The Memory Chips Shortage in the Wireless Sector

Background and Policy Options

by Clete Johnson[1]
August 2026

Introduction

For decades, the wireless communications industry has been a leader in developing and deploying Artificial Intelligence ("AI") and machine learning ("ML") to improve network performance, security, spectrum management, traffic routing, energy efficiency, fraud detection, and customer experience. As wireless networks continue to evolve toward increasingly software-defined, cloud-based, and intelligent architectures, AI will remain essential to 5G optimization, network automation, and the transition to 6G — and the wireless industry will continue pushing the cutting edge of innovation in this field. The wireless sector benefits from and contributes to continued AI innovation and investment, and the policy question is how to ensure that rapid AI growth occurs alongside — rather than at the expense of — resilient and affordable communications networks and the tools and devices that consumers use to access those networks.

The AI infrastructure expansion is creating unprecedented market demand for memory chips, the semiconductor chips that store (rather than process) data. Memory chips are used in products and infrastructure throughout almost every element of connectivity and computing technology — including wireless communications. Manufacturers are directing an increasing share of production capacity toward higher margin memory products used in AI data centers, resulting in a shortage in the supply of general-purpose memory chips used in smartphones, computers, communications equipment, vehicles, and other consumer and industrial products. The near-term shortage appears especially acute for Dynamic Random-Access Memory ("DRAM") products such as fourth-generation Double Data Rate ("DDR4") memory, which remain embedded in many existing devices and network-equipment designs even as manufacturers focus new investment on AI-oriented products.

This shortage is different from a traditional supply-chain disruption (e.g., delayed manufacturing, increased operating costs, and product shortages). Instead, it is a reallocation of finite production capacity. Manufacturers have strong economic incentives to prioritize high-bandwidth memory ("HBM") and other advanced products for AI customers over lower-margin consumer general-purpose memory products, including DDR4 and other mature DRAM products used in existing consumer devices, wireless equipment, and industrial applications.

The wireless sector is affected by this development at nearly every level of the wireless technology stack. Smartphones, fixed-wireless equipment, routers, modems, IoT modules, RAN

---

[1] The Liberty Bell Project is a 501(c)(3) non-profit education and training organization whose activities and reports aim to strengthen the infrastructure of our free society; the organization does not conduct advocacy of any kind. The author's analytical opinions on this topic draw on publicly available materials and decades of experience in the U.S. Army, the Senate Select Committee on Intelligence, the Federal Communications Commission, the Department of Commerce, and in the private sector telecommunications industry.

equipment, and core-network infrastructure all depend on memory chips. Perhaps the most prominent pinch involves smartphones, for which memory represents a substantial share of manufacturing costs. This is a significant challenge in the wireless economy, as rising memory prices may ultimately increase device prices, reduce the memory included in lower-cost phones, limit product availability, or cause consumers to delay upgrades. Similar pressures may also increase the cost of network equipment and extend delivery times. The wireless sector is a critical component of the nation's national security and economic infrastructure, and reliable access to memory products is essential to the broader U.S. economy.

This discussion paper examines the challenges that the current imbalance between memory-chip supply and demand creates, with particular attention to the wireless communications sector, and it provides an overview of policy options that might help address those challenges. It considers two timeframes: near-term options for limiting price increases and protecting consumer affordability without adding new cost pressures, and longer-term options for strengthening the resilience of the broader information and communication technology and services ("ICTS") supply chain, including for memory chips.

