) in comparison with a 37.5% average probability in the population as a whole. Note that Rau and Vermaelen (2002) found lower short-term returns to repurchase announcements in the UK than in the

²⁹ This result is after controlling for firm-level differences in the average share returns, e.g. due to differences in risk.

US, and so the motivations to use repurchases to boost the share price are weaker in the UK.

Incentives from performance targets

Bennett et al. (2017) study incentives to engage in repurchases that arise from bonus payouts or the vesting of equity grants being tied to specific performance targets (e.g. for EPS or profits). They compare firms that just meet targets to those that just miss, to identify causality rather than correlation. They find that firms that just meet the performance target have lower R&D and abnormal accruals than firms that just miss the target, suggesting that they cut investment or manipulate earnings to hit the target. However, they do *not* find any difference in repurchases. Thus, while firms do take short-termist actions to meet performance targets, repurchases are not one of them.

Cheng et al. (2015) study the relationship between EPS-dependent bonuses and share repurchases. Firms with EPS-dependent bonuses engage in more repurchases than those without, and their repurchases are not followed by positive future abnormal returns, unlike those without. However, these results are only correlations, and most of the results investigate whether the bonus depends on an EPS target, rather than the actual level of the target and whether the repurchase was used to hit the target. Marquardt et al. (2007) examine the use of Accelerated Share Repurchases (ASRs) and find that they are positively correlated with the use of explicit EPS targets in annual bonuses. Young and Yang (2011) show that UK firms that conduct repurchases are more likely to have EPS-dependent bonuses than firms that do not engage in repurchases. However, they do not study whether firms with EPS-dependent bonuses repurchase more than firms without. They also do not observe the level of EPS targets.

In summary, the academic literature shows some correlation between executive incentives and repurchases, but only one study has found a causal relationship. This relationship is caused by vesting equity rather than EPS targets and the magnitudes are small. There is a notable gap in the literature on this topic using UK data.

Note that repurchases may be incentivised not only by executive pay, but also analyst earnings forecasts. For example, Hribar, Jenkins, and Johnson (2006) find that firms that would have just missed EPS forecasts in the absence of repurchases are significantly more likely to engage in repurchases than other firms. On the other hand, the survey of Graham, Harvey, and Rajgopal (2005) finds that 12% of executives would engage in repurchases to either meet EPS forecasts or avoid EPS falling below the same quarter last year, while 80% would cut investment to do so. This is an important consideration in our setting, since to the extent to which repurchases (or investment cuts) stem from short-termist behaviour, this short-termist behaviour may be induced by quarterly earnings reporting rather than executive pay.

Qualitative findings on the motivations for share repurchases

This section moves from the literature review into the findings from our qualitative interviews of senior executives and the online survey on the motivations for share repurchases. This allows us to contrast the role of executive pay structures with other motivations.

How companies make executive pay decisions

The role of the Remuneration Committee

In this section we describe findings from our interviews on the role of the RemCo in setting executive pay. Our main observations were:

- (a) Most interviewees (including all companies) agreed that the Remuneration Committee and ultimately the Board of Directors is responsible for executive pay decisions.
- (b) No companies questioned the adequacy of existing legislation to hold directors to account for decisions with respect to executive pay.
- (c) Companies saw the RemCo chair to be a challenging position due to the complexity of the subject matter and the need to balance the interests of shareholders, directors and wider stakeholders. The expectation on RemCos to apply discretion to amend formulaic outcomes when appropriate is particularly difficult. No companies questioned the performance of Remuneration Committees in general.
- (d) Some companies did explicitly adjust remuneration targets for a range of factors including repurchases. Others expected discretion to be used as and when appropriate. Further information on this is elaborated below.
- (e) Neither companies nor wider stakeholders saw RemCos as having much focus on the question of share repurchases. Companies felt this is often because the issue is too small to deserve attention, whereas some wider stakeholders expressed concerns that they may receive insufficient attention.

The influence of investors on executive pay

Our interviews found that investors had strong views on the level of executive pay and on how information on this topic was communicated to them from the boards of directors. This was confirmed by companies which indicated that investors, in particular institutional investors, do have an influence over company strategy, financing and capital allocation decisions as well as executive remuneration. Some companies rated this influence as significant and named specific individuals or funds whose opinions they considered when setting executive pay. Our other observations were:

- (a) Investor concerns about executive pay focused on issues of magnitude of pay package and how it was communicated to investors.
- (b) In particular, it was pointed out that the annual “single figure” on executive pay reported by quoted companies, did not fully break down the performance year for which payments were made.
- (c) It was also noted that remuneration reports do not always make clear whether and how executive targets were set and adjusted.
- (d) One interviewee had recently lost an advisory AGM vote on executive compensation. The total pay package was subsequently revised downwards although the structure of the package was largely unchanged.

Perspectives on the merits of different executive compensation structures

Interviewees emphasised the importance of ensuring that remuneration structures and performance metrics are aligned with long-term performance. All companies and most other interviewees were supportive of the use of LTIPs and stock options in general. As the use of EPS within LTIPs may give rise to perverse incentives to use share repurchases to hit EPS targets, it is interesting to review the wider benefits and drawbacks of EPS and the other frequently used measure in LTIPs: TSR. Interviewees expressed a wide range of views on the pros and cons of different performance metrics. Some also hinted at differences of opinion within the same leadership team, so there is no clearly preferred measure. The following table summarises the benefits and drawbacks of metrics based on EPS and TSR, as provided in interviews.

Table 6.1: Benefits and drawbacks of metrics related to EPS and TSR

	Benefits	Drawbacks
EPS metrics	<ul style="list-style-type: none"> • Transparent (simple to calculate and in the public domain). • More easily attributable to performance of management and employees. • Long-term EPS growth is broadly aligned to interests of company and shareholders. 	<ul style="list-style-type: none"> • Potential for poor alignment to value creation in the short term (e.g. when EPS growth coincides with price-earnings multiple contraction). • Sensitive to a range of factors including tax rate, financing decisions, capital structure, investment cuts which can be used by management to impact short-term results. • May require ex-post discretionary adjustment which is not always well-understood by investors.
TSR metrics	<ul style="list-style-type: none"> • Well-aligned to interests of company and shareholders. 	<ul style="list-style-type: none"> • Relies on benchmarking which is dependent upon the selection of benchmark companies and potentially less systematic than measures based on absolute values or growth rates. • Very dependent upon start and end dates of measurement.

Source: PwC interviews

Lastly, interviewees commented on the importance of other performance metrics. These should be ideally selected to incentivise management to deliver long-term performance objectives and are likely to be specific to each business.

Adjusting remuneration targets for share repurchases – practice and perspectives

The responses to our survey indicated that a minority of companies adjust executive pay targets for share repurchases. 30% of respondents to the question “Are your company’s executive pay targets adjusted for share repurchases?” replied “yes”, of which most had repurchased shares in the last three years. However, this constituted less than 28% of the total number of companies that indicated they had repurchased shares in the last three years. This suggests that among our respondents, the majority of those repurchasing shares do not make adjustments for this when making executive pay awards.

The qualitative interviews provided further insights into company practices on adjusting targets in general and for share repurchases in particular. The practices mentioned were varied and include:

- Specifically minuting in a board meeting that executive remuneration must be ambivalent to share repurchase.
- Adjusting targets ex-ante for planned large expenditures including share repurchase programmes.
- Making formulaic adjustments to EPS targets (ex-post) in the case of large repurchases (particularly when not anticipated at the time of target setting).
- Using qualitative judgment to assess executive remuneration, in the context of share repurchase activity.
- Not adjusting executive pay for share repurchases, particularly if the impact was considered to be small.
- Including caps on payment plans and bonuses (instead of adjustments) to reduce incentives for executives to overly influence any particular performance indicator.

It was not always straightforward to match the reported practice with the information on adjustments provided in annual reports. In some cases, the interviewee stated that targets were adjusted; however, this was not clear from the most recent published remuneration report. In one case, the interviewee stated that executive pay target is not adjusted to avoid the appearance of changing targets, which may be interpreted unfavourably.

Interviewees were generally but not universally positive to the suggestion of adjusting EPS targets for share repurchase activity. However, there was some caution as it was mentioned that the magnitude is often too small to merit adjustments; the adjustment may be complicated if there was a prior expectation of share repurchase activity in the year

relating to the EPS target³⁰ and that adjustments for any reason can be unpopular and create questions about what other adjustments should be made.

How companies make investor payout decisions

Investor proposition and communication with investors

Several interviewees referred to their “investor proposition”. This was in the context of their investment strategy and their offering to current and potential future investors. The “investor proposition” might be growth in share price, a reliable stream of dividends, or other forms of payout linked to the strategy and performance of the company.

Many interviewees emphasised the importance of communicating clearly with investors on their investor proposition and how it was implemented. Company reports and one-on-one meetings with large investors were mentioned as an important means to achieve this; AGMs received less attention.

Investor preferences over payouts

Interviewees also made clear that different investors have different preferences, and that these preferences differ according to certain characteristics of the investor e.g. size, client-base and country of location.

Table 6.2 below summarises various characteristics of investor payouts which result in differential impact on investors, and which were mentioned in interviews as factors motivating company behaviour.

³⁰ If there was shareholder approval and therefore expectation for a share repurchase, which was not conducted by management, then would it be correct to adjust down EPS targets, even when management have not delivered on this expectation. A number of our interviewees suggested not.

Table 6.2: Summary of characteristics of payouts and impact on investors which were raised in interviews

Feature of payouts	Share repurchases	Dividends and special dividends ³¹	Balance of effects
Tax	Subject to capital gains tax if share price has increased.	Subject to tax on dividends which usually results in higher tax burden, especially for US investors	Overall greater concern to US investors. Currently tends to encourage investors to prefer share repurchases over dividends.
Predictability	Less predictable	Regular dividends preferable to institutional investors	Investors tend to prefer dividends over one-off share repurchases.
Choice	Companies mentioned benefit to investors since they can choose whether to sell their shares when offered, or to hold them anticipating an increase in the share price. Investors mentioned that share repurchases causes their share of ownership to increase (if they do not sell), without them choosing this. This may be positive as it leads to investors being less fragmented and increases incentives to monitor.	Not mentioned	Although some companies suggested that investor choice is a positive feature of repurchases, it is not clear whether this opinion was shared by all investors.

Source: PwC interviews

Investor influence on decisions to repurchase shares

In addition to the above general examples of shareholder preferences described in interviews, companies also provided specific examples of their payout choice (including share repurchases) being influenced by investors:

- One company stated that it was actively encouraged by investors to repurchase shares at the expense of paying down debt.
- Several companies stated that in cases where the company would have preferred to issue special dividends, shareholder preferences had encouraged them to also repurchase shares.
- Several interviewees stated that US investors tended to prefer share repurchases more than UK investors.

³¹ Scrip dividends were not mentioned by investors.

Company preferences over payouts

Companies also indicated a range of preferences over the choice of payout. The motivations to repurchase shares which were mentioned in interviews include:

- To return cash for which there was seen to be no better use in the business.
- To maintain, or move towards a balanced capital structure.
- Investor expectations and preferences over form of pay-outs.
- To benefit from presumed under-valued share price.
- The size of the payout may need to be spaced out or supplemented with special dividends due to constraints imposed by market liquidity.

These are summarised in Table 6.3 below, which also provides a comparison to the impact of various forms of dividends as reported in interviews.

Table 6.3: Summary of characteristics of payouts and impact on companies which were raised in interviews

Feature of payouts	Share repurchases	Dividends and special dividends	Scrip dividends
Investor preferences	Depends on investor preferences which in turn depends on the characteristics of investors and their preferences over the features described in the table above. This also depends on the ability of the company to communicate to investors the value of pursuing a particular payout approach.		
Execution time and costs	There are transaction limits on share repurchases; therefore, larger transactions need to be broken up over a longer period of time.	One example raised where company would have preferred to issue all cash in one special dividend to save costs; however, investors preferred a repurchase.	Not mentioned.
Expectations of payout levels being sustained	Not normally expected.	Normally expected for dividends (not specials) thus reducing future flexibility.	Not mentioned.
Impact of capital structure of the business	Reduces cash on balance sheet and reduces the number of shares outstanding, thereby increasing leverage.	Reduces cash on balance sheet, thereby increasing leverage.	No impact on balance sheet (slight increase in cash relative to ordinary dividend).
Impact on commonly-used measures of company performance	Positive impact on EPS provided earnings yield exceeds net cost of debt. Some potential for positive impact on TSR (depending upon market expectations and signalling).	Broadly neutral for EPS Systematic evidence that dividend increases cause share price (and so TSR) to rise.	Potential negative impact on EPS, if not offset by share repurchases.

Feature of payouts	Share repurchases	Dividends and special dividends	Script dividends
Impact on share price	Ambiguous and depends on market interpretation of company expectations signalling.	When combined with a share consolidation, the share price impact should be neutral. Regular dividends are normally not followed by consolidation and so act to reduce share price.	Neutral.

Source: PwC interviews

Case studies of share repurchases provided in interviews

Interviewees provided a range of case studies to explain their motivations for share repurchases. These are summarised in Table 6.4 below.

Table 6.4: Case studies of repurchases shared by interviewees and motivations provided

Case study of repurchases	Rationale shared in interviews	Motivation
One-off large repurchases to return capital	Large transaction e.g. sale of business (several cases)	<ul style="list-style-type: none"> • Efficiency • Maintain balanced capital structure • Investor preferences
	Operational cash surpluses e.g. due to increase in commodity price	<ul style="list-style-type: none"> • Efficiency • Avoid creating expectations of repeated pay-outs • Ease of arranging • Maintain balanced capital structure
	Return capital to shareholders which is above regulatory capital solvency requirements (in the case of financial services companies)	<ul style="list-style-type: none"> • Efficient capital structure
(Frequent) repurchases to offset dilution of share base	Offset dilution due to scrip dividend	<ul style="list-style-type: none"> • Manage share count
	Offset dilution due to employee compensation schemes	<ul style="list-style-type: none"> • Manage share count
Embedding share repurchases mechanism as core financial strategy	Consistent, frequent repurchases as part of overall approach for returning profit to investors	<ul style="list-style-type: none"> • Investor preferences • Flexibility • Potential for enhancing long-term value growth for retained shareholders
Trend towards increased use of repurchases as part	Improved overall financial position (several cases) -	<ul style="list-style-type: none"> • Limited (additional) investment opportunities to pursue • Investor preferences

Case study of repurchases	Rationale shared in interviews	Motivation
of increased total shareholder payouts	economic returns consistently above target cost of capital	<ul style="list-style-type: none"> Flexibility
	Limited profitable investment opportunities to pursue (several cases)	<ul style="list-style-type: none"> Avoid risky investments (particularly acquisitions) Investor preferences

Source: PwC interviews

Comparing the motivations for different forms of payouts

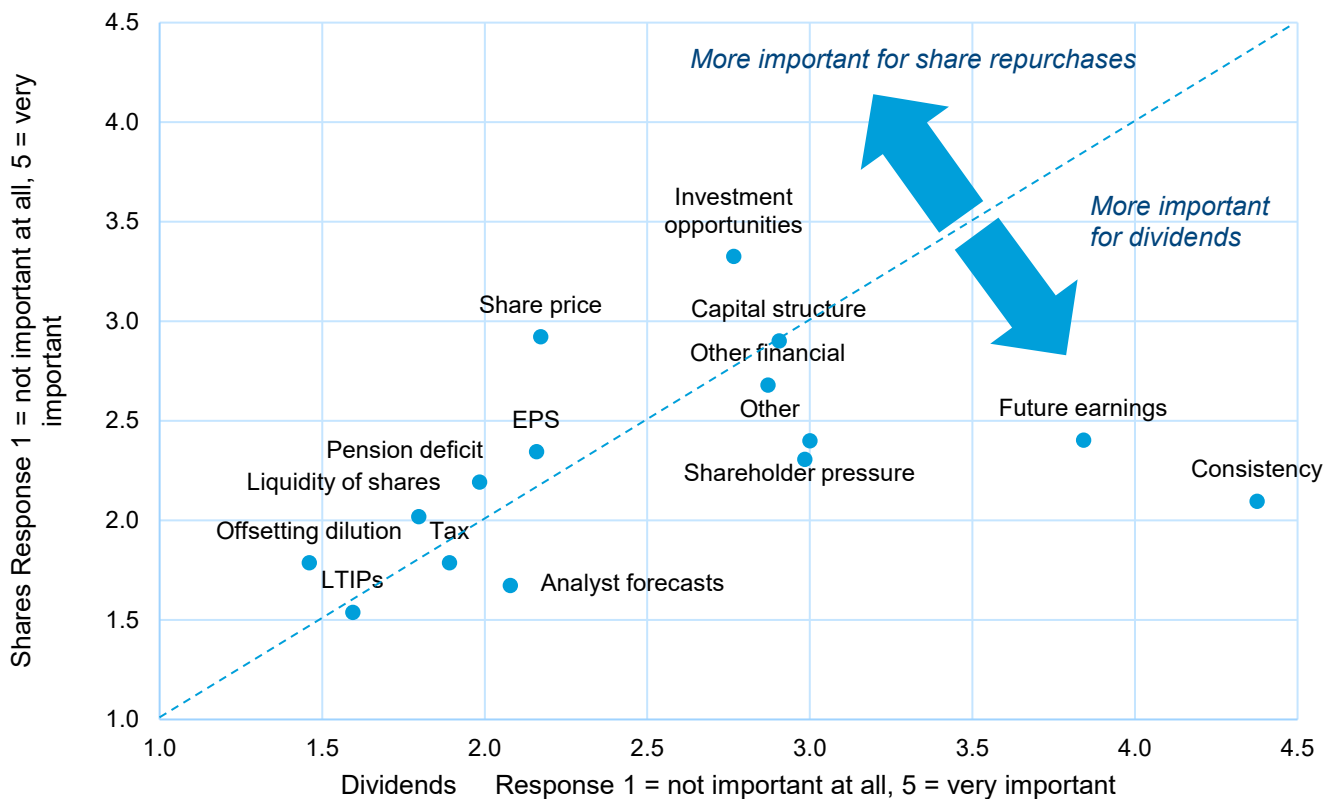
Our survey of senior executives sought to provide deeper insight on the motivations for share repurchases and dividend decisions. It is guided in part by the 2005 survey by Brav et al., which had a similar objective, and it is incorporated in our literature review in Appendix A. Their findings indicated that undertaking value-creating investments is as important as maintaining the dividend level, but more important than undertaking repurchases. Rather, repurchases are made out of the residual cash flow after investment spending.

As part of the survey we asked companies about different motivations for share repurchases. This is plotted below on Figure 6.1.

On this figure, the x-axis shows the average response provided to the question “How important are the following factors in your decision to issue dividends?”. The numbers on the scale range from 1 = not at all important to 5 = very important. The y-axis shows the average response to the question “How important are the following factors in your decision to repurchase shares?”. The same scale range is used. Each of the points on the figure represents a statement.

The location of each point against the axes summarises the average score for this statement for both share repurchases and for dividends. The dotted line through the origin has been drawn to facilitate this comparison. The points above the dotted line indicate factors that are more important for repurchase considerations than for dividends. The points below the dotted line indicate factors that are more important for dividend considerations than for share repurchases. Points close to or on the line were of similar importance for both share repurchases and dividends. The full list of statements is provided in Appendix D: Survey.

Figure 6.1 Comparison of factors that motivate companies to issue dividends and repurchase shares



Source: PwC Research Survey Results

The most important factors in the decision to repurchase shares were:

1. The availability of good investment opportunities to pursue (3.3 out of 5, scored as 4 or 5 by 64% of respondents).
2. Whether the share price is under- or over-valued (2.9 out of 5, scored as 4 or 5 by 48% of respondents).
3. Optimising the company’s capital structure (2.9 out of 5, scored as 4 or 5 by 42% of respondents).
4. Other financial commitments and constraints (2.9 out of 5, scored as 4 or 5 by 34% of respondents).

Of these, only “the availability of good investment opportunities” scored more than the mid-point available score. This is in line with company interviews, which had suggested that there are a range of different factors that motivate share repurchases in different companies, and these include available investment opportunities, perceived share price valuation, and capital structure.

The factors relating to general profitability metrics (increasing EPS) and shareholder pressure both scored 2.3 out of 5:

1. Shareholder pressures was scored as 4 or 5 for importance by 20% of respondents, and 1 or 2 by 57%. This was considerably lower than the importance ascribed to shareholder pressure for decisions on dividends.
2. Increasing EPS was scored as 4 or 5 for importance by 27% of respondents, and scored as 1 or 2 by 62%. This was one of the higher levels of variation found in the sample.

The least important factors in the decision to repurchase shares were:

1. LTIPs (1.5 out of 5, ranked as 1 or 2 out of 5 by 83% of respondents).
2. Analyst EPS forecasts (1.7 out of 6, ranked as 1 or 2 out of 5 by 62% of respondents).
3. Tax efficiency and offsetting dilution from compensation packages (1.9 out of 5 for both, ranked as 1 or 2 out of 5 by 73% and 75% respectively).

All of these factors were considered “not important” against the scale. This is consistent with the view from the interviews that LTIPs are not an important motivation for share repurchases. The scores for analyst EPS forecasts, tax efficiency and offsetting dilution were somewhat lower than might have been suggested from the interviews and the literature review. One possible explanation for this is that although intuitively these factors may encourage companies to repurchase shares, the magnitude of the effect may be relatively small.

Turning now towards dividends, the most important factors in determining the decision to issue dividends were:

1. Maintaining consistency with historic dividend policy (4.4 out of 5).
2. An increase in the level or stability of future earnings (3.8 out of 5).
3. Other (elaborated further below) and shareholder pressure (both 3.0 out of 5).

These factors all ranked at close to or above the mid-point on the scale. These findings are also consistent with the interviews, which had suggested that a key characteristic of dividends is their consistency, that shareholders value this, and that companies are more likely to issue dividends if they expect increased earnings to persist in the future.

The least important factors in the decision to issue dividends were:

1. LTIPs (1.6 out of 5).

2. The float or overall liquidity of the shares (1.7 out of 5).
3. Tax efficiency (1.8 out of 5).
4. Level of pension deficit (2.0 out of 5, scored as 1 or 2 by 66% and 4 or 5 by 13%).

This is consistent with views expressed in interviews and in the literature that these factors are either more important to share repurchases than dividends, or that they are not important to either. The question on the level of pension deficit is UK-specific and around one third of respondents did imply that this was a factor that influenced their dividend payouts, and fractionally more suggested it influenced their decision to repurchase shares.

The survey also found that there were a range of factors with some influence on the decision both to issue dividends and to repurchase shares. Chiefly these were optimising the balance sheet and other financial constraints.

The most striking differences between the responses for shares and for dividends is that share repurchases were indeed more closely linked to investment opportunities and share price. This is consistent with the fact that repurchases are flexible and thus can be cut when investment opportunities are good. This is summarised in Table 6.5 below.

Table 6.5: Main differences in survey responses for share repurchases and dividends

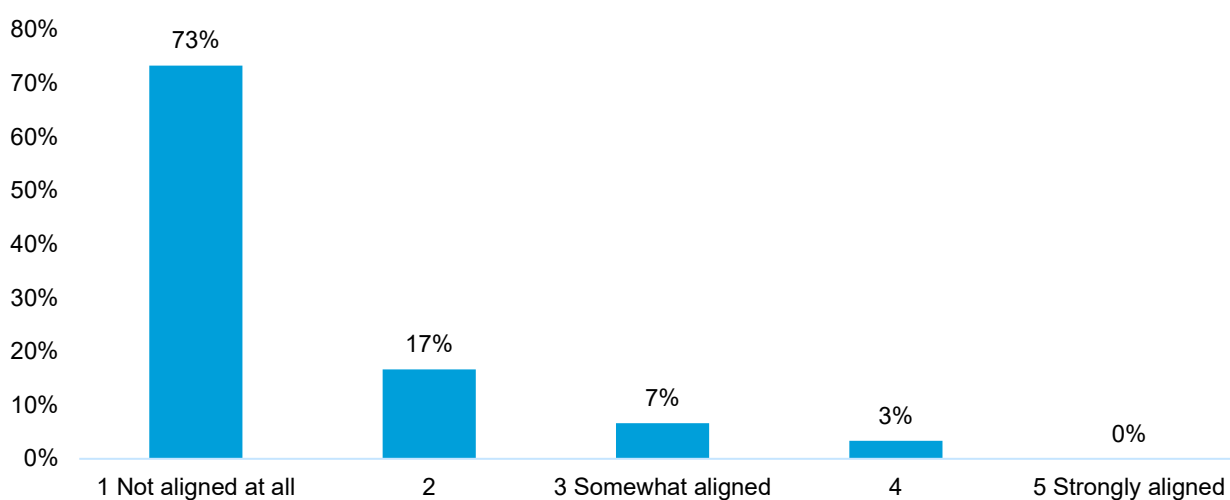
Comparison between share repurchase and dividends	Importance of factor for company decisions
Higher importance for share repurchases	<ul style="list-style-type: none"> - Investment opportunities (also important for dividends) - Share price under- or over-valued
Higher importance for dividends	<ul style="list-style-type: none"> - Consistency - Future earnings - Shareholder pressure (also important for share repurchases)
Similar, mid-to-low level of importance for both share repurchases and dividends	<ul style="list-style-type: none"> - Optimising capital structure - Other financial constraints and commitments - Other*
Similar, low importance for both share repurchases and dividends	<ul style="list-style-type: none"> - Increasing EPS - Level of pension deficit
Very low importance for both share repurchases and dividends	<ul style="list-style-type: none"> - LTIPs - Tax - Dilution - Analyst forecasts - Liquidity of shares

Source: PwC Research Survey Results. The response “other” includes the following responses of note. For dividends it included (i) the expectations of investors; (ii) the industry regulator’s view of appropriate distributions; and (iii) a clear dividend policy. For share repurchases, “other” included: (i) offsetting share issuance scrip dilution; (ii) returning of capital generated from operational cash flow that is surplus to requirements and (iii) availability of good acquisition targets.

