

July 15, 2021 11:18 AM GMT

## TSMC | Asia Pacific

## Disappointing 3Q21 gross margin guidance; Stay EW

Stock Rating  
Equal-weight

Industry View  
In-Line

Price Target  
NT\$580.00

After the discussion with the management team at the earnings call, we maintain our contrarian view that TSMC's gross margin will fall below 50% in 2022/2023.

**Stock may fall in the near-term given the 3Q21 guidance disappointment:** The company guided the 3Q21 gross margin mid-point at 50.5% (flat Q/Q vs. the guided gross margin of 50.5% in 2Q21), which falls in our Scenario 1 in the CDI report ([link](#)), suggesting stock may fall 5% in the coming trading days. The 3Q21 revenue guidance is up 11% Q/Q, similar to our estimate of up 10% Q/Q in USD, but much lower than Street bulls' forecasts of a 15-20% Q/Q growth into the print. The company's 2Q20 actual gross margin was only 50.0% (the FX negatively impacted the 2Q margin by 0.5%), please see Exhibit 1 & 2 for the earnings tables. We believe investors will need to reconsider TSMC's long-term gross margin profile, as TSMC's gross margin is barely 50% in the middle of the very strong semi up-cycle.

**We asked the question, is TSMC able to act as a monopoly vendor with bargaining power over customers:** We prompted the debate, 'who is going to pay for the more expensive Moore's Law' in our TSMC downgrade report ([link](#)). One of the major pushbacks from investors was about TSMC's monopoly in 5nm/3nm and some investors' belief that TSMC should have bargaining power to offset the higher capex intensity. Addressing our question, management didn't say that TSMC was a monopoly, just very high market share. They also said its pricing for leading-edge nodes was "strategic", to ensure the proper returns. Management also added, "advanced node is getting more challenging in terms of costs, which TSMC needs to work with customers and equipment vendors to overcome."

**We are still much below consensus on gross margin assumptions:** The company maintained its long-term gross margin target of 50%, but declined to comment on the preliminary 2022 margin trend. Thus, we still believe at some point in 2022 and 2023, TSMC's gross margin will fall below 50% given the steep increase in depreciation cost, while the company doesn't seem to be demonstrating pricing power. Or, simply as indicated, Moore's Law is just getting too expensive while TSMC will have to suffer margin erosion to keep the chip scaling trend going. We expect earnings downward revisions from the Street (generally forecasting 52-53% gross margins in 2022 and 2023) and keep EW.

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## TSMC ( 2330.TW, 2330 TT )

Greater China Technology Semiconductors / Taiwan

Stock Rating	Equal-weight
Industry View	In-Line
Price target	NT\$580.00
Up/downside to price target (%)	(6)
Shr price, close (Jul 15, 2021)	NT\$614.00
52-Week Range	NT\$679.00-353.50
Sh out, dil, curr (mn)	25,930
Mkt cap, curr (mn)	NT\$15,921,253
EV, curr (mn)	NT\$15,579,583
Avg daily trading value (mn)	NT\$24,862

Fiscal Year Ending	12/20	12/21e	12/22e	12/23e
ModelWare EPS (NT\$)	19.97	22.20	24.88	30.01
Prior ModelWare EPS (NT\$)	-	22.26	25.13	30.01
EPS (NT\$)§	19.83	22.84	26.24	30.00
Revenue, net (NT\$ bn)	1,339.3	1,557.8	1,827.0	2,191.8
ModelWare net inc (NT\$ bn)	517.9	575.7	645.2	778.2
P/E	26.5	27.7	24.7	20.5
P/BV	7.4	7.6	6.7	5.8
RNOA (%)	35.9	34.5	36.9	37.8
ROE (%)	31.9	31.1	30.7	33.0
Div yld (%)	2.5	2.4	2.4	2.4

Unless otherwise noted, all metrics are based on Morgan Stanley ModelWare

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## Gross margin pressure becoming evident in 3Q21 guidance

### Gross margin concern may cap TSMC's stock performance

The 2Q21 gross margin was barely 50%. The company said that were it not for the FX impact, the pro forma 2Q21 gross margin would have been 50.5%, which would still be below the Street's estimate.

On average, the Street expects 3Q21 gross margin will improve to 52.7%, given a higher revenue scale, tight foundry supply and improved efficiency of 5nm production. However, the company guided for 50.5% for 3Q, citing 5nm ramp dilution and FX headwinds. The margin guidance was also below our conservative estimate of 51.7%.

**Exhibit 1:** TSMC: 2Q21 earnings review table

(NT\$ mn)	2Q21				
	Actual	Q/Q	Y/Y	MS Est.	Consensus
<b>Financials</b>					
Revenue	372,145	2.7%	19.8%	371,320	371,695
Opex	(40,530)	-0.3%	20.9%	(39,511)	(40,208)
EPS (NT\$)	5.18	-3.8%	11.2%	4.96	5.25
<b>Ratios</b>					
GM (%)	50.0%	-235bps	-295bps	50.7%	51.2%
Opex (%)	10.9%	-32bps	10bps	10.6%	10.8%
OPM (%)	39.1%	-203bps	-305bps	40.0%	40.3%

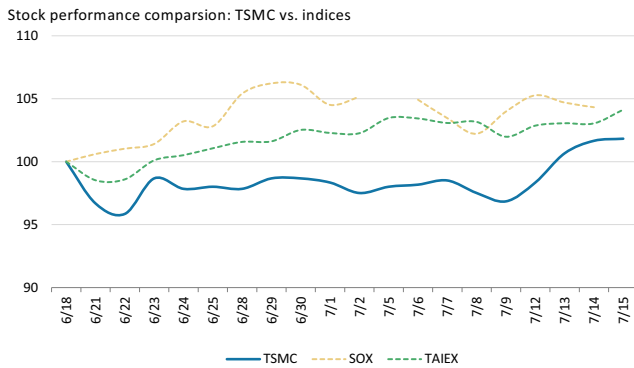
Source: Company data, Refinitiv, Morgan Stanley Research estimates

**Exhibit 2:** TSMC: 2Q21 earnings outlook table

(NT\$ mn)	3Q21				
	Guidance	MS Est.	Q/Q	Y/Y	Consensus
<b>Financials</b>					
Revenue	US\$14.6bn to US\$14.9bn +11% Q/Q at mid-point	404,866	8.8%	13.6%	414,780
Opex		(42,802)	5.6%	5.8%	(43,377)
EPS (NT\$)		5.88	13.5%	11.0%	6.04
<b>Ratios</b>					
GM (%)	49.5% to 51.5%	51.7%	171bps	-170bps	52.7%
Opex (%)		10.6%	-32bps	-78bps	10.5%
OPM (%)	38.5% to 40.5%	41.2%	203bps	-93bps	42.2%

