

Investor Presentation | Asia Pacific

# TMT Webcast: Big Themes for 2021 - Our Top Stock Ideas

MORGAN STANLEY ASIA LIMITED+

**Shawn Kim**  
EQUITY ANALYST  
Shawn.Kim@morganstanley.com +852 3963-1005

MORGAN STANLEY MUFG SECURITIES CO., LTD.+

**Kazuo Yoshikawa, CFA**  
EQUITY ANALYST  
Kazuo.Yoshikawa@morganstanleymufg.com +81 3 6836-8408

MORGAN STANLEY TAIWAN LIMITED+

**Sharon Shih**  
EQUITY ANALYST  
Sharon.Shih@morganstanley.com +886 2 2730-2865

**Charlie Chan**  
EQUITY ANALYST  
Charlie.Chan@morganstanley.com +886 2 2730-1725

**Daniel Yen, CFA**  
EQUITY ANALYST  
Daniel.Yen@morganstanley.com +886 2 2730-2863

**Ray Wu, CFA**  
EQUITY ANALYST  
Ray.Wu@morganstanley.com +886 2 2730-2871



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**Shawn Kim**

**Asia Technology - Memory**

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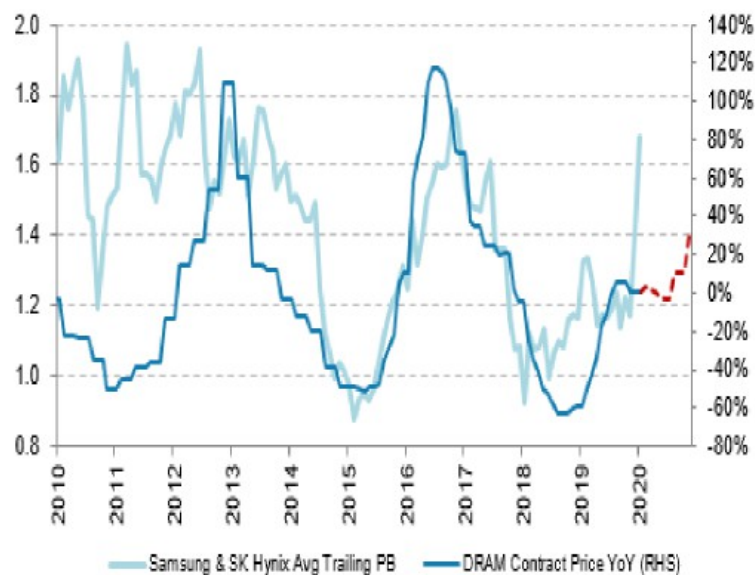
## Dawn of a New Cycle

**Samsung and SK Hynix outperformed MSCI Asia, Still catching up with overall semiconductor rally**



Source: Refinitiv, Morgan Stanley Research

**The memory cycle – inflecting higher in 2021**



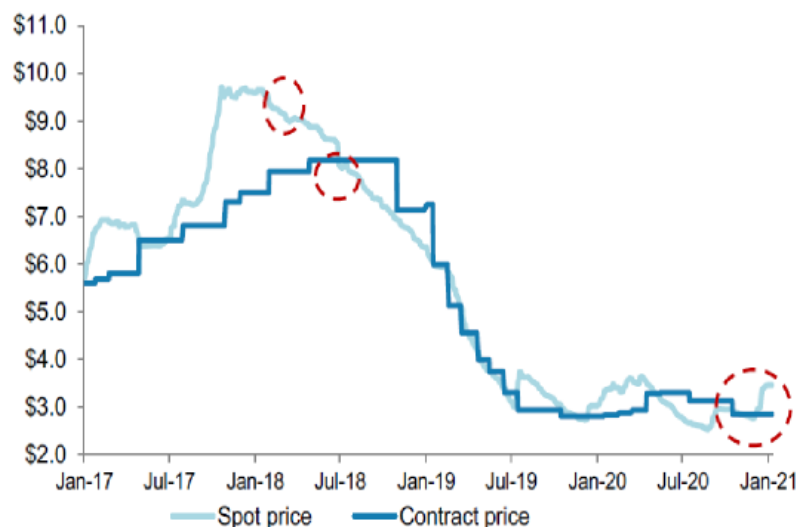
Source: DRAmExchange, Company data, Morgan Stanley Research

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## Bullish DRAM and Mixed NAND

**DDR4 8Gb spot price traded at 21% premium to contract price**



Source: DRAmEXchange, Company data, Morgan Stanley Research

**NAND 64Gb MLC spot price at 19% discount to contract price**



Source: DRAmEXchange, Company data, Morgan Stanley Research

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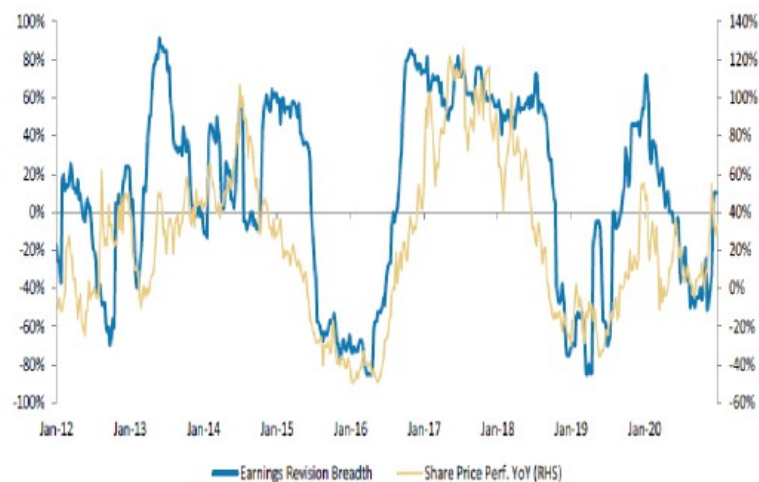
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## Earnings Revisions Still Lagging

Earnings estimate revisions matter for Samsung



...as well as for SK Hynix



Source: Refinitiv, Morgan Stanley Research

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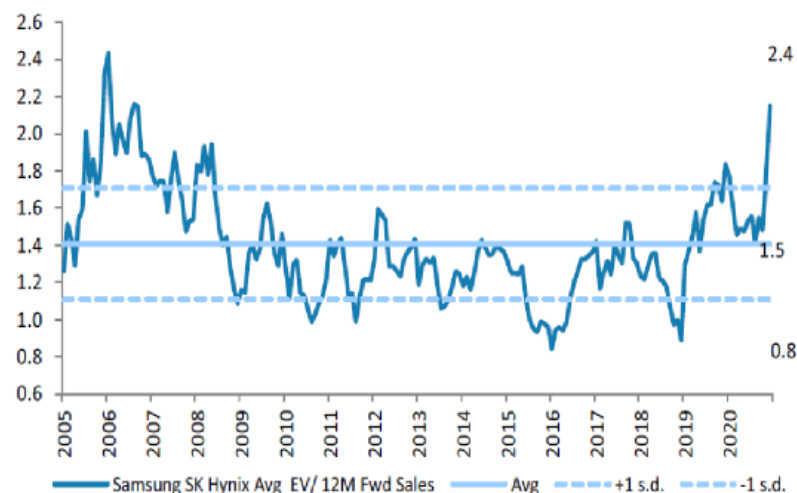
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## Valuations Will Re-Rate Further

**Average P/B valuation is 13% below the historical peak level (use MS book forecasts)**



**Average EV/Sales is 12% below peak cycle multiples (use MS rev forecasts)**



Source: Bloomberg, Morgan Stanley Research

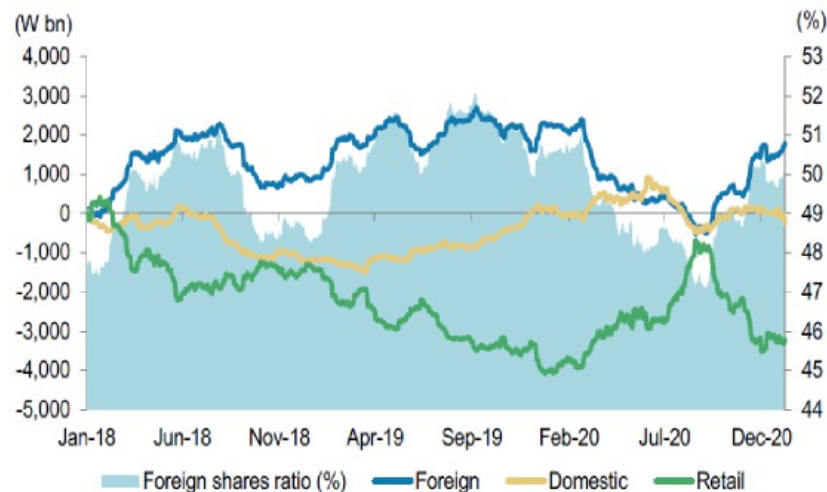
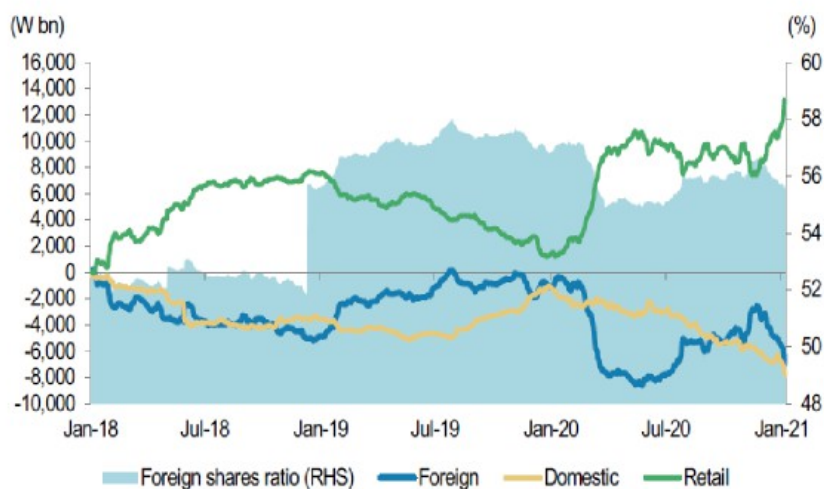
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## Incremental Buyer?

