

Valuation Date: 12/01/2019
Current price: 118.79
Ticker: TXN

Recommendation: Buy
Target Price: \$142.09
Headquarters: Dallas, TX

Industry: Semiconductors
Stock Exchange: NASDAQ
Sector: Information Technology

Introduction – TEXAS INSTRUMENTS

Texas Instruments is a fortune 500 technology company that was started in 1930. They are a global company with locations in over 30 countries, employ more than 30,000 people, and have obtained over 40,000 patents on their 100,000 products. As a company Texas Instruments considers their core values to be integrity, innovation, and commitment. They state that ethics is foundational and the starting place for every decision. Texas Instrument expects innovation from every organization and employee. They consider innovation to be their lifeblood and the way they push the boundaries of what is possible to create new products. Their research and development labs are innovation centers focused on delivering breakthrough technology. These labs work with staff and students at top universities to increase creativity and speed up development. Texas Instrument also takes great pride in their focus on commitment. They make it top priority to fulfill promises to customers and stakeholders such as safeguarding the environment, make communities stronger, and help their customers succeed.

Texas Instruments is a semiconductor manufacturer primarily focused on Analog products and embedded processing products.

Analog semiconductors condition and regulate physical functions such as temperature, speed, sound, and electrical current. The analog product lines offered by TI include power, signal chain, and high volume. Power includes products that help customers regulate voltage levels. Signal Chain includes products that sense and condition “real world” signals and convert them into readable information. The High Volume segment includes products sold into markets such as personal electronics, industrial, and automotive. These products enable products like displays and safety systems to operate effectively. Analog products make up for about 68% of TI’s revenue.

Embedded processing products are a microprocessor that is designed into a system to control electrical and mechanical functions. They are generally simple in design and have limited computational power. The embedded processing products that TI offers include processors and connected microcontrollers. Processors are used to perform mathematical computations; improve digital data, and specific computing activity. Connected Microcontrollers are self-contained systems designed to control a specific task for electronic equipment. Embedded processing generated about 23% of TI’s revenue.

Recommendation

We recommend a **BUY** for Texas Instruments (TI) under the following rationale:

- High quality products
- Demand Growth
 - Implementation of 5G, Expansion of IoT, and Development of AI will drive the need for analog and embedded processing products.
- Undervaluation

- Low price to earnings ratio when compared to direct competitors provides an opportunity to buy at a discount.
- Research and Development Prioritization
 - Drives innovation and demand in the market
- Automation

Investment Thesis

Product Quality

Texas Instruments makes it a top priority and goes to extreme lengths to produce high quality products for their customer. TI states "Quality is foundational to achieving our business objectives. We are committed to satisfying applicable requirements and providing quality products to customers around the world by encouraging and expecting the creative involvement of every Tler, Listening to our customers, and continuously improving and innovating our products, processes and services". TI ensures that the products they produce meet their quality expectations by spending 6-14 weeks being developed and performing a very wide variety of accelerated reliability testing. Their very high quality products give Texas Instruments a very strong brand image allowing them to continue to grow their market share.

Demand Growth

Demand growth for semiconductors is favorable for the industry as a whole and more specifically for Texas Instruments. TI is a major player in the major segments of the semiconductor space, some include healthcare, automotive, aerospace and defense, appliances, factory automation, mobile phones, ADAS, wearable's and PC's. As industries evolve and devices require more efficient and advanced systems, TI is set to take advantage of expansion with their high market share and low cost of production. Texas Instruments generates 79% of their revenue through three product segments; these include industrial, automotive, and personal electronics. Each of these specific segments are set to have demand increases with the roll out of 5G, advancements in autonomous vehicle technology, increases in medical technology, and increases in connected devices such as mobile phones, PC's, and internet of things devices.

Texas Instruments three main product segments have increasing revenue and demand projections leading into 2024. Their industrial product segment which includes technology such as medical, appliances, and lighting, is set to increase from 50.1 billion in 2019, to 82.2 billion in 2024. Automotive is set to increase from 40.82 billion in 2019 to 109.56 billion in 2024. Personal electronics are set to grow at a CAGR of 15.9% leading up to 2024. While these three specific segments are all set to increase in the future, it is important to note that the overall worldwide semiconductor industry is set to increase from 577 billion in 2019 to 831.5 billion in 2024.

Research and Development

Research and Development play a huge role in the information technology. As stated above, innovation is a core value of Texas Instruments. This focus on innovation driven by research and development as allowed them to be one of the first semiconductor manufactures to bring a chip built on a 300mm wafer

to market. This new design has allowed them to cut costs by about 40% when compared to the standard 200mm wafer chip. Over the last 3 years Texas Instruments has increased their research and development spending from about 1.35 billion to 1.55 billion. This is a positive indicator that the management team will continue to be able to produce innovative products that will stay up to date with market trends as well as continue to reduce production costs. An important aspect of TI's business model is their return on invested capital, compared to the other companies in the S&P 500 Texas Instruments ranks in the 97th percentile on return on invested capital. Along with that they also rank in the 94th percentile in cash returns as % of revenue, and 91st percentile in free cash flow as % of revenue.

