International Journal of Social, Political and Financial Researches, 2025, 5(2), 223-235
DOI: 10.70101/ussmad.1660326

Uluslararası Sosyal Siyasal ve Mali Araştırmalar Dergisi

International Journal of Social, Political and Financial Researches

https://dergipark.org.tr/tr/pub/ussmad

Araştırma Makalesi/ Research Article

Tech Cold War: China at the Gate

Teknolojik Soğuk Savaş: Kapıdaki Çin

Burcu Türkcan[a], Mustafa Mutluer[b]
[a] Assoc. Prof. Dr., Ege University, burcu.turkcan@ege.edu.tr, ORCID: 0000-0002-7494-5897
[b] Prof. Dr., Ege University, mustafa.mutluer@ege.edu.tr, ORCID: 0000-0002-4929-6055

A R T I C L E I N F O

Article Received: 18.03.2025

Article Accepted: 21.08.2025

Keywords: Semiconductor industry, Microchips, Economic policy, China

JEL Codes: F13, L52, O33

ABSTRACT

Power balances across nation-states have changed because of the semiconductor production since 1970s. Manufacture of microchips have shifted through China, by providing higher growth, trade and competitiveness rates. Hence, the United States has begun to apply compulsory policies on trading with and investing in China. However, the rise of Chinese production in the semiconductor industry is still tremendous. Emerging discussions suggest that the current rivalry can be called as the Second Cold War. However, this definition is not completely true, since China's socio-economic structure is not similar to USSR. Hence, this study adopts the Tech Cold War phrase, which is defined as a geopolitical rivalry between superpowers trying to achieve supremacy over critical technologies. Moreover, all these discussions show that there is an urgent need to analyse the current situation to understand the inclinations in global power balances. Therefore, the main aims of this study are twofold. The first is analyzing the current situation of both countries from the view of microchip production and trade. And, the second is foresighting power balances of new global era. Since there is a shortage about the economic-policy analyses about this issue, it's expected to make a contribution to the related literature.

MAKALE BİLGİSİ

Makale Gönderim Tarihi: 18.03.2025

Tarihi: 21.08.2025

Anahtar Kelimeler: Yarı iletken endüstrisi, Mikroçipler, İktisat politikası, Çin

JEL Kodları: F13, L52, O33

ÖZ

1970'lerden bu yana ulus devletler arasındaki güç dengeleri yarı iletkenler üretimi nedeniyle değişim göstermiştir. Mikroçip üretimi, daha yüksek büyüme, ticaret ve rekabet gücü oranları sağlayarak Çin'e kaymıştır. Bu nedenle ABD, Çin ile ticaret ve Çin'e yatırım konularında zorunlu politikalar uygulamaya başlamıştır. Ancak yarı iletken endüstrisinde Çin üretiminin yükselişi hala çok büyüktür. Güncel tartışmalar, mevcut rekabetin İkinci Soğuk Savaş olarak adlandırılabileceğini işaret etmektedir. Ancak Çin'in sosyoekonomik yapısı SSCB'ye benzemediğinden bu tanım tam olarak doğru değildir. Dolayısıyla bu çalışma, kritik teknolojiler üzerinde üstünlük sağlamaya çalışan süper güçler arasındaki jeopolitik rekabet olarak tanımlanan Teknolojik Soğuk Savaş ifadesini benimsemektedir. Üstelik tüm bu tartışmalar, küresel güç dengelerindeki eğilimleri anlamak için mevcut durumun acilen analiz edilmesi gerektiğini göstermektedir. Dolayısıyla bu çalışmanın temel amacı iki yönlüdür. Birincisi, mikroçip üretimi ve ticareti açısından her iki ülkenin mevcut durumunun analiz edilmesidir. İkincisi ise yeni küresel çağın güç dengelerinin öngörülebilmesidir. Bu konuya ilişkin ekonomi politikası analizlerinde eksiklik olması nedeniyle ilgili literatüre katkı yapılması hedeflenmektedir.

Introduction

Microchips are integrated circuits or semiconductor devices which pushed the global industrial production to a new era in 1970s (Jensen, 2022; Edwards, 1997). Although they were firstly main component of computers, today they are used in ICT (Information and communication technologies) products, automobiles, electronic kitchen wares and even in toys. As the world has getting more and more digitalized, the need for semiconductors production increases and the shortage of microchips arises (Aboagye et al., 2022). This fact has created a new political power area for countries, especially after the COVID-19 pandemic. However, this fact is not new phenomenon and the story dates back to the Cold War.

