

# Taiwan Semiconductor Manufacturing Co Ltd

TSM

15-11-22

TAIWAN SEMICONDUCTOR (LEADING WITH AN EDGE) - INITIATION OF COVERAGE

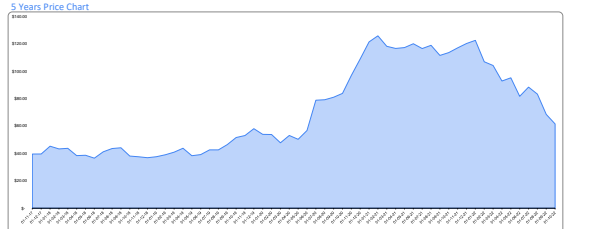
Price	52 Weeks Range	Beta 3Y	P/E	EPS	FullYearDiv	Div Yield	Shares Outstanding (mill)	MarketCap (bill)
80.46	59.43 - 145	0.9014	13.6669	5.8872	1.8691	2.32%	5186.08	417.27

Investment Theme:	Semiconductors
Sub-Sector:	Semiconductors

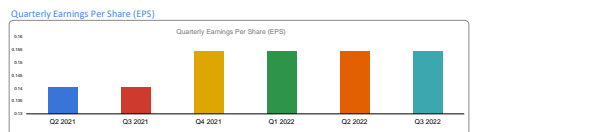
Share Price:	80.46
Target Price:	122
Upside/Downside:	52%
Rating:	Buy
Rating Held Since:	16-Nov-2022

## Price Return

3 Months	YTD Return	1 Year	3 Years
-11.64%	-32.08%	-30.52%	17.23%



Growth			
	3 Year	5 Year	10 Year
Revenue	18.40%	14.08%	14.61%
Net Income	20.72%	15.56%	16.60%
EPS	20.28%	15.44%	16.56%



Profitability (as of December 31, 2021)			
Return on Equity	Return on Assets	Profit Margin	EBITDA Margin
29.71%	18.24%	37.32%	68.72%

Financial Health (as of December 31, 2021)			
Cash Ratio	Current Ratio	Debt to Equity	Interest Coverage
1.40	2.49	0.34	-

Valuation (as of November 15, 2022)			
Price/Equity	Price/Sale	Price/Cash Flow	Price/Book Value
13.67	5.82	24.21	4.83

ESG Score (by MSCI)	9
Next Full Year End	2022-12-31
Next Quarter Date	2022-12-31
Estimated EPS	1.75



## SAVEST'S RECOMMENDATION (NOVEMBER 16, 2022)

With undisputed leadership of the global foundry business, TSMC continues to deliver impressive results led by demand from smartphone manufacturers (Apple Inc.) and high-performance computing. We initiate coverage of the stock with a **BUY** recommendation and a price target of **\$122**. We see a **52%** upside relative to the last market closing price of **\$80.46**. Although we see demand for its leading platforms (smartphone manufacturers and high-performance computing) staying flat in Q4 2022 and Q1 2023, we expect it to get stronger from Q2 2023 as it looks to commence mass production of its latest technology - the 3-nanometer chips. With strong leadership in advanced chip fabrication technologies and a deeply collaborative relationship with its customers, TSMC has positioned itself as the world's largest, most reliable, and most effective transistor fabricator. This position has entrenched TSMC in its most important markets, enjoying favorable subsidies in Taiwan, China, and the US (where it is expanding the production capacity of its plant in Arizona).

Analyst Ratings					
Date	Buy	Hold	Sell	Strong Sell	Strong Buy
2022-11-14	4	2	0	0	7

## COMPANY SUMMARY

**Business Profile**  
Taiwan Semiconductor Manufacturing Co. (TSMC) is the world's largest dedicated chip foundry, with over 57% market share in 2021 per Gartner. TSMC was founded in 1987 as a joint venture of Philips, the government of Taiwan, and private investors. It went public as an ADR in the U.S. in 1997. TSMC's scale and high-quality technology allow the firm to generate solid operating margins, even in the highly competitive foundry business. Furthermore, the shift to the fabless business model has created tailwinds for TSMC. The foundry leader has an illustrious customer base, including Apple, AMD, and Nvidia, that looks to apply cutting-edge process technologies to its semiconductor designs. Taiwan Semiconductor Manufacturing Co. is the world's largest dedicated chip foundry, with over 57% market share in 2021 per Gartner. TSMC was founded in 1987 as a joint venture of Philips, the government of Taiwan, and private investors. It went public as an ADR in the U.S. in 1997. TSMC's scale and high-quality technology allow the firm to generate solid operating margins, even in the highly competitive foundry business. Furthermore, the shift to the fabless business model has created tailwinds for TSMC. The foundry leader has an illustrious customer base, including Apple, AMD, and Nvidia, that looks to apply cutting-edge process technologies to its semiconductor designs.

