

Asia Tech 2023

The rally continues? We think yes

- But more selectively: Hardware at bottom, weak recovery
- Semi will take longer, high inventories
- Focus on data center / hyperscale / EV



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Sector summary

- Hardware inventories are down to normal levels – or soon
- But end-demand remains weak, weak re-stocking in 2-3Q23

- Semi inventories are still increasing and need another 2-3 quarters to normalize
- Revenue growth YoY is not likely before 4Q23 or 1Q24
- But many specific situations. Inventories aren't synchronized

- Few Secular / Structural shifts will continue:
 - Cloud capex accelerated in 2022 to +25% YoY, slowing in 2023 to ~5% growth
 - AI hyperscalers applications in production at scale
 - Cloud migrations doing ok
 - EV

- Valuations are unattractive short-term

Stocks

Stocks we like

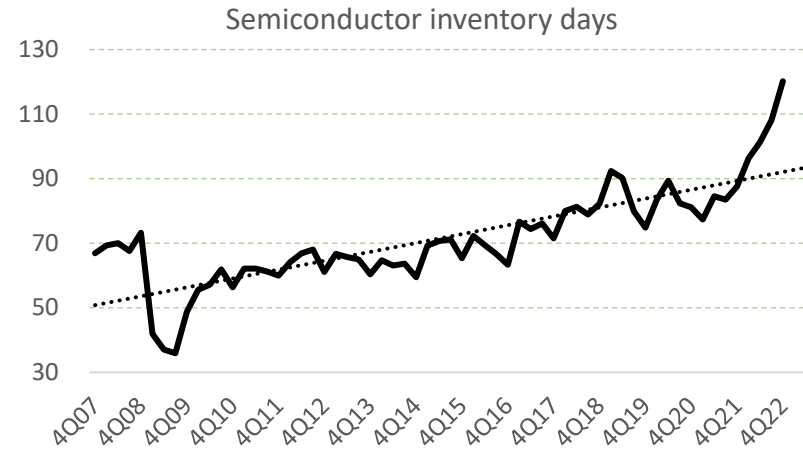
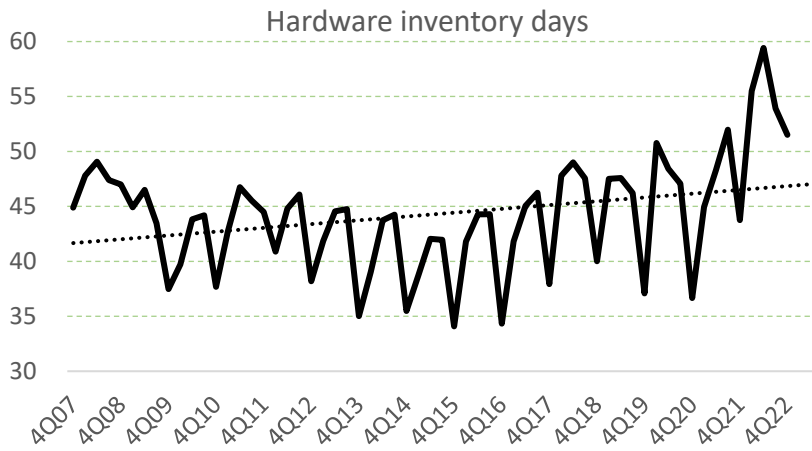
	Apples	Auto	Data Center	Foundry / OSAT	IC Design	IT service / Software	Semi Capex	Semi Materials
China	Luxshare	StarPower						
Hong Kong		BYD Elec		Hua Hong				
India						HCL Tech		
Japan							Advantest SCREEN Tokyo Electron	
Korea								
Taiwan			Accton Wiwynn	ASEH TSMC UMC	Alchip ASPEED Mediatek			Unimicron

Stocks we don't like

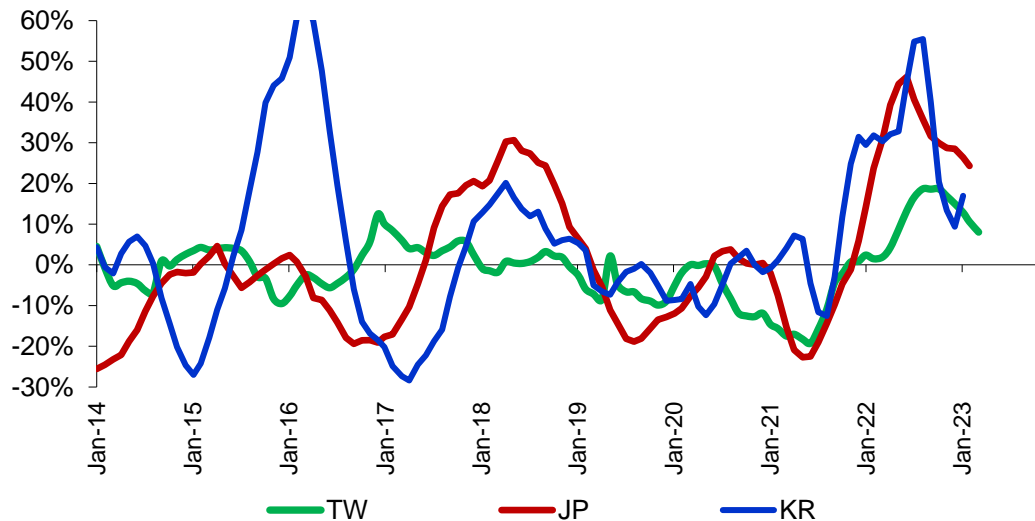
	Data Center / PC	Foundry	Panel	IC Design	Smartphone
China	Inspur		BOE	Gigadevice SGMicro	
Hong Kong		SMIC			Xiaomi
Taiwan	Acer Catcher Compal	Vanguard Win Semi	AUO		Largan

Semiconductor inventories at record high

Global big firms inventory days - 4Q22



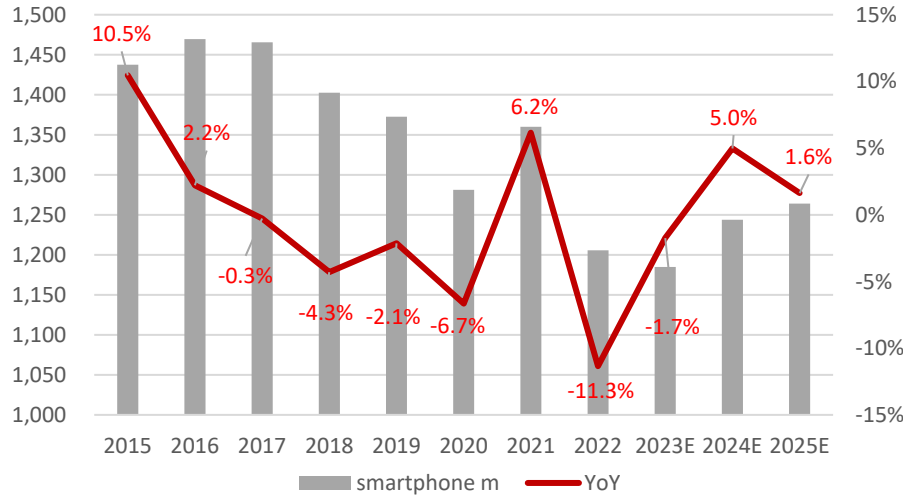
Japan Korea Taiwan IC inventory – Mar-23