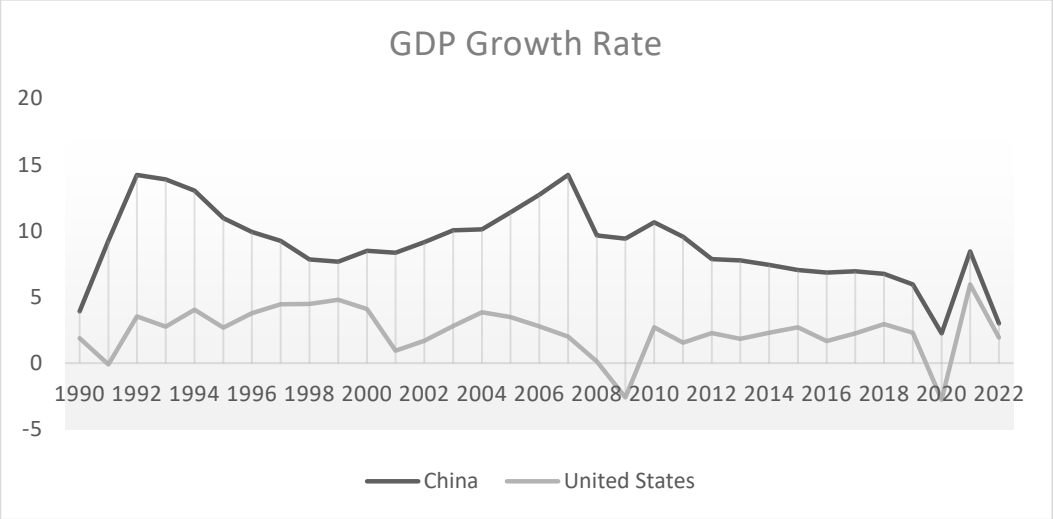
After 1980s, semiconductor industry's production has shifted from the USA towards the third World. The main reasons behind this shift was the decreases in trade barriers and transportation costs, and the integration of China to the global economy –especially following World Trade Organization (WTO) membership in 2001 (Bown, 2020, p. 351). After the Cold War, China and USA have developed intense cooperation in science and technology. The main reason behind this fact was the low skilled labor force and relatively loose environmental control of China. During 1990s, U.S. companies had an opinion that as long as intellectual property rights were owned by themselves, there was nothing wrong to transfer their manufacturing through Asia. However, 2008 global financial crisis has changed the global power balances. Western Europe and the USA have drastically affected by the crisis but Mainland China has exhibited a steady rise in especially high technology production and value added. As ICT industry has grown, U.S. companies have faced with decreases in their value added. This reality has noticed by Obama administration and first attempts have been made against Chinese companies (Haiyong, 2019, p. 197 – 199). Following Obama presidency, Trump administration changed U.S. trade policy towards China by imposing significant tariffs during 2017 – 2021 period (Bown, 2021, p. 805). This tension between two giants of the World economy caused a new era of bilateral relationships which is possible to reshape the future trends of the world economy. This strain was mainly focused on high technology production and trade, and it can be said that it was inevitable. Moreover, after Donald Trump was re-elected, he reignited the trade war between the US and China. At the beginning of 2025, he imposed higher tariffs towards China and China reacted significantly. In these new tariff wars, the critical sectors were again electronics, automotive, steel and aluminum (The Guardian, 2025).

Following all these facts, this study focuses on the semiconductor industry developments in China and the USA. In this context, the purposes of this study are twofold. The first purpose is to detect the framework of current situation, and the positions of countries in terms of microchip production and trade. And the second purpose is to analyse the acts of both the USA and China. Drawing the framework of the current situation and analyzing the behaviors of countries help to foresight both the development path of the semiconductor industry and power balances of the new era. Since there is a shortage about the economic policy analyses about this issue, it's expected to make a contribution to the related literature.

1. Macroeconomic Outlook for China and the USA

Macroeconomic conditions are the fundamental indicators to evaluate the competitive positions and potentials of countries. In this sense, this section of the study tries to draw a frame for the macroeconomic outlook of Chinese and US economies. In this context, the first major economic indicator is economic growth rates of China and the USA. Figure 1 exhibits GDP (Gross Domestic Product) growth rates of both countries. Chinese economic growth experience has accelerated in 1990s. It's observed that between 1990-1992 there is an economic boom in China. A similar trend can also be observed between 2001-2007. There is another significant economic growth increase between 2020-2021. While China exposes such important jumps in its economic growth rates, the USA experience significant increases only following global crises years. After global financial crisis, U.S. economic growth rate increases significantly. Also, following the COVID-19 pandemic, it increases drastically, too. However, overall outlook exhibits that China has always had higher economic growth rates than the USA since 1990. Although there are some ups and downs due to global crisis years, it generally exhibits a growth rate higher than %5. Even in some years, growth rates reach to 15%. However, it seems that the USA has never experienced such high rates during last 30 years. This evidence shows the high potential of Chinese economy and its rise after 1990s.

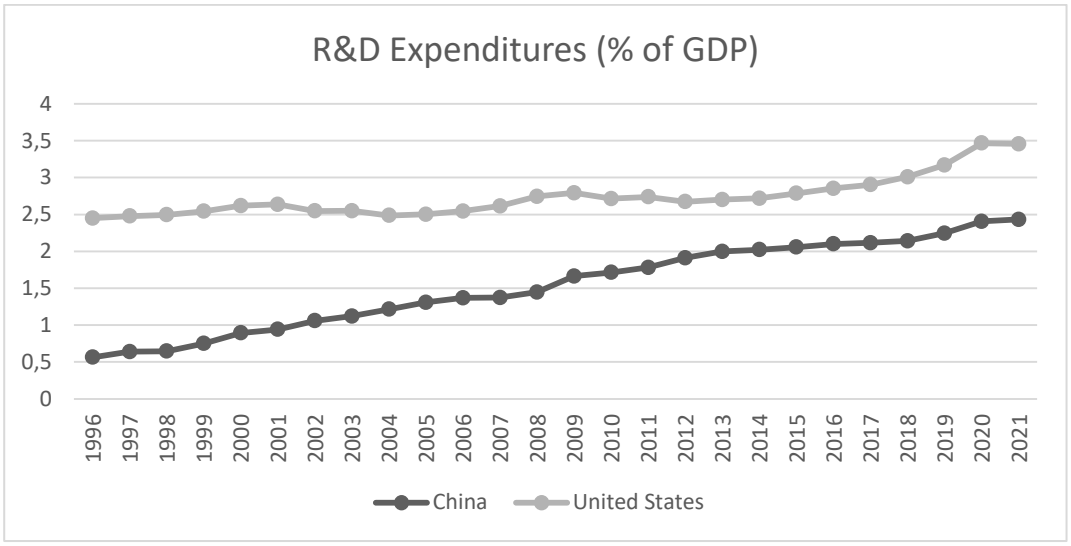
Figure 1: Economic Growth Rates of China and the USA



Source: (World Bank, 2025)

Today's world is characterized by technological developments and the competitive advantages of economies mainly arise from high-tech production (Burton, 1993, p. 120). In this manner, the fundamental indicator of the importance given to technology is research and development (R&D) activities. Figure 2 displays R&D expenditures as a percentage of GDP in China and the USA. Series show that the share of R&D expenditures have always been higher in the USA since the mid of 1990s. However, there is another remarkable point in the figure that the gap between two series has steadily been closing during those years. China has increased its R&D expenditures' share in overall GDP and it has approached 2% which is 4 times higher than the rate in 1996.

