Pricing the Sale of Video Games

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Abstract

In this research, I argue that question "Do high-priced games affect sales worse than low-priced ones?". In the articles I quoted, I focused on the effects of the price drop on the purchase of games, and I do my studies on this. I supported my research with tables, hypothesis testing, and graph to support these question. As a result…

1 Introduction

In my midterm project I found my data set in readme.md file which is https://github.com/rfordatascience/tidytuesday, and I searched the files year by year. Then in 2019 data set file 31st data is data set which I picked. My data set has 2,669 observations and 10 columns. The variables of these columns are game, release date, prices, owners, developers, publisher, average playtime, median playtime and metascore. I only focus on the prices of the video games. I deleted the NA values from data set in order to tidy it.

My question is "Do high-priced games affect sales worse than low-priced ones?". I found four articles about this question. These articles helped me with the research process.

1.1 Literature Review

Relevant to my question, from the article (Nair, 2004), it is stated that the game prices gradually decline over time to increase production with quote: "Declining prices, and declining sales are consistent with our model of dynamic price skimming in a durable good market. The motivation to inter-temporally price discriminate explains why prices are cut over time. Market saturation, arising from the exit of one-time purchasers from the potential market for each game, explains the declining sales paths.". Also article of (Liu, 2010) mentioned that this situation can also be connected to the console market where older consoles also exhibit declining prices to increase sales of both the games of that console and the console itself from quote: "Displays the prices of the two consoles over time. Similar to many other high-technology products, game consoles exhibit declining prices over time. Prima facie, this appears to be price skimming. The rationale is that firms tar- get game enthusiasts first

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and then move to the mass market through price cuts.". However, there is an idea that the biggest producers of video games are considered as monopolies and no matter what the price of the game is, people will most of the time buy the game that these companies produce. Examples of these game series can be Call of Duty or Fifa since almost every year another game is produced from one of these series and the sales almost never fail as can be seen from the (Koskela, 2021) with "Harrison and Kline (2001) show that the ability of firms to extract consumer surplus with an access fee decreases as the number of firms in competition increases, which also shows that two-part prices are not exclusive to monopolies. In addition to this, it also reasonable to assume that video game firms have monopoly power to some extent, as the products differ a lot from each other. (Meagher & Teo, 2005).".

The other price relevance can be said about the "freemium" games where the game itself is free. This does not provide any revenue to the company itself but can provide more people playing the game than the so called "premium" games. Another benefit of these types of games can be the in game sales which can cover the cost of the development of the game itself as can bee seen from (Rietveld, 2018) where "I argue that greater variety (vs. less variety) in a product's menu of paid items allows heterogeneous consumers to self-select into a combination of options that matches their WTP, increasing a product bundle's overall revenue generation. The implications of these conjectures are that products brought to market through the freemium business model will be used less and generate less revenues than premium products (keeping all else constant). Firms can partially offset this revenue loss by embedding greater variety in freemium products' menus of paid items. Support for these arguments is found in a randomized controlled trial of 246 subjects and in a real market sample of 343 digital PC games released in 2014 on the online Steam platform.".

2   Data

The source of the dataset is "https://github.com/rfordatascience/tidytuesday/". The reason I choose this dataset is that this dataset had way more variables and entries than others and it was easier to conduct a research than the other datasets that were interesting to me.

The dataset "video_games2" has 10 columns or variables and 2669 entries in total. After clearing out the values that had "NA"'s in them, I changed the owners value from a factor value to a numeric value as the factor values had intervals of numeric values such as "100000-1000000" and these were making the research harder for me. The new numeric value shows only numbers like 1,2,3,4,5,6,7,8,9,10 and these numbers are abbrevations of a thousand since the main dataset showed these as thousands. I then had to create a new subset named "x7" which had 2 variables: "price" and "owners". The price values are 9.99 and 29.99. This was because my question is directly related to the pricing of the games.

The summary statistics table shows the owners and the price summaries collectively. There are 5 variables in this table: Mean, Standard Deviation, Minimum and Maximum values and the Median values of each variable.

