Business Expectations and Uncertainty in Developing and Emerging Economies*

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Abstract

We study the properties of business expectations and uncertainty in 39 developing and emerging economies. Our evidence comes from 31,000 businesses responding to the World Bank Group Business Pulse and Enterprise Surveys. The surveys elicit three-point subjective probability distributions about future own-firm sales. We measure expectations and uncertainty using the first and second moments of those distributions and verify they predict future sales outcomes and absolute forecast errors, respectively. Our analysis reveals two new facts about business uncertainty across countries. (1) Uncertainty is higher in our sample than in advanced economies, and it declines with GDP per capita even after accounting for firm size, sector, and other firm- and country-level predictors of uncertainty. (2) Absolute forecast errors are larger than our survey-based measures of business uncertainty imply; namely, business managers are *overprecise*, understating sales volatility similarly across levels of economic development. We examine the implications of these two facts for business dynamics and aggregate productivity using a dynamic real options model with entry and exit.

JEL classification: D84, D22, E23, O11, M1, L25, C81
Keywords: Business expectations, business uncertainty, developing and emerging economies, subjective probability distributions

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1. Introduction

We examine the properties of business expectations and uncertainty about future own-firm sales in a sample of 31,000 firms across 39 developing and emerging economies. Expectations and uncertainty are fundamental inputs for business decisions, and can inform policymakers and the public about the macroeconomic outlook. But they are typically not observable except through specialized survey efforts. Many statistical agencies and consultancies around the world carry out business outlook surveys, but they are often purely qualitative, and methodologies vary from survey to survey and country to country. Thus, it is hard to undertake a multi-country, quantitative analysis of the properties of business expectations and uncertainty.

We overcome these obstacles by relying on the World Bank's 2020-2022 Business Pulse and Enterprise Surveys (BPS and ES), which adapt the methodology pioneered by Altig et al. (2022) to collect survey data on business expectations and uncertainty in dozens of countries. Specifically, the surveys elicit subjective probability distributions with three support points about future own-firm sales at a six-month horizon. Businesses across a range of developing and emerging economies in Eastern Europe, Asia, Africa, and Latin America all receive the same questionnaire. We use those subjective distributions to construct quantitative measures of businesses' subjective first and second moments (i.e., expectations and uncertainty) that are comparable across countries. As in Altig et al. (2022) and Manski (2004), our measures of expectations and uncertainty target businesses' subjective beliefs directly, without relying on assumptions about information, rationality, or stationarity of the economic environment. Then, we ask how features of the firm-specific and macroeconomic environment shape business expectations and uncertainty in our cross-country sample, and explore the implications for business dynamics across countries.

Our paper makes two key contributions. The first is to show it is feasible and informative to elicit subjective distributions about future own-firm outcomes in developing and emerging economies. Thus, statistical agencies, central banks, and multilateral institutions around the world can use surveys to collect timely quantitative information about business expectations and uncertainty to inform research and policy. Our paper stands out from the growing literature on survey-based business expectations by focusing of a range of developing and emerging economies, whereas prior work typically examines businesses in a single advanced economy, as Table 2.1 in the review article by Born, Enders, Müller, and Niemann (2021) shows.[1]

[1]See also Guiso and Parigi (1999); Bachmann et al. (2013); Bachmann, Carstensen, Lautenbacher, and Schneider (2020); Altig et al. (2022); Bloom, Davis, Foster, Lucking, Ohlmacher, and Saporta-Eksten (2020a); Coibion, Gorodnichenko, and Ropele (2020); Ma et al. (2020); Andrade, Coibion, Gautier, and Gorodnichenko

In our sample of over 31,000 unique firms in 39 countries, 50 percent of survey responses include subjective distributions with probabilities that add to 100 percent and whose support points conform to a pessimistic, baseline, and optimistic scenarios. After making minor adjustments when respondents implicitly place zero probability on one of the support points, or the sum of the probabilities is not exactly 100, this number rises to 70 percent. For comparison, in the mandatory US Census manufacturing survey studied by Bloom et al. (2020a), 85 percent of responses result in usable distributions. Larger firms that are more likely to have sophisticated managers (see, e.g., Bloom et al., 2019) also have an easier time providing subjective distributions in our data. Within a given country and sector, larger firms are more likely to provide subjective distributions that we can use to construct subjective moments.

More to the point, our measures of expectations and uncertainty contain predictive information about businesses' future outlook. Several countries fielded two or three waves of the BPS and re-interviewed many of the participating firms in late 2020, 2021, or even early 2022. Focusing on those firms that respond to subsequent waves, we show our measure of sales expectations predicts future sales outcomes and sales uncertainty predicts the size of absolute forecast errors, similar to evidence from US firms in Altig et al. (2022), Barrero (2022), and Bloom et al. (2020a).

Expectations and uncertainty also correlate with employment changes in the cross section, suggesting managers act in accordance with their stated beliefs. Firms with higher expected sales tend to have higher employment growth rates, and the opposite for firms expressing higher uncertainty about future sales. We cannot test these relationships within firm because we only have a short panel, but these crude tests point in the right direction and build on prior work linking uncertainty to economic conditions (e.g., Bernanke, 1983; Dixit et al., 1994; Abel and Eberly, 1996; Baker et al., 2020) and work linking managerial beliefs and expectations to real business decisions, including Guiso and Parigi (1999), Malmendier and Tate (2005), Coibion et al. (2020), Barrero (2022), and Kumar et al. (2022).

We also find firms are more uncertain in the cross section when they experience larger shifts in their environment and their outlook, consistent with Altig et al. (2022) and Bachmann et al. (2020). Uncertainty is higher among firms expecting larger increases or (especially) decreases in sales in the next six months. It is also higher among firms that experience sharp reductions in recent sales during the COVID-19 pandemic firms subject to larger sales surprises, that is, larger absolute forecast errors between interviews. The same is true of firms that make larger revisions to their six-months-ahead sales expectations,

(2021); and Meyer, Parker, and Sheng (2021), among others for survey-based work on business expectations in advanced economies.

expressing higher uncertainty about future sales in the second interview.

Our second key contribution is to document two new facts about business uncertainty across countries and to study their implications. First, business uncertainty in our sample of developing countries is much higher than in advanced economies, and it declines with GDP per capita, as Figure 1a shows. We compute average employment-weighted subjective uncertainty at the country level and find a negative relationship with 2019 PPP GDP per capita. The relationship is robust to controlling for firm size, sector, and other micro and macro predictors of uncertainty that vary with economic development. For example, firms tend to be smaller, and thus more volatile in lower-income countries (see, e.g., Davis et al., 2006, and Hsieh and Klenow, 2014). Still, we find firms are more uncertain in lower-income countries after accounting for these differences in fundamentals. Business expectations, by contrast, have a flat relationship with GDP per capita, with and without controls.

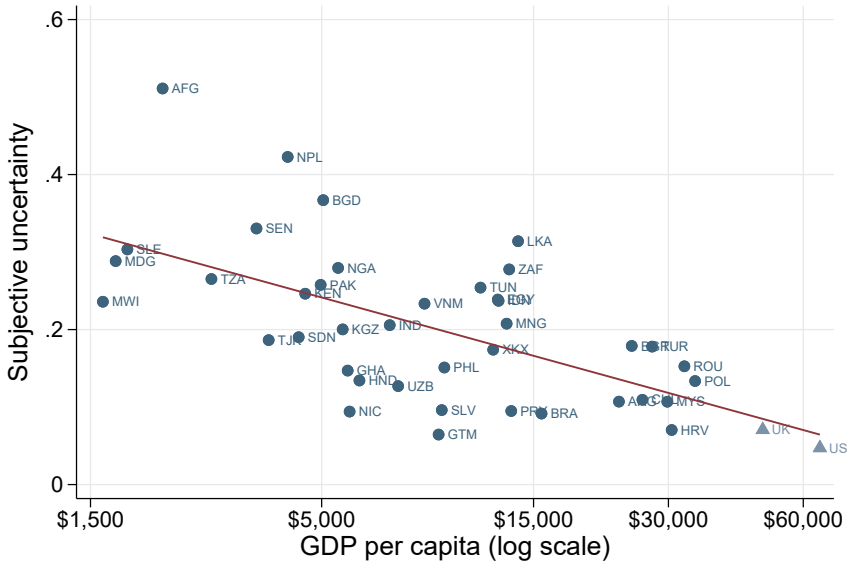
Our result provides support for the link between greater measured volatility and misallocation proposed by Asker et al. (2014). Indeed, we find that absolute forecast errors, a measure of actual volatility, also decline with GDP per capita. But our evidence goes further. By showing that businesses in developing and emerging economies actually perceive higher uncertainty, we argue that measurement error is unlikely to be the sole source of higher measured volatility and misallocation in emerging and developing economies (see, e.g. Bils, Klenow, and Ruane, 2021). Instead, our evidence says uncertain business environments in middle- and low-income countries could actively distort firm behavior and generate misallocation.

The second new fact is that managerial beliefs elicited by the BPS are *overprecise* in all countries in our sample. Namely, managers systematically underestimate future sales volatility. We can see this phenomenon by comparing the (employment-weighted) average subjective uncertainty and absolute forecast error in a given country. These two statistics should be equal if managers have full information and rational expectations, but absolute forecast errors are larger in every country in our sample, consistent with evidence from US firms in Boutros et al. (2020) and Barrero (2022). Figure 1b plots overprecision for each country in our sample against 2019 GDP per capita, where overprecision is the difference between the employment-weighted averages of absolute forecast errors and uncertainty. We can also see the absence of a clear link between GDP per capita and the degree of overprecision.

The final part of the paper examines the implications of the two cross-country facts about business uncertainty using a dynamic real options model featuring endogenous entry and exit and adjustment costs. Firms have a decreasing returns technology subject to

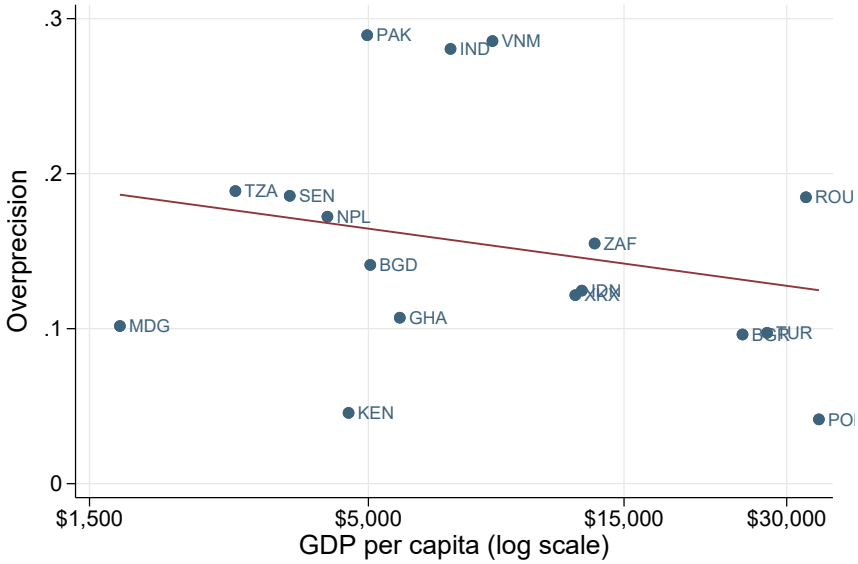
Figure 1: Two new facts about business uncertainty

(a) Business uncertainty declines with GDP per capita.



No. of observations: 27046.

(b) Firms are overprecise in all countries in our sample.



No. of observations: 4836.

Notes: The top figure plots employment-weighted average subjective uncertainty in each country (averaging across waves for the same country) against 2019 PPP GDP per capita (in 2019 US dollars). The bottom figure plots overprecision, measured as the employment weighted average of the difference between absolute forecast errors and subjective uncertainty in a given country, against 2019 PPP GDP per capita. Uncertainty and forecast error data are from the World Bank Business Pulse and Enterprise Surveys. The UK and US uncertainty values are the averages of activity-weighted mean uncertainty for Apr, 2020 - Dec, 2021 and Apr, 2020 - Mar, 2022 respectively as published by the Bank of England (https://decisionmakerpanel.co.uk/) and Federal Reserve Bank of Atlanta (https://atlantafed.org/sbu).

idiosyncratic profitability shocks and are overprecise, so they underestimate the conditional volatility of those shocks. In the model, high subjective uncertainty raises the value of the real option to wait before adjusting the firm's scale, as well the the value of the options to enter or remain in the market. Overprecision cuts in the opposite direction. Because firms are much more uncertain but similarly overprecise in lower-income countries, their economies feature less reallocation, higher entry, and lower exit rates than richer countries with otherwise similar fundamentals. In richer countries, firms are less uncertain and yet more overprecise, ignoring much of the scant uncertainty in the business environment, so they are quick to adjust to shocks, and their market entry and exit decisions are highly dependent on managers' signal of current profitability. Altogether, these patterns dampen aggregate productivity in lower-income countries because they lead to higher static and dynamic misallocation.

In the rest of the paper, we first provide details about the World Bank Group Business Pulse and Enterprise Surveys (BPS and ES) and about the feasibility of eliciting subjective probability distributions businesses in developing and emerging countries (Section 2). Then, we describe key features of the measures of business expectations and uncertainty we construct from the BPS and ES data (Section 3) and how they compare across firms in different countries (Section 4). Section 5 uses a dynamic real options model to assess the implications of our two key facts about business uncertianty across countries, and Section 6 concludes.

2. Surveying business expectations and uncertainty in developing and emerging economies

This section describes the uncertainty module of the World Bank's 2020-2021 Business Pulse Surveys and Enterprise Surveys and summarizes how we go from the raw survey data to our measures of expectations and uncertainty. We argue that such survey efforts result in usable data on expectations and uncertainty, and show how the likelihood of providing usable responses varies with firm size. While larger firms (more likely to be run by more sophisticated managers) appear to be better at completing the questionnaire, it is still feasible to elicit sensible forecast distributions from small and medium firms in developing and emerging economies.

2.1 Survey methodology

The World Bank Group Business Pulse Survey (BPS) and its close cousin, the World Bank Enterprise Survey (ES), have interviewed firms in over sixty countries since the onset

of the COVID-19 pandemic, focusing on the impact of the pandemic on firm operations, sales, employment, and performance. In most countries, the surveys were conducted in partnership with statistical agencies, government departments, or business associations. Leveraging these partnerships, the survey interviews are conducted over the phone in the native language of the country in question. The sampling frame in most participating countries comes from lists of registered firms taken from census listings, business registers, or other administrative sources.[2] The survey therefore focuses on businesses that operate primarily within the formal economy, but in many cases these registered businesses will hire both formal and informal labor, giving us a broad picture of the business sector even where the informal economy is large.