Automation

Automation in the automotive industry as well as in industrials will continue to drive demand for the products produced by Texas Instruments. With automation comes the need for sensors. They are needed for all sorts of functions ranging from general operating functions to very specific safety procedures. Two industries that are becoming more automated at a noticeably rapid rate are the automotive industry and industrials. The automotive industry makes up for about 20% of Texas Instruments total revenue and industrial makes up about 23%. As the need for automation ramps up in these industries to stay competitive the demand for analog semiconductors will increase as well. More analog semiconductors will be demanded because of the critical role that they play in the process of gathering and transmitting data from events going on outside of the system. The development of autonomous vehicles shows great potential to be a very strong driver for these products. The global autonomous vehicles market will see nearly 6 million units' incremental growth from 2018 to 2022. As the demand for electronic components used in autonomous cars for safety, infotainment, navigation and fuel efficiency continues to increase, the demand for automotive semiconductors to support increased connectivity, battery performance in EVs, enhanced sensors, and other technologies are also expected to see a huge jump over the near future for these products due to the fact that they will be almost 100% dependent on the sensors that use analog semiconductors to function.

Valuation – Target Price \$142.09

Our valuation consisted of a relative valuation which was given a weight of 50% and an EVA model weighted at 50%. The combination of these valuation models resulted in a target price of **\$142.09**. For our EVA model we used a discount rate of 8.32%, a 2-year growth rate of 1% and a 3 year growth rate of 5%. The target price that we got using this model was \$135. When performing the relative valuation model, we found that the average P/E ratio was approximately 41.44. When this P/E ratio was applied to Texas Instruments current earnings of \$3.60 per share this gave the company a share price of \$149.18.

Risk Factors

Distributors:

Texas Instruments sells a lot of its inventory to distributors on consignment. This can be risky due to the fact that there is a possibility that distributors could potentially experience a loss of TI inventory. If this loss were to occur this could result in a very negative impact to the cash flows of Texas Instruments. This loss of cash flow would also have a negative impact on operations and financial condition. There is also the possibility of delayed and only partial recovery of this loss. In 2018, about 65 percent of revenue was generated from sales of our products through distributors. These distributors carry competing product

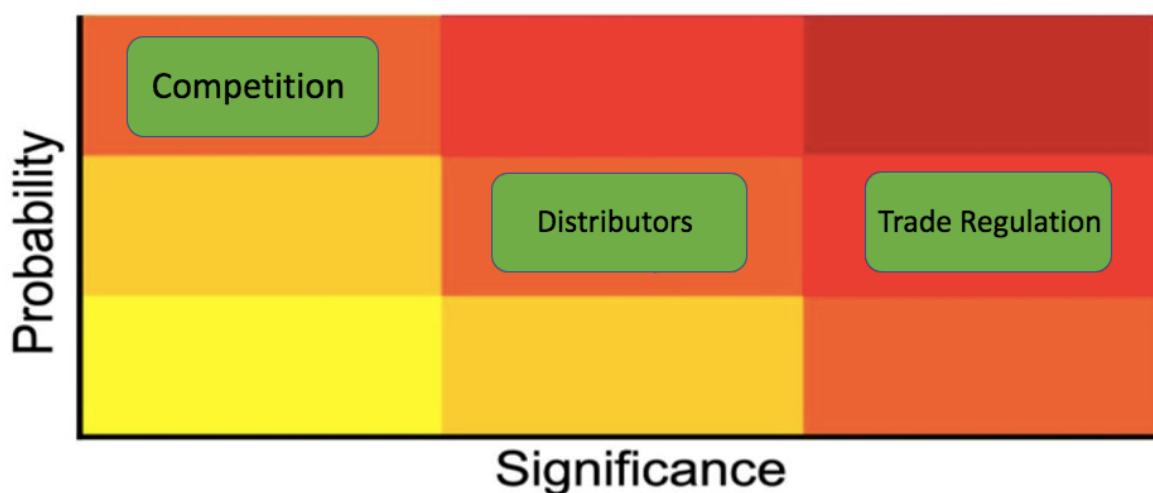
lines, and sales could be affected if distributors promote competing products over Texas Instruments products.

Trade Regulation:

Trade regulations have had and will continue to have a negative effect on Texas Instruments. In the third quarter of 2019 TI reported a revenue decline of 11% due to challenging market conditions and trade war uncertainties and warned that sales could fall even further in the fourth quarter. They also run the risk of losing customers to Chinese companies that do not face the regulations that are currently placed on US companies.

Competition:

The semi-conductor industry is heavily saturated with producers; TI has direct competition for business both domestically and abroad. Each sub section of the semiconductor industry has different company's trying to acquire market share. TI has established both a first mover and low cost advantage when it comes to producing analog and embedded semiconductors. In order to mitigate competition TI requires high amounts of R&D spending to stay ahead of its peers. The biggest threat in competition is China, as a country, China is trying to become self-sufficient in the semiconductor industry, because most of Texas Instruments revenue comes from China, it is imperative that they maintain their reputation as a high-quality producer.