**Large profit taking and net selling by foreign investors since early December**

**...while SK Hynix's foreign net buying continues to rise**



Source: Quantiwise, Morgan Stanley Research

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## **Japan Semiconductors / Semi Cap Equipment** **Kazuo Yoshikawa**

***Top stock ideas in Japan Semi***



## Japan Semiconductor Industry View – In Line

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### Market Forecast

- **Semiconductor market:** CY19 \$412bn (-12%), CY20e \$437bn (+6%), CY21e \$482bn (+10%)
- **Wafer fab equipment market:** CY19 \$51.9bn (-6%), CY20e \$61.2bn (+18%), CY21e \$66.2bn (+8%)
- **Assembly & Test equipment market:** CY19 \$7.9bn (-18%), CY20e \$9.2bn (+16%), CY21e \$10.0bn (+9%)

### Short-term Outlook

- **End-demand:** We are seeing broad-based demand strength in 4Q20, including mobile, automotive, industrial and PC markets. We expect cloud capex to rebound and a cyclical recovery other applications in 1H21.
- **Memory:** While NAND remains weaker than DRAM in 1Q21, we believe both NAND and DRAM are in a bottoming process.
- **Semi cap equipment:** We expect WFE to grow high single digits in CY21, primarily driven by memory capex recovery.
- **What to watch for in 2021:** Other than cyclical development, we will monitor (1) US/China trade issues, (2) foundry's 3nm development and production outlook (including possibility of pellicle adoption), (3) 3D-NAND 112/128-layers production ramp, (4) sub-10nm automotive SoC development and its implications for semi cap, (5) SiC penetration in EV's main inverters.

### Long-term Outlook

- Cloud computing, faster networks, and advanced semi technologies will enable faster collection and insights from data.

### Overweight

- **Renesas (6723):** Substantial room for re-rating on confirmation of high FCF creation and steady reduction of financial leverage. Renesas auto SoC, as well as IDT's datacenter and 5G solutions may surprise to the revenue upside as well.
- **Tokyo Electron (8035):** Key beneficiary of memory capex recovery. Earnings should be supported by field solutions business.

### Underweight

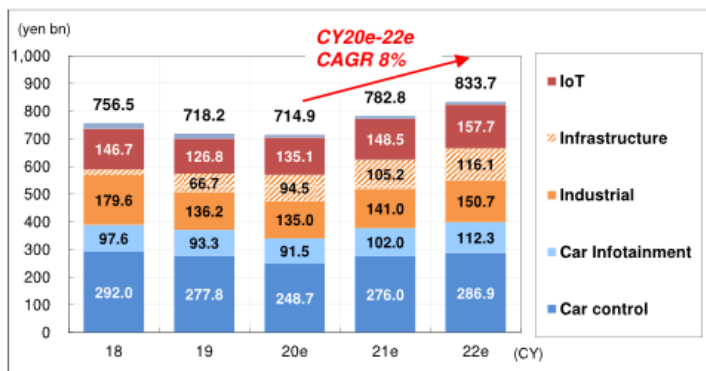
- **Horiba (6856) :** Recovery prospects outside semi systems are unclear. Automotive R&D spending will probably be adjusted.

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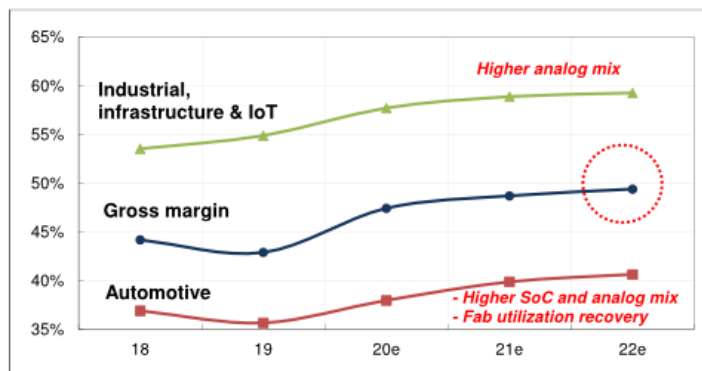
## Renesas Electronics (6723)

### Renesas: Annual revenues



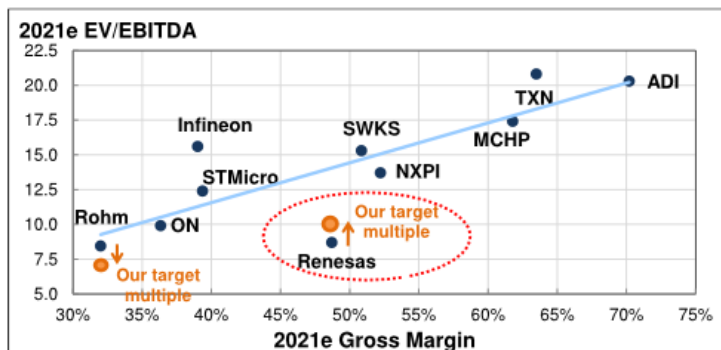
e = Morgan Stanley Research estimates  
Source: Morgan Stanley Research.

### Renesas: Non-GAAP gross margin



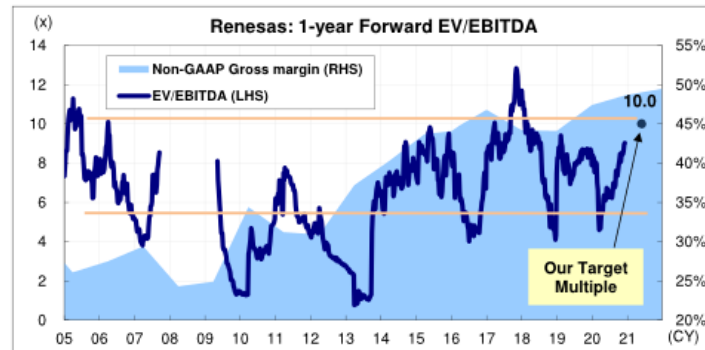
e = Morgan Stanley Research estimates  
Source: Morgan Stanley Research.

### Global Analog, power & MCU stocks: EV/EBITDA



Note: Closing prices as of December 25, 2020. e = Morgan Stanley Research estimates  
Source: Morgan Stanley Research.

### Renesas: 1-year forward EV/EBITDA



Earnings in 2021 and beyond are Morgan Stanley Research estimates  
Source: Morgan Stanley Research.

