An Empirical Analysis of a Book's Price/Ranking Relationship on Amazon.com

Emmett Dulaney
Falls School of Business
Anderson University
1303 E. 5th Street
Anderson, IN 46012, USA.

Abstract

This study examines the relationship between the ranking of a book and its price, the price of the substitutes, the number of reviews, stars, and the number of "likes" associated with it on Amazon. Linear regression was employed over a one month time period for a backlist technology book on A+ certification where the observed price changed forty-two times. Eleven other books on the same topic were also observed, and statistical significance was found for the price of the title, but not for the other variables tracked. The findings identify the relationship price has on the ranking of an older title with many substitutes on Amazon.

Keywords: Amazon, price, market share, regression, A+ certification, e-commerce

Introduction

There are a number of factors that a consumer takes into account when considering an online purchase. Not only are they looking for a product to fill a need, but they often want one that will "best" fill it based upon the criteria they use to define that word: price, quality, popularity, and so on. With some products, it is possible to stand out from similar items by adding features not found elsewhere. With other products, such as technology books on one particular topic, it is much more difficult to stand out in what could be considered an almost homogeneous market.

When new books are released, there is a great deal of promotion and activity surrounding them – both on Amazon and other retailers as well. Amazon is one of the largest book retailers in the business, carrying millions of titles that range from those just released (known as the frontlist) to those that have been out for many years (referred to as a backlist). The price on the new titles can fluctuate significantly during their frontlist time period in attempts to sell a lot of copies or use the title to draw attention to other offerings. During that initial time period, users often post descriptive information about the title at a much more rapid pace than they do at other times over the life of the title. When a book has been out for over a year, the activity on it tends to dwindle: the posting of reviews lessens, the number of likes stays the same for a long period of time, and the title moves further down in the overall ranking of titles.

This is particularly true with technology books where the shelf life can be quite short as newer versions of hardware and software steadily stream to market and books about previous technologies don't age well. One area of technology publishing where shelf life can last a bit longer than elsewhere is in the realm of certification books – those written about exams that candidates must pass in order to authenticate their skills with particular technologies. Books from publishing companies such as Pearson, Prentice Hall, Wiley and others are available on certification exams from Microsoft, Cisco, and most Information Technology (IT) vendors in addition to vendor-neutral entities from organizations such as the Linux Professional Institute (LPI) and CompTIA.

The latter offers a number of entry-level certifications and is the organization behind the most popular IT certification on the market: A+, which can claim approximately one million holding that credential. Due to it possessing ISO certification, within every three year time span CompTIA must update the A+ exams and this, in turn, causes publishers to need to update their books. In late 2011, it was announced that the exams would update in 2012; the previous updates having occurred in 2009. After that announcement, publishers began focusing on the next editions of their books and any and all promotion of existing titles ceased.

Despite the lack of an apparent reason to promote a particular title on exams that were changing, the *A+ Guide to Managing & Maintaining Your PC* by Jean Andrews (ISBN: 978-1435-49778-8) changed price on Amazon an observed forty-two times from February 26, 2012 to March 25, 2012.

Literature Review

While a plethora of literature exists that focuses on price elasticity and online commerce, none exists that specifically looks at the sales of one book on an aging topic through Amazon. It has been found that the value of customer reviews is closely tied to the helpfulness of the reviews (Mudambi et al., 2010); with helpfulness delineated as consisting of extremity (highly skewed one way or another), and review depth. While this study looked at products, and found a difference in the helpfulness based on product type, it did not focus on books. Another study of helpfulness in reviews specifically focused on those related to books, and there were two key findings (Chen et al., 2001):

- "…reviews that the community finds helpful have a stronger influence on consumer's purchase decisions than other reviews do."
- "…reviews have a stronger impact on less popular books than on popular books…"

The reviews posted that relate to the parties involved in a transaction – namely the seller – have been shown to influence the probability of a sale in eBay (Resnick, 2002), while product reviews at Amazon have a similar effect (Chevalier et al, 2006). The latter found that "an improvement in a book's reviews leads to an increase in relative sales", and one-star reviews (those suggesting this not to be a good purchase) have a greater impact than five-star reviews (glowing accolades of praise).

The topic of prices on Amazon was studied as a measure of competitiveness for 20,000 books in a study encompassing April, June, and August of 2001 (Chevalier et al., 2003). This study found that Amazon is much less price elastic than BarnesandNobles.com and sales ranks were used as a proxy to determine sales. As early as 2001, the results of the study point to Amazon as a "clear market leader in the online book business…" and their strength in the market has only grown since then and following the closing of many brick-and-mortar chains.

