

# ROCKBUSTER

stealth

Data Analysis

Q3 '05 Rentals

Aaron Manzano





# Table of Contents

<b>Introduction</b>	<b>1-4</b>
<b>Geographic Analysis</b>	<b>5-8</b>
<b>Data Metrics</b>	<b>9-13</b>
<b>Modeling</b>	<b>14-17</b>
<b>Key Optimizations</b>	<b>18-22</b>
<b>Recommendations</b>	<b>23-24</b>
<b>Conclusion</b>	<b>25</b>



## RockBuster *stealth*

### Customers

Global Movie Rentals in • 109 Countries

• 14,413 Transactions

• \$4.25 Average transaction amount:

• 599 Customers

• \$102 Avg customer spend

• (~24 rentals)



## RockBuster *stealth*

### Films

Film Catalog with • **958** Titles

• **17** Categories

• **1-8** Copies per title

• **4,581** Total movies

• **\$10-\$30** Replacement cost  
• (avg **\$20**)





# Overview

## Define Key Metrics

Gross Profit Analyzes

### Return on Investment.

- Total Revenue
  - For 3 Months
- Inventory Cost
  - 1-8 film copies
- Identify Important Variables

## Optimize Catalog

Catalog Growth Strategy:

- Identify weak titles
  - Low ROI Films
- Remove weak titles
  - Sell physical copies
  - Don't renew digital licenses

## Geographic Analysis

Identify Top Markets:

- Top Countries
  - By Customer Base
- Top Customers
  - By Total Spend
- Top Categories
  - In Top Markets

## Key Performance Metric

### *Gross Profit*

#### Total Revenue

Gross Revenue from all payments with that Film. Overall, about 30% of revenue is from late fees.

#### Inventory Cost

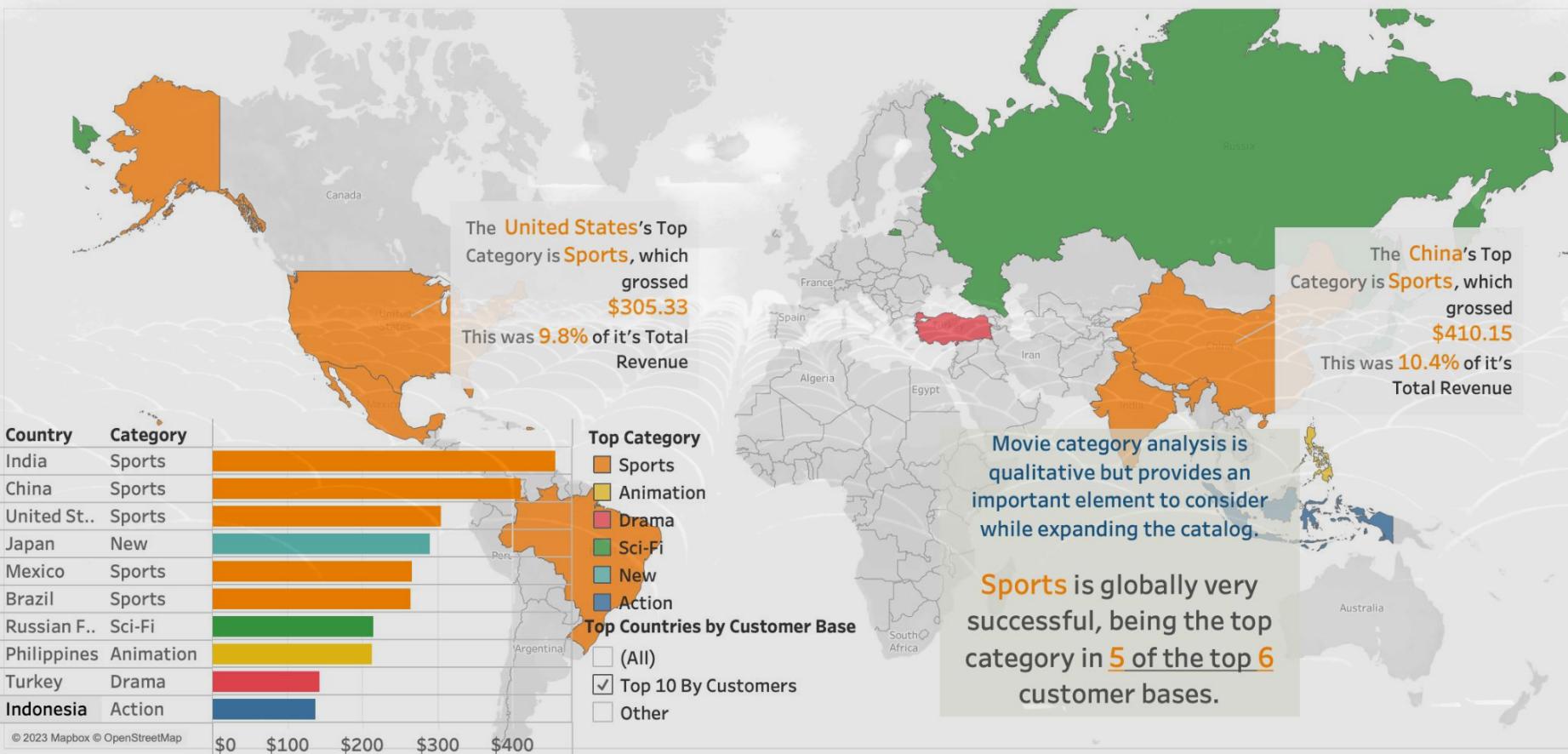
Total Cost from multiplying the replacement cost by the number of copies in inventory.



