

Financial Analysis and Valuation of Texas Instruments

Xinrui Shen¹, Changzhi Wang^{2,a,*}

¹*School of Mathematical Sciences, Shenzhen University, Shenzhen, 518060, China*

²*Fisher College of Business, The Ohio State University, Columbus, OH 43210, The United States*

a. wang.11663@buckeyemail.osu.edu

**corresponding author*

Abstract: This paper conducts an in-depth analysis of Texas Instruments' recent performance in the semiconductor industry, positioning it as a standout performer against competitors like Intel Corporation, Advanced Micro Devices, Broadcom, and Qualcomm. The study emphasizes Texas Instruments' comprehensive understanding of chip manufacturing, encompassing an examination of the industry's current landscape, recent company events, and interpretations of annual report statements. Financial statement comparisons are employed to calculate critical metrics such as liquidity ratio, solvency ratio, profitability ratio, investment ratio, and P/E ratio. Beyond quantitative metrics, the analysis extends to a thorough exploration of risk factors, spanning from internal intricacies to broader industry trends. These risk factors are systematically detailed, providing investors with a nuanced perspective for informed decision-making. The paper culminates in offering concrete and strategic investment suggestions based on the amalgamation of quantitative data and qualitative insights. This holistic approach equips stakeholders with a comprehensive understanding of Texas Instruments' standing in the semiconductor market, facilitating well-informed investment decisions in the dynamic and competitive industry landscape.

Keywords: Texas Instruments, Financial Valuation, Risk Assessment.

1. Introduction

Texas Instrument Inc is a nearly century-old enterprise headquartered in Dallas that design and manufacture semiconductor products. It believes that a good technology company should maintain a long-term cash flow growth strategy. In order to realize this strategy and criteria, Texas Instrument strictly control and implement it from three directions: The dominant business model focused on Analog and Embedded processing products, Disciplined and strict allocation of capital and efficiency and continuous improvement [1]. Clear and effective implementation of the strategy is one of the reasons that Texas instruments is indispensable in the semiconductor industry. In the present era, the semiconductor industry is grappling with a myriad of challenges, and countries worldwide are navigating the escalating demand for semiconductor chips and technological advancements. Aspects such as innovation, diversification of the supply chain, and the protection of intellectual property stand out as particularly vital components in the ongoing globalizing process [2]. The global business model also pushes Texas Instruments' competitiveness across the world.

Texas Instruments has close ties with the semiconductor industry in China, with a significant portion of its business and market share attributed to the Chinese market. The company has

manufacturing facilities in China and has established collaborative relationships with Chinese universities and research institutions, thus making a notable contribution to the semiconductor market in China [3]. Texas Instruments' product line is also extensive. It supports the company's main product architecture through Analog products, embedded processing products and other businesses such as calculators and DLP product. The most important revenue comes from the power and signal chain in Analog. More than 80,000 different products over most of the electronics industry especially the industrial side [1]. The embedded processing products and other products increases the intimacy and continuity of cooperation with customers for long-term. Such a rich product portfolio has also established Texas Instrument's strong manufacturing capabilities and technology leadership in the semiconductor field. For instance, the first single chip speech synthesizer invented by Texas Instrument has made great contributions to the development of the auxiliary learning tool market [4].

The integrated factory in the semiconductor industry has been a crucial component of the entire system and has been developed as a core competency by various companies over the past few decades [5]. Three recent events, which will probably promote Texas Instruments long-term supply chain advantages and cost control. Two factories have already implemented in Richardson, Texas and Lehi, Utah for 300-millimeter wafer manufacturing in 2022. Moreover, the facility for 300- millimeter wafer production in Sherman, Texas is also putted on the agenda and planned to start. There are certain similarities between the two factories that have started construction. Both of them are attached to existing buildings and have Leed environmental ratings. However, the planned factory in Sherman will bring more jobs, about 3000, while the Lehi plant will provide only 800 direct jobs, but will focus more on environmental production and investment in education for fostering a diverse technology community. In term of location, the factory in Sherman is a brand-new project and offers a convenient location on different aspects. The facility in Lehi is connected to the existing building in the new LFAB2 such an efficient and environmentally friendly synthesis. The two facilities will cost 30 billion dollars and 11 billion dollars separately and it shows their emphasis on core of supply chain and sustainability. In any case, these three major investments show that Texas Instruments has confidence in its own supply chain which support its main product model and will soon solve the chip shortage problem all over the world. Texas Instruments has consistently been committed to the development of social responsibility, not only in terms of environmental sustainability but also in ensuring the well-being of its employees [6].

