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Analyzing The Investable Value of Five Automotive Companies Through Financial Data and Data Mining Techniques

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Abstract:

Automobile industry is a capital-intensive, technology-intensive modern industry, after more than a hundred years of development and evolution, the automobile manufacturing industry has formed a huge industrial chain, becoming one of the world's largest and most important industries with the highest output value. In this research, I selected five world-famous automobile brand companies, stands for Ferrari, Bentley, Mercedes-Benz, Porsche, and Rolls-Royce. With reference to the operating financial data such as balance sheets, income statements, cash flow statements, year-end market share values, etc. of these five companies for the years 2021-2023, several financial ratios are used for comparative analysis and Ferrari is recommended as a company with the most promising investment outlook.

Keywords: Data Mining Techniques, Automotive industry, automobile manufacturing industry, financial ratios, investment outlook

Part I. Analysis of financial data of enterprises

Solvency

Ferrari

	FY2021	FY2022	FY2023	Three-year average
Cash Ratio	135.76%	131.70%	100%	122.49%
Current Ratio	339%	373%	356%	356%
Quick Ratio	285%	309%	274%	289%
Times Interest Earned Ratio	46.3	48.12	56.24	50.22
Total Debt Ratio	72.85%	73.15%	68.90%	71.63%
Cash Coverage Ratio	3.68	3.72	3.21	3.54

Analysis: The enterprise's overall liquidity is strong, there is sufficient cash for protection, profitability is sufficient to support the payment of interest expenses, the rights and interests of creditors are protected, and the long-term and short-term solvency is at an excellent level. However, the cash ratio is on the high side, and the enterprise liquid assets failed to be rationally utilized, and thus cash-based assets got low profitability, and the amount of such assets is so high that it can lead to an increase in opportunity cost.

Bentley

	FY2021	FY2022	FY2023	Three-year average
Cash Ratio	55.44%	11.41%	8.99%	25.28%
Current Ratio	103%	66%	55%	75%
Quick Ratio	103%	66%	55%	75%
Times Interest Earned Ratio	9.45	6.66	5.46	7.19

Total Debt Ratio	80.85%	81.88%	73.37%	78.7%
Cash Coverage Ratio	5.22	5.52	3.75	4.83

Analysis: The liquidity of the enterprise is at a normal level, but the current ratio and quick ratio are both at a low level, which affects the short-term solvency of the enterprise. The high equity multiplier is a direct response to the fact that the proportion of capital invested in the enterprise as a percentage of total assets is small and the enterprise has a high degree of indebtedness.

Mercedes-Benz

	FY2021	FY2022	FY2023	Three-year average
Cash Ratio	34.06%	27.55%	27.12%	29.58%
Current Ratio	117%	116%	126%	120%
Quick Ratio	93%	86%	94%	91%
Times Interest Earned Ratio	37.86	48.55	30.06	38.82
Total Debt Ratio	71.84%	66.72%	64.71%	67.75%
Cash Coverage Ratio	3.55	3	2.83	3.13

Analysis: The enterprise's liquidity is average, and its long-term and short-term solvency is at a normal level. Profitability of the enterprise is sufficient to support interest expenses, and creditors' rights and interests are protected.

Porsche

	FY2021	FY2022	FY2023	Three-year average
Cash Ratio	430.88%	11.32%	948.6%	463.6%
Current Ratio	644%	19%	751.8%	272.7%
Quick Ratio	644%	19%	751.8%	272.7%
Times Interest Earned Ratio	761.83	84.48	17.07	287.62
Total Debt Ratio	1%	12%	10.83%	7.94%
Cash Coverage Ratio	1.01	1.14	1.13	1.09

Analysis: The enterprise's indexes are in an abnormal state, the data changes drastically, there are no liabilities and receivables, the enterprise is too conservative, the ability to utilize financial and monetary leverage is weak, the enterprise relies too much on its own capital, and its ability to engage in risk and expand its business is poor.