# Geographic Analysis

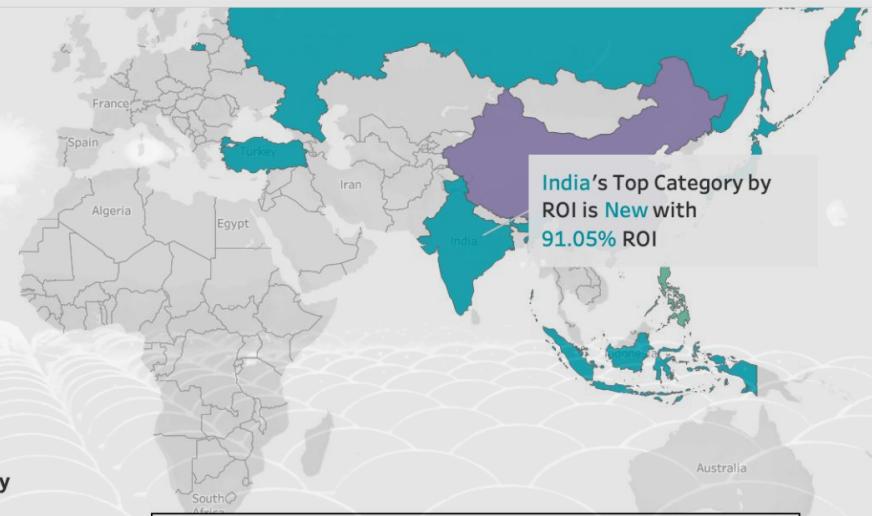
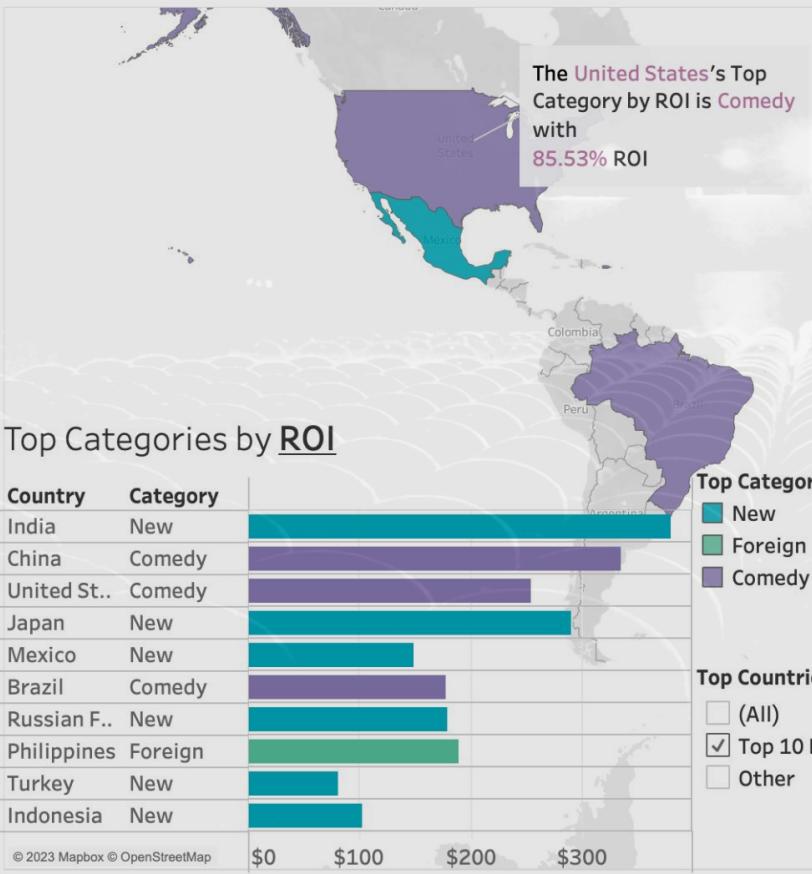
5

## Top Categories in Top Markets



# Geographic Analysis

## Top Categories in Top Markets: By Return on Investment



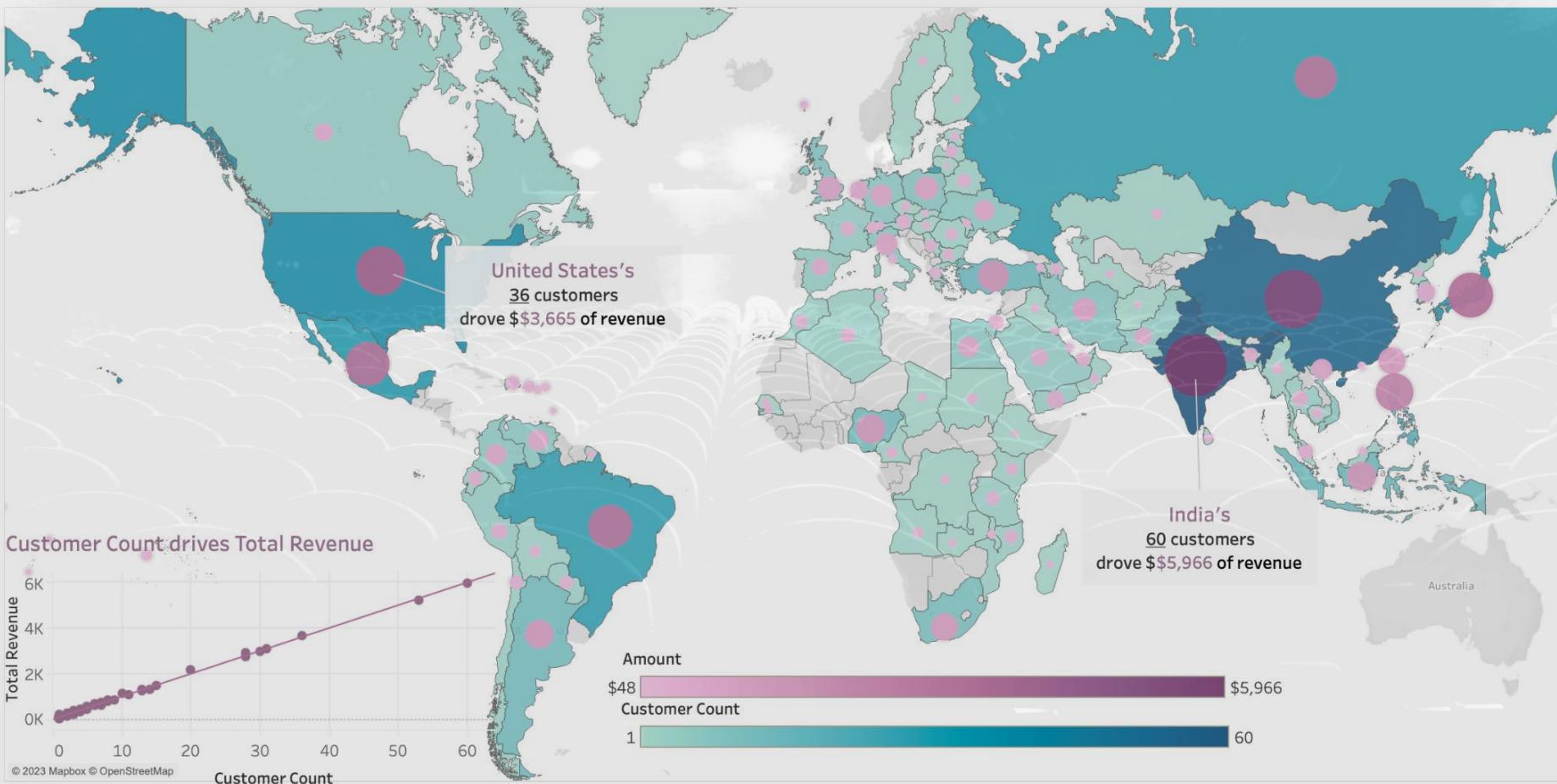
New is the top category by ROI in 6 of the top 10 countries by customer base.