Directionally our results are similar to Brav et al. While US and UK survey respondents score differently (on average US respondents provide higher scores), the ranking of the importance of factors is similar. The main exception is share price, which ranks highest in importance for share repurchases in the US and second highest in the UK.

The above section has contrasted executive pay with other motivations and factors in relation to share repurchase behaviour. The importance of executive pay in affecting repurchase behaviour was also directly covered in our survey by the question: To what extent do these statements align with your company's views: "Current executive incentive practices affect repurchase behaviour"?

Figure 6.2: To what extent do these statements align with your company's views: "Current executive incentive practices affect repurchase behaviour"?



Source: PwC Research Survey Results

Summary of findings of qualitative research

In summary, the findings from the qualitative research suggest that remuneration structures linked to profitability targets are not a systematic driver of share repurchases. Companies and wider stakeholders expressed general confidence in the ability of Remuneration Committees to scrutinise executive pay. Our survey found that LTIPs scored bottom of all possible factors that companies might consider when deciding whether to repurchase shares.

Empirical evidence on the effect of executive pay on repurchases

In this section we set out empirical evidence on the relationship between executive pay and share repurchases, following the methodology set out in Chapter 4. A more detailed presentation of our empirical findings is provided in Appendix C. We test the hypothesis that executive incentives drive share repurchase behaviour. This section is split into two subsections:

1. Regression analysis of share repurchases on EPS and TSR incentives; and
2. Threshold analysis designed to examine whether there is a causal effect of EPS target deviation on share repurchases

Regression analysis of share repurchases on EPS and TSR incentives.

The regression analysis in this section examines the association between executive pay incentives and share repurchases, controlling for financial variables and non-financial characteristics. This is set out in Table 6.6. Full explanation of the model specification, choice of controls and definition of explanatory variables is provided in Appendix C.

Table 6.6: Summary of econometric results estimating the impact of executive pay incentives linked to EPS or TSR and mean level of repurchases (preferred specification in blue)

Variable	Model selection	Standard error choice	EPS coefficient [95% CI]	EPS p-value	TSR coefficient [95% CI]	TSR p-value
Indicator of whether the firm has EPS or TSR target in its LTIP	Full	Clustered	-0.010 [-0.027, 0.007]	0.257	-0.004 [-0.016, 0.008]	0.529
Indicator of whether the firm has EPS or TSR target in its LTIP	Full	Bootstrap clustered	-0.010 [-0.029, 0.009]	0.292	-0.004 [-0.017, 0.009] Preferred specification for presence of incentive	0.536
Indicator of whether the firm has EPS or TSR target in its LTIP	Refined	Clustered	0.000 [-0.001, 0.001]	0.839	0.002 [-0.005, 0.009]	0.559
Indicator of whether the firm has EPS or TSR target in its LTIP	Refined	Bootstrap clustered	0.000 [-0.001, 0.002]	0.886	0.002 [-0.005, 0.009]	0.558
Pay incentive	Full	Clustered	-0.001 [-0.009, 0.007]	0.808	-0.000 [-0.000, 0.000]	0.513
Pay incentive	Full	Bootstrap clustered	-0.001 [-0.010, 0.008]	0.819	-0.000 [-0.010, 0.010] Preferred specification for size of pay incentive	0.985

Variable	Model selection	Standard error choice	EPS coefficient [95% CI]	EPS p-value	TSR coefficient [95% CI]	TSR p-value
Pay incentive	Refined	Clustered	-0.001 [-0.005, 0.003]	0.641	-0.000 [-0.000, 0.000]	0.367
Pay incentive	Refined	Bootstrap clustered	-0.001 [-0.005, 0.003]	0.644	-0.000 [-0.004, 0.005]	0.968

Source: PwC analysis

Of the eight regressions run, none produces a statistically significant result for either EPS or TSR. The table above can be interpreted as follows:

- **Independent variables:** Indicator is the binary dummy for EPS or TSR targets; pay incentive captures the fraction of CEO pay related to EPS
- **Coefficient (EPS or TSR):** The coefficients estimated are all 0 or -0.01 indicating that either there is no relationship or is it slightly negative.
- **P-value:** The p-values range from 0.257 to 0.985. This implies that the magnitude of coefficients found could easily have arisen due to chance and are not statistically significantly different from zero.
- **Model specification comparison and standard error choice:** There is no clear pattern between whether a full or refined set of control variables is used, or whether standard errors are adjusted for non-normal distributions, and the results.

Correlation of executive pay incentives with median level of repurchases

We also ran median quantile regression of executive pay structures on share repurchases (see Appendix C). The results are broadly in line with the results for mean repurchases. Of the eight model specifications used, one produced a statistically significant result for the presence of an executive pay incentives on share repurchases. However, this was not the preferred/most robust model specification.³²

We also considered the potential for a relationship between EPS and TSR incentives and the probability of a company repurchasing shares rather than the amount of repurchases. Again, we ran eight separate model specifications, all of which produced insignificant results.

³² The significant result does not use the bootstrap method. However, the non-normal residuals make bootstrapping the more reliable method, under which there is no relationship. See page Appendix C (page 113) for more detail.

Threshold analysis: Evidence of causal relationship between hitting a performance target and share repurchases

The threshold analysis in this subsection analyses whether there are significant differences in levels of share repurchases between firms who were incentivised to use share repurchases to hit their EPS target, and firms who did not have this incentive by having hit their target even if they had not repurchased shares. We introduce in this section the concept of the 'ex-ante' EPS measure, which deducts the effect of any repurchases for each annual period, and the 'ex-post' EPS measure, which is reported in the financial statements.

More specifically, we perform three types of threshold based analysis.

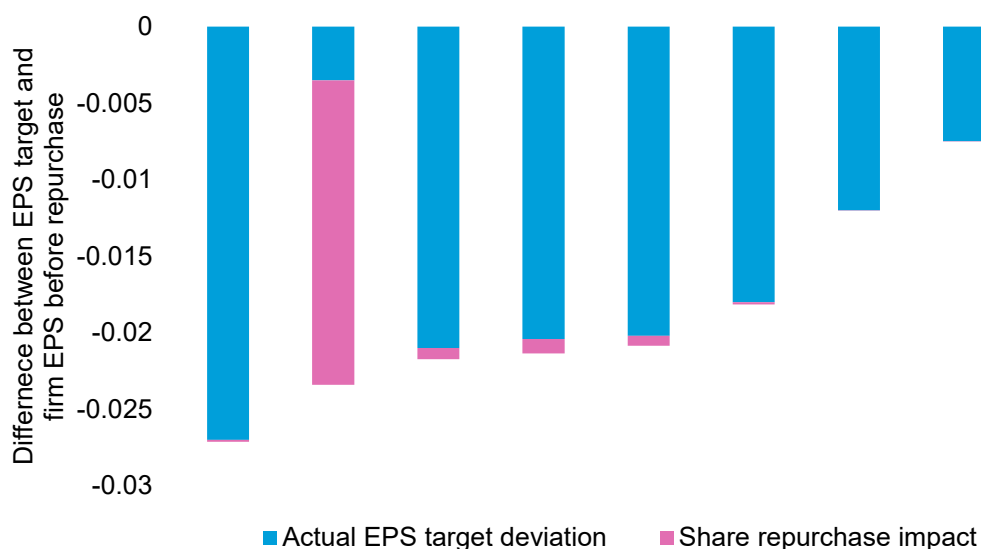
- i) An initial analysis of the 10 firms whose ex-ante EPS measure was closest to hitting the EPS target but just missed, where we examine the contribution of share repurchases to the EPS measure in each case.
- ii) A comparison of firm characteristics amongst firms whose ex-ante EPS measure was just below the target, and firms whose ex-ante EPS measure was just above the target.
- iii) A threshold regression analysis of the level of share repurchases on the ex-ante EPS target deviation, controlling for financial and other firm-level characteristics.

Did firms use repurchases to hit EPS targets?

We begin by comparing the group of firms with an ex-ante EPS measure below their EPS target (i.e. with a negative ex-ante EPS target deviation) with the group of firms with an ex-post EPS measure above their EPS target (i.e. with a positive ex-post EPS target deviation). One of the most striking findings from this analysis was that no firms in the entire sample had both a negative ex-ante EPS target deviation and positive ex-post EPS target deviation. In other words, no firms used share repurchases to successfully beat its EPS target. We then examined the 10 firms closest to hitting their EPS target (having reversed the effects of share repurchases) in order to understand the contribution of share repurchases to the EPS measure.

This point is emphasised in Figure 6.3, which shows the 10 closest firms to the threshold before and after repurchasing.

Figure 6.3: Ex-post EPS target deviation for the 10 share repurchasing firms closest to hitting their EPS target and subsequent impact of share repurchases



Source: PwC analysis

For nine of those ten firms, the repurchase impact is so negligible in the target deviation that it is barely visible. This highlights that whilst many FTSE 350 firms do engage in repurchases, the scale of these repurchases is often so small by comparison to the number of shares outstanding as to have little impact on EPS targets.

The findings from this analysis are important as they demonstrate that share repurchases have not been successfully used in the UK to hit EPS targets (over the study period). Firms are simply not repurchasing enough shares as a fraction of their total shares to have a substantial impact on their target deviation. However, it is still possible that individual firms have attempted to use repurchases to hit their EPS target, but were unable to successfully repurchase enough shares to do so. Therefore, we undertake further analysis to understand whether there is evidence that the ex-ante EPS target deviation has motivated share repurchases.

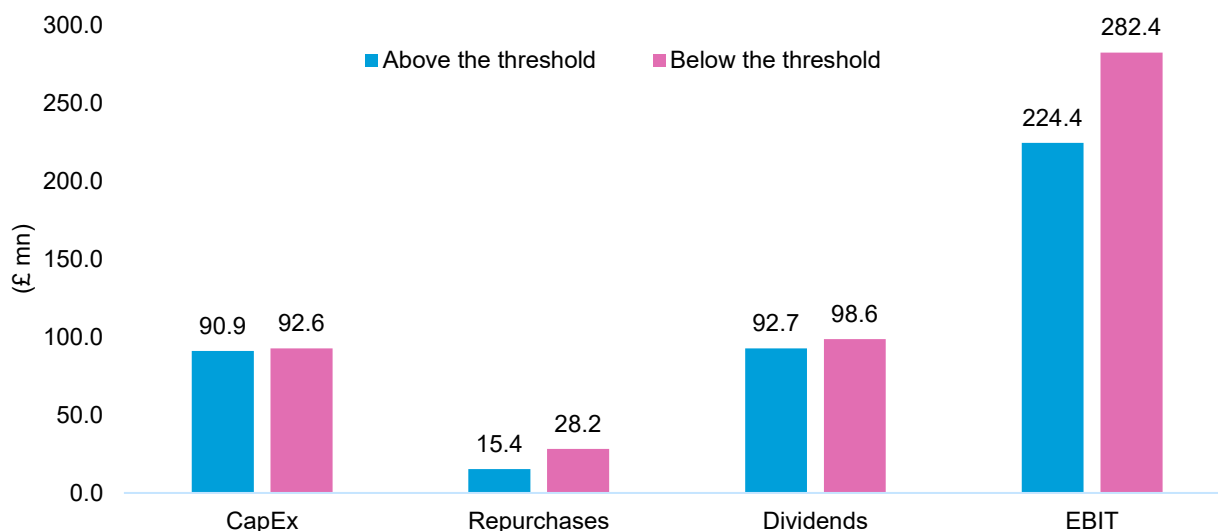
Comparison of firm characteristics with ex-ante EPS just above and below the EPS target

We study the characteristics of firms in two groups: those narrowly above the EPS target when the effects of share repurchases are deducted and those narrowly below the EPS target when the effects of share repurchases are deducted. This enables us to deduce whether firms who have been specifically motivated to undertake repurchases to hit an EPS target, have actually repurchased more in practice, and whether this result relates to their characteristics or this incentive.

The definition of “narrowly” is explained in Appendix C and was set to ensure that the sample size was large enough to draw robust statistical inference, but small enough so that each firm’s measured EPS target deviation is a random occurrence. This also allows

us to focus on those firms which likely faced the greatest incentives to repurchase to hit their EPS target.

Figure 6.4: Univariate mean comparisons of firms with pre-repurchase EPS just above and below the target



Source: PwC analysis

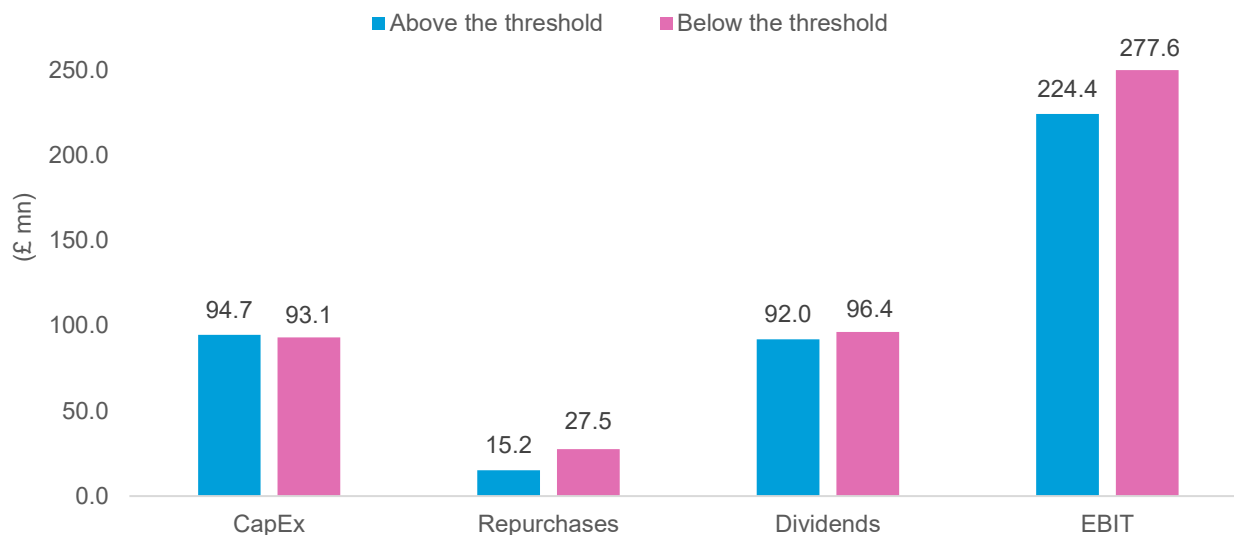
The mean comparisons show that the group who were below the target before repurchases engaged in more repurchases than those who were above the target before repurchases (£28.2m vs. £15.4m).

It is possible that this result is due to the different characteristics between the two groups. The profitability of firms below the threshold is also much larger (£282.4m vs. £224.4m), meaning that these extra profits can be used on other activities. Additionally, dividends and investment are also slightly higher for the group below the threshold, which is consistent with this scaling story. Indeed, when we calculate repurchases as a proportion of EBIT for both groups, we find that these measures are broadly similar.

In Appendix C we find the median differences between the groups of firms (for repurchases and other characteristics) are much smaller, which suggests that the difference in mean repurchases between these two groups is being driven by larger repurchases undertaken by a select number of firms.

We also conducted a similar comparison of firms with ex-post EPS just above and just below the EPS target. We found that firms that actually missed their EPS targets had higher levels of mean repurchases than firms that actually met their targets.

Figure 6.5: Univariate mean comparisons of firms with actual EPS just above and below the target



Source: PwC analysis

The mean comparisons show that the group that ended up above the target engaged in less repurchases than those who were below the target (£15.2m vs £27.5m). Again, we find that the median differences are much smaller. This is consistent with our earlier finding that no firm successfully used repurchases to hit the EPS target.

Regression analysis of share repurchases on ex-ante EPS target deviation

We then ran a threshold regression analysis of the level of share repurchases on the firm's ex-ante EPS target deviation and other firm-level control variables. The model specification and choice of control variables is discussed in depth in Appendix C.

This regression analysis tests for significant differences in share repurchases between the two groups of firms and allows us to control for any systematic differences in the characteristics of the two groups. The results of this regression analysis are set out in Table 6.7.

Table 6.7: Threshold results for ex-ante/pre-purchase EPS target deviation

Dependent variable	Independent variable	Standard error	Coefficient [95% CI]	P-value
Repurchases as a proportion of lagged total assets	Indicator for whether the EPS pre-repurchase target deviation is negative	Clustered standard errors	0.011* [-0.002, 0.024]	0.090
		Bootstrap clustered standard errors	0.011* [-0.001, 0.023]	0.080

Source: PwC analysis; *significance levels: 10%**

The results show some evidence significant at 10% that firms that would have been marginally below their EPS target, did indeed repurchase more shares. These results hold for two separate sets of controls used (from Almeida et al. (2016) and Edmans et al. (2017

The table can be interpreted as follows:

- **Coefficient:** The coefficient of 0.011 implies that the repurchases (as a proportion of lagged assets) are 1.1 percentage points higher for the group that would have been below the target without repurchases compared to the group that would have just hit its target.
- **P-value:** The p-value of below 0.1 means that we can reject the possibility that there is no relationship between these variables with more than 10% confidence.
- **R²:** The R² was less than 0.25. This indicates that a large proportion of the reasons for share repurchases is unexplained and occurs for reasons that do not relate to the firm's financial performance or fundamental characteristics.

Do EPS targets induce share buybacks?

Our empirical evidence generally found limited evidence of a relationship between executive pay targets and share repurchases.

1. No firm successfully used repurchases to hit the EPS target in the LTIP.
2. We found no relationship between the existence of an EPS target in an incentive plan and a higher level of share buybacks.
3. We find some weaker evidence (significant only at the 10% level) that firms on course to miss their EPS target conducted more repurchases than those on course to hit it, controlling for other factors. However, as noted in 1, above, no firm

in the sample actually succeeded in hitting a target that would otherwise have been missed by virtue of undertaking a share buyback, so it is difficult to conclude that the EPS target was the motivation for the buyback. In addition, when studying firms' actual EPS (including the effects of any repurchase), firms that ended up just hitting their EPS target did not undertake more repurchases than those that just missed, which is inconsistent with repurchases being used to hit EPS targets.

A possible explanation for the limited evidence found is that the typical level of repurchases undertaken in the UK is too small to have a significant impact on achievement against EPS performance conditions. Therefore, share buybacks would not normally be the most effective channel for executives seeking to influence pay outcomes.

Other findings on this topic

In addition to the above findings on our core question of research, other findings on this topic include:

1. Interviews suggested that there is room to improve alignment of executive pay metrics and pay design with long-term company performance.
2. The quality of communication between companies and investors on the topic of executive pay in general, and links to share repurchases in particular, could be improved. Interviewees noted that there is now extensive reporting on executive remuneration, but that some reporting makes it more difficult for readers to understand the incentives for executives.
3. Executive remuneration (and its reporting) has become highly complex. A number of interviewees suggested a return to greater use of share awards or Deferred Stock Units as a simpler way of aligning executive incentives with shareholders.
4. The scope for companies to keep compensation information confidential for reasons of commerciality was also questioned. If all companies were required to publish compensation information, then any commercial disadvantage may be reduced.
5. Lastly, the single-figure table that is reported by quoted companies, could be clarified, for example enabling a single figure comparison of pay received in the relevant year and pay earned for performance in the relevant year (but deferred).

7. Share repurchases and investment

This chapter presents the findings of the second research question for this study: “to examine the relationship between share repurchases and business investment in the UK and to understand whether there is any evidence that share buybacks are having a detrimental impact on company investment, growth and productivity.” The chapter starts with background information gained from secondary research and interviews, explains the findings and significance of the econometric analysis and survey, and concludes with implications for further research.

Findings of the literature review

As mentioned previously, the relationship between repurchases and investment is complex. If repurchases are associated with lower investment, it could be that repurchases crowd out investment, or that poor investment opportunities optimally lead to firms reducing investment and paying out the surplus cash, or omitted variables drive both.

Our literature review found only one study that identified a causal relationship between share repurchases and investment. Almeida, Fos, and Kronlund (2016) show that repurchases, induced by the desire to meet EPS forecasts (not pay targets), are associated with reductions in employment and investment, and a decrease in cash holdings. This suggests that some repurchases may crowd out investment. Note that their study focuses specifically on repurchases driven by the desire to meet EPS forecasts rather than repurchases in general, and the fall in investment could be either efficient or myopic.

Brav et al.'s (2005) survey of CFOs finds that they make investment decisions first and then undertake repurchases from the leftover cash, rather than making repurchase decisions first and then undertaking investment from the leftover cash. This suggests that a correlation between repurchases and low investment likely results from low investment leading to repurchases, rather than repurchases leading to low investment. Importantly, the same CFOs freely admit to cutting investment to maintain the current dividend level, attenuating concerns that executives will not truthfully acknowledge short-termist behaviour when responding to a survey. Similarly, Grullon and Michaely (2004) find that firms repurchase stock when growth opportunities are poor and that the market responds more positively to repurchases when firms have poor investment opportunities. This finding attenuates concerns that the market unthinkingly welcomes repurchases without taking into account what the cash might otherwise be used for. Dittmar (2000) finds that repurchases occur when firms have excess capital. These results are also consistent with the notion that it is declining investment opportunities that lead to repurchases, rather than repurchases causing investment declines.

To the extent to which firms have surplus cash, they can pay it out in either dividends or repurchases. The main advantage of repurchases over dividends is that they are more flexible. A repurchase in one year does not create expectations of repurchases in future years, but shareholders expect the current dividend to be maintained in the future – in part because some rely on dividends for income – thus potentially constraining investment in future years. Indeed, Guay and Harford (2000); Jagannathan, Stephens, and Weisbach (2000); and Lee and Rui (2007) show that repurchases are used more to distribute temporary cash flows while dividends are used more for permanent flows. Brav et al.'s survey (2005) finds that CFOs of dividend-paying firms wish they could start all over again and instead pay out cash in the form of repurchases, due to their flexibility.

A robust finding in the literature is that repurchases are followed by positive long-run returns, contrary to concerns that they only cause short-run price inflation or are at the expense of long-run value. The positive long-run returns may arise either because the firm was undervalued, or because it had already exhausted its investment opportunities and so repurchasing stock (rather than investing further) was the best use of cash. While the seminal paper by Ikenberry, Lakonishok, and Vermaelen (1995) found positive long-run returns to the US, Manconi, Peyer, and Vermaelen (2018) have since found that positive long-run returns also arise in the UK (and several other countries), and the results hold for a variety of methodologies.

It is also important to consider the impact of repurchases at an economy-wide level. Studying the link between repurchases and investment at the individual firm level ignores that fact that the cash paid out by repurchases can be reallocated elsewhere. Chen (2016) shows that the cash paid out in repurchases increases the prices of other stocks held by investors of the repurchasing firm, implying that the capital is reallocated to these other stocks, which are then more likely to issue equity in the future. Fried and Wang (2018) find that, even though US S&P 500 firms engage in positive net payouts, non-S&P 500 firms (i.e. smaller firms) engage in net issuance. Indeed, at a country level, Gruber and Kamin (2017) find little evidence that economies with high share repurchases and/or dividend payments suffer low aggregate investment.

Qualitative evidence on the relationship between share repurchases and investment

This section summarises the findings of the qualitative research to uncover whether there is any evidence that share buybacks are having a detrimental impact on company investment, growth and productivity. It includes the following sections:

- How companies make investment decisions, including ordering of share repurchase and investment decisions
- Extent to which companies and wider stakeholders see a trade-off between share repurchases and investment

- Extent to which companies see investment levels as sufficient
- Extent to which companies or wider stakeholders see share repurchases as directly influencing investment

How companies make investment decisions

Investment strategy

Companies interviewed varied in how far they had a formalised “investment strategy” beyond aiming to maximise profitability. They described various approaches to plan investment, with the total amounts invested being dependent on some of the below factors:

- Importance of physical assets to the company, which depends on industry and business model
- Growth prospects, including maturity and the existing customer base
- Risk appetite, which depends on various factors including existing leverage
- Whether the company is operating in a regulated or a non-regulated sector

Many of the companies interviewed referred explicitly to their “investment strategy” and some did so in the context of their overall “investor proposition”, as described in the previous chapter. However, some investors stated they wished companies communicated more clearly on what their investment strategy was.

Process for making investment decisions

The decision-making process for investment varies depending on company statutes but is generally (i) systematised based on defined metrics (e.g. NPV analysis); and (ii) governed at different levels of the organisation depending on amount, but ultimately governed at board level.

On the use of metrics, some companies interviewed described setting a specific hurdle rate for investment (for example: 14% minimum return on investment, 5% increase in profitability) with no specific target for total investment so long as returns are above this rate.

