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Tracking the views of British businesses: evidence from the Decision Maker Panel

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Tracking the views of British businesses: evidence from the Decision Maker Panel

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- In partnership with academics from Nottingham and Stanford Universities, the Bank has launched a new monthly survey of senior executives in British businesses — the Decision Maker Panel (DMP) — that will enable better measurement of the impact of uncertainty on business decisions.
- DMP members are polled regularly about their expectations for business conditions and the uncertainty around those expectations. Early results suggest that there is an important relationship between uncertainty and decisions on investment and employment.

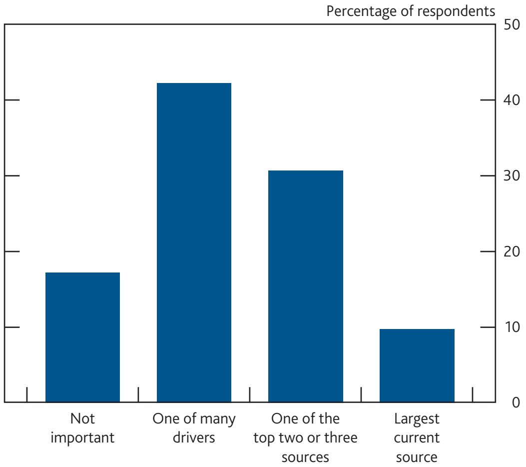
Overview

It is widely believed that uncertainty can have an important influence on economic outcomes. To measure uncertainty at the company level, the Bank has launched a new monthly survey of senior executives in British businesses — the Decision Maker Panel (DMP) — in partnership with academics from Nottingham and Stanford Universities. DMP members are asked regular questions about developments in, and the probabilities they ascribe to, a range of possible future outcomes in the following areas: investment and borrowing; employment and costs; and sales and prices. These regular questions have been supplemented by special questions that have so far focused on the possible impact of Brexit on business conditions.

Early results suggest that there is an important relationship between uncertainty about future sales and current investment and employment decisions.

Around 40% of respondents cited EU withdrawal as at least one of the top two or three sources of uncertainty facing their business, while around 20% said that it was not an important source of uncertainty (**Summary chart**). On the whole, respondents expected EU withdrawal to have a negative effect on investment and sales, a broadly neutral effect on exports and to lead to higher costs. However, there was wide variation across sectors.

Summary chart Brexit as a source of uncertainty[(a)]



Sources: DMP and authors' calculations.

(a) Question: 'How much has the result of the EU referendum affected the level of uncertainty affecting your business?' Data were collected between February and April.

(1) The authors would like to thank Sumit Dey-Chowdhury and other colleagues at HM Treasury, Georgia Craven, Okon Enyenihi, Kate Fisher, Chloe Gilbert, Kerenssa Kay, Tamara Li, Nandita Padki, Ian Short, Stefania Spiga and all other members of the recruitment team for their help with the Decision Maker Panel project.

It is widely believed among the business community, policymakers and academic researchers that uncertainty can have an important influence on economic outcomes.(1) Yet there is relatively little, if any, direct quantitative information about the extent of uncertainty perceived by UK decision makers in individual businesses or how they are reacting to it.

To address this gap, in August 2016 the Bank launched a new monthly survey of senior executives from British non-financial businesses called the Decision Maker Panel (DMP). It has been designed in partnership with Professor Nicholas Bloom of Stanford University, Professor Paul Mizen of the University of Nottingham and colleagues from HM Treasury. It has similarities with a collaboration in the United States between Professor Bloom and the Atlanta Federal Reserve Bank.(2)

The DMP provides an important new source of timely information on how business conditions are changing throughout the economy. Each month, the Bank has asked panel members about developments in, and the probabilities they ascribe to, a range of possible future outcomes in the following areas: investment, borrowing, employment, costs, sales and prices.

In addition, these regular questions have been supplemented by special questions that have so far focused on the possible impact of Brexit on business conditions. The DMP will be especially valuable in tracking developments among British businesses as the United Kingdom goes through the process of leaving the European Union. As was noted in the Bank of England's August 2016 *Inflation Report* (page 37), 'the vote to leave the European Union is likely to have significant implications for the UK economic outlook. It will take some time for those implications to become clear'. The information collected through the DMP should provide information that helps better understand those implications as they emerge.

The DMP is complementary to other sources of business information, including regular business surveys and the intelligence gathered by the Bank's Agency network; a number of DMP members are also regular contacts of the Bank's Agents. Agency intelligence is particularly useful in helping to understand what lies behind the more quantitative responses from the DMP survey. The Bank intends to publish the headline results from the DMP survey on a quarterly basis from September 2017, alongside the Agents' summary of business conditions.

The DMP offers several benefits: (i) the responses are timely and available to policymakers within the month that they are collected; (ii) responses are quantitative, whereas most business surveys indicate the direction of change rather than its magnitude; (iii) by polling the same decision makers over time it is possible to track changing business conditions more reliably; (iv) special questions of topical interest can be added on a monthly basis as desired; (v) the sample has been chosen in such a way that valid inferences can be made about the population from which it is drawn; (vi) the data can be disaggregated, for example by industry or firm size, to assess differences in business conditions for different types of companies; and (vii) historical data on the businesses of DMP members is available from company accounts for longer-term analysis.

After an initial period of piloting survey questions, the DMP has been running on a consistent basis since November 2016. At the time of writing, there were almost 2,000 DMP members but this figure is growing each month as new panel members are recruited to the DMP. The composition of the DMP membership has been selected to be representative of the UK business population, including the non-profit sector. It is intended to build up the sample further over time so that it has good coverage of most sectors of the economy.

The full benefit of the DMP will only be realised over time as the sample size increases and a longer time series of responses becomes available. Nevertheless, it has already helped to inform the MPC's deliberations, as has been referenced in the MPC's minutes, the *Inflation Report* and evidence to Parliament.(3)

The purpose of this article is to report some of the early findings on how DMP members see their businesses developing. It focuses on two areas. First, how DMP members have described the economic outlook, with a focus on sales. Second, how DMP members have reported that they expect Brexit to affect their businesses. All results are weighted to match the characteristics of the UK business population. The survey methodology is described in more detail in the Appendix on pages 118–120.