In 2022, Texas Instruments has been experiencing solid growth primarily due to contribution from the automotive and industrial markets and the growth offset the downturn in mobile phones and computers. Its long-term strategy on 300- millimeter wafer production has cut costs by 40% at this point, with more factories likely to decrease even more. Texas Instrument has also received tax incentives and subsidies as a result of the recent passage of the CHIPS Act. In conclusion, it has a good prospect.

2. Accounting Analysis

According to the financial report for the fiscal year ended December 31, 2022 of Texas Instrument Incorporated, all data are true and objective. The critical evaluation is from three different aspects of Texas Instrument: Revenue Recognition, Restructuring charges and retirement plans [1]. In addition, this paper compares four other competing companies in the chip manufacturing and semiconductors industry which are Integrated Electronics, Advanced Micro Devices, Broadcom Inc. and Qualcomm Incorporated. These companies are strong competitors in terms of product overlap, global presence, market share and loyalty programs and so on which can clearly indicate the advantages of Texas Instrument and the points corresponding to adjustment.

2.1. Revenue Recognition

Although the Texas Instrument's total revenue of 2022 was \$20,028 million which is the least one from those four companies, the revenue recognition could be measured very well by its revenue recognition because the revenue structure is clear with those three main physical products [1]. This simple and fast accounting standard does not usually apply to non-physical product structures such as service revenue or long-term business transaction patterns. However, this kind of accounting model is clear in the measurement time point when the control is transferred, the immediate recognition of revenue, which is conducive to reflecting the overall economic condition of the enterprise. Furthermore, the validated delivery method simplifies many unnecessary processes and improves operational efficiency. Such direct sales or payments to distributors around the world usually do not depend on subsequent sales, and such revenue recognition could reduce credit risk.

In the revenue recognition description of Qualcomm Inc, it also mentioned how customer incentive arrangements are handled which somewhat similar to cooperative advertising program. Moreover, Qualcomm Inc explains a complete set of accounting methods and audit procedures for the implementation of this policy [7]. According to Advanced Micro Devices' description, some details of non-custom products may not be used as a reference due to structural difference in certain products [8].

In general, there is no obvious problem with the overall accounting method with the revenue because the chip industry is mostly based on this way, but some details still need to clarify more detailed and with some supplements. For instance, it can be clearly understood that the rebate part of the cooperative advertising program will lead to a reduction in revenue and stressed that special circumstances will be counted as expenses. However, in the statement of Texas instruments, these adjustments for revenue are only briefly mentioned [1]. It is helpful for all the investors get more effective information and reduce the misunderstanding with some detailed explanations.

2.2. Restructuring Charges

For all five companies, only Texas Instrument, Intel and Broadcom Inc provide the explanation for the restructuring charges [9, 10]. The Texas Instrument's restructuring charges are very high in 2022 which is \$257 million, but the clarification is inadequate. It just mentions the cost of facility in Lehi, Utah and preproduction [1].

On the contrary, the statement of Intel's restructuring charges is specified and compelling. It clearly describes the purposes, the cost structure, the financial impact and the expected completion time for those restructuring. Intel's restructuring plan in 2022 is biased toward balancing the company's employee team and operations, and the main restructuring charges are also related to employee severance and benefit arrangements which are mainly to improve efficiency and execution. Moreover, Intel also highlights \$873 million of current liabilities and another \$165 million payment activity which both could affect the restructuring charges, and the statement indicated the approximate completion time and said that it will be reflected in future financial results [9].

In Broadcom's description of restructuring charges, specific details for 2020 are provided about lease-related asset impairment and expenses related to discontinued operation. Additionally, the introduction of the new accounting standard Topic 842 is explained, showing the impact of the new accounting standard on restructuring charges [10].

In conclusion, Texas Instruments' description of restructuring charges is not detailed, and it would be more complete if it added some expansion of costs of facility in Lehi and preproduction. It would be more understandable if it described more of the program objectives and impacts as Intel did.

