MORNING BRIEFING
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China and Semiconductors

Check out the accompanying chart collection.

Executive Summary: Today, our focus is the semiconductor and semiconductor equipment manufacturing industries, both down on their luck these days. The US Commerce Department has barred the door to one of their major markets, China. Yet the CEOs have been curiously acquiescent. … Jackie examines the administration's possible motivations and the impacts on specific players in the space. … This bad news couldn't have hit at a worse time: The semiconductor cycle may be heading south. Earnings estimates have been getting slashed, and stocks battered.

China: What Does Joe Know? On October 7, the US Department of Commerce announced serious restrictions on the sale of sophisticated semiconductors and semiconductor equipment to China. The decision will hurt the revenues of US-based semiconductor and semiconductor equipment makers that sell these high-end products into Chinese markets. In its *press release*, the agency explained that the restricted chips and equipment were being used by the People's Republic of China to "produce advanced military systems including weapons of mass destruction; improve the speed and accuracy of its military decision making, planning and logistics, as well as of its autonomous military systems; and commit human rights abuses."

The new rules "represent a shift in US policy, which is to keep China as far behind the US and other countries as possible in advanced computing technology and not just a generation or two behind," Byron Callan at *Capital Alpha Partners* explained in a recent note. "The timing suggests heightened US concern over China's advances in military related high technology."

So here's a look at some of China's advancements in military technology that may have President Joe Biden's administration worried:

(1) *China 2027.* Shortly after Chinese President Xi Jinping entered office in 2012, he laid out plans to build a strong army. In 2020, he went a step further, unveiling plans to build a "fully modernized army" by 2027, the 100th anniversary of the People's Liberation Army. The goal: to have a military that's on par with the US military. The plan includes developing

advanced weapons; incorporating smart technologies like artificial intelligence (AI); and modernizing military theories, formations, personnel, and strategic management, a December 1, 2020 *South China Morning Post* (*SCMP*) article explained.

The country has opened its wallet to achieve its military goals. The amount it spends on defense has more than doubled over the past decade to $229.5 billion in 2022 from $103.1 billion in 2012. Western research shops believe official estimates underestimate the actual spending. The nation also has adopted a policy whereby the spending and the products produced by government entities and the private sector often are indistinguishable. Technological advances made in private companies can be conscripted by the government, which means that there are far more dollars actually being used to advance military technology in China than the official government budget reflects.

(2) *Progress in the air.* In 2017, China's military introduced the J-20, a stealth fighter jet comparable to the US F-22. Now the country is working on flying an unmanned, stealth military drone on either side of the J-20. The J-20 would be flown by the pilot and carry a second passenger—a "weapons officer"—to control the drones. These stealth drones theoretically could fly deep into hostile territory and conduct precision-strike missions.

"In tomorrow's battlefield, joint cooperation between the piloted fifth-generation aircraft and stealthy drones will make up a powerful, stealthy air-combat squadron, connecting and communicating by information link that is supported by big data," Beijing-based defense expert Wei Dongxu said, according to a October 20 *SCMP* article. The concept copies the Next Generation Air Dominance initiative outlined by the US military. The drones carry "smart ammunition" with self-navigation capability.

Recent reports claim that former Western military pilots are training pilots in China. A South African company, Test Flying Academy of South Africa, has been recruiting pilots from Britain, Australia, and New Zealand to work for it in China, an October 19 Reuters article reported. One US pilot suspected of working with the Chinese is Daniel Edmund Duggan, who had been in the US military for a decade before moving first to Australia and then to China in 2014. His LinkedIn profile said he'd been working in Qingdao, China since 2017 as the managing director of an aviation consultancy company focused on the Chinese aviation industry, an October 25 Reuters article reported. The company was dissolved in 2020. Duggan was arrested in Australia; he now faces extradition to the US.

(3) *Progress at sea & with AI.* Earlier this year, The People's Liberation Army Navy (PLAN) launched the first aircraft carrier designed and built in China. The PLAN has about 355

ships, including submarines, and the US estimates the figure will grow to 420 ships in 2025 and 460 by 2030, a June 17 Associated Press *article* reported.

