



WEATHER TO SHOP?

A STATISTICAL INVESTIGATION
INTO HOW TEMPERATURE
AFFECTS UK RETAIL SALES

EXECUTIVE SUMMARY

A joint study by the BRC
and Met Office

Authors:

Dr Liliana Danila
Elizabeth Dyson
Malcolm Lee
Rachel Lund

 Met Office



EXECUTIVE SUMMARY

It's a truth universally acknowledged that the weather can strongly influence what we buy. According to previous research by the Met Office, nearly half of UK retailers say weather is among the top three external drivers of demand¹ and the idea is pretty intuitive: if it rains, retailers sell more umbrellas, if it's cold more coats are sold and if it's hot shops can find themselves out of stock of paddling pools and barbeque equipment

However, there is surprisingly little research into some aspects of the relationship between weather and sales. That's particularly true when we consider the impact of weather on sales at the whole UK level, rather than just on individual products or specific locations. Despite regular commentary blaming or praising the weather for how retailers are doing, how much the weather affects sales is not well understood.

Through application of machine learning techniques to their combined datasets, the BRC and the Met Office sought to shed some light on this question, focussing on to what extent temperature can predict growth in Non-Food sales. The findings of the study have implications for both retailers and market observers:

- Differences in temperature, are a good predictor of growth in Non-Food sales growth, but only at certain times of the year.
- While some periods, particularly the Christmas season, show little relationship with the weather others are highly sensitive to temperature. During the Summer to Autumn transition, nearly half of the variation in weekly sales growth from year to year over this period can be accounted for by differences in temperature between years. The analysis implies that for each degree warmer the first week of September is relative to the previous year, the rate of growth of Non-Food sales is reduced by 1.1%, equivalent to around £40m of sales.
- When there is a relationship, it doesn't always work in the same direction. At sometimes of year warmer weather can help sales, at other times it can hinder them.
- The study found little evidence that, at an aggregate level, temperature has a permanent impact on sales. If September is warmer and consumers do not buy as many cold weather products, they spend more on these products once cooler weather finally arrives. However, unseasonal weather can strongly affect monthly growth figures and be easily mistaken for changes in underlying consumer confidence. It can also impact profitability, with retailers selling more stock on discount following a period of unexpectedly weak sales.
- The strength and pattern of relationship to the weather differs across categories of Non-Food (See Table 1). It is particularly strong in Clothing, during the transition to Autumn. Temperature differences can explain more than 70% of year to year variations in growth of Men's Clothing in mid-September to early October and can reduce the rate of sales growth by 2.4 percentage points for each degree it is warmer than the previous year, equivalent to £6m a week.
- The bigger the variation in year to year in temperature, the more likely temperature is to be the key driver of sales growth. During the first weeks of the year the analysis showed that the temperature is a poor predictor of sales growth, however if we only look at temperature differences of more than five degrees, then there is strong relationship between sales growth and temperature.

¹ Met Office. "Understanding the role of weather in the supply chain." 2015



BRITISH RETAIL CONSORTIUM

2 London Bridge, London SE1 9RA
+44 (0)20 7854 8900 | info@brc.org.uk | brc.org.uk

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