Rolls-Royce

	FY2021	FY2022	FY2023	Three-year average
Cash Ratio	21.49%	17.21%	23.46%	20.72%
Current Ratio	129%	115%	122%	122%
Quick Ratio	89%	81%	98%	89%
Times Interest Earned Ratio	-0.17	-3.38	7.58	1.34
Total Debt Ratio	116.17%	120.43%	111.52%	116.04%
Cash Coverage Ratio	-6.25	-5	-9.09	-6.78

Analysis: The enterprise's low ability to directly service its current liabilities exposes it to a higher risk of not being able to pay interest on borrowed funds, repay debts as they fall due, or meet the cash needs of normal production and operations and emergencies. Excessive indebtedness leads to insolvency, and the rights and interests of investors and

creditors cannot be protected.
Profitability
Ferrari

	FY2021	FY2022	FY2023	Three-year average
Profit Margin	19.45%	18.30%	20.97%	19.57%
ROE	41.53%	38.74%	44.14%	41.47%
ROA	16.27%	16.45%	20.63%	17.78%

Analysis: The enterprise's profitability level is excellent, and all indicators have reached or exceeded the average level of the industry.
Bentley

	FY2021	FY2022	FY2023	Three-year average
Profit Margin	15.83%	15.91%	26.60%	19.45%
ROE	27.28%	46.56%	44.84%	39.56%
ROA	5.53%	8.01%	6.93%	6.82%

Analysis: An enterprise with excellent profitability but a low return on assets indicates a decline in overall profitability and a weakening of the enterprise's competitiveness in the market, implying that the enterprise's financial risk is increasing. A low return on assets may indicate that the enterprise's cash flow position is poor, and its solvency capacity has declined, thus increasing the enterprise's financial risk
Mercedes-Benz

	FY2021	FY2022	FY2023	Three-year average
Profit Margin	17.18%	9.67%	9.31%	12.05%
ROE	15.90%	18.46%	33.98%	22.78%
ROA	5.95%	7.97%	7.94%	7.29%

Analysis: The overall profitability of the enterprise is weak, with low profit margins and compensation ratios. This indicates that the enterprise has problems in cost control, profitability and management efficiency.
Porsche

	FY2021	FY2022	FY2023	Three-year average
Profit Margin	0	0	0	0
ROE	11.69%	11.64%	9.48%	10.94%
ROA	11.60%	10.60%	8.96%	10.39%

Analysis: Costs and expenses are not shown in the company's statements, resulting in high profit margins and various rates of return, and the data are not equal, making it impossible to effectively analyze its true operating results and profitability.
Rolls-Royce

	FY2021	FY2022	FY2023	Three-year average
Profit Margin	1.07%	-9.38%	14.63%	2.11%
ROE	-50%	-23.80%	-2.5%	-25.43%
ROA	1%	3.99%	9.15%	4.71%

Analysis: In FY2021 and FY2022, the overall profitability of the enterprise is negative, and the high costs and expenses make it impossible for the enterprise and the investors to gain profit from the operation; in FY2023, with the increase of revenue, the operating expenses are basically the same as the previous two years, which ensures that the enterprise can

make some profit. However, the low Return on equity and return on assets will cause investors to lose confidence in the enterprise.
Asset management
Ferrari

	FY2021	FY2022	FY2023	Three-year average
Inventory Turnover	4.16	4.35	3.69	4.07
Approx. time in Inventory	87.74	83.91	98.91	90.19
Receivable Turnover	3.32	3.25	3.39	3.32
Approx time to collect on credit sales	109.94	112.31	107.67	109.97
Fixed Asset Turnover	3.10	3.41	3.94	3.48
Asset Turnover	0.65	0.69	0.75	0.70

Analysis: Inventory turnover ratio is slightly lower, and accounts receivable turnover days are longer, indicating that funds are utilized for a longer period, which increases financial costs and operational risks. The excellent fixed asset turnover ratio means that the enterprise can utilize its fixed assets more effectively to support sales activities, thus enhancing the overall operational efficiency.
Bentley

	FY2021	FY2022	FY2023	Three-year average
Inventory Turnover	0	0	0	0
Approx. time in Inventory	0	0	0	0
Receivable Turnover	4.54	4.21	4.23	4.33
Approx time to collect on credit sales	80.40	86.70	86.29	84.46
Fixed Asset Turnover	11.67	15.22	16.26	14.38
Asset Turnover	0.51	0.38	0.38	0.42

Analysis: The enterprise has zero inventory. Good performance in accounts receivable management and quick recovery of funds, which is conducive to improving the efficiency of capital utilization and enterprise operation. Total asset turnover ratio is low, mainly due to the non-current assets are too large.
Mercedes-Benz

	FY2021	FY2022	FY2023	Three-year average
Inventory Turnover	4.34	4.96	4.54	4.61
Approx. time in Inventory	84.10	73.59	80.39	79.36
Receivable Turnover	0	0	0	0
= Approx time to collect on credit sales	0	0	0	0
Fixed Asset Turnover	2.07	2.23	2.21	2.17
Asset Turnover	0.49	0.58	0.66	0.58