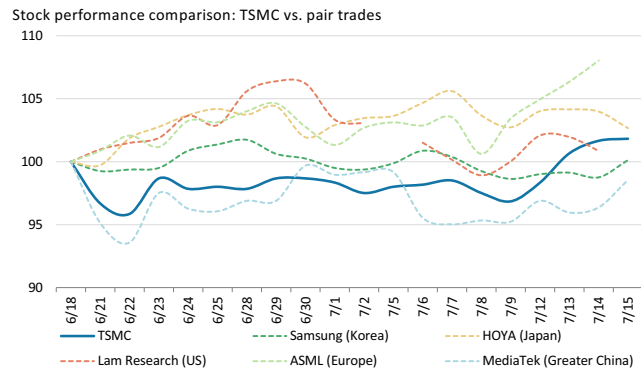
Source: Company data, Refinitiv, Morgan Stanley Research estimates

**Exhibit 3:** TSMC share price performance vs. TAIEX and SOX indices



Past performance is no guarantee of future results. Results shown do not include transaction costs. Source: Company data, Refinitiv, Morgan Stanley Research

**Exhibit 4:** TSMC share price performance vs. global semi stocks

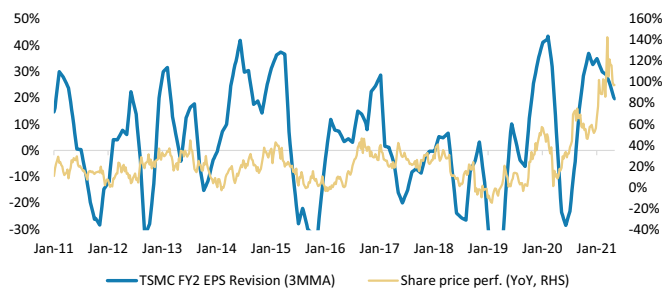


Past performance is no guarantee of future results. Results shown do not include transaction costs. Source: Company data, Refinitiv, Morgan Stanley Research

## Expect Street gross margin assumptions to be too high

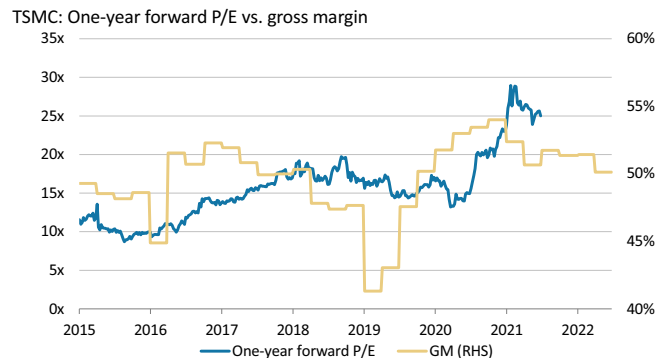
A slowdown in long-term earnings growth would be a negative catalyst for the stock, and could trigger investors to reduce positions in TSMC. Its earnings growth potential can be tracked by TSMC’s quarterly gross margin trend in the coming 12-18 months. We think it is likely that TSMC will miss current Street consensus of a 52% gross margin in 2022 and 2023 – we estimate that it will drop below 50%. We project that gross profits are going to miss Street estimates by 4%, and with a decelerating earnings growth, a stock de-rating could follow.

**Exhibit 5:** TSMC: Earnings estimate revision breadth (3MMA) vs. share price Y/Y



Source: Company data, Refinitiv, Morgan Stanley Research

**Exhibit 6:** TSMC: P/E multiple vs. gross margin trend – hard to re-rate with margin compression



Source: Company data, Refinitiv, Morgan Stanley Research estimates

**Exhibit 7:** Earnings estimates comparison: Morgan Stanley vs. the Street – We expect 2023 gross margin to fall to 49.4%, and 2023 EPS to be 3% below Street consensus

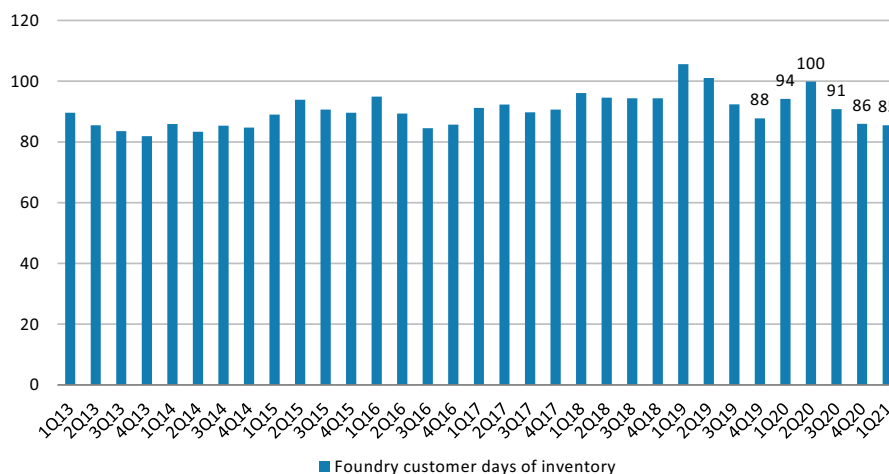
US\$ mn	New '21	Cons '21E	Diff.	New '22	Cons '22E	Diff.	New '23	Cons '23E	Diff.
Net sales	1,557,786	1,574,867	-1%	1,827,040	1,816,390	1%	2,191,752	2,145,472	2%
Gross profit	794,967	822,396	-3%	907,975	947,792	-4%	1,083,323	1,125,300	-4%
Operating profit	626,028	649,572	-4%	714,965	750,850	-5%	863,974	884,086	-2%
Pretax Income	639,678	665,101	-4%	726,965	767,881	-5%	875,974	909,954	-4%
Net income	575,750	593,360	-3%	645,190	682,597	-5%	778,198	808,791	-4%
Reported EPS	22.20	22.89	-3%	24.88	26.26	-5%	30.01	30.84	-3%
<b>Margins</b>									
Gross margin	51.0%	52.2%		49.7%	52.2%		49.4%	52.5%	
Operating margin	40.2%	41.2%		39.1%	41.3%		39.4%	41.2%	
Pretax margin	41.1%	42.2%		39.8%	42.3%		40.0%	42.4%	
Net margin	37.0%	37.7%		35.3%	37.6%		35.5%	37.7%	

Source: Refinitiv, Morgan Stanley Research (E) estimates

## Management discussion on overseas fabs and auto semi supply

TSMC admitted that it is evaluating a specialty wafer fab in Japan, and that fab capex is not included in the company's US\$100bn capex plan. The US fab capex and capacity plan is unchanged at US\$12bn for a 20k 5nm wafer fab (mass production in 1Q24). TSMC will also expand 28nm capacity at its China's fab. On the auto semi supply, TSMC expects its full-year 2021 auto semi output (mainly MCU) will be 60% higher than 2020, and 30% higher than 2018, and it believes that the auto semi shortage could be resolved soon. Lastly, the company expects the tech inventory will continue to be high in 2H21, but consider it a healthy level given the additional inventory buffer requirement during COVID-19 pandemic.

