



Not to go too far and to go into the principles of geopolitics that were born in the 19th century by the Swedish Rudolf Kjellén (1864-1922), Friedrich Ratzel (1844-1904), Karl Haushofer (1869-1946), or Harlford Mackinder (1861-1947) in the 20th century with his well-known theorem: "Whoever rules Eastern Europe will rule the *Heartland*; whoever rules the Heartland will rule the *World-Island*; and whoever rules the World-Island will rule the World (*The World*)", to go through other equally well-known political scientists, it is evident that the geopolitical mechanisms established since the end of the Second World War, always had - even if left aside - finance as an essential element.

The victors of World War II, with the indispensable help of the United States, were able to defeat their adversaries on the basis of a powerful weapons production capacity, which would not have been possible without heavy investment. The technological advantage that came with new gadgets such as radar or the famous "Enigma machine" (which had been developed under the direction of one of the pioneering scientists of artificial intelligence, Alan Turing [1912-1954], to decipher the coded messages sent by the Reich to its U-boats) also required large sums of money. Investment was also made in other military, logistical and intelligence capabilities, which proved superior both in Europe and in the Pacific theatre.

And here the role played by the US Federal Reserve in the war scenario, which has hardly been mentioned, comes to the fore. A role without which the war would have had a very different outcome. The Fed directed its efforts in several directions: financing the costs of the war, including lending them to the Allies; seizing enemy property and banking assets; and developing a plan to stabilize the post-war economy. The Bretton Woods Agreements with the creation of the International Monetary Fund, the World Bank, and the subsequent financing mechanisms of the Marshall Plan; the (approximately) 12 billion dollars of the so-called European Recovery Plan (ERP), 13% of which was devoted to "lifting" the battered West German economy, not forgetting that the ERP had the additional objective of eliminating communism from the European scene; another example of how finance intervened in the geopolitics of those years.

The entire subsequent Cold War is nothing more than a massive financial deployment by the United States to end the hegemony of the Soviet Union. Figure 1 presented here is telling in this respect. At the end of the Second World War, in 1945, the American

economy was 5 times larger than the Soviet one, only to decline until 1991, when the American economy was 3 times larger than the Soviet one at the time of its demise. Only in 1974, perhaps in response to the Yom Kippur War (6-25 October 1973), the oil embargo and the rise in oil prices by Arab oil-exporting countries (another financial action in the geopolitics of those days), did the Soviet economy come somewhat closer to the US economy (2.3 times larger than the US economy).

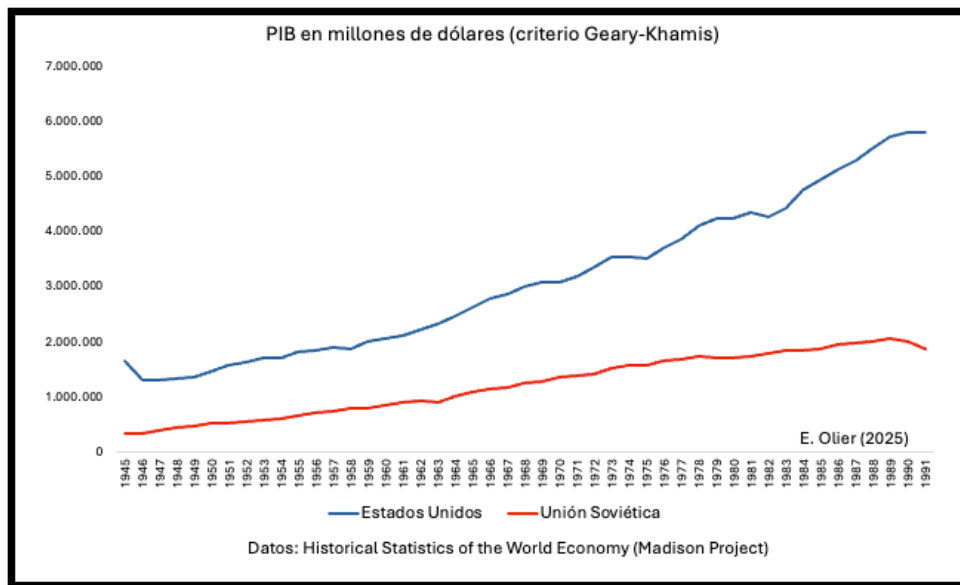


Figure 1

Comparison of GDP between the United States and the Soviet Union (1945-1991)

In the Second World War, and especially after it, the United States and the Soviet Union were in a struggle for nuclear dominance. Hiroshima and Nagasaki were not only huge catastrophes, but also the beginning of an arms race that in some ways continues to this day. The "nuclear race", however, was not possible without financial support. Between 1940 and 1996, for example, the United States invested more than 5.8 trillion<sup>2</sup> dollars in its nuclear weapons programme, something like 21,000 dollars per capita<sup>3</sup>. And in the case of the Soviet Union, although the data are more confusing, a partially declassified CIA report indicates that between 1950 and 1970, the Soviets invested more than 16

<sup>2</sup> The English notation is used. One billion represents one million million millions, i.e. 10<sup>12</sup> million; contrary to the Anglo-Saxon notation, where one *billion* is billions (10<sup>9</sup> million).

<sup>3</sup> Data according to SCHWARTZ, S. I. *The cost of U.S. nuclear weapons*. NTI Report, Sep. 30, 2008.

billion roubles (at 1955 prices) in their nuclear programme. To this should be added 11 billion roubles in the submarine programme, 28 billion roubles in air capability and an additional 18 billion roubles in the production of nuclear-tipped missiles. A total of 73 billion roubles at 1955 prices<sup>4</sup>. Obviously, nothing comparable to US spending.

Returning for even a moment to the role of the Fed, when the United States entered the war, the Board of Governors issued a statement in 1943 indicating that the Federal Reserve System was "... prepared to use its powers to ensure at all times an ample supply of funds to finance the war effort"<sup>5</sup>. Thus, following on from this analysis, it states that "finance formed the basis of the war effort. Before World War II, the US military was small, and its weapons were obsolete. The army needed to buy thousands of ships, tens of thousands of aircraft, hundreds of thousands of vehicles, millions of weapons and hundreds of millions of rounds of ammunition. The army needed to recruit, train and deploy millions of soldiers to theatres of operations on six continents. To accomplish these tasks, it was necessary to pay entrepreneurs, inventors, and businesses so that they, in turn, could buy supplies, pay workers, and produce the weapons with which US soldiers and sailors would defeat their enemies. Military expenditures rose from a few hundred million in the year before the war to \$85 billion in 1943 and \$91 billion in 1944".<sup>6</sup> There can be no doubt then that the role of the Fed was essential in the course of the war.

The fall of the Soviet Union also had a lot to do with the economy. Gorbachev's accession to power in 1985 confirmed that the Soviet economy had been stagnating for many years and was in need of major reforms. It should be remembered that from 1940 until the arrival of Gorbachev the Soviet economy had grown in terms of nominal gross domestic product (GDP) almost 4.5 times, from \$420.091 billion to \$1.863 trillion. However, if the economy were measured in terms of gross national product<sup>7</sup> (GNP) it would have fallen from 5.8 %

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<sup>4</sup> CIA. *The Soviet Atomic Energy Program*. National Intelligence Estimate. Number 2A-11-63. Top Secret. 2 July 1963. Declassified in part, 50 years, 2014/2/20.

<sup>5</sup> RICHARDSON, J. *The Federal Reserve's Role During WWII (1941-1945)*. Federal Reserve History. November 22, 2013.

