TV Marketing Campaign Analysis

Dunelm

Aim: To understand and analyse the impact of Dunelm's recent TV Marketing Campaign.

Platform	**TV**
Target Product Categories	• Furniture • Cushions • Lighting • Dining

TV Campaign Duration: 12/04/21 – 09/05/21

Focus for analysis:

1. Effect on Dunelm as a Brand.
   - Awareness

2. Effect on sales as a whole: in-store, online.

3. Effect on sales specifically of the advertised products and categories.
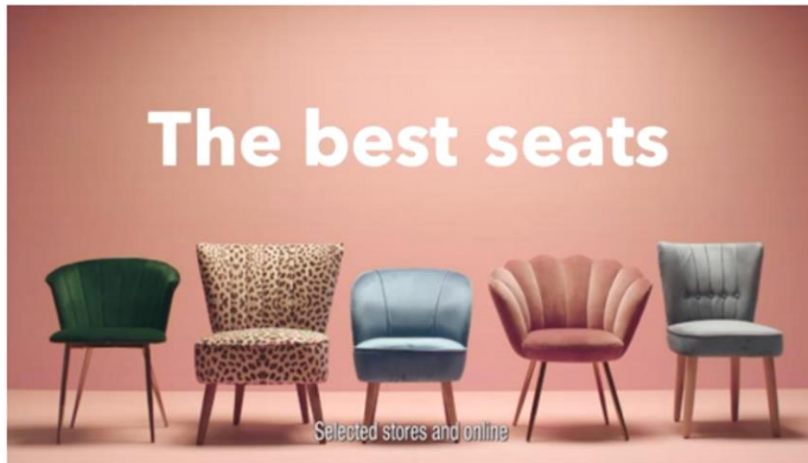
Challenges: This analysis faces many challenges.
It must account for lockdowns, seasonality and uncertainty.

- ❑ COVID19 Lockdowns have driven broader transformations in consumer behaviour.
- ❑ Lockdown #3 ended on the same day the campaign started: 12th April 21.

- ❑ Consumer behaviour is always subject to natural fluctuations throughout the year.
- ❑ Public holidays, one-off events and even the weather can cause discernible volatility.

- ❑ KPIs such as `SalesVolume` are influenced by hundreds of other variables.
- ❑ Some of the qualitative survey data here may be subject to sampling bias.

These factors complicate the analysis and affect our ability to definitively isolate the specific impact of the campaign.

Key Learnings: The TV Campaign successfully raised awareness and noticeably drove sales in four specific target categories, yielding an estimated **+£1.6**m in additional revenue.

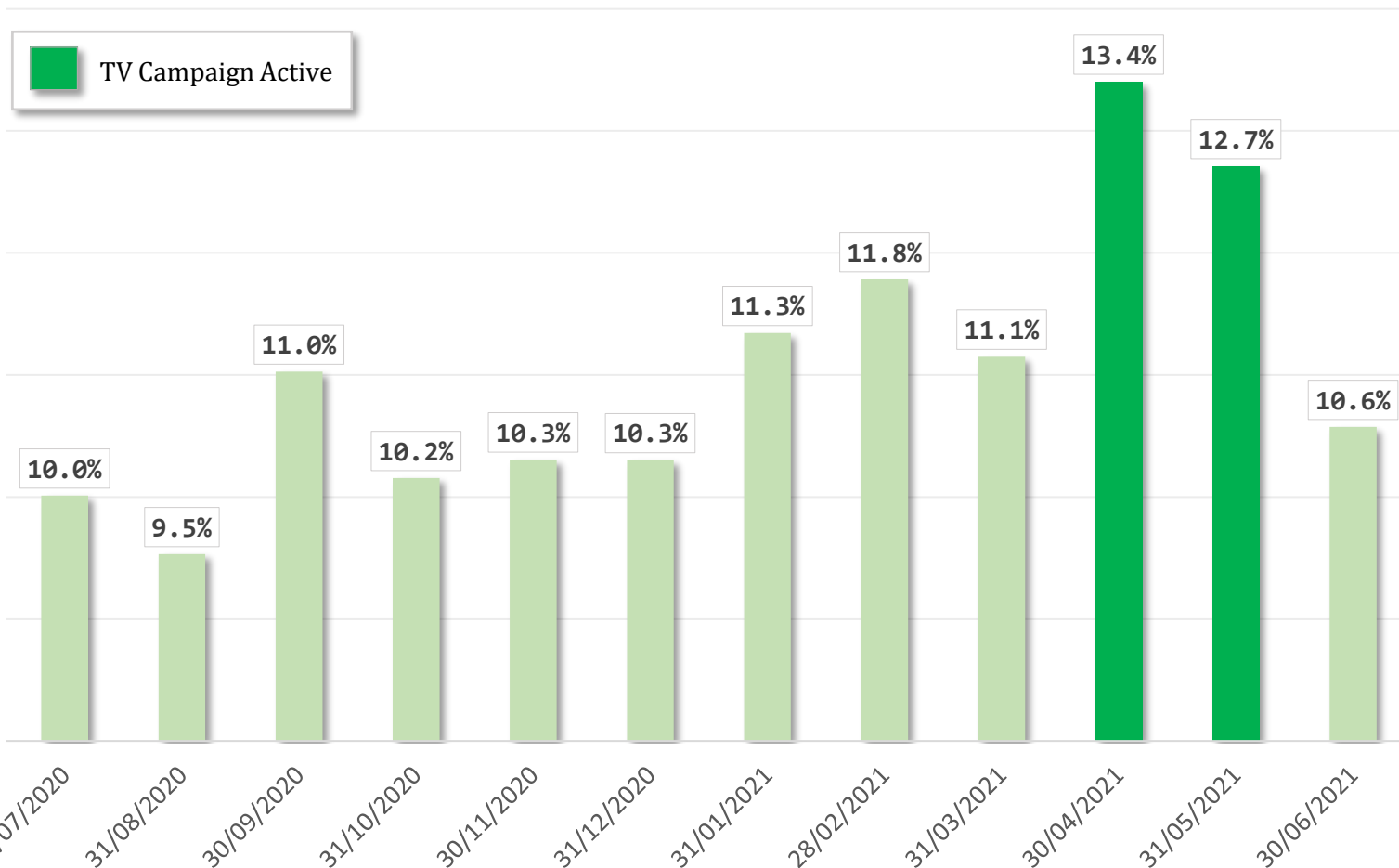| Problem	Approach	Key Findings
Effect on Dunelm as a brand.	Survey data.	TV Campaign coincides with a +2.5% net increase in Advertising Awareness among surveyed consumers.
Effect on sales as a whole.	Compare sales uplift during campaign period to the previous two post-lockdown windows.	Due to the fact that the lockdowns occurred at different points in the year (Lockdown 2 over Christmas Period), it was not feasible to determine with confidence the effect of the campaign on overall sales.
Effect on advertised products.	Compare product sales by category: categories advertised vs not advertised.	Of the advertised categories, the strongest performers were: 1. **Filled_Cushions** (+45.3k additional units sold), 2. **Ceiling_Lights** (+30.2k additional units sold), 3. **Cushions** (+29.8k additional units sold), 4. **Cutlery** (+6.7k additional units sold). The estimated total revenue uplift over these categories: **+£1.6m**.

