

The Marketing Mix

- Many marketing variables
 - Price, promotion, product, packaging, distribution, position (e.g. shelf space)
- Will now focus on promotional activity
 - Want to measure promotional effectiveness
 - Especially effect on sales
 - Have covered advertising awareness
 - Other promotional elements are also important

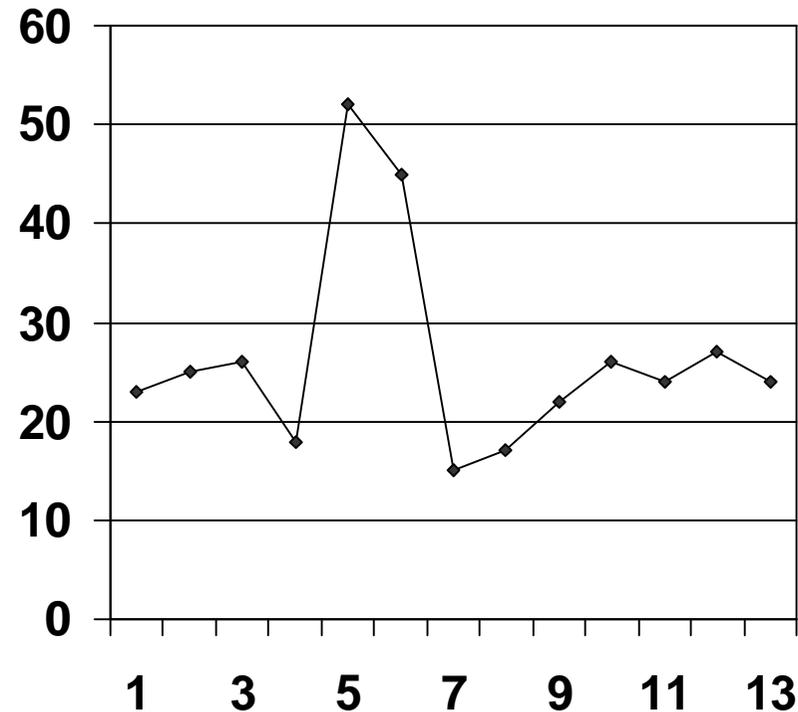
Promotions

- Fast Moving Consumer Goods (FMCG)
 - Goods sold in supermarkets
- Promotional activity can include:
 - End-aisle displays
 - Price discounts
 - Free product; e.g. buy 3, get one free
 - Direct mail or other specials advertising
 - Samples
 - Coupons

Sales Figures

- Retail sales data are collated, tidied, and projected by ACNielsen
 - Sales reported weekly at category, brand, and SKU level
- Usually look at promotional effects on sales at brand or SKU level

Sales by Week



Data Sources - Promotions

- Promotional data
 - Price levels
 - By store
 - Over time
 - Other factors, e.g. discounts only available to card holders
 - Presence and nature of end-aisle displays
 - Other promotional activity
 - Nature, extent and timing

