Robert Maire
President
Semiconductor Advisors LLC

China Chips
Trade, Taiwan & Technology

Topics

- China Investments & Aspirations in the Semiconductor Industry
- Regulatory issues - CFIUS
- Current administration policy & direction
- Taiwan – TSMC and the semiconductor industry
- Trade secrets, espionage, IP protection
- The “Double Edge Sword”

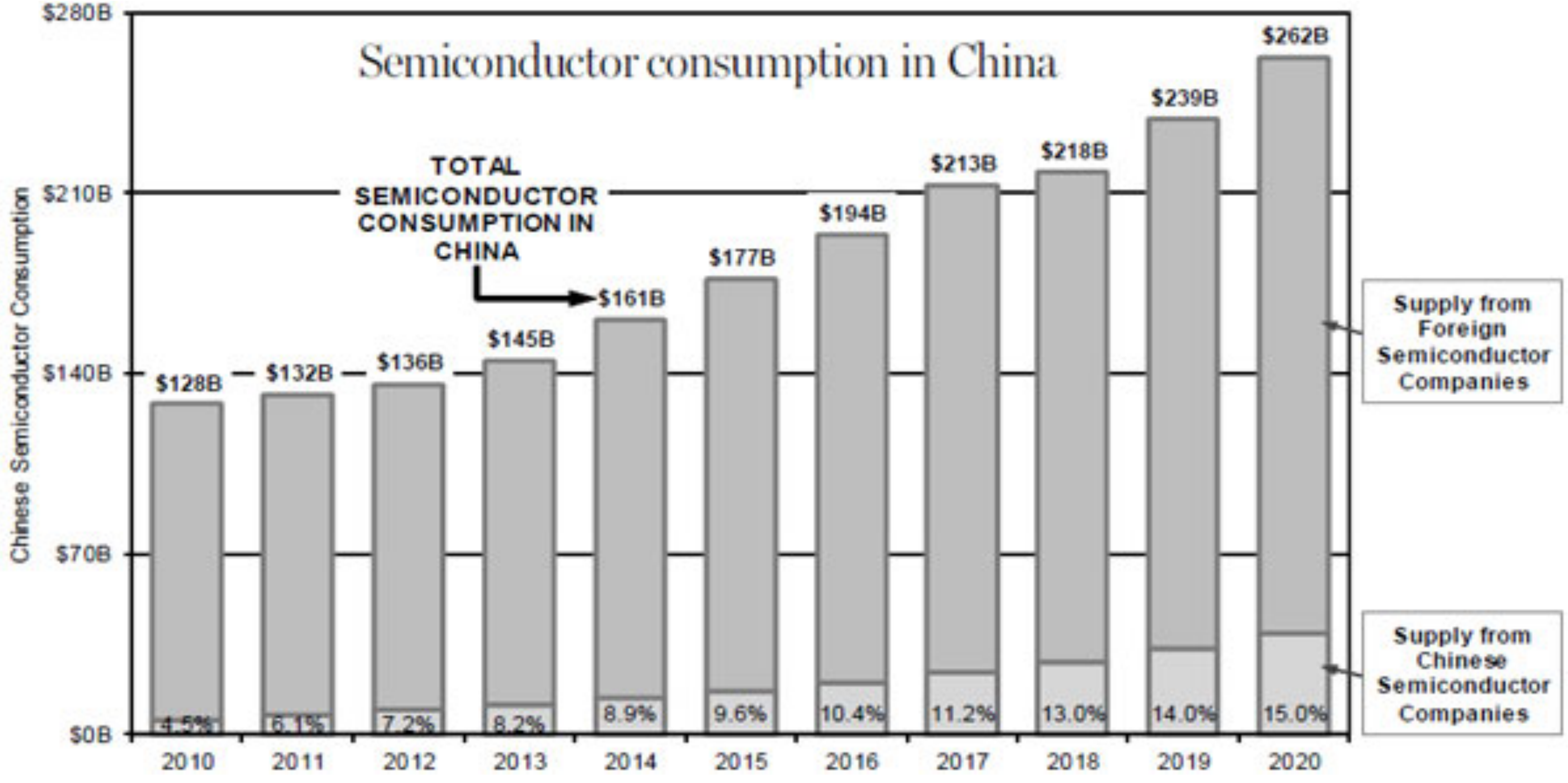
In the news

- Broadcom acquisition of Qualcomm - Blocked
- Chinese handset maker ZTE banned from buying US semiconductors
- Lattice acquisition by Canyon Bridge – Blocked
- Xcerra acquisition by Hubei Xinyan – Blocked
- Aixtron (A German company) acquisition by Grand Chip – Blocked
- Foxconn tried to buy Toshiba’s Chip business
- Barrons – “Chips Loom as a Target if China Trade Dispute Expands”
- Semiwatch – US Semi equipment sales to China blocked (April fools or not)

China's Aspirations

- China consumes more than 60% of chips yet produces less than 15%
- One fund of $21B – Total funds of over $100B
  - National Integrated Circuitry Investment Fund
- Goal- To supply the majority of Chips consumed by Chinese Electronics
- To become independent of the US and other countries
  - Concerns about US leverage over China Chips has skyrocketed
  - President Xi has directly addressed the issue
- To be the leader in AI, VR & 5G etc; Semiconductors are crucial ingredient
- To increase & dominate intelligence & defense technology
  - Largest video surveillance system in the world