Advertising Awareness

BrandVue Monthly Consumer Survey: Advertising Awareness

The percentage of respondents who report having seen advertising for a given retailer in the last month.
Q: '*Have you seen advertising for **Dunelm** in the last month?*'

Advertising Awareness of Dunelm (BrandVue) [FY21]

Legend: ■ TV Campaign Active

Date	Value
31/07/2020	10.0%
31/08/2020	9.5%
30/09/2020	11.0%
31/10/2020	10.2%
30/11/2020	10.3%
31/12/2020	10.3%
31/01/2021	11.3%
28/02/2021	11.8%
31/03/2021	11.1%
30/04/2021	13.4%
31/05/2021	12.7%
30/06/2021	10.6%

Context

BrandVue is a service provided to Dunelm from a reliable external data source, Savanta.

BrandVue operates a monthly survey targeted at consumers. Respondents answer a broad range of questions relating to perception of brand and their personal behaviour patterns.
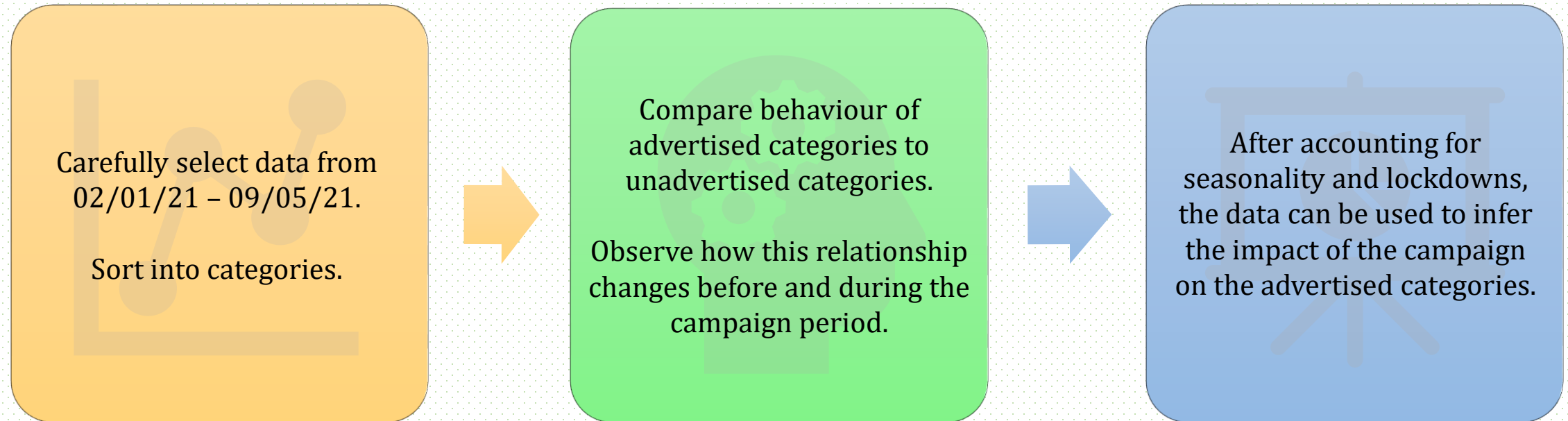
It is difficult to say with certainty whether the campaign directly caused this increase, however this metric rose to approx. +2.5% above trend level specifically during the campaign period.
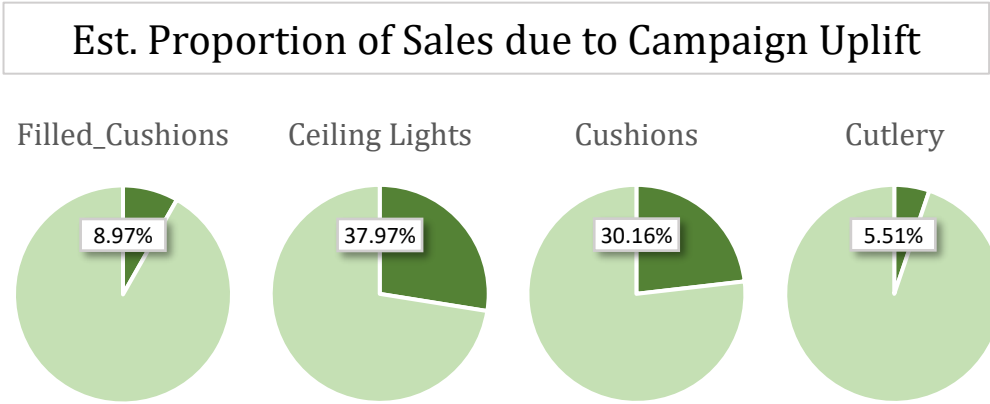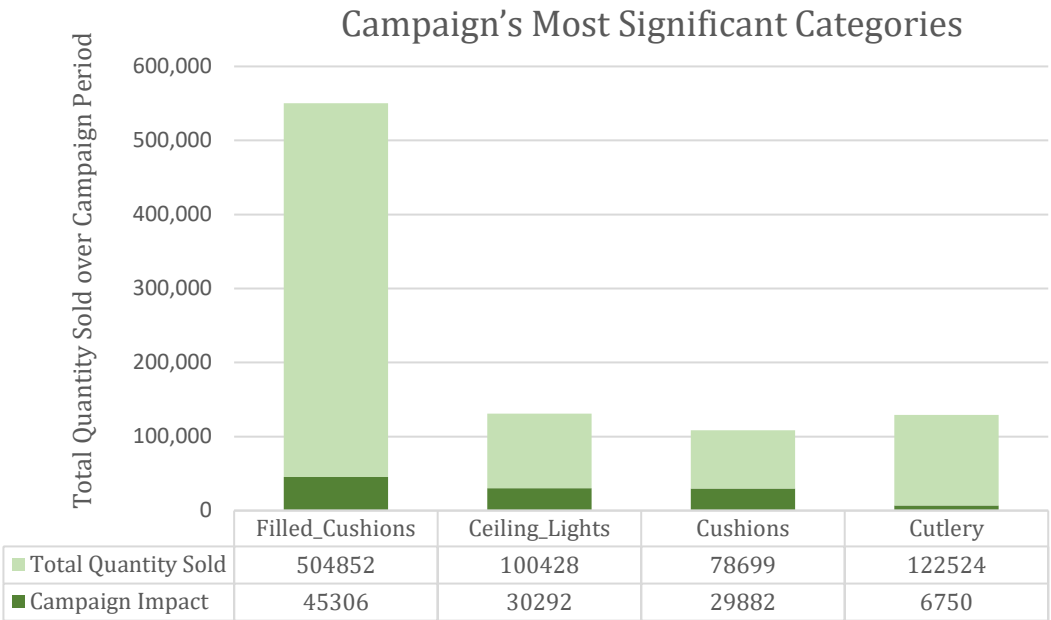
Sales

