Movie Demand and Pricing

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Although exhibition revenue is now a smaller share of total revenues than it once was (25% now versus close to 100% half a century ago), box-office success is still a very important factor in a movie's commercial success: not only for what it represents in terms of direct revenues but also for the indirect "buzz" effect that it creates. How well can studios predict market demand for a given movie? How are movies priced at theaters — how *should* they be priced? What determines a movie's release date — and how does the release date affect demand? These are some of the questions we will address in this chapter.

Trends in movie demand and pricing

Exhibit 1 shows the evolution of movie exhibition in the US in the past quarter of century. The first panel shows the evolution of the number of movie theater admissions. For comparison, the evolution of the US population is also shown (right scale). Broadly speaking, we conclude that per-capita admissions have remained approximately constant since 1980.

Notice that, roughly, the period shown in Exhibit 1 corresponds to the emergence of the home video industry. By the 1990s, revenues from home video surpassed box-office revenues. Currently, box-office revenue accounts for only one quarter of the industry's total revenues. The first panel in Exhibit 1 shows that this lower share did not come about by a decrease in box-office revenues, rather by an expansion of the overall industry revenue base.

The second panel in Exhibit 1 shows the evolution of average price. For comparison, the consumer price index is also shown (right scale). As can be seen, the ticket prices have broadly speaking followed the overall price trend.

Predicting demand

In the movie business, as in any other business, sound investment and pricing policies depend on accurate demand knowledge. How well can studios predict the demand for, and profitability of, motion pictures? The summary answer is: very poorly. Screenwriter William Goldman, referring to the same problem, lamented that "nobody knows anything."[1]

While there is considerable residual uncertainty in a movie's success, it is a bit of an exaggeration to say that "nobody knows anything." In the next paragraphs, I summarize some of the evidence regarding determinants of movie revenues and movie profitability.

First, we must distinguish revenue from profitability. The distinction is particulary important when it comes to the effect of stars. Various scholars, including J. Eliashberg and A. Ravid, have shown that, while star talent boosts a movie's revenues, the impact

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Written by Professor Luís Cabral for the purpose of class discussion rather than to illustrate either effective or ineffective handling of an administrative situation. The author is grateful to Professor Liran Einav for sharing data used in several exhibits.

on the bottom line is negligible.[2] Considering that actors like Tom Cruise now command fees in the dozens of millions of dollars, it is easy to see why: adding a big star increases revenues, but on average the revenue increase parallels the increase in actor pay, leaving net profits at approximately the same level.

According to economist A. De Vany, an industry expert,

> Stars help to launch a film. They are meant as signals to create a big opening. But they can't make a film have legs.[2]

In a study with D. Walls, De Vany finds that very few actors had an impact on revenues (the list includes Tom Hanks, Michelle Pfeiffer, Sandra Bullock, Jodie Foster, Jim Carrey, Barbra Streisand and Robin Williams), and that was mostly in the first few weeks of a film's release.[2]

One exception to the rule of profit unpredictability is the fact that G, PG and PG13 seem to systematically outperform R-rated movies.[5] See, for example, Exhibit 2. The puzzle is then: Why do directors and actors flock so easily to movies that are economically less profitable? Surely, one part of the answer is that profit is not everything for many of the concerned decision-makers, including directors and actors — and even producers: recall the account of David Puttnam's philosophy in *What Is Special About Entertainment Industries?*

Other factors that economists claim contribute to box-office success are budget size, opening on a large number of screens, and whether it is a sequel.

Finally, another aspect of predicting movie demand for US-made movies is forecasting foreign acceptance given US performance. This is relevant since most US movies are released abroad after they are first released in the US. Researchers S. Craig, S. Douglas and W. Greene have shown — perhaps not surprisingly — that countries which are culturally closer to the US show greater box-office correlation with the US as well.[3] (The authors measure cultural distance by indicators such as the number of MacDonald's stores per capita.) In a related study, A. Elberse and J. Eliashberg show that the longer the time lag between a US release and a foreign release the lower the correlation between US and foreign box office revenue. This finding is consistent with the view that initial success creates "buzz" around a new release, but such buzz is perishable.[4]

Blockbusters

One thing we know well: the distribution of movie revenues is highly skewed. In the US, it is typical for the top four grossing movies to account for more than 20% of revenues.[5] Such a skewed distribution, together with a low level of predictability, imply that the movie business is highly unpredictable, not unlikely the business of creating a new medical drug. Economist Arthur De Vany calls it "wild uncertainty." The companion technical note, *Black Swans, Fat Tails, and Movie Revenues*, deals with this in greater detail.