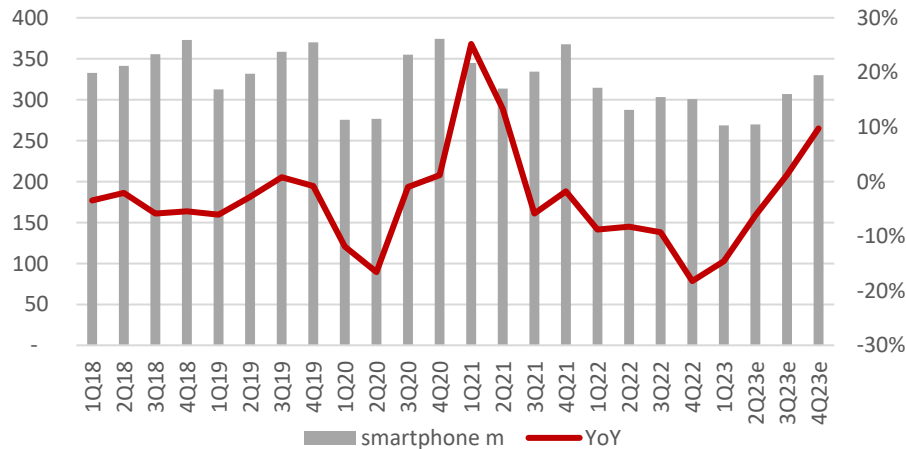
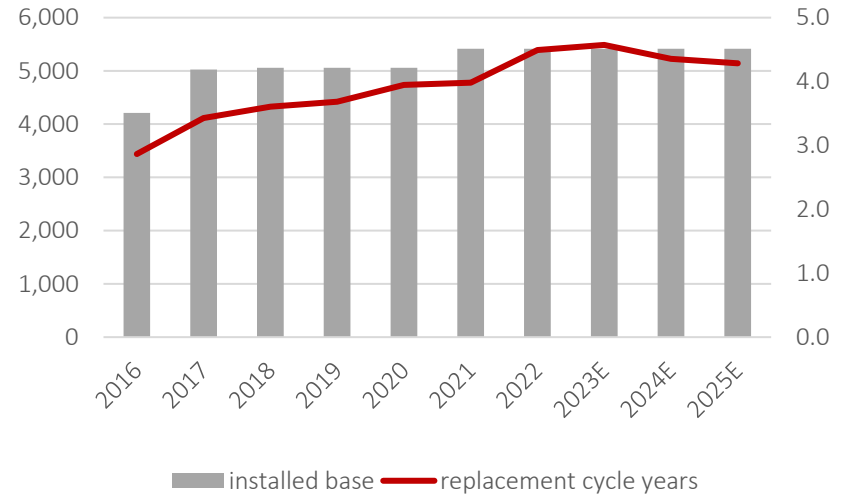
Source: Company data, Macquarie Research, April 2023

Smartphones

The Smartphone category is ex-growth
No upgrades except the end of 5G



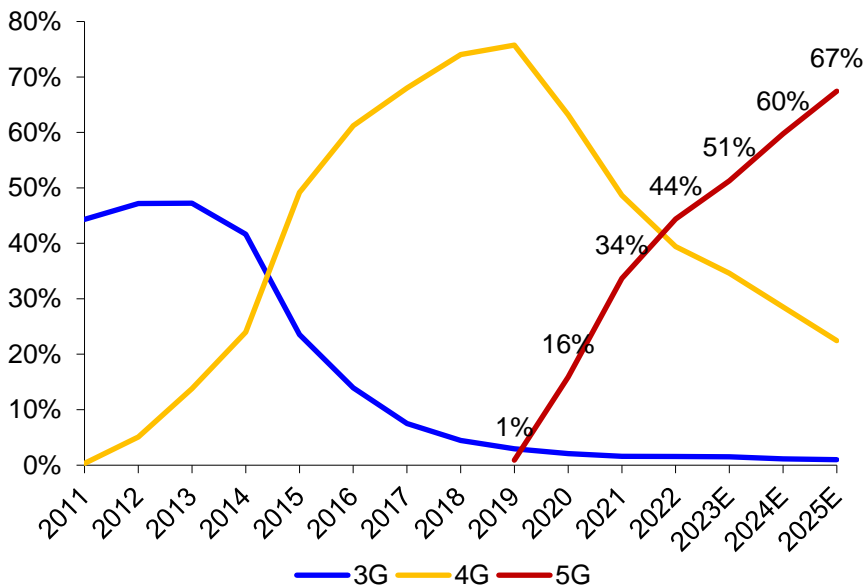
Due to extending replacement cycle.
We've seen this in all categories of consumer electronics



