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I Think What You Think: Trade Fairs and the Exchange of Firms' Beliefs

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Abstract

Does interaction between firms lead to a streamlining of expectations? We test for the existence of a so-far ignored channel of expectation formation and diffusion by matching a regular Austrian business survey on firm expectations with the schedule and confirmed exhibitors at trade fairs. We find that in the month after a firm has exhibited at a trade fair, its production expectations react stronger to consensus expectations than in other months. We thus provide first micro-level evidence suggesting that firms' beliefs are shaped by information from other firms with whom they meet and potentially trade.

Keywords: Expectations; survey data; incomplete information.
JEL codes: E32; E71, D84.

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1 Introduction

The process that governs the way in which economic agents form their expectations about the future is one of the cornerstones of modern macroeconomic models. While the workhorse model still relies on full information rational expectations (FIRE), the empirical evidence deviates from this assumption. For example, forecasters and economic agents on average underreact to macroeconomic news when forming their expectations (Coibion and Gorodnichenko, 2015; Kohlhas and Walther, 2021). This reflects a failure of the full information assumption: agents cannot observe the entire economy, either because information is sticky – they cannot immediately adjust their expectations correctly – or noisy. How do they cope with the resulting uncertainty?

Angeletos and La'O (2013) build on the prominent island model by Lucas (1972) and propose that firms, being located on different island, cannot observe information for all markets in the economy, but do so for the subset of firms with whom they interact: they exchange information with other islands as they meet and trade with each other. In other words, firms are not sure what to expect from the future, and thus incorporate the beliefs of others in their expectation formation process.

The present paper is one of the first to test this assumption empirically based on firm-level data. To this end, we combine a monthly survey of Austrian firms with information on trade fairs in Austria. As trade fairs serve not only as temporary clusters for the conduct of business, but also as platforms for information exchange and learning (Bathelt and Schuldt, 2008), they are a useful means to model interactions of firms in this context.

Matching firm names from exhibitors lists to business survey data from the Austrian Institute of Economic Research (WIFO), we have information on a firm's own expected production and price changes as well as on the month in which this firm attended a particular fair. We use participation in the same trade fair as an indicator that firms had closer contact at a specific moment. We calculate a measure for the consensus expectation of firms participating in the trade fair and estimate to what extent expectations of showcasing firms are affected by this consensus. We elicit changes as compared to their responses to the previous survey wave as well as to non-exhibiting firms.

We find that expectations of firms react more strongly to the consensus in the month after exhibiting at a trade fair than in other months. More specifically, in times when consensus expectations are largely optimistic, with for example a weighted net balance of 50% of firms expecting an increase of production, the probability that a firm expects its own production to increase as well is substantially higher in the month after exhibiting at the fair than in other months and in comparison to firms that did not exhibit at a trade fair in the previous month (42% versus 16%). However, the difference is only statistically significant for rather high values of the consensus (> 0.7). In contrast, the probability of a firm to expect an increase in production despite consensus expectations being widely negative is significantly lower after showcasing at a trade fair. Considering a weighted net balance of 50% pessimistic firms, after trade fair participation, the probability of a firm to expect an increase in own production is only 4% versus 10% compared to non-exhibition in the previous month. Concerning predicted probabilities of firms to expect a decrease of production, we even observe a higher statistical significance of this communication effect.

In summary, the results provide initial micro-level evidence suggesting that firm-to-firm interactions matter when firms form their beliefs about the future.

This paper adds to the research on survey expectations and the expectation formation process, which has experienced an uptick since the financial crises (Born et al., 2023a). We are not the first to lend support to incomplete information models. Results by Andrade et al. (2022) indicate that firms confound industry and aggregate shocks, as they show that firm expectations about broader economic conditions respond to shocks to their industry that have no effect on the aggregate. This suggests that firms do consider industry-specific information as reliable and relevant for inference regarding aggregate economic conditions. Sebbesen and Oberhofer (2024) provide evidence that network effects matter for expectation formation at the industry-level. Using input-output structures to model the relations between industries, they find that firm expectations in an industry are both influenced by expectations in their customer industries as well as in their supplier industries.

Several papers investigate FIRE by building on the strategy first proposed by Coibion and Gorodnichenko (2015). They test for the predictability of forecast errors by regressing forecast errors on forecast revisions. As stressed by Bordalo et al. (2020) and Born et al. (2023a), such regressions based on *average* errors are informative about the full information assumption (e.g., Coibion and Gorodnichenko, 2015; Kohlhas and Walther, 2021), while *individual* level predictability points to a rejection of the rational expectations assumption (e.g., Bordalo et al., 2020; Born et al., 2023b; Angeletos et al., 2021). However, empirical evidence on the impact of information exchange on expectation formation is limited. We aim to close this gap by investigating whether direct communication between firms shapes views on future economic conditions and prospects.

We also contribute to the literature on trade fairs. Bathelt and Schuldt (2008) argue for the importance of trade fairs beyond the conduct of business, such as serving as microcosm for an entire industry and enabling firms to acquire information on trends in the overall market. Panitz and Glückler (2017) provide evidence for trade fairs to foster long distance relationships between organizations, shaping the global industry network. Based on a longitudinal analysis of fabric industry trade fairs in Europe, Rinallo and Golfetto (2011) show that trade fair organizers affect learning and interactions at their events. Li (2014) investigates which factors determine the structures of temporary gatherings in Asia, and find that the share of international exhibitors is larger in more developed economies. We add to this literature by providing micro-level evidence on the role of firm-to-firm interactions and learning at trade fairs.

The remainder of this article is structured as follows: Section 2 discusses the identification strategy, presents the data and outlines our measure for consensus expectations at trade fairs. Section 3 presents the econometric model and its results, along with a series of robustness tests. Section 4 provides concluding remarks.

2 Identification Strategy and Data

2.1 Identification Strategy

We observe regularly updated information on individual firm expectations in the WIFO Business Survey, a monthly survey among Austrian firms (see subsubsection 2.2.1 for details). But are individual firm expectations influenced by expectations of other firms?

To measure the impact of the exchange of information and beliefs on stream-lining expectations, we need to have evidence for firm-to-firm interactions that would facilitate the spread of information. An obvious approach would be to assume that information is exchanged between firms that trade with each other (as in the industry-level analysis by Sebbesen and Oberhofer, 2024). However, business-to-business interactions may also occur between non-trading partners and is thus not observed in trade statistics.

To track changes in individual expectations due to information diffusion independent of actual business interactions, we propose a novel identification strategy relying on trade fairs as communication and information diffusion platforms. Trade fairs not only serve as market places for commercial transactions, but also for network-building and as temporary clusters for knowledge and information sharing (Panitz and Glückler, 2017; Bathelt and Schuldt, 2008).

These functions are well supported by firms themselves. According to a yearly survey of 500 firms by the Association of the German Trade Fair Industry (AUMA), trade fairs turn out to be the second most important instrument (after websites) in firms' marketing-mix for business-to-business communication with potential customers (Wöhler, 2018). Moreover, Bathelt and Schuldt (2008) conduct 140 interviews at two business-to-business trade fairs to explore the interaction and communication patterns with customers, partners, competitors and suppliers. They find that not only particular circumstances of the business relation are shared, but also general information about markets and technological innovations within the industry. Communication also exceeds official fair hours, as roughly 70% of the respondents meet customers for dinners and others informal events and about 50% meet their customers coincidentally.

We thus use publicly available lists of trade fair exhibitors and match the exhibitors' names to the WIFO Business Survey data. For each trade fair, we construct a consensus measure representing average expectations at the trade fair. We then compare how individual firm expectations react to consensus expectations after exhibiting at a fair in comparison to not exhibiting at a trade fair in the previous month.

