Analysis on Movie Success Indicators*

Qi Er (Emma) Teng

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In this study, we delve into the variables contributing to movie success, focusing on the interplay between a movies' genre, number of theaters showing, the moth of release, and the year of premiere, particularly in the context of the pre and post-COVID-19 era, spanning from 2019 to 2022. This comprehensive analysis aims to shed light on the nuanced relationship between these variables and movie success, highlighting how the cinematic landscape has evolved in response to the COVID-19 pandemic. The findings of this study enrich our understanding of the determinants of cinematic success, providing valuable insights for filmmakers, distributors, and industry strategists in navigating the changing film industry.

1 Introduction

In the realm of global entertainment, movies hold a pivotal role, not only as a form of artistic expression but also as a significant driver of cultural and economic activity. The advent of COVID-19 has precipitated profound changes across the global media landscape, altering audience behaviors and consumption patterns. The surge in online media consumption during the pandemic has brought unprecedented challenges and transformations to the traditional movie industry. This shift has prompted a reevaluation of what factors contribute to a movie's success in an era where digital platforms are increasingly dominating. Against this backdrop, this paper aims to analyze several indicators related to movie success, taking into account the impact of COVID-19 on both the production and consumption of films. By examining the interplay between various factors and movie ratings, this study seeks to uncover insights into the dynamics of movie success in a rapidly evolving media environment.

Employing a multifaceted analytical approach that combines genre classification, theaters metrics, seasonal release timing, and annual trends, we probed the determinants of cinematic success in the fluctuating entertainment landscape from 2019 to 2022. Our study meticulously compiled data from Box Office Mojo and IMDb, focusing on films that achieved a commendable

*Code and data are available at: https://github.com/dwz92/Analysis-on-Movie-Success-Indicators.

rating of 5/10 or above, signifying both critical and popular acclaim. Through the application of advanced statistical techniques and web scraping tools, we dissected the top 200 grossing films to unravel the intricate relationship between these variables and their collective impact on a movie's success. A higher performance in these metrics typically correlates with a movie's ability to resonate with diverse audiences, navigate distribution challenges, and capitalize on favorable release windows. This analysis not only sheds light on the evolving criteria for what makes a movie successful in the digital age but also offers insights into the strategic considerations filmmakers and distributors must weigh in an increasingly competitive and segmented market.

The paper is structured to facilitate a comprehensive understanding of the study and its implications. Following Section 1, Section 2 presents the data, detailing the data sources, analytical techniques, and the rationale behind the chosen methods. Section 4 discusses the results. Section 5 provides an in-depth discussion of these findings.

2 Data

//TODO

2.1 Dataset Introduction

Table 1: Top 10 Total Gross Value Release from 2019

Title	Release Year	Release Date	Released Theaters	Total Gross Value
Avengers: Endgame	2019	Apr 26	4,662	$858,373,000
The Lion King	2019	Jul 19	4,802	$543,638,043
Star Wars: Episode IX - The Rise of Skywalker	2019	Dec 20	4,406	$515,202,542
Frozen II	2019	Nov 22	4,440	$477,373,578
Toy Story 4	2019	Jun 21	4,575	$434,038,008
Captain Marvel	2019	Mar 8	4,310	$426,829,839
Spider-Man: Far from Home	2019	Jul 2	4,634	$390,532,085
Aladdin	2019	May 24	4,476	$355,559,216
Joker	2019	Oct 4	4,374	$335,451,311
Aquaman	2019	Dec 21	4,184	$335,061,807

Talk more about it.