The outlook for sales

In the May 2017 *Inflation Report*, the MPC's central projection was for the rate of annual economic growth to slow slightly over the course of 2017. Real household spending growth was expected to weaken as real incomes slowed, but export

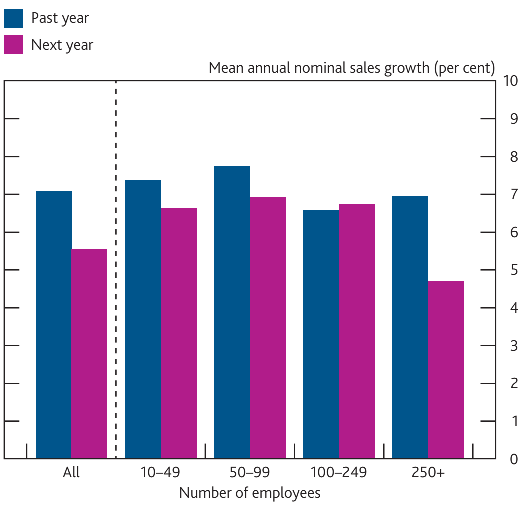
(1) See, for example, recent speeches by MPC members entitled 'Uncertainty, the economy, and policy'; www.bankofengland.co.uk/publications/Documents/speeches/2016/speech915.pdf. 'Uncertainty about uncertainty'; www.bankofengland.co.uk/publications/Documents/speeches/2016/speech942.pdf. 'Uncertain times'; www.bankofengland.co.uk/publications/Documents/speeches/2016/speech929.pdf. 'What's going on? Uncertain data and uncertain outcomes'; www.bankofengland.co.uk/publications/Documents/speeches/2016/speech907.pdf.
(2) See www.frbatlanta.org/research/surveys/decision-maker/?panel=1.
(3) For example see paragraph 15 of the November MPC *Minutes*; www.bankofengland.co.uk/publications/minutes/Documents/mpc/pdf/2016/nov.pdf; page 16 of the February 2017 *Inflation Report;* www.bankofengland.co.uk/publications/Documents/inflationreport/2017/feb.pdf; and Q48 of the Treasury Select Committee hearing on the February 2017 *Inflation Report;* http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/treasury-committee/bank-of-england-february-2017-inflation-report/oral/47444.html.

growth was expected to strengthen in the short term as global demand picked up and UK exporters benefited from what was then a 16% depreciation of sterling from its November 2015 peak.

Evidence from the DMP collected in Spring 2017 (February to April) was broadly supportive of this outlook. Many DMP members reported that their businesses had enjoyed strong nominal sales growth up to the turn of the year, but that they were expecting sales growth to be a little more subdued over the course of 2017. On average, DMP members reported that nominal sales had grown by 7.1% in the year to 2016 Q4, but that growth was expected to slow to 5.6% in the year to 2017 Q4. Given that DMP members expected their prices to increase at a marginally faster rate over the coming year (see section on The outlook for costs and prices), this was consistent with a slowdown in real sales growth.

Within these averages, there was both a significant range of outcomes for individual DMP members and uncertainty around their expectations for the coming year. **Chart 1** shows how average sales growth had varied across businesses of different sizes. On average, smaller firms had experienced slightly stronger sales growth than larger firms over the year to 2016 Q4 and they were expecting stronger sales growth over the year ahead too.

Chart 1 Average nominal sales growth by firm size[(a)]



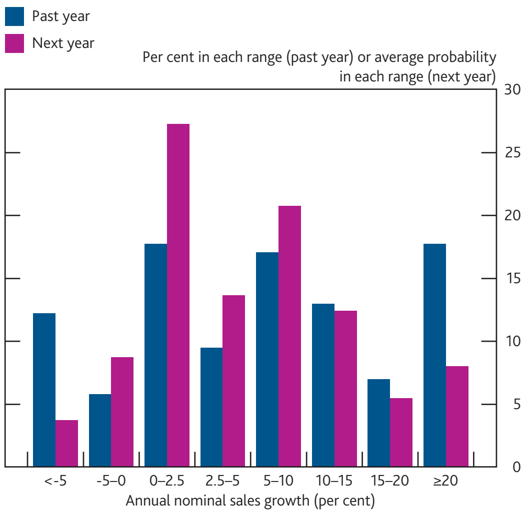
Sources: DMP and authors' calculations.

(a) Data were collected between February and April and refer to 2016 Q4.

More generally, the range of experience for individual DMP members was wide (**Chart 2**). The blue bars on **Chart 2** show the percentage of respondents that reported nominal sales growth in the different ranges indicated; for example, 17% achieved annual sales growth in the range 5% to 10%. It is striking that even though sales grew by 7% on average, 18% of DMP members reported negative sales growth, while a similar proportion reported sales growth of over 20%.

Given the wide variation in individual experience over the past year, it is not surprising that DMP members were unsure about how fast their sales would grow in the year ahead. The magenta bars in **Chart 2** show the average probability that DMP members attributed to achieving growth rates in those ranges over the coming year; for example, on average, they thought there was a 21% chance of sales growth of 5% to 10%. While DMP members saw some chance of very low or very high outcomes, they attributed less probability to these extreme outcomes than the proportion of times that these outcomes actually occurred over the past year: the magenta bars are smaller than the blue bars at the edge of the distribution. For example, 18% of DMP members reported nominal sales growth of over 20% over the year to 2016 Q4, but on average, they attributed only a 8% chance to such high growth in the coming year.

Chart 2 Distribution of nominal sales growth over past year and expectations for next year[(a)]



Sources: DMP and authors' calculations.

