Market Size and Product Composition: Evidence from Hollywood*

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Abstract

This paper examines how outside competition and inside competition affect the number and composition of products firms choose to supply. The question is addressed using the example of the U.S. motion picture industry, which has experienced declining attendance in the past decade due to outside competition from streaming services, higher quality TV programming, and smart phone applications. Using data on 2,426 wide-release movies between 1995 and 2014, we estimate a structural model of endogenous product choice in which studios allocate a fixed budget to low, medium, and high budget movie projects each year. Counter factual estimates using our parameter estimates indicate that increases in the value of the outside option reduce the number of medium budget movies but increase the number of low and high budget movies. We also find that a simulated merger between two studios, Disney and Twentieth Century Fox, which reduces competition inside the market, decreases the number of movie releases. These findings are consistent with observed changes in the industry between 2015 and 2018.

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*All errors are our own.

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1 Introduction

In creative industries, including film, book publishing, and sound recording, *ex ante* demand is unpredictable, and firms typically offer products of varying types and qualities. For example, each year Hollywood studios produce low budget horror films and comedies, medium budget films that appeal to more sophisticated audiences, and big budget special effects driven blockbusters. In this paper, we examine how a reduction in market size, precipitated by an increase in the value of the outside option, affects the number and composition of product offerings. We also study how a merger between two oligopolists, which changes competition inside the market, affects the product choices of the merged entity and its competitors.

The impact of increasing outside competition on firms' investment decisions is theoretically unclear. Though higher quality projects generate larger revenues on average, they are also more expensive to produce, which reduces the capital available for other projects. Furthermore, because higher quality products have a larger potential market, firms often invest more in marketing and distribution to generate and meet this demand. When competition from outside the market increases, it is therefore unclear whether it is optimal to produce a smaller number of high-quality products or a larger number of low-quality projects, particularly when these projects compete with one another. The empirical relationships between anticipated revenues, development costs, and the costs of marketing and distributing new projects are central to predicting the impact of decreasing market size on firms' production choices.

We address this question in the context of U.S. motion picture industry, which has been transformed in recent years by increased competition from streaming services such as Netflix, higher quality TV programming, and social media applications such as Facebook. Between 2009 and 2018, ticket price increases offset a modest decline in annual attendance from 1.42 billion to 1.3 billion, allowing aggregate revenues to increase from $10.6 billion to $11.9 billion (MPAA, 2018). Though big-budget franchise films increasingly dominate the industry, studios continue to produce movies of varying sizes. Between 2014 and 2018, the number of movies with production budgets exceeding $15 million increased from 154 to 171, while the number of movies with budgets between $1 million and $15 million increased from 328 to 405.

To estimate the impact of increasing outside competition on firms' investment decisions, we use data on 2,426 wide-release movies released by 47 different studios between 1995 and 2014.

These data include weekly revenues, production budgets, release dates, and exit polling scores from consumers. The six major studios (Disney, Fox, Paramount, Universal, and Warner Bros.) distributed 1,624 of the 2,426 movies (66.9 percent) in our sample.

Using these data, we estimate a structural model of demand and supply in which the six major studios choose to allocate a predetermined annual budget to low, medium and high budget movies, and consumers make consumption decisions based on a movie's quality, the quality of competing movies, and release week. Nested logit demand results indicate that consumers prefer more recent movies, and that consumer utility levels between movies in different budget groups are not strongly correlated. On the supply side, we obtain bounds on the fixed costs for marketing and distributing movies for each studio in each budget group such that the observed production decisions and release date choices are profit maximizing. This means that adding or removing a movie in each budget category, and optimally rescheduling release dates for all of the studio's movies, does not increase profits. Across studios, fixed cost estimates are larger in higher quality groupings, i.e. it is more expensive to market and distribute a high-budget movie than a low- or medium-budget movie, though the ratio of fixed costs to production cost is smaller the larger the budget.

Based on these estimates, we conduct counterfactual simulations to predict the impact of increases in outside competition and a reduction in inside competition. First, we raise the value of the outside option by 10 percent, and see if studios add or remove movies in each budget category. Our results show that increasing the utility of the outside good induces studios to reduce the number of medium-budget movies, and increase the number of low- and high-budget movies. High-budget movies in turn receive a disproportionately larger share of studios' annual production budgets. The basic intuition is that low-budget movies tend to be profitable and do not steal much capital from other projects because they are cheaper. High-budget movies are expensive and absorb a large share of other films' budgets, but they generate sufficient revenues to offset this effect. Medium-budget movies, however, absorb a large share of other films' potential budget but do not generate sufficient revenues to offset this effect. Therefore, when competition from the outside increases, medium-budget movies are more likely to be dropped.

Next we consider the impact of the recent merger between Disney and Twentieth Century Fox, which was completed on March 19, 2019. Under the deal, Disney acquired Fox's entertainment properties, including the X-Men and Deadpool franchises, for $71.3 billion. Counterfactual esti-

mates that simulate a merger between Disney and Fox suggest that, if Disney acquired Fox in 1995, the merged entity would have released 29 fewer movies over the 20 year period, which represents a 5.6 percent reduction in the total number of films released over the same period by the two companies without a merger. In response, the remaining four major studios increase the output of movies by 36 between 1995 and 2014 so that the merger increases the overall number of movies by only 0.35 movies per year. Consistent with the first counterfactual simulation in which the value of the outside option increases, Disney's acquisition of Fox leads to an industry-wide reduction in the number of medium budget movies which is counter-balanced by an increase in the number of low and high budget movies. In an additional counterfactual exercise, we simulate the impact of dropping a major studio (Paramount). Here we again find that a new equilibrium emerges in which remaining studios drop medium budget movies in favor of high and low budget movies.

Our analysis contributes to the empirical literature on endogenous product choice. Early research includes Berry and Waldfogel (2001) and Sweeting (2010), who both examine the impact of increased concentration on product variety offered by firms in the U.S. radio market. Our approach is closest to a recent branch of the literature that recovers the fixed costs of offering new products, e.g. Draganska et al. (2009), Eizenberg (2014), Fan (2013), Crawford et al. (2018), and Fan and Yang (2018). Rather than analyzing the welfare effects of a merger between firms (Draganska et al., 2009; Fan, 2013) or the impact of a new input choice (Eizenberg, 2014), we focus on how changes in the utility of the outside good affect product and quality provision. Furthermore, while prior studies either assume that firms choose whether to offer a single product of a discrete type (e.g. Draganska et al., 2009), or assume firms choose continuous quality levels of their products (Fan, 2013; Crawford et al., 2018; Fan and Yang, 2018), we consider the case where firms choose how many products to supply in each quality category (low, medium, or high budget). Our setting also differs from prior work because film studios do not choose prices but instead choose which weeks to open their movies on.[1]

This paper also contributes to a new literature that analyzes recent trends in the motion picture industry. One of the most important recent trends has been the growth in the number and success of big-budget franchise films. For example, 43 of the top 50 movies at the global box office between 2012 and 2016 were sequels or adaptations of young adult novels and comic books (Fritz, 2019).

[1]Einav (2010) studies the release date timing decisions of studios in detail.

Our results are consistent with this observation since our counterfactual simulations predict a small rise in the number of high budget movies coupled with a large increase in their budgets. Our results also complement recent work by Leung and Qi (2019) who examine the impact of growth in the international box office, particularly the rapid growth in the Chinese market. They find that the return on investment to action movies is higher in culturally distant markets, which induces studios to invest more in this genre. Finally, our findings help to explain the decline in medium budget movies, which are central to a 32 percent reduction in major studio output between 2006 and 2016 (Fritz, 2019).

The rest of this paper is organized as follows. Section 2 describes our data. In Section 3 we develop our structural model of demand and supply. Fixed cost estimates are presented in Section 4. Section 5 describes our counterfactual simulations and discusses the results. A final section concludes.

2 Data

Detailed data on domestic wide releases between May 19, 1995 and December 25, 2014 come from www.boxofficemojo.com. These data include weekly domestic box office revenue, production budget, distributor (studio), exit poll ratings (A+, A,. . . , F) from the CinemaScore market research firm, and release date. After omitting movies with missing data on revenues, exit poll scores, or production budget, we are left with an unbalanced panel data set comprising 2,426 movies. Although these movies represent only 22.1 percent of the total movies released theatrically in the U.S. between 1995 and 2014, they account for 84.6 percent of total domestic box office revenues.[2] All financial variables are expressed in real 1995 dollars unless noted.

There is no established definition for a low, medium, or high budget movie. We therefore define budget groupings in the following way: low budget films have budgets less than or equal to $25 million, medium budget films have budgets between $25 and $75 million, and high budget films have budgets exceeding $75 million. The average film in our data set has a budget of $45 million, slightly below the middle of our medium budget range (Panel A, Table 1). Between 1995 and 2014, 16.9 percent of movies are high-budget, which translates to 20.5 high-budget movies per year on

[2]Total unadjusted revenues for the 2,426 movies in my sample are $149.8 billion. Total domestic revenues for all 10,968 releases between 1995 and 2014 are $177.0 billion.

average, while 46.7 and 36.5 percent of movies are medium- and low-budget. The six major studios and Motion Picture Association of American (MPAA) members (Disney, Fox, Paramount, Sony, Universal, and Warner Bros.) release 3.9 low-budget, 6.7 medium-budget, and 2.9 high-budget movies per year on average (Panel B, Table 1).

Table 1: Summary Statistics

Movies (N = 2,426)	**Mean**	**Std. Dev**	**Min**	**Max**
Budget ($ Mil)	45.22174	36.88132	0.0618557	340
Low budget	0.364798	0.4814727	0	1
Med budget	0.4666117	0.4989868	0	1
High budget	0.1685903	0.3744668	0	1
Revenue ($ Mil)	53.94848	57.95808	0.0598393	546.6498
Release weeks	8.206925	2.637409	1	10
Exit poll grade	3.067354	0.7386124	0	4.3
Studio-Years (N=120)	**Mean**	**Std. Dev**	**Min**	**Max**
Movies	13.53333	3.709931	5	23
Low budget movies	3.916667	2.171563	0	9
Medium budget movies	6.716667	2.979435	1	17
High budget movies	2.9	1.726706	0	8
Aggregate budget ($ Mil)	698.2664	210.8804	170.1492	1260.577
Revenue ($ Mil)	816.3821	245.9634	208.918	1423.91

Notes: Data on revenues, release date, production budget, and studio for 2,426 movies between 1995 and 2014 come from www.boxofficemojo.com. Additional data on production budgets come from the-numbers.com. Exit poll scores from www.cinemascore.com. Each observation in the upper panel is a movie. Each observation in the lower panel is a studio-year pair for one of the six major studios (Disney, Fox, Paramount, Universal, and Warner Bros.).

