New Energy Enterprises in the Post-epidemic Era of Investment Considerations

Yongze Hu

Orient Securities, Shijiazhuang 050000, China

Abstract. Based on the thinking that the Federal Reserve interest rate hike is coming to an end and the risk-free interest rate of the US dollar is getting higher and higher, the investment opportunities of US stocks in the post-epidemic era are in the new energy field. Coal and natural gas have been the top spot for the U. S. energy market for more than 20 years. Now, the energy battlefield is shifting, and in the next decade, renewable energy, especially solar and wind energy, will dominate in the future. In 2022, the capital market ushered in the Federal Reserve's tight monetary policy, and the market value of new energy stocks plunged. However, some scholars believe that if there is no large-scale war in the next decade, the general direction of the capital market investment is new energy, such as the photovoltaic industry, wind power industry and so on. This paper calculates the statistics of 20 listed 20 new energy companies from 2015 to 2021, and analyzes the multiple financial ratios of each company, compare good companies and general performance of the financial ratio of variance and average, using Mahalanobis Distance analysis of investors choose which financial ratio about the choice of good future investment value about the company is of great significance.

Keywords: New Energy; Investment; Mahalanobis Distance; Discriminant Analysis.

1. Introduction

The global COVID-19 outbreak in 2020 has profoundly changed the trend of the global economy and the future development environment of the financial markets. The new energy economy is becoming a new global economic growth point.

As the Fed recently raised its hawkish policy guidance on still-raging inflation, once-thriving new energy stocks lost another $568 billion, bringing the group's total market value to its lowest level since mid-2020, Bloomberg reported. However, with the tightening monetary policy and interest rate hike policy after the COVID-19 epidemic being implemented, the US capital market is expected to usher in new investment opportunities in 2023. Meanwhile, at the same time, at the end of November 2022, the US mid-term elections were basically implemented, and the policy-stimulated energy sales are expected to increase high in 2023. Historically, Republicans and Democrats have been widely divided in the energy sector, with Democrats supporting new energy and Republicans supporting fossil energy. With the loss of the House but retaining control of the Senate, the future trend of US electrification is expected to be more clear. On the one hand, the Inflation Reduction Act was signed by the president on August 16,2022, including a number of grants for new energy and tax exemptions for electric vehicles. It is expected to advance smoothly and is expected to stimulate the growth of the new energy market. On the other hand, American and European car companies will accelerate the layout of electric vehicles, and will launch a number of pure electric platform models this year and next year, to inject more quality supply for the US car market, and it is expected that the US energy sales will maintain a high growth trend in 2023. Therefore, how to find high-quality investment targets from the capital market is an important research issue in this paper.[1]

Therefore, considering the following accounting ratios s, this paper can help us to better understand the new energy companies, so as to preliminarily judge which accounting ratios s can distinguish between the profitability of the companies.

The accounting ratios's covered in this paper include:

a) Current Ratio = Current Assets/Current Liabilities

b) Total Debt / Total Assets

c) EBITDA/Total Revenue

d) Gross Profit/ Total Revenue

e) Operating Expense/Total Revenue

The variance calculation was used to select the above four financial ratios with good discrimination ability, and to obtain which accounting ratios s have good discrimination ability of company profitability through Mahalanobis Distance analysis. This may be of important significance for us to study the future development trend of the new energy industry.

2. Analysis

The main problem of this paper is that in the context of a new round of investment opportunities, What financial ratios of new energy enterprises are worth our attention, So I selected 20 new energy companies with different performance from the US stock market, T are: Tesla (TSLA), SolarEdge Technologies(SEDG), Daqo New Energy(DQ), NextEra Energy(NEE), Sunrun(RUN), JinkoSolar Holding (JKS), Workhorse Group(WKHS), First Solar(FSLR), General Motors Company(GM), Clearway Energy (CWEN), Canadian Solar(CSIQ), Toyota Motor Corporation(TM), Ford Motor Company (F), The southern Company(SO), TransAlta Corporation(TAC), Duke Energy Corporation (DUK), Atlantica Sustainable Infrastructure(AY), Dominion Energy(D), Honda Motor(HMC) and Kandi Technologies Group(KNDI).

