

5.4 The Quantitative Expectations Module of the ifo Business Survey

RÜDIGER BACHMANN, KAI CARSTENSEN, MANUEL MENKHOFF, MARTIN SCHNEIDER

5.4.1 Introduction

This chapter introduces the quarterly quantitative expectations module of the ifo Business Survey. It describes its inception and its sample composition, provides a few summary statistics, introduces special questions and a one-time special survey related to the quantitative expectations module, and summarizes the existing research developed from it.

In the second quarter of 2013, in April 2013 to be precise, ifo added a quarterly online module with quantitative expectation questions to the manufacturing part of the ifo Business Survey (IBS).² The new questions concern the firm's own sales revenues.³ This initiative was pioneered by economists Rüdiger Bachmann, Kai Carstensen, and Martin Schneider. There was a pilot survey in December 2012.

Initially, the new module was featured as a separate addition to the online version of the regular IBS. Specifically, only after the main survey had been filled out and submitted, the survey participant was made aware of the new module on a "Thank you-"site and asked to fill it out as well. From April 2017 on, the module was placed more prominently jointly with the regular online manufacturing survey on the starting/overview page, although still as two separate links. This change increased the number of respondents considerably. From January 2019 on, the service and trade sectors were also included, increasing the overall number of respondents yet again.

The tradition of asking firms via surveys about (aspects of) their own business prospects and aggregate economic conditions is a long-standing one (see, for a historical overview, Bachmann and Carstensen 2022). As this overview also shows, the answer scale for such questions has traditionally been qualitative, in fact trichotomous, a variation of "decline", "stay the same", and "increase." It is also a tradition with ups and downs, especially in the United States, where, after the rational expectation revolution in the 1960s, business surveys took a backseat role. More recently, this has changed again because of increasing scepticism towards the paradigm of full-information rational expectations and, as a result, stronger empiricism towards expectations and expectation formation in the field of Economics.

² This module is in the field together with the January, April, July, and October IBS, in the first two and a half weeks of each month.

³ As is well known, the IBS does not elicit expectations on aggregate quantities such as GDP growth or inflation; also, for brevity reasons, we use "firm" to indicate the survey participant, noting that, for larger conglomerates, this could be a business unit of a firm rather than a stand-alone firm.

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To make progress in our understanding of how decision makers in firms form expectations, it is clear that we need to elicit and study them in a quantitative way. This is what the new quantitative expectations module added to the IBS is intended to make possible. It is not entirely without predecessors (again, see, for a cross-country overview, Bachmann and Carstensen 2022). The Banca d'Italia is one of the pioneers in asking firms about quantitative sales revenue expectations as described in Guiso and Parigi (1999) and Bontempi et al. (2010). Recently, economists in the United States and the United Kingdom have also introduced surveys eliciting quantitative expectations from firms as described in Bloom et al. (2019), Altig et al. (2020a), Altig et al. (2020b), Bloom et al. (2020), and Bloom et al. (2021).

5.4.2 Questionnaire

The quantitative expectations module of the Ifo Business Survey asks firms, at the beginning of a quarter, a three-part question. Figure 5.14 displays the sample questionnaire for April 2014 in the original German (we provide a translation into English below).

The following questions refer to changes against the previous quarter.

1. *By how much in percentage terms have your sales changed in the first quarter of 2014?*
2. *By how much in percentage terms will your sales change in the second quarter of 2014?*
 - a. *In the best possible case:
In the worst possible case:*
 - b. *Taking into account all contingencies and risks, I expect for the second quarter of 2014 all in all a change of:*
3. *You can either answer with a probability or a probability interval:
(a) how do you assess the probability (in percentage terms) that your sales will increase in the second quarter of 2014?*
 - *Probability is ____% (please insert integers)*
 - *Probability lies between ____% and ____% (please insert integers)*

The questionnaire contains boxes for respondents to provide their numerical answers. Next to every such box, there is a reminder to provide positive or negative integers. In addition, respondents are given a “don’t know-”option (“weiß nicht” in German) behind the box, as shown in Figure 5.14. The default option is to skip the question with a “don’t know”, the option checked in the screenshot. Once a respondent enters a number, the “don’t know”-option becomes unchecked. Finally, underneath each of parts one, two, and three, firms are invited to provide free text comments (“Anmerkungen”).⁴