I. The Nature of the Memory Chip Shortage

According to some estimates, the overall semiconductor industry is expected to generate approximately $975 billion in global sales in 2026.[2] This aggregate growth, however, obscures an extraordinary disparity in revenue within the industry. High-value AI chips account for as little as 0.2% of total unit volume, but this small percentage generates approximately ***half*** of total semiconductor revenue.[3] Meanwhile, chip supply for smartphones, personal computers, vehicles, and non-data-center communications applications is experiencing slower growth, thereby increasing cost pressure.[4]

Over the past year, memory chip prices have risen approximately six-fold.[5] Memory products are expected to generate approximately $200 billion in revenue in 2026, or roughly one-quarter

---

[2] Jeroen Kusters et al., *2025 Global Semiconductor Industry Outlook,* DELOITTE (May 15, 2025), https://www.deloitte.com/us/en/industries/tmt/articles/2025-global-semiconductor-industry-outlook.html ("Deloitte Semiconductor Industry Outlook").

[3] *Id.*

[4] *See, e.g.,* Soo Kyoum Kim, *Why the Memory Market Is Still Tight: What Comes Next*, INTERNATIONAL DATA CORPORATION (June 21, 2026), https://www.idc.com/resource-center/blog/why-the-memory-market-is-still-tight-what-comes-next/ (explaining that memory shortage is expected to remain tight through 2027 and is not just a normal semiconductor cycle because memory "has become a strategic infrastructure input," and smartphones and PCs are facing bill-of-materials costs that are "rewriting device economics"); *see also* Jeff Janukowicz & Nina Turner, *Semiconductor Market to Surge Past the Trillion-Dollar Threshold: AI Infrastructure Drives Market Growth,* INTERNATIONAL DATA CORPORATION (Apr. 29, 2026), https://www.idc.com/resource-center/blog/semiconductor-market-to-surge-past-the-trillion-dollar-threshold-ai-infrastructure-drives-market-growth/ (reporting total semiconductor revenue of $1.29 trillion in 2026, up 52.8% year over year; data-center semiconductor revenue of $477.1 billion; DRAM revenue of $418.6 billion, up 177% year over year; non-memory, non-data-center revenue of $406.3 billion; and mobile semiconductor revenue declining to $89.8 billion).

[5] Kanishka Ajmera & Aditya Soni, *AI "Chipflation" Spreading from Data Centers to Wider Economy*, *Morgan Stanley Warns,* REUTERS (June 3, 2026), https://www.reuters.com/business/retail-consumer/ai-chipflation-spreading-data-centers-wider-economy-morgan-stanley-warns-2026-06-03/.

of total semiconductor revenue.[6] AI training and inference systems require large quantities of high-performance memory capable of moving data rapidly between processors and memory stacks. AI servers also require far more memory per system than ordinary consumer devices.

As a result, memory chip manufacturers have shifted resources toward HBM and other advanced products used in AI infrastructure. That decision has limited the supply of general-purpose DRAM chips and other memory used in consumer electronics, causing an imbalance in supply and demand. As noted above, the shortage is particularly acute for DDR4, which remains widely used in existing device and equipment designs but is less attractive for manufacturers to produce. Consequently, prices reportedly doubled for DDR4 and tripled for DDR5 between September and November 2025.[7] Other analyses indicate that DRAM prices increased 171% year over year and forecasts further price increases through 2026.[8]

This shortage differs from a conventional supply-chain breakdown. There has not been a sudden loss of aggregate factory capacity. Rather, manufacturers are reallocating finite wafers, fabrication tools, engineering resources, and advanced-packaging capacity among competing products. Each wafer committed to HBM is a wafer that cannot be used to produce general-purpose memory for a smartphone, computer, router, or other device. HBMs' significantly higher wafer consumption (three times the wafer area for an equivalent bit of memory) exacerbates the short supply for non-AI DRAM.

The shortage likely indicates a durable structural market shift — rather than a temporary supply-demand mismatch — due to the higher margins, large purchase volumes, and, in many cases, long-term commercial commitments that AI infrastructure buyers provide. By comparison, general-purpose consumer-memory markets can be lower-margin and are historically more cyclical. Manufacturers therefore will prioritize AI-oriented production even when temporary scarcity causes the market price of an older product such as DDR4 to exceed that of DDR5, as has recently been the case. Meanwhile, customers cannot quickly redesign existing products to utilize alternative memory chips. The structural shifts described above, along with other commercial considerations, are such that a high DDR4 price does not necessarily mean that manufacturers will rapidly redirect capacity to DDR4.

