Wine Retailer
Case Assignment

MSBA Cohort 2 Group 22

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EXECUTIVE SUMMARY

Is sending email effective?

YES !

Purchase value increases by $1.35 on average

Average Casual Effect

What group should we send email to?

Recent Buyers

- Sending email has **insignificant** impact on non-recent buyers
- The impact is **greater** on recent buyers

Past Purchase Value

- The impact of sending email to loyal customers is **5 times** higher than to non-loyal customers

Slicing & Dicing

Who should we send email to?

43,325 customers with expected profits greater than email cost

Targeted customers have:

Past purchase:
$55 higher

Days since last purchase:
38 days shorter

Causal Forest

METHODOLOGY

Is sending email effective?

Randomization Check

Passed !

Average Casual Effect

- Run regression on main effect
- `groupemail` is statistically significant
- Sending email on average increases purchase amount by **$1.35**

What group should we send email to?

Slicing & Dicing

- Plot **histograms** of `last_purch`, `past_purch` and `visits` to find threshold to split into groups
- Plot groups' difference
- Run regression with **interaction terms** between main effect and group dummy

Who should we send email to?

Individual-level Effect

- Train **causal forest** model on the entire dataset
- Predict causal effect estimates for each customer

Scoring

Score = 30%*Beta - 0.1

Profit Margin: 30%

Email Cost: $0.1

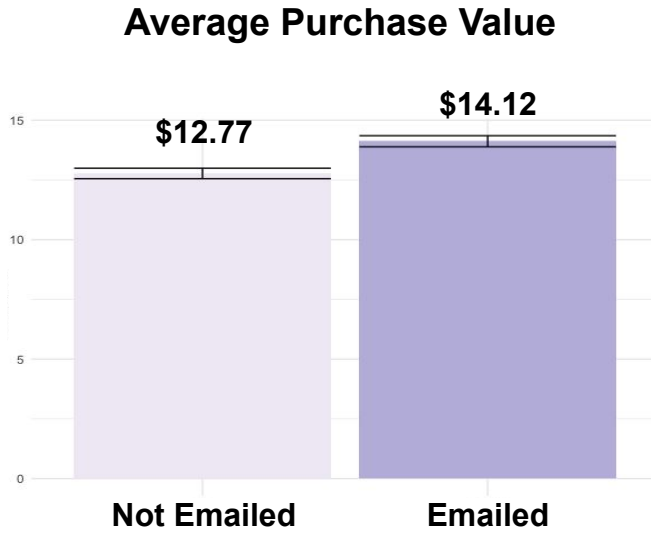
Targeting

Send email to individuals with **score > 0**

Average Casual Effect

- Sending email is **statistically significant** and can increase customers' purchase by **$1.34**

```
Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept)  12.7727     0.2260  56.528  < 2e-16 ***
groupemail    1.3465     0.3195   4.214 2.52e-05 ***
```

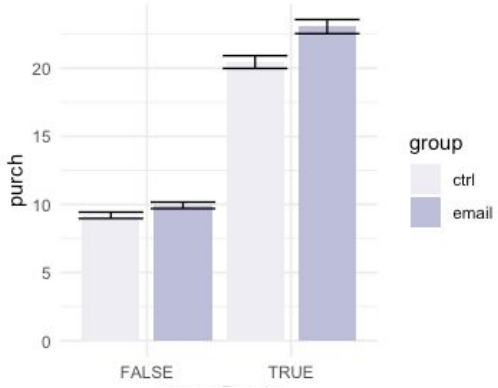


	Dependent variable:	
	purch	
	(1)	(2)
groupemail	1.346***	1.260***
	(0.320)	(0.310)
Model	No Controls	With Controls
Observations	78,312	78,312
R2	0.0002	0.058
Adjusted R2	0.0002	0.058
Residual Std. Error	44.712 (df = 78310)	43.394 (df = 78304)
F Statistic	17.755*** (df = 1; 78310)	693.252*** (df = 7; 78304)
Note:		*p<0.1; **p<0.05; ***p<0.01

- Compared to controlling all Xs, the coefficients of `groupemail` is still statistically significant.
- The expected value is slightly lower than the previous results.