China's Chip Challenge



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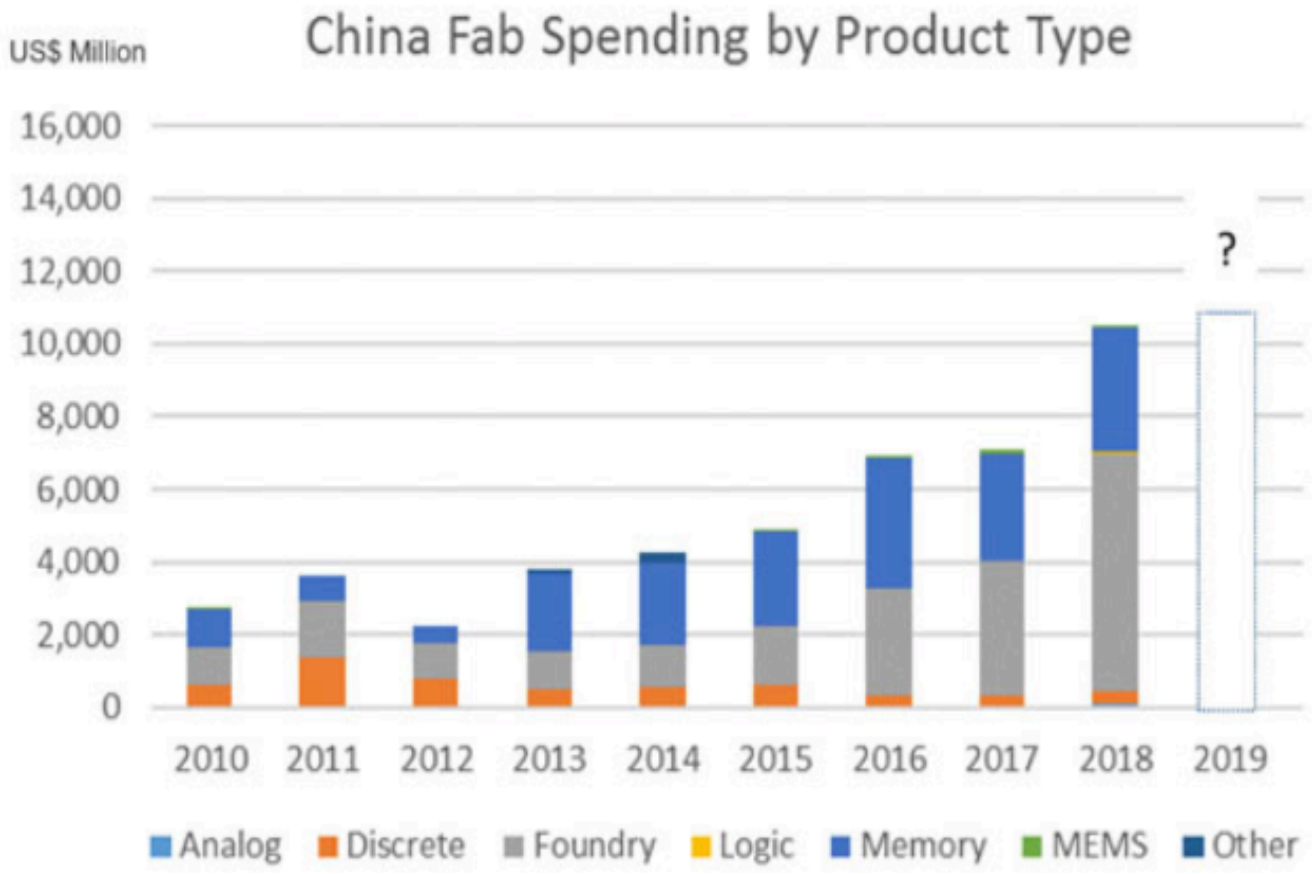
