

The Impact of the Economy on the Plastic Surgery Industry in the Post-pandemic Era

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Abstract: In today's era of rising aesthetics, there is growing consumer demand for cosmetic surgery, and more and more people are using plastic surgery as a way to achieve their high expectations for appearance and body. According to the data of the American Society for Aesthetic Plastic Surgery, the number of people who undergo plastic surgery activities in the United States each year is very large. Therefore, the plastic surgery industry is a very important industry in the United States and has a huge market. With the impact of COVID-19, the revenue of the U.S. plastic surgery industry continues to change from 2018 to 2021, with a significant downward trend in the most severe year, 2019. Several studies have argued that there may be a link between the plastic surgery industry and economic indicators, but the experimental subjects and results still differ. This study uses the Pearson correlation to conduct an experiment whose purpose is to explore the relationship between the revenue of plastic surgery in the United States and U.S. economic indicators. The results achieved show that GDP and CPI, among the economic indicators, are positively associated with the benefits of plastic surgery in the United States.

Keywords: economy, cosmetic surgery, COVID-19, economic indices

1. Introduction

The economic devastation caused by the COVID-19 pandemic in various countries around the world is undeniable [1]. According to the Bureau of Labor Statistics total U.S. nonfarm employment fell to 20.5 million in April 2020, a 14 percent decline in just two months [2]. Reflecting the dampening effect of the COVID-19, April's year-over-year decline was the largest in the history of the index and brought employment down to its lowest level since January 2011. As of August 2021, seasonally adjusted first-time claims for unemployment benefits are up to 262,000. In comparable weeks in 2021, 11,825,252 people applied for benefits each week across all programs [2]. This number is a staggering presence throughout U.S. history. U.S. GDP has also fallen to its lowest trough since the fourth quarter of 2019. All in all, the contraction and dampening impact of COVID-19 on the economy is evident.

The situation in the U.S. plastic surgery industry market has also declined to some degree. According to data from the American Academy of Plastic Surgery, the U.S. plastic surgery industry market size was \$1.7 billion in 2018 shrinking to \$1.63 billion in 2019 by the pre-COVID-19 period. The gains bounce back to \$1.84 billion by 2020 as the epidemic situation improves, reaching an all-time high of \$1.98 billion in 2021 [3]. Dr. Pierre B. Saadeh, a surgeon with the American Society of

Plastic Surgeons, in his study of the factors that influence the growth of the plastic surgery business, found that revenue from cosmetic surgery varies with changes in the market value of the stock market and other macro factors. The change in revenue from minimally invasive surgery is even more controlled by the disposable income of consumers [4]. In order to explore the relationship between economic development and the cosmetic surgery market, this paper proposes to compare economic indices with data on the revenue of the U.S. plastic surgery industry to explore the findings. This conclusion will have important implications for the future development of the U.S. plastic surgery market.

2. Overview of the Plastic Surgery Industry

Plastic surgery is made up of two parts: cosmetic surgery and reconstructive surgery. Cosmetic procedures also include cosmetic surgical procedures and cosmetic non-surgical procedures. Among the cosmetic procedures commonly known by the public are liposuction, breast augmentation and blepharoplasty (eyelid). Cosmetic non-surgical procedures are carried out by neurotoxins, dermal fillers and skin treatment. Tumor removal (including skin cancer) and laceration repair (other than facial) are the main types of reconstructive surgeries. In all of these cosmetic procedures, cosmetic surgical procedures are the largest in number and market share [5]. According to the American Society of Plastic Surgeons, 15.6 million cosmetic surgical procedures were performed in 2020 [3]. The U.S. cosmetic surgery industry maintained a steady growth trend even before the coronavirus invaded. And as the number of cosmetic surgery procedures in the U.S. continues to grow, the idea of cosmetic surgery is becoming more and more popular in the minds of the public. More and more people are participating in cosmetic surgery activities, and consumer demand and consumption patterns are influenced by cosmetic surgery. As a result, the U.S. cosmetic surgery industry has led the economic development trend to some extent [6]. The factors that affect the cosmetic surgery industry are diverse, and the impact of these economic indicators is very significant. During COVID-19, which was also a time of economic turmoil, it was inevitable to study the impact of the economy on the cosmetic surgery industry.

3. Methodology

3.1. Data

Data on revenue for cosmetic surgery in the United States before and after the epidemic (2018-2021) are from the American Society of Plastic Surgery. All data for plastic surgery in the United States are summarized from national procedure data statistics. They are sent in paper questionnaires to leading U.S. plastic surgeons as well as to board-certified plastic surgeons within. And an online version of the questionnaire is also available. This result primarily reflects cosmetic surgery procedures performed by surgeons.