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## Tokyo Electron (8035)

### Tokyo Electron: Semi equipment revenues

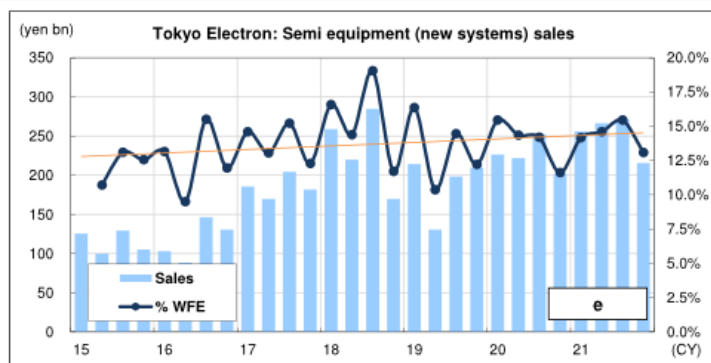
(yen bn)							
FY	13	14	15	16	17	18	19
<b>Semi equipment sales</b>	<b>478.8</b>	<b>576.2</b>	<b>613.0</b>	<b>749.9</b>	<b>1,055.2</b>	<b>1,166.8</b>	<b>1,061.0</b>
<b>New system</b>	<b>354.0</b>	<b>401.2</b>	<b>437.4</b>	<b>550.3</b>	<b>814.6</b>	<b>888.7</b>	<b>765.1</b>
Coater/Developer	99.1	116.4	122.5	137.6	162.9	204.4	198.9
Etch System	106.2	132.4	126.8	187.1	325.8	355.5	283.1
Deposition System	81.4	88.3	113.7	121.1	187.4	177.7	153.0
Cleaning System	46.0	36.1	43.7	60.5	81.5	80.0	76.5
Wafer probers	10.6	16.0	17.5	33.0	48.9	62.2	45.9
Others	10.6	12.0	13.1	11.0	8.1	8.9	7.7
<b>Field solution</b>	<b>124.8</b>	<b>175.0</b>	<b>175.5</b>	<b>199.3</b>	<b>240.6</b>	<b>278.1</b>	<b>295.9</b>

#### % of total semi equipment sales

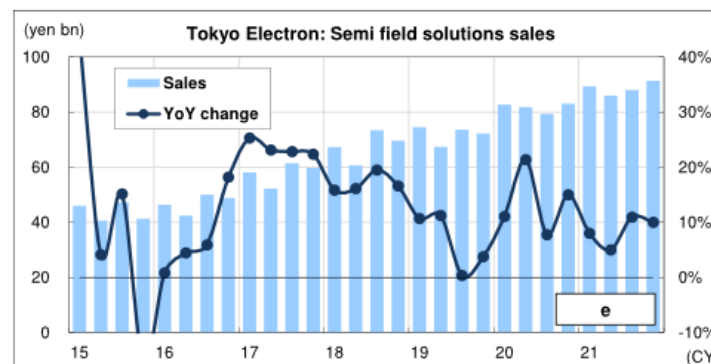
<b>Semi equipment sales</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>
<b>New system</b>	<b>74%</b>	<b>70%</b>	<b>71%</b>	<b>73%</b>	<b>77%</b>	<b>76%</b>	<b>72%</b>
Coater/Developer	21%	20%	20%	18%	15%	18%	19%
Etch System	22%	23%	21%	25%	31%	30%	27%
Deposition System	17%	15%	19%	16%	18%	15%	14%
Cleaning System	10%	6%	7%	8%	8%	7%	7%
Wafer probers	2%	3%	3%	4%	5%	5%	4%
Others	2%	2%	2%	1%	1%	1%	1%
<b>Field solution</b>	<b>26%</b>	<b>30%</b>	<b>29%</b>	<b>27%</b>	<b>23%</b>	<b>24%</b>	<b>28%</b>

Source: Company data, Morgan Stanley Research.

### Tokyo Electron: Semi system revenues


e = Morgan Stanley Research estimates  
Source: Company data, Morgan Stanley Research.

### Renesas: 1-year forward EV/EBITDA


e = Morgan Stanley Research estimates  
Source: Company data, Morgan Stanley Research.

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## Semi cap equipment market forecasts

(US\$bn)	Calendar Year					FY ending March 31			Quarter (CY)							
CY	17	18	19	20e	21e	Mar 20	Mar 21e	Mar 22e	1Q20	2Q20	3Q20	4Q20e	1Q21e	2Q21e	3Q21e	4Q21e
Global real GDP growth (YoY)	3.7%	3.7%	3.1%	-3.4%	6.4%	-			-1.6%	-9.0%	-2.4%	-0.6%	4.1%	12.5%	5.3%	5.2%
<b>Semiconductor Market (\$bn)</b>	<b>412.2</b>	<b>468.8</b>	<b>412.1</b>	<b>436.7</b>	<b>478.1</b>	<b>418.8</b>	<b>445.1</b>	<b>490.2</b>	<b>104.6</b>	<b>102.4</b>	<b>113.6</b>	<b>116.2</b>	<b>113.0</b>	<b>116.7</b>	<b>123.4</b>	<b>125.1</b>
MPU	44.3	46.9	48.0	50.4	49.5	50.5	48.8		13.2	12.6	12.5	12.1	11.5	12.0	12.8	13.1
MCU	16.3	17.1	15.8	15.2	16.6	15.8	15.6		3.7	3.5	4.0	4.1	4.1	4.2	4.3	4.1
Logic	105.5	112.6	109.0	119.7	128.6	111.4	123.6		27.6	27.7	30.7	33.7	31.5	31.5	32.4	33.1
DRAM	72.8	99.3	62.5	65.0	82.4	60.3	68.5		14.7	16.9	17.3	16.2	18.2	20.0	21.9	22.3
NAND	47.2	54.2	40.2	48.9	49.4	43.7	47.0		12.8	12.2	12.9	11.0	10.9	11.8	12.9	13.9
Analog, Discrete & Opt	122.1	134.3	132.9	134.0	148.1	133.3	138.1		31.8	29.9	35.3	37.0	35.8	36.4	38.2	37.7
<b>YoY % change</b>																
<b>Semiconductor Market</b>	<b>22%</b>	<b>14%</b>	<b>-12%</b>	<b>6%</b>	<b>9%</b>	<b>-8%</b>	<b>6%</b>	<b>10%</b>	<b>7%</b>	<b>4%</b>	<b>6%</b>	<b>7%</b>	<b>8%</b>	<b>14%</b>	<b>9%</b>	<b>8%</b>
MPU	3%	6%	2%	5%	-2%	8%	-4%		24%	15%	-2%	-11%	-12%	-5%	3%	8%
MCU	12%	4%	-7%	-4%	9%	-4%	-1%		-1%	-12%	-3%	2%	11%	20%	7%	1%
Logic	12%	7%	-3%	10%	7%	0%	11%		9%	7%	7%	16%	14%	14%	6%	-2%
DRAM	77%	36%	-37%	4%	27%	-35%	14%		-13%	12%	11%	8%	24%	18%	27%	38%
NAND	47%	15%	-26%	22%	1%	-12%	7%		38%	31%	27%	-4%	-15%	-3%	0%	27%
Analog, Discrete & Opt	11%	10%	-1%	1%	10%	0%	4%		1%	-8%	1%	8%	13%	22%	8%	2%
<b>Units (bn)</b>	<b>935</b>	<b>1,004</b>	<b>932</b>	<b>943</b>	<b>1,035</b>	<b>927</b>	<b>964</b>	<b>1,061</b>	<b>224</b>	<b>219</b>	<b>249</b>	<b>252</b>	<b>245</b>	<b>253</b>	<b>267</b>	<b>271</b>
YoY % change	13%	7%	-7%	1%	10%	-7%	4%	10%	-2%	-3%	3%	6%	9%	16%	7%	8%
<b>Semi Equipment Sales (\$bn)</b>	<b>56.7</b>	<b>64.5</b>	<b>59.8</b>	<b>70.4</b>	<b>77.1</b>	<b>61.5</b>	<b>74.4</b>	<b>78.4</b>	<b>15.6</b>	<b>16.8</b>	<b>19.4</b>	<b>18.7</b>	<b>19.6</b>	<b>20.0</b>	<b>19.4</b>	<b>18.2</b>
<b>YoY % change</b>	<b>38%</b>	<b>14%</b>	<b>-7%</b>	<b>18%</b>	<b>9%</b>	<b>0%</b>	<b>21%</b>	<b>5%</b>	<b>13%</b>	<b>26%</b>	<b>30%</b>	<b>5%</b>	<b>26%</b>	<b>19%</b>	<b>0%</b>	<b>-3%</b>
% of Semi Revenues	14%	14%	14%	16%	16%	15%	17%	16%	15%	16%	17%	16%	17%	17%	16%	15%
<b>Wafer Fab Equipment</b>	<b>48.1</b>	<b>54.9</b>	<b>51.9</b>	<b>61.2</b>	<b>67.0</b>	<b>53.4</b>	<b>65.0</b>	<b>68.0</b>	<b>13.4</b>	<b>14.4</b>	<b>16.9</b>	<b>16.5</b>	<b>17.2</b>	<b>17.4</b>	<b>16.7</b>	<b>15.7</b>
YoY % change	40%	14%	-6%	18%	9%	2%	22%	5%	13%	25%	32%	5%	28%	21%	-1%	-5%
<b>Assembly Equipment</b>	<b>3.9</b>	<b>4.0</b>	<b>2.9</b>	<b>3.5</b>	<b>3.8</b>	<b>3.0</b>	<b>3.6</b>	<b>3.9</b>	<b>0.8</b>	<b>0.9</b>	<b>0.9</b>	<b>0.9</b>	<b>0.9</b>	<b>0.9</b>	<b>1.0</b>	<b>0.9</b>
YoY % change	30%	2%	-27%	21%	9%	-16%	21%	7%	15%	35%	22%	12%	18%	8%	5%	5%
<b>Testing Equipment</b>	<b>4.7</b>	<b>5.6</b>	<b>5.0</b>	<b>5.7</b>	<b>6.3</b>	<b>5.1</b>	<b>5.8</b>	<b>6.5</b>	<b>1.3</b>	<b>1.5</b>	<b>1.5</b>	<b>1.3</b>	<b>1.4</b>	<b>1.6</b>	<b>1.7</b>	<b>1.6</b>
YoY % change	27%	20%	-11%	14%	10%	-7%	13%	11%	10%	31%	16%	2%	6%	7%	8%	19%
SoC test equipment	2.3	2.5	2.8	2.9	3.2	2.8	2.9	3.3	0.7	0.8	0.7	0.7	0.7	0.8	0.8	0.8
YoY % change	13%	12%	10%	2%	11%	8%	4%	11%	2%	13%	-1%	-5%	8%	5%	12%	20%
Memory test equipment	0.7	1.1	0.7	1.2	1.3	0.8	1.2	1.3	0.3	0.3	0.4	0.3	0.3	0.3	0.4	0.3
YoY % change	98%	50%	-38%	78%	6%	-15%	50%	9%	104%	115%	94%	25%	5%	5%	0%	15%

e = Morgan Stanley Research estimates  
Source: SIA, SEMI, Company data, Morgan Stanley Research.