Statistics on the overall investment return of these 20 listed companies from January 01,2011 to December 30,2021, as shown in the following table:

Table 1. Total return on investment statistics

	Total return
T SLA	**2495.87%**
SEDG	**1022.28%**
D Q	**923.35%**
NEE	**241.85%**
RUN	**230.76%**
JKS	**157.91%**
WKHS	**118.00%**
FSLR	**105.95%**
GM	**81.18%**
CWEN	**64.60%**
CSIQ	**53.46%**
TM	**43.81%**
F	**41.20%**
SO	**40.42%**
TAC	**27.38%**
DUK	**20.39%**
AY	**8.63%**
D	**2.17%**
HMC	**-5.86%**
KNDI	**-75.90%**

Note: Data is from yahoo finance

Their total returns from 2015 to 2021 were calculated, sorted. Combined with the financial resources of each company, different financial ratios are calculated and analyzed in the following table:

Table 2. Different financial ratios

	TSLA	SEDG	DQ	NEE	RUN	JKS	WKHS	FSLR	GM	CWEN	
	USD, in thousands	USD, in thousands	USD, in thousands	USD, in thousands	USD, in thousands	USD, in thousands	USD, in thousands	USD, in thousands	USD, in thousands	USD, in thousands	
Current Assets	27,100,000	1,711,291	1,742,980	9,288,000	1,547,719	45,524,074	216,222	3,191,243	82,103,000	1,531,000	
Current Liabilities	19,705,000	525,181	550,499	17,437,000	1,012,120	45,459,469	27,550	726,878	74,408,000	1,631,000	
Total Debt	8,873,000	713,831	243,090	54,827,000	6,871,282	37,286,028	26,260	398,594	110,391,000	8,272,000	
Total Assets	62,131,000	2,892,060	3,343,651	140,912,000	16,483,252	72,983,487	228,139	7,413,746	244,718,000	12,813,000	
EBITDA	16,206,000	250,166	2,649,662	8,250,000	20,931	1,820,704	-191,103	458,435	23,649,000	2,205,000	
Total Revenue	53,823,000	1,963,865	1,678,793	17,069,000	1,609,954	40,826,521	-851,922	2,923,377	127,004,000	1,286,000	
Gross Profit	13,606,000	629,318	1,097,208	8,589,000	244,482	6,657,835	-133,344	729,954	17,878,000	835,000	
Operating Expense	7,110,000	420,829	45,790	5,725,000	910,669	4,815,932	51,771	290,487	8,554,000	555,000	
											var
Current Ratio	**1.3753**	**3.2585**	**3.1662**	**0.5327**	**1.5292**	**1.0014**	**7.8483**	**4.3903**	**1.1034**	**0.9387**	2.3576
Total Debt / Total Assets	**0.1428**	**0.2468**	**0.0727**	**0.3891**	**0.4169**	**0.5109**	**0.1151**	**0.0538**	**0.4511**	**0.6456**	0.2101
EBITDA/Total Revenue	**0.3011**	**0.1274**	**1.5783**	**0.4833**	**0.0130**	**0.0446**	**0.2243**	**0.1568**	**0.1862**	**1.7146**	0.6627
Gross Profit/ Total Revenue	**0.2528**	**0.3204**	**0.6536**	**0.5032**	**0.1519**	**0.1631**	**0.1965**	**0.2497**	**0.1408**	**0.6493**	0.2147
Operating Expense/Total Revenue	**0.1321**	**0.2143**	**0.0273**	**0.3354**	**0.5656**	**0.1180**	**-0.0608**	**0.0994**	**0.0674**	**0.4316**	0.2056