2.3. Retirement Plans

Texas Instrument is diversified and clear in its classification of retirement plans. It offers defined contribution, retiree health care benefit plans, defined benefit and even the deferred compensation plan for different qualifications. The U.S. retirement plan is mainly divided into four forms, according to the financial report, the total cost of the defined contribution plan is the largest proportion and gradually increased every year, the amount of 2022 is \$70 million. The defined benefit plan in it was closed to new participants in 1997. The benefit cost of the U.S. retiree health care benefit plan is determined by various reasons, such as years of service, retirement date, etc., but it is clearly stipulated that employees hired after 1 January, 2001 are not eligible for this benefit plan. Moreover, it also indicates the various plans are appropriate for non-U.S. retirement plan according to local legislations and points out the cost is not great. The most important part is it makes a good job of showing that pension funds are invested in portfolio of low-cost, broad market indexes and explaining the purpose of monitoring risk and sensitivity [1].

Of the five companies, only Intel's description of retirement plans is comparable. Intel's clarification does not focus heavily on the classification of the retirement plans, but Intel indicates its strategy for investing liquid asset and specific amount in U.S. retiree medical plan. In addition, it also mentions the concentration of non-American pensions in Ireland, Israel and Germany [9]. In aggregate, Texas Instruments' description of the retirement plan is the most comprehensive and clear. It is conducive to better management and evaluation by investors and stakeholders. A well-designed and reasonable retirement and benefits plan is also one of Texas Instruments' competitive advantages in recruiting top-tier professionals. It plays a crucial role in the company's human resources management, employee financial well-being, and corporate image [11].

3. Performance Evaluation

This paper conducts the company's performance evaluation based on four ratios, which are liquidity ratios, solvency ratios, profitability ratios and investment ratios. It compares these ratios with four competitors, which are INTC, AMD, AVGO and QCOM. The data used to calculate for these ratios are all from the financial statements of their annual reports [1, 7-10].

3.1. Liquidity Performance

Table 1: Liquidity ratios of TXN and its competitors.

Company Name	Current Ratio	Quick Ratio	Cash Ratio
TXN	4.70	3.77	1.02
INTC	1.57	1.16	0.35
AMD	2.36	1.77	0.76
AVGO	2.62	2.35	1.76
QCOM	1.75	1.21	0.23

Table 1 shows that except for AVGO's higher cash ratio, the liquidity ratios of TXN are the largest among all five companies. It is noticed that TXN's current ratio and quick ratio are abnormally high, which illustrates the company is capable to pay its short-term obligations or those due within one year. Current ratio of 4.70 indicates the company could technically pay off its current liabilities almost five times over. And a quick ratio of 3.77 signals that TXN can be liquid and generate cash quickly in case of emergency. A careful review of TXN's annual financial reports reveals that exaggeratedly large liquidity ratios are due to many short-term investments, which reached \$6067million and accounted for nearly half of the company's total current assets. TXN's short-term investments

includes \$1535million of corporation obligations, \$4234million of U.S. government and agency securities and \$248million of Non-U.S. government and agency securities. It indicates TXN preferred lots of sound short-term investments last year such as corporate bonds and government bonds. It is reasonable for TXN to make short-term security investments while keeping relatively high liquidity ratios to go over emergencies safely but it would be better for the company to control short-term investments slightly and focus on investing more in operating costs to try to boost profits in long run.

3.2. Solvency Performance

Table 2: Solvency ratios of TXN and its competitors.

Company Name	Total Debt Ratio	Long-Term Debt Ratio	Times-interest-earned ratio
TXN	0.46	0.30	47.38
INTC	0.43	0.26	2.00
AMD	0.19	0.10	14.36
AVGO	0.69	0.59	8.19
QCOM	0.63	0.39	32.37

Table 2 informed that TXN generally has a good solvency since its total debt ratio and long-term debt ratio are both within their normal ranges and it has the highest Time-interest-earned ratio. To be specific, 0.46, which is not an extreme number when it comes to total debt ratio, illustrates that TXN has managed to use appropriate debt to build and expand its business. Long-term debt ratio of 0.3 exactly represents that 30 percentage of a corporation's assets is financed with long-term debt, interpreting that TXN had an impressive extent of leverage. As for 47.38 times-interest-earned ratio, it means TXN has stronger performance and presents less of a risk to investors. By contrast, AVGO had a poor debt paying ability in the past year because its total debt ratio and long-term debt ratio are too large while its times-interest-earned ratio is too small. In all, it will be outstanding for TXN to maintain certain total debt ratio and long-term debt ratio while increasing its times-interest-earned ratio in order to fully utilize appropriate debt for product development or business expansion.

3.3. Profitability Performance

Table 3: Profitability ratios of TXN and its competitors.