Strategy: The campaign's impact on specific categories was inferred by analysing how these categories changed over time relative to each other. Through this technique it was possible to estimate the proportion of sales and revenue attributable to the campaign.

Carefully select data from 02/01/21 – 09/05/21.

Sort into categories.

Compare behaviour of advertised categories to unadvertised categories.

Observe how this relationship changes before and during the campaign period.

After accounting for seasonality and lockdowns, the data can be used to infer the impact of the campaign on the advertised categories.

A more precise and detailed summary of this Bayesian causal inference analysis is available in the appendix.

Net Revenue Impact: By calculating the proportion of sales gained due to the inferred impact of the campaign, this analysis estimates a net revenue uplift of over £1,664,000.00.

Campaign's Most Significant Categories

	Filled_Cushions	Ceiling_Lights	Cushions	Cutlery
Total Quantity Sold	504852	100428	78699	122524
Campaign Impact	45306	30292	29882	6750

Y-axis: Total Quantity Sold over Campaign Period (0 to 600,000)

Est. Proportion of Sales due to Campaign Uplift

Filled_Cushions	Ceiling Lights	Cushions	Cutlery
8.97%	37.97%	30.16%	5.51%

Revenue per Category

Category	Total Revenue Over Period	Estimate of Revenue due to Campaign
Filled_Cushions	£4,076,464.41	£365,827.00
Ceiling_Lights	£2,692,719.15	£1,022,425.00
Cushions	£916,581.63	£276,468.00
Cutlery	£541,957.68	£29,857.00

Best Estimate of Total Campaign Uplift :   **£1,664,719.00**.

Performance of Advertised Products: This analysis estimates that approximately **£100,000** of the overall revenue uplift came from products specifically showcased in the advertisements. Of those products, the two key-performers were…

Clara Cotton Velvet Square Cushion	Stockholm Cushion - White
Retail Price: • £12 / £20	Retail Price: • £8
Total Quantity Sold over Period: • 21,078 (6,950 due to Campaign)	Total Quantity Sold over Period: • 2,197 (1,350 due to Campaign)
Revenue over Period: • £249,254.03 (£82,250.00 due to Campaign)	Revenue over Period: • £13,724.82 (£6,280.00 due to Campaign)

Overall estimate of revenue uplift via advertised product lines: **£100,000**.

Appendix

Analysis of `Filled Cushion` Sales per Day:

Over the campaign period, `Filled Cushion` sales exceeded model forecast by over **45.3k** units.

After accounting for the effects of seasonality and lockdown #3, this analysis showed that the campaign was **successful** in boosting sales of **Filled Cushions** to a statistically significant level.
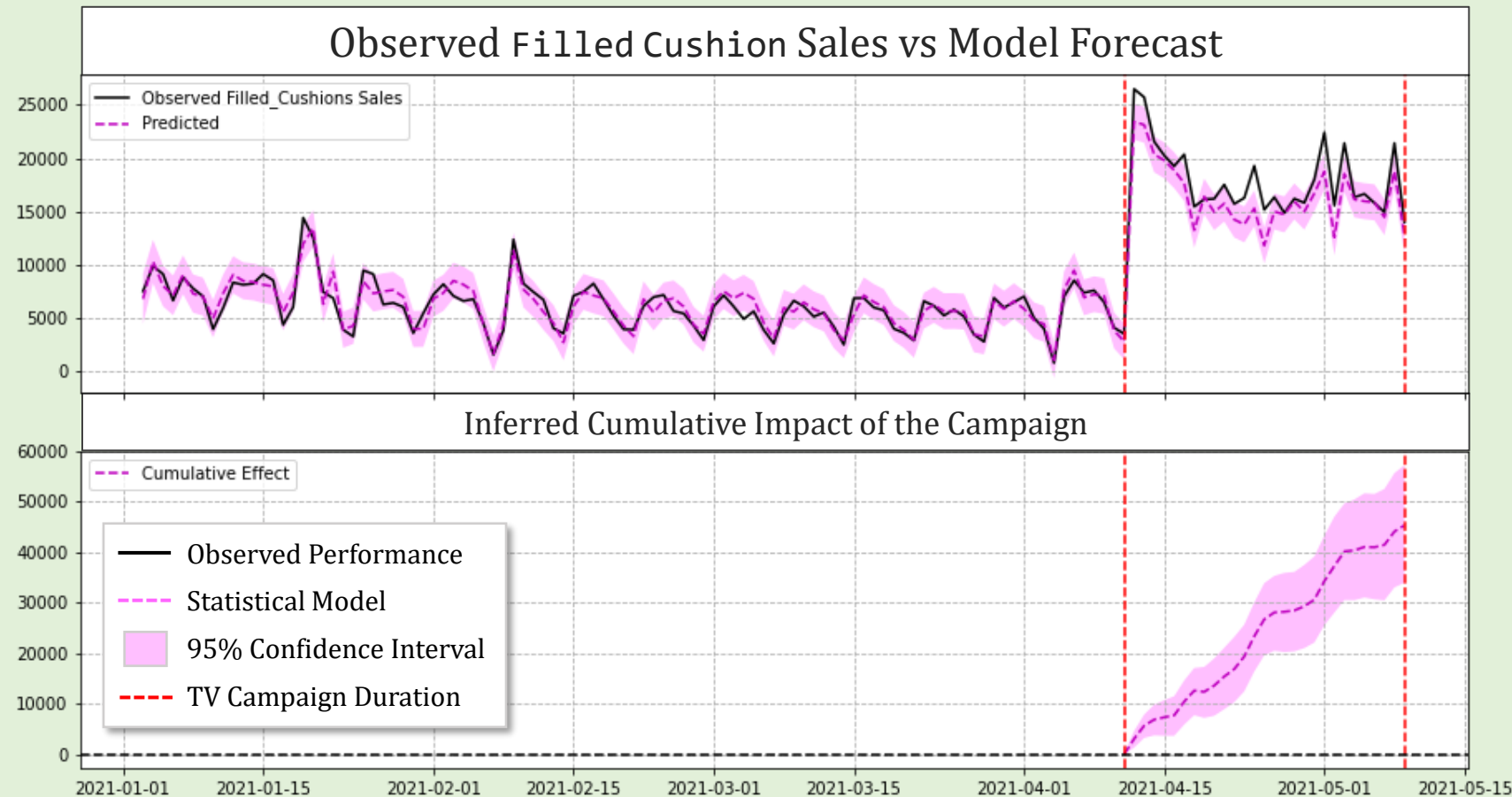
The inferred cumulative impact by the end of the campaign period:

Estimate: **+45,306** units sold.

95% CI: [**+33,889**, **+56,046**].

Covariate (Control) Categories:

- `Bath_Mats`
- `Clocks`
- `Doormats`
- `Kitchen_Gadgets`
- `Photo_Frames`
- `Rugs`
- `Storage_Boxes`
- `Venetian_Blinds`
- `Wall_Mirrors`

Observed `Filled Cushion` Sales vs Model Forecast

- Observed Filled_Cushions Sales
- Predicted

Inferred Cumulative Impact of the Campaign

- Cumulative Effect
- Observed Performance
- Statistical Model
- 95% Confidence Interval
- TV Campaign Duration

Analysis of `Ceiling Light` Sales per Day:

Over the campaign period, `Ceiling Light` sales exceeded model forecast by over **30.2k** units.

After accounting for the effects of seasonality and lockdown #3, this analysis showed that the campaign was **successful** in boosting sales of **`Ceiling Lights`** to a statistically significant level.
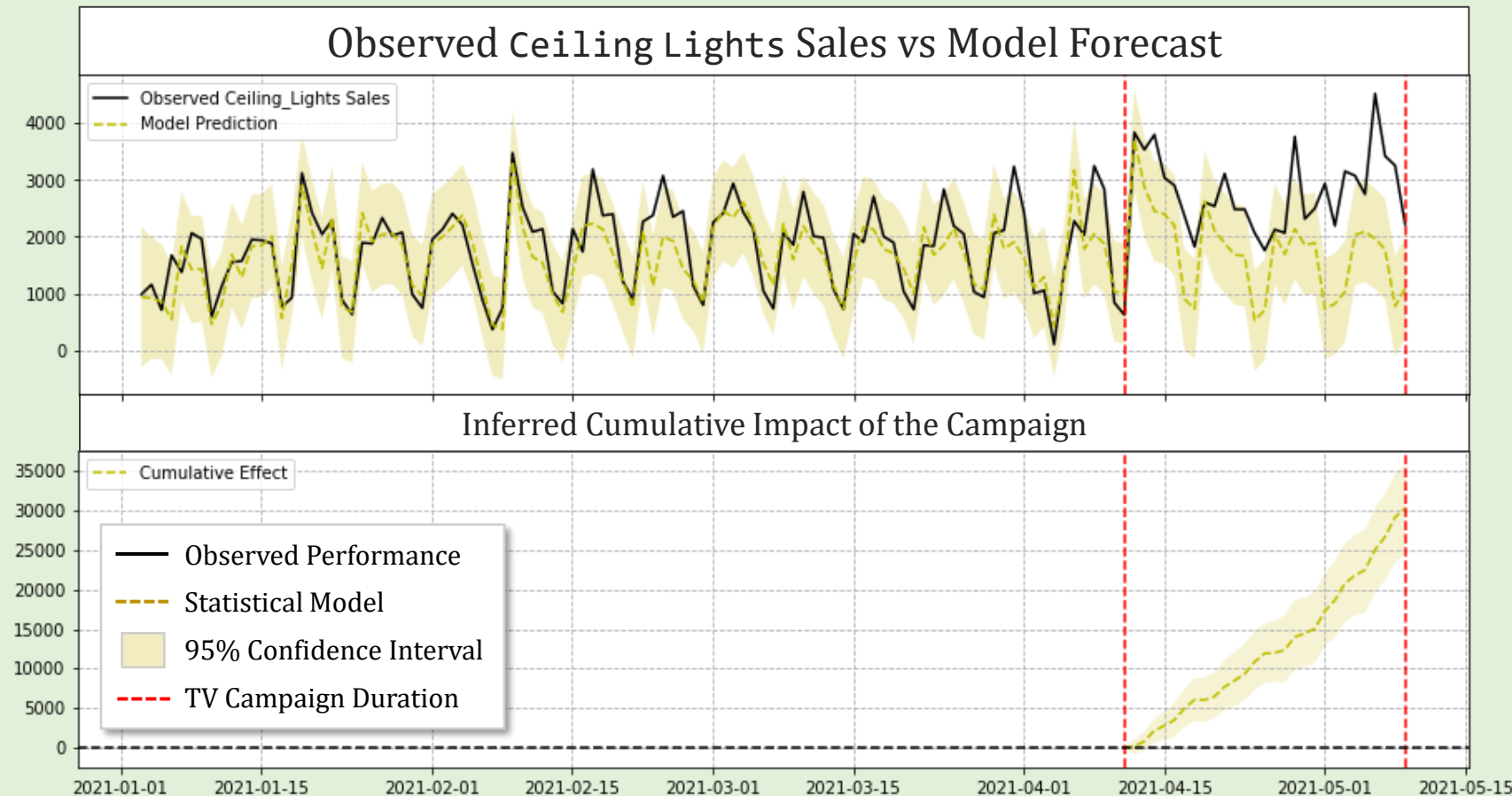
The inferred cumulative impact by the end of the campaign period:

Estimate: +**30,292** units sold.

95% CI: [+**24,466**, +**35,842**].

