

## Taiwan Semiconductor Manufacturing Co.

## Positive read-through from NVIDIA Jan quarter earnings; AI keeps growing

Maintain Rating: BUY | PO: 760.00 TWD | Price: 681.00 TWD

## Robust AI demand to continue; maintain Buy

TSMC is the enabler of generative AI and a key beneficiary, manufacturing the best-in-class semiconductor chips (GPU/ASIC/accelerators) and CoWoS advanced packaging to companies globally. NVIDIA's stronger April quarter guidance of ~US\$24bn bodes well for TSMC's business. Despite market concerns on demand sustainability, we are glad to learn of NVIDIA's strong growth outlook in 2024/2025 with expanding AI adoption across firms, industries, and countries. We expect cloud AI revenue contribution to jump to ~10% in 2024 from mid-single digit % in 2023. We maintain our Buy rating on TSMC, as the current valuation looks attractive at 17x/14x 2024/25E P/E, and we expect the stock to re-rate on AI growth.

## NVIDIA keeps surprising to the upside

We estimate NVIDIA's revenue contribution to rise to 14% in 2024/25E, from 11% in 2023. We like TSMC's efforts to capture greater value by offering both wafers and advanced packaging service, which are particularly in need when it comes to AI and HPC. We expect the N4-based H200 launch in 2Q24 and N3-based B100 to drive TSMC's growth and support the strong UTR into 2025. We expect 5nm/3nm foundry industry utilization rate to stay robust at 80%/97% and 95%/102% in 2024E and 2025E, respectively, with solid pricing, to support TSMC's margins.

## Improving CoWoS supply but still tight

Because of the stronger demand, we share NVIDIA's view on the supply tightness and see a constraint at CoWoS capacity, despite TSMC's active increase in capacity. We expect the CoWoS monthly capacity to reach 30-35k by the end of 2024, and likely reach 40-45k by end of 2025. We believe TSMC will likely remain the go-to CoWoS supplier globally, despite expansion by other foundry and OSAT peers, thanks to its technology leadership, profound experience, and higher logistic efficiency.

Estimates (Dec) (NT\$)	2021A	2022A	2023E	2024E	2025E
Net Income (Adjusted - mn)	596,540	1,016,530	838,498	1,012,777	1,251,331
EPS	23.0	39.2	32.3	39.1	48.3
EPS Change (YoY)	15.2%	70.4%	-17.5%	20.8%	23.6%
Dividend / Share	11.00	11.00	13.00	14.25	15.50
Free Cash Flow / Share	10.5	20.4	11.3	29.8	38.1
ADR EPS (US\$)	4.12	6.58	5.13	6.19	7.65
ADR Dividend / Share (US\$)	1.97	1.85	2.06	2.26	2.46
<b>Valuation (Dec)</b>					
P/E	29.6x	17.4x	21.1x	17.4x	14.1x
Dividend Yield	1.6%	1.6%	1.9%	2.1%	2.3%
EV / EBITDA*	16.0x	11.0x	11.8x	9.4x	7.7x
Free Cash Flow Yield*	1.5%	3.0%	1.7%	4.4%	5.6%

\* For full definitions of *IQmethod*<sup>SM</sup> measures, see page 6.

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**Refer to important disclosures on page 7 to 10. Analyst Certification on page 4. Price Objective Basis/Risk on page 4.**

12662398

Timestamp: 21 February 2024 09:55PM EST

22 February 2024

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## Stock Data

Price (Common / ADR)	681.00 TWD / 125.34 USD
Price Objective	760.00 TWD / 130.00 USD
Date Established	3-Oct-2023 / 15-Jan-2024
Investment Opinion	B-1-7 / B-1-7
52-Week Range	489.00 TWD-709.00 TWD
Market Value (mn)	560,031 USD
Market Value (mn)	17,659,740 TWD
Shares Outstanding (mn)	25,932.1 / 5,186.4
Average Daily Value (mn)	921.76 USD
Free Float	92.0%
BofA Ticker / Exchange	TSMWF / TAI
BofA Ticker / Exchange	TSM / NYS
Bloomberg / Reuters	2330 TT / 2330.TW
ROE (2023E)	26.2%
Net Dbt to Eqty (Dec-2022A)	-23.7%

GPU: Graphics Processing Unit

ASIC: Application-Specific Integrated Circuit

CoWoS: Chip-On-Wafer-On-Substrate

HPC: High Performance Computing

UTR: Utilization Rate

OSAT: Outsourced Semiconductor Assembly and Test

# iQprofile<sup>SM</sup> Taiwan Semiconductor Manufacturing Co.

## Key Income Statement Data (Dec)

(NT\$ Millions)