**Exhibit 8:** Foundry customer days of inventory trend



Source: Company data, Refinitiv, Morgan Stanley Research

## How could the 3Q21 margin trend link to our pricing power argument on TSMC?

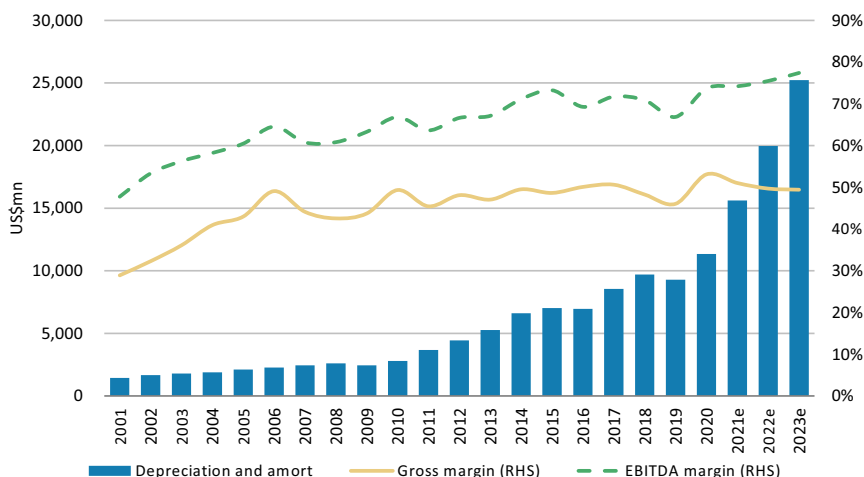
One of the fundamental reasons for our more conservative margin assumption is that TSMC cannot re-price its 7nm/5nm wafers to cover the additional capex burden. Therefore, the 5nm business continues to be margin dilutive even though it is already in the second year of mass production.

From a long-term perspective, TSMC's EBITDA margin hit an historical high of around 74% in 2020, and we estimate that needs to expand to 77% in 2023 to cover the steep increase in depreciation cost. We therefore think that whether TSMC can reprice its leading-edge wafer price with big customers (e.g., Apple, AMD, NVIDIA, Qualcomm, MediaTek) will be the key to keeping its gross margin above 50% in the coming years (Street consensus forecasts a 52% gross margin for 2022 and 2023).

We think the major reason for the gross margin recovery in 2016 and 2017 is that TSMC continued to expand its EBITDA margin during 2010-16. In that period, we saw a major consolidation in the foundry industry, and TSMC executed its "Cost of Ownership" program to reduce its variable costs. We see limited room for further variable cost reduction in the coming years, based on our checks with chemical material vendors. In addition, wage and human resource costs are rising.

Therefore, we do not think that in this cycle (2022e and onward), TSMC will be able to sustain its gross margin above 50%, given: 1) difficulty in repricing with big customers; and 2) limited room to cut variable costs.

**Exhibit 9:** TSMC: Depreciation and amortization vs. EBITDA and gross margin



Source: Company data, Morgan Stanley Research (e) estimates

# Earnings Estimate Revisions Summary and Quarterly Financials

## We cut our 2022 ModelWare EPS estimate 1%, and fine-tune our 2021 and 2023 estimates:

We lower our 2021 gross margin assumptions to reflect FX headwinds and higher-than-expected 5nm ramp margin dilution effect. The lowered 2022 estimates are primarily affected by FX headwinds.

**Exhibit 10: TSMC: Earnings estimate revisions summary**

(NT\$ mn)	New 2021e	Old 2021e	Diff %	New 2022e	Old 2022e	Diff %	New 2023e	Old 2023e	Diff %
Net sales	1,557,786	1,557,647	0%	1,827,040	1,836,580	-1%	2,191,752	2,200,710	0%
Gross profit	794,967	802,666	-1%	907,975	914,764	-1%	1,083,323	1,083,625	0%
Operating profit	626,028	636,915	-2%	714,965	721,994	-1%	863,974	864,068	0%
Pretax income	639,678	649,541	-2%	726,965	733,994	-1%	875,974	876,068	0%
Net income	575,750	577,155	0%	645,190	651,501	-1%	778,198	778,273	0%
<b>EPS</b>	<b>22.20</b>	<b>22.26</b>	<b>0%</b>	<b>24.88</b>	<b>25.13</b>	<b>-1%</b>	<b>30.01</b>	<b>30.01</b>	<b>0%</b>
<b>Margins</b>									
Gross margin	51.0%	51.5%		49.7%	49.8%		49.4%	49.2%	
Operating margin	40.2%	40.9%		39.1%	39.3%		39.4%	39.3%	
Pretax margin	41.1%	41.7%		39.8%	40.0%		40.0%	39.8%	
Net margin	37.0%	37.1%		35.3%	35.5%		35.5%	35.4%	

