

An Analysis on the Feasibility of Financial Valuation of Technology Companies Based on Value Investing

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Abstract. This research explores the critical issue of accurately valuing internet companies in today's business environment, highlighting the inadequacies of traditional valuation methods like Net Present Value (NPV) and Price to Earnings (PE) ratios for this sector. By conducting a fundamental analysis rooted in value investing principles, this study examines 2022 financial data from thirteen internet companies listed among Forbes Global Technology firms. It scrutinizes key financial metrics such as liquidity, debt-servicing capability, profitability, and shareholder returns. The analysis reveals that these companies experience cash flow challenges affecting their liquidity. Despite having a moderate long-term debt ratio, they heavily depend on debt financing and struggle with interest payments. While capable of generating profits, these firms face stiff competition and significant cost pressures. Market sentiment remains highly optimistic about the future of internet companies, resulting in high valuations. Given the favorable market conditions, it is crucial for internet companies to strategically enhance their competitive edge, improve core product competitiveness, and increase profitability through innovative operational and marketing strategies, thereby boosting their industry presence and societal impact.

Keywords: Technology Industry; Financial Valuation; Fundamental Analysis.

1. Introduction

Due to the bursting of the dot-com bubble in 2000 and the huge losses of venture capital funds in internet companies, how to objectively value internet companies have become an important issue in recent years. With the continuous development of the times and the economy, people have been looking for the most common and acceptable valuation method, but there is still no one answer that satisfies everyone. In order to understand the intrinsic value of Internet enterprises and the factors that create the value of Internet enterprises, it is necessary to use realistic and reasonable valuation methods, and the academic and corporate circles have also made a lot of efforts to solve this problem. However, these legacy techniques may not work when it comes to internet valuation. The valuation of Internet companies often forms a huge obstacle due to their own technical difficulties and logical thinking [1]. Therefore, this paper focuses on the concept of value-based investment, studies the liquidity, solvency, profitability, and shareholder returns of Internet enterprises, and explores the dependence of Internet enterprises on capital flow according to the relationship between cash ratios. From the overall debt level of Internet companies, we can observe their dependence on financing and the level of interest payment; Explore the balance between the costs and revenues of Internet companies; Then analyze the operating status of the enterprise from their average turnover rate, ROE, ROA, and market conditions. Based on the fundamentals of Internet companies, we make valuation and investment decisions for companies. Value investing strategies are prevalent in both practice and academia and are widely used in practice due to the achievements of investors [2]. Whereas fundamental analysis evaluates a company's financial position by analyzing financial metrics, calculating the value of the underlying asset, and comparing it to the market price, thereby providing a target price for the asset [3]. In a general sense, it assesses the financial position of a company and a project for future results by determining the price that is closest to the actual value of the stock, which is based on three pillars: (i) an analysis of the company or asset; (ii) industry and market analysis; and (iii) analysis of economic and financial indicators, considering both the important role of economic behavior in micro and macroeconomic aspects [4]. This helps future value investors to



avoid the negative impact of short-term market fluctuations and market noise and focus more on the long-term value of the company.

Based on the 2022 Forbes list of the world's largest technology companies, this article selects 13 Internet companies that meet the requirements of this article, and analyzes them in detail, in an attempt to establish a simple valuation method for the entire Internet industry. During the period of the Internet bubble, some scholars reported that the correlation between financial and accounting information and market valuations declined, and this form seems to have been reversed after the bubble burst [5]. Based on the particularity of Internet companies with few tangible assets and most of them are difficult to make profits, this paper divides the fundamental analysis into four sections, and analyzes the company's liquidity ratios, solvency ratios, and profitability ratios, and studies the overall trend of the industry.