The 2020 and later waves of the BPS and ES included a module on expectations and uncertainty that asked firms for their expected changes in sales over the next six months, compared to the same six-month period in 2019, across three scenarios: a central "most likely" scenario, an optimistic scenario, and a pessimistic scenario. The survey then asked firms to allocate percent probabilities to each of these scenarios. To guide firms through these questions, the interviewer asked firms give their projections for the central scenario first, and then asked them to consider the pessimistic and optimistic scenarios. See Table 1 for an overview of the uncertainty module in the BPS and ES questionnaire and the wording of the English-language version of the questionnaire. During the initial waves of the BPS, the survey also asked firms about expected changes in employment in each of these scenarios.

Our core sample covers 39 predominantly low- and middle-income countries from all World Bank lending regions. At the low-income end, our data includes Malawi, Madagascar, Sierra Leone, and Tanzania. At the high end, we have Bulgaria, Turkey, Malaysia, Romania, and Poland, the latter being the only high-income country in the data. Our analysis includes surveys conducted between April 2020 and March 2022. In 18 out of the 39 countries, the BPS collected follow-up survey waves that re-interviewed many of the participating firms, so our data has a panel dimension in those countries. For the remainder, we only have data from a single wave (i.e., a single cross-section). Our final dataset has a total of 65 country-wave combinations and includes countries with a single or multiple waves. See Table A1 in the appendix for the full list of countries and a timeline of when each survey wave took place.

The survey data include firms from most manufacturing and services sectors, ranging

[2]For Central American countries and Mongolia, the surveys were follow-ups to a previous Enterprise Survey. The questionnaire in those countries used the same format and design as that used for the BPS in other countries.

Table 1: Expectations and uncertainty module

Question	Response options
Central (most likely) scenario	
Q1a. Looking ahead to the next 6 months, do you expect that your sales will increase, decrease, or remain the same, compared to the same period last year?	Increase / Decrease / Remain the same
⇒ If *Increase*: **Q1b.** Increase by how much?	% change
⇒ If *Decrease*: **Q1c.** Decrease by how much?	% change
Q1d. On a scale of 0 to 100, what is the chance (probability) you believe this will happen?	% probability (between 0-100)
Prompt: As you know, sometimes businesses don't go as we expect. Given that businesses can go better or worse, let us talk about these possible alternative situations:	
Optimistic scenario	
Q2a. In a more optimistic (better) scenario, do you expect that your sales for the next 6 months will increase, decrease, or remain the same, compared to the same period last year?	Increase / Decrease / Remain the same
⇒ If *Increase*: **Q2b.** Increase by how much?	% change
⇒ If *Decrease*: **Q2c.** Decrease by how much?	% change
Q2d. On a scale of 0 to 100, what is the chance (probability) you believe this will happen?	% probability (between 0-100)
Pessimistic scenario	
Q3a. In a more pessimistic (worse) scenario, do you expect that your sales for the next 6 months will increase, decrease, or remain the same, compared to the same period last year?	Increase / Decrease / Remain the same
⇒ If *Increase*: **Q3b.** Increase by how much?	% change
⇒ If *Decrease*: **Q3c.** Decrease by how much?	% change
Q3d. On a scale of 0 to 100, what is the chance (probability) you believe this will happen?	% probability (between 0-100)

Notes: This table shows English-language versions of the questions that appear in the expectations and uncertainty module of the 2020-2022 World Bank Group Business Pulse and Enterprise Surveys. In each country, interviewers elicit these questions in the local language.

in size from small (5 to 19 workers) to medium (19 to 99 workers) and large (100 or more workers). Table A3 shows the coverage across size groups and sectors for each country. Micro firms, with fewer than 5 employees, received a simplified and trimmed-down version of the questionnaire in most countries that typically only asked for projections about the central scenario. We therefore exclude firms with fewer than 5 employees from our analysis, as we cannot construct measures of uncertainty for them. We exclude firms operating in social services sectors (education and health) given the large role the government plays in these sectors and due to differences in coverage across countries. Finally, we also exclude firms that report having closed permanently by the time of the interview.

2.2 Data preparation and descriptive statistics

Our raw data include almost 40,800 subjective distributions pooling across the 65 country-waves collected between April 2020 and March 2022 across 39 countries. Around 7,300 businesses in our raw sample participated in the survey two or three times. Our analysis exploits both the cross-sectional dimension of our data, pooling across country-waves, and the panel dimension, following the same firm across two or three waves.[3]

We summarize the three-point subjective distributions elicited in the surveys using their first and second moments for future sales, using the approach in Altig et al. (2022). First, we express the projection for future sales over the next 6 months in each scenario as an arc-change from the same period in 2019. Assuming a raw survey projection for future sales relative to 2019 h represents a proportional change (so $h = .01$ means a 1 percent increase), the arc-change is $g = {}^{2h}/_{(h+2)}$.[4] The literature on business dynamics favors the use of arc-changes because they are symmetric around zero, are a close approximation to log-changes, and have desirable aggregation properties. See Davis et al. (1998) for more details. We compute a business's expected arc-change in sales as the first moment (i.e the mean) of the corresponding three-point probability distribution:

$$\text{Mean} = \sum_{i=1}^{3} p_i g_i, \tag{1}$$

where i indexes scenarios and p_i denotes the probability associated with scenario i. Similarly, we measure firm-level subjective uncertainty using the standard deviation of the

[3] In the raw data, 31,219 businesses account for the 40,763 subjective distributions. 23,928 firms participated in only one wave; 5,038 participated in two waves; and 2,253 firms in three waves.

[4] To obtain the formula in the main text, note that if $h \in (0, 1)$ is a conventional proportional change for variable x, then $h = (x' - x)/x$ where the prime indicates the future value of x. The arc-change, then, is $g \equiv (x' - x)/(0.5(x' + x)) = 2h/(h + 2)$.

future growth distribution:

$$\text{Uncertainty} = \left[\sum_{i=1}^{3} p_i \left(g_i - \text{Mean}\right)^2\right]^{\frac{1}{2}}. \tag{2}$$

Because we the underlying probability distributions are firm-specific, we can compute these moments at the firm level.

To create these measures of expectations and uncertainty, we need well-formed probability distributions that satisfy the following criteria: (1) the respondent provided two or three support points for the expected change in sales; (2) the sum of the two or three probabilities associated with the support points equals 100; and (3) the standard deviation of the subjective distribution (our measure of subjective uncertainty) is positive. (We allow respondents to assign zero probability to either the optimistic or pessimistic scenarios, but not both.)

Our analysis sample, therefore, focuses on survey responses that provide well-formed distributions, and responses for which we can obtain a well-formed distribution by making only small imputations to the *probability vector*. It would be more desirable not to have to make these imputations, but we believe this approach is unlikely not materially affect our key measures of expectations and uncertainty. In the study that pioneered the survey expectations methodology used in the BPS and ES, Altig et al. (2022) provide evidence that the position of *support points* rather than the precise value of their associated probabilities is the main driver of subjective first and second moments (expectations and uncertainty). That fact supports our approach of modifying probabilities, while respecting the respondent-provided support points.

The imputations we use are the following:

- When a respondent provides the subjective probability for each scenario and the sum of the probabilities is between 50 and 150 (but not exactly 100), we rescale the probabilities to add to 100.

- When a respondent provides three support points for the subjective distribution but some or all of the probabilities are missing, or the sum of the three probabilities is below 50 or above 150, we impute the probability vector using the sample of well-formed distributions. For each country-wave and each of the optimistic, central, and pessimistic scenarios, we compute the average probability for that scenario in the sample of well-formed distributions. Then, we impute the full probability vector in question using the three scenario-specific average probabilities for the relevant

country and wave.[5]

- When just one or two of the probabilities are missing we impute the missing ones using the corresponding country-wave-scenario average probability, and then rescale the firm's probability vector to add to 100.

- When a respondent fails to provide two or more support points (14.6% of the raw sample) we drop that observation from our analysis of subjective expectations and uncertainty. In such cases, we cannot obtain a non-degenerate distribution by modifying or imputing solely the probability vector.

After completing the above imputations, we drop degenerate subjective distributions, namely, those implying zero standard deviation because the respondent assigns the same expected change in sales for each scenario or 100% of the probability mass to a single scenario. Such degenerate distributions amount to 15% of the raw sample. Ultimately, distributions where we rescaled or imputed at least one element of the probability vector and end up with a well-formed non-degenerate distribution account for 24.4% of the raw sample we started with.

The core sample of survey responses for which we can measure subjective expectations and uncertainty, after the above modifications and selections, covers 70% the raw sample. This rate of success suggests it is feasible to elicit subjective probability distributions via surveys in a range of developing and emerging economies. Many of the survey waves in our data took place during times of significant turmoil associated with the COVID-19 pandemic. Improving survey implementation, question design, and institutionalization could likely increase the share of usable distributions well above that 70%. For comparison, Bloom et al. (2020b) obtain well-formed distributions from about 85% of US manufacturing plants responding to a mandatory Census survey. If that 85% is an upper bound, our cross-country survey effort doesn't trail too far behind what leading statistical agencies can achieve.

[5]For Sierra Leone and Bangladesh, we use world averages to impute probabilities. The two survey waves conducted in Sierra Leone asked for the three support points but not the corresponding probabilities. In Bangladesh, there were not enough well-formed distributions in the sample to reliably use country-specific averages for the imputation.

Table 2: Sample sizes and summary statistics for sales growth forecast means and subjective uncertainty in each quarter.

	Apr-Jun 2020	Jul-Sep 2020	Oct-Dec 2020	Jan-Mar 2021	Apr-Jun 2021	Jul-Sep 2021	Oct-Dec 2021	Jan-Mar 2022	Full sample
Countries covered	9	11	10	13	6	13	2	1	41
Subjective distributions in the raw data	6,330	6,425	5,313	4,964	4,113	9,769	1,161	616	40,763
Subjective distributions in the clean data	4,460	4,552	4,303	3,818	2,390	6,696	639	188	28,612
Fraction of total									0.70
Well-formed distributions	2,523	2,085	2,774	2,523	2,139	6,352	632	128	20,062
Fraction of total									0.49
Distributions where at least one probability is imputed or rescaled	1,937	2,467	1,529	1,295	251	344	7	60	8,550
Fraction of total									0.21
Average sales growth forecast for the coming six months	−0.22	−0.12	−0.10	−0.05	0.06	0.01	0.10	0.16	−0.06
	(0.455)	(0.375)	(0.350)	(0.296)	(0.238)	(0.327)	(0.284)	(0.130)	(0.354)
Average subjective uncertainty	0.26	0.24	0.23	0.18	0.14	0.21	0.21	0.10	0.21
	(0.224)	(0.196)	(0.190)	(0.193)	(0.130)	(0.233)	(0.178)	(0.075)	(0.202)

Notes: The number of countries reported in the Full Sample column only counts a given country once. The sum of observations across quarters does not equal the number of subjective distributions in the full sample because there are 850 observations where the date of the interview is missing. To compute average expected sales and average subjective uncertainty we only use the sample for which we can compute a measure of subjective uncertainty after making modest imputations to the probability vector. That sample excludes distributions where two or more support points are missing or where the subjective uncertainty is zero because the distribution places 100% of the probability mass on a single outcome. In the bottom panel, we report standard deviations in parenthesis. All statistics in the bottom panel use employment weights within countries. The forecasting period corresponds to a 6-month look-ahead horizon relative to the same period in 2019.

Table 2 provides more details about how we clean and select our sample. It shows the number of subjective distributions in the raw data and the final sample, grouping country-waves by the calendar quarter when the last interview was completed. The exact data collection period for each country-wave is available in Table A2 in the appendix. Table A4 provides information about countries with a panel sample (i.e. a second or third wave where some firms participated in a follow-up interviews), as well as the number of businesses for which we have a follow-up interview.

To focus on estimates that are more relevant for the macro-economy, our analysis below uses weights that are proportional to economic activity (unless we note otherwise). That is, we weight each firm by the total number of full-time and part-time workers they report in the survey, scaling the weights so they add up to 1 in a given country-wave.[6]

The bottom panel of Tables 2 and 3 report summary statistics about our main sample. The former report the sample mean and standard deviations for our measures of sales expectations and uncertainty (expressed relative to 2019) at a six-month look-ahead horizon in each calendar quarter of our sample period. Between April 2020 and March 2022 mean sales forecasts increase significantly while mean uncertainty and forecast dispersion declines, as does dispersion in subjective uncertainty. This pattern broadly fits the trajectory of the economic impact of the pandemic, but the set of countries fielding the survey varies by quarters, so these descriptive statistics are therefore not necessarily comparable across time. (See Table A1 in the appendix for more information about data collection periods by country.)

Table 3 reports (unweighted) means and standard deviations for each of the three (optimistic, central, pessimistic) support points and their corresponding subjective probabilities. Sales projections vary significantly across scenarios, and range from -65.5% in the pessimistic scenario in the second quarter of 2020 to +31.4% in the optimistic scenario in the first quarter of 2022. The mean probability assigned to the central scenario is about 40%, similar to the average for the middle support point in Altig et al. (2022). The other two (optimistic and pessimistic) support points have probabilities that average close to 30%.

2.3 Likelihood of providing well-formed distributions

The likelihood a firm does not provide a well-formed subjective distribution in the BPS and ES declines with firm size in a given country. Figure 2 shows the predicted likelihood

[6]When our analysis exploits the panel dimension of our data, we use employment at the time of the second wave and scale the weights so they add up to 1 within each country rather than each country-wave, to avoid giving countries with third waves mechanically more weight in the results.