<sup>6</sup> *Ibid.*

<sup>7</sup> Gross national product (GNP) refers to the amount of goods and services generated by a country's inhabitants (regardless of whether they are generated in a foreign country). It is the production capacity of a particular country, while gross domestic product (GDP) measures the value of all goods and services produced annually in the economy and is used to measure the wealth generated by a country.

in 1940 to 2.6 % in 1970, with the fact that, in 1985, the country's economic openness (exports plus imports) amounted to 4 % of GNP.<sup>8</sup>

Surprisingly, this did not affect defence investment, since in the last years of the Soviet Union's existence, from 1987 to 1990, the Soviet conglomerate spent a total of 909 billion dollars in those four years, compared to 1.26 trillion dollars by the United States, that is, 72% of the American effort<sup>9</sup>. In the period 1993-2001, Russia spent less than 4% of the US effort on defence<sup>10</sup>. The outcome of the Cold War was clear, the world, geopolitically, was a matter of one: the United States, as China was still dormant, in fact, its defence investments were less than 6% of what the United States spent in that period.<sup>11</sup>

Finally, it is worth looking at the economic effect of the Second World War in Europe on the most representative countries as an example. Figure 2 shows these effects. For example, between 1943 and the end of the war in 1945, Germany reduced its economy by almost 70%. The United States, since its entry into the war in 1942, increased its economy by 20 %, hence the runaway inflation at the end of the war. France, the United Kingdom, Japan and Germany changed their economies between 1939 and 1945 as follows: France -28%; the UK +12%; Japan -26%; and Germany -54%. The Marshall Plan, launched by the United States in the form of loans to European countries, brought some improvement in the situation. Thus, the United Kingdom, a preferential ally of the United States, boosted its economy by 89% between 1948 and 1951, while France by 19% and Germany by 39% during that period. France, of course, did not come out of it very well, perhaps because of the presence of Charles de Gaulle in the presidency.

An analysis that demonstrates the close relationship between war and economics or, if you prefer, geopolitics and finance.

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<sup>8</sup> Norwich University. *Consequences of the Collapse of the Soviet Union*. <https://online.norwich.edu/online/about/resource-library/consequences-collapse-soviet-union>. Last accessed 19 February 2025.

<sup>9</sup> Data according to SIPRI (Stockholm International Peace Research Institute).

<sup>10</sup> *Ibid.*

<sup>11</sup> *Ibid.*

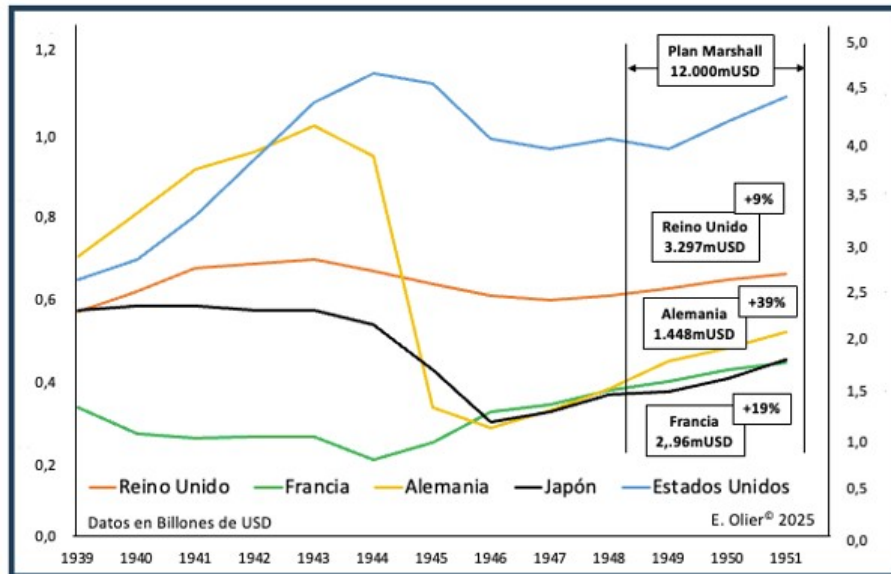


Figure 2

Effect of World War II in Europe<sup>12</sup> (mUSD refers to millions of US dollars)  
 (left axis European countries, right axis United States)

## Finance in the Gulf War and the Iraq War

Two major events, apart from the war between China and the United States (Korean War between June 1950 and July 1953), and the long Vietnam War (1959-1975) which, in a way, originated from that one, led to an economic cost that, in today's monetary value exceeded one trillion dollars, with 58,220 Americans killed and more than 153,000 wounded; with a total increase in inflation between 1965 and 1973 of 40.3%, and a public deficit of 100 billion dollars accumulated in that period .<sup>13</sup>

Closer to home, the Gulf War (authorised by the US Congress in January 1991, although funding for the war was approved three months later) and the Iraq War in 2003-2011 were a true geopolitical action against a common enemy involving dozens of countries.

In the first case, the Gulf War, authorised by the United Nations through Resolution 678 to liberate Kuwait from Iraqi aggression, brought together a collective of 34 nations,

<sup>12</sup> Author's figure. Data according to BARRO, R. J. and URSUA, J. F. *Macroeconomic Crises since 1870*. Brookings Papers on Economic Activity. Economic Studies Program. The Brookings Institution, vol (39) (1) Spring, pp. 255-350.

<sup>13</sup> AMADEO, K. "Vietnam War Facts, Costs and Timelin", *The Balance*. September 20, 2024. <https://www.thebalancemoney.com/vietnam-war-facts-definition-costs-and-timeline-https://4154921#:~:text=The%20Vietnam%20War%20cost%20%24168,cost%20%2422%20billion%20per%20year>. Last accessed 18 February 2025.

whose first phase (Operation Desert Shield) took place, as well known, between August 1990 and January 1991, and continued from that month of 1991 until the end of February of that year (Operation Desert Storm) with several air strikes against Iraq to end with the liberation of Kuwait and, it was said, prevent the Iraqi invasion of Saudi Arabia.

As far as we are concerned, these actions would have been impossible without a concrete financial effort. Several mechanisms were put in place to finance them. First, an amount in excess of \$2 billion was authorised (in October 1991) to finance Operation Desert Shield, while a Defence Cooperation Account (DCA) was created to receive contributions from the allies in that military operation. A mechanism was introduced into the US budget whereby a "bill" of \$1 billion would be sent to the allies from the Department of Defence to be included in the DCA. To this, the US Congress authorised the transfer of \$42.6 billion from the DCA to fund the incremental costs of Operation Desert Storm and allocated an additional \$15 billion to a Persian Gulf Regional Defence Fund. The Fund would only be used when the DCA was exhausted.<sup>14</sup>

It should be added that the US General Accounting Office estimated the total cost of the so-called Persian Gulf War at \$120 billion, with some \$50 billion in 'sunk costs', direct and indirect costs to recruit, maintain and support a force of 540,000 personnel; plus, other costs related to the cancellation of Egypt's \$7 billion debt to the US. Incremental costs amounted to \$61.1 billion.<sup>15</sup>

According to Harvard professor Linda Bilmes, the Iraq war and its combined Afghanistan war cost a total of 5 trillion dollars. What she calls a "ghost budget". Although at the time of writing, her book *The Ghost Budget: Paying for America's Endless Wars*, to be published by Cambridge University Press (as yet unpublished), is not available and one has to go back to the work Bilmes published in February 2006 with Nobel Prize-winning economist Joseph Stiglitz, which focused on the costs of the Iraq war three years into the conflict.<sup>16</sup> Once again, investment or, in other words, the financial support of the conflict was presented as an essential issue; without finance, the war could not be carried on.

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<sup>14</sup> CALLANA, B., WEILER, D. "War Budgeting Strategies. Case Studies of The Gulf War and The Iraq War", *Harvard Law School. Briefing Paper No. 39*. May 2008.

<sup>15</sup> *Ibid.*

<sup>16</sup> BILMES, J., STIGLITZ, J. "The Economic Cost of the Iraq War: An Appraisal Three Years After the Beginning of the Conflict", *NBER Working Paper Series*. National Bureau of Economic Research. Working Paper 12054. February 2006.

In principle, as Bilmes and Stiglitz's analysis indicates, with \$251 billion already spent at the time, the Congressional Budget Office estimated that the Iraq war would total \$500 billion. Obviously, behind this was the reconstruction of Iraq after the war was over. This is how Deputy Secretary of Defence Paul Wolfowitz put it, asserting that Iraq could "actually finance its own reconstruction", which, in his opinion, would be good for the economy<sup>17</sup>. Again, war, geopolitics, and finance.