Least squares regression results reveal that the number of medium-budget movies declined over our sample period. Separate regressions of the number of movies in each category on a simple time trend and controls for studio identity indicate that the number of medium-budget movies decreased by 0.13 per year on average (significant at 1 percent, Table 2). There is no statistically significant trend in the number of low- and high-budget movies. This is consistent with the observations of media journalist Ben Fritz:

> When home video revenues fell dramatically, the studios cut costs and risky original scripts and adaptations of highbrow books were the first to go. Between 2006 and 2016 the studios reduced production by 32%. The decline is explained entirely by the evaporation of interesting, intelligent mid-budget films. Fritz notes that today anything thats not a big budget franchise film or a low-cost, ultra-low risk comedy or horror movie is an endangered species at Hollywood's

six major studios.[3]

Table 2: Coefficients on time trend

	Coefficient	Std. Error
Low budget	0.0613319	0.0457791
Medium budget	-0.1361976*	0.0446345
High budget	0.0462943	0.0238211

Notes: Data on production budgets and release dates for 2,426 movies between 1995 and 2014 come from www.boxofficemojo.com. Additional data on production budgets come from the-numbers.com. Each row reports the coefficient estimate on the linear time trend from a regression of total low, medium, or high budget movies on a linear time trend and studio fixed effects. * denotes statistical significance at the 5% level.

Further inspection of the data also reveals that aggregate expenditure on new productions per studio is roughly constant over time. Each year, the major studios spent $698.3 million on average producing new movies (Panel B, Table 1). Though there is variation across studios in annual aggregate production expenditures, the coefficient estimate on a simple linear time trend in a regression of annual aggregate production expenditure on a time trend and studio fixed effects is small and statistically insignificant, which indicates that real production expenditures have neither risen or fallen over time.[4] This in turn implies that spending on low- and/or high-budget movies increased over our sample period since the number of medium budget movies declined. A framework in which studios seek to optimally allocate a stable budget across a menu of low-, medium-, or high-budget movie projects each year is consistent with the empirical model we estimate below.

3 Empirical Model

Our static model of firm (studio) decision making comprises three stages. In the first stage, firms choose the number of products of each type (low, medium, or high budget) to produce. In the second stage, firms choose release weeks for their movies, based on expected demand for their film, and the release date choices of competing studios. In the third stage, consumers choose which movies to see based on a discrete choice demand model. We begin by describing the third stage and work backward to the first stage.

[3]https://filmmakermagazine.com/105516-the-truth-about-hollywood-on-ben-fritzs-the-big-picture-the-fight-for-the-future-of-movies/, accessed 23 May 2019.

[4]The coefficient estimate (standard error) is 0.0001 (0.001).

3.1 Demand for Movies

In the last stage, studios have already chosen their product offerings and release dates for the year. Consumers then decide which (if any) movie they want to see on a given week. The market over which consumers make their choice is defined by the year ($y = \{1995, 1996, \ldots, 2014\}$) and week ($w = \{1, 2 \ldots, 56\}$)[5] . Each week, yw, consumers choose between J_{yw} different movies indexed by $j = 0, 1, \ldots, J_{yw}$. Choice $j = 0$ is the outside option, which represents alternatives such as Netflix, HBO, and other entertainment options. Films are grouped into three types based on their budget $c = \{L, M, H\}$. We denote the set of films released each week as $\mathbb{J}_{yw}$ and the set of films of type c as $\mathbb{J}_{cyw}$.

Each week, consumers choose the available movie that gives them the highest level of utility. The utility each consumer i gets from going to movie j in week w, is given by:

$$U_{ijw} = \theta_j + \lambda_1(w - r_j) + \lambda_2(w - r_j)^2 + \delta_{jw} + \zeta_{icw} + (1 - \sigma)\epsilon_{ijw} \tag{1}$$

where θ_j is the expected quality of film j, r_j is the release week of film j, and $(w - r_j)$ is the number of weeks since the film was released. The unobservable utility from movie j in week w is δ_{jw}, which represents an unobserved deviation from the common decay pattern. The individual error term is $\zeta_{ic} + (1 - \sigma)\epsilon_{ijw}$, where ζ_{icw} represents the individual propensity for i to go to a movie of type c in week w, and ϵ_{ijw} is the idiosyncratic unobservable that is distributed iid type 1 extreme value. The distribution of ζ_{icw} is such that $\zeta_{icw} + (1-\sigma)\epsilon_{ijw}$ has an extreme value distribution. The parameter $\sigma \in [0, 1]$, which is estimated, measures how correlated consumer preferences are for films of the same type. As σ approaches 1, there is no substitution across groups. As σ approaches 0, the model simplifies to the simple logit model, where consumers are just as likely to switch to films in the same group as they are to switch to films in different groups.

The utility of the outside option is given by:

$$U_{i0w} = -\xi_w + \zeta_{icw} + (1 - \sigma)\epsilon_{ijw} \tag{2}$$

where ξ_w is a week fixed effect that allows the utility from the outside good to vary from week to

[5]Holiday weeks are coded consistently across years as in Einav (2007) so that holidays falls in the same coded week each year. The set of holidays is: President's Day, Memorial Day, 4th of July, Labor Day, Thanksgiving, and Christmas.

week within a given year to capture seasonality (Einav, 2007).[6]

The mean level of utility for each film j in week w be defined as:

$$U_{jw} = \theta_j + \lambda_1(w - r_j) + \lambda_2(w - r_j)^2 + \delta_{jw} \tag{3}$$

such that the predicted market shares for each film j (of type $c(j)$) in week yw are then given by (Berry, 1994):

$$ms_{jyw} = \frac{exp\{U_{jw}/(1-\sigma)}{\sum_{j' \in \mathbb{J}_{c(j)yw}} exp\left\{U_{j'w}/(1-\sigma)\right\}} \times \frac{\left[\sum_{j' \in \mathbb{J}_{c(j)yw}} exp\left\{U_{j'w}/(1-\sigma)\right\}\right]^{1-\sigma}}{\left[1 + \sum_{c'} \sum_{j' \in \mathbb{J}_{c'yw}} exp\left\{U_{j'w}/(1-\sigma)\right\}\right]^{1-\sigma}} \tag{4}$$

where the first term is the market share for a firm within it's type, and the second term is type c movies' total share of the entire market in week yw.

We estimate the parameters λ_1, λ_2, σ, and the weekly fixed effects, ξ_w, by matching the model predicted market shares with market shares in the data. This generates the following estimation equation:

$$\ln(ms_{jyw}) - \ln(ms_{0yw}) = \theta_j + \lambda_1(w - r_j) + \lambda_2(w - r_j)^2 + \xi_w + \sigma \ln\left(ms_{j/c,yw}\right) + \delta_{jw} \tag{5}$$

where $ms_{j/c,yw}$ is the first term in equation (4) that represents movie j's market share among movies of the same type in week yw. This within group market share is almost certainly correlated with δ_{jw} and so we instrument for it using the characteristics of films that are within the same group and are available to consumers that week: average production budget, average exit poll score, and total number of films.

The estimation results are presented in Table 1. The estimate of σ is close to 0, which indicates that consumers are almost as likely to substitute across budget groups and they are to substitute between movies within a budget group. The coefficient estimates on weeks out and weeks out squared reveal a quadratic decay rate, i.e. revenue decays are larger in early weeks.

[6]The negative sign is for notational convenience.

Table 3: Nested Logit Demand Model Results

Variable	Coefficient	Standard Error
σ	0.06662*	0.01616
λ_1	-0.72716*	0.01293
λ_2	0.01877*	0.00073
Obs	19,433	
F	1685.49	

Notes: Regression also includes week and film fixed-effects. Data on revenues and release date for 2,426 movies between 1995 and 2014 come from www.boxofficemojo.com. * denotes statistical significance at the 5% level.

3.2 Release Week Choice

We break firms (studios) into two types: major firms and minor firms. The set of six major studios is given by $\mathbb{S}$ and consists of Disney, Fox, Paramount, Sony, Universal, and Warner Brothers. Each studio $s \in \mathbb{S}$ has a set of movies in year y, $\mathbb{J}_{sy}$, that has already chosen (and discussed in the next section). In this stage, each studio chooses which week w to release their film on, given the release date choices made by the other studios. There is also a set of films released by the non-major studios, $\mathbb{J}_{sy}$, which do not have strategically chosen release dates, and whose release dates are known to the six major studios when they make their decisions.

The set of possible release weeks in year y is denoted as $\mathbb{W}_y$. Once a studio chooses a release week for film j, that film will be available to consumers for that week, and for five subsequent weeks (for a total of six release weeks).[7] Thus, the set of films available to consumers in week wy, $\mathbb{J}_{yw}$, is the set of new releases plus the set of movies from the previous week that are on their fifth or less week of release. Denoting the set of films that are released in week yw as $\mathbb{R}_{yw}$, and defining $\mathbb{E}_{yw}$ as the set of expiring movies in week yw (i.e. $\mathbb{E}_{yw} = \{j \in \mathbb{J}_{yw} | w - r_j = 6\}$), then $\mathbb{J}_{yw} = \mathbb{J}_{y(w-1)} - \mathbb{E}_{y(w-1)} + \mathbb{R}_{yw}$

When setting the release date, studios do not know realized demand, but only expected demand based on the expected quality of their film, θ_j^E, and the expected quality of other films playing during that same six-week window, θ_{-j}^E. Expected quality is based on the following equation:

$$\theta_j^E = \beta_B \ln(B_j) + \psi_s + \omega_{c(j)} \tag{6}$$

[7]The share of revenues accruing in the first six weeks exceeds 90 percent on average.

where B_j is the budget of film j, ψ_s is a studio fixed effect and $\omega_{c(j)}$ is a fixed effect for low, medium, or high budget films. The actual quality of the film is realized once the film is released and is given by:

$$\theta_j = \theta_j^E + \upsilon_{j,r_j} \tag{7}$$

We estimate the parameters $\{\beta_B, \psi_s, \omega_c\}$ by first taking the θ_j for each film based on the residual from the regression in Table 3. We then regress these film-specific residuals on film budgets and indicators for film studio and budget type. The results are in Table 4. These results are then used to derive the expected quality of any film given it's budget and studio, according to equation (6). Expected quality is increasing in the size of the budget and budget category. In particular, the budget fixed effect for high budget movies is three times as large as the fixed effect for medium budget movies, suggesting that high budget movies perform disproportionately better than medium budget movies.

