

The Impact of COVID-19 on the Stock Portfolio Construction: Advice Based on Indicators

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Abstract. Contemporarily, it is challenging to quantitatively predict or backtrack stock performance in financial markets to determine stock selection portfolios, especially after the outbreak of COVID-19 in early 2020, and more uncertainties are reflected in various stock indicators. The purpose of this study is to examine the judgment criteria of stock selection portfolios according to the stock indicators in different categories and to explore the impact of the COVID-19 pandemic based on these indicators. The annual data of 3,255 stocks is used between fiscal 2015 and fiscal 2021 to evaluate the stocks on the basis of four categories: Profitability, Payout, Growth, and Value. Besides, five companies are chosen (i.e., Intuit, TransUnion, Equifax, H&R Block, and Paychex) as examples. According to the analysis, the suggestion is that the pandemic impacted the stock market significantly, resulting in the indicators decreasing. The value of stocks might be hard to measure because of the unpredictable changes. The recommendation is to put importance on stocks with smooth growth and stable profits. In the complex market environment, a coronavirus pandemic is an event that suggests that the uncertainty in the future will increase. These results shed light on guiding further exploration of the stock portfolio from the perspective of individual investors.

Keywords: COVID-19; Stock Portfolio; Profitability; Payout; Value; Growth.

1. Introduction

Stock markets were formed before the 20th century, and it took centuries to create the modern stock markets that exist. During this period, stocks and markets fluctuate on any given day. Market cycles are universal and consist of the accumulation phase, mark-up phase, distribution phase, and mark-down phase during which the stock market expands or contracts [1]. Volatility is reflected in two of the stock market's most famous benchmarks: Dow Jones Industrial Average and the S&P 500 Index. The U.S. stock market has experienced many major market cycles, including the “Roaring 20s”, “Black Monday” and the Internet boom [2]. By the end of 2019, however, COVID-19 broke out all over the world and had become a pandemic in 2020. The dramatic changes in the global situation brought about by the pandemic have created uncertainty and panic, affecting financial markets and causing stock prices to fall [3]. For example, on Feb. 27, 2020, the Dow fell 1,191 points which was the biggest one-day drop since the 2007-2008 financial crisis [4]. When analyzing stocks in recent years, the pandemic may be one of the most important pieces of evidence to explain the unusual changes in stock. Taking the period of the pandemic as an important time node to analyze the stock situation and stock portfolio selection is an important research focus to reduce the impact of inevitable external shocks on stocks.

In the efficient market defined by finance, all information related to assets, whether public or private, is reflected in the price. However, the efficient market has been challenged in financial research because of whether there are active investments. Nowadays, the financial market exists efficiently in an inefficient state and different indicators are used to reflect the market characteristics [5]. Based on these indicators, the performance of stocks can also be predicted so that the change of them can also be regarded as the signal of trading. The data sources used to calculate these parameters are different, reflecting the performance of stocks measured from different perspectives. In particular, the pandemic is a kind of negative news that affects the price of the stock market. This impact is external so it can't be predicted by internal factors of the company. Therefore, when using financial data to calculate indicators, negative news will not be seen, which represents the necessity to include the pandemic in the analysis.

Obviously, it is feasible to predict the future development of stocks and analyze the past performance of stocks through indicators. However, the way to distinguish the perspectives that different indicators represent needs to be considered. Therefore, there are four categories to summarize the different stock indicators: Profitability, Payout, Growth, and Value. These four categories indicate different perspectives to measure the past performance and prospects of stocks, so as to help the investors analyze the rationality of the stock portfolio. Although there are continuous changes in the stock market and it is challenging to predict the stock market, many of the core contemporary views currently focus on the correlation between indicator changes and investment value changes [6]. After the COVID-19 pandemic spread around the world in 2020, stock prices fell sharply due to investor anxiety. Because the stock price is a decisive indicator, its rise and fall will contain a lot of information, and the sharp decline in stock price will lead to unexpected changes in many indicators, including the Price-to-Earnings ratio. At present, large-scale machine learning has been applied to predict the development of the stock market using indicators.