2.2 Data

2.2.1 WIFO Business Survey

We use data on expectations from a monthly Business Survey (Konjunkturtest) conducted by the Austrian Institute of Economic Research (WIFO). The WIFO Business Survey (BS) collects information from more than 1,700 Austrian firms on their economic situation and their expectations of the coming month. Similar surveys are conducted throughout the European Union by partner institutes of the European Commission with the main aim

to provide early indicators for economic developments in member states and candidate countries. Firms assess recent changes and prospects over the upcoming months for their own production and business activity, for the prices they set as well as for general economic conditions. Conducting such surveys follows an international trend for filling gaps in official statics regarding measuring timely changes in the current business environment and an overall outlook (see Born et al., 2023b).

The WIFO Business Survey is voluntary and confidential, so we assume that firms do not have strategic motives to answer. The survey covers firms with 15 or more employees in the manufacturing and construction sector, and firms with more than 10 employees in the services sector. Most of the responses come from services firms (51%), followed by manufacturing firms (33%) and construction firms (16%). The survey has a panel structure, as the same firms are surveyed repeatedly. To maintain a high number of participating firms, WIFO regularly invites new firms to join the survey. On average, 1,360 Austrian firms respond to the survey each month, which corresponds to an average response rate of around 62 percent. The firms that answer the WIFO Business Survey represent more than 50 percent of firm employment in Austria (Fidrmuc et al., 2023).

We are mainly interested in the questions on future prospects of the firms in the WIFO Business Survey. Each month t, an Austrian firm i replies to a questionnaire on expected changes in its production/demand over the upcoming three months, denoted by $F_t^i(x_{t+3,t}^i)$. The expectations are elicited via the following response: *"Our production will (i) increase (ii) stay the same (iii) decrease in the next three months"*.[1] In an additional analysis, we further consider the firm's forecasts on the expected sales prices, which are elicited via the following response: *"Our selling prices will (i) increase (ii) stay the same (iii) decrease in the next three months"*. Firms are not only surveyed prospectively, but are also asked in retro-perspective about their production and sales price development in the past three months.

Since the WIFO Business Survey only distinguishes between three types of outlooks, the expected decreased, unchanged or increased outlooks of firm i at time t are denoted by $F_t^i(x_{t+3,t}^i) \in \{-1, 0, 1\}$.[2]

Additionally, the Business Survey contains information on the number of employees, location and the ÖNACE 4-digit industries of the surveyed firms.

2.2.2 Trade Fairs

The AUMA collects information on Austrian trade fairs. The data set encompasses information on dates and the location of fairs, a classifier of whether the trade fair targets trade or private visitors, information on its cycle, the numbers of exhibitors and (trade) visitors as well as information on an (AUMA-defined) industry group the trade fair is associated to.

[1] Note that the exact formulation of the question varies by sector. In the construction sector, firms are asked whether their *"building activity will (i) increase (ii) stay the same or (iii) decrease in the next three months"* and in the services sector, firms answer whether *"the demand for [their] services will (i) increase (ii) stay the same or (iii) decrease in the next three months"*.

[2] The same notation is also used for prices.

The dataset does not cover the whole universe of Austrian trade fairs, but is close in doing so. We complete missing events and trade fair characteristics by online research and direct communication with the organizers. This leaves us with 1,275 trade fairs over the period 2009 to 2023.

For selecting trade fairs for our analysis we prioritize large events: we include trade fairs with an amount of exhibitors or trade visitors larger than the 80th percentile of exhibitors or trade visitors of all fairs, or, whenever this information is missing, if overall visitors exceed the 80th percentile.

We search the internet for lists of exhibitors at trade fairs and digitize them. Whenever we find exhibitors lists for other topically relevant fairs not listed by the AUMA in the course of research, we add them too. Sometimes the information on fair participants is provided in the form of lists, sometimes it needs to be extracted from brochures or floor plans. Some brochures only depict product brands, so in this case we search for the companies producing the respective brands. Merging all these information leaves us with 32 lists of exhibitors for the selected trade fairs.

Table 7 in the Appendix summarizes key meta data from all trade fairs for which we have lists of exhibitors. It presents the respective numbers on exhibitors and on professional and private visitors according to the AUMA data, and the amount of exhibiting companies according to our lists. It also gives information on the industry group a trade fair is associated to by AUMA. These industry groups and their English translation are listed in Table 8 in the Appendix. The last column shows the other years the respective trade fair took place according to our dataset.

As demonstrated in Table 7, trade fairs tend to be regularly recurring events (most are repeated annually) and in several cases, we have exhibitor lists from different years for the same trade fair. For those trade fairs for which we have exhibitor lists for two consecutive years, we find that on average 66% of the firms that exhibit in a given year t also exhibit at the same trade fair in the following year $t + 1$. Accordingly, for those trade fairs for which we have lists of exhibitors with one year in between, 62% of firms that exhibit in year t also exhibit in year $t + 2$.[3]

2.2.3 Matching Individual Expectations to Trade Fairs Participation

We match firms from the exhibitors lists to their responses in the WIFO Business Survey. We fuzzy match firms by name using a vectorial decomposition and fuzzy soundex algorithm. Additionally, information on location and industry were used in case these information were available from the exhibitors lists. Further, the industry focus of the fair was used to validate matches manually[4]. In total, we are able to match 31.83% of the Austrian fair exhibitors[5] to an observation in the WIFO Business Survey.

[3]The statistics exclude exhibition lists for the years 2020, 2021 and 2022, for which we expect a structural break due to the COVID 19 pandemic.

[4]Note that not all exhibitors lists include information on location and industry of the respective firms. Some larger firms have multiple business premises in Austria. We only consider firms that we can uniquely attribute to the corresponding business premises indicated by the stated postal code and industry.

[5]Foreign exhibitors are excluded from our sample. Around one quarter of the in total observed 4981 fair exhibitors are foreign businesses, mainly from Germany, Italy and other neighboring countries.

The business survey has a substantial amount of missing data at the monthly frequency, as many firms choose to be surveyed only every quarter. In order to increase the sample size of firm-month matches between the business survey and the trade fair exhibition lists, we assume that the list of exhibitors for some events, where we know that the trade fair took place (from the AUMA dataset or web research), is the same as in other years. This is done to compensate for cases where we only have lists of exhibitors for some years and not all years the fair took place. We only assume the consistency of trade fair exhibitors for particular trade fairs where we observe a relatively high persistence over trade fair exhibitors over the other years where exhibition information are available, i.e. when more than 66% of firms that exhibit in year t also exhibit in $t+1$. We restrict this imputation and go back (or forward) in time for one or two years, depending on the extent of persistence in the data. The trade fairs for which we complete the data in the described way are: com:bau, Boot Tulln, Automesse Ried, Frühjahrsmesse (SCHAU! Vorarlberg) and CARAVAN.

We construct a monthly dummy variable to represent whether a firm exhibited at a trade fair. The majority of firms answer the WIFO business survey in the first half of the month. Hence, we generally suppose that trade fair participation in t has an effect on expectation formation in the following month $t+1$. To increase the number of matches between trade fair data and the business survey, however, we also match the exhibitors to expectations in $t+2$ and in $t+3$ and create the respective dummy variables.

Table 1 presents the firm size and sector distribution of the WIFO Business Survey sample from January 2012 to February 2023 compared to the distribution of firms of the WIFO Business Survey sample that are observed at fairs. To construct our sample, we select all firms that were observed to attend at least one fair between 2012 and 2023, leaving us with 9405 observations across 54 industries. Compared to the full WIFO Business Survey, our sample has a higher representation of manufacturing firms and an under-representation of firms in the service and construction sector. This can be attributed to a higher data availability for manufacturing firms and the industry focus of the observed fairs. In our sample, 59.6% of the fairs primarily target exhibitors in the manufacturing or construction industry. Despite more than two-thirds of the fair attendees being small or medium-sized businesses, our sample, which focuses on firms observed to be visiting trade fairs, relatively under represents small companies compared to the full business survey.