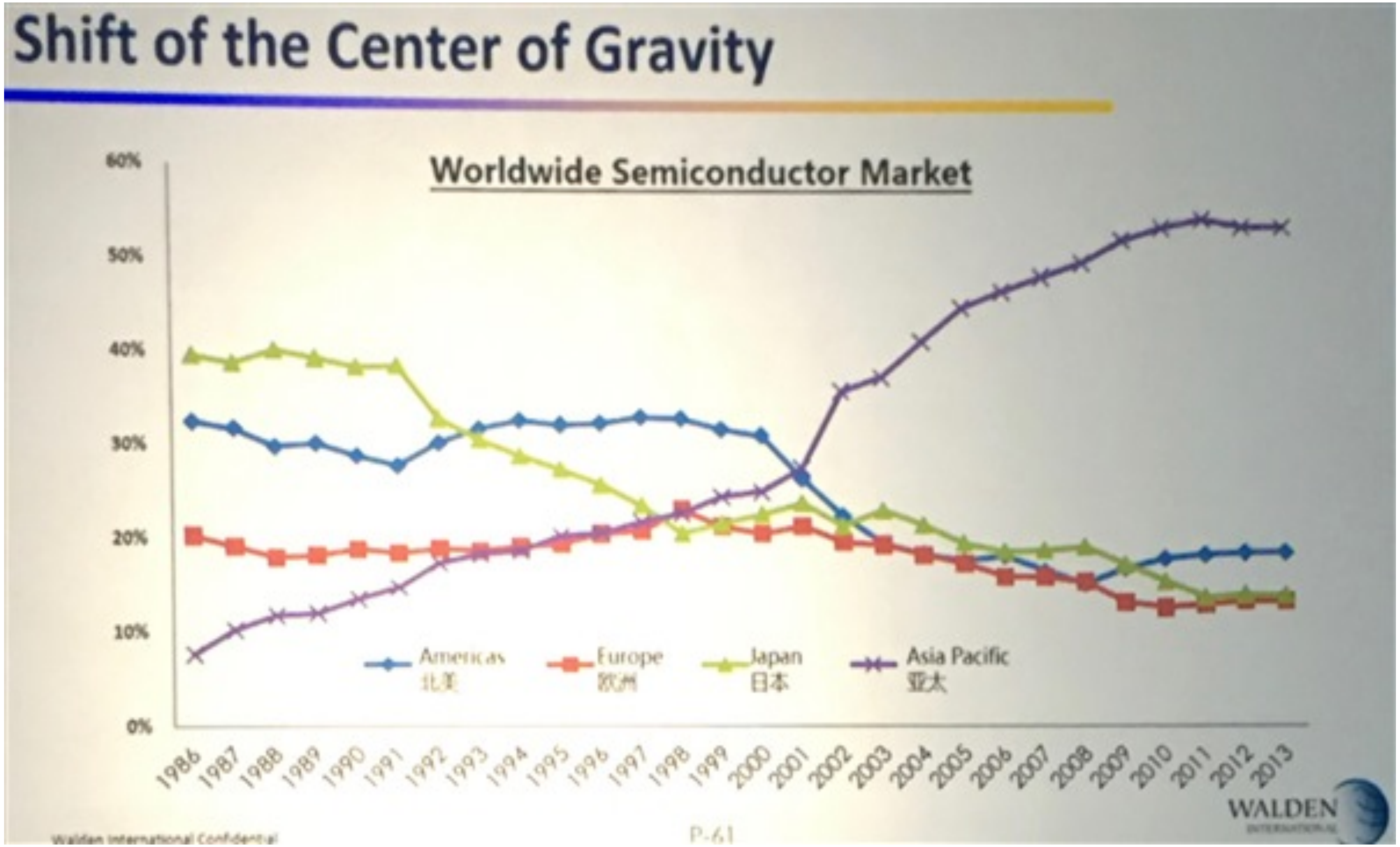
China's growth in Capex exceeds everyone