2. Liquidity Analysis

The current ratio is a financial ratio that measures the short-term solvency of a company, and it usually compares the current assets of a business with its current liabilities [6]. This ratio provides investors and creditors with a quick and verifiable way to assess the financial health of a business. As can be seen from Figure 1, the Internet industry generally has a relatively high current ratio, which means that they have sufficient funds to cover short-term debt. Since Internet companies themselves are actively funded, it is easier to attract venture capital (VC/PE), so this will lead to Internet companies being able to have more cash and liquid assets. Second, compared with the traditional manufacturing and retail industries, Internet companies have the characteristics of light capital (low fixed capital investment), and in this business model, the company discards a large amount of fixed capital, such as land, machinery and construction. Instead, they tend to focus more on talent, technology and innovation, which helps companies become more agile and adaptable to the market, which is why they have higher current ratios.

According to Figure 1, it can be found that the current ratio of Sohu and Weibo is particularly high, even more than 3 times, which reflects the financial stability of the enterprise on the one hand, and on the other hand, it also means that the enterprise has a large amount of idle funds and is not fully utilized. In its 2022 annual report, Weibo mentioned that although the Group does not currently require dividends, deposits and advances from subsidiaries in the People's Republic of China, VIE and VIE subsidiaries to provide liquidity and other financing purposes, the Group may need to obtain additional cash resources from its subsidiaries in the People's Republic of China, VIE and VIE subsidiaries in the future due to changes in its business conditions, for future acquisitions and developments or simply to declare and pay dividends or distribute to its shareholders. As of December 31, 2022, the Group was restricted to US\$566.9 million, representing 16.7% of the Group's total consolidated net assets. Sohu's 2022 annual report noted that of its cash and cash equivalents, US\$506.5 million was deposited in financial institutions in Chinese mainland and US\$191.3 million was deposited in financial institutions outside Chinese mainland. They believe that their current liquidity and capital resources are sufficient to meet anticipated working capital needs, commitments, capital expenditures and investment activities for at least the next twelve months. However, due to changes in business conditions and other future developments, or changes in general economic conditions, they may require additional cash resources (see item 3 for details). Amazon and Apple, on the other hand, have lower current ratios, with their current ratios of 0.94 and 0.88 respectively, which means that companies do not have enough funds to repay short-term debt, which may lead to financial risks for companies. In Amazon's annual report, capital expenditures in 2022 were \$58.3 billion, a year-on-year increase of \$2.9 billion compared to \$55.4 billion in 2021, mainly reflecting investments in technology infrastructure (most of which were used to support AWS business growth) and support for the additional capabilities of the company's fulfillment network. Amazon also used cash on hand to finance the acquisition of MGM Holdings, Inc., and expects to use cash on hand to fund the acquisitions of One Medical and iRobot Corporation. Apple disclosed in its annual report that Apple's cash, cash equivalents and other balances were \$156.4 billion, but the company faces

credit risk and fluctuations in the value of its portfolio. Although the Company has not realized any material losses on its cash, cash equivalents and marketable and non-marketable securities, fluctuations in their value in the future could cause significant losses and could have a material adverse effect on the Company's results of operations and financial condition. At the same time, the decline in the economic environment has also led to an increase in the risk of the company's trade receivables recovery, reducing its current ratio.

