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Abstract

Expectations are highly relevant for macroeconomic dynamics. Yet, the empirical evidence about properties of corporate macroeconomic expectations is scarce. Using new survey data on quantitative growth expectations of firms in Germany, we show that expectations are highly dispersed. The degree of dispersion depends on firm size and on how important the general economy is for the business of firms, supporting theories of rational inattention. Firms seem to extrapolate from local economic conditions and business experiences to aggregate growth expectations. Differences in growth expectations are associated with differences in firms' investment and labor demand.

JEL-Codes: D840, E320.

Keywords: GDP expectations, expectation heterogeneity, firm, ifo business tendency survey.

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1 Introduction

Expectations play a central role in current macroeconomic models and it is widely believed that they are a key driver of aggregate fluctuations (Beaudry and Portier, 2007; Angeletos and La'O, 2013). Yet, it remains controversial how macroeconomic expectations are formed and how macroeconomists should model this process. In particular, evidence on the process by which firms form macroeconomic expectations remains very scarce. As firms are of central importance for price setting and labor and investment demand, a better understanding of what determines their expectations is of crucial importance for macroeconomic research and policy.

One important part of corporate expectations are firms' expectations of the growth rate of the (real) gross domestic product (GDP). Since aggregate demand is a key variable for fluctuations in corporate investment demand (Bachmann and Zorn, 2018) and GDP is the broadest measure of aggregate demand available, firms' expectations of GDP growth are an important driver of their business decisions (Tanaka et al., 2019).[1] In a recent survey, a majority of German firms report that a solid understanding of the future business cycle situation is the most important factor for them when estimating future demand for their products.

Against this background, this paper contributes to a recent strand of literature (e. g., Kumar et al., 2015; Koga and Kato, 2017; Coibion et al., 2018, 2020; Tanaka et al., 2019) that studies quantitative macroeconomic expectations of firms and aims to broaden the understanding of their expectation formation process. Using new data on firms' expectations for GDP growth (henceforth *growth expectations*), we study which factors influence those expectations and whether differences in expectations are associated with differences in investment or hiring decisions. We address the following main research questions: How heterogeneous are corporate growth expectations and which factors explain such heterogeneity? How strongly do firms extrapolate from their own business experience to

[1] Even if sector-specific demand is eventually what firms are interested in, that demand for specific products is likely to depend strongly on aggregate demand.

their outlook on the broader economy? How strongly do growth expectations affect the investment and hiring behavior of firms?

To shed light on these issues, we combine answers of German firms in a large-scale business survey to a wide range of questions related to their expectations, business decisions, and general firm characteristics. We mainly explore the cross-sectional variation in expectations and use carefully selected sub-samples and instrumental variable regressions to provide causal evidence regarding the link between firms' own business situation and their growth expectations.

Based on a sample of roughly $4,700$ firms from the ifo Business Tendency Survey (BTS), we document that the heterogeneity of growth expectations across firms is large—more similar to that observed for private households than for professional macroeconomic forecasters. For all economic sectors that we investigate (manufacturing, trade, and services), the dispersion of growth expectations is higher for small firms than for large firms. The standard deviation of growth expectations is below 1 for large firms while it is almost 2 for the small firms in our sample. Heterogeneity is also higher for firms whose business does not depend on the general business cycle in Germany. The latter two findings support theories of rational inattention (Sims, 2003).

We also present new evidence about the factors behind the heterogeneity of growth expectations. Firms that are located in a county that is not doing well economically (as indicated by high local unemployment) tend to have more pessimistic growth expectations. A 1 percentage point higher unemployment rate in the home county of a firm is associated, on average, with roughly 35 basis points lower growth expectations. Similarly, firms that report a good business situation or optimistic expectations for their own business report also high growth expectations. Thus, there is evidence that firms extrapolate from their local economic experiences to the broader national business cycle situation. This is in line with several other studies which show in other contexts that such "local" information can significantly affect macroeconomic expectations and might be an important driver of expectation heterogeneity (Berger et al., 2009, 2011; Kuchler and Zafar, 2019).

Firms that report being uncertain about their own business outlook tend to also report low growth expectations. The magnitude of this correlation is large. Comparing a firm that reports a maximum of business uncertainty with one that reports to be very certain about its business outlook reveals an average difference in growth expectations of roughly 60 basis points (controlling for business situation and expectations).

Finally, growth expectations are positively related to firms' investment and labor demand. Even after controlling for reported business situation and expectations (and a number of commonly used fixed effects) higher growth expectations are associated with a higher propensity of firms to increase their investment and their number of employees. This result is similar to the one presented in Coibion et al. (2020) who show that inflation expectations of firms affect their business decisions.

Our paper contributes to a burgeoning literature on how market participants—most importantly private households and firms—form macroeconomic expectations and which alternatives to the concept of full information rational expectations (FIRE) are suitable to model this process (Manski, 2018).

Most macroeconomists relied on the concept of FIRE for decades. Recently, this has changed. Contributions by, inter alia, Manski (2004), Mankiw and Reis (2002), Sims (2003), and Woodford (2003) have spurred a rapidly growing theoretical and empirical literature that aims at measuring and modeling macroeconomic expectations in a more realistic fashion. This literature emphasizes informational rigidities in general and private information in particular to explain why and how survey-based expectations deviate from the predictions of the FIRE model.

Initially, most of the empirical literature investigating survey-based macroeconomic expectations relied on expert forecasts, such as those provided by the Surveys of Professional Forecasters in the US and the euro area or by *Consensus Economics Inc.*, because these surveys provided much more information on quantitative expectations (especially along the time series dimension) compared to household and firm surveys. This is unfortunate because in reality expectations of households and firms, both of which interact on various markets, are the relevant objects that drive macroeconomic dynamics.