MTK & QCOM expect 2023
smartphone -8% -10% YoY to 1.1bn

Smartphones SoC value can still increase

The last 3 years of 5G upgrade cycle

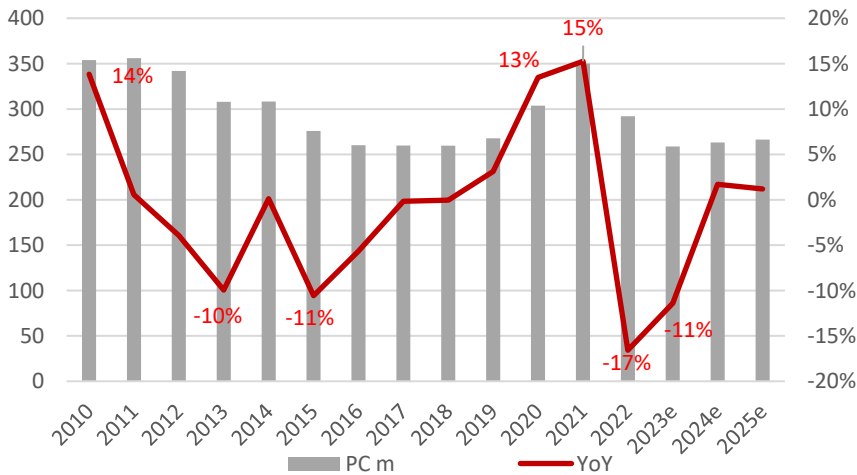


Smartphones SoC value is stable

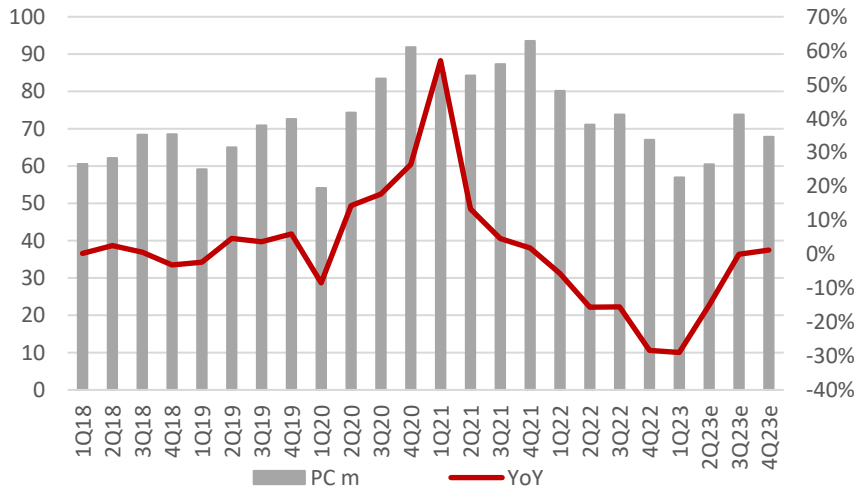
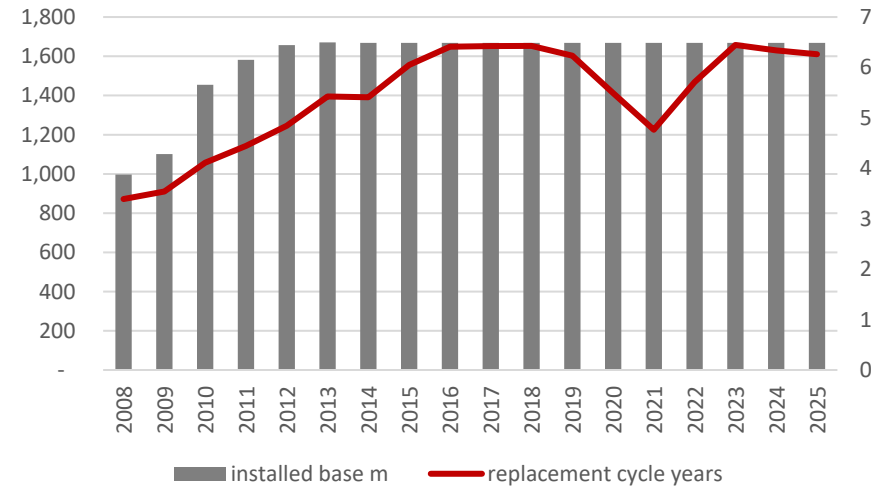
	2019	2020	2021	2022	2023E	2024E	2025E
smartphone m							
3G	48	30	24	21	0	0	0
4G	1,308	998	780	547	477	402	316
5G	16	255	557	638	707	842	948
sum	1,372	1,283	1,361	1,206	1,185	1,244	1,264
SoC ASP US\$							
3G	3.0	3.0	3.0	3.0	3.0	3.0	3.0
4G	15.0	14.0	13.0	13.0	12.5	12.0	11.5
5G	80	75	65	60	55	52	48
SoC total value US\$ bn	21.1	33.2	46.4	45.4	44.9	48.6	49.1
YoY	2%	58%	40%	-2%	-1%	8%	1%

PC

Giving back Covid's gains



Due to extending replacement cycle. Covid is a hiccup



Infrastructure (server / switch / data center)

Server decline in 2023, but small growth in hyperscale

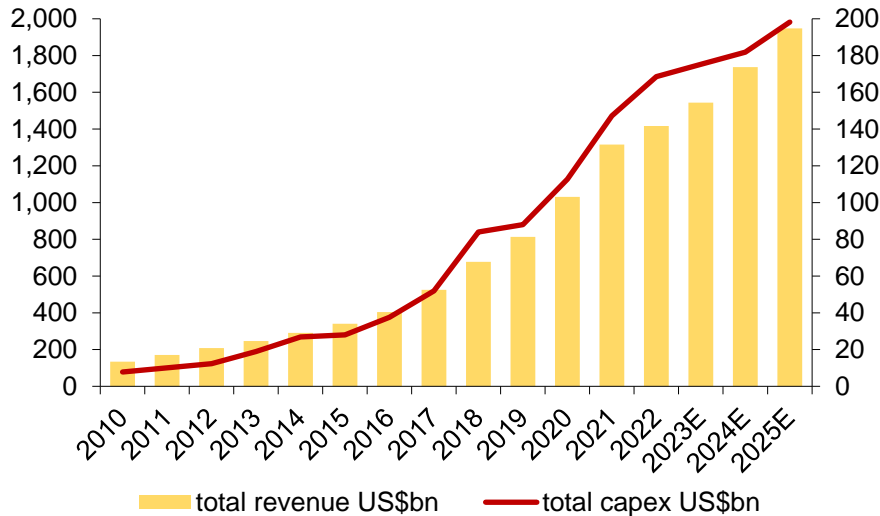
Revenue US\$ bn	2016	2017	2018	2019	2020	2021	2022	2023E	2024E	2025E
Hyperscale	10.0	14.8	21.1	21.1	26.2	27.8	34.3	36.6	43.8	52.7
YoY	19%	49%	42%	0%	24%	6%	24%	7%	20%	20%
Enterprise	48.9	53.1	67.7	66.3	66.7	70.3	83.4	72.8	74.9	77.2
YoY	5%	9%	28%	-2%	1%	5%	19%	-13%	3%	3%
Total	58.8	67.9	88.8	87.4	92.9	98.1	117.7	109.4	118.8	129.9
YoY	7%	15%	31%	-2%	6%	6%	20%	-7%	9%	9%