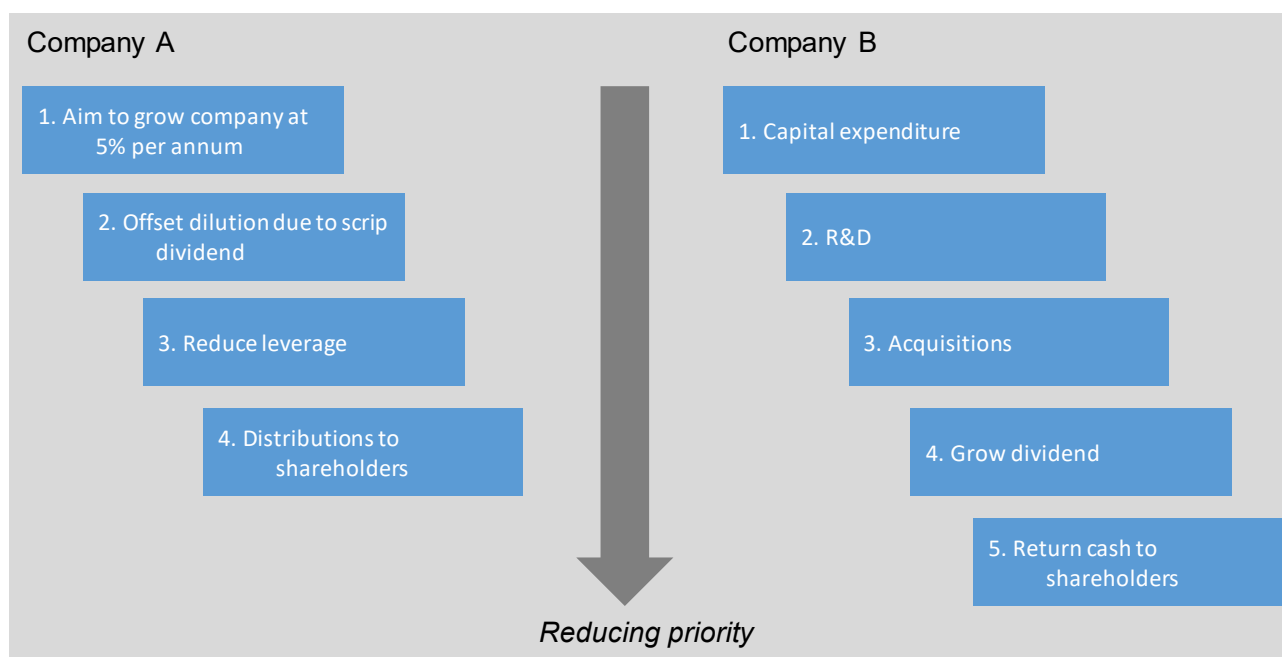
No companies interviewed suggested that access to finance was a constraint on their investment decisions. As described in Chapter 5, this is supported by the stylised fact that the recent decline in share repurchase activity has been accompanied by an increase in cash holdings; companies have cash but are choosing not to invest it.

On the involvement of shareholders in setting investment decisions, all companies interviewed described the views of investors as important. However, it seemed that few/none had specifically sought approval at AGM level for their investment plans.

Ordering of investment and share repurchase decisions

Interviews corroborated the findings of the literature review that in general companies take decisions about investment before decisions about shareholder payouts. Box 7.1 shows two examples of different investment prioritisation policies described during interviews. In both cases, decisions about company growth or investment are taken first.

Box 7.1: Example of different investment prioritisation policies described by companies during interviews



Source: PwC interviews

The response to the survey also indicated that investment decisions generally happen first, although with less clarity than was indicated in interviews. The average level of alignment with the statement “We make repurchase decisions after our investment plans are determined” was 3 out of a maximum of 5. The average response to the inverse statement, “We sometimes make repurchase decisions before investment decisions have been made”, was 2 out of 5. The fact that the results for these questions were not clearer, leaves open the possibility that sometimes the decisions are taken simultaneously or that other decisions which are taken before investment decisions also influence repurchases. Indeed, one example of where an announced share repurchase programme was scrapped to provide the financial resources for a large acquisition demonstrates that the ordering of decisions can be in reverse (share repurchases before investment), but even in this case it is the investment needs which are driving share repurchase behaviour.

Investor concerns about share repurchase and investment decisions

Some wider stakeholders suggested that too much capital is being returned to shareholders overall as opposed to paid in taxes or invested in staff. However, share repurchases were seen as a symptom rather than the root cause of any underlying effect.

Most investors indicated some concern about investment levels and whether they are sufficient. However, none suggested share repurchases were the cause, although there was some general suspicion.

- One major investor said they were less concerned about how companies make their share repurchase decisions, and more concerned about how they are using their capital. They want companies to exhaust all organic investment opportunities before considering share repurchases as an option. They will generally question management if they are not investing.
- Another investor said that share repurchases are part of broader issue between investors and companies about how to understand how current capital allocation decisions relate to future earnings.
- Another investor suggested companies should be required to provide more clarity on their investment plans.
- One investor suggested there may be a mismatch between the rates of return that management target, and the rates of return investors require. This could result in value creating investments not being pursued.

In interviews, companies also suggested that, if anything, the pressure is towards increasing investment. No company mentioned an example of shareholders encouraging companies to payout at the expense of investing.

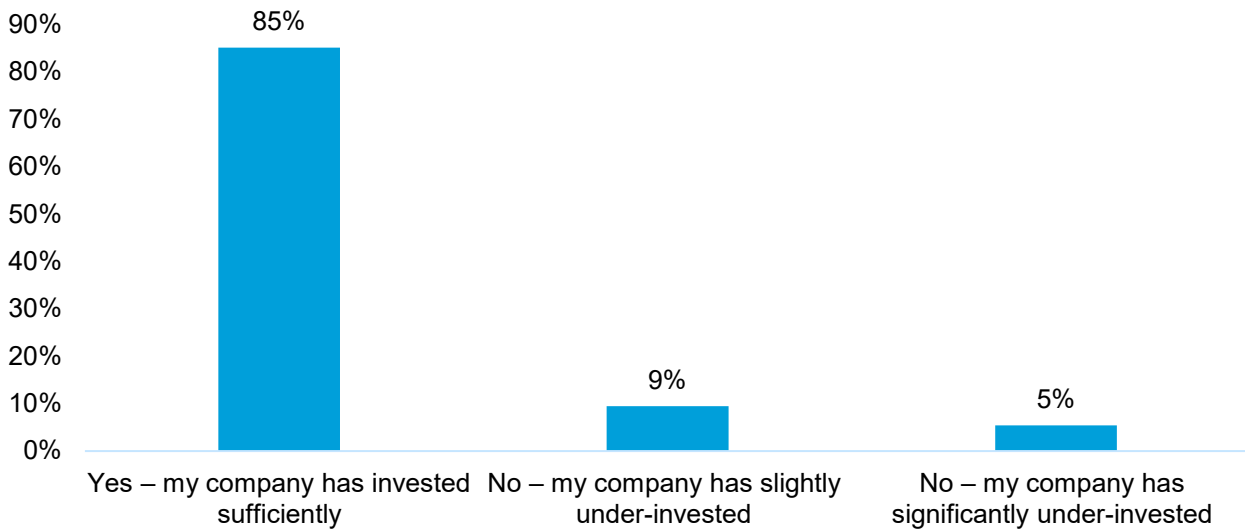
Extent to which companies view current investment levels as sufficient

All companies interviewed suggested that they were currently investing at the optimal level, given available investment opportunities. Interviewees provided a range of justifications for investment not being higher than it is currently, which include:

- Caution about the level of risk inherent to investment in acquisitions, new overseas projects or even opening new operations in the UK.
- Observations on the recent trend away from portfolio businesses (where new investment is driven by acquisitions or expansion into new industries) and towards business models described variously as more “focused”, more “coherent” and more “disciplined”.

The survey findings somewhat supported this. 63 of 74 respondents (or over 85%) felt that their companies had invested sufficiently in the last three years to contribute to success in the future.

Figure 7.1: Survey findings on extent to which businesses felt they had invested sufficiently to contribute to future business success



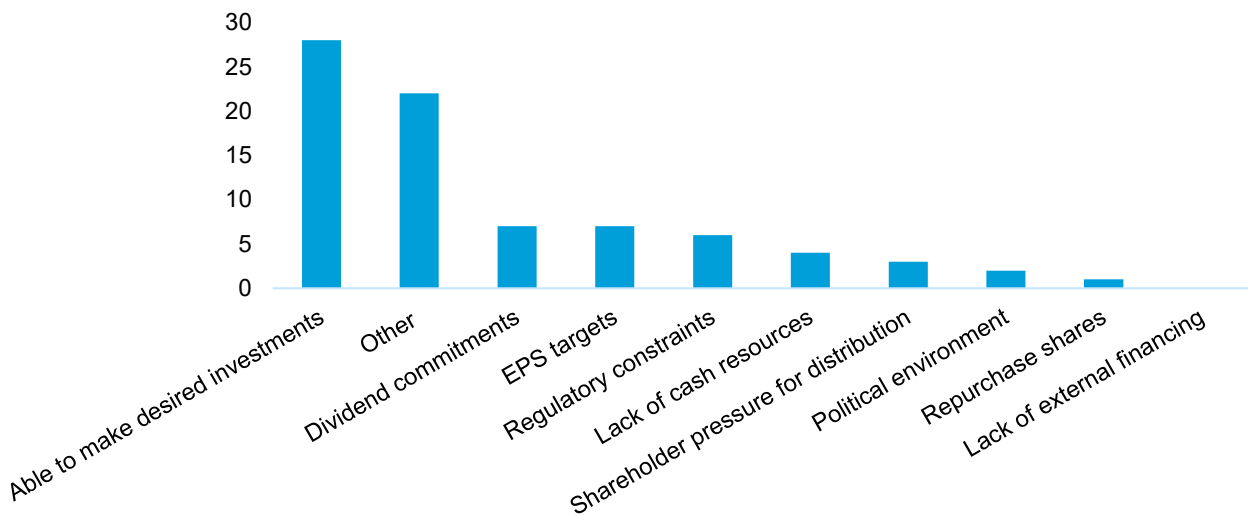
Source: PwC Survey Results

However, when asked the question “if your company was unable to make all the investments it wanted to pursue, what was the reason for this?”, only 28 respondents selected the option “we were able to make all the investments we wanted to”.

Extent to which companies see a trade-off between repurchases and investment

Figure 7.2 explores the above question by looking at the reason that companies gave for not being able to make the investments they wanted to. The need to repurchase shares was ranked the second lowest, selected by only one company. This suggests that companies themselves do not see repurchases as the driver of low investment. However, in light of our other research question, it is noteworthy that EPS targets were selected as a reason by only a small number of companies.

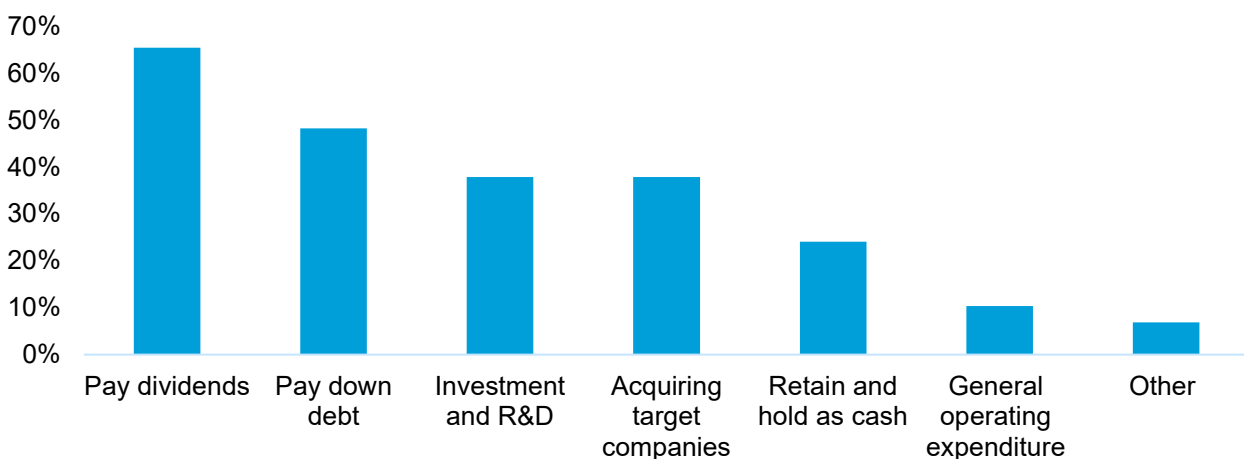
Figure 7.2: Survey findings on reasons for companies not being able to make all the investments they wanted to



Source: PwC Survey Results. “Other” includes: 1. Trade-off between business transformation projects and capital expenditures 2. Lack of appropriately priced M&A targets 3. Mandatory regulation restricts financial capacity to invest

Figure 7.3 shows the response to the alternate, hypothetical question “Of funds that could have been used to repurchase shares, what is the most likely alternate use?”. Investment was the joint third most selected option, after paying dividends and paying down debt. This suggests that some companies do see a trade-off between repurchases and investment, although these investments may not have been value-creating ones since no executive reported that a lack of financing prevented them undertaking desirable investments. However, this option was still only chosen by a minority of companies. Furthermore, this does not necessarily mean that share repurchases are crowding out investment. It is possible that investment was already at their preferred level, and that companies therefore chose to payout the cash instead.

Figure 7.3: Alternative uses for funds used to repurchase shares



Source: PwC Survey Results

Lack of direct evidence to support share repurchases crowding out investment

The above findings suggest that there could be some scope for repurchases to crowd out investment, but that this is scope is very limited.

This was supported when we asked the question directly. In the survey, only one single company responded that a need to buy-back shares was a factor in a company not being able to make all the investments it wanted to pursue.

In interviews, no specific examples or anecdotes were provided to suggest that share repurchases are directly or indirectly causing a detrimental impact on investment. No companies suggested that investment was cut in order to finance repurchases or executive pay.

In interviews, some companies suggested that if surplus cash were generated the first consideration would be to pay it out to shareholders rather than to invest. This is also consistent with the fact that lack of external financing was not a barrier to investment, i.e. firms were generally able to make all desired investments. One company explicitly stated that there is some interaction between the business having excess cash and the decision to invest.

Empirical evidence on how far share repurchases are linked to lower investment in the UK

This section sets out our empirical findings. Further information on the model specification and results is provided in Appendix C.

Impact of repurchases on investment

The first set of regressions examined the correlation between the level of repurchases in the dataset on the mean level of investment. These are presented in Table 7.1.

Table 7.1: Summary of econometric results estimating the impact of mean shareholder payouts on capital expenditure (preferred specification in blue)

Independent Variable	Dependent variable	Model selection	Standard error choice	Coefficient [95% CI]	P-Value
Share repurchases	CapEx	Full set of control variables	Clustered	0.013 [-0.045, 0.071]	0.66
Share repurchases	CapEx	Full set of control variables	Bootstrap clustered	0.013 [-0.121, 0.147] Preferred specification to examine mean effect	0.85

Independent Variable	Dependent variable	Model selection	Standard error choice	Coefficient [95% CI]	P-Value
Share repurchases	CapEx	Refined set of control variables	Clustered	-0.011 [-0.041, 0.019]	0.47
Share repurchases	CapEx	Refined set of control variables	Bootstrap clustered	-0.011 [-0.955, 0.735]	0.80

Source: PwC analysis

None of the four specifications tested found statistically significant evidence of a relationship. The table can be interpreted as follows:

- **Coefficient:** The coefficients estimated are either slightly greater or slightly less than 0.01. This would imply that a 10 percentage point increase in share repurchases (as a proportion of lagged total assets) is associated with a 0.1 percentage point increase in investment (as a proportion of lagged total assets), on average
- **P-Value:** The p-values are between 0.47-0.88. This implies that the magnitude of the coefficients found could easily have arisen due to chance and are not statistically significantly different from zero.
- **Model specification comparison:** when a full set of control variables is used the relationship between share repurchases and investment is positive (but insignificant). When a refined set of control variables is used the relationship is negative (but insignificant).
- **Standard error choice:** When bootstrapped standard errors are used, the statistical significance of the relationship falls even further.

The second set of regressions examined the impact of the median level of repurchases in the dataset on investment. These are provided in Appendix C. The p-values vary between 0.06 to 0.783. This implies that most of the coefficients were not found to be statistically significantly different from zero. One specification (refined with clustered standard errors) was found to be statistically significant. When the standard errors are adjusted for the strange (non-normal) distribution in the residuals, none of the specifications produce a statistically significant relationship. This suggests little difference between mean and median regression forms.

Impact of repurchases motivated by EPS targets on investment

In Chapter 6 we showed that firms that would have just missed EPS targets without repurchases are more likely to engage in repurchases. Here we study whether repurchases, motivated by being just below the EPS target, reduce investment. The methodology is similar to Almeida, Fos, and Kronlund (2016) and described further in Appendix C; it aims to demonstrate a causal effect of EPS-driven purchases on investment. Once again, we found no evidence of a statistically significant relationship.

Table 7.2: Summary of econometric results estimating the impact of repurchases motivated by EPS targets on investment

Dependent variable	Independent variable	Standard error	Coefficient [95% CI]	P-value
Two-year growth in investment	Share repurchases motivated by EPS target deviation	GLS (Generalised least squares) standard errors	-0.93 [-3.087, 1.227]	0.397
		Bootstrapped standard errors	-0.93 [-24.76, 22.90]	0.94

Source: PwC analysis

Note that any large-scale analysis will uncover the average effect in the data and there will always be outliers. Thus, even though repurchases do not appear to be crowding out investment in the average firm, we cannot rule out the fact that there may be individual firms in which they do.

8. Executive pay and investment

Although not one of the two main questions of our study, our research also allows us to study the direct link between executive pay structures and investment. Our findings on this relationship were stronger than our findings on the individual relationships between executive pay structures and repurchases, and repurchases and investment. This suggests that insofar as there is an issue, repurchases may be a by-product of the effect of executive pay structures on investment rather than a cause - executive pay structures encourage investment cuts, and then the firm has surplus cash with which to repurchase shares. Our findings on this are summarised below.

Literature review findings on direct relationship between executive pay structures and investment

Our academic literature review had found relatively weak evidence that investment cuts are associated with share repurchases. However, there is stronger evidence of a direct relationship between executive incentives and cuts in investment.

- Edmans, Fang and Lewellen (2017) show that vesting equity is associated with declines in R&D and capital expenditures. The fall in investment may be either efficient or myopic. Contradicting the “efficiency” interpretation, vesting equity is not associated with other increases in efficiency, such as a fall in cost of goods sold or operating expenses. Consistent with the “myopia” interpretation, the fall in investment is lower when there are more blockholders (large shareholders) who are likely to see through earnings increases caused by investment cuts.
- Ladika and Sautner (2018) find that the FAS 123R accounting standard in the US caused some firms to accelerate the vesting of options to avoid an accounting charge. This accelerated vesting in turn led to reduced capital expenditure.
- Bennett et al. (2017) find that firms that just meet the performance target have lower R&D and abnormal accruals than firms that just miss the target, suggesting that they cut investment or manipulate earnings to hit the target. However, they do *not* find any difference in repurchases, suggesting that repurchases are not used to meet targets.

A number of studies also find that firms cut discretionary expenditure, including R&D, in order to meet analyst earnings forecasts (rather than earnings targets in executive pay). For example, the survey of Graham, Harvey, and Rajgopal (2005) finds that 80% of CFOs would decrease discretionary expenditure on R&D, advertising, and maintenance to meet an earnings forecast. However, 12% would engage in repurchases to do so.

Evidence of systematic correlation between presence of performance targets on investment

In addition to studying the individual relationships between executive pay and share repurchases, and separately share repurchases and investment, we also study the direct relationship between executive pay and investment. This used a similar methodology as for the executive pay analysis.

We found evidence, significant at 5%, in several regression specifications that companies with EPS-based incentives invest less. We ran similar general regression specifications to those described in the previous two chapters. The results are shown in Table 8.1 below.

Table 8.1: Summary of econometric results estimating the impact of the presence of EPS and TSR values on mean levels of investment.

Variable	Model selection	Standard error choice	EPS coefficient [95% CI]	EPS p-value	TSR coefficient [95% CI]	TSR p-value
Indicator of whether the firm has EPS or TSR target in its LTIP	Full	Clustered	-0.01** [-0.019, -0.001]	0.025	-0.01* [-0.022, 0.002]	0.096
Indicator of whether the firm has EPS or TSR target in its LTIP	Full	Bootstrap clustered	-0.01** [-0.019, -0.001] Preferred specification for presence of EPS target	0.031	-0.01 [-0.022, 0.002]	0.116
Indicator of whether the firm has EPS or TSR target in its LTIP	Refined	Clustered	-0.01*** [-0.017, -0.003]	0.005	-0.003 [-0.008, 0.002]	0.253
Indicator of whether the firm has EPS or TSR target in its LTIP	Refined	Bootstrap clustered	-0.01*** [-0.017, -0.003]	0.007	-0.003 [-0.008, 0.002]	0.272
Pay incentive	Full	Clustered	-0.005** [-0.009, -0.001]	0.026	-0.000** [-0.000, -0.000]	0.010
Pay incentive	Full	Bootstrap clustered	-0.005** [-0.010, -0.000] Preferred specification for size of pay incentive	0.043	-0.000 [-0.003, 0.003]	0.958
Pay incentive	Refined	Clustered	-0.003 [-0.007, 0.001]	0.105	-0.000 [-0.001, 0.000]	0.688

Variable	Model selection	Standard error choice	EPS coefficient [95% CI]	EPS p-value	TSR coefficient [95% CI]	TSR p-value
Pay incentive	Refined	Bootstrap clustered	-0.003 [-0.007, 0.001]	0.112	-0.000 [-0.020, 0.020]	0.994

Source: PwC analysis *Significance levels: 1%***, 5%** , 10%**

The results show that there is a negative relationship between the presence of an EPS target in an LTIP, and the level of CapEx. This is statistically significant in all cases, including the preferred specification. There is also a similar negative relationship between the size of the pay incentive related to EPS and CapEx and this is statistically significant at 5% in the preferred specification. The results for TSR were mostly not statistically significant.

- **Coefficient:** The coefficients estimated for the relationship between the presence of an EPS target and investment, are all 0.01 including in the preferred specification. This implies that firms with EPS targets in their LTIPs have a one percentage lower mean levels of CapEx (as a percentage of lagged total assets) than firms without these targets. The coefficient for the size of pay incentive and investment is 0.005 and significant in the preferred specification.
- **P-value:** The p-values for the relationship between EPS targets and CapEx is 0.031 in the preferred specification. This is statistically significant at the 5% level. The p-values for the relationship between TSR and CapEx are mostly not statistically significant.
- **Model specification comparison:** For the relationship between executive pay incentives and investment, the coefficient is 0.01 in both the full and the refined model specifications.
- **Standard error choice:** When the standard errors are adjusted for the non-normal distribution in the residuals, the coefficient remains statistically significant.

Though the analysis controls for a variety of factors and firm characteristics, one should note that these results nevertheless are not proof of causality. For example, it may be that a poor economic outlook both causes a firm to (rationally) cut investment and also causes a board to implement EPS targets to induce a turnaround. Alternatively, a lack of investment opportunities leading to a plan to cut investment may lead to selection of an EPS target to retain discipline in relation to this strategy.

Evidence of causal relationship between proximity to performance targets on investment

To move towards identifying causality, we conduct a threshold-based regression analysis where we compare the investment behaviour of firms just above and just below an EPS target ex-post. In this case, the results are no longer statistically significant.

Table 8.2: Average investment level for firms who hit the EPS target compared with those who had missed the target

Dependent variable	Independent variable	Standard error	Coefficient [95% CI]	P-value
Investment	Indicator for whether the EPS target was hit (assumed to be "random")	Clustered standard errors	0.01 [-0.003, 0.023]	0.128
		Bootstrap clustered standard errors	0.01 [-0.002, 0.023]	0.124

Source: PwC analysis

The results here contradict the previous finding to some extent, since they suggest that firms that hit the EPS target were unlikely to have cut investment to do so.

One possible explanation is that firms are cutting investment at a more 'general' level – i.e. they do not specifically try to hit the target with measured investment cuts, but rather generally undertake less investment than otherwise with the EPS target in mind. Another explanation is reverse causality or omitted variables bias in the general regression, which is addressed by the discontinuity analysis.

Qualitative evidence of impact of executive pay structures on investment

Our qualitative research also found some evidence in support of a direct relationship.

In the survey, in response to the question, "If your company was unable to make all the investments it wanted to, what was the reason for this?", 10% of respondents answered "need to meet EPS targets". This compares with 1% of respondents who answered "need to buy back shares" and 3% who responded "shareholder pressure for distribution". This suggests that companies are more conscious of a direct impact of EPS targets on investment, than of an indirect impact via share repurchases.

Note that this survey question did not specify that the EPS targets in question are those in executive pay contracts. It is possible that management has business targets linked to EPS, or management felt pressure to meet analyst EPS forecasts or avoid EPS dropping below the prior quarter (or the same quarter last year).

In interviews, as stated in the previous chapter, companies did not express concerns about levels of investment. All companies interviewed suggested they were investing at their desired level. Where wider stakeholders expressed concerns about levels of investment, these were generally related to wider concerns about short-termism, transparency, and inequality, rather than the impact of EPS targets in executive remuneration.

9. Conclusion

In this research paper we have sought to address the two questions:

1. To examine the relationship between executive remuneration and motivations to undertake share repurchases. More specifically, to understand whether buybacks are being used to meet EPS targets in CEO remuneration packages and/or to inflate the value of their share awards rather than to create long-term value for the company.
2. To examine the relationship between share buybacks and corporate investment in the UK and to understand whether there is any evidence that share buybacks are having a detrimental impact on company investment, growth and productivity.

Our approach used was a combination of econometric research using a bespoke dataset of FTSE 350 companies, analysis of international trends, as well as an online survey and in-depth interviews.

Due to substantial reporting of executive pay, we found relatively few gaps in our data. In relation to investment we were constrained by the use of CapEx from reported accounts and were not able to test for any relationship with R&D due to the varied and inconsistent reporting of R&D expenditure.

We are grateful to those senior executives who gave their time in interviews and completed our online survey. While the econometric analysis and qualitative findings are broadly consistent, the latter have helped to provide additional understanding of the motivations of share repurchases and inform the likely direction of causality.

The main findings of our study are set out below.

1. The existing academic literature (based mainly on US studies) finds some evidence of a correlation between executive incentives and repurchases but not evidence of a systematic causal relationship. The only causal evidence we found in the literature links vesting equity (rather than EPS targets) to repurchases, and finds small magnitudes. Interestingly, one study suggests that firms that just meet performance targets have lower levels of R&D. However, the study did not find differences in repurchases between firms that just meet targets and those that just miss targets.
2. Over the period considered (2007-2017) our econometric analysis found no significant relationship between share repurchases and either the existence of an

EPS condition or the proportion of an incentive award linked to that condition within executive pay incentives and share repurchases.

