SBU Survey of Business Uncertainty

FEDERAL RESERVE BANK of ATLANTA | CHICAGO BOOTH The University of Chicago Booth School of Business | Stanford University

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The Survey of Business Uncertainty (SBU) is fielded by the Federal Reserve Bank of Atlanta. It was designed, tested, and refined in cooperation with Nick Bloom of Stanford University and Steven Davis of the Chicago Booth School of Business and the Hoover Institution. Bloom and Davis received research support from the Sloan Foundation and the U.S. National Science Foundation. Davis also received research support from Chicago Booth.

August 2020 updates and revisions

In August 2020, we undertook the first revision of the Survey of Business Uncertainty (SBU) and refreshed our methodology. These revisions and updates resulted in significant changes to our panel design, the questions we ask, and the series we report.

Specifically,

- We discontinued the overall Business Expectations and Business Uncertainty indexes and stopped eliciting forward-looking capital investment expectations (see Appendix E for historical information).
- We began updating and producing expected reallocation rates for sales revenue and employment (see Barrero, Bloom, and Davis. "COVID-19 is also a Reallocation Shock" (2020) for further details).
- We began publishing unsmoothed series for sales revenue and employment growth and uncertainty alongside our smoothed (moving average) series.
- We now use forward-looking, topic-specific activity to aggregate individual responses into our expectations and uncertainty indices.
- We extend the period from which we obtain winsorization thresholds for firm-level expectations and uncertainty up to December 2019 (previously the period ended in December 2018).
- We also now edit the microdata to clean out extremely large forecast errors on an annual basis.

Structure of the Document

1. Overview
2. Development of the Survey of Business Uncertainty (SBU)
3. Recruitment of SBU Panel Members
4. Assignment of Panel Members to Survey Groups
5. Panel Composition
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7. Survey Response Rates
8. Computing Moments of Firm-Level Subjective Probability Distributions
9. Data Cleaning
10. Summary Statistics for Firm-Level Outcomes
11. Subjective Expectations and Uncertainty Indices
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1. Overview

Our monthly Survey of Business Uncertainty (SBU) goes to about 1,300 panel members (as of August 2020), who occupy senior finance and managerial positions at U.S. firms. We contact panel members each month by email, and they respond via a web-based instrument.

- Survey questions pertain to current, past, and future outcomes at the respondent's firm. Our primary objective is to elicit the respondent's subjective probability distributions over own-firm future sales growth rates and employment levels.
- Panel members receive a unique link to the web–based survey on the Monday of the second full week in the month. The survey link remains active for two weeks, during which time we send up to three reminder emails.
- Completing the survey takes about five minutes, on average, according to our response time analysis.

2. Development of the Survey of Business Uncertainty

- Initial testing of the SBU question design began in the special question series of the Federal Reserve Bank of Atlanta's Business Inflation Expectations (BIE) Survey in October 2013.
- Cognitive interviews with members of the BIE Survey panel took place during the summer of 2014. Testing in the BIE survey ended in July 2014, when the first SBU was administered to a newly established, national panel.
- For a complete chronology and description of all question testing in the BIE Survey panel and piloting of the new survey instrument with the national SBU Panel, please see Exhibit C.
- Historically, the SBU included capital investment, unit costs, profit margin and average price questions. Over time, we deleted these questions from our core survey instruments to reduce cognitive burden and keep average survey response time to about five minutes.
- The last revision to the survey instruments was in August 2020.

3. Recruitment of SBU Panel Members

We identify prospective panel members from lists of firms and contacts that we purchased from Dunn & Bradstreet, a supplier of business information and research.

- The mix of firms on the D&B list reflects the sectoral composition of U.S. gross domestic product, with random sampling of firms within sectors.
- For a given firm, we select a contact person using a hierarchy of job functions, prioritizing persons in senior finance roles such as CFO or controller. If no such person is available (e.g., for small firms), we contact the CEO or other senior executive.

Approximately 49 percent of potential contacts reached via telephone or email agree to join the panel. Conditional on joining, 73 percent responded at least once. Our average monthly response rate is 49 percent.

Note: The panel membership statistic reflects all recruiting from June 2014 to August 2020. Response rates reflect the period from September 2016 (the last methodological change) to August 2020.

4. Assignment of Panel Members to Sample Groups

As detailed below, the SBU current makes use of two questionnaires:

- The Sales questionnaire asks about sales revenue growth.
- The Employment questionnaire asks about number of employees.

We randomly assign each new panel member to each sample group:

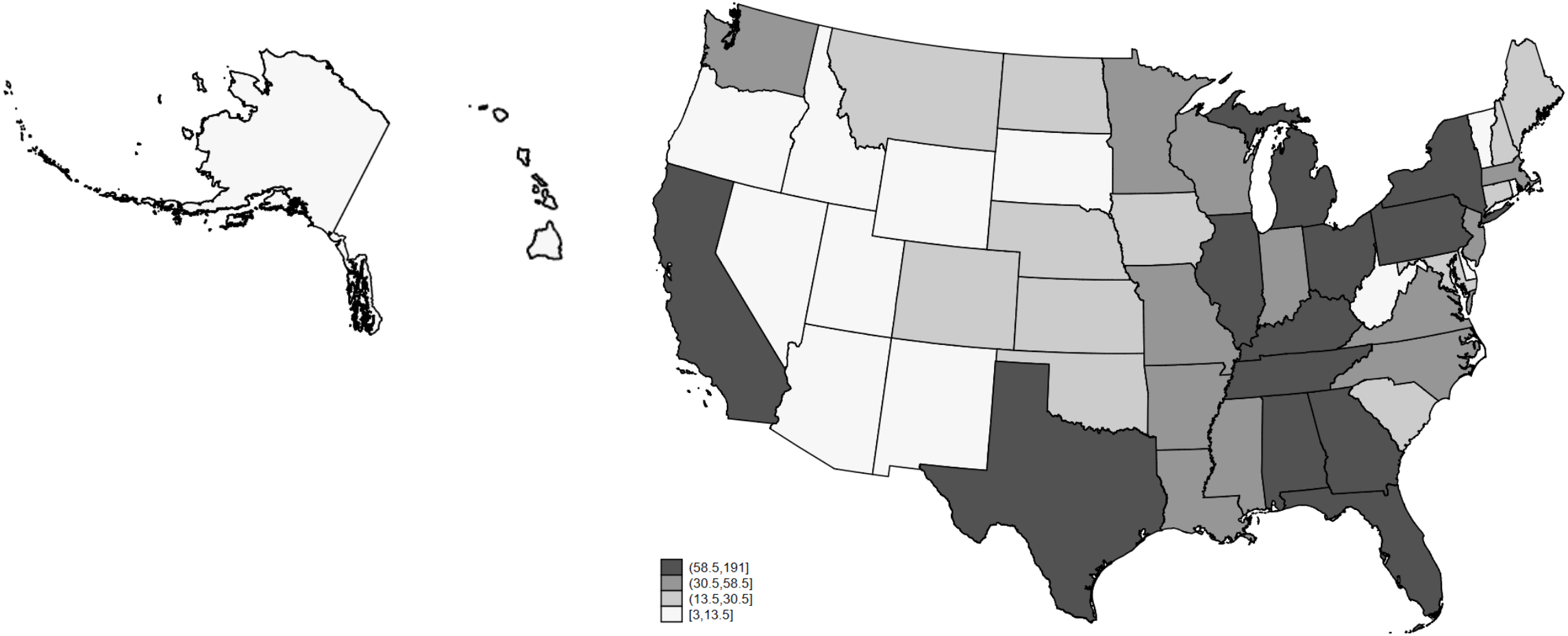
- Members of Group A (B) receive the Sales (Employment) questionnaire in even–numbered months and the Employment (Sales) questionnaire in odd–numbered months.
- In addition to our core question, we often add one or more special questions.

In May 2019, we retired the questions on unit costs and reassigned panel members to one of three groups. Each group answers questions about one of employment, sales, or investment in any given month.

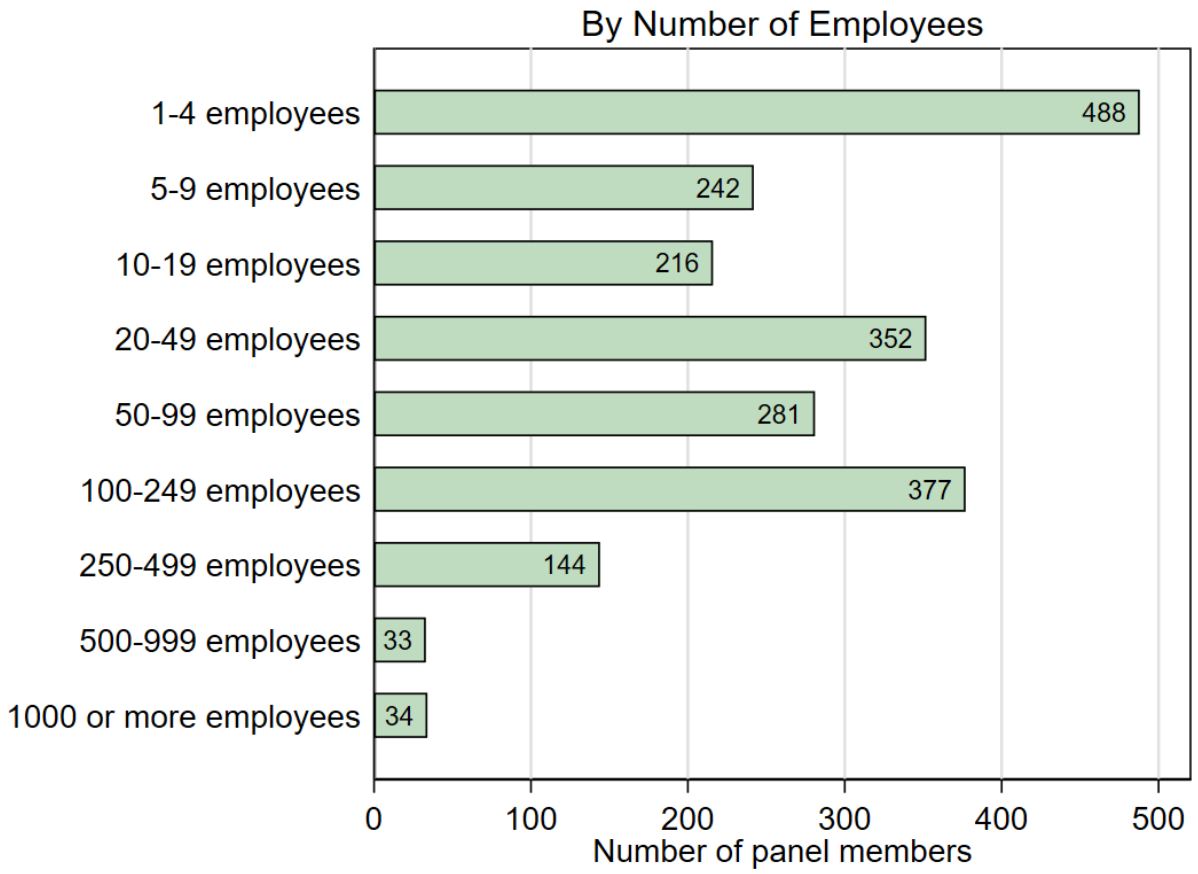
In August 2020, we retired the questions on capital expenditures and reassigned panel members back into two groups.

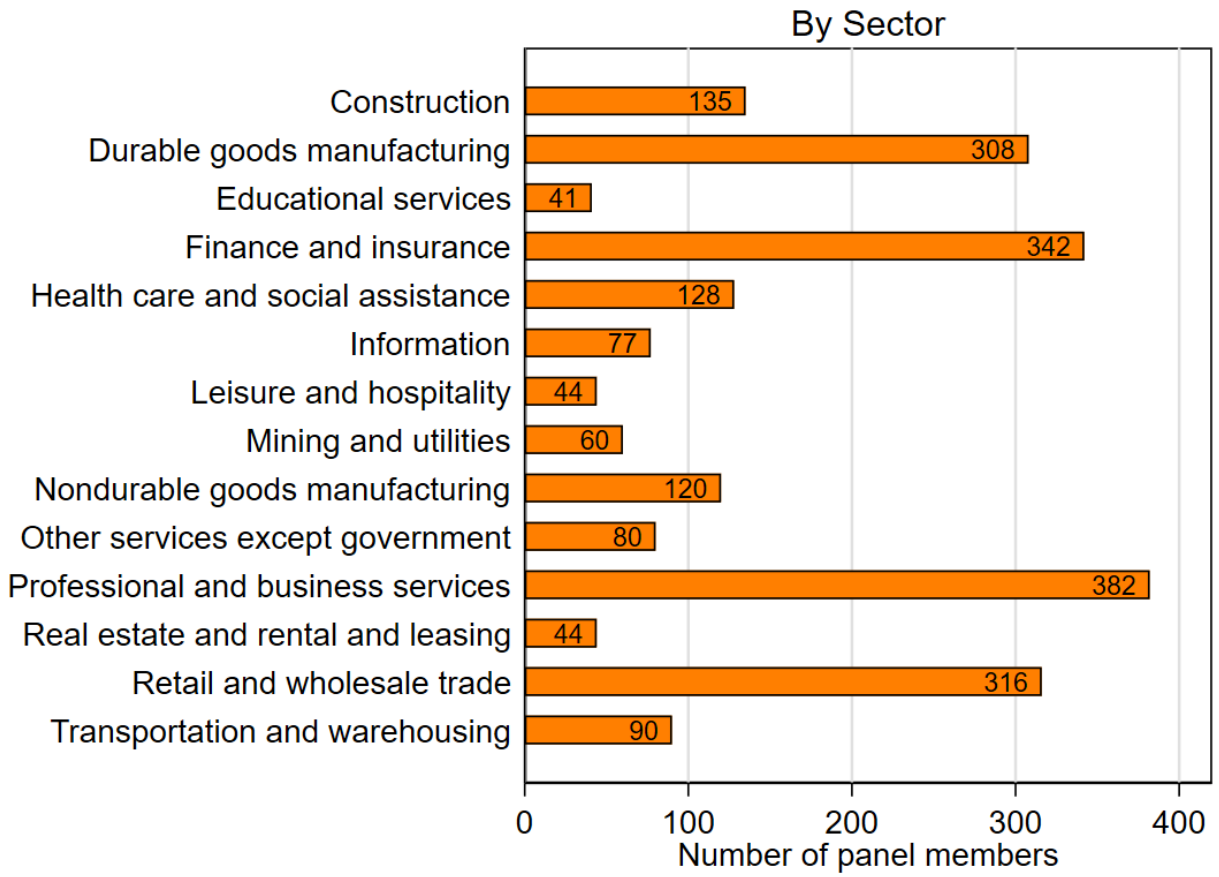
5. Panel Composition

This slide shows the geographic distribution of panel members as of August 2020. The next slide reports the distribution of panel members by industry and firm size (number of employees) as of August 2020.



5. Panel Composition (Cont'd)
As of August 2020

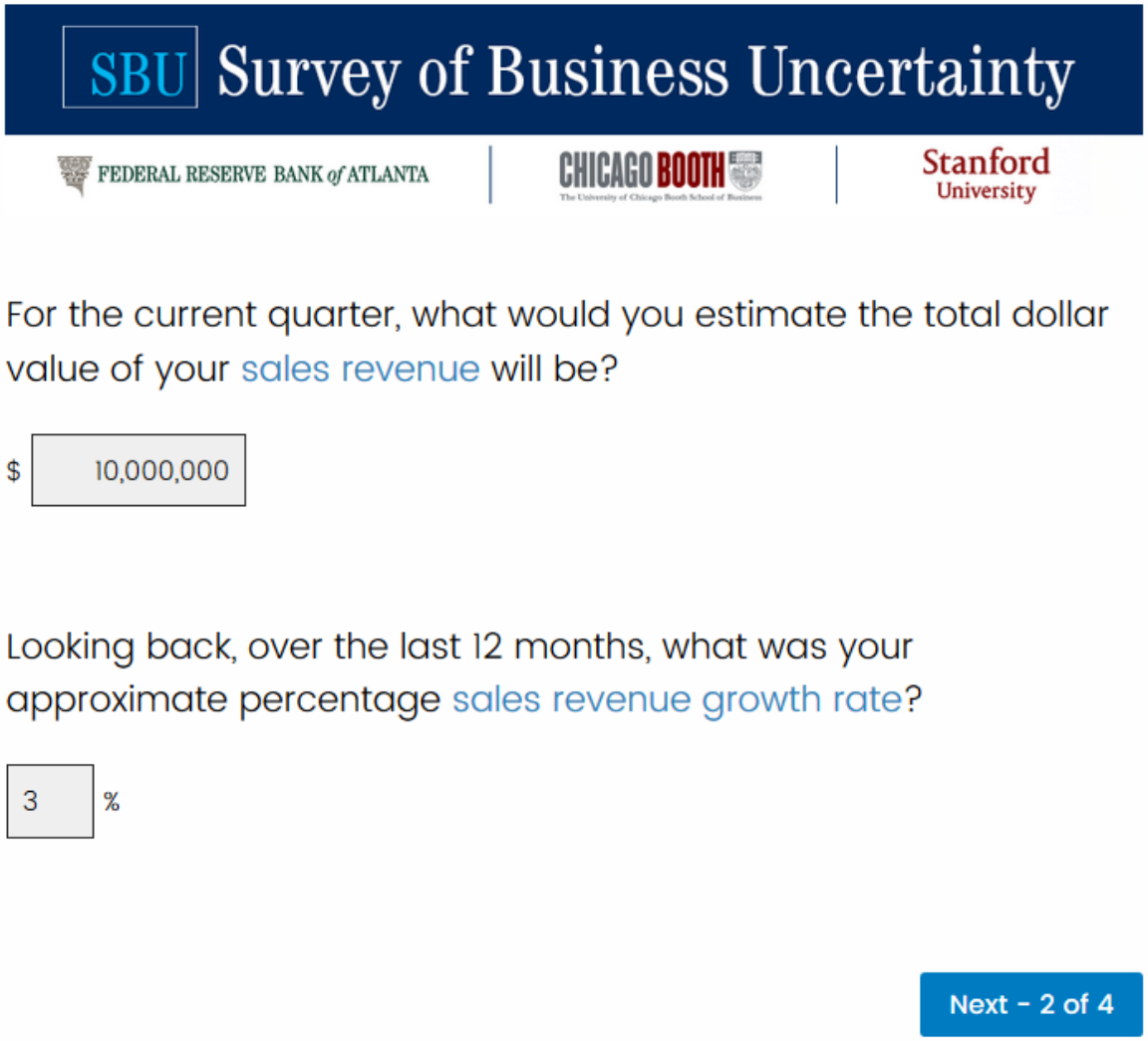




6. SBU Questionnaires

- The next four slides display screen shots of the questionnaires.
- To reduce data entry errors by respondents, we modified the sales-related questions in September 2016, as shown below.
- In April 2019, we retired the unit cost questionnaire.
- In August 2020, we retired the capital expenditures questionnaire (See Appendix D for details).