Table 4: Quality Regression Results

Variable	Coefficient	Standard Error
$\ln(B_j)$	0.41918*	0.05007
Disney	0.43397*	0.07901
Fox	0.09485	0.07629
Paramount	0.28810*	0.08370
Sony	0.15066	0.078370
Universal	0.12504	0.07261
Warner Brothers	-0.02489	0.07261
High Budget	0.81251*	0.12243
Medium Budget	0.27433*	0.07534
Constant	-11.63100*	0.81940
Obs	2,420	
R^2	0.2656	

Notes: Data on revenues, distributor, production budget, and release date for 2,426 movies between 1995 and 2014 come from www.boxofficemojo.com. * denotes statistical significance at the 5% level.

When studios are choosing the release date for a film with expected quality, θ_j^E, they take as given the release dates of other films across the year and the expected qualities of each of those

films, θ_{-j}. The expected market share for film j that is available to consumers on week yw is:

$$ms^E_{jyw} = \frac{exp\{U^E_{jw}/(1-\sigma)}{\sum_{j' \in \mathbb{J}_{c(j)yw}} exp\left\{U^E_{j'w}/(1-\sigma)\right\}} \times \frac{\left[\sum_{j' \in \mathbb{J}_{c(j)yw}} exp\left\{U^E_{j'w}/(1-\sigma)\right\}\right]^{1-\sigma}}{\left[1 + \sum_{c'} \sum_{j' \in \mathbb{J}_{c'yw}} exp\left\{U^E_{j'w}/(1-\sigma)\right\}\right]^{1-\sigma}} \tag{8}$$

where U^E_{jw} is the expected mean utility of film j in week w, which is given by:

$$U^E_{jw} = \theta^E_j + \widehat{\lambda_1}(w - r_j) + \widehat{\lambda_2}(w - r_j)^2 + \widehat{\xi_w} \tag{9}$$

where the expectation is being taken over both θ_j and δ_{jw}, where the later has expectation zero. Expected gross for week w is then defined as:

$$g^E_{jyw} = ms^E_{jyw} * Pop_{yw} * P_{yw} \tag{10}$$

where Pop_{yw} is the population of market yw and P_{yw} is the average price of a ticket. The total expected gross of a film j released in week r_j is then:

$$G^E_{jy}\left(r_j, \theta^E_j, \{\theta^E\}_{-j}, \{r\}_{-j}, \{c\}\right) = \sum_{w=r_j}^{r_j+5} g^E_{jyw}\left(\theta^E_j, \{\theta\}_{-j}, \{r\}_{-j}, \{c\}\right) \tag{11}$$

where $\{\theta^E\}_{-j}$ is the expected quality of all films other than j, $\{r\}_{-j}$ is the release dates of all films other than j, and $\{c\}$ is the budget type of all films (including j).

In this stage budgets are given, so each studio is trying to maximize their total expected gross over all their films in a given year. An equilibrium in the release date game for year y occurs when each studio has chosen release dates so that their total expected gross for the year is maximized, given the release date choices of their competitors. This takes into account both the negative effect that rival films will have on a studio's expected gross, and the impact that films from the same studio will have on the grosses of the studio's other films.

We find this equilibrium using the following algorithm. We begin with each film scheduled for release on its observed week of release. For each year, we then determine if any studio would benefit from moving the release dates of one of their movies, taking as given the release dates of all the studio's other films, the release dates of other films from rival studios, and their expected qualities.

Changing the release date of a film will affect its expected gross, because it changes the competition that film faces. It also changes the expected grosses of other films released by that studio if either the release window the deviating film enters or leaves overlaps with the release window of another one of the studio's films. If more than one studio would gain from changing release dates (or a studio would like to change the release date for more than one movie), we choose the studio and movie that would benefit most from changing release dates. We then iterate until no studio-movie would benefit from moving release dates. This procedure is repeated for each of the 20 years in the sample.

3.3 First Stage: Film Choice

In the first stage, each studio chooses the number and types of movies to release. Each studio takes their overall production budget as given, and decides how to allocate that budget across low, medium, or high budget movies.[8] The release of an additional movie of type c incurs a fixed cost of FC_{csy}, which is specific to the budget type, studio, and year. This represents the additional costs of marketing and distributing the movie after it has been made. The expected profit of film j released in week r_j is:

$$\pi^E_{jy} = G^E_{jy}\left(r_j, \theta^E_j, \{\theta^E\}_{-j}, \{r\}_{-j}, \{c\}\right) - FC_{c(j)w(j)y} \tag{12}$$

This fixed cost formulation assumes there are no economies or diseconomies of scope in terms of marketing and distribution costs.

Each year, studios have a portfolio of potential films of each of the three types. For studio s, let $\mathbb{P}_{syc}$ be the set of films of type c that s can potentially produce and release in year y. Each potential film j (of type c) comes with a production budget B_j that is drawn from a normal distribution with mean μ^c_B and standard deviation σ^c_B. As mentioned above, studios have a fixed total production budget each year, which they can spend on producing films, denoted TB_{sy}. The combined budget of all films that the studio releases must be less than or equal to this total production budget:

$$\sum_{j \in \mathbb{J}_{sy}} B_j \leq TB_{sy} \tag{13}$$

[8] This overall budget each year is set at the level observed in the data.

Thus, each year the studio's maximization problem is:

$$\max_{\mathbb{J}_{sy}} \Pi_{sy} = \sum_{j \in \mathbb{J}_{sy}} \pi^{E}_{jy}(r^{*}_{j}, \cdot) \tag{14}$$

$$s.t. \sum_{j \in \mathbb{J}_{sy}} B_j \leq TB_{sy} \tag{15}$$

where r^{*}_{j} be the optimally chosen release week from stage 2.

The parameters of the normal distribution for budgets, displayed in Table 5 below, are derived from the underlying data on production budgets, and are simply the observed mean and standard deviation of production budgets for each budget type. The average production budget of high budget movies is $111.5 million, more than double the average budget of medium budget movies, and more than seven times the average budget of low budget movies.

Table 5: Budget Distribution Parameters

Budget Type	Mean ($ Mil)	Standard Deviation ($ Mil)
Low	15.210	6.115
Medium	44.774	14.540
High	111.523	32.703

Notes: Data on production budgets for 2,426 movies between 1995 and 2014 come from www.boxofficemojo.com and the-numbers.com.

4 Fixed Cost Estimation Results

Fixed costs are estimated by assuming that the movies studios choose to produce have positive expected profits, and that potential movies that studios choose not to produce have negative expected profits. These two conditions provide an upper and lower bound on the permissible fixed costs of marketing and distribution. Let $\mathbb{J}_y$ be the set of all films released in year y. The upper bound is given by the following condition:

$$\Pi_{sy}\left(\mathbb{J}_y\right) \geq \Pi_{sy}\left(\mathbb{J}_y \setminus j\right) + FC_{c(j)sy} \quad \forall j \in \mathbb{J}_{sy} \tag{16}$$

which identifies the maximum value of FC such that the studio's profits from releasing film j are greater than the profits from not releasing j and recouping its fixed cost. The lower bound on fixed costs is then given by:

$$\Pi_{sy}\left(\mathbb{J}_y \cup p\right) - FC_{c(p)sy} \leq \Pi_{sy}\left(\mathbb{J}_y\right) \quad \forall p \in \left(\mathbb{P}_{sy} \setminus \mathbb{J}_{sy}\right) \tag{17}$$

which identifies the minimum value of FC such that the profits from producing an additional movie p after incurring the fixed costs to market and distribute it are lower than profits from not producing it. Note that the change in profit in the above conditions includes the indirect effect that subtracting (or adding) a movie has on the other films that the studio releases that year through (1) the effect on those films' budgets, and (2) the competition they face in the market.

To evaluate condition (17) we first need to draw a potential movie of type c. This involves drawing a budget from the normal distribution with mean $\widehat{\mu_B^c}$ and standard deviation $\widehat{\sigma_B^c}$. Because this potential movie, p, must be worse than the lowest performing film that studio s did release that year, we draw from a truncated normal distribution. The budget draw, B_p, is then used to get the expected quality of the film according to (6).

Since the total budget for studio s is fixed for year y, adding a movie of budget B_p requires a reduction in the budgets of the other films in $\mathbb{J}_{sy}$. We reduce budget proportionally from each film in studio s's set. In other words, the remaining budget for film $j \in \mathbb{J}_{sy}$ after adding p is $B_j - \frac{B_j}{TBsy} * B_p$. After calculating the new budgets, we then adjust the expected quality of each film in $\mathbb{J}_{sy}$ using equation (6), determine the optimal release date for film p, holding fixed all other films release dates, and finally evaluate condition (17) by finding the fixed cost such that:

$$FC_{csy} = \Pi_{sy}\left(\mathbb{J}_y \cup p\right) - \Pi_{sy}\left(\mathbb{J}_y\right) \tag{18}$$

We complete the above steps for 100 draws of B_p and take the average over all these draws. This is performed for each studio, year, and budget type.

Fixed cost estimates are presented in Tables 6–8. Estimates are increasing in budget type, and are also increasing over time. In 1995, average fixed costs are \$9.9, \$19.5, and \$58.6 million for low, medium, and high budget movies. In 2014, average fixed costs are \$12.5, \$27.5, and \$71.8 million for low, medium, and high budget movies. The increase in fixed costs over time is consistent with

reports of rising marketing costs that are driven by the need to advertise on new social media platforms in addition to regular TV and print media.[9] Estimates are generally larger for Disney compared to the other major studios for all budget types. Estimates for the other major studios are roughly even. The larger fixed costs for Disney are driven, in part, by the higher average quality of its releases, which include the Pixar movies (e.g. *Toy Story*) and recent Marvel movies (e.g. *The Avengers*). If a studio releases a movie with very broad appeal, it will typically spend more on advertising to ensure all potential consumers are aware of the movie.