Analysis: No accounts receivable. Total asset turnover is gradually increasing.
Porsche

	FY2021	FY2022	FY2023	Three-year average
Inventory Turnover	0	0	0	0
Approx. time in Inventory	0	0	0	0

Receivable Turnover	0	0	0	0
Approx time to collect on credit sales	0	0	0	0
Fixed Asset Turnover	0	0	0	0
Asset Turnover	0.12	0.11	0.09	0.11

Analysis: No inventory and no accounts receivable. Higher current asset turnover indicates high efficiency in the use of current assets, which is related to the absence of accounts receivable and inventory. Despite the high current asset turnover, the total asset turnover ratio is at a low level, which needs to be emphasized.

Rolls-Royce

	FY2021	FY2022	FY2023	Three-year average
Inventory Turnover	3.05	3.23	3.45	3.24
Approx. time in Inventory	119.67	113	105.80	112.82
Receivable Turnover	0	0	0	0
Approx time to collect on credit sales	0	0	0	0
Fixed Asset Turnover	2.19	1.29	3.56	2.35
Asset Turnover	0.38	0.47	0.54	0.46

Analysis: Low inventory turnover increases the cost of inventory, reduces the efficiency of capital utilization, and has poor liquidity. Current asset turnover and total asset turnover ratio are not high, reflecting the poor operating ability of the enterprise and high debt.

Enterprise performance measurement (Market Value)

Ferrari

	FY2021	FY2022	FY2023	Three-year average
Earnings per Share	4.50	5.11	6.91	5.51
P/E Ratio	57.52	41.92	48.98	49.47
Market-to-Book Ratio	22.74	16.02	21.45	20.07

Bentley

	FY2021	FY2022	FY2023	Three-year average
Earnings per Share	0.30	0.57	1.20	0.69
P/E Ratio	161.1	64.84	43.48	89.80
Market-to-Book Ratio	33.56	18.67	17.51	23.24

Mercedes-Benz

	FY2021	FY2022	FY2023	Three-year average
Earnings per Share	21.50	14.10	16.82	17.47
P/E Ratio	3.14	4.35	3.72	3.74
Market-to-Book Ratio	1	0.77	0.73	0.83

Porsche

	FY2021	FY2022	FY2023	Three-year average
Earnings per Share	1.49	1.79	1.66	1.65

P/E Ratio	56	28.63	27.90	37.51
Market-to-Book Ratio	0.60	0.30	0.26	0.5

Rolls-Royce

	FY2021	FY2022	FY2023	Three-year average
Earnings per Share	0.01	-0.15	0.29	0.05
P/E Ratio	-122.88	-621.3	1033	370.77
Market-to-Book Ratio	-2497.5	-490.53	-877.71	-1288.58

Part II Comparison and Evaluation of Key Indicators

1. Total Debt Ratio

Total Debt ratio is a comprehensive reflection of the enterprise's ability to repay debts, this indicator can reflect, to a certain extent, the degree of protection of assets against debt repayment. From the comparison of data, Ferrari, Bentley, Mercedes-Benz 3 companies, maintain a favorable ratio of assets and liabilities, moderately borrowing business, to ensure sufficient operating cash. The average Total Debt ratio of Porsche is only 8%, does it mean that the enterprise is too conservative, failing to effectively utilize the borrowed funds for expansion or investment, i.e., insufficient ability to borrow and operate, and unable to make good use of financial leverage to promote the rapid development of the enterprise. Rolls-Royce's Total Debt ratio is as high as 116%, which puts the company in the state of insolvency, and its business situation is worrying.

2. Profit Margin

As the most direct indicator of the enterprise's operating results, it reflects the profitability of the main business. High profit margin means that the enterprise can get more profit under the same sales volume, or maintain the same profit margin under lower cost, which reflects the enterprise's advantages in cost control, market competition, product innovation and so on. From this, we can see that Ferrari and Bentley maintain good index data. Porsche is not evaluated because the corresponding cost is not reflected in the statement and the profit is extremely high, so it is impossible to determine the reliability of the data. At Rolls-Royce, excessive costs and expenses have resulted in a low indicator.

3. Return on Equity (ROE)

Return on equity is an important indicator of the profitability of an enterprise, and the excellent return on equity of Ferrari and Bentley can bring investors a good return on investment. Rolls-Royce's negative Return on equity is a decline in profitability, and investors are unable to get more income or dividend bonus, which lacks the attraction and confidence of investors to hold the company for a long period of time.