# Geographic Analysis

7

Map: Customer Base and Total Revenue





# Geographic Analysis

8

Map: Top Countries and Customers

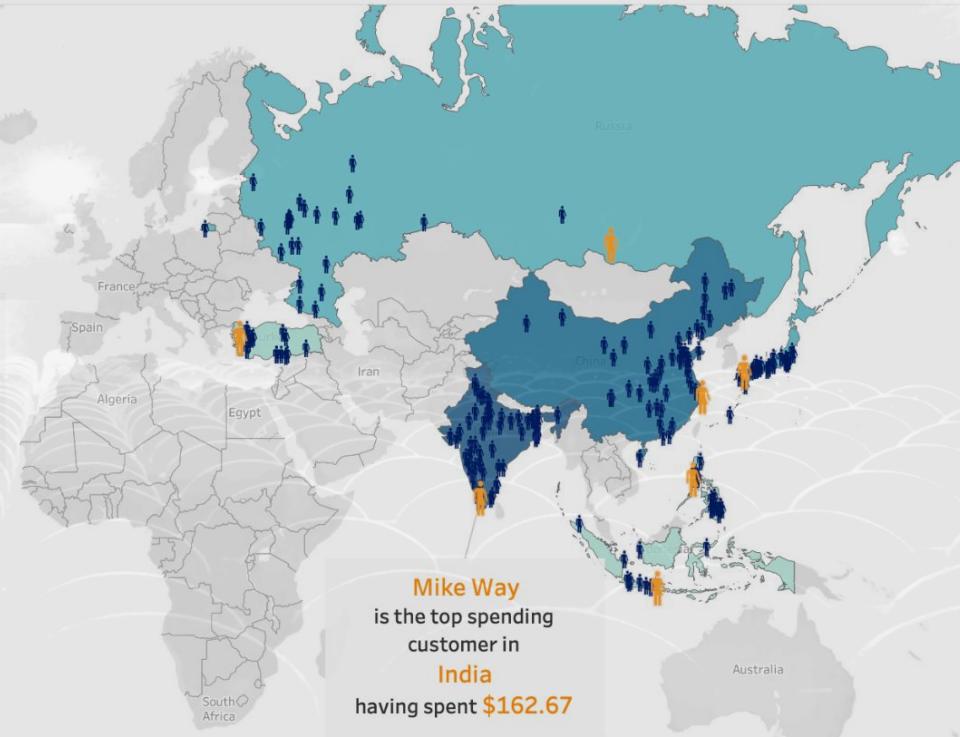


Top Customers

Customers

Top Countries by Customer Count ↓

Top Countries	Top Customer	Customer Count	Top Spend
India	Mike Way	60	\$162.67
China	Guy Brownlee	53	\$151.69
United States	Karl Seal	36	\$208.58
Japan	Angela Hernandez	31	\$138.65
Mexico	Alex Gresham	30	\$143.68
Brazil	Marion Snyder	28	\$194.61
Russian Federation	Warren Sherrod	28	\$152.69
Philippines	Marcia Dean	20	\$166.61
Turkey	Brandon Huey	15	\$145.64
Indonesia	Steve Mackenzie	14	\$152.68



Top Countries by Customer Base

(All)

Top 10 By Customers

Other

Customer Count

14

60

50 unknown

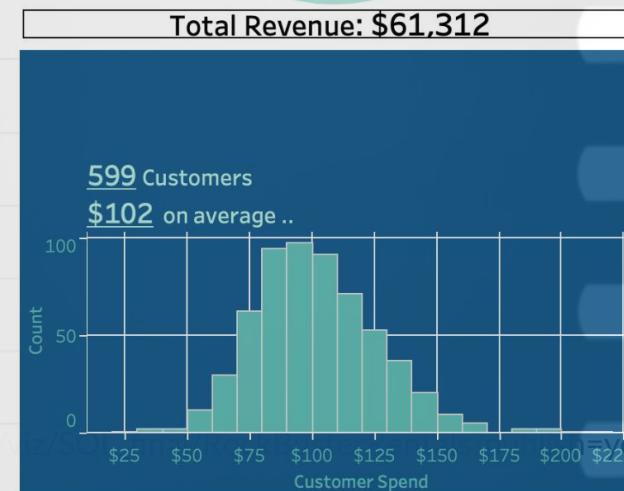
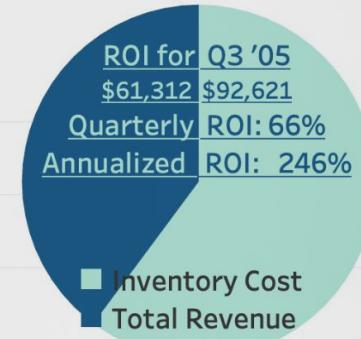
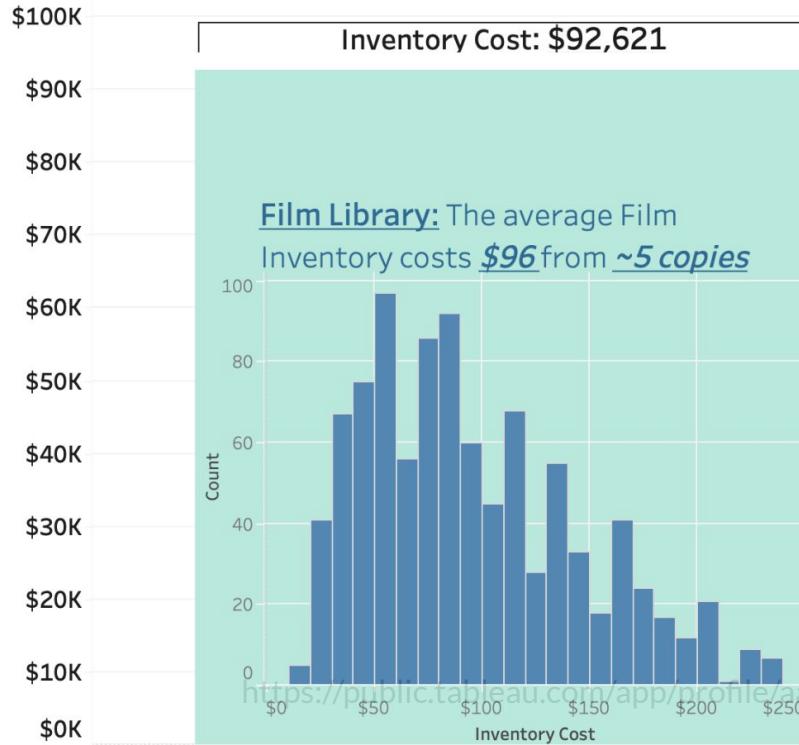