	CSIQ	TM	F	SO	TAC	DUK	AY	D	HMC	KNDI	
	USD, in thousands	JPY, in thousands	USD, in thousands	USD, in thousands	USD, in thousands	USD, in thousands	USD, in thousands	USD, in thousands	JPY, in thousands	USD, in thousands	
Current Assets	4,771,827	22,776,800,000	108,996,000	8,965,000	2,197,000	9,940,000	1,166,905	7,269,000	8,841,425,000	342,608	
Current Liabilities	4,038,148	21,460,466,000	90,727,000	10,921,000	1,931,000	15,931,000	824,405	8,673,000	6,004,399,000	64,163	
Total Debt	3,257,763	25,659,634,000	139,485,000	55,470,000	3,267,000	68,213,000	6,059,264	40,581,000	8,102,556,000	11,359	
Total Assets	7,388,342	62,267,140,000	257,035,000	127,534,000	9,226,000	169,587,000	9,751,930	99,590,000	23,973,153,000	520,160	
EBITDA	275,702	5,383,570,000	19,740,000	9,950,000	1,091,000	12,215,000	764,699	6,829,000	1,712,091,000	4,323	
Total Revenue	5,277,169	27,214,593,000	136,341,000	23,113,000	2,721,000	25,097,000	1,211,749	13,964,000	14,552,696,000	91,486	
Gross Profit	909,312	4,832,373,000	21,690,000	10,061,000	1,489,000	12,095,000	946,262	6,709,000	2,984,773,000	16,248	
Operating Expense	728,939	2,634,625,000	11,915,000	6,547,000	1,112,000	6,379,000	606,297	3,387,000	2,113,541,000	62,080	
											var
Current Ratio	**1.1817**	**1.0613**	**1.2014**	**0.8209**	**1.1378**	**0.6239**	**1.4155**	**0.8381**	**1.4725**	**5.3397**	1.5375
Total Debt / Total Assets	**0.4409**	**0.4121**	**0.5427**	**0.4349**	**0.3541**	**0.4022**	**0.6213**	**0.4075**	**0.3380**	**0.0218**	0.1768
EBITDA/Total Revenue	**0.0522**	**0.1978**	**0.1448**	**0.4305**	**0.4010**	**0.4867**	**0.6311**	**0.4890**	**0.1176**	**0.0473**	0.2116
Gross Profit/ Total Revenue	**0.1723**	**0.1776**	**0.1591**	**0.4353**	**0.5472**	**0.4819**	**0.7809**	**0.4804**	**0.2051**	**0.1776**	0.2158
Operating Expense/Total Revenue	**0.1381**	**0.0968**	**0.0874**	**0.2833**	**0.4087**	**0.2542**	**0.5003**	**0.2426**	**0.1452**	**0.6786**	0.1946

Note: The data is obtained from yahoo finance and Bloomberg

Since the variance represents the degree of data concentration, and also intuitively reflects the similarity between the data, the more the smaller the variance, the data group (financial ratio) can reflect the discrimination of the company. Therefore, the Total Debt / Total Assets factor has good discrimination ability by calculating the variance of each financial ratio of the first ten companies and the last ten companies. Considering the financial ratio of Total Debt / Total Assets itself, the total assets of a company can reflect the available resources of a listed company and thus bring the benefits to investors. On the other hand, listed companies with more total debt show that they have a lot of pressure to pay off their debts.Therefore, when choosing the company through this indicator, the smaller the financial interest rate, the better. Of course, it is obviously not comprehensive to judge the profitability of the company from the perspective of total assets and total liabilities. For example, if a new technology company needs to borrow a lot of money from banks in the early stages of its development, then the ratio of total debt to total assets will be relatively low. So if we don't consider such new tech companies, we could miss out on companies that will make huge profits in the future.

Therefore, here I introduce Mahalanobis Distance for discrimination analysis. The financial indicators are tested by two pairs to get different Mahalanobis Distance s of each financial ratio, and then to determine which financial ratio has a better discrimination. This allows investors to consider multiple factors for a more comprehensive screening of good companies. From a logical perspective, this is also more convincing, because in complex capital markets, it is not reasonable to judge a company's profitability based on just one indicator.

The specific analysis process by using Mahalanobis Distance is as follows:

1) Consider variables X1 and X2, assuming Z= aX1+ bX2 is the discriminant function.

2) Let Sz2 be pooled covariance matrix of two populations.

3) Select a and b to maximize Mahalanobis distance D2 = (mean Z1-meanZ2)2/Sz2 between the two groups

The discriminant analysis using Excel simulation analysis is as follows:

After a total of ten times, I got the largest Mahalanobis Distance out of the financial ratio of Total Debt / Total Assets and Gross Profit / Total Revenue. Therefore, it is ideal to consider Total Debt / Total Assets and Gross Profit / Total Revenue simultaneously when choosing a company. From a qualitative point of view, the size of total assets and total liabilities represents the overall size of a listed company, and the gross margin and gross revenue represent whether the main business of the company is highly profitable, that is to say, whether it can bring excellent returns to investors.