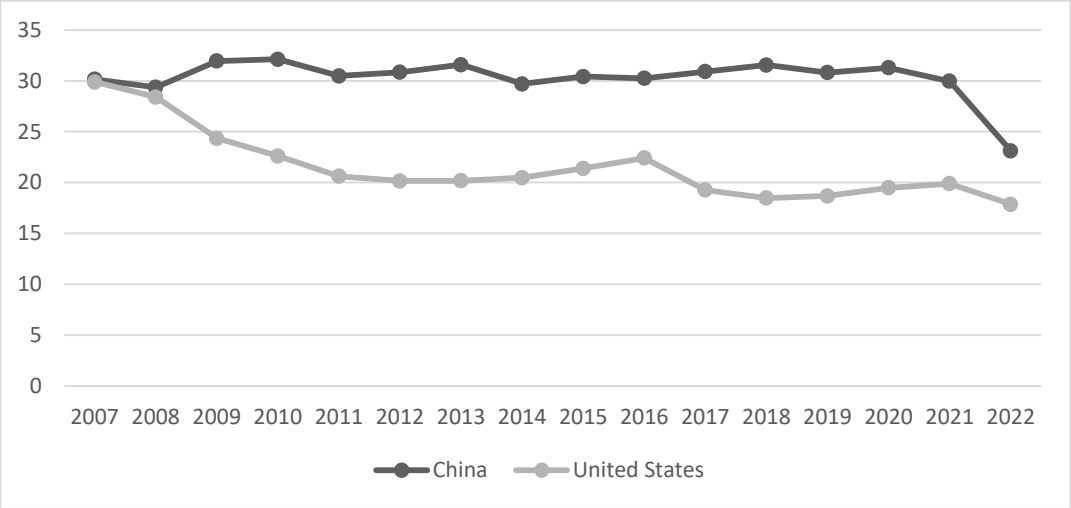
Figure 2: Research and Development Expenditures as a Percentage of GDP



Source: (World Bank, 2025).

It's sure that R&D expenditures become meaningful when they turn to exportable products. In this sense, Figure 3 shows high technology exports as a percentage of manufactured exports in China and the USA. Figure is for the time-span between the years of 2007 and 2022. It seems that following 2008, a significant gap has occurred between the shares of China and the USA. The main reason of this gap seems the decrease in high-tech exports share of US economy. Although China expresses a stability in its shares, it has also experienced a significant decline after 2021.

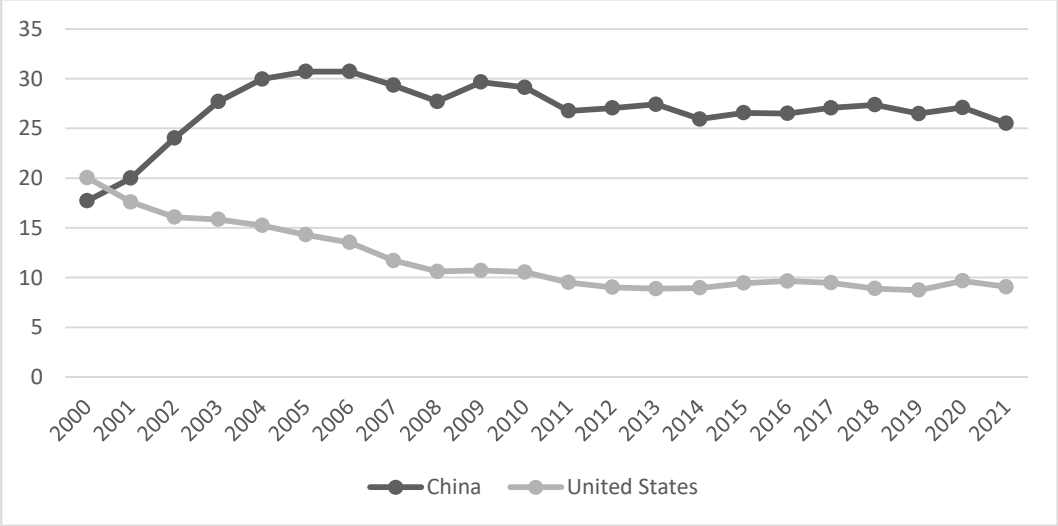
Figure 3: High Technology Exports as a Percentage of Manufactured Exports



Source: (World Bank, 2025).

ICT has a special importance across high-technology production and trade. It has reshaped the global economy by raising productivity and accelerating globalization (Erdil et al., 2010, p. 148). In this manner, it's important to evaluate the share of ICT exports across overall exports. Figure 4 exhibits ICT goods exports as a percentage of total goods exports in both China and the USA. The graph highlights the significant gap between the shares in both countries. The share of ICT exports has steadily increased in China between 2000 – 2005. Then it has slightly decreased to approximately 25% which is a quite high rate for an economy. On the other hand, the U.S. economy has experienced a drastic decrease in shares between 2000 – 2021. The share of ICT exports has decreased from 20% to 10% at the end of the relevant period.