# Data Metrics

9

## Cost and Revenue:

Breaking down the Key Metric: Return on Investment

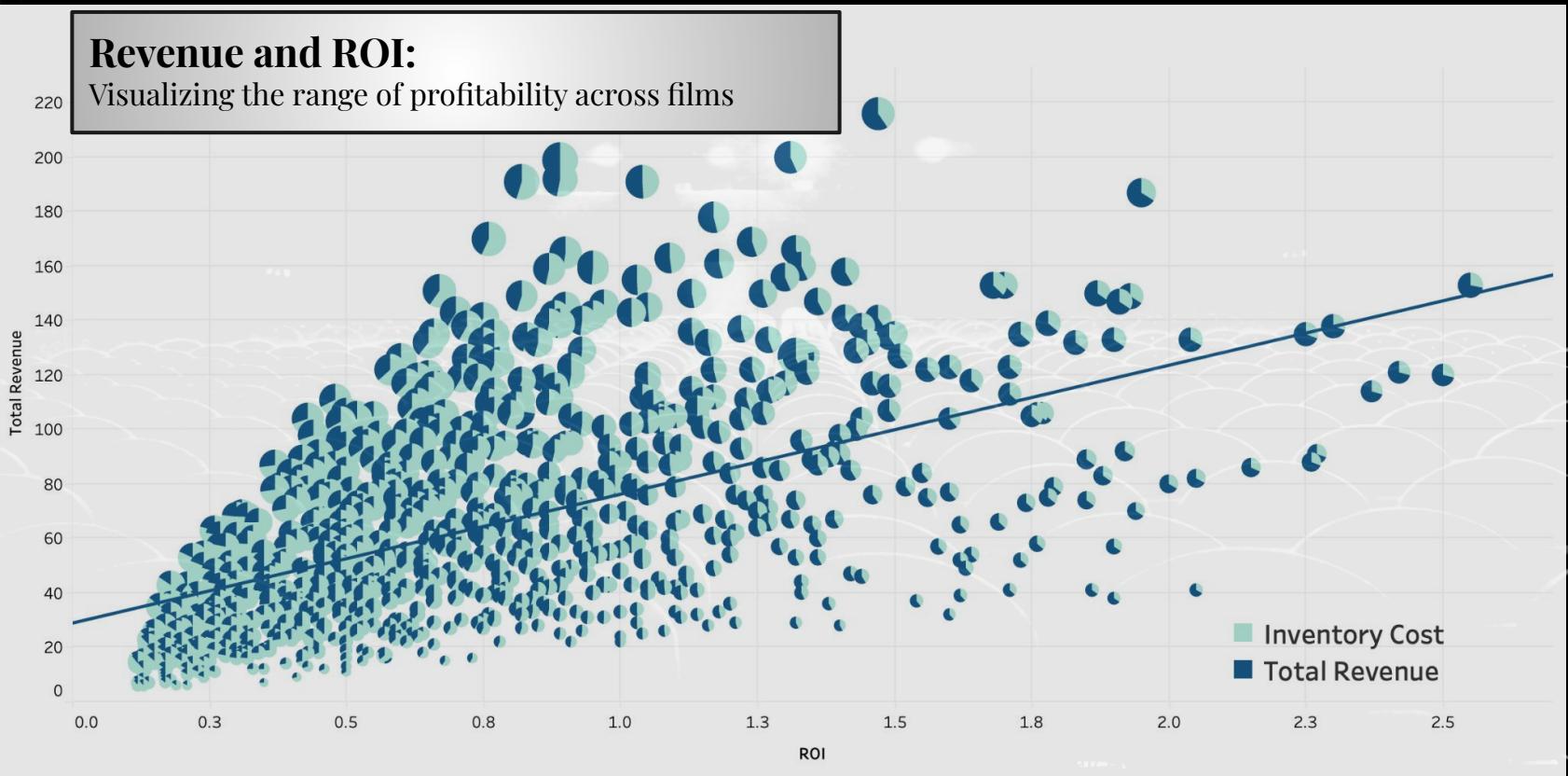


<https://public.tableau.com/app/profile/aaron.franzana>



## Revenue and ROI:

Visualizing the range of profitability across films





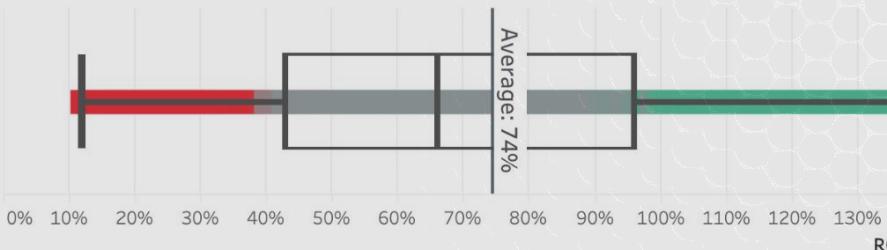
## Determining the Least Profitable Titles:

The *Shapely Values* indicate that [Quantitative > Qualitative](#).

Instead of choosing between categories or ratings, we select the [bottom quartile](#) of all categories by Gross Profit.

This measure of [Inventory Cost / Total Revenue](#) provides

Gross Profit by Category Quartiles



Low Profit Titles (244)↑

Cruelty Unforgiven: 12%   Japanese Run: 13%  
Freedom Cleopatra: 12%   Lawrence Love: 13%  
Hollywood Anonymous: 12%   Silence Kane: 13%  
Sassy Packer: 12%   Texas Watch: 13%  
Clockwork Paradise: 13%   Bride Intrigue: 14%

Profitable Titles (467)↑

Hills Neighbors: 33%   Chitty Lock: 39%  
Dalmations Sweden: 35%   Midnight Westward: 39%  
Glass Dying: 36%   Army Flintstones: 40%  
Extraordinary Conquerer: 38%   Doctor Grail: 40%  
Reunion Witches: 38%   Carrie Bunch: 41%