Table 3: Summary statistics for sales outcomes in the coming six months and their corresponding probabilities

	Sales growth forecast		Support point probability	
	Mean	SD	Mean	SD
Full sample				
Pessimistic	−0.452	0.557	27.5	15.9
Central	−0.077	0.416	38.8	16.7
Optimistic	0.155	0.298	34.2	15.7
Apr-Jun 2020				
Pessimistic	−0.655	0.598	30.2	17.9
Central	−0.247	0.494	37.8	18.1
Optimistic	0.083	0.374	32.2	16.4
Jul-Sep 2020				
Pessimistic	−0.572	0.583	28.7	14.2
Central	−0.178	0.451	41.0	15.4
Optimistic	0.084	0.321	31.0	13.8
Oct-Dec 2020				
Pessimistic	−0.463	0.532	27.2	13.9
Central	−0.074	0.381	38.5	13.9
Optimistic	0.138	0.286	34.6	14.1
Jan-Mar 2021				
Pessimistic	−0.421	0.531	27.3	15.9
Central	−0.058	0.376	39.0	17.5
Optimistic	0.149	0.280	34.0	16.3
Apr-Jun 2021				
Pessimistic	−0.182	0.340	23.6	14.7
Central	0.058	0.307	40.4	17.0
Optimistic	0.208	0.240	36.7	16.6
Jul-Sep 2021				
Pessimistic	−0.379	0.558	27.7	16.6
Central	0.002	0.389	37.6	17.4
Optimistic	0.218	0.252	35.1	16.0
Oct-Dec 2021				
Pessimistic	−0.418	0.542	21.4	18.7
Central	0.002	0.278	38.8	20.7
Optimistic	0.246	0.212	39.8	21.2
Jan-Mar 2022				
Pessimistic	0.045	0.098	33.4	21.4
Central	0.162	0.191	35.5	20.6
Optimistic	0.314	0.185	34.8	18.3

Notes: The table reports means and standard deviations (SD) of sales outcomes associated with the three support points of businesses' subjective probability distributions over future own-firm sales and their corresponding probabilities. We do not use employment weights to compute those statistics. The sample includes all responses for which we can compute a measure of subjective uncertainty (i.e., excluding distributions for which two or more support points are missing or with zero subjective uncertainty). Sales outcomes in each scenario are for a 6-month look-ahead period, and sales levels are expressed relative to the same period of 2019.

a firm provides a distribution with two or more missing support points (panel a) and the predicted likelihood it provides a well-formed forecast distribution (panel b). In both cases we compute these likelihoods for 5 quintiles of the within-country-wave-sector firm size distribution, and control for country and quarter fixed effects. We focus on these within relationships because the survey was implemented in each country in collaboration with a private sector association, statistical agency, or other government agencies. So, there could be systematic differences in data collection quality across countries, captured by the country effects. We also control for the calendar quarter when a given survey took place to control for the evolution of the pandemic and the possibility that firms responding to a follow-up survey are more familiar with the format of the uncertainty module.

Panel a) of Figure 2 shows firms in the smallest quintile of a country-sector-wave are significantly more likely to omit two or more support points of their subjective distribution than firms in the largest quintile. Recall that we drop distributions with two or more missing support points because we cannot compute measures of expectations and uncertainty even after making modest imputations to the probability vector. This result suggests small firms are more likely to be unable to conceptualize several business scenarios, but in any case only less than 20% do. This pattern is consistent with the evidence in Bloom et al. (2020b) regarding US manufacturing plants, where productivity and firm size are associated with the ability to provide good forecasts and distributions. Panel b), however, shows all size quintiles in a given country-sector-wave have a similar probability of providing well-formed distribution without imputation.

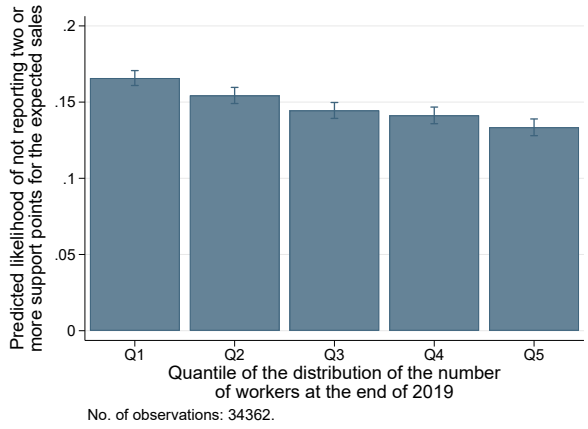
Ultimately, these results say that eliciting subjective distributions is feasible in developing and emerging economies. Even if larger firms are more likely to provide sensible responses to our sophisticated questionnaire, a majority of small and medium firms in our sample developing and emerging economies are still provide distributions with two or more support points.

3. Features of firm-level expectations and uncertainty

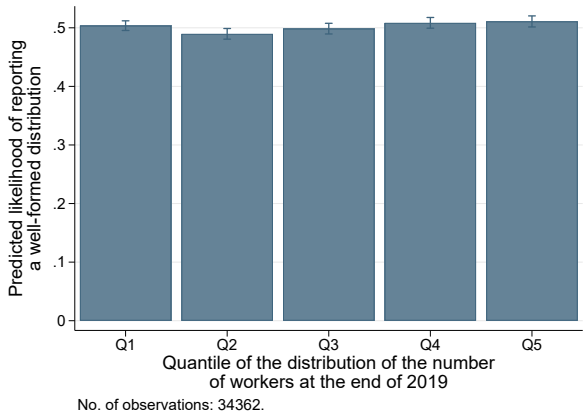
This section examines the key properties of the business expectations and uncertainty data we obtain from the BPS and ES surveys. We show both measures informative about the future: in the subsample for which we have panel data, expectations predict future sales outcomes and uncertainty predicts absolute forecast errors. They also correlate with changes in employent in the cross section. Moreover, our measures of uncertainty reflect shifts in the business environment. Many of these properties are consistent with survey evidence from advanced economies and thus speak to the utility of conducting surveys of

Figure 2: The likelihood of eliciting well-formed subjective distributions for own-firm sales growth increases with the size of the firm.

(a) Average predicted likelihood of not reporting two or more support points for each quantile of the firm size distribution.



(b) Average predicted likelihood of reporting well-formed subjective distributions for each quantile of the firm size distribution.



Notes: In panel a the dependent variable is an indicator that equals 1 when the subjective distribution has two or more missing support points for the expected sales growth, and 0 otherwise. In panel b the dependent variable is an indicator that equals 1 when the firm reports a well-formed subjective distribution for sales in the coming six months. Explanatory variables in both cases are fixed effects for country, quarter, and country-wave-sector firm size quintiles (based on pre-pandemic employment). We pool data across country-waves and run least squares estimations for each dependent variable. In each case, the figures show the average predicted likelihood (the average of the linear prediction) at each size quantile, keeping the other regressors constant.

this sort in the developing and emerging world.

3.1 Expectations and uncertainty predict outcomes

Our measures of business expectations and uncertainty contain information about future outcomes, which we show by exploiting the panel dimension of our survey data. The survey conducted follow-up survey waves in a number of countries, reaching many of the original participants and asking about realized sales outcomes.

The BPS and ES were designed to measure the impact of the pandemic at the time of the interview, however, so the forecasting period for future sales in the initial interview does not always align with the period covered by the question about sales outcomes in follow-up waves. Firms provide expectations for the level of their sales in the six months following the initial survey interview, expressed as a percent of sales in the same period of 2019. During a follow-up (i.e., second- or third-wave) interview, the survey asks about sales levels in the 30 days prior, again expressed relative to 2019.[7] In many cases, follow-up waves also don't take place exactly six months after the original wave. In what follows, we

[7]The exact wording of the questions that capture the realized change in sales is "Comparing this establishment's sales for the last 30 days before this interview with the same period last year, did the sales increase/decrease/or remain the same? Increased/decreased by how much (in percentage terms)?"

ask whether expectations and uncertainty have any predictive power for those subsequent sales outcomes, bearing in mind that the timing mismatch is likely to introduce some noise into these relationships.

There is a positive and significant relationship between a firm's sales expectations during the initial interview and the sales level it reports in the follow-up interview, as the binned scatter plots in the top two panels of Figure 3 show. The slope is about 0.3 regardless of whether we give firms equal weight (panel a) or use our preferred employment weights (panel b). Qualitatively, this result is consistent with similar findings in Altig et al. (2022), Barrero (2022), and Bloom et al. (2020a), but the slope is shallower than in prior work. The timing mismatch between forecasts and realizations, and noisier expectations in our data due to the pandemic context or to firms being less sophisticated in our sample of developing and emerging economies could all attenuate this relationship. Regardless, the positive and approximately linear conditional mean in the top two panels of Figure 3 suggests our measure of expectations is an informative signal about firms' future business outlook.

We also find a positive relationship between subjective uncertainty about a firm's future sales (looking six months ahead) and the absolute error implied by the sales forecast (i.e., the expectation) and the reported actual sales in the follow-up interview. Thus, firms that report higher uncertainty about future sales, subsequently report sales levels that, on average, differ from their sales forecasts by larger amounts. The bottom two panels of Figure 3 show equal-weighted (left) and employment-weighted (right) binned scatter plots of this relationship in our BPS and ES data.

As with expectations, the relationship in the bottom panels of Figure 3 is likely subject to measurement error in subjective uncertainty and compares forecast and realization periods that don't always match, so the slope coefficient is lower than it is for corresponding tests in Altig et al. (2022) and Barrero (2022). The slope coefficient is higher at 0.56 in the employment-weighted specification (panel b), likely because measured uncertainty has more signal content among larger firms. In any case, the existence of a positive and statistically significant relationship reveals that the second moment of firm subjective distributions reflect the ex-post volatility of their business situation.

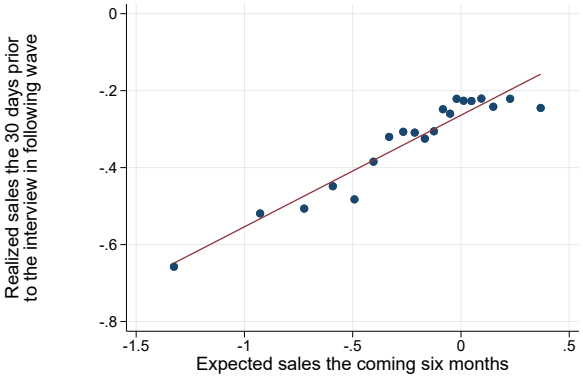
3.2 Uncertainty reflects shifts in the business environment

We examine the nature of business uncertainty in our BPS and ES data by asking what firms are more uncertain about future sales? To do so, we exploit both the cross-section and panel dimensions of our BPS data and link uncertainty to shifts in the business environment and, given the nature of our sample, to disruption associated with the COVID-19 pandemic. Our

Figure 3

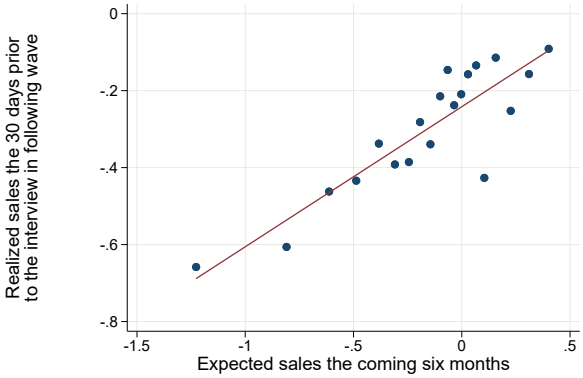
Expectations about future sales predict subsequent changes in sales.

(a) Unweighted correlation.



No. of observations: 4868.
Coefficient: 0.29 with standard error of 0.020.

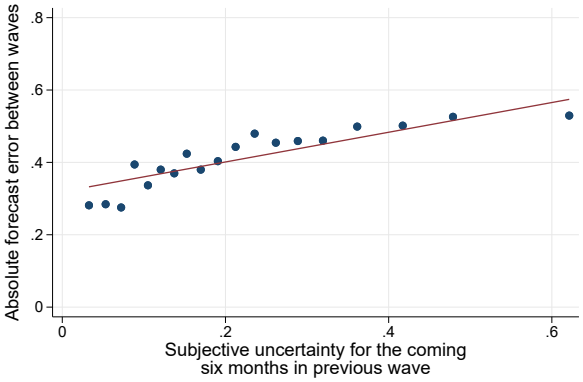
(b) Using employment weights.



No. of observations: 4868.
Coefficient: 0.36 with standard error of 0.057.

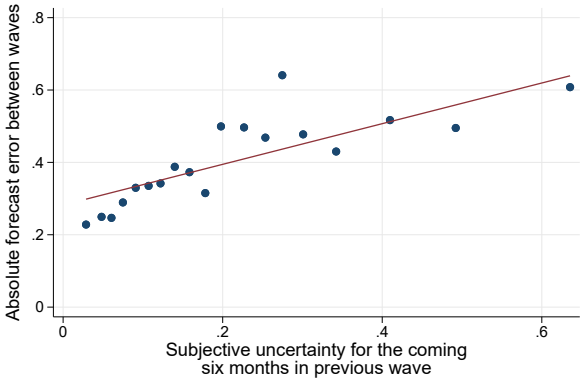
Uncertainty about future sales predicts larger absolute forecast errors.

(c) Unweighted correlation.



No. of observations: 4868.
Coefficient: 0.41 with standard error of 0.033.

(d) Using employment weights.



No. of observations: 4868.
Coefficient: 0.56 with standard error of 0.077.

Notes: The top two figures show binned scatter plots of realized sales in the 30 days prior to the follow-up interview on the vertical-axis against sales expectations for the next six months as of the initial interview on the horizontal axis. The bottom two figures show binned scatter plots of the absolute error between six-months-ahead sales expectations elicited in the initial wave and realized sales in the 30 days leading to the follow-up interview on the vertical-axis, against subjective uncertainty about six-months-ahead sales elicited in the initial wave on the horizontal-axis. Both realized sales and expected sales are expressed relative to the same period in 2019. In the bottom panels, we winsorize subjective uncertainty at the 5th and 95th percentiles. The sample for panels b and c is smaller because it includes only firm-level observations for which we have a follow-up interview in a subsequent wave. See Table A4 in the appendix for a list of countries where we have this sort of panel data. Panels a and b show equal-weighted relationships, while b and d show employment-weighted relationships. The reported statistics below each figure correspond to the least squares regression in the underlying micro data and the corresponding robust standard error.

results are highly consistent with evidence from plausibly larger and more sophisticated firms in advanced economies, namely Germany in Bachmann et al. (2020) and the US in Altig et al. (2022) and Bloom et al. (2020a). Thus, we view these results as further confirmation that our measures of uncertainty are highly informative, and capture many of the same forces as similar surveys collected in high-income economies.

3.2.1 Firms report high uncertainty when they have pessimistic sales expectations

In the cross section of country-waves, pessimistic business expectations predict higher business uncertainty. Panel a of Figure 4, shows a scatter plot of employment-weighted average uncertainty against employment-weighted average expectations for each country-wave in our sample. At one extreme, the typical firm in the single Nepal wave expected sales in the next six months to change by nearly -0.6 relative to 2019 with uncertainty (i.e., a standard deviation across sales outcomes) of 0.5. At the other end, the typical firm in the second Ghana wave or the sole Brazil wave expected sales to increase by 0.2 on the arc-change scale, and perceived uncertainty of just about .10 around that forecast – one-fifth as much as in the Nepal wave.

We suspect the negative relationship between expectations and uncertainty owes largely to the context of the COVID-19 pandemic. Countries with tighter restrictions on mobility and commercial activity, or with high and rising infection levels, are likely to see both steep reductions in business outlook and high uncertainty, with higher likelihoods of business exit than we might expect in normal times or in shallower recessions. Thus, we suspect differences in the state of the pandemic across country-waves are the primary driver of the joint variation in expectations and uncertainty in Figure 4 panel a.