Source: SEMI Fab Database Analysis, December 2016

Asia is the Center of the Chip Universe



The Current Political Environment

- Trade has emerged as the number one international issue (After the wall….)
- China is at the top of the list of trade complaints
- Sanctions and tariffs have been fast and furious
- Tit for Tat increases have been going on- escalating tensions
- China can't respond 100% to tariffs due to massive trade imbalance
  - China did respond by blocking Qualcomm acquisition of NXP
  - This tries to reduce US dominance in 5G technology
- The current trade issue re-doubles China's effort to become chip independent
- China's concerns about semiconductors are equal parts strategic & economic

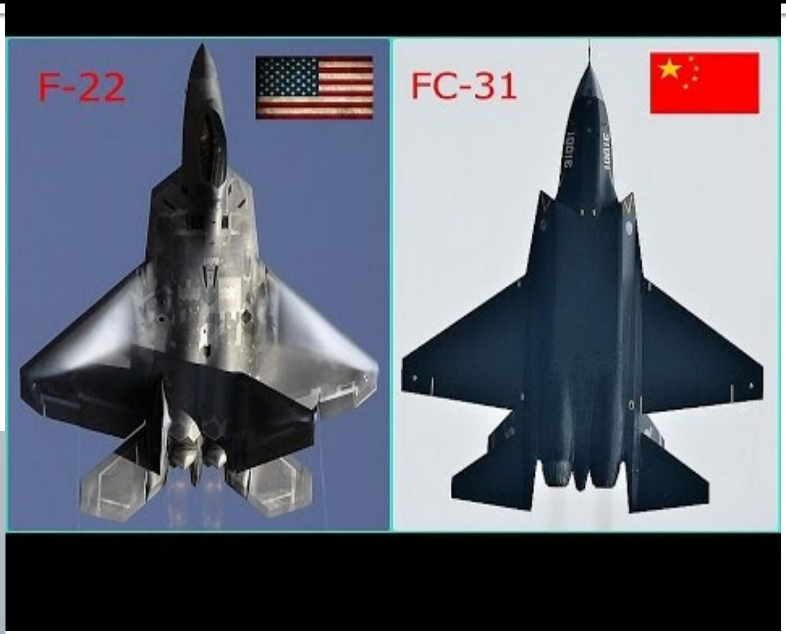
Taiwan – Critical Crossroad of the Chip industry
A Missile away from China

- Taiwan is viewed as a "Run –Away" province of China
  - See recent airline labeling issue
- Re-unification is viewed as inevitable – PRC says by force if needed
- In 1996, when China was shooting missiles over Taiwan, we wrote an article about the importance of Taiwan to the PC industry (at that time the core of all tech) as it produced 100% of all motherboards
- Get Taiwan and you get TSMC
- Get TSMC and you become number one in foundry
- Get TSMC & you have leverage over Apple, Qualcomm & US companies

