# Can Netflix Beat Disney in Business Operation-Evidence from the Streaming Media Competition

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**Abstract:** With the impact of COVID-19 in the last two years, streaming media that can be played and watched at home is becoming mainstream in the United States. Disney, the world's largest entertainment company, is facing the closure of its theme parks, a lack of sports programming at ESPN (Entertainment Sports Programming Network), layoffs and the suspension of live movies. Netflix is an innovative company focused on streaming and has been at the forefront of deals for nearly a decade. In the past two years, it has also made great achievements in the field of independent IP research and development. Netflix, meanwhile, has used the pandemic as a springboard to record numbers of new subscribers. In order to explore whether Netflix, Disney's main potential competitor in the streaming industry, will affect Disney's future business development, this paper selects financial input indicators and output indicators of Disney and Netflix from 2003 to 2021, and uses DEAP2.1 software to calculate and analyze the streaming media operation efficiency of the two companies in 19 years from the perspective of output. The results show that Netflix has excellent streaming media operation efficiency from 2003 to 2021, while Disney has poor streaming media operation efficiency. Results of the streaming media operation efficiency of Disney and Netflix from the perspective of comprehensive efficiency decomposition can highlight the allocation of streaming media operation from the perspective of relaxation variable value and achieve DEA effective target value.

**Keywords:** Streaming Media; DEA Model; Malmquist Index

## 1. Introduction

During the COVID-19 pandemic, streaming video has become part of many people's lives at home, with streaming usage continuing to grow. However, online streaming services are challenging long-standing decision-making processes in the traditional motion picture industry (Hadida *et al.*, 2020). According to the European Audiovisual Observatory, a media think-tank, European countries' revenues from subscription video streaming has soared from $14.6 million in 2010 to $11.7 million in 2020. An estimated 140 million Europeans subscribe to at least one video-streaming service. In Latin America, subscription video streaming is expected to reach $69 million users this year. In Asia, China, India and Japan are the most potential subscription-based video streaming media markets, among which the number of subscribers of subscription video streaming media in China will reach 300 million in 2021.

Streaming media can be divided into audio and video, among which video can be divided into the live broadcast, on-demand, long video, short video and other forms. In terms of content, in addition to the familiar film and television series and video streaming media, there are also music and guest streaming media, video game streaming media, sports streaming media, documentary streaming media and other platforms. The industry generally believes that the future of global streaming media development will still maintain a good trend. According to the latest data from Statista, subscription video streaming revenue is expected to grow by 8.9% a year between 2022 and 2026; The sector is expected to grow to 1.49 billion subscribers worldwide by 2026, with a penetration rate of 18.9%. The global video streaming market is expected to reach about $930 billion by 2028, according to an Indian market research firm.

The following section of this study briefs streaming media industry followed by theoretical efficiency analysis using DEA. The results will be demonstrated by static analysis and dynamic analysis. Conclusions and policy suggestions will be proposed in the final.

## 2. Analysis of Current Development Status of Streaming Media Industry

### 2.1. Streaming Media

Streaming media refers to a technology and process that compresses a series of media data, sends data segmented through the Internet, and instantly transmits video and audio on the Internet for viewing. This technology enables data packets to be sent like flowing water. Streaming transmission can transmit live video or video stored on the server. When the viewer watches these video files, the video data is immediately delivered to the viewer's computer and played by specific player software. Hundreds of options readily available on the streaming services' homepages reduce user search costs to a minimum (Gomez-Uribe and Hunt, 2016). Streaming apps provide differing consumption values to customers (Oyedele and Simpson, 2018) and can be made more environmentally friendly (Nair *et al.*, 2019). In the ranking of the world's top ten streaming media platforms in 2021, Netflix ranked first, and Disney's Hulu and Disney+ ranked fifth and sixth.

### 2.2. Disney

The Walt Disney Company is a diversified global entertainment company. It has five business units: media Networks, Parks and Resorts, studio entertainment, consumer products and interactive. Disneyland and its movie business have been hit hard by the pandemic, with offline park closures, layoffs and its first loss in a decade in 2020. Launched in November 2019, Disney+ has experienced rapid growth in its subscriber base. Its memberships grew to 50 million in just five months following its launch. Disney currently has three streaming platforms: Disney+, Hulu+ and ESPN+. Disney is outperforming its competitors in the youth media market (Schiele *et al.*, 2020).