As Table 2 shows, the majority of the observed firms in the full WIFO Business Survey and in our matched survey-fair sample are rather reluctant to changes. The majority of firms do report that they expected production, prices or past demand remains unchanged. There is no significant difference between the full sample and our sample related to the outlook. Further, firms are rather sticky in their answer pattern. More than half of the firms (54.2%) reporting an expected decline in production in month t report as well a decline in production in $t+1$, while more than three quarters of firms (77.1%) of firms reporting that their production remains unchanged in the next three month, also report that their expected production stays the same in $t+1$ and 43.1% of firms that report in t an increase in their expected production report the same in $t+1$.

Table 1: Firm distribution

	2012-2023 full BS		2012-2023 BS-fair match	
	in %	# observations	in %	# observations
By industry				
Construction	15.97	34,355	9.37	881
Manufacturing	32.91	70,801	62.49	5,877
Services	51.12	109,993	28.14	2,647
By size				
<50 employees	64.13	137,970	35.58	3,346
50-249 employees	25.67	55,238	36.90	3,470
>250 employees	10.20	21,941	27.53	2,589
Total	100.00	215,149	100.00	9,405

Source: Authors' calculations based on the WIFO Business Survey.

Table 2: Firm perception

	Share of replies (in %)			# observations
	decreases	stays the same	increases	
Expected production				
2012-2023 full BS	22.21	63.50	14.29	215,149
2012-2023 our sample	24.83	62.18	12.99	9,405
Expected price development				
2012-2023 full BS	21.61	71.97	6.42	181,471
2012-2023 our sample	24.36	70.61	5.03	8,533

Source: Authors' calculations based on the WIFO Business Survey.

2.3 Consensus Expectations

Using information from the exhibitors lists and the WIFO Business Survey, we construct a variable on trade fair specific consensus expectations, denoted by $\overline{F}_t^T(x_{t+3,t})$. This variable represents a proxy for average expectations across firms attending the trade fair. As the number of matches between the lists of exhibitors and the WIFO Business Survey per trade fair is too small to compute a sensible consensus measure across only these firms, we have to follow a different methodological approach.

In a first step, we use the matched survey-fair firms and retrieve information from the survey data on the main NACE 2 digit industry of the respective firms. To obtain a proxy for the distribution of industries represented at each trade fair T, we compute the industry (trade fair specific) weight $w^{j,T}$ for each industry j as the share of firms from industry j exhibiting at trade fair T.[6] In a next step, we consider data from the full WIFO Business Survey and calculate average expectations across firms in industry j, denoted by $F_t^j(x_{t+3,t})$. In a last step, we calculate the industry weighted consensus measure as $\overline{F}_t^T(x_{t+3,t}) = {}^1\!/_N \sum_{j=1}^N w^{j,T} F_t^j(x_{t+3,t})$. Taking the average over $F_t^i(x_{t+3,t}^i) \in \{-1, 0, 1\}$ can also be interpreted as subtracting the share of firms giving negative replies from the share of firms giving positive replies. The consensus measure can therefore be interpreted as an industry weighted net balance of optimistic versus pessimistic firms.

On the one hand, our consensus measure has the advantage that it also considers expectations of potential trade visitors, and not only of exhibitors. As communication is very likely to specifically occur also between exhibitors and visitors (or even among visitors), $\overline{F}_t^T(x_{t+3,t})$ should cover more of this interaction. On the other hand, obviously we might also capture expectations of many firms that actually do not attend the trade fair.

For a firm that only exhibited at one trade fair in the sample period, the reference group of firms for computing the (time-varying) consensus variable remains the same over the whole period. For a firm that exhibited at several different trade fairs, this reference group changes over time. Obviously, for firms that exhibited at a specific trade fair at time t, the reference group (and thus the consensus) at time t is the one associated to this particular trade fair taking place at t. For all other months, the relevant reference group is the one closest in time to the event of the respective trade fair. For instance, consider a firm that over the whole sample period exhibited at two trade fairs, being "Electrify Europe" in June 2018 and "Austro Agrar Tulln" in November of the same year. For this firm, the reference group of consensus expectations will be formed by all firms in industries represented at "Electrify Europe" from the beginning of the sample to August 2018, and will switch to all firms in industries represented at "Austro Agrar Tulln" thereafter.

Table 3 shows in more detail the base for the calculation of the consensus expectation. The first column shows the number of unique exhibitors for which we have data in the business survey within three months after the trade fair took place ("BS-Fair-Time match").[7] The second column counts the number of firms that are used to learn about the industry

[6] For repeated trade fairs where we have lists of exhibitors from several years, we assume that the industry distribution remains the same over time. A firm name that appears more than once is also considered multiple times in the weighting accordingly.

[7] As outlined below, the main econometric specification will incorporate a one-month lag.

distribution at each trade fair ("BS-Fair match"). The third column presents the number of total exhibitors according to the list of exhibitors. For those trade fairs, where we have to derive information on the industry distribution from less than 15 firms, we manually investigate the industry weights more closely. Due to inconsistencies between the industry distribution derived by the business survey and the industry focus of the trade fair, we exclude the following three fairs from our subsequent analysis: (i) "Automesse Ried – Car Exhibition", (ii) "European Utility Week", and (iii) "Bike-Austria – Motorradmesse".

3 Empirical Analysis

Using an ordered categorical variable with three levels as outcome, we estimate ordered regression models to assess the impact of firm-to-firm interactions during trade fairs on changes in expectations. More specifically, these models measure whether expectations react to changes of consensus expectations at trade fairs.

The ordered logit model takes the form

$$\begin{aligned} Pr(F_t^i(x_{t+3,t}^i) \leq j) &= Pr(\alpha_{j-1} < y_{t+3,t}^{i*} < \alpha_j) \\ &= \frac{1}{1+\exp(-\alpha_j + X_{it}')} - \frac{1}{1+\exp(-\alpha_{j-1} + X_{it}')} \end{aligned} \tag{1}$$

where we use $j = \{-1, 0, 1\}$ to index the reported expectations about firm i's production (or prices) $F_t^i(x_{t+3,t}^i)$. α_{j-1} and α_j are threshold parameters. $y_{t+3,t}^{i*}$ is the latent linear response, which we specify in its general form as

$$y_{t+3,t}^{i*} = \beta_1 \overline{F}_{t-1}^T(x_{t+2,t-1}) + \beta_2 T_{it-1} + \beta_3 \overline{F}_{t-1}^T(x_{t+2,t-1}) \times T_{it-1} + \varepsilon_{it} \tag{2}$$

T_{it-1} is a dummy variable that takes value 1 if firm i exhibited at a trade fair in the previous month, and zero otherwise. $\overline{F}_{t-1}^T(x_{t+2,t-1})$ denotes consensus expectations at a trade fair at $t-1$. The main coefficient of interest is β_3: if positive, it implies that firm expectations react stronger to changes in the consensus after exhibiting at a trade fair. This would suggest that firms share information as they meet and interact with each other. ε_{it} is a time-varying error term, which is independent and identical distributed as logistic.