Empirical evidence on how firms form their expectations remains scarce. This is mainly due to the fact that existing "business tendency" surveys mostly either provide information about quantitative expectations only (e. g., the CEO Confidence Survey by the Conference Board or the Business Leaders Survey ran by the Federal Reserve Bank of New York) or contain only information about very large firms (e. g., the Livingston Survey).[2] Very recently, a small number of papers have investigated macroeconomic expectations of more representative samples of firms. Most notably, Kumar et al. (2015) and Coibion et al. (2018) use information from surveys that have been conducted among a sample of just above 3,000 firms in New Zealand to study the properties of their inflation and growth expectations and whether models of rational inattention can explain the observed patterns. Based on a randomized control trial embedded in a survey among Italian firms, Coibion et al. (2020) investigate the causal effect of inflation expectations on business decisions of firms. Tanaka et al. (2019) use information from the Japanese Annual Survey of Corporate Behavior (that surveys only firms listed on the stock market) to analyze how GDP expectations of firms affect their business decisions.

We add to the literature by using a sample of firms that is very large and more representative of the entire universe of firms compared to previous studies which are restricted to rather small firms (Kumar et al., 2015; Coibion et al., 2018) or only listed companies (Kaihatsu and Shiraki, 2016; Koga and Kato, 2017; Tanaka et al., 2019). In addition, we are able to link firms' expectations to their local economic environment and their individual business history. This allows us to address the link between individual experiences and expectations while previous studies investigate the effects on expectations of common experiences made by entire cohorts of individuals and mainly focus on expectations of private households (Malmendier and Nagel, 2011, 2016).

The remainder of this paper is structured as follows. Section 2 describes the data that we use, in particular the novel data on quantitative corporate growth expectations.

[2]There are more papers that analyze expectations of private households. However, also this strand of the literature suffers from the problem that few data sets contain information about quantitative expectations of private households. Exceptions are, for instance, Bruine De Bruin et al. (2011), Das et al. (2020), Malmendier and Nagel (2011), and Malmendier and Nagel (2016).

Section 3 presents our empirical results. Section 4 discusses the broader implications of our results and concludes.

2 Data and Descriptive Statistics

Most of our data come from the Business Tendency Survey (BTS) conducted monthly by the ifo Institute. The survey elicits information about different aspects of their business from a panel of roughly 5,500 firms from the manufacturing sector, the trade sector, and the service sector.[3] At about 98% of firms, one person is responsible for regularly answering the questionnaire (Sauer and Wohlrabe, 2019). More than 80% of those persons are in an upper management position such as owner, CEO, or department head. Thus, we are confident that respondents have a good overview of their company and give responses that accurately reflect sentiments that are representative for the firm. The BTS is conducted technically at the product level, i. e., some larger firms answers more than one questionnaire. We aggregate the answers to the firm level by using the mean over all questionnaires returned by one firm.[4] We rely both on questions that have been regularly asked in the survey and new questions that focus explicitly on our research questions and were included in the surveys of August and September 2018 and March and August 2019.

The most important new data that we elicited in August 2018, March 2019 and August 2019 are quantitative growth expectations of firms for the German economy. The firms were asked to report the annual growth rate of real GDP which they expect.[5] While the question in the first wave targeted the expectations for growth in 2018, the two following waves in 2019 targeted GDP expectations for 2019 and 2020. Thus, we have data for five combinations of survey wave and target year. On average, about 80 % of firms who returned a questionnaire answered our special question.

[3]The survey also covers the construction sector but we discard information from that sector.

[4]For qualitative questions we transform the mean of all questionnaires returned by one firm back into the answer categories. For instance, in the case of questions reported on a trichotomous scale with values from -1 to 1, we assign the value -1 when the mean lies on the interval $[-1, -0.5]$, we assign the value 0 when the mean lies on the interval $(-0.5, 0.5)$, and the value 1 when the mean lies on the interval $[0.5, 1]$.

[5]In Appendix A we state the exact wording of the special questions.

We trim our sample to exclude unreasonable reported expectations.[6] The average growth expectations in the trimmed sample lie within a range from 0.8 % for 2020 when asked in August 2019 to 1.8 % for 2018 when asked in August 2018 (Table 1). The overall standard deviation of expectations is between 1.3 and 1.7 percentage points. Table 1 shows that average expectations decrease with target year and wave, and that the standard error increases respectively. Given a general worsening of the German business cycle outlook during that time, these changes seem plausible.

Table 1: Descriptive Statistics for Quantitative Growth Expectations

Wave	Target Year		Full Sample	Manufacturing	Trade	Services
Aug. '18	2018	N	4,641	1,541	1,396	1,704
		Mean	1.8	1.9	1.7	1.9
		Median	1.8	1.8	1.7	1.8
		Std. Dev.	1.3	1.3	1.1	1.5
Mar. '19	2019	N	4,833	1,664	1,447	1,722
		Mean	1.2	1.2	1.2	1.3
		Median	1.2	1.2	1.2	1.3
		Std. Dev.	1.4	1.5	1.3	1.4
	2020	N	4,779	1,651	1,431	1,697
		Mean	1.1	1.1	1.0	1.2
		Median	1.0	1.0	1.0	1.1
		Std. Dev.	1.5	1.6	1.4	1.5
Aug. '19	2019	N	4,821	1,751	1,379	1,691
		Mean	0.9	0.7	1.0	1.0
		Median	1.0	0.9	1.0	1.0
		Std. Dev.	1.5	1.6	1.6	1.5
	2020	N	4,795	1,745	1,366	1,684
		Mean	0.8	0.7	0.8	0.9
		Median	1.0	1.0	1.0	1.0
		Std. Dev.	1.7	1.8	1.7	1.6

Notes: All numbers refer to the entire sample after dropping any extreme observations.

We also asked firms in August 2018 about their assessment of how important the general economic situation in Germany is for their own business. Most firms either reported that it is important or even very important. The average reported value on a scale from 1 (very important) to 5 (unimportant) is 2.1. To obtain a more objective measure of

[6] We drop all observations which lie outside a three-standard-deviations band around the median growth expectation. We loose on average 37 observations per wave.

how dependent firms are on the German economy we asked firms in September 2018 to report the share of their turnover that they make abroad. On average firms report to make 15.6 % of their sales in another country, which is mainly driven by firms in the manufacturing sector that report a share of 31.1 % on average. The average share of turnover made abroad reported by firms in the sectors trade and services is 9.8 % and 7.7 %, respectively.