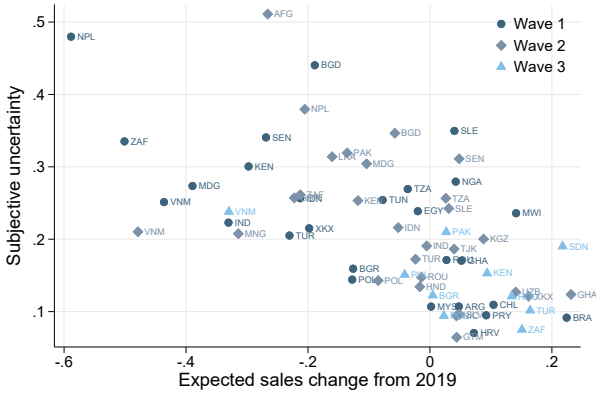
Figure 4 panel b shows a similar relationship in the (employment-weighted) pooled sample of firms in our data. The predominant relationship between expectations and uncertainty is negative, as it is across countries, but we also find uncertainty is lowest among firms with near-zero expected sales changes from 2019. Indeed, uncertainty increases as expected sales deviate from their 2019 level, both to the right and the left of zero, tracing an asymmetric v-shape. Indeed, the absolute value of the slope is more than twice as large for firms that expect to contract relative to 2019 (and whose data are to the left of zero) than for those that expect to grow during the pandemic (located to the right of zero).

The v-shape pattern in panel b Figure 4 is the first of several pieces of evidence in our data that show firms are more uncertain when they are in a turbulent or rapidly shifting environment. The asymmetry, whereby uncertainty is higher for negative shifts, is also a recurring pattern below.

Figure 4: Uncertainty reflects shifts in the business environment

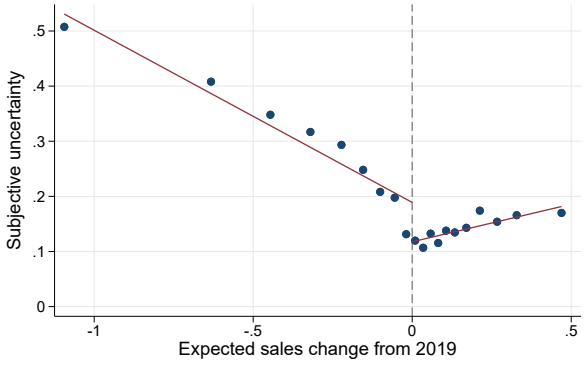
Subjective uncertainty has a negative correlation with expected sales.

(a) Across country-wave averages.



No. of observations: 27046.

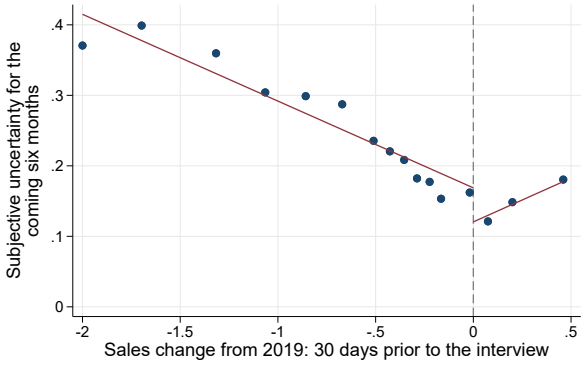
(b) In the raw firm-level panel.



No. of observations: 13990.
Coefficient of the left-side: -0.31 with standard error of 0.012.
Coefficient of the right-side: 0.14 with standard error of 0.017.

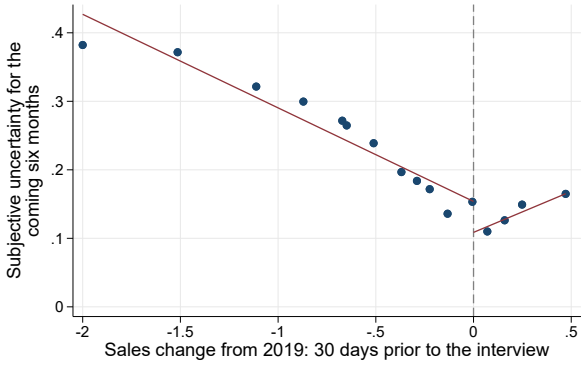
Uncertainty is v-shaped in recent sales shifts.

(c) Unweighted correlation.



No. of observations: 3626.
Coefficient of the left-side: -0.12 with standard error of 0.003.
Coefficient of the right-side: 0.12 with standard error of 0.016.

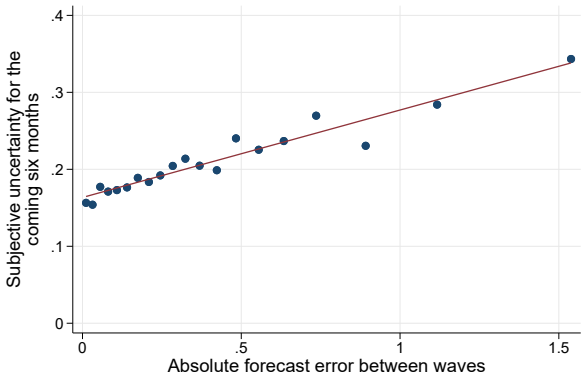
(d) Using employment weights.



No. of observations: 3626.
Coefficient of the left-side: -0.14 with standard error of 0.006.
Coefficient of the right-side: 0.12 with standard error of 0.028.

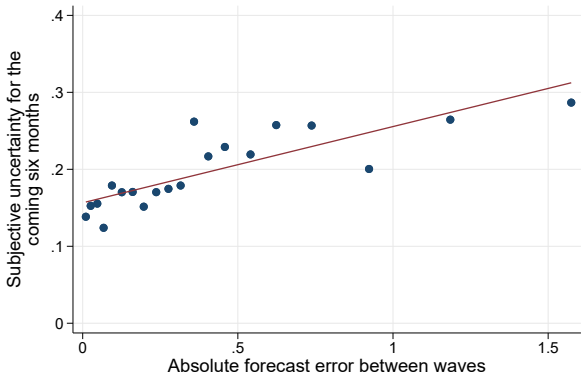
Uncertainty rises with past absolute forecast errors.

(e) Unweighted correlation.



No. of observations: 4868.
Coefficient: 0.11 with standard error of 0.008.

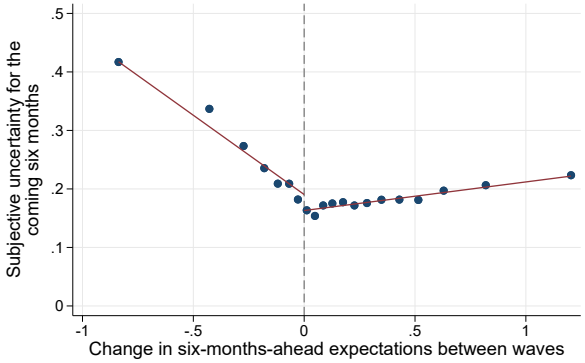
(f) Using employment weights.



No. of observations: 4868.
Coefficient: 0.10 with standard error of 0.021.

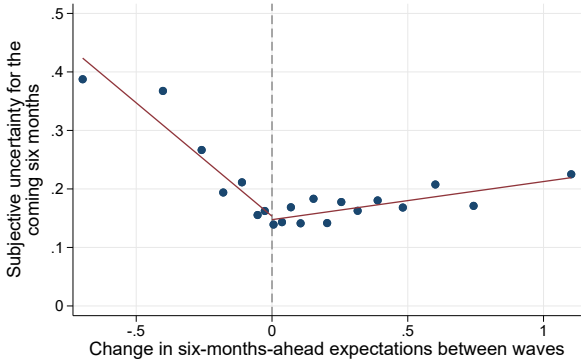
Uncertainty is v-shaped in revisions to expected sales.

(g) Unweighted correlation.



No. of observations: 3110.
Coefficient of the left-side: -0.27 with standard error of 0.020.
Coefficient of the right-side: 0.05 with standard error of 0.009.

(h) Using employment weights.



No. of observations: 3110.
Coefficient of the left-side: -0.37 with standard error of 0.040.
Coefficient of the right-side: 0.07 with standard error of 0.016.

Notes: Panel a plots country-wave employment-weighted average subjective uncertainty about six-months-ahead sales on the vertical axis against employment-weighted average expected sales on the horizontal axis. Panel b shows an employment-weighted binned scatter plot of firm-level subjective uncertainty against sales expectations pooling across all country-wave cross-sections. Panels c) and d) show binned scatter plots of subjective uncertainty about six-months-ahead sales on the vertical axis against realized sales the 30 days prior to the initial interview on the horizontal axis. Panels e) and f) show binned scatter plots of subjective uncertainty about six-months-ahead sales as expressed in follow-up interviews on the vertical axis against the absolute error (i.e. difference) between forecast six-months-ahead sales in the initial interview and realized sales in the 30 days prior to the follow-up interview. Panels g) and h) show binned scatter plots of subjective uncertainty about six-months-ahead sales in the follow-up interview on the vertical axis against the change in expected sales between the initial and follow-up interviews on the horizontal axis. Panels c), e), and g) show unweighted relationships while d), f) and g) use employment-weights. Sales expectations and uncertainty concern the next 6 months relative to the same period of 2019. The sample for panels a) and b) includes businesses from all countries and waves. Panels c) thru h) focus on the balanced panel where we observe initial and follow-up interviews. The reported statistics below a figure correspond to the least squares regression in the underlying micro data and their corresponding robust standard error.

3.2.2 Uncertainty rises with idiosyncratic shocks and a changing environment

Businesses are more uncertain after experiencing large recent shifts in their sales. Panels c and d of Figure 4 show equal- and employment-weighted binned scatter plots of subjective uncertainty against realized sales in the 30 days prior to the survey interview, expressed as an arc-change relative to 2019.[8] As before, we partition the sample at zero along the horizontal axis and report the coefficients from independent regressions on each subsample. Most of the support of the distribution of realized sales changes is below zero, so the overall correlation is, once again, negative. But the overall pattern is, again, a v-shape: recent sales shifts, whether positive or negative, are linked to higher business uncertainty. Indeed, we find a statistically significant and positive slope for the subsample reporting positive recent sales changes.

Panels e and f of Figure 4 show firms express higher uncertainty after large unforeseen shocks. On the horizontal axis, we have the absolute forecast error between a firm's initial sales forecast and its recent sales outcome as reported in a follow-up survey interview. On the vertical axis, we have subjective uncertainty at the time of the follow-up interview. The positive relationship in both plots says that firms facing larger shocks to sales that make their forecasts inaccurate ex-post are more uncertain as they, in turn, look to the future.

Finally, panels g and h of Figure 4 plot uncertainty against revisions to the six-months-ahead sales forecasts between the initial and follow-up survey waves. We take the same approach as with panels c and d, running separate binned scatter plots above and below zero and estimating the fit line in each subsample. Firms for which the business outlook has worsened, whose change in expectations is negative report higher levels of uncertainty. So do firms whose outlook has improved, but the slope is about one-sixth as large as for negative revisions. Relative to panels c though f, these results suggest the shift in expectations is a likely mediator between between uncertainty and the external shocks captured by the variables on the horizontal axis of panels c through f.

3.3 Business decisions

We conduct one final test of whether our measures of expectations and uncertainty are informative, in this case for business decisions. Table 4 shows regressions that have the change in employment in the 30 days prior to a firm's survey interview as the dependent variable and expectations and uncertainty about changes in sales as explanatory variables. In the raw cross sectional regression shown in column 1, higher expectations predict more

[8] Just as for future growth rates, we measure realized sales using arc-changes, which are bounded by -2 and 2 and symmetric about zero. A value of -2 corresponds to a 100% decrease in sales and 2 would correspond to a shift from zero to positive sales.

positive changes in employment and higher uncertainty predicts lower changes (although with weak statistical significance). We find a similar pattern in column 2, which only compares firms within the same country and sector after including an appropriate fixed effect. The coefficient on uncertainty remains stable after we add fixed effects for calendar quarter, but the one on expected sales drops by about half and is no longer statistically significant.

The results in Table 4 suggest that firm managers' responses to the BPS and ES are not just cheap talk. Instead, they correlate with actual decisions in the cross section. A stronger test of this hypothesis would leverage within variation to see if the same firm's employment tends to change with fluctuations in expectations and uncertainty, but the short panel dimension of our data precludes us from conducting that test. That said, we are reassured to find coefficients that have the sign you would expect based on a model in which expectations of high sales lead firms to hire workers to deliver those sales, and high uncertainty leads them to temper or delay that hiring decision, lest they regret it later. This

Table 4: Expectations and uncertainty correlate with employment changes in the cross section

	(1)	(2)	(3)
	Change in employment last 30 days		
Expected change in sales	0.037^{***}	0.027^{***}	0.013^{+}
	(0.009)	(0.007)	(0.008)
Subjective uncertainty	-0.013	-0.020^{+}	-0.020^{+}
	(0.012)	(0.013)	(0.013)
Country x Sector FE	No	Yes	Yes
Quarter FE	No	No	Yes
Observations	19543	19542	18590
R^2	0.010	0.078	0.100
Within R^2		0.005	0.002
No. of clusters	185	184	179

Notes: We compute changes in employment in the past 30 days of the interview using data on current employment and survey questions about recent changes in employment, and express them as arc-changes. The table reports standard errors clustered by country-sector. $^{+}$ $p < 0.15$ * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

4. Business uncertainty across firms and countries

We now turn to the key new facts about business uncertainty in the cross section of 39 developing and emerging economies in our BPS and ES data, and which appear in Figure 1:

1. Across countries, average business uncertainty declines with GDP per capita, while forecast accuracy increases.

2. In all countries for which we have panel data, managers are *overprecise*: absolute forecast errors are systematically higher than subjective uncertainty.

Moreover, we show these relationships capture systematic differences in the business environment across varying levels of development that are not fully explained by other variables that could also relate to the degree of uncertainty and volatility in a given country, including the sectoral mix, differences in firm sizes across countries, or exchange rate regimes.

