Insights on unemployment, unemployment insurance, and mental health

Nathan Tefft *

Department of Economics, Bates College, 271 Pettengill Hall, Lewiston, ME 04240, United States

A R T I C L E   I N F O

A B S T R A C T

This paper contributes to the growing literature on the relationship between business cycles and mental health. It is one of the first applications in the economics literature to incorporate data on web searches from Google Insights for Search, and these unique data allow the opportunity to estimate the association between weekly unemployment insurance (UI) claims, in addition to monthly unemployment rates, and search indexes for "depression" and "anxiety". Results from state fixed effects models yield (1) a positive relationship between the unemployment rate and the depression search index and (2) a negative relationship between initial UI claims on the one hand and the depression and anxiety search indexes on the other. A lag analysis also shows that an extended period of higher levels of continued UI claims is associated with a higher depression search index.

1. Introduction

This paper adds to the growing literature on the relationship between business cycles and health. Previous studies have focused on the relationship between unemployment levels and a range of health outcomes including both mortality and morbidity (see Ruhm, 2005 for example). Recent business cycle changes and the availability of new data offer two advantages that are leveraged here. First, the "Great Recession" of 2007[1,2] is widely believed to be the worst recession in the U.S. since the Great Depression, notably with an extended duration of high levels of unemployment. Insofar as this recession is different from those previously studied it is important to measure its potentially unique effects on population health.

Second, data that have recently been made available by Google through the product Google Insights for Search[3] (GI) allow a unique view on how people may respond to business cycles regarding their health. These data allow for the comparison of an index of Google searches within U.S. states and by week for specific search terms. This paper explores the relationship between unemployment and unemployment insurance (UI) claims and Google searches for "depression" and "anxiety". To flesh out the relationship, evidence is presented suggesting that these searches are meaningful representations of the intent to understand or seek treatment for symptoms of psychological distress that are experienced at the time of search. Broadly speaking, the results suggest that unemployment and continued UI claims are positively associated with searches for depression while initial UI claims are negatively associated with searches for depression and anxiety (with a more negative association in states with more generous unemployment insurance benefits).

There are several contributions to the literature made by this paper. It is one of the first to simultaneously examine the effects of unemployment and UI on measures related to psychological distress. It is also one of the first to introduce GI in the economics literature, which in this case allows for a precise analysis of weekly reported UI claims. Finally, it adds to the large but growing literature on the relationship between macroeconomic conditions and mental health.

The paper proceeds as follows. First, I describe previous literature that (a) explores the relationship between business cycles and mental health and (b) introduces the GI data. Next, I outline the empirical framework and provide a detailed data description. Results on the relationship between unemployment, UI, and searches are presented including robustness checks, a lag analysis,

---

* Tel.: +1 207 786 6069; fax: +1 207 786 8337.
E-mail addresses: nathan.tefft@bates.edu, ntefft@bates.edu

[1] The term "Great Recession" has been used to refer to previous recessions, but presently it is known to refer to the most recent recession (Rampell, 2009).

[2] The National Bureau of Economic Research (2010) has identified the beginning of the most recent recession to be December 2007.

[3] See http://www.google.com/insights/search/ (accessed 25.08.10).

timing effects of UI receipt, and pre- and post-recession effects. In the last section I conclude.

2. Background

A large number of studies have examined the relationship between aggregate economic conditions and health, with a focus on unemployment. In a series of papers using similar empirical strategies to that employed here, Ruhm (2000) finds that aggregate mortality is procyclical but mortality from suicide is not, suggesting a worsening of psychological distress during economic downturns. Ruhm (2003) finds that an increase in the unemployment rate has a positive association with the self-reported prevalence of non-psychotic mental disorders. Studying data on happiness and its relationship with macroeconomic conditions, Clark and Oswald (1994) and Di Tella et al. (2001) find that higher levels of unemployment are linked with lower reported happiness. Dooley et al. (1996) and Burgard et al. (2005) report on a large number of studies supporting the positive effects of unemployment on suicide, depression, physician consultations, illness episodes, and substance abuse.

Relatively few studies have considered the effects of changes in UI claims on health in the U.S. Kessell et al. (2006) find that an increase in initial UI claims is associated with increased involuntary admission to psychiatric services in Florida. Wallace and Haveman (2007) show that discrepancies between earnings reports from administrative UI data and employer surveys are associated with a higher level of measures of hardship.

There is a small but growing economics literature that incorporates GI data. Choi and Varian (2009) show that data on Google searches can improve forecasts for a range of economic time series. Askitas and Zimmerman (2009) find strong correlations between searches and unemployment rates using monthly data from Germany. Kahn and Kotchen (2010) find that an increase in the state unemployment rate is associated with a decrease in searches related to public concern for the environment. An application of GI in population health analyzes influenza trends inferred from Google searches (Pelat et al., 2009).