Data Sources - Sales

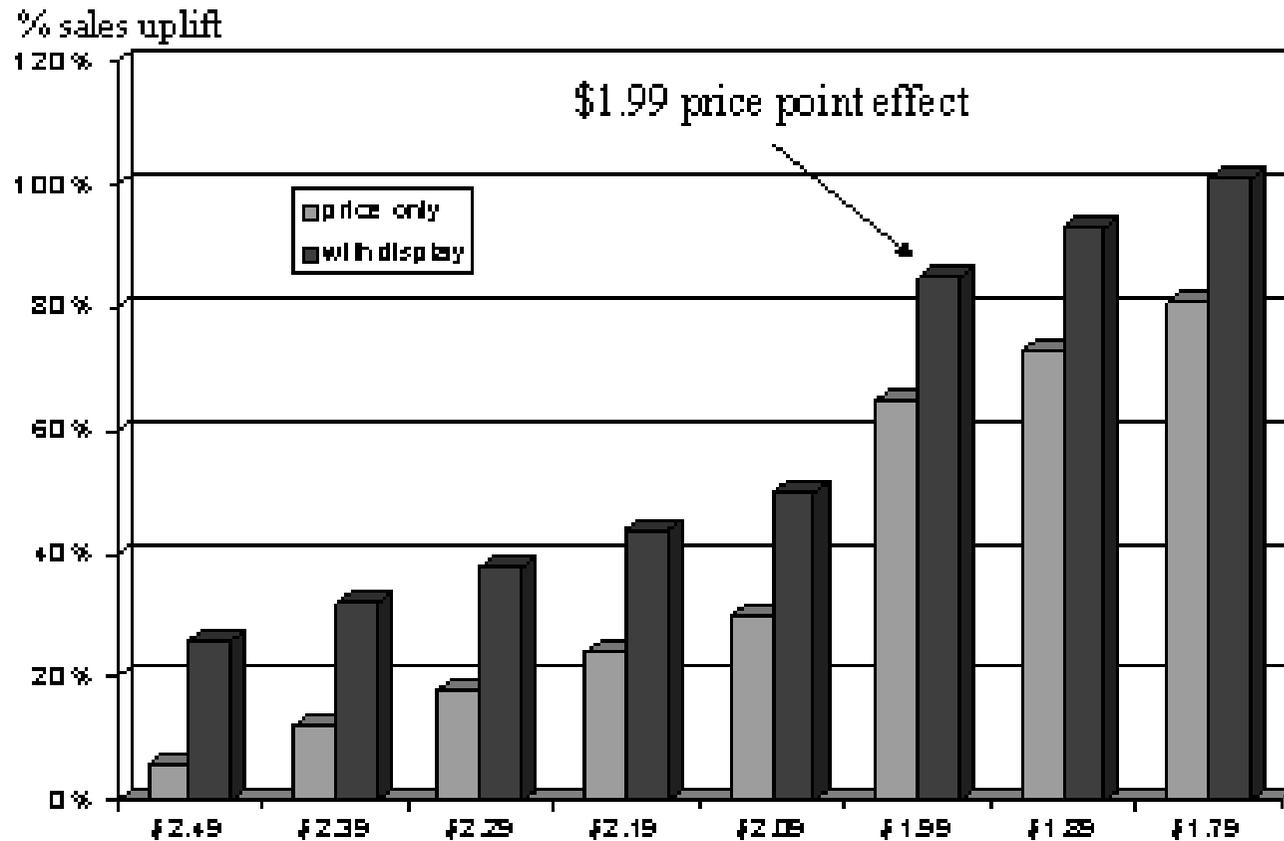
- Aggregate sales figures
 - E.g. total NZ sales of Mainland cheese
 - Typically reported weekly or monthly
 - Broken down by
 - Product – Category, brand, SKU
 - Markets – E.g. Upper North Island
 - Provides much insight, but can miss important changes or give misleading results
- Store-level weekly sales data
 - Not publicly available for confidentiality reasons
 - Used for some analyses within ACNielsen

Data Sources - Sales

- Household scanner data
 - Panel of households scans all grocery items bought, recording when and where from
 - Details of household are also available
 - Provides knowledge of
 - Household purchasing repertoire
 - Within a category
 - Between categories
 - Trying out new products
 - Changes in purchasing behaviour at the level of individual households

Promotional Effects

Sales response to price and promotion
regular price = \$2.59



Measuring Promotional Effects

- Try out promotion – see what happens
 - Many confounding factors
 - Competitor activity, seasonality, etc
 - Main drawback is cost of making a mistake
- Full Test Market versus Control
 - Similar markets needed
 - Services available in larger countries, not NZ
- Test Stores vs Control Stores
 - Match similar stores based on sales patterns and other information about market

Measuring Promotional Effects

- Econometric or time series analysis
 - Response: weekly sales data (ideally by store)
 - Predictors: price, other promotional data
 - Method: Seasonal ARIMA model
 - Box and Jenkins (1970). Time Series Analysis, Forecasting and Control
 - Remove trend first
 - Provides price elasticities (and cross-elasticities), and measures effects of other promotional activity
 - Takes seasonality into account

Cross-Elasticity Example

Quantifying the impact of promotional events
on competition and vice versa

Volume Output	1% Price Input								
	1	2	3	4	5	6	7	8	9
Brand 1	-	1.9	1.4			0.7			4.6
Brand 2		-							2.1
Brand 3			-			2.1			6.7
Brand 4				-		1.6			
Brand 5	1.6		1.9		-	2.2			3.4
Brand 6					15	-			
Brand 7						1.2	-		3.3
Brand 8	1.1		2.9			1.1		-	
Brand 9									-

When Brand 1 reduces its price, it steals
1.6% of Brand 5's Base volume
and 1.1% of Brand 8's Base volume

Baseline Sales

- Econometric methods can be used to estimate sales in the absence of any promotional activity
 - Called baseline sales
 - Can be included in weekly sales reports
 - Allows easy calculation of net effect of all promotional activity (including competitors)
 - Does not show how much effect different promotional activities are having (except in simple situations)

Broader Issues

- Methods described so far have focused on short-term effects on total sales, typically for a brand (or SKU) and its competitors
- Other issues
 - Whose purchasing behaviour is changed, and how?
 - Apply choice models to household scanner data
 - Effects on category sales
 - Long-term effect of promotions on sales and profit