A similar study conducted years after Chevalier found that price elasticity on Amazon increases after a price decrease, but price elasticity at BarnesandNoble.com decreases after a price decrease (Ghose et al., 2008). The ramifications of this study point to high brand loyalty among Amazon customers even when prices are fluctuating.

Outside of Amazon research, studies have associated feedback with price obtained for items in online auctions (Dulaney, 2011), and the value of trust in the textbook market (Bai, 2011). Internet market efficiency literature has looked at the price differences that exist online between sites (Bailey, 1998), and the ability to conduct experiments with pricing in that medium (Clay et al., 2002). While these studies are useful, they do not bridge the gap and focus on a single retail product from an online-only market leader.

Lastly, Amazon has been accused of price-testing in the past where they would allegedly charge different prices for the same product to different customers (Rosencrance, 2000). They have stated that they do not currently engage is such practices (2001) in the interest of protecting the customer. Amazon does often offer the same product from many vendors – including themselves – and thus there can be some disparity in pricing options based upon which seller is currently being featured (Arar, 2007). This study only focused, however, on prices that Amazon sells the product for and not the prices available through any affiliates.

Research Hypotheses

The purpose of this study is to identify factors that contribute to the change in market share experienced on Amazon by one book in a crowded market. Within the technology field, CompTIA is one of the most well-known purveyors of entry-level "vendor-neutral" certifications required by many employers for employment. They offer a number of certifications, with the most recognized being A+ (pronounced "a plus") which has been obtained by approximately one million individuals worldwide. Since the certification is ISO certified, CompTIA must update it regularly and does so on average every three years.

In the fall of 2011, CompTIA announced that the two exams required to achieve the A+ certification would be updated in mid-2012 to versions 220-801 and 220-802, respectively.

That means that books written to the current exams (220-701 and 220-702) have a short shelf life remaining; authors and publishers alike turned their attention to creating – and promoting – products for the upcoming new versions of the exams and ceased any promotion that may have existed on the older titles.

Being cast off were many products (not just books, but videos, CBT products and other resources) aimed at the 700-series of A+ exams. The list of the top 100 CompTIA-related book titles at Amazon included twelve written specifically for the 701 and 702 versions of the exams and they are listed in Table 1 in order of publication date.

Table 1: Top ranked CompTIA A+ titles on Amazon

Title	Publication Date	List Price	ISBN
CompTIA A+ Complete Study Guide: Exams 220-701 (Essentials) and 220-702 (Practical Application)	10/5/2009	$59.99	978-0470486498
CompTIA A+ Certification All-In-One for Dummies	10/19/2009	$39.99	978-0470487389
CompTIA A+ Complete Deluxe Study Guide: Exams 220-701 (Essentials) and 220-702 (Practical Application)	10/19/2009	$79.99	978-0470486481
CompTIA A+ 2009 In Depth	11/18/2009	$44.99	978-1435454897
A+ Guide to Managing & Maintaining Your PC	12/2/2009	$105.95	978-1435497788
CompTIA A+ Certification All-in-One Exam Guide, 7th Edition (Exams 220-701 & 220-702)	1/21/2010	$59.99	978-0071701334
CompTIA A+ Certification Study Guide, Seventh Edition (Exams 220-701 & 220-702)	4/28/2010	$49.99	978-0071701457
Mike Meyers' CompTIA Certification Passport, Fourth Edition (Exams 220-701 & 220-702)	6/8/2010	$29.99	978-0071702980
CompTIA A+ Certification Practice Exams (Exams 220-701 & 220-702)	1/10/2011	$30.00	978-0071760188
CompTIA A+ 220-701 and 220-702 Exam Cram (5th Edition)	1/30/2011	$44.99	978-0789747921
CompTIA A+ Cert Guide (220-701 and 220-702) (Second Edition)	3/4/2011	$79.99	978-0789747907
Mike Meyers' Guide to Supporting Windows 7 for CompTIA Certification (Exams 701 & 702) (All-in-One)	8/25/2011	$30.00	978-0071763929

This study focused on the most expensive book among the titles and the hypotheses were that a number of variables would factor in to the Amazon rank the observed title held among the twelve (as determined by comparing rank of each book among all titles):

- The price that Amazon was currently selling the book for
- The number of reviews posted for the title
- The average number of stars (positivity of reviews) associated with the title
- The number of "Likes" for the title
- The price of ten other books at the time (substitutability)
- The price of the market leader

Sales rank at Amazon has been used as a proxy for product sales in previous studies (Chen et al. 2001, Chevalier et al 2006). The relationship between sales rank and sales, per Chen, follows the Pareto distribution:

$Quantity = B_1 Rank^{B_2}$

Building from that, the following sections discuss each of the six hypotheses in more detail.

