

Initiating Coverage:

Taiwan Semiconductor Company

Taiwan isn't Taiwan without AI

Key Take-away: TSMC (Taiwan Semiconductor Company) dominates the semiconductor market. It is the only foundry to offer a reliable 3-nanometer product as Samsung and Intel fail to keep up with TSMC regarding yield and power efficiency. Large technology companies such as Nvidia, Apple, and Google have already decided to trust TSMC with all their 3nm needs, increasing TSMC's control over the market. With a large war chest of cash to make large R&D investments, TSMC will likely remain the sole supplier of advanced chips for the next eight years. Although we may not see the same tremendous growth as we saw in 2023, we remain bullish on TSMC for the next 3-5 years. Geopolitical tensions will be forefront in the coming years and the key risk for investment.

Development 1: Strong CoWoS Demand. A decade ago, TSMC's CoWoS (Chip-on-Wafer-on-Substrate) process only had one customer. However, AI chips adopting CoWoS advanced packaging have led to a sudden surge in demand, causing Taiwan Semiconductor to expand production urgently. The company's production capacity is expected to double this year and next year, with the balance of supply and demand projected to be achieved by 2026. TSMC previously expected that the compound annual growth rate of CoWoS capacity from 2022 to 2026 would exceed 60%.

Development 2: Introduction of N2 and A16 Developments. 2nm production is expected to begin in 2025. In a recent earnings call, CEO C.C Wei reassured investors that development is on track and expects no significant delays. Even though the three main companies in the space Samsung, Intel, and TSMC have aggressive roadmaps for the next three years, TSMC's development will remain ahead due to its lead with 3nm production. Semiconductor manufacturing relies on a process of trial and error. As TSMC already has 3nm in full production, it is afforded the time to test and develop its 2nm process properly. In the past, Samsung has tried to jump TSMC past during 7nm development by working on lower nm process without perfecting the previous level. Ultimately, this proved to fail causing TSMC to pull ahead.

Valuation: We initiate coverage with a \$265 PT.



Consortium Equity Research
TMT | Semiconductors
August 19th, 2024

Stock Rating: Overweight

Price Target: USD \$265.00

Price: \$171.70

Potential Upside/Downside: 54.9%

Ticker(s): \$TSM

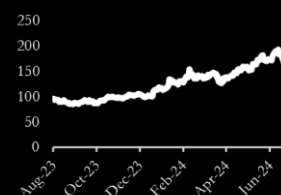
Market Cap: \$891.38b

Shares Outstanding: 25.9b

Free Float (%): 0.65%

Dividend Yield: 1.25%

1 Year History



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Peer Comparisons

| Comparable Companies | | | | | | |
|-------------------------|-------------------|-------------------|--------------|------------------|------------------|--|
| \$Mn | | | | | | |
| Ticker | Mkt Cap | EV | P/E | Revenue LF | EBITDA LF | |
| Samsung | \$ 397,550 | \$ 365,000 | 14.7x | \$ 211,000 | \$ 46,000 | |
| Intel | \$ 92,000 | \$ 115,800 | -53.8x | \$ 55,000 | \$ 11,000 | |
| United Microelectronics | \$ 22,000 | \$ 19,900 | 13.7x | \$ 7,000 | \$ 3,000 | |
| Super Micro Computer | \$ 35,900 | \$ 37,020 | 30.5x | \$ 15,000 | \$ 1,000 | |
| TSMC | \$ 784,400 | \$ 751,400 | 31.6x | \$ 77,000 | \$ 51,000 | |

| Ticker | LTM EV/EBITDA | Gross Margin | EBIT Margin | EBITDA Margin | 1 Yr Rev Growth Rate LF |
|-------------------------|---------------|--------------|-------------|---------------|-------------------------|
| Samsung | 7.93 | 36.2% | 9.2% | 22.6% | 12.8% |
| Intel | 10.53 | 41.4% | 0.9% | 19.2% | 2% |
| United Microelectronics | 6.63 | 33.8% | 23.8% | 41.8% | (11.9%) |
| Super Micro Computer | 37.02 | 14.1% | 8.5% | 8.7% | 109.8% |
| TSMC | 14.73 | 53.4% | 42% | 67.2% | 9.4% |

Industry Overview

Data Center Growth for AI:

The AI chipset market for data centers is projected to grow from \$38 billion in 2023 to \$138 billion by 2028, with a compound annual growth rate (CAGR) of 30%. Nvidia, which gets all its chips from TSMC, dominates 92% of the GPU market, which accounts for 74% of AI chipsets in data centers. CPUs will also continue to play a vital role, expanding from \$7.7 billion in 2023 to \$26 billion by 2028, with a 28% CAGR. Hyperscale cloud providers like Google and AWS are key drivers of demand, making 43% of AI chipset purchases in 2023, a figure expected to reach 50% by 2028.

