Using Surveys to Learn about the Future and Other Hard Stuff

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Hard Stuff

• Prediction in the wake of big shocks and developments that lack close precedents
• Estimating and predicting causal effects
• Understanding mechanisms behind causal effects
• Quantifying perceived uncertainty in real time and estimating its effects – brief remarks today.
• Developing portable theories of belief formation and revision – See Ma (2022).
Example 1: Predicting how the pandemic will affect working arrangements
A Prediction Challenge

Standing in spring 2020, how would you predict whether the pandemic-induced shift to WFH would stick, and to what extent?

• Historical analysis won’t deliver much in the way of quantitative predictions.
• No statistical model fit only to pre-pandemic data will provide a credible basis for prediction.
• Structural models fit to pre-pandemic data are just formalized guesses in this situation, and heavily shaped by simplifying assumptions.
A Solution: Forward-Looking Surveys

• Ask managers what they anticipate for their organizations (about which they know a lot), and aggregate.
• Ask workers what their employers say about plans for future working arrangements, and aggregate.

These approaches readily yield quantitative predictions at the aggregate level and by industry, city or region, employer characteristics, worker characteristics, etc.

Because managers & workers have limited visibility into equilibrium effects, combining survey-based anticipations with equilibrium models can potentially yield better predictions.
### Survey of Business Uncertainty (fielded May 11 - May 22 2020)

<table>
<thead>
<tr>
<th>What percentage of your full-time employees...</th>
<th>Rarely or never</th>
<th>1 full day per week</th>
<th>2 to 4 full days per week</th>
<th>5 full days per week</th>
<th>Paid working days at home as a percent of all working days</th>
</tr>
</thead>
<tbody>
<tr>
<td>...Worked from home in 2019?</td>
<td>90.3%</td>
<td>3.4%</td>
<td>2.9%</td>
<td>3.4%</td>
<td>5.5%</td>
</tr>
<tr>
<td>...Will work from home after the coronavirus pandemic?</td>
<td>73.0%</td>
<td>6.9%</td>
<td>9.9%</td>
<td>10.3%</td>
<td>16.6%</td>
</tr>
</tbody>
</table>

### BLS’ American Time Use Survey (2017-2018)

<table>
<thead>
<tr>
<th>What percentage...</th>
<th>Rarely or never</th>
<th>1 full day per week</th>
<th>2 to 4 full days per week</th>
<th>5 full days per week</th>
<th>Paid working days at home as a percent of all working days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full-Time Workers</td>
<td>89.8%</td>
<td>3.8%</td>
<td>3.8%</td>
<td>2.6%</td>
<td>5.2%</td>
</tr>
</tbody>
</table>

Reproduced from Altig et al. (2020, Chart 1)
Share of Full Paid Workdays Performed at Home in the United States, Workers 20-64, 1965 to July 2022

ATUS = American Time Use Survey
ACS = American Community Survey
SWAA = Survey of Working Arrangements & Attitudes

Reproduced from "Why Working from Home Will Stick" by Barrero, Bloom, and Davis
6. **After COVID, in 2022 and later, how often is your employer planning** for you to work full days at home?

- [ ] Never
- [ ] About once or twice per month
- [ ] 1 day per week
- [ ] 2 days per week
- [ ] 3 days per week
- [ ] 4 days per week
- [ ] 5+ days per week
- [ ] My employer has not discussed this matter with me or announced a policy about it
- [ ] I have no employer

This question goes to workers in the monthly Survey of Working Arrangements & Attitudes. See WFHresearch.com and “Why Working from Home Will Stick.”
Based on what they tell workers, companies increasingly plan for employees to work from home after the pandemic

Responses to the question:
- After COVID, in 2022 and later, how often is your employer planning for you to work full days at home?

Sample: SWAA waves from July 2020 to July 2022, excluding respondents who report having no employer. "Workers able to WFH" are those who report any WFH experience during the pandemic.

N = 82,885 (all respondents) and 58,138 (able to work from home)

Methodological Note: If the employer has not discussed post-COVID WFH plans with the employee, we impute 0 days for plan before January 2002 wave. From January 2022 onwards, we impute: 0 days if the employee is not currently WFH; the mean value of planned WFH days in the same survey wave among workers who are currently WFH 1+ days per week, otherwise.

