Executive Summary of the Supply-Chain Report

BI Computer Hardware & Storage, Global Dashboard


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Untangling US-China Technology Supply Chain Hard, Not Impossible

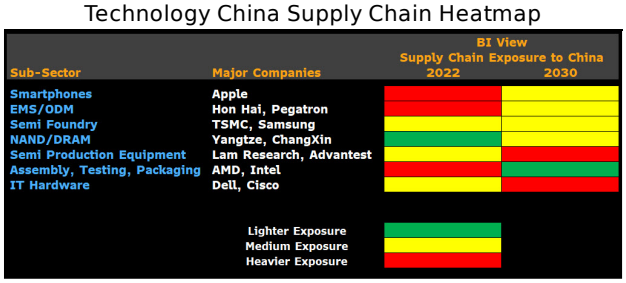
(Bloomberg Intelligence) -- Reducing exposure to China's dominance in the technology supply chain built over decades will face significant challenges, but our analysis indicates that dependence could be reduced by 20-40% in most cases by 2030. While geopolitical tensions as well as government and company policies are spurring nascent moves to diversify geographically, it will take years of investment to significantly untangle from China's complex, efficient and skilled supply chain from semiconductors to hardware to assembly. (09/28/22)

1. Chinese Exposure Trends Mixed for Hardware Sub-Sectors

Contributing Analysts Andrew Girard (Technology)

The exhibit below represents a summary of Bloomberg Intelligence's view on the direction of Chinese exposure across leading hardware sub-sectors and their bellwether companies. (09/28/22)

Technology China Supply Chain Heatmap



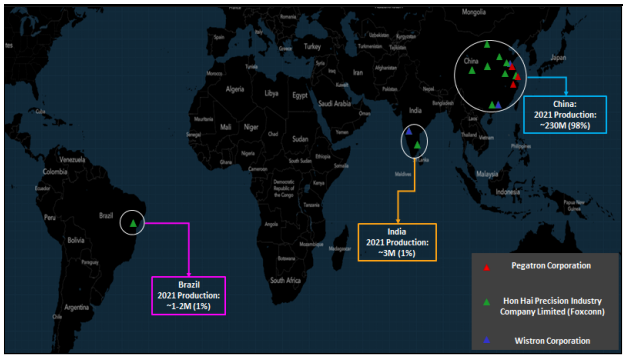
Source: Bloomberg Intelligence

2. Apple's Massive China Exposure Likely to Remain Elevated

Meaningfully decoupling from China will be tough for Apple's $200 billion-plus iPhone business because of an almost total reliance on its manufactured chips, components and assembly. About 98% of iPhones are assembled in China due to the region's expertise in smartphone manufacturing and an extensive supply chain built over 20 years. Even though the world's largest tech company may desire to diversify its manufacturing, our base-case scenario is that it could move 10% of production capacity out of China by 2030, with our aggressive-case scenario being 20%.

With China accounting for 70% of global smartphone manufacturing and its leading vendors for almost half of global shipments, the region has a well-developed supply chain that will be tough to replicate -- and one Apple could lose access to if it moves. (09/28/22)

Apple Regional Manufacturing Exposure



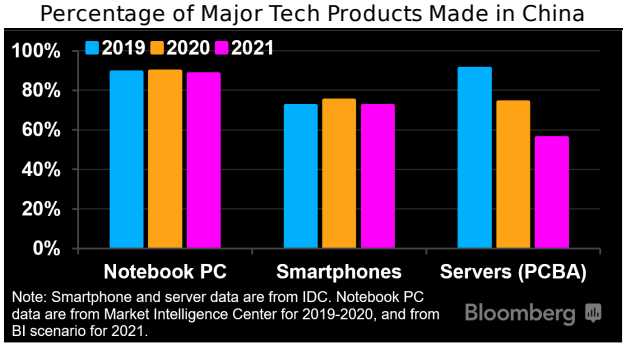
Source: MAP<GO>, Company Data, Apple Supply Report, Bloomberg Estimates

3. EMS Sector's China Reliance May Drop to 40% From 70%

Capacity exposure in China for original equipment manufacturers (OEMs) and electronics manufacturing services (EMS) could potentially drop to 35%-40% by 2030 from 70% should Apple, which accounted for 45%-47% of the sector's revenue in 2021, seek to diversify production. Incidents in China have brought unprecedented supply-chain challenges, including pandemic-driven lockdowns, unexpected power curbs and cross-strait tensions. More companies have embraced the concept of "China Plus One" -- keeping China as the main production base but diversifying capacity elsewhere.