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**Sharon Shih**

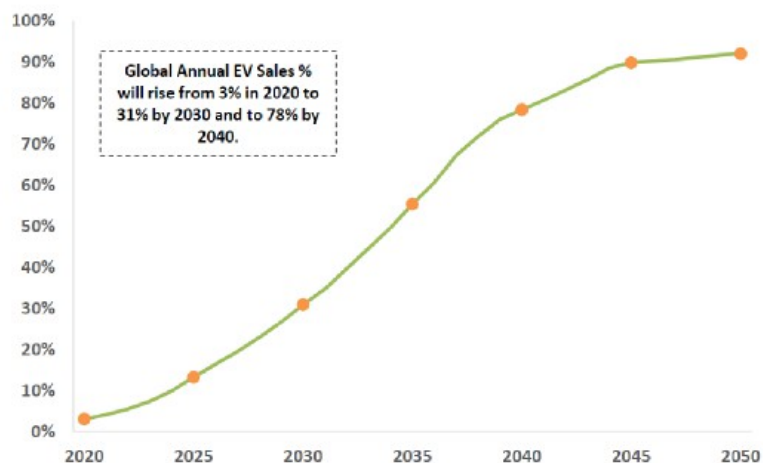
**Greater China Technology Hardware**

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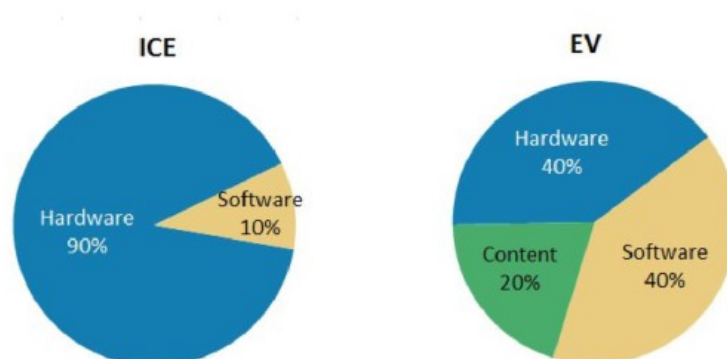
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## Why are Tech Hardware Companies Looking at EV Supply-chain Potential?

Global EV penetration is expected to rise from 3% in 2020 to 13% in 2025E



Value of the car in future: Software and content contribute 60% of EV value



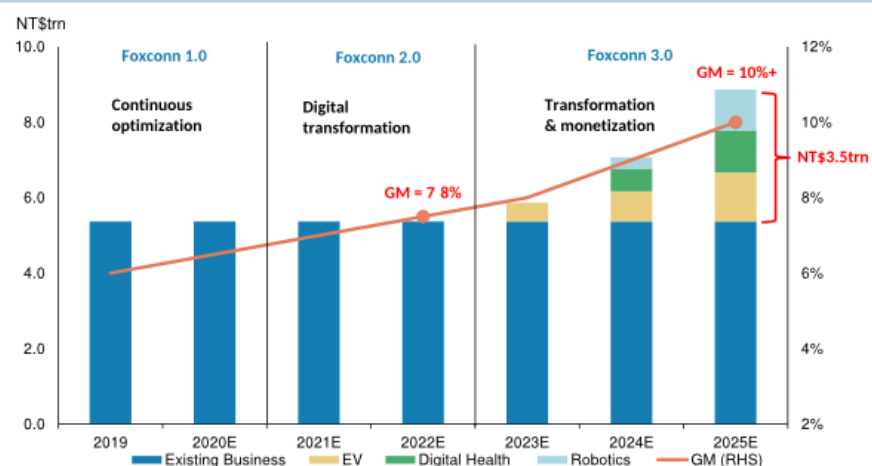
Source: Morgan Stanley Research estimates  
Note: ICE = internal combustion engine; EV = electric vehicle

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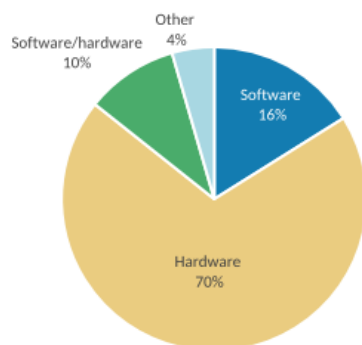
## Hon Hai (2317.TW): EV Business On Track As A Long-Term Growth Driver

EV the key driver amid Hon Hai's Foxconn 3.0 digital transformation plan in 2023-25e

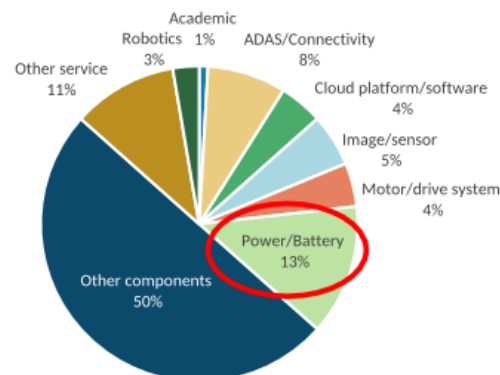


Hon Hai obtained >200 partners for its MIH Open Platform since debut in October 2020

MIH platform partners by offerings



MIH platform partners by application



Source: Company Data, Morgan Stanley Research. E = Morgan Stanley Research estimates.



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TMT Webcast**Hon Hai (2317.TW): Potential Valuation Multiple Expansion When EV Business Uptake****Valuation trades below ODM/OEM peers despite stronger earnings growth seen for 2021**

Ticker	Company	Market Cap	Revenue YoY	OP Profit YoY	Earnings YoY	P/E	3-year P/E	Share price performance since Jan 1, 2020
		(US\$mn)	2021E	2021E	2021E	2021E	Trading range	
2317.TW	Hon Hai	49,366	9%	45%	22%	10.7	7-16x	20%
4938.TW	Pegatron	6,327	0%	11%	-21%	10.3	9-18x	4%
2382.TW	Quanta	11,166	-3%	-3%	3%	12.6	10-20x	38%
3231.TW	Wistron	3,119	-9%	20%	0%	10.7	9-30x	14%
2324.TW	Compal	3,268	1%	23%	20%	10.2	9-16x	22%

**Valuation looks cheap among EV supply chain peers**

Ticker	Company	Closing Price	P/E		P/B	
		1/5/2021	2021E	3-y AVG.	2021E	3-y AVG.
EV component supplier						
2317.TW	Hon Hai	104.00	10.7	10.3	1.0	1.2
2308.TW	Delta	276.50	24.6	19.9	3.3	3.0
1536.TW	Hota	120.5	34.3	36.7	NA	4.9
3665.TW	Bizlink	265.50	14.5	18.2	2.4	3.0
002050.SZ	Zhejiang Sanhua	27.7	47.2	31.2	8.2	5.0
300750.SZ	CATL	402.00	110.2	62.4	13.3	6.6
600406.SS	NARI Tech	27.1	19.6	20.3	3.2	3.7

- Hon Hai trades at an 11x 2021 P/E, below the midpoint of its 3-year P/E range of 12x
- Hon Hai has traded below 1x P/B since 2018

Source: Company Data, Morgan Stanley Research. E = Morgan Stanley Research estimates.