Hypothesis 1 – *Price Amazon is Currently Selling Book For*

With a list price of $105.95, the price of the observed title (*A+ Guide to Managing & Maintaining Your PC*) is over 3.5 times that of the list price of the lowest priced title in the top 100 (*Mike Meyers' CompTIA Certification Passport, Fourth Edition: Exams 220-701 & 220-702*). Amazon's listing for the title prominently displays their price, the amount a customer would save from the list price, and the percentage of the saving. The greater the savings, the more it could entice a potential buyer to become a purchaser and the more copies sold, the lower the corresponding rank of the title should be.

The first hypothesis thus is:

H_1: The price of the title will be a significant predictor in the rank of the selected title within the observed set of books.

Hypothesis 2 – Number of Reviews

Using activity as a proxy for appraisal, a herding mentality can occur when other individuals begin talking about an item. The herding mentality that can take place at a physical location can transpire with online listings as well. When a potential buyer is presented with a large number of listings of similar items, they may focus their attention on the one item others have identified as most valuable, using the number of reviews as a proxy. Studies have tied reviews with sales forecasting as it relates to the movie industry (Dellarocas et al., 2007), as well as shown that consumers will often consult more than one review before making a purchase (Kee, 2008).

When it comes to Amazon, Chevalier and Mayzlin (2006) drew a connection between improvements in book review scores and increases in relative sales.

The second hypothesis is:

H_2: The number of reviews a title has will be a significant predictor in the rank of the selected title within the observed set of books.

Hypothesis 3 – Average Number of Stars

Reviewers can leave text descriptions of all sorts, but must also choose a number of stars they want to associate with the title as well. They can leave between one (bad) and five (great) stars and the average number of stars appears at the top of the listing. Studies have shown that the average rating for a sample of books is lower than 4.1 in 35% of titles (Sun, 2012).

Studied by both Chen et al. (2004) and Duan et al. (2008) have indicated that higher ratings cannot be directly correlated to increased sales. One possible explanation proffered is that the majority of reviews in their studies tended to be favorable. This finding contradicts social psychology findings which point to social validation influencing consumer's attitudes (Cialdini, 2008) and purchases.

The third hypothesis is:

H_3: The number of stars a title has will be a significant predictor in the rank of the selected title within the observed set of books.

Hypothesis 4 – Number of "Likes"

Studies have shown that 54% of Facebook users who "like" a company's or brand's page were either "somewhat more likely" or "much more likely" to buy from that brand ("The importance of being 'Liked'", 2012). On Amazon, past and potential customers alike have the ability to click on the Like button on the title's description and increment the number of Likes associated with it. Once identified, it is not possible to click repeatedly and increment the number more than once. It is also not possible to "Dislike" or "Unlike" and thus this serves as only a rudimentary form of review. Nevertheless, it is possible the herding that can be present with reviews may exist with Likes as well and serve as a signal of the desirability of a title.

The fourth hypothesis is:

H_4: The number of Likes will be a significant predictor in the rank of the selected title within the observed set of books.

Hypothesis 5 – Price of Substitutes

The A+ exams from CompTIA consist of a number of multiple choice questions which must be answered within a set time period at a proctored testing center.

CompTIA publishes the list of domains and topics covered by each exam and publishers then create books that prepare candidates to take the exams. Publishers can also join the CompTIA partner program and submit their book for review to have it authenticated that the title does indeed cover the material that a candidate needs to know to pass both exams and become certified. Given that every publisher – and thus every author – has the opportunity to work on an even playing field and write to the known objectives, one title theoretically can serve the same purpose as another and substitutability between the twelve titles in question exists. Therefore, the price of the other titles as related to the one being studied could influence an individual's purchasing decision and affect the ranking of the book.

The fifth hypothesis is:

H_5: The price of the substitute titles will be a significant predictor in the rank of the selected title within the observed set of books.