Switch slowdown in 2023

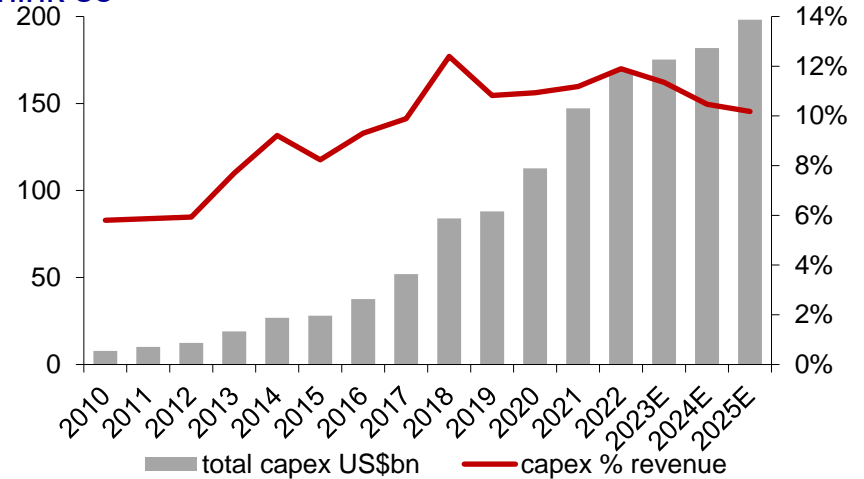
Revenue US\$ bn	2016	2017	2018	2019	2020	2021	2022	2023E	2024E	2025E
Hyperscale	10.2	11.2	12.4	12.5	12.1	13.1	16.1	17.0	19.1	21.2
YoY	18%	9%	11%	1%	-3%	9%	23%	6%	12%	11%
Enterprise	14.2	14.7	15.8	16.6	15.9	17.6	20.4	20.5	20.9	21.6
YoY	-6%	3%	8%	5%	-4%	11%	16%	1%	2%	3%
Total	24.4	25.8	28.2	29.1	28.0	30.7	36.5	37.6	40.0	42.7
YoY	2%	6%	9%	3%	-4%	10%	19%	3%	7%	7%

Cloud Infrastructure (server / data center)

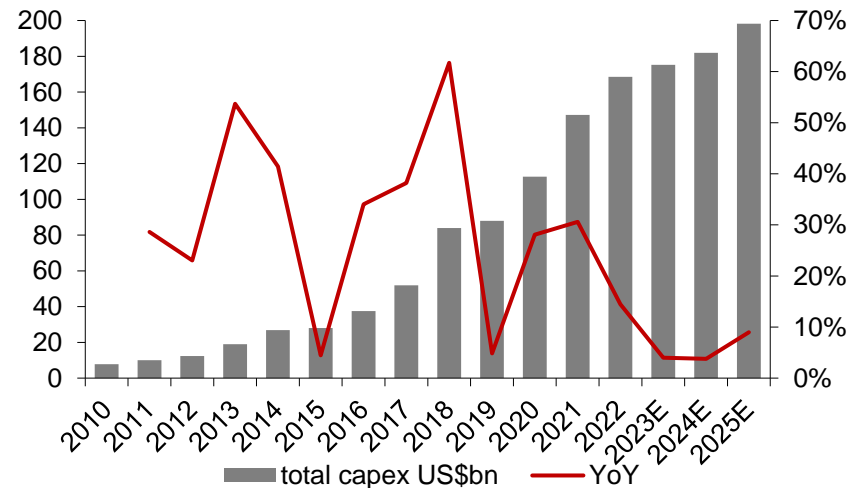
Hyperscalers: no revenue growth without capex



Consensus forecasts that Capex intensity will decline.
We don't think so



But Capex growth is volatile



Source: **sum of top-10 Alibaba, Baidu, Meituan, PinDuoDuo, Tencent and Amazon, Facebook, Google, Microsoft, Salesforce**
Bloomberg consensus, Macquarie Research, April 2023

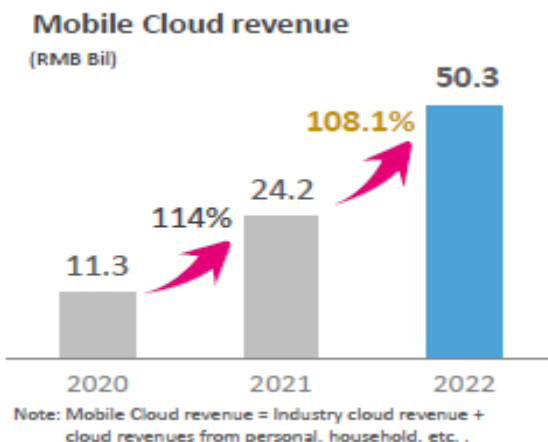
Cloud Infrastructure (server / data center)

China's Cloud shifting to Telcos

ex: China Mobile

and

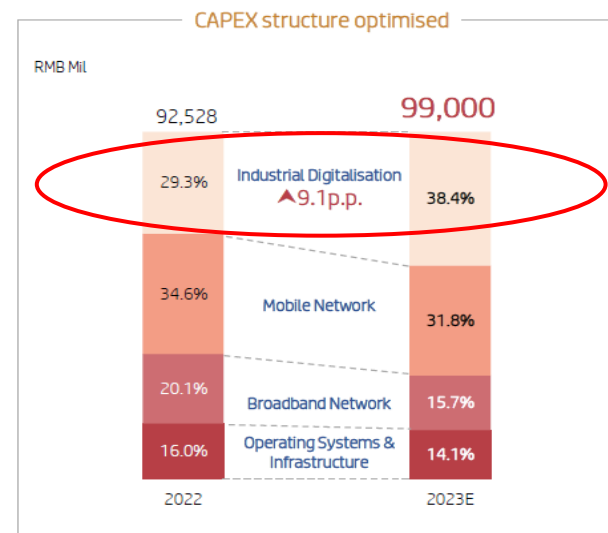
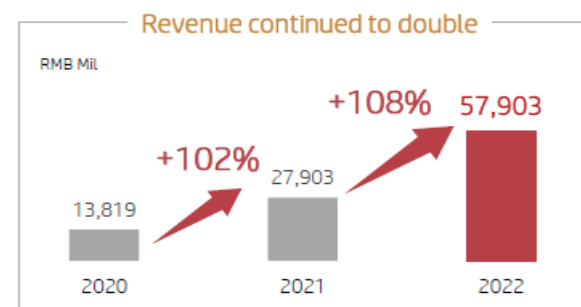
China Telecom



Major areas of CAPEX

(RMB Bil)	FY2022 (Actual)	FY2023 (Planned)
Connectivity	117.1	102.9
Of which: 5G-related	96.0	83.0
Computing force	33.5	45.2
Capabilities	13.4	14.1
Basic	21.2	21.0