Geopolitical developments also compound these market constraints. U.S. export controls involving advanced memory and China's countermeasures involving critical minerals may limit supply chains and reduce manufacturers' ability to shift products, inputs, and production across markets. The concentration of approximately 95% of DRAM production among three

---

[6] *Id.*

[7] *See* Memory Spot Price Update: DDR5 Prices Up 307% Since September as Module Costs Poised to Surge, TrendForce (Nov. 19, 2025), https://www.trendforce.com/news/2025/11/19/insights-memory-spot-price-update-ddr5-prices-up-307-since-september-as-module-costs-poised-to-surge/ (reporting that, from the start of September through November 18, 2025, spot prices rose approximately 158% for DDR4 1Gx8 chips and approximately 307% for DDR5 2Gx8 chips).

[8] Aryamehr Fattahi, *Global RAM Shortage and Price Hikes: Causes, Consequences, and Market Outlook,* BLOOMSBURY INTELLIGENCE AND SECURITY INSTITUTE (Jan. 5, 2026), https://bisi.org.uk/reports/global-ram-shortage-and-price-hikes-causes-consequences-and-market-outlook. ("Global RAM Shortage Outlook").

manufacturers further increases systemic exposure to the investment and production decisions of a small number of companies.[9]

II. Effects on the Wireless Communications Sector

The wireless sector depends on memory throughout the technology stack. Memory chips are used in RAN equipment, core-network systems, fixed-wireless access equipment, routers, modems, IoT modules, edge-computing systems, and supporting network infrastructure. Smartphones provide the most prominent example; memory products represent approximately 15% to 20% of the bill of materials for a mid-range smartphone and approximately 10% to 15% for a high-end flagship device.[10] Further, as memory prices rise, wireless companies must make difficult decisions about whether to absorb the added cost, increase retail prices, reduce device specifications, or limit production.[11]

Such tradeoffs are particularly difficult in the low- and mid-range smartphone markets, where profit margins are narrower.[12] Some device manufacturers are reducing the RAM included in lower-priced devices, in some cases returning certain models to 4 GB configurations. Others may maintain an established model name or price point while providing less memory than consumers would otherwise have received. The shortage may therefore be passed through to consumers not only as a visible price increase, but also as diminished product capability. Ultimately, all of these options negatively impact consumers.

The International Data Corporation ("IDC") estimates that the global smartphone market could contract by approximately 2.9% to 5.2%, depending on the severity of the shortage.[13] IDC estimates that average smartphone selling prices could rise by approximately 3% to 5% under a moderate scenario and by 6% to 8% under a more pessimistic scenario.[14] Another analysis

---

[9] *Id.*

[10] Francisco Jeronimo et al., *Global Memory Shortage Crisis: Market Analysis and the Potential Impact on the Smartphone and PC Markets in 2026,* INTERNATIONAL DATA CORPORATION (Dec. 18, 2025), https://www.idc.com/resource-center/blog/global-memory-shortage-crisis-market-analysis-and-the-potential-impact-on-the-smartphone-and-pc-markets-in-2026/. ("IDC 2026 Memory Shortage Analysis").

[11] *See, e.g., How Obsolete Electronic Parts Are Reshaping the Global Semiconductor Supply Chain in 2026–27*, VYRIAN (Jan. 8, 2026), https://www.vyrian.com/blog/how-obsolete-electronic-parts-are-reshaping-the-global-semiconductor-supply-chain-in-2026-27/ (noting that component obsolescence has become a structural supply-chain issue, that the average integrated circuit now remains in production for approximately five to seven years, and that long-life industrial systems may operate for 15 to 30 years or longer).