Following this analysis by Bilmes and Stiglitz, the financial problem of the Iraq war had to incorporate other chapters not considered by policy makers, such as the future cost of operations after 2003, the subsequent costs related to veterans of the war, those due to brain injuries and disability of soldiers, the cost of demobilisation, interest on the debt and the increase in defence spending, the latter chapter becoming very topical nowadays due to the new policy of the Trump Administration initiated in January 2025. In total, Bilmes and Stiglitz's calculations led, in their modest case, to a total of 1.269 trillion dollars, which included what had already been invested up to that point (251 billion dollars).

That said, these costs did not take into account the fact that the economy and war usually go hand in hand and, in the case of the Iraq war, it was necessary, as the authors we are considering indicate, to include other elements, such as: the effect on the public accounts deficit due to the debt generated; the losses related to an investment that, dedicated to the war, does not generate any financial return; the increase in interest rates; or the increase in oil prices due to the war being carried out in a hydrocarbon-producing country. "hidden costs" led these authors to determine that the Iraq war would have an economic impact of at least 2.239 trillion dollars<sup>18</sup>. Not to mention the subsequent effects, such as the loans that the International Monetary Fund (IMF) had to give Iraq to stabilise its economy (5.34 billion dollars, in addition to another 18 billion dollars given earlier<sup>19</sup>) and other disbursements not taken into account for accounting purposes.

And this is where politics comes in. Instead of raising taxes to pay for the war, the Bush administration decided to cut them through the public deficit, which increased by billions of dollars, thereby raising the public debt from 5.95 trillion dollars in 2001 to 9.62 trillion

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<sup>17</sup> *Ibid.*

<sup>18</sup> *Ibid.*

<sup>19</sup> INTERNATIONAL MONETARY FUND. *Iraq Gets \$5.34 Billion IMF Loan to Support Economic Stability*. July 14, 2016. <https://www.imf.org/en/News/Articles/2016/07/12/14/31/NA071416-Iraq-Gets-IMF-Loan-to-Support-Economic-Stability>. Last accessed 20 February 2025.

dollars in 2006: an increase of more than 60% in five years. A public debt that, naturally, would be paid for by subsequent generations. And this is where the other side of modern geopolitics emerges: the role of foreign investors. And in that case the role of the Chinese government, which indirectly went on to finance the Iraq war by buying US Treasury bonds.<sup>20</sup> A policy that China continues, selling or buying US bonds, in order to "manipulate" the value of the dollar. A geo-economic strategy used against the US economy (figure 3). Again, finance in global geopolitics.

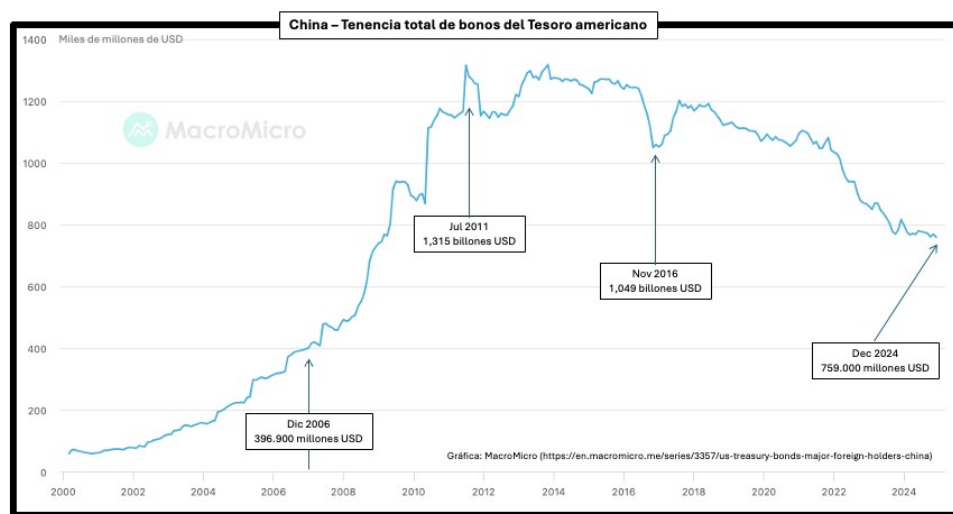


Figure 3

US Treasury bonds at the People's Bank of the People's Republic of China (2000-2024)

### The importance of investment funds in defence

When analysing the costs of wars or defence activities, one rarely looks in detail at who is or are behind them, and what interests are involved. Defence and security spending is most often assumed to be entirely the responsibility of states, which include it in their general budgets. So, in the end, these are expenses or investments that are financed through taxes, public debt or, as we have seen at the end of the previous section, by issuing this debt in the form of bonds, treasury bills, etc., which are bought by foreign or national investors. An opaque system that remains outside the struggles of geopolitics.

<sup>20</sup> COOPERSMITH, J. "Who Will Pay for Iraq and When?", *Origins*. Current Events in Historical Perspective. November 2006. <https://origins>. Visited on 20 February 2025.

In this context, however, it is worth mentioning the role of private investment funds that are currently behind defence industries and, of course, behind government spending.

As it is less well known, although some additional reference will be made later to private investors because of their importance, we will focus on the world of the so-called investment funds or, more commonly, funds of funds or asset management firms, without forgetting the sovereign wealth funds of the different countries, which are also involved in the global economy. This problem is based primarily on what can generally be called a currency war.

When talking about sovereign wealth funds, we must start by saying that the ten largest ones currently accumulate globally just over 9.6 trillion dollars in 2025<sup>21</sup>, with the Norwegian government's sovereign wealth fund as the largest of them. Some of them invested 58 billion dollars in the 2008 financial crisis in the United States to support troubled banks, such as Citigroup, Merrill Lynch, UBS and Morgan Stanley, with China being the country that invested 1 billion dollars in Bear Stearns, a well-known American investment bank.<sup>22</sup>

It should be borne in mind that sovereign wealth funds are dependent on their governments, which leads to the conclusion that current geopolitical tensions increase the risks of cross-border investments which, in particular, should require increased transparency of those behind investments in assets that may be strategic, including supply chains or productive industries. A circumstance that falls squarely within the defence and security aspects and the geopolitical context at the global or regional level, since it is clear that the tensions between blocs that currently exist lead, as is well known, to the use of economic or financial sanctions, promote currency fluctuations, or limit imports of critical materials (hydrocarbons or semiconductors, for example), which usually lead to bottlenecks in supply chains that could explode into large-scale conflicts.

In this case, speaking of defence, without being exactly a sovereign wealth fund, the European Defence Fund (EDF) acts in the same way. It is a financial instrument whose main objectives are: (1) to foster cooperation between companies, including SMEs and research actors across the European Union (EU); (2) to boost defence capability

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<sup>21</sup> NEUFELD, D. "Ranked: The Largest Sovereign Wealth Funds in the World", *Visual Capitalist*. February 13, 2025. <https://www.visualcapitalist.com/largest-sovereign-wealth-funds-in-the-world/>. accessed 21 February 2025.

<sup>22</sup> RICKARDS, J. *Currency Wars. The Making of the Next Global Crisis*. Penguin Group, New York, 2012, pp. 7-8.

development through investment; and (3) to help EU companies develop cutting-edge, interoperable defence technologies and equipment. The Fund has a budget of EUR 8 billion for the period 2021-2027, with 2.7 billion euros allocated to collaborative defence research and 5.3 billion euros to collaborative capability development projects complementing national contributions<sup>23</sup> (Figure 4).

Financial support is mainly provided through grants of up to 100% of the costs, depending on the activities, and a bonus system that takes into account SMEs, mid-cap companies and their connection with the Permanent Structure Cooperation (PESCO), a framework created in 2017 with the objective that the twenty-six participating EU Member States plan, develop and invest jointly to improve collaboration between the different countries, as well as to improve the operational readiness and contribution of the armed forces in European missions. A strategy that does not avoid the current dispersion in combat assets between the US and the EU, as we will see later.