The streaming platform Disney+ had a five-year plan to reach at least 60 million subscribers by 2024, but it took less than a year. Its new target now is 260 million users. More recently, Disney +, to lead the subscription market (Martínez-Sánchez *et al.*, 2021). Bob Chapek, who took the helm at Disney before the pandemic, was convinced that the key to the company's future was to go direct to consumers, and that was the North Star that helped him point the way. Although it started late, it successfully grabbed a place in streaming media based on Disney's copyright advantages. On February 10, Disney announced its first-quarter results for 2022. The report shows that as of January 1, 2022, Disney's streaming media service Disney+ had 129.8 million global subscribers, up from 118.1 million in the previous quarter, and market expectations were 125.75 million; Disney+ added 11.8 million new users for worldwide households, exceeding the market average estimate of 7 million.
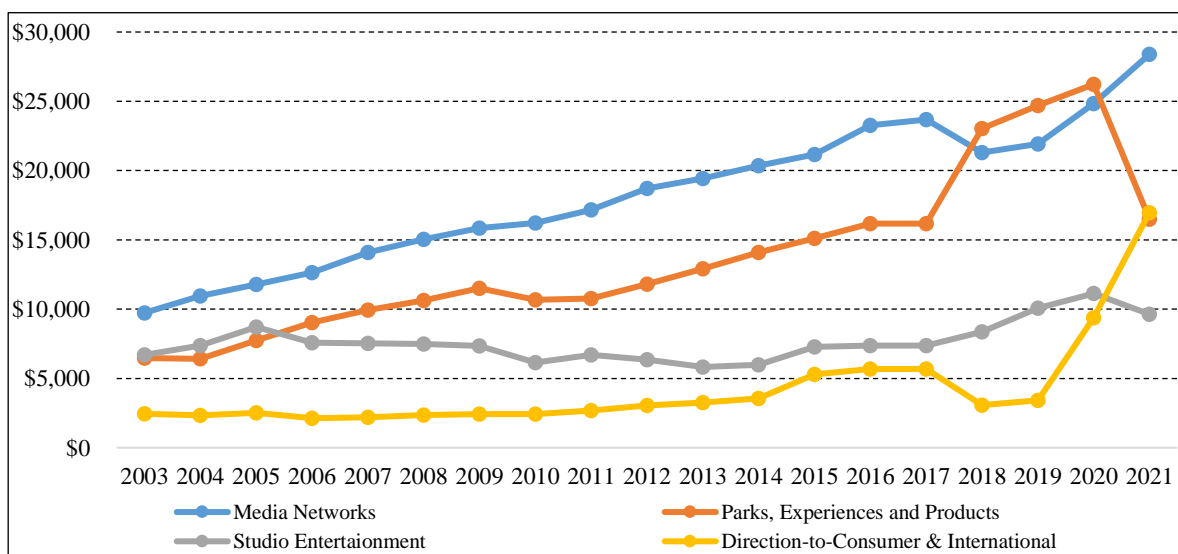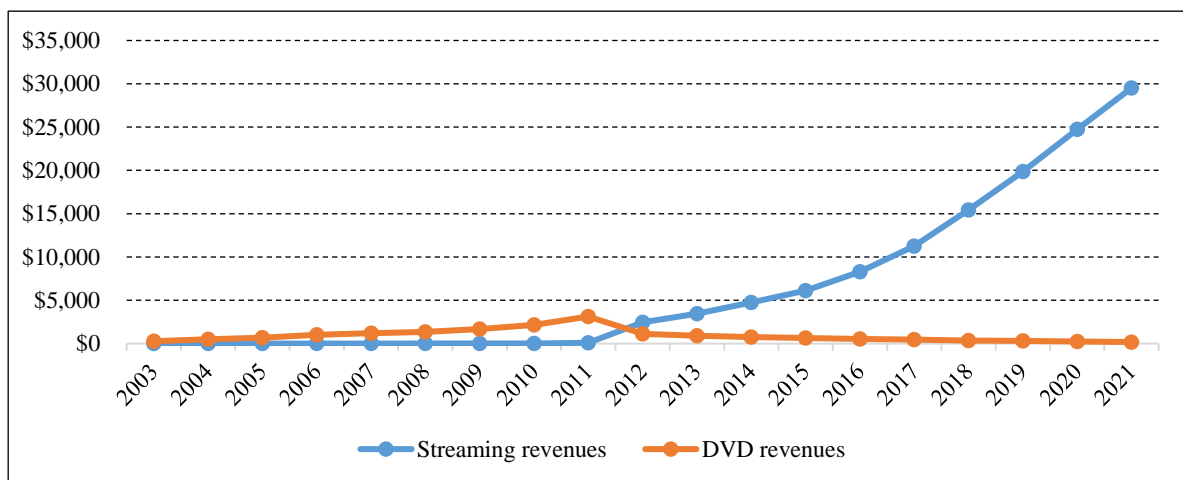