// TODO

Table 2: First Ten Rows of Basic Information from IMDb

Title	Release Year	Genres	IMDb primary key
Carmencita	1894	Documentary,Short	tt0000001
Le clown et ses chiens	1892	Animation,Short	tt0000002
Pauvre Pierrot	1892	Animation,Comedy,Romance	tt0000003
Un bon bock	1892	Animation,Short	tt0000004
Blacksmith Scene	1893	Comedy,Short	tt0000005
Chinese Opium Den	1894	Short	tt0000006
Corbett and Courtney Before the Kinetograph	1894	Short,Sport	tt0000007
Edison Kinetoscopic Record of a Sneeze	1894	Documentary,Short	tt0000008
Miss Jerry	1894	Romance	tt0000009
La sortie de l'usine Lumière à Lyon	1895	Documentary,Short	tt0000010

//TODO

Table 3: First Ten Rows of Movie Rating from IMDb

Rating	Number of Votes	IMDb primary key
5.7	2037	tt0000001
5.7	272	tt0000002
6.5	1988	tt0000003
5.4	178	tt0000004
6.2	2746	tt0000005
5.0	183	tt0000006
5.4	853	tt0000007
5.4	2183	tt0000008
5.3	210	tt0000009
6.8	7510	tt0000010

//TODO

2.2 Variable

Table 4: First Ten Rows of Movie Rating and Basic Information

Title	Release Year	Release Date	Genres	Rating	Released Theaters
Mortal Kombat	2021	Apr 23	Action,Adventure,Fantasy	6.0	3114
Motherless Brooklyn	2019	Nov 1	Crime,Drama,Mystery	6.8	1342
Alita: Battle Angel	2019	Feb 14	Action,Adventure,Sci-Fi	7.3	3802
Shazam!	2019	Apr 5	Action,Adventure,Comedy	7.0	4306
Pet Sematary	2019	Apr 5	Horror,Mystery,Thriller	5.7	3585
Jungle Cruise	2021	Jul 30	Action,Adventure,Comedy	6.6	4310
Fantasy Island	2020	Feb 14	Fantasy,Horror,Mystery	4.9	2784
A Journal for Jordan	2021	Dec 25	Drama,Romance,War	6.0	2500
The Rental	2020	Jul 24	Drama,Horror,Mystery	5.7	250
The Little Things	2021	Jan 29	Crime,Drama,Mystery	6.3	2206