Like the US military, the Chinese military is exploring ways to use AI to make operations more efficient and more deadly. AI is being used to determine maintenance and repair schedules, detect leaks, and automate ordering. It's used in war game simulators to train officers and study the outcome of theoretical conflicts. Military intelligence, surveillance, and reconnaissance are using AI to aid with "geospatial imagery analysis, media analysis and intel acquisition," according to a February 21 *article* originally in *Analytics India Magazine* and republished by Georgetown University. More ominously, AI is being used in autonomous amphibious vehicles for automated target recognition.

There are fears that systems using AI could misinterpret something as an attack and mistakenly launch a counterattack. The US Department of Defense attempted twice to begin a dialog with its Chinese counterparts about AI risk reduction, and both times the Chinese military refused to put the subject on the agenda, according to a May 20 *commentary* by AI expert Gregory Allen of the Center for Strategic & International Studies.

(4) *Ahead in hypersonic missiles.* China appears well ahead of the US in the development of hypersonic missiles. Last year, the country tested a nuclear-capable hypersonic missile that circled the globe before missing its target. The missiles are designed to be launched via a rocket into space, then orbit the Earth using their own energy. The missiles fly at five times the speed of sound, which is slower than a ballistic missile; but they are maneuverable, making them difficult to track and destroy.

The missile launches "stunned the Pentagon and US intelligence because China managed to demonstrate a brand-new weapons capability … [which] appeared to 'defy the laws of physics,'" an October 20, 2021 *FT* *article* reported. The Chinese foreign ministry denied that it was a supersonic weapon at the time. The tests came after satellite images showed China "was building several hundred silos to house intercontinental ballistic missiles."

The Chinese hypersonic missiles reportedly were developed using US software designed for computer simulations of hypersonic weapons by companies that had received funding from the Pentagon, according to a recent *Washington Post* report. The paper also claims that a Chinese semiconductor company uses US electronic design automation software to design microchips for supercomputers that run hypersonic weapons simulations. The chips are manufactured in Taiwan, according to an October 19 *Asia Times* *article*. In August, the US moved to ban the export of this software to China.

Meanwhile, the US is playing catchup. Raytheon Technologies announced that it was awarded $1 billion to develop the Hypersonic Attack Cruise Missile for the US Air Force. In its Q3 earnings *conference call* on Tuesday, Raytheon said the "first-of-its-kind" missile can travel at hypersonic speeds of Mach 5 or greater. The company also said its "R&D completed the systems requirement review for the hypersonic glide phase interceptor program prototype. This is designed to protect the United States from increasing hypersonic missile threats."

Semiconductors I: CEOs Awfully Quiet. US CEOs of semiconductor chip and equipment companies have been quite subdued in the face of the US government's massive policy change. Perhaps they realize that here isn't much upside to fighting the US government and are concerned about appearing unpatriotic. Perhaps, knowing how important semiconductors are, they've been wondering what took the US so long to put restrictions in place. Or perhaps they suspected this was coming when the US Congress this summer passed the Chips and Science Act, which provides $53 billion of funding, some of which will be given to companies building semiconductor factories in the US.

Here's what companies have been saying about the hit to their bottom lines since the government made its announcement:

(1) *Intel comments.* Intel's sales in China last year were north of $21 billion—or about 27% of total sales. However, often the chips sold to Chinese electronics manufacturers were put in laptops, desktops, and other equipment that was ultimately sold in other countries. Despite the large potential impact, Intel's CEO Pat Gelsinger seemed resigned to the US restrictions. "I viewed this geopolitically as inevitable," he said in an October 24 *WSJ* *article*. He believes the location of semiconductor factories will be more important geopolitically over the next five decades than oil was over the past 50 years.

(2) *Applied Materials & Nvidia.* Intel isn't the only firm feeling the impact. China represents 22% of sales at Applied Materials, and the US restrictions mean that sales in its fiscal Q4 (ending October 30) will be about $400 million, or 6%, lower than its previous fiscal Q4 sales estimate. The company *lowered* its adjusted earnings-per-share guidance for its fiscal Q4 to $1.54-$1.78 from $1.82-$2.18 but didn't comment on the new export rules.