[12] *See* Ben Shimuks, *The AI memory crunch could kill budget smartphones,* BUSINESS INSIDER (July 9, 2026), https://www.businessinsider.com/budget-smartphone-market-expected-decline-memory-shortage-2026-7 (explaining that memory now accounts for up to 60% of production cost for smartphones under $400 and more than 64% for phones under $99. Furthermore, a 12% global smartphone market contraction in 2026 and a 22% decline in sub-$400 shipments are expected.).

[13] *See* IDC 2026 Memory Shortage Analysis.

[14] *Id.*

projects a substantially larger shipment decline of 13.9%.[15] Similar shortages are occurring in the PC market.[16] Although the forecasts differ, they point in the same direction: higher manufacturing costs, reduced availability, increased average prices, and consumer purchase deferrals.

These effects raise concerns about wireless affordability and adoption. Price-sensitive consumers may retain existing devices longer, purchase refurbished or pre-owned devices, select phones with lower specifications, or delay upgrading to devices capable of using newer 5G features.[17] Higher prices could slow the replacement cycle and widen the gap between consumers who can afford newer devices and those who cannot. Slower U.S. adoption of advanced wireless technologies also means the United States may fall behind competitor and adversary countries in technology demand, placing downward pressure on the market's ability to conduct R&D and drive toward innovative advancements.

Public market data regarding the potential effect on wireless network infrastructure is scarce but merits additional attention. RAN equipment, core-network systems, routers, modems, and fixed-wireless devices contain memory and other constrained semiconductor components. Higher component prices could increase the cost of building, maintaining, and upgrading networks. Supply constraints could also increase equipment lead times and complicate procurement.

These pressures could affect 5G densification and federally supported broadband projects, including deployments undertaken through the BEAD program. Equipment costs assumed in project budgets may no longer reflect current market conditions, and delayed availability could affect construction schedules. At present, additional data is needed to determine the memory content of specific categories of wireless equipment and to quantify how much of any equipment-price increase is attributable to the memory chip market.

U.S. policymakers cannot afford to choose between supporting AI or wireless communications; this is a false choice, as AI and wireless are deeply interrelated and mutually beneficial elements of the same technology ecosystem. U.S. policy must support both AI and wireless communications. Wireless industry stakeholders benefit from and contribute to AI innovation as leading adopters and innovators of AI and ML in commercial networks. The question is whether the semiconductor supply chain can support rapid AI expansion without materially reducing the affordability, availability, or resilience of other critical technologies. Below we provide an

---

[15] Che Pan & Casey Hall, *Global Smartphone Market Faces Record Annual Decline as Chip Crunch Worsens,* REUTERS (June 1, 2026), https://www.reuters.com/world/china/global-smartphone-market-faces-record-annual-decline-chip-crunch-worsens-2026-06-01/.

[16] See Jitesh Ubrani & Jean Phillippe Bouchard, *PC Market Enters Volatile Territory as Memory Shortage Persists Through 2027,* INTERNATIONAL DATA CORPORATION (June 1, 2026), https://www.idc.com/resource-center/blog/pc-market-enters-volatile-territory-as-memory-shortage-persists-through-2027/ (explaining that global PC shipments will decline 11.3% in 2026, with Q4 down 20% year-over-year, no meaningful relief before the end of 2027, and PC ASP growth of 17% in 2026).

[17] *See* MCPC, *Corporate Memory Loss: How the Global Memory Shortage Is Reshaping Device Planning*, CIO (Apr. 14, 2026), https://www.cio.com/article/4158392/corporate-memory-loss-how-the-global-memory-shortage-is-reshaping-device-planning.html; *see also* Arjun Kharpal, *Memory Chip Shortage to Last Through 2027, Semiconductor Boss Says*, CNBC (Jan. 26, 2026), https://www.cnbc.com/2026/01/26/memory-chip-shortage-synopsys-lenovo-ai-data-centers.html.

overview of a number of near- and long-term policy options for policymakers to explore, with an emphasis on avoiding additional cost burdens, improving supply-chain visibility, and removing barriers to resilient ICTS supply chains.

