Northeast Regional Center for Rural Development
COVID-19 Issues Brief

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Google Searches Predict Initial Unemployment Insurance Claims

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The COVID-19 pandemic has produced historically unprecedented numbers of layoffs, leading to surges in the number of unemployment filings: over 26 million Americans have filed claims for unemployment benefits (New York Times, 4/23/2020). In this brief we show how Google Trends searches predated or anticipated these filings, and how they were propagated across the different states as the coronavirus took its toll. Google Trends analysis has been used in a growing number of studies to "nowcast" economic variables (Baker & Fradkin, 2017; Choi & Varian, 2012; D'Amuri & Marcucci, 2017; Pavlicek & Kristoufek, 2015), as well as the spread of disease, including now COVID-19 (Carneiro & Mylonakis, 2009; Ginsberg et al., 2009; Mavragani, 2020; Mavragani et al., 2018; Nuti et al., 2014; Strzelecki & Rizun, 2020; Walker et al., 2020).

At the national level, confirmed COVID-19 cases have been rising at first gradually and then more steeply in March. At about the same time, initial unemployment claims filings started to rise around March 14 (Fig. 1). Importantly, Google searches nationally on "file for unemployment" and "unemployment benefits" began to rise on March 16, one week before the official unemployment statistics were reported. Table 1 shows the Spearman correlation coefficient matrix among initial claims, confirmed cases, and Google Trends, using state-level cross-sectional data during the period of March to April, 2020. These terms are all positively correlated. [1]

Table 1. Spearman correlation coefficients of Initial claims, confirmed cases, and Google Trends (GT) search

	Initial claims	Confirmed cases	GT: file for unemployment	GT: unemployment benefits
Initial claims	1.000	0.862	0.272	0.534
Confirmed cases	0.862	1.000	0.205	0.472
GT: file for unemployment	0.272	0.205	1.000	0.316
GT: unemployment benefits	0.534	0.472	0.316	1.000

Data sources: Initial claims are the cumulative initial claims from March 21 to April 18, obtained from the U.S. Department of Labor; Confirmed cases are the cumulative cases on April 20, obtained from *New York Times*; Google Trends are queried from March 1 to April 25.

[1] The Pearson correlation coefficients across these variables are also positively correlated with smaller correlation coefficients.

Figure 2 shows the same search patterns at the level of individual states. To put the comparison of Google Trends and initial claims into context, we use the shaded areas to indicate the period when the first COVID-19 case was confirmed up to the present and the dashed line to indicate the date the statewide stay-at-home order was issued.[2] The states are sorted by the date of the first reported confirmed case. Noteworthy in this figure is that the searches started much later than the dates of the first reported cases in the early reporting states, while in the later-reporting states the searches started much earlier. For example, in the last 5 states reporting cases, the searches started well in advance of the first case reported as workers saw the writing on the wall. Also, in Delaware, North Dakota and Wyoming the searches coincided with the filings, while in Alaska the filings occurred before the searches, perhaps because of reduced broadband availability in that state.

Figure 3 shows some similarity among these data on national state-level maps. Especially, people in Michigan, Nevada, and the Mid-South searched for "file for unemployment" more frequently than was true in other states. Maps for initial claims, the share of initial claims in unemployment-insurance covered employment, and the share of employment in exposed sectors[3] also show darker colors in these states.

We conclude from the above that Google Trends can be used as a leading indicator to predict real-time economic conditions and responses in labor markets. Monitoring Google Trends could be helpful for taking advance actions to potentially mitigate the effects of future shocks.

Note on Methods and Data source:

1. Google Trends reflect how intensively people search for a word in a region during a period of time. While useful, it is not without limitations. See, e.g., https://medium.com/@pewresearch/using-google-trends-data-for-research-here-are-6-questions-to-ask-a7097f5fb526
2. Google trends data can be time series for a particular region, and it can also be used cross-sectionally for a set of regions during a defined time period. In either form, the data are always standardized to have values from 0 to 100, reflecting from close to zero to maximal popularity of a key word at a time or in a region.
3. We searched keywords, such as "file for unemployment", "unemployment benefits", and "initial claims". We performed two types of searches. For the time series data, we searched the terms from January 1, 2019 to April 25, 2020, which shows the long-term trend for a word in the U.S. and each state. For cross-sectional data, we searched the terms for all states in the U.S during the period from March 1 to April 25, 2020, which is used to compare people's searching behavior in different states.
4. Other data used:
    a. U.S. Department of Labor. We downloaded the state-level initial calms from Januray 5, 2019 to April 18, 2020.
    b. COVID-19 from NYTimes. We compare the trend of the confirmed cases with those for Google Trends and initial claims during the pandemic.
    c. U.S. Bureau of Labor Statistics. BLS provides an estimate of the share of employment in the exposed sectors that were affected by the pandemic and shut-down orders.