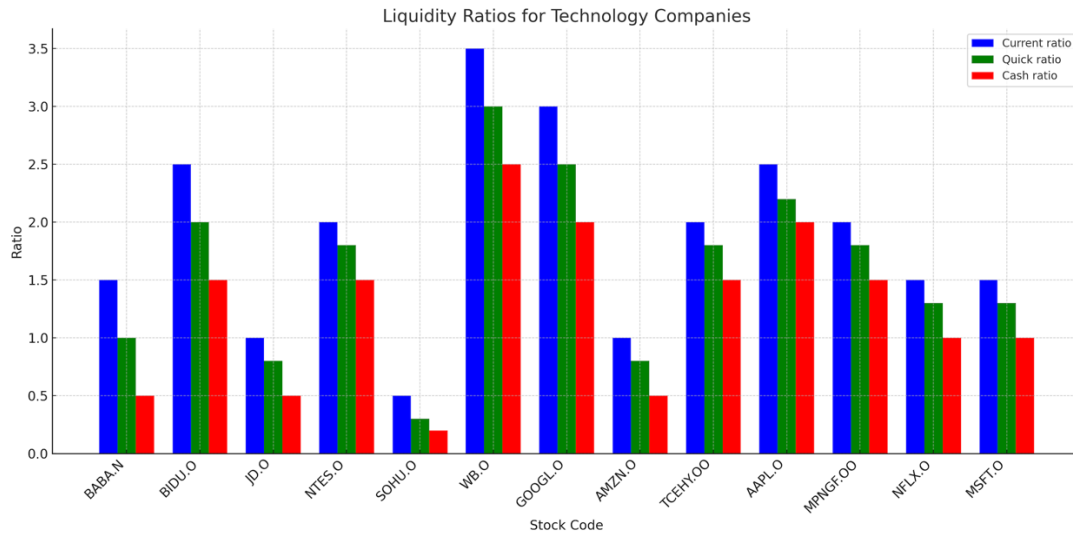


Figure 1: Liquidity ratios for technology companies.

The quick ratio represents a company's ability to pay its current debt with their company's most liquid assets without relying on selling inventory [6]. It assesses whether a business can pay off short-term debts without selling its inventory. The Internet industry generally has a high-speed ratio, which means that they can repay short-term debt even after deducting inventory, which reflects that the industry generally has a good ability to repay debts in the short term. Interestingly, by comparing the speed and current ratios of the above Internet companies, it is surprising to find that there is almost no difference between the two, and only a few companies have a slightly lower speed ratio than the current ratio. This phenomenon can also show that the inventory of the Internet industry is small, and the flexibility and market adaptability of related enterprises are high. As can be seen from Table 1, the companies with the highest current ratios, Weibo and Sohu, also have the highest quick ratios, and surprisingly, these two companies have a current ratio equal to the quick ratio, which means that they have no relevant inventory. Apple and Amazon also have lower quick ratios because of their own poor current ratios. It is worth noting that the quick ratios of JD.com and Amazon are quite different from the current ratios, because these two companies are e-commerce companies, and they provide online sales and distribution of goods through Internet platforms, so they will have relatively large inventories. In JD.com's 2022 annual report, it was concluded that their inventory increased significantly, from 58,933 million RMB as of December 31, 2020 to RMB 75,601 million as of December 31, 2021, and further increased to ¥77,949 million (US\$11,302 million) as of December 31, 2022, which accounted for 13% of total assets, and the large amount of net inventory was partly due to the unsalable or damaged nature of some goods. Involves factors such as the impact of aging inventories, historical and forecasted consumer demand, and the causes of market conditions that affect pricing.

The cash ratio is a relatively conservative ratio for assessing a company's liquidity, as it does not take into account other assets that can be used to repay debts, and the "cash" here usually includes cash and investments equivalent to cash, such as short-term investments that can be quickly realized in the market [6]. As can be seen from Figure 1, the general cash ratio of the Internet industry is low, basically not more than 1, and compared with the first two ratios, it can be seen that most of the liquidity of Internet companies is not cash. For higher current ratios and lower cash ratios, companies are more inclined to reinvest cash in the business to support growth and expansion, or perhaps invest more in certain non-cash assets. With a lower cash ratio and a higher current ratio, for internet

companies, this may include upfront advertising expenses, partner payments, or other operation-related expenses. But a low cash ratio can also mean some cash flow pressure on companies when faced with unexpected expenses or investment opportunities. The same two companies, Weibo and Sohu, still have significantly higher cash ratios than other competitors in the same industry. Weibo said in its 2022 annual report that their ability to repay the principal amount of debt and make interest payments depends on their ability to manage business operations, generate sufficient cash flow, raise additional capital, and other factors, and may not be able to meet their payment obligations if they are unable to obtain funds in a timely manner or on commercially acceptable terms. And they may take on additional debt in the future, which requires them to have ample cash flow.

