

Introduction to Marketing Analytics

Session 6: Promotion II and Distribution Channels

Professor Ricardo Montoya

Promotion Strategy

Sales promotions are short term inducements designed to have a direct impact on the buying behavior of end-users and trade

Promotion Objectives

- Introduce new products and encourage new trial
- Increase awareness
- Switching
- Inventory
- Balance sales and production
- Competitors: lead or follow
- Signaling: to both consumers and retailers
- Service
- Increase category sales (Retailer)

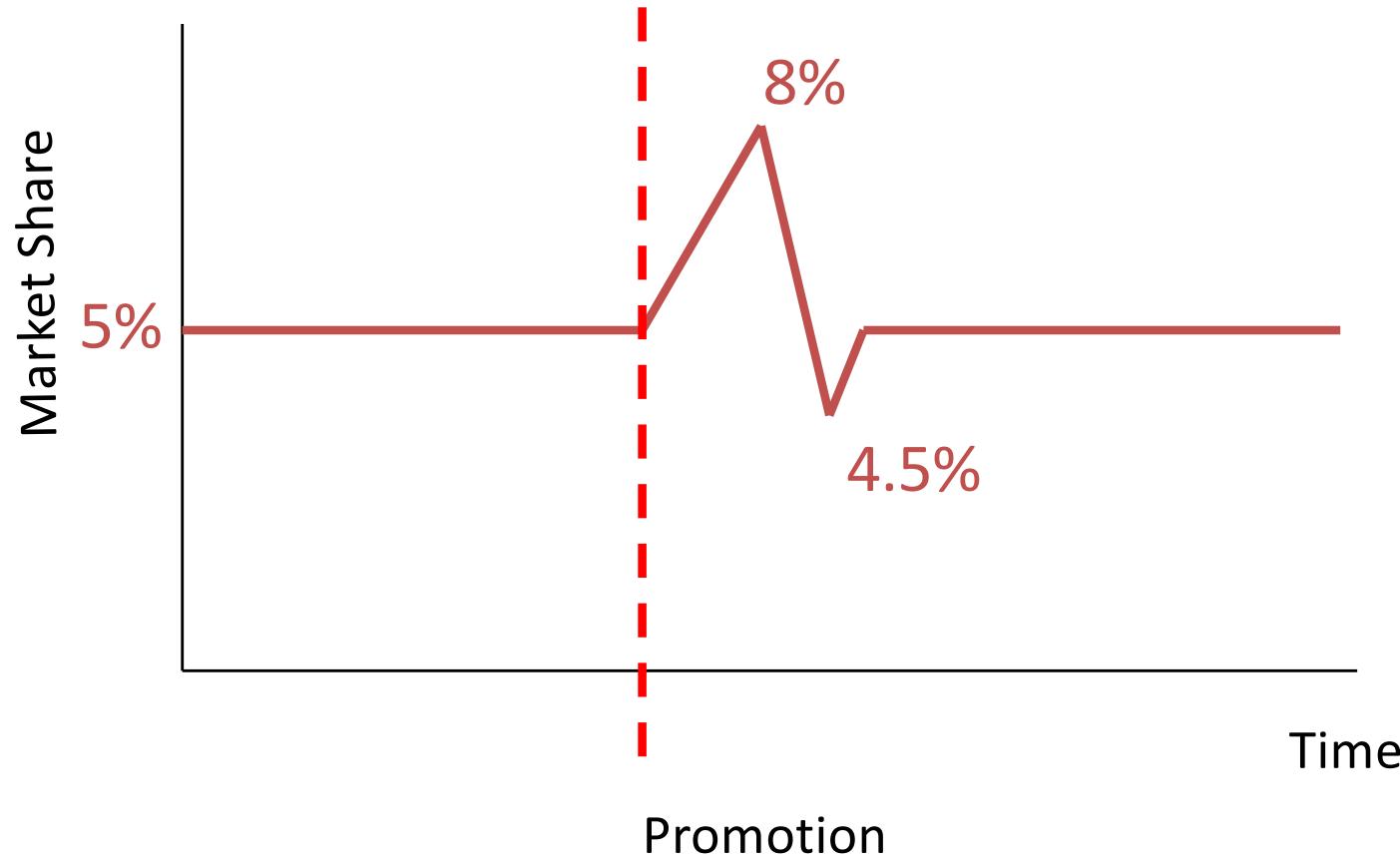
Growing Importance of Promotions

- Increasing use of sales promotions at the expense of advertising
- Approximately 75% of the promotion budget for packaged-good manufacturers
- Why?
 - Increasing short term focus
 - Empirical “evidence” that promotions work
 - Maturing products
 - Increased competition/competitive reaction
 - Growing power of trade

Promotion Risks

- Losses and reduced profits (e.g. car and airline industries in recent years)
- Consumer and retailer stockpiling
- Inefficiency in sales – capacity
- Low pass-through (52-62%)
- Short-term versus long-term focus
- Consumers' expectations
- Changing reference prices – getting used to deals

Analyzing Promotion Effectiveness



Assessing Profit Impact of Promotions

Assessing Profit Impact of Promotions

- The RM Candy Bar brand manager is considering options for promotions for the month of January 2014
- She has decided to freeze trade promotions so that all amounts will be identical by prior year's month
 - (Jan 2014 = Jan 2013, Feb 2014 = Feb 2013)
- She is still considering whether to offer a consumer promotion during the month of January
- She wants to know:
 - What factors can she use to predict his sales?
 - How will the consumer promotion impact profits?
 - Should she go ahead with her promotion?

Assessing Profit Impact of Promotions

- Candy Bars are sold to retailers in cases of 24. The regular gross margin the company makes on each bar is \$2.20 per bar (i.e., $\$2.20 * 24 = \52.8 per case)
- For simplicity, assume that the company offers only one bar size
- The plan:
 - Distribute 2 million coupons, \$1.00 face value, in each of the four Sundays in January
 - Each coupon is valid towards the purchase of one bar
 - On average 10% of the coupons are redeemed
 - Printing and distribution costs for the coupons are \$20 per thousand coupons
 - Coupon processing costs are 10 cents per redeemed coupon

Assessing Profit Impact of Promotions

- She has data from the last few years in which she has offered different consumer and trade promotions and seen various levels of sales
- Note that the Consumer Promotion variable in the dataset represents the total dollar amount of redeemed coupons by consumers
- The Trade Promotion variable represents dealer allowances that include co-op advertising, display allowances, slotting allowances, etc.