Nvidia will also see next quarter's sales fall by $400 million, about 7%, because it won't be able to sell two of its fastest GPUs for machine learning systems to China, an October 22 *FT* *article* reported. Nvidia's CEO Jensen Huang *noted* a September 21 Reuters article that the chips affected by the export restrictions are part of Nvidia's much larger product lineups

that can still be sold to China. And Nvidia will seek licenses to sell even restricted chips to Chinese customers.

(3) *Lam and ASM.* Sales to China are 31% of Lam Research's revenue. The company said the restrictions would cut as much as $2.5 billion, or about 15%, from 2023 sales, the FT article reported. Conversely, Micron Technologies could benefit, as it had been facing competition from China's YMTC.

ASM International, a Dutch semiconductor equipment company, expects US restrictions to affect more than 40% of its sales in China, which equals roughly 6.4% of the company's total revenue. The company went on to forecast flat q/q sales for the October quarter, an October 25 Reuters *article* reported.

Dutch competitor ASML Holding has said that demand was strong enough that any equipment that couldn't be sold to Chinese buyers could be sold elsewhere.

Semiconductors II: Analysts Cutting Estimates. On top of the bad news about US restrictions on semi sales into China, there's mounting evidence that the semiconductor cycle has taken a turn for the worse.

Texas Instruments, which sells basic chips that likely won't be affected by the new government export regulations, warned on Tuesday that it was seeing rising order cancellations and lower order rates. It experienced the expected weakness in personal electronics and warned that the weakness was expanding to other industrial sectors outside of autos, an October 26 *Barron's article* reported.

Likewise, memory chip manufacturer SK Hynix reported a 67% y/y decline in Q3 net profit. It expects further declines next year and warns of a softer market for corporate servers.

Semiconductor stocks continue to have a tough year as the industry flounders. The S&P 500 Semiconductor industry's stock price index has fallen 41.7% ytd through Tuesday's close, and the S&P 500 Semiconductor Equipment index is 36.2% lower ytd. Both indexes are trailing far behind the S&P 500's 19.0% ytd decline and the S&P 500 Information Technology sector's 26.3% drop.

As for performances this month to date (through Tuesday's close), the S&P 500 Semiconductor index has risen 5.4%, and the S&P 500 Semiconductor Equipment index has climbed 2.3%, while the S&P 500 rose 7.7%, and the S&P 500 Information Technology

sector added 8.2% (*Fig. 1* and *Fig. 2*).

Analysts have been cutting their earnings estimates in the semi space, but it looks like estimates need to head even lower. The S&P 500 Semiconductors industry's earnings for this year are expected to rise 0.9% and then fall 4.0% in 2023 (*Fig. 3*). On July 1, the earnings estimate for 2023 was 8.4%. The industry's forward P/E has shrunk to 14.4 from 24.5 at the start of this year (*Fig. 4*).

Analysts still expect the S&P 500 Semiconductor Equipment industry to grow earnings by 16.8% this year and 2.9% in 2023 (*Fig. 5*). The estimate for 2023 has been reduced from 18.0%, where it stood on July 1. The industry's forward P/E has fallen to 13.4 from 21.7 at the start of 2021 (*Fig. 6*).

Calendars

US: Thurs: Real GDP & Price Index 2.4%/5.3%; Core PCED 4.5%; Durable Goods Orders Total & Nondefense Capital Goods Orders Ex Aircraft 0.6%/0.5%; Kansas City Manufacturing Index; Initial & Continuous Jobless Claims 220k/1.388k; Natural Gas Storage. **Fri:** Personal Income & Spending 0.3%/0.4%; Core PCED 0.5%m/m/5.2%y/y; Employment Cost Index 1.2%; Consumer Sentiment 59.8; Pending Home Sales -5.0%; Baker-Hughes Rig Count. (Bloomberg estimates)

Global: Thurs: Germany Gfk Consumer Climate Index -41.9; Italy Business & Consumer Confidence100.0/93.8; Spain Unemployment Rate 13.0%; Japan Unemployment Rate & Japan Job Applications Ratio 2.5%/1.33; Australia PPI; ECB Interest Rate Decision 2.00% & Deposit Facility Rate 1.50%; BOJ Interest Rate Decision -0.10%; Lagarde. **Fri:** Eurozone Business & Consumer Sentiment 92.5; Germany GDP -0.2%q/q/0.7%y/y; Germany CPI 0.6%m/m/10.1%y/y; France GDP 0.2%; France CPI; Italy CPI 1.2%m/m/9.6%y/y; Spain GDP 0.3%q/q/39.%y/y; Spain CPI 8.1% y/y; Canada GDP 0.1%m/m. (Bloomberg estimates)