Hypothesis 6 – Price of the Market Leader

One author, Mike Meyers, wrote several of the titles within the set of available CompTIA A+ books. One of those titles, *CompTIA A+ Certification All-in-One Exam Guide, 7th Edition (Exams 220-701 & 220-702)*, is the leader within the market. Meyers is a vocal spokesman, presenter, educator, and promoter. Not only does this book always appear as the bestseller within the A+ titles, but it often appears in a top position among all computing books and is prominent among the ranking of all titles sold on Amazon. Because of the uniqueness of this book in relation to the other titles, changes affecting the price of it conceivably could affect the observed title as well.

The sixth hypothesis is:

H_6: The price of the market leader will be a significant predictor in the rank of the selected title within the observed set of books.

This study aims to make a unique contribution by focusing on price changes to a backlist title in one niche category and identifying the changes in sales associated with the changes in the associated variables. No similar micro-level study of the dynamics involved with these variables could be found.

Research Methodology

From February 26, 2012 to March 25, 2012, the listings for the twelve titles being studied were regularly checked and variables recorded. Figure 1 shows an example of some of the variables that appear with a listing within this set – the other variables that were collected appear at the top of the listing when one views it on Amazon. By scrolling over the stars, a popup appears giving the average number of stars rounded by Amazon to one decimal place between 1.0 and 5.0.

Figure 1: Variable Information for a title on Amazon

While Amazon reports that they update ranking information on an hourly basis, that did not always occur and there were times when the information would stay the same for several hours.

There were also occasions when one or more of the variables simply did not appear in the listing, as illustrated by the missing rank information in Figure 2.

Figure 2: Some Variable Information for a title Would Occasionally not Appear on Amazon

When either of the two conditions occurred, different browsers (Internet Explorer and Chrome) and machines were employed to verify the problem existed on Amazon's site and not with the collection process itself.

On several instances, titles were added to the shopping cart without completing the purchase to make it easier to spot changes. Keeping them in the cart causes alerts to be sent when the price changed in either direction, as illustrated by Figure 3.

Figure 3: Alerts Notify of Price Changes
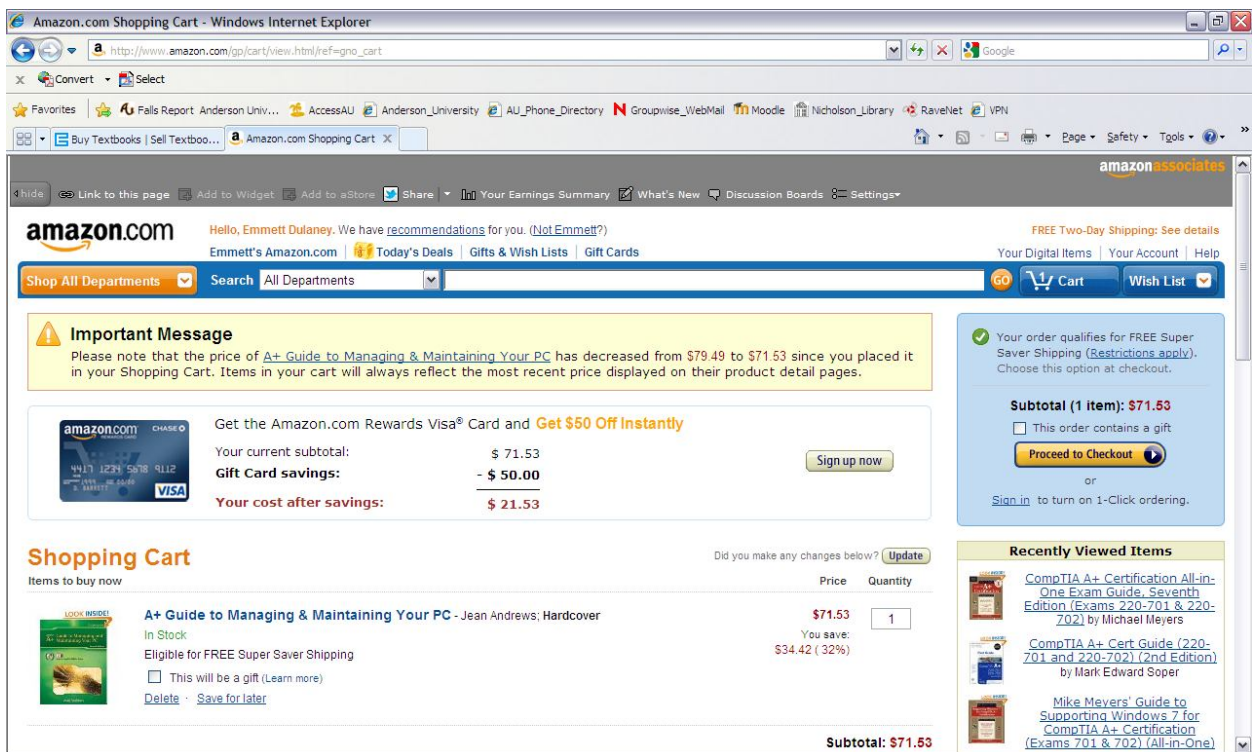
The data from the observations was entered into a spreadsheet for later analysis. After the observation period ended, randomly printed hard copies and screenshots were referenced to spot check the entries. A total of 245 observations were collected and entered for each of the twelve titles.