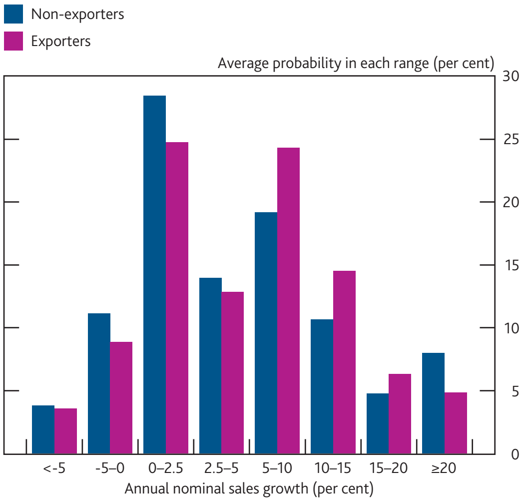
(a) Data were collected between February and April and refer to 2016 Q4.

There was little difference in the average rate of sales growth expected by exporters and non-exporters: both were expecting annual sales growth of around 5%.[(1)] But exporters were slightly more uncertain and attached less weight to modest growth in sales of between 0% and 5% (**Chart 3**).

The standard deviation of the distribution of expected sales growth is an indicator of the uncertainty that businesses are facing. Uncertainty is likely to vary over time as economic conditions change. At this early stage in the development of the DMP, where a time series of readings is not available, it is not possible to tell from the DMP alone whether the uncertainty facing British businesses is unusually high, low or

(1) This average for both groups was slightly less than the average for all DMP members reported in **Chart 1** because the companies who had answered a previous question on whether they export or not had lower average expected sales growth than those who had not answered that export question.

Chart 3 Distribution of expected sales growth over the next year for exporters and non-exporters[(a)]



Sources: DMP and authors' calculations.

(a) Data were collected between February and April and refer to 2016 Q4.

normal, although, as **Chart 2** shows, reported uncertainty was, if anything, low relative to the cross-sectional variation in achieved outcomes for sales growth. But it is possible to assess which types of companies are more uncertain than others within the cross-section: for example exporters had a slightly higher standard deviation of expected sales growth over the next year in 2016 Q4 than non-exporters (5.0% versus 4.3%).

Uncertainty about the UK macroeconomic outlook

Uncertainty about the overall economic outlook is one of the factors influencing DMP members' uncertainty about their own sales. Their assessment of this appears to be broadly in line with that of professional economic forecasters. In March 2017, DMP members were asked to assess the likelihood of different possible outcomes for GDP growth in the year ahead. The average responses are summarised in **Table A** alongside those of professional economic forecasters as reported in the Bank's Survey of External Forecasters in February 2017. The distribution of probabilities provided by DMP members was broadly similar to that of professional economic forecasters with the expected growth rate of both groups being around 1% and with almost the same average weight given to tail outcomes.

The effect of uncertainty on corporate decisions

Uncertainty about economic prospects is likely to influence business decisions, especially those that cannot easily be reversed. In theory, businesses facing elevated uncertainty would be more likely to defer irreversible investment projects

Table A Expectations for real GDP growth over the next year[(a)]

Per cent

DMP respondents		Professional economists	
GDP growth scenario	Probability	GDP growth scenario	Probability
-2 or less	6	less than -1	5
-1	10	-1 to 0	10
0	18	0 to 1	30
1	32	1 to 2	33
2	27	2 to 3	16
3 or more	7	3 or more	6

Sources: Bank of England, DMP and authors' calculations.

(a) DMP data were collected in March and refer to 'the year ahead'. Data for professional economists were collected in January, referring to the year to 2018 Q1, and were published alongside the February 2017 *Inflation Report*.

until the outlook became clearer — the so-called 'real options effect' that confers the value of waiting. However, it has been difficult to assess the relevance of this concept in practice because of a lack of information about how much uncertainty businesses are facing; most tests in the academic literature use proxy information about uncertainty that is not derived directly from those making business decisions.

Early evidence from the DMP survey finds that firm-level uncertainty does weigh on the investment and hiring decisions of businesses. In **Table B** we report some simple firm-level regressions that relate the investment and employment expectations of DMP members to expected sales growth in their businesses and the uncertainty around that (as represented by the standard deviation of their expected sales growth over the next year).

Table B Regression results showing how uncertainty about sales expectations affects investment and employment decisions[(a)]

Dependent variable:	Expected investment growth growth over next year (per cent)	Expected employment over next year (per cent)
	(1)	(2)
Investment growth over past year (per cent)	-0.086*** (0.031)	
Employment growth over past year (per cent)		0.033 (0.031)
Expected percentage sales growth over next year:		
Mean	0.698*** (0.185)	0.163*** (0.040)
Standard deviation	-0.648** (0.280)	-0.115* (0.061)
Skewness	4.884** (1.943)	0.080 (0.218)
Observations	298	718
R-squared	0.164	0.094

Sources: DMP and authors' calculations.

(a) Robust standard errors in parentheses (adjusted for clustering), *** $p<0.01$, ** $p<0.05$, * $p<0.1$. All equations also include time dummies, industry dummies and a constant. The sample for the investment equation is limited to companies whose investment over the past year (in levels) was within the range of scenarios given for expected investment over the next year and whose expected investment growth was between -50% and 70%.

The regression results show that DMP members who were more uncertain about the outlook for sales growth had weaker investment and employment expectations, once their mean expected sales growth was taken into account.

The equation in column (1) of **Table B** shows that, for given mean sales growth, an extra standard deviation of uncertainty reduces expected investment growth by around 0.65 percentage points. This coefficient is statistically different from zero at the 5% significance level. As well as the standard deviation, the skewness of expected future sales growth (a measure of the asymmetry of the distribution) appears relevant too. The coefficient on skewness is also significant at the 5% level, with a positive coefficient, suggesting that firms with a negative skew on expected sales growth invest less. The equation in column (2) shows that uncertainty about future sales growth is also associated with weaker employment growth, at least at the 10% significance level.

These results are very provisional and the samples are small, but they support the hypothesis that uncertainty about future sales growth matters for investment and employment. They illustrate the importance and usefulness of quantitative information about uncertainty from businesses in gaining a better understanding of its effects. As the DMP survey evolves the sample size will become larger and will include more variation over time and across more DMP members, allowing for a more comprehensive analysis.