Table 3. The discriminant analysis using Excel simulation analysis

					Mahalanobis Distance
			Mean Gp1 -Mean Gp2	1.283604842	0.6805328
	a	b	Pooled Variance	2.421105037	
	1	2	Cutoff point	2.580818871	
	Current Assets/Current	Total Debt/ Total Assets	Mean =	3.222621292	
	Current Ratio		Variance =	4.405928371	Classification
1	1.375285461	0.142811157	outperform	1.660907775	bad
2	3.258478506	0.246824409	outperform	3.752127323	good
3	3.166181955	0.072701966	outperform	3.311585886	good
4	0.532660435	0.389086806	outperform	1.310834047	bad
5	1.529185274	0.416864463	outperform	2.362914201	bad
6	1.001421156	0.510883071	outperform	2.023187299	bad
7	7.848348457	0.115105265	outperform	8.078558987	good
8	4.390341983	0.053764183	outperform	4.49787035	good
9	1.103416299	0.451094729	outperform	2.005605758	bad
10	0.938687922	0.645594318	outperform	2.229876558	bad
1	1.181687001	0.440932891	underperform	2.063552784	bad
2	1.061337624	0.412089491	underperform	1.885516605	bad
3	1.201362329	0.542669286	underperform	2.286700901	bad
4	0.820895522	0.434942839	underperform	1.6907812	bad
5	1.13775246	0.354107956	underperform	1.845968371	bad
6	0.623940744	0.402230124	underperform	1.428400992	bad
7	1.415451144	0.621339981	underperform	2.658131105	good
8	0.838118298	0.407480671	underperform	1.65307964	bad
9	1.472491252	0.337984578	underperform	2.148460408	bad
10	5.339650577	0.021837512	underperform	5.383325601	good
			Mean =	1.93901645	
			Variance =	0.152735512	

3. Discussion

When most investors consider whether a stock is worth buying, the first consideration is the PE, the price / earnings ratio. The question discussed in this article is: is it always accurate to measure the quality of a company's stock by price-earnings ratio? The p / E ratio is the ratio of the market price per share to earnings per share. P / E ratio is one of the most commonly used to evaluate whether the stock price level is reasonable indicators, is a very reference value of the stock market pointer. Usually refers to a static p / E ratio, which is often used to compare whether stocks at different prices are overvalued or undervalued. It is generally believed that if a company's stock trades too much, the price has a bubble and is overvalued. However, for the new energy stocks discussed in this article, investors can observe that most stocks have a very high p / E ratio, with Tesla trading at 55.92 and SolarEdge Technologies trading at 145.15. This is very different for Warren Buffett's value investment philosophy of investing in low-valued stocks. So are the high-valuation stocks selected in this article overvalued? This article holds that the answer is no. Because this paper believes that, although the new energy industry has achieved great development from 2015 to 2021, and the stock price of new energy companies has achieved substantial growth, but the new energy industry is far from reaching the saturation state. From our daily life, we can find it. In China, the streets, for example, are now mostly fuel cars rather than new energy vehicles; Europe still relies on plenty of coal to heat people in the winter. Therefore, this paper believes that the new energy industry is a high-growth sunrise industry. When choosing a listed company, if this article considers the company valuation, it

will limit those companies with high growth in the future. Therefore, this paper does not study the stock price of new energy companies as the focus of the research.

4. Conclusion

In 2022, the capital market ushered in the Federal Reserve's tightening monetary policy, and the market value of new energy stocks plunged. However, some scholars believe that if there is no large-scale war in the next decade, the general direction of the capital market investment is new energy, such as the photovoltaic industry, wind power industry and so on. When considering investing in a new energy enterprise, investors can start from the Total Debt / Total Assets and Gross Profit / Total Revenue, the two pair of factors, to preliminarily judge whether the company deserves continuous attention and long-term holding.

References

[1] (2022). The mid-term elections in the United States have basically landed, and the policy stimulus is expected to speed up electrification. Electric Vehicle Industry Weekly .

[2] Giofré Maela. (2022). Foreign Investment, COVID-19 Stringency Measures and Risk of Openness. International Business Research(4).doi:10.5539/IBR.V15N4P74.

[3] Liu Zhengmin, Wang Xinya, Wang Wenxin, Wang Di & Liu Peide. (2022). An integrated TOPSIS–ORESTE-based decision-making framework for new energy investment assessment with cloud model. Computational and Applied Mathematics(1).doi:10.1007/S40314-021-01751-9.

[4] (2015). SMU Cox School of Business; SMU Cox Students Gain New Energy Investment Learning Resource. Energy Weekly News.

[5] BLACKROCK NEW ENERGY INVESTMENT TRUST PLC (2013). BLACKROCK NEW ENERGY INVESTMENT TRUST PLC - ANNUAL REPORT - OCTOBER 31, 2013.Reportal.

[6] Robertson, Helen. (2013).UK hunting for new energy investment. Petroleum Economist.