//TODO

2.2.1 Relationship between Movie Success from 2019 to 2022 by Release Theaters

//TODO

//TODO

//TODO

//TODO

//TODO

//TODO

//TODO

//TODO

3 Model

//TODO

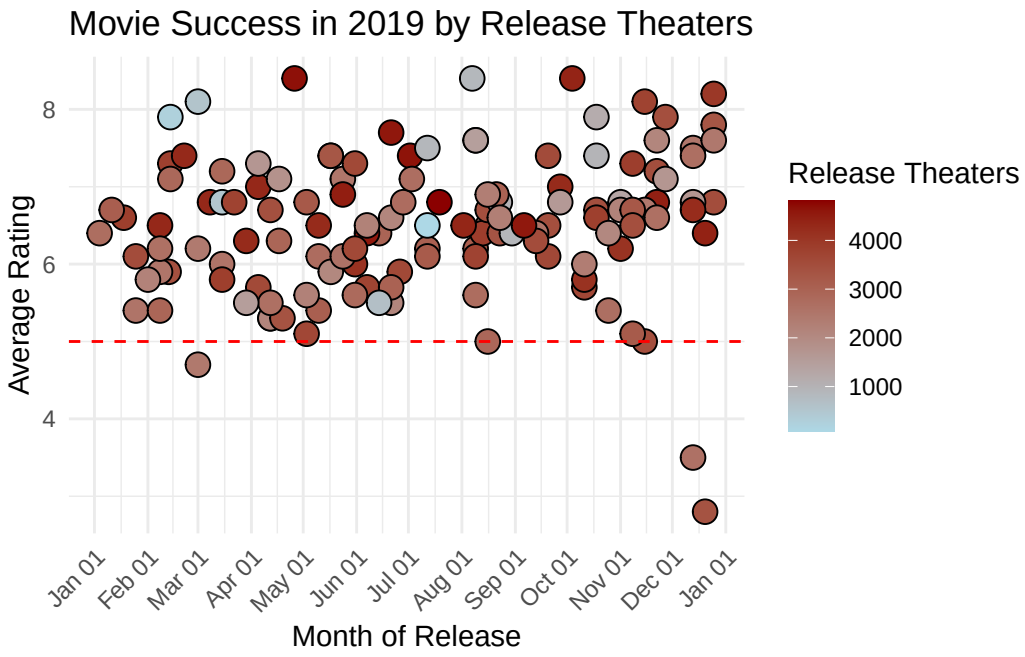


Figure 1: Movie Success in 2019 by Release Theaters