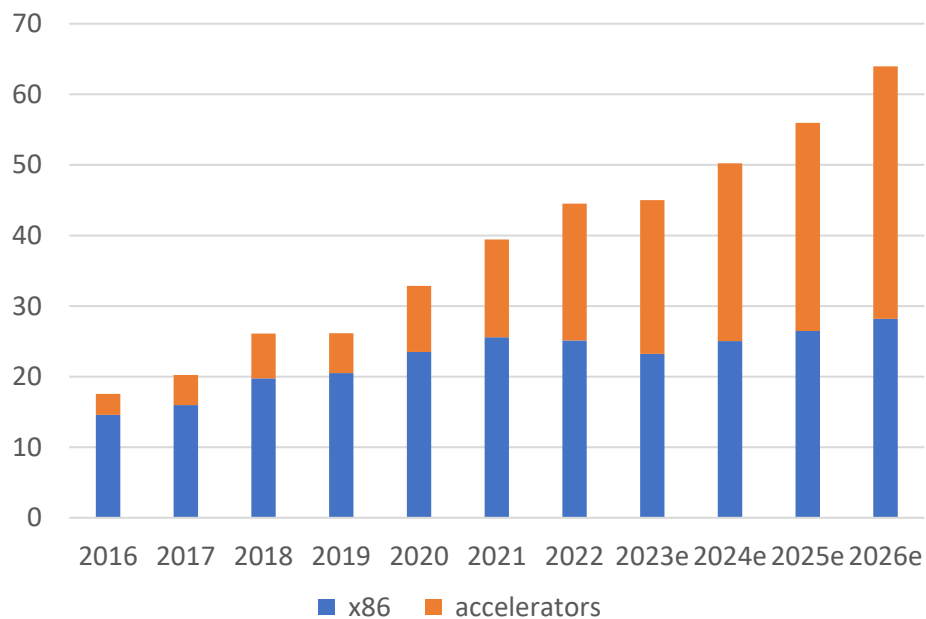
China Telecom Cloud Revenue Doubling



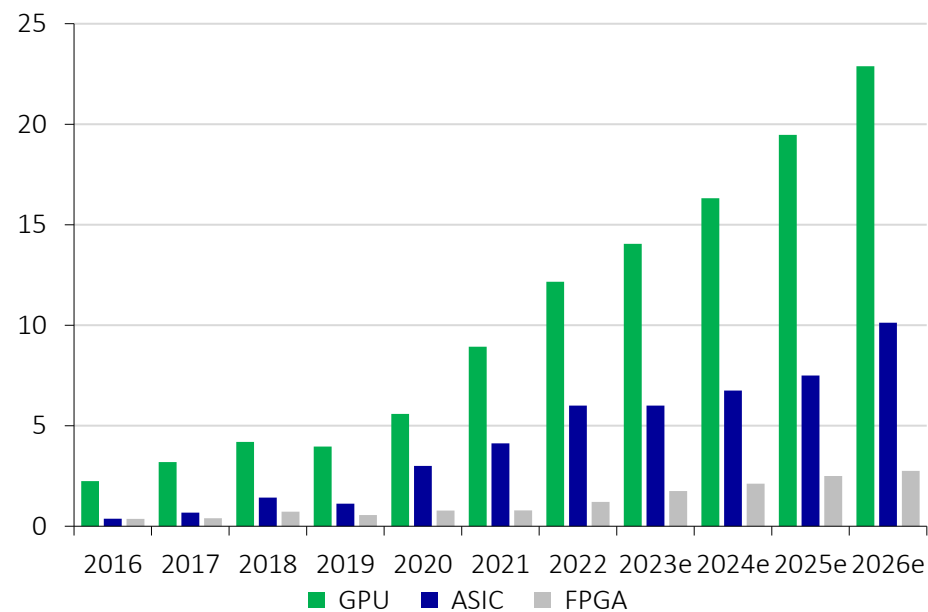
Source: Company data, Macquarie Research, April 2023

Computing silicon (server / data center)