Columns were used for each of the following: Date, Time, Price, Discount, Reviews, Stars, Likes, Rank. Though not used in the analysis, columns were also used to store information on the number of new and used copies of each title available at each observation period for a future study.

Regression was used to analyze the data and assess the association between the dependent variable (the rank of the selected title within the observed set of books) and independent variables, and to test the effect of each independent variable as a predictor of the ranking. The expected equation was:

Rank of Selected Title = $a + B_1$PRICE - B_2REVIEW - B_3STARS - B_4LIKE - B_5SUB - B_6PLDR

Where a is equal to the intercept, while coefficient B is equal to the magnitude of each of the variables and may take on any value greater than zero. PRICE is the price of the book at the time of observation on Amazon, and REVIEW is the number of reviews associated with the title. STARS is the number (from 1.0 to 5.0) of the average review associated with the title. LIKE is the number of "Likes" that viewers have clicked upon for the title. SUB indicates the aggregate price of ten of the other eleven titles in the observation – the substitute price. PLDR is the price of the market leader (ISBN: 978-0071701334). With continuous independent variables (the price, the number of stars, etc.), B will indicate the value of the change in each increment.

It is important to note that a lower rank indicates that the title is selling better since a value of 1 means the book is the bestseller among the observed set and a value of 12 means it is the worst seller among the set.

Results

Table 2 shows the descriptive data for the twelve books in the study, again listed in the order of publication date. The highlighted row is the selected title chosen to be compared against the others and the entry marked with an asterisk identifies the market leader. The columns Price, Reviews, Stars, and Likes indicate ranges of observed values.

Table 2: Descriptive Values of Data

Title	Number of Observed Price Changes	Unique Prices	Price	Reviews	Stars	Likes
CompTIA A+ Complete Study Guide: Exams 220-701 (Essentials) and 220-702 (Practical Application)	11	6	$35.09–36.44	39–40	4.2	25–29
CompTIA A+ Certification All-In-One for Dummies	17	17	$23.02–24.34	16	3.9	7
CompTIA A+ Complete Deluxe Study Guide: Exams 220-701 (Essentials) and 220-702 (Practical Application)	5	5	$45.59–47.41	8	4.1	8–10
CompTIA A+ 2009 In Depth	4	2	$26.53–26.79	22	4.5	3
A+ Guide to Managing & Maintaining Your PC	42	22	$71.27–82.42	33–35	4.4–4.5	16–17
*CompTIA A+ Certification All-in-One Exam Guide, 7th Edition (Exams 220-701 & 220-702)	4	3	$33.32-37.32	140-151	4.6	64-74
CompTIA A+ Certification Study Guide, Seventh Edition (Exams 220-701 & 220-702)	3	3	$28.99–31.49	8	4.5	4–5
Mike Meyers' CompTIA Certification Passport, Fourth Edition (Exams 220-701 & 220-702)	5	4	$16.64–19.55	12–13	4.4–4.5	5
CompTIA A+ Certification Practice Exams (Exams 220-701 & 220-702)	5	2	$19.80–21.90	6–7	3.3–3.7	2-3
CompTIA A+ 220-701 and 220-702 Exam Cram (5th Edition)	0	1	$27.37	44	4.6	40–43
CompTIA A+ Cert Guide (220-701 and 220-702) (Second Edition)	33	8	$45.99–49.77	26–27	4.7	24-25
Mike Meyers' Guide to Supporting Windows 7 for CompTIA Certification (Exams 701 & 702) (All-in-One)	0	1	$18.26	4	4.8	31–38

Table 3 shows the descriptive data for the forty-two observed prices of the selected title including the average rank among the observation set while it was at that price, the price of all the substitute titles (including the market leader) and the date on which it first went to that price.