**Geographical Spread**  
Taiwan Semiconductor Manufacturing sells chips to clients globally and thus serves a worldwide market. Through locations in North America, Europe, Japan, China, and South Korea, the company offers customer support, account management, and engineering services. Its subsidiaries worldwide employ more than 65,000 people.

Key Executives	
Dr. Mark Liu	Chairman
DR. C. C. Wei	Chief Executive Officer
Lora Ho	Senior Vice President, Human Resources
Dr. Wei-Jen Lo	Senior Vice President, Research and Development
Rick Cassidy	Senior Vice President, Corporate Strategy Office/CEO and President, TSMC Arizona
Y. P. Chin	Senior Vice President, Operations.
J. K. Lin	Senior Vice President, Information Technology and Material Management & Risk Management
Dr. Cliff Hou	Senior Vice President, Europe & Asia Sales, R & D/ Corporate Research

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### Investment Theme Review - Semiconductor

Semiconductor technology has become one of the foundational technologies for the modern economy.

It is one of the most critical components powering the current phase of the technological revolution. It is a part of virtually everything, from phones, electric cars, laptops, and headsets to LED bulbs. Over the next decade, we expect more demand from technological advancements (such as 5G, Internet of Things, Artificial Intelligence, and cloud computing), global digitalization, and government subsidies.

We screen the entire semiconductor value chain based on fundamental values and our internal rating methodology to identify those offering the best value for our various portfolios, including client portfolios.

### Sub-Sector Analysis - Semiconductor

Companies involved in the design and fabrication of transistors and integrated circuits are collectively classified under the semiconductor sub-sector. Semiconductor companies are grouped into three: Integrated Device Manufacturers (IDMs), Pure-play foundries, and Fables companies. Integrated Device Manufacturers (IDMs) such as Intel and Samsung Electronics design and manufacture chips and integrated circuits. Pure-play foundries only manufacture devices for other companies. TSMC and Samsung Electronics control most of the global chip manufacturing, accounting for over 70% of device chip manufacturing. Fabless semiconductor companies design their own chips but contract the manufacturing to pure-play foundries. The leading fabless companies are Qualcomm, Nvidia, Broadcom, Mediatek, and Advanced Micro Devices.

Semiconductor Chips are made out of tiny silicon transistors. These transistors are very small in size and measured in nanometers (nm) in chips according to the length of the transistor gate of each individual transistor. The smaller the nanometer, the more processing power could be packed into a given space, which could result in faster processing, reduced power consumption, and less heat. As computers and mobile technology seek to become small and more portable, semiconductor manufacturers are in a race to reduce chip sizes so as to gain market leadership.

The design-to-manufacturing process for semiconductors requires large-scale investment in technology and building fabrication plants. Companies focus on the aspects of the value chain where they can extract the greatest benefits. While most of the fabless companies reside in the USA, the actual fabrication is predominantly in Asia, particularly Taiwan and Korea. Fabrication plants also need materials and silicon wafers from the USA, Japan, and the Netherlands.

In 2021, the revenue from the global semiconductor market reached \$555.89 billion according to Statista. According to Business Insight, the market is projected to grow to US\$573.44 billion in 2022, and reach US\$1.3 trillion in 2029, growing at a compounded annual growth rate (CAGR) of 12.2%. The growth of the market is attributed to the increasing consumption of consumer electronics devices across the globe. Additionally, the development of the industry is being facilitated by the Internet of Things (IoT) and Machine Learning (ML) technologies.