We also rely on questions contained in the regular BTS questionnaire. Most importantly, we use the firms' assessment of their current business situation and their business expectations (both reported on a trichotomous scale from -1 (bad) to 1 (good)). We use these variables also to construct a measure of historical volatility of business expectations for each firm, a measure of a firm's success in predicting their own business situation and a measure of dependence on German GDP growth in the past. For the measure of historical volatility we use the standard deviation of the monthly responses between 1991 and 2018. The firm's success in predicting its own business situation is computed as a firm-specific expectation error as in Bachmann and Elstner (2015). To measure how strongly a firm depends on the German business cycle, we regress (quarterly averages of) business assessment on GDP growth using a sample from 1990 to 2019.[7]

Furthermore, we use information about perceived business uncertainty. The firms report, on a scale from 1 (no uncertainty) to 100 (very high uncertainty), how uncertain they perceive their current business expectations. We construct a firm size variable that has five values from 1 (very small) to 5 (very large). The categories are based on different measures on the sector a firm operates in. The basis for firms in the trade sector is a measure by the ifo BTS that assigns a certain weight to each firm (from 1 to 99). For firms in the service sector the basis is a categorical variable for the amount turnover. Firms in manufacturing are categorized according to the number of employees. Finally, we rely on a qualitative assessment of firms regarding changes in investment (surveyed in May and November) and employment.

[7] We include only firms with at least 32 quarterly observations.

In addition to the BTS data, we use information about regional unemployment rates to approximate local business cycle conditions. These data are provided by the German Federal Employment Agency (Bundesagentur für Arbeit, BA). The monthly observations for each county that we use cover the sample from 1991 to August 2019.[8] To eliminate the effect of any seasonal movements in unemployment (which we need to do because the amplitude of seasonal effects is very likely to differ substantially across counties given their very different economic structure) we always consider twelve-months moving averages. Table B.1 in Appendix B contains a set of descriptive statistics for all variables.

3 Empirical Results

3.1 Dispersion of Growth Expectations

It is a well known fact that macroeconomic expectations are quite dispersed if one compares them across individuals (e.g., Mankiw et al., 2003; Dovern et al., 2012). Especially for firms and private households the range of observed expectations can be large. Our data are no exception (Figure 1). The histograms show very dispersed distributions of expectations for each survey wave and target year.

It is also interesting and informative to compare the observed expectation dispersion in our sample to other similar surveys. Table 2 lists the dispersion of growth expectations from different well-known surveys. It is evident that there are huge differences in terms of expectation dispersion across the different type of surveys. While the dispersion observed in our data (after trimming) is comparable to the dispersion in the Japanese Annual Survey of Corporate Behavior (ASCB) as reported in Tanaka et al. (2019) and only slightly larger than the dispersion reported by Coibion et al. (2018) for firms in New Zealand, surveys among professional macroeconomic forecasters with comparable forecast horizons yield much smaller dispersion levels.[9]

[8] We construct artificial historical time series based on population weight for those counties that were redrafted at some point in the past.

[9] Due to the lack of surveys that contain information about quantitative growth expectations of private households we cannot compare our results to corresponding results for private households.

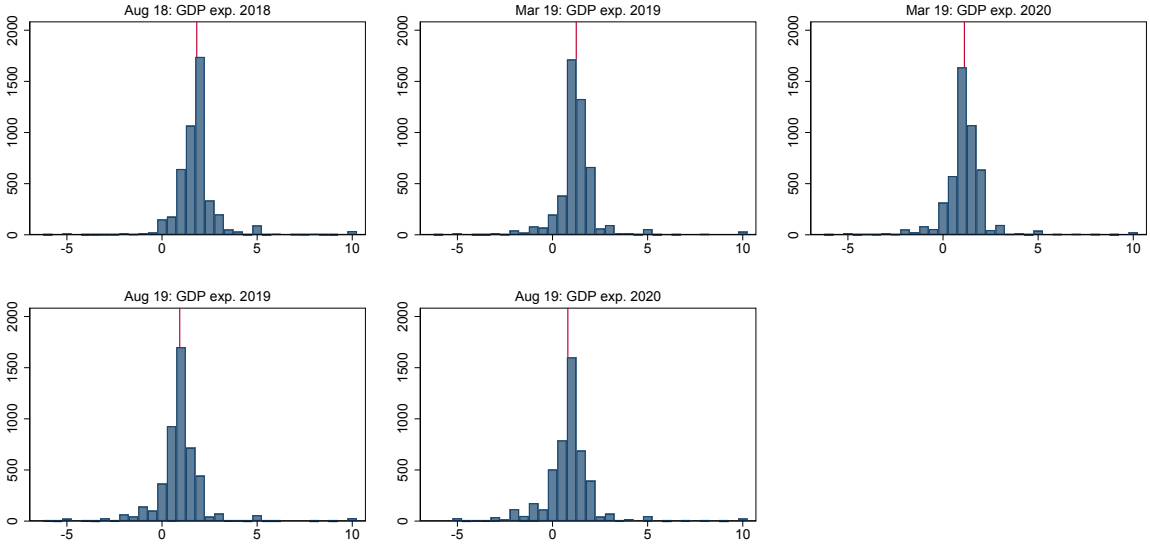

Figure 1: Dispersion of Growth Expectations for Different Waves and Target Years

Table 2: Dispersion of Growth Expectations in Different Surveys

Survey	Country	Subjects	Survey period	Target	Dispersion
ifo BTS (trimmed)	DE	Firms	Aug. 18	Same year	1.3
ifo BTS (trimmed)	DE	Firms	Mar. 19	Same year	1.4
ifo BTS (trimmed)	DE	Firms	Mar. 19	Next year	1.5
ifo BTS (trimmed)	DE	Firms	Aug. 19	Same year	1.5
ifo BTS (trimmed)	DE	Firms	Aug. 19	Next year	1.7
ASCB	JP	Firms	Various	4q ahead	1.3*
Firm Survey NZ	NZ	Firms	Various	4q ahead	0.5 – 1.0†
Blue Chip	US	Large firms	Jan. 18	Same year	0.2
Consensus Econ.	DE	Forecasters	Aug. 18	Same year	0.1
Consensus Econ.	DE	Forecasters	Mar. 19	Same year	0.3
Consensus Econ.	DE	Forecasters	Mar. 19	Next year	0.3
SPF (EZB)	EA	Forecasters	Oct. 18	Same year	0.1
SPF (EZB)	EA	Forecasters	Apr. 19	Same year	0.2
SPF (EZB)	EA	Forecasters	Apr. 19	Next year	0.3
SPF (Fed)	US	Forecasters	Aug. 18	Same year	0.1
SPF (Fed)	US	Forecasters	Feb. 19	Same year	0.2
SPF (Fed)	US	Forecasters	Feb. 19	Next year	0.5

Notes: *Tanaka et al. (2019) report the average standard deviation across all survey waves from 1989 to 2015. † The survey was conducted four times and the standard deviations of growth expectations where 0.7, 1.0, 0.5, and 0.6 percentage points respectively.