⁴ We note that, for the sake of brevity, we have left out the translation of parts 3(b) and 3(c), which repeat 3(a)

Figure 5.14: Original survey questionnaire in German

April 2014

Hinweis zu diesen Zusatzfragen:

Dass Wirtschaft zu 50% aus Psychologie besteht, wusste schon Ludwig Erhard. Ein wichtiges Element sind dabei Erwartungen über eine unsichere Zukunft, mit der Sie als Unternehmer tagtäglich umgehen müssen. Das haben die Wirtschaftswissenschaften zu lange vernachlässigt. Diese Erwartungen und diese Unsicherheit zu messen und zu evaluieren, ist das Ziel der folgenden Fragen. Mit Ihren Antworten helfen Sie uns sehr.

Für Rückfragen steht Ihnen Frau Wieland zur Verfügung: Tel. 089-9224-1247 - E-Mail: wieland@ifo.de

Die folgenden Fragen beziehen sich auf Änderungen **gegenüber dem Vorquartal**.

1. Um wieviel Prozent hat sich der Umsatz in Ihrem Bereich im ersten Quartal 2014 verändert?

Veränderung um: % (bitte ganze, positive oder negative Zahlen eingeben) weiß nicht

Anmerkungen:

2. Um wieviel Prozent wird sich der Umsatz in Ihrem Bereich im zweiten Quartal 2014 verändern?

a) Im bestmöglichen Fall: % (bitte ganze, positive oder negative Zahlen eingeben) weiß nicht

Im schlechtestmöglichen Fall: % (bitte ganze, positive oder negative Zahlen eingeben) weiß nicht

b) Unter Berücksichtigung aller Chancen und Risiken erwarte ich im zweiten Quartal 2014 alles in allem eine Veränderung um: % (bitte ganze, positive oder negative Zahlen eingeben) weiß nicht

Anmerkungen:

3. Bei den nächsten drei Teilfragen können Sie entweder eine Wahrscheinlichkeit oder ein Wahrscheinlichkeitsintervall angeben.

a) Wie hoch schätzen Sie die Wahrscheinlichkeit ein, dass der Umsatz in Ihrem Bereich im zweiten Quartal 2014 steigt?

Wahrscheinlichkeit liegt bei % (bitte ganze Zahlen eingeben)

Wahrscheinlichkeit liegt zwischen % und % (bitte ganze Zahlen eingeben)

weiß nicht

b) Wie hoch schätzen Sie die Wahrscheinlichkeit ein, dass der Umsatz in Ihrem Bereich im zweiten Quartal 2014 gleich bleibt?

Wahrscheinlichkeit liegt bei % (bitte ganze Zahlen eingeben)

Wahrscheinlichkeit liegt zwischen % und % (bitte ganze Zahlen eingeben)

weiß nicht

c) Wie hoch schätzen Sie die Wahrscheinlichkeit ein, dass der Umsatz in Ihrem Bereich im zweiten Quartal 2014 sinkt?

Wahrscheinlichkeit liegt bei % (bitte ganze Zahlen eingeben)

Wahrscheinlichkeit liegt zwischen % und % (bitte ganze Zahlen eingeben)

weiß nicht

Anmerkungen:

Notes: Original questionnaire from ifo's online quantitative expectations module in German; screenshot from April 2014.