Figure 1 was created based on receipts received from the American Society of Plastic Surgery. According to figure 1, it can be seen that except for a very small decrease in the revenue of plastic surgery in the United States from 2018 to 2019, the revenue of plastic surgery remains on a significant upward trend from 2019-2021 during the rest of the COVID-19. Even the total revenue in 2021 reached the highest value since 2000, \$14 billion [3].

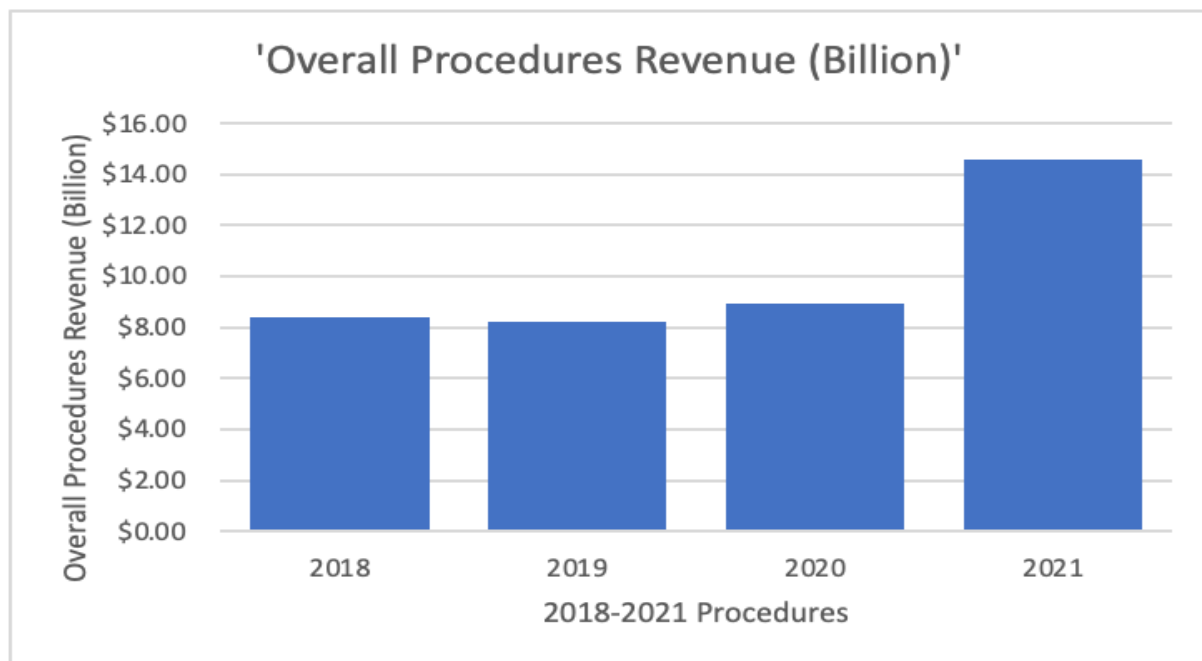


Figure 1: Overall procedures revenue (Billion).

3.2. Economic Indicators

In this work, the correlation between specific economic indicators and changes in the US plastic surgery revenue for the period before and after COVID-19 was analyzed. The economic indicators used for this analysis are shown below.

Gross Domestic Product (GDP), which is defined as the total monetary value of all goods and services produced by countries over a period of time (usually defaulted to one year). This data is taken from the World Bank website [7].

Consumer Price Index (CPI), which is defined as a price index that measures the change over time in the weighted average market price of consumer goods and services purchased by consumers. This data was obtained from the U.S. Bureau of Labor Statistics [8].

It can be seen visually in Figure 2 that U.S. GDP is on an upward and then downward trend from 2018 to 2021. In 2020, U.S. GDP is severely impacted by the intensifying COVID-19 scenario, with revenues in all industry sectors shrinking significantly [7]. As COVID-19 improves, the economy gradually recovers and develops.