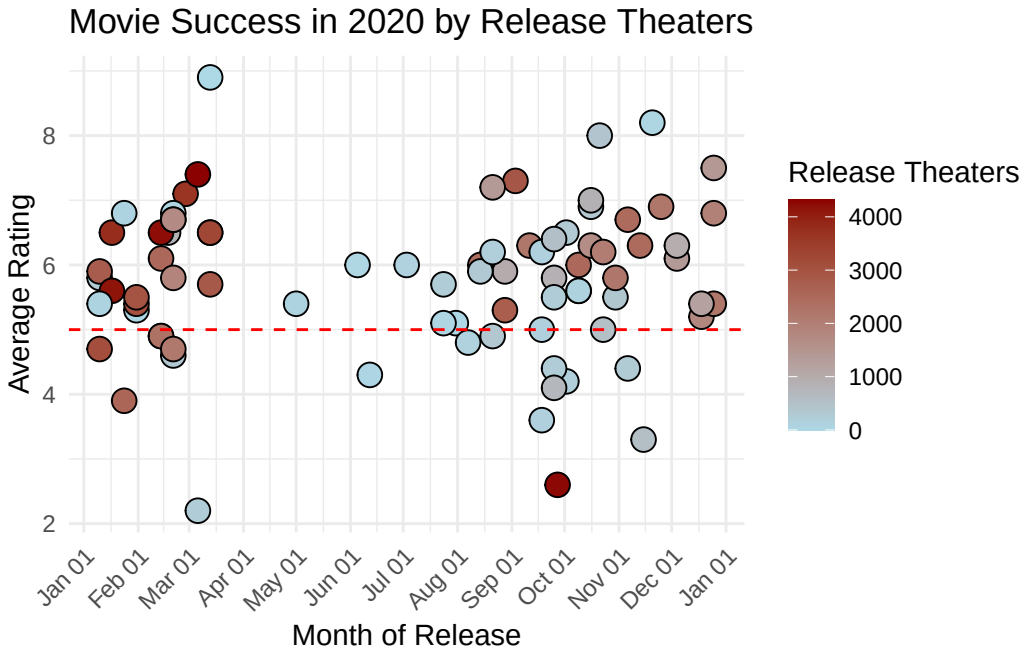


Figure 2: Movie Success in 2020 by Release Theaters

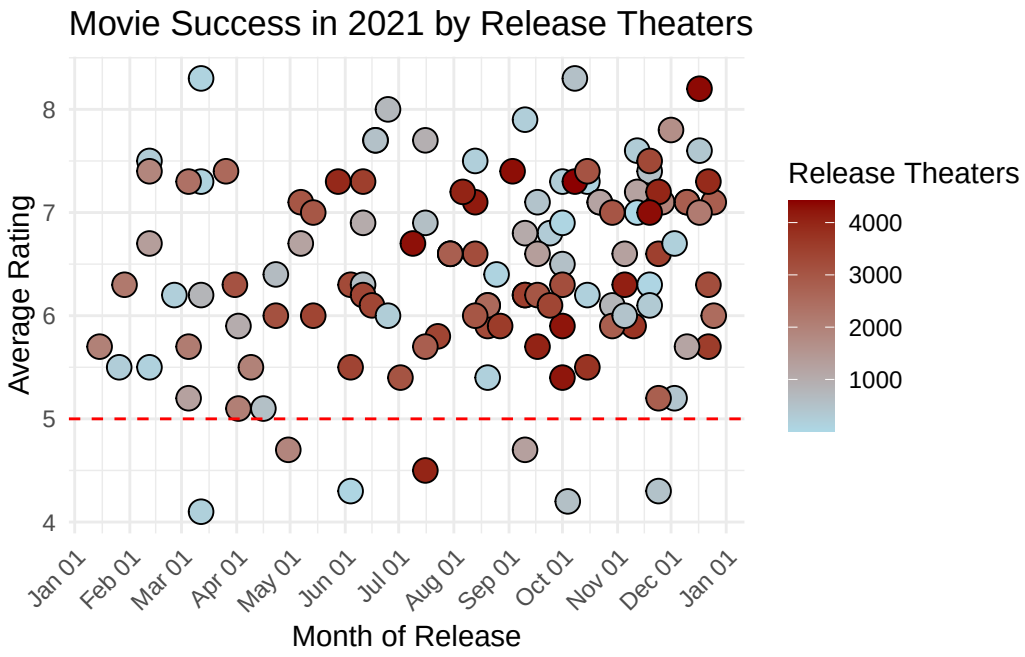


Figure 3: Movie Success in 2021 by Release Theaters

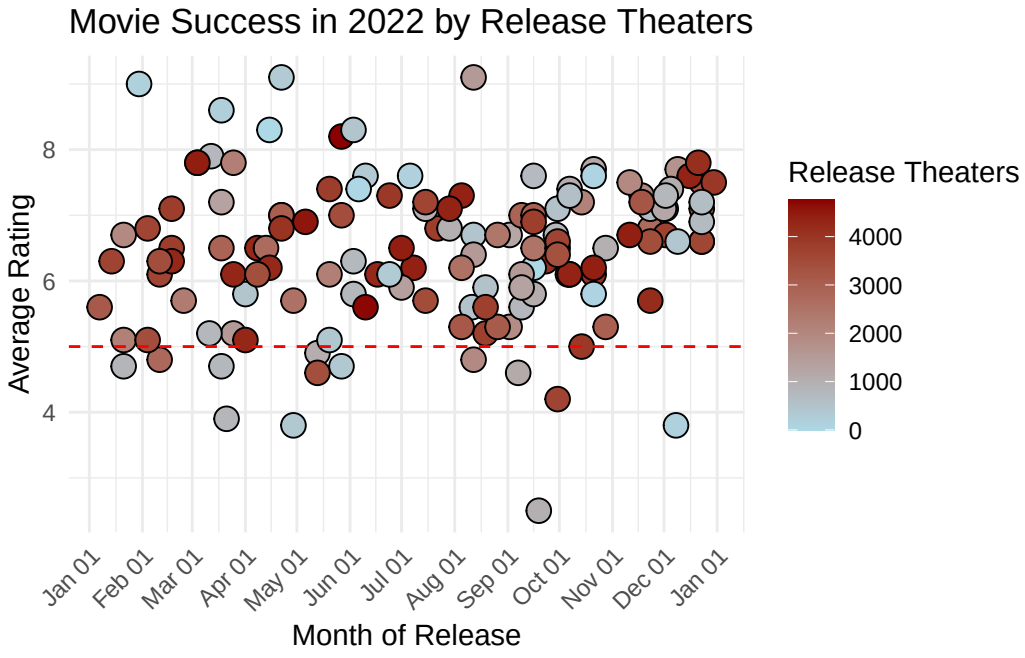


Figure 4: Movie Success in 2022 by Release Theaters