3. Additionally, we carried out threshold analysis to compare firms' EPS performance had they not repurchased shares to their EPS including the repurchase. This covers the period 2007-2017. The analysis found that:
 - (a) No firms in the sample would have been below the EPS target had they not repurchased shares repurchase and above the EPS target with the share repurchase. In other words, no firm successfully used share repurchases to beat its EPS target.
 - (b) We then examined 10 firms who missed, but came closest to hitting, their EPS target in the absence of repurchases. These are the firms that would have been most able to use repurchases to hit their EPS target. For nine of those ten firms, the repurchase impact was negligible compared to difference between the EPS target and the firm's EPS before the repurchase. This is consistent with the evidence cited below that firms rarely repurchase enough shares to materially impact their EPS measure.
 - (c) We found one instance where a firm was very close to its EPS target, while also undertaking one of the largest share repurchases in the dataset but then it was unable to successfully hit the target.
 - (d) Finally, we did find some weaker evidence (significant only at the 10% level) that firms on course to miss their EPS target conducted more repurchases than those on course to hit it, controlling for other factors. However, as noted in (a) above, no firm in the sample actually succeeded in hitting a target that would otherwise have been missed by virtue of undertaking a share buyback, so it is difficult to conclude that the EPS target was the motivation for the buyback. Moreover, the difference in mean share repurchase amounts between the two groups of firms is driven by larger repurchases undertaken in a small number of firms. In addition, when studying firms' actual EPS (including the effects of any repurchase), firms that ended up just hitting their EPS target did not undertake more repurchases than those that just missed, inconsistent with repurchases being used to hit EPS targets.
4. Our survey of senior executives who might be responsible for buybacks asked questions about the importance of factors in making decisions to repurchase shares or pay dividends. The responses were that LTIP targets are one of the least important considerations in decisions to repurchase shares or pay dividends: on a 5 point scale both scored around 1.5, where 1= not important at all. More important reported factors for determining share repurchases were the share price and the availability of good investment opportunities – both scoring around 3.

5. In our survey responses, 30% of companies adjust their EPS targets contained within LTIPs for share repurchase activity, and most senior executives acknowledge share repurchases should be reviewed by remuneration committees. The qualitative interviews provided further insights into company practices on adjusting targets in general and for share repurchases in particular. Interviewees were generally, but not universally, supportive of adjusting EPS targets for share repurchase activity. But the most common reason given for not adjusting EPS targets for share repurchases is on the grounds of immateriality: i.e. for most companies the level of share buybacks is too small to have a material impact on achievement against the EPS target.
6. Senior executives suggest that investment decisions are made before share repurchase decisions, and investment is higher up the ranking of priorities than share repurchases. Asset managers also suggested they want companies to exhaust all organic value enhancing investments before they return surplus cash to investors. These findings are consistent with existing academic evidence. Thus, to the extent to which any correlation between investment and repurchases exist, the analysis suggests that it is the lack of investment opportunities that drives repurchases, rather than repurchases preventing companies from exploiting investment opportunities.
7. Between 2007 and 2017 we found no relationship between share repurchases and investment. This is consistent with the survey findings that investment decisions are taken independently of share repurchase decisions. Repurchases are then driven by factors (e.g. excess cash and undervalued equity) which are largely unrelated to investment opportunities.
8. We then focus on firms that would have just missed an EPS target in the absence of a repurchase, and thus are particularly likely to cut investment to finance a repurchase. Even when focusing on such firms, we still found no effect on investment. Specifically, these firms did not cut investment more than other firms that would have just met an EPS target in the absence of a repurchase.
9. Overall, while we have used a variety of different research methodologies (literature review, qualitative surveys and interviews, and quantitative econometric analysis), they paint a consistent picture. The evidence does not suggest that repurchases are being used systematically to artificially hit EPS targets, or crowd out investment. (Of course, they may still have these effects in isolated cases).
10. Our analysis does reveal some evidence of a more direct link between EPS conditions in the LTIP and investment. In particular, the presence of EPS conditions in the LTIP is correlated with lower investment. This could indicate that the executive pay structures are encouraging investment cuts. Alternatively, firms entering into a period of reduced investment may be more likely to employ EPS measures to encourage profit discipline. Our study cannot determine which way

the causality runs, if there is indeed a causal link. Alternatively, the correlation may arise from a common driver of both factors.

11. The literature review highlighted there is evidence of a direct relationship between executive incentives (particularly vesting equity and performance targets) and cuts in investment. However, we do not find a statistically significant relationship between specific EPS targets and investment, in that firms that just meet EPS targets do not invest less than firms that just miss.

Next steps and avenues for further work

As a UK focused piece of research, we hope this study provides additional insight on the use of share repurchases in the UK and acts as a point of comparison to US studies. Overall our research findings are consistent with the findings from these US studies, even though share buybacks are much less prevalent in the UK.

During the course of our work we identified a number of areas which were not central to our research questions, but which would benefit from further work or renewed scrutiny. These were:

1. We found a correlation between use of EPS targets and lower investment. Although the effect was large, with investment being around a fifth lower in companies using EPS targets, the results did not demonstrate that EPS targets were causing the reduced investment, and the results were not consistently supported by all of our modelling approaches. It would be premature to draw firm conclusions, but this is clearly an area that warrants further research to shed light on the behavioural impacts of different types of incentive measures. If the use of EPS targets is found to contribute to underinvestment, or other forms of short-termism, then it would strengthen the case for exploring alternatives to EPS as a performance measure. It would also strengthen the case for replacing LTIPs with deferred share awards as a simpler way of aligning executives with long-term shareholder interests, an approach that was supported by a number of the interview participants.
2. Greater reporting and communication around long-term capital use and allocation would allow investors to better understand and scrutinise company investment and capital plans. This is consistent with the improved reporting on capital allocation recommended in the Investment Association's Productivity Action Plan³³.
3. If there were a mismatch between the returns which executives are targeting and investors require, this could lead to sub-optimal investment levels. We observed views were divided on this topic and many interviewees considered their target

³³ Investment Association (2016). Supporting UK productivity with long-term investment: The Investment Association's productivity action plan.

Conclusion

returns to be aligned with investors'. This area could be researched in more detail and more transparency could result in better alignment of return requirements.

Glossary

Term	Definition
Board of Directors	Responsible for the corporate governance of the company, including any decisions not taken by shareholders. According to Section 172 of the UK Companies Act, directors are required “to act in a way he considers, in good faith, would be most likely to promote the success of the company, for the benefit of its members as a whole”, while having regard to the interests of a wider set of specified stakeholders.
Deferred matching award (DMA)	A form of executive compensation consisting of an opportunity to invest part of a bonus into shares, which then is matched by an additional LTIP award.
EPS (Earnings per share)	Net company profit minus dividends, divided by average number of shares outstanding (i.e. owned by shareholders). This is a commonly used measure of company performance. Shares outstanding can be calculated either as shares outstanding at the end of period, or more typically as the weighted average of shares outstanding over the reporting term.
EPS (Adjusted)	This removes all non-core profits and losses, as well as those in minority interests. The focus of this calculation is to see only profit or loss generated from core operations on a normalized basis.
EPS (Diluted)	The Diluted EPS formula is equal to Net Income less preferred dividends, divided by the total number of diluted shares outstanding (basic shares outstanding plus the exercise of in-the-money options, warrants, and other dilutive securities). This is the hypothetical EPS in the event that all stock options were exercised.
LTIP (Long-term incentive plans)	Pay package with various performance metrics (e.g. target EPS) and payout schedules (e.g. payment if the target is achieved).
Remuneration Committee (“RemCo”)	Appointed by the Board of Directors to oversee executive pay policy and set executive pay. It consists of at least two independent, non-executive directors in public companies. The corporate governance code sets out the principles and provisions that apply to RemCos in public companies on a “comply or explain” basis.
ROCE (Return on capital employed)	Profits before tax and interest, divided by working capital and fixed assets. This is a commonly used measure of company performance and efficiency.
TSR (Total shareholder return)	Change in share price and dividends during a period of time (usually one year) expressed as a percentage of the starting share price. This is a commonly used measure of company performance.
Vesting period	The time taken before deferred shares or share options are “vested” i.e. available. After this period the recipient acquires the shares or can choose to buy the shares at a reduced rate (as applicable).

Appendix A: Literature review

Summary

This section summarises the findings of our survey of the academic literature on the relationship between executive compensation, repurchases, and investment. Unless otherwise stated, the studies are on the US. This is not so much due to an academic bias towards the US but a result of the fact that repurchases are much rarer outside the US. In many continental European countries, many companies do not have to disclose share buyback authorisations (leading to limited data), repurchases were illegal until relatively recently, or pay schemes incentive executives to maximise firm size even if investment is inefficient. While one cannot automatically assume that findings from the US immediately translate to the UK, one can still learn a significant amount from US studies given the economic systems are similar (although far from identical) – just as one can apply the findings of most US medical studies to a UK context despite differences in diet, lifestyle, and healthcare systems. However, we will highlight contextual differences wherever relevant.

The main findings are as follows:

1. The effect of repurchases on the short-term stock price is much smaller in the UK than in the US, reducing the incentives to use repurchases to inflate the short-term share price.
2. Repurchases are followed by positive long-term returns, not only in the US but also in the UK (and other countries), attenuating concerns that they are at the expense of long-term value.
3. Repurchases are typically used when a firm has surplus cash, poor investment opportunities, or poor recent stock price performance.
4. Managers make investment decisions first and then undertake repurchases from the leftover cash, rather than making repurchase decisions first and then undertaking investment from the leftover cash. Thus, any correlation between repurchases and low investment likely results from low investment leading to repurchases, rather than repurchases leading to low investment. The underlying cause of repurchases is likely low incentives to invest, and so solutions should focus on these low incentives. These potentially include:
 - (a) Executive incentives from vesting equity. When CEOs' equity is about to vest, they cut investment and focus on short-term earnings. They also

engage in repurchases that increase the short-term share price at the expense of long-term value.

- (b) Executive incentives from EPS or share price targets in bonuses and long-term incentive plans. CEOs cut investment in order to meet such targets, although there is no evidence that they use repurchases to do so.
 - (c) Analyst forecasts. Executives cut investment, use accruals, and engage in repurchases to meet analyst forecasts.
5. Repurchases are more flexible than dividends. Unlike repurchases, managers tend to pay dividends first and then make investment decisions out of the remaining cash. Any restriction on repurchases may encourage managers to switch to dividends, a less flexible form of payout.
 6. Repurchases increase a firm's ability to subsequently issue equity in the future, similar to how repaying debt allows a firm to borrow later without breaching leverage targets.
 7. The cash used to repurchase is typically reinvested in other companies, allowing them to invest in capital expenditure and R&D. These effects are ignored in an analysis of the link between repurchases today and the investment undertaken by the same company today.

A1.1 Introduction

The role of share repurchases in pursuing short-term targets and crowding out investment has been widely discussed as a potential issue for both policy-makers and company leadership. There are a number of legitimate business reasons why companies may wish to repurchase their own shares. However, since repurchases also increase short-term performance measures, there may be an incentive to use them for reasons other than maximising long-term value. Whether this actually can, and does, reduce long-term investment is a matter for academic study.

The existing literature contains considerable evidence on the determinants and consequences of repurchases, including the “effect” of executive pay on repurchases and the “effect” of repurchases on investment. However, it is difficult to make strong causal claims, because omitted variables may jointly determine repurchases, pay, and investment, or because causality may be in the opposite direction – for example, investment may drive repurchases rather than repurchases driving investment. In addition, it is difficult to make strong efficiency judgements – repurchases and cuts in investment may be efficient if investment opportunities are poor.

In this literature review, we examine the existing evidence base and draw conclusions about how far it supports the hypothesis that share repurchases may be causing lower long-term investment in the UK. This literature review has informed the methodology used in our econometric study and the questions used in our surveys and qualitative interviews.

Note that academic studies differ substantially in their quality and rigour. Many papers, even papers published in peer-reviewed journals, fail to define a correct comparison group, do not control for confounding variables, and interpret correlation as causation. That a result was “shown” by an academic paper does not mean that it is reliable; one of the most dangerous phrases is “research has shown that ...” because one can almost always find a paper to show what one would like to show. Wherever possible, we focus our literature review on papers published in the very top finance journals which reject nearly 95% of papers given their high bar for rigour. We do include some papers published in more minor journals, because few non-US studies have been published in these top journals. This in turn means that there is a need for a rigorous non-US study.

A1.2 Value-creating motivations for share repurchases

This section considers motivations for repurchases that enhance long-term shareholder value. Section A1.3 below considers motivations for repurchases that stem from the manager’s personal incentives and Section A1.4 consider the relationship with investment.

A primary motivation for repurchases is to distribute surplus cash to shareholders. Once a firm has exploited all value-creating investment opportunities, it should not continue to invest (any further investments will be value-destroying) but instead return surplus cash to shareholders, allowing them to invest it in other companies. In other words, it is declining investment opportunities that lead to repurchases, rather than repurchases causing investment declines. Indeed, Grullon and Michaely (2004) find that firms repurchase stock when growth opportunities are poor and that the market responds more positively to repurchases when firms have poor investment opportunities. This finding attenuates concerns that the market blindly welcomes repurchases without taking into account what the cash might otherwise be used for. Similarly, Dittmar (2000) finds that repurchases occur when firms have excess capital. Brav, Graham, Harvey, and Michaely’s (2005) survey of CFOs finds that they make investment decisions first and then undertake repurchases from the leftover cash, rather than making repurchase decisions first and then undertaking investment from the leftover cash. Importantly, the same CFOs admit to cutting investment to finance dividends, attenuating concerns that they will not truthfully acknowledge short-termist behaviour in a survey.

Any surplus cash can be paid out in either dividends or repurchases. The main advantage of repurchases over dividends is that they are more flexible. A repurchase in one year does not create expectations of repurchases in future years, but shareholders expect the current

dividend to be maintained in the future – in part because some rely on dividends for income – thus potentially constraining investment in future years. Indeed, Guay and Harford (2000); Jagannathan, Stephens, and Weisbach (2000); and Lee and Rui (2007) show that repurchases are used more to distribute temporary cash flows while dividends are used more for permanent flows. Brav et al.'s survey (2005) finds that CFOs of dividend-paying firms wish they could start all over again and instead pay out cash in the form of repurchases, due to their flexibility.

In theory, special dividends also offer the flexibility to make one-off cash distributions. However, repurchases are typically preferable for at least three reasons. First, a special dividend is paid out to all shareholders, regardless of whether they can put the dividend to good use. In a share buyback, only shareholders with good alternative investment opportunities will sell. Second, special dividends are generally less tax-efficient than repurchases. Third, repurchases concentrate the firm's equity, leading to large shareholders who have greater incentives to engage in stewardship.

Another source of flexibility is that firms are not legally bound to undertake repurchases after announcing to do so. This flexibility is valuable – Stephens and Weisbach (1998) find that firms are more likely to complete repurchases after negative prior stock returns, i.e. where stock is more likely to be undervalued. Bonaimé (2012) finds that a low completion rate of past repurchases is associated with a lower announcement return to future repurchases, suggesting a reputation effect of not completing announced repurchases.

The flexibility motivation for repurchases is important. Repurchases are only one form of payout. Any restriction in repurchases will likely cause firms to substitute into an alternative form of payout – dividends. Dividends are less flexible and thus more likely to constrain investment, since firms are expected to maintain the current dividend. Indeed, as discussed above, Brav et al. (2005) find that CFOs sometimes cut investment to maintain dividend levels.

A second motivation for repurchases, which is not shared with dividends, is undervalued stock. When a stock's true value is greater than its current price, buying it creates benefit for continuing shareholders (i.e. ones that do not sell out in the repurchase). Indeed, Jagannathan, Stephens and Weisbach (2000), and Dittmar (2000) find that repurchases are more common in firms with poor recent share price performance; as discussed earlier, Stephens and Weisbach (1998) find that firms complete a greater proportion of announced repurchases after poor stock performance. However, in the UK, Rau and Vermaelen (2002) note that undervaluation motives are likely much weaker than in the US, since companies are not allowed to buy back shares without two months of earnings announcements, which is when executives are particularly likely to have private information about their firms' true value.

A very robust finding in the literature is that repurchases are followed by positive long-run returns, contrary to concerns that they only cause short-run price inflation or are at the expense of long-run value. The positive long-run returns may arise either because the firm was undervalued, or because it had already exhausted its investment opportunities and so repurchasing stock (rather than investing further) was the best use of cash. While the seminal paper by Ikenberry, Lakonishok, and Vermaelen (1995) is on repurchases in the US, Manconi, Peyer, and Vermaelen (2018) find positive long-run returns to repurchases in the UK, and the results hold for a variety of methodologies. More broadly, they extend the analysis to 31 non-US markets and find that positive long-run returns generally continue to hold – including in the UK - and so the result is not just a US phenomenon. The few countries where the result do not hold have weak corporate governance (and so repurchases can be done for non-value-maximising reasons), which is not the case for the UK.

A third motivation for repurchases is to undo dilution and finance employee (and executive) stock option exercises. When employees exercise options, they increase the number of shares outstanding, thus diluting the value of each share. Thus, repurchases may be used to counter this effect. Kahle (2002), Jolls (1998), and Cuny, Martin, and Puthenpurackal (2009) indeed find that repurchases are correlated with option exercise in the US. However, Gao and Kronlund (2017) find that there is no causal effect of option exercises on share repurchases. Moreover, this motive is likely less important for the UK. Before 2003, firms were required to cancel repurchased shares instead of holding them as treasury shares to later issue them to employees. We are unaware of any evidence that UK firms repurchased more after this requirement was lifted in 2003.

Finally, regulation can drive repurchase behaviour. Grullon and Michaely (2002) show a structural increase in repurchases in the US, after a 1982 Securities and Exchange Commission regulatory change reduced the risk of repurchasing firms being accused of share price manipulation. Higher income tax rates and lower capital gains tax rates also make repurchases relatively more favourable dividends. Rau and Vermaelen (2002) show that changes in the relative tax attractiveness in the UK of repurchases over dividends, for investors such as pension funds, led to significant increases in repurchases from 1985-1998. Geiler and Renneboog (2014) find that in the UK, capital gains tax reduces the use of repurchases.

A1.3 Managerial motivations for share repurchases and investment cuts

This section considers repurchases driven by the desire to increase managers' wealth or reputation. These incentives arise because managers can benefit from repurchases in the short-term, even if they do not increase long-term value (i.e. the motivations in Section A1.2

do not apply). There are two sources of such benefits. First, repurchases can increase EPS, and the manager's bonus or LTIP may depend on EPS. As discussed in Chapter 3, repurchases do not automatically increase EPS, but may do.

Second, repurchases typically increase the short-term share price (Ikenberry, Lakonishok, and Vermaelen (1995)), because the market usually interprets them as a signal of stock undervaluation or the manager reining in excessive investment – irrespective of the true motivation for the repurchase, which is typically unobservable to the market. Note that Rau and Vermaelen (2002) found lower short-term returns to repurchase announcements in the UK than in the US, and so the motivations to use repurchases to boost the share price are weaker.

Since some of the papers on managerial motivations for repurchases also study managerial motivations for investment cuts, we include the latter literature here rather than in a separate section. Note that any cut in investment or repurchases driven by executive incentives need not be myopic. It could be that managers generally overinvest (for example, because CEO pay is significantly correlated with firm size), and incentives induce managers to take tough decisions and rein in excessive expenditure.

A1.3.1 Managerial motivations from executive compensation

Executive compensation design has changed since the early 1990s to link executive pay increasingly to the share price, through shares and options, or bonuses or LTIPs with targets based on the share price or EPS. Note, however, that it is very difficult to show a causal relationship from executive incentives to repurchases. As Edmans, Gabaix, and Jenter (2017) note: “Identifying the causal effect of compensation contracts on any interesting outcome variable is extraordinarily difficult. These contracts are endogenous – executives, directors, and compensation consultants spend time and effort designing them, taking into account unobservable firm, industry, and executive characteristics. As a result, compensation contracts are inevitably correlated with these unobservable characteristics, which in turn affect firm behaviour, performance, and value”.

Incentives from vesting equity

In one of the few causal studies, Edmans, Fang, and Huang (2017) find that short-term incentives – measured by the amount of equity that is scheduled to vest in a given quarter – are positively associated with repurchases (as well as M&A). The amount of vesting equity is decided by equity grants made several years prior (equity is granted, on average, three years before it vests) and so is unlikely to be driven by current determinants of repurchase behaviour. Moreover, vesting equity is positively associated with the short-run returns to repurchasing firms (compared to a benchmark), but negatively associated with the returns over the next two years. Simply put, firms that repurchase stock when the CEO has significant equity vesting subsequently underperform their benchmarks over the long term. Note, however, that while the results are statistically significant, the magnitudes are not

large: a one standard deviation increase in vesting equity is associated with a 1.2% increase in the probability of a firm repurchasing stock in a given quarter, compared to the 37.5% average probability, or alternatively an increase in repurchases by \$1.54 million. These modest magnitudes may be because the CEO's long-term stock holdings and reputational incentives, plus monitoring by boards and investors, deter excessively myopic behaviour.

Edmans, Fang, and Lewellen (2017) show that vesting equity is also associated with declines in R&D and capital expenditures, an increase in analysts' earnings forecasts, a higher likelihood of firms issuing positive earnings guidance, and a higher likelihood of firms just meeting or slightly beating analyst forecasts. The results suggest that vesting equity causes managers to prioritise quarterly earnings over investment. The fall in investment may be either efficient or myopic. Contradicting the "efficiency" interpretation, vesting equity is not associated with other increases in efficiency, such as a fall in cost of goods sold or operating expenses. Consistent with the "myopia" interpretation, the fall in investment is lower when there are more blockholders (large shareholders) who are likely to see through earnings increases caused by investment cuts. Ladika and Sautner (2016) study the effect of the FAS 123R accounting standard in the US, which caused some firms to accelerate the vesting of options in 2005 to avoid an accounting charge. Such accelerated vesting caused firms to cut capital expenditure investment rates.

Incentives from equity

Other papers study the relationship between repurchases and equity holdings in general (rather than vesting equity in particular) and, as such, identify only correlations rather than causality. In a still-unpublished paper, Jolls (1998) shows that the likelihood of repurchasing is positively related to executive options as a proportion of total outstanding shares. Geiler and Renneboog (2016) similarly find that executive options in the UK are associated with higher repurchases and lower dividends.

Incentives from performance targets

Bennett et al. (2017) study incentives to engage in repurchases that arise from bonus payouts or the vesting of stock and option grants being tied to specific performance targets (e.g. for EPS or profits). They indeed find that firms are disproportionately likely to just meet the target than to just miss the target, suggesting that CEOs take actions to hit performance targets. Firms that just meet the target have lower R&D and higher abnormal accruals than firms that just miss, suggesting that they cut investment or manipulate earnings to meet the target. However, they do not find any difference in repurchases, suggesting that repurchases are not used to meet targets.

While Bennett et al. (2017) have data on the specific performance targets, Cheng, Harford and Zhang (2015) study the link between EPS-dependent bonuses and repurchases. Firms with EPS-dependent bonuses engage in more repurchases than those without, and their repurchases are not followed by positive future abnormal returns, unlike repurchases by

those without. However, these results are only correlations – firms with EPS-dependent bonuses may differ in many ways from firms without – and most of the results investigate whether the bonus depends on an EPS target, rather than the actual level of the target and whether the repurchase was used to hit the target. For the 7% of firms for which the authors have data on the target, the likelihood of engaging in repurchases is stronger when the EPS is just below the target.

Marquadt, Tan, and Young (2007) hypothesise that CEOs wishing to hit EPS targets will be more likely to use Accelerated Share Repurchases (ASRs), which take only a few hours to execute, rather than Open Market Repurchases which may take months. They find that the use of ASRs is positively correlated with the use of explicit EPS targets in annual bonuses, although they do not observe the level of the targets.

Young and Yang (2011) show that UK firms that conduct repurchases are more likely to have EPS-dependent bonuses than firms that do not engage in repurchases. However, the relevant control group is firms without EPS-dependent bonuses. They do not study whether firms with EPS-dependent bonuses repurchase more than firms without. They also do not observe the level of the EPS targets.

Overall, the evidence suggests that vesting equity leads to investment cuts and repurchases. In addition, EPS targets are associated with investment cuts, but there is weaker evidence that they are associated with repurchases. Note that, even if incentives lead to investment cuts and repurchases, this must be weighed against the positive effects of incentives. For example, von Lilienfeld-Toal and Ruenzi (2014) find that CEOs with high equity incentives outperform those with low equity incentives by 4-10%/year. As Edmans, Gabaix, and Jenter (2017) write: “Any high-powered incentive contract creates incentives to manipulate the performance measure(s) it relies upon. However, finding that a pay practice, such as equity-linked pay, is associated with manipulation does not imply that incentive contracts are worse than no incentive contract.” Any negative effect of incentives can be reduced by removing specific targets from the contract, rather than scrapping incentive pay entirely.

A1.3.2 Managerial motivations from analyst earnings forecasts

In addition to explicit incentives from executive compensation targets, CEOs may have incentives to meet analyst EPS forecasts, since missing such forecasts typically leads to a large share price decline (Bartov, Givoly, and Hayn (2002)). Again, we stress that any cut in investment or repurchases to meet analyst forecasts need not be myopic. It could be that managers generally overinvest, and analyst forecasts incentivise managers to take tough decisions and rein in excessive expenditure.

Hribar, Jenkins, and Johnson (2006) show that managers use repurchases to meet EPS forecasts. Specifically, firms that would have just missed EPS forecasts in the absence of repurchases are significantly more likely to engage in repurchases than other firms. Almeida, Fos, and Kronlund (2016) show that repurchases, induced by the desire to meet EPS

forecasts, are associated with reductions in employment and investment, and a decrease in cash holdings. This suggests that some repurchases may crowd out investment. Note that their study focuses specifically on repurchases driven by the desire to meet EPS forecasts rather than repurchases in general, and they do not investigate whether the fall in investment is efficient or myopic. Bhojraj, Hribar, and Picconi (2009) show that firms which cut discretionary expenditures and manage accruals to just beat analyst forecasts tend to have poorer 3-year performance than firms that just miss analyst forecasts due to having high discretionary expenditures and low accruals, suggesting that earnings management erodes long-term value. Note that all of these papers study investment cuts to meet analyst forecasts, not investment cuts driven by repurchases.