Company Name	Profit Margin ratio	Operating Margin ratio	Asset Turnover ratio
TXN	0.44	0.51	0.81
INTC	0.13	0.04	0.37
AMD	0.06	0.05	1.90
AVGO	0.35	0.43	0.44
QCOM	0.29	0.36	1.07

TXN has a strong profitability in semiconductor industry based on overall higher ratios displayed in Table 3. Although AMD has 1.90 of the highest Asset Turnover ratios, its Profit Margin ratio and Operating Margin ratio are too small to consider it has a stronger capacity to make profits than TXN does. TXN has 0.44 of profit margin ratio explaining 44 percentage of profit the company has produced is from its total revenue, which also measures 0.44 net profit the company obtains per dollar of revenue gained. It means that TXN is able to effectively control its costs and provide goods or services at a price significantly higher than its costs. The operating margin measures 0.51 profit a company makes on a dollar of sales after paying for variable costs of production, such as wages and raw materials, but before paying interest or tax. The high operating margin of TXN acts as a good

indicator that the company is being well managed and able to generate profit through its core operations. Higher operating margin ratio suggests that TXN is potentially less of a risk than a company with a lower operating margin and it shows the proportion of revenues that are available to cover non-operating costs, such as paying interest, which is why investors and lenders pay close attention to it. Asset turnover ratio implies the efficiency with which a company is using its assets to generate revenue, so the higher the asset turnover ratio, the more effective a company is at creating income. Comparing TXN's asset turnover ratio with its competitors, it has a poorer performance than AMD and QCOM, indicating its ability to utilize assets to make profits remains to improve. The company can choose to increase revenue, improve inventory management or lease instead of buying assets to augment its asset turnover ratio.

3.4. Investment Performance

Table 4: Investment ratios of TXN and its competitors.

Company Name	ROE	ROA	Market-to-book ratio
TXN	0.60	0.32	8.83
INTC	0.08	0.04	1.33
AMD	0.02	0.02	2.83
AVGO	0.51	0.16	15.44
QCOM	0.72	0.26	6.49

Taking overall investment ratios into consideration, QCOM and TXN are matched with each other. However, combined with Table 2, QCOM has a relatively limited profitability, it still considers TXN outperform QCOM. 0.60 of ROE shows TXN is well managing the capital that shareholders have invested in it. High ROE implies TXN is efficient at generating income and growth from its equity financing. As for the fact that TXN possesses the highest ROA ratio, it suggests the company is profitable in relation to its total assets and how well the company is performing by comparing the profit it's generating to the capital it's invested in assets. Since TXN's market-to-book ratio is over 1, suggesting the market value of the company is trading higher than its book value per share, which means it is slightly overvalued by the market and very popular among the investors. In combination with Table 4, from an investment perspective, the market is optimistic about TXN and it is also valued reasonably by investors. TXN will become more welcomed if they remain high ROE and ROA ratios while decreasing their market-to-book ratio meantime.

4. Strategic Valuation

Table 5: P/E ratio of TXN and its competitors.

Company Name	P/E
TXN	19.09
INTC	64.77
AMD	46.14
AVGO	22.99
QCOM	14.77

The calculated TXN and its competitors' P/E ratios are shown in Table 5. The stock prices used to compute these data are the closing prices of each corporate on November 11th and all the TTM EPS are derive from Website ESTIMIZE.

From Table 5, TXN has a P/E ratio of 19.09, which is relatively low between its competitors indicating that the company might currently be undervalued by the market. In conclusion, combining Table 5 with analysis in performance evaluation mentioned above, it is sensible for investors to invest in TXN for it is a lucrative stock and it is relatively undervalued by the market now. Besides, TXN has been conducting wafer manufacturing in two factories in Richardson, Texas and Lehi, Utah and putting the 300-millimeter wafer production plan into agenda. It suggests that TXN is trying to build its own supply chain to solve chip shortage problems and ensure its production line goes smoothly. Constructing self-sufficient supply systems effectively reduces production costs since the company now has the right to determine and supervise the quality and quantity of their products so as to help further obtain high profits, which proves once again that investing TXN is a wise decision. Therefore, several risk factors of TXN need to analyze for helping investors gain a comprehensive understanding of the stock.