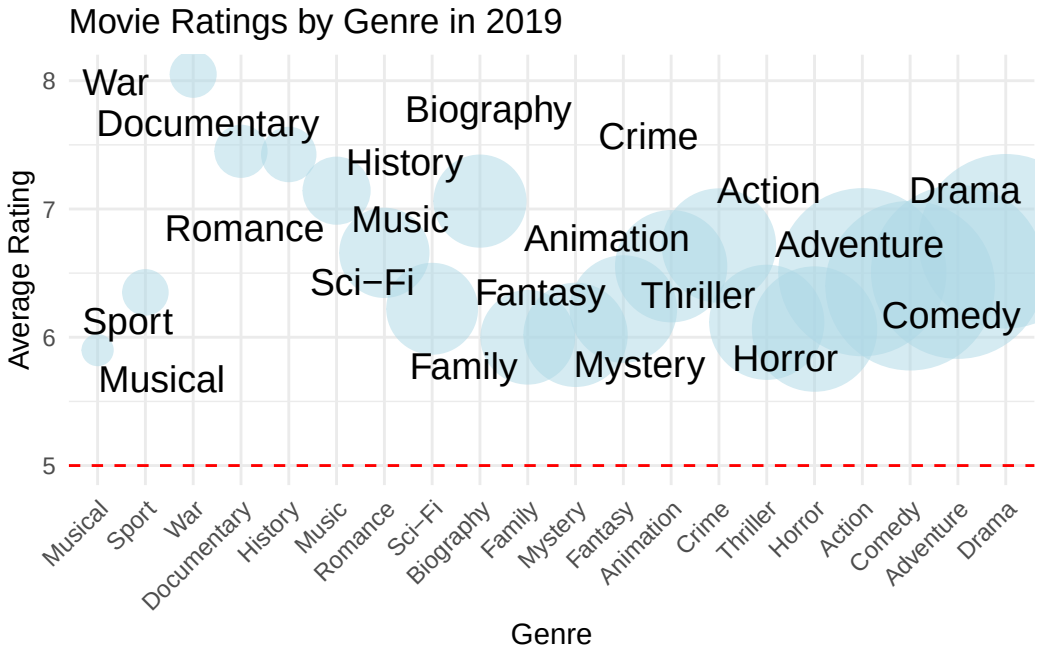


Figure 5: Movie Success in 2019 by Genre

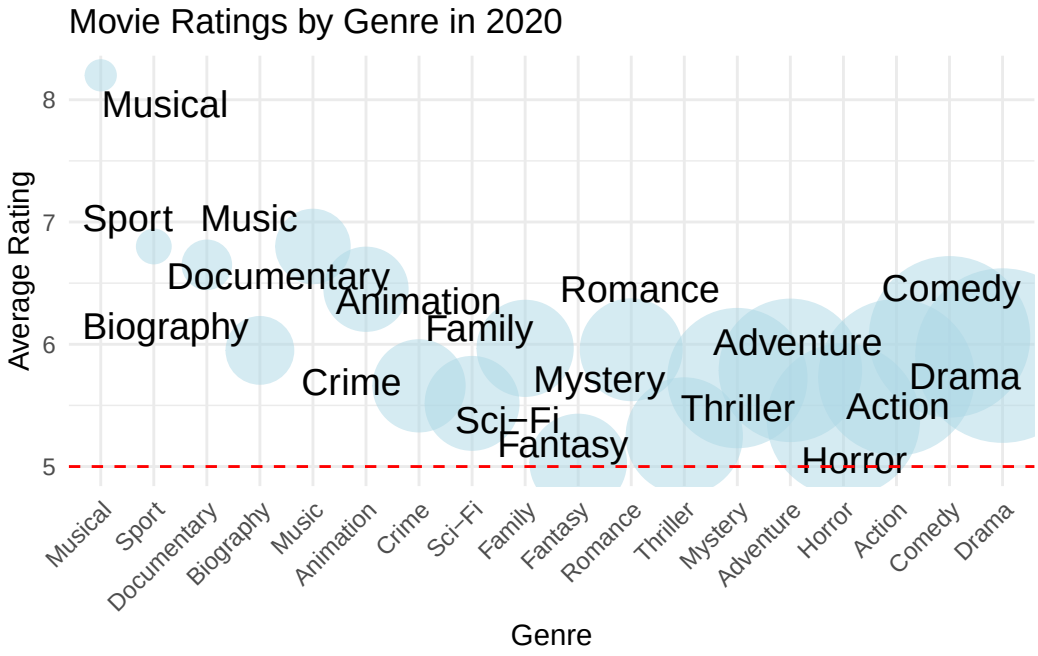


Figure 6: Movie Success in 2020 by Genre

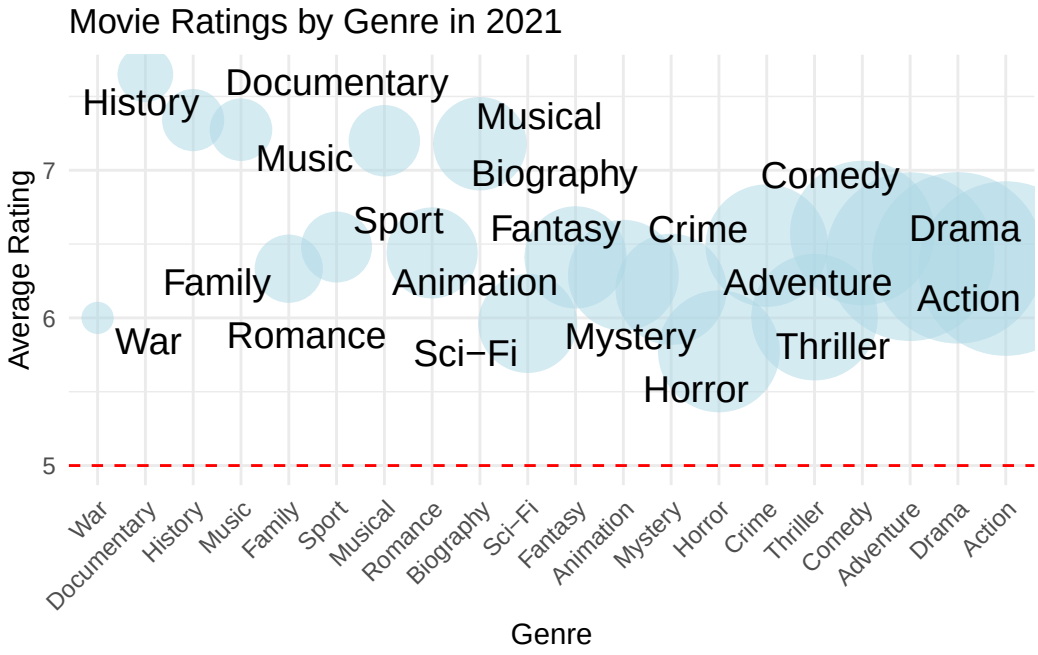


Figure 7: Movie Success in 2021 by Genre

