

# Movie Star Salaries and Revenue Volatility

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# Background – Star Power

- Stars earn disproportionately higher wages than other participants in the industry.
- As a result of their importance, there has been extensive research on this issue
- However, evidence has been mixed...

- The popular press seems to disagree on the issue of the power of stars...
- Insiders argue that big name stars are the “locomotives behind some of Hollywood’s biggest blockbusters” (Variety 2002)
- While Forbes (2004) finds that fewer than half of the top grossing films of recent times have included actors with at least one previous hit.

- Likewise, academic research has also found conflicting evidence on whether stars bring in revenue and profits.
- Ravid (1999) finds that stars capture their economic rents.
- Elberse (2006) demonstrates that while stars may indeed impact movie revenues, they have no impact on profit levels.
- However, De Vany and Walls (2004) find that movies with stars are more profitable than non-star movies.

- Thus, while stars seem to provide added revenues, they do not necessarily generate profits.
- This raises the question of why studios hire stars for big movie projects.
  - Or, alternatively, why stars are so highly compensated

# Risk and Volatility

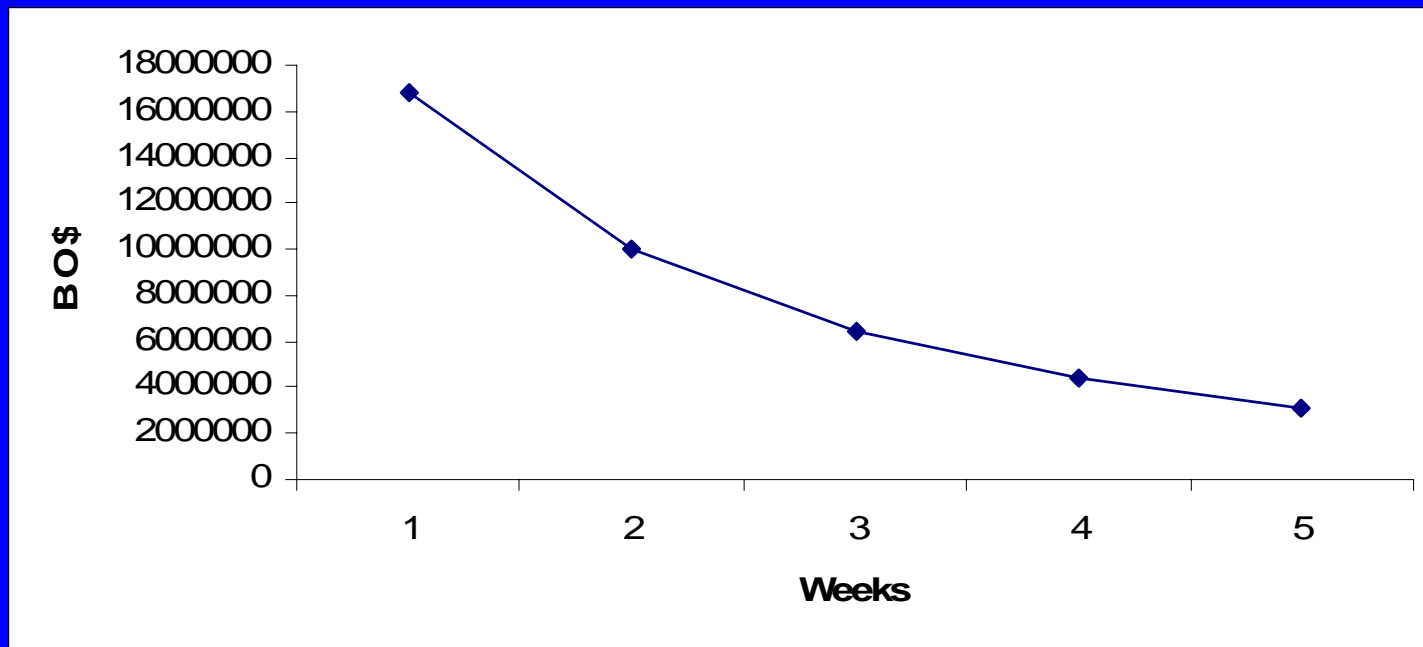
- From the financial perspective, an asset is valued based on revenue generation and risk.
- The marketing literature has recently accepted the importance of cash flow risk and volatility (Srivastava, Shervani and Fahey 1998, McAlister, Srinivasan and Kim 2007).
- Fisher, Shin and Hanssens (2006) find that marketing activities may have a major impact on both revenue volatility as well as cash flow volatility
- In general, assets that provide cash flows with lower risk and volatility are preferred.

- In the context of the motion picture industry, there has been relatively little research on the risk and volatility aspects of stars.
  - Notable exceptions are De Vany and Walls (1999)
  - The authors note that certain stars have a lower variance of probability of success.