Sales Revenue Questionnaire



We first ask about the current ***level*** of sales revenue to obtain a measure of firm size. We then ask about the ***growth rate*** of sales over the last 12 months.

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Looking ahead, from now to four quarters from now, what approximate percentage sales revenue growth rate would you assign to each of the following scenarios?

The LOWEST percentage sales revenue growth rate would be about:	1 %
A LOW percentage sales revenue growth rate would be about:	2 %
A MIDDLE percentage sales revenue growth rate would be about:	3 %
A HIGH percentage sales revenue growth rate would be about:	4 %
The HIGHEST percentage sales revenue growth rate would be about:	5 %

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Please assign a percentage likelihood to the sales revenue growth rates you entered. (Values should sum to 100%)

LOWEST: The likelihood of realizing a **1%** sales revenue growth rate would be:	10 %
LOW: The likelihood of realizing a **2%** sales revenue growth rate would be:	20 %
MIDDLE: The likelihood of realizing a **3%** sales revenue growth rate would be:	40 %
HIGH: The likelihood of realizing a **4%** sales revenue growth rate would be:	20 %
HIGHEST: The likelihood of realizing a **5%** sales revenue growth rate would be:	10 %
Total	100 %

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These two screens conclude the sales revenue questionnaire. As noted above, we often add one or more special questions at the end of the questionnaire.

Employment Questionnaire

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Currently, what is your number of employees (including part-time)?

100

Looking back, 12 months ago, what was your number of employees (including part-time)?

95

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Looking ahead, 12 months from now, what number of employees (including part-time) would you assign to each of the following scenarios?

The LOWEST number of employees would be about:	100
A LOW number of employees would be about:	105
A MIDDLE number of employees would be about:	110
A HIGH number of employees would be about:	120
The HIGHEST number of employees would be about:	125

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Please assign a percentage likelihood to the number of employees you entered above. (Values should sum to 100%)

LOWEST CASE: The likelihood of employing about **100** people 12 months from now would be:	0 %
LOW CASE: The likelihood of employing about **105** people 12 months from now would be:	0 %
MIDDLE CASE: The likelihood of employing about **110** people 12 months from now would be:	0 %
HIGH CASE: The likelihood of employing about **120** people 12 months from now would be:	0 %
HIGHEST CASE: The likelihood of employing about **125** people 12 months from now would be:	0 %
Total	0 %

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These two screens conclude the employment questionnaire. As noted above, we often add one or more special questions at the end of the questionnaire.

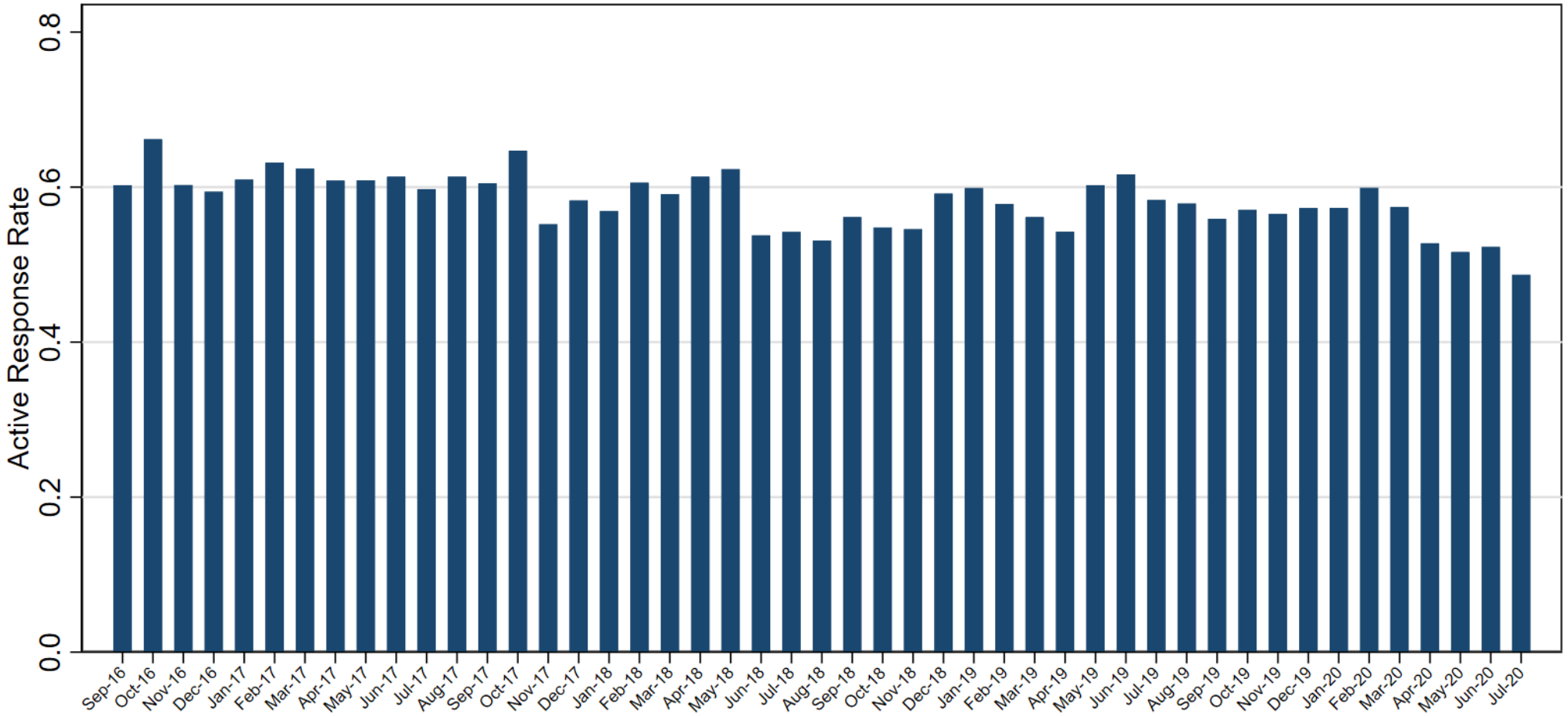
7. Survey Response Rates

Response Rates*	
Conditional on joining the panel, percentage of panel members who:	
Respond at least once	68%
Respond at least two times*	47%
Respond at least three times*	38%
Respond at least four times*	33%

*Calculated from September 2016 to July 2020 using panel members who received at least one questionnaire since September 2016.

Average Monthly Response Rates (September 2016 – July 2020)	
All firms	49%
By Firm Size, Number of employees	
1–4	43%
5–9	52%
10–19	45%
20–49	48%
50–99	55%
100–249	52%
250–499	49%
500–999	50%
1,000 or more	45%

7. Active Monthly Response Rates



Note: Active respondents at time t are firms that have completed any of the standard surveys at least once between t-1 and t-6

7. Responses by Sector

Sector	Surveys Sent	Responses	Nonresponse	Response Rate*
Construction	3,173	1,429	1,744	45.0%
Durable goods manufacturing	7,092	3,471	3,621	48.9%
Educational services	844	293	551	34.7%
Finance and insurance	4,854	2,622	2,232	54.0%
Health care and social services	3,332	1,158	2,174	34.8%
Information	946	401	545	42.4%
Leisure and hospitality	997	549	448	55.1%
Mining and utilities	2,268	978	1,290	43.1%
Nondurable goods manufacturing	1,577	822	755	52.1%
Other services	1116	449	667	40.2%
Professional and business services	4,519	2,475	2,044	54.8%
Real estate and rental and leasing	1,229	625	604	50.9%
Retail and wholesale trade	4,966	2,332	2,634	47.0%
Transportation and warehousing	1,644	749	895	45.6%

Notes: Responses by sector in the Survey of Business Uncertainty, pooling across all firms and months since September 2016 for which we can construct a subjective probability distribution over the growth rate of at least one of EMPLOYMENT (twelve months hence), SALES REVENUE (four quarters hence), CAPITAL EXPENDITURES (four quarters hence), or AVERAGE UNIT COST (twelve months hence). See slide 18 for a note on how we compute growth rates throughout this document. Also see slides 18-21 for details on constructing these subjective distributions over growth rates.

*Response rate = (partial + complete responses) / surveys sent. Includes survey distributions from September 2016 (the last methodological change) to July 2020. Noncontact includes bounced or undeliverable email invitations.

8. Computing Moments of the Firm-Level Subjective Probability Distributions

- The next set of slides explain how we use the survey responses to compute moments of subjective probability distributions over own-firm future outcomes.
- We calculate first and second moments of the subjective growth rate distributions of employment and sales revenue over the next 12 months or four quarters, as appropriate.
- Following standard practice in the literature on business-level dynamics, we calculate the growth rate of *x* from *t–1* to *t* as $g_t = 2(x_t - x_{t-1})/\ (x_t + x_{t-1})$.*

* This definition of the growth rate of sales is convenient for its symmetry around zero and because its support lies on the closed interval [–2, 2], with the endpoints of the interval corresponding to entry and exit. See "Gross Job Creation, Gross Job Destruction, and Employment Reallocation" by Steven J. Davis and John Haltiwanger in the 1992 *Quarterly Journal of Economics* for a more extensive discussion.

8. Employment

Respondent Data

$CEmp =$ firm's current employment level, as reported by the respondent

$FEmp_i =$ employment 12 months hence, $i = 1, 2, 3, 4, 5$

$p_i = \textit{the associated probabilities}, \; i = 1, 2, 3, 4, 5$

Scenario-Specific Growth Rates

$$EGr_i = 2(FEmp_i - CEmp)/(FEmp_i + CEmp), \; i = 1, 2, 3, 4, 5$$

First and Second Moments of the Subjective Growth Rate Distribution

$$Mean(EGr) = \sum_{i=1}^{5} p_i \, EGr_i$$

$$Var(EGr) = \sum_{i=1}^{5} p_i (EmpGr_i - Mean(EGr))^2$$

$$SD(EGr) = \sqrt{Var(EGr)}$$

8. Sales Revenue (Current Sales Questionnaire)

Respondent Data

$CSale =$ firm's sales revenue in the current quarter, as reported by the respondent

$FSaleGr_i =$ respondent's scenario–specific sales growth rate from now to four quarters hence, $i = 1, 2, 3, 4, 5$

$p_i = \textit{the associated probabilities},\ i = 1, 2, 3, 4, 5$

Implied Future Sales Level

$$FSale_i = \left(1 + \frac{FSaleGr_i}{100}\right) CSale,\ i = 1, 2, 3, 4, 5$$

Scenario–Specific Growth Rates (re–expressing respondent growth rates to our growth rate measure)

$$SaleGr_i = 2(FSale_i - CSales)/(FSale_i + CSale) = 2FSaleGr_i/(FSaleGr_i + 2),\ i = 1, 2, 3, 4, 5$$

First and Second Moments of the Subjective Growth Rate Distribution

$$Mean(SaleGr) = \sum_{i=1}^{5} p_i\, SaleGr_i$$

$$Var(SaleGr) = \sum_{i=1}^{5} p_i (SaleGr_i - Mean(SaleGr)_i)^2$$

$$SD(SaleGr) = \sqrt{Var(SaleGr)}$$

8. Sales Revenue (Old Questionnaire)

Respondent Data

$CSale =$ firm's sales revenue in the current quarter, as reported by the respondent

$FSale_i =$ sales revenue four quarters hence, $i = 1, 2, 3, 4, 5$

$p_i =$ the associated probabilities, $i = 1, 2, 3, 4, 5$

Scenario–Specific Growth Rates

$SaleGr_i = 2(FSale_i - CSales)/(FSale_i + CSale), i = 1, 2, 3, 4, 5$

First and Second Moments of the Subjective Growth Rate Distribution

$Mean(SaleGr) = \sum_{i=1}^{5} p_i \, SaleGr_i$

$Var(SaleGr) = \sum_{i=1}^{5} p_i (SaleGr_i - Mean(SaleGr))^2$

$SD(SaleGr) = \sqrt{Var(SaleGr)}$

9. Data Cleaning

Automated Cleaning of Data from September 2016 and Later:

- If the respondent's future outcome values are descending rather than ascending, we reverse the order of the outcomes and their associated probabilities.
- If the probabilities sum to a value in [95, 105], we rescale them to 100.
- We identify and correct obvious errors that fit certain repeat patterns—for example, an extra or missing zero digit in the response for a future scenario-specific outcome.
- After implementing these corrections, we discard subjective probability distributions that display any of the following:
  - Subjective probabilities do not add up to 100 percent.
  - Future outcome values are not weakly monotonic.
  - One outcome has 100 percent probability.
  - All future outcome values are identical.

Manual Review of Data from September 2016 and Later:

- We manually review the responses of firms with extreme growth rates for past to current and current to expected future outcomes.
- We manually review all responses of firms with more than 1,000 employees.
- When the above manual reviews reveal potentially anomalous data points, we consult external sources (e.g., the company website) and/or recontact the respondent for confirmation or clarification. If warranted, we manually edit the data point(s) in question.

Manual Review of Data from Prior to September 2016:

- We conducted a human audit on all data from prior to September 2016. We reviewed each individual observation looking for obvious mistakes and patterns.
- Common revisions include correcting for missing or extra "0", adjusting reports of annual sales to quarterly values, and deleting responses that simply enumerate bins (1, 2, 3, 4, 5).

Manual Review of Forecast Errors (all data):

- We manually review the responses of firms with extremely large forecast errors for sales or employment growth rates. In particular, we review responses when the absolute difference between forecast and realized employment growth rates is greater than unity, i.e. if $|Mean(EGr)-Realized(EGr)|>1$, and similarly for sales.
- See slides 23–28 for details on how we measure $Mean(EGr)$ and its analog for sales and Appendix D for details on how we measure $Realized(EGr)$.
- We use the firm's history of responses about current sales and employment to correct obvious mistakes. Common mistakes include missing or added zeros and reporting an annual rather than a quarterly sales figure.
- If we cannot find an obvious mistake, we flag these observations as likely errors and disregard them when analyzing forecast errors.

10. Summary Statistics for Firm–Level Outcomes

Current Levels

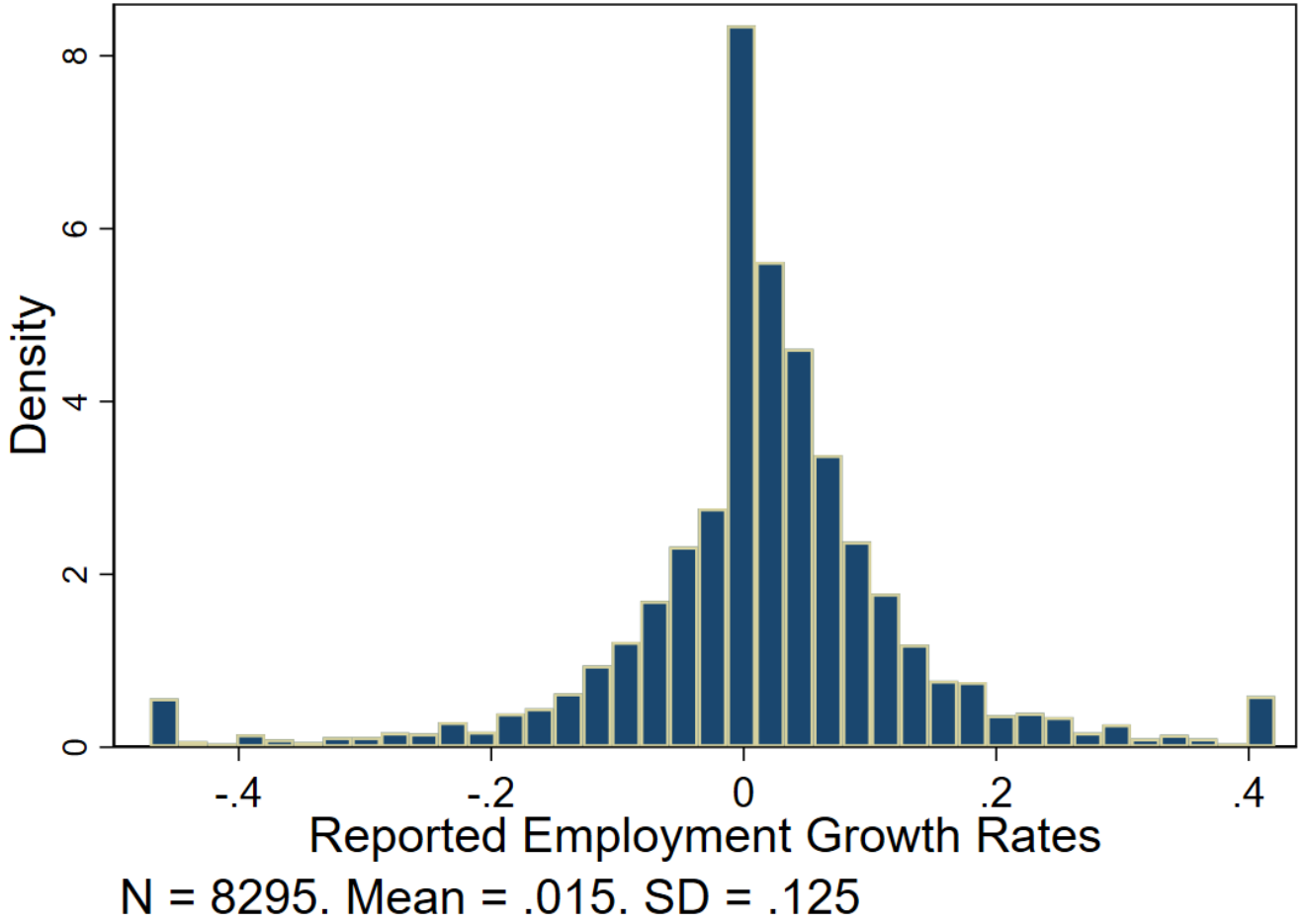
Variable	Count	Mean	Standard Deviation	Percentiles				
				10	25	50	75	90
Current Employment	8,315	410	1,024	17	55	135	294	700
Current Quarterly Sales ($ Millions)	8,260	33.6	96.6	0.5	2.5	7.0	20.5	69.8