3. Solvency Analysis

The debt-to-asset ratio is usually a measure of a company's financial leverage, which can be used to determine how much of the company's assets are exchanged for borrowing, and it can assess the company's financial risk [7]. As we can see from Figure 2, the overall asset-liability ratio of Internet companies is as high as 50%, which to some extent reflects the dependence of enterprises on debt financing. Generally speaking, Internet companies are identified as a high-growth industry, and in order to achieve the goal of rapid expansion and market share, companies will adopt more active financial strategies, and due to the rapid pace of innovation in the Internet industry, companies may need to continue to invest in R&D, which will lead to a preference for debt financing. According to Table 2, Amazon and Apple have high debt-to-asset ratios of 68.6% and 85.6%, respectively, which indicates that the two companies have a high debt burden. As of September 24, 2022, Apple had a total of \$111.8 billion in fixed-rate notes outstanding, of which \$11.1 billion is due to be repaid over a 12-month period. Future interest payments related to these notes totaled \$41.3 billion, of which \$2.9 billion was due over 12 months. Apple also issues unsecured short-term promissory notes under the Commercial Paper Program. As of September 24, 2022, the Company had \$10 billion of commercial paper outstanding, all of which must be paid within 12 months. Amazon.com, on the other hand, noted in its 2022 annual report that the company received cash inflows of \$27 billion and \$62.7 billion from short-term debt and other long-term debt in 2021 and 2022, respectively. This is a significant part of the company's liabilities. And a significant portion of this cash is used for share repurchases, short-term debt payments, long-term debt, finance leases, and financing obligations. The company said there is significant uncertainty about future cash requirements and cash flow forecasts. The Company is constantly evaluating opportunities to sell additional equity or debt securities, acquire credit facilities, acquire financing and operate lease arrangements, enter into financing obligations, repurchase common stock, pay dividends or repurchase, refinance or otherwise restructure debt. At the same time, economic conditions and the actions of policymakers have led to higher interest rates and significant volatility in capital markets. This, along with an increase in the company's borrowing level, may increase the company's borrowing costs in the future. Google has a debt-to-asset ratio of only 29.9%, which means that Google is a relatively healthy and conservative company with a relatively healthy financial structure compared to other Internet companies, and at the same time has more self-capital. In its 2022 annual report, Google noted that the company classifies its assets, with the company classifying transferable debt securities with an effective maturity date of three months or less from the date of purchase as cash equivalents, and securities with an effective maturity date of more than three months as transferable securities. And after taking into account the risk and return objectives and liquidity requirements, the Company may sell these debt securities prior to their effective maturity dates. At the same time, the company records these securities at fair value and reports unrealized gains and losses (net of taxes) as an integral part of shareholders' equity. Changes in the fair value of certain negotiable debt securities are recorded in other income (expense). For certain market-based negotiable debt securities, the company chooses the fair value option. All of the above helps to keep the debt ratio low.

The long-term debt-to-asset ratio indicates how much of a company's assets are backed by long-term liabilities (bonds, long-term borrowings, etc.) [7]. As can be seen from Figure 2, the long-term debt-