RM's Historical Sales Data

Month	Sales in Cases	Consumer Promotion	Trade Promotion
Jan-10	425,075	\$361,214	\$457,732
Feb-10	315,305	\$72,173	\$254,396
Mar-10	367,286	\$645,312	\$259,952
Apr-10	429,432	\$574,752	\$267,368
May-10	347,874	\$650,832	\$158,504
Jun-10	435,529	\$910,267	\$430,012
Jul-10	299,403	\$44,678	\$388,516
Aug-10	296,505	\$197,275	\$225,616
Sep-10	426,701	\$45,077	\$1,042,304
Oct-10	329,722	\$4,522	\$974,092
Nov-10	281,783	\$8,726	\$301,892
Dec-10	166,391	\$3,226	\$76,148
Jan-11	629,402	\$2,633,779	\$0
Feb-11	263,467	\$253,526	\$315,196
Mar-11	389,320	\$13,406	\$703,624
Apr-11	376,569	\$133,195	\$198,464
May-11	444,404	\$105,058	\$478,880
Jun-11	386,986	\$5,328	\$457,172
Jul-11	414,314	\$2,093	\$709,480

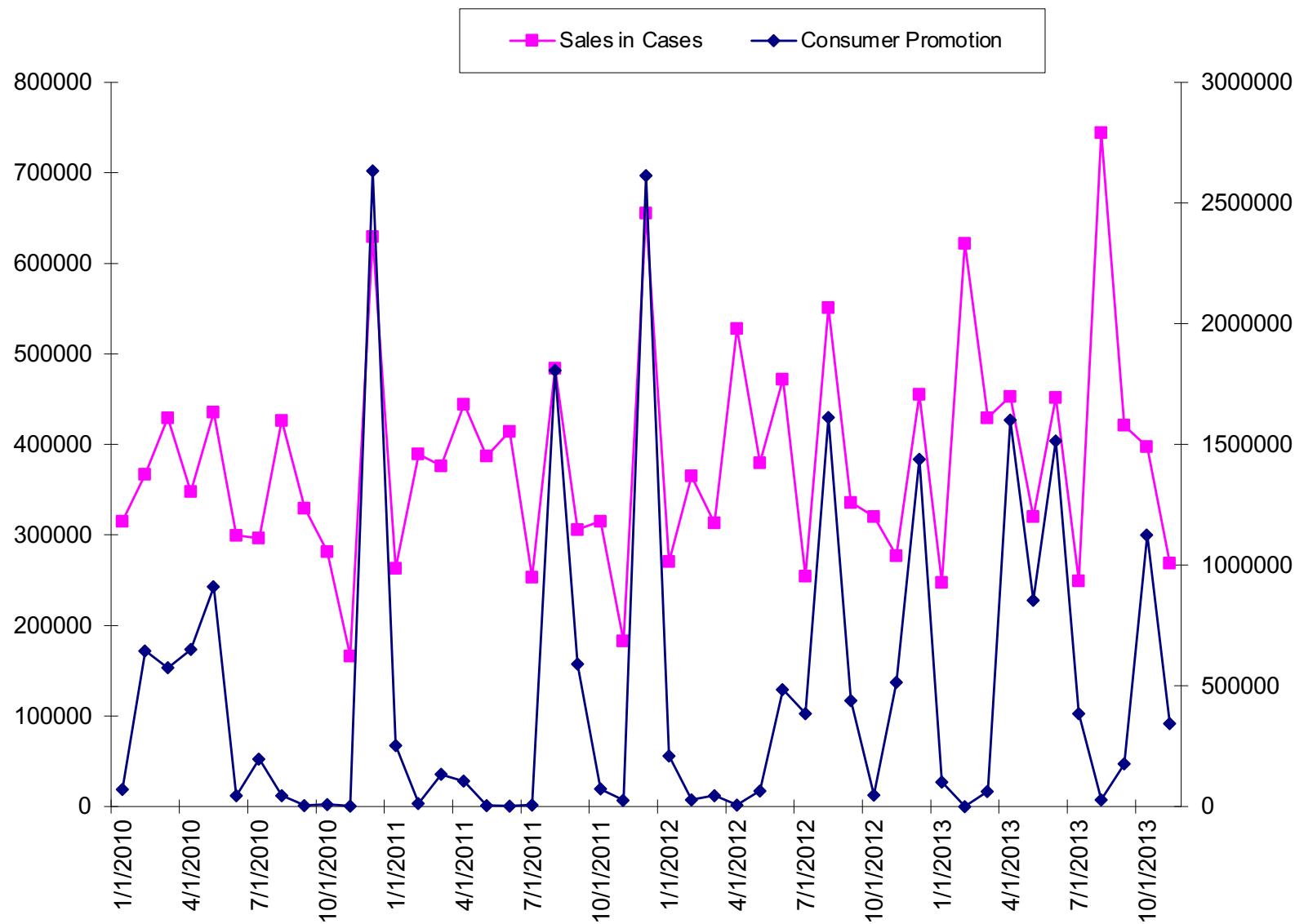
Aug-11	253,493	\$6,754	\$45,380
Sep-11	484,365	\$1,807,920	\$28,080
Oct-11	305,989	\$589,949	\$111,520
Nov-11	315,407	\$72,662	\$267,200
Dec-11	182,784	\$26,554	\$354,304
Jan-12	655,748	\$2,615,074	\$664,712
Feb-12	270,483	\$209,798	\$536,824
Mar-12	365,058	\$27,552	\$551,560
Apr-12	313,135	\$46,147	\$150,080
May-12	528,210	\$7,234	\$580,800
Jun-12	379,856	\$65,376	\$435,080
Jul-12	472,058	\$485,659	\$361,144
Aug-12	254,516	\$385,483	\$97,844
Sep-12	551,354	\$1,611,686	\$30,372
Oct-12	335,826	\$440,208	\$150,324
Nov-12	320,408	\$47,309	\$293,044
Dec-12	276,901	\$514,426	\$162,788
Jan-13	455,136	\$1,438,949	\$32,532
Feb-13	247,570	\$101,846	\$23,468
Mar-13	622,204	\$754	\$4,503,456

Apr-13	429,331	\$62,213	\$500,904
May-13	453,156	\$1,600,939	\$0
Jun-13	320,103	\$854,904	\$0
Jul-13	451,779	\$1,514,707	\$46,104
Aug-13	249,482	\$384,989	\$92,252
Sep-13	744,583	\$28,512	\$4,869,952
Oct-13	421,186	\$176,731	\$376,556
Nov-13	397,367	\$1,125,898	\$376,556
Dec-13	269,096	\$345,029	\$552,536