Covariate (Control) Categories:

- `Bath_Mats`
- `Clocks`
- `Doormats`
- `Kitchen_Gadgets`
- `Photo_Frames`
- `Rugs`
- `Storage_Boxes`
- `Venetian_Blinds`
- `Wall_Mirrors`

Observed `Ceiling Lights` Sales vs Model Forecast

- Observed Ceiling_Lights Sales
- Model Prediction

Inferred Cumulative Impact of the Campaign

- Cumulative Effect

- Observed Performance
- Statistical Model
- 95% Confidence Interval
- TV Campaign Duration

Analysis of `Cushion` Sales per Day:

Over the campaign period, `Cushion` sales exceeded model forecast by over **29.8k** units.

After accounting for the effects of seasonality and lockdown #3, this analysis showed that the campaign was **successful** in boosting sales of **Cushions** to a statistically significant level.
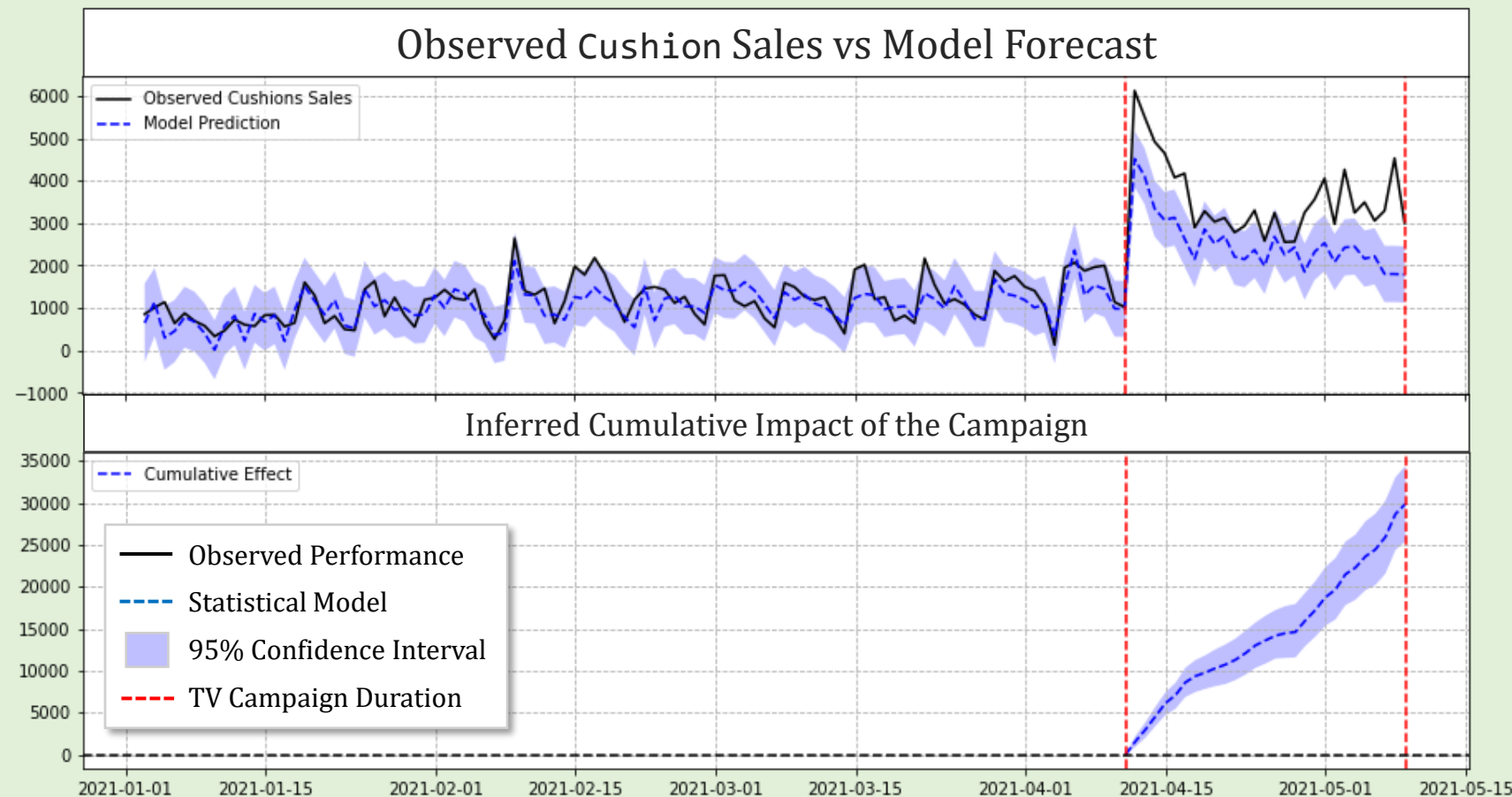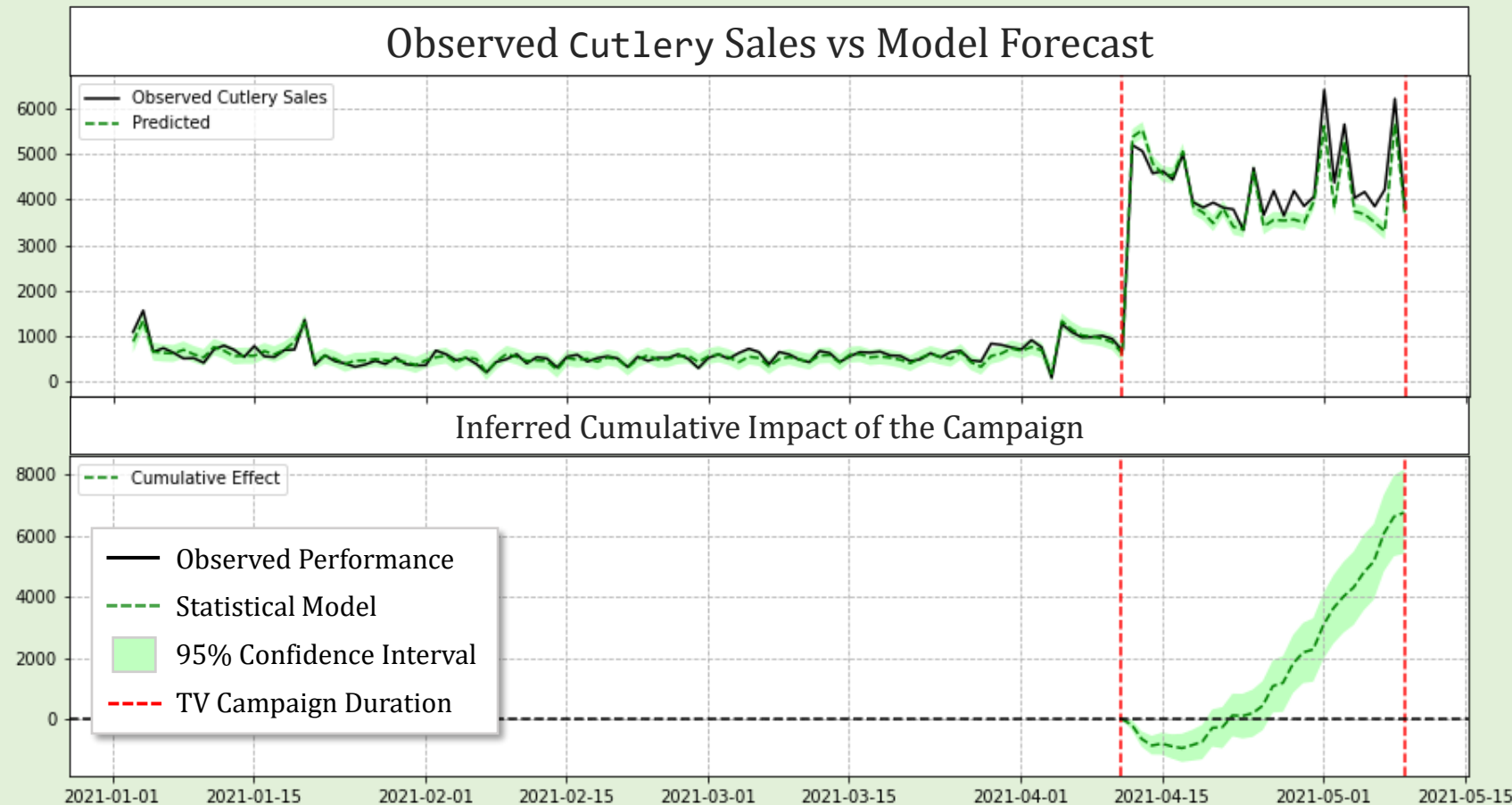
The inferred cumulative impact by the end of the campaign period:

Estimate: +**29,882** units sold.

95% CI: [+**25,423**, +**34,399**].

Covariate (Control) Categories:

- `Bath_Mats`
- `Clocks`
- `Doormats`
- `Kitchen_Gadgets`
- `Photo_Frames`
- `Rugs`
- `Storage_Boxes`
- `Venetian_Blinds`
- `Wall_Mirrors`

Observed Cushion Sales vs Model Forecast

- Observed Cushions Sales
- Model Prediction

Inferred Cumulative Impact of the Campaign

- Cumulative Effect
- Observed Performance
- Statistical Model
- 95% Confidence Interval
- TV Campaign Duration

Analysis of `Cutlery` Sales per Day:

Over the campaign period, `Cushion` sales exceeded model forecast by over **6.7k** units.

After accounting for the effects of seasonality and lockdown #3, this analysis showed that the campaign was **successful** in boosting sales of **`Cutlery`** to a statistically significant level.

The inferred cumulative impact by the end of the campaign period:

Estimate: **+6750** units sold.

95% CI: [+**5,451**, +**8,017**].

Covariate (Control) Categories:

- `Bath_Mats`
- `Clocks`
- `Doormats`
- `Kitchen_Gadgets`
- `Photo_Frames`
- `Rugs`
- `Storage_Boxes`
- `Venetian_Blinds`
- `Wall_Mirrors`

Observed `Cutlery` Sales vs Model Forecast

— Observed Cutlery Sales
-- Predicted

Inferred Cumulative Impact of the Campaign

-- Cumulative Effect

— Observed Performance
-- Statistical Model
■ 95% Confidence Interval
-- TV Campaign Duration

Data from 02/01/21 – 09/05/21 containing sales figures via all channels was selected and grouped by product category.

Those categories which appeared in the TV adverts were flagged as target_categories. A complementary subset of data from those categories which did not appear was used as covariate data to train a diffusion–regression state–space model[1]. Data recorded from prior to the start of the campaign was used as the training period.

Selecting to train the model in this way is fruitful because the effects of seasonality and lockdowns will be strongly expressed in the covariate data while the relative effect of the TV campaign will not. The model successfully learns to relate the behaviour of the target_categories to the behaviour of the covariate categories throughout the duration of the training period to within a 95% CI. Once the model is deemed sufficiently accurate, it can reliably be used to extrapolate from the training data.

We can then attempt to use the trained model to produce a counterfactual forecast of the expected volume of sales of these target_categories during the campaign period, 12/04/21 – 09/05/21. Thanks to our well-chosen selection of covariate categories, we can infer that the discrepancy between what was observed in reality and what was retroactively forecasted by the model is due to the impact of the campaign.

[1] Brodersen, K.H., Gallusser, F., Koehler, J., Remy, N. and Scott, S.L., 2015. Inferring causal impact using Bayesian structural time-series models. *The Annals of Applied Statistics*, *9*(1), pp.247-274.

N.B: Care was taken not to select any covariate categories which appeared in Dunelm's recent radio marketing campaign.

AND 4 NEW RADIO ASSETS

TOWELS | BEDDING | CHILDREN'S BEDDING | CURTAINS

5 Year guarantee, price | Range of colours, Good Housekeeping approved, price | Price | Price, Expertise fitting
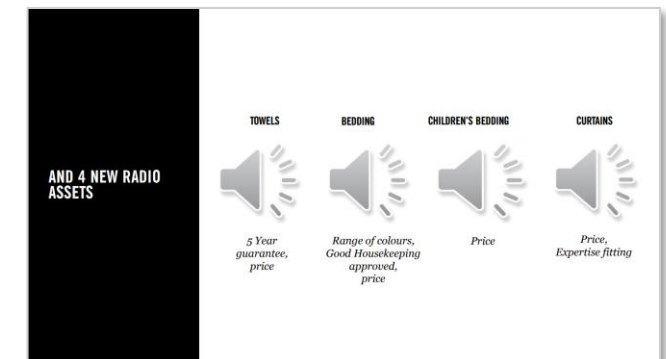
An identical analysis was run on other advertised categories,
but the results were either inconclusive or demonstrated negligible impact.