India and Vietnam have benefited materially from diversification, and other ASEAN countries like Malaysia, Thailand and Indonesia are seeing more investment. Mexico is a popular location, but it's mainly for servers and automotive customers in North America. (09/28/22)

Percentage of Major Tech Products Made in China



Source: IDC, Market Intelligence Center, Bloomberg Intelligence

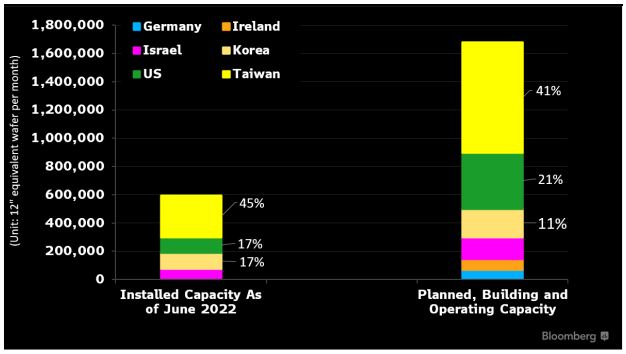
4. Apple, AMD's Taiwan Chip Exposure to Exceed 40% by 2030

Contributing Analysts Charles Shum (Technology)

Apple, AMD and other chipmakers that don't own foundries may only be able to reduce their exposure to China and Taiwan to about 40% by 2030, according to our calculations. Taiwan will still hold the largest share of advanced-node semiconductor manufacturing capacity while China dominates the mature-node capacity. Apple now depends 100% on Taiwan's TSMC to make its custom processors.

The US could take a lead in capacity expansion with a jump of 2.6x over the next eight years. Taiwan will follow with a 1.6x jump as the nation's foundries -- led by TSMC -- aggressively expand in their home market. South Korea, Japan, Malaysia and Singapore may be the preferred regions for TSMC, UMC and other foundries to diversify supply-chain footprints outside China and Taiwan over the next 10 years. (09/28/22)

Leading-Edge Node Capacity (10 nm or less)



Source: SEMI, Bloomberg Intelligence

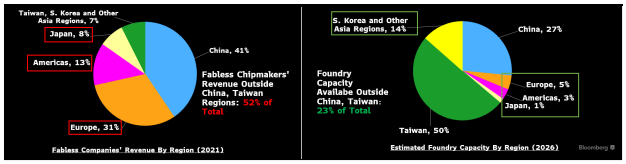
5. Taiwan Will Still Be Largest Chip Manufacturing Hub in 2030

Contributing Analysts Charles Shum (Technology)

Hurdles to moving manufacturing capacity of advanced chips outside Asia include the high requirements for utilities infrastructure, slow deliveries of extreme ultraviolet lithography systems and the lack of local supply-chain support from photomasks and wafer materials to experienced engineers. The mismatch of downstream market demand is also a key issue. PCs and handsets, the two largest end-markets for chips, are still largely produced in China and Southeast Asia.

Apple and other fabless chipmakers, instead of governments, may have to consider offering more incentives to push a faster capacity expansion outside Asia. In addition to direct financial subsidies and partial shareholdings, multiple-year supply agreements are good measures for companies to consider. (09/28/22)

Mismatch Between Chip Sales and Capacity



Source: IDC, Bloomberg Intelligence

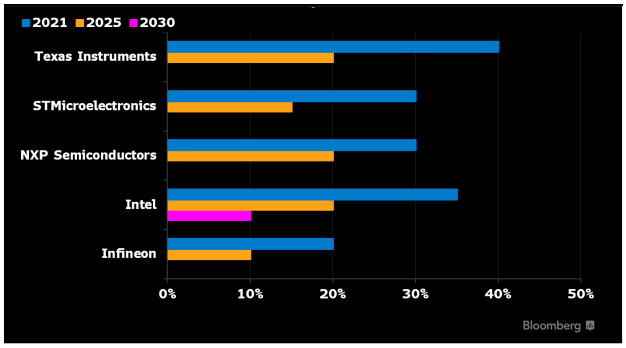
6. Semi Assembling and Testing Could Be Quickest to Exit China