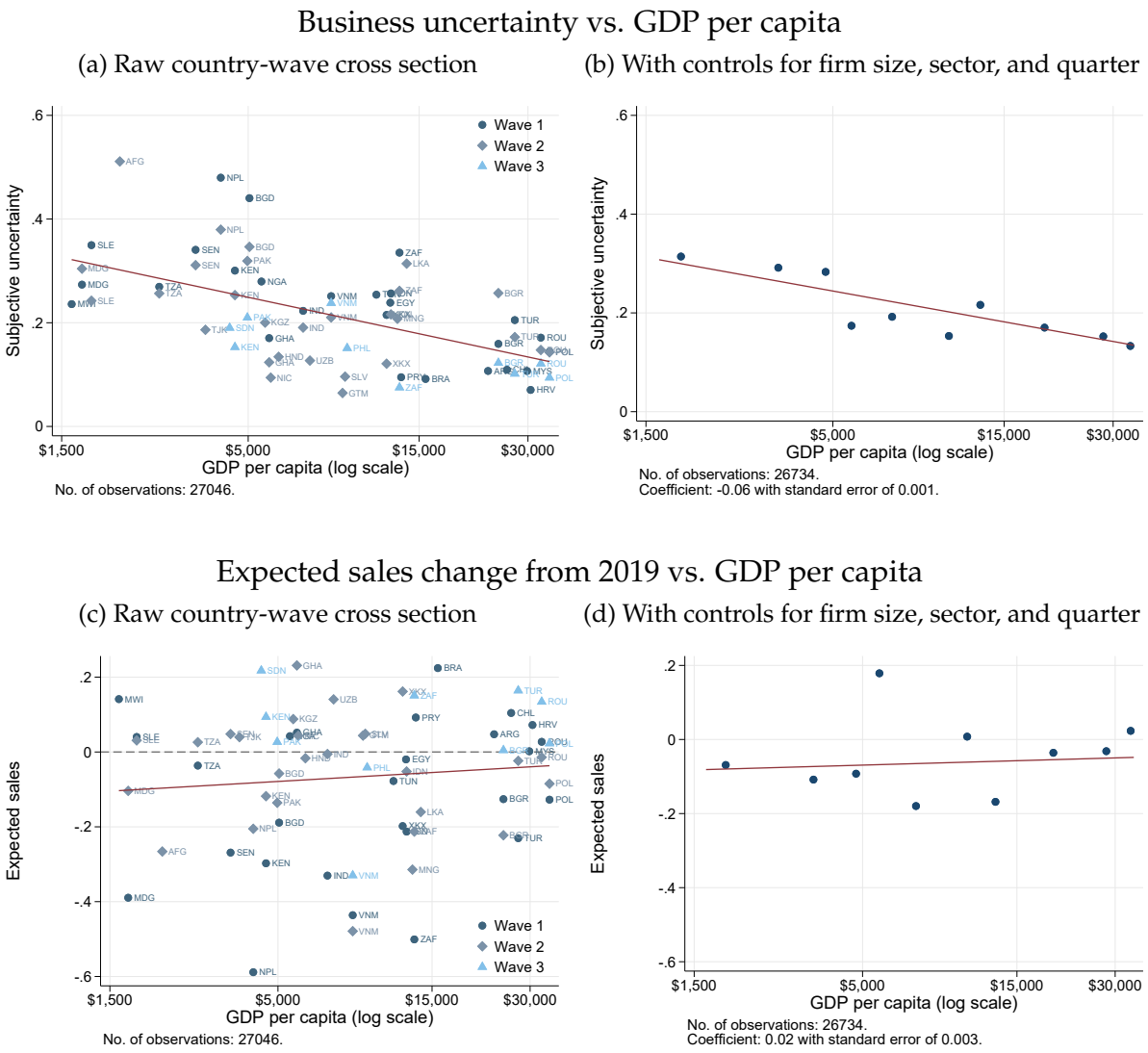
4.1 Businesses in emerging economies are more uncertain than in advanced economies

Figure 1a plots a negative relationship between average employment-weighted subjective uncertainty by country (pooling across waves) and 2019 PPP-adjusted GDP per capita (expressed in 2019 US dollars). Figure 5a takes a more granular approach, plotting a separate point for each country-wave. Several months elapsed between survey waves in most countries, so allowing for wave-specific uncertainty estimates provides added flexibility and shows the pattern in Figure 1a does not arise from a systematic correlation between the timing of pandemic-related uncertainty and GDP per capita. Quantitatively, business uncertainty is about twice as high as in the US and UK for countries with GDP per capita around $30,000. At GDP per capita of $5,000 it is 5 or 6 times higher.

The business sector differs across high-, middle-, and low-income countries in ways that could be systematically correlated with uncertainty and volatility. Firms are larger in higher-income countries (see, e.g., Bento and Restuccia, 2017, and Poschke, 2014), and larger firms are also less volatile (see, e.g., Davis et al., 2006) because they aggregate across more clients and lines of business with imperfectly correlated demand shocks. The distribution of economic activity across industry sectors also differs across countries. If lower-income countries have a higher share of, say, retail businesses that were subject to especially widespread disruption due to the COVID-19 pandemic, the sectoral mix could also drive the pattern in Figure 5a.

Figure 5b shows that firm size, sector, and survey timing have a hard time accounting for the negative relationship between GDP per capita and business uncertainty. The

Figure 5: Business uncertainty declines with GDP per capita, but there is no clear relationship with business expectations



Notes: The vertical axis in each panel shows employment-weighted averages across firms in each country. The top panels have subjective uncertainty about six-months-ahead sales on the vertical axis, while the bottom panels have sales expectations. In both bases, future sales changes are expressed relative to the same period of 2019. We measure GDP per capita in 2019, using 2019 US dollars at purchasing power parity rates.

figure shows a binned scatter plot that traces the conditional mean of uncertainty against GDP per capita in a firm-level regression that also controls for $\log(\text{Employment})$ and includes dummies for industry sectors and calendar quarters. We can still see the negative relationship, with little quantitative change in the level or slope compared with the raw cross sectional relationship in Figure 5a.

There is little evidence, by contrast, that business expectations vary systematically with economic development. 5c plots employment-weighted average expected sales in

each country wave in our Business Pulse and Enterprise Survey data against GDP per capita. There is more dispersion in expected sales conditional on a given level of GDP per capita than there is dispersion in uncertainty. The figure also provides little evidence of an upward- or downward-sloping relationship. The binned scatter plot in 5b, which controls for firm size, sector, and calendar quarter, traces an essentially horizontal relationship between expectations and income per capita. Thus, for the rest of this section and paper we focus on the nature and implications of cross-country differences in business uncertainty.

Table 5 shows estimates of regressions similar to the one from in Figure 5b. Specifically, we examine how robust the negative relationship between business uncertainty and GDP per capita is to controlling for other potential micro- and macroeconomic determinants of uncertainty. In addition to firm size, sector, and survey timing, column 1 includes a control for the change in transit mobility in a firm's country during the 30 days prior to the interview, to capture COVID-related lockdowns and restrictions. We estimate a large and significant coefficient of -0.06 on GDP per capita.

Column 2 adds the responding firm's absolute change in sales in the 30 days prior to the interview, which is a key predictor of uncertainty at the micro level (see Figure 4) and the coefficient on GDP per capita drops by about one third. However, as we add other controls for the variability of GDP in the 10 years after the Global Financial Crisis, for sales dispersion in the firm's country-wave-sector, and exchange rate volatility, the coefficient remains stable between .042 and .047 and highly significant. We do see the coefficient drop in columns 6 and 7, the latter of which adds fixed effects for each country's exchange rate regime.[9] However, the sample drops by a significant amount when we add that control, so column 6 estimates the specification from column 5 on the column 7 sample. The coefficient on GDP percapita is similar to the one in column 7, so sample selection rather than the the exchange rate regime control accounts for more of the drop in the coefficient.

Altogether, Table 5 suggests there is a robust negative relationship between uncertainty and economic development as captured by GDP per capita, even after controlling for a range of micro- and macroeconomic variables that predict uncertainty and GDP per capita. Our preferred estimate of the GDP-uncertainty slope from column 5 implies that a firm operating in a country with GDP per capita of \$30,000 perceives uncertainty that is lower by $.084$ (=$0.047(\log(30,000) - \log(5000))$ than a firm in a country with \$5,000 GDP per capita. For comparison, the mean subjective uncertainty in our core sample is 0.21.

[9]We obtain data on exchange rate regimes from the 2019 Annual Report on Exchange Arrangements and Exchange Restrictions. Recent reports can be obtained at: https://www.elibrary-areaer.imf.org/Pages/YearlyReports.aspx

Table 5: Business uncertainty declines with GDP per capita, after controlling for macro and micro predictors of uncertainty

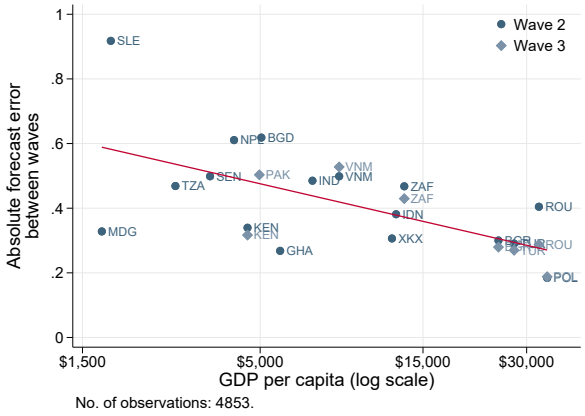
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
				Subjective Uncertainty			
GDP per capita (log)	-0.061***	-0.048***	-0.046***	-0.043***	-0.047***	-0.038***	-0.034***
	(0.006)	(0.005)	(0.005)	(0.005)	(0.005)	(0.004)	(0.005)
Absolute change in sales		0.118***	0.119***	0.113***	0.111***	0.110***	0.109***
		(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
GDP SD 09-19 / Mean			0.504**	0.498**	0.671***	1.163***	1.269***
			(0.243)	(0.237)	(0.230)	(0.198)	(0.184)
SD (arc) change in sales by country-wave-sector				0.073**	0.076**	0.108***	0.084**
				(0.030)	(0.030)	(0.031)	(0.034)
Exchange rate volatility last 30 days					0.806**	0.751**	1.521***
					(0.363)	(0.349)	(0.453)
Exchange rate regime dummies	No	No	No	No	No	No	Yes
Mobility and size	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector and quarter dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	26,734	25,892	25,892	25,892	22,986	20,854	20,854
Within R^2	0.088	0.167	0.171	0.173	0.194	0.200	0.208
No. of clusters	195	195	195	195	151	124	124

Notes: The table shows linear regressions with subjective business uncertainty about six-months-ahead sales (relative to the same period in 2019) as dependent variable. We measure GDP per capita in 2019 US dollars and at purchasing power parity. Absolute change in sales is the absolute value of the sales level reported by each firm for the 30 days prior to the survey interview, expressed relative to 2019. *GDP SD 09-19/Mean* is the coefficient of variation for GDP in the country a firm is located in. SD (arc) change in sales is the standard deviation of changes in sales among firms in the same country, wave, and sector. in sales See Table A5 for exchange rate regimes, which we obtain from the 2020 IMF Annual Report on Exchange Arrangements and Exchange Restrictions. *Mobility* is the level of mobility around transit stations in the 30 days before the interview according to Google Mobility Trends. Heteroskedasticity-robust standard errors are clustered at the country-sector level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

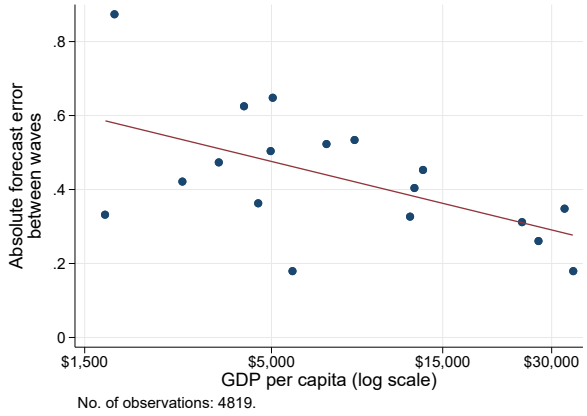
Our data also suggest that businesses in poor countries have reasons to be more uncertain than those in richer ones. Figure 6a plots employment-weighted average absolute forecast errors at the country level against GDP per capita. Here, again, there is a negative relationship implying that, at higher levels of GDP per capita, businesses face smaller unforeseen shocks to sales and a more predictable (less volatile) environment. They should, therefore, perceive lower uncertainty about future sales than businesses subject to the higher unpredictability of lower-income countries. As before, Figure 6b shows this negative relationship between GDP per capita and forecast accuracy is hard to explain away based on only cross-country differences in firm size, sector, or the evolution of the pandemic.

Figure 6: Forecast accuracy vs. GDP per capita

(a) Raw country-wave cross section



(b) With controls for firm size, sector, and quarter



Notes: The vertical axis in each panel shows employment-weighted averages across firms in each country considering only surveys that were implemented between April and September of 2020. Only Ghana implemented a second wave in that period. Expected sales growth corresponds to the next 6 months relative to the same period of 2019. GDP per capita in 2019 converted to international dollars using purchasing power parity rates.

The pattern in Figures 6a and 6b is highly consistent with the argument in Asker et al. (2014) that businesses in lower-income countries face higher volatility, and volatility generates static misallocation (dispersion in the marginal products of capital and labor) that drags down aggregate TFP. But combined with Figures 5a 5b they say more. Worse measurement error in lower-income countries could lead to higher measured volatility and static misallocation (e.g., see Bils, Klenow, and Ruane, 2021) even if business uncertainty was similar across low-, middle, and high-income countries. Figures 5a and 5b argue against that hypothesis because firms *actually perceive* higher levels of uncertainty in lower-income countries, and managerial decisions to invest in capital or technology, hire or lay off workers, are all subject to heightened uncertainty in low-income countries.

Table 6 examines the joint relationship between absolute forecast errors, GDP per

capita and business uncertainty, and shows the latter two have independent predictive power. Columns 1 and 3 begin by corroborating our findings from Figures 6b and 3b: sales forecasts are less accurate in lower-income countries, and when a firm perceives higher subjective uncertainty at the time of the forecast. Moreover, neither relationship is due to a systematic correlation between the key explanatory variable and firm size and sector. Columns 2 and 4 show, furthermore, that other measures of macroeconomic unpredictability the policy environment have a hard time knocking out GDP per capita and subjective uncertainty as predictors of forecast errors, although we do see material (and not unexpected) declines in the coefficient.

Columns 5 and 6 ask a different question. They test whether subjective uncertainty and GDP per capita have independent predictive power over absolute forecast errors. If firm-level uncertainty fully captures the unpredictability associated with operating in a low-income country environment (plus any idiosyncratic factors) we should expect GDP per capita to have a hard time predicting absolute forecast errors when we also control for uncertainty (or vice-versa). Columns 5 and 6 say otherwise: both coefficients are statistically significant and only decline modestly in comparison with columns 2 and 4.

Overall, Table 6 illustrates several properties of business uncertainty, as captured by the Business Pulse and Enterprise Surveys, that are inconsistent with the (full-information) rational expectations hypothesis. The coefficient on ex-ante uncertainty is far below one in columns 3 to 6, and drops when we add more predictors of absolute errors. The within R-squared (i.e., variation explained by regressors other than fixed effects) is below .15 in all specifications, even with a number of other explanatory variables. If business managers know the stochastic process for sales that their firms are exposed to, subjective uncertainty should capture the bulk of cross-firm variation in absolute errors. Additionally, higher GDP per capita predicts lower absolute errors conditional on a firm's ex-ante uncertainty, which says that such uncertainty fails to predict absolute forecast errors differently across low- and high-income countries.