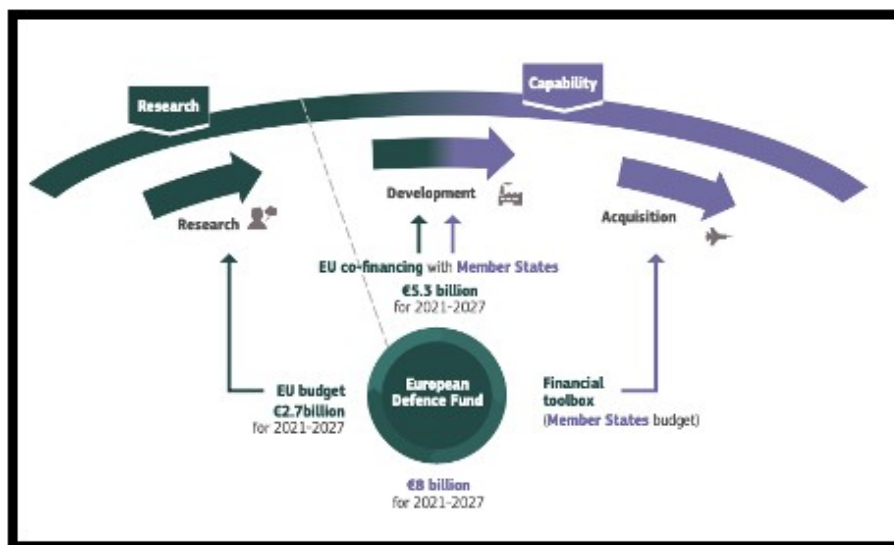


Figure 4

Structure of the European Defence Fund (EDF)

Turning to the United States, as shown in figure 5<sup>24</sup>, the five largest defence companies had revenues of almost 207 billion dollars in 2024. The most important industry in this

<sup>23</sup> <https://defence-industry-space.ec.europa.eu/system/files/2021-04/20210429%20-%20%20Factsheet.pdf> . Last accessed 27 February 2025.

<sup>24</sup> <https://www.usfunds.com/resource/the-top-10-u-s-aerospace-and-defense-contractors/>. Visit or 27 February 2025.

sector, Lockheed Martin, sold 74% of its production in the United States, with the circumstance that its capital is owned, in 2024 data, at 35.5% by five financial companies (*Asset Management Firms*): State Street Corporation, Vanguard Fiduciary Trust, Co., BlackRock Advisors LLC, Charles Schwab Investment Management Inc. and Eaton Vance Management.<sup>25</sup>

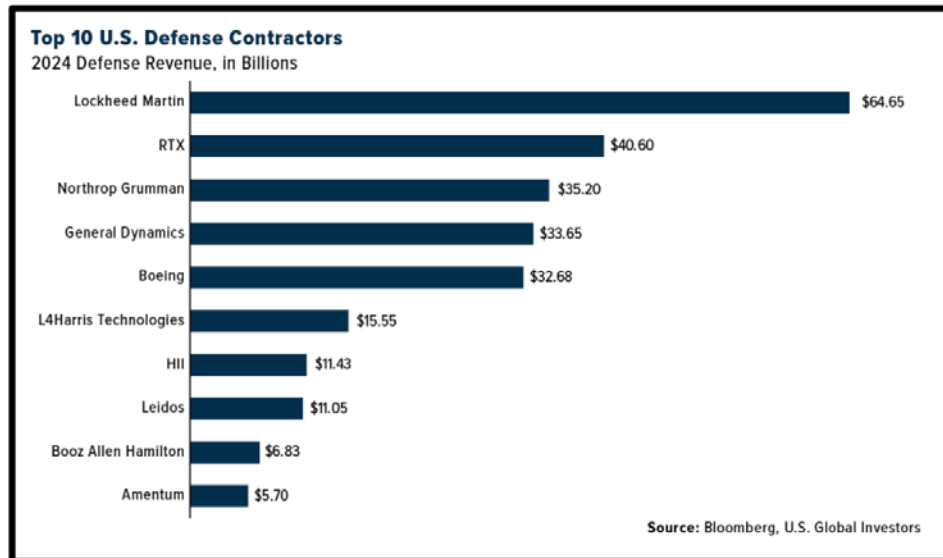


Figure 5  
 Largest defence companies in the United States

If one considers the second largest, RTX (Raytheon Technologies Corporation), similarly, on the same date, 33.6 % of the shares were owned by five private investment companies: State Street Corporation, Vanguard Fiduciary Trust, Co., BlackRock Advisors LLC, and two companies of the same group Capital Research & Management Co, Global Investors and International Investors.<sup>26</sup>

The same applies to Northrop Grumman<sup>27</sup> : 33 % is held by State Street Corporation, Vanguard Fiduciary Trust, Co, BlackRock Advisors LLC, Capital Research & Management Co (International Investors) and Wellington Trust Co, NA.

<sup>25</sup>[www.marketscreener.com/quote/stock/LOCKHEED-MARTIN-CORPORATI- https://13406/company/](https://www.marketscreener.com/quote/stock/LOCKHEED-MARTIN-CORPORATI-https://13406/company/). Last accessed 27 February 2025.

<sup>26</sup><https://www.marketscreener.com/quote/stock/RTX-CORPORATION-4840/company/>. Last accessed 27 February 2025.

<sup>27</sup>[www.marketscreener.com/quote/stock/NORTHROP-GRUMMAN-CORPORAT- https://13763/company/](https://www.marketscreener.com/quote/stock/NORTHROP-GRUMMAN-CORPORAT-https://13763/company/). Last accessed 27 February 2025.

Finally, not to go on, since it is the same "rule" in all cases, we will conclude by saying that Boeing's most relevant shareholders coincide once again: State Street Corporation, Vanguard Fiduciary Trust Co, BlackRock Advisors LLC, Capital Research & Management Co (Global Investors), Wellington Trust Co, NA, Fidelity Management & Research Co, LLC, Fidelity Management & Research Co. LLC.<sup>28</sup> It can therefore be concluded that State Street Corporation, Vanguard Fiduciary Trust, Co., BlackRock Advisors LLC. lead in the US defence industry with their investments in this industrial sector, in which they logically have a considerable influence on American industrial policy.

It is a scheme where private investors, the large investment funds in this case, dominate the US defence industrial sector. According to the Sovereign Wealth Fund Institute (SWFI)<sup>29</sup>, the five largest investment funds total \$29 trillion, with the two largest, Black Rock and Vanguard, accounting for some \$20 trillion Black Rock, \$11.6 trillion, and Vanguard, \$8.7 trillion, or 70% of the top five. A fact that leads to the conclusion that private investors, the Asset Management Funds, are key to the development of the American defence industry: finance and defence in combination.

To give a more accurate picture of the power of large investment funds, Figure 6 plots, with data from 2022, the 15 largest global asset management firms alongside the industries in which they invest. And, on the right in the figure, according to data from the International Monetary Fund (IMF), the sum of the nominal GDP in current dollars of the world's three largest economies.

Obviously, the two figures are not economically comparable, since the investment funds figure refers to the investments they held in different industries in that year, while the GDP refers to the sum of the goods and services produced in that year by these three economies: the European Union, the United States, and China. Figure 6 is only intended to give an idea of the economic magnitudes alone, reflecting the importance of financial investments in the economic world.

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<sup>28</sup> <https://uk.marketscreener.com/quote/stock/THE-BOEING-COMPANY-50471805/company-shareholders/>. Last accessed 27 February 2025.

<sup>29</sup> <https://www.swfinstitute.org/fund-manager-rankings/asset-manager/>. Last accessed 27 February 2025.



Figure 6

Comparison between the 15 largest investment funds and the 3 largest economies<sup>30</sup> (yellow shows European funds, white shows US funds; *trillion USD* corresponds to trillions of dollars)

In the European case, the five largest aerospace and defence companies are dominated by French industry, including the Airbus conglomerate. We are talking about: Airbus SE, ThyssenKrupp AG, BAE Systems Plc, Thales SA and Safran SA.