Value of datacenter computing silicon US\$ bn

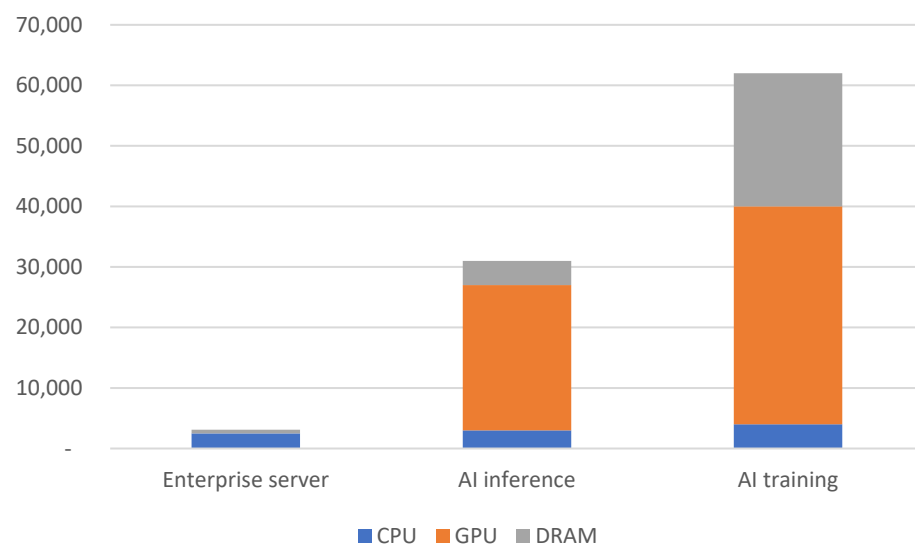


Breakdown of Accelerators US\$ bn



AI silicon

And the winners are... Accelerators / GPU and DRAM
Silicon cost in a server US\$

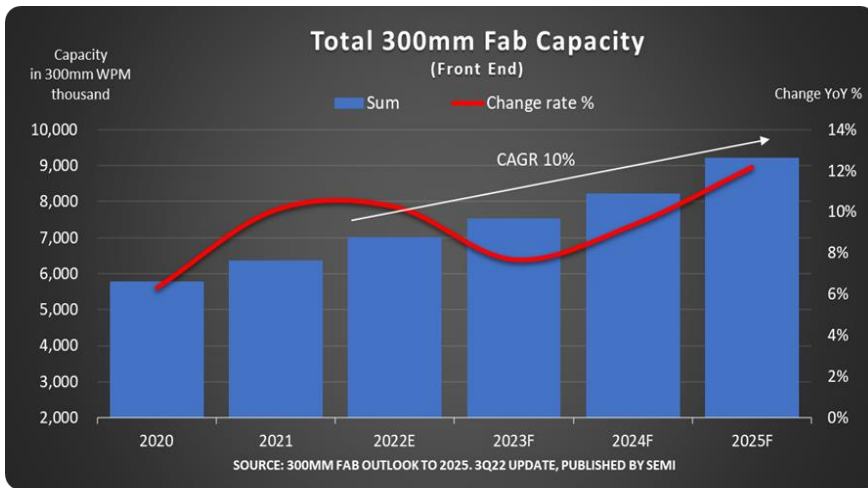


Revenue exposure

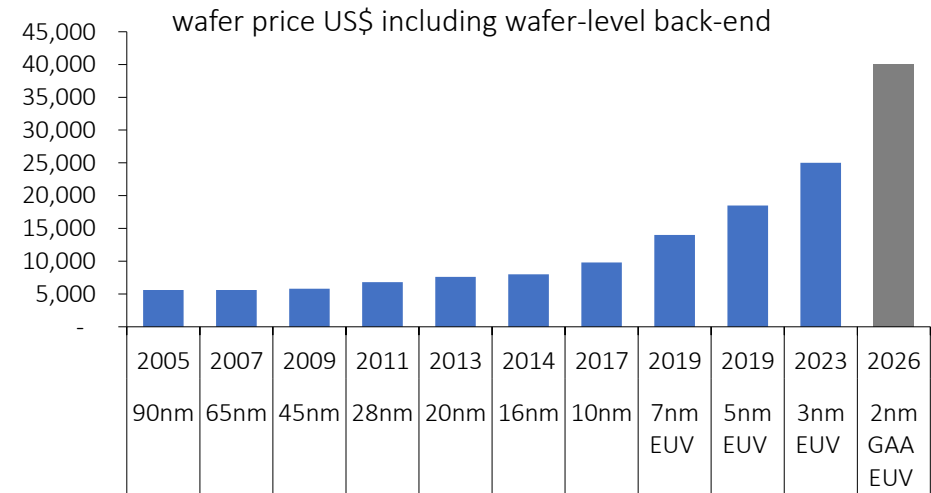
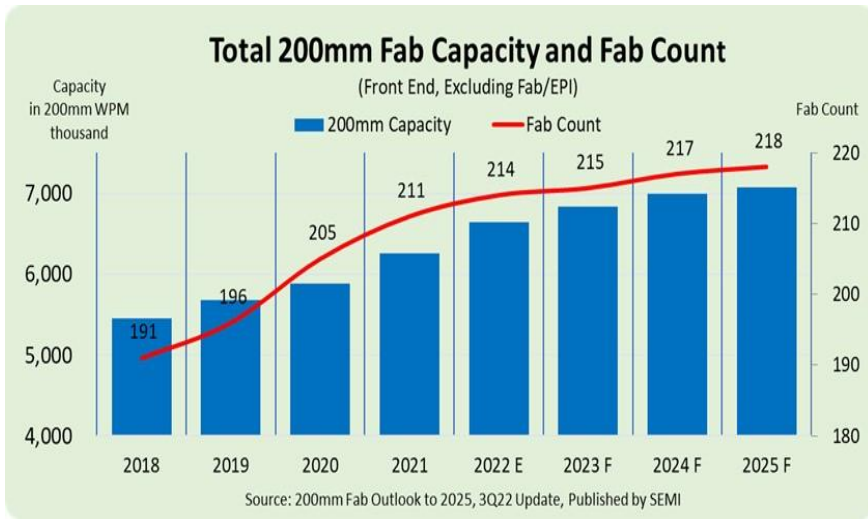
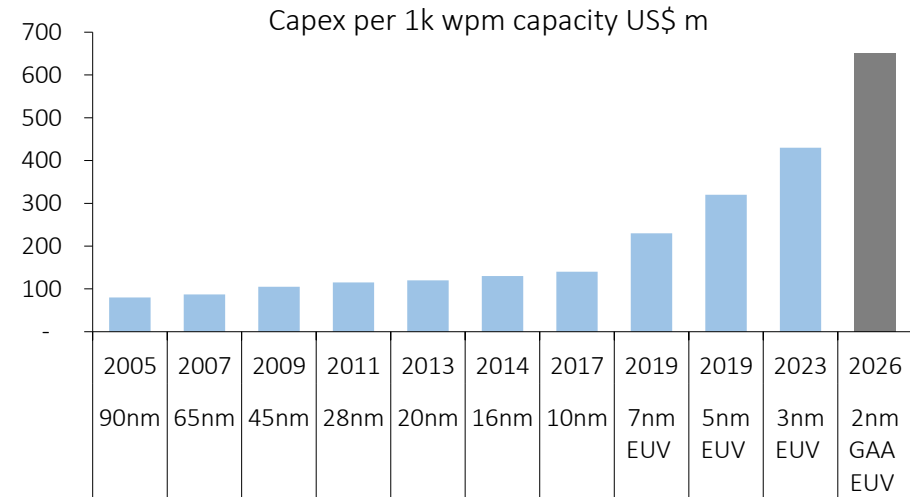
	% Infrastructure	% hyperscale	% AI
Alchip	75%	70%	60%
Aspeed	95%	75%	15%
GUC	35%	25%	15%
Samsung DRAM	30%	15%	3%
SK Hynix DRAM	35%	20%	4.5%
TSMC	30%	20%	13%
Wiwynn	100%	100%	25%

Semi capacity just enough (not the same as demand declining)