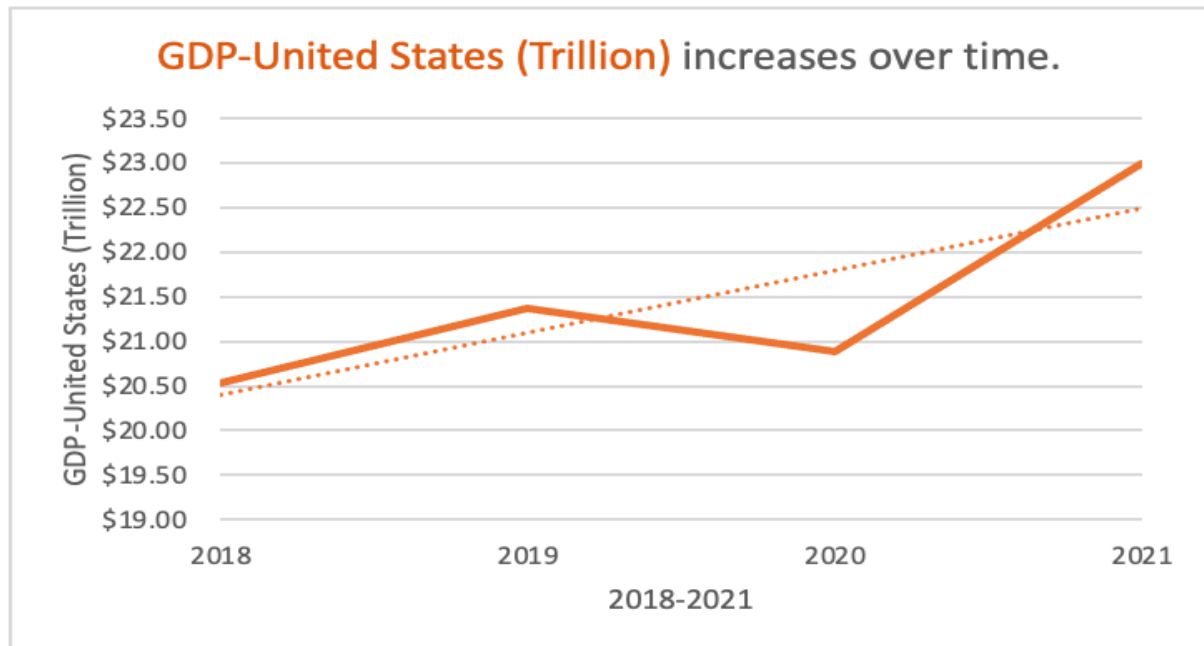


Figure 2: GDP-United States (Trillion) increases over time.

From the data obtained from the U.S. Bureau of Labor Statistics expressed in Figure 3, the CPI index in the U.S. does not fluctuate significantly from 2018-2021 and has been on a steady upward trend, except for a slight downward trend in 2020 [8].

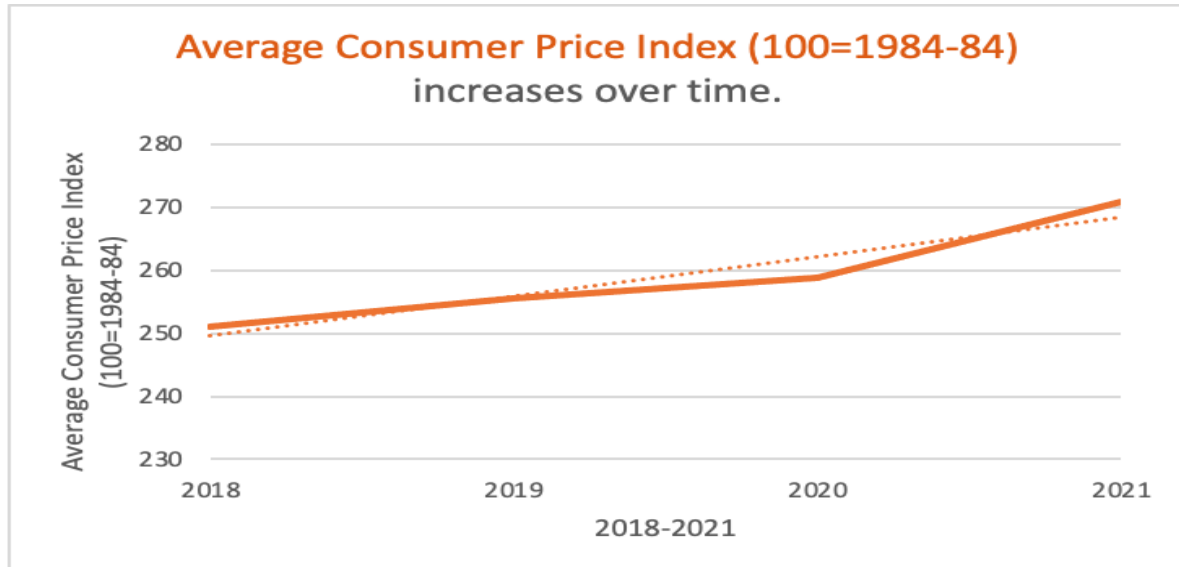


Figure 3: Average consumer price index increases over time.

