

Bank of England

The Decision Maker Panel: a user's guide

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Abstract

The Decision Maker Panel (DMP) is a large monthly online panel survey of UK businesses. It was established in 2016 and is run by the Bank of England in partnership with King's College London and the University of Nottingham. It collects quantitative information from Chief Financial Officers about recent developments in business conditions, (the distribution of) expectations, and uncertainty. This paper provides an overview of the survey. It covers the survey methodology and evaluates the data quality. It shows how the survey is representative, that the data are of high quality and that they match official statistics well. Aggregated DMP data are published on a monthly and quarterly basis, and anonymised microdata are available to researchers via the Office for National Statistics' Secure Research Service.

Key words: Decision Maker Panel, firm data, survey methods, uncertainty.

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*Molly Sculthorpe contributed to this paper while working at the Bank of England.

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1 Introduction

The Decision Maker Panel (DMP) is a large and representative online panel survey of UK businesses. It was launched in August 2016 and is run by the Bank of England in partnership with King’s College London and the University of Nottingham. It was also developed in collaboration with Nicholas Bloom from Stanford University and is supported by funding from the Economic and Social Research Council. The DMP is a monthly survey that asks firms about recent developments in business conditions and about their expectations for how those conditions will evolve. It is similar in style to the Survey of Business Uncertainty run in the United States by the Federal Reserve Bank of Atlanta ([Altig et al., 2022](#)). This paper provides an overview of the survey. It covers the survey methodology, assesses how representative the respondents are and evaluates the data quality.¹

The panel grew quickly after its launch and regularly receives around 2,500 monthly responses, making it one of the largest regular business surveys in the UK (see [Figure 1](#)). Businesses with at least ten employees are randomly selected and invited to participate in the survey, resulting in a representative view of the UK economy. It covers private-sector and third-sector organisations of various sizes across all industries. Results are weighted using employment data in order to match the UK Interdepartmental Business Register, a comprehensive list of UK businesses broken down by geography, industry, legal status and employment size band.

The motivation behind establishing the Decision Maker Panel (DMP) was to collect more detailed and timely information on business conditions and business expectations than was currently available from other sources. The results have proven valuable to the Bank of England, both in terms of informing policy decisions and in creating opportunities for high-quality research. Having a clear understanding of how businesses are being affected by various economic events and how they are responding to those events is important for the Bank’s Monetary Policy Committee (MPC) in helping them to assess the prospects for the UK economy and set monetary policy. The survey has been widely referenced in MPC meeting minutes, the Mone-

¹[Bloom et al. \(2017\)](#) provided a short overview of the survey and its methodology. This paper supplements that with a more comprehensive assessment.

tary Policy Report, speeches by MPC members, and evidence given to Parliament.²

The initial catalyst for starting the DMP survey was to help assess how the UK's decision to leave the EU was affecting UK businesses and the wider economy (for published research on this issue using the DMP survey, see [Bloom et al. \(2018\)](#) and [Bloom et al. \(2019\)](#)). Since then, it has been used to study the effects of other key events that have had significant economic impacts, such as the Covid-19 pandemic ([Altig et al., 2020](#); [Bloom et al., 2023](#)), the Russia-Ukraine war ([Anayi et al., 2022](#)), and the wider increase in inflation ([Bunn et al., 2022](#)). More recently, the survey has been used to study the impact of higher interest rates on UK firms ([Shah et al., 2024](#)) and the response of firms to CPI inflation data releases ([Yotzov et al., 2024](#)).

Alongside special questions on topical issues, the DMP survey contains a set of regular questions asking about recent developments and expectations for sales, prices, employment, wages, unit costs, and investment. Since the survey began in 2016, it has included questions about sales, own-prices, employment, and investment. Questions on wages were briefly included in 2017 and have featured in every wave since May 2022, while questions on unit costs have appeared in some periods but not all.

The DMP has three key advantages relative to other business surveys. First, it focuses on questions that ask firms to provide precise numerical values rather than just asking if they expect economic conditions to improve or worsen, which can offer valuable insights during significant economic shocks such as the Covid-19 pandemic. The quantitative nature of the DMP data, combined with the panel structure of repeatedly surveying the same firms, makes the DMP particularly useful for research and policy analysis.

Second, the DMP survey asks firms about the distribution of their expectations, not just the single most likely outcome. Prior to the launch of the DMP survey, there was relatively little, if any, direct quantitative information about the distribution of expectations of decision makers in individual UK businesses. Businesses are unlikely to be able to predict the future with complete certainty and are usually less accurate when uncertainty is higher at the point the prediction was made. This highlights the value of asking about a range of possible outcomes rather than just the single most

²To see the MPC publications that reference the DMP, please visit: www.decisionmakerpanel.co.uk/references-in-other-publications/

likely outcome, as it facilitates the construction of the distribution of expectations and the estimation of a point forecast from that distribution as well as measures of businesses' uncertainty.

Third, the DMP survey provides very timely data. Its monthly frequency provides a regular flow of data, with aggregated data published within ten days of the survey closing and made available to policymakers before that. Aggregate data tables are published on the first Thursday of each month on the Bank of England website (see www.bankofengland.co.uk/decision-maker-panel/2024/august-2024 for a recent example) and are also uploaded onto the standalone DMP website (see www.decisionmakerpanel.co.uk/data).

This paper demonstrates that the survey is representative and that the data are of high quality, closely matching official statistics and company accounts. Additionally, at the firm level, there is a strong correlation between firms' expectations and their subsequent realised outcomes, illustrating how the expectations data collected in the DMP are informative.

Anonymised DMP microdata are available to researchers via the Office for National Statistics' Secure Research Service. Further information on how to apply for access to the DMP microdata is available on the DMP website: www.decisionmakerpanel.co.uk. The website also contains a comprehensive list of publications using DMP data, links to media citations and further background information on the survey.

The structure of this paper is as follows. Section 2 describes the survey design and methodology in more detail. Section 3 provides information on the characteristics of the survey respondents, Section 4 analyses the response rates, and Section 5 explains how the survey data are cleaned and weighted. Section 6 evaluates the quality of the survey responses by assessing the accuracy of forecasts made by panel respondents and validating aggregated DMP data against other external sources. Section 7 sets out what DMP data are publicly available and provides more detail on how to access the anonymised data for research. Finally, Section 8 concludes. The paper uses DMP data up to June 2024.

2 Survey Design and Methodology

The DMP's design and methodology have allowed the survey to become a rich and valuable source of information, providing insights into recent developments and expectations for the year ahead in sales, prices, wages, employment, and investment. The DMP survey has three key advantages relative to other business surveys: it collects quantitative data, asks about the distribution of firms' expectations rather than just the single most likely outcome, and offers timely insights making it an essential tool for policymakers during periods of high volatility.

The sampling frame for the DMP consists of active UK businesses with ten or more employees, as listed in the Bureau van Dijk FAME database, and includes third-sector and private-sector organisations of various sizes and industries. Prior to the June 2024 update, the DMP survey sampling frame contained approximately 73,000 firms and had expanded multiple times (see Figure 2) to provide a larger pool of firms for recruitment and support a steady flow of data.³ Firms are randomly selected from this sampling frame and are invited by telephone to join the panel by a recruitment team based at the University of Nottingham. This approach helps to ensure that the survey provides a representative view of the UK economy.

When the DMP recruitment team initially contacts firms, they request to speak with the Chief Financial Officer (CFO) and, if unavailable, the CEO. Consequently, an average of 79% of respondents hold these senior positions (66% are CFOs and 13% are CEOs), with the remainder primarily senior finance managers (see Panel A Figure 3 for more details on this). Given that the median firm in the survey employs about 75 people, these CEOs and CFOs will generally have a very good understanding of the overall direction and performance of the business.

New recruits to the DMP are initially assigned to an introductory survey focus-

³The sampling frame originally included only firms that reported having 10 or more employees, had published financial accounts in at least one of the last three years, and had an available phone number. Firms were required to have a registered address in England, Scotland, Wales, or Northern Ireland, not be subsidiaries of another UK company and have a set of basic accounting data. Initially, firms in agriculture, mining & quarrying, finance & insurance, and public administration & defence were excluded, but these were added (apart from public administration & defence) as part of the 2018 sample frame expansion. Over time, the sampling frame has continued to grow as the phone number restriction was relaxed and several firms crossed thresholds either through increased employee numbers, change of ownership or by publishing financial accounts, while newly incorporated firms also meeting the criteria were added.

ing on the characteristics of their business (panel N). Panel N collects information on recent sales and employment, whether they are consumer-facing and measures of exposure to the EU. After completing Panel N, recruits are then randomly assigned to cohorts who receive a monthly email with a link to one of three sub-panels (A-C) containing one-third of the questions.⁴ Panel A focuses on sales and prices, Panel B contains labour market questions on employment and wages, and Panel C covers capital expenditure. Within a given quarter the cohorts rotate through all three sub-panels receiving all survey questions. The DMP's unique rotating three-panel structure helps to keep the survey short for respondents, aiding firm retention and yielding a regular representative monthly data flow. Specialist survey software is used to set up and distribute the online surveys. Since 2020 the survey has been run using Qualtrics, but earlier survey waves used Key Survey.

Four retention strategies are used to try and help prevent firms from dropping out of the survey once they have joined, which helps create a longer panel time series and increases the reliability and accuracy of the results. First, firms that have not responded to the survey for three consecutive months are re-contacted by telephone to check whether they received the emails or have other reasons for not completing the survey. Second, firms that have failed to respond to the introductory survey are also contacted to check whether they received the invitation email and to resolve any issues they may have had when responding to the survey. Third, firms that started to complete the survey but did not submit it are contacted to gain feedback on why this was the case and resolve any challenges they may have faced when answering the questions. Fourth, firms that reply to DMP emails with an automated bounce-back message, implying the email has not been delivered or suggesting a contact may have left the company, are also re-contacted (via telephone) to allow them to explain the cause and provide an updated email address if available.

Firms are also sent a monthly summary of the latest aggregate survey data to incentivise them to remain on the panel. This summary includes references to recent Bank publications (e.g. the Monetary Policy Report, speeches by MPC members, and MPC meeting minutes) and places in the media where DMP work has been cited.

To submit the DMP survey, firms must respond to all questions, of which there

⁴The linear response regressions in Table 1 show the random nature of these cohorts as they demonstrate that there is no discernible distinction between the characteristics of the cohorts.

are two types:

(A) Regular Questions on Subjective Expectations: Respondents are asked on a rotating basis about their past year and one-year-ahead expectations for sales, employment, investment, prices, unit costs and wages.^{5,6} Following the methodology outlined by [Altig et al. \(2022\)](#), the DMP survey asks firms to estimate growth in these areas over the next year under five distinct scenarios (lowest, low, medium, high, and highest). As illustrated in Panel A of Figure A1, the scenarios are not pre-defined, so firms estimate the growth for each scenario themselves and then assign a probability to each scenario (see Panel B of Figure A1). The ‘lowest’ and the ‘highest’ scenarios would be the lowest or highest growth rates that firms think might be realistically possible. The ‘middle’ scenario would be the business-as-usual scenario, with the ‘low’ and ‘high’ scenarios between the business-as-usual and extreme scenarios. Probabilities often vary between scenarios as firms may have different views about the likelihood of different outcomes occurring. However, these probabilities are required to add up to 100 before the respondent is able to move on to the next question. By asking firms about their expectations in this way, rather than requesting a single number, firms provide feedback on the range of anticipated possibilities and reveal their confidence in the plausibility of those outcomes. After three months, having moved through the three sub-panels (A-C), DMP members receive the same regular questions again, referring to a different time period.⁷ As a result, subjective expectations and uncertainty can be generated for each of these variables. The recurring nature of these DMP questions also helps to unlock insights

⁵The DMP has included the sales, prices, employment, and investment questions in all survey waves from the beginning (August 2016). However, questions about wages were only fully incorporated into the survey in May 2022, though they were briefly featured in 2017, while questions regarding unit costs, asked in the same manner, have only appeared in some periods.

⁶The DMP asks for data on sales, prices, unit costs and wages in terms of growth rates but collects data on investment and employment in levels. [Davis et al. \(1996\)](#) (DHS) growth rates are then calculated for investment and employment. These DHS growth rates are symmetric growth rates designed to address biases in the traditional growth indicator. Unlike the typical growth measure that scales by the initial level (x_t), the DHS growth rate scales by the average, calculated as $\frac{1}{2}(x_t + x_{t+1})$, which bounds the growth rate between -200% and 200%. It also allows for growth rates to be calculated if a variable is zero in a given period, which can sometimes be the case for firm investment. This method ensures consistent measurement across firms of different sizes, providing a balanced and fair metric for assessing changes in employment and investment.

⁷Questions about prices, employment and wages refer to the current period, 12 months ago, and 12 months from now, whereas questions about sales and capital expenditure pertain to the previous calendar quarter and the corresponding quarter a year ago and a year from now.

into how expectations and uncertainty adjust to changing economic conditions over time.

(B) Special Topics: Firms are also asked a set of special questions on a rotating basis. Some special questions remain in the survey for a short time, e.g., a three-month cycle, while others stay in the survey for longer, which allows firms' views to be tracked as events affecting the UK economy evolve. Therefore, the special questions are naturally very topical and adapt to the immediate informational needs of Bank policymakers, providing them with up-to-date insights into how firms are affected by the current economic environment while delivering novel insights for academic research more widely. Throughout its history, the DMP has featured special questions covering a diverse set of topics. These include questions on major economic events such as Brexit and Covid, but there have also been questions on many other topics too, such as how firms set prices, the effects of tax changes, the impact of higher interest rates, the effects of climate change and profit margins. Figure A2 shows one of the longest-standing special questions, asking firms whether Brexit presented a source of uncertainty for their business. This was first asked in August 2016 and periodically featured in the survey until May 2024. Figure A3, on the other hand, shows an example of a short-term question the DMP introduced in November 2021 to help policymakers understand the impact the Covid-19 pandemic had on firms' operating conditions.

At the end of each survey, there is a comment box where panel members can provide any additional information that may help clarify their responses. Ferrario and Stantcheva (2022) note that by allowing respondents to elaborate on their responses through free-text answers, they can express their primary concerns on policy issues without being constrained by predefined answer choices, providing policymakers with further valuable insights into the economy and ensuring that important issues are not overlooked. Figure 4 demonstrates that over the sample period, Brexit has been a key consideration when firms respond to the DMP survey. The dominance of Brexit as a topic reflects not only in the use of the term 'Brexit' itself, but also in the frequent use of the closely related term 'EU'. 'Coronavirus' also proves a prominent focus for firms. Firms comment equally on issues that the regular questions concern,

which includes referencing ‘cost’, ‘sale’, ‘price’, ‘work’, ‘staff’, and ‘capital’ in their free response answer. These terms that firms mention when responding to the DMP feature consistently over time, as [Yotzov et al. \(2021\)](#) shows.

Sometimes free text questions about specific issues are also asked. For example, the DMP has asked firms about the factors that will impact their own-price and CPI inflation expectations in the short term, which helped reveal the most important supply and demand-side factors driving these expectation shifts at the firm level ([Thwaites et al., 2022](#)). Other similar questions have been asked on wages and the effects of higher interest rates.

A full list of all survey questions that have been asked is available on the DMP website.⁸ All responses to the DMP survey are treated as confidential. This means they are held securely, aggregated before being published, and anonymised before being made available to researchers.⁹

3 Characteristics of Survey Respondents

The DMP currently covers around 4% of total UK private sector employment, which rises to about 6% for employees in private sector businesses that have more than 10 employees (See [Figure 5](#)). That makes it one of the largest monthly business surveys in the UK.

The DMP survey covers all industrial sectors of the UK economy and all regions, including Northern Ireland. It also covers large, medium-sized and small businesses; only firms with less than ten employees are not covered. As well as private businesses, the survey also includes charities and other not-for-profit organisations (this group accounts for 8% of all survey responses). The broad coverage allows the sample to be split in several different ways for analysis. The DMP also weights by industry and firm size to ensure that it matches the UK Interdepartmental Business Register, a comprehensive list of UK businesses broken down by geography, industry, legal status and employment size band (see [Section 5.2](#) for details).

Even on an unweighted basis, the DMP survey matches the industrial composition of the UK economy well. Comparing the DMP to the Business Register, Panel

⁸See www.decisionmakerpanel.co.uk/wp-content/uploads/2024/10/DMP-list-of-questions.pdf

⁹For more information, please see the DMP privacy policy: www.decisionmakerpanel.co.uk/wp-content/uploads/2021/02/Decision-Maker-Panel-Privacy-Notice-Jan-21.pdf

A of Figure 6 shows that while the DMP sample slightly overrepresents the share of employment in the finance & insurance and professional & scientific sectors, overall coverage of industry employment shares is close to that implied by official data sources. On average, the wholesale & retail sector has accounted for the largest share of employment in the DMP, and manufacturing the largest share of firms (see Panel B of Figure 6). Weighting the survey data helps to correct for any of the differences identified between the DMP and the Business Register.

By region, Figure 8 shows that the DMP survey generally aligns well with the regional distribution of firms across the UK, but there is a small overrepresentation of London in both firm and employment shares (see Figure 9). The DMP allocates firms to regions using the location of their headquarters. The high concentration of firm headquarters in the London area can plausibly explain London's overrepresentation, but firms' operational activities are likely spread more evenly across other parts of the country.

By firm size, Figure 10 shows that the DMP sample contains a more significant share of large firms than the Business Register. This is primarily because smaller firms are less likely to meet the DMP sampling frame criteria, since, for example, they typically lack the necessary basic accounting data, although larger firms are also slightly more likely to respond conditional on being in the sample frame. A significant share of large firms in the sample benefits the DMP survey as it captures many of the influential companies shaping UK economic outcomes. The survey still includes a good number of small firms with 10 to 49 employees, and by matching to the Business Register by industry and firm size in the weighting process, the DMP data can still provide a representative view.

Table 2's sample statistics provide a comprehensive overview of the characteristics of firms responding to the DMP. From 2017 to 2023, the median number of employees for these firms was 76, while the mean employment was 525. The higher mean values relative to the median can be explained by the presence of some very large UK companies in the sample. Panel A of Figure 11 demonstrates that the size of the average firm in the DMP survey has fallen modestly over time, reflecting the increased recruitment of smaller firms into the DMP with the sample frame expansions, which typically included a greater proportion of smaller firms than the original frame. The

median firm age of responding firms was 19 years, with a mean firm age of 25 years, as detailed in Table 2. Average firm age has remained relatively stable annually, as depicted in Panel B of Figure 11. Publicly listed firms constitute 2% of the firms responding to the DMP, on average.

4 Response Rates

4.1 Trends in Response Rates

The DMP is a voluntary survey and there is no statutory requirement for firms to participate. Figure 1 plots the number of responses in each month since the survey started. Following the DMP's launch in August 2016, the survey steadily expanded as more firms were recruited into the panel, eventually reaching a peak of 3,200 responses in May 2021. Since 2022, the survey has received an average of around 2,500 responses each month, although this has fallen slightly to around 2,300 in 2024. Around 220,000 surveys have been completed since the survey began.

To help better understand the trends in response patterns, the changes in response rates can be broken down into new firms who joined the survey for the first time and changes in response rates for existing panel members. Figure 12 shows that since the DMP's inception, around 150 new firms have joined the survey on average each month. The number of new firms joining the DMP was higher in the earlier years of the DMP, but since 2022, around 100 new firms a month have been added as more resources on the recruitment team have been put into retaining existing panel members. Retention of existing panel members is as important for maintaining the DMP's sample size and panel structure as recruitment of new firms.

Figure 13 shows the DMP's overall response rate and the active response rate, defined as the response rate for firms that have responded to at least one survey within the previous 12 months. As the number of firms who have agreed to be part of the DMP has increased, the response rate has gradually declined, although this has begun to level off at just over 20%. Since at least 2018, the active response rate has been more stable at around 50-55%.

Response rates across the three sub-panels (A, B, and C) of the survey have followed similar trends and broadly track each other, showing a decline over time as the

survey has grown and settling at around 20% (see Figure 14). The response rate for the introductory panel (Panel N) is higher but also more volatile, given the smaller number of firms who receive this survey.

Figure 15 Panel A shows that DMP response rates decline with survey tenure before stabilising at a response rate of 20-25% after approximately 40 surveys. Panel B of Figure 15 shows a similar trend across survey cohorts based on the year the firm joined the panel. Firms that joined the DMP in 2016-17 and continue to participate exhibit a greater propensity to respond each month, as their higher overall response rate indicates.

Figure 16 provides information on the length of time each firm typically spends in the panel. Panel A shows that there are some firms that only stay in the panel for relatively short periods of time but that there are others who have responded to a large number of surveys. Around 1000 firms have responded to at least 50 DMP surveys, and 3000 firms have responded to at least 25 surveys. Figure 16 Panel B demonstrates the mean number of surveys completed by responding firms has continued to rise over time, reaching 34 by the middle of 2024. The large number of firms who repeatedly respond to the survey have contributed to the high-quality panel element of the DMP survey data.

4.2 Response Rates by Firm Type

As well as looking at trends in response rates it is also important to look at the characteristics of firms who respond to the survey and whether certain types of firms are more or less likely to respond. As well as considering factors such as size and age, it is also important to consider whether firms' exposure to large shocks such as Brexit or Covid-19 impacts their response rates.

The linear response regressions in Table 3 show how larger firms, older firms and more productive firms are more likely to respond to the DMP survey, conditional on being in the sampling frame. However, the magnitudes of these coefficients are not particularly large. For example, the coefficient in column 6 of Table 3 implies that, holding all other firm characteristics constant, if one firm is 10% larger than another it has a 0.001 percentage point higher probability of ever having responded to the survey. Overall, Figure 17 shows that the response rates by firm size broadly track each other, which implies that any bias relating to firm size is minimal and can be

corrected by weighting the survey data.