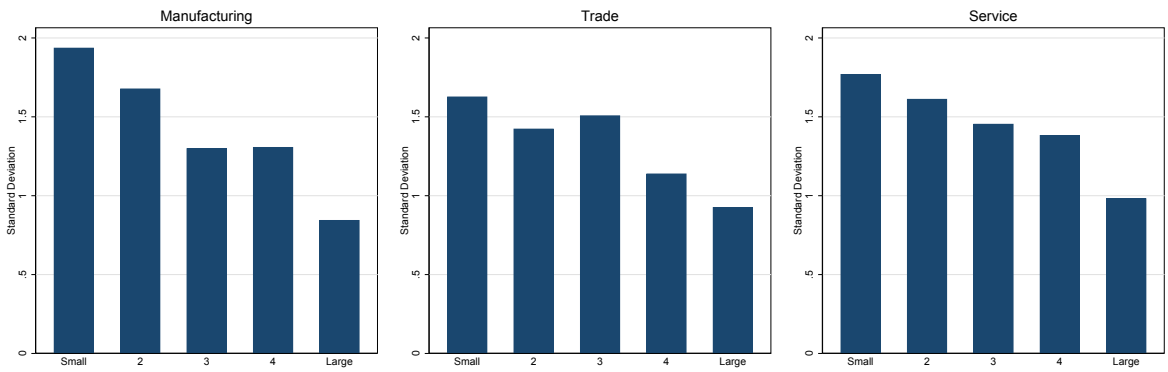

Figure 2: Dispersion of Growth Expectations for Different Firm Sizes

Next we look at differences in the level of dispersion across sectors, firms size, and depending on whether the German business cycle is important for a firm or not. First, expectation of smaller firms are more dispersed than those of larger firms. For each of the sectors, we group firms into five size categories and compute the standard deviation of expectations within each group. In all cases, this standard deviation declines with firm size (Figure 2). The differences are large, ranging from between 1.5 and 2 percentage points for small firms to below 1 percentage point for the largest firms. The observed pattern is in line with theories of rational inattention (Sims, 2003; Reis, 2006b,a), which postulate that, due to the (fixed) cost of information collection and expectation formation, it is optimal for larger firms to invest more in producing accurate forecasts than for small firms.

Likewise it does not make sense to closely follow the German business cycle for a firm whose business does not depend on the German economy, for instance, because it produces mainly for export markets. As a consequence, we can expect the dispersion of expectations to be larger for those firms that report that the German economy is not important for their business. And indeed this is what we find. For each survey wave the expectation dispersion of those firms that report that the German economy is not important for them is substantially higher than for other firms (Figure 3). Note that the target years 2019 and 2020 are pooled for each survey wave in 2019 in Figure 3.

Overall, we find that growth expectations of firms are much more dispersed than those of professional forecasters and that the different levels of dispersion across types of firms

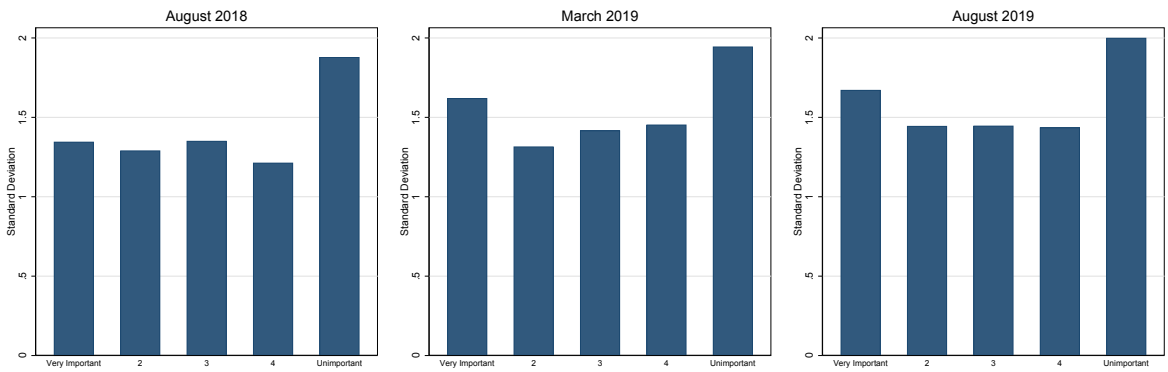

Figure 3: Dispersion of Growth Expectations for Different Survey Waves and Degrees of Dependence on German Business Cycle (target years 2019 and 2020 are pooled for each of the two survey waves in 2019)

are in line with the prediction of models of rational inattention. Next, we focus on factors that can potentially explain the cross-sectional variation of growth expectations.

3.2 Determinants of Growth Expectations

3.2.1 The Local Economic Environment

One hypothesis is that growth expectations of firms are driven by the local economic situation firms experience in the area where they do business. The idea behind this hypothesis is that firms could show a tendency to extrapolate, or generalize, from the local economic conditions in their county to the business cycle situation of the entire country. Given that each individual county is too small to have a substantial impact on the overall growth rate in Germany, such behavior would constitute a deviation from optimal forecasting and could explain some of the variation of expectations across firms.

We match firms with the local unemployment rate (which is one of the few economic indicators that are available without major publication lag).[10] To measure the relative structural economic strength of a county, we simply take the average of the unemployment rate during the 12 months ending with the respective survey wave.