Nevertheless, this study will mainly focus on four categories and the overall index trend of the stock market taking the epidemic as the time node, to give corresponding portfolio suggestions. The rest part of the paper is organized as follows. Section 2 will show the methodology and afterward, section 3 will analyze the impact of COVID-19 and give suggestions based on stock examples.

2. Methodology

The source of data for this article is Yahoo Finance. In this study, the collected data are from the fiscal year 2015 to the fiscal year 2021, a total of 7 years. The timing of COVID-19 impact is set at 2020 so fiscal years 2020 and 2021 will be discussed separately from other fiscal years as these years are affected by external factors. The database consists of 3,800 companies with each indicator present from 2015 to 2021 across a variety of industries, including technology, construction, retail, and more. This study takes the existence of all indicators as the screening basis in order to ensure the accuracy of data and the stability of results. Therefore, companies delisted or listed during this 7-year period are not included in the calculation.

In this paper, the main method is using different indicators to measure stocks which can be summed up into four categories which are Profitability, Payout, Growth and Value. First, Profitability includes Gross Margin, GP/A, and Asset Turnover. Gross Margin is used to measure the profitability of the company's manufacturing activities.

$$\text{Gross Margin} = \frac{\text{Gross Profit}}{\text{Net Sales}} \quad (1)$$

GP/A and Asset Turnover can be used to measure the asset efficiency used by a company:

$$\text{GP/A} = \frac{\text{Gross Profit}}{\text{Assets}} \quad (2)$$

$$\text{Asset Turnover} = \frac{\text{Total Sales}}{\text{Average Assets}} \quad (3)$$

It should not be ignored that these indicators will be affected by changes in the company's industry, so it is meaningful to use them to compare companies in the same industry. Then for the Payout, it includes dividend per year(DPS) and dividend yield.

$$\text{DPS} = \frac{\text{Total Dividends}}{\text{Total Shares}} \quad (4)$$

$$\text{Dividend Yield} = \frac{\text{DPS}}{\text{Share Price}} \times 100\% \quad (5)$$

The third category is growth, which is measured by EPS (earnings per share) growth and Sales growth:

$$\text{EPS Growth} = \frac{\text{EPS (Current Fiscal Year)} - \text{EPS (Last Fiscal Year)}}{\text{EPS (Last Fiscal Year)}} \times 100\% \quad (6)$$

$$\text{Sales Growth Rate} = \frac{\text{Sales (Current Fiscal Year)} - \text{Sales (Last Fiscal Year)}}{\text{Sales (Last Fiscal Year)}} \times 100\% \quad (7)$$

In the study of this paper, the calculation standard of these two indicators is simplified as the percentage change compared with the previous fiscal year. Then finally for the Value, which is measured here by the Price-to-Earnings rate, to backtrack the value of the company [7].

$$P/E \text{ Ratio} = \frac{\text{Share Price}}{EPS} \quad (8)$$

Through the indicators mentioned above, the annual data of each stock is firstly calculated, and the stocks with non-existent data are eliminated through screening to unify the sample number. Since the four categories are very important judgment basis in the setting of a stock portfolio, the other indicators except for PE rate were sorted at the beginning. Summing up the ranking numbers to get the stock with the smallest value is the method to find the best performance in all categories. The P/E ratio is excluded because it is difficult to simply rank stocks from positive to negative. A low positive PE ratio means that a stock may be undervalued and may have greater investment potential, but a high PE ratio does not necessarily mean that the stock is of low investment value. PE rate can measure whether a stock is a growth or value stock, so it is measured as a separate indicator in the study [8]. But simply adding up the rankings was not enough. We later introduced standard deviations to measure whether the composite performance of stocks was average across the four categories.