Source: Company Data, Morgan Stanley Research (e) estimates

**Exhibit 11: TSMC: Quarterly financials**

(NT\$ mn)	1Q20	2Q20	3Q20	4Q20	1Q21	2Q21p	3Q21e	4Q21e	2020	2021e	2022e	2023e
<b>Total Revenues</b>	<b>310,597</b>	<b>310,698</b>	<b>356,426</b>	<b>361,533</b>	<b>362,410</b>	<b>372,145</b>	<b>404,504</b>	<b>418,727</b>	<b>1,339,255</b>	<b>1,557,786</b>	<b>1,827,040</b>	<b>2,191,752</b>
Sequential Change	-2.1%	0.0%	14.7%	1.4%	0.2%	2.7%	8.7%	3.5%				
Change vs Year Ago	42.0%	28.9%	21.6%	14.0%	16.7%	19.8%	13.5%	15.8%	25.2%	16.3%	17.3%	20.0%
<b>Cost of Sales</b>	<b>(149,821)</b>	<b>(146,075)</b>	<b>(165,933)</b>	<b>(166,297)</b>	<b>(172,571)</b>	<b>(185,948)</b>	<b>(198,893)</b>	<b>(205,407)</b>	<b>(628,125)</b>	<b>(762,819)</b>	<b>(919,064)</b>	<b>(1,108,429)</b>
Percent of Revenues	48.2%	47.0%	46.6%	46.0%	47.6%	50.0%	49.2%	49.1%	46.9%	49.0%	50.3%	50.6%
<b>Gross Profit</b>	<b>160,777</b>	<b>164,624</b>	<b>190,493</b>	<b>195,236</b>	<b>189,839</b>	<b>186,197</b>	<b>205,611</b>	<b>213,320</b>	<b>711,130</b>	<b>794,967</b>	<b>907,975</b>	<b>1,083,323</b>
Gross Margin	51.8%	53.0%	53.4%	54.0%	52.4%	50.0%	50.8%	50.9%	53.1%	51.0%	49.7%	49.4%
<b>Total Opex</b>	<b>(32,255)</b>	<b>(33,529)</b>	<b>(40,446)</b>	<b>(38,116)</b>	<b>(39,301)</b>	<b>(40,530)</b>	<b>(43,870)</b>	<b>(45,239)</b>	<b>(144,346)</b>	<b>(168,940)</b>	<b>(193,010)</b>	<b>(219,349)</b>
Percent of Revenues	10.4%	10.8%	11.3%	10.5%	10.8%	10.9%	10.8%	10.8%	10.8%	10.8%	10.6%	10.0%
R&D	(24,969)	(24,893)	(29,684)	(29,940)	(30,756)	(30,874)	(33,374)	(34,374)	(109,486)	(129,378)	(148,796)	(168,500)
Percent of Revenues	8.0%	8.0%	8.3%	8.3%	8.5%	8.3%	8.3%	8.2%	8.2%	8.3%	8.1%	7.7%
SG&A	(7,286)	(8,636)	(10,762)	(8,176)	(8,545)	(9,656)	(10,496)	(10,865)	(34,860)	(39,561)	(44,214)	(50,849)
Sequential Change	-21.8%	18.5%	24.6%	-24.0%	4.5%	13.0%	8.7%	3.5%				
Change vs Year Ago	28.4%	43.2%	42.5%	-12.3%	17.3%	11.8%	-2.5%	32.9%				
<b>Operating Income</b>	<b>128,522</b>	<b>131,095</b>	<b>150,047</b>	<b>157,120</b>	<b>150,538</b>	<b>145,667</b>	<b>161,742</b>	<b>168,081</b>	<b>566,784</b>	<b>626,028</b>	<b>714,965</b>	<b>863,974</b>
Percent of Revenues	41.4%	42.2%	42.1%	43.5%	41.5%	39.1%	40.0%	40.1%	42.3%	40.2%	39.1%	39.4%
<b>Non-operating Income(Loss)</b>	<b>3,626</b>	<b>5,304</b>	<b>5,077</b>	<b>3,987</b>	<b>4,526</b>	<b>3,724</b>	<b>2,700</b>	<b>2,700</b>	<b>17,993</b>	<b>13,650</b>	<b>12,000</b>	<b>12,000</b>
<b>Profit Before Taxes</b>	<b>132,147</b>	<b>136,399</b>	<b>155,124</b>	<b>161,107</b>	<b>155,064</b>	<b>149,391</b>	<b>164,442</b>	<b>170,781</b>	<b>584,777</b>	<b>639,678</b>	<b>726,965</b>	<b>875,974</b>
Percent of Revenues	42.5%	43.9%	43.5%	44.6%	42.8%	40.1%	40.7%	40.8%	43.7%	41.1%	39.8%	40.0%
Taxes	(15,084)	(15,506)	(17,746)	(18,283)	(15,326)	(14,910)	(16,444)	(17,078)	(66,619)	(63,758)	(81,775)	(97,776)
Tax Rate	11.4%	11.4%	11.4%	11.3%	9.9%	10.0%	10.0%	10.0%	11.4%	10.0%	11.2%	11.2%
Net Income, Cont Ops	117,063	120,893	137,378	142,825	139,739	134,481	147,998	153,703	518,158	575,920	645,190	778,198
Minority Interest	(76)	(70)	(68)	(58)	(48)	(122)	0	0	(273)	(170)	0	0
<b>Reported Income (TW GAAP)</b>	<b>116,987</b>	<b>120,822</b>	<b>137,310</b>	<b>142,766</b>	<b>139,690</b>	<b>134,359</b>	<b>147,998</b>	<b>153,703</b>	<b>517,885</b>	<b>575,750</b>	<b>645,190</b>	<b>778,198</b>
Percent of Revenues	37.7%	38.9%	38.5%	39.5%	38.5%	36.1%	36.6%	36.7%	38.7%	37.0%	35.3%	35.5%
Change vs Year Ago	90.6%	81.0%	35.9%	23.0%	19.4%	11.2%	7.8%	7.7%	50.0%	11.2%	12.1%	20.6%
<b>Reported EPS (NT\$, TW GAAP)</b>	<b>4.51</b>	<b>4.66</b>	<b>5.30</b>	<b>5.51</b>	<b>5.39</b>	<b>5.18</b>	<b>5.71</b>	<b>5.93</b>	<b>19.97</b>	<b>22.20</b>	<b>24.88</b>	<b>30.01</b>

Source: Company Data, Morgan Stanley Research (e) estimates

# Valuation Methodology and Discussion

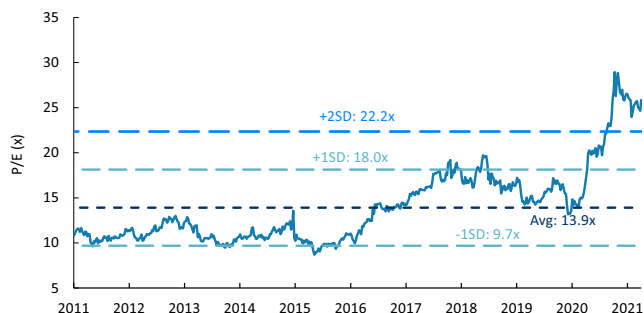
**We maintain our price target of NT\$580.** We continue to derive our price target using our base-case RI value. We keep all our key assumptions unchanged, including a cost of equity of 9.2% (beta of 1.2, risk premium of 6.0%, and risk-free rate of 2.0%), an intermediate growth rate of 9.5%, a terminal growth rate of 4.0% and a cash dividend payout ratio of 80%. Our bull and bear scenario values are also unchanged.

**Exhibit 12: TSMC: Residual income model**

	2021e	2022e	2023e	2024e	2025e	2026e	2027e	2028e	2029e	2030e	2031e	2032e
<b>Total Equity</b>	2,104,787	2,361,022	2,750,264	2,988,859	3,250,122	3,536,204	3,849,463	4,192,483	4,568,089	4,979,378	5,429,739	5,922,885
<b>Net Profit</b>	575,750	645,190	778,198	852,127	933,079	1,021,721	1,118,785	1,225,070	1,341,451	1,468,889	1,608,433	1,761,235
<b>ROAE</b>	29.1%	28.9%	30.5%	29.7%	29.9%	30.1%	30.3%	30.5%	30.6%	30.8%	30.9%	31.0%
<b>Residual Income</b>	368,496	414,530	501,722	563,677	619,030	679,639	746,001	818,665	898,228	985,348	1,080,740	1,185,192
<b>Spread</b>	19.9%	19.7%	21.3%	20.5%	20.7%	20.9%	21.1%	21.3%	21.4%	21.6%	21.7%	21.8%
Ending Equity Capital	2,104,787											
PV of Forecast Period	3,947,427											
PV of Continuing Value	8,984,496											
<b>Equity Value</b>	<b>15,036,710</b>											
No. of Shares	25,930											
<b>Projected Price (NT\$)</b>	<b>580</b>											

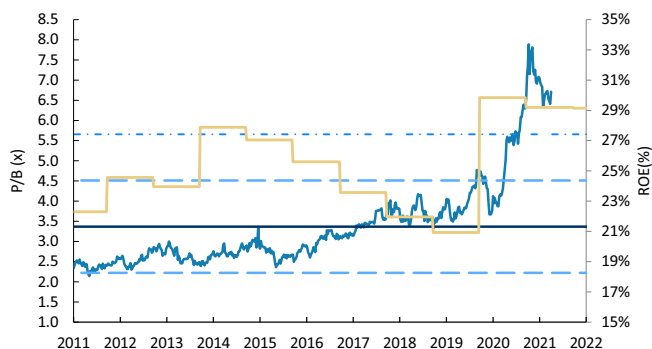
Source: Company data, Morgan Stanley Research (e) estimates