Capacity additions are just ok

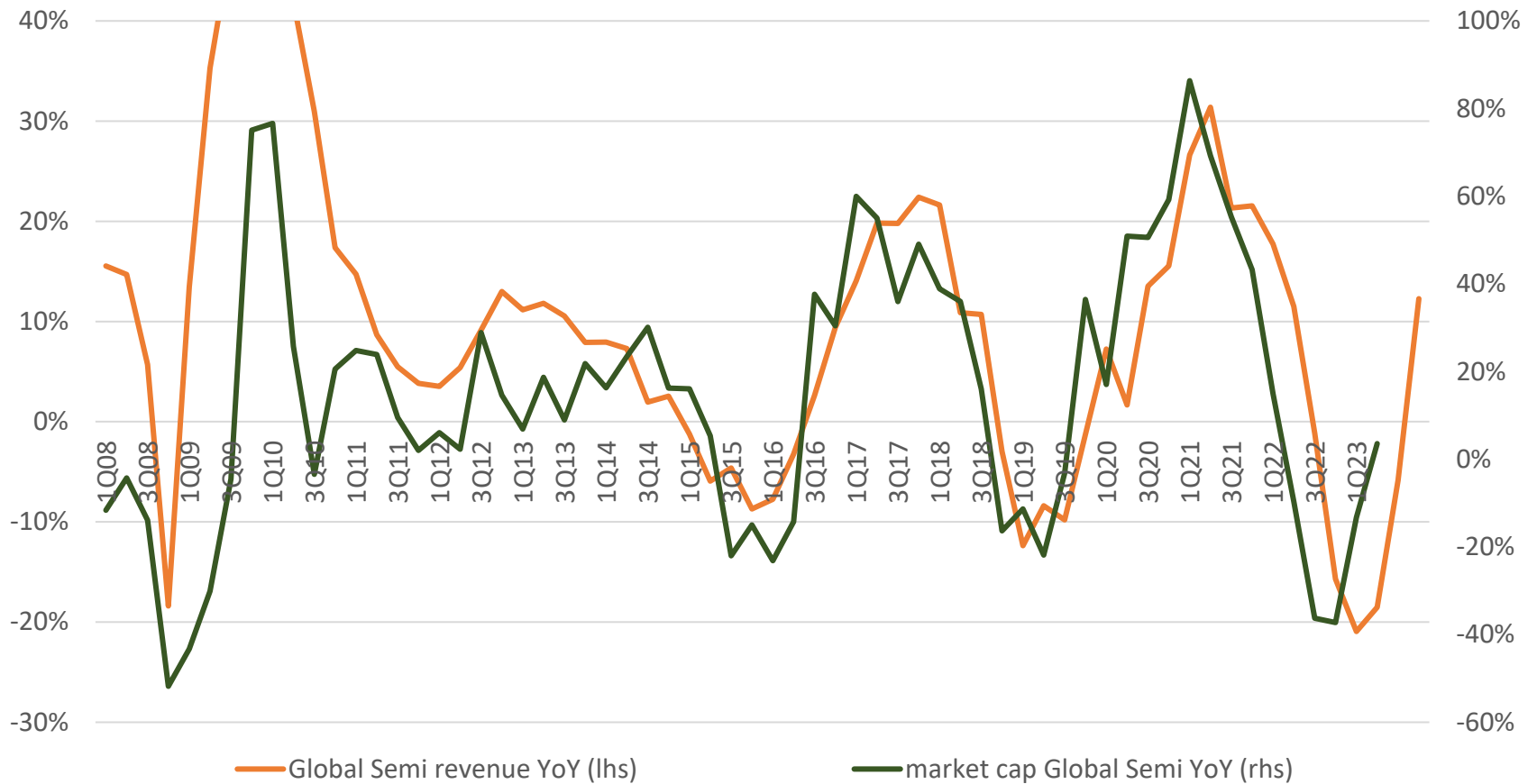


Capex & wafer price will keep increasing



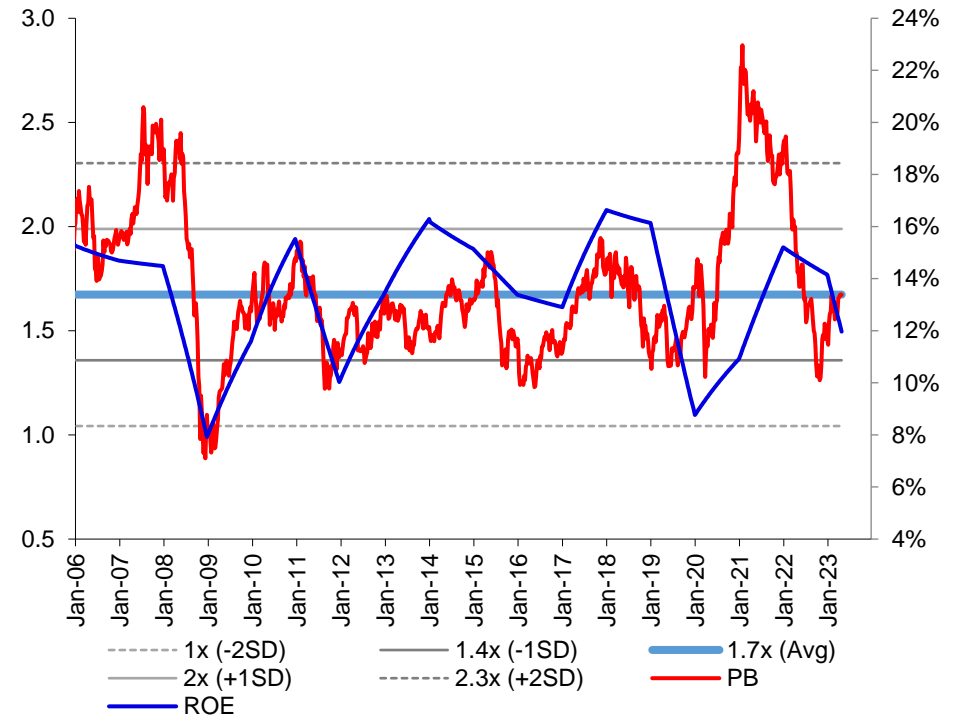
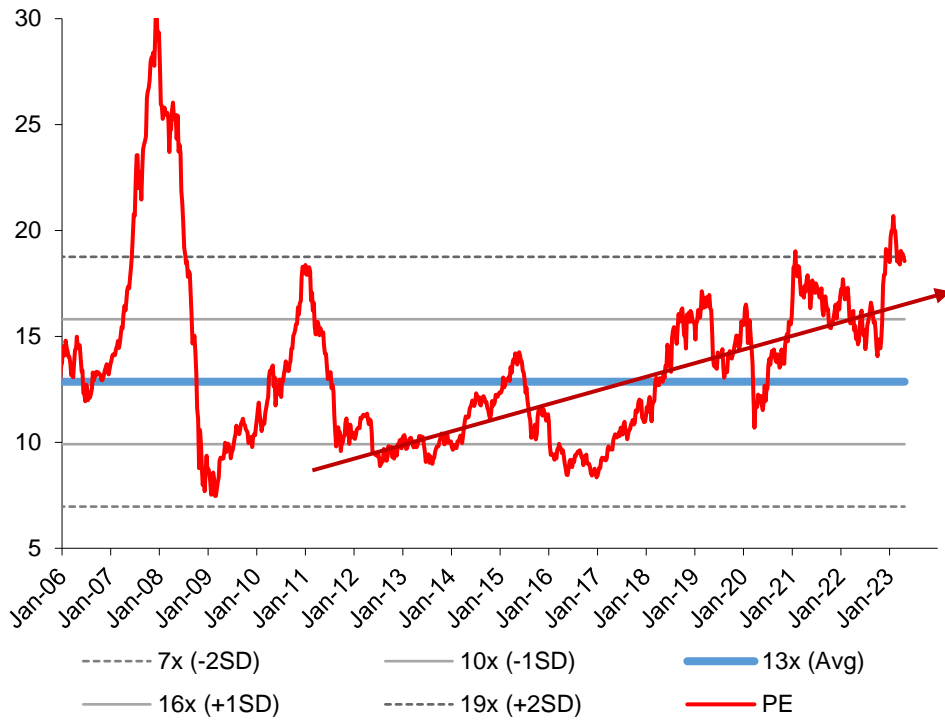
What next after the rebound?