From the sum of the rankings, the basic situation of the stock market is reflected. However, the different characteristics of each of the four categories lead to different criteria in the analysis. Due to the COVID-19 pandemic, calculating by time period is a good strategy. For example, in the analysis of profitability, the expected Gross Margin, GP/A and Asset Turnover are to be high and the standard deviation between different years is to be small. In Payout's case, the weight on the dividend side goes up because the data show that at least half of the stocks don't pay dividends. For Growth, stocks with both high growth and stability are more attractive. Finally, in terms of Value, there is a process of comparing P/E rates and using the average level of different industries as a reference.

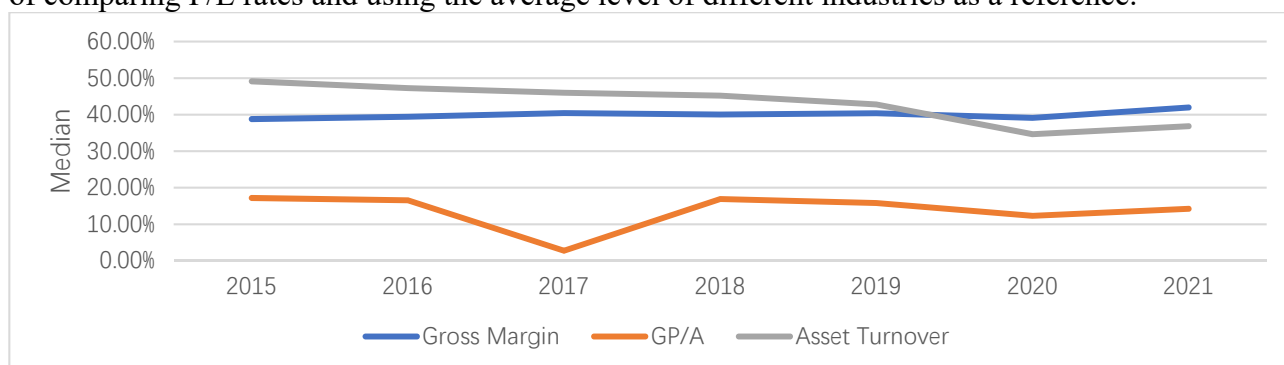


Fig. 1 Median of Profitability indicators

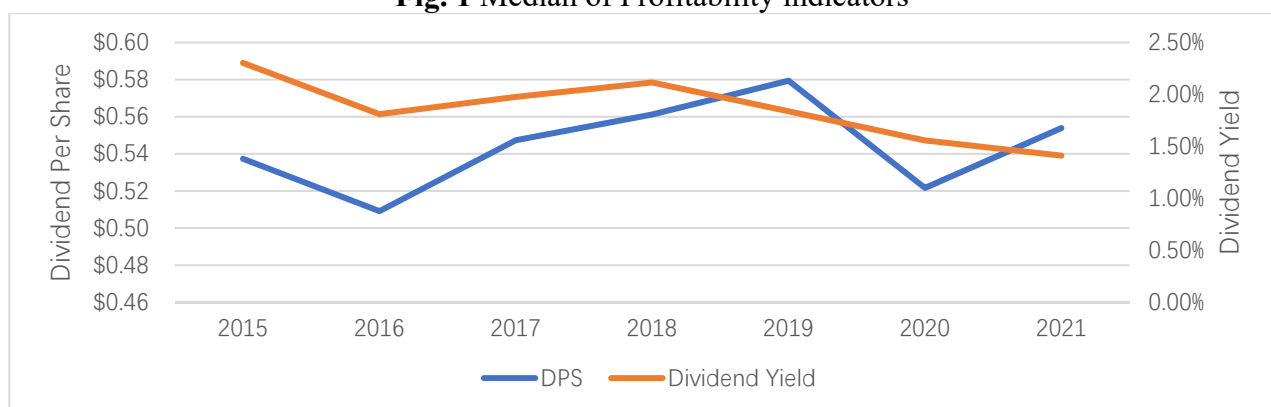


Fig. 2 Median of Payout indicators

3. Results and discussion

3.1 The impact of COVID-19

The negative impact of COVID-19 on the stock market is enormous. Figs 1-3 show the stock market performance in terms of Profitability, Payout, and Growth, and the median of each index can be used to reflect the overall situation. Seen from Fig. 1, the three indicators that profitability declined in the fiscal year 2020, among which the asset conversion rate was more affected. In fiscal 2021, the