There is no clear evidence of a correlation between firms' exposure to Brexit and their propensity to respond to the DMP survey. The linear response regressions in Tables 3 and 4 demonstrate that survey response rates across years and overall have been independent of the share of people voting for Brexit in the EU referendum in the local authority where a firm is headquartered. Panel A of Figure 18 confirms this lack of correlation; the scatter plot reveals no discernible pattern between response rates and local Brexit vote share. Taking an alternative approach, Panel B of Figure 18 shows that 24% of panel members had a positive personal view of Brexit during the referendum. This closely aligns with data from the British Election Survey (BES), where 23% of respondents with CFO characteristics (managers with a degree and income over £50,000 a year) reported that they had voted for Brexit (see Bloom et al. (2019) for more details). Therefore, CFOs responding to the DMP survey appear to share similar views on Brexit with the wider population of CFOs who were less in favour of the UK leaving the EU than the country as a whole, where 52% voted to leave the EU.

Turning to the Covid-19 pandemic, the regressions in Table 5 confirm that changes in response rates were not larger in sectors more heavily impacted by the pandemic. While many UK surveys observed significant falls in response rates due to the Covid-19 pandemic, Figure 1 shows that the DMP response rate remained relatively stable, with only modest and short-lived falls in response rates occurring around the times that the UK government introduced lockdown restrictions (March 2020, September 2020, and January 2021). The DMP's consistent response rate throughout this period most likely stems from its online format, which plausibly allowed firms to continue participating in the survey despite the pandemic's challenges.

Crucially, the DMP survey's consistent response rates and absence of response bias make it a rich and balanced data source, offering novel insights into how businesses were affected by and responded to Brexit and the Covid-19 pandemic.

4.3 Survey Completion Patterns

Firms are given a 15-day window to complete the DMP survey, with the survey typically sent out on the first Friday of the month and reminder emails sent on the following two Thursdays (days 7 and 14). Date and time stamps are collected at the

point each firm submits their completed survey. Figure 19 shows that, on average, nearly a quarter of responses are collected on the first day of the survey window, with a further 16% and 14% being collected on day 7 and day 14, respectively, following the distribution of reminder emails. Although reminder emails are beneficial in prompting a higher number of responses per firm, they are restricted to two per month in order to limit email traffic for panel members.

Firms complete the DMP survey at various points throughout the day, but a majority of responses are submitted during regular working hours, with late morning and early afternoon being the most common times to complete a survey. Figure 20 shows that, on average, firms predominantly complete the survey after 9 am and before 1 pm; these times account for approximately 50% of all survey responses. 10 to 11 am emerges as the most favoured hour for responses, which typically coincides with the survey's release or the distribution of reminder emails to participating firms. Between 1 pm and 4 pm, there is a consistent and gradual accumulation of DMP survey completions, accounting for around 9% of responses per hour on average. Subsequently, survey response rates gradually diminish from 5 pm onwards.

The median DMP survey takes around 7 and a half minutes to complete from first being opened to being submitted. There has been some variation in this over time with changes in the survey's questions, but only by around a minute in either direction. Figure 21's Panel A illustrates median survey completion rates over time. Around two-thirds of surveys are completed within 10 minutes, with a long tail for the remaining survey durations as, for example, some respondents open the survey and then come back to it later to complete. Across DMP survey panels A, B, and C, firms answering panel A questions (focused on sales and prices) usually take slightly longer to complete the DMP survey than those answering panels B and C (see Figure 21 Panel B).

5 Data Cleaning and Weighting

5.1 Data Cleaning

The DMP has several checks and strategies in place to remove outliers and implausible responses, ensuring that the survey responses used for analysis are of high

quality.

Outliers: When dealing with sales, price, employment, cost, and wage growth data, extreme values are classified as outliers and are recoded as missing. For sales growth, data points outside the $\pm 100\%$ window are dropped, leading to around 2.0% of responses being classified as outliers for realised sales growth and approximately 4.6% for expected sales growth (see Table 6). This is often due to firms reporting their level of sales rather than the growth rates when answering this question. Observations beyond the lower outlier classification threshold of $\pm 50\%$ are dropped for price, employment, cost and wage growth. Table 6 shows that this $\pm 50\%$ classification window results in less than 1% of responses being classified as outliers for price, cost, and wage growth, while for employment, approximately 1.4% of responses are classified as outliers for realised growth, rising to around 2.7% for expected growth.

Capital expenditure growth data are treated differently because investment is often volatile at the firm level. Firms recording zero investment in either of the two periods are not used to calculate capital expenditure growth and are classified as outliers and excluded from the calculation of aggregate statistics although they remain in the dataset for research analysis. Table 6 shows that this criterion leads to around 14% of observations being excluded from the calculation of aggregated investment data, on average.

100% weight on one scenario: In the regular expectations questions, where respondents assign 100% weight to a single growth scenario the corresponding expectations are recoded as missing. The third column in Table 6 shows the percentage of observations removed due to this 100% weighting for the sales, price, employment, cost, wage, and capital expenditure variables. 100% weight on one growth scenario is most common for expected price, capital expenditure, cost, and wage growth, typically affecting between 2% and 4% of observations.

Probabilities not summing to 100%: Probabilities within the expected growth probability distribution for the regular expectations questions must sum to 100%. If they do not, it indicates an error and the relevant expectations data are recoded as missing. However, Table 6 shows that the issue is minimal, affecting only around 0.06% of capital expenditure responses and approximately 0.002% of price responses, making these the most and least impacted variables. Where probabilities do not add

up to 100%, respondents are prompted to correct this within the survey software before moving on to the next question.

Low employment: The DMP was designed to capture firms with ten or more employees, but over time, some firms may drop below this threshold. When a firm becomes very small, with fewer than three employees, it may no longer accurately represent the DMP's target population. Therefore, firms classified as having low employment, defined as fewer than three employees, are dropped from the sample. This has resulted in an average of 0.5% of observations being excluded over the full sample period.

5.2 Weighting

As shown in section 3, the DMP provides strong coverage across different industries, firm sizes, and regions in the UK. However, when analysing the survey results each month, responses are weighted so that the sample becomes more representative of the business population of the United Kingdom using data from the Business Register. To construct the weights, respondents are divided by industry (14 industries¹⁰) and firm size (two size categories¹¹) into the 28 groups used in creating the sample. The weight of each company within a given month-panel is calculated by dividing the total employment share for that industry and firm size within the business population by the number of DMP respondents in that category. So, for example, if a given industry and size group accounts for 10% of employment on the Business Register and the survey had 10 respondents in that group, each firm would get a weight of 1%. This methodology allows the results to be representative but also caps the weight of very large individual companies and prevents them from dominating the overall results. Figure 22 shows that selected key series are not particularly sensitive to this weighting assumption, and the differences between the weighted and unweighted series are not significantly different. This reflects the fact the DMP data are broadly representative of the wider business population even on an unweighted basis.

¹⁰The 14 industries are manufacturing, other production, construction, wholesale & retail, transport & storage, accommodation & food, finance & insurance, real estate, professional & scientific, administration & support, health, recreational services, and other services.

¹¹Firms are classified into the following two size categories: (i) firms with 10-249 employees and (ii) firms with 250+ employees.

6 Evaluation of Data Quality

A number of different approaches can be taken to assess different aspects of the DMP data quality. This can involve both internal and external checks. Internally, it is possible to assess how predictions for variables such as sales, employment, price and investment growth align with realised outcomes one year later, leveraging the panel nature of the DMP. Externally, DMP data can be benchmarked against other data sources, such as company accounts or ONS national accounts data.

6.1 Assessing Firms' Forecast Accuracy

In the DMP survey, panel members are asked to define expected growth under five scenarios over the coming year. They then assign probabilities to each scenario, allowing both a mean growth rate and standard deviation around that to be calculated. Figure 22 shows the evolution of the mean values for sales, price, employment and investment growth over time. Figure 23 shows the average standard deviations, which we also refer to as a measure of subjective uncertainty. It highlights a particularly pronounced increase in uncertainty during the Covid-19 pandemic, for example (see Altig et al. (2020) for a more detailed discussion of this). Asking firms to provide these probabilities also serves as a mechanism for evaluating the plausibility of their responses. Figure 24 demonstrates that the average probability distribution does not exhibit a significant skew, the highest probability tends to be attached to the middle scenario and the lowest probability to the tail scenarios.

Firm-level forecast accuracy: Figure 25 demonstrates that firms make reasonably accurate predictions in the cross-section, with a strong correlation between expected growth rates and subsequent outturns a year later for sales, employment, prices, and capital expenditure growth. The accuracy of these predictions underscores the value of the DMP.

However, firms cannot always accurately predict the future and sometimes they make forecast errors. As shown in Figure 25, firms' forecasts are typically less accurate if they were more uncertain and had a higher standard deviation around their mean forecast at the point it was made. This highlights the value of asking about the distribution of expectations and not just for a point estimate, and it reflects the deep understanding firms possess about their businesses and the careful considera-

tion they give to the answers provided when completing the DMP survey.

Aggregate forecast accuracy: As well as assessing the accuracy of expectations data at the firm level, it is also possible to examine the accuracy of predictions on average across firms using aggregated data. Sales, prices, employment and investment growth data are aggregated and depicted in Figure 26. The solid blue lines show growth over the past year, and the solid orange lines represent expectations for same period from a year earlier. Figure 26 shows that the DMP data generally forecasts future growth rates quite accurately. However, forecasts have, perhaps unsurprisingly, been less accurate in periods when the economy has faced large unanticipated shocks, such as during the Covid-19 pandemic and, for prices, following the Russian invasion of Ukraine. But expectations for variables such as sales, employment and investment were more accurate during the recovery from the pandemic.

Overall, the relative accuracy of the DMP data has helped to make it a key source of information for policymakers at the Bank of England.

6.2 Survey Learning Effects

Another potential source of bias is that repeated engagement with the DMP survey has the potential to impact future responses, as found by [Kim and Binder \(2023\)](#) in the context of household inflation expectations. To test for ‘learning-through-survey’ effects in the DMP, we use the same model specification found in [Yotzov et al. \(2023\)](#):

$$\ln Uncert_{itj} = \alpha_i + \beta_t + \sum_{j=0}^{48} \gamma_j + \varepsilon_{itj} \quad (1)$$

The natural logarithm of the subjective uncertainty measures appear on the left-hand side. The main explanatory variables are the dummies, γ_j , which capture ‘survey tenure’ in the DMP by counting how many times a firm has answered any five-bin distribution question.¹² The regressions also include firm fixed effects, α_i , and month fixed effects, β_t , with standard errors, ε_{it} , clustered at the firm level.

Figure 27 plots the coefficients from Equation 1 for sales, price, employment and

¹²Due to the DMP’s rotating panel structure, firms are not asked about their expected sales growth, price growth, employment growth, or investment growth every month. However, since five-bin distribution questions are included in every survey panel, these months are included in the estimation of the ‘learning-through-survey’ effects. Subjective uncertainty measures are winsorized at the 5th and 95th percentiles. To reduce noise from small samples in the right tail, survey tenure is top-coded at 48 months, with about 7% of the sample consisting of firms answering more than 48 surveys (out of a maximum of 94).

investment uncertainty. There is a downward-sloping relationship between survey tenure and subjective uncertainty for all but investment. This would suggest that some ‘learning-through-survey’ effects may be present in the sample for select variables, although these effects are only statistically significant for employment.

6.3 Attentiveness to Macroeconomic Developments

Drawn from [Yotzov et al. \(2024\)](#), Panel A of Figure 28 shows that panel members’ current CPI inflation perceptions follow actual CPI inflation very closely. This suggests that panel members are well-informed and pay close attention to macroeconomic developments in the UK economy. Moreover, [Yotzov et al. \(2024\)](#) use the data on when each survey was submitted to show that perceptions of CPI inflation update almost immediately after new CPI inflation data are released (see Panel B of Figure 28). This again highlights the attentiveness of panel members to the economic environment in which they operate.

6.4 Cross-Check Against Company Accounts Data

Certain variables tracked by the DMP survey are also reported by firms when filing accounts with Companies House. Company accounts are an independent source of firm level information that companies have to submit annually and which are required to be accurate. However, these data are lower frequency and are also only available with a lag, making them much less timely than the DMP data. But this overlap does provide another cross-check to assess the reliability of the DMP data.

Figures 29 and 30 focus on the comparison between two key variables, sales and employment, that are both collected by the DMP survey and found in company accounts on a comparable basis. DMP data are aggregated from a quarterly to an annual frequency to match the yearly accounts data. The charts show that the DMP’s estimates of employment and sales in levels and growth rates closely match annual firm-level accounts data, highlighting that the DMP delivers reliable data in a timelier way.

6.5 Comparisons to Aggregate Data

Aggregated DMP data can also be compared to various other sources of aggregate information to cross-check their accuracy. The few examples provided below high-

light that the DMP data strongly match other sources across a number of different dimensions.

ONS national accounts: Figure 31 compares aggregated DMP time series for sales, prices, employment and investment growth against official statistics produced by the ONS in order to validate their accuracy. Although there are still some definitional differences, the comparison shows a strong alignment between the DMP aggregate data series and their official ONS counterparts.¹³ The strength of the alignment can also be further enhanced by mean/variance adjusting the DMP data to match the ONS series, which helps to address some of the levels differences (Figure 32). Overall, this strong correlation with official ONS data highlights the data provided by DMP respondents are of high quality and are consistent with the panel being representative of the wider business population.

Furloughed employees: Official HMRC statistics measuring the percentage of private-sector employees on full-time furlough during the Covid-19 pandemic is another series where directly comparable data were collected in the DMP. This provides another useful benchmark for evaluating the quality of the DMP data. Figure 33 demonstrates that the DMP's furlough figures very closely followed the official statistics throughout the pandemic. This helps validate that those firms responding to the DMP during the pandemic were likely providing a representative view of the impacts of the Covid-19 pandemic on firms across the UK.

EU exposure: A final check of the DMP's data quality against official ONS data is on measures of exposure to the EU. This is important if using the survey data to assess the effects of Brexit, which was the initial motivation for originally setting up the DMP. Figure 34 makes a comparison across three different metrics immediately prior to the referendum: the percentage of sales to the EU, the percentage of costs from EU imports, and the percentage of EU migrants in the UK workforce.¹⁴ The DMP data align closely with ONS figures, especially for EU sales and the importance

¹³DMP sales data (for the private sector) are compared to whole economy nominal ONS total final expenditure from the National Accounts (ABMF, equivalent to GDP plus the value of imports). DMP price data for the whole private sector are compared to ONS CPI inflation (D7G7), which only includes consumer prices. DMP employment (for the private sector) is compared to both ONS private sector employment (MFZ2) and ONS/HMRC data on the number of payrolled employees. DMP capital expenditure data are benchmarked against ONS nominal business investment data (NPEK).

¹⁴ONS data on imports and exports are taken from the Input-Output tables while data on EU migrant workers are from the Labour Force Survey.

of EU migrant workers. There is a notable discrepancy in EU import costs for the wholesale and retail industry, where DMP firms report a higher share of costs to be imports. This is likely to be because ONS data only include imports used in the provision of wholesale and retail services, whereas survey respondents probably also included the cost of imported goods that are sold in their shops (or online). Excluding this sector the relationship is much closer, as seen in Figure 34 Panel D. Overall, the DMP data again closely match the ONS data.

7 How to Access DMP Data

The DMP survey data are available across multiple channels in a way that maintains the confidentiality of the data while also ensuring widespread availability for economic research. This section provides information on the DMP data that are available and how to access it. For further details, visit the DMP website.¹⁵

7.1 Aggregated Data

Aggregated DMP data are published on the Bank of England website, usually on the first Thursday of every month.¹⁶ A copy is also made available on the DMP website. Monthly data releases focus on key data series and include information on realised and expected annual sales, prices, employment, wages and cost growth. They also include data from some special questions on topical issues, which in the past have included the effects of Brexit and Covid-19, climate change, as well as data on CPI inflation expectations, interest rate impacts, borrowing rates, and profit margins.

Once a quarter, a more detailed set of quarterly data tables are also published on the Bank of England website alongside the monthly data. This usually coincides with the publication of the quarterly Monetary Policy Report in February, May, August, and November. Quarterly data tables include aggregated data for all survey questions and also industry breakdowns for some key series such as realised and expected annual sales, prices, employment, wages and cost growth. Aggregated data are freely accessible for use with the appropriate citations.

Each month a short press release is published alongside the monthly data high-

¹⁵www.decisionmakerpanel.co.uk/data

¹⁶See www.bankofengland.co.uk/decision-maker-panel/2024/august-2024 for a recent example.

lighting any key developments over the month. Every quarter (March, June, September, and December) the Bank of England also publishes a more detailed blog describing the latest survey results to complement the aggregate data releases and provide more context for the latest results.¹⁷ This is published at the same time as the monetary policy decision alongside the Bank Agents' summary of business conditions.

7.2 Microdata

Accredited researchers can also access anonymised DMP microdata via the Office for National Statistics' (ONS) Secure Research Service (SRS).¹⁸ The SRS version of the DMP data is released with approximately a six-month lag and follows the quarterly data cycle. To preserve anonymity, some data have been banded and a small number of variables (those relating to the identity of the company/individual respondent and free text comments) are excluded altogether. A full list of DMP variables available in the SRS are available in the data catalogue.¹⁹

Users interested in accessing the DMP microdata through the SRS will need to become fully accredited researchers before applying for an accredited research project via the ONS website. These SRS project applications, as well as the research outputs and publications, will all require approval from the ONS and the Bank of England via the usual SRS approval process. Work is also being undertaken to match the DMP with other ONS datasets available in the SRS, with the aim of opening up new opportunities for research and adding further value to the DMP data.

Any projects employing DMP microdata must yield significant public good and help the Bank of England fulfil its functions. Projects must also maintain the confidentiality of the data and not significantly overlap with any ongoing or planned future DMP team projects at the point of the research proposal submission.²⁰ DMP microdata are generally only available for non-commercial use by academics, Bank of England economists, UK Government economists, and similar professionals. Finally, note that permission to use the DMP microdata for one project does not automatically

¹⁷For the latest survey results, please visit: www.bankofengland.co.uk/agents-summary/2024/2024-q3/latest-results-from-the-decision-maker-panel-survey-2024-q3

¹⁸The DMP data will also be made available in the future through the Integrated Data Service, which is expected to eventually replace the SRS.

¹⁹See <https://ons.metadata.works/browser/dataset/163401/0/1255641>

²⁰For a comprehensive list of live projects currently utilising DMP microdata, please refer to the following document: www.decisionmakerpanel.co.uk/wp-content/uploads/2024/09/Live-DMP-team-research-projects.pdf

carry over to others. Researchers must submit a new SRS project proposal and obtain approval for any subsequent use of the DMP micro dataset or if there is a significant change in research direction.

8 Conclusion

Established in 2016, the Decision Maker Panel is a comprehensive monthly online panel survey of UK businesses, run by the Bank of England in collaboration with King's College London and the University of Nottingham. The DMP gathers detailed quantitative data from CFOs on business conditions and future expectations, including their distribution and uncertainty. Its timely stream of representative data and flexibility to adapt to new economic issues as they arise has made it a valuable resource for Bank of England policymakers.

This paper has outlined the design and methodology of the DMP, including how businesses are sampled and invited to take part, response rates, data cleaning, and weighting processes. It also describes the characteristics of the survey respondents, assesses the survey's representativeness, and evaluates the quality of the survey data by assessing the prediction accuracy of DMP firms and comparing the data to other external sources. It provides information on accessing the monthly and quarterly aggregated DMP data, as well as the anonymised microdata available through the Office for National Statistics' Secure Research Service. We expect it will prove a useful source of information for future users of the DMP survey data.