to-asset ratio of the entire Internet industry is not high, averaging 23%. This is a modest ratio relative to other sectors, suggesting that companies have some debt, but are not overly reliant on external financing. Apple and Netflix are the two companies with higher long-term debt ratios, as high as 42% and 40.9% respectively. In its annual report, Apple noted that its total long-term debt was US\$111,824 million as of September 24, 2022, and to manage the interest rate risk of certain U.S. dollar-denominated fixed-rate notes, the company conducted interest rate swaps, effectively converting the fixed interest rates of these notes into floating rates. In addition, in order to manage the foreign exchange risk of certain notes denominated in foreign currencies, the Company has conducted foreign exchange swaps, effectively converting these notes into U.S. dollar-denominated notes. In its 2022 Annual Report, Netflix stated that as of December 31, 2022, the Company's total outstanding notes balance was US\$14,353 million, less the cost of issuance of US\$79 million, with different maturity dates. Netflix also has its future capital needs, and as the Company expects future capital needs from the debt market to be more limited than in previous years, it is prepared to raise additional capital through the issuance of equity and debt securities, which may have rights over common stock, with more priority and privileges. In 2022, NetEase had a long-term debt-to-asset ratio of only 4%, and in 2022, NetEase earned a net income of ¥4,845.0 million (US\$702.5 million) from short-term and long-term loans. The net cash outflow from financing activities was mainly attributable to NetEase's repurchase of its American Depositary Shares (ADSs) and the purchase of shares in subsidiaries, as well as dividends paid to shareholders and non-controlling shareholders, while net gains from short-term and long-term loans partially offset cash outflows from share repurchases and dividend payments. Finally, due to the existence of multiple loan agreements between NetEase and Youdao, the relatively small amount of long-term loans actually used despite the shorter original term of the loans, and the relatively small amount of long-term loans actually used despite the rotating loan facility supporting Youdao's long-term growth, resulted in less long-term debt.

EBIT multiples are used to measure a company's profitability and ability to pay interest. According to Figure 2, the Internet industry generally has a low EBIT multiple, which means that the company's profitability is not high, and it may face difficulties in paying interest. Meituan's EBIT multiple in 2022 was -3.7, which means that the U.S. earnings for one year are not enough to cover the interest payable, and Meituan believes that the higher interest payable is due to the fact that the time value of money and the risks specific to obligations are taken into account when measuring withholding expense, and these factors are reflected in the interest rate, resulting in an increase in interest expense. Interestingly, Meituan also explained how an organization recognizes and measures provisions for liabilities, particularly statutory or constructive obligations related to past events, and Meituan's higher interest payable is due to the fact that the measurement of provisions takes into account the time value of money and the unique risks of obligations, which leads to an increase in provisions and the recognition of corresponding interest expense. Microsoft has a surprising EBIT multiple of 40.6% among many Internet companies. In Microsoft's annual report, we can learn that in 2022, the company's interest payment is \$1.9 billion, due to the use of corporate interest rate swaps and other financial contracts, interest rate changes may directly affect interest expense, and the hedging strategy used by the company may affect the company's financial performance, especially the part related to interest expense. Finally, interest expense accrued due to uncertain tax status can directly affect the company's bottom line, resulting in an increase in the EBIT multiple.