Past Activity

Variable	Count	Mean	Standard Deviation	Percentiles				
				10	25	50	75	90
Employment Growth, from 12 Months Ago	8,295	0.016	0.126	–0.105	–0.024	0.015	0.068	0.141
Sales Growth, from Four Quarters Ago	8,303	0.035	0.157	–0.105	0.000	0.031	0.095	0.182

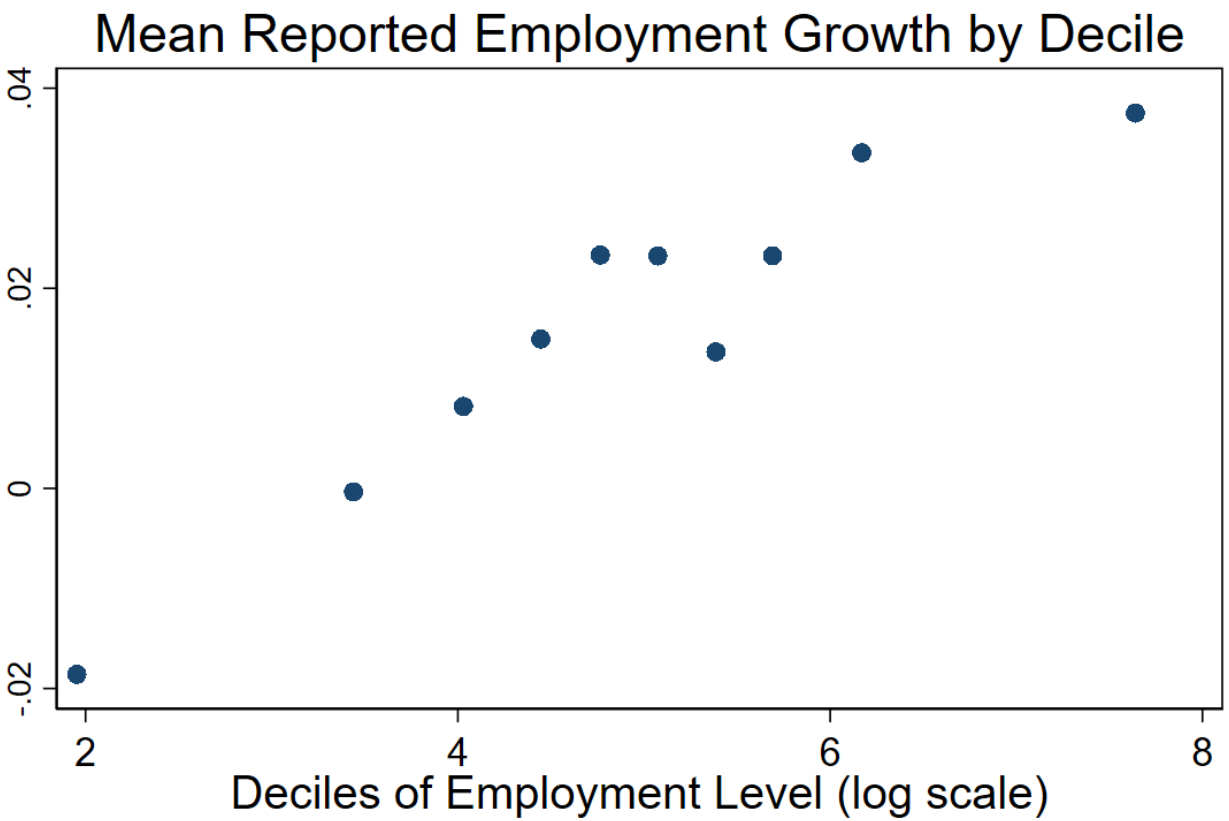
Notes: The sample contains all firm–level responses from October 2014 to July 2020 for which we can construct subjective probability distributions over the growth rates of future employment (12 months hence), sales revenue (four quarters hence),

Distribution of Employment Growth Rates over Past 12 Months

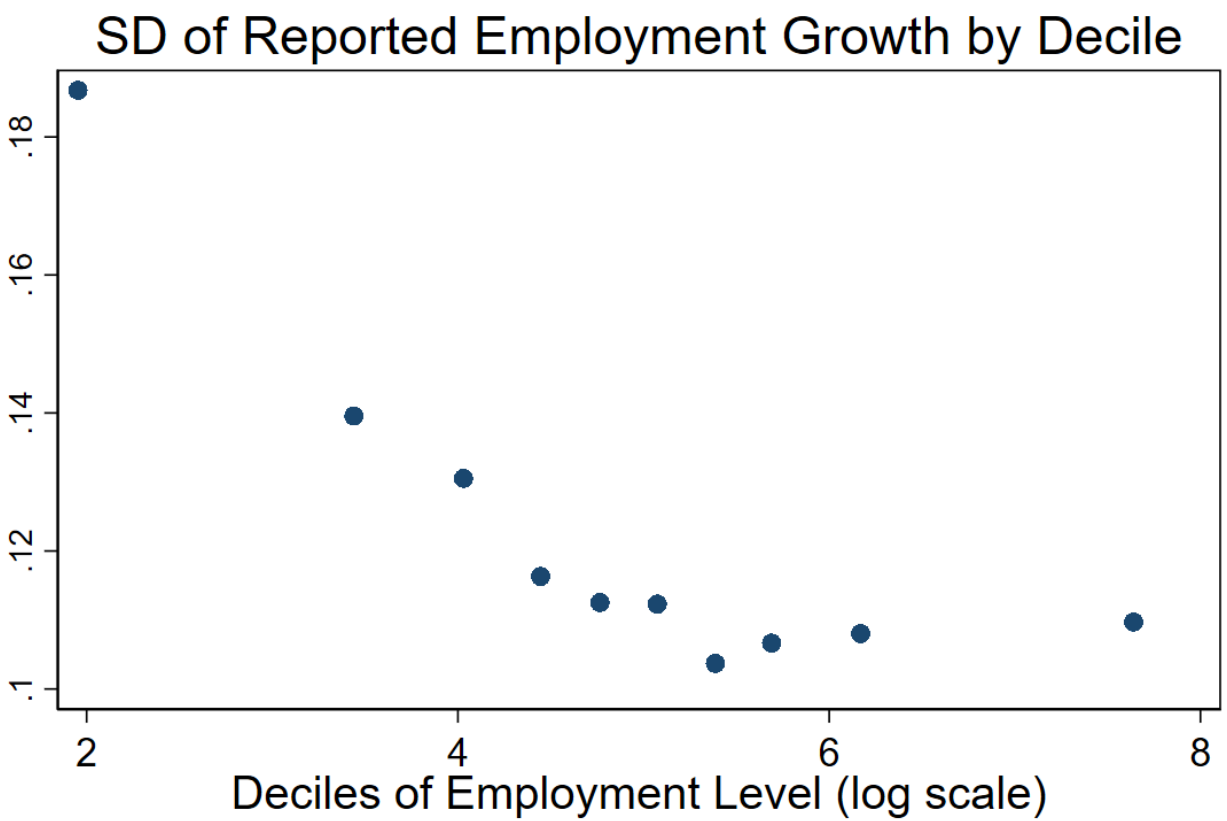


Notes: The histogram shows the empirical distribution of realized employment growth rates in the Survey of Business Uncertainty from October 2014 to July 2020, pooling over all firms for which we can construct subjective distributions over future employment growth rates. We compute the realized employment growth rate in month *t* using the firm's reported employment in *t* and its recollection of employment in month *t – 12.* We compute growth rates using the formula in slide 19.

Mean and Standard Deviation (SD) of Employment Growth Rates by Deciles of Firm Size



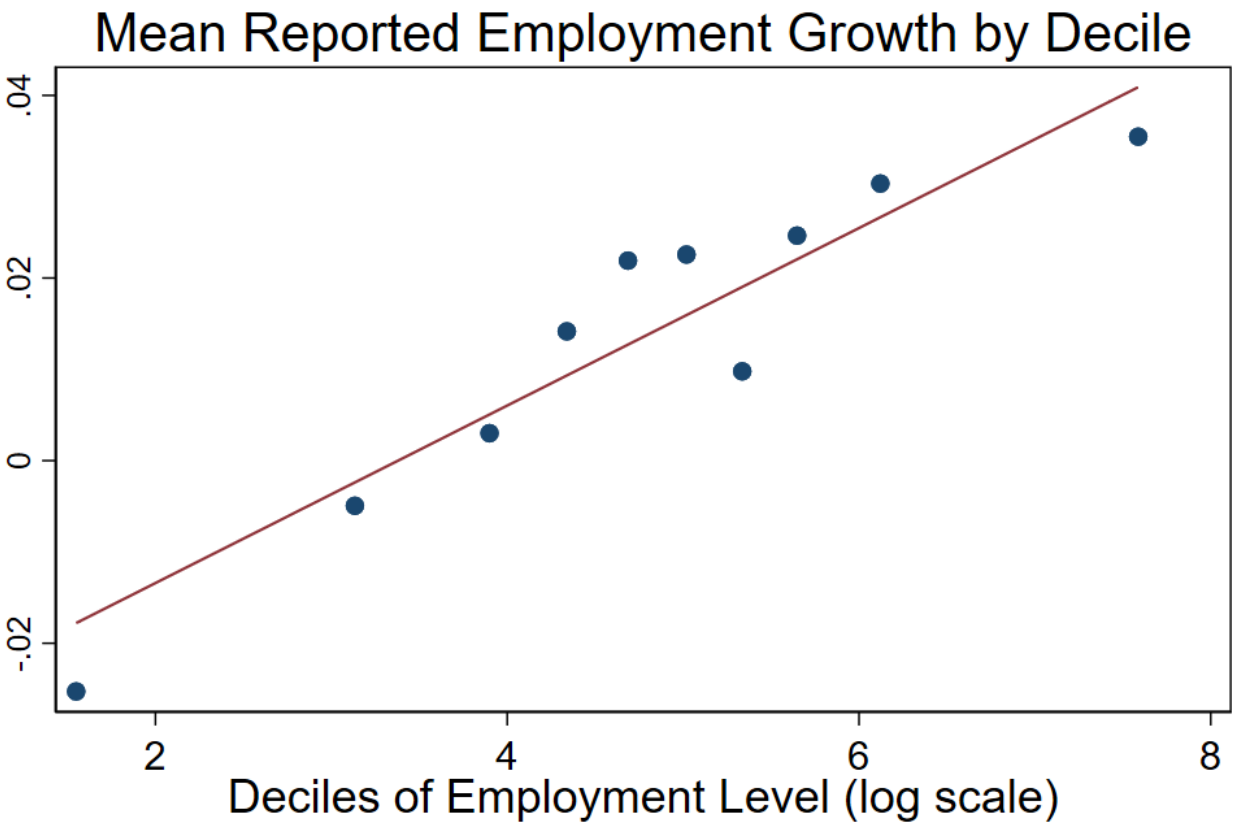
N = 8295. Overall Mean = .015

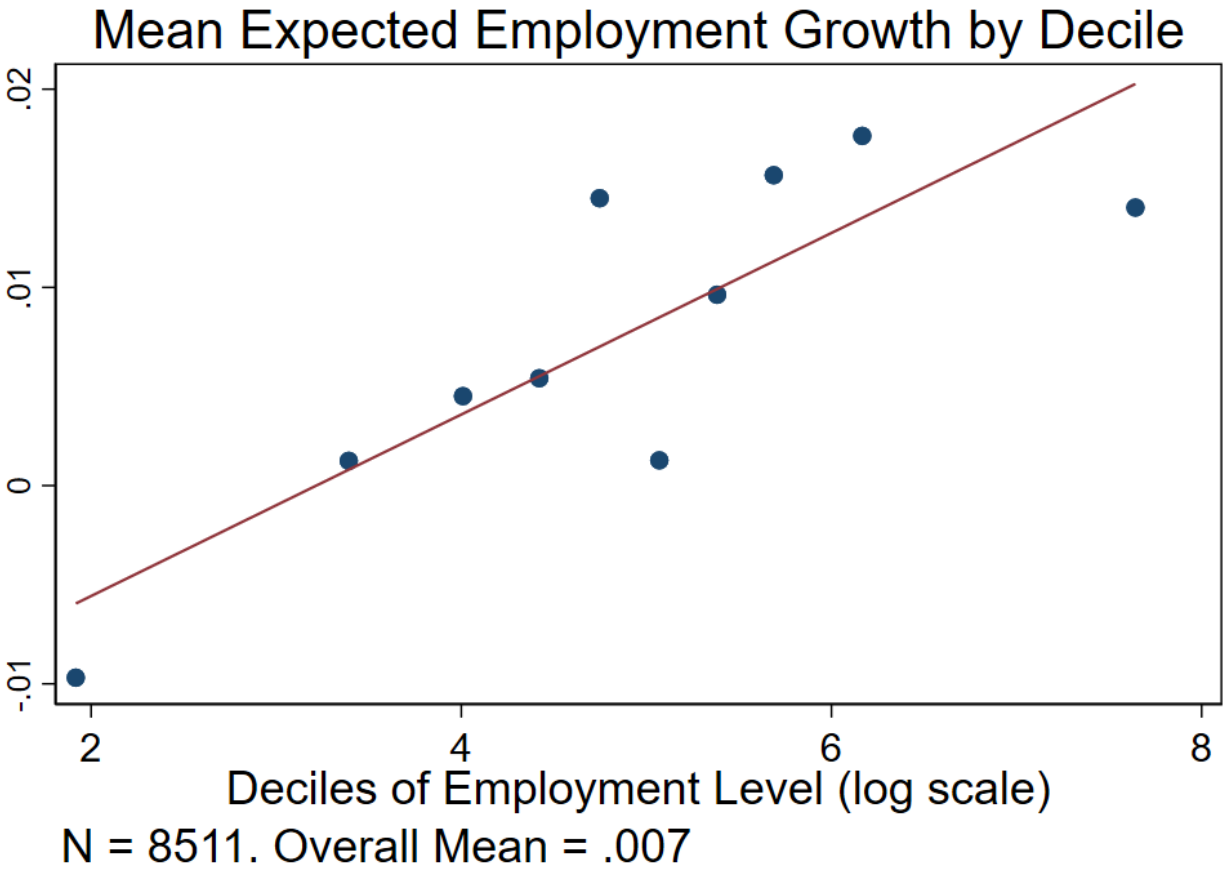


N = 8295. Overall SD = .125

Notes: See slide 25 for a description of the sample.

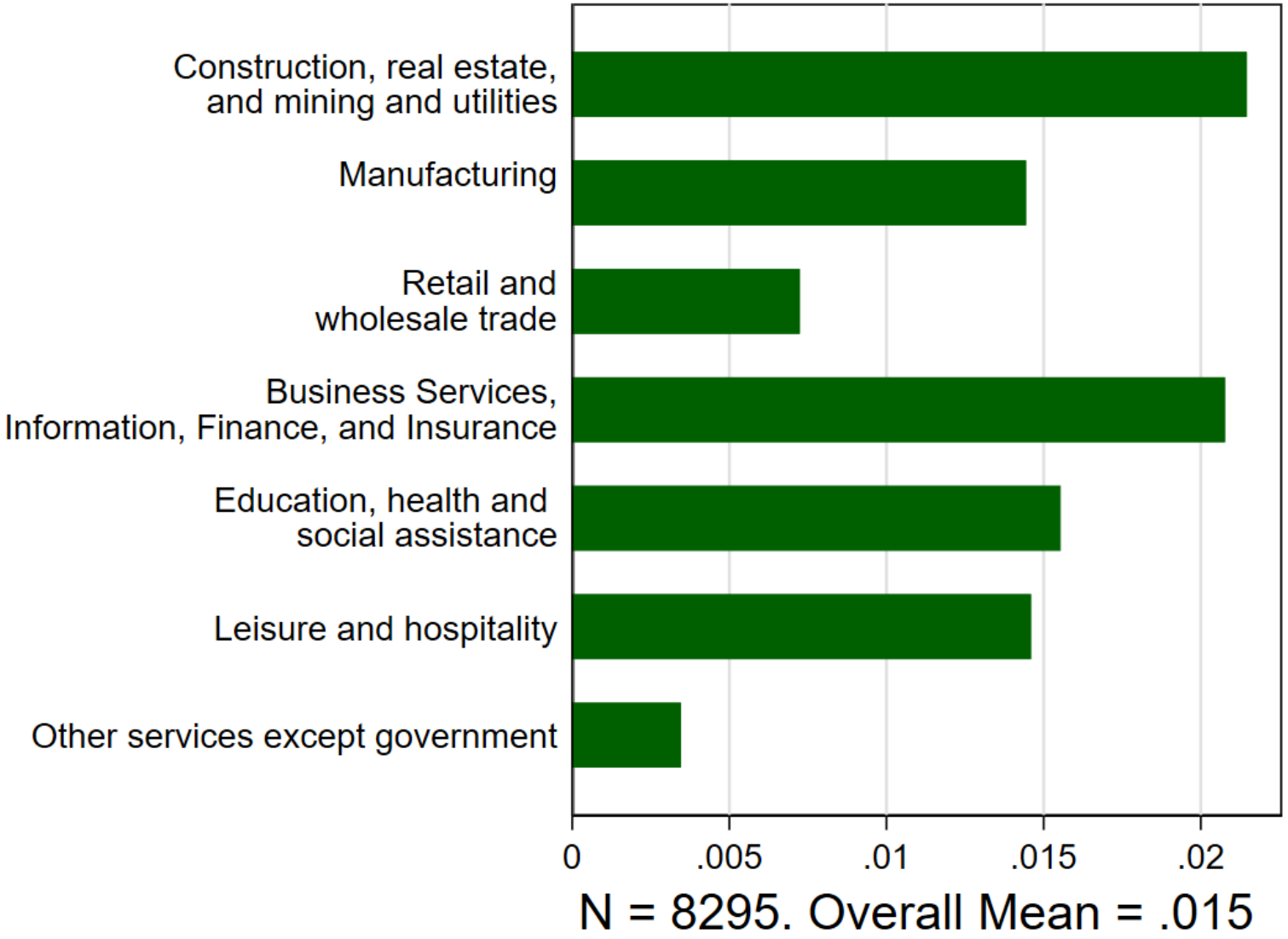
Mean and Standard Deviation (SD) of Employment Growth Rates by Deciles of Firm Size