3.3. Data Analysis

The Pearson correlation was chosen to analyze the correlation between economic indicators and the plastic surgery industry. The Pearson correlation is a measure of the strength of the linear relationship between two variables [9]. It is calculated by the formula:

$$r = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum (x_i - \bar{x})^2 \sum (y_i - \bar{y})^2}}. \quad (1)$$

Its value ranges from -1 to 1, with -1 representing a complete negative correlation and 1 indicating a complete correlation.

Pearson correlation calculation shows that American Society for Aesthetic Plastic Surgery (ASAPS) data has a significant positive correlation with US GDP ($r = 0.9326$, $P < 0.01$). By calculating the correlation coefficient between the US plastic surgery revenue and the US CPI ($r = 0.9479$, $P < 0.01$), it is found that there is a positive relationship between them. This is easy to understand. In the post-pandemic era, the US economy gradually recovered, GDP and CPI increased, which promoted the further development of the plastic surgery market.

4. Results

From figure 4 and the above-calculated correlation coefficient between plastic surgery revenue in ASAPS data and US GDP, it is clear that the growth of the US plastic surgery market is influenced by economic indicators and is positively correlated. The trend in revenue from 2019 to 2020 shows that the plastic surgery market is affected by the disruptive effects of COVID-19 on economic development. As the COVID-19 situation eases and recovers, the gains of the cosmetic surgery market rebound with it.

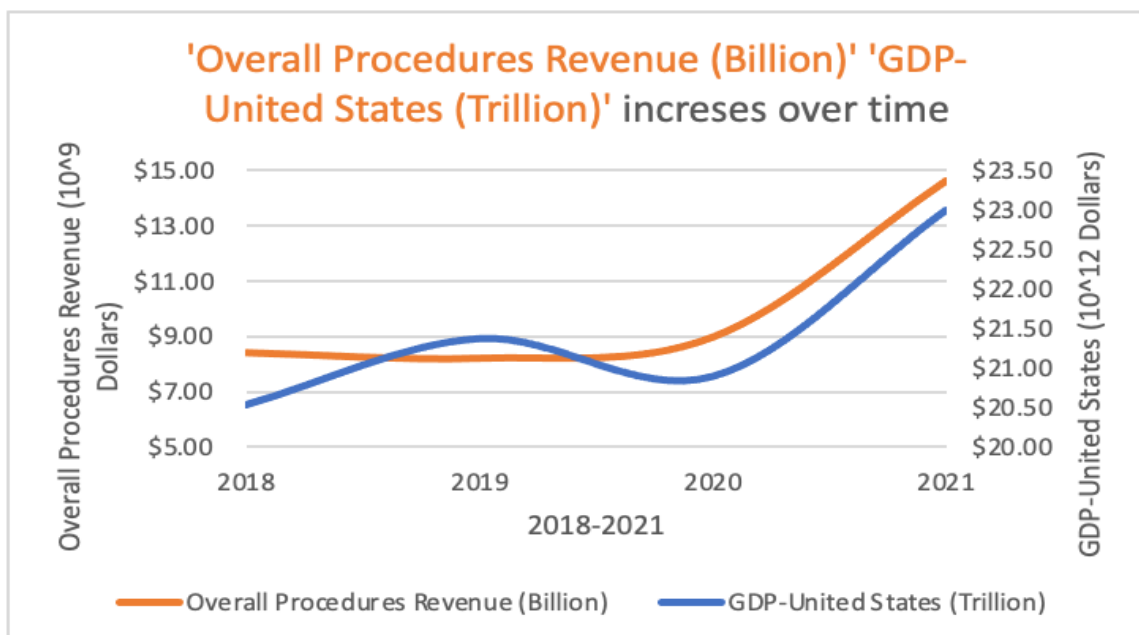


Figure 4: Plastic surgical procedures revenue compared with gross domestic product (GDP) in the United States.

The relationship between gains in the U.S. plastic surgery market and the U.S. CPI can also be found visually in Figure 5 and the calculation of the Pearson correlation coefficient. The trend in the number of gains is very similar to the trend in the CPI, with a simultaneous slowdown in the growth trend during COVID-19 until 2021, when it resumes its development and reaches a new height.