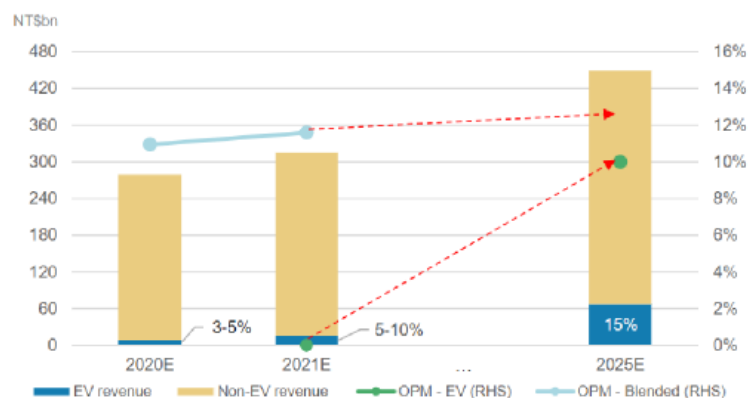


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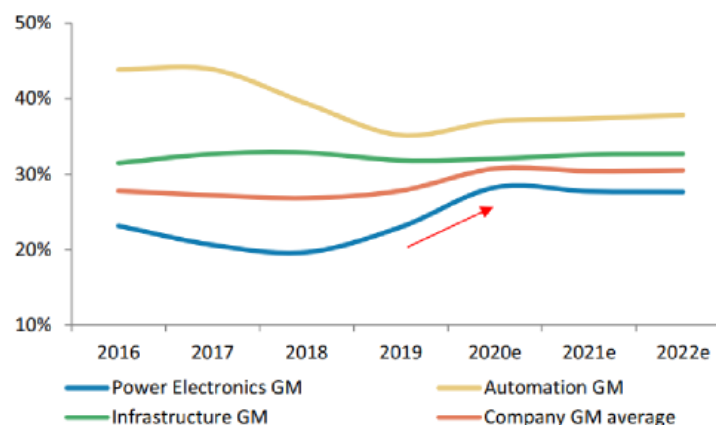
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## Delta (2308.TW): EV-related business Scale Increase To Drive Profit Upside

**We expect Delta's EV-related business to reach 15% of total revenue and OPM at 10% in 2025e**



**Gross margin upgrade in power electronics segment driven by 5G and EV**



Source: Company Data, Morgan Stanley Research. E = Morgan Stanley Research estimates.

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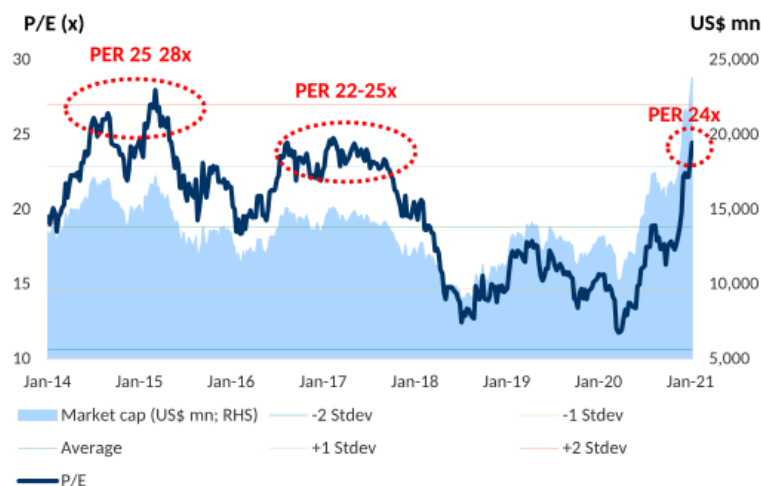
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## Delta (2308.TW): Operating Margin Widening To Drive Valuation Expansion

**OPM vs. share price: Delta's operating margin has been one of the key share price drivers**



**Delta is trading at 24x 2021e P/E vs. EV supply chain on average trades at 36x**



Source: Company Data, Refinitiv, Morgan Stanley Research. E = Morgan Stanley Research estimates.

Morgan Stanley

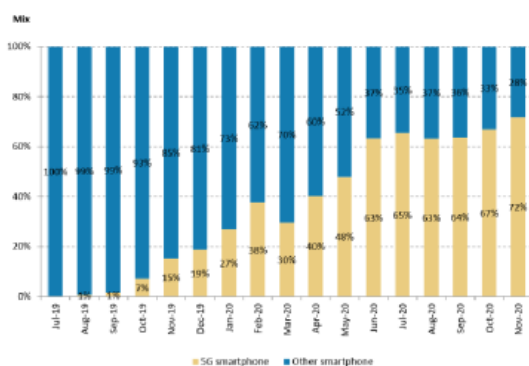
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**Ray Wu**

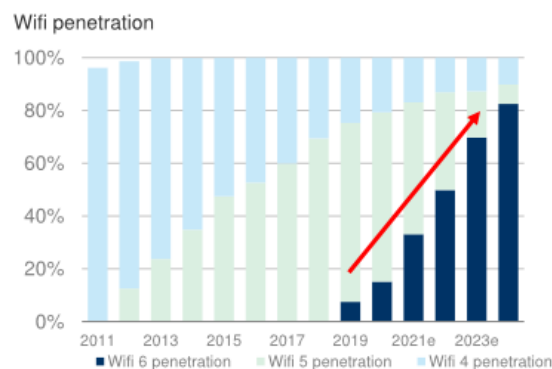
**Greater China Technology Semiconductors**

## WiFi 6 is supplementary to the 5G network

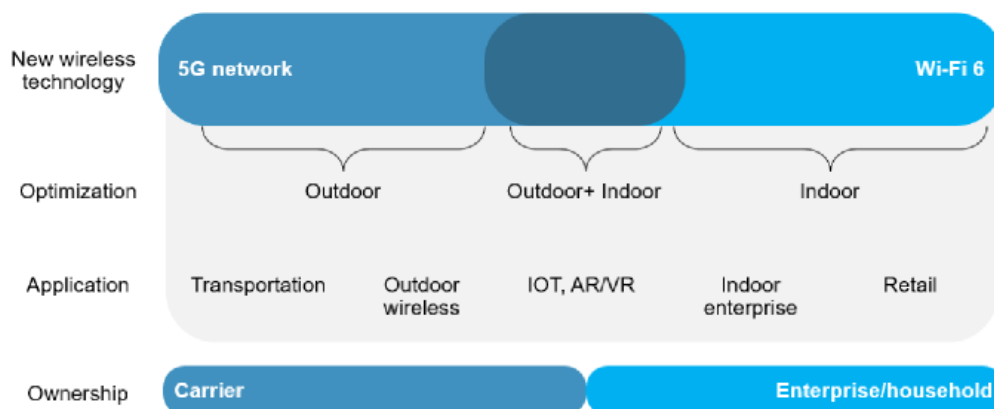
**5G as a percentage of total Chinese smartphone shipments**



**WiFi 6 penetration to increase more than 80% by 2024**



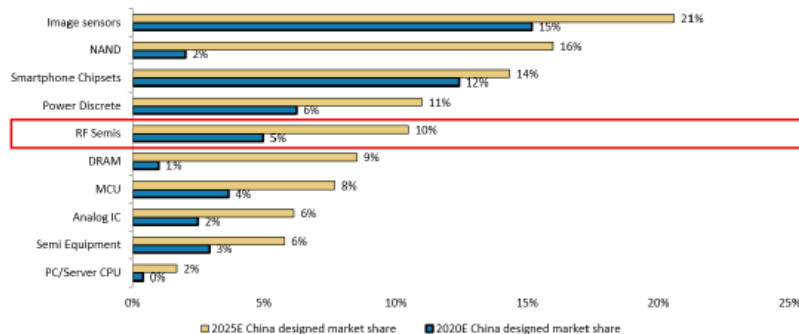
**WiFi 6 is supplementary to the 5G network**



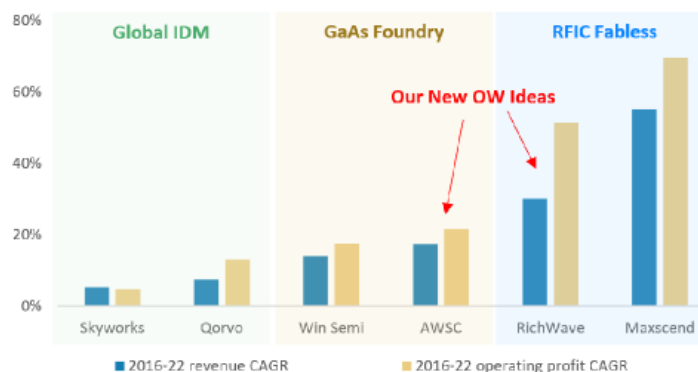
Source: Morgan Stanley Research estimates

## GaAs foundry/RF Semis companies outgrowing IDM

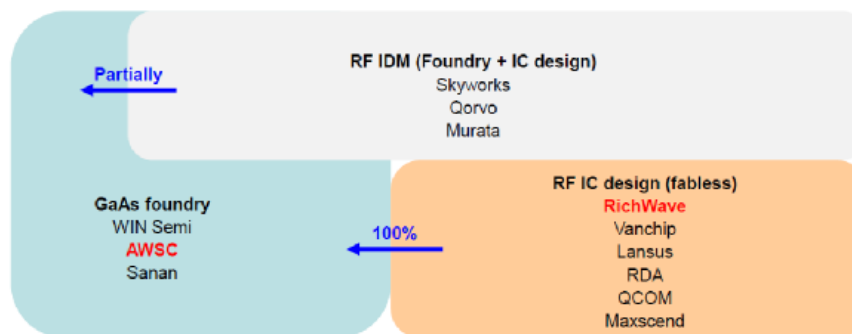
China's designed semiconductor market share – 2020e vs. 2025e