	2021A	2022A	2023E	2024E	2025E
Sales	1,587,415	2,263,891	2,161,736	2,664,058	3,211,612
Gross Profit	819,537	1,348,355	1,175,111	1,416,741	1,757,467
Sell General & Admin Expense	(44,488)	(63,445)	(71,464)	(71,471)	(88,075)
Operating Profit	649,981	1,121,279	921,466	1,139,030	1,421,088
Net Interest & Other Income	13,145	22,912	57,705	53,649	52,397
Associates	NA	NA	NA	NA	NA
Pretax Income	663,126	1,144,191	979,171	1,192,679	1,473,485
Tax (expense) / Benefit	(66,053)	(127,290)	(141,403)	(180,820)	(223,118)
Net Income (Adjusted)	596,540	1,016,530	838,498	1,012,777	1,251,331
Average Fully Diluted Shares Outstanding	25,930	25,931	25,932	25,932	25,932

## Key Cash Flow Statement Data

Net Income	596,540	1,016,530	838,498	1,012,777	1,251,331
Depreciation & Amortization	422,395	437,254	532,190	676,719	801,287
Change in Working Capital	(110,281)	(64,994)	(37,713)	(16,116)	(56,612)
Deferred Taxation Charge	NA	NA	NA	NA	NA
Other Adjustments, Net	203,507	221,809	(91,009)	34,299	(9,494)
Cash Flow from Operations	1,112,161	1,610,599	1,241,967	1,707,679	1,986,512
Capital Expenditure	(839,196)	(1,082,672)	(949,817)	(935,430)	(999,421)
(Acquisition) / Disposal of Investments	4,400	(130,522)	(108,194)	(1,313)	(82)
Other Cash Inflow / (Outflow)	(1,570)	22,266	151,890	(2,051)	316
Cash Flow from Investing	(836,366)	(1,190,928)	(906,120)	(938,794)	(999,187)
Shares Issue / (Repurchase)	0	0	0	0	0
Cost of Dividends Paid	(259,304)	(285,238)	(285,248)	(337,117)	(369,532)
Cash Flow from Financing	136,608	(200,244)	(204,894)	(341,980)	(369,263)
Free Cash Flow	272,965	527,927	292,150	772,249	987,091
Net Debt	(455,588)	(703,075)	(759,439)	(1,196,612)	(1,814,743)
Change in Net Debt	(13,970)	(135,238)	(60,981)	(431,768)	(617,793)

## Key Balance Sheet Data

Property, Plant & Equipment	1,975,119	2,693,837	3,064,475	3,423,802	3,622,964
Other Non-Current Assets	143,312	218,045	273,863	272,633	272,897
Trade Receivables	198,301	231,340	201,938	208,388	224,037
Cash & Equivalents	1,188,456	1,561,486	1,687,645	2,119,956	2,738,355
Other Current Assets	220,316	260,071	304,450	322,296	372,589
Total Assets	3,725,503	4,964,779	5,532,371	6,347,075	7,230,843
Long-Term Debt	613,380	839,096	918,913	914,824	915,219
Other Non-Current Liabilities	201,887	220,967	216,612	431,449	489,950
Short-Term Debt	119,488	19,314	9,293	8,519	8,393
Other Current Liabilities	620,015	924,913	904,290	920,940	938,824
Total Liabilities	1,554,770	2,004,290	2,049,108	2,275,733	2,352,386
Total Equity	2,170,733	2,960,489	3,483,263	4,071,342	4,878,457
Total Equity & Liabilities	3,725,503	4,964,779	5,532,371	6,347,075	7,230,843

## iQmethod<sup>SM</sup> - Bus Performance\*

Return On Capital Employed	22.1%	28.5%	19.4%	20.2%	21.5%
Return On Equity	29.7%	39.8%	26.2%	27.0%	28.1%
Operating Margin	40.9%	49.5%	42.6%	42.8%	44.2%
EBITDA Margin	67.6%	68.8%	67.2%	68.2%	69.2%

## iQmethod<sup>SM</sup> - Quality of Earnings\*

Cash Realization Ratio	1.9x	1.6x	1.5x	1.7x	1.6x
Asset Replacement Ratio	2.0x	2.5x	1.8x	1.4x	1.2x
Tax Rate (Reported)	10.0%	11.1%	14.4%	15.2%	15.1%
Net Debt-to-Equity Ratio	-21.0%	-23.7%	-21.8%	-29.4%	-37.2%
Interest Cover	NM	NM	NM	NM	NM

## Key Metrics

\* For full definitions of iQmethod<sup>SM</sup> measures, see page 6.

