A Quantitative Analysis of the Impact of COVID-19 on Video Gaming Industry

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Abstract

The impact of the Covid-19 pandemic has been growing at a tremendous speed all over the world since its outbreak in 2020, which resulted in massive uncertainty and disorder in many fields including the economy, society, politics and culture. It is reported that gaming usage has been increasing during the pandemic. In this research, we analyze the impact of Covid-19 on the video gaming industry in the United States. A quantitative analysis which focuses on the behavior of major gaming companies' stock prices and the video gaming user data before and during the Covid-19 pandemic is performed. It shows that daily player counts and average concurrent players increased dramatically with the advent of Covid-19. However, there is only a weak correlation between the concurrent Covid-19 cases and the change in daily players, which suggests that the pandemic introduced many people to video games as a more permanent new hobby instead of as a temporary alternative to entertainment and social interaction. Other important results include that the stock prices of major gaming companies did not alter significantly due to Covid-19. With the exception of a few drops, their stock prices during Covid-19 have continued to grow and recover from drops in a similar manner to before the pandemic.

Data Sources and Methodology

We gathered data on daily players, daily stock prices, and daily Covid-19 cases. The stock prices and player count was gathered for 18 months prior to March 1st, 2020, and designated as before Covid-19. We also gathered data for 18 months following March 1st for players, prices, and Covid-19 cases, and designated this as during Covid-19.

We performed a series of hypothesis tests to determine our results.

T-Test:

$$\mathrm{t} = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}},$$

Kendall Rank Correlation Test:

$$\tau = \frac{n_c - n_d}{\sqrt{(n_0 - n_1)(n_0 - n_2)}},$$

Statistical Analysis

Hypothesis Test 1: The daily total number of people who play video games has increased since the pandemic began.

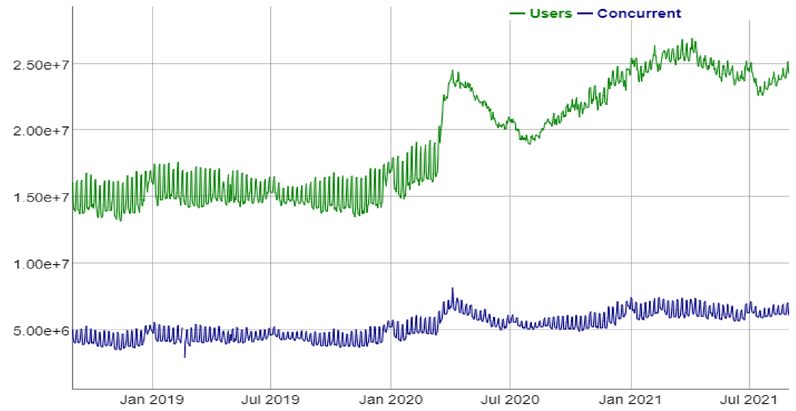
$$H_0 : \mu_0 = \mu_1$$
$$H_A : \mu_0 < \mu_1$$

$\bar{x}_1$	$\bar{x}_2$	t	df	α	p-value
15296300	22918550	-73.632	850.6	0.05	$<$ 2.2e-16

Hypothesis Test 2: The daily current number of people who play video games has increased since the pandemic began.

$$H_0 : \mu_0 = \mu_1$$
$$H_A : \mu_0 < \mu_1$$

$\bar{x}_1$	$\bar{x}_2$	t	df	α	p-value
4459485	6022452	-43.676	1057.4	0.05	$<$ 2.2e-16



Hypothesis Test 3: The stock price for game companies has increased since Covid-19 began.