[2] The dates of statewide stay-at-home orders are based on an article of New York Times, https://www.nytimes.com/interactive/2020/us/coronavirus-stay-at-home-order.html. For states where only partial stay-at-home orders were issued, we used the first day when the order was placed at the county or city level. Five states without any stay-at-home order are indicated in Figure 2.

[3] The map for exposed sectors is based an article of the U.S Bureau of Labor Statistics (Dey & Loewenstein, 2020), in which the exposed sectors include restaurants and bars, travel and transportation, entertainment, etc. For more details, please read the article, https://www.bls.gov/opub/mlr/2020/article/covid-19-shutdowns.htm.

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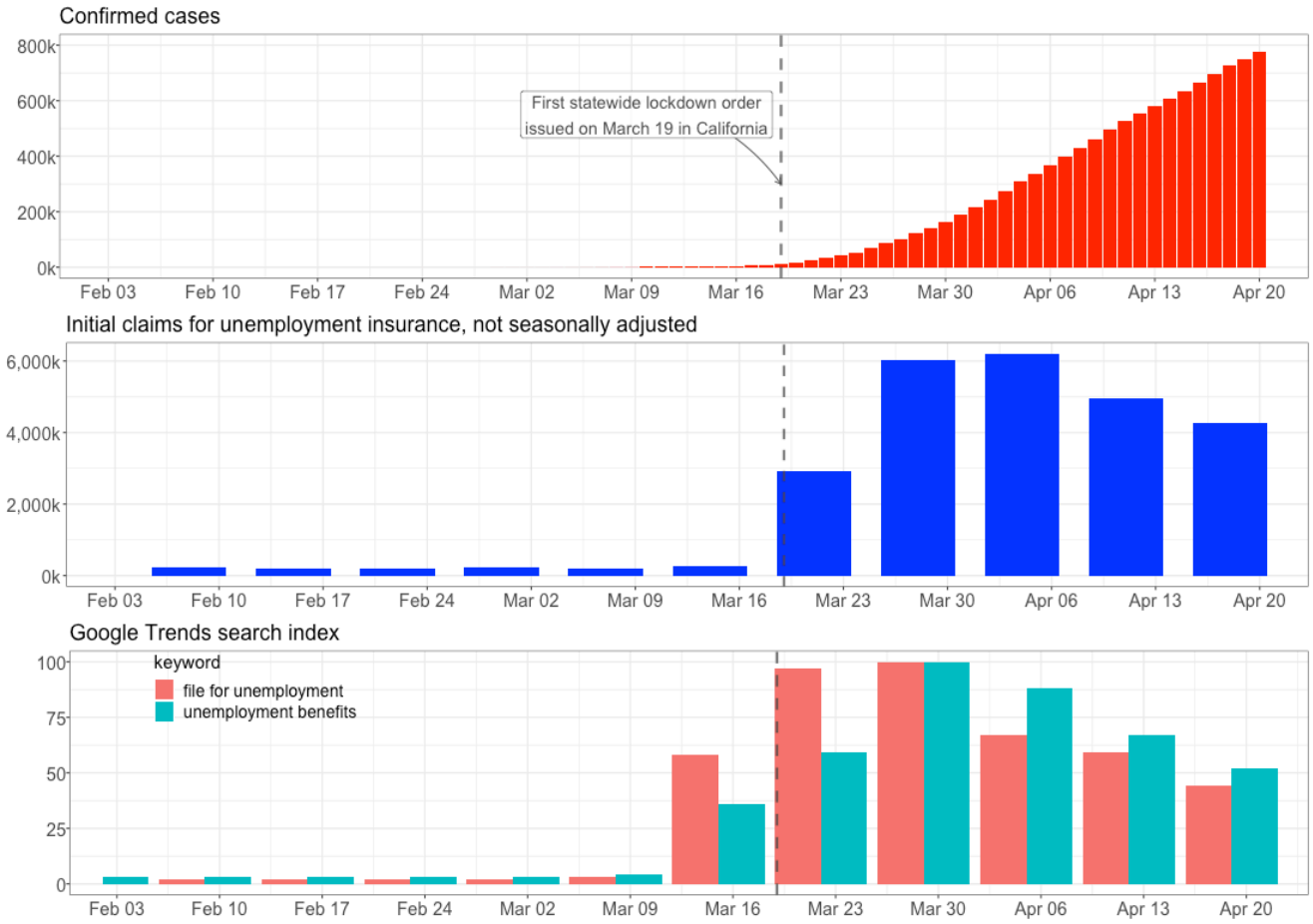