Table 6: GDP per capita and subjective uncertainty have independent predictive power for absolute forecast errors

	(1)	(2)	(3)	(4)	(5)	(6)
	Absolute Forecast Error					
GDP per capita (log)	-0.104^{***}	-0.049^{**}			-0.087^{***}	-0.041^{*}
	(0.027)	(0.021)			(0.027)	(0.022)
Uncertainty in previous wave			0.363^{***}	0.236^{***}	0.271^{***}	0.223^{***}
			(0.081)	(0.080)	(0.078)	(0.080)
GDP SD 09-19 / Mean		-1.742		-1.240		-1.503
		(1.383)		(1.410)		(1.359)
SD (arc) change in sales by country-wave-sector		0.399^{***}		0.447^{***}		0.367^{***}
		(0.109)		(0.105)		(0.108)
Exchange rate volatility last 30 days		-2.960^{**}		-2.782^{**}		-3.196^{**}
		(1.314)		(1.369)		(1.282)
Exchange rate regime dummies	No	Yes	No	Yes	No	Yes
Size	Yes	Yes	Yes	Yes	Yes	Yes
Sector and quarter dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4659	4622	4659	4622	4659	4622
Within R^2	0.055	0.091	0.041	0.099	0.073	0.103
No. of clusters	88	81	88	81	88	81

Notes: The table shows firm-level linear regressions with absolute forecast errors about six-months-ahead sales (relative to the same period in 2019) between successive survey interviews. During the first interview, managers provide a subjective probability distribution for future sales which we use to measure expectations (i.e. forecasts) subjective uncertainty. During the follow-up interview, they report sales levels in the past 30 days, relative to 2019, and we measure forecast errors as the difference between these realized sales and the forecast in the first interview. We measure GDP per capita in 2019 US dollars and purchasing power parity. *GDP SD 09-19/Mean* is the coefficient of variation for GDP in the country a firm is located in. See Table A5 for exchange rate regimes, which we obtain from the 2020 IMF Annual Report on Exchange Arrangements and Exchange Restrictions. We report heteroskedasticity-robust standard errors are clustered at the country-sector level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Indeed, the second key fact of our paper says that business uncertainty deviates systematically from measured volatility in all countries where we can track firm outcomes. Namely, managers are *overprecise* in the sense that their subjective uncertainty underestimates the magnitude of forecast errors, as in Barrero (2022). We show this fact in Figure 7. We define overprecision as the employment-weighted average of the difference between absolute forecast errors and subjective uncertainty in each country:

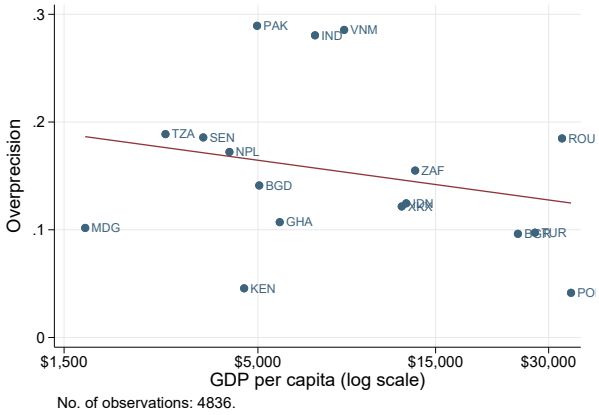
$$\text{Overprecision}_c \equiv \sum_{i \in \mathcal{C}} \frac{z_i}{Z_c} \cdot \left[\| \text{Realized Sales}_i - \text{Forecast Sales}_i \| - \text{Uncertainty}_i \right],$$

where i indexes firms in country c, $\frac{z_i}{Z_c}$ are our employment weights, and Uncertainty is defined as in Equation 2. Then we plot this country-level measure of overprecision on the vertical axis against GDP per capita. Every data point is above the horizontal axis, implying that absolute errors are larger than we would expect from business uncertainty as reported in the survey. There appears to be a negative relationship, whereby higher-income countries underestimate actual volatility by less, but it is noisy and not significant.

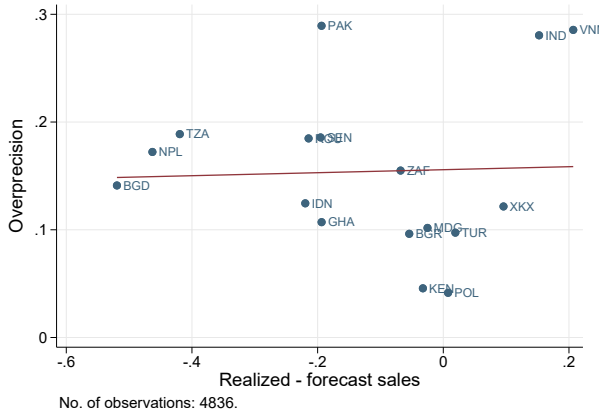
The right panel of Figure 7 shows that overprecision at the country level is not solely due to common shocks that inflate absolute forecast errors relative to subjective uncertainty. If that were the case, when we plotted overprecision against realized minus forecast sales, we should see a sharp v-shaped pattern with the bottom of the v at the origin, as in the absolute value function $f(x) = |x|$. Instead, there is positive overprecision even in countries where the average firm forecast error is near-zero, so no large common shock inflates absolute errors, and only a noisy relationship between overprecision and the country-level (non-absolute) forecast errors.

Figure 7: We find *overprecision* in every country where we have panel data

(a) Raw country-wave cross section



(b) Overprecision vs. forecast errors



Notes: The vertical axis in each panel shows, for each country, the employment-weighted average of the difference between absolute forecast errors and ex-ante subjective uncertainty. Businesses provide subjective probability distributions about six-months-ahead sales, relative to 2019, and we compute expectations (i.e. forecasts) and uncertainty based on those responses. We compute absolute forecast errors as the absolute difference between realized sales in the 30 days prior to the follow-up interview and forecast sales from the initial interview. GDP per capita data are from 2019 and measured in 2019 US dollars at purchasing power parity rates.The right panel has the employment-weighted average (non-absolute) forecast error across firms in a given country.

4.2 Putting things together: uncertainty, forecast errors, and GDP per capita

The two key facts in our paper suggest there are several patterns that distinguish subjective uncertainty and actual volatility across countries that differ in terms of GDP per capita. Our two key facts say that subjective, i.e., perceived, uncertainty declines with GDP per capita, while businesses appear overprecise regardless of their level of development. Because the degree of overprecision declines only modestly (and statistically insignificantly) with GDP per capita, businesses in lower-income countries underestimate uncertainty by a smaller *proportion* than businesses higher-income countries.

These patterns could imply that different forces drive firm dynamics and average firm sizes across lower- and higher-income countries. In the former, perceived uncertainty is high, so entrepreneurs might abstain from investing in profitable start-up opportunities when such investments imply high upfront costs, similar to the mechanism in Bento and Restuccia (2017). In lower-income countries, managers and entrepreneurs also underestimate uncertainty by a small proportion, so there is limited scope for overprecision-fueled decisions to worsen aggregate productivity. The opposite is true in higher-income countries, where perceived uncertainty is low and overprecision is high. There, profitability is a stronger driver of firm entry and exit decisions. And because managers underestimate actual volatility, they might actually overreact to shifting signals of future profitability as

in Barrero (2022).

5. Implications of cross-country uncertainty and overprecision using a dynamic real options model

This section builds a dynamic model of firm dynamics with real options to assess how declining uncertainty with GDP per capita and overprecision affect firm behavior, misallocation, and aggregate productivity across lower- and higher-income countries.

UNDER CONSTRUCTION

6. Concluding remarks

Our paper makes two key contributions to the empirical literature that uses surveys to measure business expectations and uncertainty.

First, we show it is feasible to collect quantitative data on these topics in developing and emerging economies by eliciting subjective probability distributions from businesses. We are able to measure subjective expectations and uncertainty for over 70 percent of Business Pulse and Enterprise Survey respondents who received the expectations/uncertainty module. Many survey interviews were conducted in a challenging context due to the COVID-19 pandemic, in partnership with a variety of statistical agencies and organizations who collaborated with the implementation of the survey in each country. Thus, we expect improvements in the survey methodology and implementation could yield even better results and higher value added in future survey efforts.

Second, we show that our measures of business expectations and uncertainty are informative about firm-specific and macroeconomic conditions. Both have predictive power for future firm-level outcomes, and our measure of uncertainty, in particular, rises when a firm experiences a turbulent or shifting environment, as in Altig et al. (2022) and Bachmann et al. (2020). Expectations and uncertainty also correlate with employment changes in the cross section. Thus, our evidence from a broad range of developing and emerging economies is consistent with previous survey evidence from several advanced economies.

Our second key contribution is to show how the nature of subjective uncertainty differs across countries summarized in two facts. (1) Businesses perceive lower levels of uncertainty (and make more accurate forecasts) in higher income countries, a pattern which we cannot explain with various characteristics of the macroeconomic environment, or other predictors of firm-level uncertainty. (2) Firms in low- and high-income countries are *overprecise*: the amount of uncertainty they express in our survey data understates

the magnitude of absolute forecast errors in all countries of our sample, and by a similar amount. A firm dynamics model with endogenous entry and exit suggests cross-country differences in uncertainty and similar levels of overprecision could help explain why profitability is a stronger determinant of firm and employment dynamics in rich countries.

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ONLINE APPENDIX, NOT FOR PUBLICATION

Appendix A: Additional Information about the World Bank Business Pulse and Enterprise Surveys

Table A1: Survey country and time coverage in each region.

	2020			2021				2022
	Apr-Jun	Jul-Sep	Oct-Dec	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	Jan-Mar
East Asia and Pacific								
Indonesia	X		X					
Malaysia			X					
Mongolia				X				
Philippines					X			
Vietnam		X	X	X				
Central and Eastern Europe								
Bulgaria	X		X		X			
Croatia					X			
Kosovo		X				X		
Kyrgyzstan					X			
Poland		X	X	X				
Romania	X			X	X			
Tajikistan						X		
Turkey		X		X				X
Uzbekiztan						X		
Latin America								
Argentina						X		
Brazil		X						
Chile						X		
El Salvador				X				
Guatemala				X				
Honduras				X				
Nicaragua				X				
Paraguay						X		
North Africa								
Tunisia	X							
South Asia								
Afghanistan						X		
Bangladesh		X				X		

Table A1: Survey country and time coverage in each region.

	2020				2021			2022
	Apr-Jun	Jul-Sep	Oct-Dec	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	Jan-Mar
India	X					X		
Nepal	X					X		
Pakistan						X		
Sri Lanka						X		
Sub-Saharan Africa								
Ghana	X	X						
Kenya		X	X		X			
Madagascar		X		X				
Malawi			X					
Nigeria		X						
Senegal	X			X				
Sierra Leone			X	X				
South Africa	X		X			X		
Sudan							X	
Tanzania		X	X					

Table A2: Data collection period for each country-wave.

	Date of first interview	Date of last interview
Indonesia		
Quarter 1	Jun 18, 2020	Jun 30, 2020
Quarter 3	Oct 17, 2020	Nov 5, 2020
Malaysia		
Quarter 3	Oct 2, 2020	Oct 22, 2020
Mongolia		
Quarter 4	Feb 1, 2021	Feb 18, 2021
Philippines		
Quarter 5	May 11, 2021	May 26, 2021
Vietnam		
Quarter 2	Jun 12, 2020	Jul 7, 2020
Quarter 3	Sep 6, 2020	Oct 26, 2020
Quarter 4	Jan 21, 2021	Feb 7, 2020
Bulgaria		
Quarter 1	May 14, 2020	Jun 12, 2020
Quarter 3	Nov 19, 2020	Dec 29, 2020

Table A2: Data collection period for each country-wave.

	Date of first interview	Date of last interview
Quarter 5	Apr 15, 2021	Jun 26, 2021
Croatia		
Quarter 5	May 11, 2021	Jun 18, 2021
Kosovo		
Quarter 2	Jun 29, 2020	Jul 22, 2020
Quarter 6	Jul 1, 2021	Aug 6, 2020
Kyrgyzstan		
Quarter 5	May 26, 2021	Jun 18, 2021
Poland		
Quarter 2	May 26, 2020	Jul 1, 2020
Quarter 3	Sep 18, 2020	Oct 16, 2020
Quarter 4	Feb 23, 2021	Mar 15, 2021
Romania		
Quarter 1	May 11, 2020	Jun 26, 2020
Quarter 4	Nov 2, 2020	Jan 18, 2021
Quarter 5	Mar 29, 2021	Jun 7, 2021
Tajikistan		
Quarter 6	May 28, 2021	Jul 19, 2021
Turkey		
Quarter 2	Jun 8, 2020	Jul 22, 2020
Quarter 4	Mar 4, 2021	Mar 11, 2021
Quarter 8	Dec 4, 2021	Jan 21, 2022
Uzbekistan		
Quarter 6	May 28, 2021	Jul 2, 2021
Argentina		
Quarter 6	May 23, 2021	Jul 28, 2021
Brazil		
Quarter 2	May 26, 2020	Jul 27, 2020
Chile		
Quarter 6	Jun 11, 2021	Sep 28, 2021
El Salvador		
Quarter 4	Nov 23, 2020	Jan 22, 2021
Guatemala		
Quarter 4	Dec 2, 2020	Jan 21, 2021

Table A2: Data collection period for each country-wave.

	Date of first interview	Date of last interview
Honduras		
Quarter 4	Nov 30, 2020	Jan 21, 2021
Nicaragua		
Quarter 4	Dec 2, 2020	Jan 21, 2021
Paraguay		
Quarter 6	Jun 15, 2021	Aug 19, 2021
Tunisia		
Quarter 1	Jun 5, 2020	jun 25, 2020
Afghanistan		
Quarter 6	May 201, 2021	Aug 12, 2021
Bangladesh		
Quarter 2	Jun 4, 2020	Jul 7, 2020
Quarter 6	Jun 30, 2021	Aug 12, 2021
India		
Quarter 1	May 13, 2020	Jun 29, 2020
Quarter 6	Jun 29, 2021	Aug 28, 2021
Nepal		
Quarter 1	May 1, 2020	Jun 6, 2020
Quarter 6	May 29, 2021	Jul 31, 2021
Pakistan		
Quarter 4	Jan 4, 2021	Feb 15, 2021
Quarter 6	May 31, 2021	Aug 16, 2021
Sri Lanka		
Quarter 6	May 30, 2021	Jul 31, 2021
Ghana		
Quarter 1	May 26, 2020	Jun 22, 2020
Quarter 2	Sep 1, 2020	Sep 13, 2020
Kenya		
Quarter 2	Jun 10, 2020	Aug 31, 2020
Quarter 3	Sep 4, 2020	Oct 27, 2020
Quarter 5	Mar 29, 2021	Jun 2, 2021
Madagascar		
Quarter 2	Jun 9, 2020	Jul 29, 2020
Quarter 4	Dec 15, 2020	Feb 10, 2020

Table A2: Data collection period for each country-wave.