**Exhibit 13: TSMC: One-year forward P/E chart**



Source: Company data, TEJ, Morgan Stanley Research estimates

**Exhibit 14: TSMC: one-year forward P/B vs. ROE**



Source: Company data, TEJ, Morgan Stanley Research estimates

## Risk Reward – TSMC (2330.TW)

Long-term margin compression may spur de-rating

### PRICE TARGET NT\$580.00

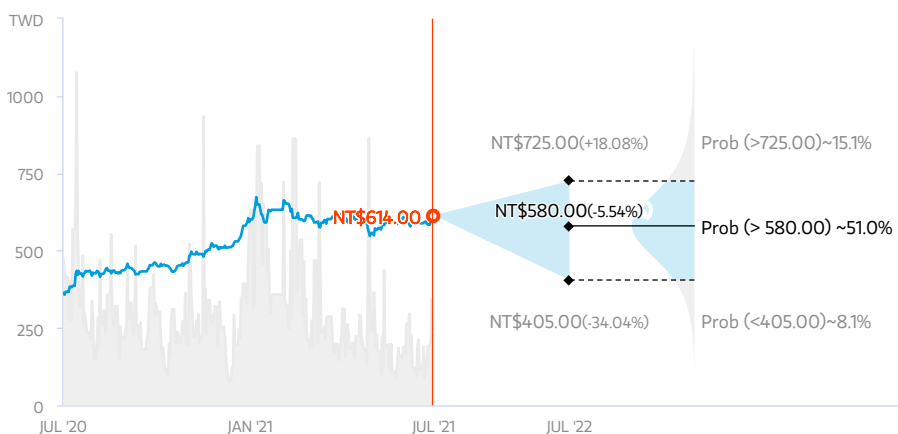
Base case, residual income model. Key assumptions: a cost of equity of 9.2% (beta of 1.2, risk free rate of 2.0% and risk premium of 6.0%), an intermediate growth rate of 9.5%, a terminal growth rate of 4% and a payout ratio of 80%.

#### Consensus Price Target Distribution



Source: Thomson Reuters, Morgan Stanley Research

### RISK REWARD CHART AND OPTIONS IMPLIED PROBABILITIES (12M)



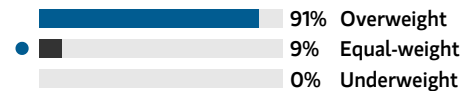
Key: — Historical Stock Performance ● Current Stock Price ◆ Price Target

Source: Thomson Reuters, Morgan Stanley Research, Morgan Stanley Institutional Equities Division. The probabilities of our Bull, Base, and Bear case scenarios playing out were estimated with implied volatility data from the options market as of 15 Jul, 2021. All figures are approximate risk-neutral probabilities of the stock reaching beyond the scenario price in either three-months' or one-years' time. View explanation of Options Probabilities methodology [here](#)

### EQUAL-WEIGHT THESIS

- TSMC is now a consensus OW-rated stock, given its technology leadership and perception of promising 2022 and 2023 revenue growth prospects.
- Yet we think it is potentially dead money in the next 12-18 months.
- Our price target of NT\$580 is 23% below consensus of NT\$749.
- We see leading-edge foundry ROI declining structurally. Thus, TSMC's GM may drop below 50%, missing consensus of 52% for 2022 and 2023.
- Investors could rethink TSMC's long-term earnings growth potential, spurring a de-rating.
- Our target implies 19x our 2023e EPS (includes 3nm Intel CPU outsourcing contribution in 2023). 2020-23e EPS CAGR is 15%. Our 9.5% CAGR for 2024-32e reflects long-term growth and margin outlook.

#### Consensus Rating Distribution



● MS Rating

Source: Thomson Reuters, Morgan Stanley Research

#### Risk Reward Themes

Contrarian: *Negative*  
Secular Growth: *Positive*  
Market Share: *Positive*

View descriptions of Risk Rewards Themes [here](#)

#### BULL CASE

NT\$725.00

33x 2021e EPS

**TSMC dominates foundry service:** 1) Breakthrough in EUV tech and materials accelerates node migration to 3nm and beyond. 2) Intel outsources its mainstream CPU production to TSMC sooner than expected. 3) Intel or Samsung exits leading-edge foundry business. 4) New tech megatrends such as 6G or AI drive global semi revenue growth and increasing demand for leading-edge nodes. 5) Cost per transistor proves able to decrease further along with node migration.

#### BASE CASE

NT\$580.00

26x 2021e EPS

**Leading position in leading-edge logic foundry service with some gross margin compression:** 1) Global semi revenue CAGR is sustained in the single digits in 2020-23e. 2) TSMC continues to lead 16nm, 7nm, 5nm and 3nm market share. 3) Secular semi trend themes continue, such as China's semi localization and 5G. 4) Intel outsources ~15% of its CPU production in 2023. 5) Cost per transistor cannot decrease meaningfully further in 3nm/2nm, while capex per k is more demanding than for 7nm/5nm.

#### BEAR CASE

NT\$405.00

18x 2021e EPS

**TSMC's dominance in foundry business weakens:** 1) Global semi revenue growth is weaker than expected in 2020-23e. 2) Declining trailing-edge market share leads to revenue shortfall. 3) Intel contribution is weaker than expected. Intel and/or Samsung successfully develop leading-edge process technology. 4) Intel's foundry business execution proves successful and weighs on TSMC with foundry order competition. 5) Demand for 2nm is less than expected given high transistor cost for foundry customers.



## Risk Reward – TSMC (2330.TW)

### KEY EARNINGS INPUTS

Drivers	2020	2021e	2022e	2023e
Revenue from 5nm Geometry (NT\$, mn)	91,361	342,945	540,766	634,833
Revenue from 10/7nm Geometry (NT\$, mn)	396,980	478,132	482,834	432,009
Revenue from 16/20nm Geometry (NT\$, mn)	218,781	208,309	206,008	179,309

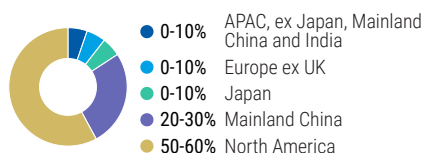
### CATALYST CALENDAR

Date	Event	Source: Thomson Reuters, Morgan Stanley
26 Jul 2021	Taiwan Semiconductor Manufacturing Co Ltd Annual Shareholders Meeting	
10 Aug 2021	July 2021 Taiwan Semiconductor Manufacturing Co Ltd Corporate Sales Release	

### INVESTMENT DRIVERS

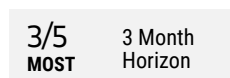
- Moore's law migration (chip scaling) and alternative technologies
- Capex intensity - cost of building leading-edge foundry capacity
- Bargaining power with key equipment vendors
- Transistor cost for customers
- ROI for leading-edge foundry

### GLOBAL REVENUE EXPOSURE



Source: Morgan Stanley Research Estimate  
View explanation of regional hierarchies [here](#)

### MS ALPHA MODELS



Source: Thomson Reuters, FactSet, Morgan Stanley Research; 1 is the highest favored Quintile and 5 is the least favored Quintile

### SUSTAINABILITY & ESG



### RISKS TO PT/RATING

#### RISKS TO UPSIDE

- New killer apps in tech justify cost of further chip scaling.
- Samsung and Intel face new node migration challenges.
- Logic semi cycle stays strong in 2022 and 2023.
- TSMC successfully reprices leading-edge foundry services against big customers.