You can't Blame China for being paranoid

- SMIC, China's largest foundry and most advanced was prohibited from buying the latest generation of US semiconductor equipment tools as the US defense department was concerned about SMIC as a dual use facility (commercial & military). This permanently kept SMIC at the trailing edge.
- The US department of defense had the ability to do "inspections" *on site* in China, at SMIC to insure compliance
- How would people in the US feel if the Chinese could "inspect" Intel's fabs?
- The concern over self sufficiency in semiconductors is likely justified

If you can't buy it…steal it



Assume the worst in IP issues & theft

- There has been long standing concerns about Korean copies of US tools
- Samsung has fostered local competitors to US companies with similar tools
- Issues will be many times worse in China as it tries to rapidly grow
- Veeco & AMEC is the textbook example of what will happen in China
  - Veeco sold MOCVD tools primarily to Chinese customers
  - AMEC copied some aspects of the tool & Veeco sued, halting sales
  - AMEC countersued, stopped Veeco & Chinese courts supported AMEC
  - Veeco is in a "no win" situation & will lose its biggest market
- The US slowing technology sales to China will result in the acceleration of IP theft, much worse than experienced in any other market

Developing Industries Copy Others

- Samuel Slater, "the father of the American industrial revolution" copied British cotton mills and started the US industrial revolution on copied British technology
- Was called "Slater the Traitor"

CFIUS- Committee on Foreign Investment in the US

- Headed by the US Treasury secretary
- Representatives from 16 agencies – Defense, Commerce, State, Homeland
- Established by President Ford in 1975
- Review for 30 days or more- Can ask for “resolutions” to issues
- Sends recommendation to President for final yea or nay

IEEPA–International Emergency Economic Powers Act

- Was created during the Carter administration to deal with the Iranian hostage situation
- The IEEPA authorizes the president to declare the existence of an "unusual and extraordinary threat... to the national security, foreign policy, or economy of the United States" that originates "in whole or substantial part outside the United States." It further authorizes the president, after such a declaration, to block transactions and freeze assets to deal with the threat. In the event of an actual attack on the United States, the president can also confiscate property connected with a country, group, or person that aided in the attack
- The IEEPA can be used to block the sale of technology
- ZTE component sales were blocked by the commerce department after ZTE violated trade sanctions on Iran and North Korea as well as allegations of trojan horse software

ZTE Update – In the News– Flip Flop

- After making ZTE the poster child as a “bad actor” Chinese company, the administration has done a 180, “to save Chinese jobs” and will apparently nullify the blockade of chip sales
- US companies provide approximately 60% by dollar volume of semiconductor content in their latest phones
- Most US companies and agencies still will not sell or use ZTE phones

