

Jak: Localization Tears Apart the Globalization of the Semiconductor Supply Chain

HONG KONG, CHINA, February 3, 2023 /EINPresswire.com/ -- Europe, America, Japan, Korea, and other countries have very consistent strategic demands to implement and strengthen the localization of the semiconductor supply chain. That is to say, on the premise of ensuring their absolute advantages, they should try their best to complete the local weaknesses of the supply chain, realize the control of the whole semiconductor industry chain and get rid of the dependence on the outside world.

The semiconductor supply chain is a complete end-to-end system, including front-end research and development, upstream design and midstream manufacturing, downstream closed test and back-end sales, service and technical support, as well as semiconductor equipment and materials. Over the past half century, the semiconductor supply chain has been developing according to Moore's Law. Although the distribution of semiconductor enterprises presents a regionalized and clustered pattern due to the differences in technology and factor endowment between countries and regions, it does not affect the coordinated operation of the global industry and the smooth supply and demand of the market on the whole. Only in recent years have there been distortions and reversals due to policy-driven localization in major economies, increasing the risk of disruption and fragmentation in the global semiconductor supply chain.

Under the Chip and Science Act, the United States earmarked \$52.7 billion in subsidies from 2022 to 2026 for companies that invest in chip research, development, and manufacturing in the United States, plus a 25 percent tax credit, for a total of \$24 billion in tax credits. America's self-first policy has attracted the EU to follow. Under the European Chip Act, the EU will provide 45 billion euros in funding for chip and MCU manufacturing, pilot projects, and entrepreneurship in Europe by 2030, while allowing member governments to subsidize a wider range of chip companies than just the most advanced ones, covering chips that bring innovation in computing power, energy efficiency, environmental benefits, and artificial intelligence. The aim is to increase the EU's 8% share of global chip production to 20%.

In Asia, the "semiconductor digital industry strategy" established by Japan aims to strengthen cooperation with overseas partners, jointly develop cutting-edge semiconductor manufacturing technology and ensure production capacity, and transfer part of the supply chain of the partners to Japan. For this purpose, Japan's Ministry of Economy and Trade has provided subsidies to Taiwan Semiconductor Manufacturing Company, and American chip manufacturers Micron, Kaixia, and Western Digital. The Rapidus chip consortium, led by SONY Corp. and NEC Corp. with \$500 million from the Japanese government and about \$7 million each from other participants, was also launched with much fanfare. In addition, Korea announced the "K-Semiconductor Strategy" to invest 510 trillion won in the semiconductor industry by 2030, and the National Assembly passed a special law on semiconductors that expanded tax incentives for semiconductor research and development and facility investment. The tax support for semiconductor companies' facility investment increased from 6-10 percent to 8-12 percent.

According to JAK Electronics, there are very consistent strategic demands in the implementation and strengthening of localization of semiconductor supply chain in Europe, America, Japan, Korea, and other countries, that is, on the premise of ensuring their absolute advantages, to make up for local weaknesses in the supply chain, to realize the control of the whole semiconductor industry chain and get rid of dependence on the outside world. The specific policy orientation has led to the regulated directional capital increase and the new allocation of capital and factors in global semiconductor enterprises. The production capacity competition orientation based on strengthening localization is bound to increase the division trend of the already unbalanced global semiconductor supply chain layout and further highlight the Matthew effect.

From the perspective of economics, the globalization of any supply chain of goods and services should include the following aspects: First, the borderless investment, that is, except the restricted areas, capital follows the principle of the lowest cost and maximum benefit in different regions and countries of the world to carry out independent and free site selection and construction of factories. Second, trade without threshold, that is, except for prohibited goods and services, other goods and services follow the principle of rapid and convenient free flow in the global scope; The third is the optimization of resource and factor allocation, that is, the enterprise follows the principle of shortest path and maximum time to acquire capital, information, technology, labor and other resource elements in the world, and make efficient arrangement and disposal. Of course, the above statement is just a pure theoretical comprehensive appeal. Meanwhile, many facts show that the globalization of the semiconductor supply chain is not only unable to do well now but also faces the coverage and erosion of the haze of anti-globalization, resulting in huge risks and costs of industrial changes.

First, in terms of industry extension length, it is very unlikely that any country tries to form a closed-loop pattern in the semiconductor supply chain, and the globalization of the original industrial chain is divided into the fragmentation of capacity distribution, which is bound to delay the future process of the semiconductor industry. The semiconductor supply chain involves a wide range of content, the global supply chain has formed the foundation of semiconductors. According to Boston Consulting Group estimates, if the major countries and regions of the world were to establish a complete local supply of semiconductors, it would require an upfront investment of US \$900 billion to US \$1,225 billion and incremental annual operating costs of US \$45 billion to US \$125 billion. Meanwhile, the American Integrated Circuit Association estimates, Building a self-sustaining US supply chain would require at least \$1tn in upfront investment and overall chip price increases of 35-65 percent. Such a huge cost is not affordable for all countries,

and even if it is barely affordable, it will take at least 10 years to establish a semiconductor supply chain. The result of the scattered and independent layout of countries will only drag and restrain the process of the semiconductor industry in terms of technology and market maturity.

Second, in terms of the inherent trend of the semiconductor supply chain, any artificial disassembly and separation against the law will certainly bring about the disorder of global industrial allocation and international trade. At present, the development of the semiconductor industry has entered a new era of accelerated innovation and cross-border integration. On the one hand, integrated circuit technology is developing towards isomerization, diversification, and multi-technology integration, and the division of labor of the industrial chain is showing a further refinement trend. On the other hand, new materials, new technologies and structures promote wafer manufacturing technology, which is also undergoing major changes. The division of labor of the industrial chain is gradually blurred, and the trend of cross and penetration of upstream and downstream is becoming more obvious. In addition, semiconductors have become the third largest producer in terms of international trade, following oil and automobiles, showing a remarkable feature of globalization. Therefore, ignoring the above ecological environment and subjectively tearing apart the global market network will only lead to the mismatch of industrial resources, lead to abnormal geo-competition, and frequent international trade friction, and ultimately endanger the security of the global semiconductor supply chain.

Third, in terms of the real purpose of this round of attempts to seek global semiconductor supply chain restructuring, the United States plays the leading role, while other major countries are passively and reluctantly involved. The main object of containment and suppression is China's semiconductor industry, but any selective policy arrangements and practical actions are based on specific target objects. In the end, it's hard to avoid killing the enemy and losing 1,000. In the case of the United States, although the erection of trade barriers against China will certainly slow down the pace of China's semiconductor industry catch-up, it will also incur many commercial losses. As the largest export market for the US chip industry, China contributes 35% of the US global market. According to estimates by the Boston Consulting Group and others, if the US adopts the policy of "technology hard decoupling" from China, the US semiconductor companies will lose 37% of their global market revenues and correspondingly reduce 15,000 to 40,000 highly skilled jobs. More importantly, under the "carrot + stick" power of the United States, many semiconductor multinational companies are forced to "choose sides", the result is helpless "innocent". In the case of South Korea, nearly 40 percent of its semiconductor exports go to China, which is the largest overseas market for Samsung Electronics and SK Hynix. If South Korean semiconductor companies bow to the U.S. and limit deals with Chinese customers, they can only imagine the price they would pay. In general, under the premise that export earnings are significantly compressed, enterprises will inevitably reduce research and development expenditure, restrain the innovation activity of the global semiconductor supply chain and lengthen the product iteration cycle.

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