Market Cap correlation with inventories don't work consistently.
 Correlation with revenues is the best fit
 Max revenue decline in 1Q23 or 2Q23 – does it matter?



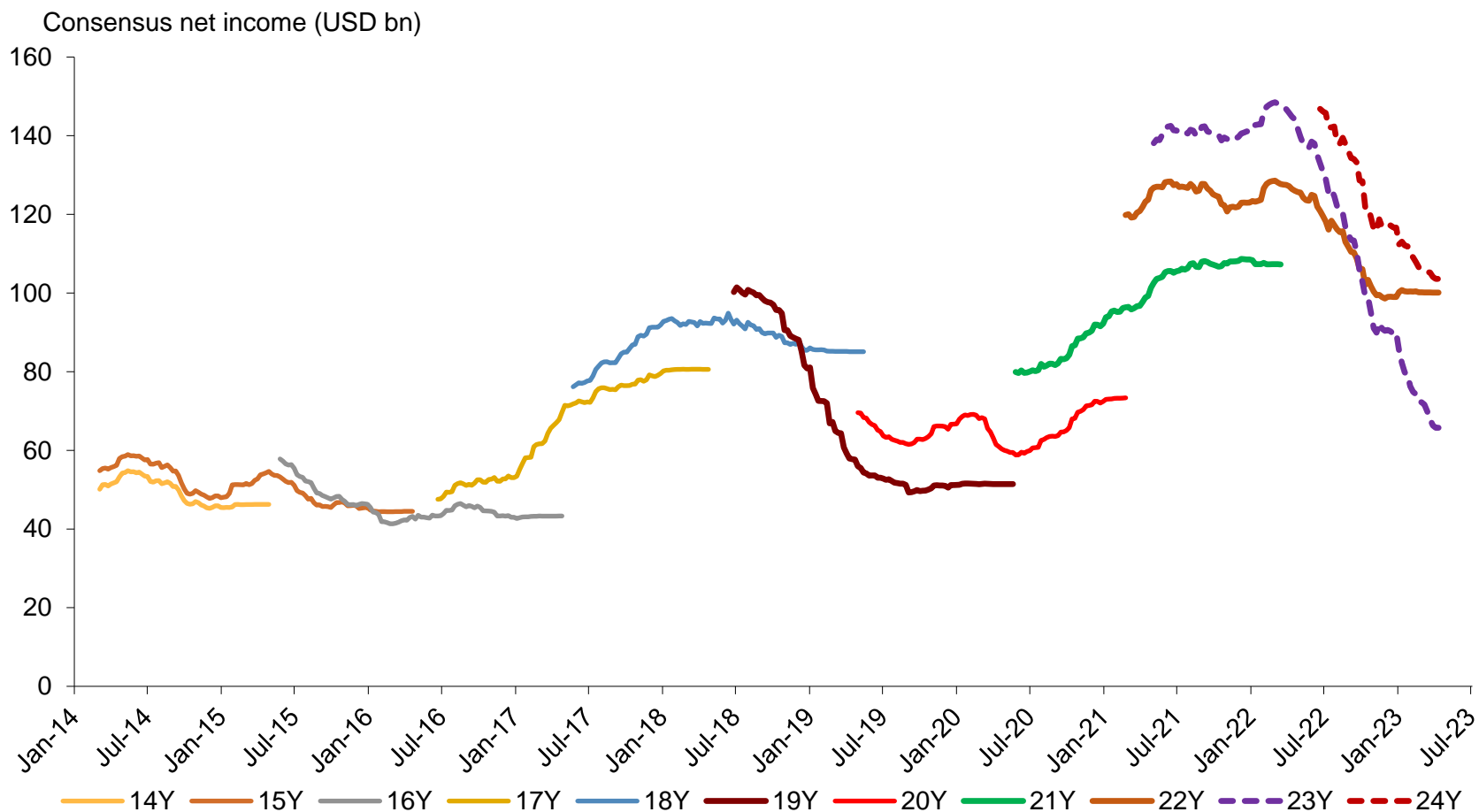
Valuations not low (Asia ex Big Caps)

Re-rating is obvious but that does not make valuations attractive



Consensus revisions Asia ex Japan

April 2023 consensus forecasts: 2023e net income declining -34% YoY, 2024e +58% YoY



Important Disclosures:

Recommendation definitions

Macquarie – Asia and USA

Outperform – expected return >10%
 Neutral – expected return from -10% to +10%
 Underperform – expected return <-10%

Macquarie – Australia/New Zealand

Outperform – expected return >10%
 Neutral – expected return from 0% to 10%
 Underperform – expected return <0%

Note: expected return is reflective of a Medium Volatility stock and should be assumed to adjust proportionately with volatility risk

Volatility index definition*

This is calculated from the volatility of historic price movements.

Very high–highest risk – Stock should be expected to move up or down 60-100% in a year – investors should be aware this stock is highly speculative.

High – stock should be expected to move up or down at least 40-60% in a year – investors should be aware this stock could be speculative.

Medium – stock should be expected to move up or down at least 30-40% in a year.

Low–medium – stock should be expected to move up or down at least 25-30% in a year.

Low – stock should be expected to move up or down at least 15-25% in a year.

* Applicable to select stocks in Asia/Australia/NZ

Recommendation – 12 months

Note: Quant recommendations may differ from Fundamental Analyst recommendations

Financial definitions

All "Adjusted" data items have had the following adjustments made:

Added back: goodwill amortisation, provision for catastrophe reserves, IFRS derivatives & hedging, IFRS impairments & IFRS interest expense

Excluded: non recurring items, asset revals, property revals, appraisal value uplift, preference dividends & minority interests

EPS = adjusted net profit /efpowa*

ROA = adjusted ebit / average total assets

ROA Banks/Insurance = adjusted net profit /average total assets

ROE = adjusted net profit / average shareholders funds

Gross cashflow = adjusted net profit + depreciation

*equivalent fully paid ordinary weighted average number of shares

All Reported numbers for Australian/NZ listed stocks are modelled under IFRS (International Financial Reporting Standards).

Recommendation proportions – For quarter ending 31 March 2023

	AU/NZ	Asia	USA	
Outperform	56.13%	64.77%	64.49%	(for global coverage by Macquarie, 2.51% of stocks followed are investment banking clients)
Neutral	37.74%	23.98%	32.71%	(for global coverage by Macquarie, 1.83% of stocks followed are investment banking clients)
Underperform	6.13%	11.26%	2.80%	(for global coverage by Macquarie, 0.00% of stocks followed are investment banking clients)

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