GaAs foundry/RF Semis companies outgrowing IDM



WiFi RF semis supply chain – where RichWave and AWSC fit in



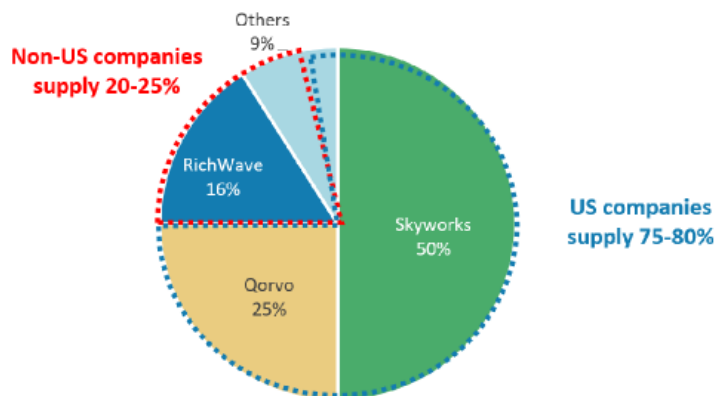
Source: Company data, Morgan Stanley Research estimates

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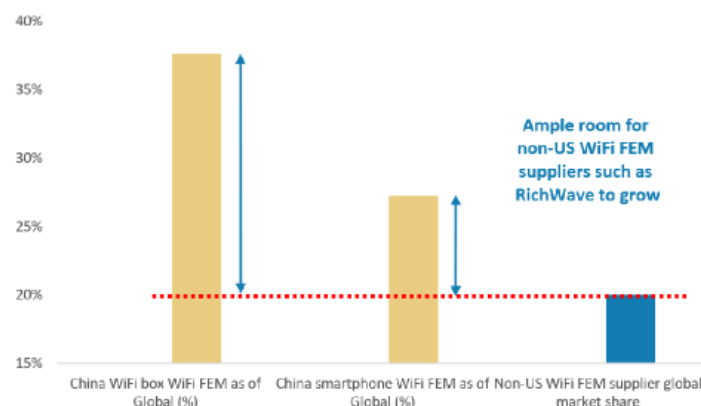
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## RichWave (4968.TW; OW) – to double market share by 2023

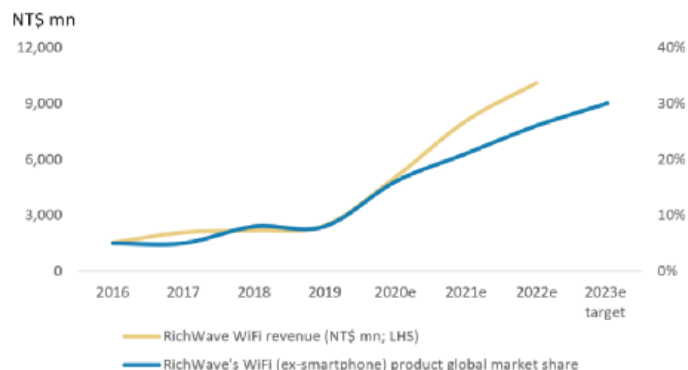
Currently US companies supply 75-80% of global WiFi RF key components



China's demand makes up 30-40% of global demand; we see ample room for non-US suppliers to grow



We expect RichWave to expand market share from 16% to 30%, revenue CAGR of 40% during 2020-22



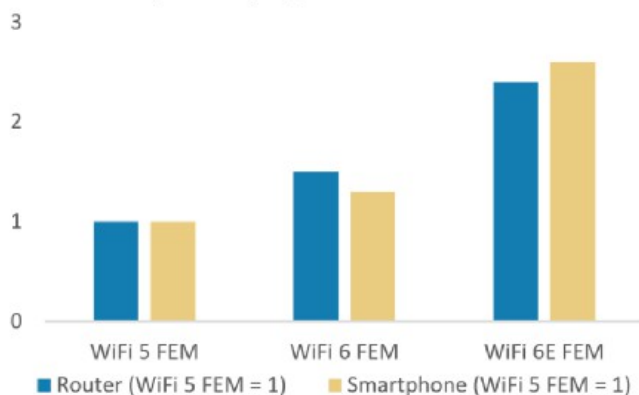
Source: Company data, Bloomberg, Morgan Stanley Research estimates. \*e = Siltronic 2020 number based on Bloomberg consensus

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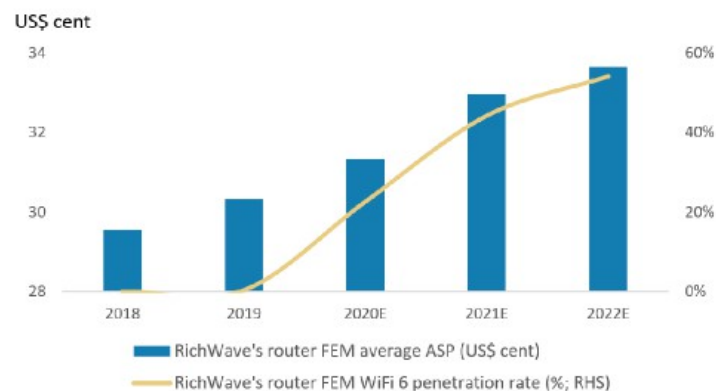
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## RichWave (4968.TW; OW) – WiFi 6 migration leads to ASP and margin boost

WiFi 6 FEM ASP is 30% (smartphones) to 50% (routers) higher than WiFi 5 FEM



RichWave's router FEM average ASP will thus increase



WiFi 6 router adopting RichWave's FEM



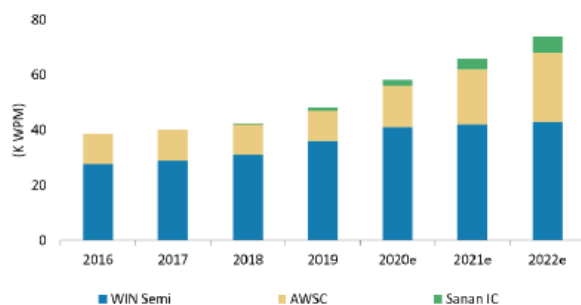
Source: SEMI, Morgan Stanley Research estimates

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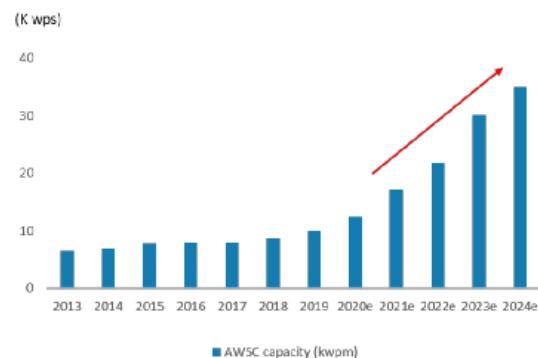
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## AWSC (8086.TWO; OW) – scaling up to meet GaAs PA supply shortfall; high exposure to fabless clients

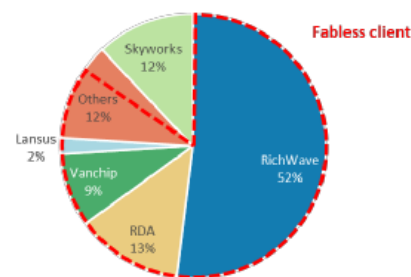
GaAs pure foundry suppliers – AWSC is the one with a strong capex plan



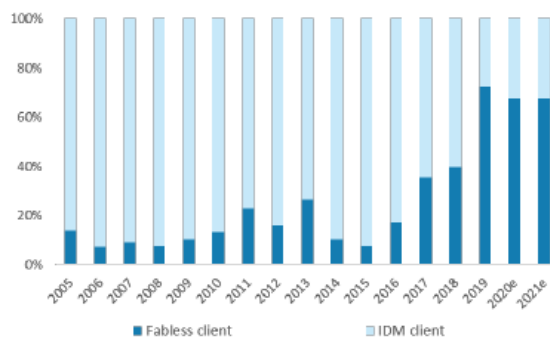
AWSC to double capacity by 2022



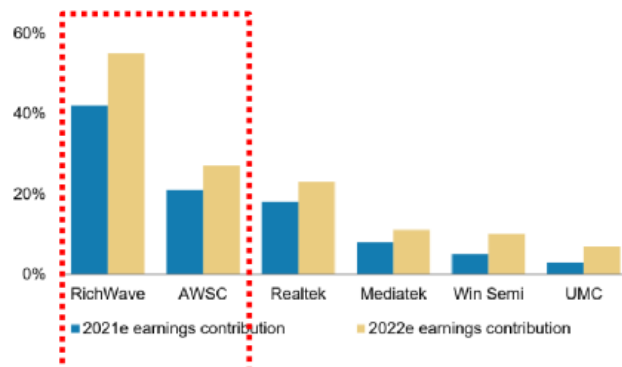
>80% of revenue from Chinese/Taiwanese companies



AWSC has high exposure to fabless clients – they are more reliant on AWSC's capacity



WiFi 6 earnings contribution estimates



Source: SEMI, Morgan Stanley Research estimates





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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
Overweight/Buy	1450	42%	378	47%	26%	646	42%
Equal-weight/Hold	1449	42%	347	43%	24%	648	43%
Not-Rated/Hold	5	0%	1	0%	20%	4	0%
Underweight/Sell	521	15%	81	10%	16%	223	15%
<b>TOTAL</b>	<b>3,425</b>		<b>807</b>			<b>1521</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.