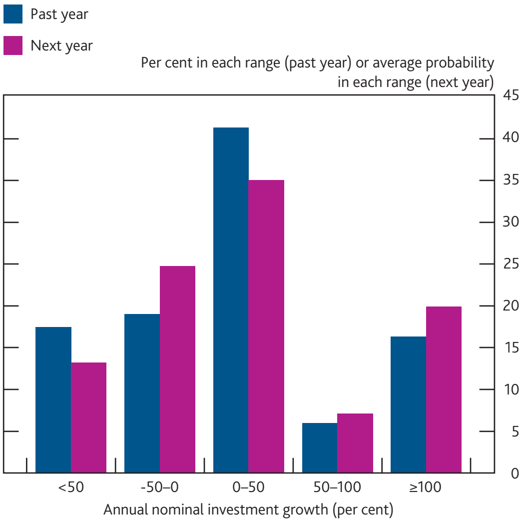
The outlook for investment and employment

Information from the DMP can help the Monetary Policy Committee to assess the prospects for investment and employment. The outlook for investment and employment as reported by DMP members is shown in **Charts 4** and **5** respectively. DMP members, on average, were expecting investment to grow by more over the year to 2017 Q4 than it had done in the year to 2016 Q4: median expected investment growth was around 3% over the year to 2017 Q4, compared to zero over the previous year.(1) While investment is very volatile at the firm level, reflected in the size of buckets shown in **Chart 4**, DMP members were attaching a slightly higher probability to high outcomes for investment over the coming year than were achieved over the past year (**Chart 4**). By contrast, employment growth was expected to slow over the coming year, with around a 30% chance that employment would be reduced (**Chart 5**).

The outlook for costs and prices

DMP members reported that they were expecting annual unit cost inflation (the percentage increase in the cost of making a fixed unit of output) to be around 3.5% over the coming year, a little lower than the 4% they reported for the past year (**Chart 6**). Those increases in costs are likely to put upward

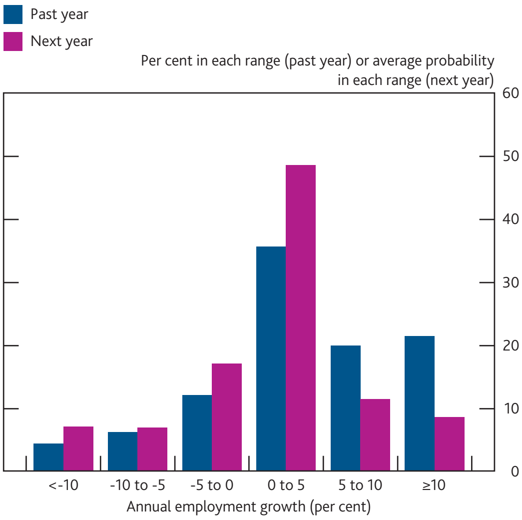
Chart 4 Distribution of investment growth over the past year and expectations for next year(a)



Sources: DMP and authors' calculations.

(a) Data were collected between February and April and refer to 2016 Q4.

Chart 5 Distribution of employment growth over the past year and expectations for next year(a)



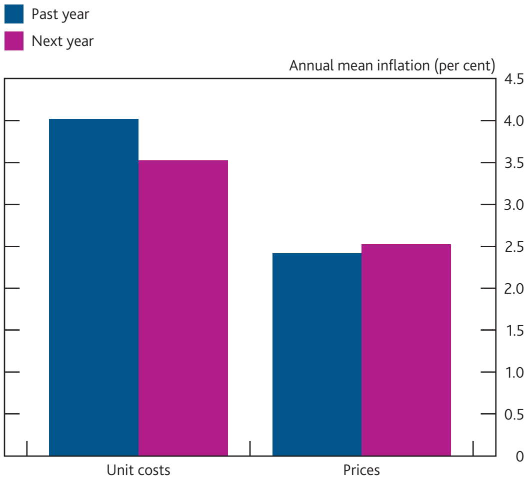
Sources: DMP and authors' calculations.

(a) Data were collected between February and April and refer to those months.

pressure on prices: DMP members were expecting that inflation in their own prices would pick up marginally over the coming year from 2.4% to 2.5% (**Chart 6**). Expectations for year-ahead price rises were highest among wholesale and retail businesses, where own prices were expected to increase by 3.4% (**Chart 7**). This was also the sector that expected the highest unit cost inflation. These data from the DMP allow the Monetary Policy Committee to observe cost increases before they feed through to prices, and they indicate the sectors that are being more or less affected by cost pressures at any point in time.

(1) The median is reported here because investment is lumpy at the firm level and therefore the mean can be affected by some companies having very high growth rates.

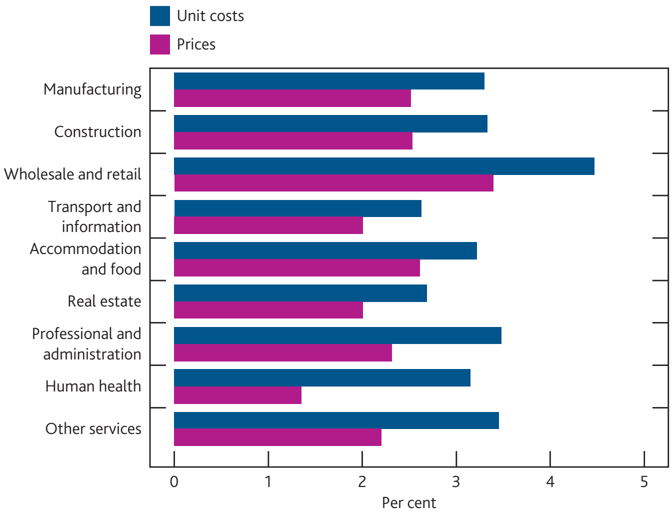
Chart 6 Average unit cost and price inflation over the past year and expectations for next year[(a)]



Sources: DMP and authors' calculations.

(a) Data were collected between February and April and refer to those months.

Chart 7 Mean unit cost and price inflation expectations for next year by industry[(a)]



Sources: DMP and authors' calculations.