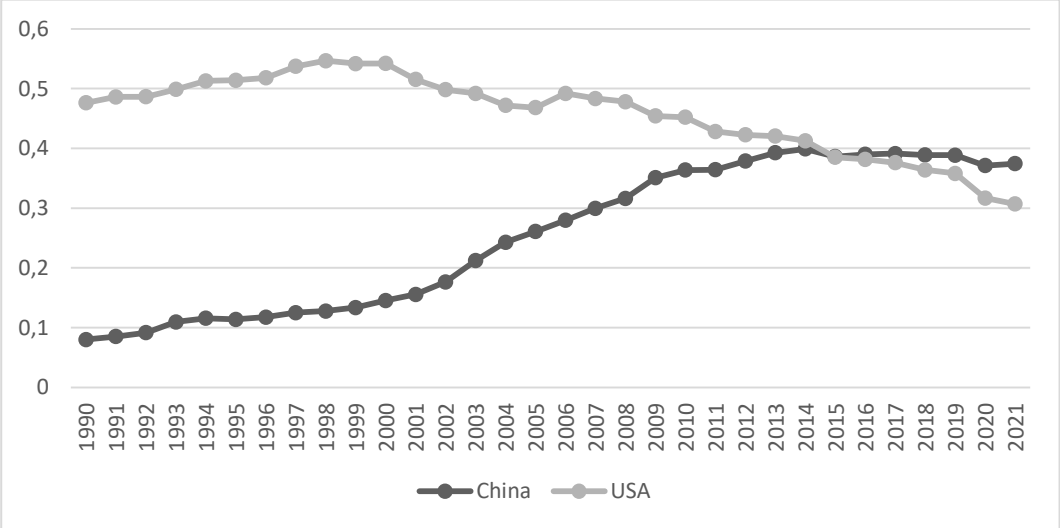
Figure 4: Information and Communication Technologies Goods Exports as a Percentage of Total Goods Exports



Source: (World Bank, 2025).

Since our main concern is international competitiveness from the point of high-tech production – namely semiconductor industry, it's important to examine the developments in competitive industrial performance index (CIP) in both countries. CIP index measures the countries' rates of competitiveness. It has 4 performance indicators as: the manufacturing industry value added, the manufacturing industry exports, the ratio of medium and high technology industries' value added, and the ratio medium and high technology industries' exports (UNIDO, 2002). Figure 5 displays CIP Index of China and the USA between 1990 and 2021. It seems that competitive industrial performance of China has significantly increased during 1990 – 2014 and beaded the USA out after 2014. There is also a decline trend in US's competitive industrial performance during this period.

Figure 5: Competitive Industrial Performance Index



Source: (World Bank, 2025).

2. The U.S. Economic Policy Towards China: Gathering the Pieces of the Puzzle

Power is a multifaceted concept in international relations. Dahl (1957) defines the power as a relational concept, which provides superiority for a country over another. Further, Holsti (1964) defines the power as a tool to achieve national interests. However, the contemporary analyses have brought about a more comprehensive understanding for the concept of power. Today, technology is perceived as a direct tool to provide structural power and enhance power base (Alfian et al., 2025). In this context, Uruguay Round Agreement in 1995, opened the doors of a more globalized and integrated world trade by cutting tariffs in international trade. In 1997, the Information Technology Agreement (ITA) resulted in more tariff cuts for numerous advanced technology products. In 2001 China participated in World Trade Organization (WTO) and then joined the ITA (Bown, 2020, p. 364). However, in the following years, the rapid rise of China in advanced technologies – especially in semiconductors industry- tied the USA into knots. The rise of China caused some trade barriers and investment barriers set by the USA.

2.1. Trade Barriers

Before 2017, U.S. trade with China was liberal by imposing low tariffs on exported goods from China. However, it does not mean that U.S.-China trade relations were similar to US-other WTO members trade relations. The USA always treated China very differently. Trade remedies were always in turn (Bown, 2021, p. 808). However, Donald Trump has changed the trade relations with China, significantly. He has engaged in an aggressive trade campaign against China during his presidency (2017 – 2021). The U.S. government convinced European partners to ban Chinese 5G network suppliers. However, they found it risky, since the global world was so interconnected that export bans and other trade barriers could not prevent the rise of China in high-tech industries. Although they did not ignore the push of the U.S. at this issue, they also did not take high action to side with the USA (Barkin, 2020, p. 2). The only significant action was taken as imposing bans to Huawei in Great Britain, Poland and Germany (Gladstone, 2020).

The US trade protection process started in April 2017. Then, Export Control Reform Act - ECRA (signed in August 2018) set a very offensive approach, suggesting that China should have been prevented to buy vital technologies from the USA. This act defended that China may have got those vital technologies to use for military purposes against the USA. This Act has arisen due to the increasing Chinese government efforts to take apart in the development of advanced technologies in the Silicon Valley (Barkin, 2020, p. 4). The list of banned goods in case of export controls in this Act was as follows: artificial intelligence and machine learning technologies, quantum information and sensing technologies, 3D printing, advanced computing technology, position-navigation and timing (PNT) technology, data analytics technology, brain-computer interfaces, advanced materials, biotechnology, microprocessor technology, logistics technology, robotics, advanced surveillance technologies and, hypersonics (U.S. Federal Register, 2018). All the mentioned goods rely on semiconductors and hence, semiconductor tariffs were imposed in July 2018 (just before the set of ECRA). The US government imposed 25% tariffs on semiconducters. In 2018, the U.S. government imposed $250 billion

tariffs on hundreds of Chinese products imported into the US. Furthermore, China answered this with $110 billion tariffs of U.S. products (Kempf et al., 2021, p. 64).

Moreover, in 2019, another action came from the US government by limiting U.S. semiconductor sales to China (specifically to Huawei). However, this action did not work. Because Huawei started to import semiconductors from Taiwan and South Korea (Bown, 2020, p. 350). Huawei was on target because of the introduction of 5G technology. It is a Chinese telecom giant, which has a superpower against this industry (Haiyong, 2019, p. 199).

By 2022, China imported about 90% of its requirements in the microchip industry. It produces only about 15% of the global semiconductor output. It annually spends more than US$400 billion in importing microchips. In October 2022, new rules were announced that require U.S. companies, such as Nvidia and AMD, to stop supplying Chinese chipmakers. Further control measures were implemented in December 2022. The U.S. Commerce Department's Bureau of Industry and Security added Chinese memory chipmaker Yangtze Memory Technologies Corp. (YMTC) and 21 companies in the artificial intelligence to a trade blacklist. With the efforts of the USA, Japan, and The Netherlands agreed to tighten export restrictions of chip manufacturing equipment to Chinese companies in January 2023 (Kshetri, 2023, p. 101-102). On February 2025, Trump announced that he would rise tariffs on semiconductor chips by almost 25% (Dev, 2025).