Strategy Indicators

Stock Market Sentiment Indicators (*link*): The *Bull-Bear Ratio* was below 1.00 this week for the sixth successive week. However, it did edge up for the second week, to 0.96, after

falling steadily from 1.15 in mid-September to 0.57 two weeks ago—which was the lowest since March 2009. _Bullish sentiment_ increased for the second week, to 36.9%, after falling the prior four weeks from 32.4% to 25.0%—which was the fewest bulls since early 2016. _Bearish sentiment_ exceeded bullish sentiment for the sixth week, though fell for the second week, by a total of 5.6ppts to 38.5%, after rising the prior four weeks by 15.9ppts (to 44.1% from 28.2%). It was the largest group for the fourth consecutive week, unseating the correction count—which held the top spot for the prior four weeks. The _correction count_ retreated for the fourth week by 15.7ppts (24.6% from 40.3%). In the meantime, the _AAII Sentiment Survey_ (as of October 20) showed rises in both optimism and pessimism about the short-term direction of the stock market—with bullish sentiment unusually low and bearish sentiment unusually high. The _percentage expecting stocks will rise over the next six months_ climbed to 22.6% after falling from 23.9% to 20.4% the prior week, with optimism remaining below its historical average of 38.0% for the 48th consecutive week; it was unusually low for the eighth successive week and for the 31st time in 42 weeks. (The breakpoint between typical and unusually low readings is currently 27.6%.) The _percentage expecting stocks to fall over the next six months_ rose for the second week, by 1.4ppts to 56.2% after falling the prior two weeks from 60.9% to 54.8%. Bearish sentiment has been above its historical average of 30.5% in 47 of the last 48 weeks, and is at an unusually high level for the 32nd time in 40 weeks. (The breakpoint between typical and unusually high readings is currently 40.7%.)

S&P 500 Earnings, Revenues, Valuation & Margins (_link_): The S&P 500's forward profit margin remained steady last week at a 16-month low of 12.9%. That's down 0.5ppts from its record high of 13.4% achieved intermittently from March to June. Since the end of April 2020, it has exceeded its prior record high of 12.4% in September 2018. It's now up 2.6ppts from 10.3% during April 2020, which was the lowest level since August 2013. Forward revenues dropped 0.3% w/w from a record high as forward earnings fell 0.4% to a six-month low and to 2.4% below its record high in mid-June. Both had been steadily making new highs from the beginning of March 2021 to mid-June; prior to that, they peaked just before Covid-19 in February 2020. The consensus expectations for forward revenues growth fell 0.2ppt w/w to a 26-month low of 4.9% as the heaviest part of the Q3 earnings season approached. That's down from a record high of 9.6% growth at the end of May 2021 and compares to 0.2% forward revenues growth during April 2020, which was the lowest reading since June 2009. Forward earnings growth was down 0.3ppt w/w to a 27-month low of 6.6%. That's down from its 23.9% reading at the end of April 2021, which was its highest since June 2010 and up substantially from its record low of -5.6% at the end of April 2020. So far this year, analysts' revisions to their forecasts for 2022 revenues have outpaced their revisions for 2022 earnings, so the imputed 2022 profit margin estimate that we calculate

from those forecasts has fallen 0.6ppt to 12.6%. They expect revenues to rise 11.7% (down 0.2ppt w/w) in 2022 and 3.9% in 2023 (down 0.1ppt w/w) compared to the 16.5% gain reported in 2021. They expect earnings gains of 8.5% in 2022 (down 0.2ppt w/w) and 6.6% in 2023 (down 0.2ppt w/w) compared to an earnings gain of 50.5% in 2021. Analysts expect the profit margin to drop 0.4ppt y/y to 12.6% in 2022 (unchanged w/w) compared to 13.0% in 2021 and to improve 0.3ppt y/y to 12.9% in 2023 (unchanged w/w). The S&P 500's weekly reading of its forward P/E rose 0.6pt w/w to 15.9 from a 30-month low of 15.3. That compares to a 15-week high of 18.2 in mid-August and is now below its prior 26-month low of 15.8 in late June. That also compares to 23.1 in early September 2020, which was the highest level since July 2000 and up from a 77-month low of 14.0 in March 2020. The S&P 500 weekly price-to-sales ratio rose 0.07pt w/w to 2.05 from a 31-month low of 1.98. That's down from a 15-week high of 2.38 in mid-August. That also compares to a record high of 2.88 at the end of 2021 and a 49-month low of 1.65 in March 2020.