3.1 Results

Table 4 presents the baseline results of estimating different specifications of the ordered logit regression model introduced above. Columns (1) and (2) display results when using the ordered logit estimator without individual firm effects, while columns (3) to (6) report panel results of incorporating random effects for each firm. In columns (1) and (3) we control for general shocks to expectations of all Austrian firms by including fixed effects for each of the 45 quarters in the sample. In the other specifications, we control for such common tendencies by including the monthly cross-sectional average of expectations over the whole business survey (not only our limited sample) as covariate in the model. We denote this variable by $\overline{F}_t(x_{t+3,t})$. In models including fixed effects for each NACE 2

Table 3: Number of matching firms per trade fair

Title[a]	Date	# Time	BS-Fair-matches[b]	# BS-Fair matches[c]	# Total Exhibitors[d]
SCHAU! - Die Vorarlberger Frühlingsausstellung	2017-04		6	75	437
INTERNATIONALE HOLZMESSE	2022-08		14	34	256
Intertool Austria	2022-05		10	34	247
AutoZum	2013-01		3	41	313
AutoZum	2015-01		5	41	281
AutoZum	2017-01		11	41	290
AutoZum	2019-01		7	41	239
FAFGA Alpine Superior	2019-09		14	55	385
FERIEN-MESSE	2021-05		4	12	162
Electrify Europe	2013-06		2	18	248
Electrify Europe	2018-06		3	18	303
INTERPÄDAGOGICA	2022-05		8	22	186
HAUS & BAU	2014-11		15	66	239
Smart Automation Austria	2021-10		3	16	168
Austrian Boat Show	2012-03		2	14	86
Austrian Boat Show	2022-03		6	14	298
Automesse Ried - Car Exhibition	2020-01		2	10	33
Austropharm	2021-09		2	24	90
Power-Days	2022-05		5	12	82
European Utility Week	2015-11		1	3	119
com:bau	2014-02		7	59	154
com:bau	2015-02		9	59	198
com:bau	2016-03		6	59	182
com:bau	2022-04		4	59	101
Austro Agrar Tulln	2018-11		16	44	306
bike-austria - Motorradmesse	2019-02		3	11	183
pool + garden Tulln	2022-03		3	12	206

[a] Short title, for full titles see Table 7.
[b] Number of exhibitors for which survey data is available within three months after the trade fair.
[c] Number of exhibitors used to calculate the industry distribution at the trade fair.
[d] Total number of exhibitors according to exhibitors lists.

digit industry, the sample size is slightly smaller because firms in industries with only one observation have to be excluded due to collinearity problems.

Across all specifications, the results show that firm expectations are positively affected by consensus expectations. As the consensus measure is calculated as the weighted industry average of firms that attend the same trade fairs, this result is not surprising. Trade fairs are generally events where potential buyers and suppliers meet. Even if the trade fair is directed at private customers, it is likely that firms from same or similar industries are represented at the trade fair. Thus, the consensus measure represents (i) average expectations of a firm's own industry, (ii) general developments in similar industries and to some degree (iii) average expectations in industries linked through trade relationships. Thus, this result is inline with previous evidence on the impact of industry-specific conditions on expectations (Andrade et al., 2022) and on the positive interdependence of expectations through input-output relationships (Sebbesen and Oberhofer, 2024).

The positive and statistically significant parameter estimate of β_3 is remarkable. It implies that firm expectations are more responsive to consensus expectations in the month after exhibiting at a trade fair than in other months and compared to non-exhibiting firms. This finding suggests that firms obtain information from others as they meet and communicate with each other and incorporate this information in their expectation formation process. Due to the way the consensus measure is constructed, the exchanged information could either be specific to other trade fair participants or it could also represent knowledge on general developments in (other) industries or the wider economy that is shared at the trade fair.

The specification presented in column (6) tests for additional effects two and three months after the trade fair took place. However, the communication effects seems to diminish quickly and to be specific only to the month directly after the trade fair. In the following months, the coefficient estimates associated to the interaction terms are statistically not different from zero.

For ordered logistic models, the magnitude of the coefficient estimates cannot be interpreted directly. Hence, Figure 1 illustrates predicted probabilities of firm expectations for different levels of the consensus measure for our preferred model specification (5). The line with the triangle marker represents predicted probabilities in the months after exhibiting at a trade fair, the line with the circle marker represents predicted probabilities in all other months and for firms that did not exhibit at a trade fair in the previous month. The dashed and the dashed-dotted lines show the respective 90% confidence intervals.

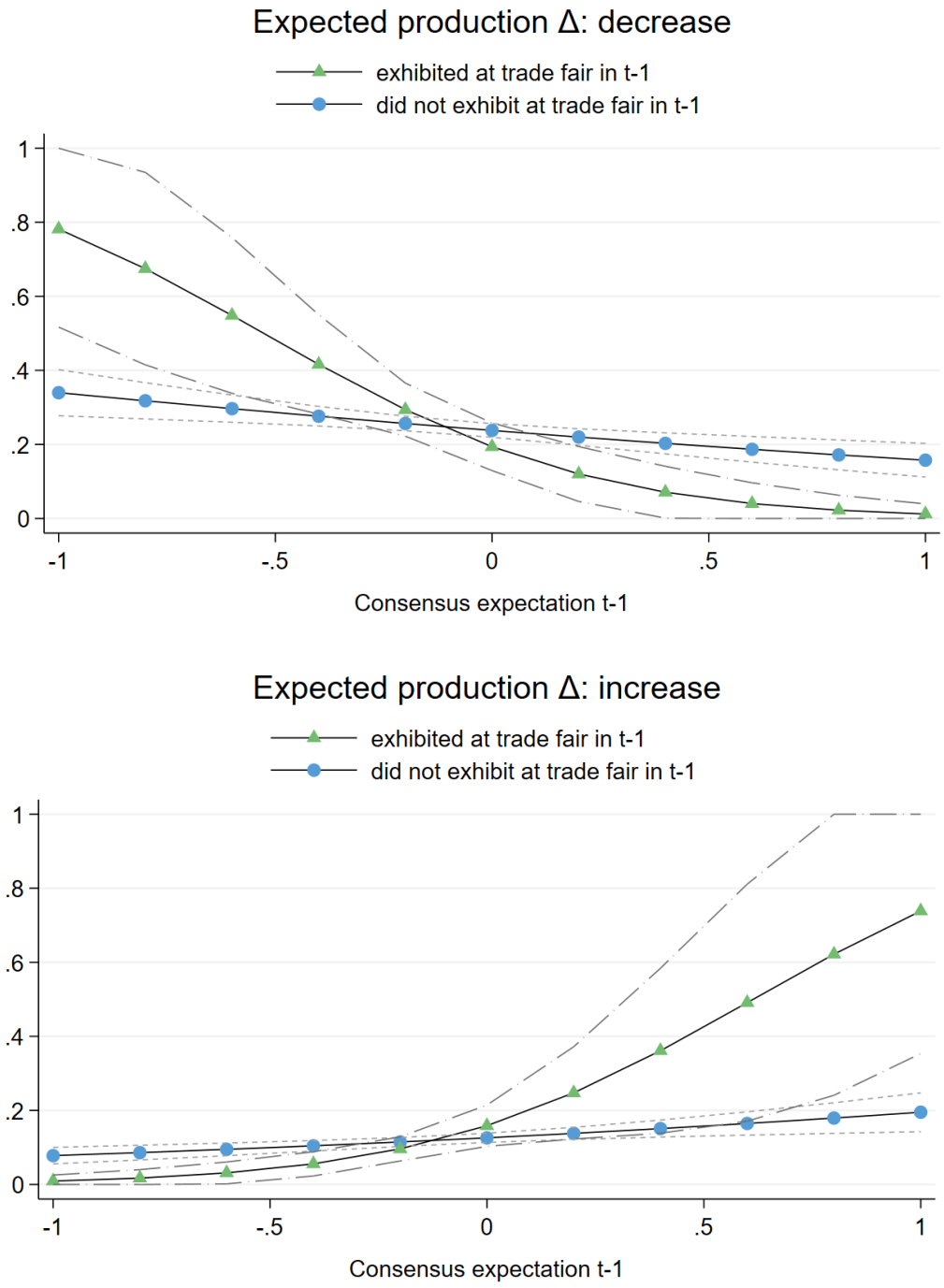
The upper panel demonstrates predicted probabilities of a firm to expect its production to decrease. In times when as a (weighted) net balance, 50% of all firms in industries represented at a trade fair expect their production to decrease, in the month after the trade fair, the probability of a firm to expect its own production to decrease as well is 48%. In all other months, conditional on the same shares of pessimistic and optimistic reference firms, the probability that a firm answers "decrease" is only 28%. However, the difference is only statistically significant for consensus expectations below -0.6. Conversely, when consensus expectations are positive with a net balance of at least 20%, the probability that a firm is anyway pessimistic is significantly lower after exhibiting at a trade fair in