indicators all rebounded. On the Payout side depicted in Fig. 2, DPS experienced a large decline in 2020 and picked up in 2021, while Dividend Yield experienced a sustained decline. Obviously, both growth rates in 2020 decreased significantly, indicating that the overall performance of EPS and Sales was worse than that of the previous year (seen from Fig. 3). Subsequently, it is challenging to backtrack the market with PE rates, as exhibited in Fig. 4 that PE fluctuates greatly after the pandemic, and investor sentiment is also reflected in change of PE rates [9].

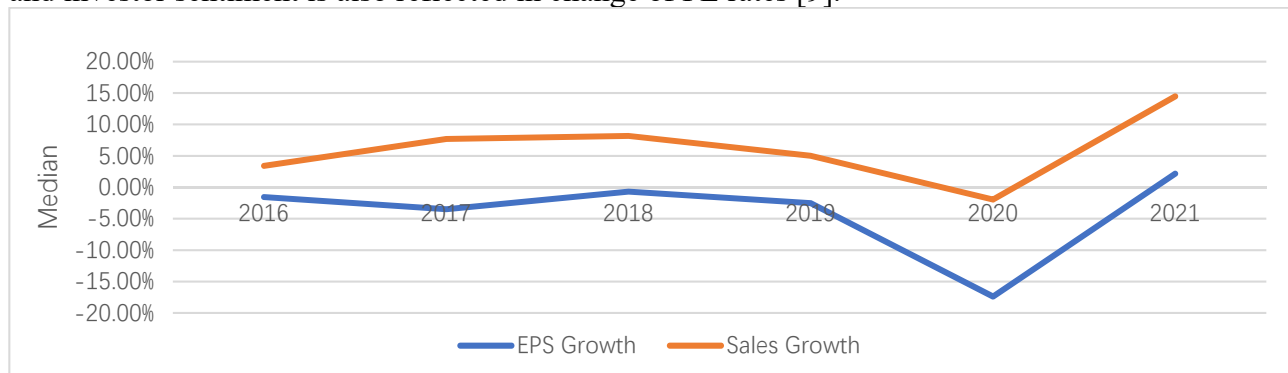


Fig. 3 Median of Growth indicators



Fig. 4 S&P 500 PE Ratio by Month.

According to the overall market performance, the four categories are all affected by the outbreak of novel coronavirus. The sharp decline in asset conversion may be related to the isolation and varying levels of commodity overstocking in response to the pandemic, while the decline in profitability also affected the payout and growth to some extent. Affected by "increased market uncertainty" and panic, investor psychology and policy changes are also more reflected in the change in PE rate. Compared with industry, the technology industry is more suitable for current research because of its characteristics. According to the above enterprise screening method, five companies (Intuit, TransUnion, Equifax, H&R Block, Paychex) are selected and analyzed. In addition, investment suggestions are given.