Choice Models For Scanner Data

- Stochastic models of purchase behaviour
 - E.g. multinomial logit model for brand choice
 - Guadagni and Little (1983), Marketing Science.
 - Denote the utilities for brand j for household h at time t as $V_j^h(t)$
 - Express this as $V_j^h(t) = \beta X_j^h(t) + \varepsilon_j^h(t)$
 - Then the probability that household h chooses brand j is given by

$$\frac{e^{\beta X_j^h(t)}}{\sum_j e^{\beta X_j^h(t)}}$$

Choice Models for Scanner Data

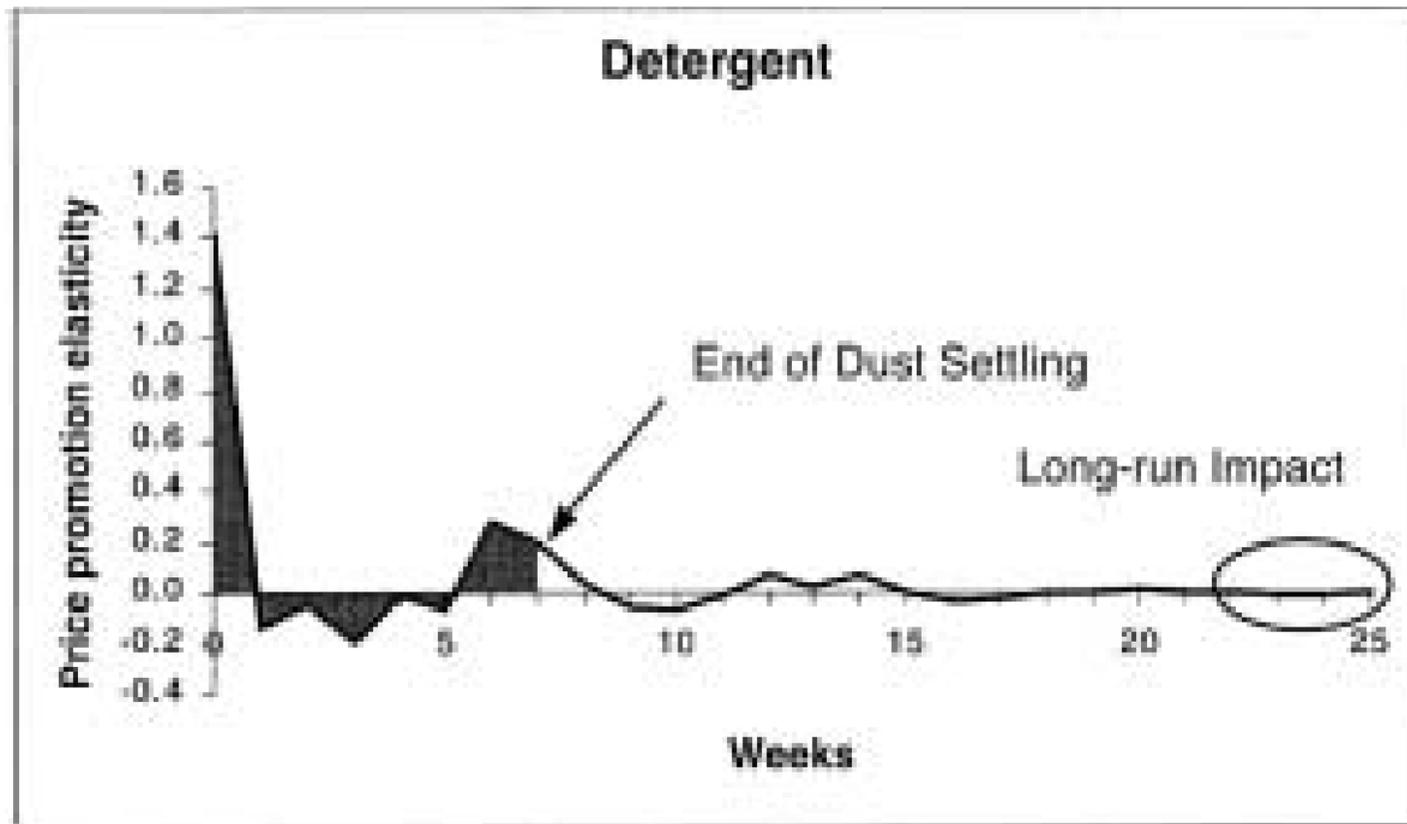
- Many different models have been developed, addressing various aspects of the consumer choice process
 - Brand choice
 - Multinomial logit
 - Variety-seeking
 - Purchase incidence and timing
 - Effect of marketing variables
 - E.g. stock-piling in response to price promotions
 - Heterogeneity in consumer purchase patterns or responses
 - Purchase cycle stages
 - need arousal, information search, evaluation, purchase decision, post-purchase feelings