5 Counterfactual Simulations

In this section, we conduct three counterfactual simulations to analyze the effect that external and internal competition have on studios' production choices. The first counterfactual assesses the impact of an increase in competition from the outside option (e.g. Netflix, HBO, social media). The second counterfactual considers the effect of a merger between two major studios, Disney and Twentieth Century Fox. The third counterfactual examines the effect of one studio, Paramount, exiting the market. In each counterfactual simulation, we are interested in the effect that the change in competition has on the number and composition of products that each firm chooses to produce.

5.1 Counterfactual 1: Increase in Outside Option

In the first counterfactual exercise, we examine the effect that increased competition from the outside option has on the number and types of films that studios release each year. To simulate an increase in the utility of the outside option, we raise the base value of the outside option, the ξ_w in (2), by 10 percent, and then allow each studio to drop or add movies using estimates from the previous section.

Studios will drop a movie j if the change in profit from including j is lower than the fixed cost of marketing and distributing it:

$$\Pi_{sy}\left(\mathbb{J}_y\right) - \Pi_{sy}\left(\mathbb{J}_y \setminus j\right) < FC_{c(j)sy} \tag{19}$$

[9]Source: https://www.hollywoodreporter.com/news/200-million-rising-hollywood-struggles-721818, accessed 24 May 2019.

The change in profit includes the direct effect of losing the revenue film j generates and two indirect effects. The first indirect effect is that the unused production budget from film j can be applied to other films produced by the same studio. We apply the additional budget to other films in proportion to their share of the total studio budget for that year. This raises those films' expected qualities according to (6) and the estimates in Table 3, e.g. because the additional budget allows for more special effects or higher profile actors. The second indirect effect from removing film j is that it lowers competition. This helps the studio's own films as well as other studios' films since they face competition from one less movie. Studios only consider the change in profit to their own studio and do not internalize the effect on competitors. At each iteration, if more than one studio finds it profitable to drop a movie, then we drop the least profitable movie. We continue iterating until no studio wants to drop any of their movies for the year. For fixed costs, we use the estimated lower bounds from Section 3. Weekly grosses are then estimated using the nested logit model of Section 3.1 and the estimates in Table 3.

Studios can also add movies. Each year, studios have three potential additional projects of each budget type, i.e. nine projects in total. Each project has a budget associated with it, drawn from the truncated normal distribution described in Section 4. Also, movies that have been dropped in previous iterations are added to the top of the add list. Studios then add a movie, p, from the top of their list if the additional profits from producing p outweigh the fixed cost of marketing and distributing it:

$$\Pi_{sy}\left(\mathbb{J}_y \cup p\right) - FC_{c(p)sy} \geq \Pi_{sy}\left(\mathbb{J}_y\right) \tag{20}$$

As above, the change in profit includes the direct effect of gaining the revenue movie p generates as well as indirect effects of diminished budgets and increased competition for the studio's other films. Again, if more than one studio finds it profitable to add a movie, we add the most profitable movie, and then iterate until no studio finds it profitable to release an additional movie. We continue iterating until we obtain a new equilibrium in which no studio wants to drop or add movies (or they have run out of movies to add). The new equilibrium simulates how an increase in competition from the outside option affects the number and composition of movies released by studios.

Counterfactual simulations, presented in Table 9, reveal that an increase in competition from the outside option induces studios to produce fewer movies, especially medium budget movies. Between 1995 and 2014, studios collectively drop between between 3 and 11 movies each year, with

an average of more than 7 movies per year. Closer inspection reveals that, over the 20 years, studios collectively drop 193 medium budget movies and 11 high budget movies. Since studios also add 63 low budget movies, the net effect is a reduction of only 141 movies across all types. Table 10 shows that the share of aggregate production expenditures allocated to low budget movies rises by 1.64 percent while the share allocated to high budget movies increases by 3.65 percent. The share allocated to medium budget movies decreases by 5.29 percent. The share of revenues going to low and high budget movies increases by 2.18 and 2.75 percent, while the share of revenues going to medium budget movies falls by 4.92 percent.

5.2 What is driving our counterfactual findings?

What is driving our findings that an increase in competition from outside the market leads to a large reduction in the number of medium budget movies that is partly offset by a small change in the number of low budget movies?

To understand what is driving this result, consider the effects of producing an additional counterfactual movie. Since we do not observe this movie in our data, i.e. the studio chose not to produce it, it is ex-ante lower-quality than the movies that the studio did produce. There are now three main effects to consider. First, the new movie will generate its own sales. We show the "own revenue effect" for counterfactual Disney movies from 1995 in each budget category for different budget sizes with the upward sloping blue line in Figure 1. Within each budget category, as the budget of this counterfactual movie is increased, the film generates more sales in expectation. For example, the cheapest medium budget movie ($25 million) generates $40 million in expectation while the most expensive medium budget movie ($ 75 million) generates a little less than $70 million in expectation (Panel (b)).

Second, the new movie will compete with the studio's existing films and reduces their sales. This "competition effect" is represented by the orange line in Figure 1. It is very flat for each budget category because we do not observe much competition in our model. Recall from above that the estimate of σ is very small.

Third, the new movie draws budget from the studio's existing films, and these films will generate less sales because of their lower budgets. This "lower budget effect" is represented by the downward sloping yellow line in Figure 1. While the cheapest high budget movie ($75 million) leads Disney's

other movies to generate roughly $50 million less in revenues, the most expensive high budget movie ($250 million) causes the studio's other movies to generate more than $150 million less in revenues (Panel (c)).

The net revenue from producing an additional movie is the sum of these three effects, which we represent for counterfactual movies of different budget sizes and groups in Panel (d) of Figure 1. For example, the net revenue from releasing the cheapest high budget movie is above $71 million, which is the "own revenue effect" of $120 million minus the "lower budget" effect of $49 million (as well as a negligible competition effect). The resulting net revenue stream of $71 million coincides with our fixed cost estimate. Since the counterfactual movie was not produced, the fixed costs of releasing this movie must have exceeded the additional revenues it would have generated. For high budget movies, the net revenue effect of adding an additional high budget movie declines sharply as the movie's budget increases (since the "lower budget effect" outweighs the "own revenue" effect). For low budget movies, the net effect is increasing in budget size (since the "own revenue" effect outweighs the "lower budget effect"). For medium budget movies, the relationship is very flat, suggesting the "own revenue" and "lower budget" effects roughly cancel as budget size is increased.

In addition to the effects of adding a lower-quality movie on a studio's revenues, there are also decreasing returns to adding movies. Due to competition between movies, particularly for lucrative release dates, there are decreasing returns to releasing movies, even for movies that are equivalent in quality. The impact on revenue from releasing additional movies of the same quality as the last movie produced is shown for each budget category in Panel (e) of Figure 1. Decreasing returns are very sharp for high budget movies compared to medium and low budget movies, implying that high budget movies are particularly affected by competition, especially competition for scarce release dates.

Combining all the above effects explains the relationship between the last movie produced by a studio and the fixed costs of releasing an additional movie. For high-budget movies, due to the significant decreasing returns from adding another movie (Panel (e) of Figure1), the counterfactual movie would generate significantly less revenue for the studio than the last high-budget movie produced, indicating that a wedge exists between the revenues of the last movie and its fixed costs. Similarly, due to a large "own revenue effect" for low-budget movies (Panel (a) of Figure 1), the counter-factual low-budget movie would generate significantly less revenue than the last low-budget

movie produced, which again indicates that a wedge exists between the revenues of the last low-budget movie and its fixed cost. Medium-budget movies, however, do not possess a wedge between the revenues a counterfactual medium-budget movie would generate and its fixed costs. Notice that the relationship between revenues and budget size, as well as the relationship between revenues and the number of additional movies, are both flat (Panels (b) and (e)).

The absence of a wedge between the revenues from the last medium budget movie and its fixed costs, and the presence of these wedges for high- and low-budget movies, completes the explanation for our counterfactual findings. As the utility of the outside good increases, and the market for theatrical movies contracts, revenues from releasing movies falls. Since the revenue from releasing the last medium budget movie is not far above its fixed costs, it is the first movie to be dropped. Furthermore, since the relationship between budget size and additional revenues is very flat for medium budget movies (Panel (b) of Figure 1), other (higher budget) medium-budget movies that the studio would release are also dropped. The revenues saved from not producing these medium budget movies are then used to produce more low-budget movies and/or bigger budget high-budget movies. Together, the result of decreasing market size results in fewer medium budget movies, partly compensated by more low-budget movies.

5.3 Counterfactual 2: Merger

In the second counterfactual simulation, we examine how a recent merger between two studios, Disney and Twentieth Century Fox, affects the number and composition of product offerings. Disney's acquisition of Fox was completed on March 19, 2019. In our simulation, we assume that Disney acquires Fox at the start of 1995 such that any movie previously released by Fox is now released by Disney. Though we assume Fox movies retain the Fox fixed effect from Table 4, we use Disney's distribution and marketing fixed cost when performing the counterfactual. Results, presented in Panel A of Table 11, indicate that Disney's acquisition of Fox results in 29 fewer movies between 1995 and 2014 from the combined entity. This is due to two effects. First, Disney now internalizes the effect of releasing a Fox movie has on the profits of its own (non-Fox) movies. Second, Disney's fixed cost of marketing and distribution is larger than Fox's, such that it requires greater revenue potential to release a movie than Fox does alone. In response, rival studios (Paramount, Sony, Universal, and Warner Bros.) increase their combined output by 36 movies over the same period.

Therefore, Disney's acquisition of Fox yields 7 additional films across all studios. The effect of the merger on the composition of movies, presented in Panel B of Table 11, reveals that Disney's simulated acquisition of Fox leads to a large reduction in medium budget releases (95 movies), which is counterbalanced by increases in the number of low and high budget movies (59 and 43 movies).