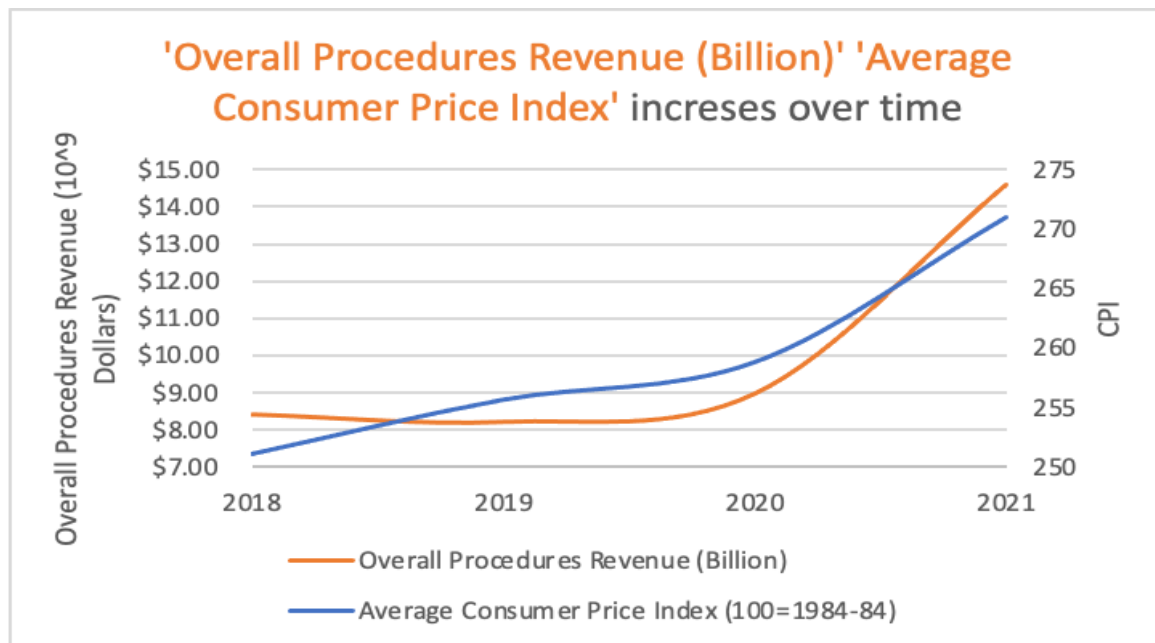


Figure 5: Plastic surgical procedures revenue compared with consumer price index (CPI) in the United States.

5. Discussions

CPI has a significant impact on the plastic surgery industry. And it is also certain that GDP is an important variable for predicting the growth rate of revenue in the plastic surgery industry. The study clearly shows that the revenue of the plastic surgery industry has not been hit by the adverse economic situation.

In addition to GDP and CPI, there are other economic factors that affect the U.S. plastic surgery industry. Dr. Duncan et al. have suggested that consumer demand for plastic surgery may be potentially linked to changes in the national mile. National interest rates are positively correlated with plastic surgery industry earnings [10]. This may indicate that consumers are more willing to spend more during periods of high national interest rates. Dr. Gordon et al. proposed the volume of plastic surgery and its correlation with major U.S. stock market indexes, but no direct results are available and further analysis is needed [11]. Remote working patterns during COVID-19 were also an important factor influencing the revenue of the U.S. plastic surgery industry. Because the remote working model increases the amount of time people have at their disposal, it directly allows more time to complete post-operative recovery and is more protective of people's privacy. Research by Dr. Padley and Pace suggested that increased remote video interactions are more likely to lead to consumer demand for plastic surgery procedures [12]. This is because remote video increases the likelihood that patients will see themselves in online video communication, an act that reinforces patients' dissatisfaction with their image and body image. As a result, patients turn to seeking plastic surgery as a way to change themselves. This is why the Remote working model of the COVID-19 situation is also an important factor in the revenue of the plastic surgery industry.

6. Conclusions

In this paper, based on the data and Pearson correlation calculations of the U.S. economic indicators and plastic surgery market, and the analysis of different economic indices on plastic surgery revenue, the following conclusions can be obtained.

Firstly, GDP is positively correlated with plastic surgery revenue. When there was an economic downturn due to the COVID-19 situation, there was also a decrease in the revenue of the U.S. plastic surgery market.

Secondly, CPI is also positively correlated with plastic surgery revenue. The decline in the national CPI also affected the plastic surgery market revenue.

The shortcoming of this study is that only two economic indicators, GDP and CPI, were considered, in addition to other factors that affect the U.S. plastic surgery market. The results of the ASAPS statistics show that the revenue of the U.S. plastic surgery industry is growing due to the continuous increase in demand. Therefore, the market size of the U.S. plastic surgery industry is expanding. In the future, more factors will be considered in conjunction with the analysis of the relationship with the plastic surgery market to better predict and develop the plastic surgery industry.

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