Figure 1: Time series of COVID-19 confirmed cases, Google Trends, and initial claims for unemployment insurance. Data source: U.S. Department of Labor, New York Times, and Google Trends.

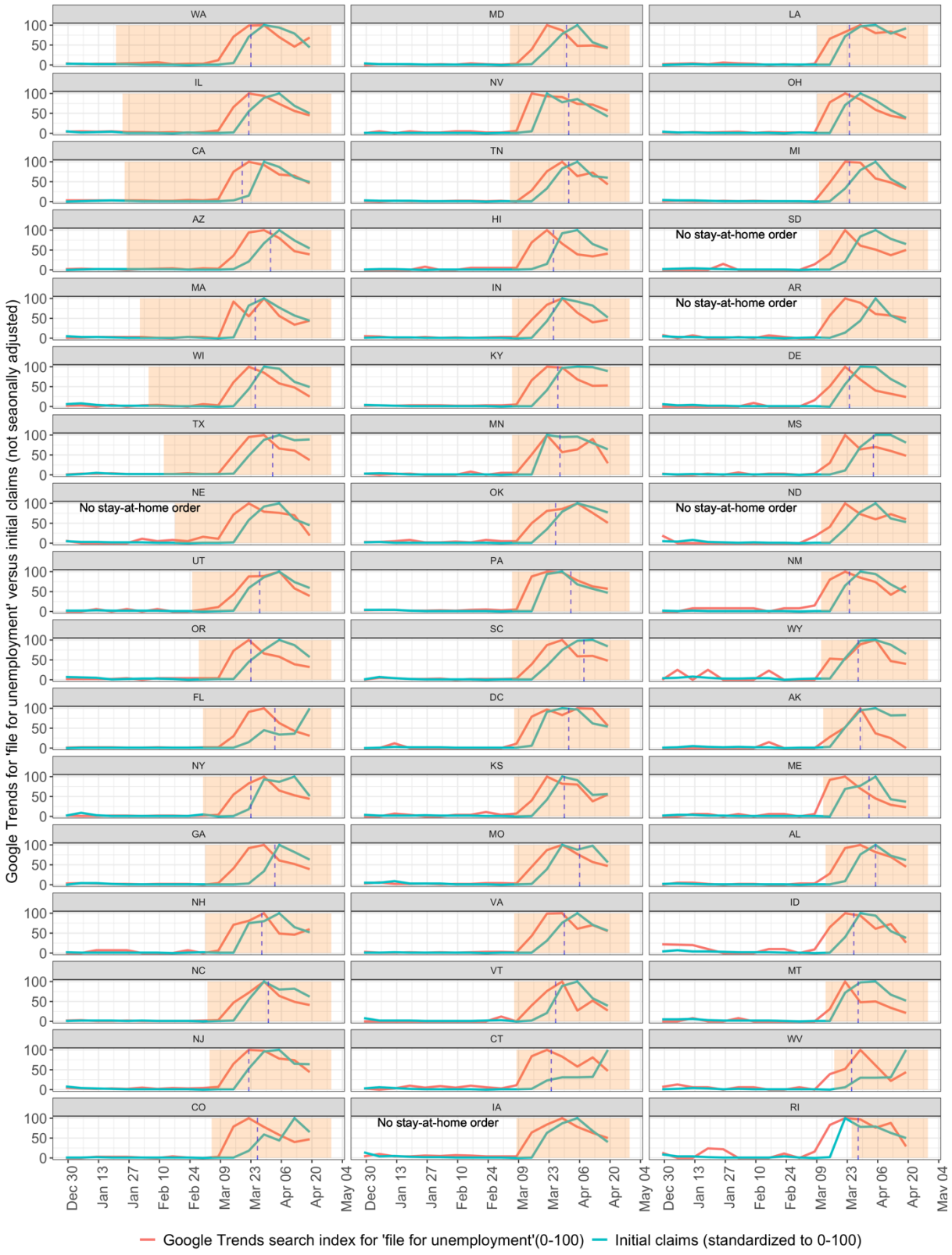

Figure 2. Time series by state for Google Trends and initial claims for unemployment insurance. Data source: the same as in Figure 1.