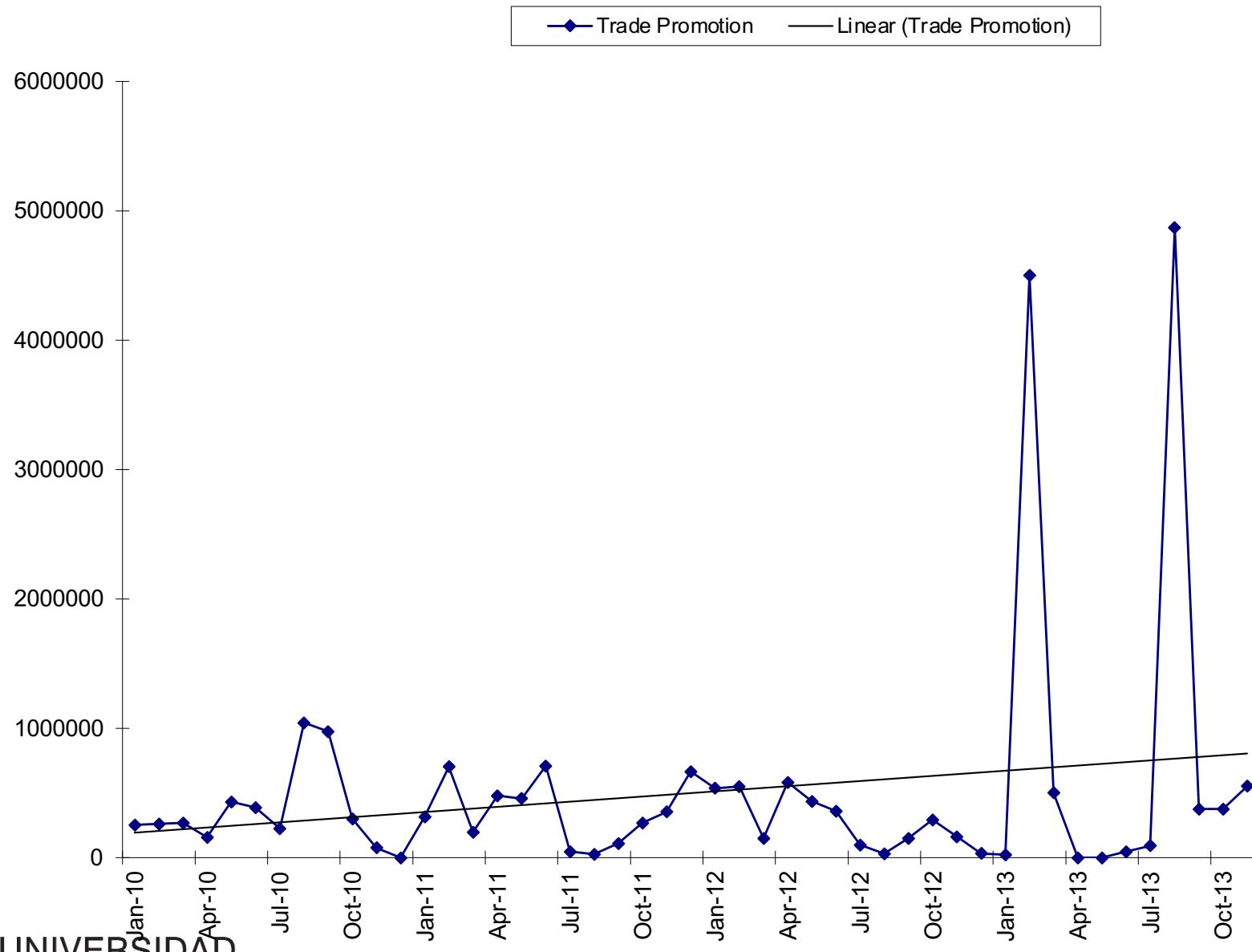
A closer look...

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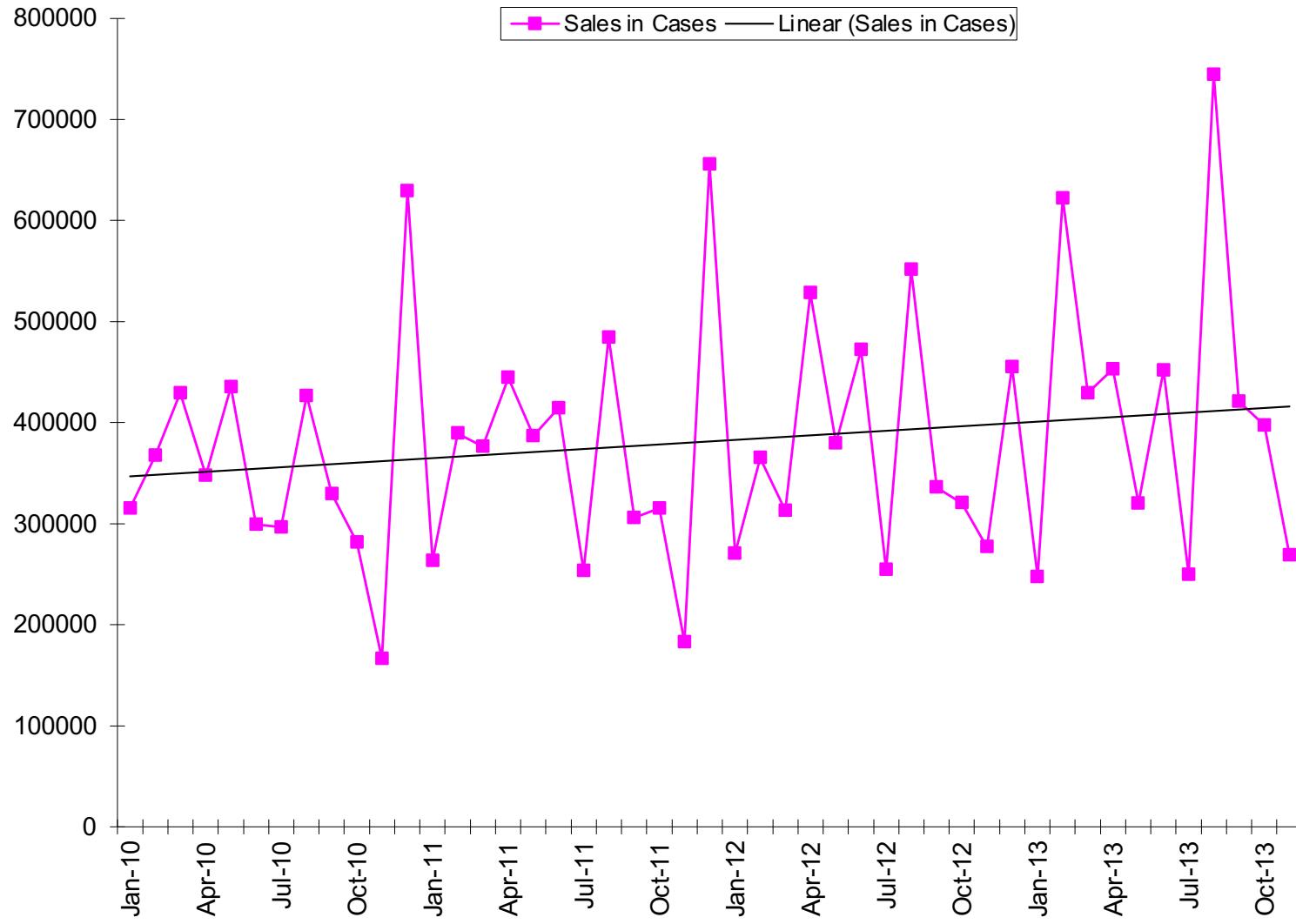
RM's Consumer Promotion Over Time



