

Self Regulation or Price Discrimination

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Abstract: Price discrimination is hypothesized in the form of censorship regulation within the motion picture industry. The test indicates consumers of DVD movies are separated into two groups according to their price sensitivity. The movie rating system administered by the MPAA operates as the enforcing mechanism that allows for price discrimination.

I. INTRODUCTION

Trade associations provide members benefits greater than their costs. This research examines a specific, revenue generating function of the Motion Picture Association of American or MPAA. The rating system (R, PG, PG-13, or G) enacted by the MPAA in 1962 separates their consumers into groups in order to price discriminate. This will be empirically derived through a price differential between groups of ratings. The MPAA uses industry-wide power to seek a higher producer surplus by employing censorship regulation and therefore price discriminating throughout the industry.

II. CONTROLS FOR DEMAND

To test this hypothesis, I chose a retailer with a wide range of DVD movies, Wal-Mart. I recorded the price and name of every single disc, DVD movie they had for sale, a total of 295 observations. Wal-Mart's online movie database provided the MPAA rating and *date released to DVD* (Wal-Mart). The breakdown of the sample was 50% R rated, 27% PG-13, 14% PG, and 7% G rated movie.

In order to hold demand constant, I needed more measures of consumer's demand for each heterogeneous movie. I chose the Internet Movie Database (IMDb), which claims over thirteen millions viewers each month. For each movie, users can make one vote (per email address) from one to ten. The number of votes and the average user rating are compiled and available for each movie, and both variables estimate the demand for that movie. The strength of the variable depends on the correlation between the statistics gathered from the online Internet Movie Database users and the true consumer demand for those movies. In addition, I collected data on the gross box office earnings for 261 of the sample observations (The Numbers).

III. CONTROLS FOR COST

The marginal cost for DVD's is the cost of producing the DVD without influence from the budget or fixed cost of the movie. To maximize profits, producers will charge the price where marginal cost equals marginal revenue for their heterogeneous product. I will assume that the cost of producing, shipping, and inventory space is approximately equal for each of the DVD movies. That is to say, the DVD movies are homogeneous with respect to cost, and controls for

supply are not needed. The observed data supports this assumption¹. When regressed against *store price* with or without other variables, the film's *production budget* proved statistically insignificant as shown in Table 1.

Table 1. Production Budget against Store Price for n = 112

	<u>Est. Coefficients</u> (std error)	
Intercept	17.46 (.638)	18.64 (1.178)
Days since DVD Release		-.0039 (.0008)
Days since Theatre Release		-.00254 (.000639)
(Release Date)²		3.45 * 10⁻⁰⁷ (8.5 * E ⁻⁰⁸)
Total Gross Earnings in mil.		.004 (0.0052)
PG-13 and R Dummy		-.439 (0.69)
# of Online Votes		6.44 * 10⁻⁰⁵ (3.06 * 10 ⁻⁰⁵)
(User Rating)²		.0464 (.024)
Production Budget in mil.	.00842 (.0098)	-.0115 (1.05)
R²	.0067	.499

IV. RESULTS

To test for price discrimination, store price was regressed on six variables controlling for demand and a dummy for the PG-13 or R rating versus a PG or G rating. Price discrimination is hypothesized to exist when the coefficient of the PG-13 and R dummy will not statistically equal zero, *ceteris paribus*, with a high level of confidence. This coefficient is interpreted as the difference between the predicted price of a PG-13 or R rated movie versus the price of a PG and G rated movie holding demand for that movie constant. After testing revealed greater significance, *days since theatre release* and the *user rating* variables were regressed as quadratic variables².

Results indicate a statistically significant negative relationship between a PG-13 or R rating and the price of the DVD movie. So how much does an R rating affect the price of a DVD? With 99.9% statistical confidence, the price is expected to be \$1.82 less than movies that are rated PG or G with a standard error of around 55 cents. With the assumption that the marginal cost of producing an R rated DVD is the same as producing any other DVD, this indicates price discrimination of the third degree. The first column of Table 2 illustrates results

¹ Andrea Shepard (1991, 31) used a similar assumption, concerning the input cost of gasoline for retailers, in "Price Discrimination and Retail Configuration." Her model differs, in that the suppliers are heterogeneous and not the products. The paper finds results of price discrimination within the retail gasoline market, an environment of monopolistic competition. For more on the existence of price discrimination with free entry, see Borenstein (1985), Katz (1984), and Holmes (1989).

² *Days since theatre release* displayed a decreasing effect on price at a decreasing rate, and *user rating* was increasing in its effect of price at a constant rate.

linking the *store price* of the DVD movie with all of the variables collected minus the *gross earnings* variable.

Table 2. Results of Best Regression Models for n = 262

	<u>Est. Coefficients</u> (std error)	
Intercept	18.09 (.8716)	17.33 (.917)
Days since DVD Release	-.0047 (.0004)	-.0047 (.0004)
Days since Theatre Release	-.001 (.00016)	-.000958 (.00016)
(Release Date)²	5.61 * 10⁻⁸ (1.08 * 10 ⁻⁸)	5.57 * 10⁻⁸ (1.07 * 10 ⁻⁸)
# of Online Votes	9.4 * 10⁻⁵ (2.14 * 10 ⁻⁵)	6.1 * 10⁻⁵ (2.509 * 10 ⁻⁵)
(User Rating)²	.0445 (.0201)	.0468 (.02)
Total Gross Earnings in mil.		.00918 (.0037)
PG-13 and R Dummy	-1.82 (.547)	-1.47 (.5602)
R²	.581	.591

After adding the *gross earnings* variable, we have the second column of Table 2. This regression gives an expected \$1.47 decrease in store price for an R or PG-13 rating. This model has a marginally higher R² value with 59.1% of the variation in *store price* explained, 1% higher than the model without the *gross earnings* variable.

V. CONCLUSIONS

So if adult consumers benefit (in the form of a lower price) from this price discrimination, who loses? That would be the parents of younger, less elastic consumers. Table 3 is the regression between all of the significant dependent variables and either a PG or G rating. With 98% statistical confidence, PG and G movies are \$1.36 more than other rated movies with a standard error of 56 cents.

Enforcing the rating system is crucial for the equilibrium of price discrimination to survive. It is in the MPAA's interest to lobby, advertise, and persuade parents to adhere to the system and keep the younger, more inelastic consumers separated from the more elastic consumer group. The retail suppliers of DVD movies also protect the rating system by constraining the choices of the inelastic consumers to PG and G movies only.

Stigler (1971) proposed a theory of economic regulation where groups with similar economic interests organize into trade associations and interest groups in order to petition the government for economic rents. When examining the benefits and costs of joining a trade association, firms will consider benefits of lobbying for government regulation as well as alternatives forms of economic regulation. This experiment is an example of services that trade associations offer that circumvents expensive government regulation by utilizing industry wide power. Through the veil of censorship, the MPAA provides its members with the crucial sorting mechanism allowing for price discrimination.

Table 3. PG and G Dummy Results for n = 262

	<u>Est. Coefficients</u> (std error)
Intercept	15.88 (.7918)
Days since DVD Release	-.0047 (.000417)
Days since Theatre Release	-.000952 (.00016)
(Release Date)²	5.57 * 10⁻⁸ (1.073 * 10 ⁻⁸)
# of Online Votes	6 * 10⁻⁵ (2.51 * 10 ⁻⁵)
(User Rating)²	.0464 (.02)
Total Gross Earnings in mil.	.00939 (.0037)
PG and G Dummy	1.36 (.564)
R²	.589

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