	Date of first interview	Date of last interview
Malawi		
Quarter 3	Nov 14, 2020	Dec 17, 2020
Nigeria		
Quarter 2	Jul 27, 2020	Sep 10, 2020
Senegal		
Quarter 1	Apr 28, 2020	May 8, 2020
Quarter 4	Dec 10, 2020	Jan 7, 2021
Sierra Leone		
Quarter 3	Oct 14, 2020	Dec 3, 2020
Quarter 4	Mar 12, 2021	Mar 30, 2021
South Africa		
Quarter 1	May 15, 2020	Jun 2, 2020
Quarter 3	Oct 30, 2020	Dec 5, 2020
Quarter 6	Jul 28, 2021	Sep 15, 2021
Sudan		
Quarter 7	Sep 7, 2021	Dec 1, 2021
Tanzania		
Quarter 2	Jun 18, 2020	Jul 10, 2020
Quarter 3	Nov 20, 2020	Dec 31, 2020

Table A3: Characteristics of the sample in each country-wave.

	No. observations	Percentage by size			Percentage by sector				
		Small	Medium	Large	Manufacturing	Retail*	Hospitality	Services	Others
Indonesia									
Quarter 1	523	40.7	35.6	23.7	41.0	2.4	9.0	40.0	7.6
Quarter 3	429	40.3	32.2	27.5	40.5	3.2	7.4	39.6	9.3
Malaysia									
Quarter 3	632	22.0	27.1	50.9	26.0	23.0	4.1	32.3	14.6
Mongolia									
Quarter 4	199	39.7	46.7	13.6	30.7	37.7	4.0	6.0	21.6
Philippines									
Quarter 5	342	64.0	24.9	11.1	17.2	15.7	20.1	29.3	17.8
Vietnam									
Quarter 2	413	47.2	30.8	22.0	41.2	21.5	0	24.0	13.3
Quarter 3	417	52.0	28.8	19.2	41.0	23.2	0	23.5	12.3
Quarter 4	427	50.8	27.6	21.5	41.8	22.5	0	22.5	13.3
Bulgaria									
Quarter 1	572	49.5	36.9	13.6	32.2	20.6	6.8	23.6	16.8
Quarter 3	459	52.5	37.3	10.2	29.8	17.4	7.4	26.6	18.7
Quarter 5	360	53.3	36.1	10.6	24.7	18.3	5.6	33.3	18.1
Croatia									
Quarter 5	193	34.2	44.0	21.8	29.0	19.2	8.3	28.5	15.0
Kosovo									
Quarter 2	574	74.0	22.3	3.7	18.1	19.7	9.9	5.1	47.2
Quarter 6	454	74.9	21.6	3.5	18.7	24.4	8.8	4.8	43.2
Kyrgyzstan									
Quarter 5	376	67.0	29.3	3.7	34.8	19.7	8.2	13.6	23.7
Poland									
Quarter 2	802	32.8	47.3	20.0	37.8	24.2	3.5	22.1	12.5

Table A3: Characteristics of the sample in each country-wave.

	No. observations	Percentage by size			Percentage by sector				
		Small	Medium	Large	Manufacturing	Retail*	Hospitality	Services	Others
Quarter 3	402	34.6	48.0	17.4	42.5	22.6	4.7	19.2	10.9
Quarter 4	328	37.5	43.9	18.6	43.4	23.2	4.0	19.3	10.1
Romania									
Quarter 1	549	41.3	44.4	14.2	21.1	16.4	12.2	32.8	17.5
Quarter 4	371	47.4	41.5	11.1	20.2	15.4	11.6	35.3	17.5
Quarter 5	317	46.1	42.0	12.0	24.0	17.6	12.1	30.7	15.7
Tajikistan									
Quarter 6	442	66.3	33.7	0	20.6	28.3	3.2	15.8	32.1
Turkey									
Quarter 2	628	40.8	39.5	19.7	45.1	9.7	5.3	24.7	15.2
Quarter 4	819	47.7	36.4	15.9	25.4	9.3	16.6	25.6	23.1
Quarter 8	188	46.8	37.2	16.0	21.8	10.6	16.5	28.2	22.9
Uzbekistan									
Quarter 6	448	60.7	39.3	0	22.5	25.9	7.1	20.8	23.7
Argentina									
Quarter 6	592	47.8	38.3	13.9	49.2	26.4	0	24.5	0
Brazil									
Quarter 2	327	28.7	38.2	33.0	45.8	21.6	4.4	5.3	22.9
Chile									
Quarter 6	448	70.3	22.8	6.9	15.0	33.7	16.5	34.8	0
El Salvador									
Quarter 4	305	39.0	35.4	25.6	48.2	33.3	2.3	13.5	2.6
Guatemala									
Quarter 4	149	38.9	35.6	25.5	38.8	34.7	5.4	15.6	5.4
Honduras									
Quarter 4	116	39.7	40.5	19.8	23.3	46.6	2.6	22.4	5.2

Table A3: Characteristics of the sample in each country-wave.

	No. observations	Percentage by size			Percentage by sector				
		Small	Medium	Large	Manufacturing	Retail*	Hospitality	Services	Others
Nicaragua									
Quarter 4	135	40	45.9	14.1	31.3	33.6	10.4	22.4	2.2
Paraguay									
Quarter 6	150	62	27.3	10.7	23.3	20.7	8	48	0
Tunisia									
Quarter 1	439	22.3	28.9	48.7	54.9	12.5	7.5	19.8	5.2
Afghanistan									
Quarter 6	454	62.3	30.0	7.7	43.2	6.5	4.8	8.7	36.8
Bangladesh									
Quarter 2	172	66.9	27.3	5.8	67.4	2.9	8.7	5.8	15.1
Quarter 6	394	60.7	28.7	10.7	80.2	4.1	4.8	4.8	6.1
India									
Quarter 1	571	23.6	43.6	32.7	62.1	0.9	0.9	29.6	6.5
Quarter 6	2051	41.9	48.1	10.0	40.6	19.9	13.5	23.0	2.9
Nepal									
Quarter 1	288	71.5	21.9	6.6	18.1	37.5	18.1	13.9	12.5
Quarter 6	387	74.4	18.3	7.2	33.9	23.3	14.2	14.0	14.7
Pakistan									
Quarter 4	195	58.5	26.2	15.4	15.4	8.2	27.7	43.1	5.6
Quarter 6	286	61.2	26.2	12.6	17.8	4.2	18.5	53.1	6.3
Sri Lanka									
Quarter 6	320	59.4	15.3	25.3	56.3	15.9	7.2	11.6	9.1
Ghana									
Quarter 1	47	0	59.6	40.4	19.1	14.9	4.3	31.9	29.8
Quarter 2	72	0	69.4	30.6	15.3	11.1	4.2	31.9	37.5

Table A3: Characteristics of the sample in each country-wave.

	No. observations	Percentage by size			Percentage by sector				
		Small	Medium	Large	Manufacturing	Retail*	Hospitality	Services	Others
Kenya									
Quarter 2	789	41.6	37.4	21.0	18.1	13.3	17.7	26.4	24.5
Quarter 3	658	48.8	30.2	21.0	19.2	12.9	14.8	27.9	25.3
Quarter 5	802	57.9	30.7	11.5	17.0	12.6	15.8	29.8	24.8
Madagascar									
Quarter 2	257	38.5	38.1	23.3	11.2	14.1	13.7	46.9	14.1
Quarter 4	350	50	32.9	17.1	12.4	8.3	8.3	52.1	18.9
Malawi									
Mali									
Quarter 3	647	68.8	25.0	6.2	11.9	29.7	21.9	29.4	7.1
Nigeria									
Quarter 2	325	47.4	49.8	2.8	17.5	9.5	8.3	30.2	34.5
Senegal									
Quarter 1	436	55.0	29.6	15.4	31.2	23.9	3.0	21.6	20.4
Quarter 4	328	64.6	25	10.4	30.8	24.4	2.7	20.1	22.0
Sierra Leone									
Quarter 3	116	76.7	16.4	6.9	8.6	22.4	13.8	43.1	12.1
Quarter 4	96	82.3	11.5	6.3	11.5	21.9	20.8	40.6	5.2
South Africa									
Quarter 1	1035	57.6	37.5	4.9	16.9	10.0	11.0	34.1	27.9
Quarter 3	242	66.5	30.2	3.3	19.6	8.8	10	36.3	25.4
Quarter 6	270	58.1	35.9	5.9	14.6	6.7	15.0	39.3	24.3
Sudan									
Quarter 7	49	89.8	10.2	0	10.2	40.8	10.2	30.6	8.2
Tanzania									
Quarter 2	193	51.8	38.9	9.3	40.4	14.5	14.0	21.2	9.8

Table A3: Characteristics of the sample in each country-wave.

	No. observations	Percentage by size			Percentage by sector				
		Small	Medium	Large	Manufacturing	Retail*	Hospitality	Services	Others
Quarter 3	301	83.7	13.6	2.7	33.9	7.0	13.3	11.3	34.6

* Retail and wholesale. Values may not add up to 100 due to rounding. A total of 529 observations are missing date of the interview and hence do not have a quarter assigned: 52 in Madagascar, 5 in Nigeria, 78 in Turkey, 3 in Tanzania and 391 in Kosovo. Quarter 1 is April to June 2020, Quarter 2 is July to September 2020, and so forth, so Quarter 8 is January to March 2022.

Table A4: Panel observations in the dataset.

	No. of observations	Wave 1	Wave 2	Wave 3
Bangladesh	74	Quarter 2	Quarter 6	
Bulgaria	330	Quarter 1	Quarter 3	Quarter 5
Ghana	53	Quarter 1	Quarter 2	
India	254	Quarter 1	Quarter 6	
Indonesia	357	Quarter 1	Quarter 3	
Kenya	724	Quarter 2	Quarter 3	Quarter 5
Kosovo	310	Quarter 2	Quarter 6	
Madagascar	122	Quarter 2	Quarter 4	
Nepal	139	Quarter 1	Quarter 6	
Pakistan	36		Quarter 4	Quarter 6
Poland	427	Quarter 2	Quarter 3	Quarter 4
Romania	412	Quarter 1	Quarter 4	Quarter 5
Senegal	227	Quarter 1	Quarter 4	
Sierra Leone	33	Quarter 3	Quarter 4	
South Africa	249	Quarter 1	Quarter 3	Quarter 6
Tanzania	44	Quarter 2	Quarter 3	
Turkey	234	Quarter 2	Quarter 4	Quarter 8
Vietnam	434	Quarter 2	Quarter 3	Quarter 4

Table A5

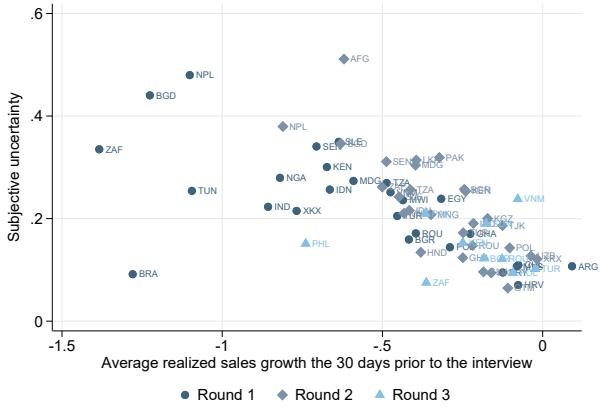
Exchange rate type	Countries
Hard peg	Bulgaria, El Salvador, Kosovo.
Soft peg	Bangladesh, Guatemala, Honduras, Malawi, Mongolia, Nepal, Nicaragua, Nigeria, Romania, Senegal, Tanzania, Tunisia, Vietnam.
Floating	Brazil, Ghana, India, Indonesia, Madagascar, Malaysia, Poland, South Africa, Turkey.
Residual	Kenya, Sierra Leone.

Appendix B: Additional Facts About Business Expectations and Uncertainty

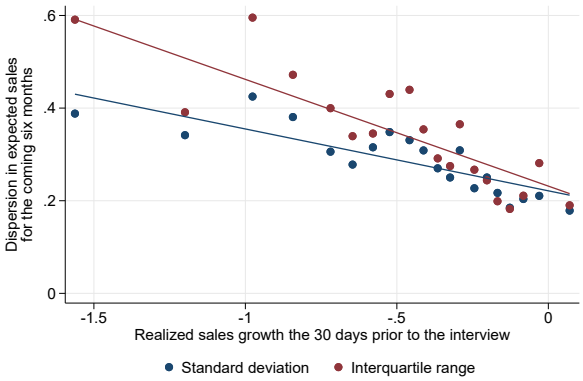
Figure B1: Country-waves with larger drops in sales relative to 2019 have more pessimistic expectations, higher uncertainty, and higher dispersion in sales expectations.

(a) Expected sales growth the next six months.

(b) Subjective uncertainty about future sales growth.



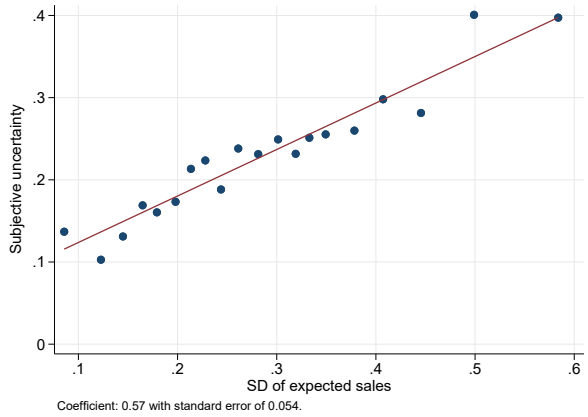
(c) Dispersion in expected sales growth.



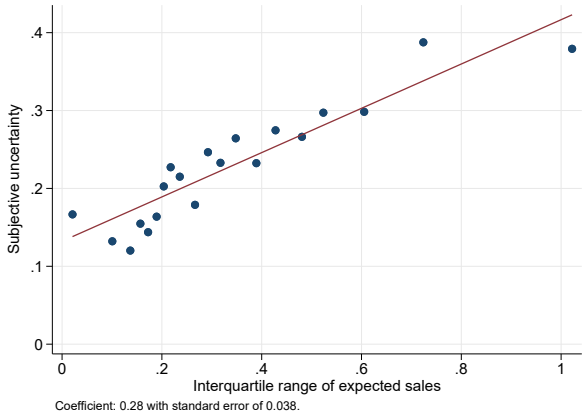
Notes: The vertical axis in panels a and b shows, respectively, employment-weighted average sales expectations and uncertainty across firms in each country-wave. The forecast horizon is 6 months and in both cases future sales are expressed relative to the same period of 2019. The horizontal axis shows employment-weighted average arc-changes in sales between the 30 days prior to the interview and the same period of 2019. Panel c shows binned scatter plots of the standard deviation and interquartile range of sales forecasts across firms (looking six months ahead) within a country-wave-sector. Again, the horizontal axis shows arc-changes in sales between the 30 days prior to the interview and the same period of 2019.