Source: Author's own compilation

**Figure 1.** Operating revenue of Disney's four major businesses from 2003 to 2021 (in millions).

*2.3. Netflix*

Netflix is a company that rents DVDs to paying subscribers through the mail. Back in 2007, Netflix introduced streaming technology and began to plow its way into streaming video. A poster child for a firm that has made this transition several times over a 20-year period is Netflix. It is interesting to note that that firm was named "Netflix" back in the late 1990s when the internet or "net" was just emerging as a commercial force. The firm could have easily been named "DVDflix" or some other classification recognizing the dominant technology at the time. But the name Netflix was farsighted, since it ultimately became the platform for streaming, original content, and global production (Jaworski, 2021). Subscribers choose which movies to rent through a web interface that allows browsing by genre and searches for specific films, actors, or directors (Vickers *et al.*, 2010). Netflix uses premium content to generate more subscriptions to its streaming service and fend off competitors (Hadida *et al.*, 2020). After a long time of accumulation, Netflix has adopted a series of streaming media technologies such as terminal adaptive picture quality and multi-screen, changing the way users watch videos. Netflix is accelerating subscriber growth through its spending on original content and marketing efforts and rising fast to become the largest online streaming platform in the world. Its popularity surged faster during the pandemic when people stayed indoors following lockdown in several leading markets, and Netflix was their main source of entertainment. Overall, while Netflix continues to experience a fast surge in popularity and higher engagement rates than rivals, its focus on innovation continues to grow stronger. According to data released by Netflix, the number of global subscribers in the first quarter of 2022 was 221.64 million, a year-on-year increase of 6.7%, but a month-on-month decrease of 200,000, the first decline in history.

Source: Author's own compilation
**Figure 2.** Operating revenue of Netflix's two major businesses from 2003 to 2021 (in millions).

## 3. Theoretical Analysis Hypothesis and Research Methods

*3.1. The Research Hypothesis*

Due to the difference in the time when Disney and Netflix entered the streaming media market, in order to analyze the efficiency of streaming media operation in a more targeted way, this paper takes time as the standard to judge the efficiency value. Among Disney's three streaming product lines, ESPN+ launched in 2002, HULU+ in 2008, and Disney+ in 2020. Netflix's streaming service has been in operation since 2008. Based on the above judgment, the paper puts forward the following two hypotheses:

H1: Netflix's streaming operation has been efficient since 2008

H2: Disney's streaming operation was inefficient in the first few years and may increase its efficiency value in the next few years

Next, the paper will combine the two proposed research hypotheses. The DEA model and Malmquist index are applied to evaluate the efficiency of the two enterprises in 19 years, and find out the existing problems and propose solutions based on the results.

## 3.2. Porter's Five Force Model

Porter's five forces model was proposed by Michael Porter in the early 1980s. He believes that there are five forces that determine the scale and degree of competition in the industry, which together affect the attractiveness of the industry and the competitive strategy decisions of existing enterprises. Porter's five force framework is a very popular tool for analyzing the competitive environment of an industry (Mukherjee, 2018). In a sense, it belongs to micro analysis of external environment analysis. Porter's five forces model can be used to analyze competitive strategy effectively. Here, Walt Disney's bargaining power from suppliers and buyers, threat from potential entrants, threat from substitutes, and finally, competition from companies in the same industry will be analyzed.

It is worth mentioning that in terms of revenue, Netflix, as Disney's new entrant and competitor in the streaming media industry, achieved revenue of $29.7 billion and profit of $5.1 billion in 2021. For 2019, Disney is expected to post a profit of minus 2.9 billion dollars on revenue of $65.4 billion dollars, after posting a profit loss for the first year. The revenue difference for the two companies is 2.5 times, but with Netflix's high growth premium, the two companies' market values are now very similar. Therefore, the future business trend and stock price trend of the two companies is also a great watch. It is not only a competition between traditional companies and technology companies, but also a competition between companies with different paths in the same industry. It can be predicted that these two companies, as the current leader of the content industry, will operate for a long time. In the context of mobile penetration and globalization, both companies will continue to deliver great content, acquire new users, and grow revenues.