5.4 Counterfactual 3: Drop Studio

In the third counterfactual simulation, we drop one studio and again examine the effect this reduction in competition has on the number and composition of product offerings. Specifically, we remove the smallest studio, Paramount, and all of its movies, and allow studios to add/drop movies and adjust release dates. The results, presented in Table 12, indicate that the remaining studios produce 86 additional movies between 1995 and 2014 when Paramount is dropped. Studios again shift production from medium budget movies to low and high budget movies. Combined, they produce 54 fewer medium budget movies but produce 91 and 49 additional low and high budget movies. The impact on industry revenue is presented in Table 13. The removal of Paramount increases the revenues of remaining studios of 5.53 percent (Panel A). Total industry revenues, however, fall by 6.41 percent.

6 Conclusion

Using the example of the U.S. motion picture industry, this paper examines how outside competition and inside competition affect the number and composition of products firms choose to supply. We first estimate the parameters of a structural model in which studios endogenously allocate a fixed budget to low, medium, and high budget movie projects each year. Counterfactual simulations then examine the impact of increasing the value of the outside option, e.g. due to the introduction of Netflix or better quality TV. We find that studios reduce the number of movies they produce, particularly the number of medium budget movies. We also find that a simulated merger between two studios, Disney and Twentieth Century Fox, which reduces competition inside the market, also decreases the number of movie releases, especially medium budget movies.

References

[1] Berry, S. (1994). "Estimating Discrete-Choice Models of Product Differentiation." *RAND Journal of Economics*, 25, pp. 242–262.

[2] Berry, S., and J. Waldfogel (2001). Do Mergers Increase Product Variety? Evidence from Radio Broadcasting, *Quarterly Journal of Economics*, 116, pp. 1009–1025.

[3] Cardell, N. S. (1997). "Variance Components Structures for the Extreme-Value and Logistic Distributions with Application to Models of Heterogeneity." *Econometric Theory*, 13, pp. 185–213.

[4] Crawford, G. S., O. Shcherbakov, and M. Shum (2018). "Quality overprovision in cable television markets," Unpublished manuscript.

[5] Draganska, M., M. Mazzeo, and K. Seim (2009). "Beyond plain vanilla: Modeling joint product assortment and pricing decisions." *Quantitative Marketing and Economics*, 7, pp. 105–146.

[6] Einav, L. (2007). "Seasonality in the U.S. Motion Picture Industry." *RAND Journal of Economics*, 38, pp. 127–145.

[7] Einav, L. (2010). "Not All Rivals Look Alike: Estimating an Equilibrium Model of the Release Date Timing Game." *Economic Inquiry*, 48, pp. 369–390.

[8] Eizenberg, A. (2014). "Upstream Innovation and Product Variety in the U.S. Home PC Market." *Review of Economic Studies*, 81, pp. 1003–1045.

[9] Fan, Y. (2013). "Ownership consolidation and product characteristics: A study of the U.S. daily newspaper market." *American Economic Review*, 105, pp. 1598–1628.

[10] Fan, Y., and C. Yang (2018). "Competition, Product Proliferation and Welfare: A Study of the U.S. Smartphone Market." Unpublished manuscript.

[11] Fritz, B. (2019). *The Big Picture: The Fight for the Future of Movies.*

[12] Leung, T. C., and S. Qi (2019). "The World is Not Enough: Globalizations Impact on the Movie Industry." Unpublished manuscript.

[13] Nosko, C. (2014). "Competition and Quality Choice in the CPU Market." Unpublished manuscript. University of Chicago.

[14] Sweeting, A. (2010). "The Effects of Merger on Product Positioning: Evidence from the Music Radio Industry," *Rand Journal of Economics*, 41, pp. 372–397.

[15] Sweeting, A. (2013). "Dynamic product positioning in differentiated product markets: the effects of fees for musical performance rights on the commercial radio industry." *Econometrica*, 81, pp. 1763–1803.

Table 6: Fixed Cost Estimates for Low Budget Movies ($ Mil)

Year	Disney		Fox		Paramount		Sony		Universal		Warner Brothers	
1995	11.223		10.557		11.853		5.553		10.546		9.686	
	7.561	13.161	8.203	11.456	8.653	13.059	2.119	7.235	8.299	11.644	7.253	10.634
1996	15.073		10.394		12.332		5.929		10.330		8.623	
	11.332	16.600	6.872	11.818	10.259	13.288	2.917	7.365	7.213	11.523	6.056	9.660
1997	8.487		8.506		13.759		9.193		10.822		9.594	
	4.452	10.197	5.757	9.867	11.684	14.905	6.249	10.429	8.484	12.033	7.868	10.397
1998	13.022		10.466		12.435		7.785		6.287		9.610	
	8.948	14.684	7.929	11.951	8.775	14.158	4.361	9.178	3.592	7.913	7.528	10.638
1999	10.553		8.281		9.993		6.892		9.665		7.515	
	6.049	12.747	6.342	9.384	5.445	11.606	3.945	8.450	5.915	10.949	4.187	8.973
2000	17.248		8.063		14.414		11.562		10.574		7.685	
	13.785	18.924	4.722	9.647	9.710	15.933	8.538	12.909	6.399	12.206	4.840	9.008
2001	15.449		11.649		11.382		12.623		11.855		10.472	
	12.742	16.759	8.537	12.833	6.709	13.356	10.522	13.623	8.404	13.278	7.614	11.667
2002	11.097		10.233		7.660		12.347		7.625		9.276	
	5.682	13.762	5.928	11.732	3.675	9.830	8.475	13.944	3.687	9.282	6.383	10.426
2003	15.325		12.007		2.939		12.167		13.268		11.472	
	11.943	16.929	8.961	13.383	1.216	4.137	7.094	13.905	10.765	14.630	9.429	12.649
2004	15.450		11.700		15.882		11.920		14.517		11.328	
	11.868	17.289	8.701	12.840	13.042	17.147	7.046	14.001	11.860	15.746	8.123	12.760
2005	13.902		11.622		16.210		14.118		11.095		12.264	
	8.907	16.156	8.679	13.081	12.161	17.891	10.352	15.737	6.822	12.818	10.142	13.375
2006	16.644		7.616		14.390		8.950		12.513		11.447	
	12.330	18.658	3.844	9.602	11.197	16.061	4.245	10.981	9.493	14.034	8.947	12.597
2007	21.488		10.843		17.408		13.313		14.182		5.057	
	14.442	25.241	5.523	12.798	12.053	19.380	9.021	14.517	11.261	15.351	2.589	6.541
2008	17.398		10.354		18.028		12.472		10.173		9.271	
	11.477	19.762	5.781	12.159	13.205	20.148	9.035	13.984	5.753	12.127	4.914	11.245
2009	22.339		14.041		18.436		16.013		12.100		12.997	
	17.604	24.675	9.901	15.829	13.133	20.679	12.090	17.510	8.520	13.721	10.290	14.086
2010	21.793		11.453		8.758		13.054		12.057		12.427	
	17.795	24.141	7.777	13.456	5.111	11.139	8.729	14.877	8.080	13.843	10.051	13.774
2011	15.787		11.314		10.877		12.691		15.765		13.925	
	10.562	18.621	7.062	13.154	6.137	13.213	6.133	14.594	12.260	17.473	11.344	15.121
2012	20.275		12.396		5.301		16.792		13.836		3.687	
	15.238	22.724	8.988	14.127	2.524	7.022	11.740	18.766	9.628	15.358	1.390	5.080
2013	22.301		15.351		16.805		16.873		7.259		12.648	
	15.029	25.157	11.993	17.023	12.112	19.049	13.481	18.465	3.807	9.202	9.161	14.235
2014	21.618		9.842		10.439		14.093		8.698		10.493	
	16.266	23.460	4.932	11.874	4.359	13.283	10.124	16.230	4.588	10.633	6.432	12.198

Notes: These estimates are based on 100 simulation draws of the budget for the potential movie to add. The point estimate is based on the mean. The 90 percent confidence interval is underneath each estimate.

Table 7: Fixed Cost Estimates for Medium Budget Movies ($ Mil)

Year	Disney		Fox		Paramount		Sony		Universal		Warner Brothers	
1995	23.820		17.424		21.517		17.397		19.899		16.698	
	22.088	24.565	17.327	17.498	20.263	22.074	15.939	18.182	19.442	20.194	16.304	16.865
1996	23.308		17.904		20.175		18.509		17.349		15.271	
	22.078	23.892	17.247	18.154	18.931	20.654	18.187	18.718	16.484	17.755	14.967	15.439
1997	22.372		18.073		22.539		17.595		18.376		15.531	
	20.995	23.126	17.673	18.284	22.208	22.772	16.141	18.307	17.612	18.715	14.609	15.897
1998	24.734		18.698		23.896		18.019		17.721		16.016	
	23.615	25.129	18.020	19.047	23.269	24.208	16.656	18.573	16.725	18.250	15.534	16.238
1999	25.491		17.382		22.038		18.610		17.995		16.914	
	24.076	26.030	16.020	17.952	20.405	22.587	17.514	19.096	16.767	18.470	16.226	17.223
2000	26.366		19.331		24.885		19.492		19.596		18.125	
	24.077	27.211	17.780	19.876	24.570	25.151	17.686	20.223	18.542	20.014	17.649	18.354
2001	27.512		20.017		24.726		20.714		20.214		17.111	
	27.512	27.512	18.943	20.446	24.578	24.835	19.398	21.241	19.191	20.672	15.882	17.512
2002	29.380		19.469		23.805		22.240		21.992		16.726	
	28.073	30.021	18.669	20.018	21.464	24.725	21.187	22.684	21.599	22.179	15.180	17.332
2003	28.597		22.682		26.669		23.609		21.966		19.783	
	27.924	28.991	21.972	23.082	25.135	27.145	23.535	23.676	20.901	22.422	19.625	19.951
2004	29.358		20.709		26.289		25.207		23.009		19.497	
	28.469	29.769	19.829	21.158	25.199	26.762	24.555	25.690	22.215	23.326	18.887	19.798
2005	30.101		19.692		25.871		23.025		22.556		18.976	
	29.988	30.225	18.013	20.293	24.105	26.479	21.940	23.391	21.696	22.977	18.482	19.182
2006	30.608		20.320		26.716		22.933		22.526		19.231	
	30.549	30.664	18.874	20.900	26.401	26.983	22.889	22.984	21.621	22.947	18.966	19.414
2007	42.797		23.202		31.754		23.466		25.411		21.277	
	40.145	43.859	21.525	24.052	30.972	32.153	23.409	23.486	24.480	25.838	20.219	21.729
2008	37.399		23.116		30.066		25.475		24.326		21.057	
	36.470	37.863	21.791	23.626	29.497	30.458	25.257	25.653	23.197	24.764	20.964	21.136
2009	36.834		28.879		32.025		26.872		25.379		22.659	
	36.525	37.092	27.443	29.370	31.332	32.255	26.461	27.041	24.249	25.729	22.422	22.822
2010	38.620		23.802		31.966		25.559		25.650		22.229	
	38.302	38.890	21.843	24.686	30.869	32.456	23.764	26.318	25.188	25.958	21.981	22.403
2011	36.975		24.866		29.965		27.381		25.462		22.045	
	36.637	37.262	23.266	25.431	29.472	30.120	26.601	27.701	24.812	25.843	21.251	22.384
2012	37.317		24.265		25.865		27.670		25.824		23.745	
	36.931	37.679	22.018	25.053	23.544	27.421	27.577	27.757	25.755	25.881	23.188	24.163
2013	37.571		26.333		32.247		27.180		24.872		23.595	
	37.476	37.657	25.581	26.627	30.948	32.833	26.290	27.597	23.977	25.319	22.745	23.881
2014	36.853		24.747		31.114		27.917		21.736		22.459	
	36.098	37.277	23.125	25.411	28.836	31.895	27.612	28.180	20.093	22.968	21.614	22.805