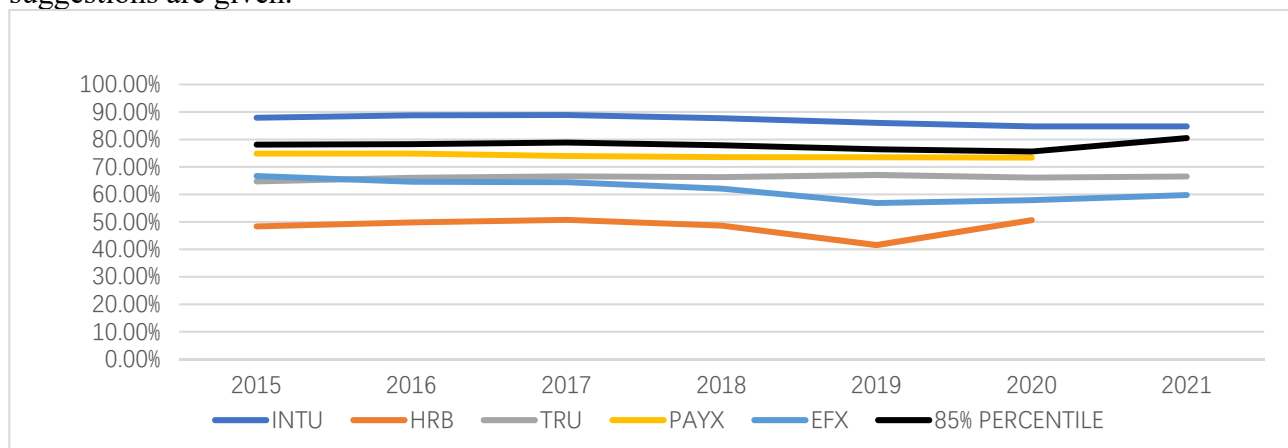


Fig. 5 Gross Margin by year.

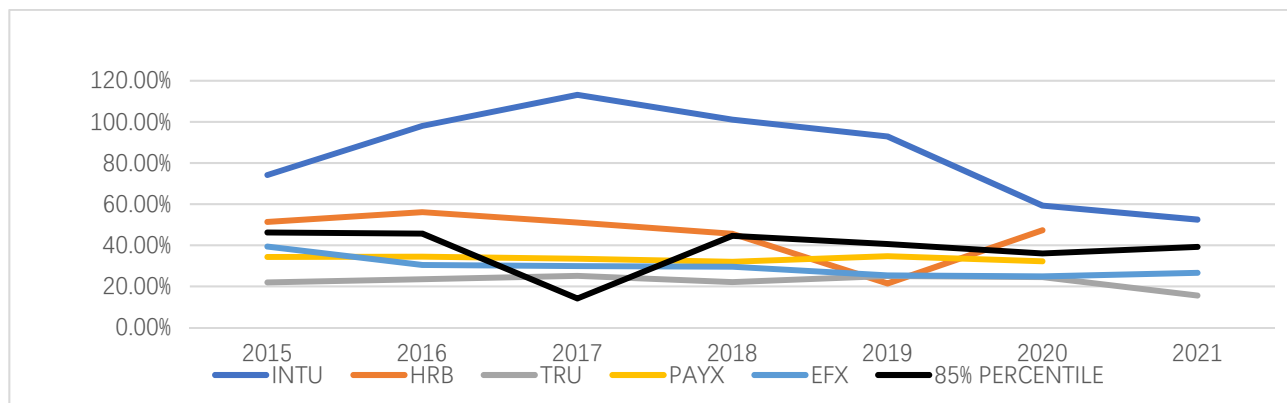


Fig. 6 GP/A by year

3.2 Stocks analysis

These companies generally outperform in profitability so it is feasible to choose the 85% quantile, a very high standard, to narrow the range. As shown in Fig. 5, the black line represents the 85% quantile for each year of the market. The dark blue line represents Intuit Inc, while the others represent competing companies. It is clear that Intuit performed better than the other stocks in all three indicators and ranked first as illustrated in Fig. 6. However, about the Asset Turnover (seen from Fig. 7), all of these stocks are outside the 85% quartile line. So, there is the 75% quantile and the results show that both Intuit and H&R Block fluctuate at the 75% quantile, while the other stocks are not able to exceed it.