## 3.3. DEA Model

DEA is an efficiency evaluation method based on the concept of relative efficiency, which can evaluate and sort the relative validity of each decision unit of the same type by determining the production front surface (Zheng, 2021). The basic principle of DEA method is as follows: Suppose there are *n* evaluation objects, and each evaluation object can be regarded as a DMU, and each DMU has a kind of "input" and "output", which respectively represent the consumption of "resources" and the amount of "effect" generated by the DMU. DEA method includes CCR model with fixed returns to scale and BCC model with variable returns to scale. CCR model determines effective production frontier by analyzing sample input-output data, and determines whether DMU is DEA effective according to the distance between DMU and production frontier. However, since this paper will measure the operating efficiency of streaming media between Netflix and Disney, it is more reasonable to use the BCC model with variable returns to scale for calculation. The expression of the BCC model is as follows:

$$\min \left[\theta - \varepsilon\left(\sum_{i=1}^{m} s_i^- + \sum_{r=1}^{n} s_r^+\right)\right] \quad (1)$$

In equation (1), $x_{ij}$ is the $i^{th}$ input of the $j^{th}$ decision making unit, $y_{ij}$ is the $i^{th}$ output value of the $j^{th}$ decision making unit, $\theta$ is the efficiency evaluation value, $\lambda_j$ is the planning decision variable, $s_i^-$ and $s_r^+$ is the relaxation variable, $\varepsilon$ is the non-Archimedean infinitesimal. PE is comprehensive efficiency, PTE is pure technical efficiency, and SE is scale efficiency. When PTE = PE = SE, it indicates that DEA is effective. When PTE = 1, TE, SE < 1, it indicates that DEA is weak efficient. When TE, SE and PTE < 1, it indicates that DEA is invalid.

## 3.4. Malmquist Index

Malmquist index is a non-parametric efficiency evaluation method to measure multi-input and multi-output production efficiency. Compared with the DEA model, which can only measure static efficiency, Malmquist index can dynamically reflect the longitudinal changes of streaming media efficiency for Netflix and Disney in multiple periods and explain the dynamic characteristics of efficiency changes. Assuming that the output functions of period and period are respectively, and the input and output vectors are respectively, the Malmquist index expression of period to period is:

$$M(X^{t+1}, Y^{t+1}, X^t, Y^t) = \sqrt{\frac{D^t(X^{t+1}, Y^{t+1})}{D^t(X^t, Y^t)} \times \frac{D^{t+1}(X^{t+1}, Y^{t+1})}{D^{t+1}(X^t, Y^t)}} \quad (2)$$

In equation (2), when M < 1, indicating that total factor productivity decreases; When M = 1, it indicates that the total factor production efficiency remains unchanged; When M > 1, indicating that total factor productivity increases.

In addition, Malmquist index can also be decomposed into EFC index and TEC index, whose expressions are:

$$EFC = \frac{D^t(X^{t+1},Y^{t+1})}{D^t(X^t,Y^t)} \qquad (3)$$

$$TEC = \sqrt{\frac{D^t(X^{t+1},Y^{t+1})}{D^{t+1}(X^{t+1},Y^{t+1})} \times \frac{D^t(X^t,Y^t)}{D^{t+1}(X^t,Y^t)}} \qquad (4)$$

$$M(X^{t+1},Y^{t+1},X^t,Y^t) = EFC \times TEC \qquad (5)$$

where, EFC is the technical efficiency index. When EFC < 1, it indicates that the technical efficiency decreases and the distance between decision unit and production front is far. When EFC = 1, it indicates that the technical efficiency is unchanged, and the distance between decision unit and production front is changed. When EFC > 1, it indicates that the technical efficiency is improved and the distance between decision unit and production front is shortened. TEC is the technological progress index. When TFC < 1, it indicates technological recession and the production boundary of the whole industry moves inward. When TFC = 1, it indicates that the technology remains unchanged and the production boundary of the whole industry remains unchanged. When TFC > 1, it indicates that technology has improved and the production boundary of the whole industry moves outward.

## 4. Verify Hypotheses and Analyze Empirical Results

### 4.1. Indicator System and Data Sources

Based on the public annual reports of Disney and Netflix, this paper selects assets and employees as investment indicators to investigate the operation status and scale of the two companies in the streaming media industry. In addition, operating revenue, profit and owner's equity are selected as output indicators by using the annual report data to measure the economic development status and operating effects of the two companies in the streaming media industry. After determining the input-output index, a database was established and analyzed by DEAP2.1.