[10] We use information about the firms' ZIP codes and the municipality names in their address to assign them to counties. We loose approximately 11 % of answers because either no information about the location is provided or because – due to reporting errors – the reported combination of ZIP code and municipality name does not allow identifying an unambiguous county.

Table 3: Impact of Local Conditions on Growth Expectations

	(1)	(2)	(3)	(4)
U	0.0118**	0.0142	0.0098	-0.3522***
	(2.40)	(1.18)	(0.80)	(-3.05)
U * Firm size 2		-0.0104	-0.0048	-0.0156
		(-0.72)	(-0.33)	(-1.03)
U * Firm size 3		-0.0169	-0.0202	-0.0336*
		(-0.89)	(-1.06)	(-1.69)
U * Firm size 4		0.0104	0.0116	0.0059
		(0.49)	(0.55)	(0.26)
U * Firm size 5		-0.0073	0.0027	-0.0032
		(-0.39)	(0.14)	(-0.16)
Wave FE	Yes	Yes	Yes	Yes
Controls	No	Yes	Yes	Yes
Industry FE	No	No	Yes	Yes
Region FE	No	No	No	Yes
N	21,205	16,059	16,018	16,018
R^2	0.05	0.07	0.08	0.14

Notes: *p<0.1, **p<0.05, ***p<0.01. t-statistics in parentheses. The control variables include firm size categories, the time since a firm's first survey participation, a dummy for answering online, the (self-reported) firm age, the historical volatility of business expectations and past success in predicting own business situation. "U" is the unemployment rate. We use a twelve-months moving average. Standard errors are clustered at the two-digit business classification level.

We run regressions of growth expectations on the twelve-months average of unemployment with additional interaction terms for different firm size categories. We use four different specifications where we gradually include control variables, industry fixed effects[11] and county fixed effects[12]. All regressions include dummies for the survey-wave-target-year combinations. Once we include all fixed effects and control variables, the estimate has the expected sign and is significant at the 1% level (Table 3). A one percentage point higher local unemployment rate (in the county) is associated with a growth expectation (for Germany) that is 0.35 percentage points lower. Thus, firms from counties with high unemployment have more pessimistic growth expectations for Germany as a whole. We do not find that this extrapolation effect varies systematically with firm size.

[11] We sort firms into XY industries using the harmonized classification scheme proposed in Link (2020)

[12] The firms in our sample cover all of the 401 administrative districts, which are named "Kreise und kreisfreie Städte" in Germany.

To investigate whether also the relative *business cycle* situation of a county has an impact on growth expectations, we relate a twelve-months moving average of the cyclical component of the unemployment rate (that we estimate using the Hodrick-Prescott filter) to growth expectations. Table C.1 in Appendix C contains the results. In this case, we do not find any significant correlation which suggests that the more pessimistic outlook for the German economy is indeed driven by the structurally worse economic situation in counties with high unemployment rather than by the local cyclical economic situation experienced by the firms.

Overall, we conclude that local experiences made by firms might have some framing effect in the sense that firms extrapolate from them when forming their general business cycle expectations. This effect, however, does not seem to be strongly influenced by the size of a firm.

3.2.2 Individual Business Situation and Expectations

Another piece of "private information" that a firm clearly has and that might affect its (GDP) growth expectations is its own business expectations. Again, one plausible hypothesis is that firms might extrapolate from their own business expectations to the general business cycle situation. Thus, in a next step we relate the quantitative growth expectations of firms to their business expectations as reported in the regular ifo BTS.

We face a problem of potential reverse causality at this point because a firm might well report bad business expectations *because* it is pessimistic about future GDP growth. We address this concern in three ways while acknowledging that a proper identification of causal effects is hard given the data that we have at our disposal.

First, we argue that the problem of reverse causality is likely to be much smaller when looking at the relation between the assessment of the *current business situation* and growth expectations since the current situation of a firm depends on actual current factors rather than the expectation that a firm has for the general economic outlook. Hence, we will also regress growth expectations on reported business situation.

Second, we use a reduced samples of firms for which the German economy is not important. For those firms their expectation of domestic GDP growth should not affect their business assessment and a significant correlation would indicate that when forming growth expectations firms extrapolate from their business expectations. We select these subsamples in three ways. We rely on i) a self-reported measure of importance that we elicited in August 2018, ii) information about firms' export shares that firms reported in September 2018, and iii) the historical correlation between German GDP growth and the business assessment of firms.

Third, we employ an instrumental variables approach to tackle the issue of potential reverse causality. We instrument current business expectations with business expectations 24 months prior to the respective survey when GDP growth expectations are elicited, i. e. the 24th lag of business expectations. Clearly, the reported business expectations in 2016 and 2017 should not be affected by general growth expectations two years later.

The first two columns of Table 4 present results for the first strategy. The full-sample OLS estimates indicate that both firms which report a better current business situation or better business expectations do indeed tend to report also more optimistic growth forecasts. The estimated effect is a little lower in the lower part that refers to the regression involving current business assessment but in both cases the point estimates are around 0.3.

The remaining columns of Table 4 present results for the second strategy. It is evident that the effect in general holds also for subsamples of firms that report not being dependent on the German business cycle, make large shares of their turnover on export markets, or historically reported business assessments that were not strongly correlated with the German business cycle[13]. The coefficients remain positive in almost all cases (and often even remarkably similar in size) and statistical significance vanishes only when the number of observations in subsamples become very small.

Also the instrumental variables approach supports the hypothesis that firms extrapolate from their own business expectations to the overall economic outlook. Again we

[13]The two subsamples include firms whose absolute values of the dependence coefficient are below the 5 % or 10 % quantile, respectively.