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A Figures

Figure 1: Number of responses to the DMP survey by wave

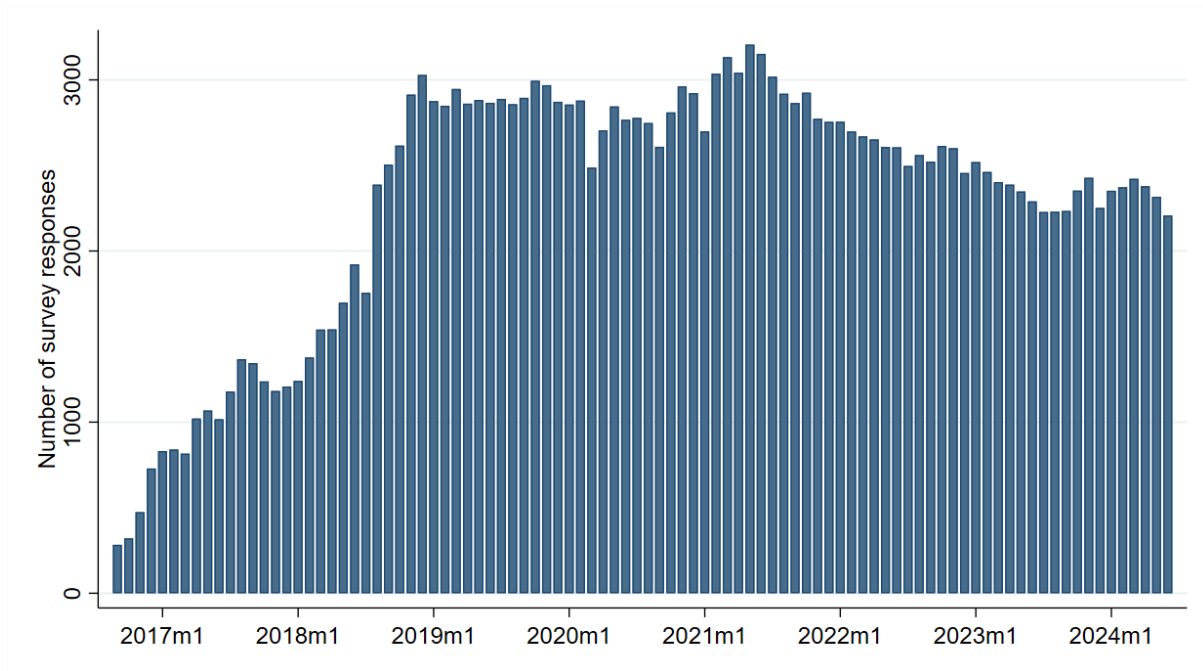


Figure 2: Growth of the DMP sampling frame

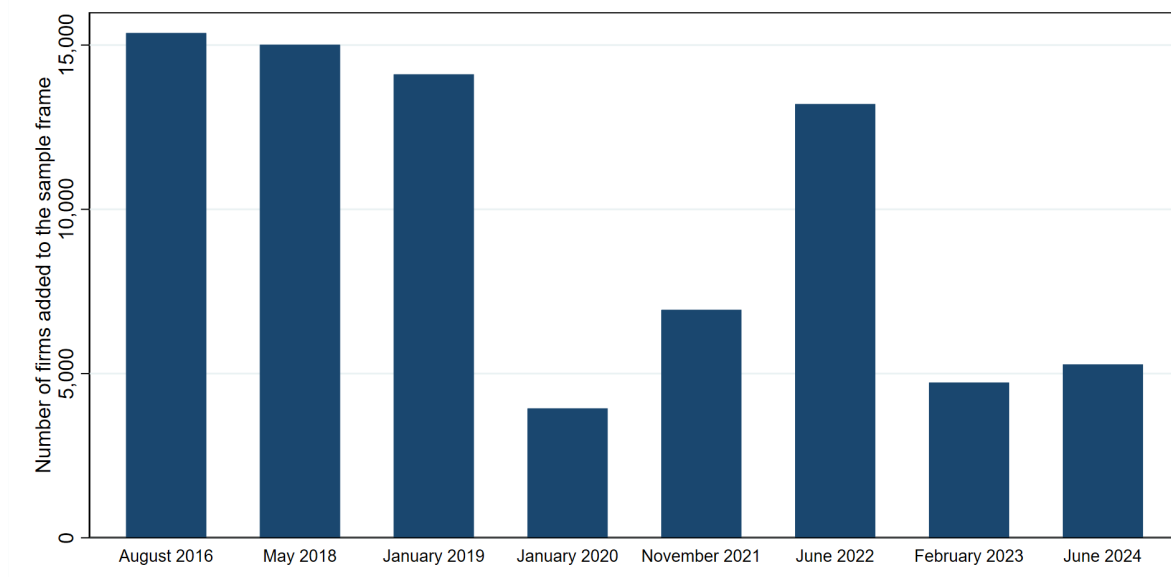


Figure 3: DMP respondents' position within their firm

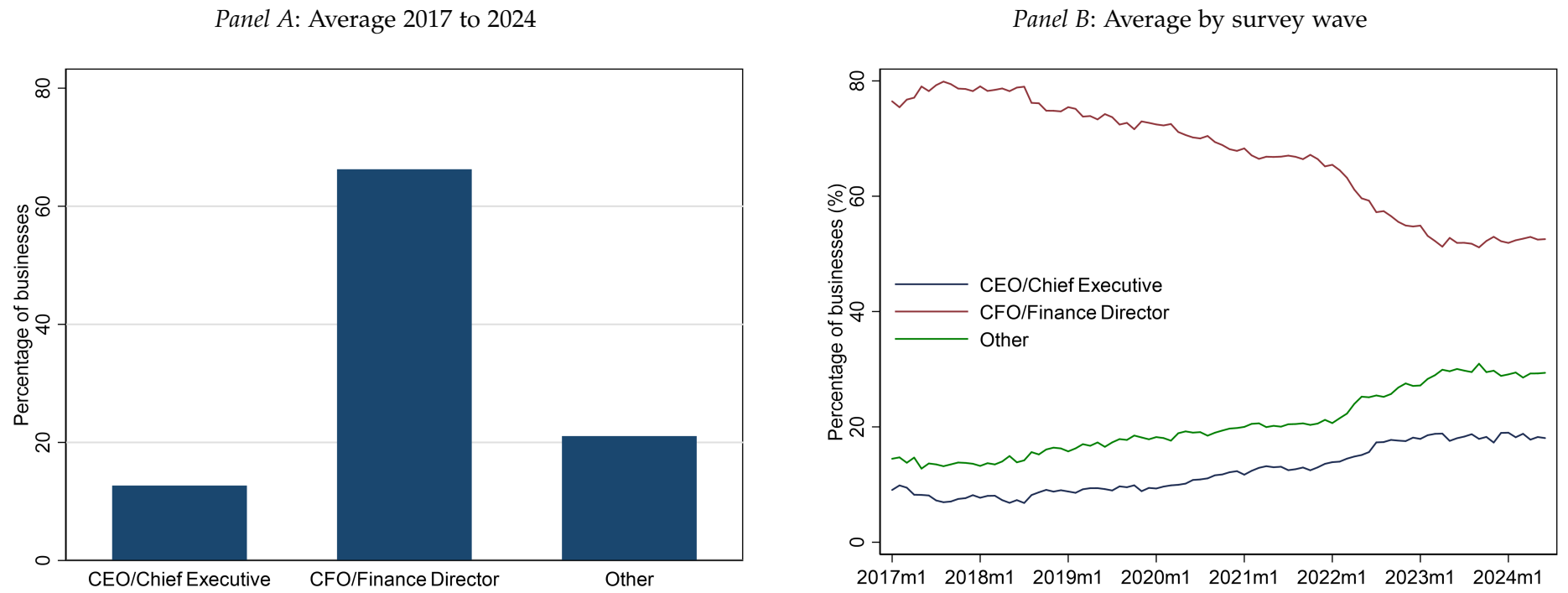
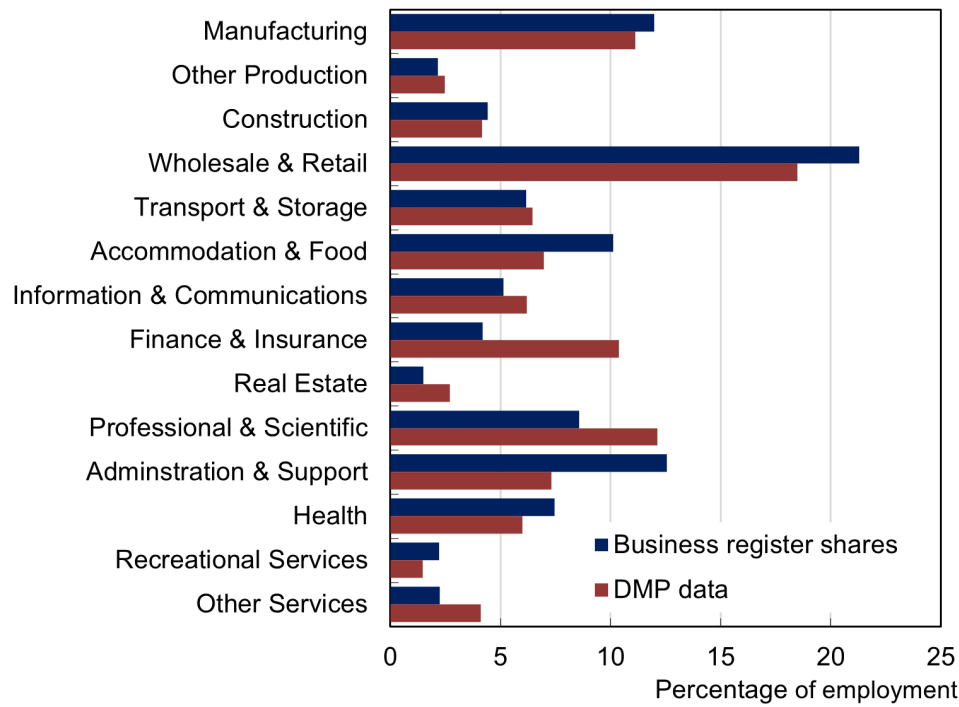
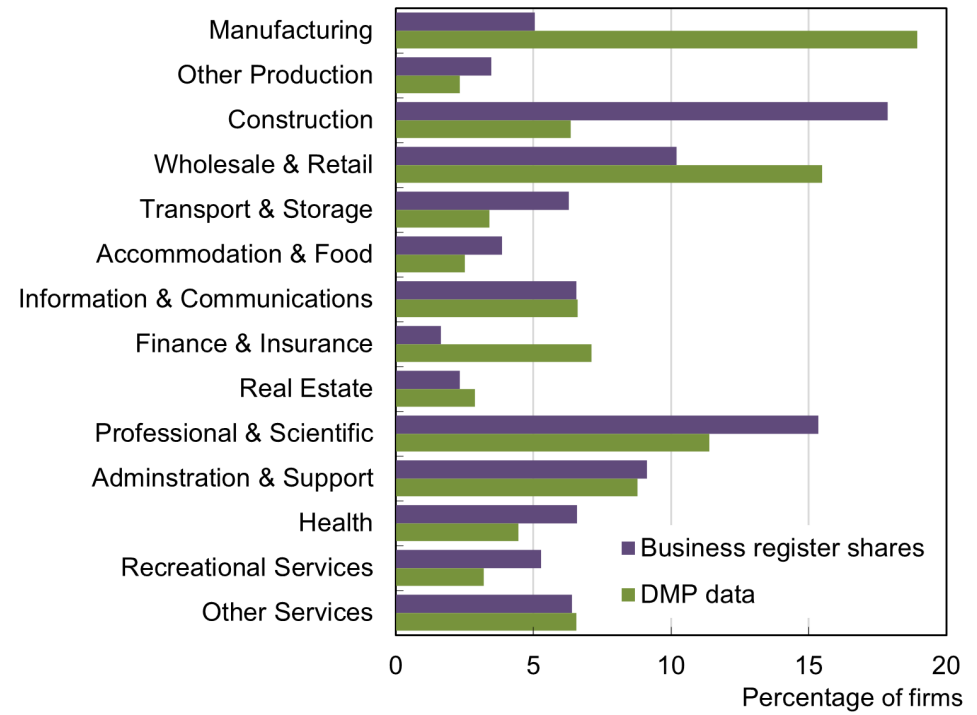


Figure 6: DMP sample by industry (average from 2017 to 2023)

Panel A: Employment share



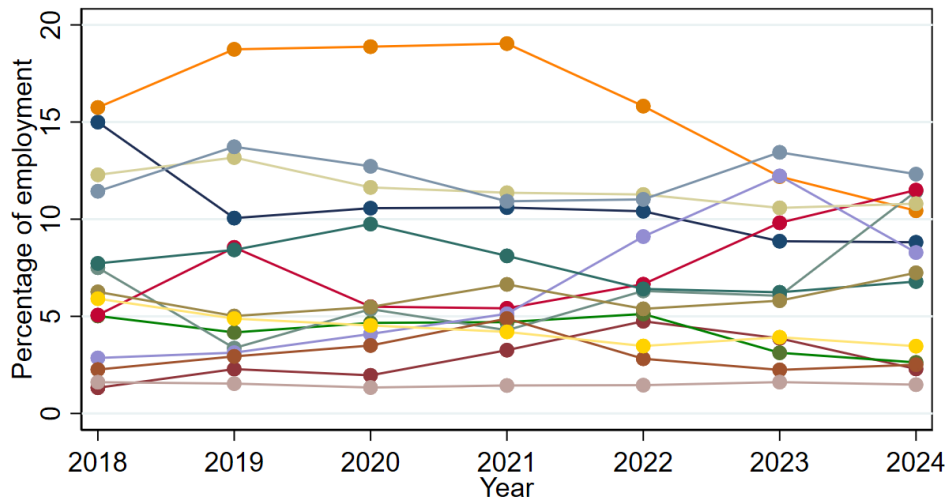
Panel B: Firm share



Notes: Other production includes agriculture; forestry & fishing; mining & quarrying; electricity, gas & air conditioning supply; water supply; and sewerage, waste management & remediation activities.

Figure 7: DMP sample by industry (annual averages)

Panel A: Employment share



Panel B: Firm share

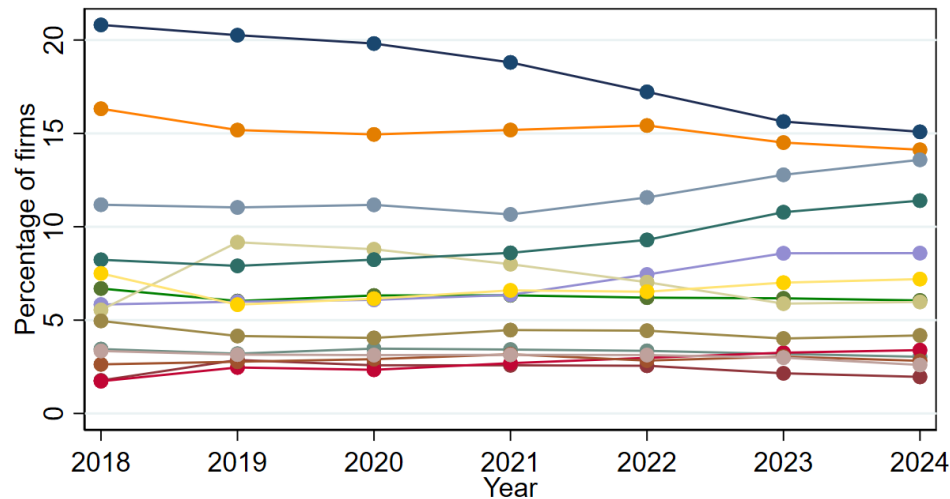
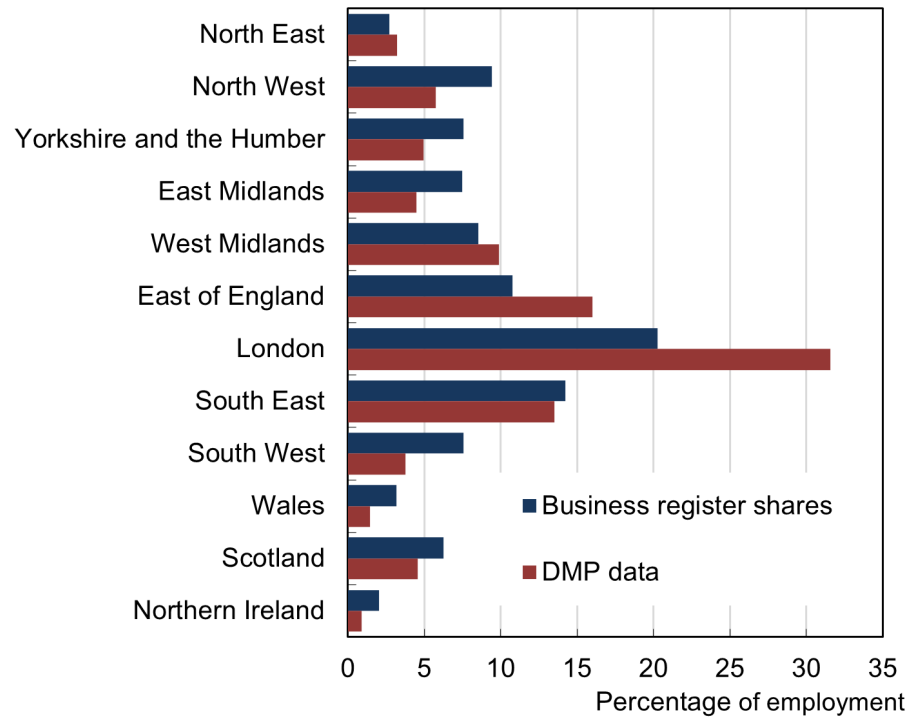


Figure 8: DMP sample by region (average from 2017 to 2023)

Panel A: Employment share



Panel B: Firm share

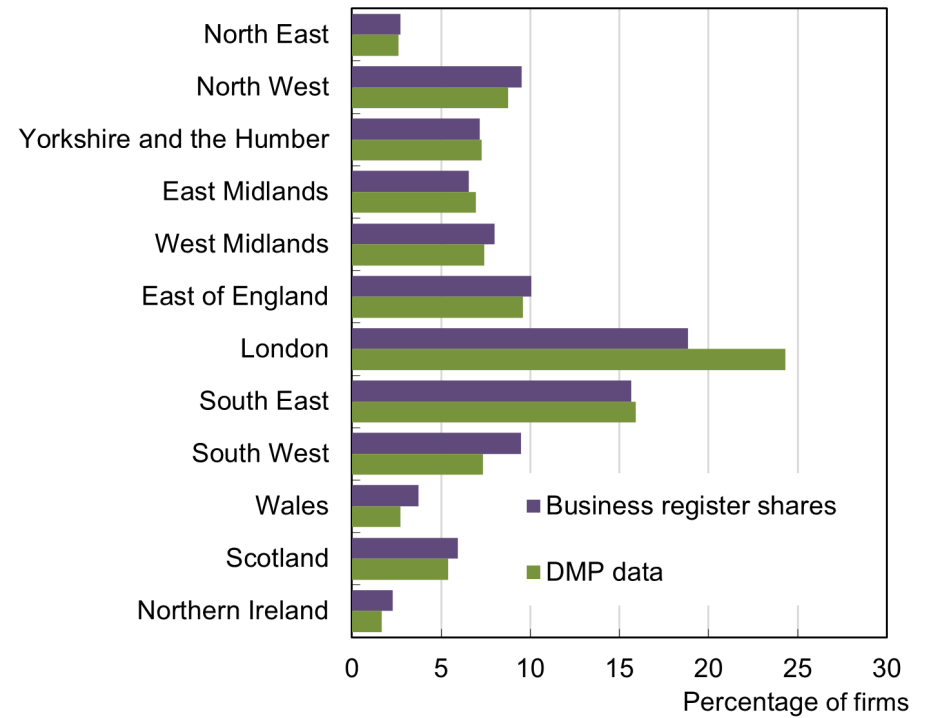
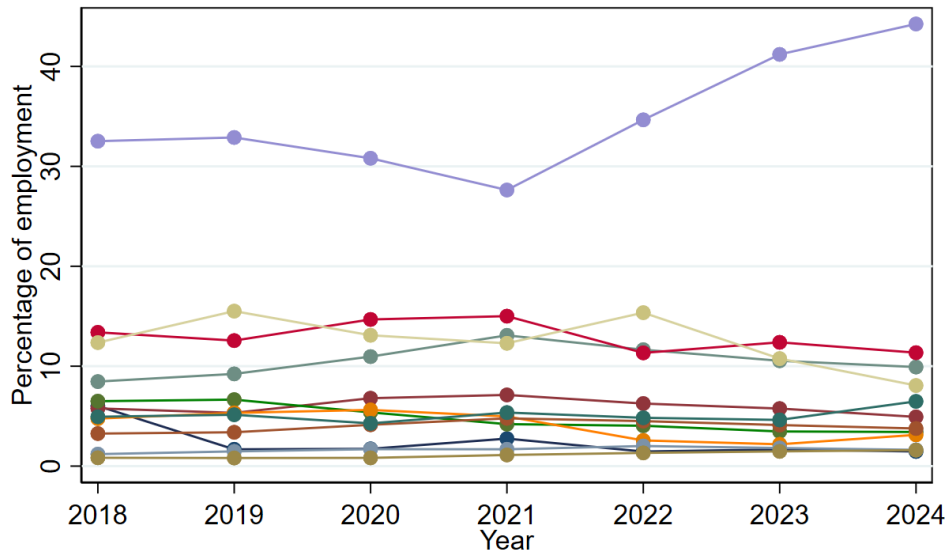


Figure 9: DMP sample by region (annual averages)

Panel A: Employment share



Panel B: Firm share

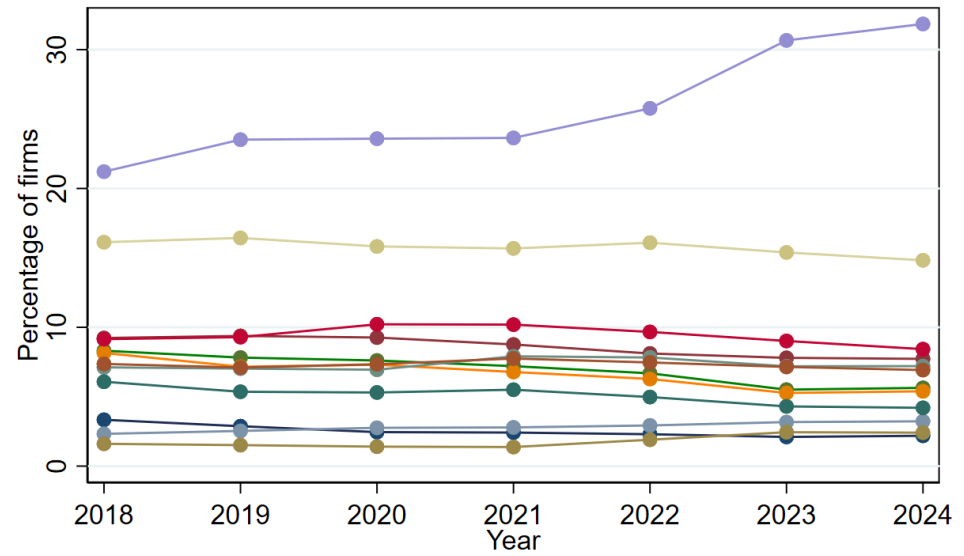
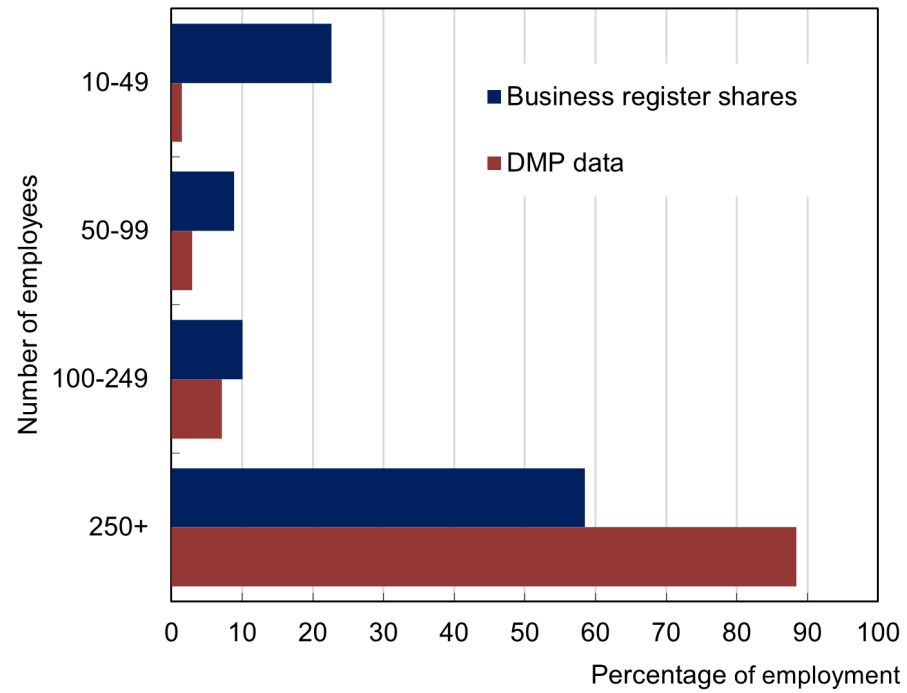