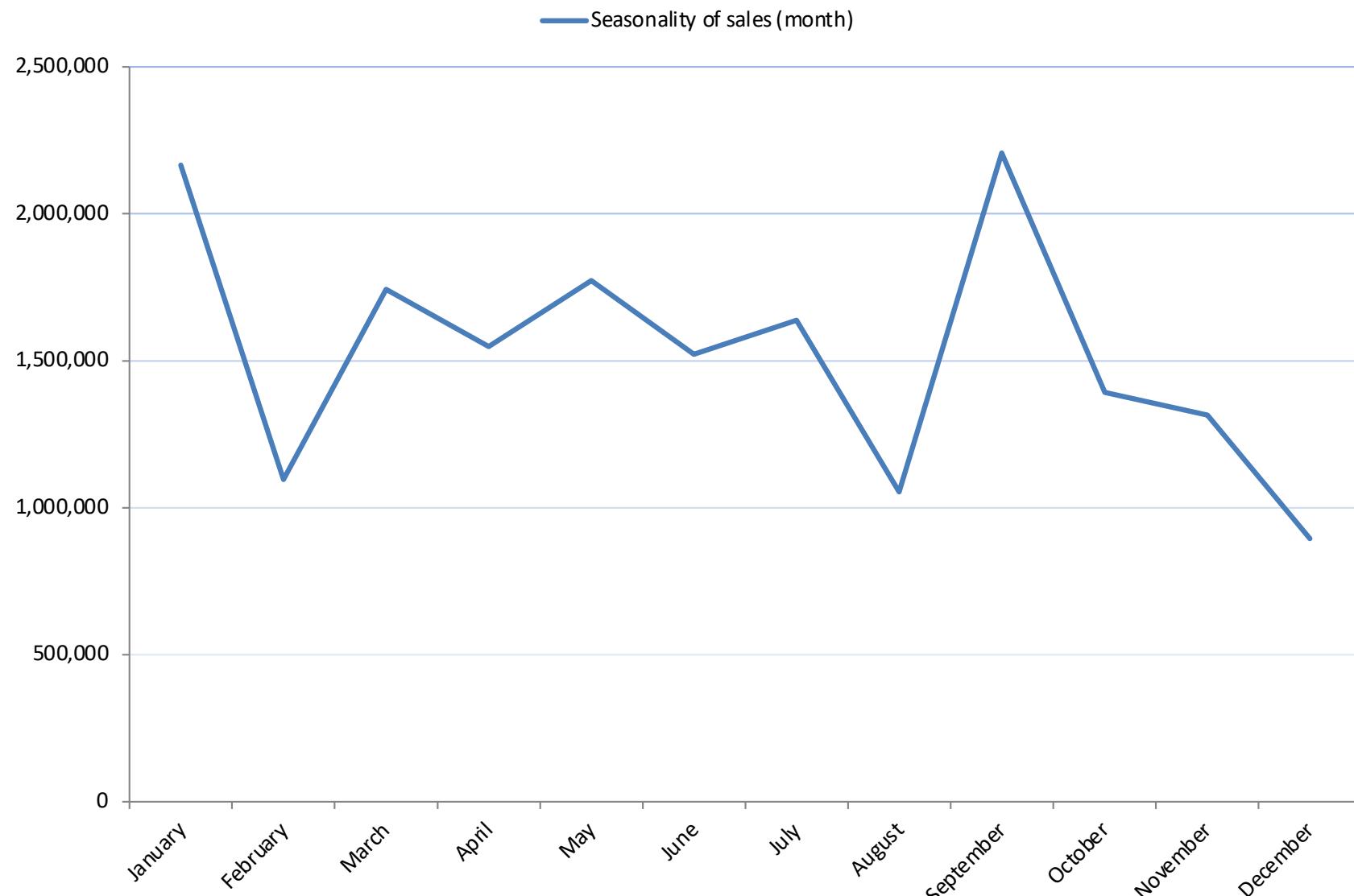
RM's Trade Promotion Over Time



RM's Sales over Time



RM's Sales Seasonality



Assessing Short Run Impact of Promotions

- Estimate “baseline” sales
- Identify incremental sales due to promotion
- Profitability = Profits from incremental sales - cost of Promotion

Regression Model

Residuals:

	Min	1Q	Median	3Q	Max
	-64452	-24781	2451	23971	98986

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	1.762e+05	2.505e+04	7.036	8.04e-08 ***
Tlag1	6.590e-03	9.206e-03	0.716	0.479666
Trade.Promotion	7.030e-02	9.230e-03	7.616	1.71e-08 ***
Clag1	-3.418e-02	1.431e-02	-2.389	0.023362 *
Consumer.Promotion	7.244e-02	1.626e-02	4.456	0.000108 ***
Month.January	2.144e+05	4.627e+04	4.633	6.55e-05 ***
Month.February	1.118e+05	3.777e+04	2.960	0.005957 **
Month.March	1.313e+05	3.260e+04	4.028	0.000354 ***
Month.April	1.579e+05	3.230e+04	4.889	3.18e-05 ***
Month.May	1.929e+05	3.086e+04	6.251	6.94e-07 ***
Month.June	1.502e+05	3.080e+04	4.878	3.29e-05 ***
Month.July	1.666e+05	3.068e+04	5.430	6.93e-06 ***
Month.August	5.928e+04	3.011e+04	1.969	0.058243 .
Month.September	1.970e+05	3.539e+04	5.565	4.73e-06 ***
Month.October	1.231e+05	3.441e+04	3.576	0.001207 **
Month.November	9.640e+04	2.987e+04	3.228	0.003017 **
Trend	6.891e+02	5.643e+02	1.221	0.231559

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 42120 on 30 degrees of freedom
 Multiple R-squared: 0.9226, Adjusted R-squared: 0.8814
 F-statistic: 22.36 on 16 and 30 DF, p-value: 2.145e-12

Residuals:

	Min	1Q	Median	3Q	Max
	-76518	-27482	3186	19802	103860

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	1.961e+05	2.226e+04	8.810	4.57e-10 ***
Trade.Promotion	7.444e-02	8.671e-03	8.585	8.23e-10 ***
Clag1	-3.444e-02	1.266e-02	-2.720	0.010456 *
Consumer.Promotion	7.719e-02	1.570e-02	4.918	2.52e-05 ***
Month.January	2.008e+05	4.561e+04	4.403	0.000111 ***
Month.February	1.055e+05	3.559e+04	2.963	0.005708 **
Month.March	1.201e+05	3.213e+04	3.737	0.000728 ***
Month.April	1.604e+05	3.041e+04	5.274	8.96e-06 ***
Month.May	1.860e+05	3.101e+04	6.000	1.09e-06 ***
Month.June	1.448e+05	3.072e+04	4.714	4.55e-05 ***
Month.July	1.616e+05	3.075e+04	5.254	9.50e-06 ***
Month.August	5.763e+04	3.050e+04	1.890	0.067901 .
Month.September	1.855e+05	3.507e+04	5.289	8.56e-06 ***
Month.October	1.288e+05	3.116e+04	4.132	0.000242 ***
Month.November	9.580e+04	3.040e+04	3.151	0.003519 **