III. Near-Term Policy Options to Address Prices and Affordability

A. Potential Tariff and Trade Measures

In the near term, policymakers should avoid adding artificial cost pressures to products already affected by memory scarcity. Tariffs, duties, or other trade measures that increase the cost of memory chips, memory modules, semiconductor inputs, or affected finished products could compound shortage-driven price increases and make it more difficult for manufacturers and wireless providers to preserve device affordability.[18] To ensure this "do no harm" approach, policymakers could consider mechanisms such as a Section 301 exclusion process,[19] a Miscellaneous Tariff Bill or another duty-suspension measure,[20] or a targeted carve-out from applicable Section 232 measures,[21] where such measures would otherwise increase costs for constrained memory products or equipment that depends on them.

Trade stabilization measures could help ensure that policy interventions do not exacerbate the situation, and could help alleviate a source of price pressure that accrues to the cost of finished goods, but would not in themselves mitigate the core supply shortages and memory price inflation currently besetting the market. Alleviating these pressures would likely require more direct policy measures.

B. Procurement, Design, and Sourcing Flexibility

Manufacturers and network operators could reduce near-term pressure by qualifying alternative suppliers, exploring steps to redesign products to use memory that is easier to obtain (noting the challenges in redesign discussed above), and adopting multi-supplier procurement strategies. Government agencies and private certification bodies could expedite procedures for approving substitute components or redesigned products. Companies could use supply-chain analytics to predict shortages, adjust production schedules, and allocate scarce components more efficiently.

---

[18] *See, e.g.,* Robert D. Atkinson, *Economic Consequences of Section 232 Tariffs on Semiconductor Imports*, INFO. TECH. & INNOVATION FOUND. (June 24, 2026), https://itif.org/publications/2026/06/24/economic-consequences-of-section-232-tariffs-on-semiconductor-imports/ (finding that President Trump's Section 232 tariffs on semiconductor imports—issued in January 2026 to impose a 25 percent tariff on a narrow category of advanced semiconductor components—will permanently destroy chip affordability by raising prices up to 47.6% and will trigger cascading technology cost hikes that ultimately strip up to $4.4 trillion from U.S. GDP over a decade).

[19] DANIELLE M. TRACHTENBERG, CONG. RSCH. SERV., IF11346, SECTION 301 OF THE TRADE ACT OF 1974 (2026), https://www.congress.gov/crs-product/IF11346.

[20] Int'l Trade Admin., Miscellaneous Tariff Bill, U.S. DEP'T OF COM., https://www.trade.gov/feature-article/miscellaneous-tariff-bill (last visited July 10, 2026).

[21] KYLA H. KITAMURA, CONG. RSCH. SERV., IF13006, SECTION 232 OF THE TRADE EXPANSION ACT OF 1962 (July 1, 2026), https://www.congress.gov/crs-product/IF13006.

Geographic diversification could also reduce dependence on a single manufacturer or region. Firms could develop sourcing relationships across North America, Europe, and Asia or enter partnerships that allow shared production infrastructure, inventories, or technical expertise.

These measures would not necessarily increase total supply. Alternative suppliers may depend on the same constrained fabs, packaging facilities, or critical inputs. Diversification may therefore spread risk across more suppliers without eliminating the underlying shortage. Expedited approval should also not come at the expense of necessary reliability, safety, security, compatibility, and performance testing. Substituting memory in telecommunications equipment can affect power use, heat management, software compatibility, cybersecurity, and long-term reliability. The goal should be to speed up validation without eliminating important safeguards.

IV. Longer-Term Policy Options

As policymakers consider longer-term options for addressing the memory chip shortage, they should view the challenge through the broader lens of maintaining the resilience, robustness, and responsiveness of the ICTS market in general. The memory chip shortage is an acute challenge at this moment, but as AI and other advanced telecom and tech developments continue, market disruptions will likely occur in other areas. Policymakers should consider the below possibilities specific to memory chips as applicable more broadly to other areas of the ICTS market.