#### RISKS TO DOWNSIDE

- Samsung's and Intel's node migration is faster and smoother than expected.
- Capex for 3nm/2nm nodes is more demanding than expected.

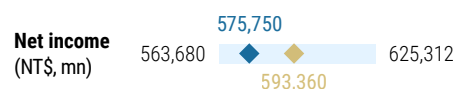
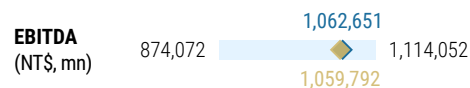
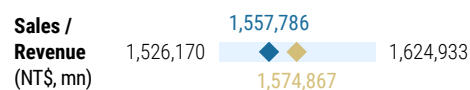
### OWNERSHIP POSITIONING

Inst. Owners, % Active 82.2%

Source: Thomson Reuters, Morgan Stanley Research

### MS ESTIMATES VS. CONSENSUS

FY Dec 2021e



◆ Mean ◆ Morgan Stanley Estimates

Source: Thomson Reuters, Morgan Stanley Research

## Financial Summary

Income Statement, 2020-2023e, Year End Dec				
(NT\$ mn)	2020	2021e	2022e	2023e
<b>Turnover</b>	<b>1,339,255</b>	<b>1,557,786</b>	<b>1,827,040</b>	<b>2,191,752</b>
YoY Growth	25.2%	16.3%	17.3%	20.0%
Gross Profit b/f dep	1,015,279	1,199,659	1,429,837	1,742,925
<b>Less: COGS</b>	<b>(628,125)</b>	<b>(762,819)</b>	<b>(919,064)</b>	<b>(1,108,429)</b>
Variable costs	(323,976)	(358,128)	(397,203)	(448,827)
Depreciation & amort	(304,149)	(404,691)	(521,861)	(659,602)
<b>Gross profit</b>	<b>711,130</b>	<b>794,967</b>	<b>907,975</b>	<b>1,083,323</b>
% margin	53.1%	51.0%	49.7%	49.4%
YoY Growth	44.3%	11.8%	14.2%	19.3%
<b>Operating Expenses:</b>	<b>(144,346)</b>	<b>(168,940)</b>	<b>(193,010)</b>	<b>(219,349)</b>
R&D	(109,486)	(129,378)	(148,796)	(168,500)
Sales and Marketing	(7,113)	(7,871)	(9,501)	(11,397)
General and Admin	(27,747)	(31,690)	(34,714)	(39,452)
<b>Operating Profit</b>	<b>566,784</b>	<b>626,028</b>	<b>714,965</b>	<b>863,974</b>
% margin	42.3%	40.2%	39.1%	39.4%
YoY Growth	52.1%	10.5%	14.2%	20.8%
<b>Non-Operating Income</b>	<b>17,993</b>	<b>13,650</b>	<b>12,000</b>	<b>12,000</b>
<b>Pretax Profit</b>	<b>584,777</b>	<b>639,678</b>	<b>726,965</b>	<b>875,974</b>
% margin	43.7%	41.1%	39.8%	40.0%
Tax	(66,619)	(63,758)	(81,775)	(97,776)
<b>Reported net Income</b>	<b>517,885</b>	<b>575,750</b>	<b>645,190</b>	<b>778,198</b>
<b>Reported EPS (NT\$)</b>	<b>19.97</b>	<b>22.20</b>	<b>24.88</b>	<b>30.01</b>
<b>ModelWare EPS (NT\$)</b>	<b>19.97</b>	<b>22.20</b>	<b>24.88</b>	<b>30.01</b>

Key Ratios, 2020-2023e				
	2020	2021e	2022e	2023e
<b>Return (%)</b>				
ROAA	21%	20%	20%	22%
ROAE	30%	29%	29%	30%
OP. ATO	0.8x	0.8x	0.9x	0.9x
<b>Gearing (x)</b>				
Net Debt/ Equity	-0.29x	-0.19x	-0.13x	-0.15x
Current Ratio	1.8x	1.6x	1.5x	1.8x
Quick Ratio	1.3x	1.1x	1.0x	1.2x
<b>Operating Cycle</b>				
AR/NR Turnover (days)	38	38	38	38
Inventory Turnover (days)	63	73	75	75
AP Turnover (days)	23	21	21	21
Cash Conversion (days)	78	90	93	93

e = Morgan Stanley Research Estimates  
Source: Company Data, Morgan Stanley Research

Balance Sheet, 2020-2023e, Year End Dec				
(NT\$ mn)	2020	2021e	2022e	2023e
Cash & Equivalent	660,171	547,731	456,676	570,887
Marketable Security	131,306	131,994	131,994	131,994
A/R & N/R	146,038	180,622	207,475	256,383
Inventories	137,353	173,258	209,458	252,365
Other Current Ass.	17,317	21,019	21,019	21,019
<b>Total current assets</b>	<b>1,092,185</b>	<b>1,054,623</b>	<b>1,026,621</b>	<b>1,232,647</b>
Long-term Investment	27,728	31,530	34,730	37,930
Total fixed assets	1,555,589	1,913,936	2,204,882	2,396,643
Total other assets	85,209	91,663	91,663	91,663
<b>Total Assets</b>	<b>2,760,711</b>	<b>3,091,752</b>	<b>3,357,896</b>	<b>3,758,884</b>
A/P & N/P	41,095	47,429	57,338	69,084
Accrued Expenses	0	0	0	0
Other Payable	343,209	298,535	298,535	298,535
Curr. of L-T Debt	2,600	0	0	0
Other Curr. Liab.	230,247	324,515	324,515	324,515
<b>Total Current Liab.</b>	<b>617,151</b>	<b>670,479</b>	<b>680,389</b>	<b>692,134</b>
L-T Liabilities	254,105	276,838	276,838	276,838
Total Other L-T Liab	38,833	39,648	39,648	39,648
<b>Total Liabilities</b>	<b>910,089</b>	<b>986,965</b>	<b>996,874</b>	<b>1,008,620</b>
Common Stocks	259,304	259,304	259,304	259,304
Preferred Stocks	0	0	0	0
Capital Reserve	56,347	64,754	64,754	64,754
Retained earnings	1,534,006	1,778,669	2,034,904	2,424,146
Treasury Stock	0	0	0	0
Minority Equity	965	2,061	2,061	2,061
<b>Total Equity</b>	<b>1,850,622</b>	<b>2,104,787</b>	<b>2,361,022</b>	<b>2,750,264</b>
<b>Total Liab. &amp; Equity</b>	<b>2,760,711</b>	<b>3,091,752</b>	<b>3,357,896</b>	<b>3,758,884</b>