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 42940 on 32 degrees of freedom
 Multiple R-squared: 0.9142, Adjusted R-squared: 0.8767
 F-statistic: 24.37 on 14 and 32 DF, p-value: 3.85e-13

Evaluation

- No promotion
 - Sales = 690,805 (Jan and Feb)
 - Contribution= \$36,474,511
 - Yes promotion
 - Sales = 725,012 (Jan and Feb)
 - Contribution= \$38,280,622
-
- Cost of promotion
 - \$1,040,000
 - Diff= \$766,110 (go ahead)

Takeaways

- Evaluating a price cut promotion involves
 - comparing profits with the promotion and without the promotion (called baseline estimates)
- Estimates should consider
 - effects of promotions on the period in which they are offered and on subsequent periods to account for potential stockpiling and other enduring effects of the promotion
- Regression analysis is a tool that
 - can be applied to historical data to make sales estimates and forecasts (controlling for endogenous effects)

Takeaways

- A lag variable
 - can be used to evaluate the effects of a promotion in a subsequent period
- Seasonality in a dependent variable
 - use dummy variables that represent the categories associated with the “seasons” (quarters, months, etc.)
- A trend variable
 - accounts for an increase or decrease in the dependent variable though time
 - can have many functional forms (linear and non-linear)

A/B testing

**“Half the money I spend on
Advertising is wasted; the problem
is I don’t know which half” (John
Wanamaker)**



Why Experimentation in Advertising?

- “Think like a scientist”
- Make informed decisions with insights in a controlled environment
- Compare the strategies head-to-head
- Leverage on randomized experiments to reduce biases
- Understand causal effects
- Understand user’s behavior in constantly changing environments
- Question old practices

Advertisers who run +15 experiments in a year get up to

30%

Higher ads performance

Harvard Business Review “Marketers Underuse Ad Experiments. That's a Big Mistake”.
<https://hbr.org/2020/10/marketers-underuse-ad-experiments-thats-a-big-mistake>



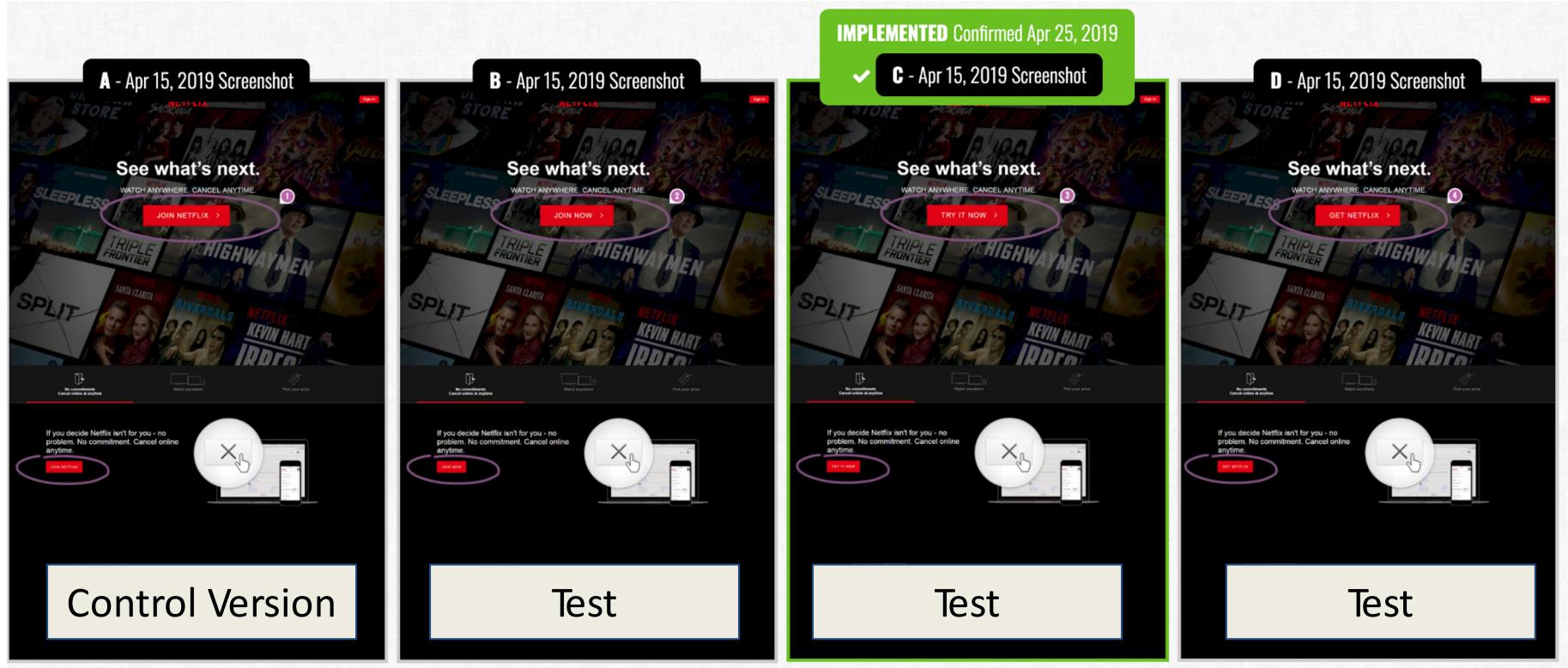
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Why Experimentation in Advertising?

- A test can help us answering:
 - Is my webpage layout the best?
 - What is the impact of my display investment?
 - Should I add an extra CTA (Call to Action) to my banner?
 - Will pick-up-in-store drive more sales?
 - Which is the best image for my product?



What Does A/B Testing Look Like?