Table 4: Impact of Business Situation on Growth Expectations

	(1) Full sample	(2) Full sample	(3) Importance ≥3	(4) Importance ≥4	(5) Foreign Sales >50	(6) Foreign Sales >75	(7) Foreign Sales >90	(8) Past GDP Dep. ≤ q(10%)	(9) Past GDP Dep. ≤ q(5%)
PANEL A									
Bus. exp.	0.31***	0.33***	0.31***	0.35***	0.38***	0.39***	-0.08	0.35***	0.02
	(18.57)	(17.39)	(8.77)	(4.53)	(5.80)	(4.15)	(-0.32)	(3.82)	(0.13)
Wave FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	21,135	15,795	4,796	1,140	1,563	606	143	1,075	526
R^2	0.11	0.15	0.26	0.52	0.45	0.60	0.55	0.48	0.54
PANEL B									
Bus. ass.	0.25***	0.26***	0.22***	0.07	0.39***	0.35***	0.15	0.27***	0.06
	(15.35)	(14.02)	(6.27)	(0.90)	(5.89)	(3.29)	(0.44)	(2.73)	(0.27)
Wave FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	21,164	15,815	4,801	1,138	1,560	608	143	1,076	525
R^2	0.11	0.14	0.26	0.51	0.45	0.60	0.55	0.47	0.54

Notes: *p<0.1, **p<0.05, ***p<0.01. t-statistics in parentheses. The control variables include firm size categories, the time since a firm's first survey participation, a dummy for answering online, the (self-reported) firm age, the historical volatility of business expectations and past success in predicting own business situation. "Bus. exp." and "Bus. ass." refer to the firms' business expectations and assessments, respectively, that the firms report on a scale from -1 (bad) to 1 (good). Standard errors are clustered at the two-digit business classification level.

regress quantitative growth expectations on firms' business expectations (and a number of control variables), this time instrumenting business expectations by their value lagged by 24 months. The estimates are highly significant and with about 0.5 slightly higher than the OLS estimates (Table 5). Estimates are insensitive with respect to the set of fixed effects used in the regressions. The first-stage F-statistic indicates that the instrument is strong in all four specifications.

Overall, the results in this subsection indicate that firms seem to extrapolate systematically from their business expectations (and the assessment of their current business situations) to the general national business cycle outlook.

3.2.3 Perceived Economic Uncertainty

To test if growth expectations and perceived uncertainty about the business outlook are correlated, we regress growth expectations on the self-reported uncertainty measure described above while controlling for business assessment and the historical volatility of business assessment. Both variables are significantly correlated (Table 6). The negative

Table 5: Impact of Business Expectations on Growth Expectations – IV Estimates

	(1)	(2)	(3)	(4)
Bus. exp.	0.456***	0.476***	0.481***	0.465***
	(8.19)	(8.07)	(7.88)	(7.22)
Wave FE	Yes	Yes	Yes	Yes
Controls	No	Yes	Yes	Yes
Industry FE	No	No	Yes	Yes
Region FE	No	No	No	Yes
F-Stat	1,985.6	1,681.8	1,596.2	1,421.1
N	17,121	13,956	13,943	13,210

Notes: *p<0.1, **p<0.05, ***p<0.01. t-statistics in parentheses. Lag 24 of business expectations serves as the instrument. The control variables include firm size categories, the time since a firm's first survey participation, a dummy for answering online, the (self-reported) firm age, the historical volatility of business expectations and past success in predicting own business situation. Standard errors are clustered at the two-digit business classification level.

sign means that those firms that report high uncertainty about their business outlook tend to report more pessimistic growth expectations. The coefficient of -0.007 (for the full sample) means that the growth expectation of a firm that reports very low uncertainty (a value of 1) can be expected to have growth expectations that are 0.7 percentage points higher than a firm that reports a maximum of uncertainty (a value of 100). The result holds also for the individual sectors as reported in the last three columns of the table.

Thus, it seems to be the case that business uncertainty is associated with more pessimistic growth expectations even when controlling for business assessment and the historical volatility of business assessment. This leads to two conclusions. First, business uncertainty seems to be no "first-moment-neutral" measure of higher moments of expectations. This is in contrast to how uncertainty and uncertainty shocks have been treated in most of the macroeconomic literature so far. Second, we see again extrapolating behavior of firms from their own business situation to their macroeconomic expectations.

Table 6: Impact of Business Uncertainty on Growth Expectations

	(1) Full sample	(2) Full sample	(3) Manuf.	(4) Trade	(5) Service	(6) reg_unc4
Uncertainy	-0.007***	-0.007***	-0.006***	-0.009***	-0.006**	-0.004**
	(-7.11)	(-5.96)	(-5.05)	(-4.29)	(-7.08)	(-2.48)
Bus. ass.	0.242***	0.228***	0.195***	0.189***	0.185***	0.161**
	(7.92)	(7.61)	(7.16)	(5.22)	(11.13)	(2.45)
Wave FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	Yes	Yes	Yes	Yes	Yes
Industry FE	No	No	Yes	Yes	Yes	Yes
Region FE	No	No	Yes	Yes	Yes	Yes
N	15,551	12,432	11,729	3,976	2,832	4,921
R^2	0.08	0.09	0.17	0.27	0.28	0.22

Notes: *p<0.1, **p<0.05, ***p<0.01. t-statistics in parentheses. The control variables include industry and region dummies, firm size categories, the time since a firm's first survey participation, a dummy for answering online, the (self-reported) firm age, the historical volatility of business expectations and past success in predicting own business situation. "Uncert." refers to the business uncertainty that firms reported on a scale from 1 (very low uncertainty) to 100 (extreme uncertainty). Standard errors are clustered at the two-digit business classification level.

3.3 Revisions of Growth expectations

Since heterogeneity of expectations might also arise due to a staggered and infrequent updating of information sets (as, e.g., in models of sticky information (Mankiw and Reis, 2002)), it is also interesting to look at revisions of growth expectations. Since we observe only one instance of proper expectation revisions (revisions of growth expectations for 2019 and 2020 between March and August 2019), we cannot analyze long-run frequencies of expectation updating. However, we can at least document the share of firms that change their expectations over the half year that we cover with our sample and the cross-sectional distribution of the size of revisions.

The vast majority of firms changed their expectations between the two survey waves (Table 7). Only a little over 17 % of firms did not change their growth expectations for 2019 or 2020 respectively. In contrast, large change in growth expectations of more than 0.5 percentage points are common (almost half of the firms). This is in line with Coibion et al. (2018), who show that firms in New Zealand revise their macroeconomic expectations strongly and frequently, and strong evidence against the importance of sticky information.