2.2. Investment Barriers

In August 2022, the CHIPS and Science Act has been enacted by Washington to attract investment in semiconductor research and production in the USA. In two years, 90 new semiconductor projects have been announced across the country. 448 billion dollars private investments have been made across 28 states. These investments have created 58.000 new direct jobs in semiconductor industry (SIA, 2024). By the courtesy of this Act, it's projected that the semiconductor industry's workforce will grow approximately 115.000 jobs (33% growth) by 2030 (Martin & Rosso, 2023, p. 4). However, other regions of the World have also acts and plans to enhance semiconductor investments. Since 2021, Japan, Singapore, South Korea and the European Union have announced their own legislations to support their domestic semiconductor R&D investments. As also known, Mainland China has invested over a hundred billion dollars to support its domestic semiconductor industry. All these countries (including the USA) perceives the semiconductor industry as a growth-providing and national security-supporting industry (SIA, 2022, p. 11).

All the aforementioned investment incentives have arisen from the facts of the fall of US and the rise of China in semiconductor industry in the beginning of 2000s. In 1990s, the U.S.'s manufacturing capacity in semiconductor industry was 37%, but it fell to 12% in 2000s. Moreover, it's forecasted that China will add about 40% manufacturing capacity until 2030. What is more is that currently, 75% of global capacity in semiconductor industry is concentrated in East Asia (Varas et al., 2020, p. 1). This evidence is especially critical for the USA national defense, since it mainly depends on the manufactures of Asia. Consequently, some investment barriers are in turn to prevent the rise of China in semiconductor industry.

In 2018, the White House issued the Presidential Memorandum on the Actions by the United States Related to the Section 301 Investigation. In this Memorandum, it accused China about preventing U.S. companies to invest in key semiconductor areas in China by imposing foreign ownership restrictions. Also, it accused China to support theft from the computer networks of U.S. companies. Hence, the next step came by imposing restrictions on Chinese investments in the USA. The Trump administration reformed the reviews of the Committee on Foreign Investment in the United States (CFIUS). As a result of this attempt, number of Chinese companies sharply declined in the USA since 2018 (Haiyong, 2019, p. 201 – 204). As another action, U.S. citizens and green-card holders were banned from working for Chinese entities producing certain microchip technologies, by the action declared on 7th October, 2022 (Kshetri, 2023, p. 103).

3. The Consequences of the 'Tech Cold War'

Some studies in the literature calls the tension between U.S. and Mainland China as the "Second Cold War". Some emerging discussions suggest that the rivalry between the USA and China is similar to the Cold War Era. However, we strongly believe that this definition is not completely true. Since China transitioned to liberal and capitalist society era by opening its markets and being a member of World Trade Organization, its conditions are not similar to USSR. What is more is that unlike to the situations of USSR and the USA during the Cold War, China's overall welfare seems steadily increasing while the U.S. economy is struggling since the Global Financial Crisis (Schindler et al., 2023, p. 8). So it's better to adopt "Tech Cold War" phrase to describe this emerging era (Haiyong, 2019). Tech Cold War is defined as "geopolitical rivalry between superpowers trying to achieve supremacy over technologies which have critical importance for both human development and national security" (Tung et al., 2023, p. 4). As mentioned in the previous sections, this war between China and the USA

has two fundamental dimensions as trade barriers and investment barriers. Actually both dimensions were the obstacles set by the USA against China. Although China also had some precautions like partnership share limits and investment quotas against the USA, the aggressive actor of this war has been the U.S. government. However, all the actions made through China specific to semiconductor industry have brought some significant consequences.

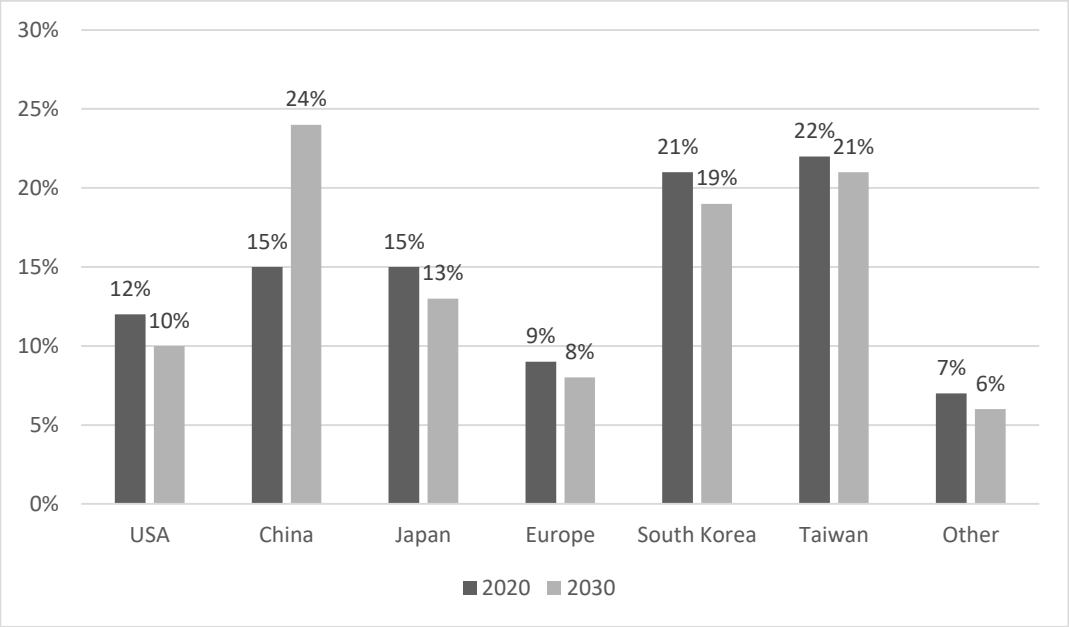
Following the aggressive acts of U.S. government against China and trade hardships of Covid-19 pandemic, in 2021, a significant microchip shortage has occurred in the global market. This shortage was so severe that productions of smartphones, computer equipment, game consoles, electric vehicles etc. have declined drastically. Especially the rise of electric vehicles created a supply-demand imbalance in the markets since such cars needed numerous microchips. The U.S., Japanese and German governments were supporting electric vehicle manufacturing but car companies couldn't find enough chips to produce the demanded cars. Another important sector affected by the shortage was the computer industry. As known, the pandemic reshaped the world with lock-downs. People started to use more social media and work from home. Hence, some platforms such as Zoom, Netflix, Microsoft Teams have started to be used by millions of people and this huge demand created a significant demand for laptops, tablets and computer equipment. Combining with the chip shortage, this huge demand caused the higher prices in computer industry and 3-4 months of delays for shipment. Samsung canceled the Galaxy Note Series, Xiaomi lost approximately 30% of its market worth, Huawei dropped to the second place behind Apple in the market (Mohammad et al., 2002, p. 477-478).