**Table 1.** Input and output index system of streaming media operation.

| Input indicators | Output indicators |
|---|---|
| Assets | Revenues |
| Employees | Profits |
| | Stockholder's Equity |

Source: Author's own compilation

### 4.2. DEA Static Analysis

This paper calculates the relevant index data of streaming media operation efficiency of the two enterprises from 2003 to 2021. The method to judge effectiveness is as follows: when PTE = 1 and SE = 1, that is, pure technical efficiency and scale efficiency are achieved at the same time, and this unit is called DEA efficiency; When PTE = 1 or SE = 1, that is, only one of pure technical efficiency and scale efficiency can be achieved, this unit is called weak DEA efficiency. When PTE < 1 and SE < 1, that is, pure technical efficiency and scale efficiency are not achieved at the same time, this unit is called non-DEA efficiency. The calculation results are shown in Table 2 and 3. Two of them were in force from 2003 to 2007; From 2008 to 2014, the operating efficiency of Disney's streaming media was ineffective and its development prospect was not very optimistic. From 2015 to 2019, the operating efficiency of Netflix's streaming media has been in an invalid state, while that of Disney fluctuates from effective to ineffective. The development is unstable in the early stage, and gradually tends to be stable in the later stage. In 2020~2021, the two companies gradually tend to be stable and

in an effective state. Next, the specific situation of streaming media operation efficiency of Disney and Netflix will be discussed from the perspective of comprehensive efficiency decomposition.

**Table 2.** Input-oriented operating efficiency of Disney and Netflix streaming media (2003~2021).

| years | firms | crste | vrste | scale | returns to scale | DEA validity |
|---|---|---|---|---|---|---|
| 2003 | Disney | 0.921 | 1.000 | 0.921 | irs | weakly valid |
| | Netflix | 0.944 | 1.000 | 0.944 | irs | weakly valid |
| 2004 | Disney | 0.915 | 1.000 | 0.915 | irs | weakly valid |
| | Netflix | 0.991 | 1.000 | 0.991 | irs | weakly valid |
| 2005 | Disney | 0.930 | 0.995 | 0.934 | irs | invalid |
| | Netflix | 1.000 | 1.000 | 1.000 | - | valid |
| 2006 | Disney | 1.000 | 1.000 | 1.000 | - | valid |
| | Netflix | 1.000 | 1.000 | 1.000 | - | valid |
| 2007 | Disney | 1.000 | 1.000 | 1.000 | - | valid |
| | Netflix | 1.000 | 1.000 | 1.000 | - | valid |
| 2008 | Disney | 0.927 | 0.972 | 0.954 | irs | invaild |
| | Netflix | 1.000 | 1.000 | 1.000 | - | valid |
| 2009 | Disney | 0.889 | 0.930 | 0.956 | irs | invalid |
| | Netflix | 1.000 | 1.000 | 1.000 | - | valid |
| 2010 | Disney | 0.836 | 0.875 | 0.955 | irs | invalid |
| | Netflix | 1.000 | 1.000 | 1.000 | - | valid |
| 2011 | Disney | 0.812 | 0.845 | 0.961 | irs | invalid |
| | Netflix | 1.000 | 1.000 | 1.000 | - | valid |
| 2012 | Disney | 0.838 | 0.877 | 0.955 | irs | invalid |
| | Netflix | 1.000 | 1.000 | 1.000 | - | valid |
| 2013 | Disney | 0.859 | 0.878 | 0.978 | irs | invalid |
| | Netflix | 0.988 | 0.991 | 0.997 | irs | valid |
| 2014 | Disney | 0.844 | 0.858 | 0.983 | irs | invalid |
| | Netflix | 1.000 | 1.000 | 1.000 | - | valid |
| 2015 | Disney | 0.998 | 1.000 | 0.998 | irs | weakly valid |
| | Netflix | 0.842 | 0.875 | 0.963 | drs | invalid |
| 2016 | Disney | 1.000 | 1.000 | 1.000 | - | valid |
| | Netflix | 0.834 | 0.887 | 0.940 | drs | invalid |
| 2017 | Disney | 0.988 | 1.000 | 0.988 | drs | weakly valid |
| | Netflix | 0.866 | 0.874 | 0.991 | drs | invalid |
| 2018 | Disney | 0.726 | 0.751 | 0.968 | irs | invalid |
| | Netflix | 0.881 | 0.885 | 0.995 | drs | invalid |
| 2019 | Disney | 0.844 | 0.847 | 0.996 | irs | invalid |
| | Netflix | 0.130 | 0.279 | 0.991 | irs | invalid |
| 2020 | Disney | 1.000 | 1.000 | 1.000 | - | valid |
| | Netflix | 1.000 | 1.000 | 1.000 | - | valid |
| 2021 | Disney | 1.000 | 1.000 | 1.000 | - | valid |
| | Netflix | 1.000 | 1.000 | 1.000 | - | valid |

Source: Author's own compilation

Note: "drs" indicates decreasing returns to scale, "irs" indicates increasing returns to scale, and "–" indicates unchanged returns to scale.