Type	Category Name	Quantity Sold over Period	Campaign Quantity Uplift
Furniture	Armchairs	9,055	Indeterminate
Furniture	Chairs_and_Loungers	12,593	Indeterminate
Furniture	Dining_Chairs	19,872	Indeterminate
Furniture	Swivel_Chairs	887	Indeterminate
Furniture	Tub_Chairs	1,973	Indeterminate
Cushions	Cushions	100,428	+30,292
Cushions	Filled_Cushions	504,852	+45,306
Cushions	Pillows	295,913	Indeterminate
Dining	Cutlery	122,524	+6,750
Dining	Dinner_Sets	27,344	Indeterminate
Dining	Glassware	257,507	Indeterminate
Dining	Placemats_and_Coasters	123,805	Indeterminate
Dining	Plates	137,573	Indeterminate
Dining	Tablecloths_and_Runners	58,643	Indeterminate
Lighting	Ceiling_Lights	78,699	+29,882
Lighting	Lamp_Shades	237,647	Indeterminate
Lighting	Light_Bulbs	129,598	Indeterminate
Lighting	Wall_Lights	16,420	Indeterminate

Unique In-Store Transactions per Day [30/06/19 – 24/06/21]
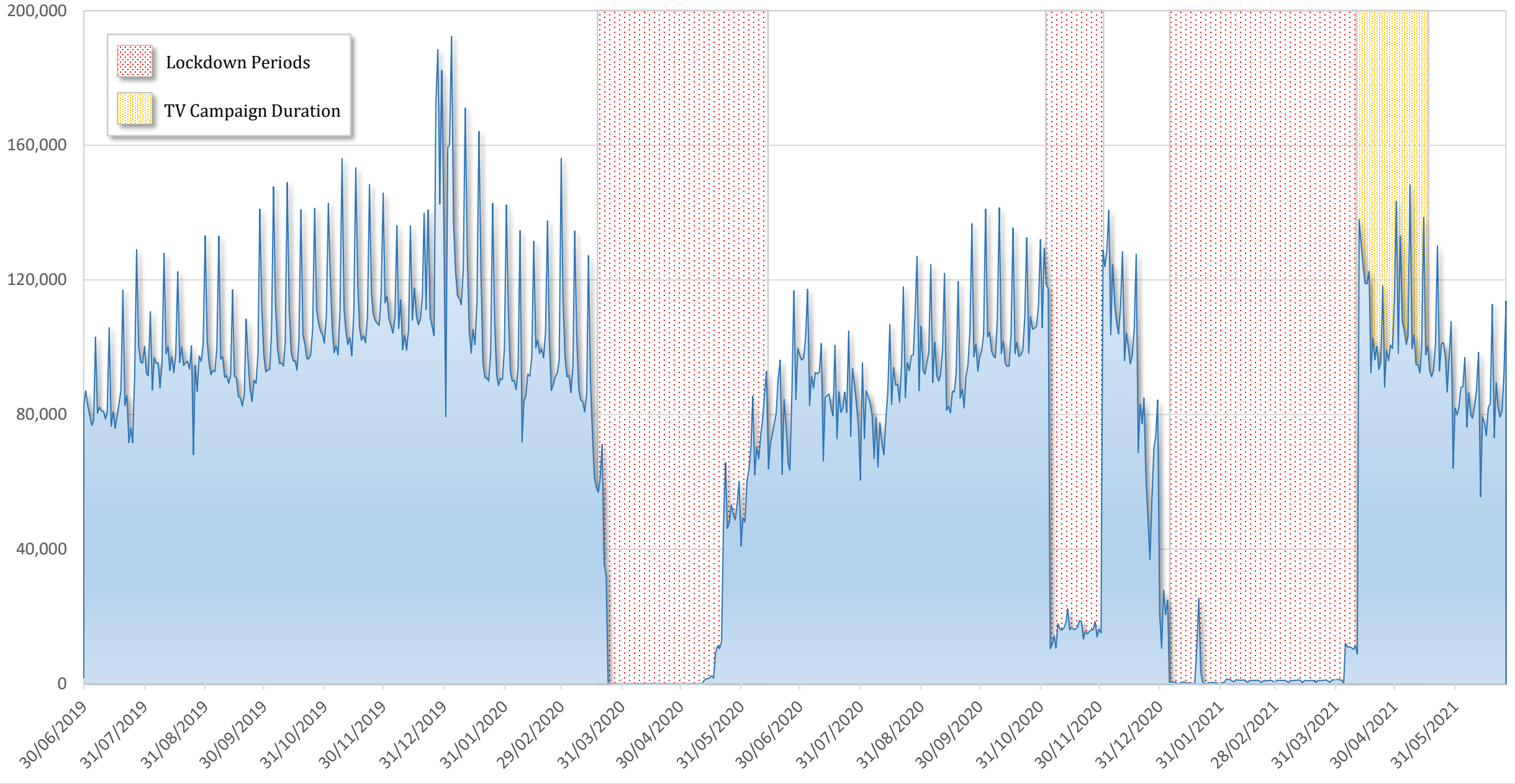
Total Volume Sold via All Channels per Day [FY20, FY21]
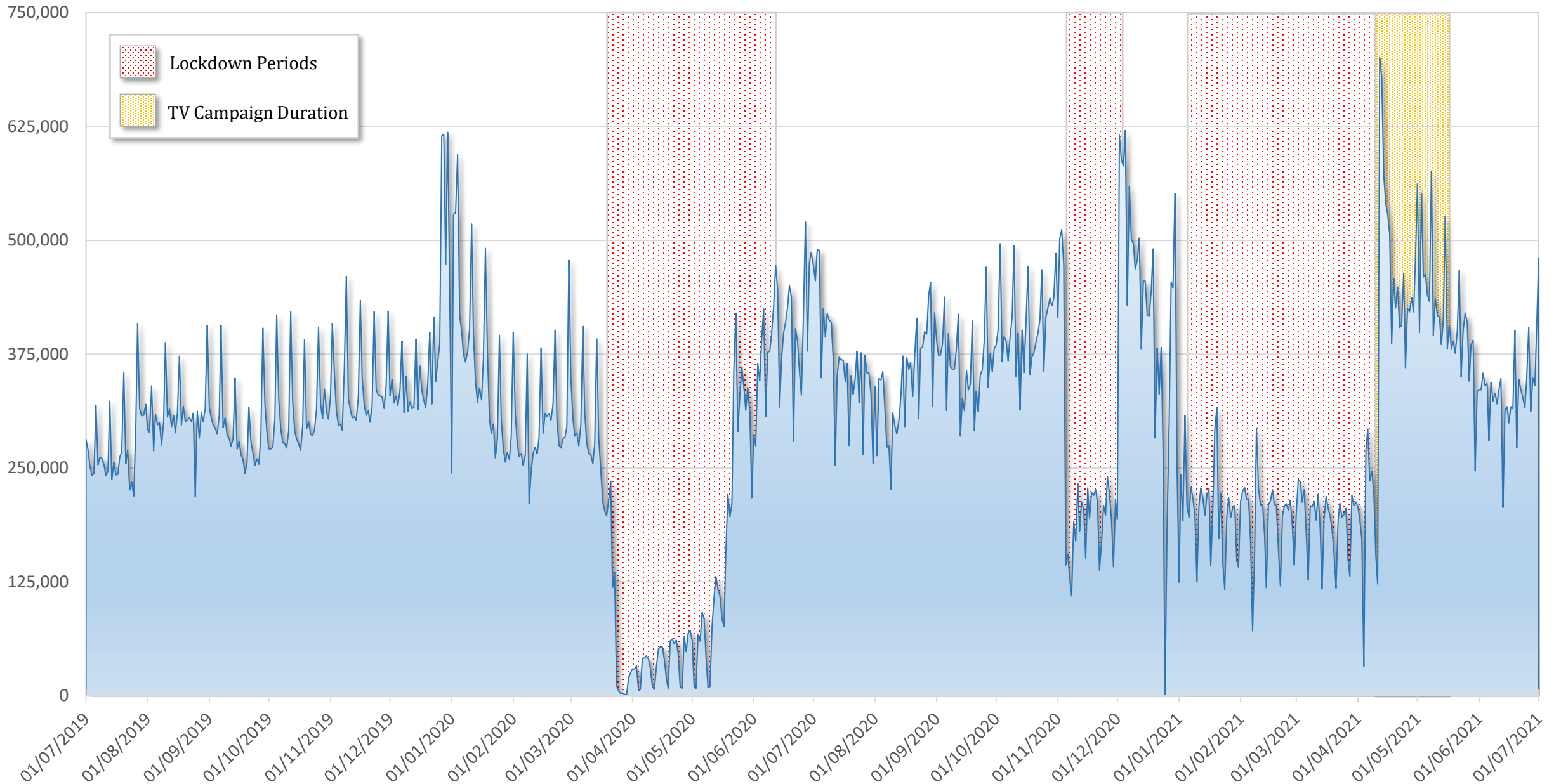
The revenue and quantity sold during campaign period, of each specific product showcased in the advertisements.