S&P 500 Sectors Earnings, Revenues, Valuation & Margins (*link*): Last week saw consensus forward revenues rise for four of the 11 S&P 500 sectors as forward earnings fell for all 11 sectors. Energy was the only sector to have its forward profit margin improve w/w. Nearly all of the sectors are below recent record highs in their forward revenues, earnings, and profit margins. Financials is the only sector with forward revenues at a record high this week and Utilities is the only sector with forward earnings at a record high. Since mid-August, all sectors have forward profit margins below their record highs. Those of Energy, Industrials, and Tech remain closest to their post-pandemic highs. Only three sectors posted a higher profit margin y/y during 2020: Consumer Staples, Tech, and Utilities; during 2021, all of the sectors but Utilities posted a y/y improvement. Just three sectors are expected to see margins improve y/y for full-year 2022, followed by seven sectors in 2023. Here are 2022's gainers: Energy, Industrials, and Utilities. Here's how they rank based on their current forward profit margin forecasts along with their record highs: Information Technology (24.4%, down 0.1ppt w/w and from its 25.4% record high in early June), Financials (18.2, down 0.1ppt w/w and from its 19.8 record high in August 2021), Real Estate (18.1, down 0.2ppt w/w and from its 19.2 record high in 2016), Communication Services (15.1, down 0.1ppt w/w and down from its 17.0 record high in October 2021), Utilities (13.8, down from its 14.8 record high in April 2021), S&P 500 (12.9, down from its record high of 13.4 achieved intermittently from March to June), Materials (12.2, down from its 13.6 record high in June), Energy (12.1, up 0.3ppt w/w and down from its 12.3 record high in August), Health Care (10.5, down from its 11.5 record high in March), Industrials (10.1, down 0.1ppt w/w and from its 10.5 record high in December 2019), Consumer Discretionary (7.5, down from its 8.3 record high in 2018), and Consumer Staples (7.2, down from its 7.7 record high in June 2020).

S&P 500 Q3 Earnings Season Monitor (*link*): The Q3-2022 earnings season is off to the poorest start of a quarterly reporting season since Q1-2020, assessed by the four surprise metrics we measure for both earnings and revenues. With 34% of S&P 500 companies finished reporting revenues and earnings for Q3, revenues are ahead of the consensus forecast by just 1.1%, and earnings have exceeded estimates by only 2.4%. At the same point during the Q2 season, revenues were 1.8% above forecast and earnings had beaten estimates by 5.4%. For the 169 companies that have reported Q3 earnings through mid-day Wednesday, the aggregate y/y revenue and earnings growth rates have slowed from their readings from Q2-2021 to Q2-2022. The 169 reporters so far collectively has a y/y revenue gain of 9.7%, but an earnings gain of only 0.8% as higher costs are pressuring profit margins. Just 68% of the Q3 reporters so far has reported a positive revenue surprise, and 76% has beaten earnings forecasts. Furthermore, significantly fewer companies have reported positive y/y earnings growth in Q3 (61%) than positive y/y revenue growth (85%). These figures will change markedly as more Q3-2022 results are reported in the coming weeks, particularly from non-Financial firms with greater exposure to the strong dollar. While we expect y/y growth rates to remain positive in Q3, we think the revenue and earnings surprises will deteriorate q/q due to the slowing economy, missed deliveries, higher costs, and currency translation.