Before the pandemic, WFH averaged about 0.25 days per week in ATUS data.
How the Planned WFH Share Varies with Local Population Density

SWAA data from Jan. 2021 to July 2022, re-weighted to match the CPS. Each dot shows the average value (across workers in zip codes in the indicated density bin) of full WFH days as a % of all workdays.
Example 2: Understanding how the pandemic catalyzed a lasting shift to WFH, and why the shift did not happen sooner and more slowly
Why the big shift to WFH will stick

1. Mass experimentation and learning → re-optimization of working arrangements

2. Investments (in time, equipment, systems, processes) by workers and firms that enable WFH

3. Attitudinal shifts:
   • Stigma around WFH has plummeted
   • Long-lingering fears of infection risks

4. A surge in innovation that supports WFH

5. Crumbling of managerial resistance in face of market pressures

6. Long pandemic entrenches shift to WFH

See Barrero et al. (2021b), Bloom et al. (2021a) and Aksoy et al. (2022).
Forced Experimentation: WFH productivity during the pandemic exceeded expectations

Compared to your expectations before COVID (in 2019) how has working from home turned out for you?

- **Hugely better** -- I am 20%+ more productive than I expected
- **Substantially better** -- I am to 10% to 19% more productive than I expected
- **Better** -- I am 1% to 9% more productive than I expected
- **About the same**
- **Worse** -- I am 1% to 9% less productive than I expected
- **Substantially worse** -- I am to 10% to 19% less productive than I expected
- **Hugely worse** -- I am 20%+ less productive than I expected

Reproduced from “Why Working from Home Will Stick” by Barrero, Bloom, and Davis
Desired and planned levels of WFH after the pandemic increase with WFH productivity surprises during the pandemic

After COVID, in 2022 and later, how often would you like to have paid workdays at home?

After COVID, in 2022 and later, how often is your employer planning for you to work full days at home?

Compared to your expectations before COVID (in 2019) how has working from home turned out for you?

Notes: This figure shows bin scatters of worker desires and employer plans for WFH after the pandemic against WFH productivity surprises during the pandemic.

Data are from 30,750 survey responses collected from July 2020 to March 2021 and reweighted to match the share of working age respondents in the 2010-2019 CPS in a given (age x sex x education x earnings) cell. We did not ask about productivity relative to expectations in May 2020.

Reproduced from “Why Working from Home Will Stick” by Barrero, Bloom, and Davis
A Similar Pattern Holds in a 27-Country Sample

This pattern holds within all 27 countries in our sample

Source: Global WFH Dataset, a multi-country version of the SWAA fielded across 27 countries in July-August 2021 and January-February 2022. See Aksoy et al. (2022).

Most countries are in Europe, but the sample includes Australia, Brazil, China, Egypt, India, Japan, Malaysia, South Korea, Taiwan, and Turkey. The chart at left uses the pooled sample. Vertical scale: How many days per week, on average, employers plan for respondents to WFH.

Reproduced from Aksoy et al. (2022).
Using Surveys to Assess and Predict Causal Effects

1. How would the Tax Cuts and Jobs Act, if passed, affect business investment? See Altig et al. (2018), who use data from forward-looking questions in the SBU.

2. How will tariffs and trade policy uncertainty during the Trump administration affect business investment? See Davis (2018) and Altig et al. (2019).

3. How would better access to high-quality internet service in American homes affect labor productivity, potential output and economic resilience to future pandemic-like disasters? See Barrero et al. (2021a).

4. How (much) will the shift to remote work affect wage-growth pressures in the current environment? See Meyer et al. (2022) and below.

5. How (much) do infection worries currently depress labor force participation and potential output. Will those effects last? See Barrero et al. (2022) and below.
Example 3: The big shift to remote work lessens wage-growth pressures (for a time)
Figure 2: Percent of Firms that Will Let Employees WFH to Moderate Wage-Growth Pressures in the Next 12 Months

Over the next 12 months, will your firm let employees work from home (or other remote location) at least one day per week to restrain wage-growth pressures?

<table>
<thead>
<tr>
<th></th>
<th>Share of &quot;Yes&quot; responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall (N=547)</td>
<td>40.8</td>
</tr>
<tr>
<td>Large, 250+ employees (N=83)</td>
<td>55.4</td>
</tr>
<tr>
<td>Small, &lt;250 employees (N=463)</td>
<td>38.0</td>
</tr>
<tr>
<td>Goods producers (N=147)</td>
<td>29.3</td>
</tr>
<tr>
<td>Retail and wholesale trade,</td>
<td>41.9</td>
</tr>
<tr>
<td>Transportation and warehousing,</td>
<td></td>
</tr>
<tr>
<td>Leisure and hospitality (N=101)</td>
<td>25.7</td>
</tr>
<tr>
<td>Educational services,</td>
<td>52.6</td>
</tr>
<tr>
<td>Health care and social assist.,</td>
<td></td>
</tr>
<tr>
<td>Other services (N=31)</td>
<td></td>
</tr>
<tr>
<td>Finance and insurance,</td>
<td></td>
</tr>
<tr>
<td>Real estate and rental and leasing,</td>
<td></td>
</tr>
<tr>
<td>Professional and business services,</td>
<td></td>
</tr>
<tr>
<td>Information (N=268)</td>
<td></td>
</tr>
</tbody>
</table>