Exhibit 3 plots the top 100 movies in terms of adjusted box-office revenue. By adjusted I mean that the dollar revenues of a given year are corrected for the ticket price difference between that year and 2009. Take for example *Gone With the Wind*, the biggest blockbuster ever (in adjusted revenues). It was released in 1939 and grossed $198,676,459. An average ticket in 1939 cost $0.07. The estimated 2009 average ticket price is $7.18. I thus multiply $198,676,459 by the ratio 7.18/0.07 to obtain adjusted box-office revenues. (The top unadjusted box-office record is *Titanic* (1997), with $600,788,188.)

Exhibit 3 suggests that the blockbuster pattern has maintained throughout the past eighty years or so. We should note, however, that the relative monetary importance of box-office in the industry's total revenues has decreased considerably in recent years. Currently it accounts for about 25%, whereas at the time of *Gone With the Wind* it was closer to 100%. In terms of total revenue (including home video and other sources), there are many recent blockbusters whose earnings are well north of *Gone With the Wind*'s $1.45 billion 2009 adjusted.

Movie seasonality and release dates

Exhibit 4 shows US box-office revenue, production budget and advertising budget for widely released movies from 1995–2000. The values are classified by week of original release. The graph shows very strong seasonal patterns, with peaks around Memorial day, July, Thanksgiving and Christmas.

The above seasonal patterns beg the question: is it a demand phenomenon or is it a supply phenomenon? Clearly, people are more pre-disposed to go to the movies during holidays. Does that explain the peak in box-office revenues? To understand the possible role of supply factors, note that the budget of movies released in weeks with peak demand is also higher. This suggests that studios choose to release their best titles in weeks of higher demand.

What is the relative contribution of supply and demand factors? Economist L. Einav estimates that supply factors account for as much as one third of the seasonal variation.[6]

This raises an interesting follow-up question: if studios all release their best movies at the same time, there may be a lot demand cannibalization going on. In fact, the clustering of movie releases is significant not only throughout the year but also within each week. Exhibit 5 shows that almost all movies are released on Friday. Considering the importance of some weeks during the year (cf Exhibit 4), it follows that a disproportionately large number of new releases take place on three or four Fridays during the year.

Is this too much clustering? Are studios playing an inefficient equilibrium in the "release date" game? Einav claims the answer is yes: he estimates industry profits would increase considerably if distributors were to space out release dates.[7]

The movie ticket price puzzle[8]

As we have seen, movies vary enormously in terms of box-office revenue. One thing does not vary much, however: movie theater ticket prices. In most other industries, we observe considerable price variation (versioning, etc) when there is vertical product differentiation. After all, there is money left on the table when a firm opts for uniform pricing. Why don't we then observe more variable pricing in movies?

Possible explanations for the price puzzle include: fairness, demand unstability, demand uncertainty, menu and monitoring costs. All of these have some relevance, but it still remains a mystery why there is virtually no price variation. To be completed.

Exhibit 1

US movie exhibition: quantity and price. Source: US Census Bureau, BLS, MPAA.