Figure 10: DMP sample by firm size (average from 2017 to 2023)

Panel A: Employment share



Panel B: Firm share

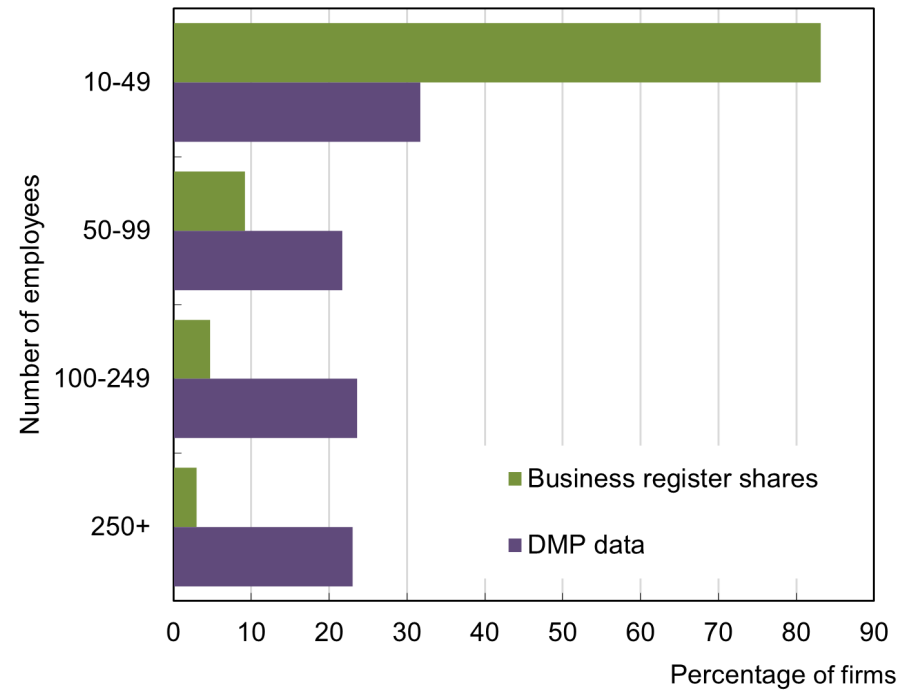
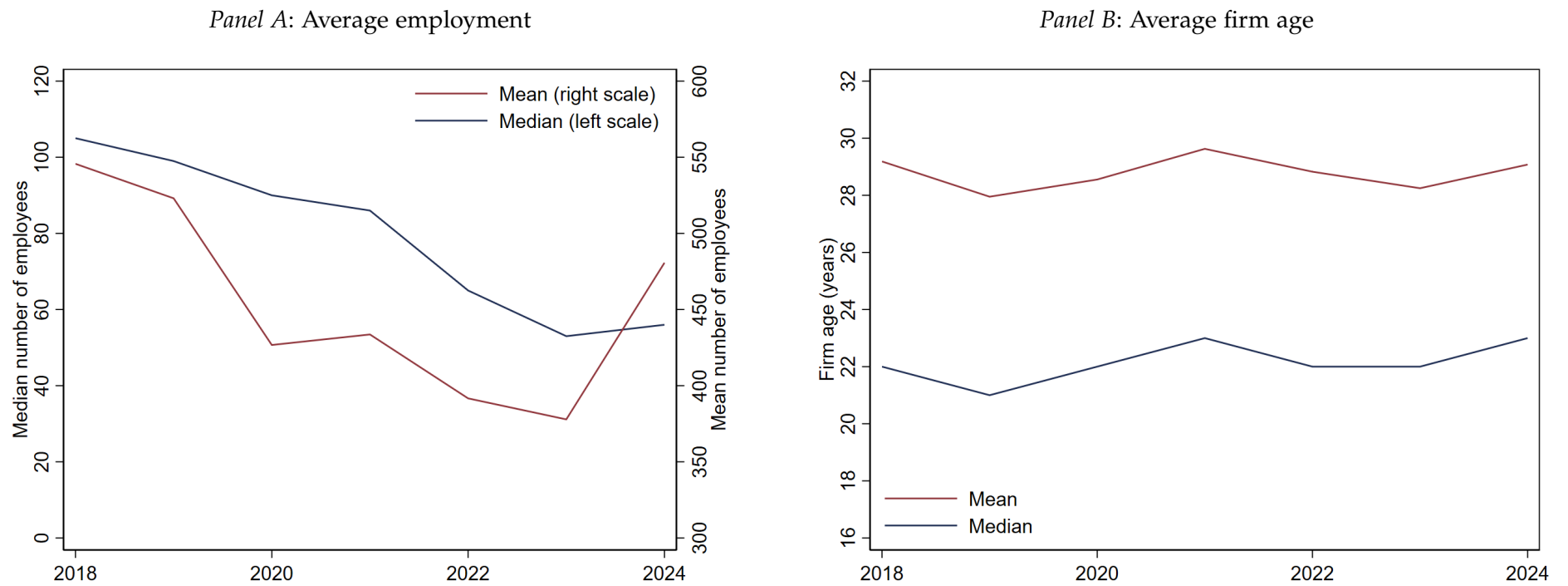
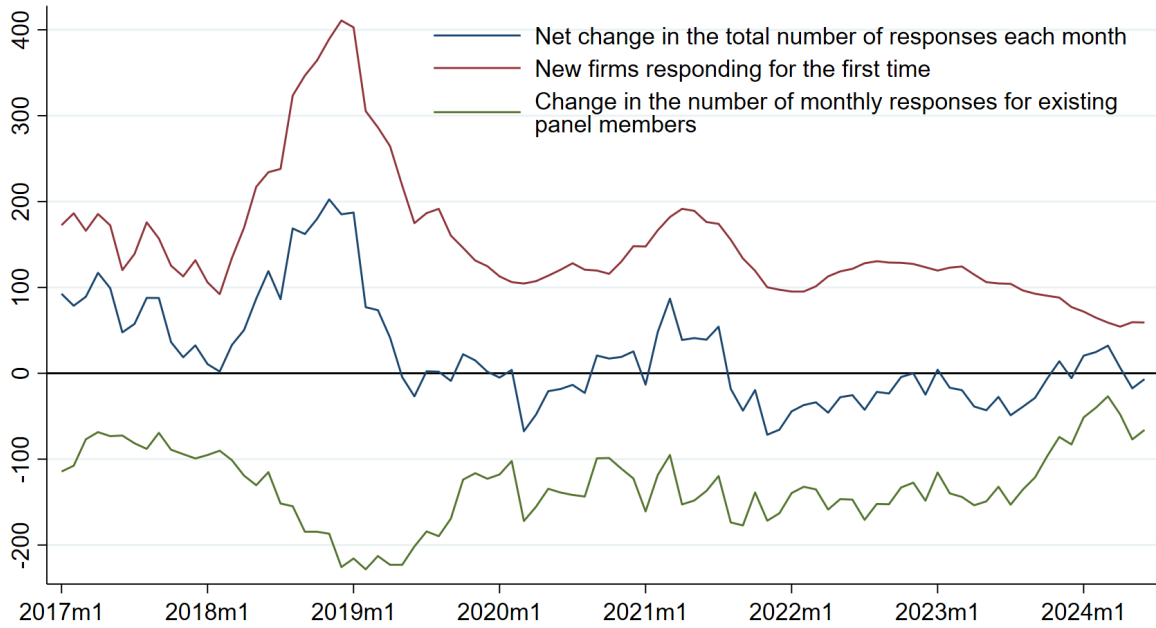


Figure 11: Characteristics of firms who respond to the DMP survey



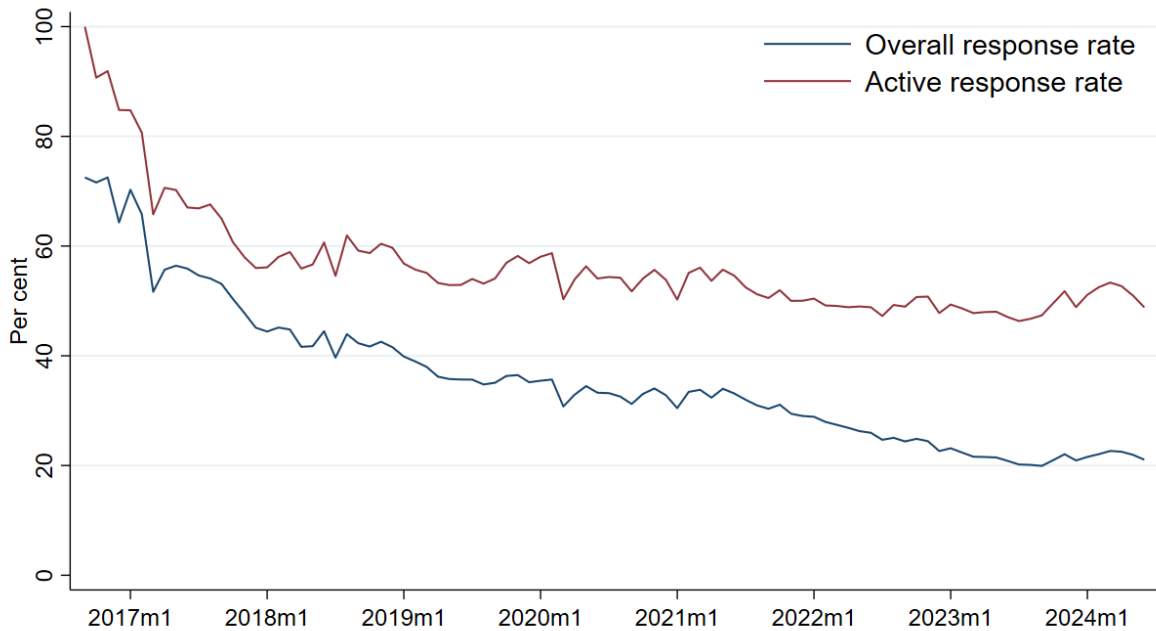
Notes: DMP data for all firms who responded in each year. Data are unweighted.

Figure 12: Monthly changes in number of survey responses



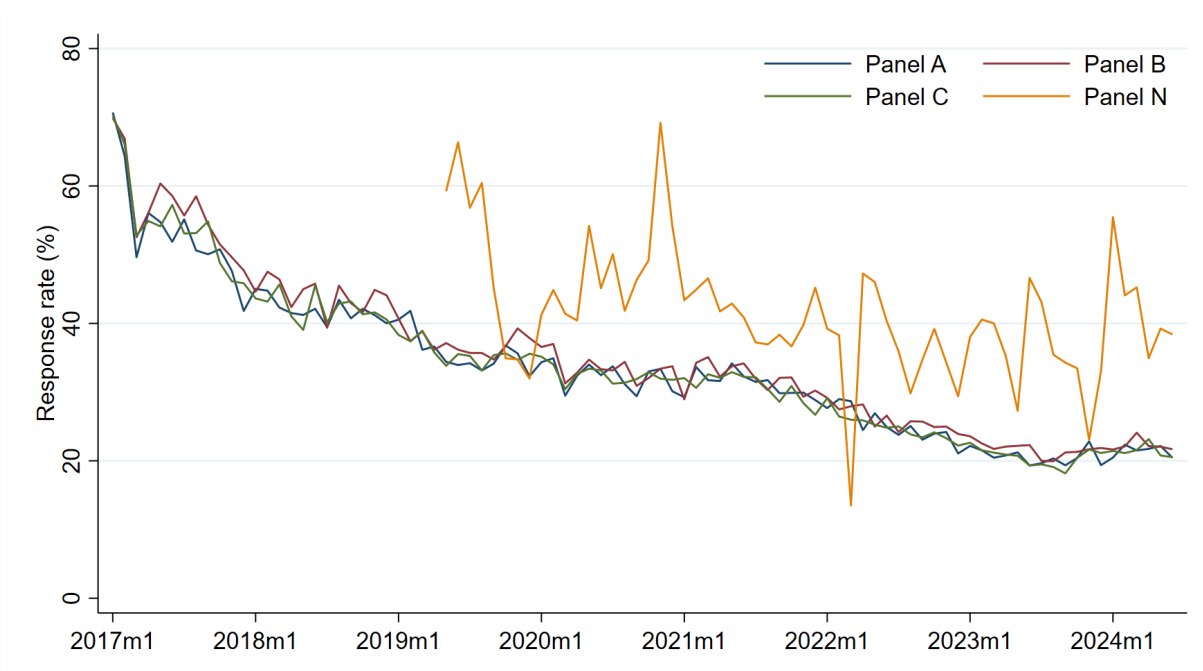
Notes: Data are six-month moving averages.

Figure 13: DMP response rate over time



Notes: The overall response rate is the the number of completed surveys as a percentage of the number of surveys sent out in each month. The response rate of active panel members is calculated as the the response rate of panel members who had completed at least one survey over the last twelve months.

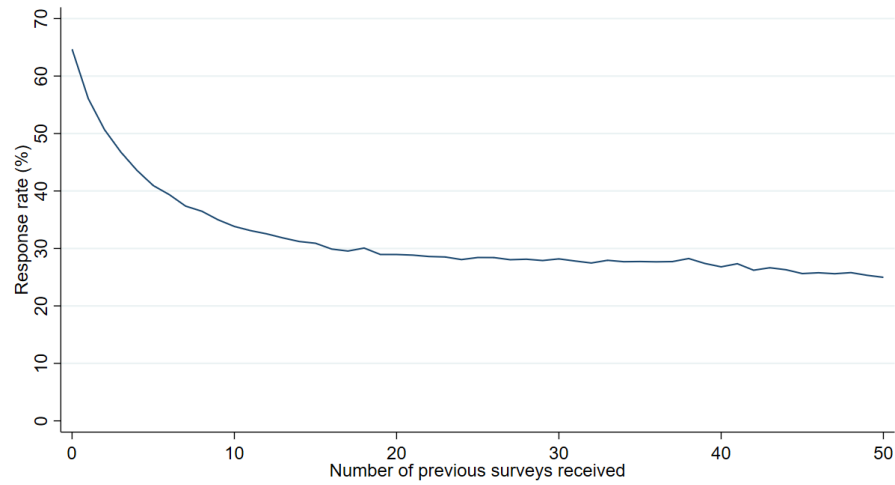
Figure 14: DMP response rate by panel



Notes: Panel A focuses on sales and prices, Panel B contains labour market questions on employment and wages, Panel C covers capital expenditure, and Panel N serves as the introductory panel focusing on the characteristics of new DMP firms.

Figure 15: DMP response rates by survey tenure

Panel A: All firms



Panel B: By year firms joined the survey

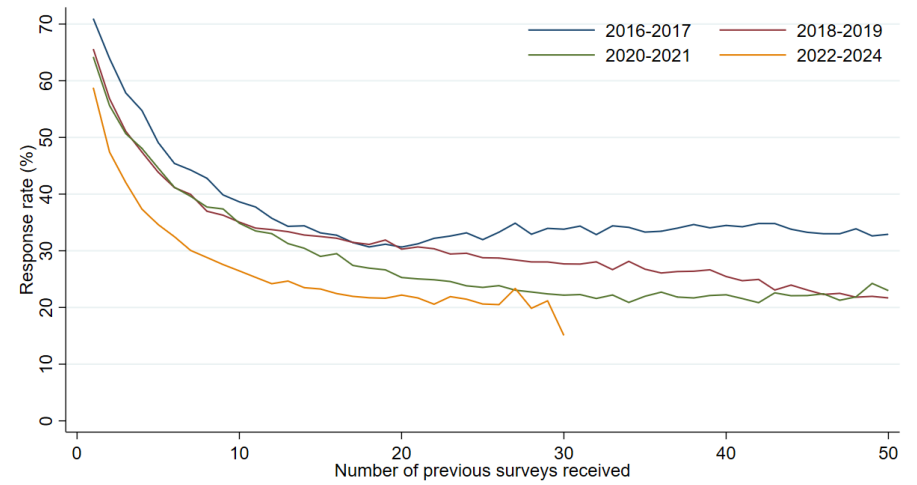
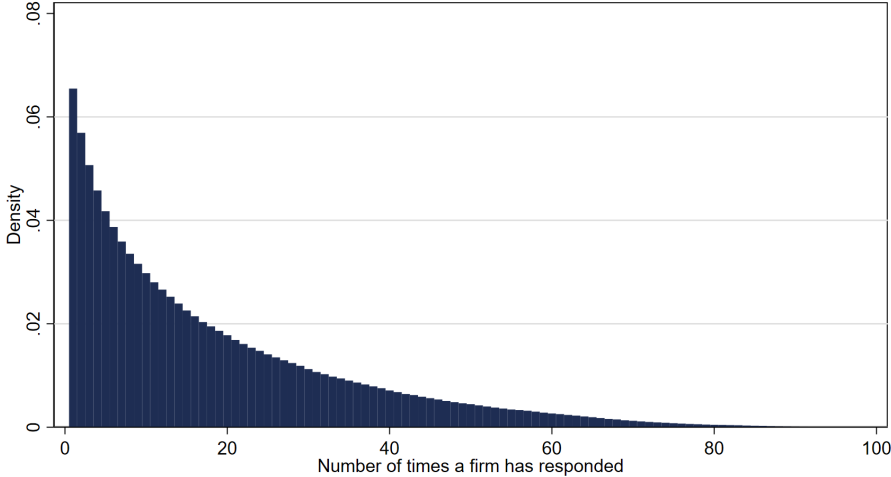


Figure 16: DMP survey tenure

Panel A: DMP survey tenure histogram



Panel B: Average number of surveys received/completed

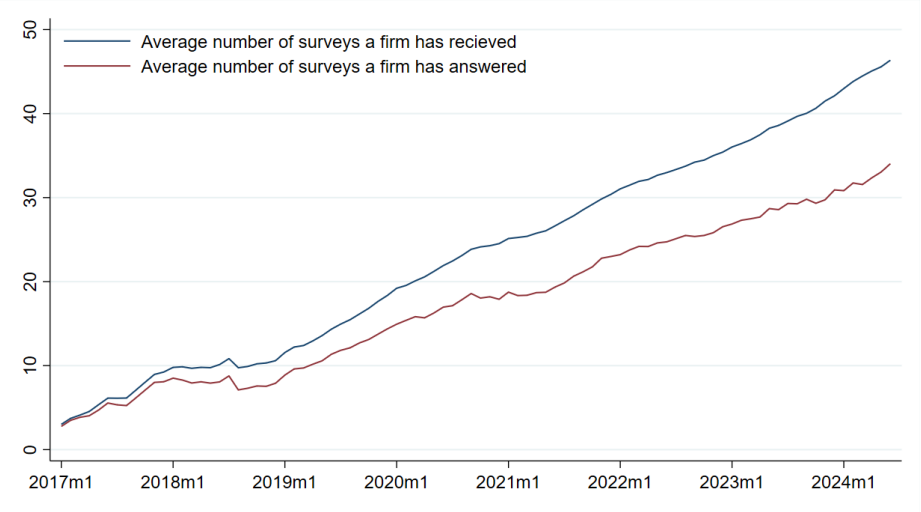
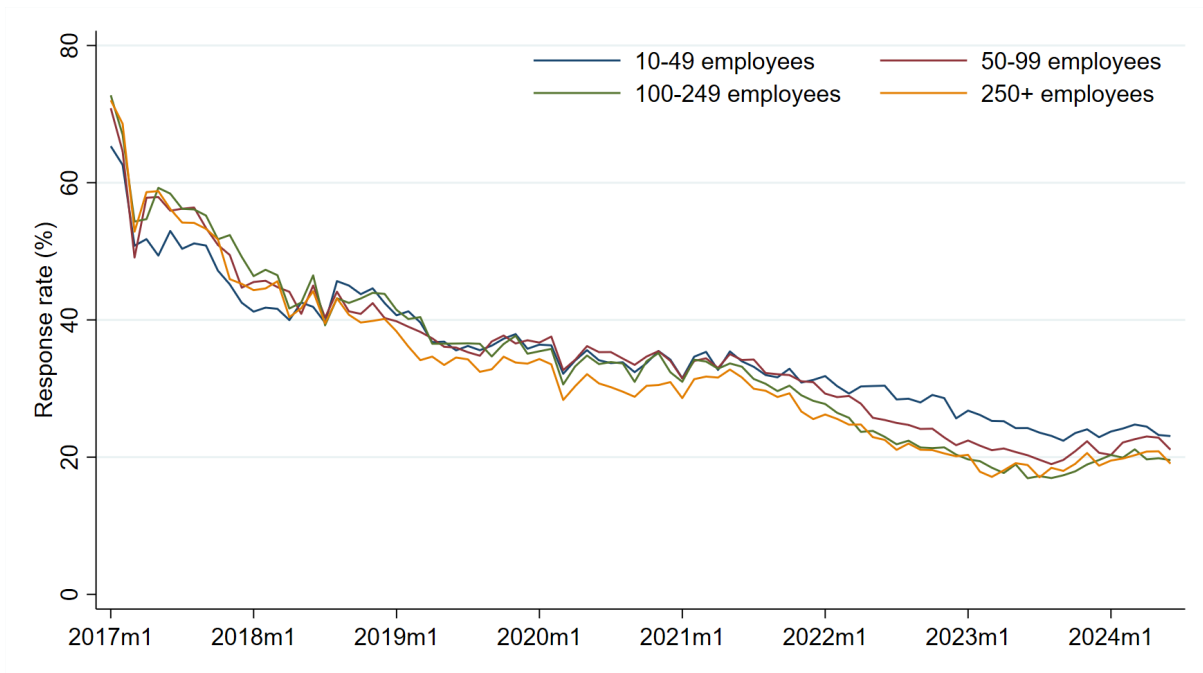