Contributing Analysts Paula Penkal (Technology)

The assembly, test and packaging, or ATP, could shift from China within two to three years -- and move at a much-faster rate than manufacturing. The lower value-added and standardized processes make it easier for foundries to change service providers than to relocate wafer fabrication. ATP for older technologies could move out even faster. China has 38% of the world's assembly, test and packaging market share, with Southeast Asia at roughly 81%.

The US's $52.7 billion CHIPS Act allocates only $2 billion to ATP expansion -- not nearly enough to build one stand-alone packaging facility for advanced nodes, which cost $7-$10 billion. Because European integrated device manufacturers make mostly analog chips built on mature nodes, moving ATP operations out of China may be easier than expected given the lower complexity. (09/28/22)

Test and Packaging Scenario: 2030 China Exposure



Source: Bloomberg Intelligence

7. Hardware's China Exposure to Shrinks With Reliance High

The modular nature of enterprise hardware -- server, storage and networking equipment -- could allow greater regionalization of hardware assembly. Chinese manufacturing exposure for US hardware vendors is below 50% of their shipment volumes. Exposure could shrink to 20-30% by 2030 with an effort by hardware and electronics manufacturers to move more to their regional customers. Except for HP Enterprise, which has its H3C joint venture in China, most US vendors have a diversified regional footprint, including Cisco and Dell. In the case of Arista and Ciena, their presence is contained to North America and Southeast Asia.

This doesn't diminish the hardware group's reliance on China since it will be tough to find alternative suppliers outside the region for roughly 10%-plus of the components and sub-components. (09/28/22)

Hardware's China Manufacturing Exposure

	U.S.	China	Mexico	Taiwan	India	Europe	South America	South East Asia
Servers / Storage								
Dell	✓	✓	✓	✓	✓	✓	✓	✓
HP Enterprise	✓	✓	✓			✓	✓	✓
NetApp	✓	✓	✓	✓		✓		✓
Networking								
Cisco	✓	✓	✓	✓	✓	✓	✓	✓
Arista Networks	✓		✓					✓
Juniper Networks		✓	✓	✓				✓
HP Enterprise		✓						✓
Dell		✓	✓	✓		✓		✓
Ciena	✓		✓					✓
F5		✓	✓					

Bloomberg

Source: Bloomberg Intelligence

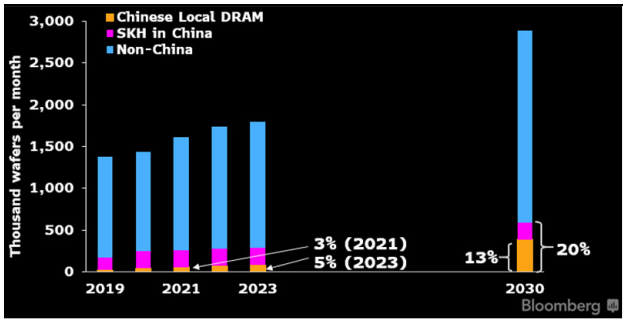
8. China DRAM, NAND Capacity Could More Than Triple by 2030

Contributing Analysts Masahiro Wakasugi (Technology)

China's share of some chips will likely increase. China's share of DRAM production capacity could grow to 13% in 2030 from 3% in 2021, based on our analysis, and its NAND share to 22% by 2030 from 5% in 2021. These increases will depend on Chinese makers being able to procure stable supplies of advanced manufacturing equipment and raw materials. DRAM, which uses cutting-edge technology, is likely to be more affected by US regulations on Chinese makers than NAND. Dutch regulations prevent Chinese makers from procuring extreme ultraviolet lithography tools.

Semiconductor production equipment sales to local Chinese chipmakers may grow to about 27% of the market in 2030 from 12% in 2021. SMIC and other chipmakers may be unable to procure tools to produce the most advanced chips and instead focus on mature-node chips. (09/28/22)

DRAM Production by Region



Source: SEMI, IDC, Gartner, Bloomberg Intelligence

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