Top Quartile + Outliers (247)↓

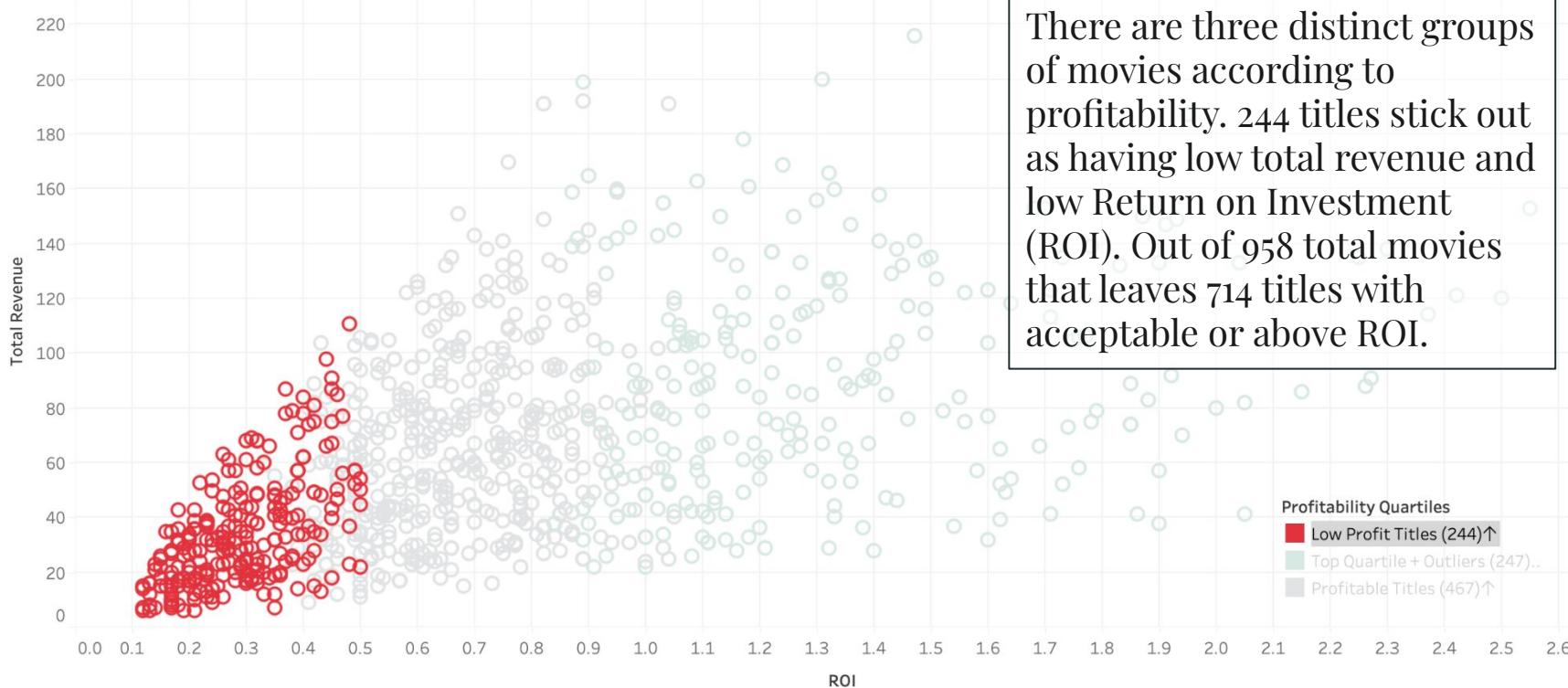
Maiden Home: 255%   Dude Blindness: 227%  
Trap Guys: 250%   Bright Encounters: 226%  
Kissing Dolls: 242%   Flintstones Happiness: 225%  
Whale Bikini: 237%   Daisy Menagerie: 215%  
Fellowship Autumn: 230%   Paths Control: 205%





## Profitability Quartiles:

Identifying low profit titles

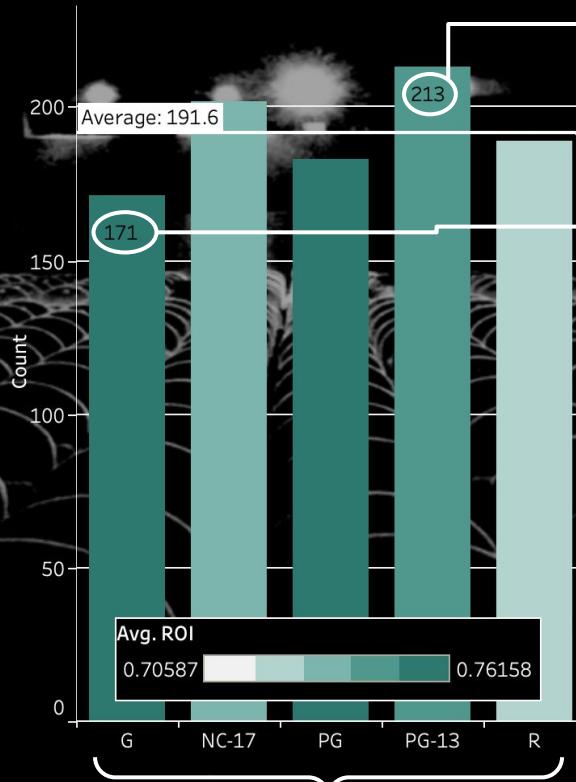




5 Ratings

## Rating Count:

Higher film count  
doesn't always lead to higher ROI



Max Count: 213  
Avg Count: 191.6  
Min count: 171

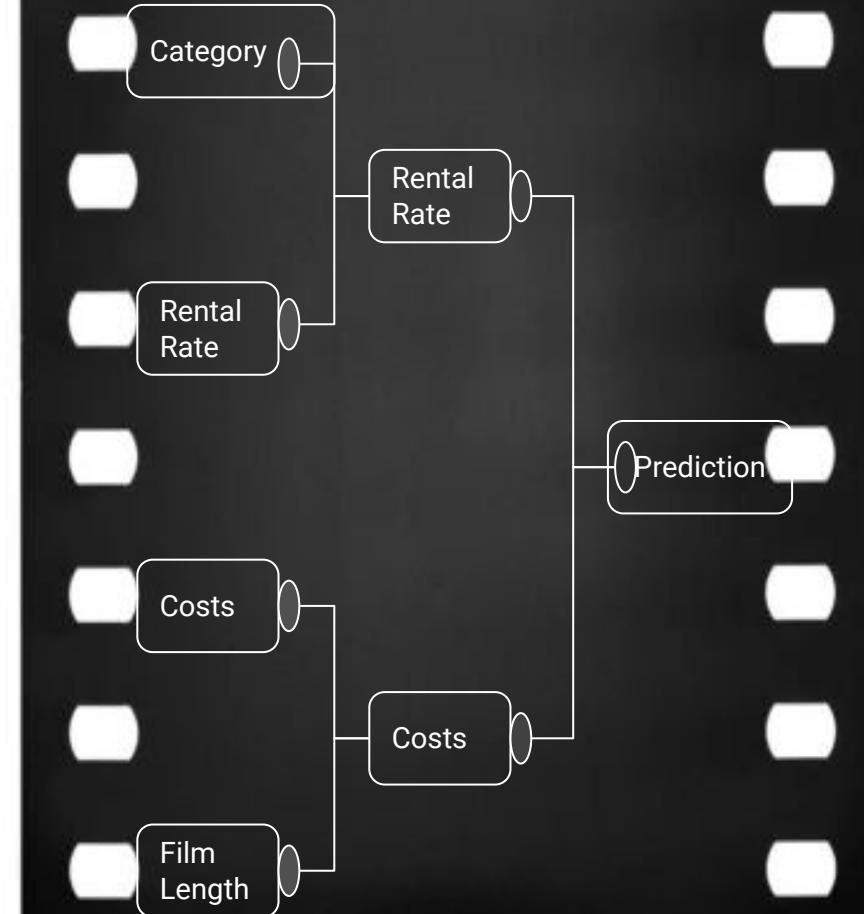
The darker the Hue, the  
higher the Rating's ROI.