Reproduced from Altig et al. (2022), based on special questions fielded to hundreds of U.S. firms in the April and May 2022 waves of the Survey of Business Uncertainty.
Wage-Growth Restraint Due to the Rise of Remote Work Over the Two-Year Period Centered on April/May 2022 (Percentage points)

<table>
<thead>
<tr>
<th>Mean Cumulative Wage-Growth Moderation Over Two Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unweighted</td>
</tr>
<tr>
<td>-------------</td>
</tr>
<tr>
<td><strong>Overall</strong></td>
</tr>
<tr>
<td>Small Firms (fewer than 250 employees)</td>
</tr>
<tr>
<td>Large Firms (250 or more employees)</td>
</tr>
<tr>
<td>Goods Producers</td>
</tr>
<tr>
<td>Retail and Wholesale Trade, Transportation and Warehousing, Leisure and Hospitality</td>
</tr>
<tr>
<td>Education, Healthcare, Social Assistance, Other services</td>
</tr>
<tr>
<td>FIRE, Professional and Business Services, Information</td>
</tr>
</tbody>
</table>

This table reports size-weighted means tabulated from special SBU questions fielded from 11-22 April and 9-20 May 2022. **Source:** Altig et al. (2022, who draw on the responses to special questions in the April and May 2022 waves the SBU. Survey of Business Uncertainty conducted by the Federal Reserve Bank of Atlanta, Stanford University, and the University of Chicago Booth School of Business.
Example 4: How infection worries and long social distancing affect labor force participation and potential output
Abstract for “Long Social Distancing”
Barrero, Bloom and Davis (2022)

More than ten percent of Americans with recent work experience say they will continue social distancing after the COVID-19 pandemic ends, and another 45 percent will do so in limited ways. We uncover this Long Social Distancing phenomenon in our monthly Survey of Working Arrangements and Attitudes. It is more common among older persons, women, the less educated, those who earn less, and in occupations and industries that require many face-to-face encounters. People who intend to continue social distancing have lower labor force participation – unconditionally, and conditional on demographics and other controls. Regression models that relate outcomes to intentions imply that Long Social Distancing reduces labor force participation by 2.5 percentage points in the first half of 2022. Separate self-assessed causal effects imply a reduction of 2.0 percentage points. The impact on the earnings-weighted participation rate is smaller at about 1.5 percentage points. This drag on participation reduces potential output by nearly one percent and lowers the college wage premium. The evidence also suggests that Long Social Distancing and its effects will persist for many months or years.
Table 3. Based on self assessments, infection worries depressed LF participation by 2.0 percentage points as of February-July 2022

From “Long Social Distancing” by Barrero, Bloom and Davis (2022)

<table>
<thead>
<tr>
<th>Question: Are worries about catching COVID or other infectious diseases a factor in your decision not to seek work at this time?</th>
<th>Percent of Those Currently Out of the Labor Force</th>
<th>Percent of full sample</th>
<th>Percent of labor force non-participation determined by fear of infection</th>
<th>Implied Drag on LF Participation Rate (ppts)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes, the main reason</td>
<td>9.3</td>
<td>1.2</td>
<td>100</td>
<td>1.2 (0.07)</td>
</tr>
<tr>
<td>Yes, a secondary reason</td>
<td>12.5</td>
<td>1.6</td>
<td>50</td>
<td>0.8 (0.04)</td>
</tr>
<tr>
<td>No</td>
<td>78.1</td>
<td>10.2</td>
<td>0</td>
<td>0.0 (-)</td>
</tr>
<tr>
<td>Does not apply: currently working or unemployed (furloughed or seeking work)</td>
<td>-</td>
<td>86.9</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Observations | 2,739 | 27,632 |

Notes: Column 1 shows the distribution of responses to the question shown at the top left among respondents who are out of the labor force (not working and not seeking work). Column 2 shows the distribution among the full sample, including respondents who didn't see the question because they are in the labor force (employed or unemployed). Column 3 assigns numerical values representing how much of a respondent's decision not to participate in the labor force comes from worries about catching COVID or other infectious diseases, as a function of their response to the survey question at the top left. Column 4 computes the implied drag of infection fears on labor force participation by multiplying the coefficient from the second column with the percent/100 from the third column. Data are from the February to July 2022 SWAA waves.
Effect on Potential Output

On an earnings-weighted basis, we estimate that infection worries lower LF participation by 1.4 percentage points in the first half of 2022.