Terry's (2017) study builds a dynamic growth model with heterogeneous firms to analyse how the impact of short-termism on R&D volatility and economic growth. His simulated model finds that R&D cuts to meet analyst forecasts lower long-term US GDP growth by 0.1%/year and consumption by \$50 billion/year.

Turning to survey data, Graham, Harvey, and Rajgopal (2005) find that 80% of CFOs would decrease discretionary expenditure on R&D, advertising, and maintenance to meet an earnings forecast. However, 12% would engage in repurchases to do so.

Overall, there is evidence that pressure to meet analyst earnings forecasts can lead firms to cut investment, and they may also induce firms to engage in repurchases. However, it is the earnings forecast that is the underlying driver of the investment cut, rather than repurchases.

Finally, some commentators have argued that the positive effect of repurchases on EPS and the share price may lead "short-term" focused shareholders to pressure managers to buy back shares, even if the manager would otherwise focus on the long-term (i.e. did not have vesting equity or targets). However, such arguments are conceptually problematic since they confuse an investor's holding period with her orientation. What matters is not whether an investor holds her shares for the long-term or short-term, but whether she makes the sale decision based on an evaluation of the company's long-term or short-term prospects. Indeed, shareholders may sell shares in the short-term if they believe that the company has cut productive long-term investments. For brevity, we do not describe the evidence that "short-term" shareholders actually increase long-term value here, but refer the reader to the Harvard Business Review article "The Answer to Short-Termism Isn't Asking Investors To Be Patient", which summarises some of the evidence.

A1.4 Literature on crowding out of investment

A1.4.1 Relationship between share repurchases and investment

As described earlier, Almeida, Fos, and Kronlund (2016) is one of the few studies identifying a causal relationship from repurchases to investment. They find that EPS-motivated

repurchases (although not repurchases in general) are associated with falls in investment. However, it could be that the desire to meet the EPS forecast directly caused the cut in investment, and the firm then used the surplus cash for repurchases. Edmans, Fang, and Huang (2017) as well as Bennett et al (2017) also test whether investment cuts and repurchases are separate channels that allow short-term increases in share prices and earnings. Both find that repurchases are not simply financed by investment cuts. Bennett et al (2017) additionally examine the association between discretionary R&D expenditure and EPS target deviations, finding that firms just beating their target engage in systematically less R&D expenditure. Another way to identify causality is to use survey evidence. As discussed earlier, Brav et al. (2005) find that firms make investment decisions first and repurchase out of the remaining cash, rather than firms making repurchase decisions first and investing out of the remaining cash.

Studies of the relationship between repurchases in one firm and investment in the same firm in the same year ignore both dynamic and economy-wide considerations. Starting with dynamic considerations, Rubio (2017) shows that repurchases signal firm quality, helping firms to raise capital and invest in the future, by examining the outcomes of share repurchases for financially distressed firms with asymmetric information reliant on capital markets. Thus, even if repurchases reduced investment today, they may support future investment. Moving to the economy-wide considerations, studying the link between repurchases and investment at the individual firm level ignores that fact that the cash paid out by repurchases can be reallocated elsewhere. Chen (2016) shows that the cash paid out in repurchases increases the prices of other stocks held by investors of the repurchasing firm, implying that the capital is relocated to these other stocks, which are then more likely to issue equity in the future. Fried and Wang (2018) find that, even though US S&P 500 firms engage in positive net payouts, non-S&P 500 firms (i.e. smaller firms) engage in net issuance. Indeed, at a country level, Gruber and Kamin (2017) find little evidence that economies with high share repurchases and/or dividend payments suffer low aggregate investment.

A1.4.2 Explaining underinvestment

Lee, Shin, and Stulz (2016) find that, since the mid-1990s, capital no longer flows to US industries which have a higher industry market-to-book, a measure of prospective profitability of investment. One interpretation is that investment decisions are now less efficient, potentially due to managers' short-term incentives, lower competition, or firms being less able to detect good investment opportunities than in the past. Another interpretation is that market-to-book is a less accurate measure of investment opportunities than in the past because they are harder for the stock market to predict, or because intangible investment is not captured by standard investment measures (Dottling, Gutiérrez and Philippon (2017)).

Gutiérrez and Philippon (2016) find that fixed investment in the US is weak relative to measures of profitability and valuation. They argue that this is due to three reasons:

increased importance of intangible investment, declining product market competition, and increased ownership by quasi-indexing investors. They find that quasi-index ownership of firms is correlated with lower investment relative to the efficient levels. In contrast, Aghion, van Reenen, and Zingales (2013) find that more institutional ownership (across all investor types) has a positive causal effect on innovation. Asker, Farre-Mensa, and Ljungqvist (2015) show that public companies respond less to investment opportunities than private ones, potentially due to their concern with short-term share prices. However, when accounting for the endogeneity of going public, Maksimovic, Phillips, and Yang (2017) find that public firm behaviour is more responsive to demand and investment opportunity shocks than private ones.

The increased importance of intangible investment may also explain the increased use of repurchases. Dottling, Ladika, and Perotti (2017) create a dynamic model which shows that firms with higher investment in intangibles tend to grant more equity to skilled employees in later periods, and prefer repurchases over dividends. The preference for repurchases is because dividends would lower the value of unvested equity for the employee (unless dividend protected).

Turning to the UK, several studies including The Purposeful Company (2016) and the LSE Growth Commission (2017) find that investment in the UK is lower than its OECD peers, but this gap is likely, at least partially, explained by intangible investment (which is higher in the UK) being excluded from standard measures of investment. Haldane and Davies (2011) show that CEOs display an implicit discount rate of 20%, much higher than standard corporate discount rates. This may result from several underlying causes, such as executives' short-term incentives, quarterly reporting, or the market failing to fully value intangible investment (Edmans (2011)), potentially due to accounting systems not being suited to intangible reporting. These factors lead to investment cuts which can subsequently lead to repurchases. Thus, as in the US, it is likely that repurchases are an outcome of the same factors that lead to low investment, rather than a separate cause.

Appendix B: Data

Data collection

The data for this study has been collected from many reliable sources and at multiple levels of granularity. The data collected can be divided into 3 sections: i) UK level database, ii) International comparison data and iii) UK firm-level data.

UK level database

We collected economy-wide data from ONS and from an aggregation of firm-level data. In Table B.1 we set out the variables and entities considered:

Table B.1: UK level variables and sources

Variable (£mn)	Source	Entities and time period
Gross operating surplus	ONS (NQBE + NQNV)	All UK financial and non-financial corporations over the period 2000-2016.
Gross fixed capital formation	ONS (DBGP + NHCJ)	
Total resources	ONS (FBXJ + NQNW)	
Distributed income of corporations	ONS (NETZ + L8HB)	
Total financial assets	ONS (NNZB + NLIZ)	
Currency and deposits	ONS (NNZF + NLJD)	
Capital consumption	ONS (DBGF + NHCE)	
Share repurchases	Capital IQ	Aggregated from firms in FTSE 350 and FTSE All-Share as of 2016 and tracked back to 2007.
Dividends	Capital IQ	Aggregated from firms in FTSE 350 and FTSE All-Share as of 2016 and tracked back to 2007.

The ONS data only refers to financial and non-financial corporations, as the purpose of the study is to understand corporate investment and not total UK investment (which also includes investment by government and households).

International comparison data

We further analyse the behaviour of share repurchases and investment in the UK over time in an international context by looking at similar trends in other advanced economies. This allows us to understand if UK firms stand out in terms of high repurchases and low corporate investment.

For this purpose, we collected data on **25+ financial variables** for **1400+ companies** listed on major global stock exchanges over a **10 year period** (2007-2016). Table B.2 provides a list of countries, associated variables considered and sources.

Table B.2: International comparisons variables and sources

Country	Main Variables (£mn)	Sample of firms	Source
United Kingdom	<ul style="list-style-type: none"> Capital expenditure Depreciation and amortisation 	Firms in FTSE 350 listed on London Stock Exchange	Capital IQ
United States	<ul style="list-style-type: none"> Repurchases Dividends Gross profit Full-time employees Total debt Total equity Total capital 	Firms in S&P 500 listed on NASDAQ	
Germany	<ul style="list-style-type: none"> Revenue Operating surplus EBITDA Cash and equivalents 	CDAX – all firms listed on Frankfurt Stock Exchange	
Australia	<ul style="list-style-type: none"> Total assets Total liabilities Average and end market capitalisation 	All firms on Australia Stock Exchange	
Canada		Firms in S&P/TSX 60 listed on the Toronto Stock Exchange	

For each year and within each country, we aggregate data over firms for all variables. This allows us to review aggregate trends in our key variables such as repurchases and CapEx for each country over time. Since typical firm size varies substantially across countries, we scale all variables to facilitate comparison.

Firm level data

This section sets out the UK firm-level data that is used for aggregation purposes and forms the foundation of our econometric analysis.

Sample included in the study

Our sample consists of firms in the FTSE 350 as of 2016. These firms are tracked back to 2007 or 2009 (depending on the analysis as detailed below). This allows us to focus on the behaviour of a select group of firms over time.

This approach could in theory lead to different results if firms that dropped out of the FTSE 350 during the sample period behave differently to those in the index in 2017. Any such effects are unlikely to be significant in practice for a number of reasons. First, even if the dropped firms engage in systematically more or systematically fewer repurchases to those in the 2017 index, this would not affect the results. They would have to differ specifically in the sensitivity of their repurchase behaviour to the presence of EPS targets. Secondly, firms that are dropped out are often due to merger and acquisition activity which has little relationship to share repurchase activity. Thirdly, 97% of all share repurchase activity is carried out by firms in the index, so we capture the vast amount of recent repurchase activity on which to base our study findings.

Process for gathering data

The list of FTSE 350 firms is cleaned for missing data and filtered by removing firms in selected industries. We drop firms in selected industries such as banks, investment trusts, real estate investment trusts and real estate management. This is because the investment patterns of these firms are not typical of other UK businesses. It is standard practice in the academic literature to focus analysis of share repurchases on non-financial companies. Firms are also dropped when the unique company identifier as provided by Capital IQ is missing. Firms that are listed twice on the stock market under different names but have identical financial variables are also dropped to avoid duplicates. This leaves us with a total of just over 250 companies.

By dealing with the same sample of firms, we maintain consistency across different pieces of analyses.

Our entire list of variables can be divided into two types: financial variables and executive pay variables. All financial data is collected using **Capital IQ** while executive data draws upon **PwC's proprietary remuneration database**.

Data collected from Capital IQ includes **40+ financial variables** for the period 2007-2016. PwC's proprietary remuneration database consists of **180+ executive pay variables** for the period 2009-2016. Table B.3 provides the complete list of variables used for our analysis:

Table B.3: UK Firm-level variables

Type	Variables
Variables of interest	<ul style="list-style-type: none"> • Capital expenditure (CapEx) • Share repurchases • Dividends
Measures of financial performance	<ul style="list-style-type: none"> • Average (and end year) market capitalisation • Average (and end year) dividend yield • Gross profit • Revenue • Full-time employees • Total Debt • Cash and equivalent • Cash from operations • EBIT • EBITDA • Operating income • Net income • Rate of return (ROA) • Retained earnings • Total assets • Total equity • Total liabilities • Depreciation and amortization
Earnings per share (EPS) performance measures	<ul style="list-style-type: none"> • Basic EPS (inclusive of adjusted items) • Basic EPS (exclusive of adjusted items) • Diluted EPS (inclusive of adjusted items) • Diluted EPS (excl. of adjusted items)
Shares and shareholders' details	<ul style="list-style-type: none"> • Weighted average shares outstanding • Percentage top, second top, third top, fourth top shareholder holding as of 2016 • Stock price
CEO details	<ul style="list-style-type: none"> • CEO first name, surname, gender, age, country, joining date, role date, leaving date • Total shares held
CEO Salary	<ul style="list-style-type: none"> • Current salary, increase in salary since last year, reference salary and threshold
Package composition details	<p>For each of threshold, target and maximum of package:</p> <ul style="list-style-type: none"> • Value of pay package • Salary (%) • Pension (%) • Other benefits (%) • LTIPs (%)
Annual Bonus details	<ul style="list-style-type: none"> • Eligibility for bonus • Target, threshold, and maximum (as % of reference salary) • 1- 10 actual performance conditions and their respective weights

Long-term Incentive Plan (LTIPs) details	<p>Following variables for all 4 LTIPs:</p> <ul style="list-style-type: none"> • Underpin • Eligibility • % of salary that the LTIP accounts for • Maximum % of the salary that the LTIP can account for • Types of vesting (cliff or phased) • Number of years of holding period • 1-5 actual performance condition • Weight given to each performance condition • % earned of the threshold, target and maximum value if the condition is met at the time of vest • Actual threshold, target and maximum value of performance measures
Other CEO pay plans	<p>Eligibility, target, threshold, maximum and performance conditions for</p> <ul style="list-style-type: none"> • Deferred annual bonus • Deferred matching awards and • Stock awards that actually vested

Our econometric analysis involves merging the two databases and uses 2009-2016 as the study time frame. Many of the above variables, especially in relation to executive pay, were combined to construct useful variables for our econometric analyses. The breadth of our dataset means that we are able to use large amount of granular information for constructing variables, as suggested in the academic literature. In particular, we used Edmans, Fang, and Lewellen (2017), Edmans, Fang, and Huang (2017), and Almeida, Fos, and Kronlund (2016) to inform the control variables to use in our regression specifications.

We employ various regression techniques to assess the relationships between executive pay, share repurchases and investment. Table B.4 sets out all the variables used in our regressions, their definitions and purpose for inclusion in the regression.

Table B.4: Econometric analysis variables and definitions

Variable	Definition	Purpose
Repurchases	Repurchase of common stock (% of lagged total assets)	Dependent Variable
CapEx	Capital expenditure (% of lagged total assets)	
EPS LTIP indicator	<p>A binary variable that equals 1 when a firm’s CEO has EPS-related performance condition in any of the LTIPs.</p> <p>EPS related performance conditions include measures on Absolute EPS, EPS versus RPI (retail price index) and EPS growth.</p>	Regressors of interest Treatment variables whose impact is examined on the dependent variables
EPS Bonus indicator	<p>A binary variable that equals 1 when a firm’s CEO has EPS-related performance condition in bonus plans.</p> <p>EPS related performance conditions include measures on Absolute EPS, EPS versus RPI (retail price index) and EPS growth.</p>	
TSR LTIP indicator	A binary variable that equals 1 when a firm’s CEO has TSR-related performance condition in any of the LTIPs.	

Appendices

	TSR related performance conditions include measures on Absolute TSR, TSR versus benchmark index and TSR growth.	
EPS (TSR) Maximum value	Maximum percentage of CEO compensation relatable to EPS (TSR). Calculated by multiplying the weight of overall EPS (TSR) related performance conditions in each LTIP with percentage of total salary dependent on that LTIP.	
New CEO	A binary variable that take a value 1 when for a given firm in a given year, there is a change in CEO.	CEO controls Potential correlation with share repurchases and executive pay related treatment variables.
CEO Gender	A dummy variable for CEO gender (male or female)	
CEO Age	CEO age in years	
CEO Tenure	CEO tenure, calculated as the number of days between the role start date and firm's financial year end date	
CEO Salary	CEO salary in GBP (using a time weighted average annual exchange rate when the default currency is not GBP) Annual exchange rates are weighted based on the number of months of each calendar year falling in a given firm's financial year.	
CEO shareholding	Total shares held by the CEO divided by the weighted average number of shares outstanding.	
Market Cap	Average market capitalisation where the average is taken over each firm's financial year	Financial controls These are determinants of investment (represented by CapEx), so any investment regression equation includes them. These also determine the financial performance of the company, so are relevant for undertaking of share repurchases.
Dividend payer	A binary variable that take a value 1 if the firm has paid positive dividends in a given year	
Market to book ratio	Average market capitalisation divided by book value of total equity	
Tobin's q	(Total liabilities + average market capitalisation) divided by total assets	
Stock price return	(End sale stock price divided by open sale stock price) -1	
Gross profit	Total revenue minus cost of goods sold, as shown in a firm's income statement	
Revenue	Total revenue from income statement	
Full time employees	Full time employees from balance sheet	
ROA	Rate of return on assets	
Top shareholding	Percentage of shares held by the largest shareholder in 2016	
Cash and Equivalents	Cash and equivalents from balance sheet	
Debt	Book value of debt from balance sheet	
Ex-ante target deviation	Deviation of As-if-EPS from LTIP weighted EPS target. Weight is given according to the vesting of each LTIP with higher weight allocated to the LTIP vesting in the given year.	Regressor of interest / instrumental variables Variables used to identify the impact of being just below

Appendices

	As-if-EPS is defined as sum of earnings and forgone interest on cash used for repurchases divided by sum of outstanding shares and shares bought back.	the EPS target on shares repurchases and real outcomes such as investment.
Ex-post target deviation	Deviation of actual EPS from EPS target using the vesting data.	

Appendix C: Econometric analysis

This appendix presents the results from our econometric analysis. Before delving into the results from each subsection in detail, we set out our overall results.

We have generally found there to be limited evidence of any links between EPS/TSR related incentives, share repurchases and investment within our data. One of our stronger findings is that no firm successfully used repurchases to hit the EPS target in the LTIP. We explore this along with our other results in more detail in the following subsections.

Most of our regression specifications yielded insignificant results. However, there were some exceptions:

- Evidence (significant at 5%) shows that companies with larger incentives relating to EPS conditions have conducted significantly less investment over the sample period.
- Weaker evidence (significant at 10%) that firms who would have just missed their EPS target conducted significantly more repurchases than those who just hit their EPS target, controlling for other factors.

Our results suggest that if anything, it is more likely that the presence of EPS incentives in executive remuneration have motivated lower investment (CapEx) rather than more share repurchases. This finding is interesting as CapEx per se does not typically impact earnings as it is not expensed in the income statement (there can be some effect from current year depreciation which is expensed). However, one interpretation of this finding is that the presence of EPS targets fosters an environment of short-termism applied to business decisions, which consequently results in CapEx lower than it would have been otherwise.

These results also suggest that it is possible, at a more specific level, some firms, initially just below their EPS target in the final year of the LTIP, may have attempted to engage in specific repurchases to hit their EPS target, though no firm successfully achieved this.

It is important to note that econometric analysis is focused on finding systematic patterns through conditional correlations in the data. Therefore, we do not consider that a lack of significant findings – particularly between EPS targets and share repurchases – supports the view that manipulative behaviour by CEO's to hit contract targets through the use of repurchases is not happening at all. Rather, we conclude that it is unlikely to be happening systematically. There may be individual firms engaging in this type of behaviour, and in fact this possibility is consistent with the findings of our univariate threshold EPS-target deviation comparisons.

The effect of incentives on share repurchases

As discussed in more detail in our methodology, here we report results from the two types of panel-data regression analysis looking at the effect of incentives on share repurchases: our **general regression analysis** documenting the correlation between incentives and repurchases; and our **threshold based regression analysis** aiming to document a causal effect of incentives on repurchases.

The empirical evidence is framed by way of a hypothesis. For this research we use the hypothesis that executive pay is driving share repurchase behaviour and then use the empirical analysis to support or reject this hypothesis.

In all of our regressions, we define share repurchases as a fraction of lagged total assets.

General regression analysis documenting the correlation between incentives and repurchases

This analysis uses three different types of modelling approaches:

1. Linear panel-data regression analysis, to study the impact of incentives on the mean level of repurchases, while controlling for other factors.
2. Quantile (median) regression analysis, to study the impact of incentives on the median level of repurchases, while controlling for other factors.
3. Logistic panel-data regression analysis, to study the impact of incentives on the probability of a firm undertaking repurchases, while controlling for other factors.

For these types of analyses, we report four types of regression specification for each variable of interest examined (the EPS/TSR indicator variable, and the EPS/TSR pay incentive size variable). These specifications vary according to:

- (a) whether the model uses all controls or uses variable selection methods to only include significant variables in the final model (“full model” or “refined model”); and
- (b) whether the standard errors are bootstrap clustered or clustered.

Although we think it is important to display all regression specifications to illustrate potential sensitivity of results to modelling choices, the most robust specification is the full model with bootstrap clustered errors (in bold in all our tables). This is because the strange (non-normal) distributions found in the residuals support the use of the bootstrap method.

We employ random effects within our model framework. Using random effects allows more flexibility and helps better estimate significance of any results. However, it assumes that if there are any constant and unobservable firm-specific characteristics that drive repurchases,

these unobservable factors are not correlated with any of the variables included in the regression.

The reason we do not use fixed effects, despite the fewer assumptions made, is that there is limited within variation in our dataset. Using fixed effects would eliminate observations from our dataset for which share repurchases do not vary over time, reducing our sample substantially.

Linear panel-data regression analysis

Our linear regression analysis shows no evidence of any significant effects of EPS or TSR conditions and incentives in the executive contract on share repurchases. Table C.1 shows the coefficients and p-values for all our regression specifications run. In all regressions, the coefficient is negative or almost exactly zero, and the coefficients are not significant even at 25% in any of our regression specifications. This is substantially below the 5-10% typically required for robust inference in statistical models.

Table C.1: Linear regression results for EPS/TSR pay incentive size and indicator and their effect on share repurchases

Variable	Model selection	Standard error choice	EPS coeff. [95% CI]	EPS p-value	TSR coeff. [95% CI]	TSR p-value
Indicator	Full	Clustered	-0.010 [-0.027, 0.007]	0.257	-0.004 [-0.016, 0.008]	0.529
Indicator	Full	Bootstrap clustered	-0.010 [-0.029, 0.009]	0.292	-0.004 [-0.017, 0.009]	0.536
Indicator	Refined	Clustered	0.000 [-0.001, 0.001]	0.839	0.002 [-0.005, 0.009]	0.559
Indicator	Refined	Bootstrap clustered	0.000 [-0.001, 0.002]	0.886	0.002 [-0.005, 0.009]	0.558
Pay incentive	Full	Clustered	-0.001 [-0.009, 0.007]	0.808	-0.000 [-0.000, 0.000]	0.513
Pay incentive	Full	Bootstrap clustered	-0.001 [-0.010, 0.008]	0.819	-0.000 [-0.010, 0.010]	0.985
Pay incentive	Refined	Clustered	-0.001 [-0.005, 0.003]	0.641	-0.000 [-0.000, 0.000]	0.367
Pay incentive	Refined	Bootstrap clustered	-0.001 [-0.005, 0.003]	0.644	-0.000 [-0.004, 0.005]	0.968

Source: PwC analysis

Quantile regression analysis

Results from our quantile regression analysis are generally consistent with the linear regression results – in all but one specification there is no robust evidence of a relationship between EPS and TSR target presence and the level of share repurchases. The coefficients are inconsistent across specifications and p-values fail to reach the 5% confidence level in all but one regression specification. The fact that this relationship holds both for quantile (median) and linear regression analysis suggests that there is no systematic relationship between these two variables in the data. Whether potential outliers are captured or not thus appears to make little difference.

Table C.2: Quantile (median) regression results for EPS/TSR indicator and pay incentive variables and their effect on share repurchases

Variable	Model selection	Standard error choice	EPS coeff. [95% CI]	EPS p-value	TSR coeff. [95% CI]	TSR p-value
Indicator	Full	Clustered	-0.000 [-0.001, 0.001]	0.790	-0.001 [-0.003, 0.001]	0.298
Indicator	Full	Bootstrap clustered	-0.000 [-0.001, 0.001]	0.775	-0.001 [-0.003, 0.001]	0.403
Indicator	Refined	Clustered	-0.000 [-0.001, 0.001]	0.882	-0.000 [-0.000, 0.000]	0.478
Indicator	Refined	Bootstrap clustered	-0.000 [-0.002, 0.002]	0.933	-0.000 [-0.001, 0.001]	0.777
Pay incentive	Full	Clustered	0.001 [-0.001, 0.003]	0.205	0.000 [-0.028, 0.003]	0.953
Pay incentive	Full	Bootstrap clustered	0.001 [-0.001, 0.003]	0.234	0.000 [-0.196, 0.196]	0.998
Pay incentive	Refined	Clustered	0.001** [0.000, 0.002]	0.025	0.000 [-0.000, 0.000]	0.555
Pay incentive	Refined	Bootstrap clustered	0.001 [-0.001, 0.003]	0.232	0.000 [-0.196, 0.196]	0.990

Source: PwC analysis

One regression result shows a 5% significant and positive association between the amount of executive pay dependent on EPS conditions in the LTIP, and share repurchases. However, this regression result does not account for the highly unusual patterns found in the residuals – as the “bootstrap clustered” regression specifications do and so should be interpreted with caution.

Logistic regression analysis

Results from our logistic regression analysis are also consistent with the above analyses. We find no significant relationship between EPS and TSR pay incentives in the executive contract, and the probability that a firm will conduct a repurchase. This result is constant across all specifications, and no specification is significant at even the 75% confidence level. Again, the coefficient signs are inconsistent, consistent with previous results and further indicating a lack of any systematic relationship. As a result, we conclude that it is unlikely that EPS or TSR incentives have in the past caused firms to switch from not repurchasing to repurchasing.

