

Week 10

Group 22

University of Melbourne

May 13, 2021

1 First Section — Data

- Data Cleaning and Processing
- Datasets Summary

2 Second Section — correlation analysis

- Assessing correlations
- Lit review: what others have done with climate variables and stock prices

Data Cleaning and Processing

- Climate Data

- Temperature Data (Done) — month, year, change of temperature
- wildfire Data (New Data, waiting to be processed) — counted by numbers and areas

- Financial Data

- Share price data (Done) — average price, return of share price
- Financial ratios (waiting to be cleaned)
 - ROA, ROE, ROC
 - Operating Margin, Net Margin
 - Current Ratio, Quick Ratio
 - D/E ratio
 - EPS

Datasets Summary

Financial Datasets:

- Full financial data for 18 agriculture companies (From the time the company went public to 2020)
- 18 Agriculture companies' average share price and return (monthly and yearly)
- Industry index including average share price and average return (monthly and yearly)

Climates Datasets:

- Monthly and yearly average temperature of U.S. (1980-2013)
- Monthly and yearly average temperature of 51 states in U.S. (1980-2013)
- Difference of temperature in the same month of adjacent years. (1980-2013)
- Total number of wildfires and burned-areas in U.S. (1983-2020)

Wildfires Data

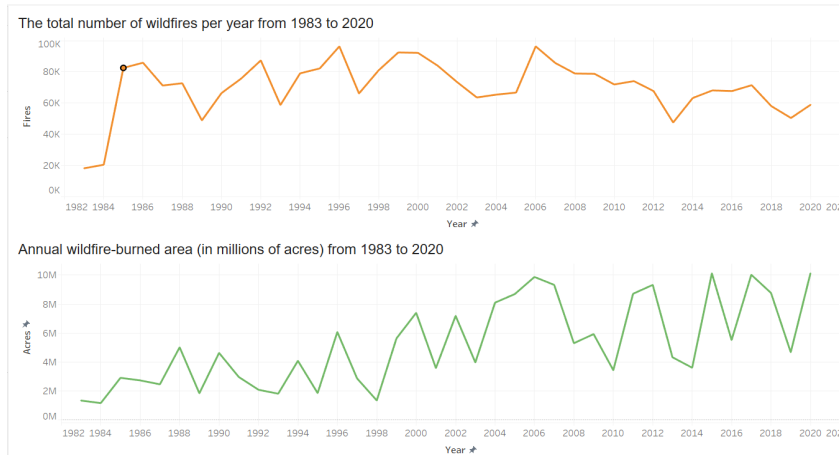


Figure: National Interagency Fire Center
<https://www.nifc.gov/fire-information/statistics/wildfires>

Correlation analysis

- Linear/monotonic relationships
 - Pearson: linear
 - Spearman: monotonic
 - Kendall: monotonic
- Nonlinear relationships
 - mutual information
 - cross-entropy
- Extreme value relationships
 - coefficient of upper/lower tail dependence
- Model of full correlation structure
 - copulas

Connecting a climate variable with CFP:

- Temperature and stock returns
 - previous model methods include: quantile regression, vector autoregression, GARCH, OLS models
 - quantile regression allows modelling where some companies are impacted but not all are
- Natural disasters and stock returns
 - previous model methods include: GARCH, and ARIMA models
 - results are inconclusive on impact of natural disasters on stock returns
 - however, results suggest that natural disasters increase risk and may influence returns through uncertainty
 - may be worth including risk measures in our dataset/models to allow for this flow of impact

CFP measures:

- Accounting-based
 - we have or can calculate all commonly used measures
- Market-based
 - allow for daily analysis (as opposed to monthly/yearly analysis)
- Composite measures
 - there is a trend towards using multiple measures, or combining multiple measures into a single index

- Next week:
 - Lit review of how bushfire/natural disaster data is processed and used in models
 - Preliminary correlation analysis of ROA and bushfire data
 - Preliminary correlation analysis of ROA and temperature data
 - Prepare report and presentation
 - Schedule the plan of next semester

The End