Table 3: Values Associated with Each Observed Price of Selected Title

Amazon Price for A+ Guide to Managing & Maintaining Your PC	Average Rank While at that Price	Average Price of Eleven Substitute Titles	Date of Observed Price Change
71.54	4	322.65	2/26/2012
79.49	3.875	326.43	2/26/2012
71.53	3.667	326.66	2/27/2012
71.54	4	327.19	2/27/2012
75.89	4.2	325.51	2/28/2012
71.50	2.5	325.51	2/28/2012
71.52	2	326.52	2/29/2012
76.44	3.667	325.97	3/1/2012
71.48	3.117	323.67	3/1/2012
71.43	4	324.12	3/3/2012
82.42	4	327.90	3/4/2012
79.49	4.363	325.62	3/4/2012
71.51	4	327.27	3/6/2012
71.52	4.5	321.52	3/6/2012
76.44	4.889	325.67	3/7/2012
71.42	7	325.63	3/8/2012
71.39	5.5	328.54	3/8/2012
76.44	4.5	328.54	3/9/2012
71.39	5.5	325.77	3/9/2012
71.34	4.4	325.77	3/10/2012
71.36	4.833	325.12	3/10/2012
71.38	6.33	330.52	3/11/2012
71.34	6.125	330.52	3/11/2012
71.35	6.09	330.40	3/12/2012
71.50	6.33	328.26	3/13/2012
71.48	4	328.22	3/14/2012
71.52	4.2	325.45	3/14/2012
71.57	6.166	323.11	3/15/2012
82.42	3.33	325.87	3/16/2012
71.52	4	325.78	3/17/2012
71.54	4	325.78	3/17/2012
71.51	5.357	326.09	3/17/2012
71.45	7	328.78	3/19/2012
82.42	7.75	328.78	3/19/2012
71.44	7.33	326.35	3/20/2012
82.42	6	326.35	3/20/2012
71.45	4.25	326.40	3/21/2012
71.36	4	326.40	3/21/2012
71.32	4.125	326.40	3/21/2012
82.42	4.75	326.40	3/22/2012
71.27	6.058	328.70	3/23/2012
79.49	5.75	329.90	3/25/2012

As summarized in Table 2, twenty-two of the forty-two prices were unique. While the range was from $71.27 to $82.42, the mean was $73.79, median was $71.52, and mode was $82.42. The range of the substitute price only varied by $9 (from $321.52 to $330.52); the mean was $326.57, median was $326.38, and mode was $326.40. At $11.15, the range on the selected title varied by $2.15 more than the range of the aggregate of the eleven other titles constituting the set of substitutes.

Rank among the twelve titles (from 1 to 12) was determined by comparing the overall rank of each title among all the books that Amazon sells (from 1 to *n*). Table 4 shows the average rank of each book on Amazon among all titles, as well as the range during the observation period. Again, the highlighted row is the selected title chosen to be compared against the others and the entry marked with an asterisk identifies the market leader.

Table 4: Overall Ranking of Each Title

Title	Average Rank Among All Titles on Amazon	Range of Rank
CompTIA A+ Complete Study Guide: Exams 220-701 (Essentials) and 220-702 (Practical Application)	28,491	7,575 – 90,872
CompTIA A+ Certification All-In-One for Dummies	33,472	10,260 – 126,038
CompTIA A+ Complete Deluxe Study Guide: Exams 220-701 (Essentials) and 220-702 (Practical Application)	232,775	4,675 – 494,108
CompTIA A+ 2009 In Depth	151,526	24,546 – 331,660
A+ Guide to Managing & Maintaining Your PC	17,782	3,501 – 72,817
*CompTIA A+ Certification All-in-One Exam Guide, 7th Edition (Exams 220-701 & 220-702)	653	383 – 1,164
CompTIA A+ Certification Study Guide, Seventh Edition (Exams 220-701 & 220-702)	41,874	10,030 – 149,654
Mike Meyers' CompTIA Certification Passport, Fourth Edition (Exams 220-701 & 220-702)	32,097	9,101 – 130,370
CompTIA A+ Certification Practice Exams (Exams 220-701 & 220-702)	203,087	39,345 – 422,780
CompTIA A+ 220-701 and 220-702 Exam Cram (5th Edition)	8,167	3,769 – 17,764
CompTIA A+ Cert Guide (220-701 and 220-702) (Second Edition)	25,090	8,470 – 80,613
Mike Meyers' Guide to Supporting Windows 7 for CompTIA Certification (Exams 701 & 702) (All-in-One)	5,772	2,977 – 11,658

Regression Results

The linear regression model specified the rank of the selected title within the observed set of books be obtained as a function of the price of the selected book, the number of reviews, the average number of stars, the number of Likes, the price of the substitute books and the price of the market leader. Continuous variables were used for all values. Given the coding of each variable, linear regression determined the association between the rank of the selected title within the observed set of books and the independent variables.