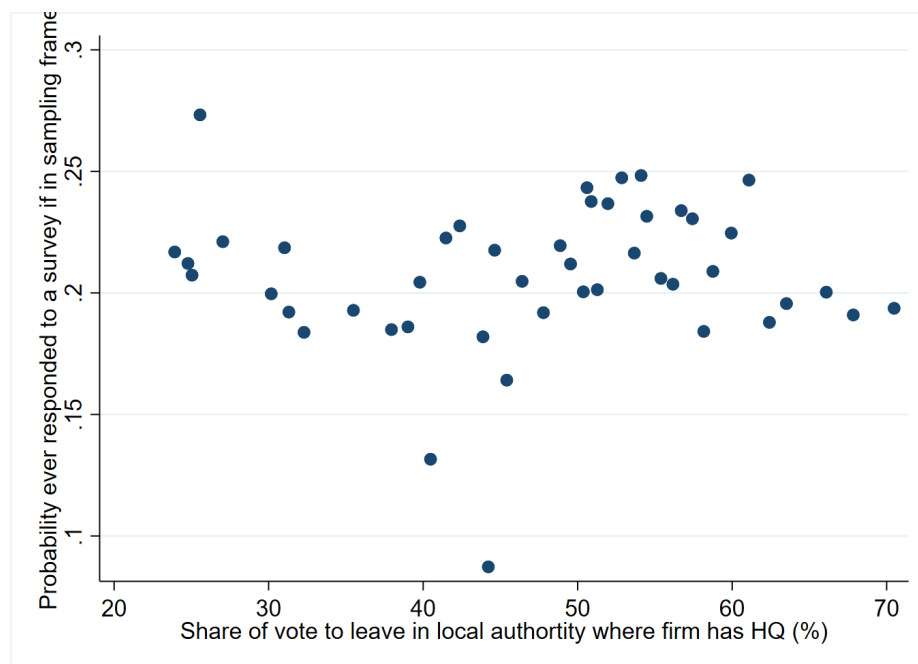
Figure 17: DMP response rate by firm size



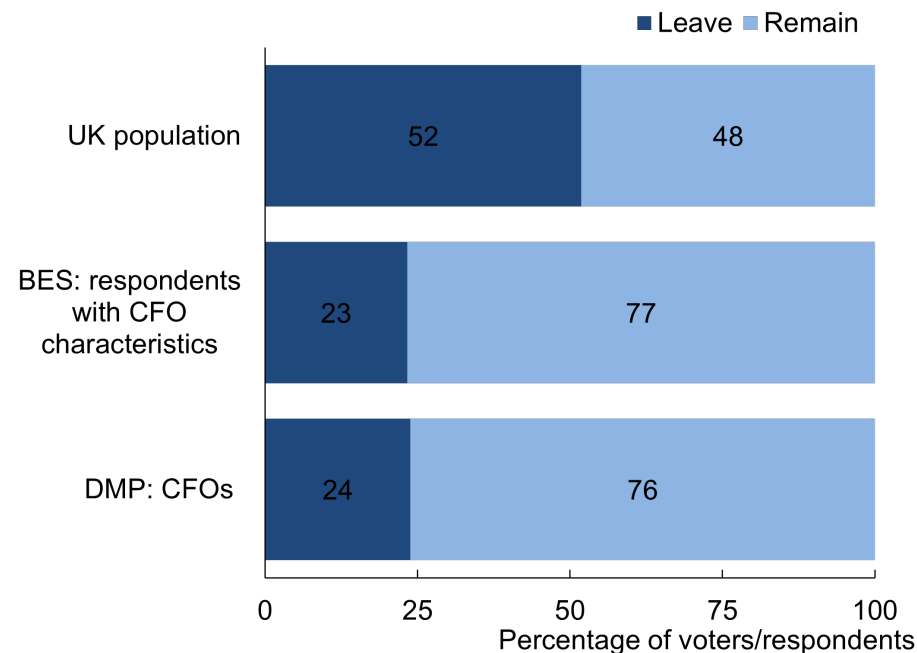
Notes: Firm sizes are banded by the number of employees.

Figure 18: Characteristics of firms who have responded to the DMP survey

Panel A: Response rates and local Brexit vote shares



Panel B: Personal views on Brexit



Source: Electoral Commission, British Election Study, Decision Maker Panel and authors' calculations.

Notes: Left-hand chart is a binscatter plot. Each dot represents 2% of observations grouped by share of vote to leave in the local authority where the firm has its headquarters. For the right-hand chart, data on Personal views on Brexit at time of referendum from the DMP were collected in February-May 2018, August-October 2018 and August-October 2019. For respondents who have answered more than once, their first response is used. Respondents who did not have a strong view either way (5 per cent) were excluded. The question asked respondents, 'Taking everything into account, how do you personally view the UK voting to leave the European Union at the time of referendum? Very positive; Somewhat positive; Neither positive nor negative; Somewhat negative; Very negative; Prefer not to state; Don't know'. British Election Study data are self-reported referendum votes. Respondents with CFO characteristics are defined as managers/professionals by work type with a degree and annual income of over £50,000.

Figure 19: DMP daily response rates

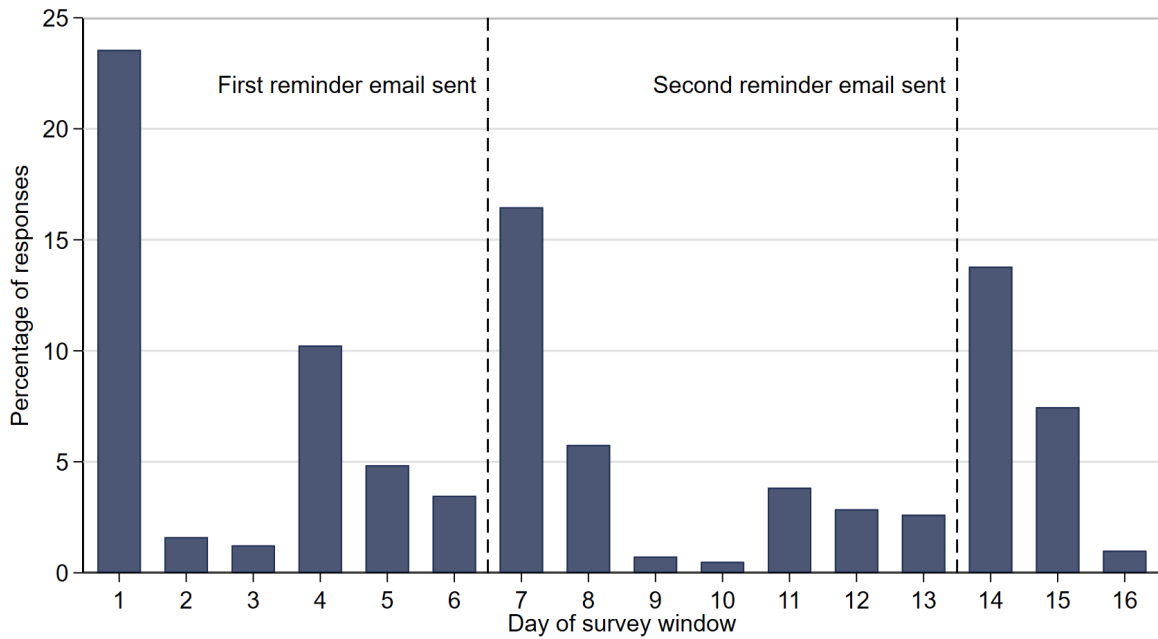
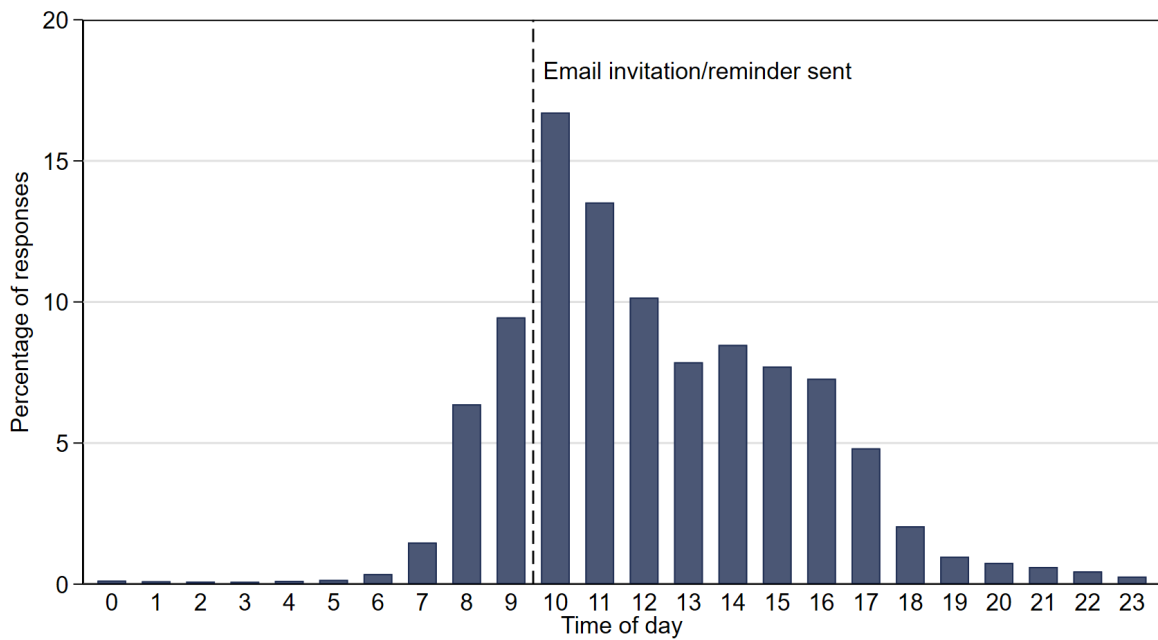


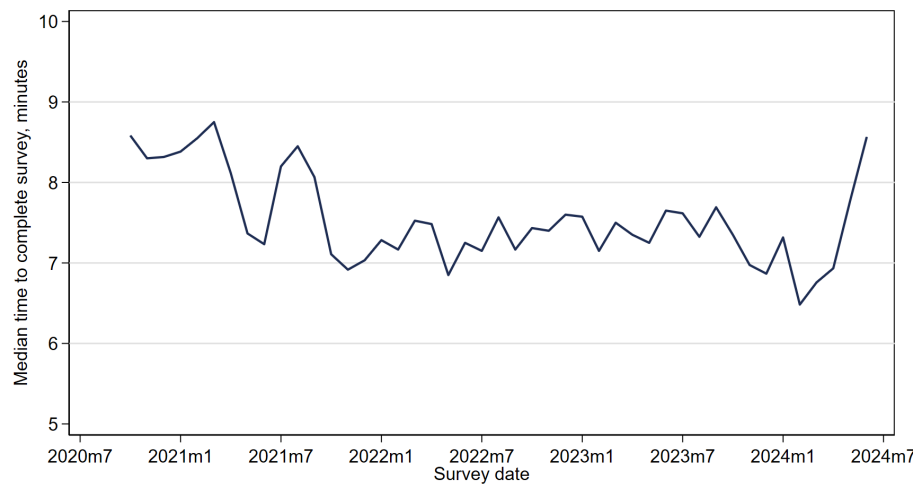
Figure 20: DMP hourly response rates



Notes: Each bar covers a one hour window. The time of day labels refer to the time the hourly window starts.

Figure 21: DMP survey completion times

Panel A: Overall median completion times



Panel B: Median DMP completion times by panel

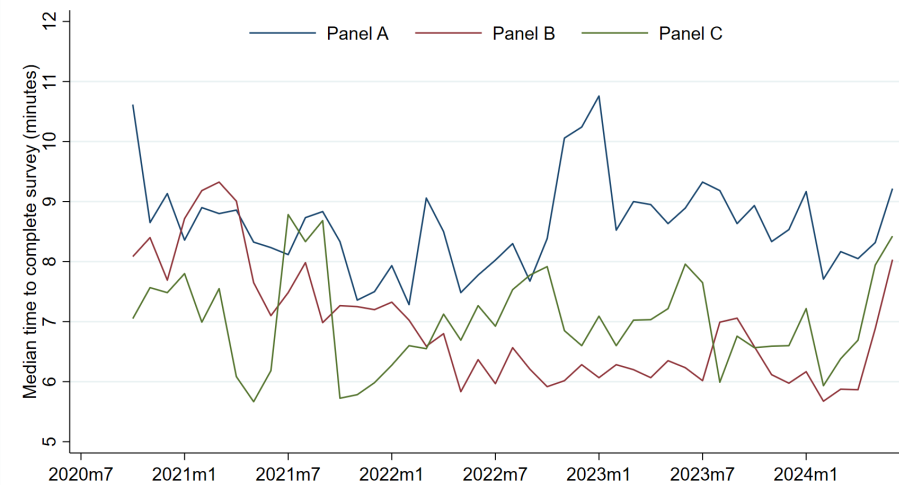
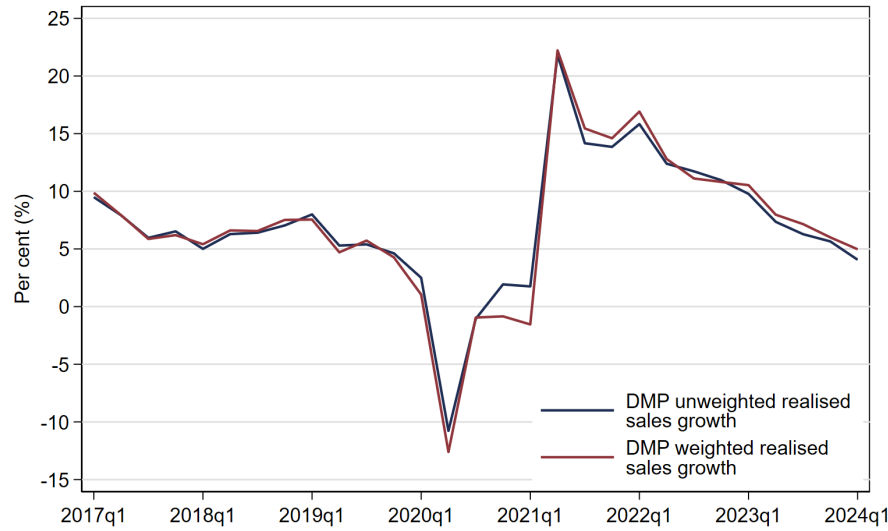
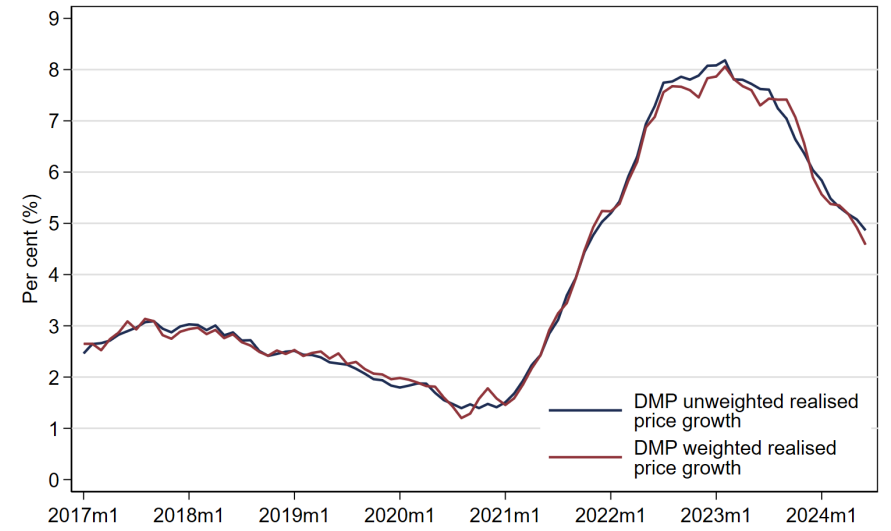


Figure 22: DMP weighted and unweighted time series

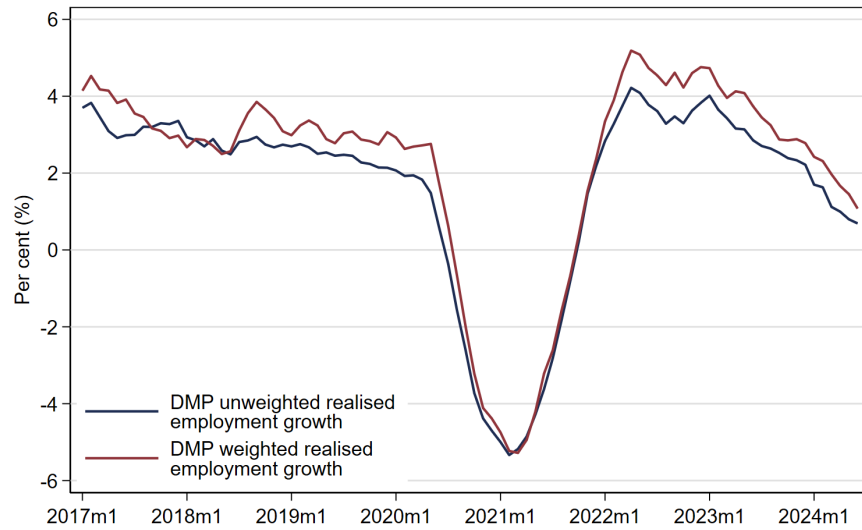
Panel A: Sales Growth



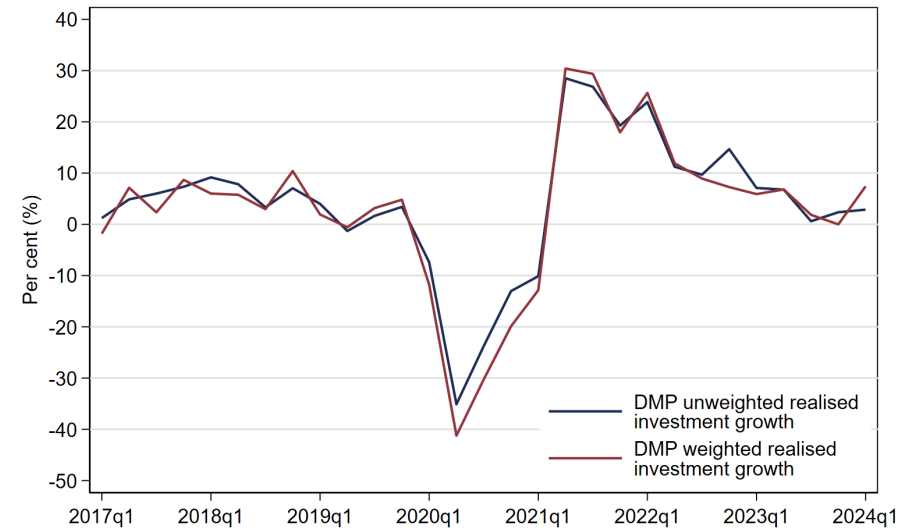
Panel B: Price Growth



Panel C: Employment Growth



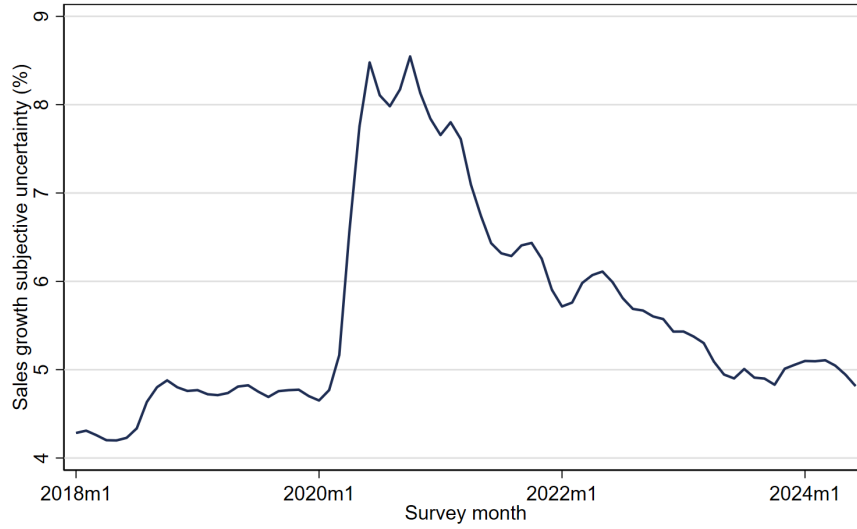
Panel D: Investment Growth



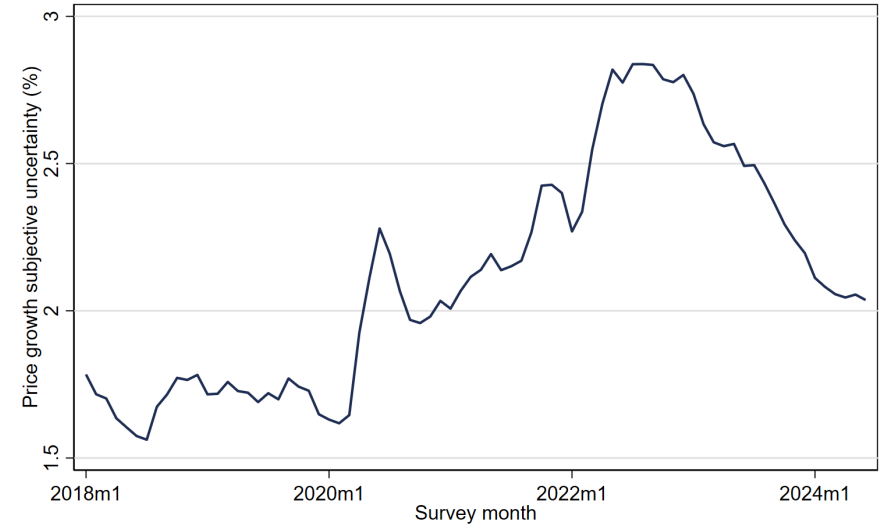
Notes: Data are three-month moving averages.