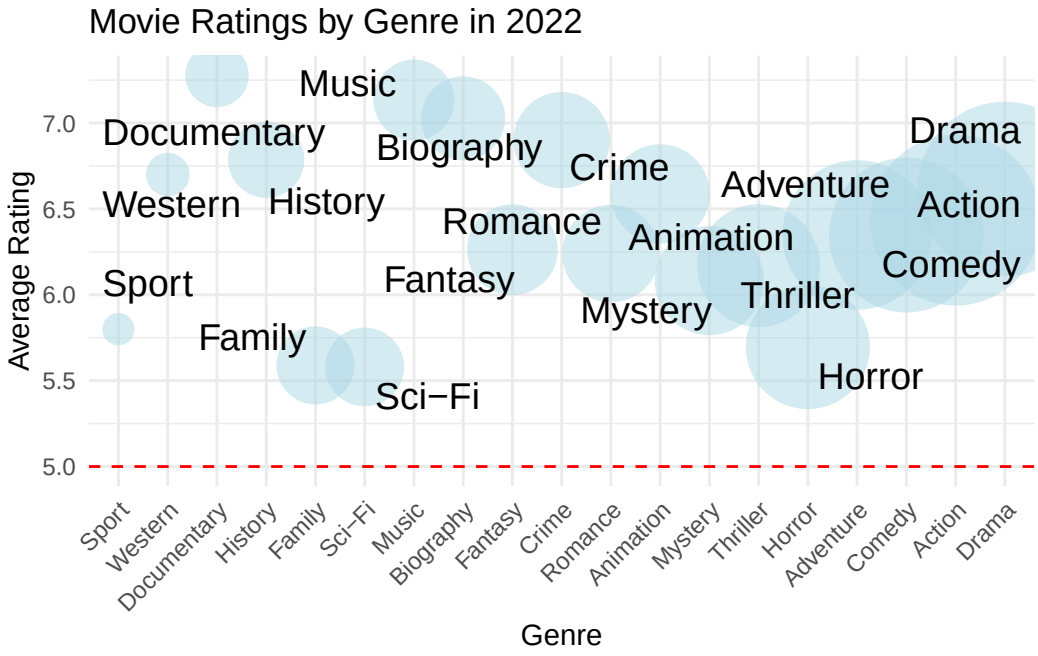


Figure 8: Movie Success in 2022 by Genre

3.1 Model set-up

//TODO

$$y_i|\mu_i \sim \text{Bern}(\mu_i) \tag{1}$$
$$logit(\mu_i) = \beta_0 + \beta_{y[i]}^{year} + \beta_2 \times theater_i \tag{2}$$
$$\beta_0 \sim \text{Normal}(0, 2.5) \tag{3}$$
$$\beta_{y[i]}^{year} \sim \text{Normal}(0, 2.5) for y = 2019, 2020, 2021, 2022 \tag{4}$$
$$\tag{5}$$

We run the model in R (R Core Team 2023) using the `rstanarm` package of Goodrich et al. (2022). We use the default priors from `rstanarm`.