The first risk is about Covid-19. Except for the unknown impact of epidemic will lead to and the extent to which the pandemic will continue to affect the business and the whole industry, it is also a big challenge for decision makers to be clearly aware of the current demands, trends and to appropriately allocate the resources according to the needs. It surely results in an erratic situation which needs a long time to go back to normality so it is also important to make corresponding decisions to deal with current situations [12]. The second risk is related to supply chains and manufacturing. The semiconductor industry depends much on third parties to provide goods and services timely, such as key materials, natural resources and new manufacturing technology to make sure companies can function normally and become outstanding among competitors. If suppliers fail to offer goods or services due to some factors like natural disasters, the damage it brings will be extensive and unprecedented. For example, the 2011 off the pacific coast of Tohoku Earthquake led to the great damage of hydrogen peroxide and the supply disruption of the automotive microcontroller units, which were used for semiconductor manufacturing, causing a tremendous shock to the semiconductor industry [13].

5. Conclusion

After comprehensive analysis and consideration on different aspects of accounting analysis and performance evaluation, Texas Instrument is a valuable company to invest from the view of value investing. From the perspective of accounting analysis, Texas Instrument's information of revenue recognition and retirement plans explicit the high efficiency and accuracy, allowing investors to clearly understand the stratification of revenue and the investment plan of pension. Apparently, compared the other four competing companies in chip manufacturing industry, Texas Instruments has advantages in the performance evaluation of liquidity, solvency, profitability and investment.

In terms of liquidity ratio, Texas Instruments performs especially in part of quick ratio and current ratio, representing the company's sound short-term investment strategy to attract more value investors. Among the solvency ratios, the times-interest-earned ratio has the best performance, which proves that Texas Instrument are good at paying interest and the less risk. According to the high profit margin and operating profit margin, it also shows the strong profitability. In addition, the high ROA and ROE will attract more shareholders for such a good return on investment. A low P/E ratio represents a low strategic valuation by the market and there is a high growth potential for Texas Instrument. In general, Texas Instruments meets the criteria of value investing, and it is a valuable stock based on both of its financial performance and data analysis.

Authors Contribution

All the authors contributed equally and their names were listed in alphabetical order.

References

- [1] *Texas Instruments Incorporated (2022). Form 10-K for the fiscal year ended December 31, 2022.*
- [2] *Lamsal, R. R., Devkota, A., & Bhusal, M. S. (2023). Navigating global challenges: The crucial role of semiconductors in advancing globalization. Journal of The Institution of Engineers (India): Series B, 104(6), 1389–1399.*
- [3] *VerWey, J. (2019). Chinese semiconductor Industrial Policy: past and present. Social Science Research Network.*
- [4] *Frantz, G., & Wiggins, R. H. (1981). The development of “Solid state speech” technology at Texas Instruments. IEEE Acoustics, Speech, and Signal Processing Newsletter.*
- [5] *Harrell, S. (1995). Factory of the future: The “whole factory” view. Journal of Vacuum Science & Technology B: Microelectronics and Nanometer Structures Processing, Measurement, and Phenomena, 13(4), 1879–1882.*
- [6] *HESLIN, P. A., & OCHOA, J. D. (2008). Understanding and developing strategic corporate social responsibility. Organizational Dynamics, 37(2), 125–144.*
- [7] *Qualcomm Incorporated (2023). Form 10-K for the fiscal year ended September 25, 2023. <https://www.sec.gov/ix?doc=/Archives/edgar/data/804328/000080432823000055/qcom-20230924.htm>*
- [8] *Advanced Micro Devices, Inc. (2022). Form 10-K for the fiscal year ended December 31, 2022. <https://www.sec.gov/ix?doc=/Archives/edgar/data/2488/000000248823000047/amd-20221231.htm>*
- [9] *Intel Corporation (2022). Form 10-K for the fiscal year ended December 31, 2022. <https://www.sec.gov/ix?doc=/Archives/edgar/data/50863/000005086323000006/intc-20221231.htm>*
- [10] *Broadcom Inc. (2022). Form 10-K for the fiscal year ended October 30, 2022. <https://www.sec.gov/ix?doc=/Archives/edgar/data/1730168/000173016822000118/avgo-20221030.htm>*
- [11] *Popov, E., & Vlasov, M. (1992). Assessment of intellectual development of the human capital of Hi-Tech Productions. Montenegrin Journal of Economics, 14(1), 121–131.*
- [12] *Marinova, G., & Bitri, A. (2021). Challenges and opportunities for semiconductor and electronic design automation industry in post-Covid-19 years. IOP Conference Series, 1208(1), 012036.*
- [13] *Matsuo, H. (2015). Implications of the Tohoku earthquake for Toyota's coordination mechanism: Supply chain disruption of automotive semiconductors. International Journal of Production Economics, 161, 217–227.*