4. Return on Assets

Return on Assets (ROA) analyzes the profitability of an enterprise based on the return on investment, which is the ratio of the enterprise's return on investment to the total amount of investment. In this indicator, Ferrari is significantly better than the other four enterprises due to its good operating income and asset structure, high input-output efficiency, effective operation and management of the enterprise.

Part III Corporate Evaluation and Conclusions

Rolls-Royce is the worst among the five automobile companies in terms of statement data. As a veteran luxury automobile company, its business situation is worrying. As high as 116% Total Debt ratio, the enterprise is in the state of insolvency. Huge debt pressure, so that the enterprise operating cash flow is seriously insufficient, most of the operating income for repayment of debts, the enterprise's own development of the lack of cash. Analyzed from the statement data, Rolls-Royce company through debt reduction, expanding sales, actively explore the market and other ways, year by year to improve the overall business performance of the enterprise, according to Rolls-Royce official news, in 2023, sales to create a new record. Under these conditions, the company urgently needs to get rid of the current difficulties by realizing assets, reducing leasing expenses, accelerating the turnover of assets, and strengthening the liquidity. Although product sales increase, revenue increases, but the excessive costs, expenses and greatly limit the profitability of the enterprise, according to the company's senior revealed that some subsidiaries or departments, serious mismanagement, is carrying out a comprehensive management reforms, at the same time, the company will carry out strategic initiatives and efficiency streamlining, reduce management costs, is expected to save 400-500 million pounds. On balance, the current ROI is negative and corporate development expectations are uncertain. There is no investment value at this stage.

Bentley's operating liquidity is strong, but through the statement analysis, the short-term solvency gradually declined in the past three years, mainly due to the accounts receivable growth year by year, although the accounts receivable turnover days is relatively reasonable, but accounts receivable accounted for the proportion of current assets reached 69.16%, which affects the level of profitability and liquidity of the enterprise. Through checking the statement, we found that the enterprise has no inventory (problem), for manufacturing enterprises, it is impossible to achieve absolute "zero inventory", so for the inventory problem, skeptical view, need to be further analyzed through the relevant financial records and data to judge. In the case of no inventory, the total asset turnover ratio is still at a low level due to the high level of non-current assets. The low return on assets may be due to increased market competition, rising costs, falling sales prices or other unfavorable factors, but it also reveals problems in the management of the company's assets, affecting solvency and increasing financial risk. From the enterprise performance measurement analysis, Bentley's too low earnings per share, greatly reducing the enthusiasm of investors, but also exposed the weakness of the enterprise's low profitability. And too high price-earnings ratio, although there is a certain expectation of future growth of the enterprise, but the high share price, but also brings investment risk.

Mercedes-Benz, most of the enterprise's financial indicators are at a good level, whether it is solvency, operating capacity, profitability, all give investors a certain degree of security and confidence. However, it should be noted that, through the financial statement data found that Mercedes-Benz excessive costs and expenses, resulting in the actual level of profitability is not high. The increase in research and development costs, advertising and promotion costs, administrative costs, etc., which are usually necessary for enterprises to enhance competitiveness or expand market share, may not be able to see a clear return in the short term. Excessive costs, expenses and other internal consumption greatly compressed the profit margin, the impact on the operating income of the enterprise. Of course, Mercedes-Benz to expand the global market, especially the Chinese market, the full commitment and development of new energy vehicles, the initial investment, will affect the short-term earnings, but in the long run, Mercedes-Benz's staying power is still very strong. From the enterprise performance measurement, can see, Mercedes-Benz earnings per share is the highest in the five enterprises.

As an internationally renowned luxury brand, Ferrari's new models, new technologies, or customized designs are the key to its higher-than-expected revenue in recent years. The overall operation of the enterprise is stable and good, with strong liquidity and anti-risk ability, guaranteed operating income and investor's income, reasonable use of financial leverage and appropriate debt to ensure that the enterprise has sufficient funds for development.

In the past three years, Ferrari's net profit margin from main operations exceeded 19%, Return on equity averaged more than 41%, and return on assets averaged more than 16%, so that investors have received sufficient income protection. According to the latest financial report in 2024, Ferrari's net income increased by 16.2% year-on-year, and net profit soared by 24% year-on-year. In terms of capital market, Ferrari's share price has repeatedly set a record high, since the beginning of 2024, the share price has increased by 45.48%, and the market value has historically exceeded 70 billion US dollars, ranking high in the market value of global automobile enterprises, and major institutions have expressed their support for the company. It can be concluded that Ferrari is the company with the best investment value and investment prospect.

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