Table C.3: Logistic regression results for EPS/TSR indicator and pay incentive variables and their effect on share repurchases

Variable	Model selection	Standard error choice	EPS coeff. [95% CI]	EPS p-value	TSR coeff. [95% CI]	TSR p-value
Indicator	Full	Clustered	-0.03 [-1.044, 0.984]	0.953	-0.37 [-1.332, 0.591]	0.444
Indicator	Full	Bootstrap clustered				
Indicator	Refined	Clustered	0.062 [-0.776, 0.900]	0.884	-0.36 [-1.227, 0.507]	0.416
Indicator	Refined	Bootstrap clustered	0.06 [-0.751, 0.871]	0.888	-0.35 [-1.277, 0.577]	0.460
Pay incentive	Full	Clustered	0.150 [-0.939, 1.239]	0.786	-0.398 [-1.083, 0.287]	0.256
Pay incentive	Full	Bootstrap clustered				
Pay incentive	Refined	Clustered	0.325 [-0.466, 1.116]	0.420	-0.122 [-0.639, 0.394]	0.644
Pay incentive	Refined	Bootstrap clustered	0.325 [-0.548, 1.198]	0.468	-0.122 [-0.632, 0.389]	0.640

Source: PwC analysis

Overall, the results from our general regression analysis of the link between executive pay incentives related to EPS/TSR and share repurchases has shown little evidence of any significant relationship. This finding is consistent across our linear regression analysis on

share repurchase levels, quantile regression analysis on share repurchase levels, and logistic regression analysis on the probability of repurchasing.

Again, it is important to stress that this evidence does not imply that EPS and TSR pay incentives do not impact share repurchase behaviour in all firms, just that this behaviour is not happening systematically – there may be one or two outliers that our econometric analysis cannot elicit.

Threshold based regression analysis documenting the causal effect of incentives on repurchases

In this section, we report the results from our three types of threshold analyses. These analyses take advantage of data on firms that finished just above and below the EPS threshold target. By only examining firms in two groups, those just above and those just below the target, we remove any systematic reasons for differences in EPS target performance. This helps us to examine more sharply if share repurchases are motivated by EPS targets in the LTIP, since any left-over systematic differences in share repurchases cannot be attributed to any other variables, provided the two groups have similar characteristics.

As previously mentioned, we perform different analyses – some using the actual EPS target deviation (ex-post/post-repurchase), some using the EPS target deviation (ex-ante/pre-repurchase) that would have existed had the firm not repurchased in the last year of the LTIP.

We first look at some key facts and statistics about the EPS pre-repurchase target deviation for firms in our dataset, before examining the impact on repurchases through both univariate firm comparisons and multivariate threshold regression analysis.

We do not look at any effects on share repurchases that could arise from a firm's TSR target deviation. This is since TSR targets in the LTIP are largely defined relative to the TSR performance of an undisclosed peer group, which makes it infeasible to calculate what the TSR target in a given LTIP actually was.

Key facts and statistics

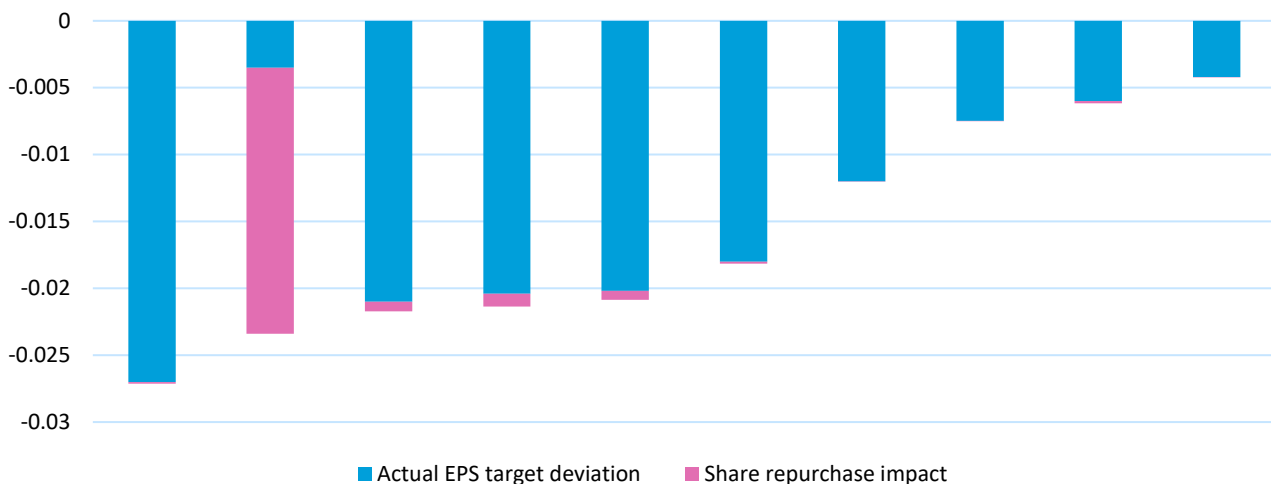
One of the most striking findings from our threshold analysis was that no firms had both a negative ex-ante EPS target deviation and positive ex-post EPS target deviation. In other words, no firms used share repurchases to successfully beat the target. This means that the third type of threshold analysis, which aimed to capture whether the EPS incentive size affected the likelihood that a firm below the target before repurchasing used repurchases to hit the target or not, could not be carried out.

This point is emphasised by Figure C.1, which shows the 10 closest firms to the threshold before and after repurchasing (in order of closest to the threshold). For 9/10 of these firms, the repurchase impact is so negligible on the target deviation that it is barely visible. This highlights the fact that whilst many FTSE 350 firms do engage in repurchases, the scale of these repurchases is often small by comparison to the number of shares outstanding. This evidence suggests that share repurchases are not likely a useful tool to hit the EPS target, even for firms close to their threshold, due to the small impact.

Only one firm sees its share repurchase activity significantly impact its target deviation. However, this was one of the largest share repurchases undertaken across our sample in relation to shares outstanding. It accounted for 4.1% of all shares outstanding (by comparison to an average of 0.9% for all repurchases across the sample). Additionally, the starting threshold deviation for these 10 firms (0.016) are extremely small compared to the average in the sample (0.504).

As such, the fact that one of the largest repurchases undertaken in our data could not eliminate the 8th smallest threshold deviation in our dataset (around 30x smaller than the average) is consistent with the notion that share repurchases have not been significant enough to eliminate even the smallest of EPS target deviations and are in most instances not a useful instrument to try and hit an EPS target.

Figure C.1: Ex-post EPS target deviation for the 10 share repurchasing firms closest to hitting their EPS target and subsequent impact of share repurchases



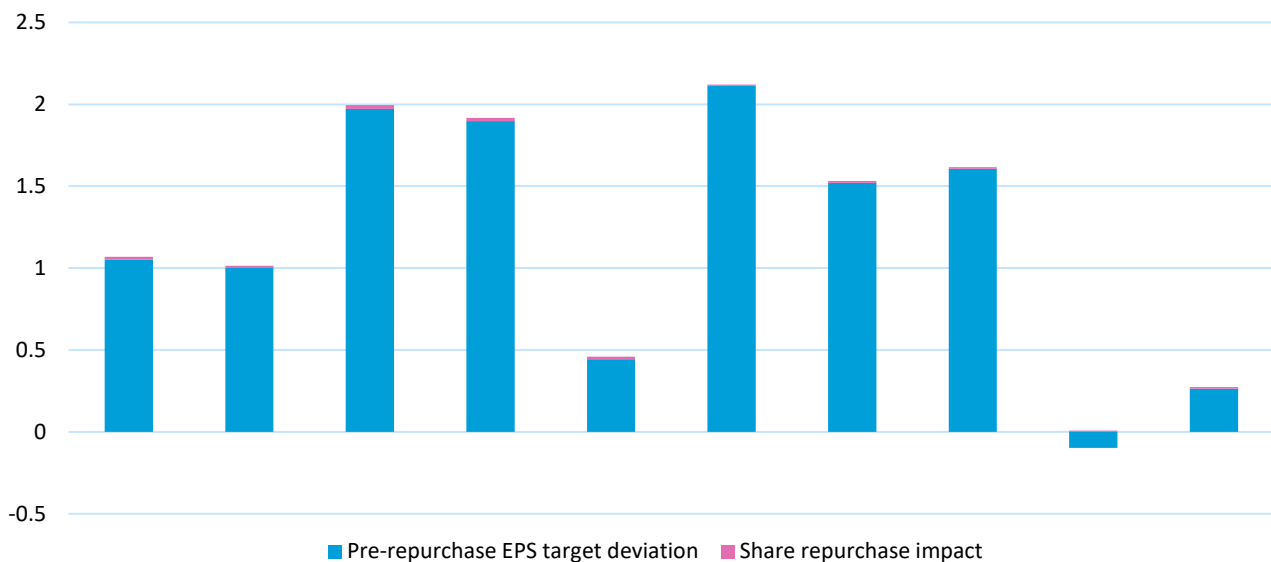
Source: PwC analysis

We also illustrate in Figure C.2 the impact of share repurchases on the EPS target deviation for the 10 largest share repurchases (£m) on which we have the required data – in descending order left to right. As is clear from the chart, 9/10 of the top 10 repurchases were

by firms that had already hit the EPS target by a substantial margin without share repurchases.

The largest share repurchases have been conducted by firms so large themselves that the impact of this activity is still negligible in affecting their ability to hit the EPS target. Equally these firms are consistently those that are hitting their EPS targets by a considerable margin. Therefore, it is clear that the largest share repurchasers would struggle to use repurchases effectively to eliminate negative EPS target deviations. Note, we would not expect 90% of firms to hit their EPS targets in the data, especially given these targets are relative. Our econometric analysis is able to separate the effects of share repurchases on target hitting from general financial performance using a variety of financial controls.

Figure C.2: Share repurchase impact on the ex-ante/pre-repurchase EPS target deviation for the 10 largest repurchases (£m)

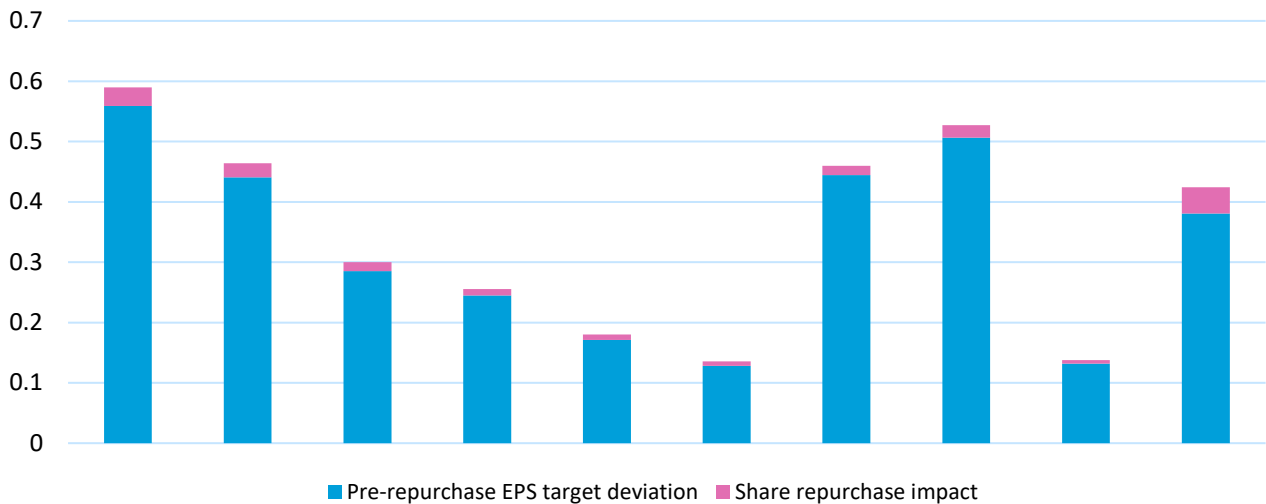


Source: PwC analysis

However, we recognise that for share repurchases to ever have a substantial effect on the EPS target deviation, the most relevant measure is the number of shares bought back as a fraction of the total shares outstanding. For completeness, we thus show below in Figure C.3 the impact of share repurchases on the target deviation for the 10 instances which account for the largest fractional shares bought back by firms (again in descending order left to right).

The results are consistent with Figure C.2: all firms in this instance were already substantially above their EPS threshold target without repurchasing any shares. As expected, the share repurchase impact is now larger since these are the largest repurchases conducted in our complete dataset as a proportion of outstanding shares.

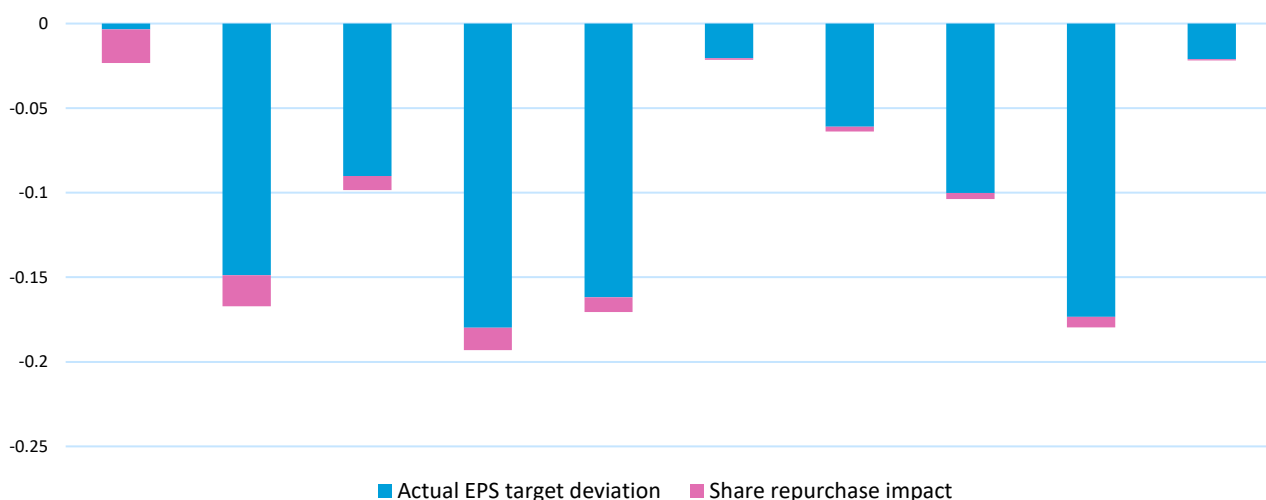
Figure C.3: Share repurchase impact on the ex-ante/pre-repurchase EPS target deviation for the 10 largest repurchases as a proportion of outstanding shares



Source: PwC analysis

Finally, in Figure C.4 we also examine the 10 instances for firms which achieved a negative EPS target deviation, where share repurchases had the largest fractional impact on the pre-repurchase target deviation (left to right descending order as previously). This would help elicit any potential individual cases where firms had attempted to use repurchases to hit their target but failed. There is only one instance where share repurchases eliminated more than 11% of the negative target deviation, and this is the same observation as discussed in Figure C.1.

Figure C.4: Share repurchase impact on pre-repurchase EPS target deviation for 10 firms with largest fractional EPS target deviation impact of repurchases



Source: PwC analysis

Overall, these preliminary facts and statistics demonstrate that share repurchases have not been successfully used in the UK as an instrument to hit EPS targets, since the impact of share repurchases on the target deviation is typically small, and in many cases negligible. Firms are simply not repurchasing enough as a fraction of their total shares to really have a substantial impact on their target deviation.

However, as the figures show, there are extreme cases where share repurchases can possibly be substantial enough to hit an EPS target. Nevertheless, it is required that both the pre-repurchase negative target deviation is very small, and that the repurchase programme is very large for this to occur.

These preliminary findings mean that it is unlikely our threshold analysis using the ex-post (actual) EPS target deviation will yield any useful results, since we know that no firms hit their target due to repurchasing shares. However, the ex-ante threshold analysis is more likely to be informative, since it is still possible that firms just below the threshold attempted to beat their target using share repurchases but that they failed to do so. This is especially plausible in our dataset since we use annual data. Repurchases undertaken in earlier quarters may have been measured to hit the EPS target, but failed due to lower than expected earnings in the subsequent and final quarter. These types of EPS “shocks” in the final quarter may cause firms to miss the target.³⁴

Univariate Analysis

This section presents the results from our univariate comparisons of firms just above and below the EPS target threshold. We are primarily interested in reviewing the level of share repurchases of firms just above and below the threshold, but in keeping with the rest of our analysis we also examine capital expenditure differences.

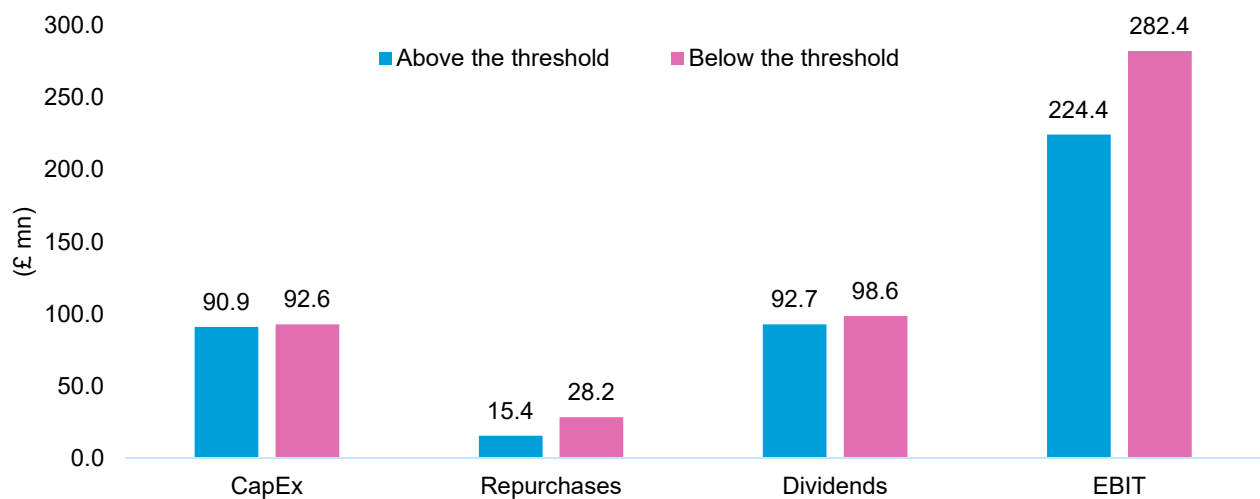
Univariate (direct) comparisons are most useful when the two groups being compared are similar in their characteristics. Dissimilarities in characteristics make it harder to draw robust inference about whether being either side of an EPS target threshold matters for share repurchases or investment behaviour. To mitigate this, we have tried to limit the bandwidth either side of the threshold, so that it is small enough to ensure there is no (other) systematic reason why firms fall either side. Equally, we have tried to ensure the sample is large enough to average out any group differences that come down to small sample issues. Having said this, our results show that there are still some systematic differences between the groups, and this must be kept in mind when interpreting results.

³⁴ Although one may expect there to be an equal number of positive shocks (resulting in some firms crossing the threshold more than expected), combining the ‘shocks’ hypothesis above with the fact that extremely large repurchase programmes are required to eliminate negative EPS target deviations, means it remains plausible that a number of (or some) firms tried and failed to hit the EPS target with share repurchases.

In Figure C.5 below we present univariate mean and median comparisons for firms above and below the EPS threshold pre-repurchasing. We also add in some other key characteristics that varied between the two groups to aid inference.

Note, since we know that no firms successfully used repurchases to hit a target in our data, the results for this same comparison, when instead measuring the EPS target deviation post-repurchasing, are near identical. As discussed previously, this fact somewhat contradicts the initial hypothesis associated with analysing firms' EPS target deviation post-repurchasing, so we only present the univariate comparisons for pre-repurchase EPS target deviations in the main body.

Figure C.5: Univariate mean comparisons of firms with pre-repurchase EPS just above and below the threshold



Source: PwC analysis

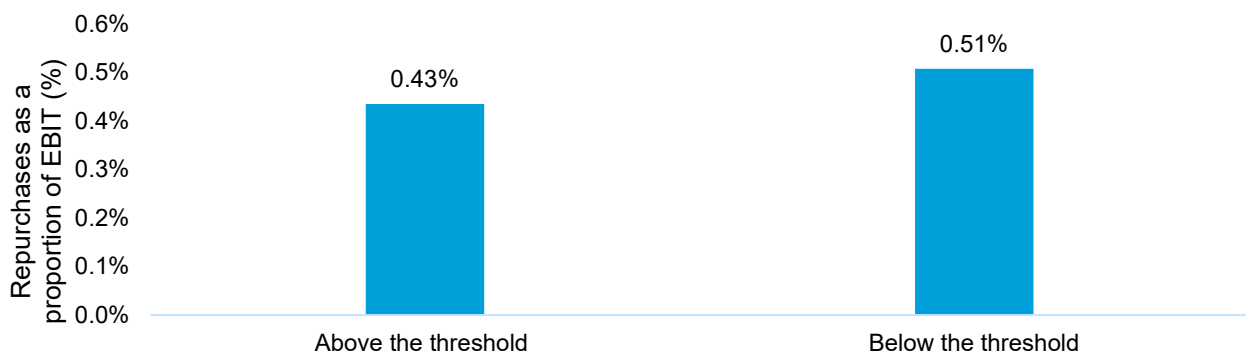
The mean comparisons show that the group that just missed the target did engage in considerably more repurchases than those that hit the target without repurchasing (£28.2m vs. £15.4m). This supports the hypothesis that being marginally below an EPS target may encourage repurchases.

However, it is also possible that this result is due to sampling differences between the two groups. The profitability of firms below the threshold is also much larger (£282.4m vs. £224.4m) meaning that these extra profits can be used on other activities. Additionally, dividends and investment are also slightly higher for the group below the threshold, which is consistent with this scaling story.

To investigate further, we also present a comparison of repurchases as a fraction of outstanding shares for firms above and below the threshold. When looking at the data this way, much of the share repurchase difference is eliminated: raw repurchases are 83% larger for firms below the threshold, but as a proportion of outstanding shares they are only 17%

larger below the threshold. This 17% could be explained by other group differences, which are explored in the econometric analysis in more detail, but this sizeable gap is still consistent with the possibility that firms may at least have tried to repurchase to hit targets in the data.

Figure C.6: Univariate mean comparisons of firms with pre-repurchase EPS just above and below the threshold respectively for share repurchases as a proportion of outstanding shares

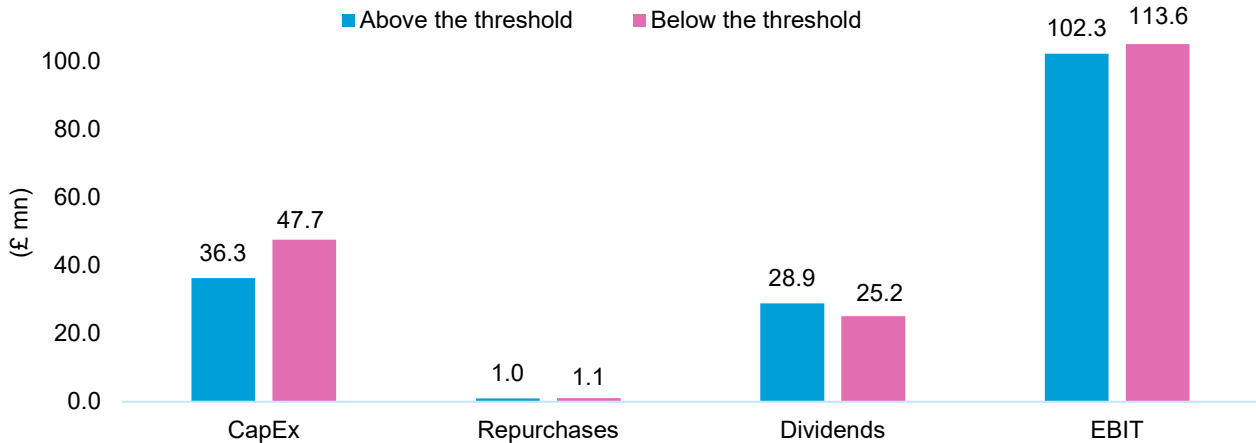


Source: PwC analysis

The median comparison in Figure C.7 presents an interesting contrast with the mean comparison above in Figure C.5. It seems that when excluding the effect of outliers on the average and simply focusing on the typical firm in the data, repurchases and profitability are similar between the groups, whilst the typical firm below the threshold invests more and pays fewer dividends.

This result is possibly consistent with the hypothesis that firms that are outliers in the data may be engaging in share repurchases as a way to hit their EPS target, or cutting investment. Indeed, when accounting for all outliers in the data, it appears share repurchases are relatively larger for firms below the threshold, and investment is relatively smaller for firms below the threshold. However, this evidence is still circumstantial, and not robust enough to prove any causal relationships on its own.

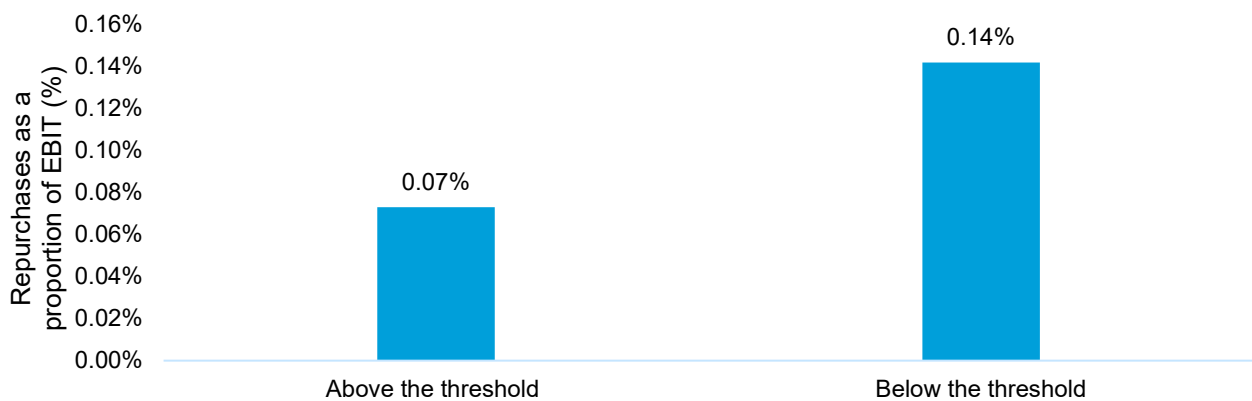
Figure C.7 Univariate median comparisons of firms with pre-repurchase EPS just above and below the threshold



Source: PwC analysis

Interestingly, the relative gap between repurchases as a fraction of outstanding shares is larger when looking at the median of the two groups (see Figure C.8); however, the absolute difference is negligible. This is also consistent with our hypothesis, but for the same reasons outlined above the evidence can only be taken as circumstantial.