A. Expand Domestic and Allied/Partner Memory Capacity

The United States should extend incentives and potentially consider new ones to not only help reduce production costs in the U.S. but also strengthen long-term semiconductor resilience in both capacity and other important aspects of memory production. New manufacturing facilities require significant capital investment and often take many years to permit, construct, equip, qualify, and reach commercial-scale production. Accordingly, government policy should complement — not replace — market-driven investment by providing long-term certainty for projects whose capacity will come online several years later.

This reality underscores the importance of extending the Advanced Manufacturing Investment Credit ("AMIC"). Long-term, predictable incentives are necessary to support investment decisions that are made years before additional capacity comes online. Extending AMIC would help sustain the pipeline of manufacturing projects needed to increase domestic production, reduce future supply vulnerabilities, and ensure the United States remains competitive in advanced semiconductor manufacturing.

In addition, in the more immediate term, the U.S. could extend CHIPS Act-style incentives more explicitly to memory fabrication, packaging, testing, and related supply-chain infrastructure. Allied governments could adopt complementary programs. Government support could reduce the financial risk of building new capacity in an industry known for sharp price swings. It could also advance national security, technological independence, and supply-chain resilience.

Again, AMIC plays a critical role in expanding domestic semiconductor manufacturing capacity and strengthening supply chain resilience. However, incentives must be designed carefully to help increase the capacity of memory products experiencing shortages and address the requirements of HBM, DRAM, NAND flash, legacy memory, advanced packaging, or other semiconductor segments. In addition, the government could create incentives that focus on reliable access to electricity, water, materials, specialized equipment, skilled workers, advanced packaging, assembly, and testing.

B. Allied/Partner Trade and Investment Arrangements

Because semiconductor supply chains extend across many countries, the United States cannot create a resilient memory supply chain through domestic fabrication alone. Fabrication, materials, packaging, assembly, testing, and critical-mineral processing occur across multiple countries. Trade and investment agreements could encourage allied/partner production, joint investment, diversified sourcing, information sharing, and emergency supply arrangements. Partners could also seek to avoid imposing export restrictions on one another during shortages.

Allied/partner coordination may reduce exposure to geopolitical disputes, trade fragmentation, and retaliation involving critical minerals or semiconductor products. It could also permit countries to specialize in different parts of the supply chain while maintaining reliable cross-border access. Such arrangements must account for competing national industrial policies, localization measures, import duties, export controls, and foreign-investment restrictions. Policies intended to protect advanced technology may also reduce supply-chain flexibility.

C. Regulatory, Permitting, and Infrastructure Reform

Accelerating the permitting and construction of semiconductor facilities could reduce the time needed to expand domestic and allied production. Semiconductor plants require reliable electricity, large quantities of water, transportation infrastructure, specialized equipment, and a highly skilled workforce.

Permitting reform alone will not solve those problems, but unnecessary delay can make them worse. Policymakers could coordinate environmental review, infrastructure approvals, power interconnection, water access, workforce development, and local permitting. International coordination may also be necessary where production depends on materials or manufacturing inputs located abroad. A domestic fab cannot operate reliably if export restrictions or processing bottlenecks prevent access to critical minerals, chemicals, substrates, or equipment.

V. Conclusion

The current memory chip shortage underscores both the promise of AI and the need for resilient ICTS supply chains. The wireless industry supports AI innovation, but AI infrastructure is creating strong demand for advanced memory, and manufacturers are responding by directing more resources toward higher-margin products used in AI systems. That shift is limiting the supply and increasing the cost of memory used in consumer devices, communications equipment, vehicles, and other markets. Policymakers should respond by: (1) avoiding measures that add costs or reduce flexibility; (2) coordinating with allies and partners; and (3) promoting long-term ICTS supply-chain resilience.