## Company Sector

Semiconductors

## Company Description

TSMC was founded in 1987 and is listed in Taiwan (2330TT) and the US (TSM/NYS). TSMC is the largest and global leader in integrated circuit (IC) manufacturing. As a build-to-order foundry, it provides a wide range of value-add activities: IC manufacturing, mask-making, IC design services, turnkey solutions, and process development. We attribute its success to its proven, winning business model, unparalleled scale advantage, optimized execution, and technology scope and depth. 5 shares = 1 ADR.

## Investment Rationale

The ongoing semi content growth in mobile, rise of artificial intelligence (AI), and proliferation of Internet of Things (IoT) should result in sustainable upside in aggregate computing power globally. TSMC, as the leading contract manufacturer of semiconductor chips, is in a good position to capitalize. We are structurally positive on TSMC and expect it to sustain over 15% growth with rising FCF and dividends during 2021-25E.

## Stock Data

Shares / ADR	5.00
Price to Book Value	5.1x



## Price objective basis & risk

### Taiwan Semiconductor Manufacturing Co. (TSMWF / TSM)

We value TSMC at NT\$760 per share (US\$130 per ADR), based on 18x 2H24-1H25E P/E, or slightly above its five-year average P/E and SOX index's ten-year average P/E, given the structural long-term opportunities. We expect the valuation to be underpinned by its stronger industry position especially in leading edge technology, improved earnings quality, and subsequently FCF/dividend upside.

Downside risks are (1) greater-than-expected slowdown in global smartphone/consumer electronics demand, (2) Intel's potential insourcing strategy and ambitions in foundry service, and (3) execution risks on advanced nodes.

## Analyst Certification

I, Brad Lin, hereby certify that the views expressed in this research report accurately reflect my personal views about the subject securities and issuers. I also certify that no part of my compensation was, is, or will be, directly or indirectly, related to the specific recommendations or view expressed in this research report.

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### APR - Semiconductor Coverage Cluster

Investment rating	Company	BofA Ticker	Bloomberg symbol	Analyst
<b>BUY</b>				
	Alchip	ALCPF	3661 TT	Mike Yang
	ASE Technology Holding	XSRI	3711 TT	Brad Lin
	ASE Technology Holding -ADR	ASX	ASX US	Brad Lin
	ASMP	ASMP	522 HK	Simon Woo, CFA
	Crystal Clear	XPPT	300655 CH	Dai Shen

**APR - Semiconductor Coverage Cluster**

<b>Investment rating</b>	<b>Company</b>	<b>BofA Ticker</b>	<b>Bloomberg symbol</b>	<b>Analyst</b>
	eMemory	XYLWF	3529 TT	Mike Yang
	Faraday	FDYTF	3035 TT	Mike Yang
	Global Unichip Corp.	GBUHF	3443 TT	Mike Yang
	GlobalWafers	XWLFF	6488 TT	Brad Lin
	Hwatsing Technology	XSNIF	688120 CH	Dai Shen
	JCET Group Co Ltd	XJIEF	600584 CH	Mike Yang
	King Yuan Electronics Corp.	KYUFF	2449 TT	Angela Huang
	Kingsemi	XKSQF	688037 CH	Dai Shen
	LX Semicon	XLXSF	108320 KS	Simon Woo, CFA
	Maxscend	XXMSF	300782 CH	Daley Li, CFA
	MediaTek	MDTKF	2454 TT	Brad Lin
	Montage Technology	XRDF	688008 CH	Daley Li, CFA
	Nanya Technology	NNYAF	2408 TT	Simon Woo, CFA
	Novatek	NVKMF	3034 TT	Brad Lin
	Parade	PRDWF	4966 TT	Mike Yang
	Realtek	RLTKF	2379 TT	Brad Lin
	Samsung Elec -G	SSNHZ	SMSN LI	Simon Woo, CFA
	Samsung Electronics	SSNLF	005930 KS	Simon Woo, CFA
	Samsung Electronics Preferred	SSNPF	005935 KS	Simon Woo, CFA
	Silicon Motion	SIMO	SIMO US	Simon Woo, CFA
	SK Hynix	HXSCF	000660 KS	Simon Woo, CFA
	Taiwan Semiconductor Manufacturing Co.	TSM	TSM US	Brad Lin
	Taiwan Semiconductor Manufacturing Co.	TSMWF	2330 TT	Brad Lin
	United Microelectronics Corp.	XUMIF	2303 TT	Brad Lin
	United Microelectronics Corp.	UMC	UMC US	Brad Lin
	Will Semiconductor	XXHQF	603501 CH	Dai Shen
	Winbond Electronics	WBEKF	2344 TT	Dai Shen
	Wonik IPS	XRHQF	240810 KS	Simon Woo, CFA
<b>NEUTRAL</b>				
	ASMedia Technology Inc.	XZSFF	5269 TT	Mike Yang
	Aspeed	XLKMF	5274 TT	Mike Yang
	Macronix International	MXICF	2337 TT	Dai Shen
	Powertech Technology	XPPZF	6239 TT	Simon Woo, CFA
	Soulbrain	XSBOF	357780 KS	Simon Woo, CFA
	Vanguard International Semiconductor Co	VGILF	5347 TT	Mike Yang
<b>UNDERPERFORM</b>				
	GigaDevice	XGXIF	603986 CH	Daley Li, CFA
	Hangzhou Silan Microelectronics	XDFRF	600460 CH	Mike Yang
	Hua Hong Semi	HHUSF	1347 HK	Mike Yang
	Ingenic	XISCF	300223 CH	Dai Shen
	Lion Electronics	XDHFF	605358 CH	Dai Shen
	Phison Electronics	PISNF	8299 TT	Simon Woo, CFA
	Powerchip Semiconductor Manufacturing Co	XCHPF	6770 TT	Mike Yang
	Shenzhen Goodix	XQPLF	603160 CH	Mike Yang
	Silergy Corp.	SLEGF	6415 TT	Brad Lin
	VeriSilicon	XMLZF	688521 CH	Mike Yang
	Win Semiconductors	XWIF	3105 TT	Brad Lin