Notes: These estimates are based on 100 simulation draws of the budget for the potential movie to add. The point estimate is based on the mean. The 90 percent confidence interval is underneath each estimate.

Table 8: Fixed Cost Estimates for High Budget Movies ($ Mil)

Year	Disney		Fox		Paramount		Sony		Universal		Warner Brothers	
1995	72.094		51.098		63.187		55.124		58.461		51.784	
	71.616	88.555	49.942	72.334	63.156	51.934	55.074	63.199	58.008	55.143	50.973	58.819
1996	71.029		53.381		59.840		55.660		53.214		46.488	
	70.868	72.742	53.185	71.172	59.794	53.536	55.406	59.872	53.081	55.775	46.449	53.287
1997	62.679		47.441		63.671		49.661		50.583		43.177	
	62.633	83.159	43.237	62.718	61.737	49.075	49.466	64.410	50.500	49.767	42.496	50.679
1998	66.564		50.997		61.382		48.749		48.565		43.039	
	66.487	82.932	50.495	66.631	61.349	51.228	48.477	61.420	48.441	48.874	42.887	48.614
1999	67.590		47.445		59.733		51.269		49.958		47.010	
	66.250	93.329	46.293	68.216	59.567	48.123	49.291	59.798	49.822	51.986	45.813	50.057
2000	74.882		55.445		71.067		56.848		56.243		50.668	
	74.672	82.986	55.034	75.032	70.272	55.824	56.548	71.451	56.205	57.012	50.438	56.280
2001	71.967		56.734		72.395		57.136		56.856		49.440	
	67.592	87.120	56.379	75.097	71.509	56.841	54.856	72.724	56.556	58.248	49.268	57.012
2002	81.834		56.243		69.284		63.025		61.690		50.399	
	81.791	107.296	55.949	81.880	69.101	56.361	61.953	69.370	61.334	63.454	50.256	61.947
2003	74.351		61.906		74.210		68.165		61.754		56.825	
	70.028	91.626	60.708	77.373	73.694	62.531	67.062	74.640	61.136	68.522	55.329	62.216
2004	80.101		58.901		72.616		69.095		63.842		54.217	
	79.855	97.302	58.222	80.222	72.331	59.222	68.142	72.879	63.118	69.804	53.209	64.290
2005	82.073		56.050		73.320		63.180		62.730		53.950	
	76.860	86.898	55.929	83.694	72.846	56.146	63.171	73.549	59.260	63.188	53.626	63.851
2006	89.061		58.125		76.555		68.880		64.270		56.248	
	83.902	110.424	53.848	90.527	76.239	59.867	67.896	76.687	63.897	69.302	54.304	64.504
2007	108.748		61.605		81.311		55.617		68.265		58.084	
	105.819	126.100	60.383	110.390	81.085	62.203	53.238	81.434	66.556	57.926	57.557	68.908
2008	97.794		65.569		81.444		71.079		67.372		59.587	
	96.596	107.304	64.939	98.199	79.097	65.774	70.341	82.452	66.915	71.429	58.149	67.624
2009	95.714		73.567		78.309		71.073		68.243		62.437	
	94.267	126.317	71.640	96.462	73.684	74.637	70.821	80.320	68.063	71.272	59.585	68.392
2010	103.182		62.393		80.951		65.929		65.160		59.648	
	100.554	120.957	62.340	104.440	80.094	62.452	65.858	81.510	60.897	65.984	59.141	66.797
2011	101.793		67.596		77.505		74.021		69.571		60.534	
	99.890	104.688	66.826	102.731	75.893	68.038	73.541	78.274	69.216	74.374	60.056	69.713
2012	101.539		66.905		48.694		75.723		70.175		64.093	
	99.995	116.071	66.802	102.211	42.069	66.969	74.703	62.828	69.654	76.379	62.162	70.463
2013	99.816		67.666		81.484		69.909		64.174		60.773	
	98.225	107.471	67.386	100.393	79.499	67.756	69.614	82.300	62.869	70.063	60.696	64.855
2014	93.893		64.264		80.528		75.239		57.110		59.743	
	92.625	105.621	61.923	94.463	80.184	65.271	73.676	80.707	55.920	75.991	56.896	58.252

Notes: These estimates are based on 100 simulation draws of the budget for the potential movie to add. The point estimate is based on the mean. The 90 percent confidence interval is underneath each estimate.

Table 9: Counterfactual 1: Total Number of Movies

	All				Low Budget				Medium Budget				High Budget			
Year	**Obs**	**CF**	**Δ**	**% Δ**	**Obs**	**CF**	**Δ**	**% Δ**	**Obs**	**CF**	**Δ**	**% Δ**	**Obs**	**CF**	**Δ**	**% Δ**
1995	91	88	-3	-3.30%	36	42	6	16.67%	49	40	-9	-18.37%	6	6	0	0.00%
1996	101	92	-9	-8.91%	33	35	2	6.06%	60	49	-11	-18.33%	8	8	0	0.00%
1997	103	97	-6	-5.83%	34	38	4	11.76%	53	43	-10	-18.87%	16	16	0	0.00%
1998	110	101	-9	-8.18%	38	42	4	10.53%	51	38	-13	-25.49%	21	21	0	0.00%
1999	135	126	-9	-6.67%	38	45	7	18.42%	65	54	-11	-16.92%	32	27	-5	-15.63%
2000	137	128	-9	-6.57%	42	46	4	9.52%	72	60	-12	-16.67%	23	22	-1	-4.35%
2001	130	119	-11	-8.46%	39	39	0	0.00%	71	60	-11	-15.49%	20	20	0	0.00%
2002	138	128	-10	-7.25%	53	55	2	3.77%	66	54	-12	-18.18%	19	19	0	0.00%
2003	118	112	-6	-5.08%	39	41	2	5.13%	62	54	-8	-12.90%	17	17	0	0.00%
2004	131	123	-8	-6.11%	44	46	2	4.55%	67	58	-9	-13.43%	20	19	-1	-5.00%
2005	137	127	-10	-7.30%	46	50	4	8.70%	72	58	-14	-19.44%	19	19	0	0.00%
2006	130	123	-7	-5.38%	50	54	4	8.00%	66	57	-9	-13.64%	14	12	-2	-14.29%
2007	98	94	-4	-4.08%	49	51	2	4.08%	32	25	-7	-21.88%	17	18	1	5.88%
2008	110	103	-7	-6.36%	42	43	1	2.38%	54	46	-8	-14.81%	14	14	0	0.00%
2009	101	96	-5	-4.95%	40	44	4	10.00%	41	34	-7	-17.07%	20	18	-2	-10.00%
2010	122	115	-7	-5.74%	48	50	2	4.17%	47	39	-8	-17.02%	27	26	-1	-3.70%
2011	128	119	-9	-7.03%	47	48	1	2.13%	60	50	-10	-16.67%	21	21	0	0.00%
2012	116	111	-5	-4.31%	51	54	3	5.88%	46	36	-10	-21.74%	19	21	2	10.53%
2013	116	113	-3	-2.59%	46	51	5	10.87%	44	38	-6	-13.64%	26	24	-2	-7.69%
2014	110	106	-4	-3.64%	46	50	4	8.70%	43	35	-8	-18.60%	21	21	0	0.00%
Total	2362	2221	-141	-5.97%	861	924	63	7.32%	1121	928	-193	-17.22%	380	369	-11	-2.89%
Average	118.1	111.05	-7.05	-5.97%	43.05	46.2	3.15	7.32%	56.05	46.4	-9.65	-17.22%	19	18.45	-0.55	-2.89%

Notes: Table shows the effect increasing the outside option has on the number and types of movies made by each studio.