Table 7: Frequencies of Sizes of Expectation Revisions

	$\Delta = 0$	$\lvert\Delta\rvert < 0.25$	$0.25 \leq \lvert\Delta\rvert \leq 0.5$	$\lvert\Delta\rvert > 0.5$	N
$E^{19}_{M19} \rightarrow E^{19}_{A19}$	17.7	29.0	27.8	43.2	3,698
Large Firms	15.3	28.6	32.3	39.0	786
Small Firms	18.3	29.0	26.6	44.3	2,912
$E^{20}_{M19} \rightarrow E^{20}_{A19}$	17.1	30.1	25.6	44.3	3,656
Large Firms	15.8	32.6	29.5	37.9	783
Small Firms	17.5	29.5	24.5	46.0	2,873

Notes: E^i_j denotes growth expectations for target year $i = \{2019, 2020\}$ reported in survey wave $j = \{M19, A19\}$. Shares are given in percent. We categorize firms into five size categories. "Large Firms" refers to firms that fall in the two upper categories (large and very large firms), "Small Firms" refers to all other firms.

Differences in revision behavior between small and large firms are not huge but noteworthy. Small firms stick to their previously reported expectations slightly more often than large firms. If, however, they revise their growth expectations, small firms make more extreme revisions. This behavior is in line with the hypothesis that costly information collection makes small firms less informed about macroeconomic variables and thus more sticky *and* erratic in their beliefs about the future.

3.4 Influence on Firms' Behavior

Eventually, it is of utmost interest, of course, whether differences in growth expectations lead to differences in firm behavior. Since not much time has passed since we elicited growth expectations, we cannot investigate long-term effects or any impact on quantitative firm outcomes. Still, we are able to analyze the correlation between growth expectations and firm responses to two questions about employment and investment that are regularly included in the survey. Each months, firms are asked to report whether they expect their number of employees to decrease, stay the same or increase over the next three months (forward looking) and whether their number of employees decreased, stayed the same or increased in the previous month (backward looking). Twice a year (in May and November), firms also report whether they intend to invest less, the same, or more in the

current year than in the previous one (forward looking) and whether they invested less, the same, or more in the last year than two years ago. We regress growth expectations on those measures of investment and employment changes, controlling for business expectation and assessment and our other usual control variables and fixed effects.

Our estimates indicate that the (qualitatively measured and self-reported) change in employment is significantly and positively related to growth expectations even when controlling for business assessment and expectations (Table 8). However, the effect is rather small: a one percentage point increase in growth expectations has a positive effect on expected employment of about 0.01 points. This holds over all four specifications. For investment the effect is of roughly the same size but less statistically significant. The results hold for both the forward looking investment/employment plans (columns (1)–(4)) and for the backward looking reports of implemented changes in investment/employment (column (5)).

These results suggest that general business cycle optimism leads firms to employ or invest beyond what is systematically driven by their expectations for their own business.[14]

4 Conclusion

In this paper we have established a number of facts about growth expectations of firms. Our evidence is based on a fairly representative sample of roughly 4,700 German firms from the manufacturing sector, the trade sector, and the service sector.

We show that the dispersion of growth expectations across firms is large, confirming evidence in Coibion et al. (2018) and Tanaka et al. (2019). This dispersion is higher for smaller firms and for those firms whose business does not depend strongly on the German business cycle. A substantial share of cross-sectional variation seems to be driven by the fact that firms tend to extrapolate from their business experiences—such as the local economic environment, their own business situation, or perceived uncertainty about the business outlook—to future aggregate growth. Finally, we show that growth expectations

[14] In the future, we will be able to analyze the effect on further variables. Using information on firm profits we will be able, for instance, to review the result of Tanaka et al. (2019) who find that the size of firms' growth forecast errors is inversely related to their subsequent profitability.

Table 8: Investment and Growth Expectations

	(1)	(2)	(3)	(4)	(5)
PANEL A: Employment					Backward
		Forward looking			looking
Growth exp.	0.011***	0.012***	0.012***	0.012***	0.010***
	(5.29)	(4.91)	(4.80)	(4.80)	(4.28)
Bus. exp.	0.218***	0.210***	0.201***	0.200***	0.075***
	(43.45)	(35.51)	(33.83)	(32.12)	(12.52)
Bus. ass.	0.206***	0.189***	0.184***	0.181***	0.153***
	(43.44)	(32.02)	(31.16)	(28.94)	(25.68)
Wave FE	Yes	Yes	Yes	Yes	Yes
Controls	No	Yes	Yes	Yes	Yes
Industry FE	No	No	Yes	Yes	Yes
Region FE	No	No	No	Yes	Yes
N	23,371	16,670	16,620	15,764	15318
R^2	0.20	0.20	0.23	0.27	0.17
PANEL B: Investment					Backward
		Forward looking			looking
Growth exp.	0.004	0.008	0.009**	0.009**	0.023**
	(0.71)	(1.18)	(2.24)	(2.16)	(2.11)
Bus. exp.	0.113***	0.125***	0.127***	0.134***	0.089***
	(9.23)	(8.93)	(12.40)	(12.45)	(3.57)
Bus. ass.	0.215***	0.202***	0.194***	0.179***	0.110***
	(17.39)	(11.74)	(19.06)	(16.69)	(4.52)
Wave FE	Yes	Yes	Yes	Yes	Yes
Controls	No	Yes	Yes	Yes	Yes
Industry FE	No	No	Yes	Yes	Yes
Region FE	No	No	No	Yes	Yes
N	18,009	13,844	13,844	13,144	2,749
R^2	0.06	0.07	0.09	0.16	0.22

Notes: *p<0.1, **p<0.05, ***p<0.01. t-statistics in parentheses. We use reported changes in employment (forward and backward looking) from the same survey waves in which we elicited growth expectation (August 2018, March 2019, and August 2019). We match growth expectations with the first available subsequent data on changes in investment. For the forward looking variable that means we use data from November 2018, May 2019, and November 2019. For the backward looking variable we currently can only match growth expectations from August 2018 with reports on investment from May 2019. The control variables include industry and region dummies, firm size categories, the time since a firm's first survey participation, a dummy for answering online, the (self-reported) firm age, the historical volatility of business expectations and the past success in predicting own business situation. "Bus. exp." and "Bus. ass." refer to the firms' business expectations and assessments, respectively, that the firms report on a scale from -1 (bad) to 1 (good). Standard errors are clustered at the two-digit business classification level.