Ticker	Company Name	Price	Market Cap	P/E	ROA	ROE	ROIC	EBIT Margin	EBITDA Margin	Profit Margin
TSM	van Semiconductor Manufacturing Ct	80.46	417.27	13.67	18.24%	29.71%	23.35%	42.11%	68.72%	37.32%
AMD	Advanced Micro Devices Inc	76.37	123.14	45.73	5.03%	6.33%	6.07%	11.39%	25.19%	9.95%
NVDA	NVIDIA Corp	166.66	414.98	54.64	18.24%	31.80%	21.81%	27.03%	31.47%	26.03%
ASML	ASML Holding NV	597.47	237.32	39.72	17.71%	57.99%	40.17%	32.52%	35.19%	27.52%
TXN	Texas Instruments Inc	177.57	161.16	18.61	35.99%	65.53%	41.90%	52.16%	56.76%	44.21%
QCOM	Qualcomm Inc	126.02	141.27	11.08	28.82%	94.19%	44.04%	35.04%	39.03%	29.27%
MU	Micron Technology Inc	63.1	68.60	8.16	13.77%	18.34%	16.26%	31.73%	54.87%	28.24%
INTC	Intel Corp	30.71	126.74	9.45	7.75%	13.55%	9.78%	20.48%	38.91%	19.13%
AVGO	Broadcom Inc	524.42	212.39	22.68	13.77%	44.37%	16.13%	40.24%	56.87%	31.96%
AMAT	Applied Materials Inc	110.46	95.03	14.77	26.09%	55.53%	38.15%	31.36%	33.06%	26.42%
NXPI	NXP Semiconductors NV	174.81	45.30	17.41	12.38%	39.40%	15.12%	27.72%	37.45%	20.62%
STM	STMicroelectronics NV	38.79	35.09	10.51	21.07%	35.66%	28.03%	26.61%	34.15%	22.69%
CRUS	Cirrus Logic Inc	77.22	4.25	12.85	16.42%	22.26%	22.26%	21.58%	25.03%	17.79%
LRCX	Lam Research Corp	490.74	66.93	14.07	28.62%	75.77%	42.60%	31.62%	33.45%	26.96%
MU	Micron Technology Inc	63.1	68.60	8.16	13.77%	18.34%	16.26%	31.73%	54.87%	28.24%
ADI	Analog Devices Inc	165.17	84.95	45.63	4.17%	5.85%	4.91%	18.93%	38.77%	17.00%
MRVL	Marvell Technology Inc	44.7	38.11	-	-1.00%	-1.41%	-1.09%	2.25%	27.96%	-3.95%
QRVO	Qorvo Inc	98.75	10.01	15.50	9.17%	15.20%	10.55%	20.65%	28.54%	15.34%
LSCC	Lattice Semiconductor Corp	69.86	9.57	62.94	21.31%	36.96%	27.04%	25.88%	31.42%	24.83%
STM	STMicroelectronics NV	38.79	35.09	10.51	21.07%	35.66%	28.03%	26.61%	34.15%	22.69%
RNECY	Renesas Electronics Corp	4.95	17.72	9.91	9.16%	18.30%	11.16%	27.61%	39.65%	16.74%
SWKS	Skyworks Solutions Inc	96.54	15.49	12.38	14.72%	23.98%	16.97%	27.79%	40.37%	23.25%
ADI	Analog Devices Inc	165.17	84.95	45.63	4.17%	5.85%	4.91%	18.93%	38.77%	17.00%
KLAC	KLA Corp	385.55	54.64	17.41	27.07%	105.83%	41.99%	40.49%	44.35%	33.28%
MCHP	Microchip Technology Inc	76.94	42.51	23.53	11.41%	31.28%	13.54%	32.47%	46.93%	24.14%
OLED	Universal Display Corp	113.44	5.36	28.36	12.87%	16.90%	16.90%	40.50%	47.83%	32.13%
SLAB	Silicon Laboratories Inc	145.89	4.86	85.82	2.22%	3.14%	2.52%	11.28%	17.38%	6.45%
UMC	United Microelectronics Corp	7.58	18.92	7.57	-	-	-	-	-	-
AMKR	Amkor Technology Inc	28.47	6.97	8.58	13.14%	26.47%	19.25%	13.69%	22.35%	11.84%
INTT	inTest Corp	10.25	0.11	20.10	5.57%	9.72%	7.69%	6.52%	10.88%	5.15%
CPSH	CPS Technologies Corp	3.6	0.05	25.71	10.94%	14.93%	14.79%	8.39%	9.79%	7.80%

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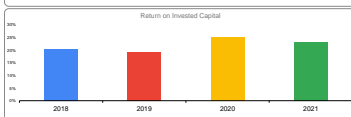
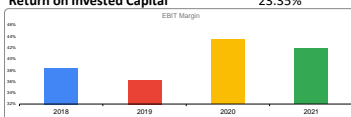
### FULL YEAR FINANCIAL REPORT/ANALYSIS

#### INCOME STATEMENT

Full Year	2021	2020	2019
Revenue	56,817.74	45,489.45	34,629.98
Cost of Revenue	27,484.35	21,335.03	18,683.73
Gross Profit	29,333.39	24,154.41	15,946.25
SG&A Expenses	1,592.35	1,208.19	908.99
EBITDA	39,044.20	31,199.77	22,008.05
EBIT	23,925.58	19,932.33	12,723.07
Net Income	21,202.09	17,348.05	11,455.50
EPS	4.09	3.35	2.21

