The Semi Shortage Faces New Headwinds

Quote
"I would say that hardware is the bone of the head, the skull. The semiconductor is the brain within the head. The software is the wisdom and data is the knowledge."

- Masayoshi Son, SoftBank CEO

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Semiconductors have been described as “the brains of modern electronics.” The small but powerful chips are a critical component to today’s connected devices, enabling everything from smartphones and TVs, to computers and automobiles, to advanced medical equipment and state of the art defense and aerospace technologies. In plain terms, the modern, digital world would not be possible without these chips. Which is part of the reason why the semi shortage has been so detrimental to the global supply chain over the past year.

Eager pontificators have shared various predictions about how long the ongoing shortage will ripple through the global supply chain and (by extension) global economy. But, lacking crystal ball, what’s clear is that the situation will remain extremely fragile for the foreseeable future – especially considering new headwinds related to neon gas supplies and the Ukraine-Russia war.

A report commissioned by the U.S. Department of Commerce concluded that “the chip industry is operating at full capacity, beset with numerous supply chain bottlenecks and unable to tolerate disruptions of any sort. For example, any interruption to overseas manufacturers, such as a COVID-19 outbreak or weather-related incident, could lead to production shutdowns in the U.S.” Just ask Ford Motor Company, which recently announced that it was shutting down production of its most popular vehicle, the Ford F-150, due to chip shortages.

Crisis in Eastern Europe
Over the past week, the world has been understandably focused on the humanitarian and geopolitical crisis in Ukraine. Economically, most media outlets and financial publications have concentrated on Western sanctions targeted at Russian businesses and oligarchs, stressing how these sanctions could disrupt the world order. A sharp rise in the price of oil has also been a major focus as Russia, one of the world’s largest oil producers, is cut off from the Western world. Something that hasn’t been as broadly publicized is how the war could have a downstream impact on the semi shortage – putting pressure on an industry that lacks the capacity to tolerate further disruptions.

Among Putin’s first targets in his invasion of Ukraine was Odesa, a port city on the Black Sea. Unfortunately, the city is not a stranger to foreign invasion. In 1941, Odesa was attacked by Romanian and German troops and was eventually subject to Axis occupation before being liberated by the Red Army in 1944. Following WWII, the city rebounded and developed shipbuilding, oil refining, chemicals, and metalworking industries. Today, the city is home to more than 1 million people, including to little-known companies Cryoin and Iceblick.

Cryoin and Iceblick make neon gas, which is a substance used to power lasers that etch patterns into semiconductor chips. However, company operations were halted last Thursday as Russian forces attacked the region, making it too dangerous to reopen. Given that between 50%-70% of the world’s neon gas is exported from Ukraine, Putin’s war has the potential to further

disrupt the semi shortage – ratcheting up pressures and concerns for chip manufacturers in Europe, Japan, Korea, China, Taiwan, and the United States.

Unfortunately, chipmakers in the United States are poised to feel the brunt of this impact. While chipmakers in Asia and Europe diversified away from their dependence on Ukrainian-sourced neon gas following Russia's annexation of Crimea in 2014, chipmakers in the United States remain highly dependent on Ukraine for this specialized product. Lita Shon-Roy, president and CEO of TechCet, predicts that Ukraine supplies US chipmakers with between 80% and 90% of its neon gas. As a result, the White House reportedly urged US chipmakers to find alternative suppliers last week.

Beyond the Ukraine-Russia War

In May of last year, investigative journalists on 60 Minutes profiled how the chip shortage highlighted the United State's dependence on a fragile supply chain. The special also documented how US chipmakers were once the dominant player in the semiconductor industry, but have recently been surpassed by technological advancements in Asia (specifically Taiwan). One of the geopolitical fears confronting the world is how China will view Russia's invasion of Ukraine, and whether it will compel them towards similar action against Taiwan, which is home to the most advanced chipsets in the world.

While it's impossible to speculate on this matter, it highlights the incredibly fragile nature of the semiconductor ecosystem. Given that semiconductors are key components to modern day technology, any disruption to this delicate and highly technical industry has the potential to cascade downhill like an avalanche.

Most analysts are currently downplaying the impact of the Ukraine-Russia war on the supply of semis. The Semiconductor Industry Association (SIA) came out with a statement last week echoing the same sentiment, saying: "The semiconductor industry has a diverse set of suppliers of key materials and gases, so we do not believe there are immediate supply disruption risks related to Russia and Ukraine."

However, as the war drags on, it's worth watching whether US chipmakers begin to modify production forecasts due to their dependence on Ukrainian-sourced neon. Doing so could add additional pressure on the global supply chain and tilt the balance of power towards international chipmakers that have already diversified away from Ukrainian-sourced neon gas. On the other hand, if analysts are correct and other neon gas suppliers can quickly ramp production to cover the shortfall, the impact of the Ukraine-Russia war on global chip supplies will likely remain limited.

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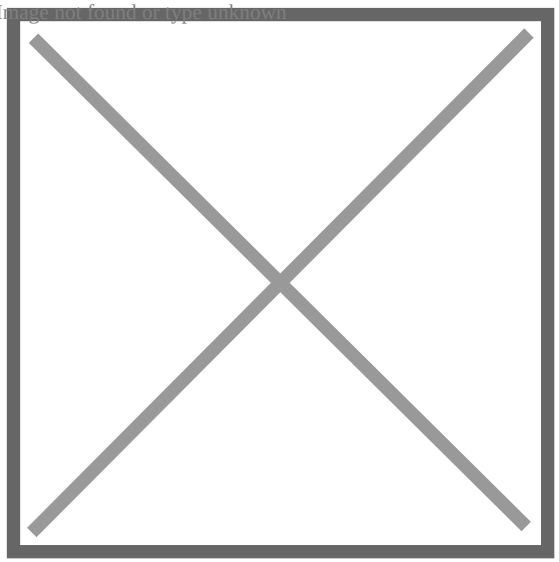

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