Table 10: Counterfactual 1: Composition of Movies Across Tiers

Panel A: % of Total Movies Allocated to Each Tier

	Low Budget			Medium Budget			High Budget		
Year	**Observed**	**CF**	**Change**	**Observed**	**CF**	**Change**	**Observed**	**CF**	**Change**
1995	39.56%	47.73%	8.17%	53.85%	45.45%	-8.39%	6.59%	6.82%	0.22%
1996	32.67%	38.04%	5.37%	59.41%	53.26%	-6.15%	7.92%	8.70%	0.77%
1997	33.01%	39.18%	6.17%	51.46%	44.33%	-7.13%	15.53%	16.49%	0.96%
1998	34.55%	41.58%	7.04%	46.36%	37.62%	-8.74%	19.09%	20.79%	1.70%
1999	28.15%	35.71%	7.57%	48.15%	42.86%	-5.29%	23.70%	21.43%	-2.28%
2000	30.66%	35.94%	5.28%	52.55%	46.88%	-5.68%	16.79%	17.19%	0.40%
2001	30.00%	32.77%	2.77%	54.62%	50.42%	-4.20%	15.38%	16.81%	1.42%
2002	38.41%	42.97%	4.56%	47.83%	42.19%	-5.64%	13.77%	14.84%	1.08%
2003	33.05%	36.61%	3.56%	52.54%	48.21%	-4.33%	14.41%	15.18%	0.77%
2004	33.59%	37.40%	3.81%	51.15%	47.15%	-3.99%	15.27%	15.45%	0.18%
2005	33.58%	39.37%	5.79%	52.55%	45.67%	-6.89%	13.87%	14.96%	1.09%
2006	38.46%	43.90%	5.44%	50.77%	46.34%	-4.43%	10.77%	9.76%	-1.01%
2007	50.00%	54.26%	4.26%	32.65%	26.60%	-6.06%	17.35%	19.15%	1.80%
2008	38.18%	41.75%	3.57%	49.09%	44.66%	-4.43%	12.73%	13.59%	0.86%
2009	39.60%	45.83%	6.23%	40.59%	35.42%	-5.18%	19.80%	18.75%	-1.05%
2010	39.34%	43.48%	4.13%	38.52%	33.91%	-4.61%	22.13%	22.61%	0.48%
2011	36.72%	40.34%	3.62%	46.88%	42.02%	-4.86%	16.41%	17.65%	1.24%
2012	43.97%	48.65%	4.68%	39.66%	32.43%	-7.22%	16.38%	18.92%	2.54%
2013	39.66%	45.13%	5.48%	37.93%	33.63%	-4.30%	22.41%	21.24%	-1.17%
2014	41.82%	47.17%	5.35%	39.09%	33.02%	-6.07%	19.09%	19.81%	0.72%
Total	36.45%	41.60%	5.15%	47.46%	41.78%	-5.68%	16.09%	16.61%	0.53%

Panel B: % of Total Budget Allocated to Each Tier

	Low Budget			Medium Budget			High Budget		
Year	**Observed**	**CF**	**Change**	**Observed**	**CF**	**Change**	**Observed**	**CF**	**Change**
1995	16.05%	20.03%	3.98%	63.97%	55.79%	-8.18%	19.98%	24.18%	4.20%
1996	12.88%	15.54%	2.66%	68.10%	60.23%	-7.86%	19.02%	24.22%	5.20%
1997	11.74%	13.89%	2.15%	51.15%	44.75%	-6.40%	37.11%	41.36%	4.25%
1998	12.62%	14.56%	1.94%	47.91%	38.60%	-9.31%	39.47%	46.84%	7.37%
1999	8.00%	9.98%	1.98%	44.67%	41.32%	-3.35%	47.33%	48.71%	1.38%
2000	10.77%	12.35%	1.58%	54.01%	47.88%	-6.13%	35.23%	39.77%	4.54%
2001	11.32%	12.05%	0.73%	54.73%	49.59%	-5.14%	33.95%	38.36%	4.41%
2002	13.42%	15.24%	1.82%	53.18%	46.43%	-6.75%	33.40%	38.33%	4.93%
2003	11.52%	12.58%	1.07%	53.69%	48.80%	-4.88%	34.80%	38.62%	3.82%
2004	12.23%	13.16%	0.93%	48.67%	44.75%	-3.92%	39.10%	42.09%	2.99%
2005	11.88%	13.29%	1.41%	52.67%	45.57%	-7.09%	35.45%	41.14%	5.68%
2006	12.50%	15.34%	2.84%	55.28%	54.78%	-0.50%	32.23%	29.88%	-2.35%
2007	17.77%	18.94%	1.18%	34.67%	28.06%	-6.61%	47.57%	53.00%	5.43%
2008	13.43%	14.12%	0.70%	50.11%	45.56%	-4.56%	36.46%	40.32%	3.86%
2009	12.90%	16.72%	3.82%	35.12%	32.42%	-2.70%	51.98%	50.85%	-1.13%
2010	12.88%	13.96%	1.07%	34.20%	30.67%	-3.53%	52.92%	55.37%	2.46%
2011	13.09%	14.04%	0.95%	44.34%	38.81%	-5.52%	42.57%	47.15%	4.57%
2012	13.22%	13.91%	0.69%	38.96%	32.51%	-6.45%	47.82%	53.58%	5.76%
2013	11.54%	12.86%	1.32%	33.57%	29.62%	-3.95%	54.89%	57.52%	2.63%
2014	11.85%	13.14%	1.28%	38.35%	32.72%	-5.63%	49.80%	54.15%	4.35%
Total	12.39%	14.03%	1.64%	47.47%	42.18%	-5.29%	40.14%	43.79%	3.65%

Panel C: % of Total Revenue Coming from Each Tier

	Low Budget			Medium Budget			High Budget		
Year	**Observed**	**CF**	**Change**	**Observed**	**CF**	**Change**	**Observed**	**CF**	**Change**
1995	22.25%	27.53%	5.28%	57.93%	49.86%	-8.07%	19.82%	22.61%	2.79%
1996	16.35%	19.10%	2.75%	60.94%	54.81%	-6.12%	22.71%	26.09%	3.37%
1997	14.73%	17.31%	2.58%	46.94%	41.39%	-5.54%	38.33%	41.29%	2.96%
1998	14.76%	17.29%	2.53%	40.51%	32.75%	-7.76%	44.73%	49.96%	5.23%
1999	10.62%	13.55%	2.93%	38.60%	35.91%	-2.70%	50.78%	50.55%	-0.23%
2000	12.64%	14.88%	2.24%	48.35%	43.16%	-5.19%	39.02%	41.96%	2.95%
2001	15.05%	16.07%	1.01%	48.87%	44.44%	-4.43%	36.08%	39.50%	3.42%
2002	18.05%	20.39%	2.34%	47.50%	41.21%	-6.29%	34.45%	38.40%	3.95%
2003	14.91%	16.46%	1.54%	47.37%	42.86%	-4.52%	37.71%	40.68%	2.97%
2004	14.54%	16.20%	1.66%	45.36%	41.27%	-4.09%	40.10%	42.53%	2.43%
2005	14.32%	16.68%	2.37%	49.17%	42.74%	-6.43%	36.52%	40.58%	4.07%
2006	16.89%	20.24%	3.35%	52.51%	51.41%	-1.10%	30.60%	28.35%	-2.25%
2007	21.96%	24.07%	2.11%	31.94%	25.53%	-6.41%	46.09%	50.40%	4.31%
2008	16.64%	17.87%	1.22%	43.85%	39.39%	-4.46%	39.51%	42.74%	3.23%
2009	15.56%	19.02%	3.46%	34.27%	30.55%	-3.72%	50.17%	50.43%	0.26%
2010	15.18%	16.77%	1.60%	30.29%	26.62%	-3.67%	54.53%	56.61%	2.08%
2011	16.07%	17.33%	1.26%	40.46%	35.78%	-4.67%	43.47%	46.89%	3.41%
2012	17.41%	18.32%	0.91%	37.21%	30.08%	-7.13%	45.38%	51.60%	6.22%
2013	13.67%	15.86%	2.19%	31.04%	27.67%	-3.37%	55.29%	56.47%	1.17%
2014	15.66%	17.73%	2.07%	34.75%	29.38%	-5.38%	49.59%	52.89%	3.30%
Total	15.61%	17.79%	2.18%	42.39%	37.46%	-4.92%	42.00%	44.74%	2.75%

Notes: Table shows the effect increasing the outside option has on the composition of movies in terms of total movies (Panel A), budget (Panel B), and revenue (Panel C)

Table 11: Counterfactual 2: Total Number of Movies

Panel A: Total Number of Movies

		All		All (Disney and Fox)			All (Other Studios)		
Year	**Observed**	**CF**	**Change**	**Observed**	**CF**	**Change**	**Observed**	**CF**	**Change**
1995	91	91	+	26	24	-2	65	67	+2
1996	101	98	-3	25	20	-5	76	78	+2
1997	103	101	-2	25	22	-3	78	79	+1
1998	110	107	-3	30	27	-3	80	80	+
1999	135	130	-5	31	26	-5	104	104	+
2000	137	136	-1	27	24	-3	110	112	+2
2001	130	129	-1	28	27	-1	102	102	+
2002	138	133	-5	28	24	-4	110	109	-1
2003	118	122	+4	23	23	+	95	99	+4
2004	131	127	-4	29	25	-4	102	102	+
2005	137	137	+	28	29	+1	109	108	-1
2006	130	132	+2	33	34	+1	97	98	+1
2007	98	103	+5	14	15	+1	84	88	+4
2008	110	113	+3	27	28	+1	83	85	+2
2009	101	104	+3	24	25	+1	77	79	+2
2010	122	123	+1	26	26	+	96	97	+1
2011	128	129	+1	26	25	-1	102	104	+2
2012	116	119	+3	21	20	-1	95	99	+4
2013	116	118	+2	23	22	-1	93	96	+3
2014	110	117	+7	27	26	-1	83	91	+8
Total	2362	2369	+7	521	492	-29	1841	1877	+36
Average	118.1	118.45	+0.35	26.05	24.6	-1.55	92.05	93.85	+1.80

Panel B: Total Number of Movies by Type

	Low Budget			Medium Budget			High Budget		
Year	**Observed**	**CF**	**Change**	**Observed**	**CF**	**Change**	**Observed**	**CF**	**Change**
1995	36	40	4	49	44	-5	6	7	1
1996	33	36	3	60	52	-8	8	10	2
1997	34	38	4	53	46	-7	16	17	1
1998	38	40	2	51	42	-9	21	25	4
1999	38	42	4	65	56	-9	32	32	0
2000	42	46	4	72	64	-8	23	26	3
2001	39	38	-1	71	68	-3	20	23	3
2002	53	55	2	66	56	-10	19	22	3
2003	39	41	2	62	61	-1	17	20	3
2004	44	46	2	67	59	-8	20	22	2
2005	46	51	5	72	62	-10	19	24	5
2006	50	55	5	66	61	-5	14	16	2
2007	49	53	4	32	32	0	17	18	1
2008	42	44	2	54	52	-2	14	17	3
2009	40	43	3	41	41	0	20	20	0
2010	48	50	2	47	45	-2	27	28	1
2011	47	48	1	60	58	-2	21	23	2
2012	51	53	2	46	45	-1	19	21	2
2013	46	50	4	44	39	-5	26	29	3
2014	46	51	5	43	43	0	21	23	2
Total	861	920	59	1121	1026	-95	380	423	43

Notes: Table shows the effect of a merger between Disney and Fox has on the number and types of movies released by studios.