Figure C.8: Univariate median comparisons of firms with pre-repurchase EPS just above and below the threshold for share repurchases as a proportion of EBIT



Source: PwC analysis

Overall, the univariate comparison presented suggest that it is possible some firms in the dataset may have attempted to use share repurchases and/or investment as a mechanism to hit their EPS target, though we know that no attempts were successful in our dataset for firms that would have missed the target without share repurchases. However, this evidence is not robust enough to draw any definitive conclusions as it is clear that the sample characteristics of firms just above and below the EPS threshold target do vary. We next turn

to our multivariate regression analysis where we examine the effect of EPS target deviations on share repurchases and investment, controlling for other characteristics.

Threshold regression analysis

This subsection presents the econometric results from our threshold regression analysis, which is aimed at evaluating whether EPS target deviations affect share repurchase behaviour while controlling for any differences in group characteristics. Our threshold regression analysis takes advantage of two types of potential discontinuities in share repurchases:

1. A discontinuity in share repurchases that occurs either side of the pre-repurchase or ex-ante EPS target deviation – where the hypothesis is that firms whose EPS is just below the threshold target before undertaking any share repurchases will (ceteris paribus) have undertaken more share repurchases than firms who just hit the target regardless of share repurchases.
2. A discontinuity in share repurchases that occurs either side of the post-repurchase or ex-post EPS target deviation – where the hypothesis is that firms whose EPS is just below the threshold target after undertaking any share repurchases will (ceteris paribus) have undertaken fewer share repurchases than firms that just hit the target when accounting for share repurchases.

Table C.4 below summarises again the thresholds examined in our analyses, the estimation method, dependant and explanatory variables and approach to controls.

Table C.4: Discontinuity designs used in each regression specification

Threshold	Estimation method	Dependent variable examined	Key explanatory variable	Approach to control variables
Ex-ante EPS target deviation	Linear regression (pooled-OLS)	Level of share repurchases	Indicator for ex-ante meeting the EPS target	See general regression methodology
Ex-post EPS target deviation	Linear regression (pooled-OLS)	Level of share repurchases	Indicator for ex-post meeting the EPS target	See general regression methodology
Ex-ante and ex-post EPS target deviation	Linear regression (pooled-OLS)	Indicator for firm beating the target due to repurchases	EPS incentive size	None required*

Appendices

*Source: PwC analysis. Note, we test for the importance of controls using the same control set as outlined for specifications with share repurchases as the dependent variables. However, we do not expect controls to be necessary as outside of our testable hypothesis, we expect the dependent variable to be randomly determined at the bound.

For our threshold regression analysis, we ran separate model specifications that examine both the pre-repurchase and post-repurchase EPS target deviation impact on share repurchases and investment (CapEx). We only run regressions of the pre-repurchase EPS target deviation on the impact of share repurchases, since the only relevant hypothesis is whether being marginally below the target before share repurchasing stimulates share repurchases.

Ex-ante EPS target deviation

Below in Table C.5 we present the results for our regression specifications looking at the impact of the EPS pre-repurchase target deviation on repurchases. More specifically, we look at whether the level of repurchases are significantly different between firms that were just below the EPS target threshold before repurchasing and firms that were just above the EPS target threshold before repurchasing. The set of controls are taken from Almeida et al. (2016) and contrary to the general regression analysis, we use only the full model here.

Table C.5: Threshold results for ex-ante/pre-repurchase EPS target deviation

Dependent variable	Independent variable	Standard error	Coefficient [95% CI]	P-value
Repurchases as a proportion of lagged total assets	Indicator for whether the EPS pre-repurchase target deviation is negative	Clustered standard errors	0.011* [-0.002, 0.024]	0.090
		Bootstrap clustered standard errors	0.011* [-0.001, 0.023]	0.080

Source: PwC analysis

The regression results with and without using the bootstrap method show some evidence significant at 10% that firms that were marginally below their EPS target before repurchasing, undertook more repurchases than firms who just hit their EPS target before repurchasing. This result has factored in the differing characteristics between the groups, and so presents stronger evidence that firms just below the target may have undertaken repurchases in an effort to hit the EPS target in the executive contract.

Furthermore, the results hold for a different set of controls (Edmans et al (2017)) as well (satisfying the ‘relevance’ condition of our instrument, a condition required to properly conduct the instrumental variable approach).

To provide some brief interpretation on the coefficient size reported here, the average size of repurchases as a proportion of lagged total assets is 0.007 in our sample. More specifically, for firms that just missed their target without share repurchases, the average size repurchases as a proportion of lagged assets is 0.005, whilst for firms that just hit their target regardless of share repurchases, it was 0.008. Therefore, the results indicate that if the firms that just missed the target before repurchasing had instead hit it, they would not have repurchased at all (holding constant the rest of their characteristics). Meanwhile, the group that hit the target before repurchasing are predicted to have had more than doubled their repurchase activity, had they actually been below the target.

However, although we have tried to capture as many reasons for repurchasing as possible, a substantial portion of share repurchases remains unexplained ($R^2 < 0.25$). This unexplained variation is partially reflected in the p-values already. Nevertheless, it is important to note since it means that we cannot say with certainty that the difference in share repurchases attributed to whether firms were above or below the EPS target before repurchasing, is caused by the motivation to hit the EPS target.

Ex-post EPS target deviation analysis

Turning next to our analysis of the ex-post EPS target deviation on share repurchases, we can expect the results to be highly similar, since the correlation in our restricted dataset between the ex-post and ex-ante EPS target deviation is 0.998. As noted previously, this is mostly driven by the fact that no firms had both a negative target deviation before repurchasing, and a positive target deviation after repurchasing. We present results for our two regression specifications below in Table C.6.

Table C.6: Threshold results for ex-post/post-repurchase EPS target deviation

Dependent variable	Independent variable	Standard error	Coefficient [95% CI]	P-value
Repurchases as a proportion of lagged total assets	Indicator for whether the EPS post-repurchase target deviation is negative	Clustered standard errors	0.005 [-0.002, 0.012]	0.174
		Bootstrap clustered standard errors	0.005 [-0.003, 0.013]	0.234

Source: PwC analysis

The coefficient is positive, indicating that having achieved an EPS target in the LTIP is associated with fewer repurchases than otherwise - although Both specifications do not yield statistically significant coefficients. This is to be expected since no firms successfully used share a share repurchase to hit a target. If we believe there is some evidence that firms may have tried to hit the target with repurchases, but failed, we cannot expect there to be

evidence that firms that hit the target did so by repurchasing more, since we know no firms managed to achieve this.

Summary of impacts

Overall, our analysis found little significant evidence that share repurchases have been employed as an instrument to hit EPS targets within LTIPs in the executive remuneration contract. Our general regression analysis did not show robust evidence of an association between the presence (or size) of EPS conditions in the LTIP and share repurchase behaviour.

Additionally, statistics from our dataset have shown that no firm has ever successfully used share repurchases to hit the target. In other words, no firms that hit the target would have missed the target if they hadn't repurchased shares. The reason for this is that firms rarely repurchase enough relative to their size to materially impact their EPS measure. There is only one instance where a firm was very close to the target. It then undertook one of the largest share repurchases in the dataset, and even in this scenario it was unable to successfully hit the EPS target.

We do find some evidence that firms just below the target before repurchasing may have repurchased with the incentive of hitting their target, but this evidence is statistically weak (significant only at 10%). If this incentive exists, the aforementioned example shows that in the future there may be individual instances where firms successfully use repurchases hit their EPS target. However, for this to occur, a firm would have to undertake one of the largest repurchases historically (purely motivated by hitting the target), and simultaneously be extremely close to hitting their EPS target prior to repurchasing. As such, we find in general, the threat of repurchases as an earnings management device is limited.

Link between Share Repurchases and Investment

This section documents the results of our regression analyses, aimed at examining the relationship between share repurchases and investment. We use two types of panel-data regression analysis as described in our methodology working paper.

1. **General regression analysis** documenting the overall correlation between repurchases and investment.
2. **Threshold based regression analysis** aiming to document the causal effect of those repurchases that are motivated by EPS targets on investment.

Throughout our investment analyses, we have also extended some of our analysis between executive pay incentives and share repurchases, to examine the possibility that executive pay incentives have a direct impact on firm investment (as measured by CapEx), since the executive pay incentives are included as controls in these regressions.

Although CapEx does not typically impact firm earnings directly and therefore EPS, R&D expenses can affect earnings depending on the firm's financial reporting procedure.

General regression analysis documenting the correlation between repurchases and investment

This analysis draws upon two distinct specifications:

1. **Linear panel-data regression analysis** to identify the impact of **repurchases** on the **mean** level of **investment** after controlling for other determinants of investment. We also look at the direct impact, if any, of executive pay incentives on investment.
2. **Quantile regression analysis** to identify the impact of **repurchases** (and executive pay incentives) on the **median** level of **investment**.

Similarly to our analysis of repurchases, we report results from four model specifications, which vary according to whether the model uses **full controls** or is **refined** through variable selection methods, and whether **bootstrap** standard errors are used.

Linear panel-data regression analysis

The dependent variable for this analysis is firm-level investment defined as capital expenditure (CapEx). This is, as usual, scaled by lagged assets. The variables of interest are share repurchases (also scaled by lagged assets as per the other analyses), the existence of an EPS/TSR target and the size of that incentive, with both existence and size of the target taken from the CEO pay contract that was granted two periods before and is due to vest in this period³⁵. We again make use of the random effects model that provides the most efficient coefficient estimates and assumes that the unobserved firm-level heterogeneity is uncorrelated with the explanatory variables.

As shown in Table C.7, we find no statistically significant link between share repurchases and investment after controlling for generally accepted and academically supported determinants of investment. This is true for all specifications (i.e. both kinds of models and both kinds of standard errors in each of the models). All coefficients are close to zero and the opposite signs of the coefficients in the full and refined model indicate lack of any systematic relationship between investment and share repurchases. Additionally, the large p-values show that the impact cannot be established even at the 80% confidence level.

³⁵ Since we deal with data on 'granted' LTIPs for each year, under the assumption of a three-year period LTIP, the relevant targets come from the LTIP that was granted two periods before and is due to vest in this period.

Table C.7: Linear regression analysis results of the relationship between share repurchases and investment

Independent Variable	Model selection	Standard error choice	Coefficient [95% CI]	P-Value
Share repurchases	Full	Clustered	0.013 [-0.045, 0.071]	0.66
Share repurchases	Full	Bootstrap clustered	0.013 [-0.122, 0.148]	0.85
Share repurchases	Refined	Clustered	-0.011 [-0.041, 0.019]	0.47
Share repurchases	Refined	Bootstrap clustered	-0.11 [-0.960, 0.740]	0.80

Source: PwC analysis

Thus, our general regression analysis suggests there is **no systematic correlation between repurchases and investment**.

This regression also allows us to examine if there exists a direct impact, i.e. after controlling for repurchases, of EPS and TSR related pay incentives on investment. We present results regarding the potential direct channel from these incentives to investment below.

The results of our linear regression analysis looking at the direct link between EPS/TSR pay incentives and investment show much stronger evidence that there may be a **significant negative association between EPS conditions and investment**. For all eight model specifications ran, we found a negative association. Six of our specifications found this association was significant at 10%, five at 5% and two at 1%. The remaining two specifications were just outside the 10% significance level.

Table C.8: Linear regression analysis results of the relationship between EPS/TSR incentives in the Executive LTIP and investment

Variable	Model selection	Standard error choice	EPS coeff. [95% CI]	EPS p-value	TSR coeff. [95% CI]	TSR p-value
Indicator	Full	Clustered	-0.01** [-0.019, -0.001]	0.025	-0.01* [-0.022, 0.002]	0.096
Indicator	Full	Bootstrap clustered	-0.01** [-0.019, -0.001]	0.031	-0.01 [-0.022, 0.002]	0.116
Indicator	Refined	Clustered	-0.01*** [-0.017,	0.005	-0.003	0.253

Appendices

			-0.003]		[-0.008, 0.002]	
Indicator	Refined	Bootstrap clustered	-0.01***	0.007	-0.003	0.272
			[-0.017, -0.003]		[-0.008, 0.002]	
Pay incentive	Full	Clustered	-0.005**	0.026	-0.000**	0.010
			[-0.009, -0.001]		[-0.000, -0.000]	
Pay incentive	Full	Bootstrap clustered	-0.005**	0.043	-0.000	0.958
			[-0.010, -0.000]		[-0.003, 0.003]	
Pay incentive	Refined	Clustered	-0.003	0.105	-0.000	0.688
			[-0.007, 0.001]		[-0.001, 0.000]	
Pay incentive	Refined	Bootstrap clustered	-0.003	0.112	-0.000	0.994
			[-0.007, 0.001]		[-0.020, 0.020]	

Source: PwC analysis

Notably, we also find the evidence is strongest when looking at simply whether having an EPS target impacts investment levels, rather than looking at the size of the EPS pay incentive. This suggests it is possible that executive decisions to cut investment may be influenced generally by the presence of such EPS targets in their contract.

This observation could also be explained in different ways:

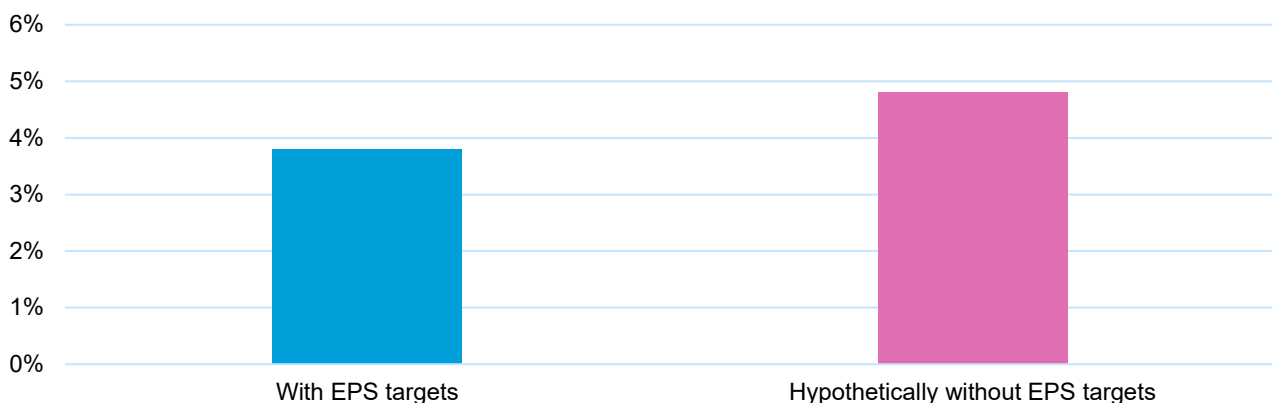
1. While capital expenditure per se does not typically affect earnings as it is not expensed in the income statement, there can be some effect from current year depreciation which is expensed. Furthermore, cash saved from reducing capital expenditure could be deployed to enhance short-term earnings (e.g. promotions, advertising).
2. It is plausible that both investment and the presence of EPS targets in the contract are jointly determined by financial conditions. For example, poor financial performance due to macroeconomic or firm-specific factors could manifest itself both in lower investment and an EPS target set in the contract. Although the EPS contracts examined are set two years previously, it is possible that poor performance can affect negatively investment in subsequent years.

To provide an interpretation on the coefficient size, the largest coefficient size is roughly -0.01. This means that the average amount of investment (as a fraction of lagged total assets) for firms with an EPS indicator, is 0.01 smaller than otherwise (or 1% smaller, in

absolute size). To provide a sense of the size of this impact, the average value of investment (as a fraction of lagged total assets) in our dataset is 4.4%.

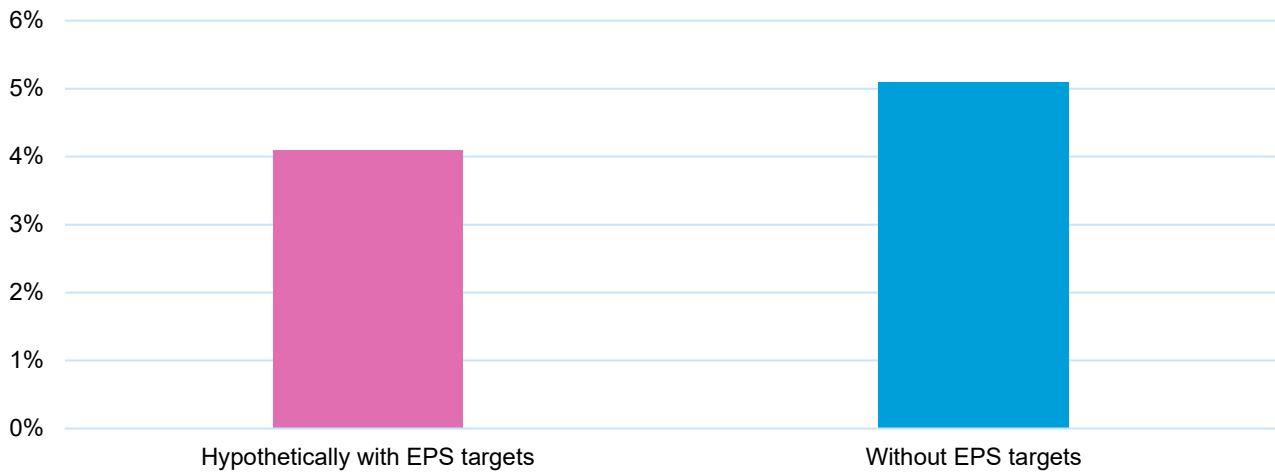
An intuitive way of thinking about the coefficient size can be found by examining firms with and without EPS targets. The average amount of investment as a fraction of last year's total assets for firms with EPS targets is 3.8%. Therefore, our results imply that these firms would be investing at a scale of 4.8% instead if they didn't use EPS targets (roughly a quarter more – see Figure C.9). Equally, the average amount of investment as a fraction of last year's total assets for firm without EPS targets is 5.1%. Our results suggest this figure would be 4.1% if targets were used (roughly a fifth less – see Figure C.10). This is a **fairly substantial impact and should not be discounted on the basis of sampling uncertainty**. The hypothetical impact of EPS targets on investment in both groups is displayed in the figures below.

Figure C.9 Average investment level for firms with an EPS target and hypothetical average if they did not have an EPS target



Source: PwC analysis

Figure C.10 Average investment level for firms without an EPS target and hypothetical average with an EPS target



Source: PwC analysis

Note, we cannot say that because EPS target using firms' investment is 1.4% lower than firms without EPS targets, that EPS targets are the most important driver of the gap between the two groups. This is because the two groups have differing characteristics. There may be larger impacts from other variables that cancel each other out and are therefore 'hidden' from the average figures. For example, 96.3% of firms using EPS targets pay dividends, but only 85.3% of firms not using EPS targets pay dividends. Since dividend payers are associated with investment levels as a proportion of lagged total assets that are 10% lower than otherwise, the presence of more dividend payers in the EPS target group also has an impact on this gap in investment.

These results indicate that investment can act as an instrument used to achieve EPS targets. However, since this methodology is primarily designed to elicit conditional correlations, it is susceptible to potential endogeneity issues listed above.

Quantile (median) regression analysis

Our quantile regression results enable us to examine potential relationships (not necessarily causal) between share repurchases and investment for a typical representative firm in the dataset. As shown in Table C.9, we generally do not identify any significant impact from repurchases on investment. Though one of the specifications in the refined model shows a significant negative impact, this specification does not include all controls and also does not use the bootstrap method to draw inference. Less weight should be attached to this result as a consequence of the non-normal residual patterns we find.

Contrary to the panel-data regression analysis, here the statistically significant coefficient sign is negative, implying that for a typical firm, more share repurchases are associated with

less investment. This result is consistent with the notion that investment and share repurchases are competing methods of capital allocation. It also indicates that the positive link found in two of the panel-data regressions could be a result of the conditional mean of investment getting biased due to large outliers (i.e. large firms that are capable of conducting both large repurchases and investment). However, this result alone is not robust enough to suggest share repurchases and investment are systematically tied.

Table C.9: Quantile regression analysis results of the relationship between share repurchases and investment

Variable	Model selection	Standard error choice	Coefficient [95% CI]	P-value
Share repurchases	Full	Clustered	-0.02 [-0.054, 0.014]	0.25
Share repurchases	Full	Bootstrap clustered	-0.02 [-0.162, 0.122]	0.783
Share repurchases	Refined	Clustered	-0.05*** [-0.086, -0.014]	0.006
Share repurchases	Refined	Bootstrap clustered	-0.05 [-0.129, 0.029]	0.214

Source: PwC analysis

Again, we also present results from this regression showing the impact of EPS/TSR targets and their incentive size on median investment level – in an extension of our quantile analysis of EPS/TSR targets and repurchases. Displayed in Table C.10, the results from our quantile (median) regression analysis also show strong evidence of a significant association between EPS pay incentives and investment. Again, six out of eight model specifications show significance at 10% or higher, five model specifications show significance at 5% or higher and four regression models show significance at 99% or higher.

Table C.10: Quantile regression analysis results of the relationship between investment and EPS/TSR incentives in the Executive LTIP

Variable	Model selection	Standard error choice	EPS coeff. [95% CI]	EPS p-value	TSR coeff. [95% CI]	TSR p-value
Indicator	Full	Clustered	-0.01 [-0.023, 0.004]	0.157	-0.002 [-0.011, 0.007]	0.653
Indicator	Full	Bootstrap clustered	-0.01 [-0.023, 0.003]	0.136	-0.002 [-0.010, 0.006]	0.632
Indicator	Refined	Clustered	-0.01* [-0.020,	0.05	-0.002	0.430

Appendices

			-0.000]		[-0.007, 0.003]	
Indicator	Refined	Bootstrap clustered	-0.01** [-0.020, -0.000]	0.04	-0.002 [-0.006, 0.003]	0.360
Pay incentive	Full	Clustered	-0.006*** [-0.010, -0.002]	0.007	-0.000 [-0.001, 0.001]	0.792
Pay incentive	Full	Bootstrap clustered	-0.006*** [-0.010, -0.002]	0.007	-0.000 [-0.016, 0.001]	0.990
Pay incentive	Refined	Clustered	-0.004*** [-0.007, -0.001]	0.006	0.000 [-0.000, 0.001]	0.636
Pay incentive	Refined	Bootstrap clustered	-0.004*** [-0.007, -0.001]	0.003	0.000 [-0.006, 0.007]	0.975

Source: PwC analysis

Interestingly, when using quantile analysis, it is the size of EPS pay incentives which is most closely linked with investment, rather than the simple presence of EPS targets in the executive contract. One plausible explanation for this is that for typical firms in the dataset, the relative pay attached to EPS has a sharper and more consistent effect on investment across all firms. However, when including data outliers, it may be that some of these outliers showed a high level of repurchases with EPS targets, with a small fraction of pay related to the EPS target in the LTIP. If these firms are large and pay large salaries, the incentive may still be large enough to affect investment expenditure.

Thus, from the general regression analysis, we found almost no evidence of linkages between share repurchases and investment. Even though the effect is not statistically significant, the effect of repurchases on investment is usually negative (some mean regressions show positive links, but they are influenced by large outliers). There exists evidence of a direct link between EPS pay incentives and investment, independent of share repurchases. The effect of such incentives on investment is always negative and, in most cases, statistically significant.

Discontinuity based regression analysis documenting the causal effect of repurchases on investment³⁶

Even though the general regression analysis controls for a long list of observable variables that may jointly drive both repurchases and investment, there may be unobservable variables that affect both. Moreover, there may also be reverse causality from investment to repurchases. A firm may first decide to cut investment, due to an uncertain economic outlook, and use the saved cash to then repurchase shares. This prevents us from drawing any causal inferences from the results outlined above.

We thus intend to identify a causal effect of repurchases on investment by building on Almeida et al.'s (2016) methodology. This is a “fuzzy” regression discontinuity analysis which uses the standard instrumental variable approach. Following from our previous results, we also explore the direct link between executive pay incentives and investment using a threshold-based regression analysis that looks at whether firms that just beat their EPS targets conducted less investment than the ones that just missed their targets.

“Fuzzy” regression discontinuity analysis

This analysis reviews firms that would have been very close to the EPS targets without repurchases (i.e. those that would either have just missed or just met their targets without conducting any repurchases). The idea is that in a small bandwidth close to the EPS target, whether a firm would have just missed or just met its target is random, and it is not affected by investment or any other variables that determine investment. But, it does affect executives' incentives to undertake repurchases through the substantial financial rewards captured when the threshold target is surpassed in the executive LTIP. We focus on such repurchases that are motivated by firms' desire to meet EPS targets.

Our econometric design (essentially an instrumental variables approach) relies on the following two-stage estimation technique:

1. We first estimate the relationship between repurchases and the ex-ante EPS target deviation (already examined in the section above), and then;
2. We study the relationship between the repurchases motivated by the EPS target deviation and investment.

We note that investment here is actually future investment (defined as two-period change in capital expenditure, excluding the current period of repurchases). This allows us to remove any concerns of direct correlations between this period's capital expenditure and EPS pay

³⁶ We note that at the outset that this analysis is performed only with respect to EPS targets and not TSR targets because in our general regression analysis we find most evidence for EPS targets, whilst the difficulties remain around defining TSR target deviations with respect to a discretionary peer group.

incentives. It also properly addresses the question whether share repurchases have any adverse effects on long-term investment by considering the future impact.

