Team #3

Joel Bravo

Stephanie Gardner

Kendra Danforth Osburn

Penematafele Seloti

Kenneth Smith

Homework #3

1. Regression analysis (40%)
   1. Graph the percent purchased against price (5%)
   2. Perform a regression using power regression to determine the predicted % column.
      1. Graph the new curve (5%)
      2. Estimate the equation of the line (5%)

**Predicted % (Y) = 14.098 \* Price (X)-1.872**

**Example – Price $5, the predicted % is 69%**

**Predicted % (Y) = 14.098 \* Price (5) -1.872 = 69%**

* + 1. What does the R2 mean? (5%)

**Measures percent of variation in Y variable explained by X variables**

* 1. Assuming there are 100,000 customers who visit your website and the publisher cost is $5.00, estimate the number of books sold (predicted sales column) (5%)

**Refer to the table below (predicted sales column). Note, number of books for predicted sales is rounded to the nearest whole number since books are sold in whole units.**

* 1. Calculate the revenue column (price \* predicted sales) (5%)

**Refer to the table below (revenue column).**

* 1. Calculate the profit column ((price – book cost) \* predicted sales) (5%)

**Refer to the table below (profit column).**

* 1. Use conditional formatting to highlight the profit values for all prices (5%)

**Refer to the table below (profit column).**



1. Optimization analysis (with constraints) (30%)
   1. Calculate the price point for the highest profit possible
      1. The publisher will sell the books to you at $5.00 each with no minimum order (10%)

**With no minimum order and to maximize the highest profit possible, the price point for the book will be $10.73 with a profit of $95,066.94.**

|  |  |
| --- | --- |
| Price | $ 10.73 |
| Demand | 16,580 |
| Unit Cost | $ 5.00 |
| Revenue | $ 177,965.31 |
| Variable Cost | $ 82,898.37 |
| Profit | $ 95,066.94 |

* + 1. The publisher has agreed to sell you the books at $4.50 each if you sell at least 30,000 (10%)

**With a constraint of a minimum order of 30,000 books and to maximize the highest profit possible, the price point for the book will be $7.82 with a profit of $99,586.50.**

|  |  |
| --- | --- |
| Price | $ 7.82 |
| Demand | 30,000 |
| Unit Cost | $ 4.50 |
| Revenue | $ 234,586.48 |
| Variable Cost | $ 134,999.98 |
| Unit Minimum | 30,000 |
| Profit | $ 99,586.50 |

* + 1. The publisher has agreed to sell you the books at $4.00 each if you sell at least 50,000 (10%)

**With a constraint of a minimum order of 30,000 books and to maximize the highest profit possible, the price point for the book will be $5.95 with a profit of $$97,606.79.**

|  |  |
| --- | --- |
| Price | $ 5.95 |
| Demand | 50,000 |
| Unit Cost | $ 4.00 |
| Revenue | $ 297,606.75 |
| Variable Cost | $ 199,999.96 |
| Unit Minimum | 50,000 |
| Profit | $ 97,606.79 |

* 1. Run a constrained optimization for each of the above situations to determine which cost point (from the publisher) and price (to your customer) maximizes your profit. Which cost point should you accept from the publisher?

**To maximize profit, we will accept a cost point of $4.50 with a minimum of 30,000 books. The price point for the book will be $7.82 to the customer.**



1. Discussion (30%)
   1. What are the risks of using Harry Potter 7 data in predicting your new demand curve for the Harry Potter sequel? (15%)

**Past book sales are not necessarily an indicator of future sales performance. The popularity of the Harry Potter series may no longer be as strong as it was when data for Harry Potter 7 was collected, which could impact sales of the new book and create a deceptive demand curve. Changing tastes in genre (is fantasy still as popular?), an emerging new audience that was too young to have read the previous books (will a new generation have interest in a story line that was concluded years ago?), and a proliferation of new books imitating the success of the Harry Potter series could all potentially affect the new demand curve in a way that a demand curve for Harry Potter 7 would not be able to realistically predict.**

**In addition, Harry Potter 7 was released in 2007, with the film coming out in 2011. Assuming Harry Potter 8 comes out in 2018, that represents a gap in data of either 11 years or 7 years. It is not clear how effective data that old would be in predicting a new demand curve. Finally, changes in technology may also play a role in creating risks. With the proliferation of e-readers and accessing digital books on tablets and smartphones, people are not necessarily buying as many physical copies as when Harry Potter 7 was released. If current trends continue regarding the greater use of digital copies, predicting a demand curve based on data from a time when physical books were far more popular could lead to false expectations. Ultimately, how much of an impact this could have will depend on whether digital copies are counted in terms of sales or if they considered separate.**

* 1. What other data would you like to have to perform your analysis? (15%)
     1. **TECHNOLOGY DATA: How has the medium of “reading” changed since 2011 when book 7 was released? How many people are “reading” via e-readers or Audiobooks? How much has the demand for physical paper books decreased in the last decade?** 
        1. **To attempt to test this data, we could look at other data from Book Emporium. It would be useful to find a book with a similar buying demographic and see how many of those books were purchased physically or via e-reader.**
     2. **E-COMMERCE DATA: How has the e-commerce world changed how brick-and-mortar bookstores operate? How many books of similar popularity were purchased online vs. in person? Is Book Emporium planning to sell online? Are they already an online store (This was not specified in the original document).** 
        1. **To attempt to test this data, we could find a prolific author with a consistent following (e.g. Stephen King) and test the online vs. in-person sales over the past decade. In order to assure we didn’t get Steven-specific data, we would want to test additional books and authors in a similar manner.**
     3. **AGE DEMOGRAPHIC DATA: What is the age demographic of the purchasers in the data we were given? Additionally, what is the original cohort of Harry Potter readers, now a decade older, reading? What do they buy? Do they have kids? What are kids in the pre-teen/teen age-range currently buying?**
        1. **To attempt to test this first few questions, we could find data on readers ages 25-45. What genres are they buying? How many of them shop in the younger sections (either for themselves or their children?).**
        2. **To attempt to test the teen/pre-teen buying habits, we’d find data either through Book Emporium or elsewhere detailing book trends in that age-range.**
     4. **BOOK CONTENT DATA: Will this book be a true sequel or simply an offshoot in the same world? Do fans want to see the original characters continue? This data is definitely harder to acquire and test, however, it will definitely provide useful insights.**
     5. **BOOK FORMAT DATA: Will this book continue to use the same format as previous books or will it attempt to do something novel (e.g. be written as a play)? If it will be in a new and different format, testing to see how well those novel non-novel(!) formats do (while still attempting to factor in the huge bonus of the loyal fanbase) in comparison to traditional formats could be useful.**
     6. **STORE DATA: Where is Book Emporium located? Does Book Emporium currently see any buying trends that differ from other bookstores either locally or globally? Does book Emporium offer any student discounts? Do they offer any additional perks?**