Cash Flow Statement, 2020-2023e, Year End Dec				
(NT\$ mn)	2020	2021e	2022e	2023e
Net Income Current	517,885	575,750	645,190	778,198
Depreciation	331,725	436,624	563,039	711,648
Net Investment Losses (Gains)	(8,244)	955	(3,200)	(3,200)
Decrease (Increase) in Working Capital	9,105	(72,466)	(53,143)	(80,069)
Others	(27,804)	33,334	0	0
<b>Cash Flow-Operating</b>	<b>822,666</b>	<b>974,196</b>	<b>1,151,886</b>	<b>1,406,577</b>
(Purchase) of FA	(507,239)	(839,137)	(853,985)	(903,410)
Sale of Fix Asset	607	58	0	0
(Purchase)L-T Inv.	0	0	0	0
Others	850	3,719	0	0
<b>Cash Flow-Inv.</b>	<b>(505,782)</b>	<b>(835,360)</b>	<b>(853,985)</b>	<b>(903,410)</b>
Inc(Dec)-S-T Debt	(29,963)	48,565	0	0
Inc(Dec) L-T Debt	2,000	660	0	0
Dividend Paid	(259,304)	(337,095)	(388,956)	(388,956)
Dir.&Emp.Bonus	0	0	0	0
Others	198,652	30,220	0	0
<b>Cash Flow-Financing</b>	<b>(88,615)</b>	<b>(257,651)</b>	<b>(388,956)</b>	<b>(388,956)</b>
<b>Change in Cash</b>	<b>204,771</b>	<b>(112,440)</b>	<b>(91,055)</b>	<b>114,211</b>
Net cash/(debt), b/f	455,399	660,171	547,731	456,676
<b>Net cash/(debt), c/f</b>	<b>660,171</b>	<b>547,731</b>	<b>456,676</b>	<b>570,887</b>

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### Global Stock Ratings Distribution

(as of June 30, 2021)

The Stock Ratings described below apply to Morgan Stanley's Fundamental Equity Research and do not apply to Debt Research produced by the Firm. For disclosure purposes only (in accordance with FINRA requirements), we include the category headings of Buy, Hold, and Sell alongside our ratings of Overweight, Equal-weight, Not-Rated and Underweight. Morgan Stanley does not assign ratings of Buy, Hold or Sell to the stocks we cover. Overweight,

Equal-weight, Not-Rated and Underweight are not the equivalent of buy, hold, and sell but represent recommended relative weightings (see definitions below). To satisfy regulatory requirements, we correspond Overweight, our most positive stock rating, with a buy recommendation; we correspond Equal-weight and Not-Rated to hold and Underweight to sell recommendations, respectively.

STOCK RATING CATEGORY	COVERAGE UNIVERSE		INVESTMENT BANKING CLIENTS (IBC)			OTHER MATERIAL INVESTMENT SERVICES CLIENTS (MISC)	
	COUNT	% OF TOTAL	COUNT	% OF TOTAL IBC	% OF RATING CATEGORY	COUNT	% OF TOTAL OTHER MISC
<b>Overweight/Buy</b>	<b>1530</b>	<b>44%</b>	<b>416</b>	<b>48%</b>	<b>27%</b>	<b>675</b>	<b>44%</b>
<b>Equal-weight/Hold</b>	<b>1439</b>	<b>41%</b>	<b>362</b>	<b>42%</b>	<b>25%</b>	<b>657</b>	<b>43%</b>
<b>Not-Rated/Hold</b>	<b>1</b>	<b>0%</b>	<b>0</b>	<b>0%</b>	<b>0%</b>	<b>0</b>	<b>0%</b>
<b>Underweight/Sell</b>	<b>529</b>	<b>15%</b>	<b>91</b>	<b>10%</b>	<b>17%</b>	<b>206</b>	<b>13%</b>
<b>TOTAL</b>	<b>3,499</b>		<b>869</b>			<b>1538</b>	

Data include common stock and ADRs currently assigned ratings. Investment Banking Clients are companies from whom Morgan Stanley received investment banking compensation in the last 12 months. Due to rounding off of decimals, the percentages provided in the "% of total" column may not add up to exactly 100 percent.

### Analyst Stock Ratings

**Overweight (O).** The stock's total return is expected to exceed the average total return of the analyst's industry (or industry team's) coverage universe, on a risk-adjusted basis, over the next 12-18 months.

**Equal-weight (E).** The stock's total return is expected to be in line with the average total return of the analyst's industry (or industry team's) coverage universe, on a risk-adjusted basis, over the next 12-18 months.

**Not-Rated (NR).** Currently the analyst does not have adequate conviction about the stock's total return relative to the average total return of the analyst's industry (or industry team's) coverage universe, on a risk-adjusted basis, over the next 12-18 months.

**Underweight (U).** The stock's total return is expected to be below the average total return of the analyst's industry (or industry team's) coverage universe, on a risk-adjusted basis, over the next 12-18 months.

Unless otherwise specified, the time frame for price targets included in Morgan Stanley Research is 12 to 18 months.

### Analyst Industry Views

**Attractive (A):** The analyst expects the performance of his or her industry coverage universe over the next 12-18 months to be attractive vs. the relevant broad market benchmark, as indicated below.

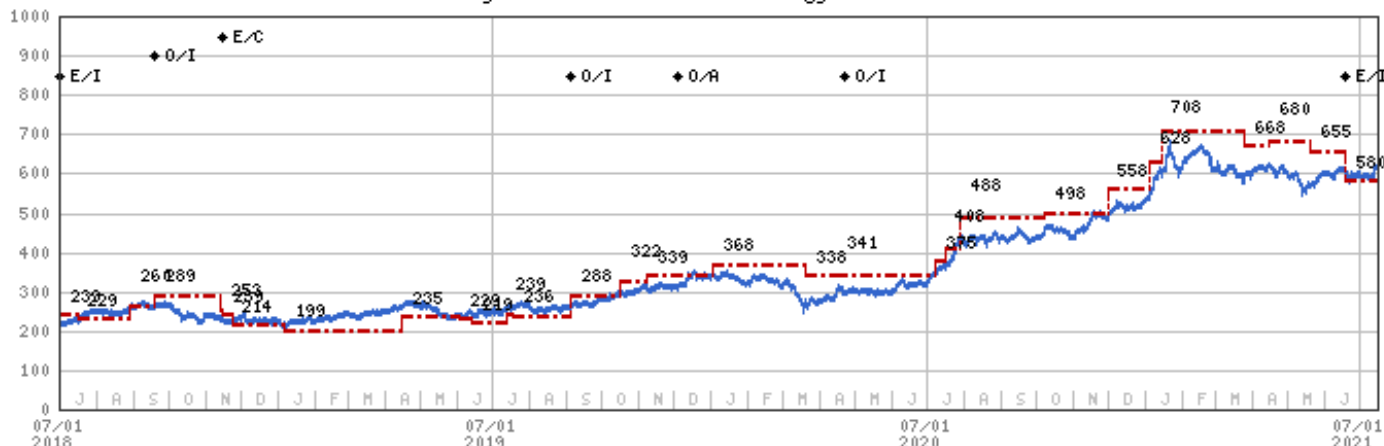
**In-Line (I):** The analyst expects the performance of his or her industry coverage universe over the next 12-18 months to be in line with the relevant broad market benchmark, as indicated below.