Figure 23: DMP subjective uncertainty measures

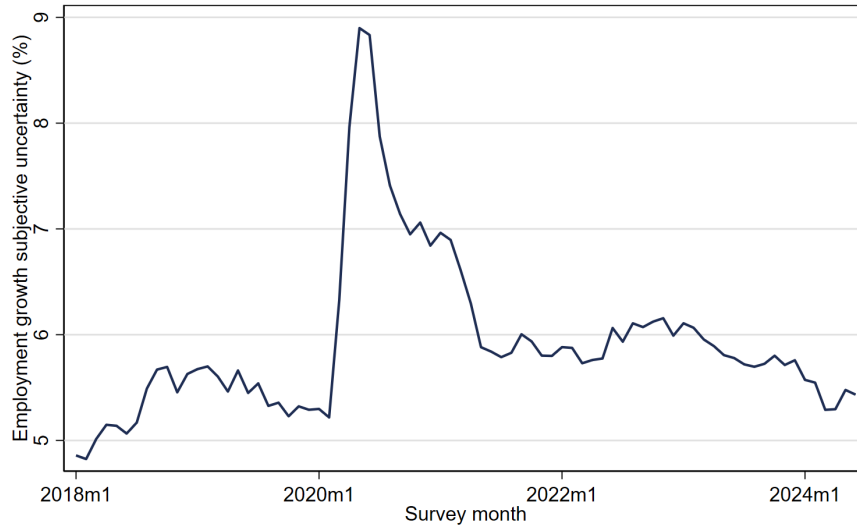
Panel A: Sales subjective uncertainty



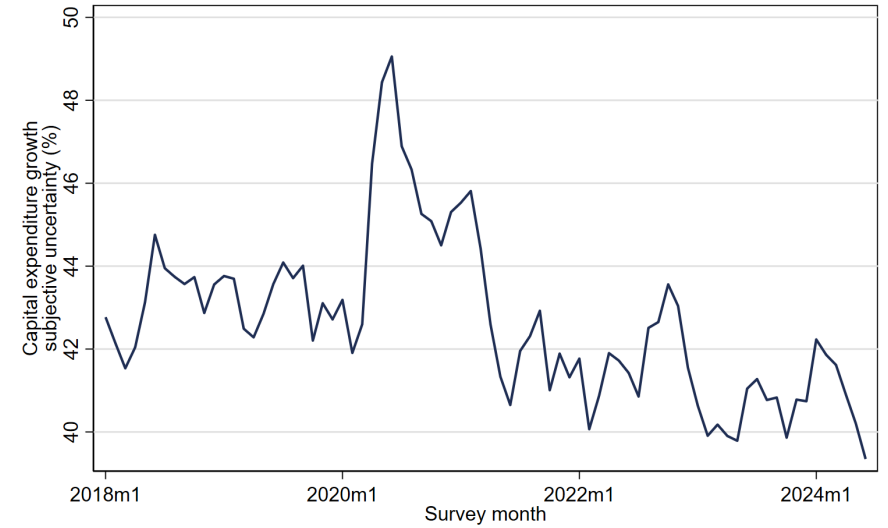
Panel B: Inflation subjective uncertainty



Panel C: Employment subjective uncertainty

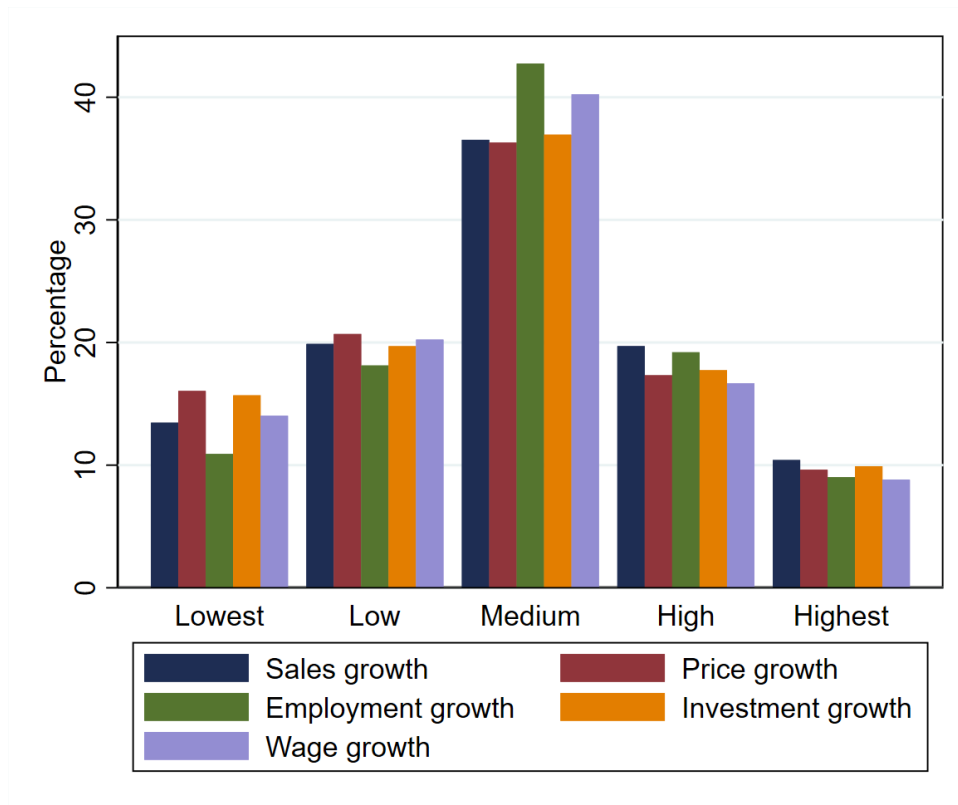


Panel D: Investment subjective uncertainty



Notes: Data are three-month moving averages.

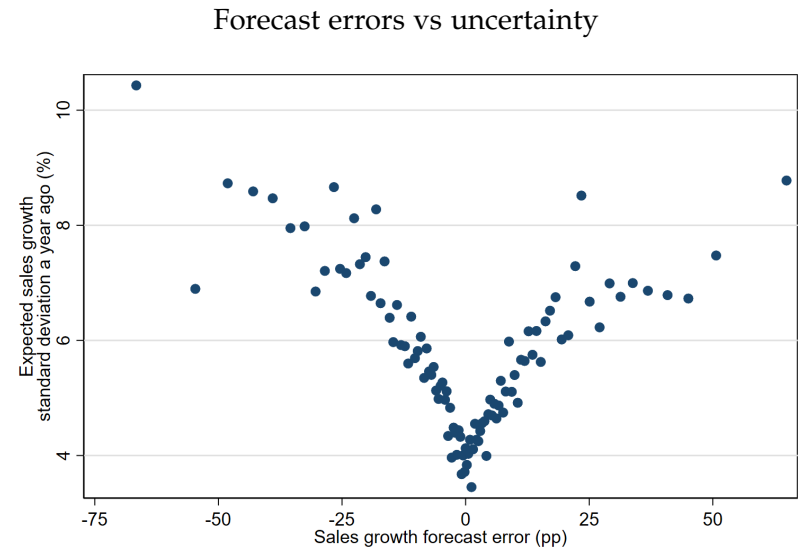
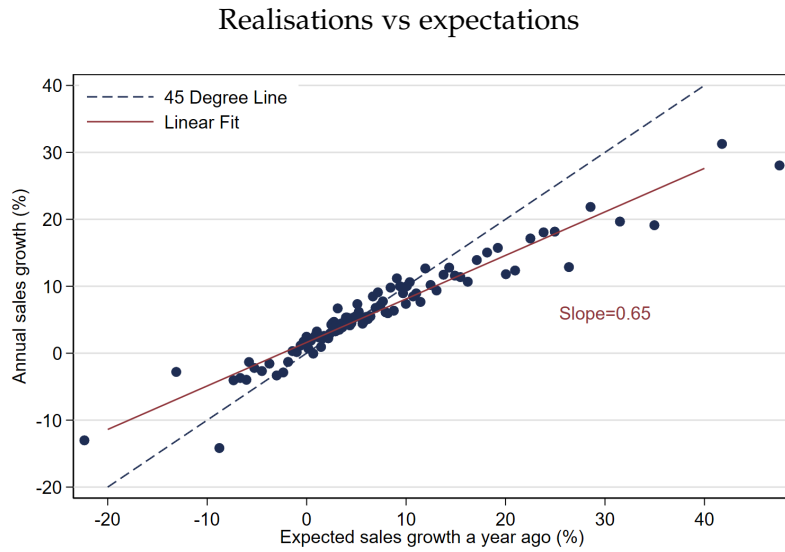
Figure 24: Average probability distribution for expectations scenarios



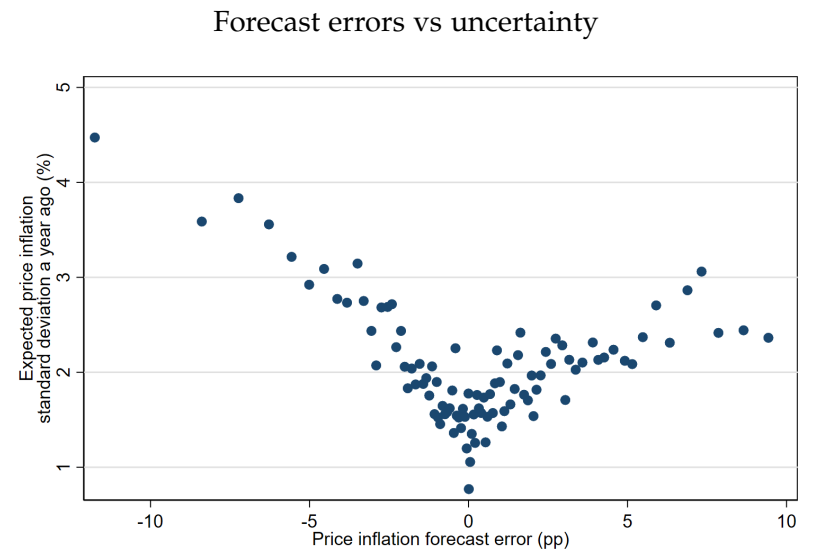
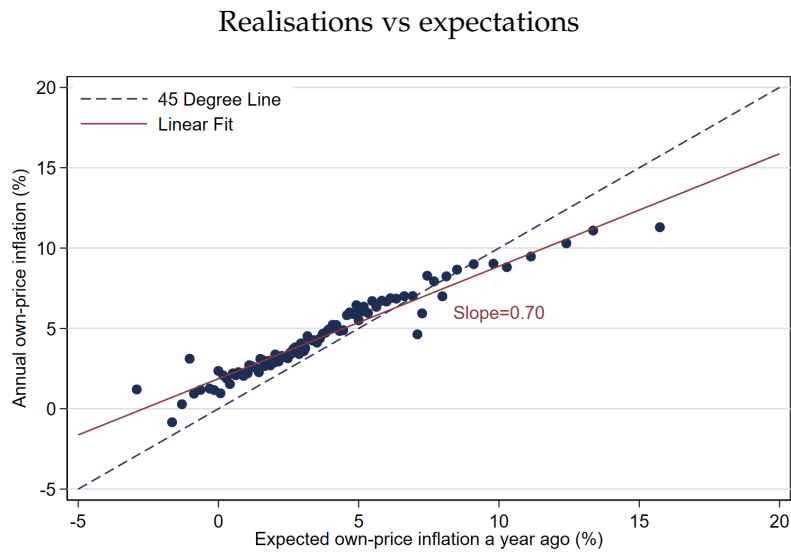
Notes: When responding to the regular expectations questions firms are attached to provide five distinct scenarios for each variable: lowest, low, medium, high, and highest. The data in this chart summarizes the average probabilities attached to these scenarios. Data for sales growth, price growth, employment growth, and investment growth cover the period from January 2017 to June 2024. The data for wage growth covers the period from May 2022 to June 2024.

Figure 25: Firm forecast accuracy

Panel A: Sales Growth

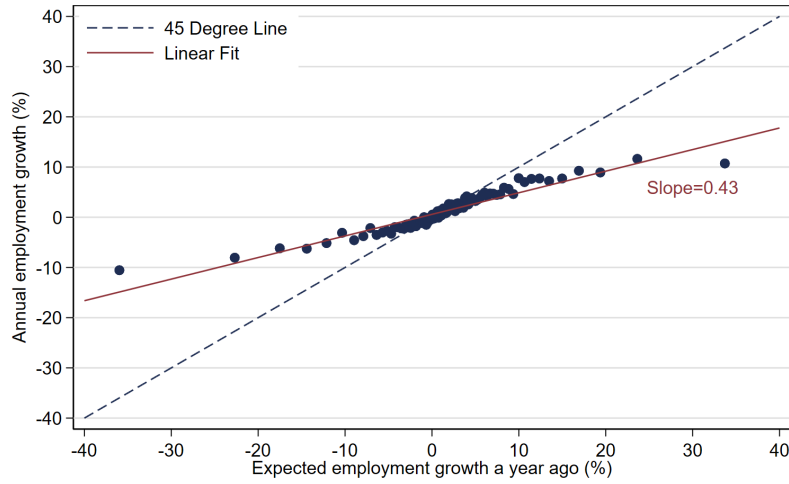


Panel B: Price Growth

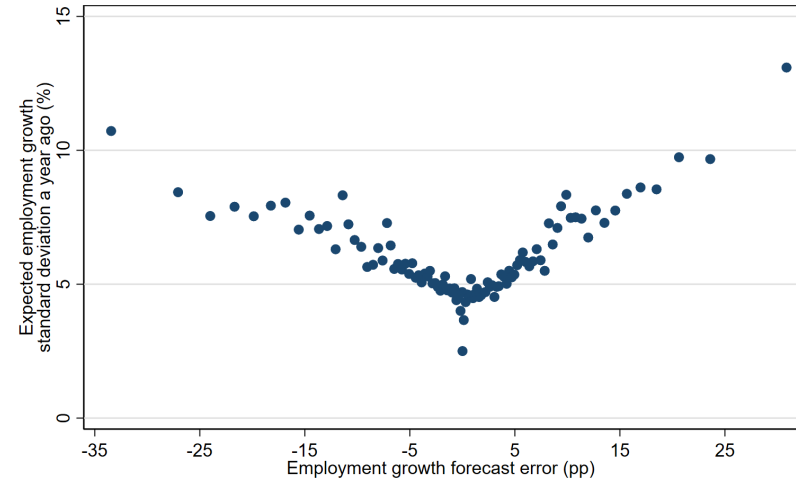


Panel C: Employment Growth

Realisations vs expectations

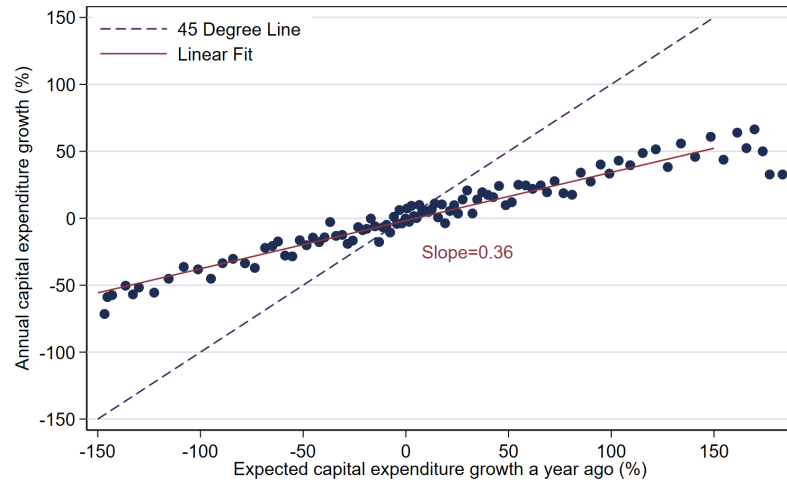


Forecast errors vs uncertainty

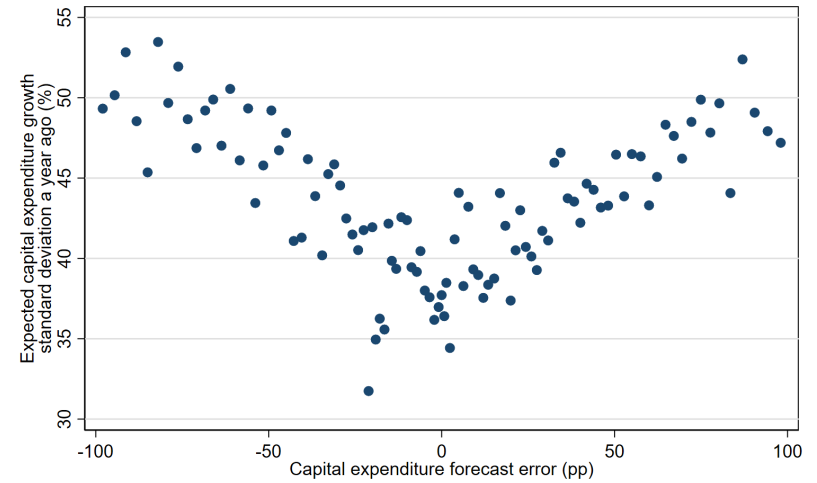


Panel D: Investment Growth

Realisations vs expectations



Forecast errors vs uncertainty



Notes: Each dot represents 1% of observations, grouped by expected sales, price, employment and investment inflation/price inflation forecast error, respectively. Data cover the period from January 2017 to June 2024.

Figure 26: Aggregate DMP expectations versus realisations

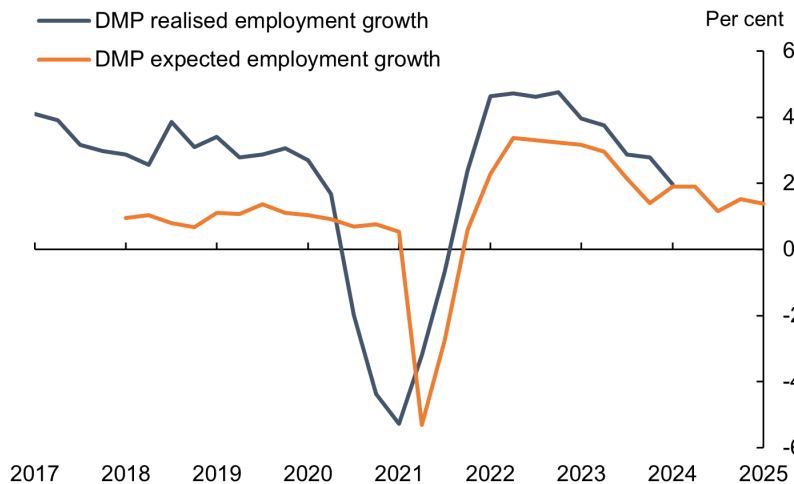
Panel A: Sales Growth



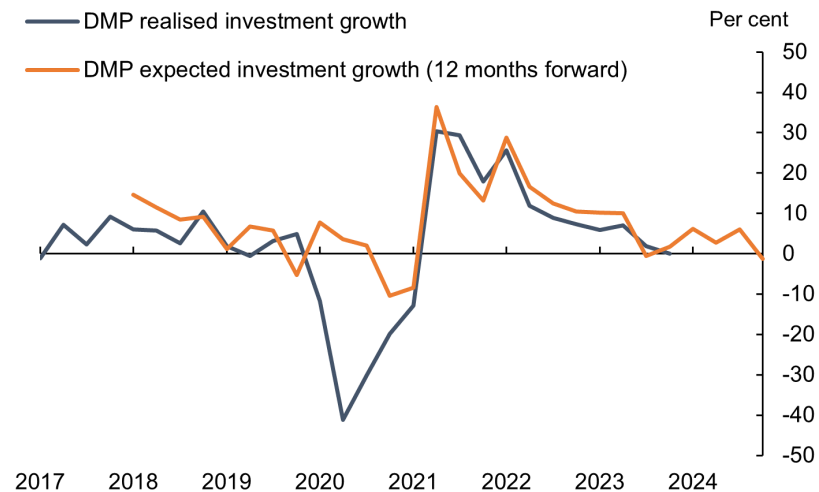
Panel B: Price Growth



Panel C: Employment Growth

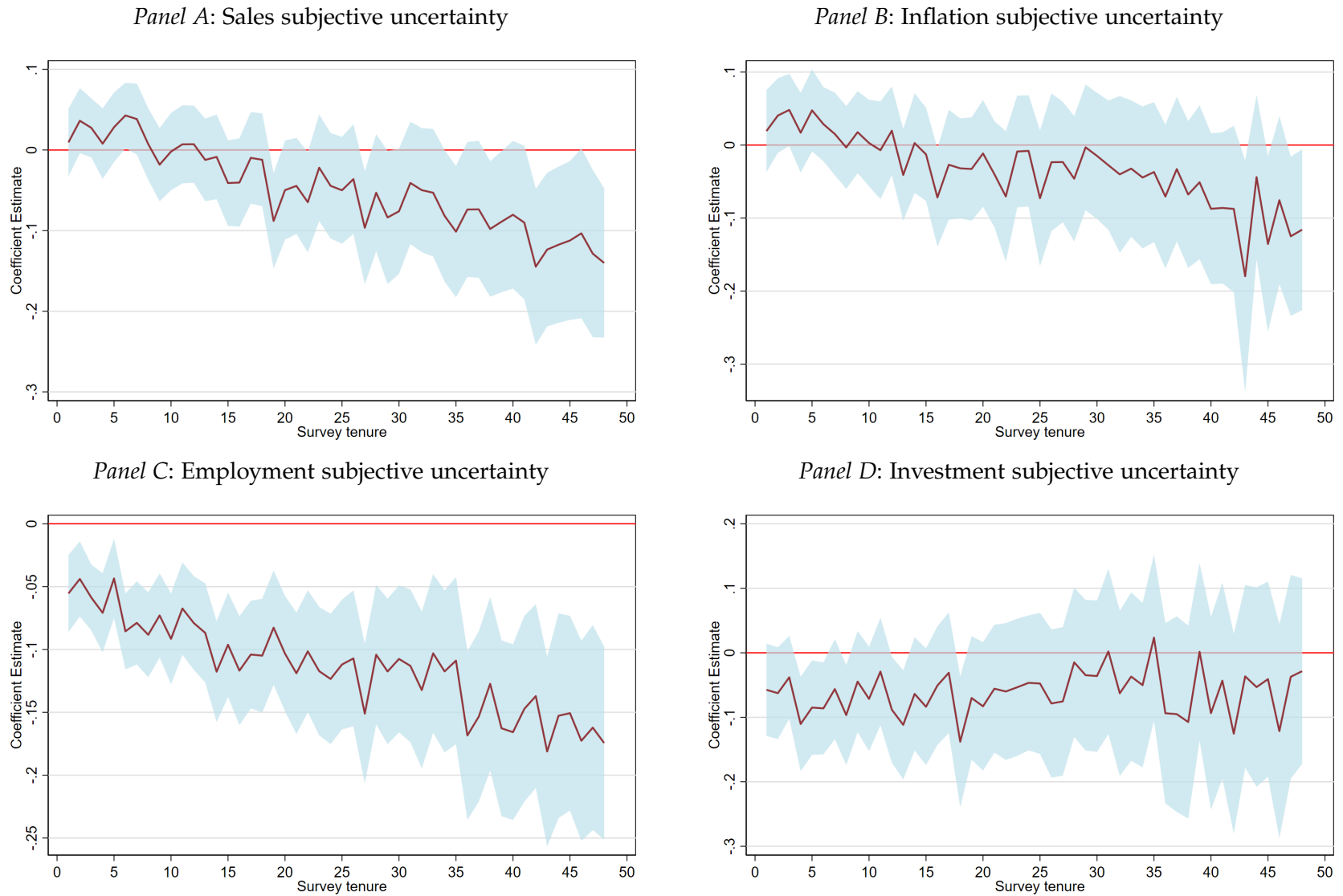


Panel D: Investment Growth



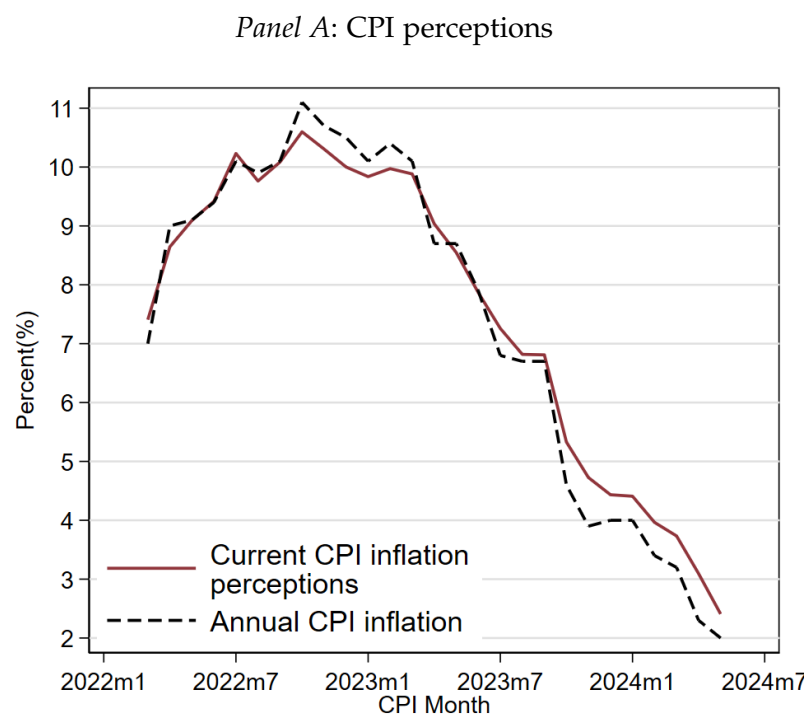
Notes: Data are three-month moving averages.

