

1013Report

Boyang

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Introduction

Traffic safety is a global concern and a socio-economic aspect and therefore agencies have focused on enacting preventive measures, such as speed limits, DUI laws and seatbelt enforcement. However, the annual number of traffic accidents and fatalities have not yet significantly decreased. Apart from regulatory safety policies, macroeconomic factors, such as median household income and unemployment rate, could also exert great influence on traffic fatalities. Economic factors are likely to have an impact on traffic fatalities since people with higher income levels are tend to demand higher level of public safety.

Understanding the relationship between economic conditions and traffic fatality can help us identify counties that might be at a higher risk for fatal crashes. The purpose of this study was to estimate association between economic conditions and traffic fatalities among counties in Maryland state. Using exploratory analysis and regression models, including linear regression and count-data regression methods, we showed that positive associations between favorable economic conditions (high median household income and high employment rate) and high traffic safety, even adjust for seasonality and weather conditions. Our results also showed that are among the top five area that might be at a higher risk for fatal crashes compared to other counties in Maryland. Therefore, state public policy makers should take this factor into consideration when allocating traffic safety related resources.

Methods

Data collection

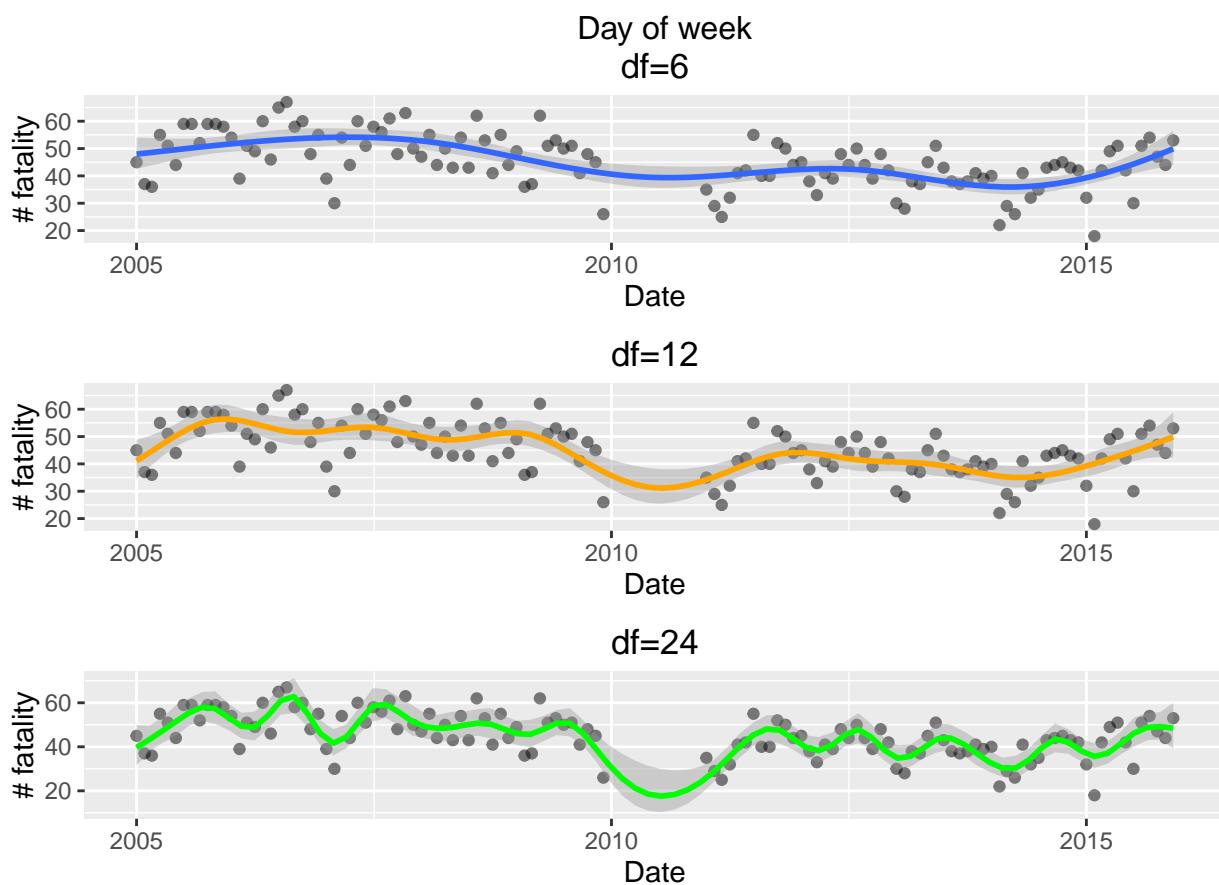