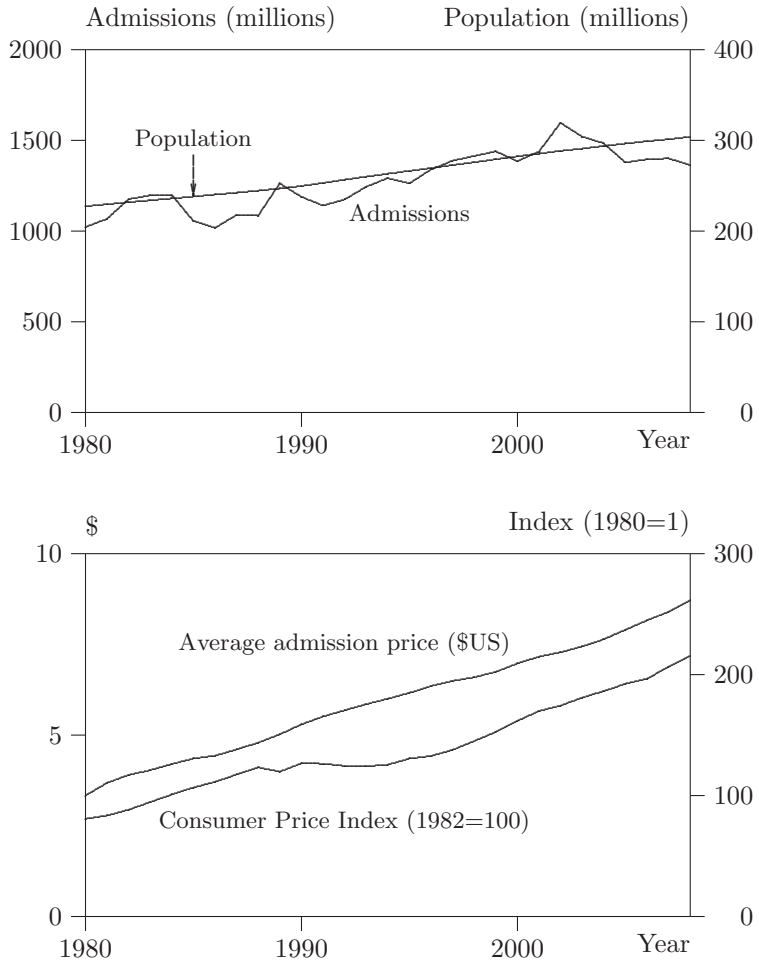

Exhibit 2

Top 20 grossing films by US box office earned during 2008. Source: MPAA.

Title	Distributor	Box Office (US$M)	Rating
The Dark Knight	Warner Bros.	531.0	PG-13
Iron Man	Paramount	318.4	PG-13
Indiana Jones & The Kingdom of The Crystal Skull	Paramount	317.1	PG-13
Hancock	Sony	227.9	PG-13
Wall-E	Disney	223.8	G
Kung-Fu Panda	Paramount	215.4	PG
Madascar: Escape 2 Africa	Paramount	177.0	PG
Twilight	Summit	176.9	PG-13
Quantum of Solace	Sony	166.8	PG-13
Dr. Seuss' Horton Hears A Who	Fox	154.5	G
Sex and the City	Warner Bros.	152.6	R
Mamma Mia!	Universal	144.1	PG-13
Chronicles of Narnia: Prince Caspian	Disney	141.6	PG
The Incredible Hulk	Universal	134.8	PG-13
Wanted	Universal	134.5	R
Get Smart	Warner Bros.	130.3	PG-13
Four Christmases	Warner Bros.	118.2	PG-13
Juno*	Fox Searchlight	112.0	PG-13
Tropic Thunder	DW/Paramount	110.5	R
Bolt	Disney	109.9	PG

*Film opened in 2007. Total reflects box office from January 2, 2008 – January 4, 2009.

Exhibit 3

Top 100 movies in adjusted box-office revenue.[9]

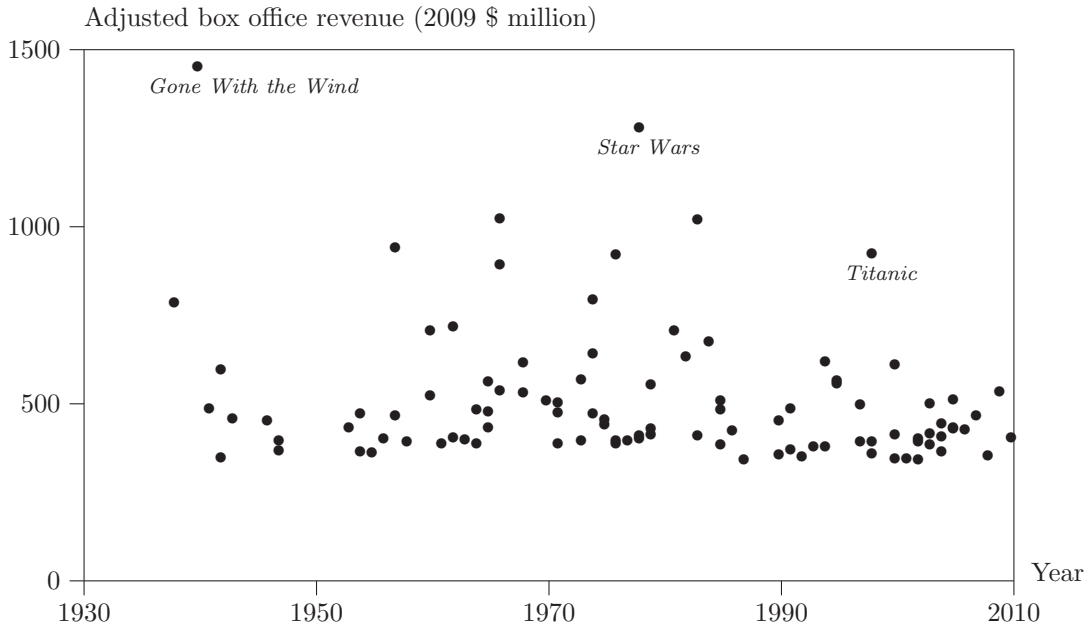

Exhibit 4

Movie production cost and cumulative revenues by week of release.
Source: see Endnote 6.