3. Data

The primary outcomes of interest are indexes of Google searches for the terms "depression" and "anxiety" exported from the "health" category of the GI online tool.[4] These terms were selected because they are both commonly recognized and refer to two categories of predominantly non-psychotic mental disorders that frequently occur.[5] Previous research on Internet use suggests that a substantial proportion of individuals with Internet access use search engines to find health information. Baker et al. (2003) report that approximately 40% of respondents with Internet access reported using the Internet for health information in 2001, including information about chronic conditions such as depression.

Fig. 1. GI normalized depression index, U.S. (2004–2009).

Lam-Po-Tang and McKay (2010) found that 79.9% of patients attending two psychiatric practices used the Internet specifically to search for symptoms about mental disorders. Berger et al. (2005) report that Internet users who self-reported a stigmatized condition, including anxiety and depression, were significantly more likely to have used the Internet for health information than respondents with non-stigmatized conditions. Weaver et al. (2010) found that illness-only information seekers reported fewer positive health assessments and a higher occurrence of health risk factors than non-seekers, suggesting that individuals who search for illness information also suffer from illness. These results together suggest that individuals suffering from prevalent mental disorders such as anxiety and depression are likely to have searched for related health information.

Search data are available from 2004 to the month prior to export, and here data through 2009 are used (data from 2010 were dropped when merged). Exports are available by state, so the index values generated for each state are comparable within that state. Larger GI index values indicate that a larger proportion of all searches during that week were made for that search term.[6] In the analysis I adopt a standard normal transformation of the exported search indexes such that the normalized distribution for each state across time has a mean of zero and a variance of one.[7] This normalization combined with the use of state fixed effects models allows for a common interpretation of the coefficients across estimated models.

Figs. 1 and 2 offer visual representations of the GI data for the entire U.S. Both time series show a general decline in the proportion of searches for depression and anxiety, likely due to a broadening use of Google searches over time.[8] The cyclical patterns suggest that web searches for both depression and anxiety in part reflect psychological distress experienced at the time of search. Fig. 1, for example, reveals consistently lower depression search activity during the summer months (with the trough often in August) with activity peaking in the winter months. Fig. 2 reveals a similar pattern, although perhaps not as pronounced. These patterns are broadly consistent with findings in literature investigating

---

[4] According to GI documentation, categories of searches are provided in order for the user to restrict attention to relevant search term meanings. For example, selecting the "health" category excludes the possibility that searches for "depression" refer to the Great Depression. For more information on how categories are constructed, see http://www.google.com/support/insights/bin/answer.py?hl=en&answer=94792 (accessed 04.12.10).

[5] A summary report from the National Institute of Mental Health finds that 9.5% of American adults have a mood disorder, all of which may include depressive symptoms (http://www.nimh.nih.gov/health/publications/the-numbers-count-mental-disorders-in-america/index.shtml (accessed 29.11.10)). The report also finds that 18.1% of American adults have an anxiety disorder in a given year. These rates of prevalence are among the highest of all mental disorders.
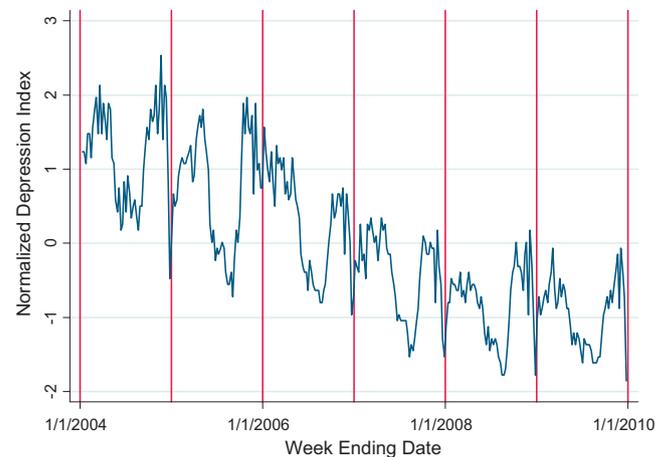
[6] More information on how Google constructs its search indexes can be found at http://www.google.com/support/insights/?hl=en-US (accessed 03.12.10).

[7] This is a similar strategy to that implemented by Kahn and Kotchen (2010).

[8] Google notes that there is often an overall downward trend across years in many search indexes (see http://www.google.com/support/insights/bin/answer.py?hl=en&answer=92769 (accessed 03.12.10)). A downward trend often means that the share of all queries is decreasing and that the absolute number of searches may not be decreasing. The inclusion of year fixed effects in all regression models accounts for much of these trends across years.