Statistically compare conversion rate of each experimental condition

Experimental Culture

- Test and learn should be adopted as an organizational culture where everyone in the company is accountable for it
 - Executive endorsement: sponsorship
 - Culture: learning agenda
 - Talent: cross-team sponsorship
 - Persistence: iterative process

Harvard Business Review “Marketers Underuse Ad Experiments. That's a Big Mistake”.
<https://hbr.org/2020/10/marketers-underuse-ad-experiments-thats-a-big-mistake>

The Netflix case



- Learning is in this company's DNA
- Constantly rolling out features/images/UI updates
- **Experimentation and causal inference focused data scientists** help shape business decisions
- Testing allows Netflix to try out new features and learn about a constantly changing user
- To make experiments quicker Netflix has developed their methodology

Learn more in ["A day in the life of an experimentation and causal inference scientist @ Netflix"](#)

Running A/B Tests

- Select the stimuli to analyze
- Test design
 - Define the hypothesis and key metrics (e.g., conversion)
 - Set targets and how you are going to measure
 - Collect historical data
 - Determine sample size
 - Split groups randomly
 - Define test duration based on business outcomes
- Run experiments
- Cooldown and analyze data with t-tests



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Type of A/B tests

- Call to action: Define which is the best wording to encourage users to take an action
 - “quote now” vs “get in touch” (e.g., insurance)
 - most effective email subject
- App or Web UX: Tests the best user experience to make sure that your app/webpage is optimized to maximize revenue
 - Page speed tests (loading time)
 - Menu size
 - Option, color and buttons
- Creative: Understand which message is more compelling to the audience
 - Compare banners or Video ads

Hypothesis and Key Metrics

- Before defining tests, it is important to define the correct hypothesis
- Do background research to avoid testing things that haven't worked in the past
- Understand the business impact of the outcome
 - Implementation costs
 - Opportunity costs
- Define the independent variable: which is the stimuli that we will be testing?
- The hypothesis will define performance metric (e.g., conversion)
- Good hypothesis
 - Changing [independent variable] will result in increase/decrease [dependent variable]

Example: A/B Testing for Racial Representation in Movie Billboards

- **Stimuli:** Image with someone from their race represented in it

Control



Test

Hypothesis: Changing movie image racial representation will result in increase people viewing the movie

- Null Hypothesis: the difference in the conversion rate is 0

KPI : interestingness - conversion rates (views)

Target : Test is targeted to India & Indonesia viewers

Example: A/B Testing for Racial Representation in Movie Billboards

- Sample size

$$n = \frac{2(\bar{p})(1 - \bar{p})(Z_\beta + Z_{\alpha/2})^2}{(p_B - p_A)^2}$$

Equation for minimum sample size

Z_β : z-score that corresponds to the level of statistical power

$Z_{\alpha/2}$: z-score that corresponds to the level of significance or confidence level

\bar{p} : pooled probability or average of p_A and p_B

p_A : success rate of control group

p_B : success rate of test group

Example: A/B Testing for Racial Representation in Movie Billboards

- To define the minimum sample size, run a power analysis before testing
- Why is it important?
 - Power is defined as the probability of not detecting an effect in the experiment when there is an effect
- We need to define the “sensitivity” of the test to define the sample
 - Minimum recommended power is 80%, but you can be more sensitive always considering the trade off in time and budget

Power Analysis

- Key to determine feasibility of testing
- There are 2 variables
 - Minimum detectable effect
 - minimum difference between the control and test group that be worth the investment
 - Sample Size: can we reach this number of people?
How much time will it take?

```
> power.t.test(n=NULL,type=c("two.sample"),power=0.8,sig.level=0.10,delta=0.2)

Two-sample t test power calculation

      n = 309.8065
      delta = 0.2
        sd = 1
     sig.level = 0.1
       power = 0.8
    alternative = two.sided

NOTE: n is number in *each* group
```



Example: A/B Testing for Racial Representation in Movie Billboards



View rate control : 2,77%

Uplift 82.72% of
B/A

View rate test : 5,07%

Can we reject the null
hypothesis? Not Yet

Example: A/B Testing for Racial Representation in Movie Billboards

```
# Pooled sample proportion for variants A & B
```

```
p_pool <- (conversions_A + conversions_B) / (visitors_A + visitors_B)  
print(p_pool) # 0.03928325
```

```
# Standard error for variants A & B (SE_pool)
```

```
SE_pool <- sqrt(p_pool * (1 - p_pool) * ((1 / visitors_A) +(1 / visitors_B)))  
print(SE_pool) # 0.01020014
```

```
# margin of error for the pool
```

```
MOE <- SE_pool * qnorm(0.975)  
print(MOE) # 0.0199919
```

```
# Point Estimate or Difference in proportion
```

```
d_hat <- conv_rate_B - conv_rate_A
```

```
# z_score <- d_hat / SE_pool
```

```
print(z_score) # 2.249546
```

Calculating the Z Score (97.5%) for the difference between samples we can get the p value that is 0.024 and this number indicates a **strong statistical significance**.

p-value <0.05 → reject null hypothesis (95%)