## iQmethod<sup>SM</sup> Measures Definitions

### Business Performance

Return On Capital Employed

Return On Equity

Operating Margin

Earnings Growth

Free Cash Flow

### Numerator

NOPAT = (EBIT + Interest Income) × (1 – Tax Rate) + Goodwill Amortization

Net Income

Operating Profit

Expected 5 Year CAGR From Latest Actual

Cash Flow From Operations – Total Capex

### Denominator

Total Assets – Current Liabilities + ST Debt + Accumulated Goodwill

Amortization

Shareholders' Equity

Sales

N/A

N/A

### Quality of Earnings

Cash Realization Ratio

Asset Replacement Ratio

Tax Rate

Net Debt-To-Equity Ratio

Interest Cover

### Numerator

Cash Flow From Operations

Capex

Tax Charge

Net Debt = Total Debt – Cash &amp; Equivalents

EBIT

### Denominator

Net Income

Depreciation

Pre-Tax Income

Total Equity

Interest Expense

### Valuation Toolkit

Price / Earnings Ratio

Price / Book Value

Dividend Yield

Free Cash Flow Yield

Enterprise Value / Sales

### Numerator

Current Share Price

Current Share Price

Annualised Declared Cash Dividend

Cash Flow From Operations – Total Capex

EV = Current Share Price × Current Shares + Minority Equity + Net Debt +

Other LT Liabilities

Enterprise Value

### Denominator

Diluted Earnings Per Share (Basis As Specified)