In the first case, Airbus is a company majority owned by the French (10.83%), German (10.82%) and Spanish (4.081%) governments. It can be said that it is a public company, unlike in the United States. In this respect, Europe is much more like China, where the defence sector is totally dominated by the state. Investment funds in Europe, and still on the subject of Airbus, are token: the British fund, TCI Fund Management Ltd., holds a mere 3.013%, and the next, Amundi Asset Management SASU (Investment Management), 0.501%.

A similar situation applies to Krupp, with the consideration that the majority of the capital is held by the German company Alfried Krupp von Bohlen und Halbach-Stiftung with 20,93 %, followed by Norges Bank Investment Management which holds 2,612 %. UBS Asset Management Switzerland AG holds 1,75 %. This leads to the conclusion that the

<sup>30</sup> This is a figure by the author presented in a lecture he gave at the XXV Armed Forces Staff Course (CEMFAS) on 5 February 2024 at the CESEDEN, under the title: *A geo-economic view of the current situation.*

financial structure of companies in Europe is far removed from the private investment funds, which are much more developed in the United States.

BAE Systems, the UK company follows the US model, albeit in a more dispersed manner, as the majority of the capital is distributed among 10 investment funds, which between them hold 37,247 % of the company. These include six American asset management firms: Capital Research & Management Co, Fidelity Management & Research, The Vanguard Group, BlackRock Fund Advisors, WCM Investment Management, and Capital Research & Management Co. The other four firms are British: BlackRock Investment Management (UK), Invesco Asset Management Silchester International Investors, and Capital International.

Thales and Safran, for their part, are French companies that follow the public ownership model, being majority-owned by the French Government. Thus, the majority of Thales' capital (56,037 %) is held by the government (26,6 %), by the Dassault Aviation company (26,59 %) and by the workers as a cooperative (2,847 %); the Dassault company is owned by the Dassault Family, which holds 66,42 % of the shares, but is obviously dependent on the Paris government for contracts. Airbus in this case holds 10,52 % (Dassault's). One could say that, albeit indirectly, Dassault is a public company.

Finally, Safran again has a significant public “weight”, with the French Government holding 11.33 % of the shares, although two investment funds are present: TCI Fund Management from the UK with 5.246 % and the American BlackRock Fund Advisors with 5.047 %.<sup>31</sup>

This capital structure of French defence companies serves to demonstrate how political decisions in defence and security are driven by geopolitical strategies while decisions are made by the French government.

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<sup>31</sup> Note: All information on shareholdings in European and American defence companies is taken from the company Market Screener.  
(see: <https://www.marketscreener.com>).

## The case of China

Regardless of the difficulty of entering into the arcana of Chinese defence policy, it may be useful, even if 5 years have passed, to recall the SIPRI report of January 2020.<sup>32</sup>

This report, regardless of China's strategy in developing specific weaponry, shows the situation (in 2017) of Chinese companies vis-à-vis US companies (figure 7).

Rank, 2017 <sup>a</sup>	Company	Country	Arms sales (constant 2017 US\$ b.)			Change, 2015-17 (%) <sup>b</sup>	Arms sales as share of total sales, 2017 (%)
			2017	2016	2015		
1	Lockheed Martin	United States	43.9	41.5	37.7	16	88
2	Boeing	United States	26.9	30.1	28.9	-6.8	29
3	Northrop Grumman	United States	22.4	21.9	20.7	7.8	87
4	Raytheon	United States	22.0	23.4	22.5	-2.1	87
5	BAE Systems	United Kingdom	21.0	22.2	22.1	-5.1	95
6	Aviation Industry Corp. of China (AVIC)	China	20.1	17.4	15.0	34	34
7	General Dynamics	United States	19.5	19.6	19.9	-2.0	63
8	China North Industries Group Corp. (NORINCO)	China	17.2	17.3	16.2	6.3	27
9	China Electronics Technology Group Corp. (CETC)	China	12.2	11.0	11.5	6.1	40
10	Airbus Group	Trans-European <sup>c</sup>	10.0	12.9	13.3	-25 <sup>d</sup>	15

Figure 7

Top ten list of the largest defence companies in 2017 according to SIPRI<sup>33</sup>

According to this report, three companies were then the largest: AVIC, NORINCO, and CETC. However, for 2024, *Defense News* shows another perspective, with China North Industries Group Corporation Limited, China Electronics Technology Group, and China South Industries Group Corporation among the 15 largest, although they only devote a minor part of their activities to defence.<sup>34</sup>

One must then go to the firm AVIC to see how China operates in the world of defence, where, according to its own information, it states the following: "Aviation Industry Corporation of China, Ltd (AVIC), a Chinese state-owned group of aerospace companies based in Beijing, is one of the major players in the global market. With more than 100

<sup>32</sup> TIAN, Nan, SU, Fei. "Estimating the Arms Sales of Chinese Companies", *SIPRI Insights on Peace and Security. Security*. No. 2020/2. January 2020. [https://www.sipri.org/sites/default/files/2020-01/sipriinsight2002\\_0\\_0.pdf](https://www.sipri.org/sites/default/files/2020-01/sipriinsight2002_0_0.pdf) Last accessed 12 March 2025. SIPRI refers to the Stockholm International Peace Research Institute.

<sup>33</sup> *Ibid.* This table only indicates the ten largest at that date. In this report, the full list includes twenty defence companies.

<sup>34</sup> <https://people.defensenews.com/top-100/>. Last accessed 11 March 2025.

branches and 27 subsidiaries, AVIC is a Fortune 500 company and one of the ten largest industrial corporations in China. Among other sectors, the company operates in passenger and transport aircraft, helicopters, avionics and systems, motor vehicles and electronics. In 2016, AVIC employed 450,000 people worldwide and generated sales of USD 53.64 billion (2016). Thanks to the strategic partnership concluded with our principal owner, AVIC, FACC enjoys access to the largest growth market in the global aerospace industry".<sup>35</sup> Again, a public company controlled by the government.

And this is where FACC<sup>36</sup>, a German aerospace company listed on the Vienna Stock Exchange and part of the AVIC group, comes in. So, China has entered Europe and, although it is very difficult to find complete information on this operation, China has become, for example, one of Airbus' suppliers through this acquisition<sup>37</sup>. Again, geopolitics in the defence world with China entering European markets through corporate operations as it does in other strategic sectors.

And in this context, albeit collaterally, it is worth considering the currency war being waged between the two great powers of the moment: China and the United States. China uses two financial instruments, apart from the balance of trade with the United States (always positive in its favour), which are the purchase of Treasury bonds and the manipulation of the exchange rate of the yuan (renminbi) against the dollar. Although a detailed discussion of China's geo-economic model is not the subject of this research paper, the following figure (figures 8 and 9) is left as an explanation of what we are saying.

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<sup>35</sup> <https://www.facc.com/en/Company/AVIC>. Last accessed 11 March 2025.

<sup>36</sup> <https://www.facc.com/en/Aerospace-Solutions>.

<sup>37</sup> <https://aviationweek.com/avic-aircraft-buys-austrias-facc-supplier-airbus-boeing>. Visited on 10 March 2025.