Introduction to Marketing Analytics

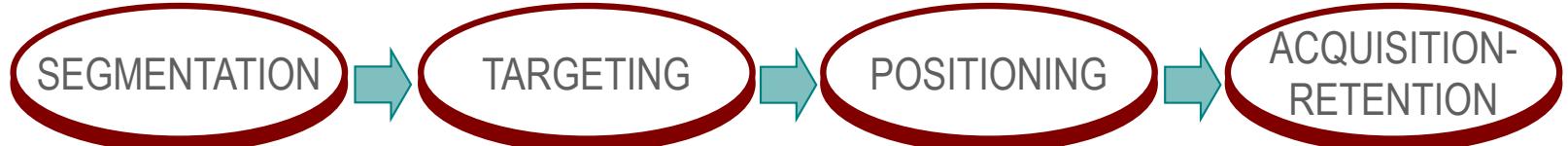
Session 6: Distribution Channels

Professor Ricardo Montoya

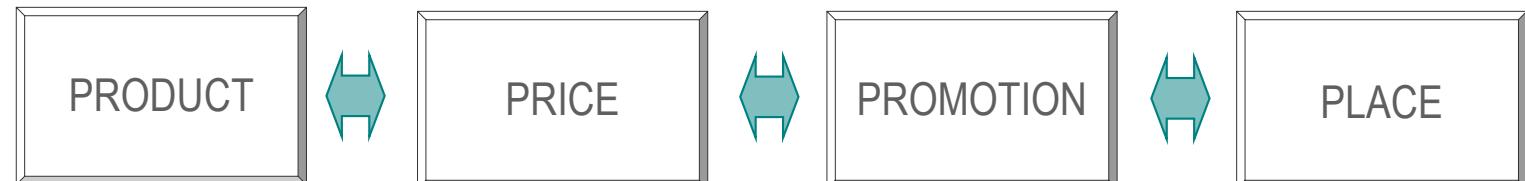
Identify Market Opportunities



Set Strategy



Formulate Marketing Program



Overview

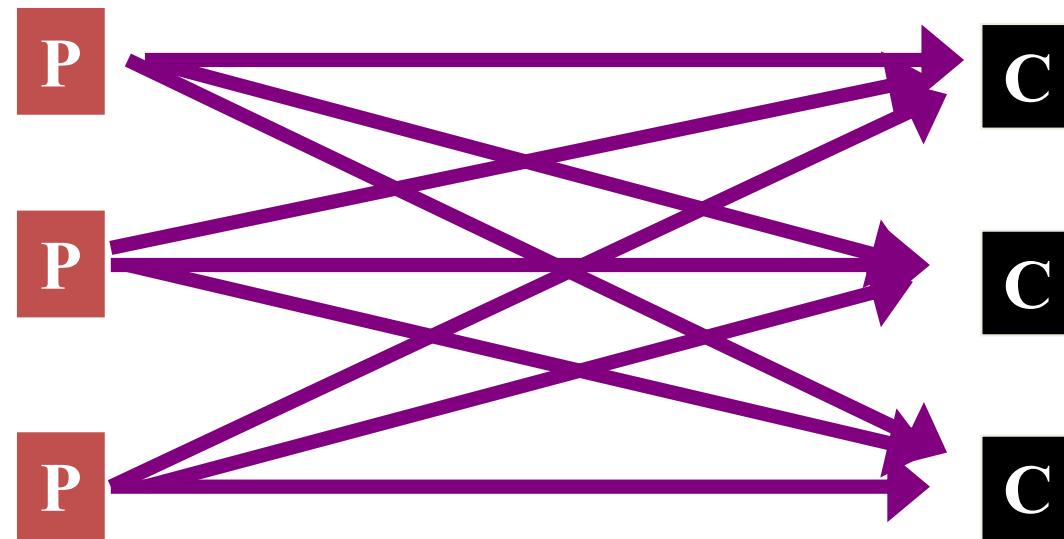
- What are **marketing channels**? What are their **functions**?
- What are the main decisions in **channel design**?
- What are the different types of **channel conflicts**?
- Omnichannel and last mile **delivery**

What are Marketing Channels?

- Sets of interdependent organizations (i.e., intermediaries) involved in the flow of goods and services from producer to consumers
- The channels perform the work of moving products from producers to consumers to overcome the time, place, and possession gaps that separate producers from customers

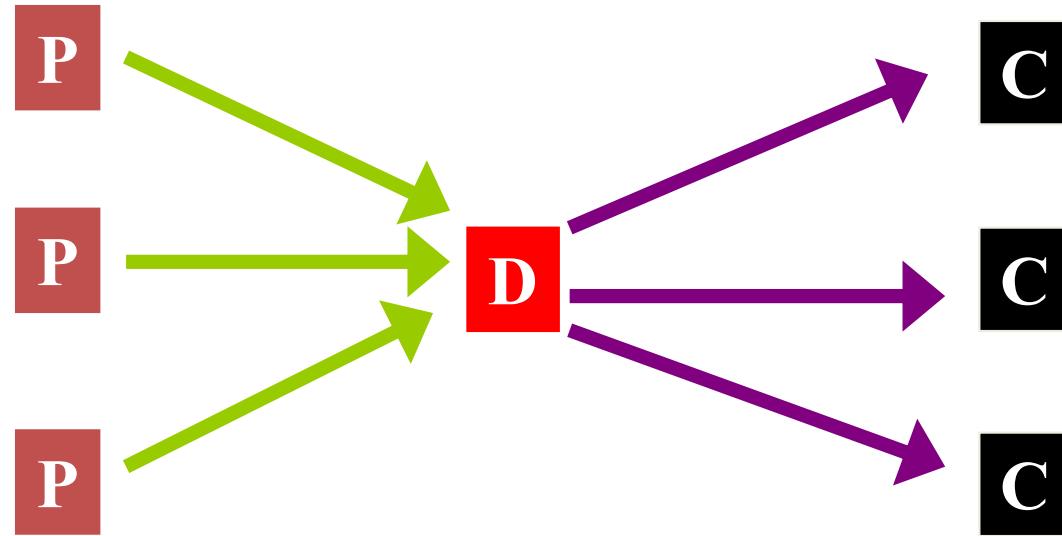
What is the Purpose of a Distribution Channel?

- Intermediary
 - Efficiency
 - Accessibility to target markets



What is the Purpose of a Distribution Channel?

- Intermediary
 - Efficiency
 - Accessibility to target markets



Channel Functions

- Physical product functions
 - Movement of physical products
 - Creation of assortments
 - Breaking down units
- Information functions
 - Product/consumer information exchange
 - Order collection
 - Transfer of ownership
- Risk spreading

Channel Functions (continued)

- Payment functions
 - Payment transfer
- Promotion and demand generation
- Warehousing
 - Spatial benefits
 - Temporal benefits
- After sales
 - Service
 - Return/Exchange
 - Quality assurance

Channel Design: Key Questions

- Who are the customers? What are their needs when buying?
- What are the major channel alternatives?
 - Types of intermediaries
 - Channel length and breadth
- How do we evaluate these alternatives?

Channel Design: Customer Needs

- Information
 - Primary (e.g., education, demo/trial, service)
 - Comparative (relative to competition)
- Logistic support
 - Variety, convenience, waiting time, lot size

Channel Design: Length

Factors influencing channel length:

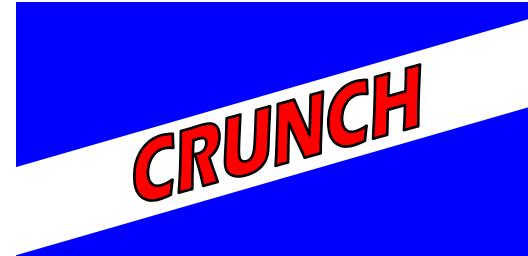
	<u>DIRECT</u>	<u>INDIRECT</u>
Need for info	high	low
Logistic support	low	high



Channel Design: Breadth

Factors influencing channel breadth:

	<u>INTENSIVE</u>	<u>SELECTIVE</u>
Manufacturer control	low	high
Shopping effort	low	high



Channel Breadth

- Intensive distribution
 - As many outlets as possible
 - Selling support not considered vital
 - Minimizes customers' cost of obtaining offering
- Selective distribution
 - Multiple, but limited, outlets per area
 - Tradeoff between selling support and the costs customers face to obtain the offering, both are considered important
- Exclusive distribution
 - Single outlet per area
 - To maintain control over service level and outputs
 - Customers' cost of obtaining offering not considered vital

Evaluating Channel Alternatives

- Economic criteria
 - Is it cost effective?
- Control criteria
 - Can I influence sales context?
- Adaptive criteria
 - Is it flexible enough to meet future needs?

Vertical Channel Conflict

Vertical Conflict: Conflict between different levels of the same channel

Possible solution: different players need to get the right incentives



Horizontal Channel Conflict

Horizontal Conflict: Interests of different members at same level are opposed

Possible solutions: diplomacy, mediation, arbitration



Multichannel Conflict

Multichannel Conflict: Exists when the manufacturer has established two or more channels that sell to the same market; especially intense when one channel gets a lower price or work with a lower margin

Possible solution: players need to get the right incentives



GOOD
YEAR



Multichannel interaction

The screenshot shows the Falabella website's homepage with a red header bar. The main navigation menu includes categories like Electrohogar, Tecnología, Decohogar, Muebles, Dormitorio, Infantil, Deportes, Belleza, Moda, Calzado, and Día del Padre. A search bar and a shopping cart icon are also present. The central promotional area features three sections: 'COMPRA ONLINE' (a woman holding a tablet), 'APROVECHA TU TIEMPO' (two women hugging), and 'RETIRA EN TIENDA' (a woman holding a Falabella shopping bag). A large button in the center reads 'Compra Online RETIRA EN TIENDA'. Below it, text states: 'Este servicio te permite comprar online y retirar en una tienda Falabella'. A smaller box below says 'Es un servicio gratuito, cómodo y rápido.'