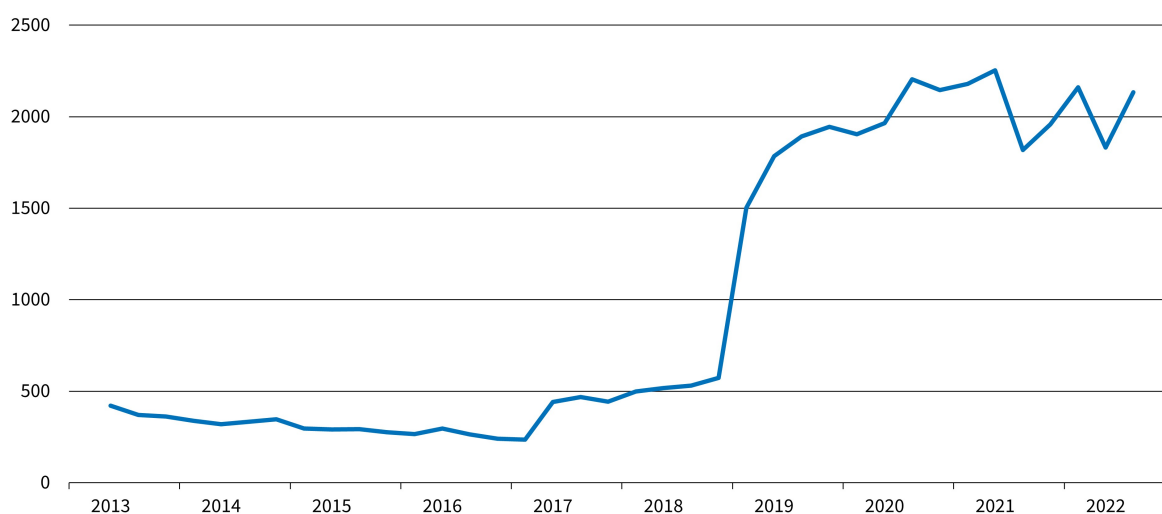
To clarify the timing, consider a firm responding in April 2014, that is, in the first two and a half weeks of 2014:Q2. Part one asks for the change in sales revenue between 2013:Q4 and 2014:Q1. This is the most recent sales growth realization that the firm has experienced. Parts two and three then ask about the firm's outlook over the current quarter 2014:Q2, as compared to the previous quarter 2014:Q1. In part two, the survey asks about the next sales revenue growth rate realization that the firm expects. In part three, the survey asks about probabilities, or probability intervals, relating to the percentage change in sales between 2014:Q1 and 2014:Q2. In other words, the survey elicits subjective beliefs about the current quarter at the beginning of that quarter, at a point in time when sales revenues of the previous quarter are already known.

with "stay the same" and "decrease", respectively.

5.4.3 Sample Development and Descriptive Statistics

As can be seen in Figure 5.15, the sample size at the start of the module in April 2013 was just over 400 complete responses for all questions; it started out in the manufacturing sector only (Figure 5.16).⁵ The manufacturing sample declined steadily to just under 250 complete survey responses in January 2017.

Figure 5.15: Number of complete survey responses over time



Source: ifo Business Survey.

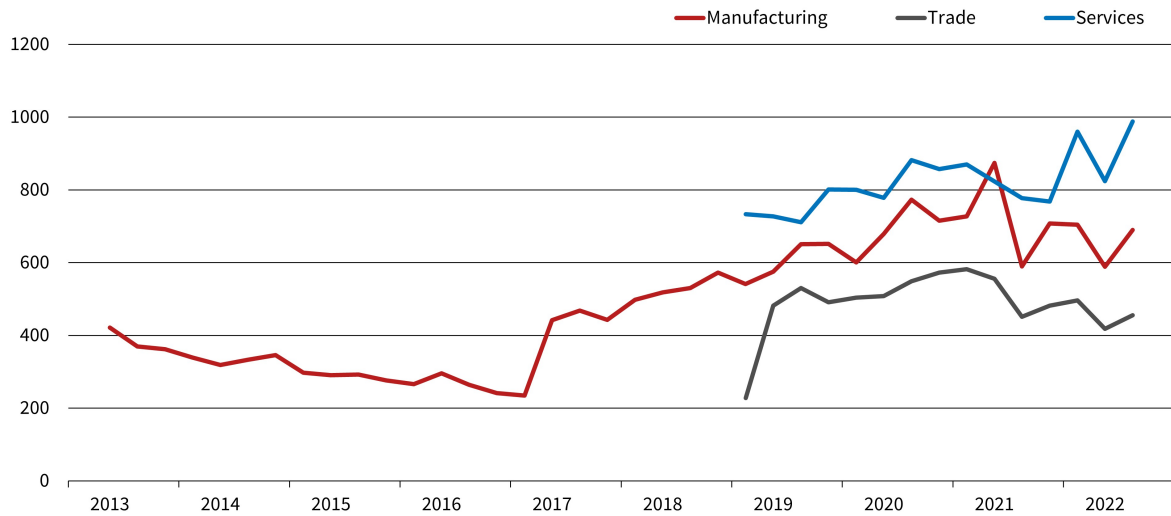
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Notes: Number of complete responses from 2013:Q2 to 2022:Q3 in the quantitative expectations module of the IBS.