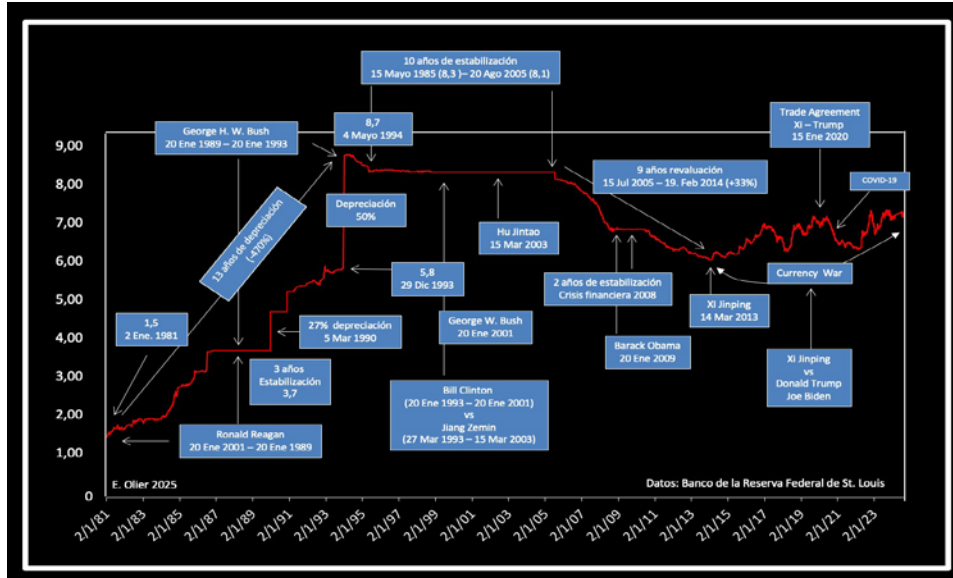


Figure 8

43 years of currency wars between China and the United States<sup>38</sup> (the left axis indicates the yuan/dollar exchange rate at the time indicated. 9.00 would indicate that one US dollar would be worth 9 yuan).

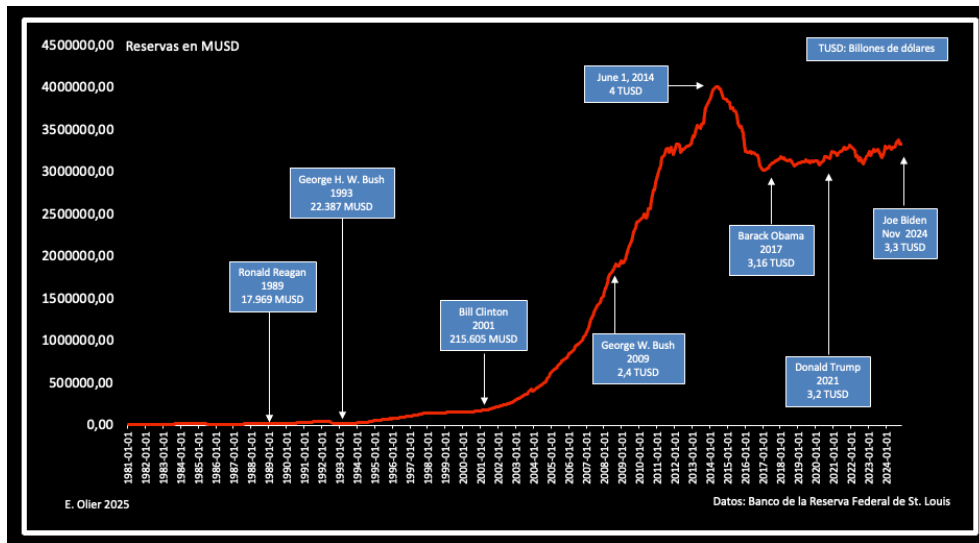


Figure 9

US dollar reserves at the People's Bank of the People's Republic of China<sup>39</sup> (MUSD refers to millions of US dollars)

### The strategic semiconductor sector

When talking about defence, apart from traditional systems (combat aircraft, naval systems, ground systems, etc.), the role played by semiconductor as key technologies in the development of new weapons systems emerges. And in this sense, a geopolitical

<sup>38</sup> OLIER, E. *International economy in 2025*. Lecture at the XVI Curso de Estados Mayor de las Fuerzas Armadas. CESEDEN, 4 February 2025.

<sup>39</sup> *Ibid.*

"struggle" is emerging in which the United States, together with China, Japan, Taiwan and the Republic of Korea, are showing a scenario that will increase their geopolitical confrontation in the future.

Manufacturing a semiconductor (a chip as it is familiarly known), in its various applications, is a complex process. The basis of chips are transistors, on the one hand, and their introduction by means of transistor circuits on refined silicon or germanium wafers, or their different versions (gallium arsenide or silicon-germanium alloys, for example), on the other.

Without going into the different types of transistors and how they work (bipolar, field-effect, light-sensitive, power, etc.), it can be said that, in essence, transistors can act as amplifiers or as switches, allowing electricity to pass through them or not.

Like so many modern technologies, the transistor and the semiconductor were inventions of American scientists. The first was born in the Bell Telephone laboratories in 1948, and its discoverers were three physicists working there: John Bardeen, Walter Brattain and William Shockley. Ten years later, Jack Kilby of Texas Instruments and Robert Noyce of Fairchild Semiconductor built what came to be known as an integrated circuit, which included several transistors. In 1971, Intel launched what was called a microprocessor, which included 2,300 transistors in a semiconductor that acted as a processing unit, like a calculator. Today they exceed 130,000 transistors per square millimetre, with the possibility of incorporating that number of transistors in a space of 3 to 5 nanometres.<sup>40</sup>

As we have said, the production of a semiconductor is a highly complex process involving several companies in different countries. Moreover, not all semiconductors serve the same functions. For example, the iPhone 12 has dozens of semiconductors produced by various companies.<sup>41</sup> This is a sector which, since its beginnings, has been changing with the entry and exit of specialised companies, as shown in Figure 10.

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<sup>40</sup> A nanometre is one billionth of a metre (10<sup>-9</sup> metres). The diameter of DNA is about 2.5 nanometres.

<sup>41</sup> IFIXIT (<https://es.ifixit.com/Guía/Desmontaje+of+the+iPhone+12+and+12+12+Pro/137669>) shows in 22 steps the disassembly of an iPhone 12. You can easily see the significant number of semiconductors inside. There are memories, radio frequency chips, etc. Apple, regardless of the importance of the company does not manufacture any of these chips. Last accessed on 10 March 2025.

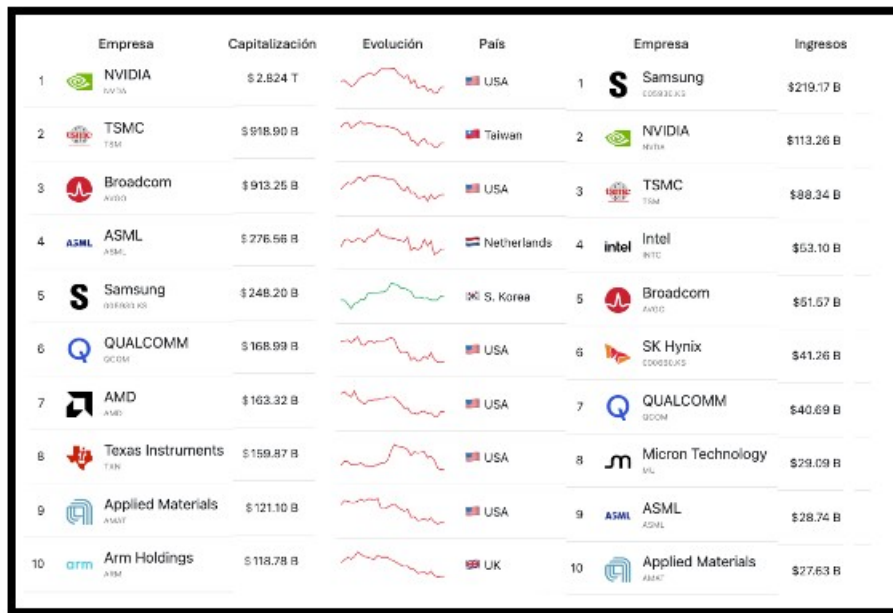


Figure 10

Semiconductor manufacturers by market capitalisation value and revenue  
(T stands for *trillion*, i.e. billion, or one million million million, and B stands for *billion*.)<sup>42</sup>

Regardless of the specific manufacturing steps of a chip, it can be said that one of the key upstream elements is the design, which is a critical phase in the value chain of the whole process. Before it can move to manufacturing, design, including performance, architecture, and the necessary energy efficiency, is essential. So, designing a chip has become a strategic, not to say geopolitical, element, as its complexity means that only highly specialised companies are capable of doing so.