Global Smartphone Demand:

When examining global smartphone demand on TSMC's revenue, we must look at Apple's revenue drivers. iPhone 15 profits are approximately 10% lower than comparable models released in 2022, alongside a 10% decline in iPhone sales over the past year. However, the introduction of Apple AI is set to transform smartphone usage, moving away from interacting with apps individually to a more integrated AI-driven experience. This AI requires significant processing power and is only compatible with the most advanced devices, such as the iPhone 15. Due to government regulations, Apple AI will not be available in China or the EU, with the US market as the primary focus. Given the processing power demands, Apple AI will only reach around 7% of iPhone users. This will ultimately lead to a large spike in demand for iPhone 16 models. Despite this limitation, forecasters predict the AI smartphone market will grow by 83% over the next four years, with Samsung poised to dominate, securing 50% market share in the next two years.

5G Wireless Communication:

The rollout and expansion of 5G networks significantly impact TSMC's revenue in several ways. As a leading semiconductor manufacturer, TSMC is positioned at the forefront of producing advanced chips that are essential for 5G infrastructure, mobile devices, and IoT products. The demand for 5G-capable modems, RF components, and power amplifiers drives the need for advanced semiconductor fabrication, which TSMC specializes in through its high-end technology nodes.

As 5G adoption accelerates globally, TSMC benefits from increased orders for these specialized chips. This drives revenue growth, particularly in the segments focused on high-performance computing (HPC) and mobile devices. Companies producing 5G devices and network equipment rely heavily on TSMC's cutting-edge manufacturing capabilities, ensuring that TSMC remains a critical supplier in the 5G ecosystem.

Company Overview

Taiwan Semiconductor Manufacturing Company (TSMC) is the world's largest dedicated semiconductor foundry, specializing in the production of integrated circuits (ICs) for global clients. TSMC's primary business model is contract manufacturing, producing chips designed by fabless companies such as Apple, Nvidia, and Qualcomm. The company's cutting-edge fabrication capabilities include advanced process nodes like 7nm, 5nm, and 3nm, which are used in high-performance computing, mobile devices, AI, and automotive applications. Beyond its advanced semiconductor manufacturing, TSMC offers innovative packaging solutions like CoWoS (Chip-on-Wafer-on-Substrate), which allow for the integration of multiple dies on a single substrate. This technology enhances performance, bandwidth, and power efficiency, making it ideal for AI and high-performance computing workloads. TSMC's industry-leading specialty technologies portfolio further complements its advanced offerings, addressing specific customer needs across various sectors. TSMC's specialty technologies include MEMS (Micro-Electro-Mechanical Systems), CMOS image sensors, embedded non-volatile memory (NVM), RF and analog, high voltage, and BCD-Power processes. These technologies power a wide range of applications, from mobile devices and automobile electronics to medical systems, wearables, and IoT devices, enriching modern life with smarter, more connected products. Based in Hsinchu, Taiwan, TSMC is the global leader in the semiconductor industry.

Investment Thesis

Thesis: As the semiconductor industry grows at an impressive rate with long-lasting demand drivers, TSMC's competitive positioning allows it to capture nearly all of the market share.

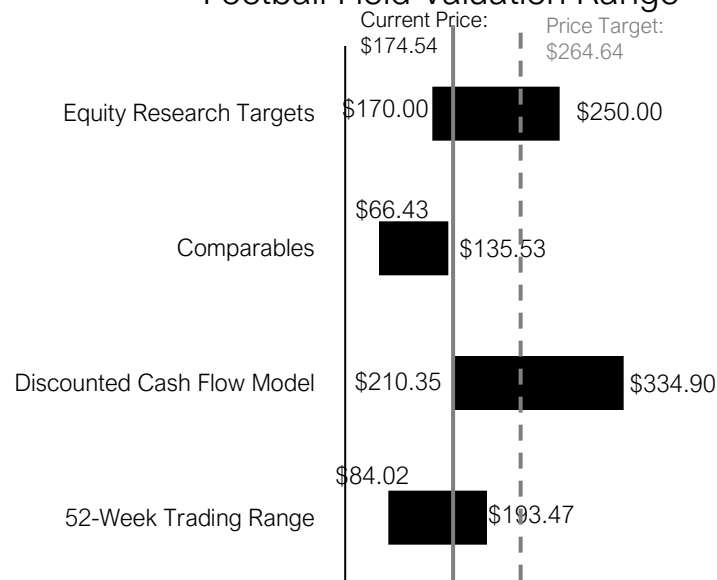
Potential Downsides: Geopolitical risks remain the largest threat to TSMC's operation. Turmoil in the months leading up to the election will impact TSMC's stock price.