(even when controlling for business assessment and expectations) are positively related to firms' investment and labor demand.

Our results have interesting macroeconomic implications. First, the fact that idiosyncratic developments at the regional level or at the firm level influence expectations of firms about the macroeconomy might amplify these idiosyncratic developments. For instance, if more pessimistic growth expectations induced by a negative shock to a firms' business translate into lower inflation expectations (something that we intend to investigate in a follow-up study), this firm effectively faces higher ex ante real interest rates. This, in turn, might dampen its business investments. All things considered, there might be an expectation feedback loop that enforces regional or firm-level inequality.

Second, the fact that uncertainty is negatively correlated with growth expectations indicates that we have to consider the possibility that measures of economic uncertainty are not merely "first-moment-neutral" indicators of higher moments of economic expectations. Instead uncertainty seems to be perceived (at least among the firms in our sample) as something with negative effects on the first moment of expectations. Thus, uncertainty might have not only (or even not mainly) direct macroeconomic effects (as argued, e.g., in Bloom (2009)) but also via an effect on the central tendency of expectations. If this was indeed the case, it would be important to always control for macroeconomic expectations when identifying the effects of economic uncertainty shocks.

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Appendix A Wording of Questions

The wording of the special questions in the BTS were as follows. To ask about the expectations for the annual growth rate of real GDP in 2018 we asked:

> Um wie viel Prozent wird sich Ihrer Einschätzung nach das reale Bruttoinlandsprodukt in Deutschland 2018 im Vergleich zum Vorjahr ändern?
>
> ___,___%
>
> *English translation (by authors)*:
> According to your assessment, by how much percent will the real gross domestic product in Germany change in the year 2018 relative to the previous year?
>
> ___,___%

To ask about the expectations for the annual growth rates of real GDP in 2019 and 2020 we asked:

> Um wie viel Prozent wird sich Ihrer Einschätzung nach das reale Bruttoinlandsprodukt in Deutschland in den unten genannten Jahren im Vergleich zum jeweiligen Vorjahr ändern? (Prozentangabe mit einer Nachkommastelle möglich.)
>
> 2019: ___,___% 2020: ___,___%
>
> *English translation (by authors)*:
> According to your assessment, by how much percent will the real gross domestic product in Germany change in relation to the respective previous year in the following years? (You can state your answer with one decimal.)
>
> 2019: ___,___% 2020: ___,___%

To elicit how important the German business cycle is for each firm we asked:

> Wie wichtig ist die allgemeine Konjunkturentwicklung in Deutschland für die Geschäftslage Ihres Unternehmens?
>
> ☐ sehr wichtig
> ☐ wichtig
> ☐ bedingt wichtig
> ☐ weniger wichtig
> ☐ unwichtig

English translation (by authors):
How important is the aggregate business cycle in Germany for the business situation of your firm?

- very important
- important
- somewhat important
- of small importance
- not important

To elicit the share of a firm's turnover made abroad we asked:

Wie viel Prozent Ihres Umsatzes erzielt Ihr Unternehmen / Betrieb im Ausland?

___%

English translation (by authors):
Which share of your firm's turnover is made abroad (in percent)?

___%

Appendix B Descriptive Statistics

Table B.1: Descriptive Statistics

	N	Mean	SD	Min	Max
GDP importance	5,792	2.14	0.90	1	5
Foreign sales	5,532	15.63	23.84	0	100
Past GDP dependence	5,105	0.09	0.08	0.00	0.66
Unemployment MA	9336	5.04	2.15	1.30	13.24
Cyclical unemployment MA	9336	−0.11	0.13	−0.97	0.77
Business assessment	7925	0.28	0.59	−1	1
Business expectation	7854	−0.03	0.53	−1	1
Uncertainty	5,294	53.69	18.66	0	100
Employment (forward looking)	7903	0.06	0.43	−1	1
Employment (backward looking)	7843	0.04	0.37	−1	1
Investment (forward looking)	7,251	0.11	0.60	−1	1
Investment (backward looking)	4,774	0.18	0.69	−1	1
Survey age	5,883	129.13	101.15		
Dummy online	7,929	0.72	0.44	0	1
Firm size	11,185	2.35	1.18	1	5
Firm age	5,772	1961.79	67.55		
Sucess in prediciting own business	7,866	0.27	0.25	0.00	1.17
Hist. volatility of bus. expectation	10,095	0.48	0.20	0.00	1.41

Notes: We calculate all descriptive statistics based on firms' means over all survey waves actually used in the analysis. Missing values are left out to ensure anonymity of firms.

Appendix C Growth Expectations and Cyclical Unemployment

Table C.1: Impact of Local Conditions on Growth Expectations

	(1)	(2)	(3)	(4)
Cycl. U	-0.1188	-0.0191	-0.0476	-0.2479
	(-1.62)	(-0.10)	(-0.25)	(-1.11)
Cycl. U * Firm size 2		-0.1879	-0.1234	0.0282
		(-0.86)	(-0.56)	(0.13)
Cycl. U * Firm size 3		0.0715	0.1457	0.1168
		(0.25)	(0.52)	(0.40)
Cycl. U * Firm size 4		-0.2590	-0.2369	-0.3435
		(-0.86)	(-0.78)	(-1.09)
Cycl. U * Firm size 5		0.1300	0.0890	0.1567
		(0.48)	(0.32)	(0.56)
Wave FE	Yes	Yes	Yes	Yes
Controls	No	Yes	Yes	Yes
Industry FE	No	No	Yes	Yes
Region FE	No	No	No	Yes
N	21205	16059	16018	16018
R^2	0.05	0.07	0.08	0.14

Notes: *p<0.1, **p<0.05, ***p<0.01. t-Statistics in parentheses. The control variables include industry and region dummies, firm size categories, the time since a firm's first survey participation, a dummy for answering online, the (self-reported) firm age, the historical volatility of business expectations and the past success in predicting own business situation. "Cycl. U" refers to the cyclical component of the unemployment rate as measured using the Hodrick-Prescott filter. Standard errors are clustered at the two-digit business classification level.