#### Profitability Margins

Net Profit Margin	37.32%	38.14%	33.08%
Gross Profit Margin	51.63%	53.10%	46.05%
EBITDA Margin	68.72%	68.59%	63.55%
EBIT Margin	42.11%	43.82%	36.74%
Return on Assets	18.24%	19.96%	15.91%
Return on Equity	29.71%	29.11%	21.18%
Return on Invested Capital	23.35%	25.24%	19.09%



#### Share Summary

Shares Outstanding	5,186.08
Free Float	
EPS (MRQ)	1.78
Div/Share	1.90
BV/Share	16.68
Average Daily Volume	10.11
Short Ratio	1.82

#### BALANCE SHEET

Full Year	2021	2020	2019
Cash and Equivalent	38,362.01	23,496.13	15,203.05
Inventories	6,955.74	4,888.54	2,770.24
Current Asset	57,888.37	38,871.97	27,462.14
Total Asset	134,189.11	98,252.53	75,605.58
Current Liabilities	27,316.63	22,489.90	19,975.78
Current Portion of Long Term Debt	4,304.08	3,244.44	5,018.36
Long Term Debt	26,398.63	12,358.32	5,856.30
Total Liabilities	56,683.36	32,915.86	21,710.87
SH Equities	77,418.49	65,302.77	53,871.95

#### Solvency Ratios

Cash Ratio	1.40	1.04	0.76
Current Ratio	2.12	1.73	1.37
Debt/Equity	0.34	0.19	0.11
Interest Coverage	-	-	-
Net Debt to EBITDA Ratio	0.47	0.30	0.30

#### Statement of Cashflow

Full Year	2021	2020	2019
Net cash provided by operating activities	\$39,807	\$27,943	\$19,909
Net cash provided by investing activities	-\$29,936	-\$17,180	-\$14,849
Net cash (used in) provided by financing	\$4,890	-\$3,010	-\$8,727

Free Cash Flow	\$9,404	\$10,230	\$4,705
Free Cash Flow/Net Income	0.44	0.59	0.41

#### ANALYSIS

Over the past five years, TSMC has seen a cumulative average growth rate (CAGR) of 14.08%, driven by growing revenue from production and sales of advanced technologies (7nm and beyond). In 2021, TSMC saw a 22.2% growth in net income, which is in line with the trend over the past three years. We believe that TSMC will continue to grow its revenue due to its dedicated customer base, global relevance, and technology leadership. Our model forecasts a compounded annual growth rate of 14% for the next ten years. Although its profitability margins have improved over the past three years, 2021 met a slight decline. Return on Asset (ROA) improved to 19.96% in 2020 from 15.91% in 2019 and slightly reduced to 18.24% in 2021. Return on Invested Capital also increased to 25.24% in 2020 from 19.09% in 2019 before slightly dropping to 23.35% in 2021. Return on Equity has continuously improved over the past few years, from 21.18% in 2019 to 29.71% in 2021.

The net profit and EBIT margins have improved and remained strong over the past three years. We forecast TSMC's EBIT margin to normalize at 40% over the next ten-year period, driven by strong demand for semiconductors and economies of scale.

The company's liquidity ratios (which measure its ability to meet its short-term obligations) have significantly improved over the last three years, as shown in the cash and current ratios. The debt/equity ratio increased to 0.34 in 2021 from 0.19 in 2020 indicating that the company has taken on more debt in its capital structure. However, the solvency ratios show a great ability to meet their near-term obligations.

Cashflow from operating activities increased significantly from \$19.91 billion in 2019 to \$27 billion in 2020 and \$39.91 billion in 2021, while free cash flow also improved from 4.9 billion in 2019 to 10.23 billion in 2020 and slightly reduced in 2021 to \$9.40 billion due to increase in capital expenditure as the firm expands operation into Japan and United States. We believe that TSMC has a healthy balance sheet and is generating adequate cash flow to meet its near-term and long-term liabilities.



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## BUSINESS SUMMARY

### BUSINESS MODEL/COMPETITIVE ADVANTAGE

TSMC is the world's largest, dedicated, and independent pure-play semiconductor foundry (manufacturer). TSMC manufactures chips for "fables" companies, that is, those companies that do not own their fabrication plants. These fables companies like Apple, AMD, Nvidia, and others companies design their chips and send them to TSMC for fabrication. This foundry model allows fables companies to avoid building a foundry, which is capital-intensive and requires a great deal of technical expertise. On the other hand, the model allows TSMC to enjoy a near monopoly.