Semiconductor design involves two types of actions: (1) hardware design and (2) *software* development. The first *-hardware-* is a four-step process: (1) semiconductor specification; (2) architecture design; (3) integrated circuit design; and (4) functional testing. *Software development* involves programming an operating system that defines the operations and instructions to be carried out by the device. So, in practice, a chip may be designed in one country by a company owned by another country. This would be, for example, the case of the British company ARM<sup>43</sup> (Advanced RISC Machines) with Japanese capital through the SoftBank Group<sup>44</sup>, which designs central processing units, known as CPUs in computers, and manufactures systems and platforms for chip design.

<sup>42</sup> According to information from: Companies Market Cap. Last accessed 25 February 2025. <https://companiesmarketcap.com/semiconductors/largest-semiconductor-companies-by-market-cap/>

<sup>43</sup> <https://www.arm.com>. Last accessed 25 February 2025.

<sup>44</sup> <https://group.softbank/en>. Last accessed 25 February 2025.

In relation to semiconductors, as we said before, there are many types of semiconductors, according to the functions they must carry out. Although this is not the place to make a complete description, one of the basic semiconductors of any computer are the memories and, in this case, we must highlight the so-called DRAM (Dynamic Random-Access Memory), which constitute the main memory of computers, today with accesses of millions of bits<sup>45</sup> per second to obtain the information they store. The Japanese company Micron<sup>46</sup> is one of the world's leading manufacturers of this type of device.

Currently, when it comes to incorporating billions of transistors on a chip after it has been designed, the state-of-the-art technology for incorporating transistors on a chip is based on photolithography. A technology that is led by the Dutch company ASML (Advanced Semiconductor Materials Lithography) with more than 66 % market share worldwide. It was founded by Phillips in 1984.

Turning to figure 7, the three largest companies, NVIDIA (with Intel as the largest by revenue), TSMC (Taiwan Semiconductor Manufacturing Company), and Samsung, gives an idea of how the market is developing and the "power" of the companies and thus the countries that dominate these technologies.

NVIDIA, which started out making semiconductor cards for graphics management, has become the leading manufacturer and designer of chips for handling artificial intelligence systems. Hence also its entry into the market of large technology companies offering cloud services (e.g. Amazon and Microsoft) that require huge data centres with computers full of microprocessors. Again, when you look at the capital distribution of this company and see who its largest shareholders are, the big Asset Management Funds appear once again: Vanguard Fiduciary Trust Co. (8.932%), BlackRock Advisors LLC (5.872%), Fidelity Management & Research Co. LLC (4,114 %), and State Street Corp. (3,967 %). In this case, the founder, Taiwanese Jensen Huang, holds 3,526 %.

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<sup>45</sup> Although it is probably well known to the reader, we recall that a bit defines the most elementary state of the binary code; representing a 1 (open circuit) or a 0 (closed circuit) in the case of traditional electronic devices. In the case of quantum computers currently under development, there are dozens of positions between 1 and 0, which makes them much more powerful in processing information than traditional computers. See, for example: *What is Quantum Computing?* <https://www.ibm.com/think/topics/quantum-computing>. Last accessed 25 February 2025.

<sup>46</sup> <https://www.micron.com>. Last accessed 25 February 2025.

The same is true for Intel. Its main shareholders are again the same: Vanguard Fiduciary Trust Co. (8,524 %), BlackRock Advisors LLC (6,413 %), State Street Corp. (4,601 %), BlackRock Life Ltd. of the UK (2,438 %), and Eaton Vance Management (2,438 %).

When it "exits" the United States, the situation changes, and the role of governments comes into play. TSMC's main shareholder is the National Development Fund of The Executive Yuan (6.377 %), which is joined by the Singapore Government's sovereign wealth fund, the Government of Singapore Investment Corporation (GIC) (3.149 %), and the Labor Pension Fund Supervisory Committee, also from Taiwan (1.314 %). The same is true of Samsung, whose shareholders are Samsung group companies.

Before we continue, let's take a short look at the influence of financial markets on technology investments; in other words, their stock price, where, in a way, technology conflicts and market response have an influence. And, in this sense, the case of the aforementioned company NVIDIA, which (along with other US technology companies) plummeted by 17% in its stock market value on Monday 27 January 2025, is interesting.

Financial analysts alluded to this fall in the share price due to the entry into the artificial intelligence (AI) sector of the Chinese company DeepSeek, which reportedly presents strong competition to the dominance of the United States as the leader in the sector.

What is surprising about this case, before moving on to the financial effect on NVIDIA in January 2025, is the DeepSeek company itself, which seemed to come out of nowhere to rival OpenAI and its GPT-4 system. A company, DeepSeek, whose capital structure is an intricate mix of Chinese companies and individuals that raises the question of who is really behind it (Figure 11). This circumstance also raises the question of whether there is not a kind of "geo-economic war" behind it to destabilise the United States in its leadership in these new technologies, given the sensitivity of the financial markets in this country to news of this type.

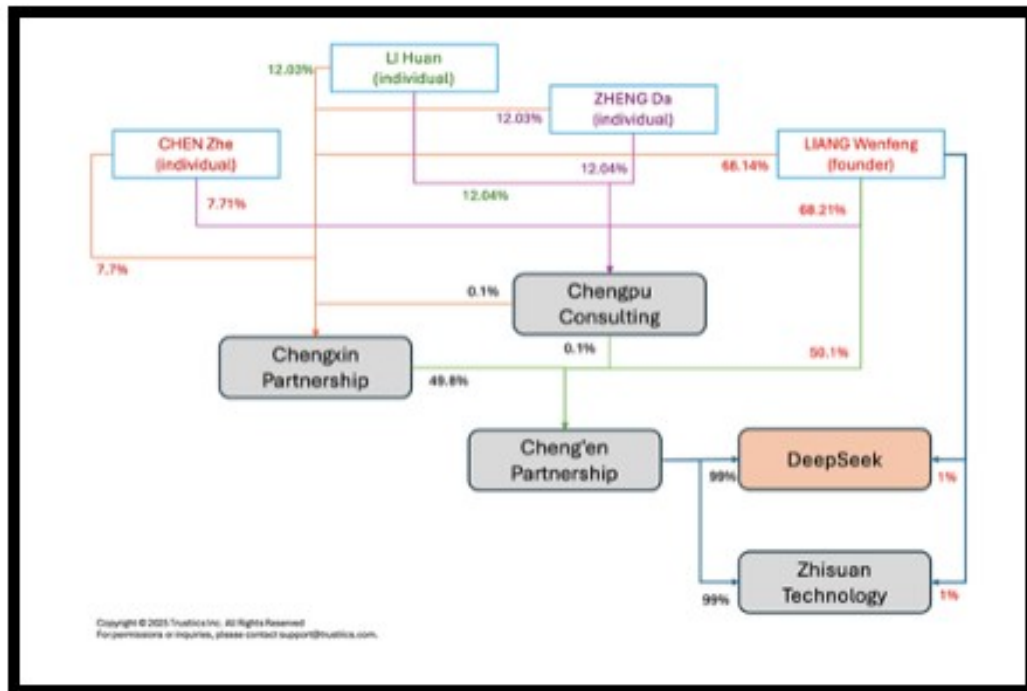


Figure 11  
 DeepSeek's capital structure<sup>47</sup>

Returning to NVIDIA, the DeepSeek effect was, in our view, coupled with a financial "short" trade. That is, a situation in which investors borrow shares and sell them in the hope that the share price will fall so that they can buy back the shares at a lower price. Be that as it may, the effect of NVIDIA in January 2025, as well as its evolution in the market, is shown in Figure 12. As can be seen, in the week of 24 January 2025, the share depreciated by almost 16 %, whereas in the period from 7 October 2022 to 13 March 2023, the share had appreciated by 680 %, which suggests the "short" operation indicated above.

<sup>47</sup> TRUSTIICS. *Who Owns DeepSeek? A Deep Dive Into Its Shareholders and Corporate Structure.* <https://www.trustiics.com/posts/deepseek-shareholders>. Last accessed 14 March 2025.