After that, as we describe in the introduction, ifo placed the quantitative expectations module more prominently, which increased the number of respondents and thus the sample size of complete responses considerably to well over 400 in April 2017. From then on, the manufacturing sample has been steadily increasing and fluctuates now between 600 and 800 complete responses. In January 2019, the trade and services sector started to receive the identical questions from the quantitative expectations module, boosting the total number of complete responses to around 2,000, with between 800 and 1,000 complete responses from the services sector, and between 400 and 600 complete responses from the trade sector.

⁵ If researchers are interested in studying only a subset of questions, they will typically have a few more observations at their disposal: for instance, while 421 answered all the module's questions in April 2013, 451 answered all questions in part one and two, and 469 answered all questions in part 3.

Figure 5.16: Number of complete survey responses by sector over time

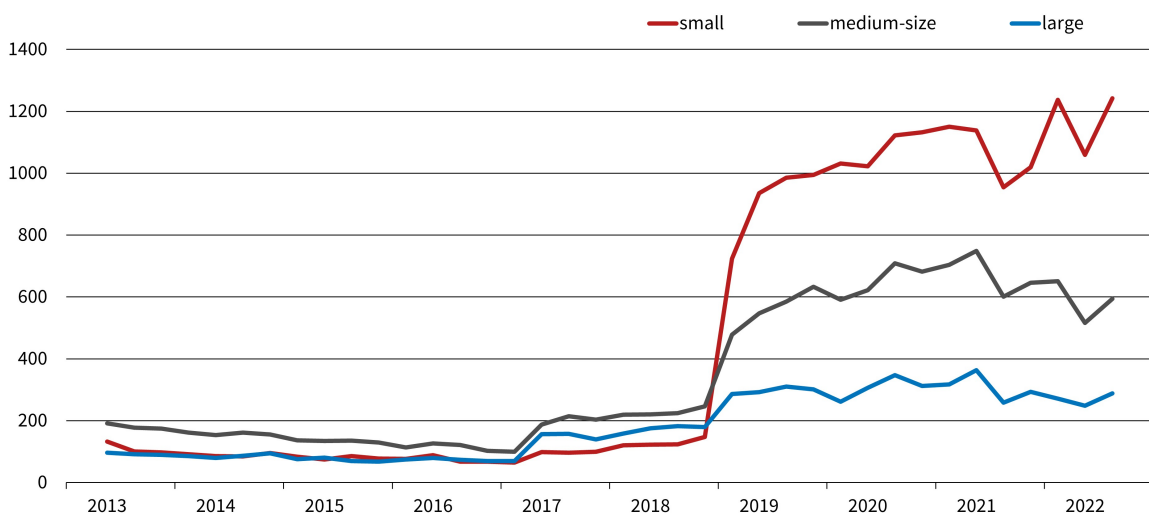


Source: ifo Business Survey.

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Notes: Number of complete responses by sector from 2013:Q2 to 2022:Q3 in the quantitative expectations module of the IBS.

Figure 5.17: Number of complete survey responses by firm size over time



Source: ifo Business Survey.

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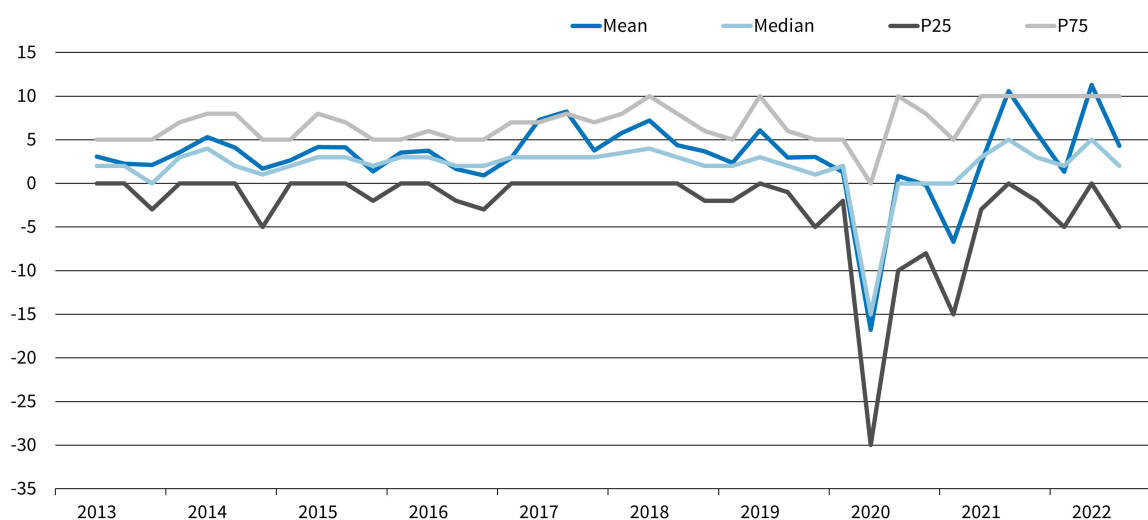
Notes: Number of complete responses by firm size from 2013:Q2 to 2022:Q3 in the quantitative expectations module of the IBS. Small firms are defined as having employees smaller than 50. Medium-sized firms have between 50 and 249 employees. Large firms have 250 employees or more.

