Analysing Steam: How the Rise in Game Releases Affects Review Scores

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1 Overview

Many games are released on Steam each year, all of which vary in price, genre, and reviews. This report investigates whether the quality of games on Steam is decreasing due to the increase in annual game releases, thereby potentially diluting the overall review ratings.

The initial analysis was carried out using the Steam catalogue dataset, specifically focusing on attributes such as release date, reviews, and game classifications. Exploratory visualisations were created to examine the number of games released per year and the proportion of games receiving above-average review scores. Statistical techniques, including R-squared, and P-test, were used to assess the relationship between release number and review score distribution. In addition, forecasting models were applied to predict potential future trends.

The results suggest that there have been notable shifts in the distribution of review scores over time, with indications of a relationship between the number of games released and the proportion of highly rated titles. These findings highlight broader trends in the industry, suggesting areas for further research, such as the role of specific game genres or other factors influencing game ratings.

2 Introduction

Context and motivation Steam is the largest digital distribution platform for PC games [1] , with the platform registering over 132 million active users per month in 2021 [2] . Launched by Valve in 2003 and rapidly gaining popularity by 2005 [3] , Steam now hosts the largest and continuously expanding game library, with as many as 50 new games being released every day [4] . This substantial volume of releases has raised concerns over quality control, specifically whether the increasing number of titles is diluting the overall quality of games available on the platform.

With the catalogue growing daily, players are faced with the challenge of finding a high quality game amidst the thousands of games available. However, Steam's comprehensive review system aggregates user ratings and reviews. This provides a valuable lens with which to examine these trends. With media discussions hinting that the gaming market is becoming saturated [5] , this might be a contributing factor to a decline in average review scores.

Previous work Newbie Indie Game Dev [6] examined aspects of the Steam ecosystem by analysing publisher revenue and genre prevalence, revealing that market saturation can dilute perceived game quality, with mainstream publishers dominating while indie titles often struggle to achieve similar recognition.

Alden Yuan [7] investigated the impact of platform changes on game quality. Yuan observed that the introduction of Steam Greenlight in 2012 was associated with an immediate drop in the proportion of

positive reviews, which later stabilised as the platform adapted to the surge in game releases. Steam Greenlight was a platform that allowed developers to submit games for public voting, with successful games gaining access for sale on the online store [8]. However, it was replaced by Steam Direct in 2017, which simplified the process for developers with the introduction of an application fee of $100, thereby eliminating the need for the gaming community approval [9]. While these changes lowered barriers for developers, they may have also contributed to the influx of lower-quality titles.

These studies suggest that while a surge in game releases may initially lower perceived quality, there remains a gap between forecasting future trends and statistically testing the relationship between release volume and game quality.

Objectives This report has two objectives. First, it aims to determine if the quality of games, as measured by review scores, is indeed declining as more games are released each year. Second, the report seeks to predict future trends by forecasting the total number of game releases and the ratio of games with above-average versus below-average review scores over the coming years. To achieve these goals, a combination of visual analysis and statistical techniques including regression analysis and future forecasting are carried out.

3 Data

Data provenance The dataset used in this report was sourced from a GitHub repository created by Newbie Indie Game Dev, who scraped publicly available data using Steam's API in October 2024. Information was retrieved on over 200,000 Steam games using the API along with details for each game. In addition to Steam's API, SteamSpy's API—a third-party tool that estimates metrics such as player count and playtime—was also utilised. After the data was scraped, the data was systematically cleaned, resulting in approximately 140,000 viable datapoints. The dataset is publicly available for academic and non-commercial research, making it suitable for this report [10].

Data description The raw dataset consists of eight CSV files containing information on 140,118 different games. Each file captures specific aspects of Steam's data.
The following files and variables were used in this study:

- **games.csv**: This contained a unique identifier: `app_id` for each game, along with its name and release date.
- **reviews.csv**: This included `review_score`: an integer from 0 to 9, where 9 represents the highest rating a game can receive.

Other files in the dataset were explored but ultimately excluded, as their contents were not directly relevant to this study.

Data processing The dataset was downloaded and processed using VS Code within a Conda environment where each CSV file was loaded into separate Pandas DataFrames. Any rows with missing values were removed from the dataframe. The `review_score` column was initially stored as an object (string), so it was converted to a numeric format to allow for mathematical operations to take place on the values. A preliminary check revealed that only five entries had a missing `review_score`, and these were subsequently removed.
The games and reviews datasets were then merged using an inner join on `app_id`, ensuring that only games present in both datasets were retained. This process resulted in the exclusion of only a further 41 games, ensuring minimal data loss. The final dataset contained 140,077 entries, with the following attributes: **app_id** (unique game identifier), **name** (game title), **release_date** (game release year), **review_score** (integer rating).

