

Costly Conversion

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Context and Business Questions

- I work in the product team at Symantec, which sells cyber security software for \$39 for a variety of devices
- Revenue has been flat for a while, so the VP of Product wants to experiment with increasing the price
- We run a three-month long experiment where $\frac{2}{3}$ of the customers see the old price (\$39) and $\frac{1}{3}$ of the customers see the new price (\$59)
- VP of Product wants to know how the experiment went

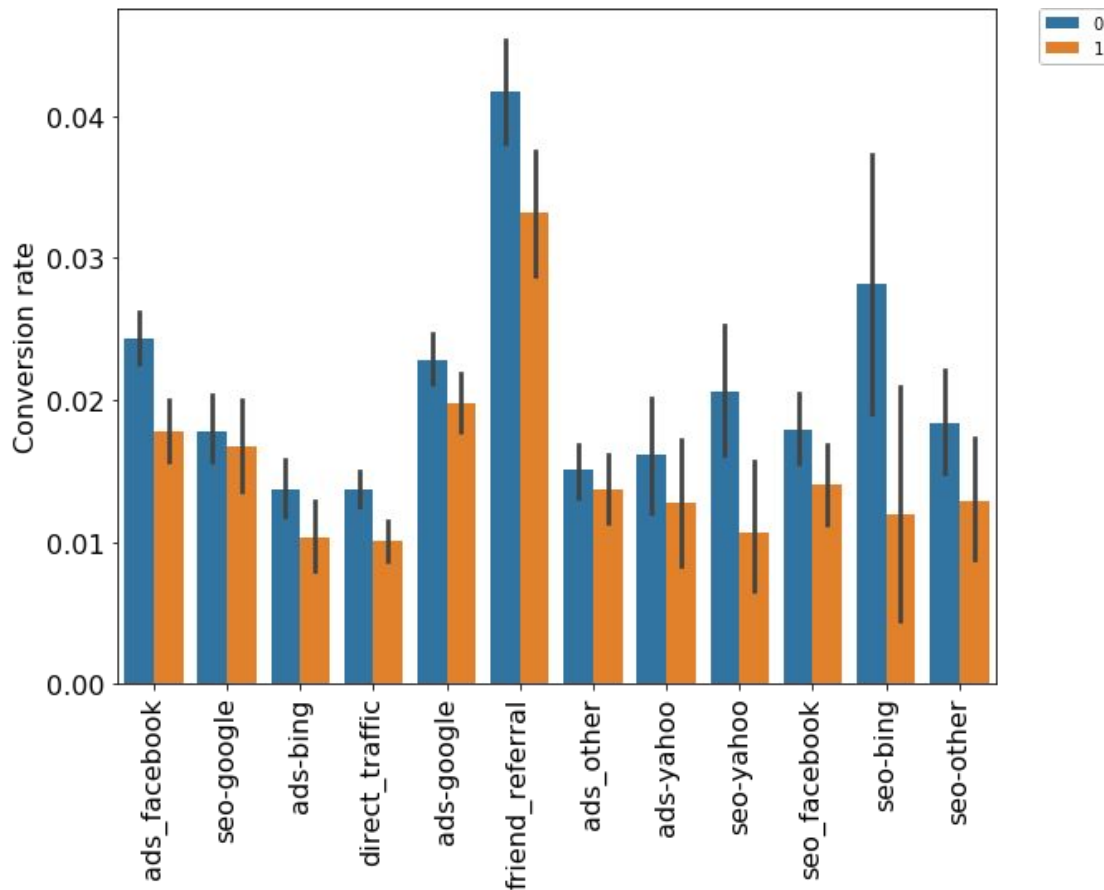
Context and Business Questions

1. Key insights about what drives conversion rate
2. Recommendation of what price to sell the software at
3. Quantify the cost of the experiment
4. Could the experiment have been done in a shorter time?
5. Would I have designed the experiment differently?