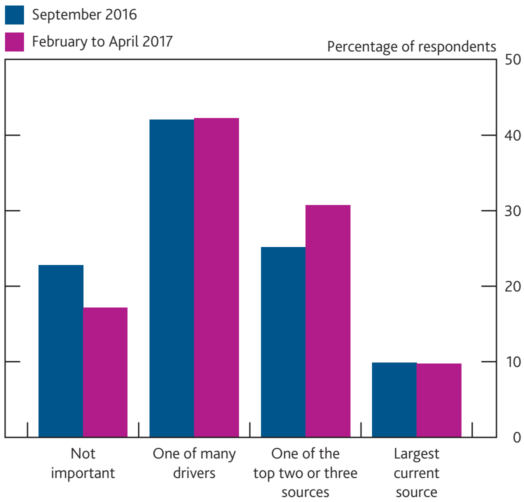
(a) Data were collected between February and April and refer to those months.

Evidence on the expected impact of leaving the European Union

As noted in the introduction, the DMP is likely to be valuable in helping to track how business attitudes to Brexit evolve, especially as details of future trading arrangements become clearer. It is important for policymakers to know how firms perceive the risks and possible opportunities associated with Brexit and how they are acting on them. So, as well as being asked about the general economic conditions facing their businesses, DMP members have also been asked specifically about the impact of Brexit, and what action they were expecting to take in response. This section summarises those results.

Brexit may lead to substantial changes in the United Kingdom's international trading arrangements and/or the regulation of its product and labour markets. Labour markets might also be affected by any changes in the ability of workers to move to and from the United Kingdom. Businesses that are not directly affected by these developments may be affected indirectly by the impact on their customers and trading partners. Consistent with this, around 40% of DMP members reported that Brexit was at least one of the top two or three sources of uncertainty for their business (**Chart 8**). Around 20% viewed Brexit as not important as a source of uncertainty, while the remaining 40% saw Brexit as one of many drivers of business risk. These responses were broadly similar when the question was first asked in September 2016 and when it was asked again in Spring 2017, although there had been a slight fall in the proportion of respondents who saw Brexit as being unimportant in the more recent poll.

Chart 8 Brexit as a source of uncertainty[(a)]

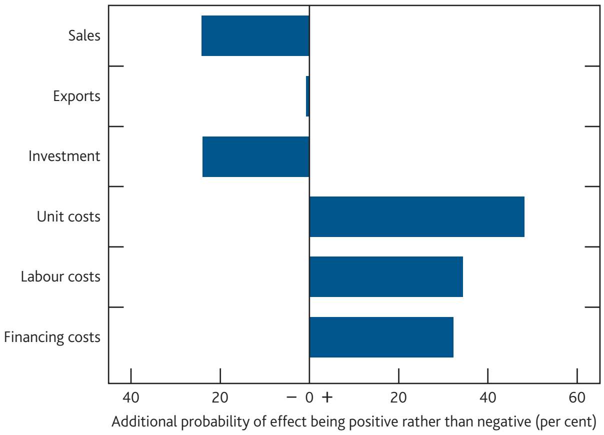


Sources: DMP and authors' calculations.

(a) Question: 'How much has the result of the EU referendum affected the level of uncertainty affecting your business?' Data were collected between February and April.

DMP members reported that they thought it more likely than not that Brexit would have a negative effect on their investment in the short term and their sales in the medium term. They also reported that they expected that their unit costs, labour costs and financing costs would be higher in 2020 than they would have been had the United Kingdom remained a member of the European Union. This is illustrated in **Chart 9**, which shows the additional probability that DMP members attached to Brexit having a positive rather than a negative effect on each variable at a particular time horizon. For example, the negative overall balance of -24% for the eventual effect of Brexit on sales means that companies placed more weight on Brexit reducing sales than on it increasing them: the average probability attached to Brexit increasing sales was 18%, while the average probability of a negative impact was 43%; the average probability of it having no effect was 39%.

Chart 9 The expected impact of Brexit[(a)]

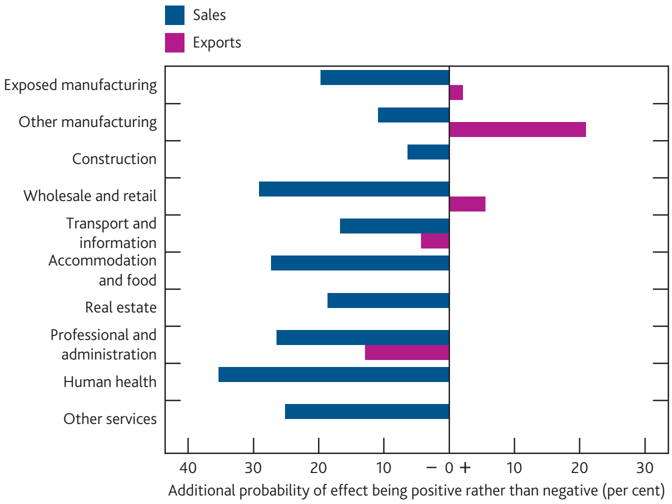


Sources: DMP and authors' calculations.

(a) See survey methodology box for wording of questions. Sales and labour cost data were collected between February and April. Export, unit cost and financing cost data were collected between November and January. Investment data were collected in October. Sales and labour cost impacts are for the eventual Brexit deal, export, unit cost and financing cost impacts are for 2020 and investment impact relates to the next year.

Looking in more detail at the expected impact of Brexit on sales and other variables, it is possible to break down the results by industry and firm size. This analysis is based on the nine major non-financial sectors that are used in the weighting over the survey, except that manufacturing firms are split into two broadly equally sized groups that are more and less exposed to EU trade depending on which subsector they are in. Subsectors (based on two digit SIC codes) that export more than 20% of their output to the EU are classified as more exposed to Brexit. The net expected Brexit effect on sales was negative for all sectors (**Chart 10**), and for all firm sizes (**Chart 11**).

