Extreme Heat and Fatal Car Accidents

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Abstract

1 Introduction

2   Data

Historical temperature data is available from the Daily Global Historical Climatology Network (Menne et al., 2012). They provide data for about 1200 measurement stations across the United States. Based on the stations' coordinates they can be matched to the county they are in. Thus, temperature data can easily be aggregated to the county level. For counties with more than one measurement station, I take the mean among those.

Similar to Habeeb et al. (2015) I define an extreme heat event as any day on which the temperature exceeds the 85th percentile of July and August temperatures. The quantile can be varied as a robustness check.

The National Highway Traffic Safety Administration provides data on fatal car accidents in their Fatality Analysis Reporting System (FARS). This includes every fatal accident between 1975 and 2020, including date and county information.
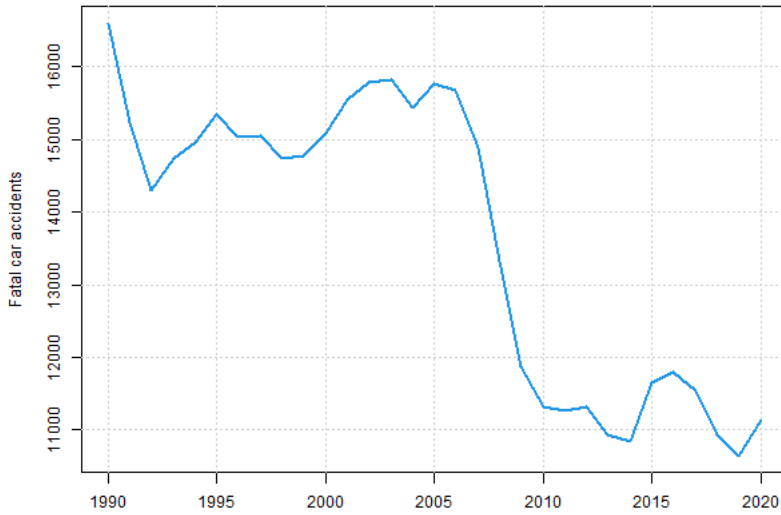

Figure 1: Fatal car accidents by year

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3 Empirical Strategy

Variation in weather is quasi-random, but due to the panel nature of the data there may still be confounders. Over time vehicles have become much safer and therefore the number of fatal accidents has decreased substantially. At the same time the frequency of heat events has increased due to climate change (see e.g. Habeeb et al., 2015). Thus, we need to condition on the point in time to identify the causal effect.
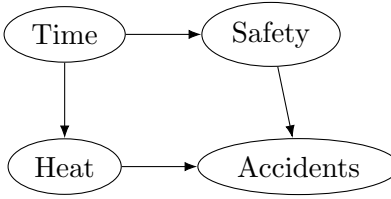

Figure 2: Directed acyclic graph of the effect

The number of fatal accidents by day and county closely follows a Poisson distribution (see figure 3). Thus, a poisson panel model with time fixed effects as proposed by Hausman et al. (1984) seems to be an attractive option.
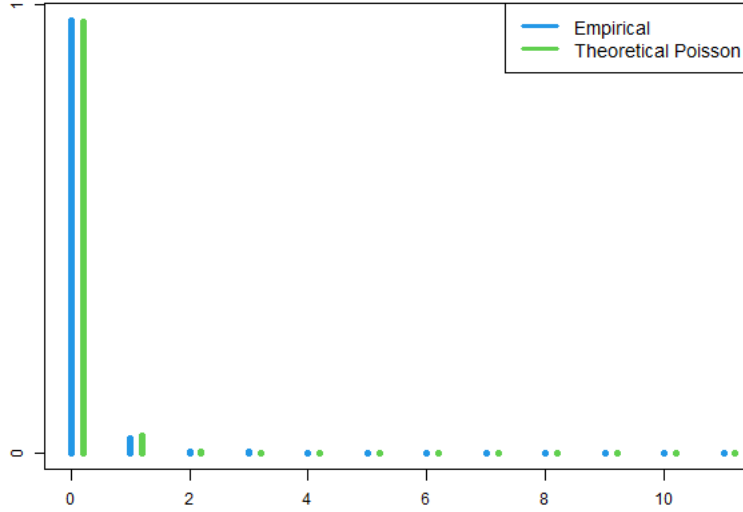

Figure 3: Probability mass of fatal car accidents and theoretical Poisson distribution

4 Results

5   Conclusion

References

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