Figure 5.17 displays the breakdown of complete responses by firm size: initially, responses coming from the manufacturing sector only, the medium-sized firms (between 50 and 249 employees) dominate in the survey, with approximately equal numbers of small and large

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firms. The more prominent placement of the module since April 2017 brought more large firms into the module. With the inclusion of the trade and services sector, perhaps unsurprisingly, responses from smaller firms dominate.

Figure 5.18: Cross-sectional summary statistics of sales revenue growth expectations over time



Source: ifo Business Survey.

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Notes: Cross-sectional summary statistics of sales revenue growth expectations, answers to part 2(b) of the quantitative expectations module of the IBS, from 2013:Q2 to 2022:Q3. We employed a mild outlier cleaning procedure but otherwise the underlying sample is that of complete responses.

Finally, Figure 5.18 shows the time series of four cross-sectional moments of sales revenue growth expectations: the mean, the median, and the 25th and 75th percentiles. It is clear that—especially for the median firm—the period from 2013 to 2022 was not a period of particularly strong aggregate cyclical fluctuations, underlying idiosyncratic changes for the surveyed firms notwithstanding, with one key exception: the Covid-19 pandemic. In April 2020, the first Covid-19 quarter with data from the quantitative expectations module, sales revenue growth expectations collapse across the entire distribution of firms, and particularly so for firms with low sales growth expectations. The average (and median) sales revenue growth expectation for the upcoming second quarter of 2020 was about negative 15 percent. Firms' sales growth expectations recovered relatively quickly at the beginning of the third quarter of 2020, but negative Covid-19 fears led to another, albeit much smaller decline for the first quarter of 2021, after a strong wave with many politically imposed restrictions on economic activity in the waning days of 2020. Interestingly, we see no discernible effect on sales revenue growth expectations of the Russian invasion in Ukraine in April 2022, the first module month after that invasion, nor in July 2022, when it became clear that Russian gas deliveries to Germany would come to an end. We will elaborate on this below in Section 5.4.5.

5.4.4 Special Survey and Special Questions

In the fall of 2018, in the months of October and November, but independently from the main survey, ifo fielded a one-time special survey in the manufacturing sector to provide a more in-depth background to the answers in the quantitative expectations module. Somewhat over 500 firms responded. The survey asked about the following topics: 1) external and internal factors influencing firms' expectations and probabilities with respect to their sales revenue development, and from which departments' information inside the firm they would draw on to answer these expectational questions; 2) whether, to answer the expectational questions, firms use existing quantitative analysis and, if so, of which nature; 3) which factors influence their choice of a probability interval over a probability; 4) the nature of competition firms perceive. Bachmann et al. (2021) and Bachmann et al. (2020a) provide summary statistics for subsamples of firms on some of these questions. They also provide the complete questionnaire in the German original.

In December 2018, after the decision about Brexit in the British House of Commons was postponed, participants in the ifo Business Survey were asked two special questions about Brexit, the first of which was in the mold of the probability interval questions in part three of the quantitative expectations module. This first question asked about the probability of a "hard" Brexit, that is, a Brexit without a deal between the EU and the UK. Firms could answer with a single probability or with a probability interval. The second question asked about the fraction of the firm's sales revenue affected by a hard Brexit, and—on a five-point intensity scale—by how much.

