

# Shortages of Semiconductors

Due to Covid-19 and increased demand for electronic products. In recent years, quite a few countries suffered from shortages of semiconductors. The shortages of semiconductors have had a great impact on the economy of many countries. "The White House reported that the shortage could have reduced U.S. Gross Domestic Product (GDP) by a full percentage point in 2021."<sup>[1]</sup> The definition of semiconductor is "an electronic conductor, resistivity in the range between metals and insulators, in which the electrical charge carrier concentration increases with increasing temperature over some temperature range."<sup>[2]</sup> Semiconductors are very important in our life because almost all electronic products need them. This essay will discuss three problems, propose possible solutions and evaluate the effectiveness of these solutions.

There are three problems with the shortages of semiconductors. The most important problem is the decline in automobile production. "Ford Motor Co said on Thursday it is cutting shifts at two plants that build its highly profitable flagship F-150 pickup trucks starting next week due to a global *shortage* of *semiconductor* chips and warned the issue could result in the loss of 10% to 20% of planned first-quarter production."<sup>[3]</sup> Chips are mainly used in the core control system of automobiles, they are an indispensable part of the car. Another possible issue is insufficient supply of electronic products and the price rise. "Ariel Abam, vice president of operations at

*semiconductor* distribution firm Infineon Technologies Mexico, predicts that the chip *shortage* will *result* not only in lower sales revenues for TV manufacturers, but also in an increase of up to 25 percent in prices for the end consumer and a 10 percent reduction in the supply of screens.”<sup>[4]</sup> In addition, shortages of semiconductors give rise to inflation. “Sen. Cantwell raised that American consumers are seeing massive increases in the price of used cars due to the national *shortage* of *semiconductor* chips.”<sup>[5]</sup> If the output of the products is insufficient, the demand exceeds supply, the price will rise. It can result in inflation. These problems seriously affected the national economic development. Thus, it needs to be solved urgently.

There are a number possible solutions that could have been implemented to solve shortages of semiconductors. One solution is for the country to enact act. The act aims at subsidizes the construction of semiconductor manufacturing plant. “The CHIPS Act earmarks \$52.7 billion in federal subsidies to U.S.-based *semiconductor* manufacturers primarily to incentivize the construction of domestic fabrication plants. It also includes \$100 billion over five years for science and technology research through the expansion of the National Science Foundation.”<sup>[6]</sup> Another clear solution is cooperation with Asian enterprises. Some East Asian countries have mature technologies for semiconductor production. “East Asia has emerged as the epicenter of fables manufacturing. TSMC and Samsung have foundry market shares of 55% and 18%, respectively. About three quarters of the global semiconductor manufacturing capacity, as well as key suppliers of key materials, are in Asia.”<sup>[7]</sup>

These two solutions can solve the problem of shortages of semiconductors effectively.

Each solution has its advantages and disadvantages. Solution1(enact the acts) the federal government provides funds to help build semiconductor production plants. It can have a positive effect on countries economy. However, constructing a fabrication plant needs three years even more time, the solution cannot take effect in a short time. As well waiting a long time, constructing a plant need a large amount money. Only a small number of enterprises have enough funds to absorb government subsidies and establish plants. Solution2(cooperate with Asian enterprises) import semiconductors from Asian enterprises. It can purchase semiconductors through the most direct and fastest way. Because each country has its own advantages, this solution can save much money. Otherwise, import from other countries is not conducive to the development to the domestic enterprises.

Overall, through shortages of semiconductors is a very serious problem from many countries, we have several solutions to solve it. From my point of view, cooperate with Asian enterprises is the most effective measure because it can save cost and time. It can still promote the common development of all countries, achieve a win-win situation for both countries.

#### **Reference list:**

---

[1] Anonymous "Consequences of semiconductor shortages, " *NAFTA (English)*, 2022

[2] Anonymous "IRE Standards on Electron Devices: Definitions of Semiconductor Terms,

1954," *Proceedings of the IRE*, vol. 42, (10), pp. 1505-1508, 1954.

[3] Anonymous "Ford cuts output of F-150 pickups due to semiconductor shortage," *National Post (f/k/a The Financial Post)(Canada)*, 2021

[4] Anonymous "Chip shortage would 'turn off' 10% of display supply," *CE Noticias Financieras English*, 2022

[5] Anonymous "WHAT'S CAUSING INFLATION? TREASURY SEC. YELLEN POINTS TO SEMICONDUCTOR SHORTAGE," *States News Service*, 2022.

[6] Anonymous "How The \$52B CHIPS Act Would Address The Semiconductor Shortage," *American Banking and Market News*, 2022

[7] J. Voas, N. Kshetri and J. F. DeFranco, "Scarcity and Global Insecurity: The Semiconductor Shortage," *IT Professional*, vol. 23, (5), pp. 78-82, 2021.