Table 4: Main regression results, production expectations

	(1) ologit	(2) ologit	(3) ologit RE	(4) ologit RE	(5) ologit RE	(6) ologit RE
$\overline{F}^T_{t-1}(x_{t+2,t-1})$	1.737***	0.699***	1.882***	0.605***	0.579***	1.720***
	(0.215)	(0.192)	(0.227)	(0.203)	(0.203)	(0.310)
T_{it-1}	0.146	0.182	0.256	0.309	0.297	0.281
	(0.264)	(0.260)	(0.281)	(0.276)	(0.276)	(0.276)
$\overline{F}^T_{t-1}(x_{t+2,t-1}) \times T_{it-1}$	2.412**	2.442**	2.441**	2.541**	2.568**	2.388*
	(1.174)	(1.149)	(1.241)	(1.219)	(1.218)	(1.219)
T_{it-2}						−0.060
						(0.243)
$\overline{F}^T_{t-2}(x_{t+1,t-2})$						−1.139***
						(0.331)
$\overline{F}^T_{t-2}(x_{t+1,t-2}) \times T_{it-2}$						−0.150
						(1.067)
T_{it-3}						0.036
						(0.282)
$\overline{F}^T_{t-3}(x_{t,t-3})$						−0.226
						(0.237)
$\overline{F}^T_{t-3}(x_{t,t-3}) \times T_{it-3}$						0.483
						(1.354)
$\overline{F}_t(x_{t+3,t})$		3.034***		3.475***	3.476***	3.072***
		(0.212)		(0.224)	(0.224)	(0.236)
Quarterly FE	YES	NO	YES	NO	NO	NO
Industry FE	YES	YES	NO	NO	YES	YES
Observations	8,931	8,931	8,939	8,939	8,931	8,810
Number of firms	482	482	489	489	482	480

Standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; "ologit" are ordered logit estimators, "ologit RE" are ordered logit with with random effects estimators.

Figure 1: Predicted probabilities of $F_t(x_{t+3,t})$



comparison to firms that did not exhibit at a fair in the previous month. For consensus expectations of +0.5, the probability of a firm to expect a decrease in production is 20% when it did not exhibit at a fair recently, and 5% in the month after showcasing at a fair.

The lower panel represents predicted probabilities of a firm to be optimistic. The probability of a firm to expect an increase in production despite consensus expectations being widely negative with −0.5 is significantly lower in the month after exhibiting at a trade fair (4%) than in other months (10%). When the consensus is positive, the probability of a firm to be optimistic is also substantially higher after exhibiting at the trade fair. However, the difference to other months and to firms that did not exhibit at a trade fair recently is only statistically significant for rather high values of consensus expectations (> 0.7).

We also conduct the above presented regressions for price expectations instead of production expectations. The respective results are presented in Table 9 in the appendix. The main parameter estimate of interest, β_3, is also positive, albeit not statistically significant in most specifications. However, this is likely to be the result of the reduced sample: the price expectations variable is not available for several firms in the month after exhibiting at a trade fair. This reduces the number of survey-fair-time matches (i.e. the number of observations when the T_{it-1} dummy takes a value of 1 that are included in the regression) from 92 to 67, i.e., by more than 25%. Hence, unfortunately our analysis does not allow us to draw conclusions on the role of communication among firms for price expectations.

3.2 Robustness

We perform several robustness tests on the model introduced above. In column (7) of Table 5, we add a firm's previous production development (past experience), $x^i_{t+3,t}$, as additional control variable to the model. In line with findings from previous studies, this variable is highly correlated with expectations. The interaction term between consensus expectations and the trade fair dummy remains positive, but is not statistically significant in this model specification. Similar to the price expectation variable, the variable on past experience is missing for a substantial amount of survey-fair-time matches (20%). When conducting the regression without variable $x^i_{t+3,t}$, but for the same observations as used in specification (7), the interaction term is also not statistically significant. Similar to above, the insignificant effect seems to be the result of the large amount of exhibitors lost in this sample. The respective results are presented in column (8).

In column (9), we add further control variables with potential effects on expectation formation. We incorporate variables on a firm's business situation and its current order book levels available from the business survey.[8] We further control for firm size by including current employment levels. The coefficients of the additional control variables show the the expected signs, the firm size coefficient is not statistically significant.[9] The statis-

[8]The specific survey questions read as follows: "Our business situation is currently (i) better than usual for the season (ii) satisfying (iii) worse than usual for the season" and "We perceive our current order book levels as (i) more than sufficient (ii) sufficient (iii) not sufficient.

[9]In an additional test, we explore whether the communication effects of trade fairs differ across the firm size distribution. An analysis incorporating a triple interaction term between the consensus, the trade fair dummy, and the size class of the firm does not show any significant difference, however.

Table 5: Robustness: Additional Firm Characteristics, Sample and Error Modifications

	(7)	(8)	(9)	(10)	(11)	(12)	(13)
$\overline{F}^T_{t-1}(x_{t+2,t-1})$	−0.064	0.338	0.156	0.444*	0.297	0.297	0.293
	(0.226)	(0.223)	(0.213)	(0.250)	(0.249)	(0.203)	(0.228)
T_{it-1}	0.254	0.237	0.293	0.306	0.579**	0.579	0.156
	(0.298)	(0.297)	(0.302)	(0.279)	(0.294)	(0.371)	(0.384)
$\overline{F}^T_{t-1}(x_{t+2,t-1}) \times T_{it-1}$	1.141	0.896	3.274**	2.715**	2.568**	2.568	3.274*
	(1.441)	(1.431)	(1.337)	(1.232)	(1.241)	(1.573)	(1.705)
$\overline{F}_t(x_{t+3,t})$	3.261***	3.388***	3.147***	3.818***	3.476***	3.476***	3.147***
	(0.242)	(0.240)	(0.236)	(0.276)	(0.357)	(0.394)	(0.375)
$x^i_{t+3,t}$	0.643***						
	(0.043)						
Current_business			0.568***				0.568***
			(0.056)				(0.090)
Order_books			0.483***				0.483***
			(0.059)				(0.101)
Employment			−0.000				−0.000
			(0.000)				(0.000)
Observations	7,915	7,915	7,961	5,880	8,931	8,931	7,961
Number of firms	404	404	471	149	482	482	471

Standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; all columns are based on ordered logit estimators incorporating individual random effects as well as industry fixed effects. In column (11), standard errors are clustered at the firm level, in column (12) and (13), standard errors are clustered at the industry level.

tical significance of the positive coefficient estimate associated to the interaction term between consensus expectations and the trade fair dummy even increases. What seems to be crucial for this result is that despite the overall sample reduction of around 1,000 observations, the number of survey-fair-time matches is not substantially decreased in this regression.

Column (10) depicts results of an additional robustness test regarding our sample. We limit the sample to only those firms, for which at least at one point in our sample period, we observe expectations in the months after they exhibited at a trade fair (i.e., firms with at least one survey-fair-time match). In contrast, in the previous regressions, our sample consisted of all firms that attended fairs in general, i.e., that were matched to the exhibitor lists, but for which a time match to the fair was not necessarily available in the expectations data. For this sample reduction, which only affects the reference group, we find that the estimate of our main coefficient of interest remains positive and statistically significant.