### 4.2.1. Comprehensive Efficiency Analysis

Comprehensive efficiency (PE) = pure technical efficiency (PTE) $\times$ scale efficiency (SE), is the comprehensive embodiment of technology and scale. The closer the value is to 1, the higher the streaming media operation efficiency of the enterprise is. As shown in Table 2 and 3, the average comprehensive efficiency of the two enterprises increased year by year from 2003 to 2005, from 0.933 in 2003 to 0.965 in 2005. The operation efficiency of streaming media is constantly improving, but there is still room for development. The average comprehensive efficiency was the highest in 2006~2007 and 2020~2021, which was 1.000.

### 4.2.2. Pure Technical Efficiency Analysis

Pure technical efficiency is a decomposition index of comprehensive efficiency, which means the proportional relationship between actual output and maximum output under the same input scale. The closer its

value is to 1, the more advanced the technology and management level of the enterprise is. As shown in Table 2, the average pure technical efficiency of the two enterprises kept at a high level from 2003 to 2009, reaching 1.000 in 2020. Among them, the pure technical efficiency in 2003~2004 and 2006~2007 remained at 1.000, which was very effective. In Table 3, the average technical efficiency of the two enterprises was basically stable at 1.000 from 2003 to 2007, and gradually declined after 2008 until it moderated in 2016.

### 4.2.3. Scale Benefit Analysis

Scale efficiency refers to the production efficiency achieved by improving input scale under the same technical level and management level, which reflects the effectiveness of input scale in the operation of Disney and Netflix streaming media. The closer its value is to 1, the closer the streaming media efficiency is to the optimal scale. As shown in Table 4, the mean scale efficiency of Netflix is the highest (0.990), while that of Disney is the lowest (0.972).

**Table 3.** Output-oriented operating efficiency of Disney and Netflix streaming media (2003~2021).

| years | firms | crste | vrste | scale | returns to scale | DEA validity |
|---|---|---|---|---|---|---|
| 2003 | Disney | 0.921 | 1.000 | 0.921 | irs | weakly valid |
| | Netflix | 0.944 | 1.000 | 0.944 | irs | weakly valid |
| 2004 | Disney | 0.915 | 1.000 | 0.915 | irs | weakly valid |
| | Netflix | 0.991 | 1.000 | 0.991 | irs | weakly valid |
| 2005 | Disney | 0.930 | 0.994 | 0.930 | irs | invalid |
| | Netflix | 1.000 | 1.000 | 1.000 | - | valid |
| 2006 | Disney | 1.000 | 1.000 | 1.000 | - | valid |
| | Netflix | 1.000 | 1.000 | 1.000 | - | valid |
| 2007 | Disney | 1.000 | 1.000 | 1.000 | - | valid |
| | Netflix | 1.000 | 1.000 | 1.000 | - | valid |
| 2008 | Disney | 0.927 | 0.968 | 0.958 | irs | invalid |
| | Netflix | 1.000 | 1.000 | 1.000 | - | valid |
| 2009 | Disney | 0.889 | 0.919 | 0.967 | irs | invalid |
| | Netflix | 1.000 | 1.000 | 1.000 | - | valid |
| 2010 | Disney | 0.836 | 0.856 | 0.977 | irs | invalid |
| | Netflix | 1.000 | 1.000 | 1.000 | - | valid |
| 2011 | Disney | 0.812 | 0.817 | 0.994 | irs | invalid |
| | Netflix | 1.000 | 1.000 | 1.000 | - | valid |
| 2012 | Disney | 0.838 | 0.850 | 0.986 | irs | invalid |
| | Netflix | 1.000 | 1.000 | 1.000 | - | valid |
| 2013 | Disney | 0.859 | 0.861 | 0.997 | irs | invalid |
| | Netflix | 0.988 | 0.991 | 0.998 | irs | invalid |
| 2014 | Disney | 0.844 | 0.873 | 0.967 | drs | invalid |
| | Netflix | 1.000 | 1.000 | 1.000 | - | valid |
| 2015 | Disney | 0.998 | 1.000 | 0.998 | irs | weakly valid |
| | Netflix | 0.842 | 0.888 | 0.949 | drs | invalid |
| 2016 | Disney | 1.000 | 1.000 | 1.000 | - | valid |
| | Netflix | 0.834 | 0.896 | 0.931 | drs | invalid |
| 2017 | Disney | 0.998 | 1.000 | 0.998 | drs | valid |
| | Netflix | 0.866 | 0.882 | 0.982 | drs | valid |
| 2018 | Disney | 0.726 | 0.782 | 0.929 | drs | invalid |
| | Netflix | 0.881 | 0.890 | 0.989 | drs | valid |
| 2019 | Disney | 0.844 | 0.909 | 0.928 | drs | invalid |
| | Netflix | 0.892 | 0.897 | 0.994 | irs | invalid |
| 2020 | Disney | 1.000 | 1.000 | 1.000 | - | valid |
| | Netflix | 1.000 | 1.000 | 1.000 | - | valid |
| 2021 | Disney | 1.000 | 1.000 | 1.000 | - | valid |
| | Netflix | 1.000 | 1.000 | 1.000 | - | valid |