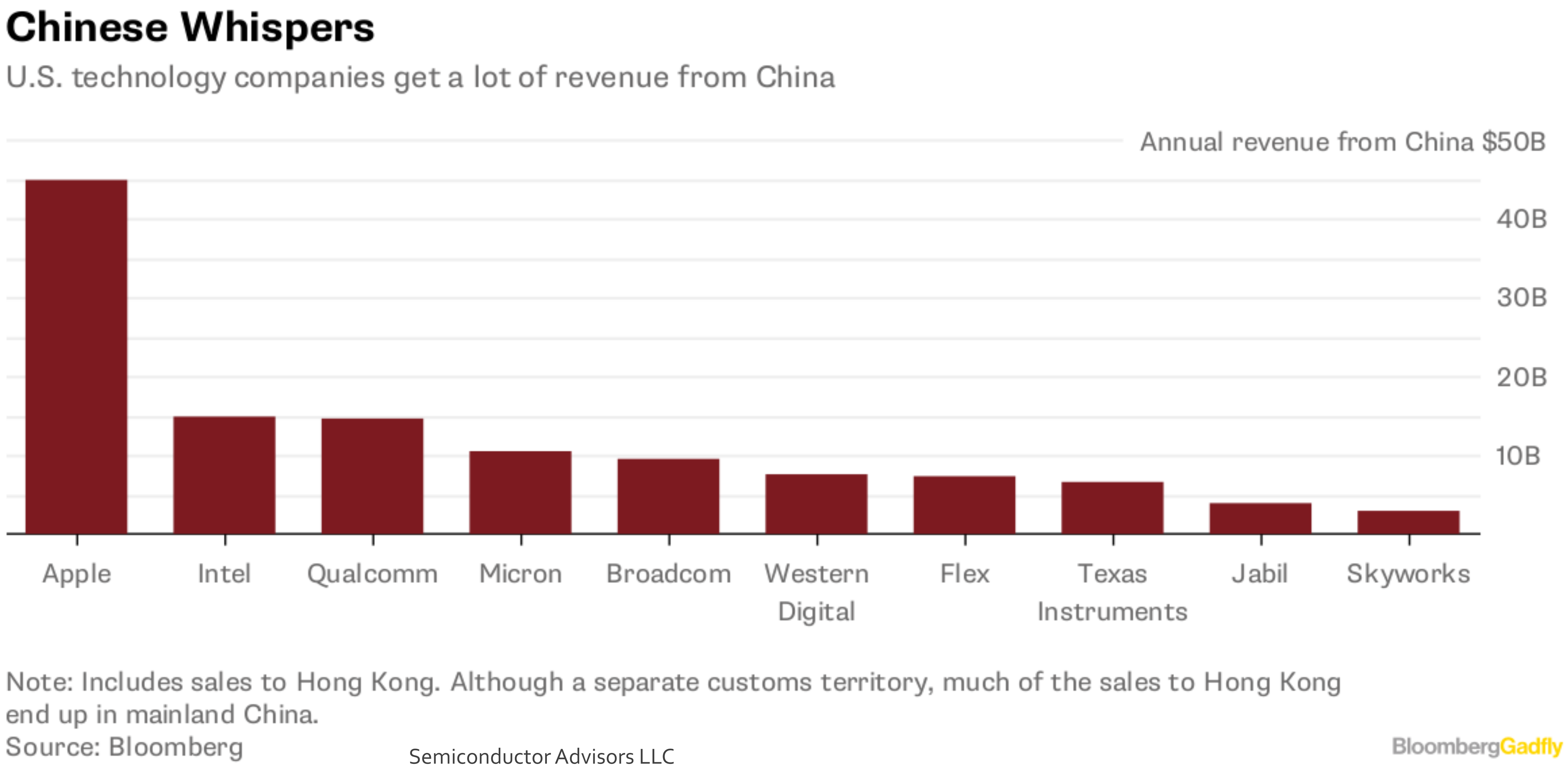
Its OK for China to invest in the US but not the other way around

- Google has been frustrated
- Uber has been shut out and gave up and sold out
- Apple is being forced to give up IP and control
- Intel built a fab in China as a "Quid pro Quo"
- US companies can't own a 51% stake in operations in China
- China has some of the strongest protectionist policies and legislation
- Report: "Made in China 2025" by US Chamber of Commerce