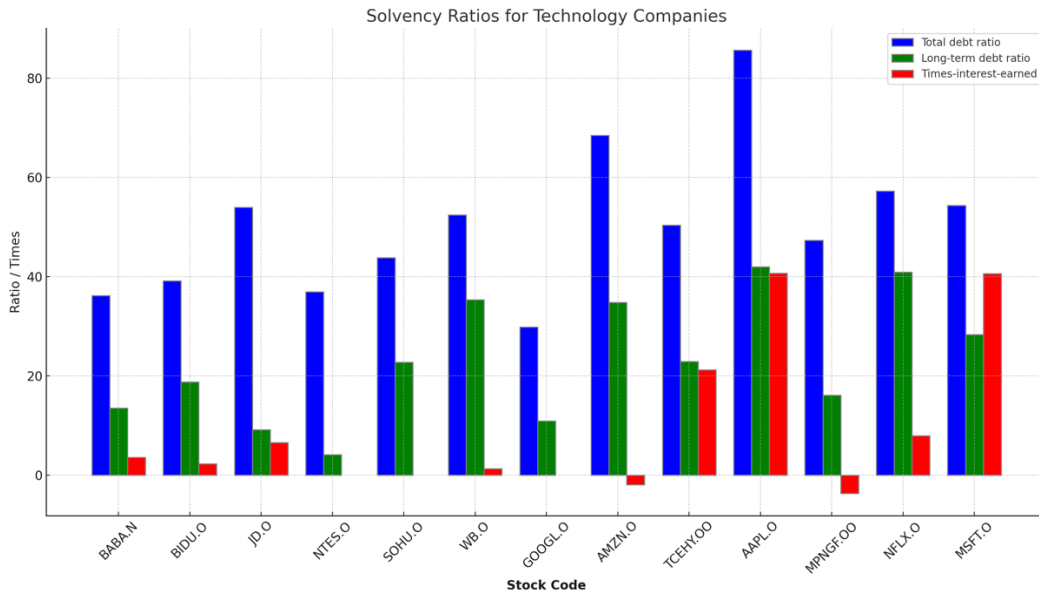


Figure 2: Solvency ratios for technology companies.

4. Profitability Analysis

Net profit margin is a financial ratio that measures a company's profitability and provides creditors with insight into a company's operational efficiency and profitability by showing how much of each unit of a company's sales revenue is retained as net profit [8]. By looking at net profit margins, companies can evaluate the effectiveness of their business and operational strategy efficiencies and make adjustments accordingly. According to Figure 3, it can be seen that the general net profit margin of the Internet industry is 12.6%, which is an interesting figure, generally speaking, Internet companies have relatively low fixed costs, but invest more in technology development and personnel, this average net profit margin may reflect the efficiency of individual companies in controlling operating costs, which indicates that Internet companies can achieve profitability to a certain extent, but also face competition and cost pressures. Tencent Holdings and Microsoft had the highest net profit margins, reaching 34.0% and 36.7%, respectively. A higher net profit margin can effectively convert sales revenue into net profit, indicating the company's strong competitive position in the market, and also reflecting the company's cost control ability. As can be seen in Microsoft's annual report, net income grew from \$61,271 million to \$72,738 million, an increase of 19%. This indicates that the company's sales performance is good, and the market demand is strong. At the same time, net income and diluted EPS for the year were positively impacted by the net tax advantage associated with the transfer of intangible assets. Interestingly, the Supreme Court of India ruled in favor of the company, holding that software sales should not be subject to withholding tax, and that Microsoft has further effectively reduced the tax burden by producing and distributing products and services at lower rates in foreign jurisdictions, such as Ireland. Tencent mentioned in its annual report that the company has taken steps to further reduce loss-making businesses and optimize its cost structure. This helps to improve the overall profitability of the company. At the same time, the company is focusing on self-developed PaaS (Platform-as-a-Service) solutions with healthier profit margins, such as audio and video cloud and databases. This shows that companies are paying more attention to their profitability when choosing and growing their businesses. Finally, the company offers solutions that help automakers improve their IT infrastructure and product offerings, such as customized smart cockpit solutions, digital maps, and data management. This may help companies increase the value and attractiveness of their services, which in turn can lead to higher profits. However, the net profit margins of Sohu and Meituan are not ideal, at -2.3% and -3.03% respectively. According to Sohu's 2022 annual report, the company's net loss from continuous operations in 2022 was US\$17.3 million. The net loss attributable to Sohu.com Limited was relatively high in 2022, suggesting that Sohu faced some financial pressure during the year. At the same time, it was also known that Sohu's net income

margin was affected by its investments in Changyou and Sogou, the modification of the equity plan and other related matters. The revision and merger of Changyou's equity plan, as well as the fact that Sohu no longer holds an equity interest in Sogou, are important factors affecting Sohu's net income and net income ratio.