4 Exploration and analysis

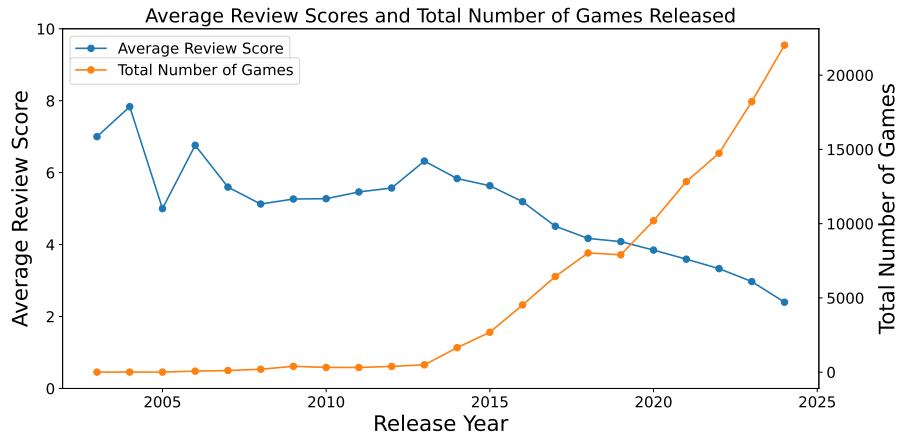

Figure 1: Average review scores and total number of games released from 2003-2024.

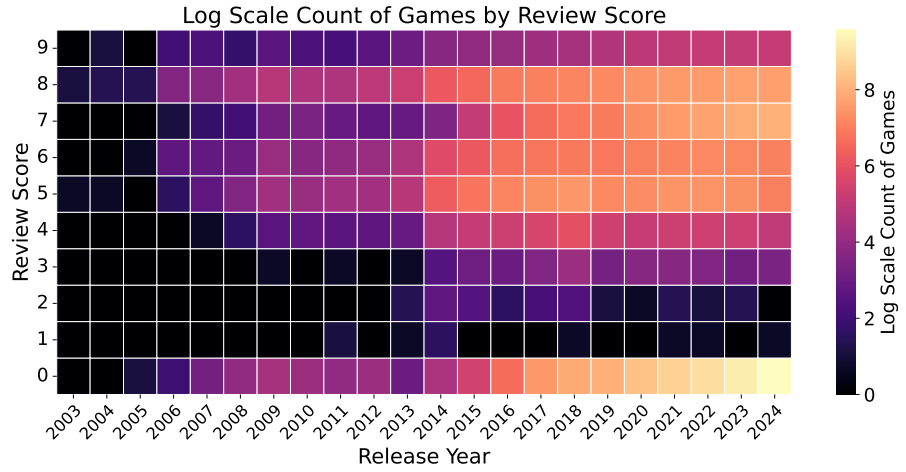

Figure 2: Distribution of game releases by review score on a log scale, from 2003-2024.

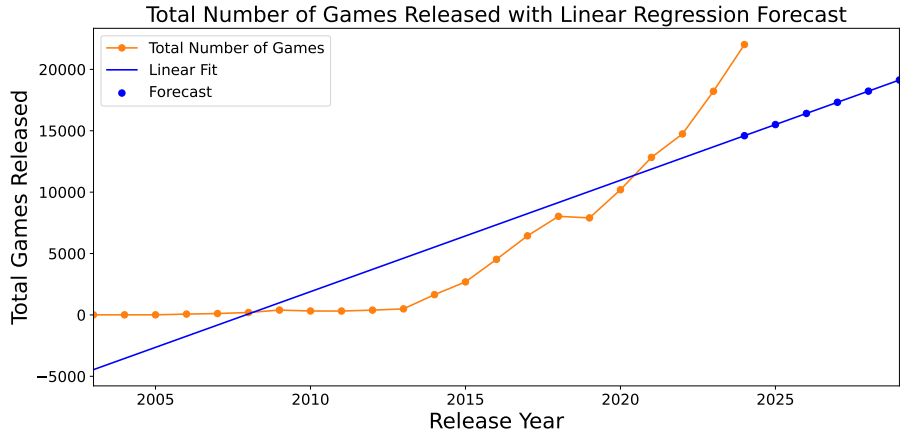

Figure 3: Total number of games released from 2003 to 2024, with a linear regression model forecasting to 2029.