Higher number of films in  
that Rating don't seem  
associated with higher ROI,  
as the Min Count has very  
high ROI.

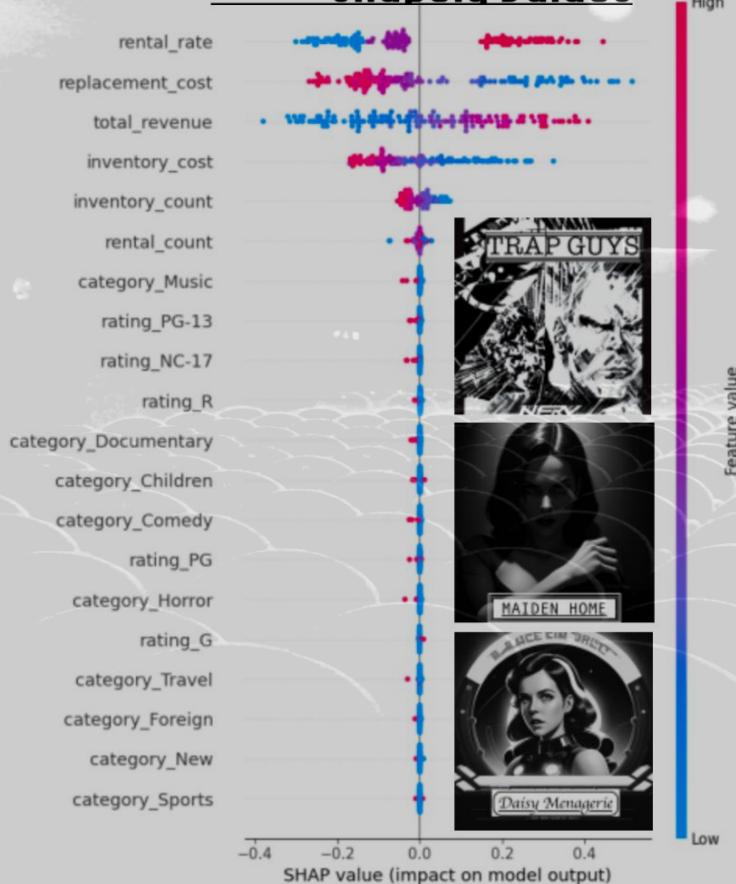


## How to determine which features are important in *driving ROI?*

- Machine Learning is an asset
- Model interpretability is important to understand how the model is weighing different features
  - Features: Rental rate, replacement cost, categories, etc
- Train the model on predicting ROI
  - Use interpretability metrics to define a path towards higher ROI



## Shapely Values



**XGBoost** is a preferred choice among experts for tackling intricate data challenges and generating robust predictive models.

- Decision Tree ML model trained to predict film's Profit Ratio ( $\frac{\text{total revenue}}{\text{inventory cost}}$ )
- Low MSE (0.0093) of the model indicates reliability

**Shapely values** offer a pragmatic framework for fairly attributing feature importance in these models, quantifying the practical significance of each variable's role in the model.

- SHAP values closer to zero indicate features with less predictive value in the model. Ratings/categories aren't predictive.
- Feature values are shown in blue (low values) to red (high values)

- 1) Rental\_rate, Replacement\_cost, Total\_revenue are furthest from 0 and are therefore contribute most to the model.
- 2) Quantitative data is much more predictive than qualitative data (like categories and ratings).
- 2) High rental rates and low replacement costs are the key drivers of profitability.



## PROFIT

Interpreting a model  
to determine feature  
importance.

Shapely Values *far from 0* are more important

Blue values are low variables, red is high.

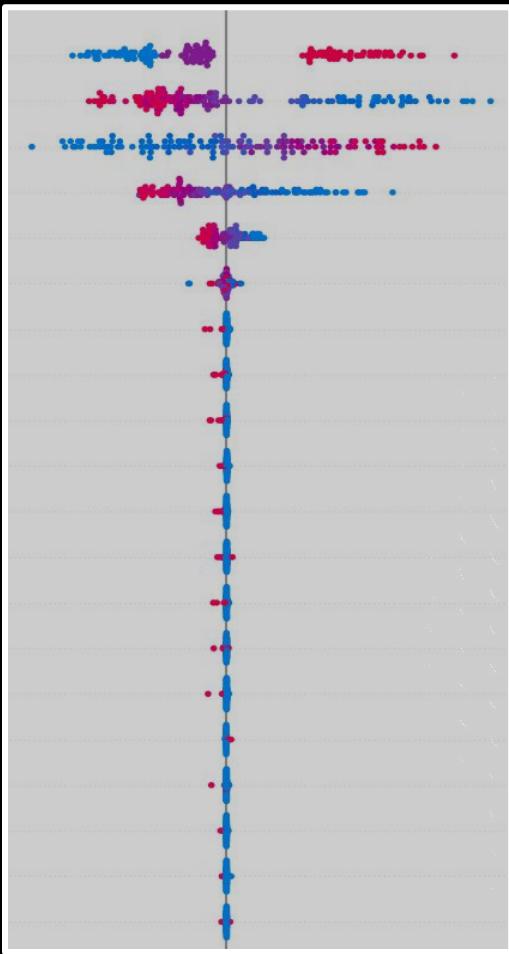
Low rates and high costs predict Low Profit

High rates and low costs  
predict High Profit

rental\_rate

replacement\_cost

0



## Categories and ratings

1 Qualitative data is closer to zero and less useful

## Replacement Costs

Maintaining low inventory costs predicts profitability

## Rental Rates

High Fees are the foundation of profitability



## Rental Rates:

High importance for predicting ROI

**\$0.99**

Low rate

**\$2.99**

Medium rate

**\$4.99**

High rate

Low rates are easily associated with lower ROI, as it takes more rentals to reach the same revenue as higher rates.

What do the rental rates look like in the context of ROI?

Do higher rates really result in more return on investment?