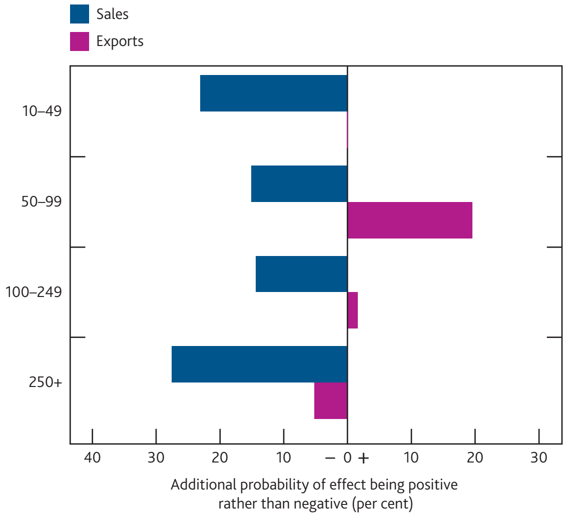
Chart 10 Expected impact of Brexit on sales and exports by industry[(a)]



Sources: DMP and authors' calculations.

(a) See survey methodology box for wording of questions. Sales data were collected between February and April, export data were collected between November and January. Sales impacts are for the eventual Brexit deal and export impacts relate to 2020. Export data are only shown for industries where at least ten exporting companies responded.

Chart 11 Expected impact of Brexit by firm size[(a)]



Sources: DMP and authors' calculations.

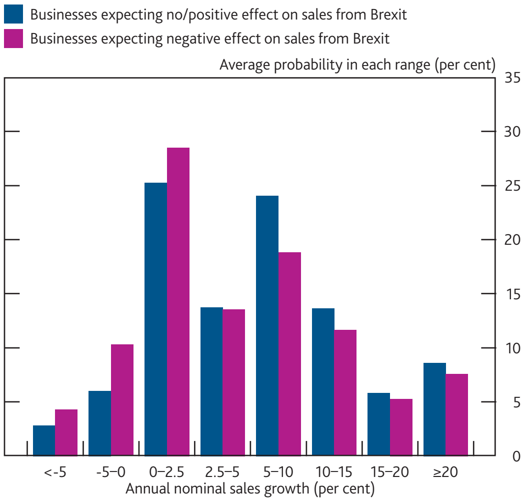
(a) Categories refer to number of employees. See survey methodology box for wording of questions. Sales impacts are for the eventual Brexit deal and export impacts relate to 2020. Sales data were collected between February and April, export data were collected between November and January.

The effect of Brexit on exports was expected to be positive by DMP members in manufacturing industries that are less exposed to EU trade and in wholesale and retail, but negative in transport and information and professional and administrative services (**Chart 10**). This pattern could, for example, be due to a stronger response to the fall in the exchange rate that took place after the referendum among firms producing goods rather than services. Small and medium sized firms were typically more positive about the impact of Brexit on their exports than large companies (**Chart 11**).

Those DMP members who expected Brexit eventually to have a negative impact on their sales also expected lower sales growth in the year ahead. DMP members who thought that Brexit was likely to reduce sales in the longer term typically attached more weight to the possibility of their nominal sales falling over the next year and less weight to possible increases of more than 5% than DMP members who expected no Brexit impact on sales or a positive one (**Chart 12**).

DMP members indicated in October that Brexit was expected to weigh on investment over the following year. The average probability attributed by DMP members to Brexit reducing investment was 33%, compared to only a 9% chance of there being a positive impact (**Chart 13**). DMP members that are exporters placed slightly less weight on Brexit reducing investment over the next year than non-exporters. But many DMP members still attached a substantial probability to investment growing over the next year (as shown in **Chart 4**), underlining the fact that Brexit is only one of several factors that is likely to determine investment decisions.

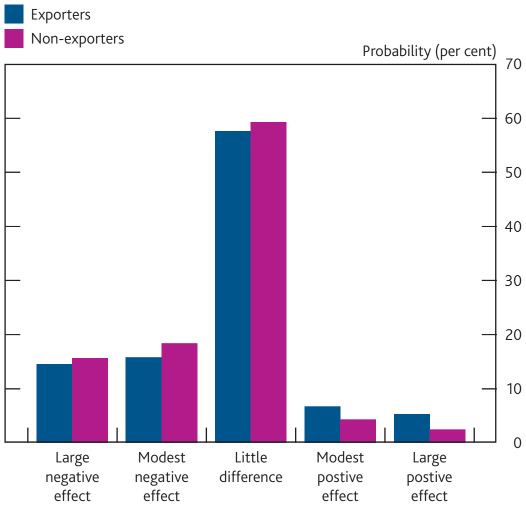
Chart 12 Distribution of expectations for nominal sales over next year and longer-run Brexit sales impact(a)



Sources: DMP and authors' calculations.

(a) Data were collected between February and April and refer to 2016 Q4.

Chart 13 Expected impact of Brexit on investment(a)



Sources: DMP and authors' calculations.

(a) See survey methodology box for wording of question. Data were collected in October. Investment impacts relate to the next year.

Conclusion

The Decision Maker Panel is an important and innovative new source of quantitative information on the expectations of the British business community and their perceptions of the associated uncertainty. In time, it will become increasingly valuable to the Bank in terms of informing better policy decisions and creating opportunities for high-quality research into business decision making. Improving understanding of the decisions that companies are making is likely to be particularly important to policymakers over the next few years as UK businesses navigate the uncertain process of the United Kingdom leaving the European Union.

Appendix A
Survey methodology

This appendix sets out how members of the Decision Maker Panel (DMP) were selected, summarises the characteristics of their businesses as of April 2017 and discusses the type of questions they have been asked.

Sample selection

The Decision Maker Panel is made up of senior executives from a diverse group of UK companies. The sample of companies was selected from a database containing information that all UK companies must submit annually to Companies House. All active companies with at least ten employees, who were not a subsidiary of a UK parent company, who had a complete set of company accounts information and who were in the sectors covered by the DMP were eligible for selection. The DMP excludes companies in agriculture, mining and quarrying, finance and insurance and public administration and defence.(1) Companies were divided into 36 groups based on nine industries and four size categories and were then selected randomly into the sampling frame within these strata to achieve a representative sample.