Table 1: Pricing

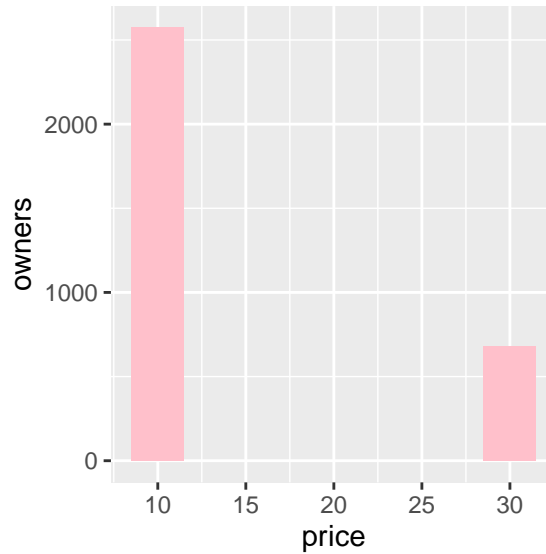|	Mean	Std.Dev	Min	Median	Max
owners	3.98	2.09	1.00	4.00	11.00
price	13.98	7.99	9.99	9.99	29.99

3 Methods and Data Analysis

Figure 1: Comparison

This graph compares the ownership by numbers. From this graph, it can be said that the games priced at 9.99 have an ownership level higher than 2000 whereas games priced at 29.99 have an ownership at around 800. This is a good indication that games with lower prices have higher sales than the games with higher prices but I conducted a T-Test to improve this hypothesis.

Before conducting the T-Test, here is my hypothesis:

H1: Lower prices of games have higher sales than games with higher prices.

H0: Lower prices of games have doesn't have higher sales than games with higher prices.

```
##
##  Two Sample t-test
##
## data:  owners by price
## t = -1.3338, df = 816, p-value = 0.1827
## alternative hypothesis: true difference in means between group 9.99 and group 29.99 i
## 95 percent confidence interval:
```

```
##  -0.6019399  0.1148701
## sample estimates:
##  mean in group 9.99 mean in group 29.99
##           3.928244            4.171779
```

Conducting the Two Sided T Test gives a t value of -1.3338 and the degree of freedom is 816. Also from this test it can be seen that the p value is 0.1827 which will be significant for my hypothesis. From this test, it can be said that my hypothesis is within the area of acceptance with a 95 percent confidence interval, as the p value is higher. With this, I am failing to reject the hypothesis. However, looking at the means does not give me a clear differance between prices and owners so I created a density plot given below:
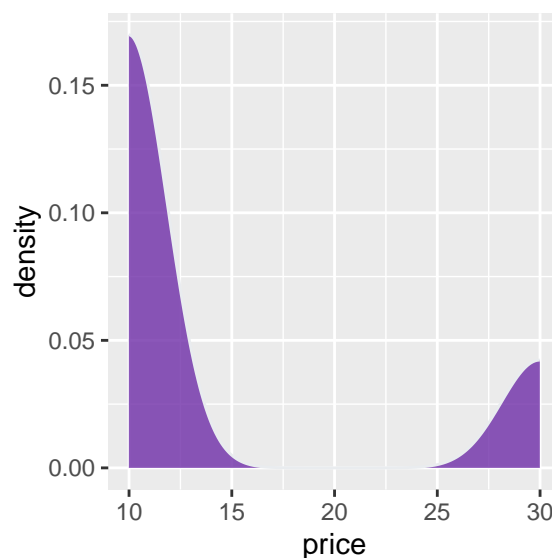

Figure 2: Density

By looking at this plot, It can be said that the ownership density of games at the price level of 9.99 is way higher than the ownership of games at the price level of 29.99 by a 0.14 margin of density, meaning that this graph supports my hypothesis along with the T-Test.

4   Conclusion

Summarize the results of your analysis in this section. Discuss to what extent your results responded to the research question you identified at the beginning and how this work could be improved in the future.

References section is created automatically by Rmarkdown. There is no need to change the references section in the draft file.

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5 References

Koskela, S. (2021). *PRICING ECONOMICS OF VIDEO GAMES: A PANEL DATA STUDY ON THE EFFECTS OF VERSIONING ON REVENUE.*

Liu, H. (2010). Dynamics of pricing in the video game console market: Skimming or penetration? *American Marketing Association*, *47*(3), 428–443.

Nair, H. S. (2004). *Dynamics of pricing in durable good markets: Application to 32-bit console video-games.* https://www.researchgate.net/profile/Harikesh-Nair/publication/228382130_Dynamics_of_Pricing_in_Durable_Good_Markets_Application_to_32-bit_Console_Video-Games/links/00b7d519e77ae1c7ad000000/Dynamics-of-Pricing-in-Durable-Good-Markets-Application-to-32-bit-Console-Video-Games.pdf

Rietveld, J. (2018). Creating and capturing value from freemium business models: A demand-side perspective. *Strategic Entrepreneurship Journal*, *12*, 171–193.