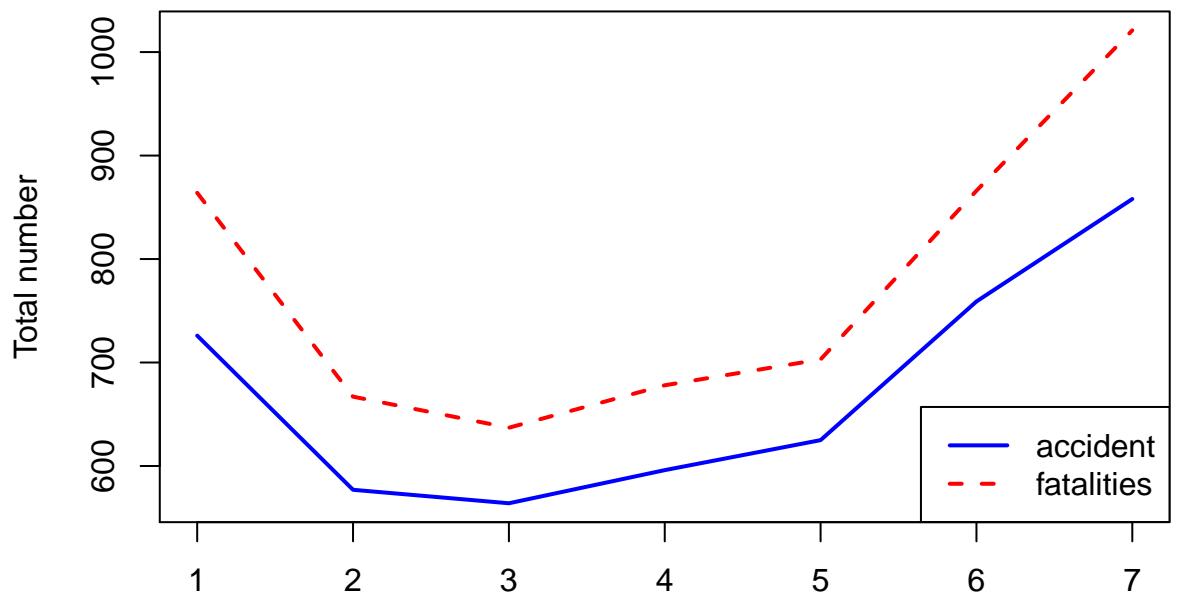
The data used in this research is obtained from the Fatality Analysis Reporting System of the National Highway Traffic Safety Administration from 2005 to 2015. Population estimates of each county in Maryland State from 2005 to 2015 was obtained from U.S. Census Bureau. Monthly unemployment rate data by county from 2005 to 2015 was obtained from Local Area Unemployment Statistics. Annual county's median household income from 2006 to 2014 was obtained from Maryland State Data Center. These data were downloaded either online by hand or by using the R programming language on October 12,2015.

Exploratory analysis

We performed transformation on the raw data based on assumptions that we make. For instance, we assume that unemployment rate would not change significantly within a month in a specific region and county-level population remained the same throughout a year. Also, we organized data in the same format by concatenating all accident files based on shared variables, extracting county-level information in Maryland, merging monthly unemployment rate data and median household income data with respect to each county and formatting them in a single data file. Moreover, we identified missingness and determined factors used in regression model relating to traffic fatality.

Time varying factors

Trend of #accidents in a week



There is evident showing that seasonality of traffic fatality exists. Also, when we have a closer look at day of week, we observe that a strong “weekend effect”, with comparably higher accident rate across years.

Geographical viewpoint

Regression

Linear Regression

Poisson Regression