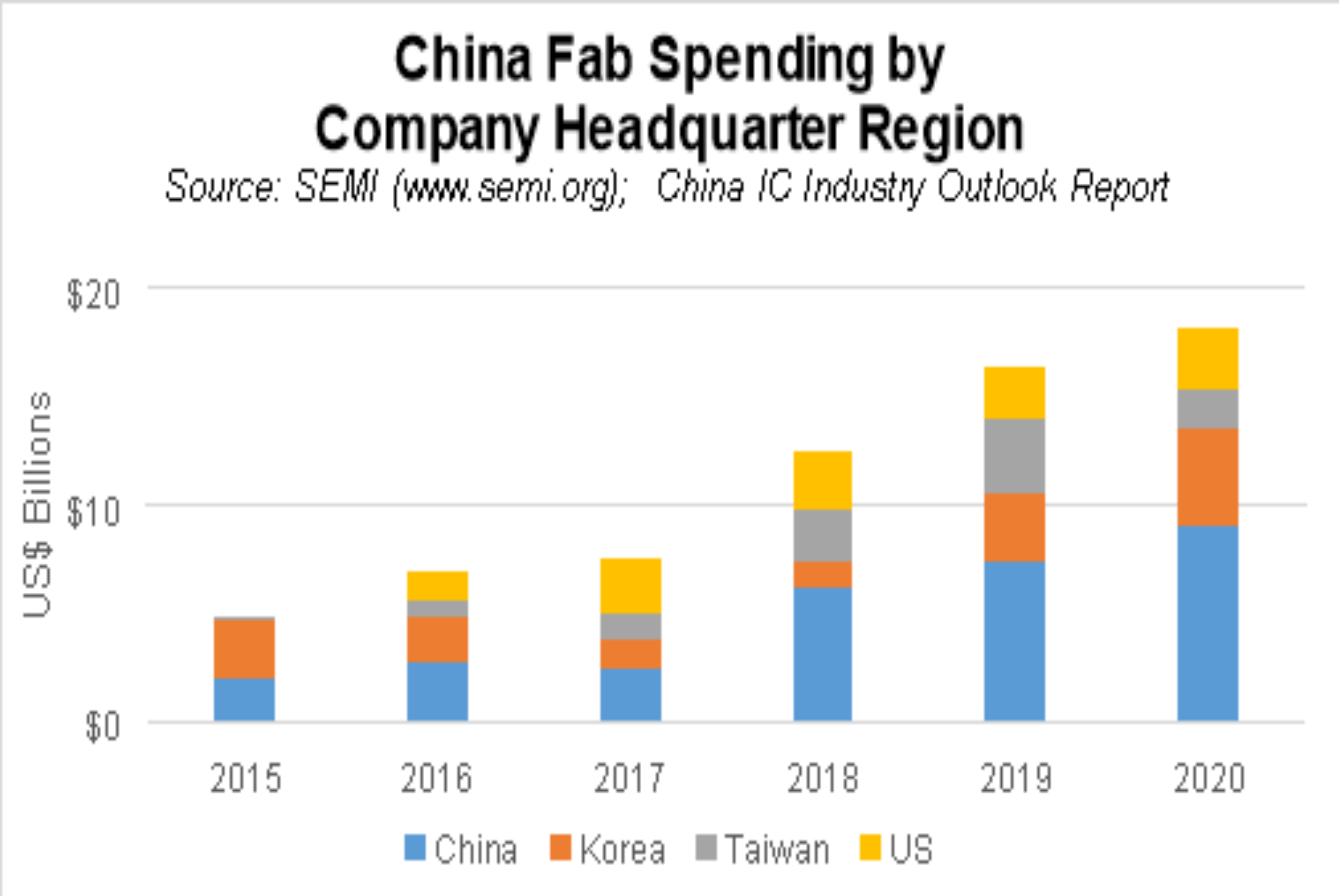
China- Too Big to Ignore- The largest market in the world

- Semiconductor and semiconductor equipment makers can ill afford to ignore or stay out of the China market
- One out of three Iphones sold are in China
- Last year China was 20% of Apple revenue at $45B
- 65% of Qualcomms business was China
- China was 23% of Intels business
- Most of the upside in the semiconductor equipment industry is the build up of domestic fab capacity in China

China is a huge market for semiconductors



And for Semiconductor Equipment



Avoiding the lessons of the LED and solar industries

- Both the LED and solar panel industries were destroyed by China's entrance into the respective markets.
- The semiconductor market is significantly different as most logic semiconductor devices are not "commodities" like LED & solar panels
- The bigger risk is to the memory market of both NAND and DRAM , which are commodities much like LED & solar
- It is more difficult for China to run "at a loss" in memory given the very high capital costs as compared to low capital costs for solar and LED
  - $50M versus $7B

Conclusion- Resistance is Futile – Join the Movement

- Much like Japan, Taiwan & Korea before them, China entering the semiconductor industry is a normal progression of modernization
- The US will also need alternative suppliers like Micron & GloFo
- The US can participate and profit in China – A huuuuge market
- Everyone must participate with eyes wide open to risks
- The US government can help level the playing field of trade & IP concerns
- China will likely be faster than Japan, Korea or Taiwan in build up
- US must promote & protect & invest in new tech – AI, VR, IOT etc;
- China remains a very sharp double edge sword that cuts both ways

Thank You

- Q&A