During this supply chain problem, the most of the Silicon Valley companies tried to produce their own microchips but most of the leading U.S. semiconductor companies preferred to outsource the chips to Samsung and Taiwan Semiconductor Manufacturing Company (TSMC) (Wall Street Journal, 2021). At the same time, China started to outsource some amount of microchips from TSMC and hence Taiwan has gained a strategic role in the global semiconductor industry (Kempf et al., 2021). Another consequence of this technological war has been the increasing rate of Chinese R&D in semiconductor industry, which is expected to be effective especially in the long-run (Xiao, 2022, p. 670). Consequently, Tech Cold War has directed China to indigenous innovation efforts (Zhang et al., 2023, p. 2).

4. China at the Gate: What is Expected for the Future?

The aggressive act of the USA against Chinese semiconductor industry was neither a coincidence nor a temporary requirement. Since the new era of industrial production mainly rely on microchips, this industry has a strategic importance both for economic development and national security. Moreover, with its huge capital and large labor force, China has exhibiting a tremendous development in this industry and threatening the world leadership of the USA in global markets. Figure 6 exhibits the shares of global microchip manufacturing by location.

Figure 6: Share of Global Microchip Manufacturing by Location (2020 – 2030 forecasted)



Source: (SIA, 2019, p. 12).

Figure 6 includes the real global shares in 2020 and the forecasts for 2030. ***It's seen that China is at the gate and the USA is about to lose the war.*** This significant success of China arises from the successful Chinese government industrial policy. In 2014, China released National IC Promotion Guidelines which sets high targets for industrial revenue, manufacturing capacity, and technological development. In 2015, China enacted its 'Made in China 2025 Plan' which set the goal of 70% self-sufficiency in semiconductors by 2025. China also constructed National Integrated Circuits Industry Development Investment Fund to support this governmental policy (SIA, 2021, p. 3).

Another important fact of the rise of China is its dominance in the most advanced microchips. The USA has mainly imported older-generation chips from China since they are used in electric vehicles (Nikkei Asia, 2024). However, China both produce and use advanced microchips that are dominantly used in artificial intelligence. Since the emerging technological era relies on 5G and artificial intelligence, China seems to dominate the global market by its production of advanced microchips (Nikkei Asia, 2024a).

Moreover, as mentioned in the first section of this study, China has a steady increase in R&D expenditures by closing the gap with the USA. Also, Competitive Industrial Performance Index of China has already passed the USA and Chinese ICT exports in total exports are significantly higher than the USA. All these macro indicators promise that China has a great potential to take the lead of the semiconductor industry in the near future. However, although Chinese manufacturing and trade capacities are significantly high and promising, there is an important obstacle for this economy. Global financial networks are still dominated by the USA. Chinese firms use US dollars for exchange in international business relations. It has a subordinate position in global financial systems and its integration seems costly. China launched renminbi (RMB)-denominated Shanghai oil futures contract in 2018 with the aim of increasing integration to international markets. But it still lags behind the West Texas International and Brent benchmarks (Schindler et al., 2023, p. 21 – 24).

If we put all this aside, there are undoubtedly other global actors involved in this macro struggle. EU, Japan, and South Korea have strengthening their digital sovereignty efforts to achieve their own strategic goals beyond the US-China technological competition. According to the EU's State of the Digital Decade 2025 Report, €288.6 billion has been allocated to digital infrastructure investments in areas such as 5G, artificial intelligence, and cybersecurity (European Commission, 2025). In addition, the European Commission will invest an additional €1.4 billion in artificial intelligence, cybersecurity, and digital skills for the 2025-2027 period (Reuters, 2025). These investments not only provide an alternative to US- and China-centered technology, but also enhance the technological competition environment.

Conclusion

The World Semiconductor Trade Statistics Platform forecasted %16 annual increase in the global semiconductor market by the end of 2024. The current market value of this sector is estimated 611 billion dollars for 2024 (WSTS, 2024). This huge and emerging market has tons of promises for both the nations and the global market. Since the new era relies on microchips in nearly all segments of manufacturing, it has a critical importance for all areas of production. 5G and artificial intelligence have created tremendous developments in computers, smartphones, electric vehicles and national security goods and services. Although the USA still leads the global semiconductor industry and dominant in global financial markets, China's rapid growth in this sector has created a fear to take the lead in the near future. This fact has resulted in aggressive precautions of the USA against Chinese firms and investments. Significant trade and investment barriers –which actually contradicting with the WTO rules- have been implemented after 2018. These precautions and the Covid-19 pandemic both created semiconductor wars and caused the pushback of China in this industry. Some sources preferred to name this war as the Second Cold War by referring the technological battle between the USA and USSR in the history. However, since there are some distinct differences exist in this emerging era, we prefer to call this new war as "Tech Cold War".