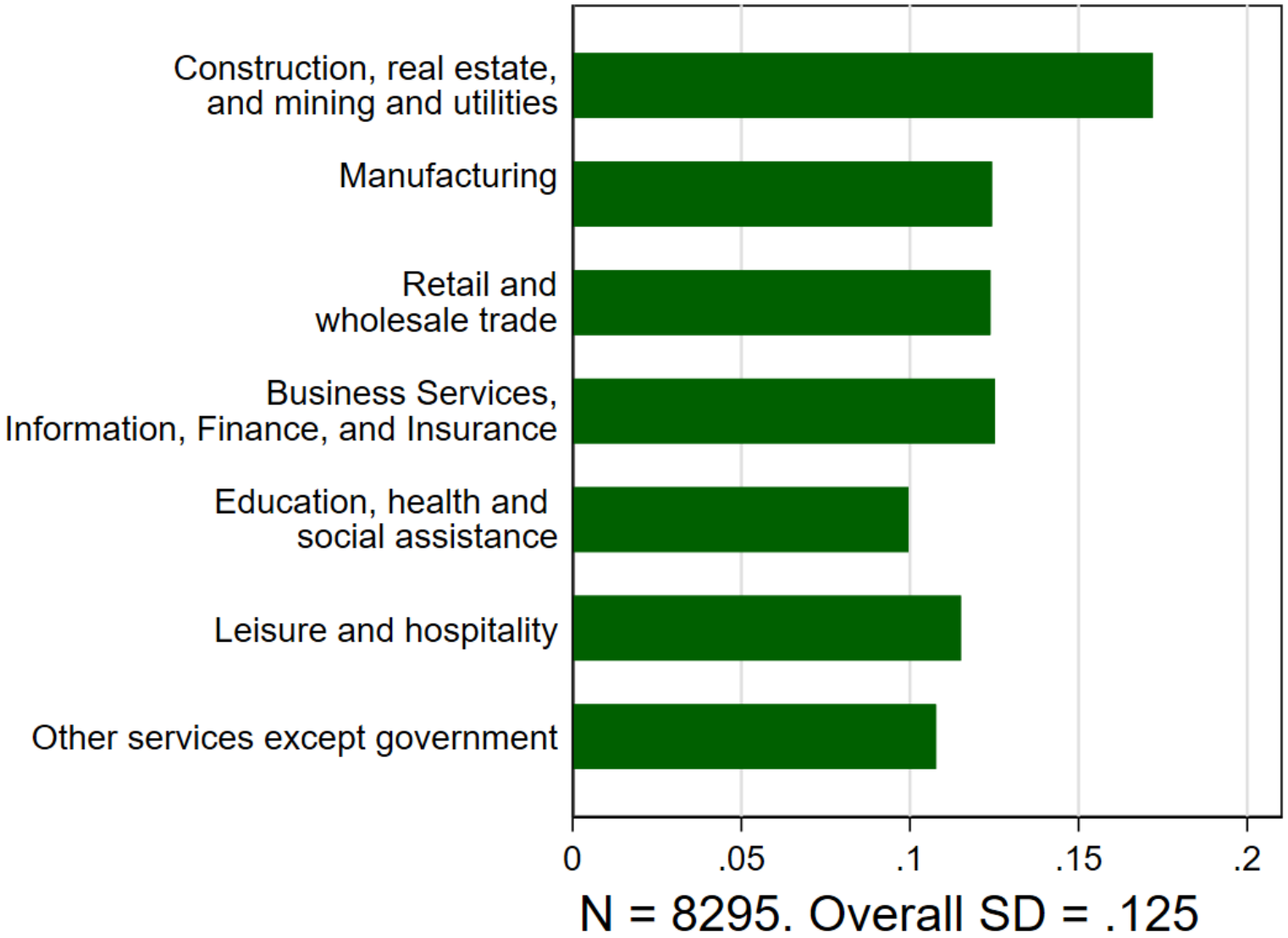
Notes: See slide 25 for a description of the sample.

Mean Realized Employment Growth Rates over Past 12 Months by One-Digit NAICS



Notes: See slide 25 for a description of the sample.

Standard Deviation of Realized Employment Growth Rates Over the Past 12 Months by One-Digit NAICS



Notes: See slide 25 for a description of the sample.

Summary Statistics: Expectations

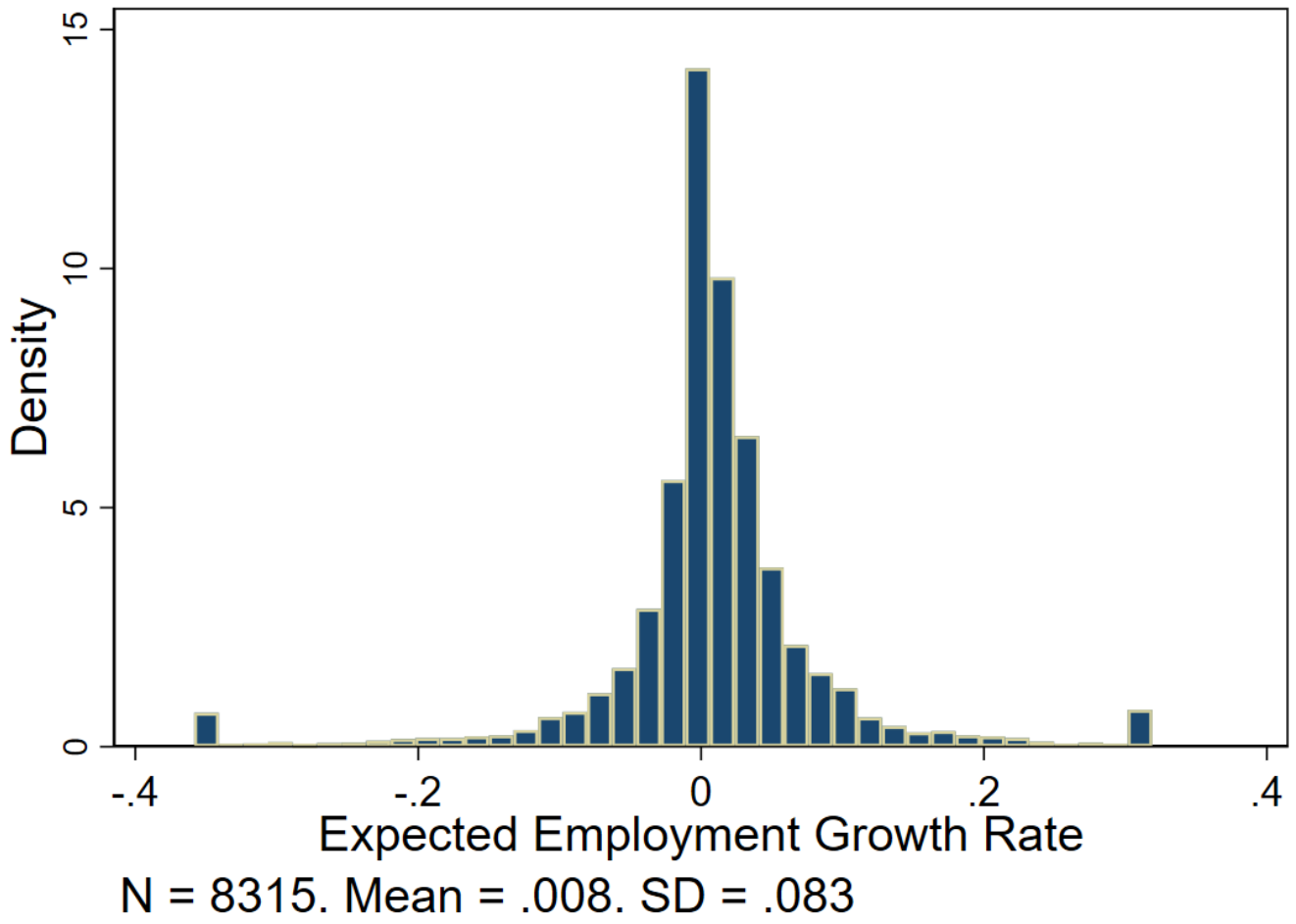
Variable	Count	Mean	Standard Deviation	Percentiles				
				10	25	50	75	90
Employment Growth, Looking 12 Months Hence	8,315	0.008	0.083	–0.055	–0.013	0.006	0.033	0.079
Sales Growth, Looking Four Quarters Hence	8,318	0.038	0.084	–0.026	0.009	0.034	0.066	0.118

Summary Statistics: Uncertainty

Variable	Count	Mean	Standard Deviation	Percentiles				
				10	25	50	75	90
Employment Growth, Looking 12 Months Hence	8,319	0.062	0.070	0.014	0.023	0.039	0.069	0.127
Sales Growth, Looking Four Quarters Hence	8,319	0.046	0.049	0.010	0.017	0.029	0.054	0.099

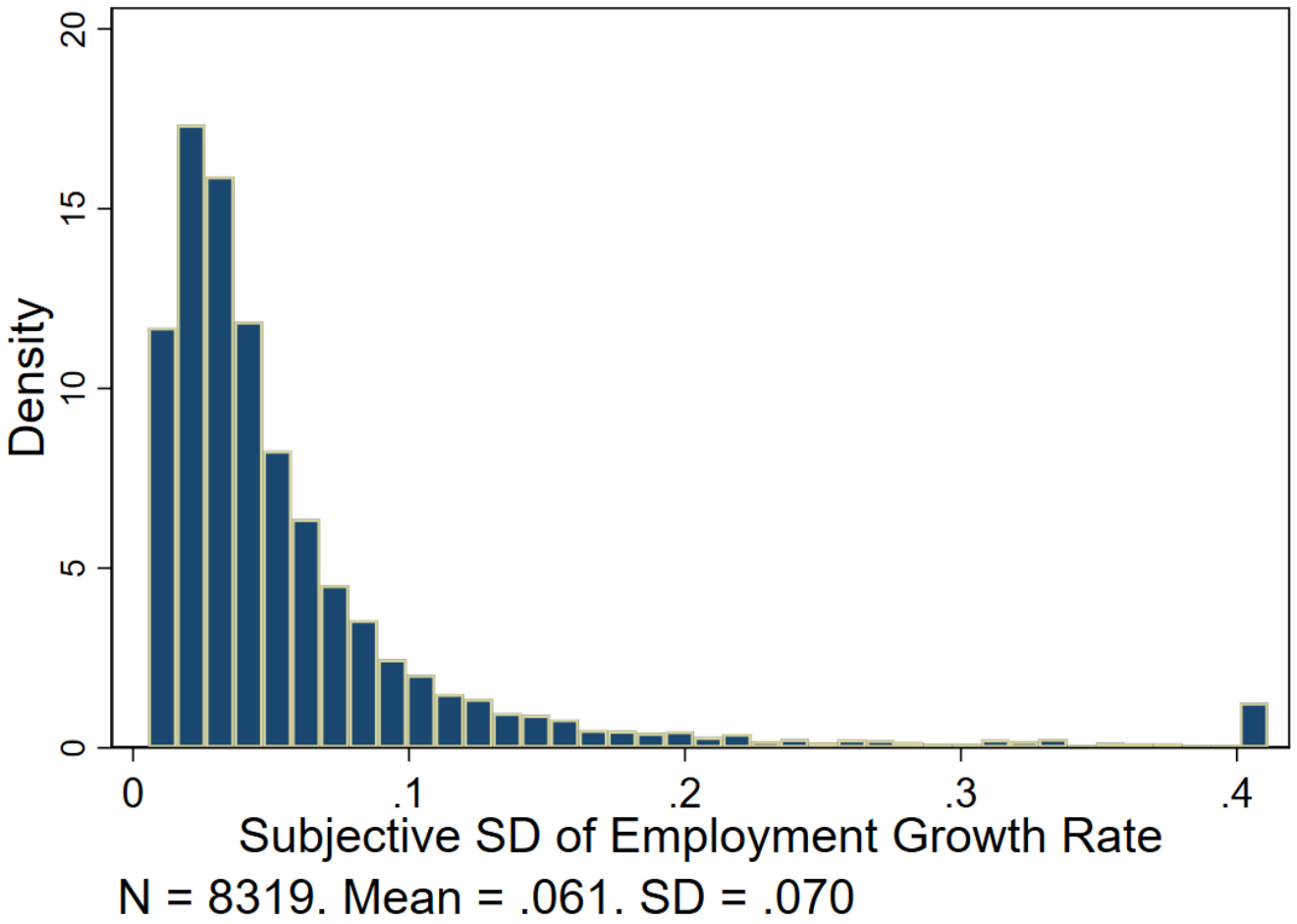
Notes: The sample contains all firm–level responses from October 2014 to July 2020 for which we can construct subjective probability distributions over the future growth rates of employment (12 months hence) and sales revenue (four quarters hence). See slides 18-21 above for an explanation of how we calculate these expectations.

Distribution of Expected Employment Growth Rates over the Next 12 Months



Notes: The histogram shows the empirical distribution of expected employment growth rates in the Survey of Business Uncertainty from October 2014 to July 2020, pooling over all firms for which we can construct the subjective distributions over future employment growth rates. We compute these subjective mean growth rates as described on slide 19.

Distribution of Subjective Standard Deviations of Employment Growth Rates over the Next 12 Months



Notes: The histogram shows the empirical distribution of the subjective standard deviations over own firm-level growth rates in the Survey of Business Uncertainty from October 2014 to July 2020, pooling over all firms for which we can construct the subjective distributions over future employment growth rates. We compute these subjective standard deviations as described on slide 19.

11. Subjective Expectations and Uncertainty Indices

Topic-Specific Expectations Indices

We construct a monthly activity-weighted expectations (first-moment) index for employment growth and sales growth looking one-year ahead.

- In month *t,* the index for Employment takes a value equal to the activity-weighted average of subjective mean employment growth rates looking 12 months hence ($Mean(EGr)$), averaging across all firms responding that month.
- We compute these subjective mean growth rates as described on slides 18-21, and winsorize them at the first and 99th percentiles before using them to construct the index.
- For employment in month *t,* we weight firm *i*'s subjective mean growth rate expectation by the average of its month-*t* employment ($CEmp_{it}$) and its expected employment level ($EEmp_{it}$). We top-code these weights at 500 to diminish the influence of outliers among very large firms.
- For sales revenue in month *t,* we weight firms *i*'s subjective mean growth rate expectation by the average of its month-*t* sales revenue ($CSale_{it}$) and its expected sales level ($ESale_{it}$). We winsorize these activity-weights at the 1st and 80th percentile.

11. Expectations Indices

Index Smoothing

- We smooth our topic-specific indices, noting that in survey months prior to September 2016 we have about 50 responses per topic per month and since September 2016 about 150 responses per topic per month. From August 2020 onward, we anticipate gathering more than 225 responses per topic per month.
- We smooth as follows:
    - Starting in August 2020-present we employ a two-month lagged moving average to reflect our split panel approach.
    - For months since November 2016-July 2019 we use a three-month lagged moving average.
    - In September and October 2016 we use a seven-month and five-month lagged moving average.
    - For months up to and including August 2016 we use a nine-month lagged moving average.

11. Business Uncertainty Indices

Topic-Specific Uncertainty Indices

We construct a monthly activity-weighted uncertainty (second-moment) index for the employment growth and sales growth looking one year ahead.

- The month-*t* index of 12-month-ahead subjective uncertainty for employment growth is the activity-weighted mean of ($SD\ (EGr)$) values across firms responding in month *t.*
- We compute these subjective standard deviations over growth rates as described on slides 18-21, and winsorize them at the first and 99th percentiles before inputting them into the index construction formula.
- For employment in month *t,* we weight firm *i*'s subjective mean growth rate expectation by the average of its month-*t* employment ($CEmp_{it}$) and its expected employment level ($EEmp_{it}$). We top-code these weights at 500 to diminish the influence of outliers among very large firms.
- For sales revenue in month *t,* we weight firms *i*'s subjective mean growth rate expectation by the average of its month-*t* sales revenue ($CSale_{it}$) and its expected sales level ($ESale_{it}$). We winsorize these activity-weights at the 1st and 80th percentile.

11. Business Uncertainty Indices

Index Smoothing

- We smooth our topic-specific indices, noting that in survey months prior to September 2016 we have about 50 responses per topic per month and since September 2016 about 150 responses per topic per month. From August 2020 onward, we anticipate gathering more than 225 responses per topic per month.
- We smooth as follows:
- Starting in August 2020-present we employ a two-month lagged moving average to reflect our split panel approach.
- For months since November 2016-July 2019 we use a three-month lagged moving average.
- In September and October 2016 we use a seven-month and five-month lagged moving average.
- For months up to and including August 2016 we use a nine-month lagged moving average.