3.1.1 Model justification

//TODO

3.1.2 Model prediction

//TODO

4 Results

//TODO

//TODO

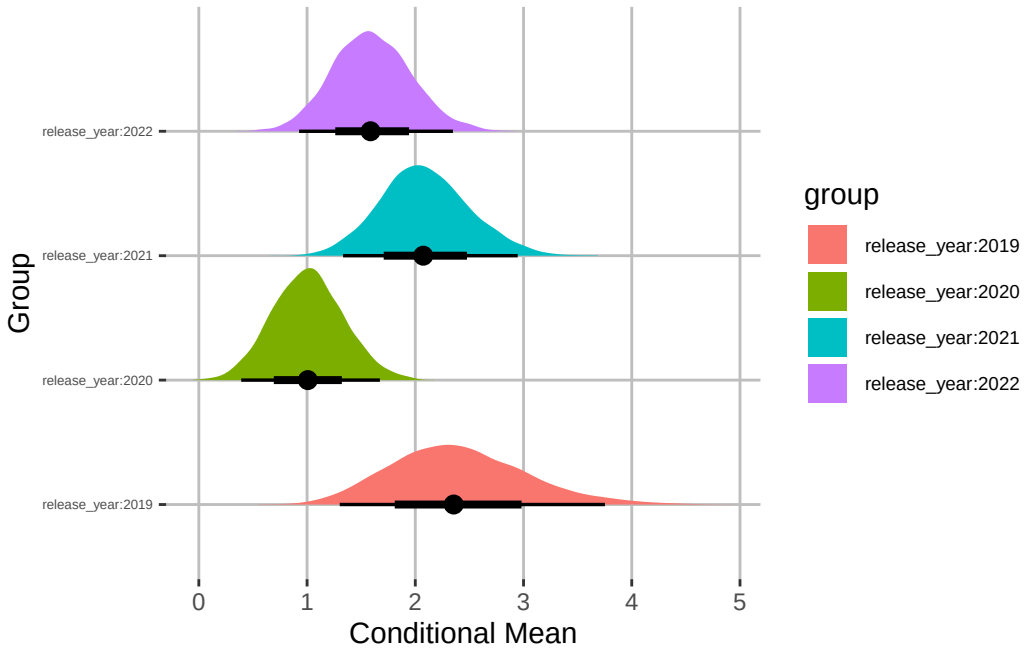
5 Discussion

5.1 First discussion point

//TODO

	(1)
(Intercept)	1.692
theaters	0.000
Sigma[release_year × (Intercept),(Intercept)]	0.556
Num.Obs.	479
R2	0.061
R2 Marg.	0.021
Log.Lik.	−123.048
ELPD	−127.9
ELPD s.e.	13.9
LOOIC	255.7
LOOIC s.e.	27.8
WAIC	255.7
RMSE	0.27

Table 5: **?(caption)**



5.2 Second discussion point

5.3 Third discussion point

5.4 Weaknesses and next steps

//TODO

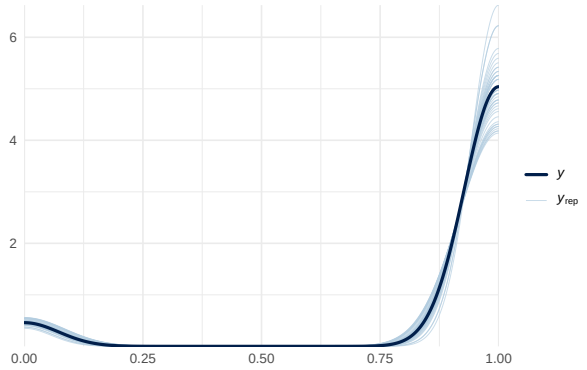
Appendix

A Additional data details

B Model details

B.1 Posterior predictive check

//TODO

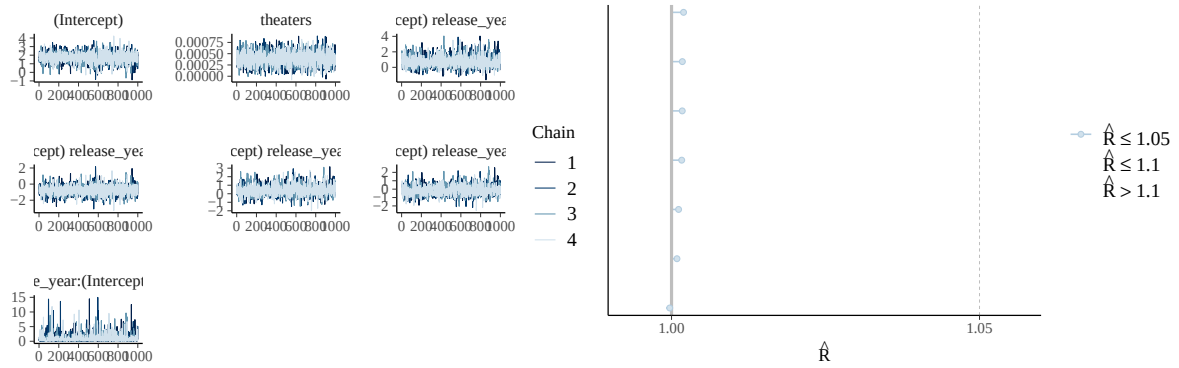


(a) Posterior prediction check

Figure 9: Examining how the model fits, and is affected by, the data

B.2 Diagnostics

//TODO



(a) Trace plot

(b) Rhat plot

Figure 10: Checking the convergence of the MCMC algorithm

References

Goodrich, Ben, Jonah Gabry, Imad Ali, and Sam Brilleman. 2022. "Rstanarm: Bayesian Applied Regression Modeling via Stan." https://mc-stan.org/rstanarm/.

R Core Team. 2023. *R: A Language and Environment for Statistical Computing*. Vienna, Austria: R Foundation for Statistical Computing. https://www.R-project.org/.