Price Target & Valuation

Our analysis gives \$TSM a price target of \$264.64 and an overweight rating.

| Income Statement (\$mm) | 2023A | 2024E | 2025E | 2026E | 2027E | CAGR% |
|-------------------------|---------|---------|---------|---------|---------|---------|
| Revenue | 69,378 | 84,750 | 109,102 | 146,017 | 200,993 | 2331.5% |
| EBITDA | 46,356 | 54,443 | 70,252 | 96,829 | 134,054 | 2318.3% |
| EBIT | 29,573 | 36,443 | 46,914 | 65,372 | 90,447 | 2760.8% |
| EBIAT | 11,031 | 16,738 | 20,905 | 33,428 | 25,035 | 1069.0% |
| Margin & Growth Data | 2023A | 2024E | 2025E | 2026E | 2027E | AVG% |
| EBITDA Margin | 66.8% | 64.2% | 64.4% | 66.3% | 66.7% | 65.7% |
| EBIT Margin | 42.6% | 43.0% | 43.0% | 44.8% | 45.0% | 43.7% |
| Revenue Growth | -8.8% | 22.2% | 28.7% | 33.8% | 37.7% | 22.7% |
| EBIT Growth | -21.6% | 23.2% | 28.7% | 39.3% | 38.4% | 21.6% |
| Valuation Metrics | 2023A | 2024E | 2025E | 2026E | 2027E | AVG% |
| P/FCF | -215.0x | -521.2x | -172.4x | 649.9x | -103.9x | -72.5x |
| EV/Sales | 11.9x | 9.8x | 7.6x | 5.7x | 4.1x | 7.8x |
| EV/EBITDA | 49.3x | 46.0x | 35.4x | 26.3x | 19.0x | 35.2x |
| FCF Yield | -0.5% | -0.2% | -0.6% | 0.2% | -1.0% | -0.4% |

Football Field Valuation Range



Our Price Target: \$264.64

TSMC remains the dominant player, but Apple iPhone sales are lackluster. However, data center growth remains strong allowing TSMC to maintain high revenue growth.

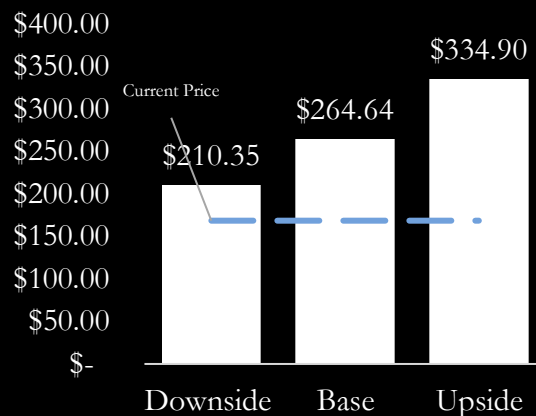
Our Upside Case: \$334.9

Apple's new iPhone completely changes the market causing an increase in demand for TSMC chips. CoWoS production more than doubles next year. Nvidia's Blackwell will be in full production Q42024.

Our Downside Case: \$210.35

Geopolitical tensions between the U.S. elections and China will impact TSMC's production. Tariffs on Taiwanese chips in favor for Intel's output will increase worldwide chip prices which will in turn increase prices of TSMC's end products. Demand for Taiwanese chips may dwindle.

DCF Case Values



About \$TSMC

Taiwan Semiconductor Manufacturing Company (TSMC), headquartered in Hsinchu, Taiwan, was founded in 1987 and has become the world's largest dedicated independent semiconductor foundry. TSMC specializes in manufacturing integrated circuits and chips for a broad range of applications, serving clients in industries such as consumer electronics, automotive, and telecommunications. The company is known for its advanced manufacturing processes, consistently leading the industry in technological innovation. TSMC plays a critical role in the global semiconductor supply chain, producing chips for many of the world's leading technology companies. Its strategic focus on innovation and efficiency has established TSMC as a dominant player in the semiconductor industry.

Disclosures & Ratings

Consortium Equity Research does not hold any professional relationships with any reported equities. **Overweight** means the analyst team believes the stock price will outperform the coverage industry (TMT, Healthcare, Industrial, Consumer, FIG) in the next 6-12 months. **Equal Weight** means the team expects performance in line with the industry. **Underweight** means the team expects underperformance relative to the industry.