S&P 500 Sectors Net Earnings Revisions (*link*): The S&P 500's NERI was negative for a fourth month in October and weakened for the 13th time in 15 months. NERI fell to a 28-month low of -13.15 in October from -9.7% in September. It had been negative for 13 straight months through July 2020 due to the pandemic shutdown. The 23-month positive streak that ended in June had exceeded the prior 18-month positive streak during the cycle that ended October 2018, when NERI reached a tax-cut-induced, then-record high of 22.1% in March 2018. October's reading compares to a record-high 23.1% in July 2021 and an 11-year low of -37.4% in May 2020. Energy and Utilities were the only two S&P 500 sectors with positive NERI in October, a count that's unchanged since August and down from five in July. Six sectors had NERI readings at post-pandemic two-year lows during the month as all 11 sectors had NERI weaken m/m. Among the lowest readings in October, Communication Services was negative for a 12th month, Consumer Staples for an eighth, and Consumer Discretionary and Health Care for a seventh month. Here are the October NERIs for the S&P 500 and its sectors compared with their September readings: Energy (10.1% in October [23-month low], down from 19.4% in September), Utilities (1.9, 4.3), Real Estate (-6.4 [18-month low], -1.5), Financials (-9.3, -8.1), Health Care (-11.5 [28-month low], -9.8), S&P 500 (-13.1 [28-month low], -9.7), Industrials (-13.4 [27-month low], -8.7), Consumer Staples (-14.0 [28-month low], -10.4), Information Technology (-15.0 [28-month low], -11.8),

Consumer Discretionary (-19.4 [28-month low], -16.8), Communication Services (-23.5, -23.1), and Materials (-27.1 [28-month low], -19.6).

S&P 500 Sectors Net Revenue Revisions (*link*): The S&P 500's NRRI weakened for a seventh straight month in October and was negative for a third month following two years of positive readings. It has weakened m/m in 11 of the past 14 months, and dropped to a 27-month low of -8.7% from -5.5% in September. Before the just-ended 24-month positive streak, it had been negative for 21 straight months. That positive streak exceeded the prior 19-month streak during the cycle that ended in October 2018, when NRRI reached a tax-cut-induced then-record high of 14.7% in March 2018. October's reading compares to a record-high 25.9% in August 2021 and an 11-year low of -35.8% in May 2020. Five of the 11 S&P 500 sectors had positive NRRI in October, up from four sectors during August and September; that's down from six with positive readings in July and all 11 during July-October 2021. Financials, Real Estate, and Utilities were the only sectors to have NRRI improve m/m. Seven sectors had NRRI readings fall to post-pandemic lows during the month. Communication Services was negative for a 12th straight month, followed by Health Care at seven months and Consumer Discretionary at six. Here are the October NRRIs for the S&P 500 and its sectors compared with their September readings: Utilities (17.8% in October, up from 16.9% in September), Energy (14.5 [22-month low], 24.9), Real Estate (10.5, 10.1), Financials (1.8, -1.4), Consumer Staples (1.2 [27-month low], 9.0), S&P 500 (-8.7 [27-month low], -5.5), Health Care (-10.8 [28-month low], -9.1), Industrials (-11.3 [27-month low], -5.6), Materials (-12.4 [27-month low], -3.7), Information Technology (-15.2 [28-month low], -12.2), Consumer Discretionary (-16.7 [28-month low], -14.3), and Communication Services (-22.4 [29-month low], -19.0).

US Economic Indicators

New Home Sales (*link*): New home sales (counted at the signing of a contract) remained on a volatile downturn in September, as rising mortgage rates depressed demand. New home sales plunged 10.9% last month to 603,000 units (saar), following an unexpected 24.7% jump in August. So far this year, sales have declined in seven of the nine months—for a drop of 28.1% ytd. Of the 603,000 *homes sold* in September, only 171,000 units were completed, while 168,000 units were not yet started and 264,000 units were under construction. Meanwhile, there were 462,000 *units for sale* at the end of September (the most since March 2008), with only 56,000 units completed and 105,000 units not started; 301,000 units were under construction. At the current sales pace, it would take 9.2 months to run through the supply of new homes, up from 8.1 months in August but down from July's

10.1 months, which was the highest since April 2009. The *median price* of a new home rose 8.0% (to $470,600 from $435,800) in September, with the yearly rate accelerating 13.9%, up from 7.8% in August but below its recent peak of 21.7% in April. Earlier this month, NAHB reported that *homebuilders' confidence* dropped for the 10th time this year, by 8 points in October and 46 points ytd, to 38—half the level of just six month ago and the lowest since May 2020 during the height of the pandemic.