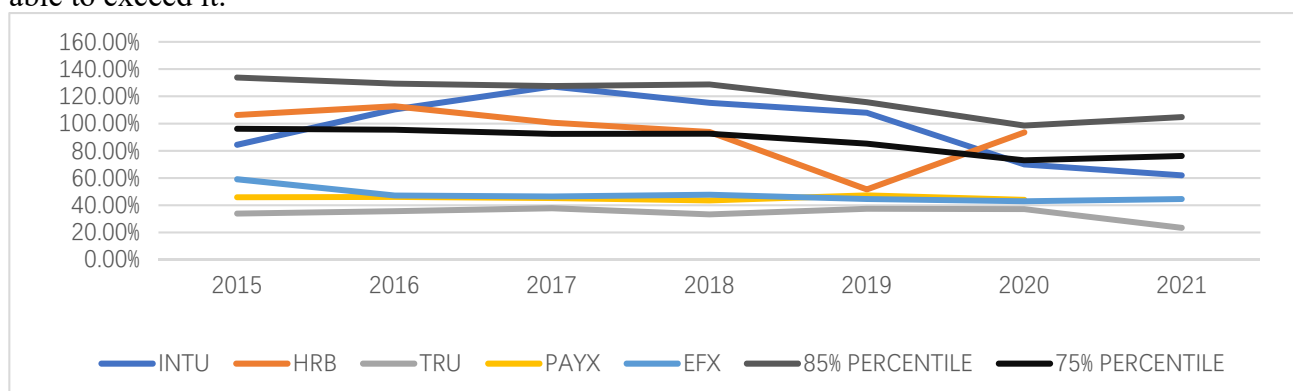


Fig. 7 Asset Turnover by year

Then, to measure the Payout, there are dividend per share and dividend yield as presented in Figs. 8 and 9. When measuring Dividend Per Share, only one company, TransUnion, is outside of the 75th percentile, while the remaining four companies all appear to be performing well. Although Intuit is not as good as Paychex in this area, it can be ranked second. After this, Intuit has a lower Dividend Yield compared with these five companies, except TransUnion, which has the lowest Dividend Yield. Therefore, Intuit is less competitive. In terms of Dividend Yield, Intuit looks like an underperformer compared to the other stocks, but the advantage is in its stability.