Table C.11 documents the results of the first stage that seeks to establish the impact of pre-repurchase target deviation on repurchases, using a random effects model. This model is identical to that reported in Table C.5, so we do not discuss this in depth here. As a reminder, we find statistically significant evidence that firms that have a negative pre-repurchase target deviation (captured by the negative surprise indicator) undertake larger repurchases. As noted previously, this result satisfies the ‘relevance’ condition required to properly conduct the instrumental variable approach. However, this evidence is only significant at the 10% level.

Table C.11: First-stage results from fuzzy discontinuity design reported threshold results for ex-ante/pre-repurchase EPS target deviation

Dependent variable	Independent variable	Standard error	Coefficient [95% CI]	P-value
Repurchases as a proportion of lagged total assets	Indicator for whether the EPS pre-repurchase target deviation is negative	Clustered standard errors	0.011* [-0.002, 0.024]	0.090
		Bootstrap clustered standard errors	0.011* [-0.001, 0.023]	0.080

Source: PwC analysis

Moving onto the second stage of our fuzzy discontinuity regression method, Table C.12 documents the results of the second stage that seeks to examine the causal impact of repurchases that are motivated by being below the EPS target on future investment.

Table C.12: Second-stage results from fuzzy discontinuity design – relationship between repurchases motivated by EPS target deviation and investment

Dependent variable	Independent variable	Standard error	Coefficient [95% CI]	P-value
Two-year growth in investment	Share repurchases motivated by EPS target deviation	GLS standard errors	-0.93 [-3.087, 1.227]	0.397
		Bootstrapped standard errors	-0.93 [-24.76, 22.90]	0.94

Source: PwC analysis

We find no systematic effect of repurchases that are motivated by a desire to meet EPS targets on investment. The sign of the coefficient on predicted repurchases is negative, implying that firms that conduct share repurchase relatively more, with the potential intention

of hitting the EPS target in the LTIP, invest relatively less. However, the lack of statistical significance shows that this result is more likely be due to sampling noise, rather than anything systematic. This confirms our findings of the general regression analysis, where generally we found a negative association between capital expenditure and repurchases but without any statistical significance.

Thus, overall, even if there is some weak evidence that being below the target motivates share repurchases (though not significant enough to actually enable firms to meet the target), we do not observe evidence in the data of a crowding out effect of repurchases on investment.

Threshold based regression analysis

This analysis extends the threshold based analysis to look at the potential direct effects of the firm’s EPS target deviation on investment levels. We look at firms that are close to their EPS thresholds as measured by their actual EPS and consider if firms that just met their targets systematically conducted larger repurchases or lower investment when compared to firms that just missed their targets. This allows us to explore in-depth whether (after keeping repurchases constant) capital expenditure was used on its own to meet EPS targets.

Since this deals with the actual EPS, we call it the ex-post analysis (in comparison with the ex-ante analysis used in the fuzzy regression approach above, relying on the EPS that would have existed without any repurchases). Note investment is again defined as capital expenditure as a proportion of lagged total assets.

Table C.13 shows the impact of being above the EPS target on this period’s CapEx. We find no systematic differences in the CapEx of firms that just met their targets versus those that just missed their targets.

Table C.13: Threshold regression results estimating the impact of meeting EPS target on capital expenditure

Dependent variable	Independent variable	Standard error	Coefficient [95% CI]	P-value
Investment	Indicator for whether the EPS target was hit	Clustered standard errors	0.01 [-0.003, 0.023]	0.128
		Bootstrap clustered standard errors	0.01 [-0.003, 0.023]	0.124

Source: PwC analysis

These results present an interesting comparison with the general regression analysis, where we found a significant negative relationship between the existence and size executive pay incentives, with capital expenditure. The results here contradict the previous finding to some

extent, since they suggest that firms that hit the EPS target were unlikely to have cut investment to do so.

One plausible explanation is that if firms are cutting investment to hit EPS targets, they are doing it at a more 'general' level – i.e. they do not specifically try to hit the target with measured investment cuts, but rather generally undertake less investment than otherwise with the EPS target in mind.

However, we do not want to attach too much importance to these results as, similar to repurchases, there is no academically established ex-ante approach. In other words, we are unable to calculate what the EPS would have been had the firms not conducted capital expenditure. This prevents us from examining how much of the impact capital expenditure had on EPS.

Summary of impacts

The results of our analysis of the relationship between share repurchases and investment suggest that the two variables are, in general, remarkably unrelated. After controlling for other factors, the majority of our regression specifications in our general analysis showed no statistically significant relationship between share repurchases and investment. The most likely interpretation for this is that investment decisions are taken independently of share repurchase decisions, and the large degree of other unrelated factors that determine overall profits mean that less investment by one firm in one year does not necessarily imply more share repurchases.

This result carried implications over into our discontinuity analysis, which sought to estimate whether share repurchases (potentially) motivated by the EPS target deviation in the LTIP, spill over into crowding out investment. The results from this analysis were consistent with our general analysis – we do not find evidence for such crowding-out even in cases where share repurchases may have been conducted to try and hit an EPS target.

Interestingly, our analysis has revealed some evidence of a direct link between EPS conditions in the LTIP, and investment. In particular, the presence of EPS conditions in the LTIP seem to be associated with lower investment (all other things equal). Although capital expenditure per se does not typically affect earnings as it is not expensed in the income statement, there can be some effect from current year depreciation which is expensed. Furthermore, cash saved from reducing capital expenditure could be deployed to enhance short-term earnings (e.g. promotions, advertising).

This relationship appears to exist at a more general level rather than specifically relating to attempts to hit a specific target – firms that have EPS targets in the LTIP invest less (all other things equal), but we found no evidence that firms that just hit their EPS target invested significantly more than those that just missed.

Further analysis would benefit from estimating the EPS pre-investment in our dataset – this was beyond the scope of our study. This would allow a threshold analysis of the pre-investment EPS target deviation on investment, as studied for repurchases. As found earlier, although no firms used share repurchases to hit their targets, it is plausible they tried and failed. If the same is true for investment this further analysis is required to elicit this behaviour.

Appendix D: Survey

Introduction

Thank you for taking the time to complete this survey.

PwC has been appointed by the Department for Business, Energy and Industrial Strategy to carry out research into the use of share repurchases. The study forms part of the Government's corporate governance reforms and wider Industrial Strategy.

As part of the study PwC have developed a survey, targeted at key decision-makers in UK companies, which aims to enhance our understanding of how companies make important capital allocation decisions, and the role of share repurchases.

Your honest responses to the survey will make a valuable contribution. All responses are anonymous and will be treated with confidentiality.

The survey is also available to complete online at: https://www.pwcresearch.com/uc/BEIS_RegSite/

About you and your company

These questions will assist us to obtain a balanced sample of respondents and ensure survey findings are not drawn from an unrepresentative sample of respondents.

A1) Please indicate your position in the company.

Please tick all that apply

CEO	<input type="checkbox"/>
CFO	<input type="checkbox"/>
Other senior financial position	<input type="checkbox"/>
Board member	<input type="checkbox"/>
Executive remuneration committee member	<input type="checkbox"/>
Other (please specify): _____	<input type="checkbox"/>

A2) What was the approximate turnover of your company in the last financial year?

Please tick one only

Larger than £10bn	<input type="checkbox"/>
Between £1bn – £10bn	<input type="checkbox"/>
Between £100m and £1bn	<input type="checkbox"/>
Less than £100m	<input type="checkbox"/>

Appendices

A3) Please indicate your company listing status

Please tick one only

FTSE 100	<input type="checkbox"/>
FTSE 250	<input type="checkbox"/>
Other publicly listed	<input type="checkbox"/>
No company listing (private company)	<input type="checkbox"/>

A5) Please indicate your company's sector (categories are from global industry classification system)

Please tick one only

Consumer staples	<input type="checkbox"/>
Consumer discretionary	<input type="checkbox"/>
Energy	<input type="checkbox"/>
Financials	<input type="checkbox"/>
Healthcare	<input type="checkbox"/>
Industrials	<input type="checkbox"/>
Information Technology	<input type="checkbox"/>
Materials	<input type="checkbox"/>
Telecommunication Services	<input type="checkbox"/>
Utilities	<input type="checkbox"/>
Other (please specify): _____	<input type="checkbox"/>

A6) How long has your CEO been in role?

Please tick one only

15 + years	<input type="checkbox"/>
10 to 14 years	<input type="checkbox"/>
5 to 9 years	<input type="checkbox"/>
1 to 4 years	<input type="checkbox"/>
Less than one year	<input type="checkbox"/>

Appendices

A7) Broadly, which of the following best describes your shareholder base?

Please tick one only

One or more large (10%+) shareholdings (investor, company or executive)	<input type="checkbox"/>
Diverse shareholder base with no shareholdings above 10%	<input type="checkbox"/>

About your company decision-making

These questions will assist us to understand how companies make decisions about whether to repurchase shares and how this relates to decision-making about investment and other considerations.

B1) What performance targets are used in your executive pay plans? *Please tick all that apply*

Bonus linked to Earnings Per Share (EPS)	<input type="checkbox"/>
Bonus linked to other measures	<input type="checkbox"/>
Long Term Incentive Plan (LTIP) linked to EPS	<input type="checkbox"/>
LTIP linked to Total Shareholder Revenue (TSR)	<input type="checkbox"/>
LTIP linked to other measures	<input type="checkbox"/>
We do not use performance targets in executive pay	<input type="checkbox"/>

B2) Which of the following activities has your company undertaken in the past three years? *Please tick all that apply*

Paid ordinary dividends	<input type="checkbox"/>
Paid special dividends	<input type="checkbox"/>
Repurchased shares on the open market	<input type="checkbox"/>
Repurchased shares directly from shareholders	<input type="checkbox"/>
None of the above	<input type="checkbox"/>

B3) If you repurchased shares in the last 3 years, what did you do with the shares you repurchased? *Please tick one only*

Cancelled the shares	<input type="checkbox"/>
Held or redistributed the shares to employees	<input type="checkbox"/>
Other (please specify): _____	<input type="checkbox"/>

B4) If you repurchased shares in the last 3 years, what percentage of your company's shares have you repurchased in the last 3 years? *Please tick one only*

<1%	<input type="checkbox"/>
1-5%	<input type="checkbox"/>
5%-10%	<input type="checkbox"/>
10% or more	<input type="checkbox"/>

Appendices

B5) If you repurchased shares in the last 3 years, were your company's executive pay targets adjusted for share repurchases? *Please tick one*

Yes	<input type="checkbox"/>
No	<input type="checkbox"/>

B6) If you repurchased shares in the last 3 years, of funds that could be used to repurchase shares, which of the following would be the most likely alternative use? *Please tick all that apply*

Pay dividends	<input type="checkbox"/>
Investment and R&D	<input type="checkbox"/>
Retain and hold as cash	<input type="checkbox"/>
Pay down debt	<input type="checkbox"/>
General operating expenditure (e.g. marketing or staff costs)	<input type="checkbox"/>
Acquiring target companies	<input type="checkbox"/>
Other (please specify): _____	<input type="checkbox"/>

B7) If you repurchased shares in the last 3 years, If your company had not re-purchased shares, would it have pursued more value-creating investments? *Please tick one only*

Yes	<input type="checkbox"/>
No	<input type="checkbox"/>
Unsure	<input type="checkbox"/>

B8) Do you consider that your company has invested sufficiently over the last three years to enable its ongoing success? *Please tick one only*

Yes – My company has invested sufficiently	<input type="checkbox"/>
No – My company has slightly under-invested to enable its ongoing success	<input type="checkbox"/>
No – My company has significantly under-invested to enable its ongoing success	<input type="checkbox"/>

Appendices

B9) If your company was unable to make all the investments it wanted to pursue, what was the reason for this? *Please tick all that apply*

We were able to make all the investments we wanted to	<input type="checkbox"/>
Lack of cash resources	<input type="checkbox"/>
Lack of available external financing	<input type="checkbox"/>
Need to maintain dividend commitments	<input type="checkbox"/>
Need to buy-back shares	<input type="checkbox"/>
Need to meet Earnings Per Share (EPS) targets	<input type="checkbox"/>
Shareholder pressure for distribution	<input type="checkbox"/>
Political environment	<input type="checkbox"/>
Regulatory constraints	<input type="checkbox"/>
Other (please specify): _____	<input type="checkbox"/>

About your company opinions

These questions will assist us to understand your opinions about how share repurchases relate to investment and other considerations, and the relative importance attached to each.

C1) How important are the following factors to your company’s decisions about paying dividends and repurchasing shares?

1 is not ‘not important at all’ and 5 is ‘very important’

Please tick all that apply

Please tick all that apply

Paying dividends						Repurchasing shares				
Not at all		Very important				Not at all		Very important		
1	2	3	4	5		1	2	3	4	5
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Maintaining consistency with historic share repurchase policy/ dividend policy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	An increase in the level or stability of future earnings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Whether the share price is under- or over valued	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The availability of good investment opportunities to pursue	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Level of pension deficit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Other financial constraints and commitments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Optimising the company’s capital structure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Offsetting dilution as a result of the issuance of shares from compensation packages	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Long term incentive plan (LTIP) targets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Increasing Earnings Per Share (EPS)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Analyst EPS forecasts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Shareholder pressure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Tax efficiency	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The float or overall liquidity of the shares	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Other (please specify):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendices

C2) How important are the following factors to your company's decisions about investment?

	Not at all Important			Very Important	
	1	2	3	4	5
Attractiveness of investment opportunities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Availability of internal funds	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Availability of external finance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Need to maintain dividend commitments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Need to buy-back shares	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Need to meet Earnings Per Share (EPS) targets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shareholder views	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

C3) To what extent do these statements align with your company's views?

	Not aligned at all		Somewhat aligned		Strongly aligned
	1	2	3	4	5
We make repurchase decisions after our investment plans are determined	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Repurchase decisions convey information about our company to investors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Current executive incentive practices affect repurchase behaviour	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We sometimes make repurchase decisions before investment decisions have been made	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Repurchases have become more important to us in recent years	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We have come under pressure to reduce investment in R&D or employees in recent years	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Our board-level decision-making processes to invest or to repurchase shares are inflexible	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

C5) To what extent do these statements align with your company's views on dividends?

	Not aligned at all		Somewhat aligned		Strongly aligned
	1	2	3	4	5
We decide on dividend pay-outs after our investment plans are determined	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We try to avoid reducing dividends per share	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We sometimes decide on dividend pay-outs before investment decisions have been made	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Our board-level decision-making processes regarding dividend pay-outs are inflexible	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We are reluctant to make dividend changes that might have to be reversed in the future	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The cost of raising external capital is smaller than the cost of cutting dividends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dividends and share repurchases are viewed as substitutes for each other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

C6) Please indicate to what extent you agree or disagree with the statement

'I have felt excessive pressure to return funds to investors from...'

	Strongly Disagree			Strongly Agree	
	1	2	3	4	5
Institutional shareholders	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Buy-side analysts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Private investors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hedge funds	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Competitors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Board of directors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Senior management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (please specify): _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

C7) Has the pressure to return funds increased or decreased over the past 2-3 years?

Please tick one only

Increased	<input type="checkbox"/>
Decreased	<input type="checkbox"/>
Unsure	<input type="checkbox"/>

Thank you for taking the time to complete this survey

Appendix E: Bibliography

Academic references

- Aghion, P., Van Reenen, J., & Zingales, L. (2013). Innovation and institutional ownership. *American Economic Review*, 103(1), 277-304.
- Almeida, H., Fos, V., & Kronlund, M. (2016). The real effects of share repurchases. *Journal of Financial Economics*, 119(1), 168-185.
- Andriosopoulos, D., & Hoque, H. (2013). The determinants of share repurchases in Europe. *International Review of Financial Analysis*, 27, 65-76.
- Asker, J., Farre-Mensa, J., & Ljungqvist, A. (2014). Corporate investment and stock market listing: A puzzle? *Review of Financial Studies*, 28(2), 342-390.
- Babenko, I. (2009). Share repurchases and pay-performance sensitivity of employee compensation contracts. *Journal of Finance*, 64(1), 117-150.
- Bartov, E., Givoly, D., & Hayn, C. (2002). The rewards to meeting or beating earnings expectations. *Journal of Accounting and Economics*, 33(2), 173-204
- Bennett, B., Bettis, J. C., Gopalan, R., & Milbourn, T. (2017). Compensation goals and firm performance. *Journal of Financial Economics*, 124(2), 307-330.
- Bens, D. A., Nagar, V., & Wong, M. H. (2002). Real investment implications of employee stock option exercises. *Journal of Accounting Research*, 40(2), 359-393.
- Bens, D. A., Nagar, V., Skinner, D. J., & Wong, M. F. (2003). Employee stock options, EPS dilution, and stock repurchases. *Journal of Accounting and Economics*, 36(1), 51-90.
- Bergstresser, D., & Philippon, T. (2006). CEO incentives and earnings management. *Journal of Financial Economics*, 80(3), 511-529.
- Bhojraj, S., Hribar, P., Picconi, M., & McInnis, J. (2009). Making sense of cents: An examination of firms that marginally miss or beat analyst forecasts. *Journal of Finance*, 64(5), 2361-2388.
- Bizjak, J. M., Brickley, J. A., & Coles, J. L. (1993). Stock-based incentive compensation and investment behavior. *Journal of Accounting and Economics*, 16(1-3), 349-372.
- Bonaimé, A. A. (2012). Repurchases, reputation, and returns. *Journal of Financial and Quantitative Analysis*, 47(2), 469-491.

- Brav, A., Graham, J. R., Harvey, C. R., & Michaely, R. (2005). Payout policy in the 21st century. *Journal of Financial Economics*, 77(3), 483-527.
- Bushee, B. J. (1998). The influence of institutional investors on myopic R&D investment behavior. *Accounting Review*, 73(3), 305-333.
- Chan, K., Ikenberry, D., & Lee, I. (2004). Economic sources of gain in stock repurchases. *Journal of Financial and Quantitative Analysis*, 39(3), 461-479.
- Chen, H. (2017). Capital redeployment in the equity market. Working Paper, Harvard Business School.
- Cheng, Q., & Warfield, T. D. (2005). Equity incentives and earnings management. *The Accounting Review*, 80(2), 441-476.
- Cheng, Y., Harford, J., & Zhang, T. T. (2015). Bonus-driven repurchases. *Journal of Financial and Quantitative Analysis*, 50(3), 447-475.
- Cuny, C. J., Martin, G. S., & Puthenpurackal, J. J. (2009). Stock options and total payout. *Journal of Financial and Quantitative Analysis*, 44(2), 391-410.
- Dittmar, A. K. (2000). Why do firms repurchase stock? *Journal of Business*, 73(3), 331-355.
- Döttling, R., Ladika, T., & Perotti, E. C. (2016). The (self-) funding of intangibles.
- Döttling, R., Gutierrez Gallardo, G., & Philippon, T. (2017). Is there an investment gap in advanced economies? If so, why? ECB Forum on Central Banking.
- Edmans, A. (2011). Does the stock market fully value intangibles? Employee satisfaction and equity prices. *Journal of Financial Economics*, 101(3), 621-640.
- Edmans, A., Fang, V. W., & Huang, A. H. (2017). The long-term consequences of short-term incentives. Working Paper, London Business School.
- Edmans, A., Fang, V. W., & Lewellen, K. A. (2017). Equity vesting and investment. *Review of Financial Studies*, 30(7), 2229-2271.
- Edmans, A., Gabaix, X., & Jenter, D. (2017). Executive compensation: A survey of theory and evidence. *Handbook of the Economics of Corporate Governance*, 383-539.
- Fenn, G. W., & Liang, N. (2001). Corporate payout policy and managerial stock incentives. *Journal of Financial Economics*, 60(1), 45-72.
- Fried, J., & Wang, C. (2019). Short-termism and capital flows. *Review of Corporate Finance Studies*, 8(1), 207-233.

- Frydman, C., & Jenter, D. (2010). CEO compensation. *Annual Review of Financial Economics*, 2(1), 75-102.
- Gao, X., & Kronlund, M. (2017). Does dilution due to option exercises cause share repurchases? Working Paper, University of Illinois at Urbana-Champaign.
- Geiler, P., & Renneboog, L. (2016). Executive remuneration and the payout decision. *Corporate Governance: An International Review*, 24(1), 42-63.
- Gong, G., Louis, H., & Sun, A. X. (2008). Earnings management and firm performance following open-market repurchases. *Journal of Finance*, 63(2), 947-986.
- Gopalan, R., Milbourn, T., Song, F., & Thakor, A. V. (2014). Duration of executive compensation. *Journal of Finance*, 69(6), 2777-2817.
- Graham, J. R., Harvey, C. R., & Rajgopal, S. (2005). The economic implications of corporate financial reporting. *Journal of Accounting and Economics*, 40(1), 3-73.
- Gruber, J. W., & Kamin, S. B. (2017). Corporate buybacks and capital investment: An international perspective. Working Paper, Federal Reserve Board.
- Grullon, G., & Michaely, R. (2004). The information content of share repurchase programs. *Journal of Finance*, 59(2), 651-680.
- Guay, W., & Harford, J. (2000). The cash-flow permanence and information content of dividend increases versus repurchases. *Journal of Financial Economics*, 57(3), 385-415.
- Gutiérrez, G., & Philippon, T. (2016). Investment-less growth: An empirical investigation. Working Paper, National Bureau of Economic Research.
- Haldane, A. G., & Davies, R. (2011). The short long. Speech at the 29th Société Universitaire Européenne de Recherches Financières Colloquium: New Paradigms in Money and Finance, Brussels.
- Hribar, P., Jenkins, N. T., & Johnson, W. B. (2006). Stock repurchases as an earnings management device. *Journal of Accounting and Economics*, 41(1), 3-27.
- Ikenberry, D., Lakonishok, J., & Vermaelen, T. (1995). Market underreaction to open market share repurchases. *Journal of Financial Economics*, 39(2-3), 181-208.
- Ikenberry, D., Lakonishok, J., & Vermaelen, T. (2000). Stock repurchases in Canada: Performance and strategic trading. *Journal of Finance*, 55(5), 2373-2397.
- Jagannathan, M., Stephens, C. P., & Weisbach, M. S. (2000). Financial flexibility and the choice between dividends and stock repurchases. *Journal of Financial Economics*, 57(3), 355-384.

- Jolls, C. (1998). Stock repurchases and incentive compensation. Working Paper, National Bureau of Economic Research.
- Kahle, K. M. (2002). When a buyback isn't a buyback: Open market repurchases and employee options. *Journal of Financial Economics*, 63(2), 235-261.
- Ladika, T., & Sautner, Z. (2018). The effect of managerial short-termism on corporate investment. Working Paper, University of Amsterdam.
- Lee, B. S., & Rui, O. M. (2007). Time-series behavior of share repurchases and dividends. *Journal of Financial and Quantitative Analysis*, 42(1), 119-142.
- Lee, D., Shin, H., & Stulz, R. M. (2016). Why does capital no longer flow more to the industries with the best growth opportunities? Working Paper, National Bureau of Economic Research.
- Lilienfeld-Toal, U. V., & Ruenzi, S. (2014). CEO ownership, stock market performance, and managerial discretion. *The Journal of Finance*, 69(3), 1013-1050.
- LSE Growth Commission. (2017). UK growth: A new chapter. Centre for Economic Performance, LSE.
- Maksimovic, V., Phillips, G. M., & Yang, L. (2017). Do public firms respond to investment opportunities more than private firms? The impact of initial firm quality. Working Paper, National Bureau of Economic Research.
- Manconi, A., Peyer, U., & Vermaelen, T. (2018). Are Buybacks Good for Long-Term Shareholder Value? Evidence from Buybacks around the World. Working Paper, European Corporate Governance Institute.
- Marquardt, C., Tan, C., & Young, S. (2007). Managing EPS through accelerated share repurchases: Compensation versus capital market incentives. Working Paper, Baruch College CUNY.
- Michel, A., Oded, J., & Shaked, I. (2010). Not all buybacks are created equal: The case of accelerated stock repurchases. *Financial Analysts Journal*, 66(6), 55-72.
- Rau, P. R., & Vermaelen, T. (2002). Regulation, taxes, and share repurchases in the United Kingdom. *Journal of Business*, 75(2), 245-282.
- Rubio, S. (2017). The bright side of stock repurchases. Working Paper, Universidad Carlos III de Madrid.
- Skinner, D. J. (2008). The evolving relation between earnings, dividends, and stock repurchases. *Journal of Financial Economics*, 87(3), 582-609.

Stephens, C. P., & Weisbach, M. S. (1998). Actual share reacquisitions in open-market repurchase programs. *The Journal of Finance*, 53(1), 313-333.

Terry, S. J. (2017). The macro impact of short-termism. Working Paper, Stanford University.

Young, S., & Yang, J. (2011). Stock repurchases and executive compensation contract design: The role of earnings per share performance conditions. *The Accounting Review*, 86(2), 703-733.

Other references used

BlackRock (2017). Our Approach to Executive Remuneration in Europe, Middle East and Africa.

Richard Greenbury (1995). Final report of the Study Group on Directors' Remuneration as published on 17 July 1995.

International Corporate Governance Network (2016). Guidance on Executive Director Remuneration.

Investment Association (2016). Supporting UK productivity with long-term investment: The Investment Association's productivity action plan.

Investment Association (2017). The Investment Association Principles of Remuneration.

IMF (2018). Measuring the digital economy

Kay, J. (2012). The Kay review of UK equity markets and long-term decision making. Final Report, 112.

PwC (2016). Time to listen.

William Lazonik (2014). Profits without prosperity.

UK Corporate Governance Code (2016).

This publication is available from: www.gov.uk/government/publications/share-repurchases-executive-pay-and-investment

If you need a version of this document in a more accessible format, please email enquiries@beis.gov.uk. Please tell us what format you need. It will help us if you say what assistive technology you use.