12. Expected Reallocation Rates

Topic-specific Expected Reallocation Indices

We construct forward-looking indices of job and sales revenue reallocation. These series measure the volume of cross-firm reallocation in economic activity above the reallocation required to support aggregate growth:

- First, in each month *t,* we compute the activity-weighted average of own-firm expected gross job creation and destruction rates, which boils down to the activity-weighted average of the absolute value of subjective mean growth rates $|Mean(EGr)|$.
- Then , in each month *t,* we compute the absolute value of the activity weighted average of own-firm expected employment growth $Mean(EGr)$. This is effectively the absolute value of the employment growth expectations index in month *t*.
- We then obtain the expected job reallocation rate index value for month *t* by subtracting the outcome of the second bullet from the first. Letting w_{it} be firm i's activity weight in month t,

$$Expected\ Job\ Reallocation\ Rate_t = \sum_i w_t \cdot |Mean(EGr)| - \left|\sum_i w_t \cdot Mean(EGr)\right|$$

12. Expected Reallocation Rates

- Analogously, the expected sales revenue reallocation rate index in month *t* is the difference between the activity-weighted average of absolute expected sales growth rates, minus the absolute value of the average activity-weighted growth rate:

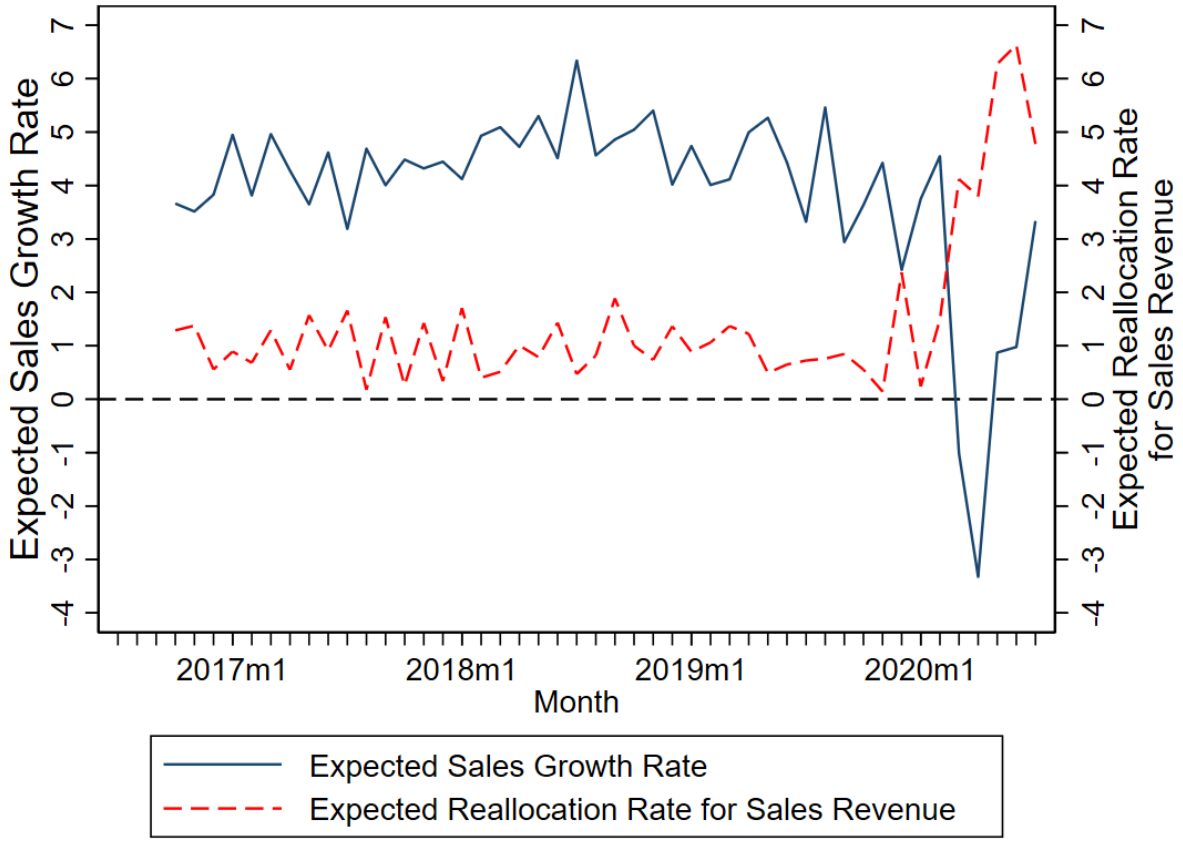
$$Expected\ Reallocation\ Rate\ For\ Sales\ Revenue_t = \sum_i w_t \cdot |Mean(SaleGr)\ \ | - \left|\sum_i w_t \cdot Mean(SaleGr)\ \ \right|$$

- We compute the subjective mean growth rates $Mean(EGr)$ and $Mean(SaleGr)$ as described on slides 18-21, and winsorize them at the 1st and 99th percentiles before using them to construct the index.

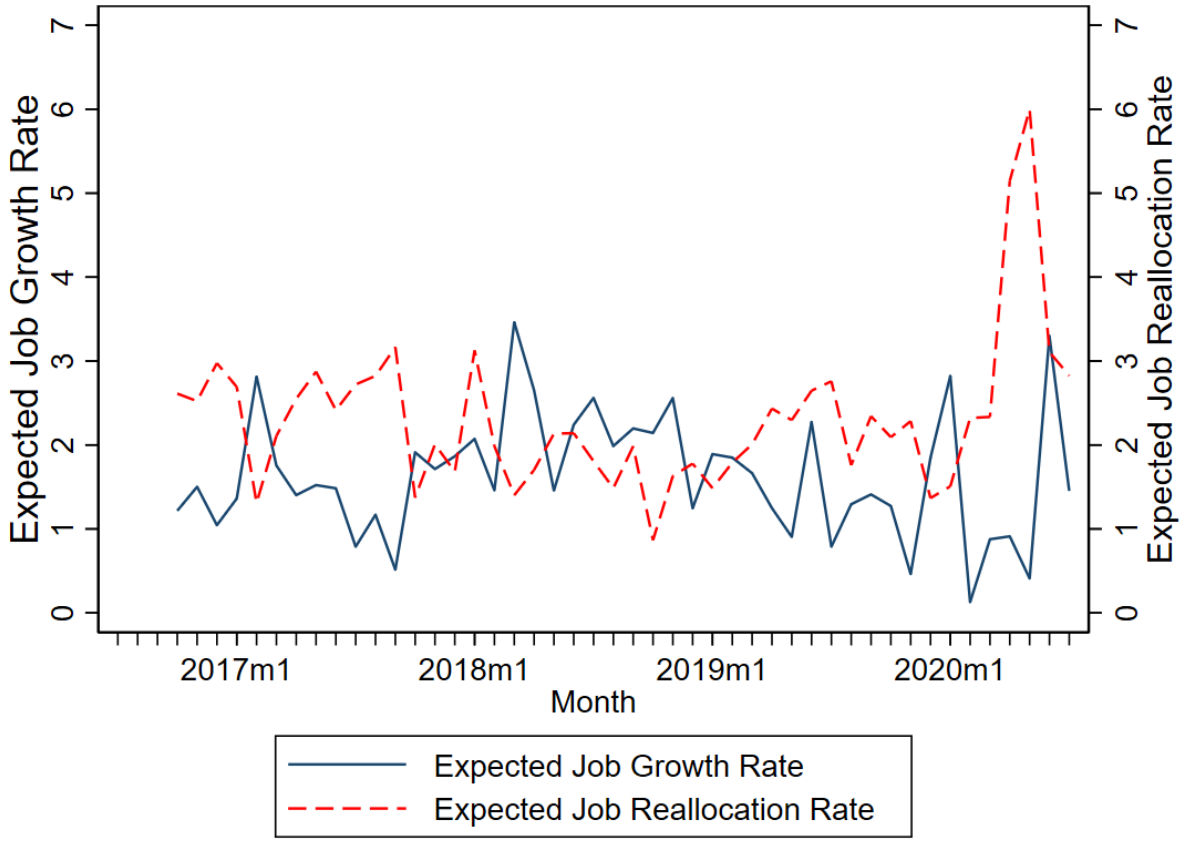
- Firm *i*'s activity weight w_{it} is the average of its month–*t* employment or sales level ($Cemp_{it}$ *or* $CSale_{it}$) and its expected employment or sales level twelve months hence ($FEmp_{it}$ *or* $FSale_{it}$). We top–code these weights at 500 for employment and at the 80th percentile for sales to diminish the influence of outliers among very large firms.

12. Expected Reallocation Rates

Expected Reallocation Rate for Sales Revenue



Expected Job Reallocation Rate



Appendix A. Screen Shots of Special Questions

July 2020 – 1 of 1

Asked in all versions of the questionnaire:

Before the outbreak of Covid-19, did anyone in your firm travel for business purposes?

- ○ Yes
- ○ No

We're interested in learning more about how your firm's business travel may change due to Covid-19.

What was your firm's annual travel expenditures in 2019 in the following categories?

Estimates are acceptable.

Air travel:	$
Accommodation:	$
All other travel costs:	$

After the COVID-19 pandemic is over, do you anticipate your firm's annual travel expenditures to increase, decrease, or remain the same relative to the pre-COVID period?

- ○ increase
- ○ remain the same
- ○ decrease

If selected "increase"

Relative to your 2019 travel expenditures, by what percentage amounts do you anticipate your firm's annual travel expenditures to increase after the COVID-19 pandemic is over?

[ ] % increase

If selected "decrease"

Relative to your 2019 travel expenditures, by what percentage amounts do you anticipate your firm's annual travel expenditures to decrease after the COVID-19 pandemic is over?

[ ] % decrease

In 2019, what percentage of your firm's external meetings (with customers, clients, patients, suppliers, etc.) were conducted by virtual means, e.g., by video conference?

Estimates are acceptable.

[ ] %

After the COVID-19 pandemic is over, what percentage of your firm's external meetings (with customers, clients, patients, suppliers, etc.) do you expect to be conducted by virtual means, e.g., by video conference?

Estimates are acceptable.

[ ] %

June 2020 – 1 of 1

Asked in all versions of the questionnaire:

Before the coronavirus pandemic, how much floor space did your firm use? In answering this question, please consider all offices, warehouses, retail outlets, manufacturing facilities, and other facilities used by your firm.

[ ] square feet of floor space

After the coronavirus pandemic is over, how do you anticipate your firm's floor space needs will have changed, if at all?

- ○ We will likely increase floor space by the following percentage: [ ] %
- ○ We will likely decrease floor space by the following percentage: [ ] %
- ○ No change

At the present time, approximately what percentage of your employees fall into the following categories:

Values should sum to 100%.

On temporary layoff or furlough, without pay	0 %
On leave without pay due to illness, self-isolation, child care, or fear of contagion	0 %
On payroll and getting paid, but not required to work any hours	0 %
Working mostly on our business premises	0 %
Working mostly from home	0 %
Total	0 %

May 2020 – 1 of 1

Asked in all versions of the questionnaire:

What was the dollar value of your sales revenue in the first quarter of this year?

	$Bil.	Mil.	Thou.	
Q1 2020 (January - March 2020)				,000

In each of the next five quarters, what would you estimate the dollar value of your sales revenue will be?

	$Bil.	Mil.	Thou.	
Q2 2020 *(April - June 2020)*				,000
Q3 2020 *(July - September 2020)*				,000
Q4 2020 *(October - December 2020)*				,000
Q1 2021 *(January - March 2021)*				,000
Q2 2021 *(April - June 2021)*				,000

What percentage of your full-time employees worked from home in 2019?

- [ ] % of my employees worked from home 5 full days per week
- [ ] % of my employees worked from home 2 to 4 full days per week
- [ ] % of my employees worked from home 1 full day per week
- [ ] % of my employees rarely or never worked from home

What percentage of your full-time employees will work from home after the coronavirus pandemic?

- [ ] % of my employees will work from home 5 full days per week
- [ ] % of my employees will work from home 2 to 4 full days per week
- [ ] % of my employees will work from home 1 full day per week
- [ ] % of my employees will rarely or never work from home

April 2020 – 1 of 1

Asked in all versions of the questionnaire:

Consider the recent outbreak and spread of the coronavirus. What's your best guess for the impact of coronavirus developments on your firm's sales revenues in 2020?

- ○ It will lower my firm's sales revenues by the following percentage:
  [ ]%
- ○ It will raise my firm's sales revenues by the following percentage:
  [ ]%
- ○ No effect

We would also like to ask how developments related to the coronavirus are affecting staffing levels at your firm.

Since March 1, we made the following staffing changes in response to developments related to the coronavirus:

Please insert a numerical value in each box. If you leave a box empty, we will interpret it as a zero value.

We placed [ ] employees on permanent layoff, with no expectation of recall.
We placed [ ] employees on temporary layoff or furlough.
We hired [ ] new employees.
We cut [ ] contractors and leased workers.
We added [ ] contractors and leased workers.

Over the next four weeks, we expect to make the following staffing changes in response to developments related to the coronavirus:

Please insert a numerical value in each box. If you leave a box empty, we will interpret it as a zero value.

We will place [ ] employees on permanent layoff, with no expectation of recall.
We will place [ ] employees on temporary layoff or furlough.
We will hire [ ] new employees.
We will cut [ ] contractors and leased workers.
We will add [ ] contractors and leased workers.

When do you think it is most likely that the coronavirus-related uncertainty facing your firm will be largely resolved?

Month [ ]
Year [ ]

How long can your firm continue to operate without tapping new sources of funding (credit lines, emergency loans, debt markets, etc.)?

[ ]

March 2020 – 1 of 1

Each questionnaire was randomly assigned to ½ of the panel:

How do you expect coronavirus to affect your sales over the next year? What is the percentage likelihood (probability) that it will:
(Values should sum to 100%)

Have a large POSITIVE effect on sales at home and abroad, adding 10% or more to sales:	0 %
Have a modest POSITIVE effect on sales at home and abroad, adding less than 10% to sales:	0 %
Make little difference:	0 %
Have a modest NEGATIVE effect on sales at home and abroad, subtracting less than 10% from sales:	0 %
Have a large NEGATIVE effect on sales at home and abroad, subtracting more than 10% from sales:	0 %
Total	0 %

Consider the recent outbreak and spread of the coronavirus. What's your best guess for the impact of coronavirus developments on your firm's sales revenues in 2020?

- ○ It will lower my firm's sales revenues by the following percentage: [ ] %
- ○ It will raise my firm's sales revenues by the following percentage: [ ] %
- ○ No effect

February 2020 – 1 of 2

Randomly assigned to ½ of the panel:

If you set an investment hurdle rate, i.e. target rate for the total rate of return required on investment expenditure, what is it, at present? (With the total rate of return on investment including all costs of funds and depreciation).

- 0-5%
- 5-10%
- 10-15%
- 15-20%
- 20% or more
- Don't know/not applicable

How frequently do you typically review investment decisions in your business?

- At least once a month
- Once a quarter
- Once every six months
- Once per year
- Less than once per year
- Don't know/not applicable

Once your business has decided to make a capital investment, how long would it typically take from the decision being made to the expenditure being incurred?

- A month or less
- 1 to 3 months
- 3-6 months
- 6 months to 1 year
- 1 year to 2 years
- 2 years
- Don't know/not applicable

February 2020 – 2 of 2

Randomly assigned to ½ of the panel:

Do you use a "hurdle rate" or a total rate of return required on an investment expenditure to determine whether you pursue a particular capital investment?

- ○ yes
- ○ no
- ○ unsure

How frequently do you typically review investment decisions in your business?

About every

Once your business has decided to make a capital investment, how long would it typically take from the decision being made to the expenditure being incurred?

About

July 2019 – 1 of 5

Asked in all versions of the questionnaire:

If a service provider:

Please provide some information about foreign sales and input purchases for your firm.

What percent of revenues from your firm's U.S. operations are due to foreign sales?

%

What percent of inputs used by your firm's U.S. operations are sourced from abroad?

%

If a goods producer:

Please provide some information about foreign production, sales, and input purchases for your firm.

What percent of your firm's production occurs outside the United Sates?

%

What percent of your firm's global revenues are due to foreign sales?

%

What percent of revenues from your firm's U.S. operations are due to foreign sales?

%

What percent of input supplies for its U.S. operations does your firm source from abroad?

%

July 2019 – 2 of 5

Asked at the end of the capital investment questionnaire:

Did tariff hikes and trade policy tensions cause your firm to cut or postpone capital expenditures in the first half of 2019?

- (●) Yes
- ( ) No

If responded "yes" to prior question:

By roughly what percentage did your firm cut capital expenditures in the first half of 2019 due to tariff hikes and trade policy tensions? Please include any capital expenditures that your firm postponed to the second half of 2019 or later.

[ ] %

Did tariff hikes and trade policy tensions cause your firm to increase capital expenditures in the first half of 2019 or to bring capital expenditures forward in time to the first half of 2019?

- (●) Yes
- ( ) No

If responded "yes" to prior question:

By roughly what percentage did your firm increase capital expenditures in the first half of 2019 due to tariff hikes and trade policy tensions? Please include any capital expenditures that your firm brought forward from the second half of 2019 or later.

[ ] %

July 2019 – 3 of 5

Asked at the end of the capital investment questionnaire:

Have recent tariff hikes and ongoing trade policy tensions caused your firm to re-assess or alter its capital expenditure plans for the second half of 2019?

- (●) Yes
- ( ) No

How have they caused your firm to re-assess or alter its capital expenditure plans for the second half of 2019? Please check all that apply.

- [x] My firm is currently **reviewing** some of its capital expenditure plans.
- [x] My firm has **postponed** certain capital expenditures
- [x] My firm has **brought** certain capital expenditures **forward in time**
- [x] My firm has **dropped** previous plans for certain capital expenditures
- [x] My firm has **added** plans for new capital expenditures

What percentage of your planned capital expenditures for the second half of 2019 are under review?

[ ] %

What percentage of your previously planned capital expenditures for the second half of 2019 have been postponed?

[ ] %

What amount did your firm bring forward to the second half of 2019 as a percentage of its previously planned capital expenditures for the second half of 2019?

[ ] %

What percentage of your previously planned capital expenditures for the second half of 2019 did your firm drop?

[ ] %

How large are these newly added capital expenditures as a percentage of your previously planned capital expenditures for the second half of 2019?