Taiwan Semiconductor's main competitive advantage comes from its technology leadership. By investing heavily in Research and Development (R&D), TSMC has been able to pioneer the fabrication of smaller chips with better processing power to support portable devices, especially in the smartphone market. The company was the first foundry to provide 7-nanometer and 5-nanometer (used by Apple in 2020; Apple A14, as well as the MediaTek 'Dimensity 8100') production capacities. Today, TSMC can produce 3-nanometer chips. TSMC's dominance in the foundry business can also be attributed to the fact that it enjoys economies of scale. Setting up a foundry is quite expensive, running into billions of dollars. Many fables companies understand that it is less profitable to manufacture their chip, and would rather outsource their needs to TSMC. This allows the company to operate at a level of operating margin that most, if not all, competitors will struggle to match and discourage new entrants.

### PROFITABILITY DRIVERS

In its Q3 2022 report, TSMC reported a third quarter revenue of US\$20.23 billion, which increased 35.9% year-over-year and increased 11.4% from the previous quarter. In its recent report, shipments of 5-nanometer chips accounted for 28% of the total wafer revenue; while 7-nanometer accounted for 26%. Advanced technologies, defined as 7-nanometers and more advanced technologies, accounted for 54% of the total wafer revenue. As growth in Internet of Things, High performing computing (HPC) and the rise in artificial intelligence and machine learning capabilities continue, TSMC's specialized chips of 5nm and 7nm will continue to be in high demand, especially with the 4nm chips coming into production in 2023.

### RISK AND UNCERTAINTIES

One risk facing the Taiwanese manufacturer is the geopolitical risk related to China. As the risk of war between Taiwan and China increases, TSMC is at some risk as most of its fabs are in Taiwan. To reduce this risk, the Company has expanded its activities outside of the Island of Taiwan. New fabs have been opened in Japan and the United States, and plans for additional expansion into Germany.

Another risk facing TSMC is technology obsolescence if competition manages to outrun them in semiconductor node development. The business has so far done a terrific job of staying ahead of the competition by making significant investments in R&D to ensure that it can't be overtaken by the competition. This emphasizes how critical it is for the business to be at the forefront of technological advancement.

Finally, TSMC's heavy dependence on a few firms could prove detrimental if any of its clients were to shift suppliers/manufacturers. Apple Inc alone accounted for over 25% of the net sales generated by TSMC in 2020. Similarly, the top ten largest customers accounted for approximately 74% of its net revenue in the same year.

<b>Growth</b>	Score	A
We assess the growth of the company over the past three years relative to their peers. We also factor future growth opportunities and how well the company is positioned to take advantage of them.		
<b>Profitability</b>	Score	A
We measure the quality and sustainability of the company's earnings.		
<b>Free Cashflow</b>	Score	A
This is the amount of cash that the company has left after meeting operating expenditures and fixed capital spending requirements. A healthy free cash flow puts the company in a good position to institute dividend payments and share buy backs.		
<b>Price Return</b>	Score	C+
We assess the performance of the share price relative to the broad market index, the S&P 500.		
<b>Economic Moat</b>	Score	A+
Measures the comparative and leadership advantage of the company over its peers. We estimate the company's ability to protect and /or increase its market share and profitability margins.		
<b>Solvency</b>	Score	A+
We score the ability of the company to conveniently meet its long term debts and other financial obligations.		
<b>ESG</b>	Score	A
ESG measures the sustainability of a company's operations. It focuses on environmental, social and governance factors and how well the company is managing any actual or potential risks associated with them. We use ESG scores from Sustainalytics, and we rewards companies with scores below 30.		

### Definition of Our Factor Scores

Score	Definition
A++	
A+	Strong
A	
B++	
B+	Average
B	
C+	
C	Weak
D	

### Our Rating Definition

**Buy:** The stock's total return is expected to perform better than our benchmark (S&P 500) over the next 12 months.

**Hold:** The stock's total return is expected to perform fairly in line with our benchmark (S&P 500) over the next 12 months.

**Sell:** The stock's total return is expected to perform worse than our benchmark (S&P 500) over the next 12 months.

### Our Recent Ratings



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#### Disclosures

Savest Financial Services LLC holds shares of TSMC in its proprietary portfolio and all three model portfolios (conservative, moderate growth, and growth-seeking) managed by the firm. While the proprietary portfolio is an actual portfolio funded by real dollars, the model portfolios show a simulated performance of individual stocks selected according to specific risk/return objectives. Investors need to know that by our investment holdings in the shares of TSMC, Savest may have a conflict of interest that may affect the objectivity of this research report.

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