SUBJECT: Protecting international security and human rights by using multilateral controls on semiconductor manufacturing equipment and advanced chips

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BACKGROUND

- Advanced computer chips are critical for artificial intelligence, autonomous weapons, hypersonic missiles, cyber weapons, surveillance tools, and the latest generation of nuclear weapons.
- Advanced chips are made using highly specialized semiconductor manufacturing equipment (SME). With over 90 percent of global market share in SME, U.S., Dutch, and Japanese firms together control multiple SME chokepoints, especially advanced photolithography tools.
- The United States and its allies and partners have enacted export controls on SME, but do not yet coordinate well on enforcing them. Licenses are often granted to export SME to China.

KEY POINTS

- ***Advanced chips are necessary to develop and use many strategic technologies.*** Older-generation chips are not effective substitutes.
- ***Only firms based in the United States, South Korea, and Taiwan currently manufacture advanced chips.*** China is attempting to join this group.
- China's attempts to build advanced chip factories rely on importing advanced U.S., Japanese, and Dutch SME, purchased with tens of billions of dollars in unprecedented state subsidies. ***China will not be able to produce its own advanced SME in the foreseeable future.***
- If China were unable to import SME, it could not make advanced chips and would have to import these from the United States, South Korea, and Taiwan. ***These three partners could then deny access to advanced chips to the Chinese government and others engaging in uses of concern, including military applications and human rights abuses.***
- Coordinating with the Netherlands, Japan, South Korea, and Taiwan may be difficult—in particular, Taiwan may be reluctant to join export controls on advanced chips—but is necessary. Without coordination, controls may lead China to purchase chips or SME from non-U.S. firms, harming U.S. industry while having little effect on China's access.
- ***Strict enforcement of SME controls would reshore chip factories and would not cause long-term harm to the SME industry.*** In the near term, the SME industry could suffer revenue losses by losing access to the Chinese market and Chinese state subsidies. However, in the longer term, revenues should recover as the United States and its allies build new chip factories to meet global chip demand.

RECOMMENDATIONS

- The United States should work with the Netherlands and Japan to bar exports to China of advanced SME in order to prevent China from manufacturing advanced chips domestically.
- The United States should work with South Korea and Taiwan to impose targeted export controls to ensure that the Chinese government and other actors cannot use advanced chips to harm international security and human rights.