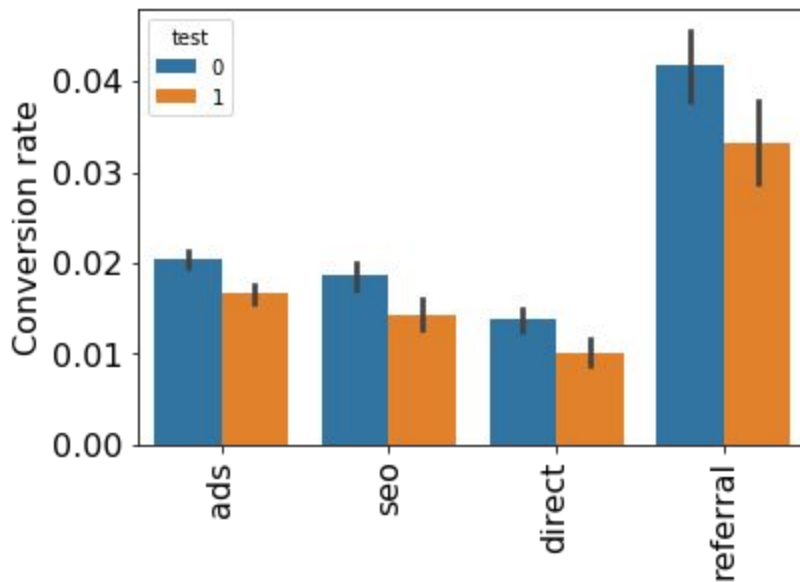
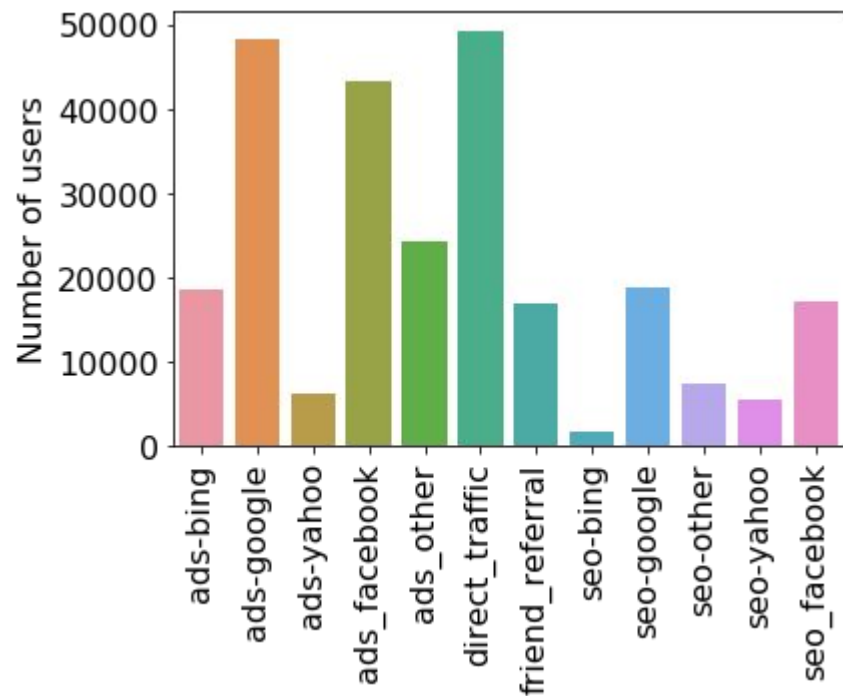
Conversion rate