Columns (11) to (13) report regression results for clustering standard errors. The statistical significance of the coefficient associated to the interaction term between the consensus and the trade fair dummy is unaffected when clustering standard errors at the firm level. When clustering standard errors at the industry level, the p-value of the coefficient of interest is equal to 0.103. However, when including additional controls to the model, it reduces to 0.055 and the coefficient is still statistically significant at the 10 percent level.

In the previous regressions, we assumed a high persistence of firms visiting fairs and assumed that the exhibitors remained unchanged in some consecutive years for a subset of fairs (see Section 2.2.3). In the first two columns of Table 6, we set the trade fair dummy equal to one only if the firm is listed on an original list of exhibitors. Thus, we refrain from inter- and extrapolating the exhibitors lists for fairs which frequently take place and for which we lack exhibitors lists. This drastically reduces the number of survey-fair-time matches, weakening the identification of the effect.

Moreover, in column (15), we differentiate by type of trade fair: we classify the trade fairs according to their main field (construction, engineering and pharmaceuticals, services, vehicles). While the coefficient of the interaction term becomes statistically insignificant in column (14), we find statistically significant interaction coefficients for fairs in construction (including wood industry) and vehicle fairs (automotive industry, motorbikes and boats). This might be explained by the fact that trade fairs in these two groups seem to be rather specialized and narrow concerning the types of firms participating at the fair. A firm might particularly rely on information stemming from firms in same or related industries, that correlate more strongly with own conditions. Consequently, communication with such firms might have a stronger effect on expectation formation than the interaction between firms from completely unrelated or different industries.[10] Another reason could be that information exchange is particularly relevant among the specific industries represented at these trade fairs: Either, news from the construction and the automotive sector might be especially important for other firms in the Austrian economy, or firms from these industries might react stronger than others to news communicated at trade fairs. Our data is not rich enough to test these hypotheses, for example by creating triple interaction effects at the NACE 2 digit level. When testing for differing communication effects for more aggregated industry groups (construction vs manufacturing vs services), we do not find any significant difference.[11]

We also test the robustness of our results with respect to our specification of the consensus variable. We estimate a model in which, instead of using a proxy for consensus expectation among firms participating in the trade fair, we use consensus expectations across firms in the whole business survey in the respective month. The results presented in column (16) show that expectations also react to this more general consensus measure directly after showcasing at an event, implying that information on the overall economy is shared at trade fairs as well.

3.2.1 A Placebo Test

We also verify the robustness our results by running a placebo test. A concern regarding our empirical strategy might be, that the specific months after the trade fairs in our sample took place are somehow particular in a way that firms in general react more to consensus expectations in these months than in other months. In order to address this concern, we generate a placebo dummy, that takes value 1 in all months where the trade fair dummy

[10] In an additional (not reported) specification, we test for differences in the communication effect across visitor groups (private versus trade versus private and trade). We do not find any significant differences between the three groups.

[11] The respective results can be obtained from the authors upon request.

is non-zero as well, however, for all firms in the sample as opposed to only exhibiting firms. The results presented in column (16) show that expectations also respond to this more general consensus measure immediately after showcasing at an event, implying that information about the overall economy is shared at trade fairs as well.

3.2.2 Alternative Estimators

In a next set of robustness tests, we also estimate our model employing fixed effects estimators. In column (18) of Table 10 in the appendix, we report results from a linear regression, while columns (19) and (20) depict outcomes of ordered logistic estimators. The parameter estimate of β_3, the coefficient associated to the interaction term between consensus expectations and the trade fair dummy, is significantly positive across all model estimations.

4 Summary and Conclusions

In this paper, we present first micro-level results suggesting that firms infer information from other firms after physical meetings when forming their own beliefs about future developments. Based on a unique dataset matching business survey data to trade fair exhibitors lists, we find that firms adjust their expectations stronger to the consensus at the trade fair directly after participation. This supports the mechanism in a class of macroeconomic models where agents, being subject to information constraints, learn from each other through interactions. These models relax the full-information part of the FIRE assumption.

On the one hand, relying on information from others might help firms to create better forecasts. On the other hand, it might also enhance the spread of fads and rumors (Angeletos and La'O, 2013). Hence, a natural next step of the empirical analysis would be to investigate whether the identified behavior of firms is rational. A common test for rationality is based on the Coibion and Gorodnichenko (2015) diagnostic, where forecast errors, i.e. $x^i_{t+3,t} - F^i_t(x^i_{t+3,t})$, are regressed on news, mainly measured by forecast revisions of firms or professional forecasters. In an adaption of this approach, a regression of forecast errors on the interaction between forecast revisions and trade fair attendance could give interesting insights as to whether forecast errors systematically react to information obtained from other firms at trade fairs. While our specific sample does not allow for this type of analysis due to the incomplete information on ex-post realizations $x^i_{t+3,t}$, it could be a promising avenue for future research.

Our sample further limits the analysis in various ways. The results indicate that information diffusion differs across trade fair types in terms of the industries targeted by the fairs. Disentangling whether this can be explained by the fact that firms consider information from certain industries to be more or less important, or whether communication effects are heterogeneous across firm characteristics, could provide interesting insights for macroeconomic modellers. It also should be noted that our data does not include observations of firms participating in trade fairs in foreign countries. Additionally, other communication channels such as newspapers and social media also play a role for information transmission (Chahrour et al., 2021). We do show, however, that Austrian firms use national trade

Table 6: Robustness: Fair and Consensus Specification

	(14)	(15)	(16)	(17)
$\overline{F}^{T}_{t-1}(x_{t+2,t-1})$	0.598***	0.581***		2.405***
	(0.203)	(0.203)		(0.177)
T_{it-1}	0.331		0.402	
	(0.284)		(0.297)	
$\overline{F}^{T}_{t-1}(x_{t+2,t-1}) \times T_{it-1}$	1.974			
	(1.312)			
$\overline{F}_{t}(x_{t+3,t})$	3.474***	3.500***	4.347***	
	(0.224)	(0.224)	(0.241)	
$\overline{F}_{t-1}(x_{t+2,t-1})$			−0.595**	
			(0.237)	
$\overline{F}_{t-1}(x_{t+2,t-1}) \times T_{it-1}$			4.155**	
			(1.778)	
$T^{=construct}_{it-1}$		−0.338		
		(0.390)		
$T^{=engin}_{it-1}$		0.473		
		(0.595)		
$T^{=serv}_{it-1}$		−0.566		
		(2.161)		
$T^{=vehicle}_{it-1}$		4.704**		
		(1.841)		
$\overline{F}^{T}_{t-1}(x_{t+2,t-1}) \times T^{=construct}_{it-1}$		3.269**		
		(1.507)		
$\overline{F}^{T}_{t-1}(x_{t+2,t-1}) \times T^{=engin}_{it-1}$		−3.267		
		(7.299)		
$\overline{F}^{T}_{t-1}(x_{t+2,t-1}) \times T^{=serv}_{it-1}$		−4.425		
		(9.650)		
$\overline{F}^{T}_{t-1}(x_{t+2,t-1}) \times T^{=vehicle}_{it-1}$		20.212**		
		(9.231)		
$T^{placebo}_{it-1}$				−0.026
				(0.083)
$\overline{F}^{T}_{t-1}(x_{t+2,t-1}) \times T^{placebo}_{it-1}$				0.528
				(0.454)
Only original trade fairs	YES	YES	NO	NO
Observations	8,931	8,930	9,312	8,931
Number of firms	482	482	500	482

Standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; all columns are based on ordered logit estimators incorporating individual random effects as well as industry fixed effects. In columns (14) and (15), the trade fair variable differentiates between trade fair types, the reference group is still constituted by firms that did not exhibit at a trade fair in $t-1$.

fairs as a platform for information diffusion. In light of all this, our empirical results on the impact of communication on expectations should be seen as a first exploration rather than as conclusive.