SHOWROOMING

THIS PAIR IS SO PERFECT, I
CAN'T WAIT TO BUY THEM
CHEAPER ONLINE SOMEWHERE.
WHAT'S YOUR WIFI PASSWORD?



OMNICHANNEL RETAIL



Omni-Channel Retail

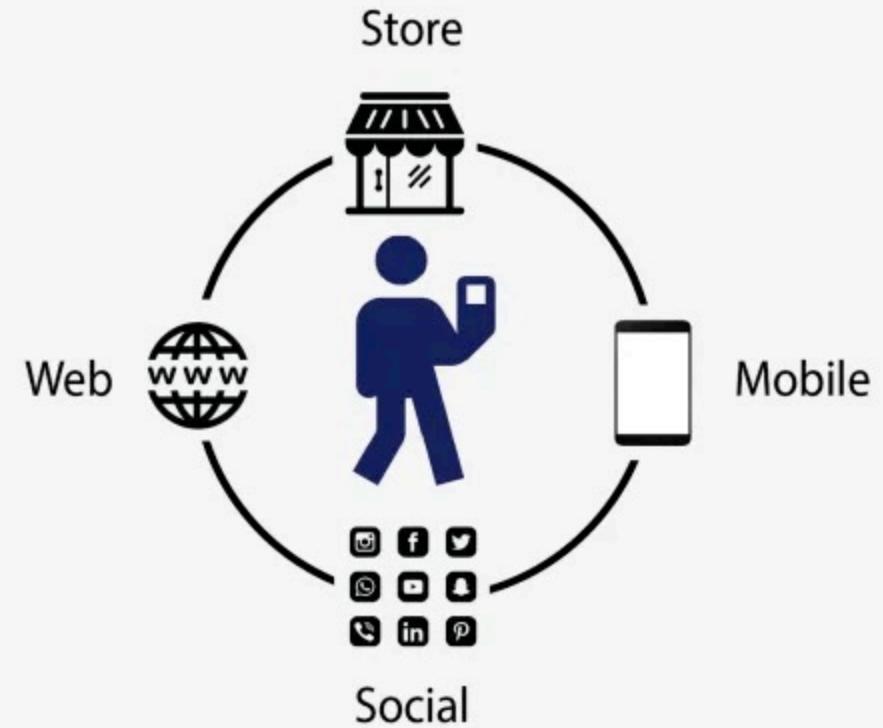
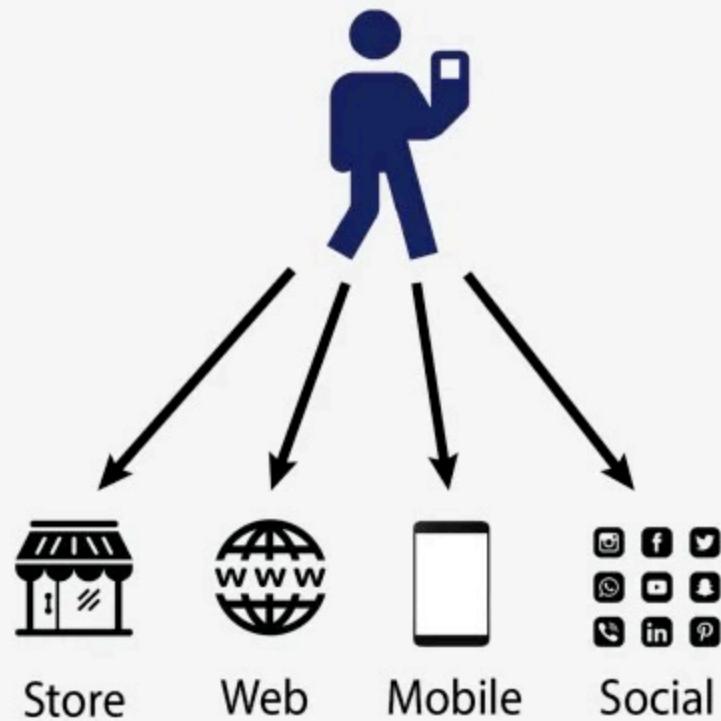
- From traditional shopping experience to a cross-functional multi-channel strategy
 - Omni-channel retailing
- This strategy allows consumers to shop and make purchases from a variety of retail channels
 - home computers, mobile devices, phones, catalogs, in-store and more
- Retailers must integrate all of these channels
 - so that they can accurately and efficiently be used in any combination
- The retail industry has evolved
 - adapt to technological advancements
 - changing customer expectations



Multichannel

Vs.

Omnichannel



LAST MILE DELIVERY



Last Mile Delivery

- Many retailers have introduced some form of an omni-channel retail strategy
- To differentiate and remain competitive, retailers and their logistics providers must focus on order fulfillment accuracy, efficiency and cost
- While many retailers have been successful in manufacturing and selling items to consumers, fulfilling customer orders in a timely fashion has proven to be more challenging
- This is the focus of **last mile delivery**
- Increased importance due to Covid-19

Changes in the Retail Landscape

- Retailers must prepare for long-lasting increase in their online traffic
- Guarantee that delivery networks are prepared
- Decide to use traditional delivery methods or new entrants
- Use technological advances and new opportunities

Changes in the Retail Landscape



PedidosYa



Rappi

Uber
Eats

Amazon going Offline

CNN BUSINESS Markets Tech Media Success Perspectives Videos Edition ▾   

MARKETS		see all →		
▲ DOW	35,455.80	+242.68	+0.69%	
▲ S&P 500	4,509.37	+39.37	+0.88%	
▲ NASDAQ	15,129.50	+183.69	+1.23%	

FEATURED

Cryptocurrency, explained
If you're a crypto novice, you might be wondering what all the fuss is about

LATEST

Here's what renters can expect after the end of the federal eviction ban
F-bombs and hate mail: Restaurants take heat when they ask for proof of vaccination
Tesla files to sell electricity in Texas

Amazon helped crush department stores. Now it reportedly wants to be one

By Nathaniel Meyersohn, CNN Business Updated 1511 GMT (2311 HKT) August 20, 2021



TOP STORIES

COLIN COOPER/REUTERS/SHUTTERSTOCK
President Xi Jinping turns his fire on China's rich in push to redistribute...

Audi unveils a shape-shifting concept car

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Main Takeaways

- Channel Functions
- Channel Design
 - Customer Needs: information, logistic support
 - Dimensions: length, breadth of channel
 - Evaluation Criteria: economic, control, adaptive
- Channel Management
 - Types and causes of channel conflict
 - Approaches for managing conflict
- Omnichannel retailing and last mile delivery
 - Focus on the customer
 - Importance of the end of the channel

Introduction to Marketing Analytics

Session 6: Distribution Channels

Professor Ricardo Montoya