Rate varies significantly based on user source

Rate decreases across all sources when price increases



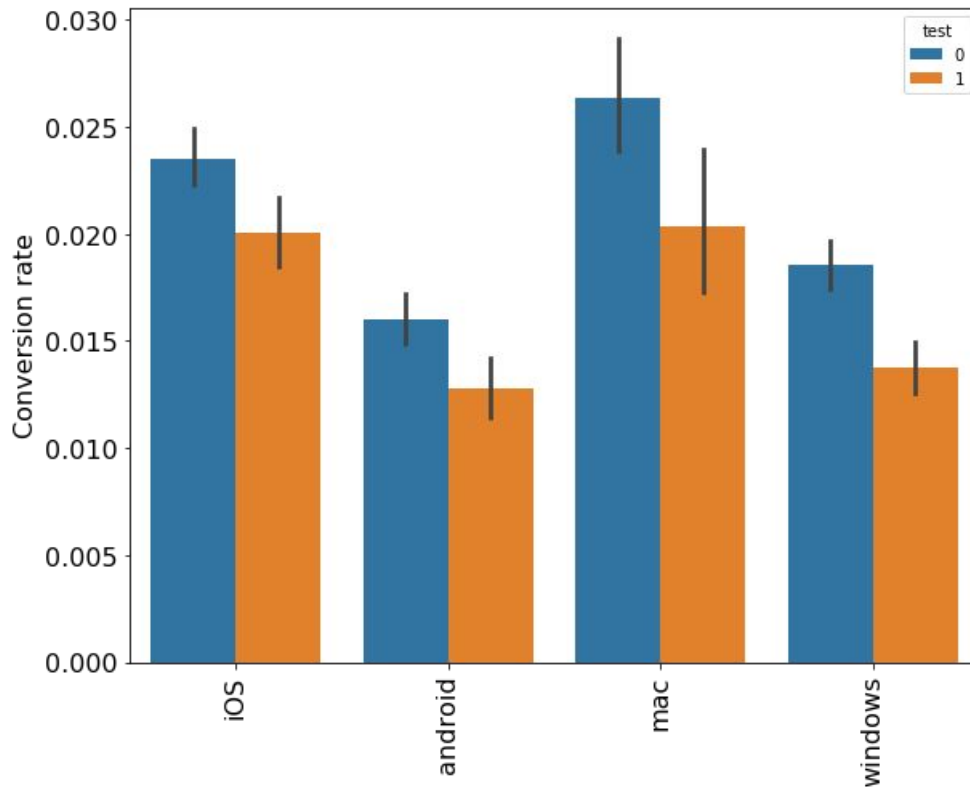
Conversion rate



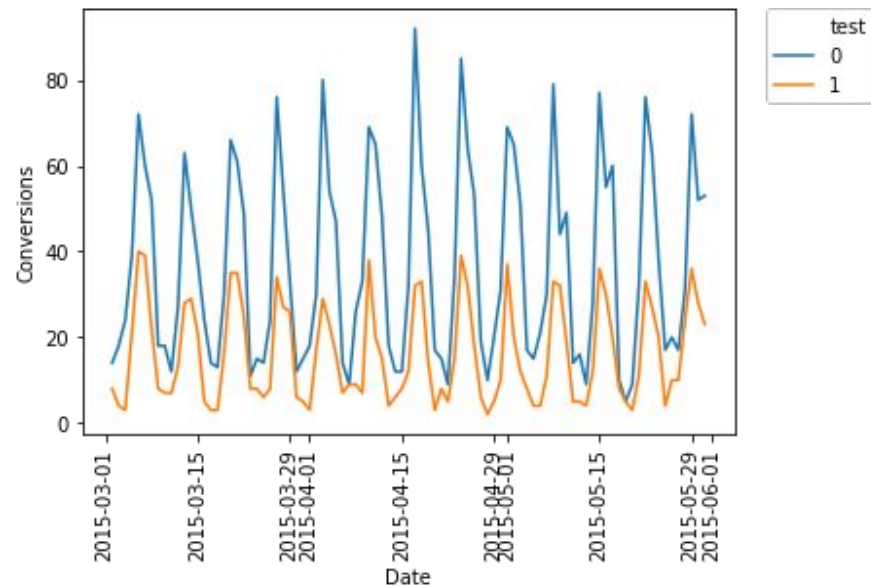
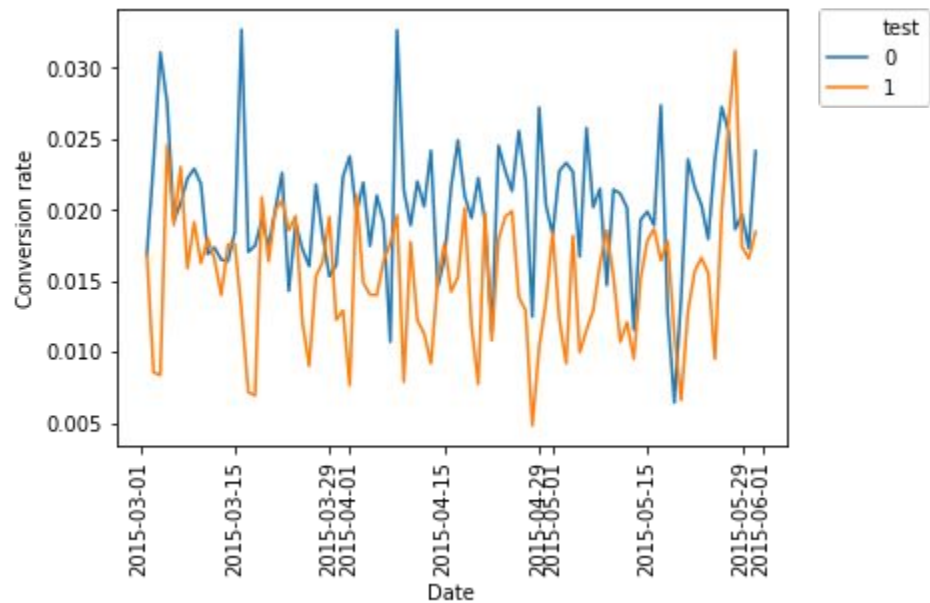
Conversion rate