[ ] %

July 2019 – 2 of 4

Asked at the end of the sales questionnaire:

What impact, if any, did recent tariff hikes and trade policy tensions have on your firm's sales revenue in the first half of 2019?

- (●) Sales revenue in the first half of 2019 was **lower**
- ( ) Sales revenue in the first half of 2019 was **not impacted**
- ( ) Sales revenue in the first half of 2019 was **higher**
- ( ) Unsure

If responded "lower" to prior question:

By what percentage was your firm's sales revenue for the first half of 2019 lower due to tariff hikes and trade policy tensions?

[ ] %

What impact, if any, have recent tariff hikes and trade policy tensions had on your firm's anticipated sales revenue for the second half of 2019?

- (●) We anticipate **lower** sales revenue for the second half of 2019
- ( ) We anticipate **no impact** on sales revenue for the second half of 2019
- ( ) We anticipate **higher** sales revenue for the second half of 2019

If responded "lower" to prior question:

By what percentage do you anticipate your firm's sales revenue for the second half of 2019 will be lower due to recent tariff hikes and trade policy tensions?

[ ] %

A similar follow-up question was asked for those who selected the "higher" response.

July 2019 – 4 of 4

Asked at the end of the employment questionnaire:

What impact, if any, did recent tariff hikes and trade policy tensions have on your firm's number of employees in the first half of 2019?

- (●) My firm's number of employees in the first half of 2019 was **lower**
- ( ) My firm's number of employees in the first half of 2019 was **not impacted**
- ( ) My firm's number of employees in the first half of 2019 was **higher**
- ( ) Unsure

If responded "lower" to prior question:

By what percentage was your firm's number of employees for the first half of 2019 lower due to tariff hikes and trade policy tensions?

[ ] %

What impact, if any, have recent tariff hikes and trade policy tensions had on your firm's anticipated number of employees for the second half of 2019?

- (●) We anticipate a **lower** number of employees for the second half of 2019
- ( ) We anticipate **no impact** on our number of employees for the second half of 2019
- ( ) We anticipate a **higher** number of employees for the second half of 2019

If responded "lower" to prior question:

By what percentage do you anticipate your firm's number of employees for the second half of 2019 will be lower due to recent tariff hikes and trade policy tensions?

[ ] %

A similar follow-up question was asked for those who selected the "higher" response.

June 2019

How many unfilled job openings did your firm have as of June 7, 2019?

Please give the number of openings at your firm that meet the following conditions:

- A specific position exists
- Work could start within 30 days
- You are actively seeking employees from outside your firm to fill the position(s)

In the past 30 days, has your firm changed the compensation it offers for open jobs?

We raised compensation for about	%
We lowered compensation for about	%
We made no compensation changes for about	%

In the past 30 days, has your firm changed the qualification requirements of its job openings?

We raised qualification requirements for about	%
We lowered qualification requirements for about	%
We made no change to qualification requirements for about	%

May 2019 – 1 of 2

Employment Questionnaire:

Roughly how many employees (including part-time) do you expect your firm to have in May of 2019, 2020, and 2021, respectively?

2019 number of employees

2020 number of employees

2021 number of employees

How would you describe the current level of uncertainty facing your firm?

- ○ Above average
- ○ Average
- ○ Below average

Sales Revenue Questionnaire:

Roughly what sales revenue growth (percentage) do you expect for your firm in calendar years 2019, 2020, and 2021?

2019 percentage sales revenue growth %

2020 percentage sales revenue growth %

2021 percentage sales revenue growth %

How would you describe the current level of uncertainty facing your firm?

- ○ Above average
- ○ Average
- ○ Below average

May 2019 – 2 of 2

Capital Investment Questionnaire:

Roughly what total dollar value of capital investment expenditures do you expect for your firm in calendar years 2019, 2020, and 2021?

2019 level of capital investment expenditures	$
2020 level of capital investment expenditures	$
2021 level of capital investment expenditures	$

How would you describe the current level of uncertainty facing your firm?

- ○ Above average
- ○ Average
- ○ Below average

April 2019

Please indicate what probabilities you would attach to the various possible year-ahead percentage changes in U.S. economic output (Real Gross Domestic Product). (Results should sum to 100%)

+6 percent or more	0	%
+5.0 to +5.9 percent	0	%
+4.0 to +4.9 percent	0	%
+3.0 to +3.9 percent	0	%
+2.0 to +2.9 percent	0	%
+1.0 to +1.9 percent	0	%
+0.0 to +0.9 percent	0	%
-1.0 to -0.1 percent	0	%
-2.0 to -1.1 percent	0	%
-3.0 to -2.1 percent	0	%
Decline more than 3 percent	0	%
Total	0	%

March 2019 – 1 of 2

Asked at the end of the Capital Investment/Unit Cost Questionnaire:

Please provide an estimate of the book value of all property, plant, and equipment owned by your firm.

$ 0

Asked at the end of the Sales Revenue /Employment Questionnaire:

Are your firm's ownership shares traded on a stock exchange or in over-the-counter markets?

- Yes
- No

Who owns the largest share of your business? (Please choose one)

- The current CEO
- The family of the current CEO
- A private equity or venture capital firm
- Another firm headquartered in the United States
- A foreign multinational
- Outside investors who are unrelated to the current CEO (e.g., the company founder)
- Other (please describe)

March 2019 – 2 of 2

Asked at the end of the Sales Revenue/Employment Questionnaire (Cont'd):

In which country is your parent firm headquartered?

Does your business operate under any trademarks or brand names authorized by a franchisor?

- Yes, we are a franchisee-owned business
- Yes, we are a franchisor-owned business
- No

February 2019 – 1 of 2

Asked at the end of the Capital Investment/Unit Cost Questionnaire:

Please provide an estimate of the book value of all property, plant, and equipment owned by your firm.

$ 0

Asked at the end of the Sales Revenue/Employment Questionnaire:

Are your firm's ownership shares traded on a stock exchange or in over-the-counter markets?

- Yes
- No

Who owns the largest share of your business? (Please choose one)

- The current CEO
- The family of the current CEO
- A private equity or venture capital firm
- Another firm headquartered in the United States
- A foreign multinational
- Outside investors who are unrelated to the current CEO (e.g., the company founder)
- Other (please describe)

February 2019 – 2 of 2

Asked at the end of the Sales Revenue/Employment Questionnaire (Cont'd):

In which country is your parent firm headquartered?

Does your business operate under any trademarks or brand names authorized by a franchisor?

- Yes, we are a franchisee-owned business
- Yes, we are a franchisor-owned business
- No

January 2019 - 1 of 3

If a service provider:

Please provide some information about foreign sales and input purchases for your firm.

What percent of revenues from your firm's U.S. operations are due to foreign sales?

%

What percent of inputs used by your firm's U.S. operations are sourced from abroad?

%

If a goods producer:

Please provide some information about foreign production, sales, and input purchases for your firm.

What percent of your firm's production occurs outside the United Sates?

%

What percent of your firm's global revenues are due to foreign sales?

%

What percent of revenues from your firm's U.S. operations are due to foreign sales?

%

What percent of input supplies for its U.S. operations does your firm source from abroad?

%

Did tariff hikes and trade policy tensions cause your firm to cut or postpone capital expenditures in 2018?

- Yes
- No

By roughly what percentage did your firm cut capital expenditures in 2018 due to tariff hikes and trade policy tensions? Please include any capital expenditures that your firm postponed to 2019 or later.

%

Did tariff hikes and trade policy tensions cause your firm to increase capital expenditures in 2018 or to bring capital expenditures forward in time?

- Yes
- No

By roughly what percentage did your firm increase capital expenditures in 2018 due to tariff hikes and trade policy tensions? Please include any capital expenditures that your firm brought forward from 2019 or later.

%

January 2019 - 2 of 3

Did tariff hikes and trade policy tensions cause your firm to increase capital expenditures in 2018 or to bring capital expenditures forward in time?

- Yes
- No

By roughly what percentage did your firm increase capital expenditures in 2018 due to tariff hikes and trade policy tensions? Please include any capital expenditures that your firm brought forward from 2019 or later.

_____ %

Have the tariff hikes in 2018 and ongoing trade policy tensions caused your firm to re-assess its capital expenditure plans for 2019?

- Yes
- No

January 2019 - 3 of 3

How have they caused your firm to re-assess its capital expenditure plans for 2019? Please check all that apply.

- My firm is currently **reviewing** some of its capital expenditure plans.
- My firm has **postponed** certain capital expenditures
- My firm has **accelerated** certain capital expenditures
- My firm has **dropped** previous plans for certain capital expenditures
- My firm has **added** plans for new capital expenditures

What percentage of your planned capital expenditures in 2019 are under review?

Percentage of my 2019 capital expenditures under review is about ____ %

What percentage of your planned capital expenditures in 2019 have been postponed?

Percentage of my 2019 capital expenditures that have been postponed is about ____ %

What percentage of your planned capital expenditures in 2019 have been accelerated?

Percentage of my 2019 capital expenditures that have been accelerated is about ____ %

What percentage of your planned capital expenditures in 2019 have been dropped?

Percentage of my 2019 capital expenditures that have been dropped is about ____ %

How large are these newly added capital expenditures relative to your previous plans for 2019?

My newly added capital expenditures as a percentage of our previously planned capital expenditures for 2019 are about ____ %

November/December 2018

When did your firm conclude its most recent fiscal year?

Month: February

Year: 2018

Did your firm retain a Certified Public Accountant to audit its financial statements for the fiscal year that ended in February 2018?

- (●) Yes
- ( ) No

Did your firm retain a Certified Public Accountant to help prepare financial reports for the fiscal year that ended in February 2018?

- ( ) Yes
- ( ) No

Please tell us why your firm retained a Certified Public Accountant to audit its financial statements. Please check all that apply:

- [ ] We are required by law
- [ ] To help us develop higher quality information for internal use
- [ ] Our creditors (e.g., our bank) require it
- [ ] Our shareholders require it
- [ ] Our suppliers require it
- [ ] Our customers require it

October 2018

Please indicate what probabilities you would attach to the various possible year-ahead percentage changes in U.S. economic output (Real Gross Domestic Product). (Results should sum to 100%)

+6 percent or more	0	%
+5.0 to +5.9 percent	0	%
+4.0 to +4.9 percent	0	%
+3.0 to +3.9 percent	0	%
+2.0 to +2.9 percent	0	%
+1.0 to +1.9 percent	0	%
+0.0 to +0.9 percent	0	%
-1.0 to -0.1 percent	0	%
-2.0 to -1.1 percent	0	%
-3.0 to -2.1 percent	0	%
Decline more than 3 percent	0	%
Total	0	%

September 2018

Roughly what percentage of your firm's employees are paid on an hourly basis?

[ ] %

Is the average hourly wage rate at your firm up, down or unchanged over the past 12 months?

- up
- down
- unchaged

Do you expect the average hourly wage rate at your firm to be up, down or unchanged over the next 12 months?

- up
- down
- unchanged

Respondents received a similar follow–up question if “down” was selected in the prior question:

By what percentage do you expect your firm’s average hourly wage rate to rise over the next 12 months?

[ ] %

August 2018 – 1 of 2

Presented only to firms in retail and wholesale trade:

Does your firm have a formal planning or forecasting process in place for the following?

	Yes	No
Sales	O	O
Inventories	O	O
Employment	O	O
Pricing	O	O
Profit margins	O	O

Presented only to firms in manufacturing:

Does your firm have a formal planning or forecasting process in place for the following?

	Yes	No
Sales	O	O
Production	O	O
Employment	O	O
Capital investment	O	O
Input costs	O	O

Presented only to firms not in retail and wholesale trade or manufacturing:

Does your firm have a formal planning or forecasting process in place for the following?

	Yes	No
Sales	O	O
Employment	O	O
Pricing	O	O
Capital investment	O	O

August 2018 – 2 of 2

Response categories were only presented if respondent selected “yes” in the prior question. The retail and wholesale trade version is pictured below. A manufacturing and nonmanufacturing /nonretail and wholesale trade version was also presented as appropriate:

How frequently does your firm update its plans or forecasts for the following?

	Daily	Weekly	Monthly	Quarterly	Semiannually	Annually	Less often than annually	Unsure
Sales	○	○	○	○	○	○	○	○
Inventories	○	○	○	○	○	○	○	○
Employment	○	○	○	○	○	○	○	○
Pricing	○	○	○	○	○	○	○	○
Profit margins	○	○	○	○	○	○	○	○

Which planning or forecasting horizon(s) does your firm use for the following? (Please check all that apply)

	Less than one month ahead	1 month ahead	3 months ahead	6 months ahead	12 months ahead	More than 12 months ahead	Fiscal year	Unsure
Sales	☐	☐	☐	☐	☐	☐	☐	☐
Inventories	☐	☐	☐	☐	☐	☐	☐	☐
Employment	☐	☐	☐	☐	☐	☐	☐	☐
Pricing	☐	☐	☐	☐	☐	☐	☐	☐
Profit margins	☐	☐	☐	☐	☐	☐	☐	☐

July 2018 – 1 of 2

Presented to service providing firms:

Please provide some information about foreign sales and input purchases for your firm.

What percent of revenues from your firm's U.S. operations are due to foreign sales?

[ ] %

What percent of inputs used by your firm's U.S. operations are sourced from abroad?

[ ] %

Presented to goods producing firms:

Please provide some information about foreign production, sales, and input purchases for your firm.

What percent of your firm's production occurs outside the United Sates?

[ ] %

What percent of your firm's global revenues are due to foreign sales?

[ ] %

What percent of revenues from your firm's U.S. operations are due to foreign sales?

[ ] %

What percent of input supplies for its U.S. operations does your firm source from abroad?

[ ] %

Have recently announced tariff hikes or concerns about retaliation caused your firm to re-assess its capital expenditure plans?

- No
- Yes

July 2018 – 2 of 2

Presented if responded "yes" to tariff question on prior page:

How have recent tariff hikes or concerns about retaliation caused your firm to re-assess its capital expenditure plans? Please check all that apply.

- My firm is currently **reviewing** some of its capital expenditure plans.
- My firm has **postponed** certain capital expenditures
- My firm has **accelerated** certain capital expenditures
- My firm has **dropped** previous plans for certain capital expenditures
- My firm has **added** plans for new capital expenditures

Presented follow–up questions based on response to prior question:

What percentage of your planned capital expenditures in 2018 and 2019 are under review?

Percentage of my 2018/2019 capital expenditures under review is about [ ] %

What percentage of your planned capital expenditures in 2018 and 2019 have been postponed?

Percentage of my 2018/2019 capital expenditures that have been postponed is about [ ] %

What percentage of your planned capital expenditures in 2018 and 2019 have been accelerated?

Percentage of my 2018/2019 capital expenditures that have been accelerated is about [ ] %

What percentage of your planned capital expenditures in 2018 and 2019 have been dropped?

Percentage of my 2018/2019 capital expenditures that have been dropped is about [ ] %

How large are these newly added capital expenditures relative to your previous plans for 2018 and 2019?

My newly added capital expenditures as a percentage of our previously planned capital expenditures for 2018/2019 are about [ ] %

June 2018

Respondents were randomly presented one of the two questions below:

During the next twelve months, by how much do you think prices will change for your competitors? Please provide a precise and quantitative answer in percentage terms.

percentage change

During the next twelve months, by how much do you think prices will change in your industry? Please provide a precise and quantitative answer in percentage terms.

percentage change

April 2018

Please indicate what probabilities you would attach to the various possible year-ahead percentage changes in U.S. economic output (Real Gross Domestic Product). (Results should sum to 100%)

+6 percent or more	0	%
+5.0 to +5.9 percent	0	%
+4.0 to +4.9 percent	0	%
+3.0 to +3.9 percent	0	%
+2.0 to +2.9 percent	0	%
+1.0 to +1.9 percent	0	%
+0.0 to +0.9 percent	0	%
-1.0 to -0.1 percent	0	%
-2.0 to -1.1 percent	0	%
-3.0 to -2.1 percent	0	%
Decline more than 3 percent	0	%
Total	0	%

March 2018 – 1 of 3

All firms received this question:

For tax purposes, what is your firm's legal form of organization?

- Sole proprietorship
- Partnership
- Limited Liability Company
- S-Corp
- C-Corp
- Other
- Unsure

March 2018 – 2 of 3

Respondents were randomly presented with one of the two questions listed on this and the next slide.

Which of the following best describes the expected change in your firm's tax bill as a result of the recently enacted Tax Cuts and Jobs Act?

- Increase of more than 10%
- Increase of less than 10%
- No change
- Reduction of less than 10%
- Reduction of more than 10%
- Unsure

March 2018 – 3 of 3

Respondents were randomly presented with one of the two questions listed on this and the prior slide.
Those who selected the "not change" option in the first question below did not receive the subsequent question:

How do you expect your firm's tax bill will change as a result of the recently passed Tax Cuts and Jobs Act?

- **Tax bill will increase**
- Tax bill will **not change**
- Tax bill will **decrease**
- Unsure

What's your best estimate of the percentage by which the recently enacted Tax Cuts and Jobs Act will increase your firm's tax bill in 2018?

0 % increase in my firm's tax bill

How do you expect your firm's tax bill will change as a result of the recently passed Tax Cuts and Jobs Act?

- Tax bill will **increase**
- Tax bill will **not change**
- **Tax bill will decrease**
- Unsure

What's your best estimate of the percentage by which the recently enacted Tax Cuts and Jobs Act will decrease your firm's tax bill in 2018?

0 % decrease in my firm's tax bill

February 2018

How has the recently enacted Tax Cuts and Jobs Act led you to revise your plans for capital expenditures in 2018?

- decrease capital expenditures by 10% or more
- decrease capital expenditures by less than 10%
- no material change to capital expenditures
- increase capital expenditures by less than 10%
- increase capital expenditures by more than 10%

How has the recently enacted Tax Cuts and Jobs Act led you to revise your plans for capital expenditures in 2019?

- decrease capital expenditures by 10% or more
- decrease capital expenditures by less than 10%
- no material change to capital expenditures
- increase capital expenditures by less than 10%
- increase capital expenditures by more than 10%

January 2018

We would like you to think more generally about your firm. Looking ahead into 2018, what are the biggest areas of concern? (detailed descriptions are helpful)

December 2017

Please rate your optimism about the financial prospects for your own company on a scale from 0-100, with 0 being the least optimistic and 100 being the most optimistic.