Slicing and Dicing

Recent Buyers

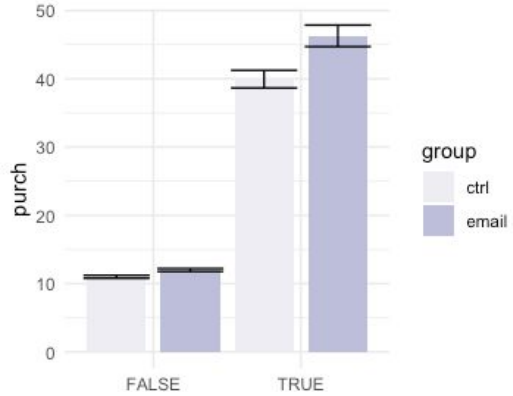


Recent Buyers (last_purch < 35)

```
Coefficients:
                          Estimate Std. Error t value Pr(>|t|)
(Intercept)                9.1999     0.2713  33.912  < 2e-16 ***
groupemail                 0.7312     0.3839   1.905  0.05680 .
recentPurchTRUE           11.2520     0.4814  23.372  < 2e-16 ***
groupemail:recentPurchTRUE 1.8753     0.6804   2.756  0.00585 **
---
```

- Recent buyers purchase **$11.25** more than non-recent buyers on average
- Sending email has **insignificant** impact on non-recent buyers (p-value > 0.05)
- Sending email has **greater impact** on recent buyers.

Loyal Customers



Loyal Customers (past_purch > 450)

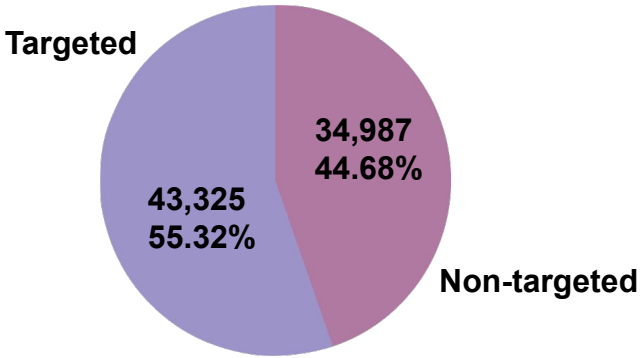
```
Coefficients:
                         Estimate Std. Error t value Pr(>|t|)
(Intercept)              10.9973     0.2298  47.855  < 2e-16 ***
groupemail                1.0060     0.3250   3.095  0.00197 **
loyalTRUE                28.9529     0.9280  31.198  < 2e-16 ***
groupemail:loyalTRUE      5.3246     1.3104   4.063 4.84e-05 ***
---
```

- Loyal customers purchase **$28.95** more than non-loyal customers on average
- Sending email is **statistically significant** and can increase non-loyal customers' purchase by **$1.01**
- The impact of sending email is **$5.32 higher** for loyal customers.

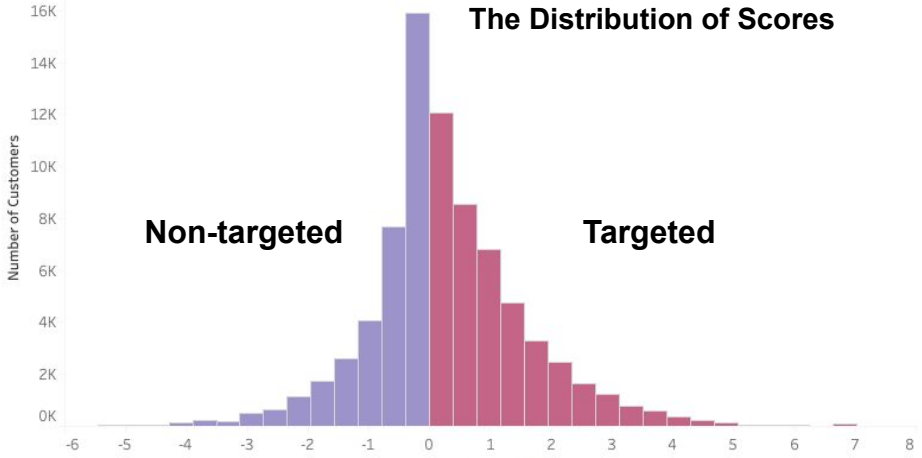
Scoring and Targeting

Findings:

- Scores concentrate between **-4** and **4**.
- Send e-mails to **43,325** customers.
- Our targeted customers have the following features on average:
  Past Purchase: 55 units higher
  Last Purchase: 38 days shorter



Number of Targeted and Non-targeted Customers



Summary of Baseline Variables for Targeted/Non-targeted Customers