Source: Author's own compilation

Note: "drs" indicates decreasing returns to scale, "irs" indicates increasing returns to scale, and "–" indicates unchanged returns to scale.

**Table 4.** Average streaming efficiency of Disney and Netflix (input-oriented).

|  | TE mean | PTE mean | SE mean |
|---|---|---|---|
| Disney | 0.912 | 0.938 | 0.972 |
| Netflix | 0.960 | 0.969 | 0.990 |

Source: Author's own compilation

### 4.3. Analysis of Slack Variables

Under the input orientation, the operating efficiency of Disney's streaming media changed from invalid to effective from 2005 to 2017, and from invalid to effective from 2018 to 2021. Netflix's streaming media operation efficiency was higher from 2003 to 2014, lower from 2015 to 2019, and gradually became effective in 2021. The two enterprises attach great importance to the operation efficiency of streaming media and can effectively solve problems, which is of reference significance to other enterprises.

The following will analyze the slack variables of the streaming media operation efficiency of the two companies from the perspective of investment. The state of input slackness reflects the gap between the actual input and the relative optimal input. From the point of view of technology, low technical efficiency is not necessarily manifested as input slackness, but input slackness is bound to bring negative impact on technical efficiency. As shown in Table 5, in the development of streaming media operation of Disney in 2005, the output deficiency value of operating income is 219.399, the output deficiency value of employees is -9,134.957. From 2008 to 2014, affected by the financial crisis, the output deficit of operating income decreased year by year. After taking appropriate measures, Disney's streaming media business efficiency has reached an effective state in the next three years.

**Table 5.** Input-oriented slack variable analysis of Disney's streaming media operation efficiency.

| years | Revenues slack movement | Profits slack movement | Stockholder's Equity slack movement | Assets slack movement | Employees slack movement |
|---|---|---|---|---|---|
| 2003 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2004 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2005 | 219.399 | 0.000 | 0.000 | 0.000 | -9,134.957 |
| 2006 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2007 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2008 | 825.795 | 0.000 | 0.000 | 0.000 | -2,402.518 |
| 2009 | 618.413 | 0.000 | 0.000 | 0.000 | -4,084.945 |
| 2010 | 303.912 | 0.000 | 0.000 | 0.000 | -4,485.802 |
| 2011 | 240.484 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2012 | 244.413 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2013 | 353.400 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2014 | 156.758 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2015 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2016 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2017 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2018 | 844.661 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2019 | 1,406.455 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2020 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2021 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Mean | 266.154 | 0.000 | 0.000 | 0.000 | -1,058.327 |

Source: Author's own compilation

In Table 6, there is not much slackness in assets and employees, probably due to Netflix's preference for online services. In the development of streaming media operation of Netflix in 2013, the input slackness value of profits is 52.929. In the era of development of and technology, the rapid development of streaming media is accompanied by the increase of profit and owner's equity slackness value of Netflix from 2015 to 2019.