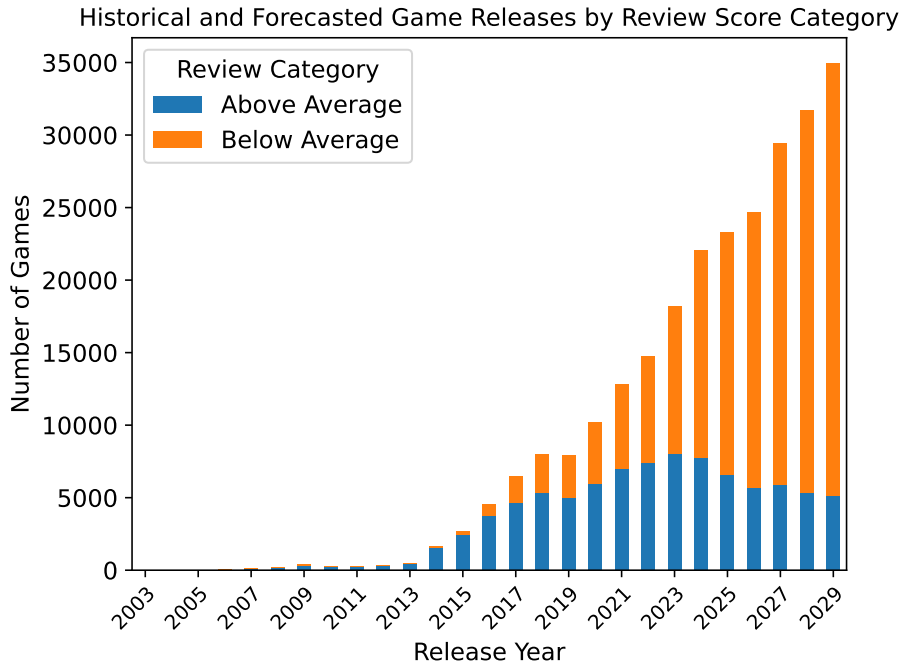

Figure 4: Historical (2003–2024) and ARIMA forecast (2025–2029) of Steam game releases, split above and below the average review score of 3.56.

Figure 1 shows a dual-axis line graph, with the total number of games released per year (orange) plotted alongside the average review score (blue). From 2003 onward, the graph reveals a clear inverse relationship: as game releases increased sharply after 2013 (exceeding 5,000 releases by 2017 and over 20,000 by 2024), the average review score dropped from about 7 in 2003 to just above 2 in 2024. The introduction of Steam Greenlight in 2012 and its subsequent replacement by Steam Direct in 2017, appear to coincide with these shifts, suggesting that an easier entry for developers may have contributed to a "dilution effect" in overall game quality.

Figure 2 presents a heatmap of game releases by review score on a logarithmic scale from 2003 to 2024. This visualisation illustrates how the distribution of ratings has evolved over time. Notably, while earlier years had few releases, recent years show a pronounced increase in games with lower review scores. The heatmap's colour gradient highlights that, from 2006 onward, the proportion of games with a rating of 0 has grown, and is the most prominent value on the heatmap in 2024, while mid-range scores (5–8) have also expanded. In contrast, high ratings (9) remain relatively sparse.

Figure 3 depicts the results of an initial linear regression model intended to forecast 5 years of future game releases. Although the model yielded a relatively high R-squared value of 0.78, its forecasts for 2025–2029 were consistently lower than the actual 2024 values. This discrepancy reveals that the data exhibits non-linear behaviour that the linear regression model cannot capture, leading to underestimation. These shortcomings prompted the exploration of alternative forecasting methods.

Figure 4 It was observed that linear regression underestimated the future values. An investigation of alternative forecasting models led to the use of time series methods, including Autoregressive Integrated Moving Average (ARIMA) [11] . After following the documentation and successfully implemented ARIMA, it produced more realistic forecasts [12] . ARIMA predicts the next value in a sequence as a linear function of differenced observations and residual errors from previous time steps. It integrates three key components: an autoregressive (AR) part that leverages trends from the previous 10 years; an

integration (I) component that applies first-order differencing to remove long-term trends and ensure stationarity; and a moving average (MA) part that smooths short-term fluctuations over 2 periods. This model is especially well-suited to time series data with non-linear behaviour.

The overall average review score for all Steam games was calculated to be 3.56, which was used as a threshold to classify each game as either above or below average. Historical data from 2003 to 2024 showed that in early years, the majority of game releases exceeded this threshold, as evidenced by high percentages of above-average games. For example, in 2003 and 2004, nearly 100% of games were above average, and even in 2013, 95.14% of releases were above average. However, a marked shift was observed in 2023 and 2024, where the proportion of below-average games rose sharply to 55.68% in 2023 and 64.91% in 2024.