Companies who were drawn into the sampling frame were then contacted by a member of the team of analysts based at the University of Nottingham by telephone and email. A senior decision-maker (typically the Chief Financial Officer) within the firm was asked to participate in the panel. If the participant agreed, they would be emailed a link to a short web-based survey, with subsequent surveys being sent once a month.

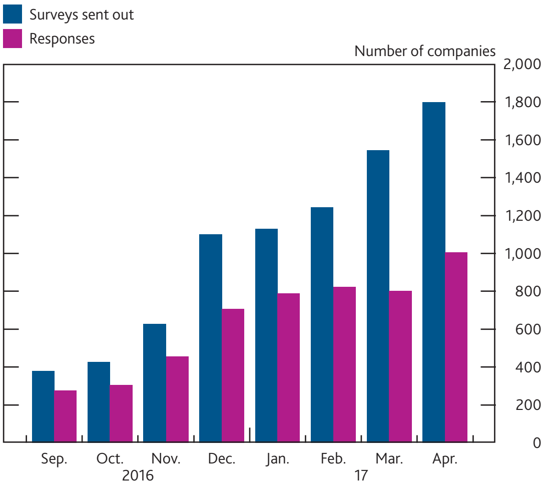
Characteristics of the panel members

The sample size has grown over time as more members have been recruited. By April 2017, members from around 1,800 companies, representing 2.2 million employees had agreed to be part of the panel with just over 1,000 members responding to the April survey (**Chart A:1**). A target sample size for the DMP survey is 2,500 responses, to provide sufficient firms to split the sample for analysis, by sector, region or firm type. Greater precision is gained by recruiting a larger sample of firms, and so to maintain the sample size it will be necessary to replace participants who drop out of the sample over time. Panel members are spread widely across the industrial sectors of the UK economy (**Chart A:2**) and the size distribution of UK firms (**Chart A:3**).

Weighting

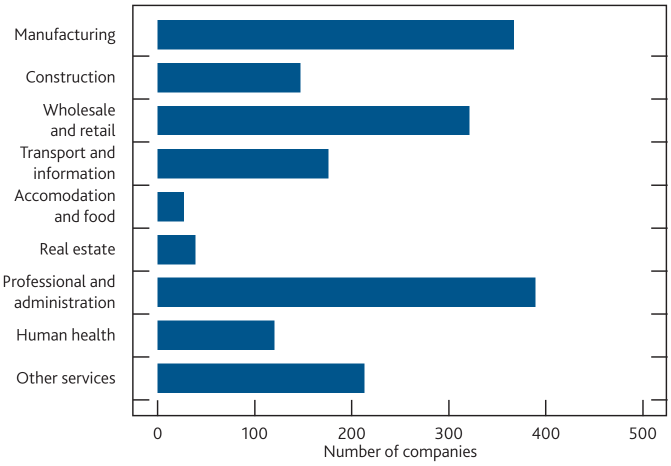
When analysing the results, responses are weighted so that the sample is representative of the business population of the United Kingdom using data from the Business Register, maintained by the Department for Business, Energy and Industrial Strategy (BEIS). To construct the weights, respondents are divided into the 36 groups used in creating the sample (nine industries and four size categories). The weight of each company is calculated as the total employment share accounted for by that group within the business population divided by the number of DMP respondents within that group. So, for example, all manufacturers with over 250 employees are given the same weight. This methodology allows the results to be representative but prevents very large individual companies dominating the overall results. When weighted, the employment distribution of the DMP matches that of the BEIS business register by industry (**Chart A:4**) and firm size (**Chart A:5**).

Chart A:1 Survey sample size



Sources: DMP and authors' calculations.

Chart A:2 DMP members by industry(a)

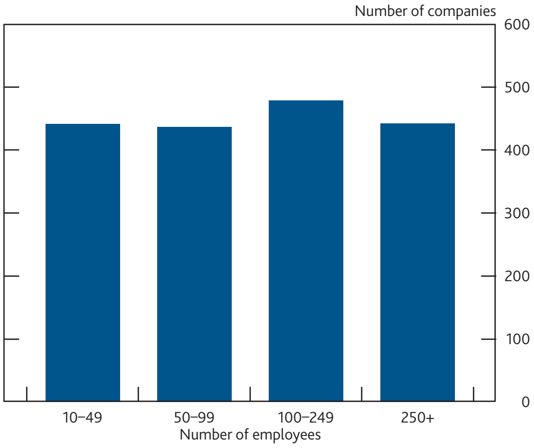


Sources: DMP and authors' calculations.

(a) All DMP members who were sent the April survey.

(1) Financial companies were excluded because those businesses have a very different structure to non-financial firms, and because the Bank has other strong connections with major financial companies. Other sectors were excluded because they only contain relatively small numbers of companies or they only make up a small share of employment.

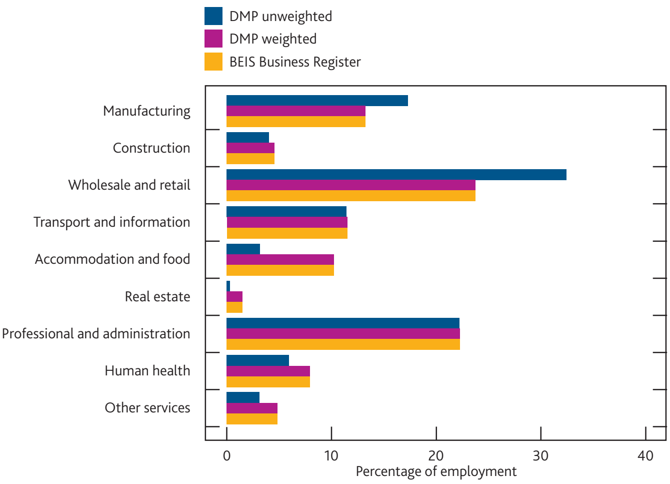
Chart A:3 DMP members by firm size(a)



Sources: DMP and authors' calculations.

(a) All DMP members who were sent the April survey.

Chart A:4 Employment by industry(a)



Sources: BEIS, DMP and authors' calculations.