**Table 6.** Input-oriented slack variable analysis of Netflix's streaming media operation efficiency.

| years | Revenues slack movement | Profits slack movement | Stockholder's Equity slack movement | Assets slack movement | Employees slack movement |
|---|---|---|---|---|---|
| 2003 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2004 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2005 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2006 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2007 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2008 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2009 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2010 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2011 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2012 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2013 | 0.000 | 52.929 | 0.000 | 0.000 | 0.000 |
| 2014 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2015 | 0.000 | 501.346 | 400.243 | 0.000 | 0.000 |
| 2016 | 0.000 | 906.450 | 1,145.254 | 0.000 | 0.000 |
| 2017 | 0.000 | 977.950 | 1,862.706 | 0.000 | 0.000 |
| 2018 | 0.000 | 1,140.489 | 2,575.311 | 0.000 | 0.000 |
| 2019 | 0.000 | 774.691 | 1,927.581 | 0.000 | 0.000 |
| 2020 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2021 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Mean | 0.000 | 229.150 | 416.373 | 0.000 | 0.000 |

Source: Author's own compilation

### 4.4. Malmquist Dynamic Analysis

#### 4.4.1. Stage Analysis

Malmquist index and decomposition index of Disney and Netflix are shown in Table 7. The mean total factor productivity of streaming media efficiency in 18 years from 2003 to 2021 is 1.046. Only in 2007~2009, 2011~2012 and 2014~2015, the total factor production index of streaming media efficiency was less than 1, and all the other years were greater than 1. Among them, the total factor productivity in 2012~2013 was the highest (1.585).

**Table 7.** Malmquist index analysis of streaming media revenue (2003~2021).

| years | effch | techch | pech | sech | tfpch |
|---|---|---|---|---|---|
| 2003~2004 | 1.000 | 1.207 | 1.000 | 1.000 | 1.207 |
| 2004~2005 | 1.000 | 1.096 | 1.000 | 1.000 | 1.096 |
| 2005~2006 | 1.000 | 1.322 | 1.000 | 1.000 | 1.322 |
| 2006~2007 | 1.000 | 1.048 | 1.000 | 1.000 | 1.048 |
| 2007~2008 | 1.000 | 0.746 | 1.000 | 1.000 | 0.746 |
| 2008~2009 | 1.000 | 0.963 | 1.000 | 1.000 | 0.963 |
| 2009~2010 | 1.000 | 1.050 | 1.000 | 1.000 | 1.050 |
| 2010~2011 | 1.000 | 1.048 | 1.000 | 1.000 | 1.048 |
| 2011~2012 | 1.000 | 0.590 | 1.000 | 1.000 | 0.590 |
| 2012~2013 | 1.000 | 1.585 | 1.000 | 1.000 | 1.585 |
| 2013~2014 | 1.000 | 1.246 | 1.000 | 1.000 | 1.246 |
| 2014~2015 | 1.000 | 0.710 | 1.000 | 1.000 | 0.710 |
| 2015~2016 | 1.000 | 1.015 | 1.000 | 1.000 | 1.015 |
| 2016~2017 | 1.000 | 1.219 | 1.000 | 1.000 | 1.219 |
| 2017~2018 | 1.000 | 1.077 | 1.000 | 1.000 | 1.077 |
| 2018~2019 | 1.000 | 1.133 | 1.000 | 1.000 | 1.133 |
| 2019~2020 | 1.000 | 1.140 | 1.000 | 1.000 | 1.140 |
| 2020~2021 | 1.000 | 1.086 | 1.000 | 1.000 | 1.086 |
| Mean | 1.000 | 1.046 | 1.000 | 1.000 | 1.046 |
| Disney | 1.000 | 1.007 | 1.000 | 1.000 | 1.007 |
| Netflix | 1.000 | 1.086 | 1.000 | 1.000 | 1.086 |
| Mean | 1.000 | 1.046 | 1.000 | 1.000 | 1.046 |

Source: Author's own compilation

### 4.4.2. Hypothesis Verification

According to the analysis of the above empirical results, Netflix does have the highest comprehensive efficiency among Disney and Netflix. Disney has failed to surpass Netflix in the efficiency of its streaming operations. H1 and H2 have been therefore verified.

## 5. Conclusion

According to the above analysis, Netflix's streaming media operation efficiency is generally good, while Disney's performance is not high. Under certain environment and policy support, Netflix's input value and output value can effectively achieve the results. Netflix does face deeper challenges with streaming technology, too, and the company recently updated its algorithm for evaluating the need to keep streaming shows based on how long users watch them. By using DEA model to analyze streaming media operation data of Disney and Netflix from 2003 to 2021, Netflix is superior to Disney in streaming media operation efficiency. Disney is stronger than Netflix in terms of operational efficiency in the streaming business. Streaming is one of Disney's main businesses. In the face of the competition of Netflix, Disney should use its strong content inventory and production and development capabilities to provide quality content for the entire Disney company and strengthen the brand. Disney could also leverage other business units to support streaming and leverage Disney's brand size on Disney+ for revenue growth.

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