Management

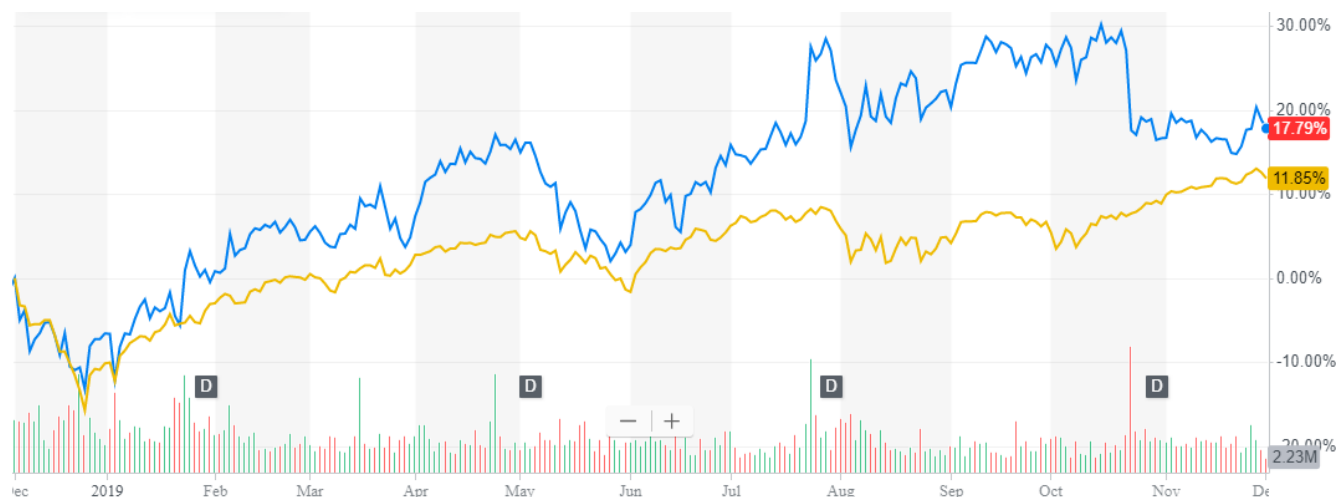
The current CEO is Richard Templeton. In 1980 Templeton obtained a degree in electrical engineering from Union College in New York. After he obtained his degree he secured employment at Texas Instruments and worked in many different positions throughout his career. Templeton held the position of chief operating officer from 2000 to 2004. In April of 2004 he was he was promoted to CEO and in 2008 he was named Chairman of the Board.

Richard Templeton's compensation is primarily performance based. He currently has a base pay of \$1,131,252 which is 6.4% of his total compensation. His other forms of compensation include cash

bonuses of \$4,026,250 (22.9%) stock and stock options of \$12,000,110 (68.2%) and “other” of \$418,612 (2.4%). This adds up to a total compensation amount of \$17,576,224. We believe that this primarily performance based compensation plan will be a strong motivator for Templeton to continue to improve and grow Texas Instruments’.

Price Performance

When you compare Texas Instruments to the S&P 500, Texas Instruments saw a return of 17.79% while the S&P 500 only returned 11.85% over the past year.



Peer Analysis

Texas Instruments faces four main competitors which include Qualcomm, NVIDIA Corp., Analog Devices, and NXP Semiconductors. A few positive indicators that make Texas Instruments stand out from its competitors are its PE ratio, price performance, and ROE. Over the past year Texas Instruments has outperformed its competitors by about 2%. Texas Instruments also has the lowest PE ratio when compared to its competitors; this gives us the opportunity to buy this stock at a discount. Finally, as you can see below, besides the outlier of Qualcomm which has an abnormally high ROE Texas instruments also has a very healthy ROE when compared to competitors

Column1	Price	Market Cap	PE	ROE
Texas Instruments	118.79	109,191.12	21.71	56.6
Qualcomm	82.45	91,952.77	22.43	117.51
NVIDIA Corp.	209.25	123,856.56	51.76	24.08
Analog Devices	111.26	40,307.01	30.07	11.7
NXP Semiconductors	114.76	31,564.19	81.23	4.08

Ownership of Shares

Texas Instruments shares are owned primarily by financial institutions and mutual funds. Institutional and mutual fund ownership consists of approximately 87.95% of the total shares outstanding while insider ownership makes up for about .89% of the total shares outstanding. Texas Instruments top 5 investors are listed below.

Stockholder	Stake	Shares owned	Total value (\$)
The Vanguard Group, Inc.	9.16%	85,588,711	10,288,618,949
Black Rock Fund Advisors	4.95%	46,300,246	5,565,752,572
SSgA Funds Management, Inc.	4.23%	39,552,319	4,754,584,267
PRIMECAP Management Co.	3.41%	31,914,422	3,836,432,669
Massachusetts Financial Services	2.55%	23,858,679	2,868,051,803