

Part 2 – An Extension Plan

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Motivation

Natural disasters aren't always natural and their effects are neither contained to nature reserves nor are they directly quantified. For instance, the worldwide economic slump on account of Covid-19 lockdowns didn't automatically go back to normal once people left their houses. Economics as a whole is stochastic and microeconomics, especially for smaller towns, don't have the same amount of research and analysis as with the larger macro trends. As part of this project, the last analysis was on the effect of wildfires in the city of Bozeman, MT. How the fires affected air quality and to predict the impact based on these causes was a prime concern. Yet, there is no smoke without fire and a lot of it with fire. Fire damage isn't merely constrained to the trees and properties burnt down. Air quality and pollution have a myriad of mid- and long-term impacts. Take the instance of Delhi, India. The capital city of the world's largest country is often the most polluted, this could probably be why Mumbai is still the financial capital of India. There is an entire Wikipedia page dedicated to air pollution in Delhi - https://en.wikipedia.org/wiki/Air_pollution_in_Delhi. Agricultural stubble burning in the nearby states by farmers is a seasonal activity that wreaks havoc in Delhi. There are no property damages (of course, there are no wildfires in this concrete jungle) due to the fire but the city regularly shuts down for a week or 2 every winter and it is getting worse year-on-year.

While the shutting down of economic activity is an immediate impact, people who can, just shut themselves in their houses with air purifiers, but such devices are usually costlier than the average monthly income of a family of 4 for the majority of the city's residents. This continued air pollution issues are causing larger issues such as an increased rate of Asthma among its residents. People don't usually flee their ancestral homes because of such issues but lesser people are motivated to move in.

This brings us back to Bozeman, MT, home of the largest university in the state – Montana State University. With roughly 3500 staff on its payrolls and nearly 17,000 students attending its undergraduate and postgraduate programs helps Bozeman's reputation as the educational hub of the state. Yet, imagine the impact such wildfires could have on this nascent population, already lured by the tech hubs on the east or west coasts. Increasing pollution will drive away a captive and talented workforce from both the state and city. College towns' economies are a thriving and diverse ecosystem. The influx of students each year helps the economy via hospitality (all those food joints on the Ave in Seattle for instance) and helps to bring in companies that would want to hire these students or work in research with the staff.

The last study on the impact of wildfires and the future predictions of such events is the main motivation to analyze how such events impact the economy of this region.

Impact focus

The main focus, as mentioned above, is on the impact of wildfires on the economy of Bozeman. The primary analysis would be centred on the past economic growth, the major contributors, green shoots and

how the MSU system affects the overall economy of this region. This will then be combined with the impact of wildfires to help create a plan that focuses on the knock-on effect.

Some of the key indicators that would help in this research include:

- 1) Contribution of MSU to the economy
- 2) Key industries, their growth and noticeable exits if any
- 3) Housing costs and rates of housing
- 4) Per capita income growth, particularly by demographics

Based on preliminary data from [DataUSA](#), it comes as no surprise that the largest industries in Bozeman, MT are Educational Services (4,852 people), Retail Trade (4,326 people), and Accommodation & Food Services (3,404 people). This will be a recurring theme through this analysis, as is oft with college towns.

Data used for this analysis

The below are some of the data sources that will be used as part of this analysis:

- 1) DataUSA – [readable link](#)
This is a listing of the past 10 years of data for Bozeman that contains details on the workforce numbers, the industry, median earnings etc. Most of this data is sourced from governmental agencies
- 2) [U.S. Department of Housing and Urban Development](#)
This covers the statistics used for housing and demographic related research including property value, rent vs owned statistics and social needs
- 3) [National Center for Education Statistics](#)
This covers the statistics used for enrolled students, their demographics, completion rate etc.
- 4) [United States Department of Transportation](#)
This covers the statistics used for analyzing freight movement, trade growth and traffic conditions

Unknowns and Dependencies

- 1) Data for enrolment and graduation is available, however, employment after graduation and the locations of such employment are tougher to ascertain.
- 2) Further, as with other prediction models, the correlation or causation effect of wildfires on the economy will need to be analyzed to present an unbiased perspective.
- 3) Covid-19 related disruptions and its lasting impact will induce some level of data creep in analysis of data post 2019.

Timeline to completion

Below is a rough estimate of the timeline to complete and present this research:

- 1) 17-Nov-23: collect data, cleanse it and perform preliminary EDA
- 2) 21-Nov-23: completion of a detailed analysis of the data and visualization

- 3) 23-Nov-23: analysis of the relationship between the current fire estimate model and the trends from the collected data
- 4) 25-Nov-23: integration of new data and updated model based on these data points
- 5) 30-Nov-23: finalize the slides and analysis
- 6) 4-Dec-23: presentation of the analysis and results
- 7) 4-Dec-23: final project submission