Figure 27: Learning through survey effects

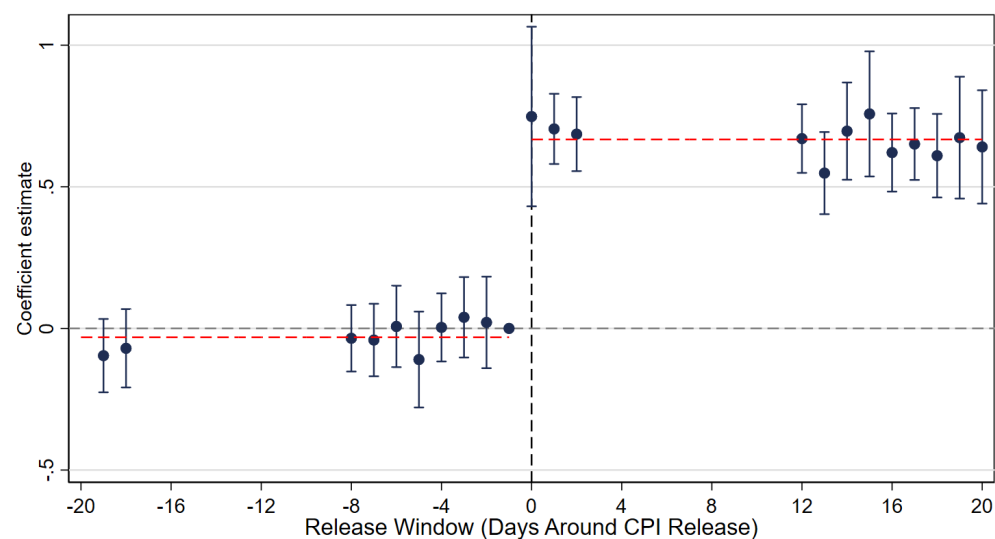


Notes: This figure presents coefficient plots of ‘learning-through-survey’ effects, as outlined in Equation 1. The dependent variable is the natural logarithm of sales subjective uncertainty (Panel A), inflation subjective uncertainty (Panel B), employment subjective uncertainty (Panel C), and investment subjective uncertainty (Panel D). Survey tenure is defined as the number of times a firm has responded to a survey panel with any five-bin distribution question. The data cover the period from November 2016 to June 2024. The regressions include firm-fixed effects and month-fixed effects. The shaded area denotes the 95% confidence interval, and standard errors are clustered at the firm level.

Figure 28: Attentiveness of firms to CPI data releases



Panel B: Impact of CPI inflation changes on current CPI inflation perceptions: Extended window specification

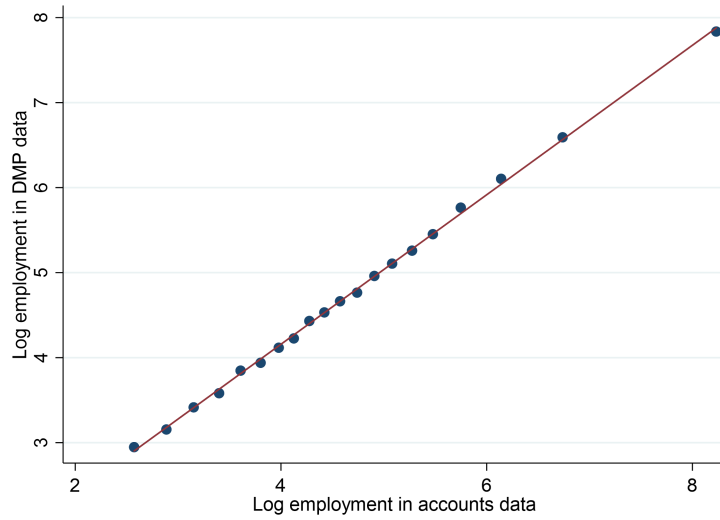


Source: Decision Maker Panel, ONS and authors' calculations.

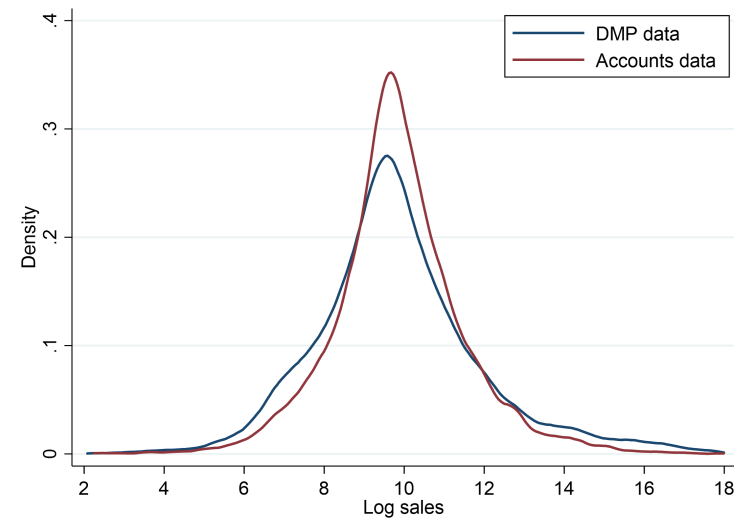
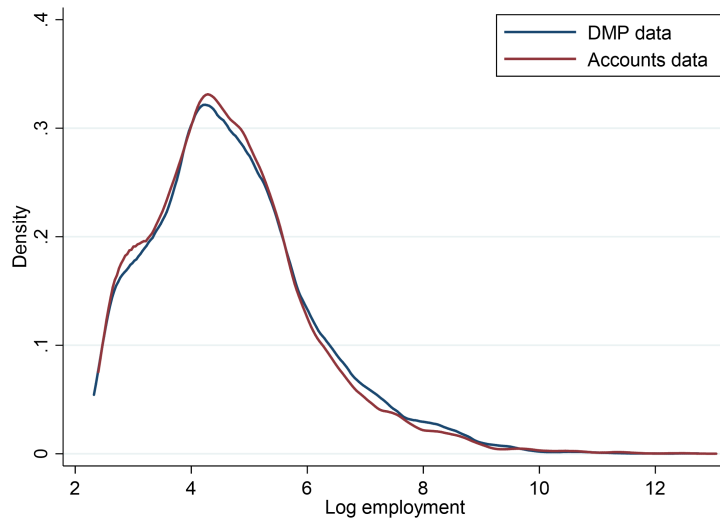
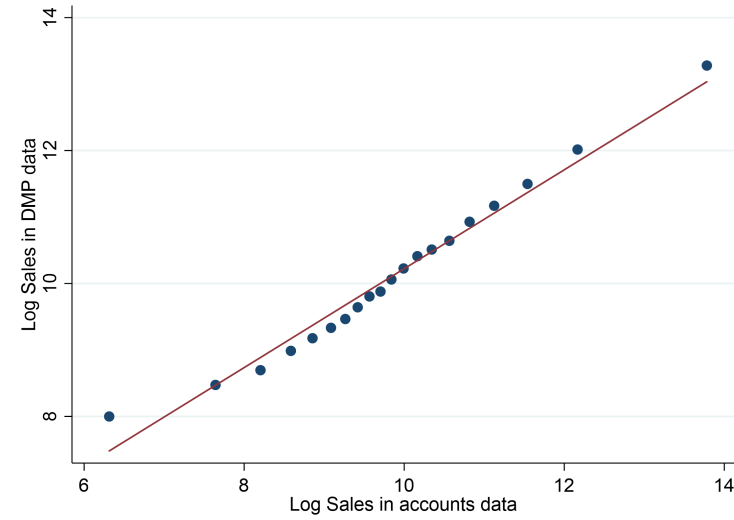
Notes: The figure in Panel A shows the evolution of CPI inflation perceptions. The data on current CPI inflation perceptions are based on data from the Decision Maker Panel. The data on annual CPI inflation is taken from the ONS. The series are three-month moving averages. In Panel A, the horizontal axis is the CPI month, rather than the survey month, to reflect the fact that CPI releases often happen during the survey window. The figure in Panel B plots the impact of CPI inflation changes on current CPI inflation perceptions. The omitted category is the day before the CPI release. 90% confidence intervals are reported around the point estimates. The red horizontal lines denote the average of the coefficients in the pre and post CPI release periods. Weekend responses are merged with the previous Friday. Months in which the CPI release is outside the survey window are dropped - March 2022, March 2023, May 2023, December 2023. Days with fewer than 30 responses are dropped.

Figure 29: DMP data versus company accounts data: levels

Panel A: Employment



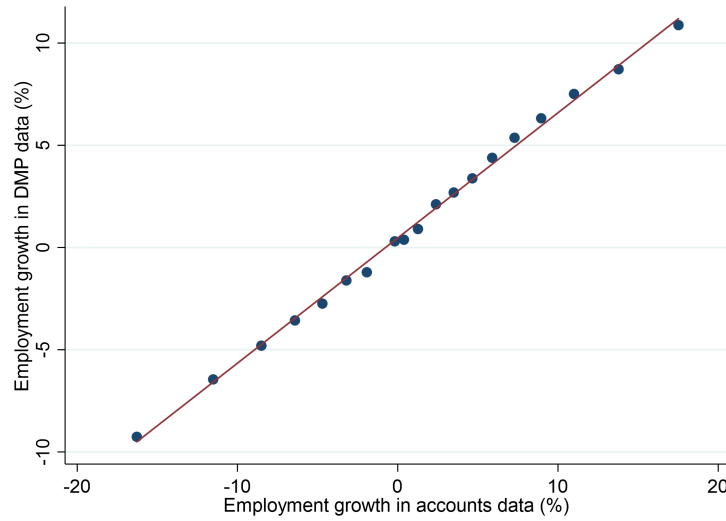
Panel B: Sales



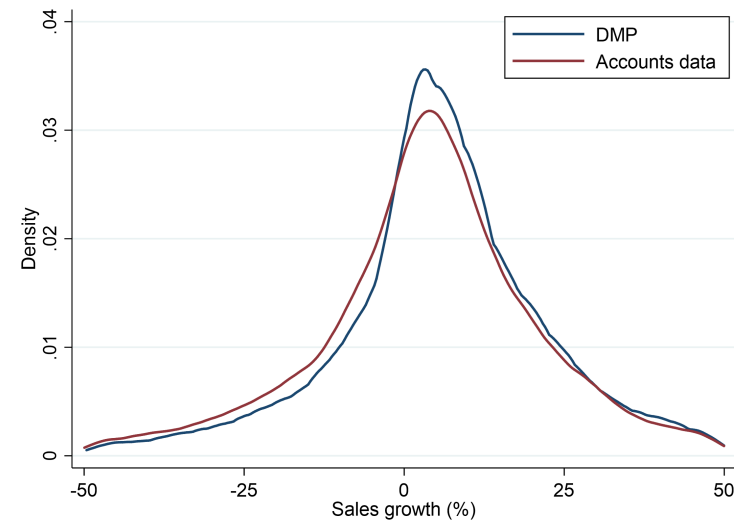
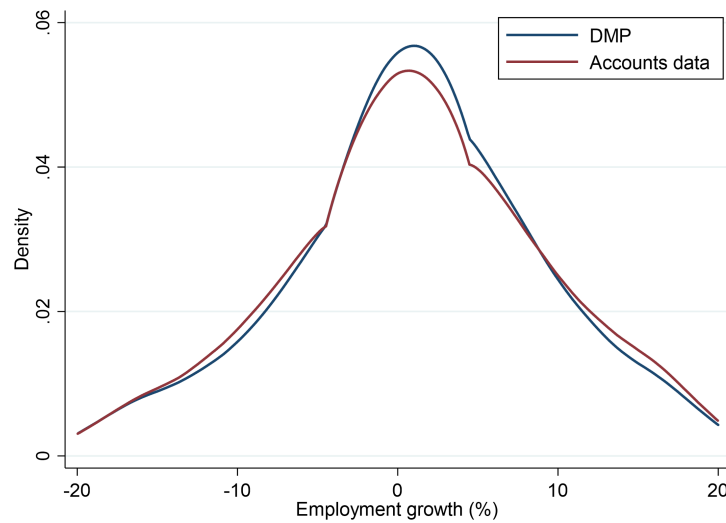
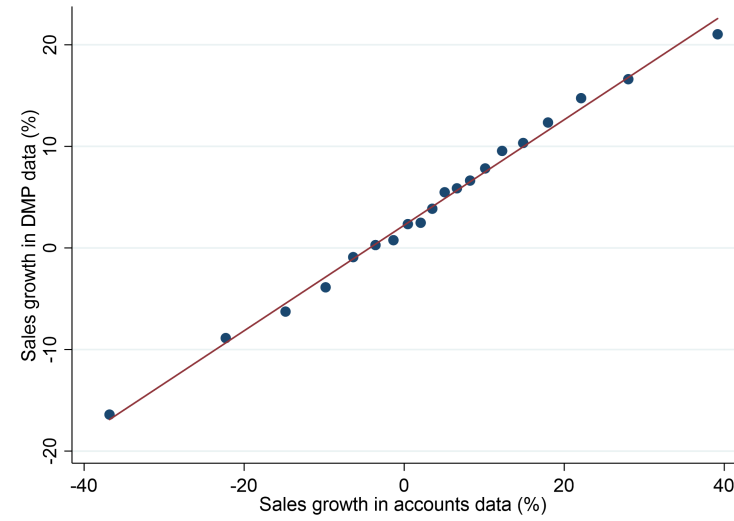
Notes: Sales values from the DMP survey are annualised average quarterly sales reported by businesses across the year. DMP employment data are averages across the year. DMP data are plotted against annual company accounts data from Bureau Van Dijk for the corresponding financial year. The dots on the top charts each represent 5% of observations, grouped by log employment/sales from accounts data. Charts are based on annual data between 2017 and 2022.

Figure 30: DMP data versus company accounts data: growth

Panel A: Employment Growth

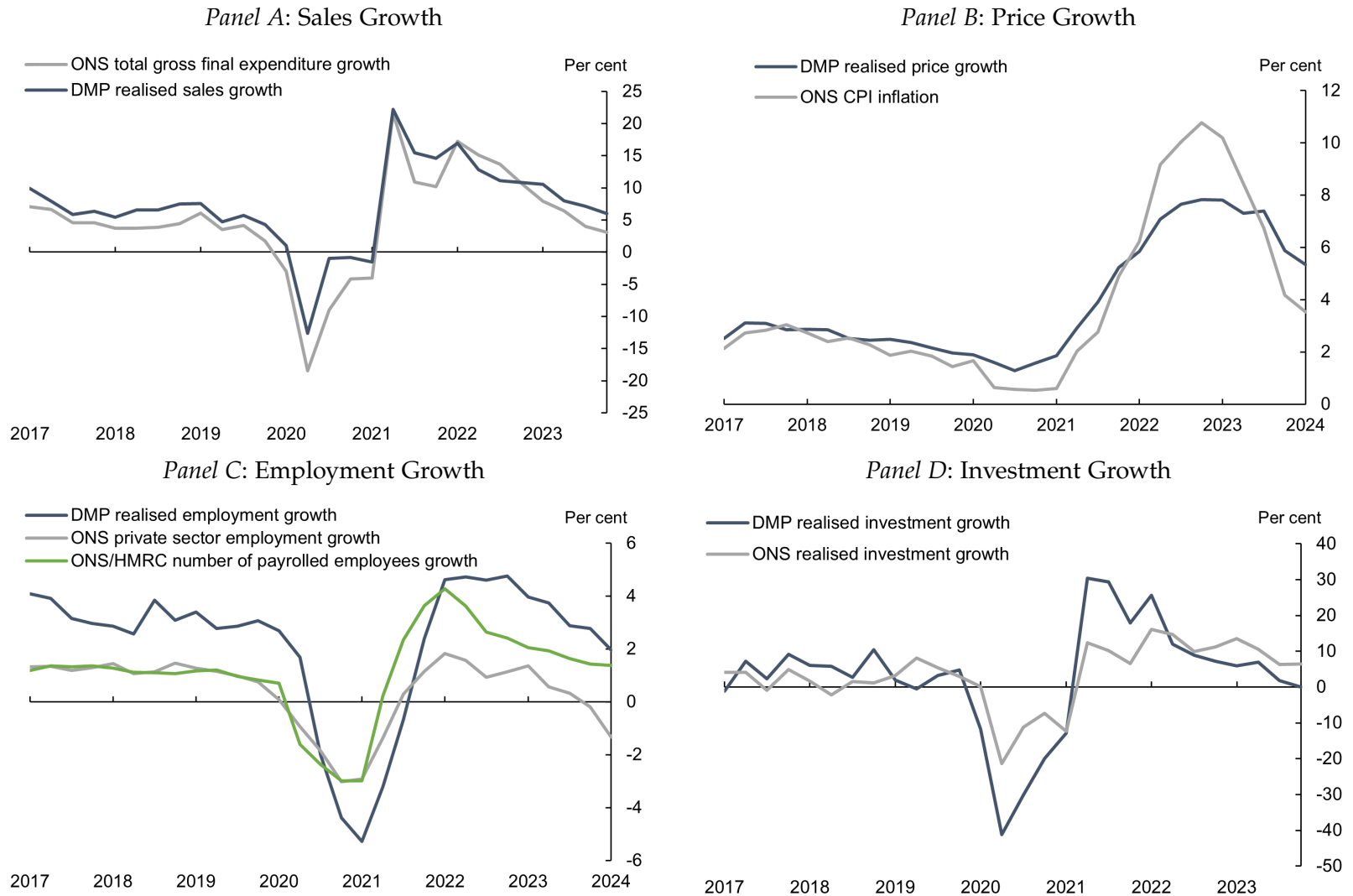


Panel B: Sales Growth



Notes: Sales growth data from the DMP survey are average growth rates reported by businesses across the year. DMP employment growth data are averages across the year. DMP data are plotted against annual company accounts data from Bureau Van Dijk for the corresponding financial year. The dots on the top charts each represent 5% of observations, grouped by employment/sales growth from accounts data. Charts are based on annual data between 2017 and 2022. DHS growth rates are used.