Shareholders' Equity / Current Basic Shares

Current Share Price

Market Cap = Current Share Price × Current Basic Shares

Sales

Basic EBIT + Depreciation + Amortization

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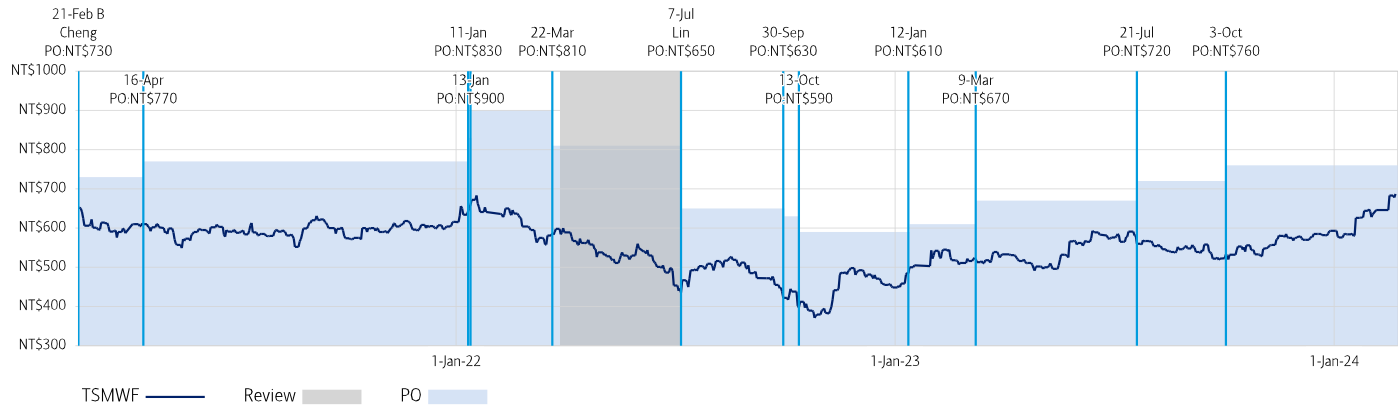
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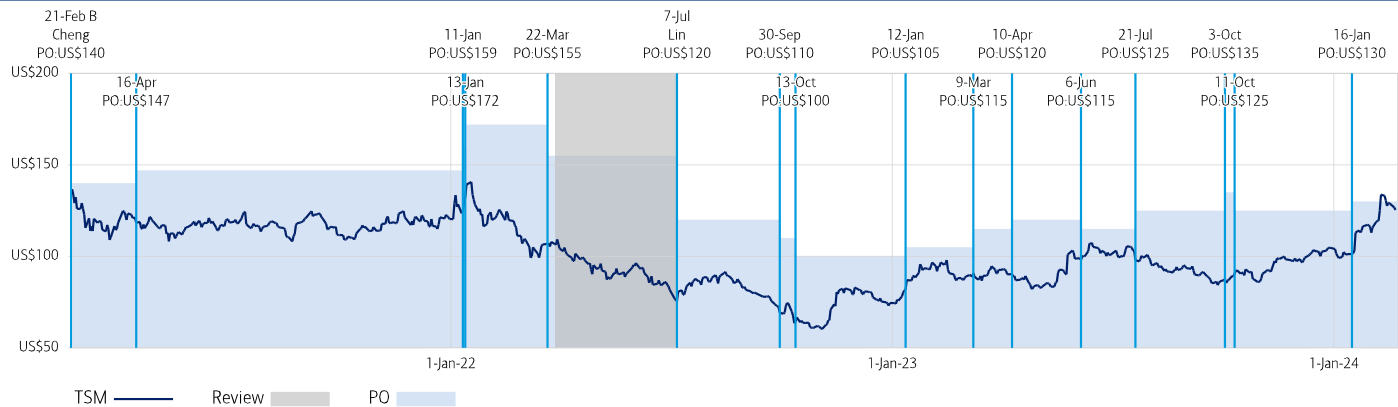
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B: Buy, N: Neutral, U: Underperform, PO: Price Objective, NA: No longer valid, NR: No Rating

The Investment Opinion System is contained at the end of the report under the heading "Fundamental Equity Opinion Key". Dark grey shading indicates the security is restricted with the opinion suspended. Medium grey shading indicates the security is under review with the opinion withdrawn. Light grey shading indicates the security is not covered. Chart is current as of a date no more than one trading day prior to the date of the report.

### Taiwan Semi Mfg Co (TSM) Price Chart



B: Buy, N: Neutral, U: Underperform, PO: Price Objective, NA: No longer valid, NR: No Rating

The Investment Opinion System is contained at the end of the report under the heading "Fundamental Equity Opinion Key". Dark grey shading indicates the security is restricted with the opinion suspended. Medium grey shading indicates the security is under review with the opinion withdrawn. Light grey shading indicates the security is not covered. Chart is current as of a date no more than one trading day prior to the date of the report.

### Equity Investment Rating Distribution: Technology Group (as of 31 Dec 2023)

Coverage Universe	Count	Percent	Inv. Banking Relationships <sup>R1</sup>	Count	Percent
Buy	215	53.09%	Buy	111	51.63%
Hold	97	23.95%	Hold	45	46.39%
Sell	93	22.96%	Sell	24	25.81%

### Equity Investment Rating Distribution: Global Group (as of 31 Dec 2023)

Coverage Universe	Count	Percent	Inv. Banking Relationships <sup>R1</sup>	Count	Percent
Buy	1895	53.62%	Buy	1083	57.15%
Hold	832	23.54%	Hold	454	54.57%
Sell	807	22.84%	Sell	383	47.46%

<sup>R1</sup> Issuers that were investment banking clients of BofA Securities or one of its affiliates within the past 12 months. For purposes of this Investment Rating Distribution, the coverage universe includes only stocks. A stock rated Neutral is included as a Hold, and a stock rated Underperform is included as a Sell.



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Investment rating	Total return expectation (within 12-month period of date of initial rating)	Ratings dispersion guidelines for coverage cluster <sup>R2</sup>
Buy	≥ 10%	≤ 70%
Neutral	≥ 0%	≤ 30%
Underperform	N/A	≥ 20%

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