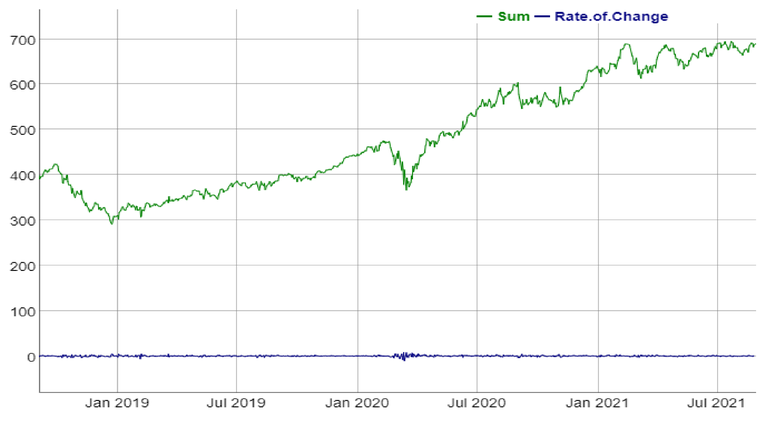
$$H_0 : \mu_0 = \mu_1$$
$$H_A : \mu_0 < \mu_1$$

$\bar{x}_1$	$\bar{x}_2$	t	df	α	p-value
379.5541	589.2899	-44.605	571.68	0.05	$<$ 2.2e-16

Hypothesis Test 4: The growth rate of gaming stock prices increased for a short time after Covid-19 began.

$$H_0 : \mu_0 = \mu_1$$
$$H_A : \mu_0 < \mu_1$$

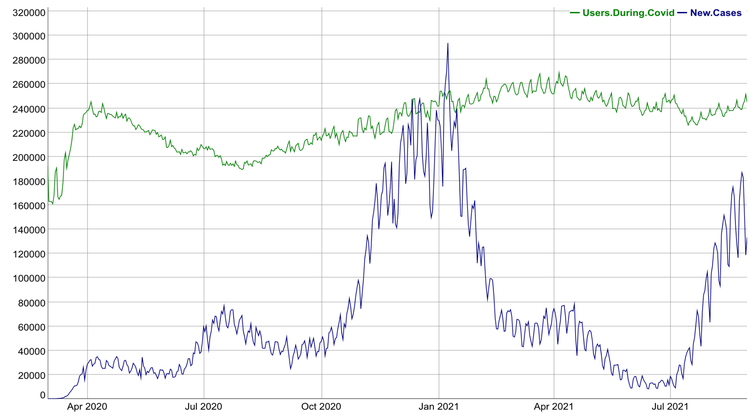
$\bar{x}_1$	$\bar{x}_2$	t	df	α	p-value
379.5541	589.2899	-0.3205	37.617	0.05	$<$ 0.3752



Hypothesis Test 5: There is a correlation between daily changes in Covid-19 cases and daily changes in the number of players.

$$H_0 : \tau = 0$$
$$H_A : \tau \neq 0$$

τ	z	α	p-value
-0.1480494	-5.1772	0.05	$<$ 2.252e-07



Statistical Interpretation

There is undeniably a significant increase in the number of daily and concurrent Steam users following the pandemic. As our representative for players in the industry, it suggests that video gaming as a whole has increased dramatically.

Covid-19 cases have a weak correlation with player data. While cases might impact player counts some, the effect is minimal. This suggests that the pandemic created created circumstances leading to a surge in players, rather than being directly responsible.

The stock prices of gaming companies have increased during Covid-19. However, the growth rate remains largely the same compared to before the pandemic.

Conclusion and Discussion

We find that there has been an increase in gaming usage since Covid-19 began, as well as a weak correlation between new cases and users.

Video game companies stock prices continue to grow at approximately the same rate as before Covid-19.

These results suggest two things. First, the introduction of Covid led to a massive spike in people playing video games. This is in line with our initial reasoning, namely that quarantine and social distancing led to many new players searching for entertainment and social interaction. Second, the circumstances of the pandemic seem more responsible for creating a surge of new players rather than maintaining them. Players appear to be using video games as a permanent hobby rather than a temporary replacement to other activities.

This is significant because it indicates an increased interest and larger interaction with the video game industry. Game developers who are aware of this trend would likely benefit from releasing new product or advertising prior products.

Covid-19 has had other affects on the industry. Further research will help determine the change in demographics among game users, such as gender and race distribution. Furthermore, what game genres are gaining popularity during the pandemic is another point of interest. Following these trends will help developers decided what audiences to target and help them determine what kind of game they want to build.

References

SteamDB
Yahoo Finance
CDC Covid Data Tracker