Please rate your optimism about the U.S. economy on a scale from 0-100, with 0 being the least optimistic and 100 being the most optimistic.

November 2017

If passed in its current form, how would the Tax Cuts and Jobs Act affect your capital expenditures in 2018?

- decrease capital expenditures by 10% or more
- decrease capital expenditures by less than 10%
- no material change to capital expenditures
- increase capital expenditures by less than 10%
- increase capital expenditures by 10% or more

October 2017

SE Version

Please indicate what probabilities you would attach to the various possible year-ahead percentage changes in U.S. economic output (Real Gross Domestic Product). (Results should sum to 100%)

+6 percent or more	0	%
+5.0 to +5.9 percent	0	%
+4.0 to +4.9 percent	0	%
+3.0 to +3.9 percent	0	%
+2.0 to +2.9 percent	0	%
+1.0 to +1.9 percent	0	%
+0.0 to +0.9 percent	0	%
-1.0 to -0.1 percent	0	%
-2.0 to -1.1 percent	0	%
-3.0 to -2.1 percent	0	%
Decline more than 3 percent	0	%
Total	0	%

CC Version

Please provide an estimate of the book value of all property, plant, and equipment owned by your firm.

$ 0

September 2017

SE Version

Please indicate what probabilities you would attach to the various possible year-ahead percentage changes in U.S. economic output (Real Gross Domestic Product). (Results should sum to 100%)

+6 percent or more	0	%
+5.0 to +5.9 percent	0	%
+4.0 to +4.9 percent	0	%
+3.0 to +3.9 percent	0	%
+2.0 to +2.9 percent	0	%
+1.0 to +1.9 percent	0	%
+0.0 to +0.9 percent	0	%
-1.0 to -0.1 percent	0	%
-2.0 to -1.1 percent	0	%
-3.0 to -2.1 percent	0	%
Decline more than 3 percent	0	%
Total	0	%

CC Version

Please provide an estimate of the book value of all property, plant, and equipment owned by your firm.

$ 0

March 2017

Please indicate what probabilities you would attach to the various possible year-ahead percentage changes in U.S. economic output (Real Gross Domestic Product). (Results should sum to 100%)

+6 percent or more	0 %
+5.0 to +5.9 percent	0 %
+4.0 to +4.9 percent	0 %
+3.0 to +3.9 percent	0 %
+2.0 to +2.9 percent	0 %
+1.0 to +1.9 percent	0 %
+0.0 to +0.9 percent	0 %
-1.0 to -0.1 percent	0 %
-2.0 to -1.1 percent	0 %
-3.0 to -2.1 percent	0 %
Decline more than 3 percent	0 %
Total	0 %

February 2017

Please indicate the level of influence each of the following might have on your capital expenditure and/or employment decisions over the next 12 months:

	little/no influence	some influence	significant influence
regulatory changes, including healthcare	○	○	○
wage and salary growth	○	○	○
interest rate changes	○	○	○
global economic growth	○	○	○
trade policy changes	○	○	○
demand for my product or service	○	○	○
strength of the dollar	○	○	○
tax policy changes	○	○	○

January 2017

In what year did your firm hire its first paid employee? If you do not know the precise year, please give your best estimate.

December 2016

How did the recent U.S. Presidential and Congressional election outcomes affect your firm's capital expenditure plans for the next twelve months?

- They prompted my firm to raise its planned capital expenditures by more than 10%.
- They prompted my firm to raise its planned capital expenditures by less than 10%.
- They did not prompt my firm to materially change its planned capital expenditures.
- They prompted my firm to lower its planned capital expenditures by less than 10%.
- They prompted my firm to lower its planned capital expenditures by more than 10%.

November 2016

CC Version

Please indicate what probabilities you would attach to the various possible year-ahead percentage changes in U.S. economic output (Real Gross Domestic Product). (Results should sum to 100%)

+6 percent or more	0	%
+5.0 to +5.9 percent	0	%
+4.0 to +4.9 percent	0	%
+3.0 to +3.9 percent	0	%
+2.0 to +2.9 percent	0	%
+1.0 to +1.9 percent	0	%
+0.0 to +0.9 percent	0	%
-1.0 to -0.1 percent	0	%
-2.0 to -1.1 percent	0	%
-3.0 to -2.1 percent	0	%
Decline more than 3 percent	0	%
Total	0	%

SE Version

Please indicate what probabilities you would attach to the various possible year-ahead percentage changes in U.S. economic output (Real Gross Domestic Product). (Results should sum to 100%)

4 percent or more	0	%
3 percent	0	%
2 percent	0	%
1 percent	0	%
0 percent	0	%
-1 percent	0	%
-2 percent or less	0	%
Total	0	%

October 2016

Looking ahead, from now to 12 months from now, what do you think will happen to overall US economic growth?

- grow at a faster pace than it is currently
- continue growing at the same pace
- grow at a slower pace than it is currently
- unsure

Looking ahead, from now to 12 months from now, what do you think will happen to your industry's growth?

- grow at a faster pace than it is currently
- continue growing at the same pace
- grow at a slower pace than it is currently
- unsure

September 2016

Is uncertainty related to the upcoming presidential election materially affecting your current business decisions?

- Yes
- No

In what way(s) is uncertainty related to the upcoming presidential election affecting your current business decisions? (specific examples are helpful)

Appendix B. Nonresponse Rate by Item, Conditional on Survey Response

I. Employment

Current Level	Past Level	Employment Level Estimate 12 months hence					Probability				
		Bin 1	Bin 2	Bin 3	Bin 4	Bin 5	Bin 1	Bin 2	Bin 3	Bin 4	Bin 5
0.012	0.001	0.006	0.008	0.006	0.009	0.007	0.007	0.006	0.0006	0.006	0.006

II. Capital Expenditures

Current Level	Past Level	CapEx Level Estimate four quarters hence					Probability				
		Bin 1	Bin 2	Bin 3	Bin 4	Bin 5	Bin 1	Bin 2	Bin 3	Bin 4	Bin 5
0.003	0.003	0.012	0.013	0.010	0.014	0.012	0.010	0.010	0.010	0.010	0.010

Notes: Fraction of missing responses by item, conditional on responding to the survey, in the Survey of B business uncertainty for the period between September 2016 and October 2018.

III. Sales

Current Level	Growth Rate, Past 4 Quarters	Sales Growth Rate Estimate over next four quarters					Probability				
		Bin 1	**Bin 2**	**Bin 3**	**Bin 4**	**Bin 5**	**Bin 1**	**Bin 2**	**Bin 3**	**Bin 4**	**Bin 5**
0.012	**0.004**	0.012	0.012	0.012	0.012	0.012	0.015	0.015	0.015	0.015	0.015

IV. Average Unit Cost

Growth Rate, Past 4 Quarters	Average Unit Cost Growth Rate Estimate over next four quarters					Probability				
	Bin 1	Bin 2	Bin 3	Bin 4	Bin 5	Bin 1	Bin 2	Bin 3	Bin 4	Bin 5
0.005	0.027	0.027	0.027	0.027	0.027	0.029	0.029	0.029	0.029	0.029

Notes: Fraction of missing responses by item, conditional on responding to the survey, in the Survey of Business Uncertainty for the period between September 2016 and January 2018.

Appendix C. Field Testing Details

Panel	Date	Variable(s)	Abbreviated description	Description
BIE Survey Panel – Special Question Series	Oct–13	sales levels	A/B test. three–estimate and five-binned range versions.	Participants were randomly assigned to one of two panels. Panel 1 received a question eliciting the "best," "most likely," and "worst" case change in sales levels over the next 12 months. A drop–down box was provided with estimates ranging from –15% to 30%. Panel 2 received a question asking respondents to assign a likelihood to five potential percentage sales level change ranges (from "less than –1%" to "more than 5%") over the next 12 months.
	Nov–13	sales levels	A/B test.	Participants were randomly assigned to one of two panels. Panel 1 received a question eliciting the "best," "most likely," and "worst" case change in sales levels over the next twelve months. For each estimate a drop–down box was provided with options ranging from –15% to 30%. A note indicating "best" and "worst" case scenarios should be associated with a 10% chance of occurrence was included. Panel 2 received a question asking respondents to assign a likelihood to five potential percentage sales level change ranges (ranging from "less than –5%" to "more than 25%") over the next 12 months.
	Dec–13	unit costs	A/B test	Participants were randomly assigned to one of two panels. Panel 1 received a question eliciting the "best," "middle," and "worst" case percentage change in unit costs over the next 12 months. Panel 2 received a question asking respondents to assign a likelihood to five potential percentage unit cost change ranges (from "less than –1%" to "more than 5%") over the next 12 months.
	Jan–14	sales levels	three estimates	Participants received a two–part question. Part one elicited the expected "low," "middle," and "high" case changes in sales levels over the next twelve months. Part two asked respondents to assign a likelihood of occurrence for each of the three scenarios.
	Feb–14	number of employees	three estimates	Participants received a two–part question. Part one elicited the expected "low," "middle," and "high" case number of employees twelve months ahead. Part two asked respondents to assign a likelihood of occurrence for each of the three scenarios.
	Mar–14	sales levels	three estimates	Repeat of the January 2014 question.
	Apr–14	sales levels	five estimates	The same question as in January and March 2014 with the addition of a "worst case" and "best case" scenario for a total of five response categories.
	May–14	number of employees	five estimates	The same question as in February 2014 with the addition of a "worst case" and "best case" scenario for a total of five response categories.
	Jun–14	sales levels	three estimates with a best case/worst case follow–up	Repeat of the January 2014 question with a follow–up question asking for the "best case" and "worst case" scenarios without a likelihood assignment.

Appendix C. Field Testing Details

Panel	Date	No. of Panels	Variable(s)	Notes	Description
Survey of Business Uncertainty Panel	Jul–14	2	number of employees, average price, sales revenue	A/B Test – 5 estimate and 3 estimate versions with drop down boxes for estimates and open text boxes for likelihoods	Participants were randomly assigned to one of two panels. In each panel, respondents received a two–part question for each variable. Panel 1: Part one elicited the "high," "medium," and "low" case change in each variable over the next 12 months. Part two asked respondents to assign a likelihood to each of these scenarios. Panel 2: Same format as Panel 1 with two additional scenarios eliciting the "lowest case" and "highest case."
	Aug–14	2	sales revenue, average price, number of employees, unit cost, capital investment, profit margin	five estimates with drop down box for estimates and open text box for likelihoods	Participants received a two–part question for each variable. Part one elicited the “highest," "high," "medium," "low," and “lowest” case change in each variable over the next 12 months. Part two asked respondents to assign a likelihood to each of these scenarios.
	Sep–14	2	sales revenue, average prices, unit cost, capital investment	five estimates with open text boxes for estimates and likelihoods	Participants received a two–part question for each variable. Part one elicited the “highest," "high," "medium," "low," and “lowest” case change in each variable over the next 12 months. Part two asked respondents to assign a likelihood to each of these scenarios.
	Oct–14 to Jan–15	3	sales revenue, average price, number of employees, unit cost, capital investment, profit margin	five estimates with open text boxes for estimates and likelihoods	Participants received a two–part question for each variable. Part one elicited the “highest," "high," "medium," "low," and “lowest” case change in each variable over the next 12 months. Part two asked respondents to assign a likelihood to each of these scenarios.
	Feb–15 to Oct–15	3	sales revenue, average price, number of employees, unit cost, capital investment, profit margin	five estimates with open text boxes for estimates and likelihoods	Participants received a two–part question for each variable. Part one elicited the “highest," "high," "medium," "low," and “lowest” case change in each variable over the next 12 months. Part two asked respondents to assign a likelihood to each of these scenarios.
	Nov–15 to Jan–16	6	sales revenue, average price, number of employees, unit cost, capital investment, profit margin	five estimates with open text boxes for estimates and likelihoods	Participants received a two–part question for each variable. Part one elicited the “highest," "high," "middle," "low," and “lowest” case change in each variable over the next 12 months. Part two asked respondents to assign a likelihood to each of these scenarios.
	Feb–16 to Aug–16	6	sales revenue, average price, number of employees, unit cost, capital investment, profit margin	five estimates with open text boxes for estimates and likelihoods	Participants received a two–part question for each variable. Part one elicited the “highest," "high," "middle," "low," and “lowest” value for each variable over the next 12 months. Part two asked respondents to assign a likelihood to each of these scenarios.
	Sep–16 to Present	2	sales revenue, average unit cost, capital expenditures, number of employees	five estimates with open text boxes for estimates and likelihoods	Participants received a two–part question for each variable. Part one elicited the “highest," "high," "middle," "low," and “lowest” value for each variable over the next 12 months. Part two asked respondents to assign a likelihood to each of these scenarios.

Appendix D. Obtaining Realizations and Forecast Errors

- Consider a firm's subjective mean employment growth in month *t,* looking 12 months ahead (*Mean*(EGr)).
- We measure the firm's realized employment growth *Realized*(EGr) as follows:
  - We record its realized employment <u>level</u> in month *t+12,* $CEmp_{t+12}$.
  - We record Realized$(EGr) = 2 * (CEmp_{t+12} - CEmp_t)/(CEmp_{t+12} + CEmp_t)$.
  - If $CEmp_{t+12}$ is missing, we use $CEmp_{t+11}$ and define *Realized*$(EGr) = 2 * (CEmp_{t+11} - CEmp_t)/(CEmp_{t+11} + CEmp_t)$*12/11.
  - If $CEmp_{t+11}$ is also missing, we use $CEmp_{t+13}$ and record *Realized*$(EGr) = 2 * (CEmp_{t+11} - CEmp_t)/(CEmp_{t+11} + CEmp_t)$*12/13.
  - If $CEmp_{t+13}$ is also missing, we use the same formula with $CEmp_{t+10}$, or with $CEmp_{t+14}$ as a last resort.
- We record the firm's forecast error for employment growth looking 12 months ahead = *Mean*(EGr) – *Realized*(EGr).

- Consider a firm's subjective mean Sales growth in month *t* of quarter *q,* looking 4 quarters ahead ($Mean(SaleGr)$).
- We measure the firm's realized sales growth, *Realized*(SaleGr), as follows:
  - We record its current quarterly sales <u>level</u> reported in month *t+12,* $CSale_{t+12}$.
  - We record *Realized*(SaleGr)$= 2 * (CSale_{t+12} - CSale_t)/(CSale_{t+12} - CSale_t)$.
  - If $CSale_{t+12}$ is missing, we proceed differently depending on whether *t* is the first, second, or third month of the quarter.
    - If *t* is the first month of the quarter, we then try $CSale_{t+13}$ and $CSale_{t+14}$ in that order.
    - If *t* is the second month of the quarter, we then try $CSale_{t+11}$ and $CSale_{t+13}$ in that order.
    - If *t* is the third month of the quarter, we then try $CSale_{t+11}$ and $CSale_{t+10}$ in that order.
  - This procedure ensures that we use the level of quarterly sales reported in quarter *q+4,* though not necessarily in month *t+12*.

- We record the firm's forecast error for sales growth looking four quarters ahead = *Mean*($SaleGr$) – *Realized*($SaleGr$)

Appendix E. Capital Investment

Capital Investment Questionnaire (discontinued)

SBU Survey of Business Uncertainty

FEDERAL RESERVE BANK of ATLANTA | CHICAGO BOOTH | Stanford University

Please provide an estimate of the book value of all property, plant, and equipment owned by your firm.

$ 50,000,000

For the current quarter, what would you estimate the total dollar value of your capital investment expenditures will be?

$ 2,000,000

Looking back, four quarters ago, what was the approximate dollar value of your capital investment expenditures?

$ 1,000,000

Next - 2 of 4

SBU Survey of Business Uncertainty

FEDERAL RESERVE BANK of ATLANTA | CHICAGO BOOTH | Stanford University

Looking ahead, from now to four quarters from now, what approximate dollar value of capital investment expenditures would you assign to each of the following scenarios?

The LOWEST dollar value of capital investment would be about:	$ 1,000,000
A LOW dollar value of capital investment would be about:	$ 2,000,000
A MIDDLE dollar value of capital investment would be about:	$ 3,000,000
A HIGH dollar value of capital investment would be about:	$ 4,000,000
The HIGHEST dollar value of capital investment would be about:	$ 5,000,000

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SBU Survey of Business Uncertainty

FEDERAL RESERVE BANK of ATLANTA | CHICAGO BOOTH | Stanford University

Please assign a percentage likelihood to the capital investment expenditures you entered. (Values should sum to 100%)

LOWEST CASE: The likelihood of about **$1,000,000** in capital investment expenditures would be:	0 %
LOW CASE: The likelihood of about **$2,000,000** in capital investment expenditures would be:	0 %
MIDDLE CASE: The likelihood of about **$3,000,000** in capital investment expenditures would be:	0 %
HIGH CASE: The likelihood of about **$4,000,000** in capital investment expenditures would be:	0 %
HIGHEST CASE:The likelihood of about **$5,000,000** in capital investment expenditures would be:	0 %
Total	0 %

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These two screens conclude the Capital Investment questionnaire. As noted above, we often add one or more special questions at the end of the questionnaire.

Appendix E. Capital Investment: Measuring Capital Stocks

- In September and October 2017 as well as February and March 2019 we included the following special question with the CC (Capex/Unit Costs) questionnaire:

  Please provide an estimate of the book value of all property, plant, and equipment owned by your firm.

  $ 0

- We thus have data on our respondents' capital stock (PPENT) during at most two survey waves.
- Our goal is to approximate firm's actual investment rates $\left(\frac{I}{K}\right)_t$ in quarter *t*, as well as their expectations and uncertainty for future investment from the standpoint of quarter *t:* $\mathrm{E_t}\left[\left(\frac{I}{K}\right)_{t+4}\right]$, $\mathrm{SD_t}\left[\left(\frac{I}{K}\right)_{t+4}\right]$ in <u>all survey waves</u>.