Rate is higher for
iOS/mac users than
android/windows users

Software is more
popular amongst Apple
product users



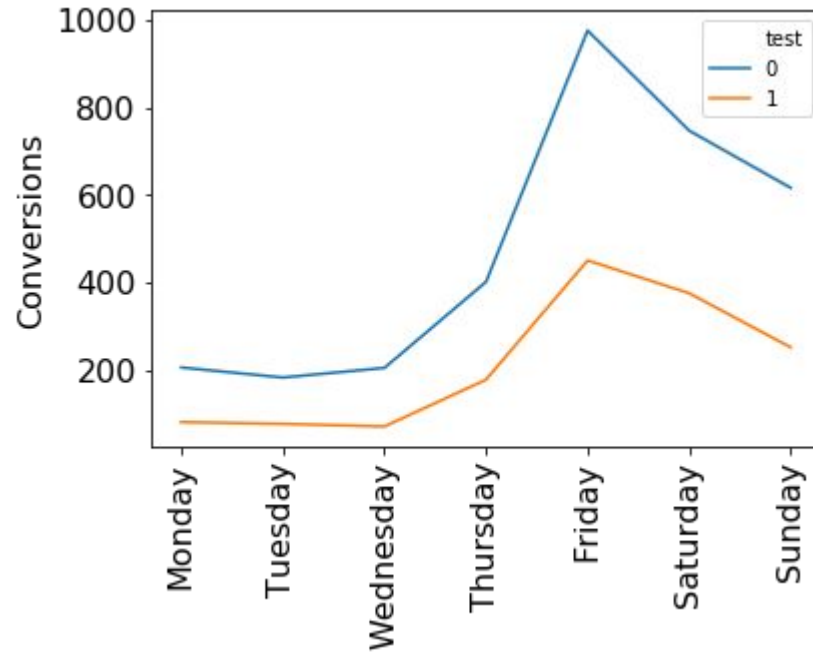
Conversion rate



Conversion rate

The number of conversions is highest on Fridays, followed by the weekend days!

Security software is for personal use, and customers shop for it on the weekends



Key insights about what drives conversion rate

- Overall conversion rate decreases by ~20% when increasing the price from \$39 to \$59
- Users who were referred by friends have the highest conversion rate but represent a small fraction of total users
 - Increase revenue by increasing number of friend referrals, perhaps by incentivizing current customers to refer people they know
- Users of iOS/mac have a higher conversion rate than android/windows
 - Market specifically to users of Apple products
- The total number of conversions is highest on Fridays and the weekend
 - Target ad spending towards weekends, when customers are most likely to be shopping for this product.

Cost of experiment

	Revenue (\$)	Extra revenue over baseline price (\$)
Baseline price of \$39	202,635.45	
During the test	217,170.0	14,534.55
If price was at \$59	243,132.61	40,497.16

→ **Price should be set at \$59 going forward**

Experiment design

To evaluate whether there is a statistically significant difference between the mean conversion rates for our two samples with different software prices, I calculate a Welch's t-test

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{s_1^2}{N_1} + \frac{s_2^2}{N_2}}}$$

	p-value	Statistically significant?
3 months	9e-15	YES
1 month	0.009	YES
1 week	0.290	NO

Experiment design

If the experiment ran for only one month, we would have discovered the change in conversion rate due to price increase, but also would have made more money during the three month period

	Revenue (\$)	Extra revenue over baseline price (\$)
Baseline price of \$39	202,635.45	
During the test	217,170.0	14,534.55
If price was at \$59	243,132.61	40,497.16
1-month test, then \$59	234,770.13	32,134.67

Experiment design

- For price changes of a similar magnitude, I would recommend that the experiment can be conducted over one month's time
- For smaller price increases, I would still recommend a three-month experiment because it will take longer to observe a statistically-significant change in conversion rates
- I would also recommend designing an experiment with multiple increased prices. Currently we have no way to know whether a higher price could lead to even higher revenue! An experiment with multiple price increases could help with that