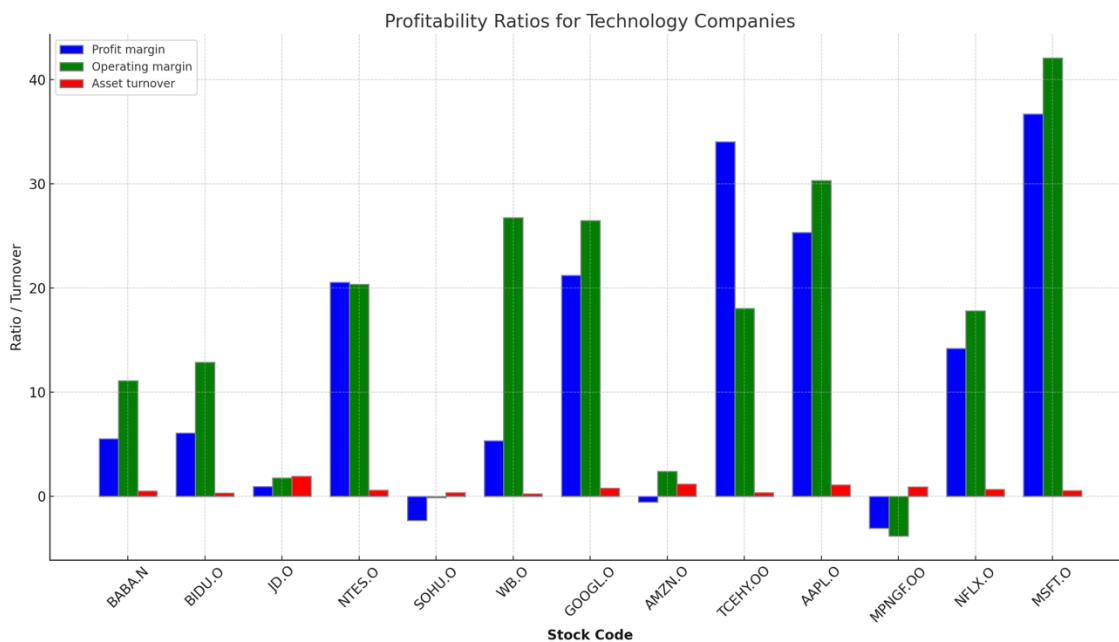


Figure 3: Profitability ratios for technology companies.

The presence and variation of these factors have increased the complexity of Sohu's net income (net loss) and also affected its net income ratio. Meituan noted in its annual report that the gross profit of the food delivery and Meituan flash sale business increased. However, this increase was offset by lower profits in the hospitality and tourism business. At the same time, the pandemic has led to a decrease in the number of customers visiting stores, which may have affected the company's overall profit. Meituan revealed on the side that the company is working hard to reduce the costs and expenses of all businesses and improve operational efficiency. This suggests that companies may face some challenges in controlling costs. Meituan's new business unit operating loss decreased from ¥9.4 billion in the fourth quarter of 2021 to ¥6.4 billion in the same period of 2022, although it improved, narrowing by 36.8 percentage points from 75% year-on-year to 38.2%, but it was still high, even if it reduced costs and improved operational efficiency in the merchandise retail business.

Operating margin represents a company's ability to generate profits from its core business [8]. As can be seen from Figure 3, the average operating profit margin of the Internet industry is 15%, which represents the feasibility and robustness of the business model of most Internet companies, and also shows that most Internet companies have done a good job in controlling operating costs and can maintain a reasonable balance between revenue and cost. Microsoft's operating margin is as high as 42%, and in its annual report, it reported an operating income of \$83,383 million in 2022, and from the company's business analysis, various business units, especially the "intelligent cloud" division, have seen significant revenue growth. In addition, the business units include "Productivity and Business Processes", "Intelligent Cloud", and "Personal Computing", etc., and the diversified business structure helps to diversify risks and achieve stable revenue and profits. Whereas Microsoft invests in high-margin business areas such as cloud engineering, LinkedIn, and gaming, where the return on investment is likely to be higher. Finally, thanks to Microsoft's effective management costs, it was able to maintain a high operating margin. Meituan's operating margin is similar to its net profit margin, which is also the lowest among the research companies at -3.8%. In their annual report, Meituan noted that in 2022, due to the impact of the macroeconomic environment, operating profit suffered a certain degree of negative impact, with the operating margin of the core local commercial segment falling from 16.6% to 3.5%, down 20.1% sequentially, and the operating loss margin of the new business unit narrowing from 38.2% to 3.4%. And the article points out that due to seasonal