Table 12: Counterfactual 3: Total Number of Movies by Type

	Low Budget			Medium Budget			High Budget			All		
Year	**Observed**	**CF**	**Change**	**Observed**	**CF**	**Change**	**Observed**	**CF**	**Change**	**Observed**	**CF**	**Change**
1995	36	41	5	49	47	-2	6	8	2	91	96	5
1996	33	38	5	60	58	-2	8	9	1	101	105	4
1997	34	37	3	53	51	-2	16	20	4	103	108	5
1998	38	45	7	51	45	-6	21	24	3	110	114	4
1999	38	43	5	65	63	-2	32	34	2	135	140	5
2000	42	47	5	72	66	-6	23	26	3	137	139	2
2001	39	43	4	71	70	-1	20	23	3	130	136	6
2002	53	58	5	66	63	-3	19	20	1	138	141	3
2003	39	45	6	62	60	-2	17	20	3	118	125	7
2004	44	46	2	67	64	-3	20	23	3	131	133	2
2005	46	51	5	72	69	-3	19	21	2	137	141	4
2006	50	58	8	66	62	-4	14	15	1	130	135	5
2007	49	55	6	32	33	1	17	18	1	98	106	8
2008	42	44	2	54	52	-2	14	17	3	110	113	3
2009	40	44	4	41	37	-4	20	22	2	101	103	2
2010	48	51	3	47	48	1	27	29	2	122	128	6
2011	47	50	3	60	53	-7	21	26	5	128	129	1
2012	51	56	5	46	46	0	19	20	1	116	122	6
2013	46	49	3	44	40	-4	26	30	4	116	119	3
2014	46	51	5	43	40	-3	21	24	3	110	115	5
Total	861	952	91	1121	1067	-54	380	429	49	2362	2448	86
Average	43.05	47.6	4.55	56.05	53.35	-2.7	19	21.45	2.45	118.1	122.4	4.3

Notes: Table shows the effect that dropping Paramount has on the number and types of movies released by studios.

Table 13: Counterfactual 3: Total Industry Revenue ($ Billions)

Panel A: Total Movie Gross (Excluding Paramount)

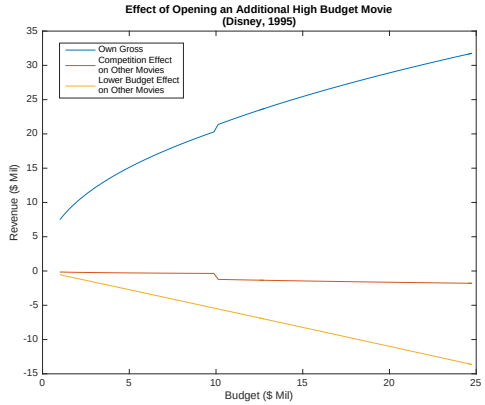
Year	Observed	CF (Before Add/Drop)	Change	CF (After Add/Drop)	Change	Total Change
1995	2.700	2.763	2.31%	2.896	4.83%	7.26%
1996	3.056	3.149	3.05%	3.225	2.40%	5.52%
1997	3.319	3.443	3.76%	3.631	5.46%	9.42%
1998	4.336	4.412	1.76%	4.512	2.27%	4.06%
1999	5.324	5.493	3.18%	5.626	2.41%	5.66%
2000	5.297	5.415	2.24%	5.537	2.25%	4.54%
2001	4.840	4.976	2.82%	5.174	3.97%	6.90%
2002	4.950	5.093	2.89%	5.151	1.14%	4.06%
2003	4.817	4.944	2.65%	5.147	4.10%	6.86%
2004	5.436	5.587	2.78%	5.731	2.59%	5.44%
2005	5.310	5.449	2.60%	5.583	2.47%	5.14%
2006	5.198	5.263	1.27%	5.368	1.99%	3.28%
2007	4.359	4.449	2.08%	4.615	3.72%	5.88%
2008	4.671	4.800	2.77%	4.970	3.53%	6.40%
2009	5.495	5.588	1.70%	5.746	2.82%	4.56%
2010	6.467	6.597	2.01%	6.784	2.84%	4.91%
2011	5.873	6.045	2.92%	6.278	3.87%	6.90%
2012	5.675	5.733	1.03%	5.853	2.08%	3.13%
2013	6.006	6.160	2.57%	6.390	3.72%	6.39%
2014	5.219	5.373	2.95%	5.566	3.59%	6.64%
Total	98.348	100.734	2.43%	103.783	3.03%	5.53%
Average	4.917	5.037	2.43%	5.189	3.03%	5.53%

Panel B: Total Movie Gross

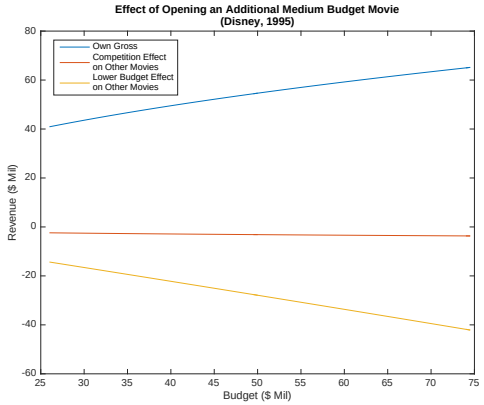
Year	Observed	CF (Before Add/Drop)	Change	CF (After Add/Drop)	Change	Total Change
1995	3.087	2.763	-10.50%	2.896	4.83%	-6.18%
1996	3.603	3.149	-12.58%	3.225	2.40%	-10.48%
1997	4.053	3.443	-15.04%	3.631	5.46%	-10.41%
1998	4.709	4.412	-6.31%	4.512	2.27%	-4.19%
1999	6.165	5.493	-10.89%	5.626	2.41%	-8.75%
2000	5.883	5.415	-7.96%	5.537	2.25%	-5.89%
2001	5.560	4.976	-10.49%	5.174	3.97%	-6.93%
2002	5.654	5.093	-9.93%	5.151	1.14%	-8.90%
2003	5.490	4.944	-9.94%	5.147	4.10%	-6.25%
2004	6.196	5.587	-9.83%	5.731	2.59%	-7.50%
2005	6.059	5.449	-10.07%	5.583	2.47%	-7.85%
2006	5.539	5.263	-4.98%	5.368	1.99%	-3.09%
2007	4.790	4.449	-7.11%	4.615	3.72%	-3.65%
2008	5.376	4.800	-10.71%	4.970	3.53%	-7.56%
2009	5.966	5.588	-6.33%	5.746	2.82%	-3.69%
2010	7.097	6.597	-7.05%	6.784	2.84%	-4.40%
2011	6.844	6.045	-11.68%	6.278	3.87%	-8.26%
2012	5.966	5.733	-3.90%	5.853	2.08%	-1.90%
2013	6.756	6.160	-8.81%	6.390	3.72%	-5.42%
2014	6.105	5.373	-11.99%	5.566	3.59%	-8.83%
Total	110.897	100.734	-9.16%	103.783	3.03%	-6.41%
Average	5.545	5.037	-9.16%	5.189	3.03%	-6.41%

Notes: Table shows the effect that dropping Paramount has on total industry profits. The first panel shows the effects on the remaining studios, and the second panel shows the total effect including the revenue previously generated by Paramount.

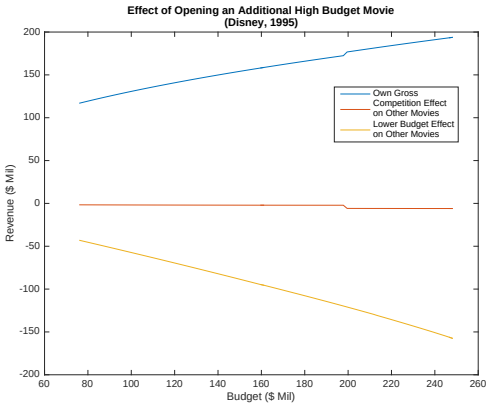
Figure 1: Effects of adding an additional (lower-quality) movie by budget and type



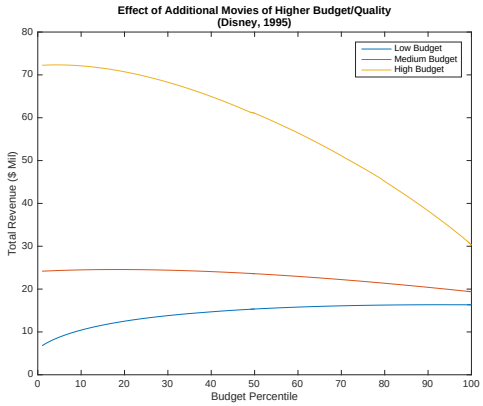
(a) Adding a low-budget movie



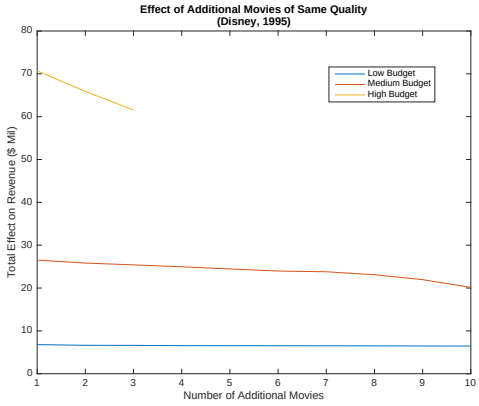
(b) Adding a medium-budget movie



(c) Adding a high-budget movie



(d) Combined effects of adding a movie



(e) Competition effect of adding movie

Notes: Data on revenues, release date, production budget, and studio for 2,426 movies between 1995 and 2014 come from www.boxofficemojo.com. Additional data on production budgets come from the-numbers.com. Exit poll scores from www.cinemascore.com. Each observation in the upper panel is a movie. Each observation in the lower panel is a studio-year pair for one of the six major studios (Disney, Fox, Paramount, Universal, and Warner Bros).