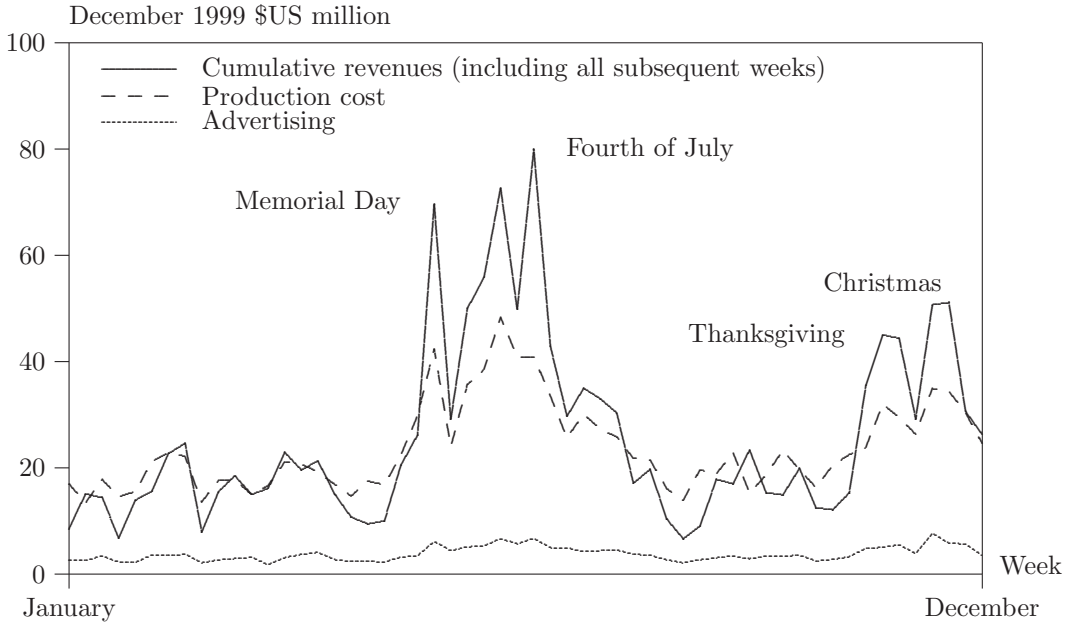

Exhibit 5

Release date by weekday. Source: see Endnote 6.

Sunday	0.79
Monday	0.17
Tuesday	0.52
Wednesday	13.84
Thursday	0.93
Friday	83.37
Saturday	0.38
Total	100.00

Exhibit 6

Movie theaters' revenue structure, 2002. Source: US Census Bureau.

	Revenue ($ million)	Percentage
Admissions (excluding admission taxes)	7,372	68.70
Sales of food & beverages	3,010	28.05
Screen advertising	141	1.31
Other	208	1.94
Total	10,730	100.00

Endotes

1. William Goldman, *Adventures in the Screen Trade*, New York: Warner Books, 1983.

2. Eduardo Porter adn Geraldine Fabrikant, "A Big Star May Not a Profitable Movie Make," *The New York Times*, August 28, 2006.

3. Samuel Craig, William Greene, and Susan Douglas, "Culture Matters: A Hierarchical Linear Random Parameters Model for Predicting Success of US Films in Foreign Markets," *Journal of International Marketing*, 2005.

4. Anita Elberse and Jehoshua Eliashberg, "Demand and Supply Dynamics for Sequentially Released Products in International Markets: The Case of Motion Pictures," *Marketing Science* 22 (2003).

5. Arthur De Vany, *Hollywood Economics: How Extreme Uncertainty Shapes the Film Industry*, New York: Routledge, 2004.

6. Liran Einav, "Seasonality in the U.S. Motion Picture Industry," *Rand Journal of Economics*, 2007..

7. Liran Einav, "Not All Rivals Look Alike: Estimating an Equilibrium Model of the Release Date Timing Game," Stanford University, 200?

8. This section draws extensively on Barak Y. Orbach and Liran Einav, "Uniform Prices for Differentiated Goods: The Case of the Movie-Theater Industry," *International Review of Law and Economics*, 2007.

9. http://www.boxofficemojo.com/alltime/adjusted.htm