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

Samsung Electronics (005930.KS) - As of 1/11/21 in KRW  
Industry : S. Korea Technology



Stock Rating History: 1/1/16 : O/I; 11/26/17 : E/C; 7/30/19 : E/I; 11/18/19 : O/A

Price Target History: 10/30/15 : 32000; 1/29/16 : 30000; 6/6/16 : 32000; 7/3/16 : 36000; 12/12/16 : 40000; 1/25/17 : 44000;  
3/8/17 : 46000; 4/28/17 : 52000; 8/15/17 : 54000; 9/7/17 : 56000; 9/22/17 : 58000; 11/26/17 : 56000; 6/28/18 : 54000;  
11/1/18 : 50000; 11/21/18 : 47000; 12/14/18 : 42000; 1/15/19 : 40000; 7/30/19 : 53000; 8/16/19 : 48000; 9/10/19 : 50000;  
11/18/19 : 60000; 1/14/20 : 72000; 2/26/20 : 75000; 3/19/20 : 68000; 4/29/20 : 65000; 7/12/20 : 70000; 9/11/20 : 73000;  
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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)

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SK Hynix (000660.KS) - As of 1/11/21 in KRW  
Industry : S. Korea Technology



Stock Rating History: 1/1/16 : O/I; 2/8/17 : NA/I; 6/27/17 : O/I; 9/20/17 : NA/I; 11/26/17 : NA/C; 8/5/18 : U/C; 7/30/19 : E/I; 11/18/19 : O/A

Price Target History: 12/21/15 : 48000; 3/15/16 : 45000; 4/26/16 : 44000; 10/13/16 : 50000; 1/4/17 : 55000; 1/31/17 : 61000; 2/8/17 : NA; 6/27/17 : 80000; 8/15/17 : 82000; 9/20/17 : NA; 8/5/18 : 71000; 9/6/18 : 70000; 11/13/18 : 69000; 12/14/18 : 63000; 1/15/19 : 61000; 1/25/19 : 63000; 3/3/19 : 60000; 4/25/19 : 70000; 6/4/19 : 61000; 7/25/19 : 70000; 7/30/19 : 85000; 8/16/19 : 80000; 9/10/19 : 81000; 11/18/19 : 95000; 1/14/20 : 115000; 2/26/20 : 120000; 3/19/20 : 110000; 8/21/20 : 93000; 10/23/20 : 100000; 12/2/20 : 160000; 1/12/21 : 170000

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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#### INDUSTRY COVERAGE: S. Korea Technology

COMPANY (TICKER)	RATING (AS OF)	PRICE* (01/11/2021)
<b>Ryan Kim</b>		
Advanced Process Systems Corp (265520.KQ)	O (04/09/2020)	W25,000
Duk San Neolux Co Ltd (213420.KQ)	O (04/09/2020)	W34,500
Ecopro Co Ltd (086520.KQ)	E (02/21/2019)	W62,300
Ijin Materials (020150.KS)	O (02/21/2019)	W58,600
L&F Co Ltd (066970.KQ)	O (12/17/2020)	W78,300
Posco Chemical Co Ltd. (003670.KS)	O (10/16/2020)	W127,500
Wonik IPS Co Ltd (240810.KQ)	O (09/07/2020)	W44,550
<b>Shawn Kim</b>		
LG Display (034220.KS)	E (03/19/2020)	W19,600
LG Electronics (066570.KS)	E (11/04/2020)	W142,000
LG Innotek (011070.KS)	E (03/19/2020)	W188,500
Samsung Electro-Mechanics (009150.KS)	O (10/06/2019)	W193,000
Samsung Electronics (005935.KS)	O (11/18/2019)	W81,000
Samsung Electronics (005930.KS)	O (11/18/2019)	W91,000
Samsung SDI (006400.KS)	U (08/14/2020)	W730,000
Samsung SDS (018260.KS)	E (06/23/2017)	W209,000
Seoul Semiconductor (046890.KQ)	U (04/04/2018)	W21,500
SK Hynix (000660.KS)	O (11/18/2019)	W133,000

Stock Ratings are subject to change. Please see latest research for each company.

\* Historical prices are not split adjusted.

#### INDUSTRY COVERAGE: Greater China Technology Hardware

COMPANY (TICKER)	RATING (AS OF)	PRICE* (01/11/2021)
<b>Daisy Dai, CFA</b>		
Guangdong Fenghua Adv. Tech. (Hldg) Co (000636.SZ)	O (04/02/2020)	Rmb30.98
Nationstar Optoelectronics (002449.SZ)	E (10/09/2020)	Rmb9.82
QuantumCtek Co Ltd (688027.SS)	O (12/17/2020)	Rmb235.49

**Derrick Yang**

AU Optronics (2409.TW)	O (12/09/2019)	NT\$14.15
BOE Technology (000725.SZ)	O (09/06/2019)	Rmb6.39
GIS Holding Limited (6456.TW)	O (12/01/2020)	NT\$119.00
Innolux (3481.TW)	O (02/18/2020)	NT\$13.45
Lens Technology (300433.SZ)	E (07/22/2020)	Rmb37.00
Leyard Optoelectronic Co Ltd (300296.SZ)	E (11/03/2020)	Rmb6.25
Radiant Opto-Electronics Corporation (6176.TW)	O (12/01/2020)	NT\$116.00
TCL Corp. (000100.SZ)	E (06/11/2019)	Rmb7.82
Tianma Microelectronics (000050.SZ)	U (01/24/2018)	Rmb15.06
Visionox Technology Inc (002387.SZ)	E (02/18/2020)	Rmb10.57
Wuhu Token Science Co. Ltd. (300088.SZ)	E (12/01/2020)	Rmb8.72

#### Howard Kao

Acer Inc. (2353.TW)	U (02/01/2018)	NT\$24.90
Asustek Computer Inc. (2357.TW)	E (07/20/2016)	NT\$283.50
Compal Electronics (2324.TW)	U (12/18/2019)	NT\$21.80
Flexium (6269.TW)	E (04/27/2018)	NT\$122.50
Inspur Electronic Information (000977.SZ)	E (02/12/2019)	Rmb30.17
Kinsus Interconnect Tech. (3189.TW)	O (02/06/2020)	NT\$88.70
Legend Holdings Corp (3396.HK)	E (03/29/2018)	HK\$11.50
Lenovo (0992.HK)	E (07/26/2018)	HK\$7.39
Pegatron Corporation (4938.TW)	E (01/05/2021)	NT\$67.30
Quanta Computer Inc. (2382.TW)	O (04/20/2011)	NT\$84.90
Shengyi Technology Co Ltd. (600183.SS)	O (07/22/2020)	Rmb29.24
Shennan Circuits Co Ltd (002916.SZ)	O (07/22/2020)	Rmb133.06
Tripod Technology (3044.TW)	E (08/11/2020)	NT\$124.50
Wistron Corporation (3231.TW)	E (07/26/2018)	NT\$31.00
Wiwynn Corp (6669.TW)	O (08/01/2019)	NT\$707.00
Yageo Corp. (2327.TW)	O (10/06/2019)	NT\$592.00
Zhen Ding (4958.TW)	U (04/24/2020)	NT\$118.00

#### Ray Wu, CFA

Advantech (2395.TW)	O (08/20/2015)	NT\$352.50
AirTAC International (1590.TW)	O (07/29/2020)	NT\$1,025.00
Chroma Ate Inc. (2360.TW)	O (07/25/2019)	NT\$182.00
Ennoconn Corporation (6414.TW)	O (02/22/2018)	NT\$252.00
Hiwin Technologies Corp. (2049.TW)	O (01/30/2020)	NT\$433.00
Wuhan Jingce Electronic Group Co Ltd (300567.SZ)	E (07/03/2020)	Rmb52.04