PRODUCT_NAME	CATEGORY	QUANTITY	REVENUE	RETAIL_PRICE
Clara Cotton Velvet Square Cushion	Cushions	14,854	£147,154.68	£12.00
Clara Cotton Velvet Square Cushion	Cushions	6,224	£102,099.35	£20.00
Nesa Two Tier Brushed Gold Velvet Shade	Lamp_Shades	4,029	£54,526.26	£20.00
Isabelle Pack of 4 Napkins	Napkins_and_Napkin_Rings	3,303	£17,830.71	£7.00
Stockholm Cushion	Filled_Cushions	3,065	£13,724.82	£6.40
Loxwood Bar Stool Oak	Bar_Stools	2,089	£63,627.74	£69.00
Kendall Chair Bottle Green Velvet	Dining Chairs	1,323	£76,833.34	£85.00
Alderley 24 Piece Cutlery Set	Cutlery	1,101	£19,890.17	£28.00
Elements Alton Crewel Cushion	Filled_Cushions	860	£12,945.73	£22.00
Grey Nesa Two Tier Velvet Shade	Lamp_Shades	709	£11,102.48	£20.00
Amalfi Sage Side Plate	Plates	668	£2,070.54	£4.00
Elsie Cocktail Chair – Grey	Armchairs	635	£36,665.33	£79.00
Stackable Tumbler Grey	Glassware	561	£932.62	£2.00
Siena Set of 2 Dining Chairs	Dining Chairs	560	£44,211.68	£111.20
Vivian Velvet Cocktail Chair – Rose	Armchairs	439	£49,605.57	£149.00
Pax Set of 2 Rattan Dining Chairs	Dining Chairs	410	£51,805.94	£169.00
Clara Cotton Velvet Rectangle Cushion	Cushions	399	£4,236.33	£18.00
Ohio Ochre Printed Cushion	Filled_Cushions	313	£1,796.18	£8.00
Ribbed Taupe Runner	Tablecloths_and_Runners	279	£1,405.48	£6.00
Isla Velvet Cocktail Chair - Light Grey	Armchairs	230	£25,135.28	£139.00
Ribbed Taupe Runner	Tablecloths_and_Runners	224	£1,475.41	£8.00
Clara Cotton Velvet Rectangle Cushion	Cushions	179	£2,494.59	£20.00
Rocco Leopard Print Cocktail Chair	Armchairs	170	£18,969.99	£149.00
Stockholm Cushion	Filled_Cushions	157	£1,529.09	£11.20
Elsie Cocktail Chair - Ashleigh Blue	Armchairs	152	£8,217.93	£79.00
Jackson Dining Table	Dining_Tables	128	£6,765.87	£339.00
Elsie Cocktail Chair – Rose	Armchairs	25	£861.23	£79.00
Siena Set of 2 Dining Chairs	Dining Chairs	15	£53.74	£139.00

This table contains upper and lower bounds for category revenue uplift estimates.

Category Name	Campaign Quantity Impact	95% CI Lower Bound	95% CI Upper Bound	Total Quantity Sold Over Period	Inferred Proportion Due To Campaign	Proportion Lower Bound	Proportion Upper Bound	Total Revenue Over Campaign Period	Campaign Revenue Impact Best Estimate	Campaign Revenue Impact Lower Bound	Campaign Revenue Impact Upper Bound
Filled_Cushions	45306	33889	56046	504852	8.97%	6.71%	11.10%	£4,076,464.41	£4,076,464.41 * 0.0897 = **£365,826.61**	£4,076,464.41 * 0.0671 = £273,639.21	£4,076,464.41 * 0.1110 = £452,547.53
Ceiling_Lights	30292	24466	35842	100428	30.16%	24.36%	35.69%	£916,581.63	£916,581.63 * 0.3016 = **£276,467.63**	£916,581.63 * 0.2436 = £223,295.16	£916,581.63 * 0.3569 = £327,121.11
Cushions	29882	25423	34399	78699	37.97%	32.30%	43.71%	£2,692,719.15	£2,692,719.15 * 0.3790 = **£1,022,425.11**	£2,692,719.15 * 0.3230 = £869,858.56	£2,692,719.15 * 0.4371 = £1,176,976.15
Cutlery	6750	5451	8017	122524	5.51%	4.45%	6.54%	£541,957.68	£541,957.68 * 0.0551 = **£29,857.12**	£541,957.68 * 0.0445 = £24,111.29	£541,957.68 * 0.0654 = £35,461.42