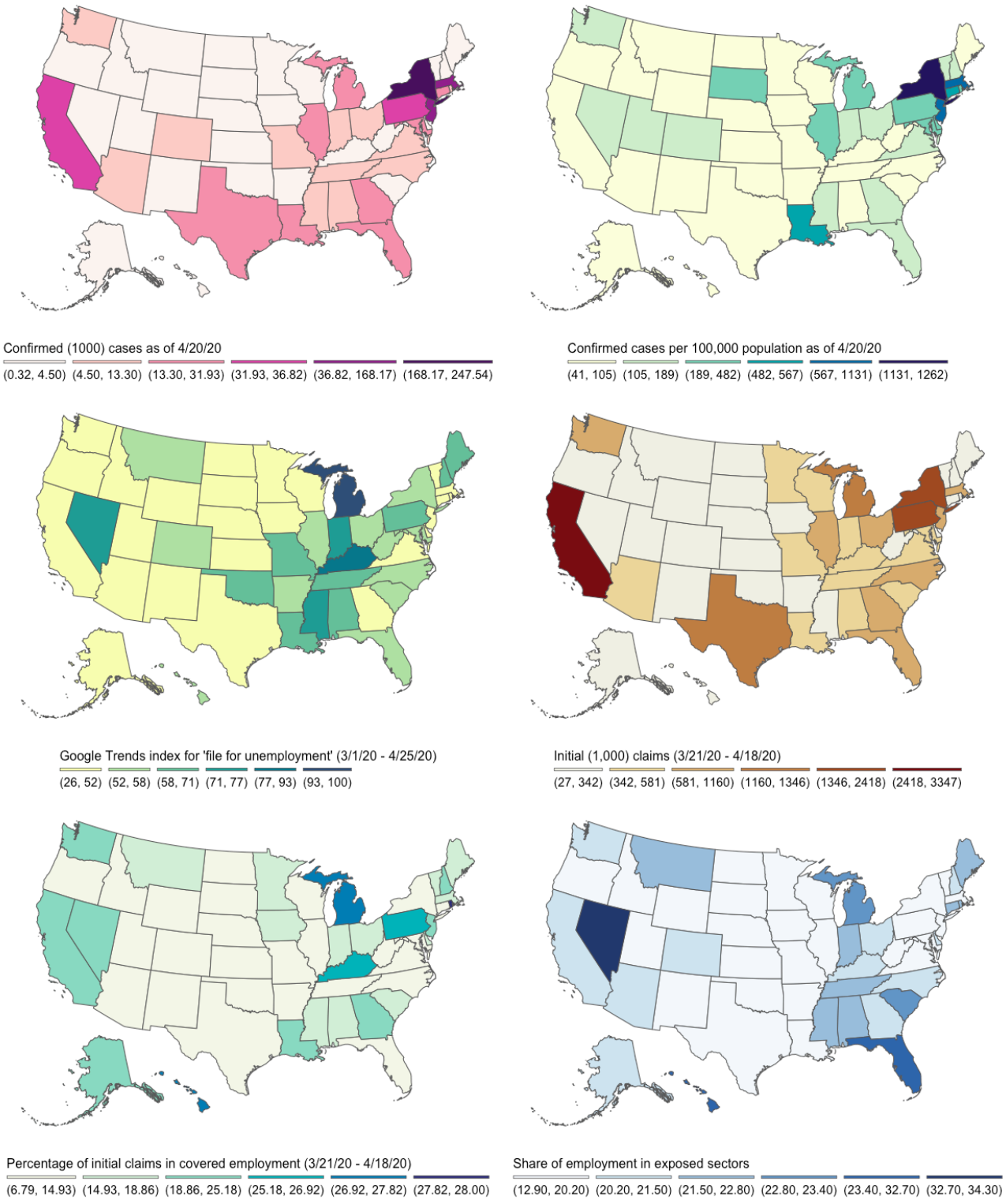

Figure 3. Maps for COVID-19 confirmed cases, Google Trends, and initial claims for unemployment insurance. Data source: the same as in Figure 1 and U.S. Bureau of Labor Statistics

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