The ARIMA forecast for 2025 to 2029 (Table 1, Figure 4) predicted a continued increase in total game releases, with the percentage of below-average games growing from 71.75% in 2025 to 85.27% in 2029. This suggests that as the volume of releases continues to escalate, the proportion of lower-quality games will further dominate the market. The model's statistical analysis produced a p-value below 0.05, confirming that the observed decline in game quality is statistically significant, and these findings support the hypothesis that market saturation on Steam is associated with a decline in overall game quality.

Table 1: Summary of Forecasted Game Releases.

Release Year	Total Games	% Above	% Below
2025	23,334	28.25	71.75
2026	24,718	23.05	76.95
2027	29,446	20.06	79.94
2028	31,709	16.84	83.16
2029	34,959	14.73	85.27

Interpretation of the findings The forecasted surge in game releases could be backed by future advancements in artificial intelligence (AI). Emerging AI tools for creating game assets—such as art, music, and code—are reducing development costs and lowering the expertise threshold for releasing games. While these technologies will make game development more accessible, they may also increase the number of lower quality games, if there is an influx of AI-assisted games which dilute overall standards [13] . The forecasted surge in game releases, driven by ARIMA forecasts, aligns with the observed historical trends where an increase in volume has been associated with a decline in game quality. Historical data indicates that until around 2022, the majority of game releases maintained ratings above the average of 3.56. However, starting in 2023, the proportion of below-average games began to dominate. This shift is statistically significant, as evidenced by a p-value below 0.05 from the regression analysis, confirming that the decline in quality is not due to random variation. This presents a significant challenge for the industry, as players may struggle to identify high-quality titles amidst a rapidly expanding and increasingly saturated market.

5 Discussion and conclusions

Summary of findings This study investigated whether the increasing number of game releases on Steam correlated with declining game quality. Key findings included a sharp increase in game releases since 2013 alongside a decline in average review scores. The proportion of low-rated games is growing, confirmed statistically by a p-value < 0.05. An ARIMA model forecasts continued growth in releases but with an increasing proportion of below-average titles, potentially amplified by future AI-assisted development.

Evaluation of own work: strengths and limitations One strength of this study is its use of multiple methods—visualisations, statistical analysis, and forecasting models—to address the research questions. The heatmaps and bar charts effectively illustrate trends in review scores and release volumes, while statistical tests like R-squared and P-test provide quantitative support for the observed patterns. The ARIMA model allowed for realistic forecasting by accounting for non-linear trends and variability in release numbers.

However, there are limitations to consider. The dataset only includes data up to October 2024, meaning that more recent releases may not have gathered enough reviews to accurately reflect their quality. Additionally, while ARIMA was effective for forecasting, it assumes that past trends will continue into the future, which may not account for unforeseen changes in the gaming industry. The study also focused solely on review scores as a measure of quality, excluding other potential factors such as sales or player engagement.

Comparison with any other related work The findings of this report align with those of Alden Yuan (2021), who similarly observed a decline in game quality following the introduction of Steam Greenlight in 2012 and Steam Direct in 2017. However, Yuan's work only analysed data up to 2018 and did not forecast future trends. This report extends Yuan's findings by demonstrating that the decline in quality has continued through 2024 and by predicting that this trend will persist over the next five years. Yuan also raised the question as to whether declining review scores reflected worse games or higher player expectations. While this study does not directly address this question, it provides evidence that the increasing volume of releases is a contributing factor.

Improvements and extensions Given more time, several extensions could enhance this analysis. One improvement would be to incorporate genre data, in order to examine whether certain genres consistently receive higher or lower reviews or whether genre popularity has shifted over time. For example, identifying genres with consistently poor reviews could provide insights into areas where developers might improve. Furthermore, a predictive model could be developed to forecast genre-specific performance based on release volume and historical review scores.

Another potential extension would involve expanding the dataset to include games from other platforms beyond Steam. While Steam is the largest digital distribution platform for PC games, significant titles are also sold on PlayStation, Xbox, Nintendo, Epic Games Store, and publisher-owned sites. Including this wider range of games could provide a more comprehensive view of trends in game quality and popularity and would open the data to a wider market than just PC gamers.

Finally, it would be interesting to identify specific games that have revolutionised or popularised certain genres and then analyse whether subsequent releases in those genres achieved similar levels of success. Such an analysis could shed light on how innovation impacts game quality and whether established formulas lead to diminishing returns.

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