Tech Cold War was characterized by the microchip shortage starting in 2021. Following the pandemic, a market imbalance has occurred and it has affected many sectors directly. Huawei lost the world leadership in smartphone market and Samsung needed to reshape its production strategies. China adopted new governmental strategy to promote its industry to decrease its foreign dependency in semiconductor industry. The USA also set some rules for its both high-tech companies and citizens about setting relationships with Chinese companies. All these developments brought a new era in that nation-states taking pivotal roles in characterizing industrial development. This is quite interesting since these acts are contradicting with the liberal markets suggestion of the capitalism and creating a new era which can be called as deglobalisation (Zhang et al., 2023, p. 10).

In this emerging era, China shows lots of promise. Its overall economic performance seems better than the USA. Its higher economic growth rates, increasing R&D expenditures, higher shares of ICT exports and increasing CIP rates are all promising for the near future. Moreover, trade barriers and investment barriers set by the USA directed China to investing more on domestic sources to face its own microchip demand. So its outsourcing dependency is expected to decline in the short-term. Also, it has strong cooperation with Thailand which is an important chip-producing country. Although barriers against Chinese semiconductor industry investments are expected to exist always from now on, their impacts will probably be low due to the high performance of China.

However, it should not be forgotten that the US economy bases its technological superiority not only on trade in goods but also on capital flows generated from intellectual property (IP) license and royalty revenues. According to WIPO data, cross-border IP payments exceeded $1 trillion in 2022, indicating that the share of IP revenues in global services trade was approximately 7.5% (Bonaglia & Wunsch-Vincent, 2024). These data show that the US has the capacity to generate indirect revenues through technology exports and has a significant strategic advantage in competition with China. Also, EU, Japan and South Korea have playing significant roles in IT competition in recent years.

It is sure that China has made significant technological progress in the short term and it has lots of promise for medium and long terms. Vernon's Product Cycle Hypothesis states that, technological leadership generally emerges in innovative countries, but when production matures, it may move to other countries (Vernon, 1966). This scenario has already been proved by China for the semiconductor industry. But it is sure that this may not mean a permanent superiority. There are some studies proving that the strong R&D infrastructure of the USA in high-tech fields such as artificial intelligence and quantum computing can provide leadership again in the medium and long terms (USCC, 2025). Consequently, from today's perspective, it seems that China is about to win the Tech Cold War. This explains why the new Trump administration is also so aggressive in its tariff practices. The second act of the Tech Cold War, which was intensified by the second Trump administration, showed that China now has serious bargaining power against the United States, also. Today, China warns the US about retaliation on supply chain deals (Reuters, 2025a). However, it should be kept in mind that in the medium and long term, the US could also make a significant comeback. China at the gate, it is a powerful enemy for the US, but the Tech Cold War has not ended yet.

AUTHOR STATEMENT

Research and Publication Ethics Statement: This study was prepared in accordance with the rules of scientific research and publication ethics.

Ethics Committee Approval: This study does not require ethics committee approval as it does not include analyses that require ethics committee approval.

Author Contributions: Both authors contributed equally.

Conflict of Interest: There is no conflict of interest for the author or third parties arising from the study.

References

Aboagye, A., Ondrej, B., Abhijit, M., & Bill, W. (2022, February 9). *When the chips are down: how the semiconductor industry is dealing with a worldwide shortage*. World Economic Forum. https://www.weforum.org/agenda/2022/02/semiconductor-chip-shortage-supply-chain/

Alfian, M. F., Hudaya, M., Anggraheni, P., & Zuliyan, M. A. (2025). Technology as an instrument in great power politics: an overview of the US-China tech war. *Jurnal Dinamika Global*, *10*(1), 73-99.

Barkin, N. (2020). *Export controls and the US-China tech war*. Mercator Institute for China Studies. https://www.merics.org/sites/default/files/2020-04/merics_ChinaMonitor_US-CH-EU-Export%20Controls_en_final.pdf

Bonaglia, D., & Wunsch-Vincent, S. (2024, June 28). *Cross-border payments for the use of intellectual property surpass 1 trillion US dollars in 2022*. WIPO. https://www.wipo.int/en/web/global-innovation-index/w/blogs/2024/cross-border-payments-ip.

Bown, C. (2021). The US-China trade war and phase one agreement. *Journal of Policy Modeling*, *43*(4), 805-843.

Bown, C. (2020). How the United States marched the semiconductor industry into its trade war with China. *East Asian Economic Review*, *24*(4), 349-388.

Burton, D. (1993). High-tech competitiveness. *Foreign Policy*, *92*, 117-132.

Edwards, P. (1997). Why build computers? The military role in computer research. In *The closed world: computers and the politics of discourse in cold war america*, Cambridge: MIT, 54-74.

Dahl, R. A. (1957). The concept of power. *Behavioral Science*, *2*(3), 201-215.

Dev. (2025, February 19). *Trump said he would raise tariffs on semiconductor chips by almost 25%. This also applies to cars*. https://dev.ua/en/news/tramp-myto-napivprovidnykovi-chypy.

Erdil, E., Yetkiner, I. H., & Türkcan, B. (2010). Does information and communication technologies sustain economic growth? The underdeveloped and developing countries case. In *Sustainable Economic Development and the Influence of Information Technologies – Dynamics of Knowledge Society Transformation*, Ed. Muhammed Karatas and Mustafa Zihni Tunca. IGI Global. New York, USA, 147 – 160.

European Commission. (2025). *State of the digital decade 2025: keep building the EU's sovereignty and digital future*. https://digital-strategy.ec.europa.eu/en/library/state-digital-decade-2025-report

Gladstone, R. (2020, July 22). *How the cold war between China and the US is intensifying: in defense, trade, technology, media, and diplomacy, among other areas, the rancor between the Trump administration and China's ruling communist party is worsening*. The New York Times. https://www.nytimes.com/2020/07/22/world/asia/us-china-cold-war.html

Haiyong, S. (2019). U.S. – China tech war –impacts and prospects. *China Quarterly of International Strategic Studies*, *5*(2), 197-212.