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Appendix

A Supplemental Tables and Figures

Table 7: List of Fairs

	Title	Industries	Year-Month	City	Attendance	# Exhibitors[a]	# Exhibitors[b]	# Trade Visitors[b]	# Total Visitors[b]	Years
01	Frühjahrsmesse - Spring Fair	03	2009-04	Dornbirn	private	609	600			2010; 2011; 2012; 2013; 2014; 2015; 2016; 2018; 2019
02	SCHAU! - Die Vorarlberger Frühlingsausstellung	03	2017-04	Dornbirn	private	438	435		63600	2010; 2011; 2012; 2013; 2014; 2015; 2016; 2018; 2019
03	INTERNATIONALE HOLZMESSE - Fachmesse für Forst- und Sägewirtschaft, Holzzuliefer-Industrie, Holzproduktenhandel und holzverarbeitendes Gewerbe	39; 49; 23	2022-08	Klagenfurt	trade	256	500		22000	2010; 2012; 2014; 2016; 2018
04	Intertool Austria - Internationale Fachmesse für Fertigungstechnik	57; 55; 63	2022-05	Vienna	trade	247				2010; 2012; 2014; 2016; 2018
05	AutoZum - Internationale Fachmesse für Autowerkstatt- und Tankstellen-Ausstattung, KFZ-Ersatzteile, -Zubehör, chemische Erzeugnisse, Umwelttechnik	28 28 28 28	2013-01 2015-01 2017-01 2019-01	Salzburg Salzburg Salzburg Salzburg	trade trade trade trade	313 281 290 239	331 303 315 273	19833 18364 20479 20161	19833 18364 20479 20161	2009; 2011; 2021; 2022; 2023

Continued on next page

	Title	Industries	Year-Month	City	Attendance	# Exhibitors[a]	# Exhibitors[b]	# Trade Visitors[b]	# Total Visitors[b]	Years
06	FAFGA Alpine Superior - Fachmesse für Gastro, Hotel und Design	33	2019-09	Innsbruck	trade	385	400		14800	2009; 2010; 2011; 2012; 2013; 2014; 2015; 2016; 2017; 2018
07	FERIEN-MESSE - Die Messe für Urlaub, Reisen und Freizeit	82	2021-05	Vienna	private & trade	162	130		11300	2009; 2010; 2011; 2012; 2013; 2014; 2015; 2016; 2017; 2018; 2019
08	POWER-GEN Europe - The Global Power Generation Exhibition & Conference / Nuclear Power Europe Conference & Exhibition	23	2013-06	Vienna	trade	247	557		12248	
09	Electrify Europe (formerly POWER-GEN Europe) - The Global Power Generation Exhibition & Conference / Nuclear Power Europe Conference & Exhibition	23	2018-06	Vienna	trade	303	322	4517	4517	
10	Bauen & Wohnen Salzburg - Internationale Messe für Bauen, Wohnen und Energiesparen	09; 58	2023-02	Salzburg	private & trade	233				2009; 2010; 2011; 2012; 2013; 2014; 2015; 2016; 2017; 2018; 2019
11	INTERPÄDAGOGICA - Bildungsfachmesse für Lehrmittel, Ausstattung, Kultur und Sport - von der Kleinkindpädagogik bis hin zum kreativen, lebensbegleitenden Lernen	52; 14; 73	2022-05	Vienna	trade	186	180		11743	2009; 2010; 2011; 2012; 2013; 2014; 2015; 2016; 2017; 2018; 2019; 2023
12	HAUS & BAU - Fachmesse für Haus und Bau	09; 70	2014-11	Ried	private	239				2009; 2010; 2011; 2012; 2013; 2015; 2016; 2017; 2018; 2019

Continued on next page

	Title	Industries	Year-Month	City	Attendance	# Exhibitors[a]	# Exhibitors[b]	# Trade Visitors[b]	# Total Visitors[b]	Years
13	Smart Automation Austria - Fachmesse für industrielle Automation	19	2021-10	Linz	trade	168			5947	2009; 2011; 2013; 2014; 2015; 2016; 2017; 2018; 2019
14	Boot Tulln - Boots- und Wassersport Fachmesse	13	2009-03	Tulln	private & trade	45	330		43832	2010; 2011; 2013;
		13	2012-03	Tulln	private & trade	86	330		45589	2014; 2015; 2016;
			2022-03[c]	Tulln	private & trade	298				2017; 2018; 2019
15	Automesse Ried - Car Exhibition	28	2012-02	Ried	private	34	39		7879	2009; 2010; 2011;
		28	2017-02	Ried	private	37	46		10376	2013; 2014; 2015;
		28	2018-02	Ried	private	50	57			2016; 2021; 2022
		28	2019-02	Ried	private	52	58			
		28	2020-01	Ried	private	33	69			
16	CARAVAN Salon Austria	28; 31	2011-10	Wels	private & trade	24	125		25700	2009; 2010; 2012;
		28; 31	2013-10	Wels	private & trade	39	140		27200	2014; 2015; 2016;
		28; 31	2019-10	Wels	private & trade	45	239			2017; 2018
17	Austropharm - Fachmesse für pharmazeutische Produkte	56	2010-04	Salzburg	trade	325		2422	2422	2012; 2014; 2016; 2018
		56	2021-09	Vienna	trade	90				
18	Power-Days - Fachmesse für Elektrotechnik	22; 11; 70	2022-05	Salzburg	trade	82				2013; 2015; 2017; 2019
19	European Utility Week	23	2015-11	Vienna	trade	119	507		9351	2018
20	com:bau - Die Messe für Architektur, Bauhandwerk, Energie und Immobilien	09; 70; 08	2014-02	Dornbirn	private	154	164		9500	2017; 2018; 2019
		09; 70; 08	2015-02	Dornbirn	private	198	200		10000	
		09; 70; 08	2016-03	Dornbirn	private	182	200		11300	
		09; 70; 08	2022-04	Dornbirn	private	101			10000	
21	Austro Agrar Tulln - Fachmesse für Landtechnik, Stalltechnik, Saatgut, Direktvermarktung, Kommunaltechnik, Wein- und Obstbau und Kellertechnik	49	2018-11	Tulln	private & trade	306	320		57321	2009; 2011; 2013; 2015
22	bike-austria - Motorradmesse	28	2019-02	Tulln	private & trade	183			51228	2013; 2014; 2015; 2017
23	pool + garden Tulln - Internationale Pool- und Gartenmesse	36	2022-03	Tulln	private & trade	206	350			2011; 2012; 2013; 2014; 2015; 2016; 2017; 2018; 2019

Notes: All fairs in our sample. Industries refer to the definitions used by AUMA and detailed in Table 8. The type of the fair distinguishes trade fairs targeted to a private or professional audience. [a] Information stems from participants lists. [b] Information stems from the AUMA data. [c] Fair was canceled.