factors, the operating loss of the bike-sharing and tram-sharing business has increased, which may be during the winter or rainy season, and people are less likely to use bike-sharing. Finally, even though the operational efficiency of the merchandise retail business has been improved and the operating loss ratio of the new business unit has been improved, it is still unable to turn losses into profits, which means that the business model is immature to a certain extent, which means that the company has a higher risk in the face of market changes.

Asset turnover is a financial ratio that measures how effectively a company uses its assets to generate sales revenue, and it can help investors understand the efficiency of a company's operations, especially in using its assets to drive sales and revenue [9]. As can be seen from Figure 3, the average asset turnover ratio of the Internet industry is 0.73%, which is a surprising value because it is a bit too low compared to other industries. As an industry that needs to continuously upgrade and innovate technology, it needs to continue to invest in high R&D, which takes a lot of time to convert into sales revenue, and due to fierce competition, the company needs to continuously invest money in order to gain market share and users [10]. JD.com, which has a much higher asset turnover rate than other internet companies, at 1.9%, and its annual report shows that the number of inventory turnover days in 2022 is 33.2 days, which indicates that the company needs an average of 30-33 days to sell and replace inventory in a year. This indirectly indicates that the company is doing a better job of using its assets (inventory) to generate sales. Similarly, the article does not directly mention the asset turnover ratio, but through indicators such as accounts payable turnover days, accounts receivable turnover days, etc., the issues related to the company's operational efficiency are discussed in detail, and the company's accounts payable turnover days have increased, from 47.1 days in 2020 to 52.5 days in 2022. This means that companies have more time to pay their suppliers and not have to use their cash flow prematurely, which may help maintain a high asset turnover. The company's receivables turnover days have increased but remain relatively low (2.7 days in 2020 and 4.5 days in 2022). This indicates that the company is able to recover its receivables quickly, which helps to keep assets liquid and high turnover.

5. Conclusion

Through the study of the liquidity, solvency, profitability and shareholder returns of Internet companies, we have summarized the following points: (1) The cash ratio of the Internet industry is generally low, and companies tend to reinvest funds in their business. However, companies will face cash flow pressures if they encounter unexpected situations such as investment, such as those in the case of Weibo and Sohu. This also reflects the need for companies to have sufficient cash flow to cope with unexpected situations. (2) The overall debt ratio of Internet companies is as high as 50%, indicating that enterprises rely on debt financing to a high degree. However, the long-term debt ratio of the industry as a whole is not high, suggesting that companies are not particularly dependent on external financing. In addition, Internet companies are not highly profitable, and EBIT multiples are generally low, making it difficult to pay interest. (3) Although Internet companies can achieve profitability to a certain extent, they still face competitive and cost pressures. Most internet companies excel at controlling operational costs, striving to maintain a balanced relationship between revenue and cost. (4) The average turnover rate of the Internet industry is low. At present, the Internet industry needs to continuously upgrade technology and innovation, and convert R&D investment into sales revenue, which requires a suitable cycle. (5) The market has a high evaluation and positive and optimistic attitude towards the prospects of the Internet industry. (6) It is important to note that in order to facilitate the conduct of the study, the companies we selected are all Chinese and American companies. However, internet companies are not only present in these two regions, which may lead to the fact that the companies studied are affected by region-specific policies in the course of development. In the future, companies from other regions could be added to the above analysis to dilute the impact of the policy on the conclusions and thus delve deeper into the issue.

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