SPSS was used for the regression analysis. An adjusted R Square value of 0.9523455 is significant and identifies that a relationship exists between one of the independent variables and the dependent variable. That relationship is able to explain approximately 95.2% of the variation obtainable in the rank of the selected title within the observed set of books. At a 95% Confidence Interval level, the association between the rank of the selected title within the observed set of books and all variables but PRICE is not significant.

The estimated coefficient (B) signifies the expected change associated with a change in ranking when all other independent variables remain the same. The estimated coefficient (B) can be used to calculate the ranking within the set of titles.

For example, if the price of the book is priced at $71.27 (the lowest observed price for the title), the predicted ranking would be:

$RANK_B = 0 + (0.0638425*71.27)$
$RANK_B = 4.55$

As contrasted to the price of the book being \$82.42 (the highest observed price for the title), in which case the predicted ranking would be:

$RANK_B = 0 + (0.0638425*82.42)$
$RANK_B = 5.26$

With a t-stat of 48.8 and a p-value near 0, there is a correlation between the ranking and price. Regression did not identify a significant association between the other variables and were thus not supported. One likely reason for the absence of significance with the other variables is the lack of much variation among them. Since it was a backlist title being examined for a one-month time period, there was an increment of only one in the number of Likes, and of only two in the number of reviews (making for only a 0.1 change in stars).

Discussion and Implications

Of all the variables in the marketing mix, price is the easiest to change. The relevance of this research is meaningful as confirmation that even for a backlisted title on Amazon, changes in price have a direct correlation to the rank of the title among similar titles. The same regression was run on two other titles in the set that had a substantial number of price changes and similar results were obtained. For the *CompTIA A+ Cert Guide (220-701 and 220-702) (Second Edition)*, which had 33 price changes (8 unique values), the Adjusted R Square is 0.9355679, with an estimated coefficient of 0.1359836, t-stat of 61.6 and a p-value near 0. For the *CompTIA A+ Certification All-in-One for Dummies*, which had 17 price changes (17 unique values), the Adjusted R Square is 0.9256353, with an estimated coefficient of 0.2990661, t-stat of 56.8 and a p-value near 0. The market leader never changed rank during the observation period and two titles did not change price, making it not possible to evaluate them.

The changing of price can catch the attention of the customer and signal that they should make a purchase. This can be particularly true with books placed in a shopping cart for purchase later – the alert and email message from Amazon informing of a price change in either direction can spur the customer to complete the purchase before there is another change.

Conclusions and Future Research

This study contributes to the literature by identifying the relationship price has on the ranking of a backlist title on Amazon.com. The linear regression results indicate that price influences the ranking of a selected title within a set of substitute titles at the .05 level of significance.

There are a number of areas where further/future research is warranted. Many possibilities were uncovered during the course of this project; however, due to design they could not be analyzed further. Among the most prominent and promising of possible areas for future research are the following:

- The number of Reviews, Stars, and Likes are still considered possible factors that can correlate to rank, but a future study would have to focus on a product where these vary significantly.
- Examining differences for variable values within subgroups – books that are consistently good sellers, and those much higher up in the overall rankings. Some auction literature suggests purchasers are more likely to bid if a few positive reviews exist (Livingston, 2005) but once a few positives have been gained, the additional reviews have "little or no impact on seller welfare" (Livingston, 2005). Beyond a base amount, returns within auctions do not increase greatly (Eaton, 2005) (Houser &Wooders, 2006) (Lucking-Reiley et al., 1999). Following this logic, variables about a book could have a greater significance for less popular – or newer – books, but not matter as much with books that have been out for a while or have a large number of reviews posted.

Limitations of the Study

There were a number of limitations to the study. The first noteworthy one is that the study only focused on twelve books written to an IT certification that many other study products have been created for.