Table 8: Definitions of Industries

No.	Industry (DE)	Industry (EN)
01	Universal- und Mehrbranchenmessen für Investitions- und Konsumgüter	Universal and multi-sector fairs for capital and consumer goods
02	Investitionsgüter-Mehrbranchenmessen	Capital goods multi-sector fairs
03	Konsumgüter-Mehrbranchenmessen	Consumer Goods Multi-Industry Fairs
04	Publikums-Mehrbranchenmessen	Public multi-sector fairs
05	Augenoptik	Ophthalmic optics
08	Finanz- und Versicherungsdienstleistungen, Immobilien, Exportförderung	Financial and insurance services, real estate, export promotion
09	Bautechnik, Baustoffe, Baumaschinen, Innenausbau	Construction technology, building materials, construction machinery, interior design
10	Bekleidung, Mode, Accessoires	Clothing, fashion, accessories
11	Beleuchtung, Lichttechnik	Lighting, lighting technology
13	Boote, Bootszubehör	Boats, boat accessories
14	Bücher, Druck-Erzeugnisse, Lizenzen, Bibliotheken	Books, printed matter, licenses, libraries
16	Bestattung und Religion	Funeral and Religion
19	C-Techniken, Fertigungsautomatisierung, Mess-, Regel- und Steuertechnik	C-technology, production automation, measurement, regulation and control technology
20	Dentalmedizin und -technik	Dentistry and dental technology
21	Eisenwaren, Werkzeuge	Hardware, tools
22	Elektrotechnik, Elektronik	Electrical engineering, electronics
23	Energiewirtschaft (konventionelle und erneuerbare Energien)	Energy industry (conventional and renewable energies)
24	Nahrungs- und Genussmittel	Foodstuffs and luxury foods
28	Fahrzeuge (Automobile, Nutzfahrzeuge, Motorräder, Caravans, Kfz-Zubehör)	Vehicles (cars, commercial vehicles, motorcycles, caravans, car accessories)
30	Foto, Kino, Film (Technik, Lizenzen), Rundfunk- und Fernsehtechnik	Photo, cinema, film (technology, licenses), radio and television technology
31	Freizeit, Hobby, DIY	Leisure, hobbies, DIY
33	Gastronomie, Ladeneinrichtungen	Gastronomy, shop fittings
34	Geschenkartikel, Uhren, Schmuck, Kunsthandwerk, Festartikel	Gift items, clocks, jewellery, handicrafts, party items
36	Garten und Heimtier	Garden and pets
38	Haushaltswaren, Hausgeräte, Keramik, Glas	Housewares, home appliances, ceramics, glass
39	Holzbearbeitung, Möbelfertigung	Woodworking, furniture manufacturing

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No.	Industry (DE)	Industry (EN)
41	Industrieausrüstung, Instandhaltung	Industrial equipment, maintenance
42	IT und Kommunikationstechnik, Software	IT and communication technology, software
43	Kinderausstattung und -bekleidung	Children's equipment and clothing
44	Kosmetik, Körperpflege, Wellness	Cosmetics, body care, wellness
45	Städtereinigung, Wassertechnik, Entsorgung, Kommunale Dienstleistungen	City cleaning, water technology, waste disposal, municipal services
46	Kunst, Antiquitäten	Art, antiques
49	Land- und Forstwirtschaft, Garten- und Landschaftsbau, Erwerbsfischerei, Nutztierhaltung	Agriculture and forestry, gardening and landscaping, commercial fishing, livestock farming
50	Leder, Lederwaren, Schuhe	Leather, leather goods, shoes
52	Lehr- und Lernmittel, Aus- und Weiterbildung, Existenzgründung, Personalentwicklung	Teaching and learning materials, training and further education, business start-ups, personnel development
53	Luft- und Raumfahrttechnik, Flughafenbau	Aerospace engineering, airport construction
55	Logistik, Antriebs-, Förder- und Lagertechnik	Logistics, drive, conveyor and storage technology
56	Medizintechnik, Gesundheit, Pharmazie, Pflege	Medical technology, health, pharmacy, care
57	Metallbe- und -verarbeitung, Schweißtechnik	Metal processing and treatment, welding technology
58	Möbel, Innenausstattung	Furniture, interior design
59	Musik (Instrumente, Lizenzen)	Music (instruments, licenses)
60	Messe-, Kongress- und Eventwirtschaft, Veranstaltungs- und Bühnentechnik	Trade fair, congress and event management, event and stage technology
61	Nahrungsmittel- und Verpackungsmaschinen	Food and packaging machines
63	Oberflächentechnik	Surface technology
64	Labortechnik, Biotechnologie	Laboratory technology, biotechnology
67	Papier-, Druckwirtschaft, Medienproduktion	Paper, printing industry, media production
70	Sanitärwirtschaft, Heizungs-, Klima-, Kälte-, Lüft ungstechnik	Sanitary industry, heating, air conditioning, refrigeration, ventilation technology
72	Sicherheit, Katastrophenschutz	Security, civil protection
73	Spielwaren, Spiele, Computerspiele	Toys, games, computer games
74	Sportartikel	Sports goods
78	Technologien, Erfindungen, Innovationen	Technologies, inventions, innovations
80	Textilien (Bekleidungs- und Heimtextilien, Technische Textilien)	Textiles (clothing and home textiles, technical textiles)
82	Tourismus	Tourism
83	Transport und Verkehr	Transport and traffic
86	Umwelt und Klimaschutz	Environment and climate protection

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No.	Industry (DE)	Industry (EN)
87	Unterhaltungselektronik, Multimedia	Entertainment electronics, multimedia
94	Werbung, Marketing, Franchising	Advertising, Marketing, Franchising
96	Zulieferwirtschaft	Supplier industry
99	Dienstleistungs-Mehrbranchenmessen	Service multi-sector fairs

Notes: Definition of industry as used by AUMA and translations. All industries appearing in our data are listed.

Table 9: Regression results, price expectations

	(1) ologit	(2) ologit	(3) ologit RE	(4) ologit RE	(5) ologit RE	(6) ologit RE
$\overline{F}^T_{t-1}(x_{t+2,t-1})$	2.442***	1.511***	2.492***	1.583***	1.569***	1.732***
	(0.395)	(0.344)	(0.424)	(0.365)	(0.365)	(0.497)
T_{it-1}	0.698	0.421	1.183*	0.902	0.906	0.980
	(0.581)	(0.573)	(0.611)	(0.600)	(0.599)	(0.614)
$\overline{F}^T_{t-1}(x_{t+2,t-1}) \times T_{it-1}$	2.825	1.791	3.593*	2.565	2.650	2.531
	(1.956)	(1.908)	(2.103)	(2.054)	(2.047)	(2.092)
T_{it-2}						0.790
						(0.610)
$\overline{F}^T_{t-2}(x_{t+1,t-2})$						0.515
						(0.515)
$\overline{F}^T_{t-2}(x_{t+1,t-2}) \times T_{it-2}$						2.658
						(1.876)
T_{it-3}						0.388
						(0.523)
$\overline{F}^T_{t-3}(x_{t,t-3})$						−1.036***
						(0.395)
$\overline{F}^T_{t-3}(x_{t,t-3}) \times T_{it-3}$						−1.150
						(1.897)
$\overline{F}_t(x_{t+3,t})$		3.094***		3.509***	3.468***	3.678***
		(0.357)		(0.383)	(0.383)	(0.429)
Quarterly FE	YES	NO	YES	NO	NO	NO
Industry FE	YES	YES	NO	NO	YES	YES
Observations	7,340	7,340	7,346	7,346	7,340	6,824
Number of firms	374	374	380	380	374	354

Standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; "ologit": ordered logit estimator, "ologit RE": ordered logit with with random effects estimator.

Table 10: Production expectations, fixed effects estimators

	(18) linear FE	(19) ologit FE	(20) ologit FE
$\overline{F}^T_{t-1}(x_{t+2,t-1})$	0.128**	1.852***	0.461
	(0.052)	(0.353)	(0.311)
T_{it-1}	0.092	0.333	0.385
	(0.072)	(0.304)	(0.287)
$\overline{F}^T_{t-1}(x_{t+2,t-1}) \times T_{it-1}$	0.690**	2.504*	2.717**
	(0.322)	(1.302)	(1.267)
$\overline{F}_t(x_{t+3,t})$	0.889***		3.731***
	(0.056)		(0.397)
Quarterly FE	NO	YES	NO
Observations	8,939	8,510	8,510
Number of firms	489	298	298

Standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; column (18) is based on a linear model with fixed effects, columns (19) and (20) are based on ordered logit models with fixed effects.