Thus, using a production function with labor input elasticity of (2/3), LSD depresses potential output by

\[ 1 - (0.986)^{\frac{2}{3}} = 0.0094, \text{ or nearly one percent} \]

This level effect on potential output will diminish if, and as, (a) infection worries dissipate and (b) people find ways to address their infection worries while working – e.g., by finding a job that allows working from home.
Grappling with uncertainty and its effects
Remarks on Uncertainty, 1

• Businesses, households, and policymakers grapple with uncertainty in forming plans and making decisions.

• We would like to track the uncertainty that agents perceive in their external environments and the uncertainty they perceive about own future outcomes, e.g., a firm’s future sales.

• A standard approach maintains rational expectations and some form of stationarity, so that past conditional volatility can serve as the basis for inferences about uncertainty over future outcomes.

• There is a now-large body of evidence that subjective expectations deviate systematically from the expectations implied by rational expectations with full use of available information.
Remarks on Uncertainty, 2

- The extent and nature of uncertainties change over time, sometimes quite abruptly, dramatically altering the outlook for decision makers.
  - The 9/11 terrorist attacks
  - The Global Financial Crisis (GFC) of 2007-09
  - The Arab Spring in the early 2010s
  - June 2016 Brexit referendum
  - Dramatic escalation of trade policy tensions during Trump Administration
  - The coronavirus pandemic of 2020 –
  - The Russian invasion of Ukraine in 2022 and the ensuing war
- Relying on stationarity to quantify uncertainty is problematic amidst developments that constitute sharp breaks from the past. But that’s also when it’s especially vital to quantify expectations and uncertainty.
Remarks on Uncertainty, 3

• Other prominent approaches rely on financial market indicators (e.g., the VIX) or newspapers and other text sources to construct uncertainty measures, as in Baker et al. (2016).

• While valuable, these approaches may not adequately capture the subjective uncertainty that agents perceive, which presumably is what drives their decisions.

• Using surveys of American firms and manufacturing establishments, respectively, Altig et al. (2022) and Bloom et al. (2020) find that perceived uncertainty about own future outcomes has strong predictive power for the absolute size of realized forecast errors – even after controlling for a battery of observable business characteristics and past volatility at the establishment, firm, and industry levels.
Subjective uncertainty about own-plant sales growth rates is highly predictive of forecast errors.

Notes: The 2017 expectation errors are calculated as the difference between realized and expected growth rates of sales. For expected growth rate we use as base year the MOPS 2015 quantity, and for 2017 the 2017 forecast. Subjective uncertainty is the S.D of the reported subjective distribution of sales growth rates from MOPS 2015.

Reproduced from Bloom et al. (2020).
Subjective Uncertainty Predicts Absolute Forecast Errors, U.S. Firms in the Survey of Business Uncertainty

Subjective Uncertainty and subsequent expectation revisions, American Firms in the SBU

Notes: This figure shows two bin-scatter plots. On the horizontal axis, both show 50 quantiles of subjective uncertainty for sales growth rates over the next four quarters, measured in month t. Both have on the vertical axis the absolute value of the change in sales growth rate expectations from months t to t+2 (or t+3). On the left, we show the relationship in the raw panel data, while on the right we show the relationship controlling for firm and time fixed effects. We report the underlying firm-level regressions with firm-clustered standard errors at the bottom of each figure, using SBU data from 10/2014 to 10/2019.
What Can Central Banks Do?

1. Support high-quality surveys of business decision makers that elicit data on their expectations, subjective uncertainty, attitudes, reasoning, ...
   • Beyond the capabilities of most academic research teams.
   • Academics also have less interest in real-time predictions and policy assessments.
   • Yields data that helps inform decision-making about monetary policy. See Raphael Bostic on this point.
What Can Central Banks Do?

2. Underwrite the systematic assessment of question design in household and business surveys that elicit expectations, subjective uncertainty, attitudes, etc., and their relationships to decisions and outcomes.

• This is unsexy research and not well rewarded in scholarly journals. But it’s essential for developing high-quality survey data that yield useful predictions, sound assessments of causal effects, and a solid foundation for scientific progress and forward-looking policy analysis.
References