# Research Questions

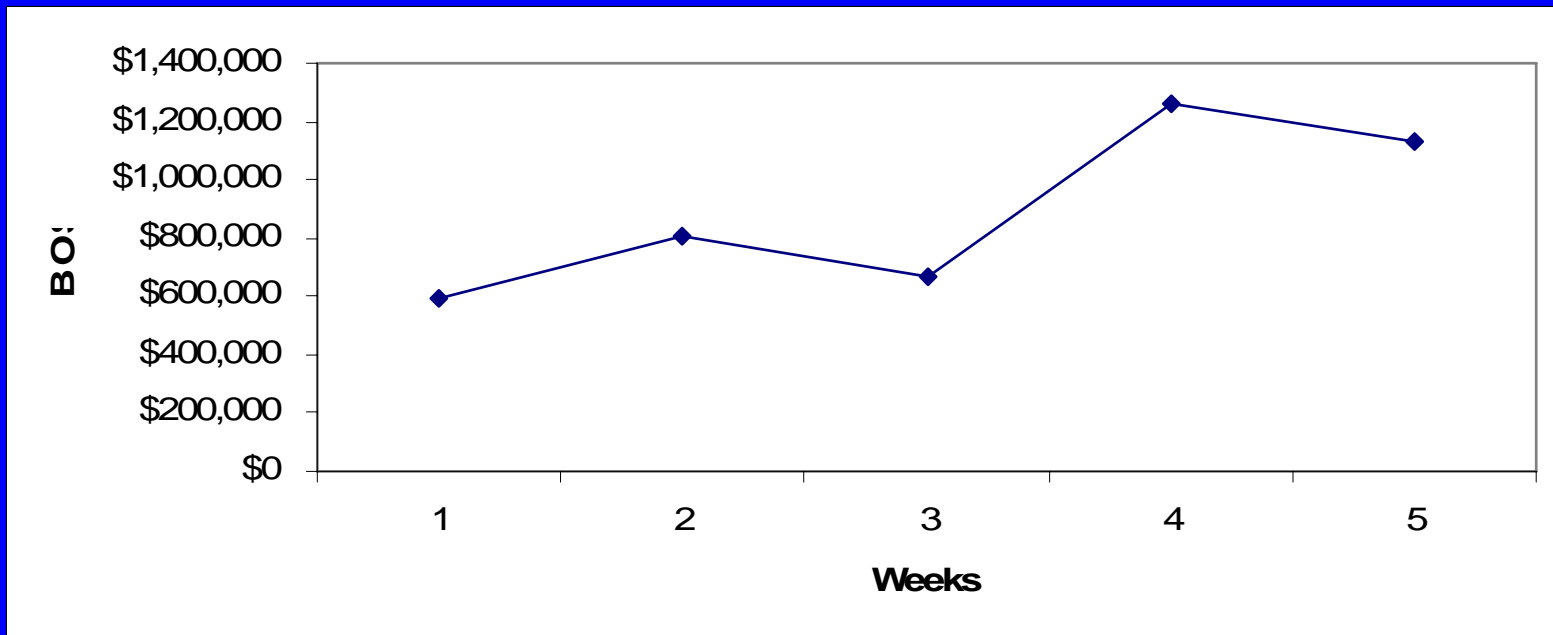
- Do movies with big name stars have a lower volatility of revenue relative to the ‘average’ movie?
  - Given that big-name stars do not lead to lower risk or higher profits.
- Is there a relationship between this volatility and the salary a star commands?
  - Inversely proportional?

# 'Blockbuster' Decay Pattern



5-Week decay pattern of the average wide-launch movie

# 'Sleeper' Decay Pattern



5-Week decay pattern of 'My Big Fat Greek Wedding'

# Studio Revenue

- It is well established that major studios retain about 90% of BO revenues (after the NUT) in the first two weeks of a movie
  - Studio share decreases in a step function after that.
- Hence, it would be in the studio's best interests if a movie followed the typical 'blockbuster' type decay pattern
  - Thereby earning most of its revenue in the first two weeks

# Revenue Volatility

- To analyze movie volatility:
  - Establish decay pattern of the ‘average’ movie
  - Find decay patterns of movie with stars.
  - Calculate the weekly variance of the average movie and the square deviation (from average) of weekly revenues for movies with stars
  - Compare on a week-by-week basis to account for decay pattern.

# Data

- Used data on widely released movies between 1994-1997 (over 300 movies) to establish 'average' movie baseline.
- Calculated average BO revenue in first 5 weeks.
  - And variance of that revenue.

# Star Movies Data

- BO revenue from first 5 weeks of wide launch for top stars in the business:
  - Only considered movies with single ‘star’.
  - All data was cpi adjusted.
- Collected data on production budgets.
- Data on star salaries was collated from numerous sources.