Figure B2: More uncertainty about future sales growth in country-sectors with more dispersion in expectations.

(a) Standard deviation of expected sales growth.



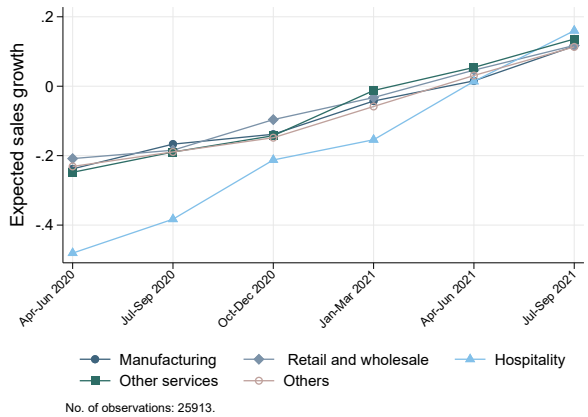
(b) Interquartile range of expected sales growth.



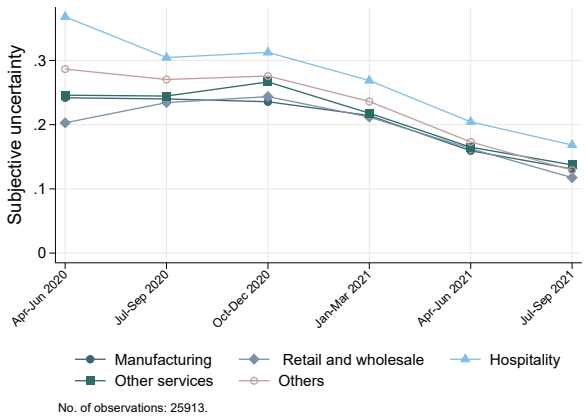
Notes: In each wave-country-sector we compute the standard deviation and the interquartile range of the expected sales growth for the next six months and the average subjective uncertainty about future sales growth. These computations use employment weights. Panel a shows the binned scatter plot for average uncertainty against the standard deviation of expected sales growth. Panel b uses the interquartile range on the x-axis as a measure of dispersion. Expected sales growth corresponds to the next 6 months relative to the same period of 2019. The reported statistics below each figure correspond to the least squares regression in the underlying micro data and the corresponding robust standard error.

Figure B3: Worse expectations and more uncertainty in the hospitality industry.

(a) Expected sales growth the next six months.



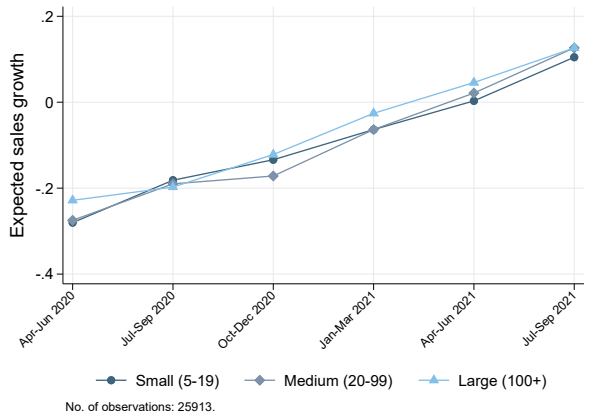
(b) Subjective uncertainty about future sales growth.



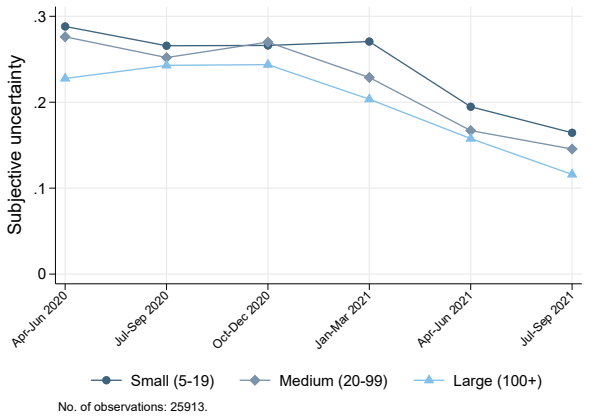
Notes: The figure on the left shows the average expected six-months-ahead sales by firm sector and quarter after adjusting for country and size effects. The figure on the right shows average uncertainty about six-months-ahead sales growth by sector and quarter, again after adjusting for country and size effects. In each case, these averages correspond to the average prediction from a linear regression on dummies for country, size, and the interaction of sector and quarter and size and quarter. Computations weighted by employment. Expected sales growth corresponds to the next 6 months relative to the same period of 2019. Full set of least squares results available in the appendix.

Figure B4: Less uncertainty among larger firms.

(a) Expected sales growth.



(b) Subjective uncertainty about future sales growth.



Notes: The figure on the left shows the average expected six-months-ahead sales by firm size category and quarter after adjusting for country and sector effects. The figure on the right shows average uncertainty about six-months-ahead sales growth by firm size category and quarter, again after adjusting for country and sector effects. In each case, these averages correspond to the average prediction from a linear regression on dummies for country, sector, and the interaction of size and quarter and sector and quarter. Computations weighted by employment. Expected sales corresponds to the next 6 months relative to the same period of 2019. Full set of least squares results available in the appendix.

Table B1: Correlation between expectations about sales growth the coming six months and subjective uncertainty (in logs) and whether the firm received public support.

	Dependent variable: Expected sales growth (Mean $= -0.106$; SD $= 0.366$)					
	(1)	(2)	(3)	(4)	(5)	(6)
Firm received support?	0.061^{*}	0.041	-0.009	0.032	0.018	-0.015
	(0.036)	(0.036)	(0.033)	(0.032)	(0.023)	(0.025)
Size and sector		X				X
Severity of the shock			X			X
Quarter				X		X
Country					X	X
Observations	7,101	7,101	6,502	6,732	7,101	6,502
R^2	0.004	0.021	0.092	0.021	0.184	0.300
	Dependent variable: Subjective uncertainty in logs (Mean $= -1.933$; SD $= 0.920$)					
	(7)	(8)	(9)	(10)	(11)	(12)
Firm received support?	-0.428^{***}	-0.336^{***}	-0.330^{***}	-0.370^{***}	-0.149^{**}	-0.112^{*}
	(0.060)	(0.052)	(0.076)	(0.058)	(0.071)	(0.067)
Size and sector		X				X
Severity of the shock			X			X
Quarter				X		X
Country					X	X
Observations	7,101	7,101	6,502	6,732	7,101	6,502
R^2	0.031	0.078	0.121	0.051	0.196	0.261

Notes: Heteroskedasticity-robust standard errors in parentheses (128 clusters at the country-sector level). * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. In the top panel the dependent variable is expected sales growth for the next six months (relative to the same period of 2019); in the bottom panel the dependent variable is subjective uncertainty in logs. The analysis only includes firms receiving support or firms that indicated that they applied for support, but not received it ("I have applied but not received it"). The dummy "Firm received support?" is 1 when the firm reports receiving support (regardless of the instrument) and 0 for those that applied but did not receive it. The controls for severity of the shock are the percentage change in sales the 30 days prior to the interview (relative to the same period of 2019) and average mobility the 30 days prior to the interview around transit stations. Our sample considers only the latest data point available in the case of the panel observations. Mean and standard deviation (SD) of the dependent variables are computed over the sample in specifications (1) and (7), respectively. The mean of subjective uncertainty (in levels) is 0.212 with a SD of 0.194. The figures in this table relate to firms surveyed between April 2020 and March 2021.

Table B2: Expectations show no clear relationship with GDP per capita

	(1)	(2)	(3)
		Expecations	
GDP per capita (log)	0.019	0.000	-0.009
	(0.012)	(0.011)	(0.017)
Absolute change in sales		-0.165***	-0.162***
		(0.020)	(0.020)
Exchange rate volatility last 30 days			-0.512
			(1.105)
SD (arc) change in sales same country-wave-sector			-0.186*
			(0.107)
GDP SD 09-19 / Mean			-2.137***
			(0.611)
GDP annual growth SD 09-19			0.031***
			(0.006)
Exchange rate regime dummies	No	No	Yes
Mobility and size	Yes	Yes	Yes
Sector and quarter dummies	Yes	Yes	Yes
Observations	26,734	25,892	20,854
Within R^2	0.015	0.071	0.132
No. of clusters	195	195	124

Notes: Linear regressions with expectations about six-months-ahead sales (relative to the same period in 2019) as dependent variable. *Transit mobility* is the level of mobility around transit stations in the 30 days before the interview according to Google Mobility Trends. Heteroskedasticity-robust standard errors are clustered at the country-sector level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B3: Correlation between other adjustments and expectations and uncertainty.

	(1) Firm started or increased use of digital technologies	(2) Firm invested in digital technologies	(3) Firm granted leave of absence past 30 days	(4) Firm reduced wages past 30 days	(5) Firm reduced hours past 30 days
Expected growth rate	0.039***	0.006	−0.040***	0.007	−0.072***
	(0.013)	(0.012)	(0.012)	(0.010)	(0.012)
Subjective uncertainty	0.037	−0.032	−0.095***	0.133***	0.010
	(0.024)	(0.022)	(0.022)	(0.019)	(0.021)
BGR	0.073**	0.082**	0.128***	−0.108***	−0.190***
	(0.035)	(0.033)	(0.033)	(0.029)	(0.031)
BRA	0.455***	0.216***	0.352	−0.122	0.426**
	(0.045)	(0.040)	(0.223)	(0.189)	(0.212)
GHA	0.125***		−0.352***	−0.026	0.043
	(0.038)		(0.035)	(0.031)	(0.033)
IDN	0.564***	0.041	−0.306***	−0.072***	−0.095***
	(0.033)	(0.031)	(0.031)	(0.027)	(0.029)
IND		0.323***	−0.079**	0.142***	−0.114***
		(0.037)	(0.037)	(0.032)	(0.035)
KEN	0.429***	0.231***	−0.278***	−0.155***	−0.192***
	(0.036)	(0.032)	(0.033)	(0.029)	(0.031)
MDG	0.245***	0.067**	−0.149***	−0.063**	0.129***
	(0.036)	(0.033)	(0.033)	(0.030)	(0.032)
MWI	0.063	0.041	−0.320***	−0.168***	−0.194***
	(0.039)	(0.036)	(0.037)	(0.032)	(0.035)
MYS	0.077**	0.523***	0.267***	0.510***	0.439***
	(0.038)	(0.035)	(0.036)	(0.031)	(0.034)
NGA	0.276***	0.250***		0.255***	0.215***
	(0.038)	(0.035)		(0.031)	(0.034)
NPL	0.033	−0.008	−0.147***	−0.269***	−0.229***
	(0.037)	(0.035)	(0.035)	(0.030)	(0.033)
POL	0.044	0.151***	0.172***	−0.047*	−0.124***
	(0.033)	(0.030)	(0.031)	(0.027)	(0.029)
ROU	0.276***	0.017	−0.180***	0.032	−0.066**
	(0.036)	(0.033)	(0.034)	(0.030)	(0.032)
SEN	0.184***	0.166***	−0.180***	−0.106***	0.054*

	(0.033)	(0.031)	(0.031)	(0.028)	(0.030)
SLE	0.276***	0.243***	0.010	0.002	0.187***
	(0.041)	(0.038)	(0.034)	(0.031)	(0.032)
TUN	0.349***	0.058	0.048	−0.094***	−0.265***
	(0.039)	(0.039)	(0.037)	(0.032)	(0.035)
TUR	0.179***	0.127***	0.057*	−0.089***	0.038
	(0.032)	(0.029)	(0.030)	(0.027)	(0.029)
TZA	0.028	0.173***	−0.148***	−0.086***	−0.082**
	(0.036)	(0.035)	(0.039)	(0.030)	(0.032)
VNM	0.303***	0.088***	−0.302***	−0.015	−0.082***
	(0.034)	(0.032)	(0.032)	(0.029)	(0.030)
XKX	0.031	0.121***	−0.057	−0.149***	−0.213***
	(0.046)	(0.042)	(0.043)	(0.037)	(0.041)
ZAF	0.485***	0.227***	−0.037	0.175***	0.088***
	(0.033)	(0.031)	(0.031)	(0.027)	(0.029)
GTM	0.193***	0.284***	−0.091**	0.032	0.039
	(0.038)	(0.035)	(0.036)	(0.031)	(0.034)
HND	0.316***	0.292***	−0.079**	0.112***	0.118***
	(0.037)	(0.034)	(0.035)	(0.030)	(0.033)
MNG	0.082**	0.167***	0.384***	0.836***	0.656***
	(0.040)	(0.036)	(0.040)	(0.034)	(0.036)
NIC	0.129***	0.131***	−0.260***	0.121***	0.107***
	(0.041)	(0.038)	(0.039)	(0.035)	(0.037)
SLV	0.119***	0.128***	−0.150***	0.024	0.055
	(0.039)	(0.036)	(0.037)	(0.032)	(0.034)
Jul-Sep 2020	0.163***	0.015	−0.010	0.001	0.018
	(0.018)	(0.019)	(0.018)	(0.016)	(0.016)
Oct-Dec 2020	0.236***	0.124***	−0.113***	−0.036**	−0.056***
	(0.020)	(0.018)	(0.018)	(0.016)	(0.017)
Jan-Mar 2021	0.206***	0.143***	−0.141***	−0.137***	−0.194***
	(0.020)	(0.019)	(0.018)	(0.015)	(0.017)
Medium (20-99)	0.086***	0.058***	0.049***	−0.001	0.006
	(0.013)	(0.012)	(0.012)	(0.010)	(0.011)
Large (100+)	0.154***	0.183***	0.097***	0.006	0.008
	(0.013)	(0.012)	(0.012)	(0.010)	(0.011)
Retail and wholesale	0.091***	0.030***	−0.012	0.012	0.020*
	(0.012)	(0.011)	(0.011)	(0.010)	(0.011)
Hospitality	0.105***	0.036**	0.038**	0.099***	0.047***
	(0.017)	(0.017)	(0.016)	(0.013)	(0.015)

Other services	0.085***	0.070***	−0.029***	0.032***	0.010
	(0.010)	(0.010)	(0.010)	(0.008)	(0.009)
Others	−0.019	−0.046***	−0.024**	−0.004	−0.011
	(0.012)	(0.011)	(0.011)	(0.009)	(0.010)
Arc change in sales	0.049***	0.064***	−0.053***	−0.093***	−0.047***
	(0.008)	(0.007)	(0.007)	(0.006)	(0.007)
Average mobility past 30 days	−0.003***	−0.003***	−0.003***	−0.003***	−0.004***
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	−0.020	−0.071*	0.420***	0.109***	0.216***
	(0.047)	(0.043)	(0.044)	(0.040)	(0.041)
Observations	15,349	15,465	15,395	15,534	15,873
r2	0.141	0.133	0.191	0.238	0.193

Robust standard errors in parentheses.* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.