- We impute the firm's capital stock based on the responses to the special questions from September/October 2017 and February/March 2019 as follows:
  - <u>Case 1. We observe a firm's reported capital stock once:</u>
    In this case we impute the capital stock $K_t = \mathrm{K}$,the reported capital stock for all survey waves t the firm participates in.
  - <u>Case 2. We observe a firm's reported capital stock twice, once in 2017 and once in 2019:</u>
    - In months prior to the first observation, we impute $K_t = K_1$, the first reported capital stock.
    - In months between the two observations, we impute $K_t = w_t * K_1 + (1 - w) * K_2$ where $w_t = (D_2 - t)/(D_2 - D_1)$, $D_i, i = 1,2$ is an integer representing the month in which we observe a reported capital stock, and $D_1 < t < D_2$.
  - <u>Case 3. We do not observe the firm's reported capital stock in any survey wave:</u>
    - We impute K_t based on a regression $\log K_{ft} = \alpha_s + \alpha_t + \beta \log E_{ft} + \varepsilon_{ft}$ where f indexes firms, s indexes sectors, and t indexes dates and E = employment. Our estimate for $\hat{\beta} = 1.009(0.013)$ and the R-squared of the regression is 0.432.
- After these imputations we have a (rough) measure of *K* for most survey responses.
- We winsorize our measure of *K* at the 1st and 99th percentiles before running the procedure in case 3.

Appendix E. Capital Investment: Calculating Capital Investment Rates

Respondent Data

$CCap$ = firm's capital investment expenditures in the current quarter, as reported by the respondent

$FCap_i$ = capital investment expenditures four quarters hence, $i = 1, 2, 3, 4, 5$

p_i = the associated probabilities, $i = 1, 2, 3, 4, 5$

K = our measure of the firm's capital stock

Current Investment Rate

$CInvRate = CCap/K$, which we winsorize at the 1st and 99th percentiles

First and Second Moments of the Subjective Distribution for Future Capex:

$$Mean(FCap) = \sum_{i=1}^{5} p_i \, FCap_i$$

$$Var(FCap) = \sum_{i=1}^{5} p_i (FCap_i - Mean(FCap))^2$$

$$SD(FCap) = \sqrt{Var(FCap)}$$

First and Second Moments of the Distribution of Future Investment Rates:

$$Mean(InvRate) = Mean(FCap)/K$$

$$SD(InvRate) = SD(FCap)/K$$

We also winsorize these first and second moments at the 1st and 99th percentiles

Appendix E. Capital Investment: Calculating Capital Investment Rates

- Consider a firm's subjective mean investment rate looking four quarters ahead, as recorded in month *t* of quarter *q* ($Mean(InvRate)$).
- We measure the firm's realized investment rate in quarter *q+4* $Realized(InvRate)$ as follows:
  - We record their current quarterly capital expenditures <u>level</u> reported in month *t+12*, $CCap_{t+12}$.
  - We record $Realized(InvRate) = CCap_{t+12}/K_t$. Here we use K_t rather than K_{t+12} to focus on changes in investment rather than changes in (potentially mis-measured) capital stocks. This is symmetrical with how we construct expectations of future investment $Mean(InvRate)$ in Appendix A.
  - If $CCap_{t+12}$ is missing, we proceed differently depending on whether *t* is the first, second, and third month of the quarter.
    - If *t* is the first month of the quarter, we then try $CCap_{t+13}$ and $CCap_{t+14}$ in that order.
    - If *t* is the second month of the quarter, we then try $CCap_{t+11}$ and $CCap_{t+13}$ in that order.
    - If *t* is the third month of the quarter, we then try $CCap_{t+11}$ and $CCap_{t+10}$ in that order.
  - This procedure ensures that we use the level of quarterly capital expenditures reported in quarter *q+4,* though possibly not in month *t+12*.

- We record the firm's forecast error for capEx growth looking four quarters ahead = $Mean(InvRate) - Realized(InvRate)$.

Appendix F: Subjective Moments about Average Unit Costs (Retired May 2019)

Respondent Data

$FCostGr_i$ = average unit cost growth between now and 12 months hence, $i = 1, 2, 3, 4, 5$

$p_i = \textit{the associated probabilities},\ i = 1, 2, 3, 4, 5$

Implied Future Cost Level

$$FCost_i = \left(1 + \frac{FCostGr_i}{100}\right) CCost,\ i = 1, 2, 3, 4, 5$$

Scenario–Specific Growth Rates (re–expressing respondent growth rates to our growth rate measure)

$$CostGr_i = 2(FCost_i - CCost)/(FCost_i + CCost) = 2FCostGr_i/(FCostGr_i + 2),\ i = 1, 2, 3, 4, 5$$

First and Second Moments of the Subjective Growth Rate Distribution

$$Mean(CostGr) = \sum_{i=1}^{5} p_i\, CostGr_i$$

$$Var(CostGr) = \sum_{i=1}^{5} p_i (CostGr_i - Mean(CostGr))^2$$

$$SD(CostGr) = \sqrt{Var(CostGr)}$$

Appendix G. Overall Indices (Discontinued)

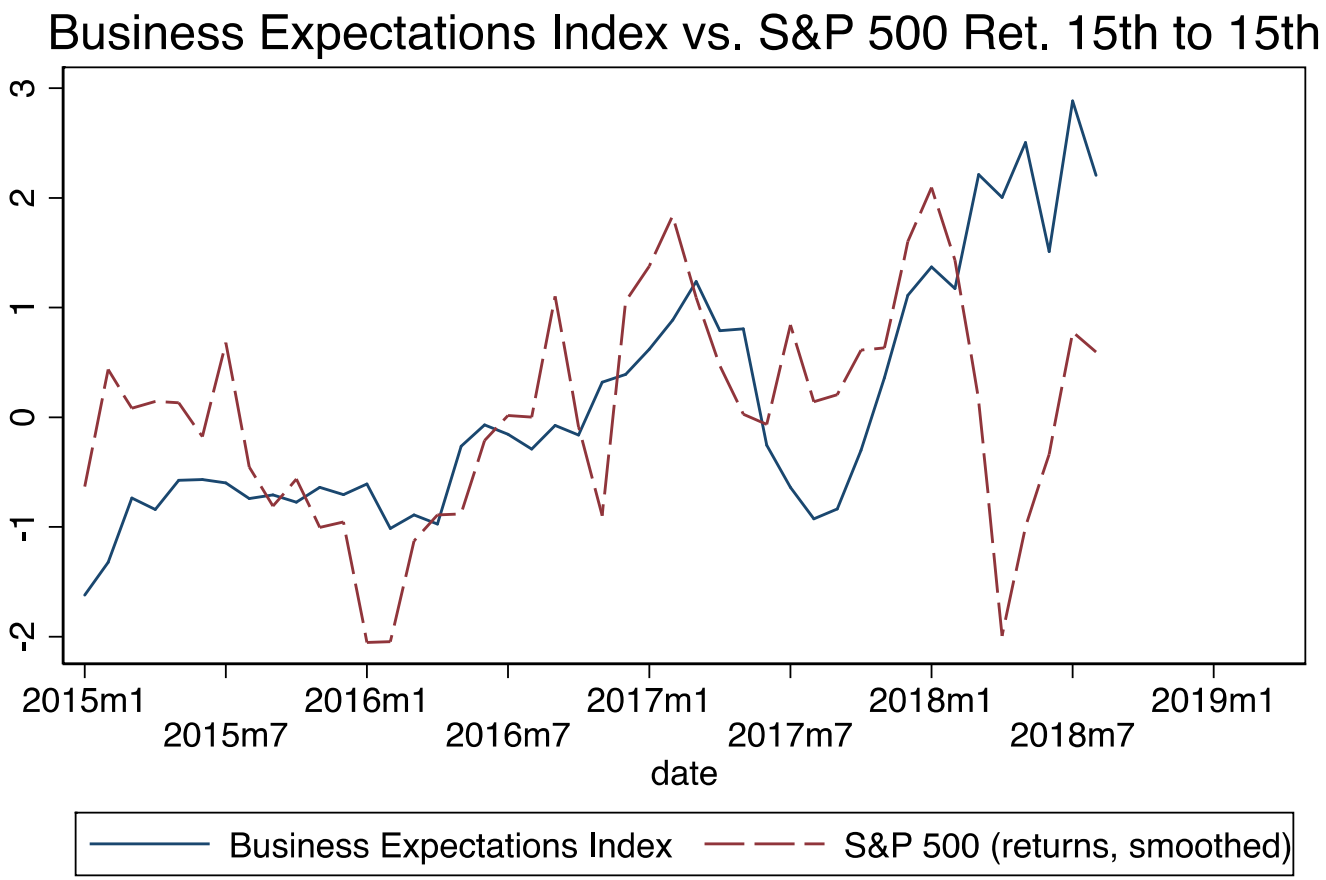
We standardize each of the topic-specific uncertainty indices to have a mean and variance of 100 during the period from January 2015 to December 2018, inclusive.

- We hold the standardization period fixed to keep historical values constant as we add more months of data.

We compute the overall index in month *t* as the equally weighted average of the three standardized topic-specific indices in month *t.*

Finally, we standardize to have a mean and variance of 100 during the period from January 2015 to December 2018, inclusive.

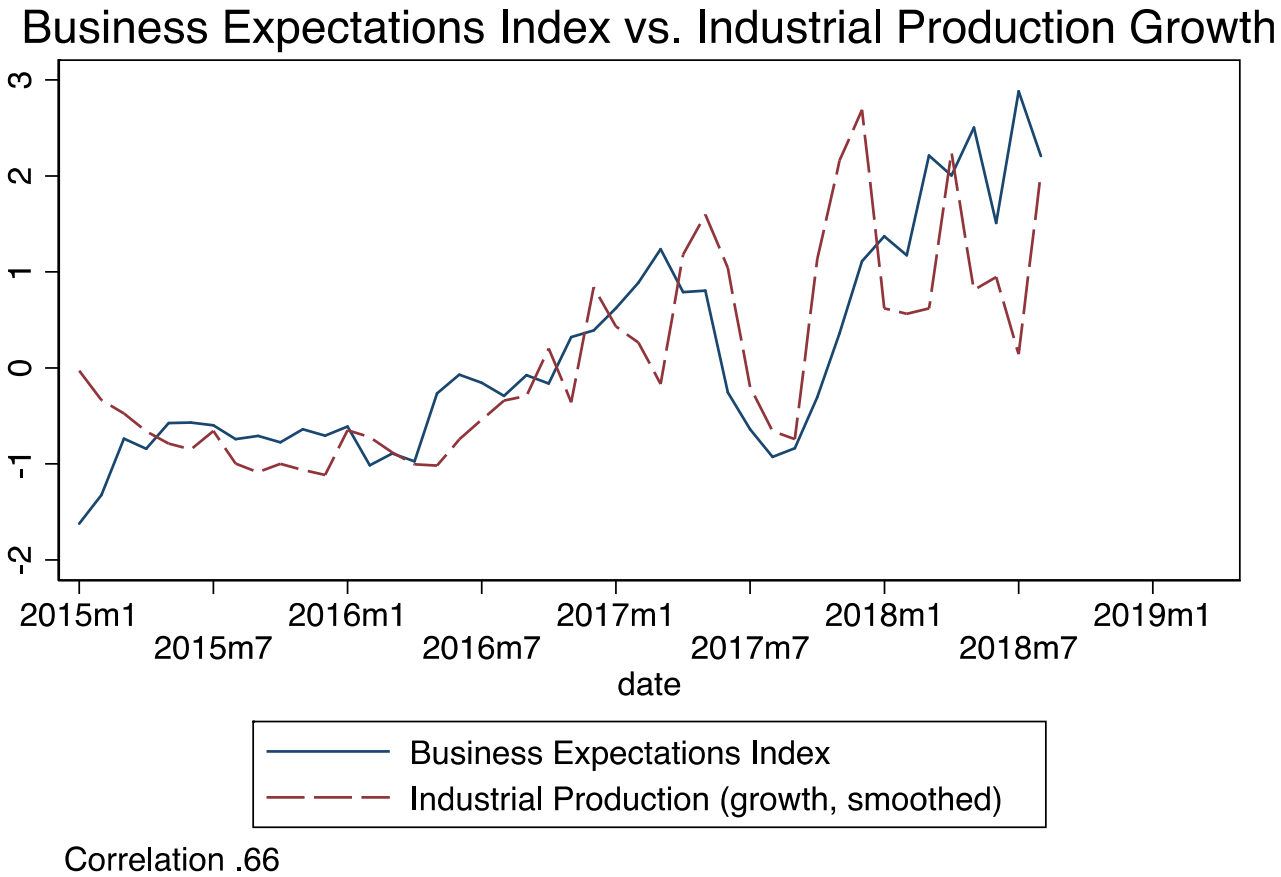
Business Expectations Index Compared To S&P 500 Movements



Correlation .30

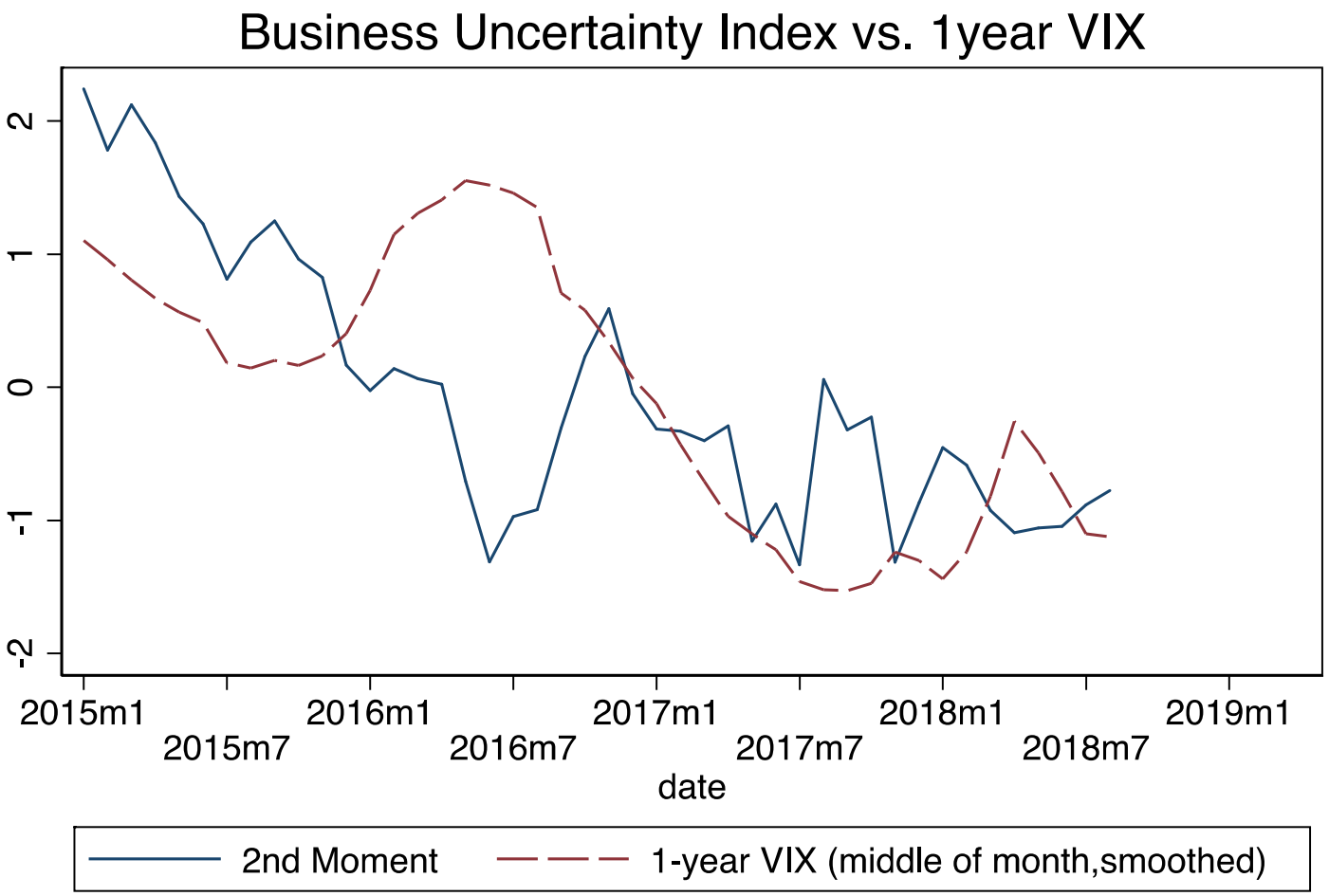
Notes: This figure shows our overall Business Expectations Index against standardized monthly S&P 500 returns between January 2015 and August 2018. We compute S&P 500 returns in month *t* as the growth rate of the dividend–adjusted S&P 500 Index (Source: Yahoo! Finance) between the 15th day of month *t–1* and the 15th day of month *t*. If the 15th is not a trading day, we try the 16th, 14th, 17th, 13th, 18th, or 12th in that order. Then, we smooth this series of monthly S&P 500 returns using the same procedure as for our Business Expectations Index and standardize the series to have mean zero and unit standard deviation during the 42 months covering January 2015 and June 2018, inclusive.

Business Expectations Index Compared to Growth in the Industrial Production Index



Notes: This figure shows our overall Business Expectations Index against the standardized monthly growth rate of the Industrial Production (IP) Index between January 2015 and August 2018. In each month we compute the growth rate of seasonally adjusted IP since the previous month and then smooth this series of growth rates using the same procedure as for our Business Expectations Index and standardize the series to have mean zero and unit standard deviation over the 42 months covering January 2015 to June 2018, inclusive.

Business Uncertainty Index Compared to the 1-year VIX



Notes: This figure shows our overall Business Uncertainty Index against the value of the 1-year VIX on the 15th day each month between January 2015 and August 2018 (Source: Yahoo! Finance). If the 15th is not a trading day, we try the 16th, 14th, 17th, 13th, 18th, or 12th in that order. We smooth the monthly VIX series using the same procedure as for our Business Uncertainty Index and standardize the series to have mean zero and unit standard deviation over the 42 month period covering January 2015 to June 2018, inclusive.