# Results

<i>Arnold Schwarzenegger</i>	Avg. Movie Std Dev	Star Movie Std Dev	Difference
Week 1	3.13E+14	5.82E+13	-2.5E+14
Week 2	7.94E+13	1.49E+13	-6.5E+13
Week 3	3.85E+13	9.08E+12	-2.9E+13
Week 4	2.15E+13	6.64E+12	-1.5E+13
Week 5	1.56E+13	5.51E+12	-1E+13

# Results

<i>John Travolta</i>	Avg. Movie Std Dev	Star Movie Std Dev	Difference
<b>Week 1</b>	3.13E+14	3.93E+13	-2.7E+14
<b>Week 2</b>	7.94E+13	7.94E+12	-7.1E+13
<b>Week 3</b>	3.85E+13	3.47E+12	-3.5E+13
<b>Week 4</b>	2.15E+13	1.53E+12	-2E+13
<b>Week 5</b>	1.56E+13	9.28E+11	-1.5E+13

# Results

<i>Russell Crowe</i>	Avg. Movie Std Dev	Star Movie Std Dev	Difference
<b>Week 1</b>	3.13E+14	4.87E+13	-2.6E+14
<b>Week 2</b>	7.94E+13	1.91E+13	-6E+13
<b>Week 3</b>	3.85E+13	1.34E+13	-2.5E+13
<b>Week 4</b>	2.15E+13	1.2E+13	-9.5E+12
<b>Week 5</b>	1.56E+13	3.68E+12	-1.2E+13

# Results

<i>Tom Cruise</i>	Avg. Movie Std Dev	Star Movie Std Dev	Difference
<b>Week 1</b>	3.13E+14	1.08E+14	-2E+14
<b>Week 2</b>	7.94E+13	1.55E+13	-6.4E+13
<b>Week 3</b>	3.85E+13	4.48E+12	-3.4E+13
<b>Week 4</b>	2.15E+13	2.84E+12	-1.9E+13
<b>Week 5</b>	1.56E+13	9.44E+11	-1.5E+13

# Discussion

- The results above show that movies with stars in have a lower volatility of revenue than an average movie.
  - Difference is statistically significant.
  - However, this may be attributed simply to the higher (potentially) production budgets for these movies.
- I further analyze the difference after controlling for production cost of the movie.

# Budget- Adjusted Results

<b>Arnold Schwarzenegger</b>	<b>Variance of Budget-Adjusted Weekly Revenue (Star)</b>	<b>Variance of Budget-Adjusted Weekly Revenue (Avg.)</b>	<b>Difference</b>
<b>Week 1</b>	0.023	0.151	-0.128
<b>Week 2</b>	0.030	0.057	-0.027
<b>Week 3</b>	0.021	0.030	-0.009
<b>Week 4</b>	0.017	0.017	0.000
<b>Week 5</b>	0.037	0.012	0.024

# Budget- Adjusted Results

<b>John Travolta</b>	<b>Variance of Budget-Adjusted Weekly Revenue (Star)</b>	<b>Variance of Budget-Adjusted Weekly Revenue (Avg.)</b>	<b>Difference</b>
<b>Week 1</b>	0.075	0.151	-0.076
<b>Week 2</b>	0.011	0.057	-0.047
<b>Week 3</b>	0.005	0.030	-0.025
<b>Week 4</b>	0.003	0.017	-0.014
<b>Week 5</b>	0.002	0.012	-0.010

# Budget- Adjusted Results

<b>Russell Crowe</b>	<b>Variance of Budget-Adjusted Weekly Revenue (Star)</b>	<b>Variance of Budget-Adjusted Weekly Revenue (Avg.)</b>	<b>Difference</b>
<b>Week 1</b>	0.005	0.151	-0.146
<b>Week 2</b>	0.004	0.057	-0.053
<b>Week 3</b>	0.004	0.030	-0.025
<b>Week 4</b>	0.005	0.017	-0.012
<b>Week 5</b>	0.002	0.012	-0.011

# Budget- Adjusted Results

<b>Tom Cruise</b>	<b>Variance of Budget-Adjusted Weekly Revenue (Star)</b>	<b>Variance of Budget-Adjusted Weekly Revenue (Avg.)</b>	<b>Difference</b>
<b>Week 1</b>	0.037	0.151	-0.113
<b>Week 2</b>	0.007	0.057	-0.050
<b>Week 3</b>	0.006	0.030	-0.023
<b>Week 4</b>	0.003	0.017	-0.013
<b>Week 5</b>	0.001	0.012	-0.011

# Discussion

- Consistently lower variance of revenues for star- movies relative to the average movie.
  - Implying lower volatility of revenues over the first few weeks
  - Difference is statistically significant for the first 3 weeks after release.

# Star Salary

- To ascertain the impact of volatility on star salaries, I regressed star wages on factors such as volatility, revenue and profitability.
  - Star salaries obtained from movie related web sites, popular press publications
- Found support for hypothesis that star salaries are positively related to *difference* between 1<sup>st</sup> week variance of average movie and star movie.

# Limitations and Further Research

- Need to expand this study to include top directors and producers.
- Star salaries may not be accurate.
  - Complicated back end deals.
- The next step would be to estimate a time series of relative volatility for each star.
  - Relate the (lagged) time-series to trend in star wages.
  - Relate to star power.