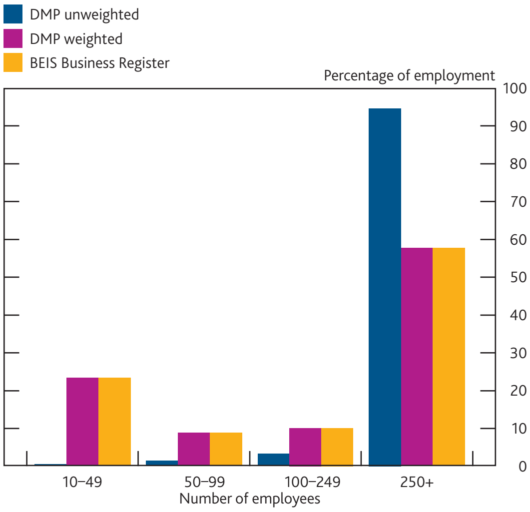
(a) All DMP members who were sent the April survey.

Survey questions

The core of the survey comprises a rotating set of questions about sales, costs, employment, investment, price-setting and financing. Each DMP member is asked about two of these six topics once a month, such that all six topics are rotated once a quarter. The information provided can be augmented with company accounts data.

Taking sales revenue as an example, DMP members are first asked about the level of sales in their businesses in the past quarter. Participants are then asked about their expectations for sales growth over the coming year. Participants are invited to give five scenarios for sales growth — five different values for the percentage change over the coming year: a lowest, low, medium, high and highest scenario. Participants are then asked to assign probabilities to each of these five scenarios, where those probabilities must sum to 100%. From these responses it is possible to calculate the average expected

Chart A:5 Employment by firm size(a)



Sources: BEIS, DMP and authors' calculations.

(a) All DMP members who were sent the April survey.

growth rate of sales, by calculating a weighted average of sales growth in each of the five scenarios, using the probabilities attached to each scenario as weights. It is possible to calculate the standard deviation and skewness of expected sales growth in a similar fashion.

Participants are also asked additional special questions that may recur at less regular intervals, sometimes in response to particular political or economic events. For example, as discussed in the main article, participants have been asked about their attitudes to the result of the referendum on EU membership, their expectations about the impact of a post-EU withdrawal relationship on their labour costs, and the effect of Single Market withdrawal on their sales. However, the overall length of the questionnaire is kept as short as possible in order to minimise the amount of time respondents need to spend completing the survey and encourage them to remain in the panel.

Question wording

The wording of the questions on Brexit reported in this article is as follows:

(i) Could you say how the UK's decision to vote 'leave' in the EU referendum is likely to influence your CAPITAL EXPENDITURE over the next year? What is the percentage likelihood (probability) that it will:

- Have a large POSITIVE influence on capital expenditure, adding 5% or more.
- Have a minor POSITIVE influence on capital expenditure, adding less than 5%.
- Have no material impact on capital expenditure.
- Have a minor NEGATIVE influence on capital expenditure, subtracting less than 5%.

- Have a large NEGATIVE influence on capital expenditure, subtracting 5% or more.

(ii) Looking ahead to 2020, how do you think the UK's decision to leave the EU will affect the revenue your business generates by selling UK-sourced goods and services in international markets, compared to what would have been the case had the UK remained a member of the EU. What is the percentage likelihood (probability) that it will:

- Have a large POSITIVE influence on revenue from foreign sales, adding 10% or more.
- Have a modest POSITIVE influence on revenue from foreign sales, adding less than 10%.
- Have no material impact on revenue from foreign sales.
- Have a modest NEGATIVE influence on revenue from foreign sales, subtracting less than 10%.
- Have a large NEGATIVE influence on revenue from foreign sales, subtracting 10% or more.

(iii) Looking ahead to 2020, how would you expect the UK's decision to leave the EU to affect the average unit costs of your business, compared to what would have been the case had the UK remained a member of the EU? What is the percentage likelihood (probability) that it will:

- Lead to a large INCREASE in your average unit costs, adding 10% or more.
- Lead to a modest INCREASE in your average unit costs, adding less than 10%.
- Have no material impact on average unit costs.
- Lead to a modest DECREASE in your average unit costs, subtracting less than 10%.
- Lead to a large DECREASE in your average unit costs, subtracting 10% or more.

(iv) Looking ahead to 2020, how do you think the UK's decision to leave the EU will affect the availability and cost of finance to your business, compared to what would have been the case had the UK remained a member of the EU? What is the percentage likelihood (probability) that it will:

- Lead to a large INCREASE in the cost of financing my business, adding over 1 percentage points to spreads over base rate.
- Lead to a modest INCREASE in the cost of financing my business, adding up to 1 percentage point to spreads over base rate.
- Have no material impact on the cost of financing my business.
- Lead to a modest DECREASE in the cost of financing my business, subtracting up to 1 percentage point from spreads over base rate.
- Lead to a large DECREASE in the cost of financing my business, subtracting over 1 percentage points from spreads over base rate.

(vi) The Prime Minister has said that the UK government does 'not seek membership of the Single Market. Instead we seek the greatest possible access to it through a new, comprehensive, bold and ambitious Free Trade Agreement.' How likely do you think it is that the eventual agreement will have the following effects, compared to what would have been the case had the UK remained a member of the EU:

- Have a large POSITIVE effect on sales at home and abroad, adding 10% or more to sales.
- Have a modest POSITIVE effect on sales at home and abroad, adding less than 10% to sales.
- Make little difference.
- Have a modest NEGATIVE effect on sales at home and abroad, subtracting less than 10% from sales.
- Have a large NEGATIVE effect on sales at home and abroad, subtracting more than 10% from sales.

(vii) The Prime Minister has said that the UK government will ensure that it gets 'control of the number of people coming to Britain from the EU'. How likely do you think it is that eventual agreement will have the following effects, compared to what would have been the case had the UK remained a member of the EU:

- Have a large POSITIVE effect on my labour costs, adding 10% or more to labour costs.
- Have a modest POSITIVE effect on my labour costs, adding less than 10% to labour costs.
- Make little difference.
- Have a modest NEGATIVE effect on my labour costs, subtracting less than 10% from labour costs.
- Have a large NEGATIVE effect on my labour costs, subtracting more than 10% from labour costs.