## Task 1: Domain-Specific Area and Objectives of the Project

> "Weather has had a greater effect on sales than economic numbers, we’ve known that forever."

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> [Andy Street, John Lewis Managing Director, 2014](https://www.preventionweb.net/news/met-office-review-uks-record-breaking-summer-2022)\*

### (a) Domain: \*Quantifying the Influence of Weather on Retail Sales in the UK from 1988 to 2023\*

This is a question aimed at anyone living in typically cool and rainy climate, like the UK:

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\*Have you ever experienced the frustration and annoyance of going clothes shopping during a particularly blustery and wet February or March and finding that all the fashion collections are full of spring-themed floral, summery dresses and floaty cardigans, when all you want is snuggly quilted parka or a woolly sweater?\*

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It's hard to believe that spring could be just around the corner when it's sleeting outside - which continue for a couple more weeks if not months. Personally, I have always wondered how clothing companies have managed to make money during these transition periods!

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As such, the purpose of this data analysis is to explore and quantify the impact of the weather on retail sales volumes in the UK by implementing several statistical techniques, as well as building and evaluating a linear regression model.

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Although it has been widely acknowledged in both economic research and the media that the weather has an important effect on consumer spending patterns and daily business activity, so far it has proven very difficult to determine precisely what the nature of this relationship is [(WeatherAds.io)](https://www.weatherads.io/blog/the-impact-of-weather-on-retail-sector-in-the-uk#:~:text=In%20the%20UK%20%E2%80%93%20a%20country,a%201%25%20fluctuation%20in%20sales).

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For instance, this \*Guardian\* article suggested that wet and cold weather during a specific month led to an unexpected fall in retail sales

[(\*The Guardian: Wet weather dampens retail sales in Great Britain\*)](https://www.weatherads.io/blog/the-impact-of-weather-on-retail-sector-in-the-uk#:~:text=In%20the%20UK%20%E2%80%93%20a%20country,a%201%25%20fluctuation%20in%20sales),

while this one on \*Euronews\* blamed the \*\*above-average\*\* temperatures for a decline in consumer spending [(\*Euronews: Cost of living and hot weather cause retail sales to fall in UK\*)](https://www.euronews.com/business/2023/10/20/cost-of-living-and-hot-weather-cause-retail-sales-to-fall-in-uk). One could argue that warm weather would make consumers less likely to go shopping as they would engage more in sports and other outdoor activities, while on the other hand, one article posits that </br>

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> " It has also been shown that when consumers are in a warm environment, their purchase intent increases, and they judge the value of certain items higher. In addition the same study found that warmth leads consumers to be more easily swayed by marketing messages."

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[(WeatherAds.io)](https://www.weatherads.io/blog/the-impact-of-weather-on-retail-sector-in-the-uk#:~:text=In%20the%20UK%20%E2%80%93%20a%20country,a%201%25%20fluctuation%20in%20sales)

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Undoubtedly, examining the nature of this relationship more closely be of value for a range of different stakeholders, including retail company managers, shareholders, governmental institutions and potential investors.

### (b) Project Objectives

- To collect, pre-process, and statistically summarize datasets containing historic UK retail sales-volumes and weather data.

- To use visualization libraries in Python to get an overview of the important trends, patterns and relationships within the data.

- To determine the effect of weather on UK retail sales using statistical analysis and linear regression.

### (c) Proposed Impact of Study

Retail sales are often considered as a "barometer" for the overall health of an economy - for instance, consumer spending accounts for 60% of the UK's GDP per capita [(\*Admirals.com\*)](https://admirals.com/financial-events/why-retail-sales-important), and the sector accounts for about 3 million jobs. Therefore, sales figures inform economists about consumer demand for finished products, whether the economy is expanding or contracting, and likely trends in the unemployment rate. Importantly, they are considered to be a \*\*reliable\*\* economic indicator of growth [(\*Finance.Yahoo.com\*)](https://finance.yahoo.com/news/retail-sales-mean-economy-110029982.html), as well as having a profound impact on foreign investment [(\*DailyFx.com\*)](https://www.dailyfx.com/education/macro-fundamentals/what-are-retail-sales-and-why-is-it-important-to-traders-a-guide.html). Consequently, an examination of how weather impacts sales can potentially be of use to the following stakeholders:

### (d) Key Stakeholders

- Governmental institutions have a vested interest in trends in retail sales in order to gauge how well businesses are doing and to assess consumers' levels of disposable income [(\*Dailyfx.com\*)](https://www.dailyfx.com/education/macro-fundamentals/what-are-retail-sales-and-why-is-it-important-to-traders-a-guide.html)

- Retail companies can use these kinds of investigations for the basis of their data-driven decision making. To provide just one example, being able to sync advertisements to match appropriate weather conditions and decreasing ad-spend during periods of less-favourable weather can lead to the decrease of costs for the company [(\*WeatherAds.io\*)](https://www.weatherads.io/blog/the-impact-of-weather-on-retail-sector-in-the-uk#:~:text=In%20the%20UK%20%E2%80%93%20a%20country,a%201%25%20fluctuation%20in%20sales)

- Central banking and monetary regulation institutions adjust interest rates based on consumer demand and sales to control inflation, thus building models to predict trends in spending can lead to a better-informed adaptation of rates [(\*Admirals.com\*)](https://admirals.com/financial-events/why-retail-sales-important).

- Shareholders, traders and potential investors in retail companies are interested in patterns in sales because retail sales exhibit a positive correlation with stock prices [(\*Dailyfx.com\*)](https://www.dailyfx.com/education/macro-fundamentals/what-are-retail-sales-and-why-is-it-important-to-traders-a-guide.html)

- Bondholders are negatively affected by an increase in retail sales, as when inflation rises, bond prices drop [(\*Finance.Yahoo.com\*)](https://finance.yahoo.com/news/retail-sales-mean-economy-110029982.html)

- Everyday consumers and small businesses can be benefitted by knowing how demand fluctuates based on weather can be of interest in relation of when to make purchases [(\*WeatherAds.io\*)](https://www.weatherads.io/blog/the-impact-of-weather-on-retail-sector-in-the-uk#:~:text=In%20the%20UK%20%E2%80%93%20a%20country,a%201%25%20fluctuation%20in%20sales)