Long-term Promotional Effects

- Promotions can have a long-term effect
 - Encouraging consumers to try a new product
 - Increases demand for brand and perhaps for category as a whole
 - Consumers may learn to expect promotions and therefore sales reduce at full retail price
 - Leaves category demand unchanged, but increases short-term price elasticity and reduces profit

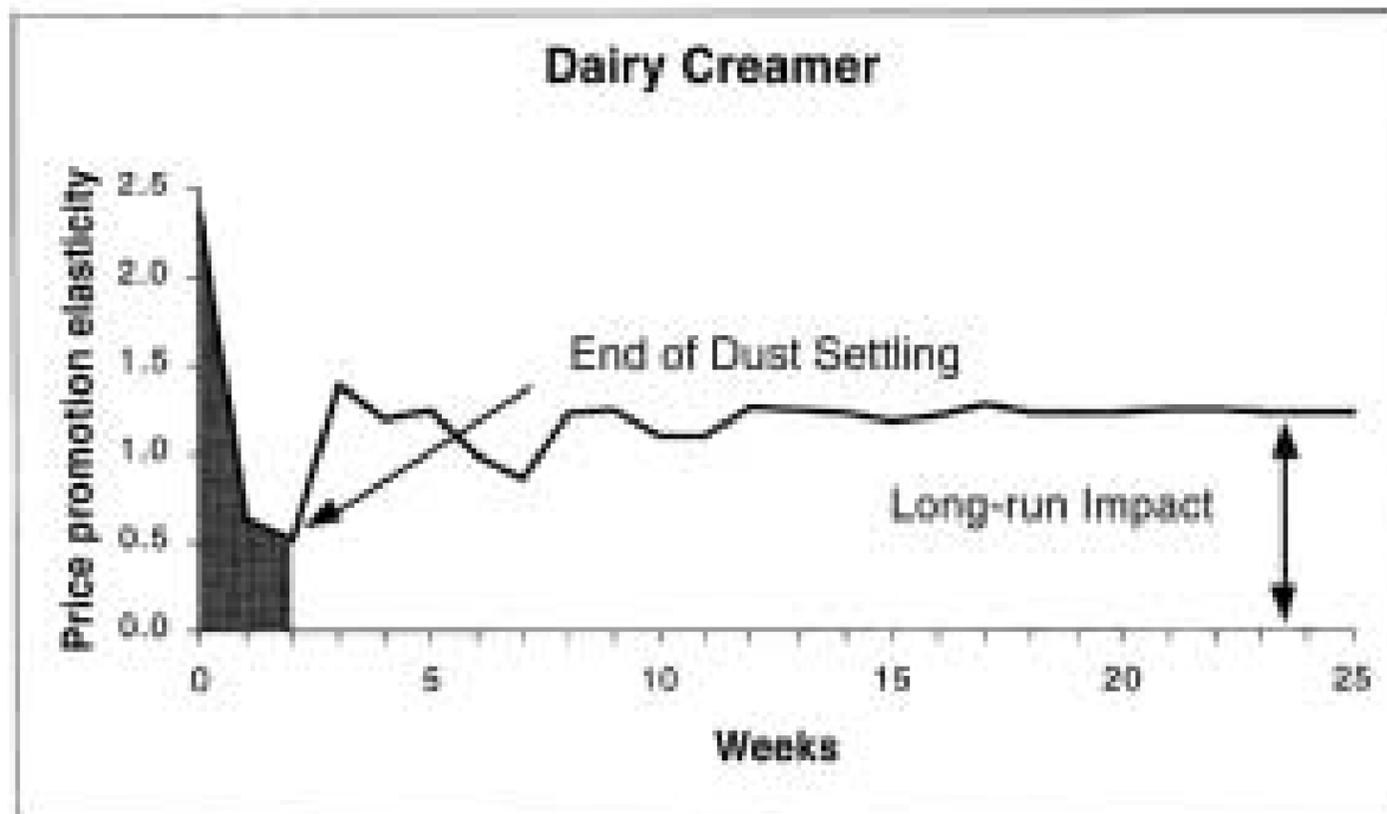
Impulse-Response Functions

A. Impulse-response function for a stationary market



Impulse-Response Functions

B. Impulse-response function for an evolving market



Promotional Effectiveness

- Many methods available for measuring the effect of promotional activity
- Naïve methods have problems
 - Usually too much going on to easily disentangle various effects
- Most commonly used statistical methods involve time series analysis of promotional data and sales figures
- Probability models for consumer purchasing behaviour are also useful
 - Based on household scanner data