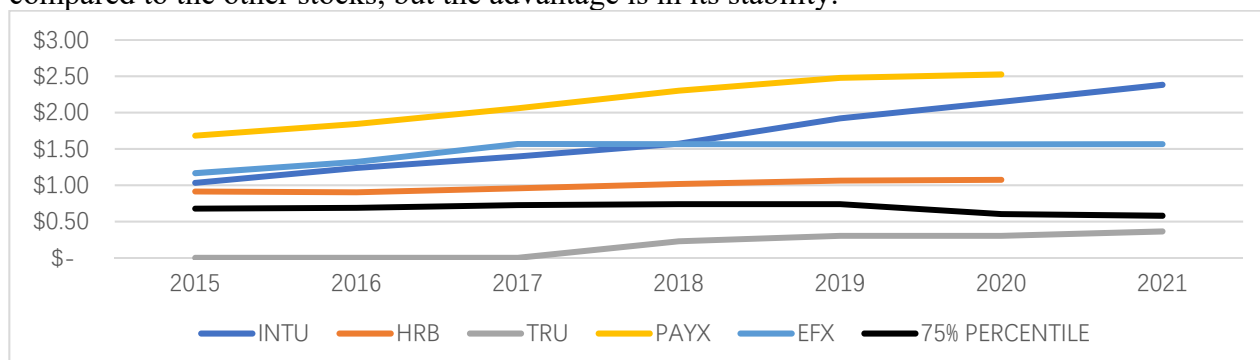


Fig. 8 Dividend Per Share by year

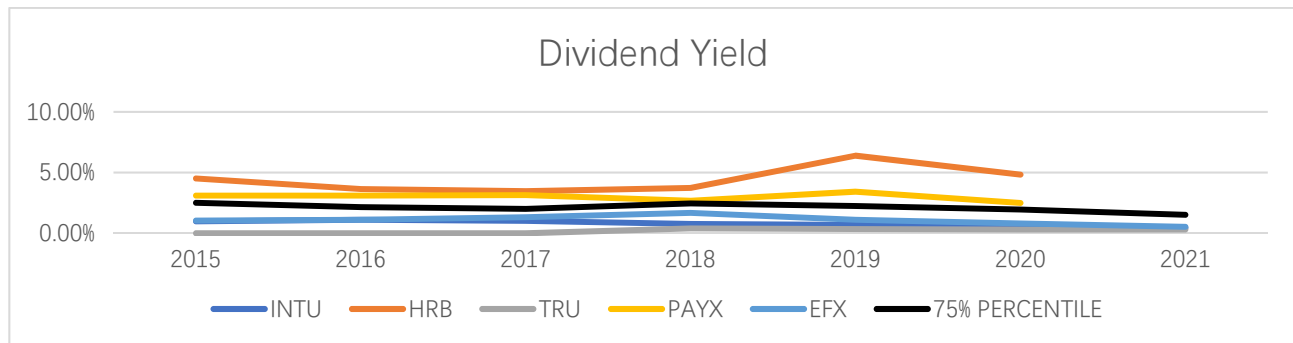


Fig. 9 Dividend Yield by year

To measure the value of each stock, this paper used the PE ratio and ranked the companies from value stocks to growth stocks and divided them into five quantiles. The PE ratios of all three stocks exceed 29.476 so they are more like growth stocks, which means they are not undervalued. Among them, Equifax may have more potential. However, according to the analysis of the software industry, this industry is trading at a PE ratio of 58.1 [10], so the PE ratio indicates that Intuit is not competitive with others, but investors appear confident in long-term growth rates [11, 12].

Finally, there is growth. Intuit has performed the best out of these five stocks so that for the stable investors, Intuit will be a good choice. Intuit's EPS Growth is above the median, while the others can't do that. H&R Block has seen a dramatic rise in EPS Growth in 2019, while TransUnion has seen a drop in EPS Growth since 2015. Equifax, on the other hand, has shown a huge drop in EPS in 2018 and 2019. The EPS Growth of these three stocks is highly variable and volatile, representing some risk. Much like EPS Growth, Sales growth is also measured. From a comprehensive perspective, Intuit is a stable and consistently growing stock.

4. Limitations & Future outlooks

Today's portfolio choices use large-scale machine learning to quantify subtle changes through mathematical modeling, making the analysis process more precise and complex. The four categories selected in this paper do not deeply discuss the advanced calculation method of a parameter. For example, when choosing the P/E ratio, whether the forward P/E ratio is used or the tracking P/E ratio will affect the focus of the analysis. In addition, this paper selects companies whose main business is software and business services, but it cannot be used to summarize the whole market situation. Retail firms, for example, need to look at conversions and more detailed balance-sheet data. Information is reflected in stock prices, and analyzing these public data and studying portfolios requires more comprehensive quantitative methods that involve more criteria.

5. Summary

In conclusion, this paper investigates the investment value based on the stock indicators in Profitability, Payout, Value. This study aims to analyze the criteria of a stock selection portfolio based on parameters and reflect the impact of the COVID-19 pandemic on the stock market with parameters. According to the definition and calculation method of different parameters, they are divided into four categories, i.e., each category can represent a factor affecting the value of the stock investment. These four categories combine to measure how a stock outperforms or underperforms other stocks in the same industry. In addition, the negative impact of the COVID-19 pandemic on the market is introduced, and its negative impact is shown through parameter changes. Chose five business that shares similarities and gives investment advice, namely the balance of high profitability and payout, with the steady growth and PE ratio although this study uses the methods of quantitative analysis and machine learning less, the conclusion is a long-term, overall, means that the index selection of relatively fixed and single. Based on the findings, as investors, the recommendation is to add more stable companies to the stock selection portfolio, especially in the face of situations like the COVID-

19 pandemic. At present, quantifying complex, variable and uncertain information is a challenge, which requires multi-angle work. Nevertheless, the shortcoming of this study is that a more complex mathematical model was not used to reduce the bias and make more accurate predictions. Meanwhile, the correlation of the four categories with each other which is very valuable to study in the stock market, could not be concluded using the research method of this paper. In the future, more scientifically accurate models will be introduced to analyze stock selection portfolios, and the changes and correlations between different indicators will be more truly reflected. Overall, these results offer a guideline for investors to make their own stock selection portfolio.

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