When looking at substitutes, purchasers may not be simply weighing one book over another, but also considering video products, CBT, online training, classroom sessions, and so on. Consumers wishing to make a purchase of one of the titles being observed could buy them not only at Amazon, but through many other locations as well: other online sites, training centers, and bookstores. The market share that Amazon has in this market is not known.It is also possible that prices changed more than the number of observations, but since it was not possible to monitor each title in real time and since the monitored variables did not always reflect values, some changes could have been missed. The only method of avoiding this possibility would be for Amazon to supply the values directly for research purposes.

Results can be stated only as they apply to the products and time frame studied.

References

2001. Varied online pricing not expected to continue. *Publish 15* (12): 31.

Arar, Y. 2007. Amazon.com: One item, many prices. *PC World 25* (6): 39.

Bai, X. and M. Luo. 2011. How much is trust worth? Evidence from the international online textbook market.*Journal of Internet Commerce10* (4):245-260.

Bailey, L.P. 1998. Electronic commerce: Prices and consumer issues for three products: Books, computer discs, and software. *Organization for Economic Co-Operation and Development OCDE: GD98* (4).

Chen, P., S. Dhanasobhon, and M. Smith. 2001. All reviews are not created equal: The disaggregate impact of reviews and reviewers at Amazon.com. *Heinz Research, Paper 55*. http://repository.cmu.edu/heinzworks/55.

Chen, Pei-Yu; Wu, Shin-yi; and Yoon, Jungsun, "The Impact of Online Recommendations and Consumer Feedback on Sales" (2004).*ICIS 2004 Proceedings.*Paper 58.http://aisel.aisnet.org/icis2004/58

Chevalier, J. and A. Goolsbee. 2003. Measuring prices and price competition online: Amazon.com and BarnesandNoble.com. *Quantitative Marketing and Economics 1*: 203-222.

Chevalier, J. and D. Mayzlin. 2006. The effect of word of mouth on sales: Online book reviews. *Journal of Marketing Research* (August, 2006).

Cialdini, R.B.2008. *Influence: Science and Practice (5ᵗʰ edition)*. HarperCollins, New York.

Clay, K., R. Krishnan, E. Wolff, and D. Fernandes. 2002. Retail strategies on the Web: Prices and price dispersion in the online book industry. *Journal of Industrial Economy50* (3): 351-367.

Dellarocas, C., X.M. Zhang, and N. Awad. 2007. Exploring the value of online product reviews in forecasting sales: The case of motion pictures. *Journal of Interactive Marketing 21* (4): 23-45.

Duan, W., B. Gu, and A.B. Whinston. 2008. Do online reviews matter? – An empirical investigation of panel data. *Decision Support Systems, 45 (4)*: 1007-1016.

Dulaney, E.A. and M. D. Wiese. 2011. Factors contributing to the final selling price of auctioned gift cards. *Journal of Internet Commerce10* (3):163-192.

Eaton, D.H. 2005. Valuing information: Evidence from guitar auctions on eBay.*Journal of Applied Economics & Policy24* (1): 1-19.

Ghose, A. and B. Gu. 2008. Market frictions, demand structure and price competition in online markets. *ICIS 2008 Proceedings, Paper 139*, http://aisel.aisnet.org/icis2008/139.

Houser, D., and J. Wooders. 2006. Reputation in auctions: Theory and evidence from eBay. *Journal of Economics & Management Strategy 15* (2): 353-369.

Kee, T. 2008. Majority of online shoppers check at least four reviews before buying. Online Media Daily (February 19), http://www.mediapost.com/publications/article/76727/majority-of-online-shoppers-check-at-least-four-re.html.

Livingston, J.A. 2005. How valuable is a good reputation? A sample selection model of internet auctions.*Review of Economics & Statistics87* (3): 453-465.

Lucking-Reiley, D., D. Bryan, N. Prasad, and D. Reeves. 2007. Pennies from eBay: The determinants of price in online auctions. *The Journal of Industrial Economics55* (2): 223-233.

Mudambi, S.M. and D. Schuff. What makes a helpful online review? A study of customer reviews on Amazon.com. *MIS Quarterly 34* (1): 185-200.

Resnick, P., and R. Zeckhauser. 2002. Trust among strangers in Internet transactions: Empirical analysis of eBay's reputation system. *The Economics of the Internet and E-Commerce. Advances in Applied Microeconomics 11*: 127-157

Rosencrance, L. 2000. Outrage prompts Amazon to change price-testing policy. *Computerworld 34* (38): 14.

Sun, M. 2012. How does the variance of product rating matter? *Management Science 58* (4): 696-707.

The importance of being 'Liked'.(2012). *Marketing News*, 5.