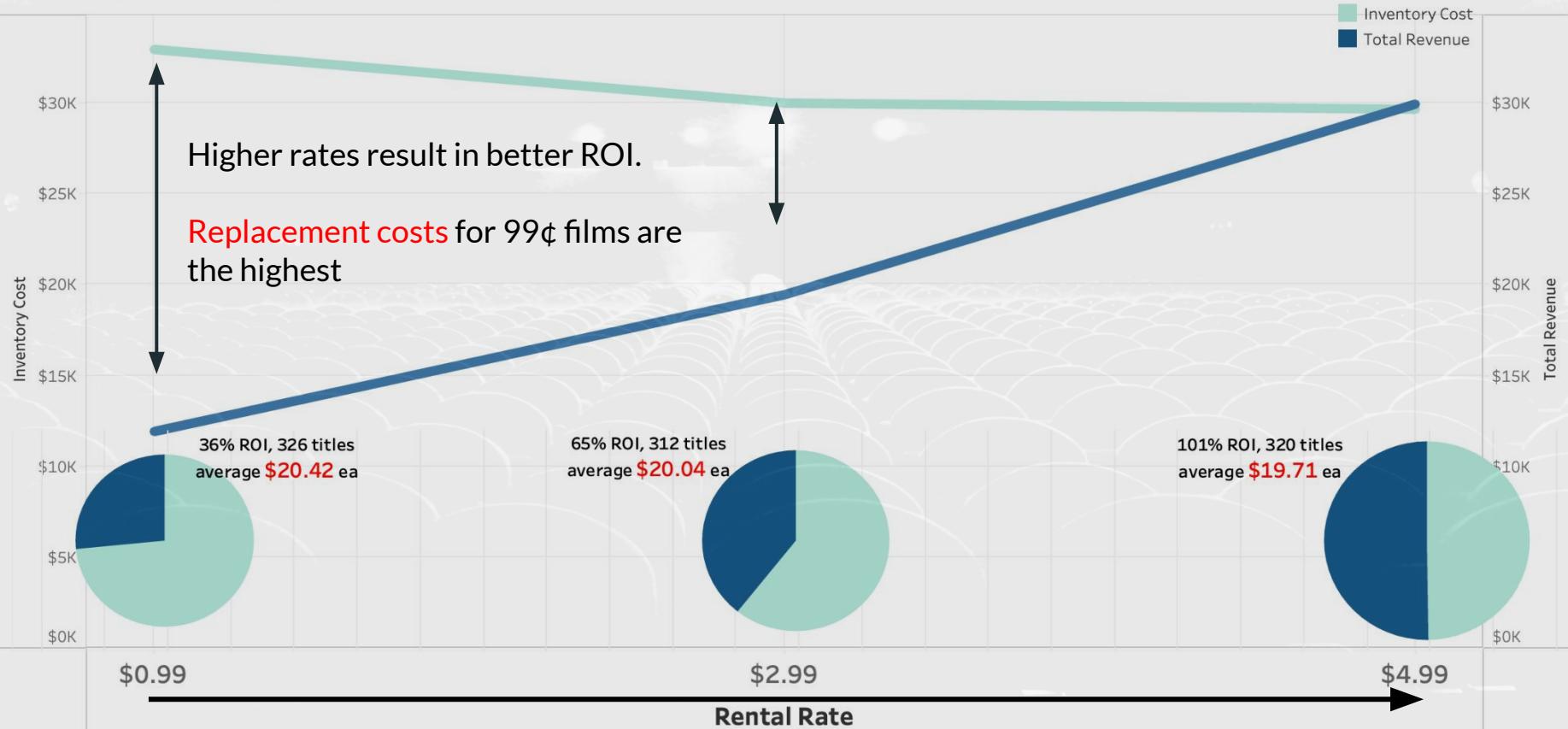


# Key Optimizations

19

## Rental Rates and ROI:

Films for 99¢ drive much less profit

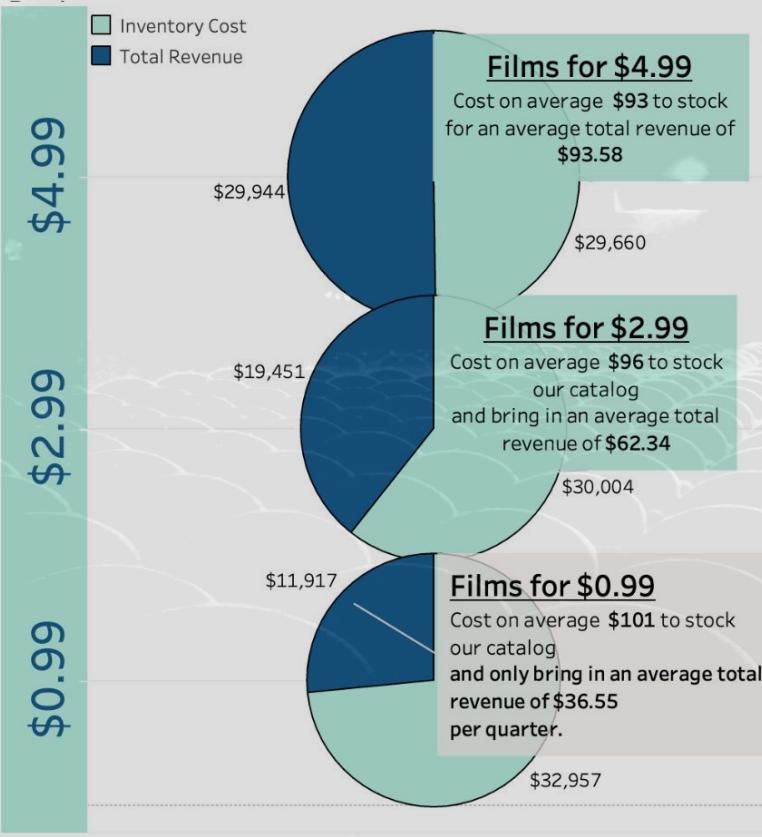




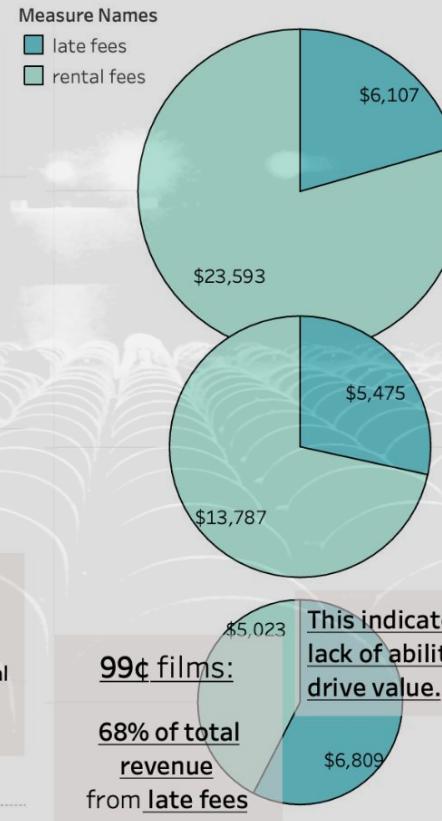
# Key Optimizations

20

## Rental Rates: Profit



## Late Fees

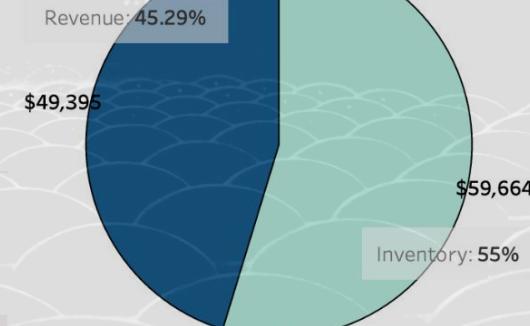


## Removing \$0.99 Rentals

There are 326 titles rentable for \$0.99, removing them changes the catalog's profitability:

Total Revenue-  $\$61,312 - \$49,395 = \$11,917$   
less revenue

Inventory Cost-  $\$92,621 - \$59,664 = \$32,957$   
less inventory cost



However, cutting 33% of the catalog may be too high a threshold and can be improved with similar results.

### Rate Groups

- (All)
- \$0.99
- \$2.99 & \$4.99

## Profitability Quartiles

There are plenty of ways to prune the catalog, the strategy is to cut the bottom ~20% in terms of ROI each quarter by category.

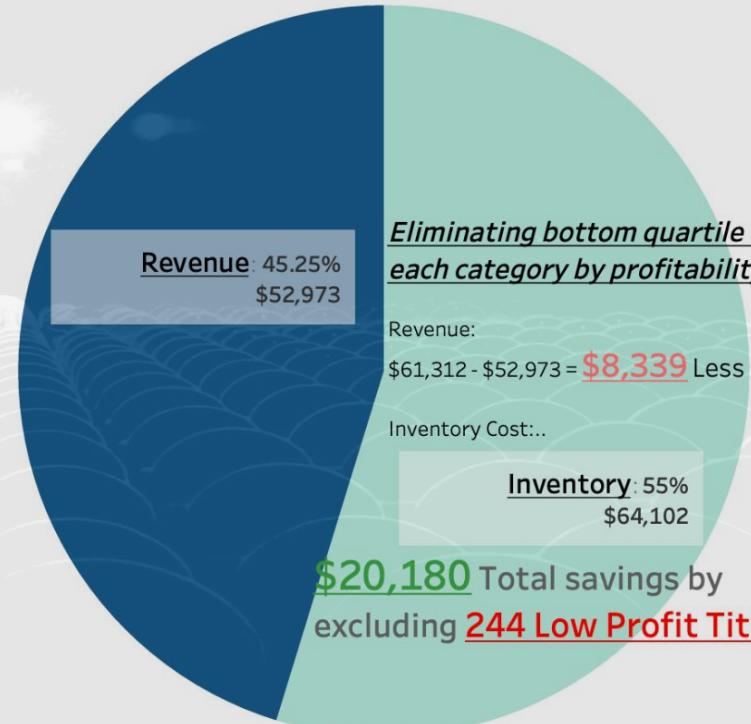
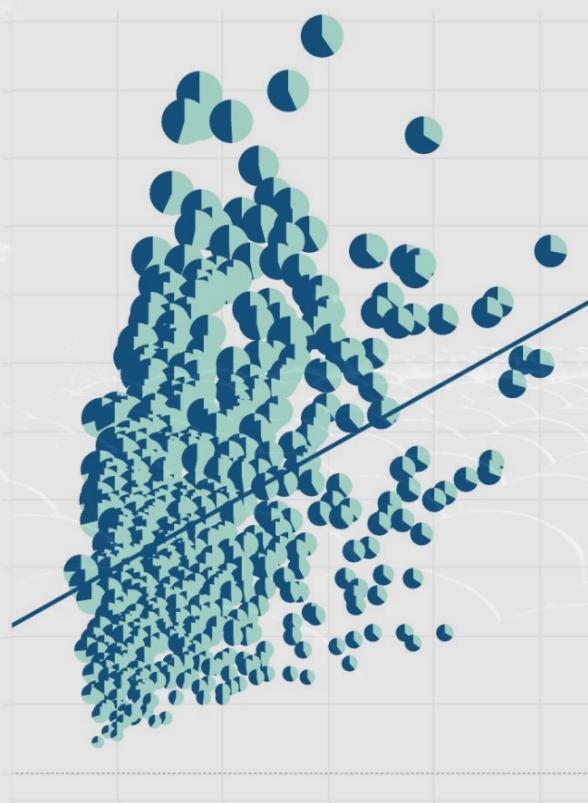
This will result in less revenue but much less cost, and will continuously update the catalog to be popular and profitable.

What happens to total ROI when we remove the Low Profit Quartile by Category?



# Key Optimizations

22



- (All)
- Low Profit Titles (244) ↑
- Top Quartile + Outliers (247) ↓





## Rates

Avoid 99¢ titles

Maximize \$4.99 rates

## Categories

Largest 10 Markets

Sports is the Highest  
Grossing, but New  
has the Highest ROI

## Loyalty

Top customers in our  
largest markets

Identify and Reward



Spend *less* to get more

Find the *weak links*

*Strengthen* and Optimize  
the film catalog

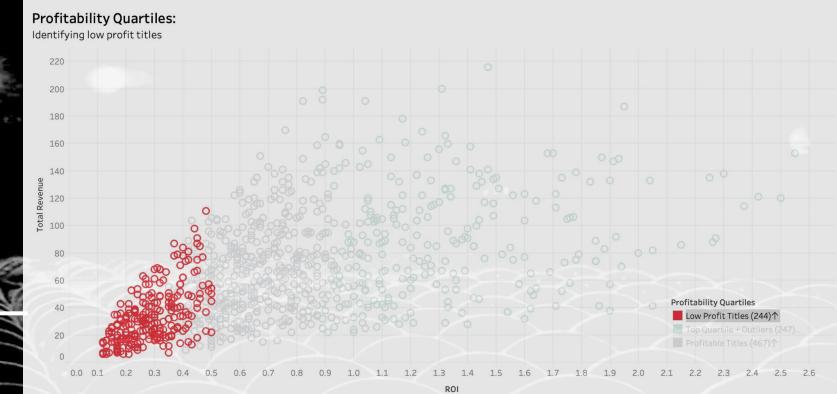


Tableau Link:

[https://public.tableau.com/app/profile/aaron.manzano/viz/SQL\\_final/RockBusterRentals?publish=yes](https://public.tableau.com/app/profile/aaron.manzano/viz/SQL_final/RockBusterRentals?publish=yes)