**Cautious (C):** The analyst views the performance of his or her industry coverage universe over the next 12-18 months with caution vs. the relevant broad market benchmark, as indicated below.

Benchmarks for each region are as follows: North America - S&P 500; Latin America - relevant MSCI country index or MSCI Latin America Index; Europe - MSCI Europe; Japan - TOPIX; Asia - relevant MSCI country index or MSCI sub-regional index or MSCI AC Asia Pacific ex Japan Index.

### Stock Price, Price Target and Rating History (See Rating Definitions)

TSMC (2330.TW) - As of 7/14/21 in TWD  
 Industry : Greater China Technology Semiconductors



Stock Rating History: 7/1/16 : O/I; 11/26/17 : E/I; 9/19/18 : O/I; 11/16/18 : E/C; 9/5/19 : O/I; 12/4/19 : O/A; 4/23/20 : O/I; 6/18/21 : E/I

Price Target History: 3/30/16 : 172; 7/14/16 : 178; 10/6/16 : 205; 10/13/16 : 208; 6/29/17 : 250; 11/26/17 : 239; 1/18/18 : 244; 5/2/18 : 239; 7/16/18 : 229; 8/29/18 : 260; 9/19/18 : 289; 11/14/18 : 253; 11/16/18 : 239; 11/23/18 : 214; 1/7/19 : 199; 4/15/19 : 235; 6/3/19 : 229; 6/14/19 : 219; 7/12/19 : 239; 7/18/19 : 236; 9/5/19 : 288; 10/17/19 : 322; 11/8/19 : 339; 1/3/20 : 368; 3/20/20 : 338; 4/16/20 : 341; 7/6/20 : 375; 7/16/20 : 408; 7/29/20 : 488; 10/6/20 : 498; 11/30/20 : 558; 1/5/21 : 628; 1/14/21 : 708; 3/25/21 : 668; 4/15/21 : 680; 5/20/21 : 655; 6/18/21 : 580

Source: Morgan Stanley Research Date Format : MM/DD/YY Price Target -- No Price Target Assigned (NA)  
 Stock Price (Not Covered by Current Analyst) — Stock Price (Covered by Current Analyst) —  
 Stock and Industry Ratings (abbreviations below) appear as ♦ Stock Rating/Industry View  
 Stock Ratings: Overweight (O) Equal-weight (E) Underweight (U) Not-Rated (NR) No Rating Available (NA)  
 Industry View: Attractive (A) In-line (I) Cautious (C) No Rating (NR)

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 Effective January 13, 2014, the industry view benchmarks for Morgan Stanley Asia Pacific are as follows: relevant MSCI country index or MSCI sub-regional index or MSCI AC Asia Pacific ex Japan Index.

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## INDUSTRY COVERAGE: Greater China Technology Semiconductors

COMPANY (TICKER)	RATING (AS OF)	PRICE* (07/15/2021)
<b>Charlie Chan</b>		
ACMResearch Inc (ACMR.O)	O (01/22/2020)	US\$78.35
Advanced Micro-Fabrication Equipment Inc (688012.SS)	U (03/20/2020)	Rmb166.40
Achip Technologies Ltd (3661.TW)	O (05/14/2021)	NT\$688.00
ASE Technology Holding Co. Ltd. (3711.TW)	O (10/26/2020)	NT\$120.00
ASMPacific (0522.HK)	O (01/12/2021)	HK\$109.30
Chipbond Technology Corp (6147.TWO)	E (05/20/2021)	NT\$77.20
Chunghwa Precision Test Tech (6510.TWO)	E (02/23/2021)	NT\$660.00
Global Unichip Corp (3443.TW)	U (02/12/2020)	NT\$453.00
GlobalWafers Co Ltd (6488.TWO)	O (12/02/2020)	NT\$905.00
Jiangsu Changjiang Electronics Tech (600584.SS)	E (10/26/2020)	Rmb38.16
King Yuan Electronics Co Ltd (2449.TW)	O (06/04/2021)	NT\$44.90
Maxscend Microelectronics Co Ltd (300782.SZ)	U (01/11/2021)	Rmb431.00
MediaTek (2454.TW)	O (01/04/2021)	NT\$951.00
Nanya Technology Corp. (2408.TW)	O (12/03/2020)	NT\$78.60
Phison Electronics Corp (8299.TWO)	E (05/20/2021)	NT\$482.00
Silergy Corp. (6415.TW)	U (05/20/2021)	NT\$3,855.00
SMC (0981.HK)	O (02/26/2021)	HK\$22.60
StarPower Semiconductor Ltd (603290.SS)	E (04/20/2021)	Rmb335.03
TSMC (2330.TW)	E (06/18/2021)	NT\$614.00
UMC (2303.TW)	O (09/14/2020)	NT\$55.10
Universal Scientific Ind. (Shanghai) (601231.SS)	O (08/04/2015)	Rmb14.61
Vanguard International Semiconductor (5347.TWO)	U (02/26/2021)	NT\$120.00
Will Semiconductor Co Ltd Shanghai (603501.SS)	O (06/17/2020)	Rmb320.38
WIN Semiconductors Corp (3105.TWO)	U (02/04/2021)	NT\$392.50
<b>Daniel Yen, CFA</b>		
ASMedia Technology Inc (5269.TW)	O (05/14/2021)	NT\$1,785.00
Aspeed Technology (5274.TWO)	O (04/29/2020)	NT\$2,200.00
Bestechnic Shanghai Co Ltd (688608.SS)	O (04/23/2021)	Rmb275.00
Egis Technology Inc (6462.TWO)	U (04/23/2020)	NT\$167.50
GigaDevice Semiconductor Beijing Inc (603986.SS)	O (04/24/2019)	Rmb173.83
Macronix International Co Ltd (2337.TW)	O (11/27/2020)	NT\$43.10
Montage Technology Co Ltd (688008.SS)	E (05/05/2021)	Rmb62.86
Novatek (3034.TW)	U (05/20/2021)	NT\$499.50
Parade Technologies Ltd (4966.TWO)	O (03/03/2019)	NT\$1,615.00
Realtek Semiconductor (2379.TW)	O (08/03/2018)	NT\$538.00
Shenzhen Goodix Technology Co Ltd (603160.SS)	U (06/16/2020)	Rmb108.80
Winbond Electronics Corp (2344.TW)	O (12/07/2020)	NT\$35.20
WPG Holdings (3702.TW)	U (04/09/2021)	NT\$54.10
<b>Ray Wu, CFA</b>		
Advanced Wireless Semiconductor Co (8086.TWO)	O (01/11/2021)	NT\$186.00
China Resources Microelectronics Limited (688396.SS)	O (04/20/2021)	Rmb81.80
Hua Hong Semiconductor Ltd (1347.HK)	E (05/20/2021)	HK\$41.75
Powerchip Semiconductor Manufacturing Co (6770.TWO)	U (07/12/2021)	NT\$68.00
RichWave Technology Corp. (4968.TW)	O (01/11/2021)	NT\$454.00
Silicon Motion (SIMO.O)	U (05/20/2021)	US\$63.00
Wafer Works Corp (6182.TWO)	O (04/20/2021)	NT\$65.50

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\* Historical prices are not split adjusted.