Figure 31: Aggregate DMP data versus official ONS data

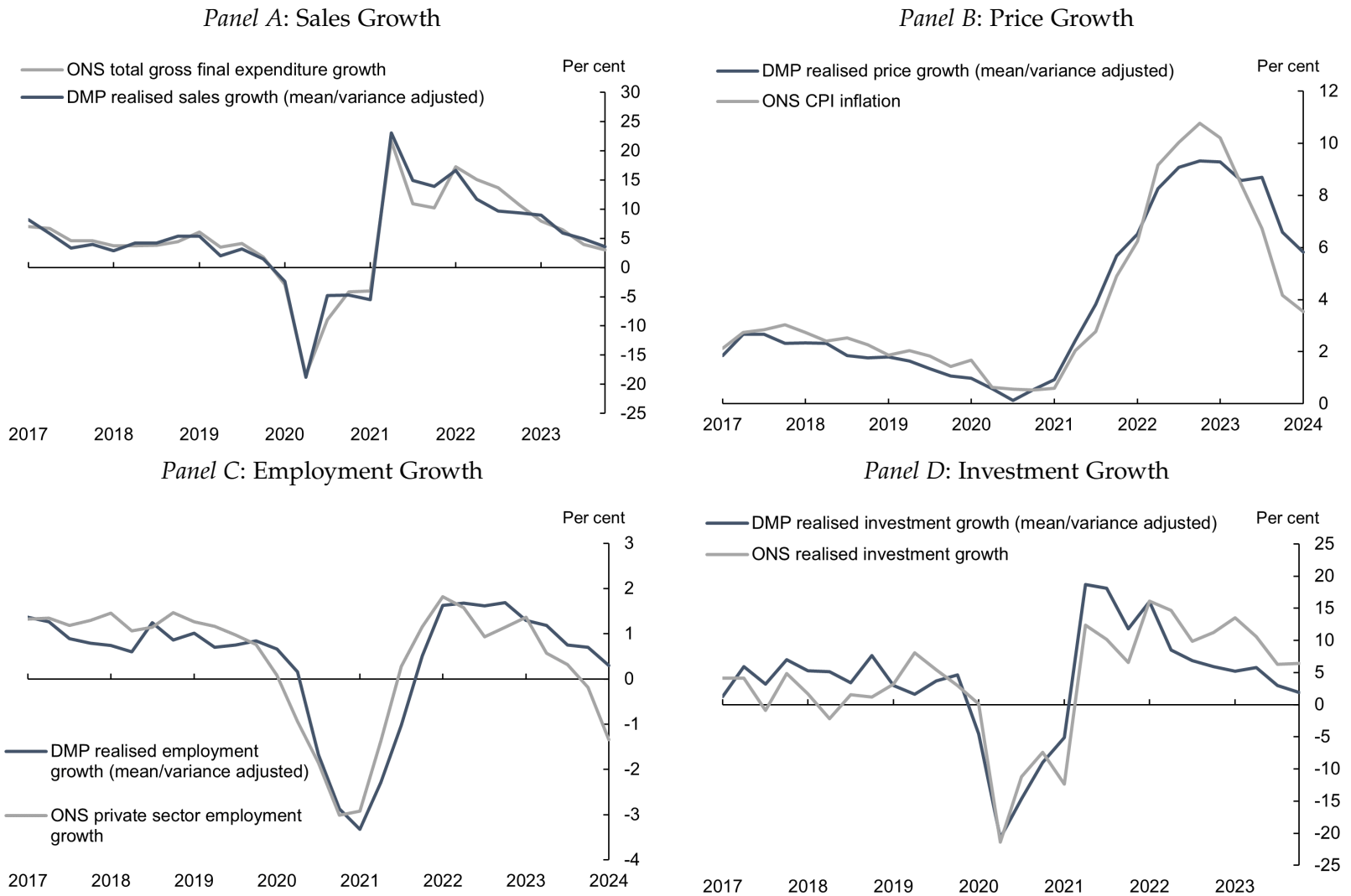


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Source: Decision Maker Panel, ONS, HMRC and authors' calculations.

Notes: Data are three-month moving averages. DMP sales data are compared to whole economy nominal ONS total final expenditure from the National Accounts (ABME, equivalent to GDP plus the value of imports). DMP price data for the whole private sector are compared to ONS CPI inflation (D7G7), which only includes consumer prices. DMP employment (for the private sector) is compared to both ONS private sector employment (MFZ2) and ONS/HMRC data on the number of payrolled employees. DMP capital expenditure data are benchmarked against ONS nominal business investment data (NPEK).

Figure 32: Aggregate mean/variance adjusted DMP data versus official ONS data

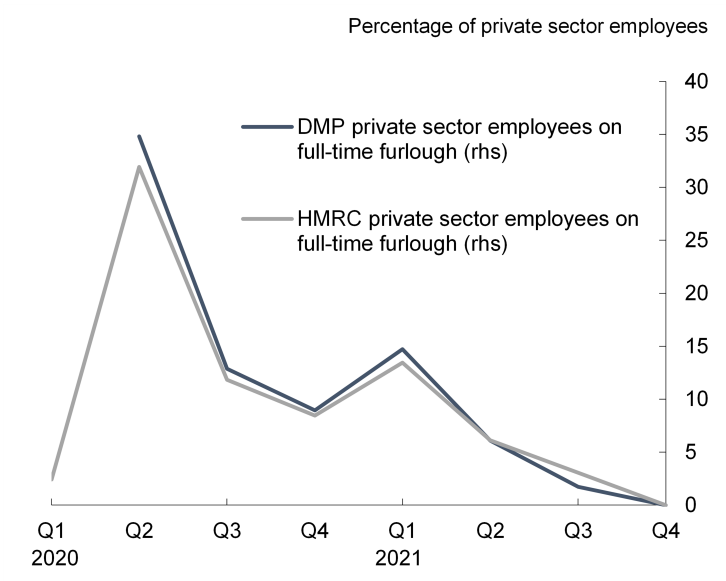


53

Source: Decision Maker Panel, ONS and authors' calculations.

Notes: Data are three-month moving averages. DMP data are adjusted to match the mean and variance of growth in the corresponding ONS series over the time period shown on each chart. DMP sales data are compared to whole economy nominal ONS total final expenditure from the National Accounts (ABMF, equivalent to GDP plus the value of imports). DMP price data for the whole private sector are compared to ONS CPI inflation (D7G7), which only includes consumer prices. DMP employment (for the private sector) is compared to both ONS private sector employment (MFZ2). DMP capital expenditure data are benchmarked against ONS nominal business investment data (NPEK).

Figure 33: Percentage of employees on furlough during the Covid-19 pandemic

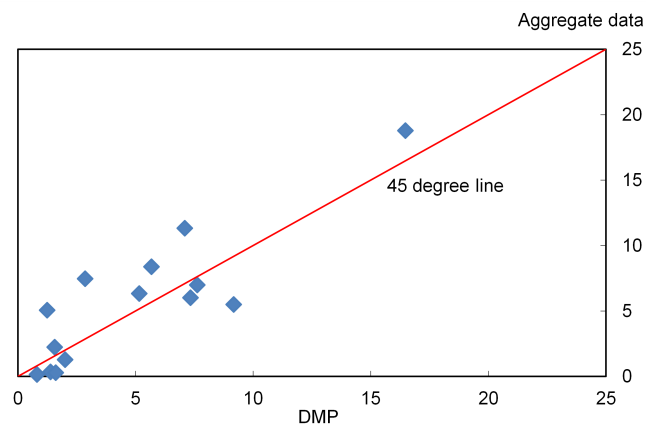


Source: Decision Maker Panel, HMRC and authors’ calculations.

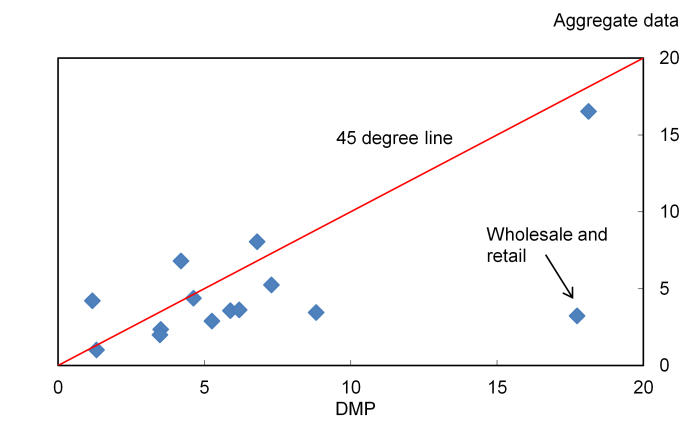
Notes: Quarterly data. Percentage of employees on full-time furlough (still employed by not required to work any hours) only.

Figure 34: Measures of EU exposure

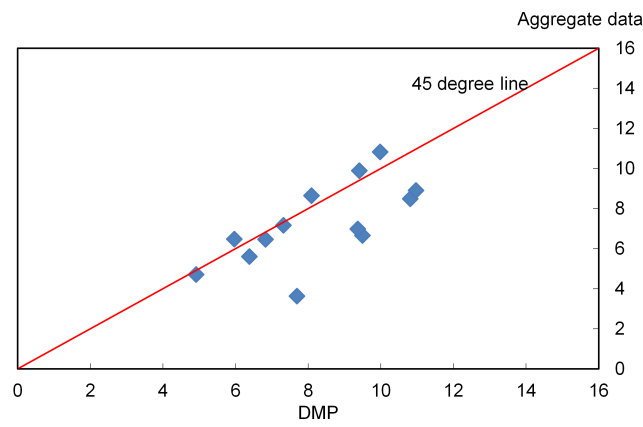
Panel A: Percentage of sales that were exports to the EU, by industry



Panel B: Percentage of costs that were imports from the EU, by industry



Panel C: Percentage of EU migrants in workforce, by industry



Panel D: Aggregate Statistics

	DMP	Aggregate data
Percentage of sales that were exports to EU	6.9%	7.4%
Percentage of costs that were imports from EU	8.9%	6.9%
- Excluding wholesale and retail	7.7%	7.4%
Percentage of EU migrants in workforce	9.1%	8.1%

55

Source: Decision Maker Panel, ONS and authors' calculations.

Notes: DMP data on the percentage of sales that were exports to the EU, percentage of costs that were imports from the EU and percentage of employees who were EU migrants are for 2016 Q1. Aggregate data on the percentage of sales that were exports to the EU and the percentage of costs that were imports from the EU are for 2015. They are calculated from the ONS 2015 Input-Output tables and are for the market sector. Imports as a percentage of costs are imports that are used for intermediate consumption. The share of imports used for intermediate consumption that are from the EU in each industry is assumed to be the same as the share of EU imports in total imports in that industry. Aggregate data on the percentage of employees who were EU migrants are for 2016 H1. They are calculated from the ONS Labour Force Survey and are the percentage of employees who report working in the private sector who were born in the EU.

B Tables

Table 1: Multinomial logit model to test for differences between the three sub-panels of the DMP survey

Dependent variable: Whether in sub-panel 1, 2 or 3 of the survey (sub-panel 1 is reference group)	Sub-panel 2	sub-panel 3
Leave vote share	0.066 (0.180)	-0.018 (0.181)
Log of employment	0.040 (0.032)	0.026 (0.032)
Log of sales	-0.002 (0.032)	0.031 (0.032)
Log of assets	-0.020 (0.019)	-0.030 (0.019)
Log of firm age	-0.042 (0.039)	0.053 (0.039)
Log of labour productivity	-0.059 (0.045)	-0.059 (0.045)
1 digit industry dummies	Yes	Yes
Observations	12,419	44,206
Chi-squared for joint significance of industry dummies (p-value)	0.7072	0.7093

Notes: Multinomial logit model for whether a firm is in sub-panel 1, 2 or 3 of the DMP survey (dependent variable takes values of 1, 2 and 3). Only includes firms that have responded to the DMP survey at least once and who have been allocated to a sub-panel. Firm characteristics are accounts data (averages from 2017 to 2023; sales, assets and labour productivity are deflated by the GDP deflator) from the Bureau Van Dijk FAME database. Regressions also include dummy variables (coefficients not reported) for having missing employment, sales or labour productivity data and a constant. 'Leave vote share' is Electoral Commission data on the share of the vote for leaving the EU in the local authority that a firm is headquartered in. Robust standard errors are used. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 2: Characteristics of firms responding to the DMP survey

	Mean	Standard deviation	10th percentile	25th percentile	Median	75th percentile	90th percentile
Accounts data (2017-2023 averages)							
Employment	525	4,797	14	29	76	208	652
Employment growth (%)	2	16	-11	-3	2	7	15
Sales (£, 000)	144,919	2,072,608	2,309	6,753	15,607	38,665	117,423
Sales growth (%)	1	19	-13	-4	2	8	15
Investment (£,000)	7,394	139,024	2	20	134	688	3,061
Investment growth (%)	3	49	-45	-17	3	23	51
Firm age (years)	25	21	7	11	19	32	50
Percentage of publically listed firms	2%	15%	0	0	0	0	0

Notes: Data for the 14237 firms who have responded to the DMP survey by June 2024. Accounts data are from the Bureau van Dijk FAME database. Data are unweighted.

Table 3: Linear probability models for propensity to respond to the DMP

Dependent variable: Ever responded to a survey if in sampling frame	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Leave vote share	0.005 (0.013)	0.013 (0.013)	-0.011 (0.013)	-0.010 (0.013)	-0.004 (0.013)	-0.008 (0.013)	-0.008 (0.013)
Log of employment			0.026*** (0.001)	0.010*** (0.002)	0.008*** (0.002)	0.008*** (0.002)	0.011*** (0.002)
Log of sales				0.010*** (0.002)	0.005** (0.002)	0.006*** (0.002)	0.001 (0.002)
Log of assets					0.007*** (0.001)	0.005*** (0.001)	0.004*** (0.001)
Log of firm age						0.019*** (0.002)	0.018*** (0.002)
Log of labour productivity							0.008** (0.003)
1 digit industry dummies	No	Yes	Yes	Yes	Yes	Yes	Yes
Observations	62,651	62,651	62,651	62,651	62,651	62,651	62,651
R-squared	0.000	0.006	0.029	0.033	0.034	0.035	0.036
F-test for joint significance of industry dummies (p-value)	-	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Notes: Linear probability model for whether a firm is in the sampling frame and has ever responded to a DMP survey between September 2016 and June 2024 (1=responded to DMP, 0=Not responded). Only includes firms that were incorporated and had a set of published accounts for 2015 or earlier. Firm characteristics are pre-referendum accounts data from the Bureau Van Dijk FAME database (2015 data for most firms, earlier data if 2015 data were not available). Regressions also include dummy variables (coefficients not reported) for missing employment, sales or labour productivity data. 'Leave vote share' is Electoral Commission data on the share of the vote for leaving the EU in the local authority that a firm is headquartered in. Robust standard errors are used. *** p<0.01, ** p<0.05, * p<0.1.

Table 4: Linear probability models for propensity to respond to the DMP in each year

Dependent variable: Responded to a survey if in sampling frame	(1) 2016	(2) 2017	(3) 2018	(4) 2019	(5) 2020	(6) 2021	(7) 2022	(8) 2023	(9) 2024
Leave vote share	-0.001 (0.016)	-0.045* (0.025)	0.015 (0.018)	0.011 (0.013)	0.004 (0.012)	0.003 (0.013)	-0.001 (0.009)	-0.019** (0.008)	-0.014* (0.007)
Log of employment	0.002 (0.003)	0.011*** (0.003)	0.012*** (0.002)	0.010*** (0.002)	0.008*** (0.001)	0.009*** (0.001)	0.007*** (0.001)	0.005*** (0.001)	0.004*** (0.001)
Log of sales	0.006** (0.003)	0.004 (0.003)	-0.000 (0.002)	-0.003** (0.002)	-0.001 (0.001)	-0.003** (0.001)	-0.001 (0.001)	-0.002** (0.001)	-0.000 (0.001)
Log of assets	-0.000 (0.002)	0.002 (0.003)	0.004** (0.002)	0.003*** (0.001)	0.001 (0.001)	0.002** (0.001)	0.001 (0.001)	0.003*** (0.001)	0.002*** (0.001)
Log of firm age	0.001 (0.002)	0.008** (0.004)	0.008** (0.003)	0.017*** (0.002)	0.029*** (0.002)	0.029*** (0.002)	0.020*** (0.002)	0.023*** (0.002)	0.016*** (0.002)
Log of labour productivity	0.005 (0.004)	0.016*** (0.005)	0.009** (0.003)	0.011*** (0.002)	0.007*** (0.002)	0.010*** (0.002)	0.004** (0.002)	0.002 (0.002)	0.002 (0.001)
1 digit industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	14,956	14,813	28,998	41,340	44,206	43,516	62,110	65,648	65,133
R-squared	0.007	0.009	0.007	0.007	0.009	0.008	0.006	0.007	0.005
F-test for joint significance of industry dummies (p-value)	0.0000	0.0008	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Notes: Linear probability model for whether a firm is in the sampling frame and has responded to the DMP survey in each calendar year (1=responded to DMP, 0=Not responded). Only includes firms that were in the sample frame and were incorporated and active in each year. Firm characteristics are accounts data in the relevant year (and lags if data for the relevant year is missing) from the Bureau Van Dijk FAME database. Regressions also include dummy variables (coefficients not reported) for missing employment, sales or labour productivity data and a constant. 'Leave vote share' is Electoral Commission data on the share of the vote for leaving the EU in the local authority that a firm is headquartered in. Data on the impact of Covid-19 on sales are from the DMP survey. Robust standard errors are used. $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 5: Linear probability models for propensity to respond to the DMP during the Covid-19 pandemic

Dependent variable: Responded to a survey if in sampling frame	(1) 2020	(2) 2020	(3) 2021	(4) 2021	(5) 2022	(6) 2022
Impact of Covid-19 on sales (2020 Q2-2022 Q3 industry-level average)	0.0000 (0.0003)	-0.0000 (0.0003)	-0.0001 (0.0003)	-0.0002 (0.0003)	0.0004** (0.0002)	0.0003 (0.0002)
Leave vote share		0.0057 (0.0121)		0.0053 (0.0122)		-0.0085 (0.0087)
Log of employment		0.0093*** (0.0014)		0.0099*** (0.0013)		0.0071*** (0.0010)
Log of sales		-0.0027** (0.0013)		-0.0040*** (0.0013)		-0.0024** (0.0010)
Log of assets		0.0013 (0.0009)		0.0020** (0.0009)		0.0012** (0.0006)
Log of firm age		0.0289*** (0.0019)		0.0298*** (0.0021)		0.0190*** (0.0016)
Log of labour productivity		0.0077*** (0.0021)		0.0103*** (0.0021)		0.0044*** (0.0017)
1 digit industry dummies	No	No	No	No	No	No
Observations	44,206	44,206	43,516	43,516	62,110	62,110
R-squared	0.000	0.007	0.000	0.007	0.000	0.004

Notes: Linear probability model for whether a firm is in the sampling frame and has responded to the DMP survey in each calendar year (1=responded to DMP, 0=Not responded). Only includes firms that were in the sample frame and were incorporated and active in each year. Firm characteristics are accounts data in the relevant year (and lags if data for the relevant year is missing) from the Bureau Van Dijk FAME database. Regressions also include dummy variables (coefficients not reported) for missing employment, sales or labour productivity data. ‘Leave vote share’ is Electoral Commission data on the share of the vote for leaving the EU in the local authority that a firm is headquartered in. Robust standard errors are used. *** p<0.01, ** p<0.05, * p<0.1.

Table 6: Percentage of observations dropped across scenarios

Variable	Outliers		100% weight on one scenario	Probabilities not summing to 100%
	Realised growth	Expected growth	Expected growth	Expected growth
Sales	2.03%	4.61%	1.32%	0.007%
Price	0.56%	0.61%	3.65%	0.002%
Employment	1.37%	2.65%	1.30%	0.014%
Cost	0.34%	0.82%	3.31%	0.012%
Wage	0.10%	0.11%	2.40%	0.009%
Capital Expenditure	14.32%	14.14%	3.60%	0.059%


Appendix

A Figures

Figure A1: Format of regular questions on subjective expectations

Panel A: Scenarios

Decision Maker Panel

 **BANK OF ENGLAND**

Looking a year ahead from the second quarter of 2024 to the second quarter of 2025, by what % amount do you expect your SALES REVENUE to have changed in each of the following scenarios?

Notes:
(a) Please include sales of UK-based businesses only and not from any overseas part of the group.
(b) Sales growth scenarios should be ordered from the lowest to the highest.

The LOWEST % change in sales revenue would be about: %

A LOW % change in sales revenue would be about: %


A MIDDLE % change in sales revenue would be about: %

A HIGH % change in sales revenue would be about: %

The HIGHEST % change in sales revenue would be about: %

Panel B: Probabilities

Decision Maker Panel

 **BANK OF ENGLAND**

Please assign a percentage likelihood (probability) to the % changes in SALES REVENUE you entered (values should sum to 100%)

LOWEST: The likelihood of realising about **2%** would be: %

LOW: The likelihood of realising about **3%** would be: %

MIDDLE: The likelihood of realising about **4%** would be: %

HIGH: The likelihood of realising about **5%** would be: %

HIGHEST: The likelihood of realising about **8%** would be: %

Total	<input style="width: 40px; text-align: center;" type="text" value="100"/> %
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Figure A2: Format of long-term special question on Brexit uncertainty

Decision Maker Panel

 **BANK OF ENGLAND**

How important is the result of the EU referendum affected the level of uncertainty affecting your business?

Not important

One of many drivers of uncertainty

One of the top two or three drivers of uncertainty for our business

The largest current source of uncertainty for our business

Bank of England | [Decision Maker Panel](#)

Figure A3: Format of short-term special question on the Covid-19 pandemic

Panel A: Direction

Decision Maker Panel



Relative to what would otherwise have happened, what is your best estimate for the impact of the spread of coronavirus (Covid-19) on the number of EMPLOYEES your business has in each of the following periods?

Notes:

- (a) Please include employees of UK-based businesses only and not from any overseas part of the group.
- (b) Please include people still on your payroll but not required to work any hours (e.g. 'on furlough') as employees.

2022 Q1 (January to March)	<input type="text" value="Number of employees lower"/>
2022 Q2 (April to June)	<input type="text" value="Number of employees lower"/>
2022 Q3 (July to September)	<input type="text" value="No impact"/>
2023+	<input type="text" value="No impact"/>

Panel B: Estimate

Decision Maker Panel



Relative to what would otherwise have happened, what is your best estimate for the impact of the spread of coronavirus (Covid-19) on the number of EMPLOYEES your business has in each of the following periods?

Please provide an estimate in percentage terms of how much higher/lower you expect your number of employees to be in each quarter. Enter 0 for no impact.

Notes:

- (a) Please include employees of UK-based businesses only and not from any overseas part of the group.
- (b) Please include people still on your payroll but not required to work any hours (e.g. 'on furlough') as employees.

Number of employees in 2022 Q1 (January to March) will be lower by the following percentage:	<input type="text"/>	%
Number of employees in 2022 Q2 (April to June) will be lower by the following percentage:	<input type="text"/>	%
Number of employees in 2022 Q3 (July to September) will not be impacted.	<input type="text" value="0"/>	%
Number of employees in 2023+ will not be impacted.	<input type="text" value="0"/>	%