Holsti, K. J. (1964). The concept of power in the study of international relations. *Wiley on Behalf of The International Studies Association*, *7*(4), 179-194.

Jensen, D. (2022). Processor problems: an economic analysis of the ongoing chip shortage and international policy response. *Summer Research*, No. 457. https://soundideas.pugetsound.edu/summer_research/457

Kempf, T., Bobek, V., & Horvat, T. (2021). The impacts of the American Chinese trade war and COVID-19 pandemic on Taiwan sales in semiconductor industry. *International Journal of Economics and Finance*, *13*(4), 62 - 72.

Kshetri, N. (2023). The economics of chip war: China's struggle to develop the semiconductor industry. *Computer*, *56*(6), 101-106.

Martin, D., & Rosso, D. (2023). *Chipping away – assessing and addressing the labor market gap facing the U.S. semiconductor industry.* Semicondustor Industry Association (SIA) and Oxford Economics. https://www.semiconductors.org/resources/?fwp_resource_types=policy-reports

Mohammad, W., Elomri, A., & Kerbache, L. (2022). The global semiconductor chip shortage: causes, implications and potential remedies. *IFAC PapersOnline*, *55*(10), 476-483.

Nikkei Asia. (2024, January 9). *U.S. nervous about 'flood' of older-generation chips from China*. https://asia.nikkei.com/Business/Tech/Semiconductors/U.S.-nervous-about-flood-of-older-generation-chips-from-China

Nikkei Asia. (2024a, February 27). *U.S. aims to make 20% of world's leading-edge chips by 2030: Raimondo*. https://asia.nikkei.com/Business/Tech/Semiconductors/U.S.-aims-to-make-20-of-world-s-leading-edge-chips-by-2030-Raimondo

Reuters. (2025, March 29). EU to invest $1.4 billion in artificial intelligence, cybersecurity and digital skills. https://www.reuters.com/technology/artificial-intelligence/eu-invest-14-billion-artificial-intelligence-cybersecurity-digital-skills-2025-03-28/

Reuters. (2025a, July 8). *China warns Trump on tariffs, threatens retaliation on supply chain deals*. https://www.reuters.com/world/china/china-warns-trump-tariffs-threatens-retaliation-supply-chain-deals-2025-07-08/

Schindler, S., Alami, I., Dicarlo, J., Jepson, N., Rolf, S., Bayırbağ, M. K., Cyuzuzo, L., Deboom, M., Farahani, A. F., Liu I. T., McNicol, H., Miao, J. T., Nock, P., Teri, G., Seoane, M. F. V., Ward, K., Zajontz, T., & Zhao, Y. (2023). The second cold war: US-China competition for centrality in infrastructure, digital, production, and finance networks. *Geopolitics*, *29*(4), 1083 – 1120.

SIA (Semiconductor Industry Association). (2024, August 28). *The CHIPS act has already sparked $450 billion in private investments for U.S. semiconductor production*. https://www.semiconductors.org/the-chips-act-has-already-sparked-200-billion-in-private-investments-for-u-s-semiconductor-production/

SIA (Semiconductor Industry Association). (2022, 31 October). *American semiconductor research: leadership through innovation*. https://www.semiconductors.org/resources/?fwp_resource_types=policy-reports

SIA (Semiconductor Industry Association). (2021, July). *SIA whitepaper: taking stock of China's semiconductor industry*. https://www.semiconductors.org/wp-content/uploads/2021/07/Taking-Stock-of-China's-Semiconductor-Industry_final.pdf

SIA (Semiconductor Industry Association). (2019, April). *Winning the future – a blueprint for sustained U.S. leadership in semiconductor technology.* https://www.semiconductors.org/resources/?fwp_resource_types=policy-reports&fwp_paged=2

The Guardian. (2025, February 11). *Trump announces 25% tariffs on foreign steel and aluminum*. https://www.theguardian.com/us-news/2025/feb/10/trump-steel-aluminum-tariffs

Tung, R. L., Zander, I., & Fang, T. (2023). The tech cold war, the multipolarization of the world economy, *IB Research. International Business Review*, *32*(6), 102195.

UNIDO. (2002). *Industrial development report 2002/2003: competing through innovation and learning*. United Nations Industrial Development Organization. http://www.unido.org

U.S. Federal Register. (2018). Review of controls for certain emerging technologies. https://www.federalregister.gov/documents/2018/11/19/2018-25221/review-of-controls-for-certain-emerging-technologies

U.S.-China Economic and Security Review Commission (USCC). (2025). *US-China competition in emerging technologies*. US-China Economic and Security Review Commission. https://www.uscc.gov/sites/default/files/2024-11/Chapter_3--U.S.-China_Competition_in_Emerging_Technologies.pdf

Varas, A., Varadarajan, R., Goodrich, J., & Yinug, F. (2020). *Government incentives and US competitiveness in semiconductor manufacturing*. Semiconductor Industry Association (SIA). https://www.semiconductors.org/resources/?fwp_resource_types=policy-reports&fwp_paged=2

Vernon, R. (1966). International investment and international trade in the product cycle. *Quarterly Journal of Economics*, *80*(2), 190–207.

Wall Street Journal. (2021, March 13). *The semiconductor shortage*. https://www.proquest.com/newspapers/semiconductorshortage/docview/2500822237/se-2?accountid=10699

World Bank. (2025). *World development indicators*. http://data.worldbank.org/data-catalog/world-development-indicators

WSTS (World Semiconductor Trade Statistics). (2024, June 4). *WSTS semiconductor market forecast spring 2024*. https://www.wsts.org/76/Recent-News-Release

Xiao, Y. (2022). *The impact of the US-China trade war on China's semiconductor industry*. 2nd International Conference on Financial Management and Economic Transition (FMET 2022).

Zhang, L. E., Zhao, S., Kern, P., Edwards, T., & Zhang, Z.-X. (2023). The pursuit of indigenous innovation amid the tech cold war: the case of a Chinese high-tech firm, *International Business Review*, *32*(6), (102079), 1-12.