#### Sharon Shih

Asia Vital Components Co. Ltd. (3017.TW)	E (09/28/2020)	NT\$67.00
Auras Technology Co Ltd (3324.TWO)	O (09/28/2020)	NT\$225.50
Casetek Holdings (5264.TW)	U (04/18/2018)	NT\$87.10
Catcher Technology (2474.TW)	E (09/10/2020)	NT\$208.00
Delta Electronics Inc. (2308.TW)	O (07/13/2017)	NT\$313.00
Foxconn Industrial Internet Co. Ltd. (601138.SS)	O (07/10/2019)	Rmb14.36
Foxconn Technology (2354.TW)	E (08/16/2016)	NT\$61.60
Guangzhou Shiyuan Electronic Tech Co Ltd (002841.SZ)	O (12/02/2020)	Rmb112.00
Hon Hai Precision (2317.TW)	O (02/25/2020)	NT\$107.50
LandMark Optoelectronics Corporation (3081.TWO)	O (08/26/2020)	NT\$316.00
Lingyi Itech Guangdong Co (002600.SZ)	E (09/28/2020)	Rmb12.14
Lite-On Technology (2301.TW)	E (07/31/2020)	NT\$53.80
MLS Company Limited (002745.SZ)	E (09/10/2018)	Rmb14.54
Sanan Optoelectronics (600703.SS)	U (06/17/2019)	Rmb33.01
Sunny Optical (2382.HK)	O (01/12/2021)	HK\$199.00
Sunonwealth Electric Machine Industry Co (2421.TW)	O (09/28/2020)	NT\$52.60
Tong Hsing (6271.TW)	E (03/18/2019)	NT\$195.50
Visual Photonics Epitaxy Co Ltd (2455.TW)	E (03/20/2020)	NT\$117.00

#### Yunchen Tsai



AAC Technologies Holdings (2018.HK)	U (08/28/2020)	HK\$45.50
Accelink Technologies Co. Ltd. (002281.SZ)	E (05/06/2020)	Rmb28.86
Accton Technology Corporation (2345.TW)	O (09/10/2020)	NT\$294.00
BizLink Holding Inc (3665.TW)	E (08/13/2019)	NT\$267.50
BYD Electronics (0285.HK)	U (10/27/2020)	HK\$38.75
Dahua Technology Co. Ltd. (002236.SZ)	E (11/05/2018)	Rmb23.00
Eoptolink Technology Inc Ltd (300502.SZ)	O (09/10/2020)	Rmb51.86
Everwin Precision Technology (300115.SZ)	U (04/06/2018)	Rmb31.58
Fiberhome Telecommunication Technologies (600498.SS)	E (06/20/2019)	Rmb24.50
FIT Hon Teng Ltd (6088.HK)	E (06/05/2018)	HK\$2.64
GoerTek Inc (002241.SZ)	E (01/21/2020)	Rmb41.40
HKVision Digital Technology (002415.SZ)	O (11/02/2015)	Rmb59.00
Largan Precision (3008.TW)	E (08/28/2020)	NT\$3,045.00
Luxshare Precision Industry Co., Ltd. (002475.SZ)	O (10/24/2016)	Rmb61.00
Merry Electronics Co Ltd (2439.TW)	U (01/21/2020)	NT\$147.00
Q Technology Group Co Ltd (1478.HK)	E (08/28/2020)	HK\$13.26
Shenzhen O-film Tech (002456.SZ)	E (11/11/2019)	Rmb13.65
Shenzhen Sunway Communication Co. Ltd. (300136.SZ)	E (11/17/2016)	Rmb38.21
Sunwoda Electronic Co., Ltd. (300207.SZ)	E (06/25/2015)	Rmb27.80
Xiaomi Corp (1810.HK)	E (10/27/2020)	HK\$32.05
Yangtze Optical Fibre and Cable (601869.SS)	U (06/20/2019)	Rmb26.22
Yangtze Optical Fibre and Cable (6869.HK)	E (06/20/2019)	HK\$10.38
Zhongji Innolight Co Ltd (300308.SZ)	O (09/10/2020)	Rmb57.00
ZTE Corporation (0763.HK)	O (06/20/2019)	HK\$21.50
ZTE Corporation (000063.SZ)	E (06/20/2019)	Rmb34.93

Stock Ratings are subject to change. Please see latest research for each company.

\* Historical prices are not split adjusted.

#### INDUSTRY COVERAGE: Japan Semiconductors

COMPANY (TICKER)	RATING (AS OF)	PRICE* (01/08/2021)
<b>Hiroto Segawa</b>		
Mcronics Japan (6871.T)	U (07/04/2019)	¥1,395
<b>Kazuo Yoshikawa, CFA</b>		
Advantest (6857.T)	E (12/07/2020)	¥8,430
DISCO (6146.T)	E (07/22/2015)	¥36,100
Horiba (6856.T)	U (06/09/2020)	¥6,390
HOYA (7741.T)	E (09/05/2017)	¥14,075
Nikon (7731.T)	E (07/14/2020)	¥751
Renesas Electronics (6723.T)	O (11/26/2019)	¥1,149
Rohm (6963.T)	E (12/06/2019)	¥10,610
SCREEN Holdings (7735.T)	E (04/07/2020)	¥7,950
Shimadzu (7701.T)	E (04/14/2020)	¥4,020
Tokyo Electron (8035.T)	O (07/23/2019)	¥40,680
Tokyo Seimitsu (7729.T)	E (08/11/2015)	¥5,150
Toshiba (6502.T)	++	¥3,015

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\* Historical prices are not split adjusted.

## INDUSTRY COVERAGE: Greater China Technology Semiconductors

COMPANY (TICKER)	RATING (AS OF)	PRICE* (01/11/2021)
<b>Charlie Chan</b>		
ACMResearch Inc (ACMR.O)	O (01/22/2020)	US\$102.83
Advanced Micro-Fabrication Equipment Inc (688012.SS)	U (03/20/2020)	Rmb157.94
Alchip Technologies Ltd (3661.TW)	O (11/08/2019)	NT\$828.00
ASE Technology Holding Co. Ltd. (3711.TW)	O (10/26/2020)	NT\$90.40
ASMPacific (0522.HK)	O (01/12/2021)	HK\$94.80
Chipbond Technology Corp (6147.TWO)	O (04/24/2019)	NT\$69.30
Chunghwa Precision Test Tech (6510.TWO)	U (07/14/2020)	NT\$861.00
Global Unichip Corp (3443.TW)	U (02/12/2020)	NT\$401.50
GlobalWafers Co Ltd (6488.TWO)	O (12/02/2020)	NT\$740.00
Jiangsu Changjiang Electronics Tech (600584.SS)	E (10/26/2020)	Rmb43.52
King Yuan Electronics Co Ltd (2449.TW)	U (10/26/2020)	NT\$35.95
Maxscend Microelectronics Co Ltd (300782.SZ)	U (01/11/2021)	Rmb637.00
MediaTek (2454.TW)	O (01/04/2021)	NT\$851.00
Nanya Technology Corp. (2408.TW)	O (12/03/2020)	NT\$91.20
Phison Electronics Corp (8299.TWO)	O (05/21/2019)	NT\$377.00
Silergy Corp. (6415.TW)	O (03/06/2020)	NT\$2,650.00
Silicon Motion (SIMO.O)	E (03/20/2020)	US\$47.82
SMIC (0981.HK)	E (08/18/2020)	HK\$25.30
TSMC (2330.TW)	O (09/05/2019)	NT\$584.00
UMC (2303.TW)	O (09/14/2020)	NT\$50.00
Universal Scientific Ind. (Shanghai) (601231.SS)	O (08/04/2015)	Rmb20.63
Vanguard International Semiconductor (5347.TWO)	E (09/14/2020)	NT\$118.00
Will Semiconductor Co Ltd Shanghai (603501.SS)	O (06/17/2020)	Rmb276.24
WIN Semiconductors Corp (3105.TWO)	E (01/11/2021)	NT\$394.00
<b>Daniel Yen, CFA</b>		
ASMedia Technology Inc (5269.TW)	O (01/17/2020)	NT\$1,885.00
Aspeed Technology (5274.TWO)	O (04/29/2020)	NT\$2,150.00
Egis Technology Inc (6462.TWO)	U (04/23/2020)	NT\$166.00
GigaDevice Semiconductor Beijing Inc (603986.SS)	O (04/24/2019)	Rmb204.19
Macronix International Co Ltd (2337.TW)	O (11/27/2020)	NT\$39.90
Montage Technology Co Ltd (688008.SS)	O (03/26/2020)	Rmb90.82
Novatek (3034.TW)	O (07/09/2020)	NT\$387.50
Parade Technologies Ltd (4966.TWO)	O (03/03/2019)	NT\$1,215.00
Realtek Semiconductor (2379.TW)	O (08/03/2018)	NT\$431.50
Shenzhen Goodix Technology Co Ltd (603160.SS)	U (06/16/2020)	Rmb156.49
Winbond Electronics Corp (2344.TW)	O (12/07/2020)	NT\$28.45
WPG Holdings (3702.TW)	O (07/31/2017)	NT\$43.85
<b>Ray Wu, CFA</b>		
Advanced Wireless Semiconductor Co (8086.TWO)	O (01/11/2021)	NT\$144.50
Hua Hong Semiconductor Ltd (1347.HK)	O (11/24/2020)	HK\$40.35
RichWave Technology Corp. (4968.TW)	O (01/11/2021)	NT\$475.50

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