In May and July 2020, the IBS fielded special questions regarding expectations related to the worldwide Covid-19 pandemic. Specifically, in May 2020, participants were asked, following part two of the quantitative expectations module, when (in months) they expect their business situation to normalize in the best case scenario, the worst case scenario, and in the most probable case. In July 2020, this time explicitly as part of the quantitative expectations module, the survey repeated the regular one-quarter ahead survey question about sales revenue growth in the best and worst case scenarios as well as the overall expected scenario (part two of the module) also for the entire annual sales revenue growth in 2020 relative to 2019. Furthermore, in the mold of part three of the module, the survey asked about the probability of permanent changes in a firm's business model due to the Covid-19 pandemic. Again, firms could answer with a single probability or with a probability interval.

5.4.5 Research

Bachmann et al. (2021) is the first paper to systematically exploit the answers from parts one and two of the quantitative expectations module. The paper proposes to use the difference between the best case scenario and the worst case scenario sales growth expectations, that is, the span of a firm's expectations, as a quantitative measure of the firm's subjective uncertainty, and then characterizes empirically the properties of this measure on a sample of firms from

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2013:Q2 to 2016:Q3. Ever since the revival of interest in uncertainty fluctuations by the seminal contribution of Bloom (2009), summarized in Bloom (2014), correct measurement of subjective uncertainty in decision makers' heads, as opposed to concepts like disagreement, forecast error variances, volatility, etc., has become of paramount importance to economic research.⁶

The main finding of Bachmann et al. (2021) can be summarized as follows: firms' planning under uncertainty responds strongly to change in the firms' environment. At the firm level, the relationship between span and lagged growth is described by an asymmetric V with a minimum at zero, a steep negative branch and a flatter but significant positive branch. A second class of findings concerns the relationship between subjective uncertainty and the conditional volatility of shocks experienced by the firm. First, quarterly variation in subjective uncertainty is quite similar to that in the conditional volatility of forecast errors, estimated by fitting a power GARCH model: Both measures exhibit mild persistence and an asymmetric-V-shaped response to lagged growth. In the short run, managers' planning under uncertainty thus reflects their anticipation of the size of future shocks. Decision makers appear to understand experienced change. Over the medium term, by contrast, experienced change goes along with systematic bias in both forecasts and perceptions of uncertainty. Indeed, in firms on either good or bad growth trends, forecasts are consistently too close to the status quo. Moreover, subjective uncertainty cannot be proxied by the conditional volatility of forecast errors: planning in growing firms reflects lower uncertainty than in shrinking firms even when the firms are faced with shocks of the same size. The results are similar for large compared to small firms.

The same span-conceptualization of uncertainty has been used by Bachmann et al. (2020b) and Bachmann et al. (2022), to characterize, respectively, the development of firms' expectations and uncertainty during the Covid-19 and Ukraine crises. In April 2020, the first Covid-19 quarter with data from the quantitative expectations module, firms' sales revenue growth expectations across all industries worsened and their uncertainty shot up, particularly in certain service industries like tourism and the restaurant business. Bachmann et al. (2020b) shows that higher uncertainty had an independent negative contribution towards reducing firms' payroll employment.

In April 2022, the first quarter after the Russian invasion of Ukraine with data from the quantitative expectations module, firms, on average, displayed some increased sales growth uncertainty, albeit not nearly as strongly as at the beginning of the Covid-19 crisis, while, unlike then, their sales growth expectations hardly changed. Perhaps surprisingly, Bachmann et al. (2022) shows that neither the development of expectations nor uncertainty is related to the gas dependency of firms. The Ukraine crisis confirms the finding of an asymmetric V of uncertainty this time conditional on a particular shock: expected sales losses of firms due to this crisis.

⁶ See Bachmann et al. (2013), Bachmann and Elstner (2015), and Bachmann et al. (2019) for the usage of (mostly qualitative) IBS data which proxy for uncertainty with these concepts.

To conclude this brief overview of existing research using the quantitative expectations module, we introduce Bachmann et al. (2020a), which is the first paper to exploit the answers from part three of the module. The paper proposes to use the choice by firms to respond with a probability interval to the question about sales revenue increases as an indication of Knightian uncertainty. It finds that Knightian responses are pervasive: 76% of firms choose a probability interval at least once in five years; the sample studied by the paper being 2013:Q2 through 2017:Q4. Furthermore, Knightian responses appear to be motivated by a lack of clarity about the future; they do not reflect a lack of sophistication, which can be shown by combining the answers from the regular quantitative expectations module with those from the aforementioned special survey from the fall of 2018. Finally, substantial switching between Knightian and Bayesian responses is shown to reflect both idiosyncratic and aggregate shocks.