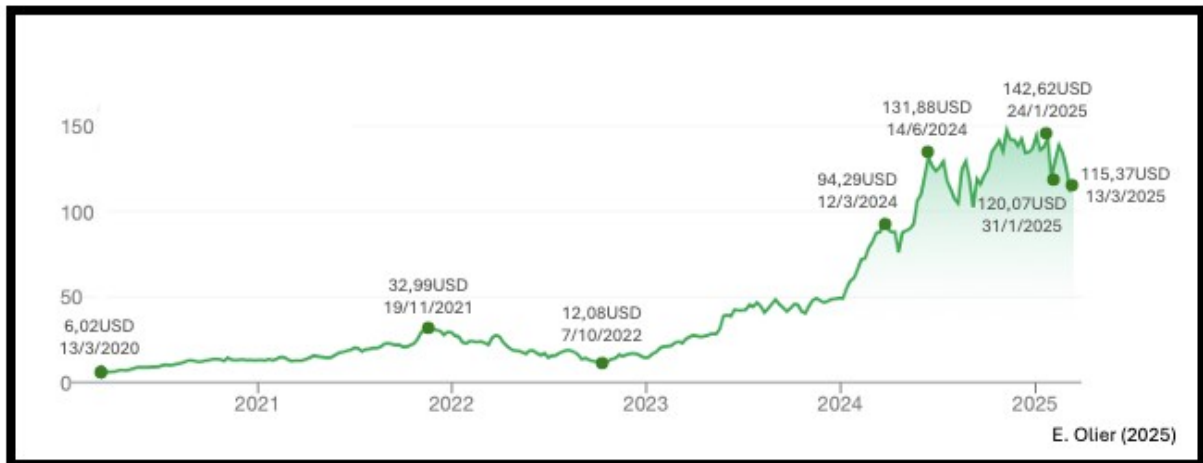


Figure 12

NVIDIA NASDAQ stock price (2020-2025). Data according to Google Finance (USD refers to US dollars).

The question now arises as to China's capacity in semiconductor manufacturing, and whether China's level of technology is comparable to that of the United States, Taiwan or the Republic of Korea. In this respect, it must be said that the outsourcing processes of the main American technology companies have focused on China as a large market to be served. This policy has been in conflict with the different American administrations, which have been imposing restrictions on the US market for the major Chinese technology companies, mainly Huawei.

Even so, everything suggests that China, regardless of its alliances with Western companies, is still far from being able to compete on equal terms with the United States (Intel, for example) or with other companies such as Samsung or TSMC, which does not mean that it will not be able to reach these capacities in a few years, even if it were to do so by whatever means it considers with the island of Taiwan.

### Taiwan's difficult invasion

The Constitution of the People's Republic of China is clear about Taiwan. Its Preamble reads: "Taiwan is part of the sacred territory of the People's Republic of China. It is the sacred duty of all Chinese people, including our Chinese compatriots in Taiwan, to

achieve the great reunification of the motherland"<sup>48</sup> . Sooner or later, therefore, Taiwan will have to participate in this ruling. The problem is when and how it will be possible to do so.

Many analysts speak of a possible future military invasion of the island<sup>49</sup> , especially given China's military presence on multiple islands in the area, including the atolls that have been converted into military bases<sup>50</sup> . Not to mention the economic cost of such an operation, which according to some analyses would rise to 10 billion dollars.<sup>51</sup>

However, in this chapter, this author is oriented towards the thesis of Chris Miller, who mentioned a comment of the president of the Taiwanese TSMC (Taiwan Semiconductor Manufacturing Company) when he said: "About a possible invasion by China, I will tell you one thing: everybody wants a peaceful Taiwan Strait".<sup>52</sup>

Following Chris Miller, therefore, it must be said that if China were to take over Taiwan and thus TSMC, there is no doubt that the United States and Japan would respond, if not with a war, then with significant limits on the export of advanced machines and materials to the Taiwanese company, which come from European, American, Korean and Japanese companies. However, according to Miller: "This scenario would be Dantesque for the economic and geopolitical position of the United States"<sup>53</sup> and a call for a conflict of enormous proportions. So, in our view, the geopolitics of the Pacific Ocean is inevitably about technology rather than the indiscriminate use of military capability . A consideration that goes to the heart of defence economics and technological development capabilities in this field.

## Economy of defence

Normally, defence programmes tend to respond to the operational needs of armies after a geostrategic analysis of each country's situation, taking into account the conditioning

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<sup>48</sup> *Constitution of the People's Republic of China*. Updated: November 20, 2019. 16:25.

[https://english.www.gov.cn/archive/lawsregulations/201911/20/content\\_WS5ed8856ec6d0b3f0e\\_9499913.html](https://english.www.gov.cn/archive/lawsregulations/201911/20/content_WS5ed8856ec6d0b3f0e_9499913.html)

<sup>49</sup> There is, for example, among many others, this analysis by *The Global Guardian* of 3 January 2025: "Will China Invade Taiwan? A Potential Timeline for Conflict". <https://www.globalguardian.com/global-digest/will-china-invade-taiwan>

<sup>50</sup> ASIA MARITIME TRANSPARENCY INITIATIVE. *China Island Tracker*. <https://amti.csis.org/island-tracker/china/>

<sup>51</sup> BLOOMBERG. "Xi, Biden and the \$10 Trillion Cost of War Over Taiwan". 8 January 2024.

[www.bloomberg.com/news/features/2024-01-09/if-china-invades-taiwan-it-would-cost-10-trillion?embedded-checkout=true](https://www.bloomberg.com/news/features/2024-01-09/if-china-invades-taiwan-it-would-cost-10-trillion?embedded-checkout=true)

<sup>52</sup> MILLER, C. *The war of the chips*. Ediciones Península, Barcelona, 2023, pp. 411-412.

<sup>53</sup> *Ibid*, pp. 416 et seq.

factors arising from the transnational security and defence alliances to which these countries are beholden, as well as the industrial instruments that must be addressed. In some cases, given the lack of resources of an isolated country, multilateral programmes for certain equipment or defence systems are carried out (such as the Eurofighter fighter aircraft).

In this way, the economy of defence as an autonomous discipline is usually left out of the analyses and strategies that establish security and defence policy. On the other hand, it is a subject that could be useful to incorporate into these strategies.

It should be recalled that the first analyses carried out in the context of defence economics were conducted in 1960 at the RAND Corporation.<sup>54</sup> At the beginning of this study of more than 400 pages and an extensive bibliography, it is stated: "Military problems are, in an important respect, economic problems in the efficient allocation and use of resources. In this sense, it must be recognised that economics is not exclusively concerned with financial or industrial activities, and it is not concerned with scrimping, that is, with reducing expenditures no matter how important the things being purchased are. Rather, economics is concerned with allocating resources - choosing doctrines, equipment, techniques, etc. - to make the best use of available resources. Economising in this sense may mean spending less on some things and more on others. But economising always means trying to make the most efficient use of available resources".<sup>55</sup>

He continues: "We consider defence economic issues at three broad levels: the amount of national resources available, now and in the future; the proportion of these resources allocated to national security purposes; and the efficiency with which resources so allocated should indicate, in varying degrees of detail, how to do so".<sup>56</sup> There can be no doubt that these principles are those that animate any general staff in the design of its defence policy, where, as noted at the outset, the military production of critical systems and the role of military outsourcing are essential aspects.

As Paul Samuelson said in his famous book *Economics*, the problem of economics as a science stems from the scarcity of resources; for which he brought up the case of

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<sup>54</sup> HITCH, C. J., MCKEAN, R. N. *The economics of defense in the nuclear age*. The RAND Corporation. Project RAND R-346. 1960.

<sup>55</sup> *Ibid.*

<sup>56</sup> *Ibid.*

Robinson Crusoe, posing three questions: "(1) what commodities are to be produced and in what quantity; (2) how are these resources to be produced; and (3) for whom is the production of these commodities to be directed?".<sup>57</sup>

To arrive a few pages later at his famous *Law of scarcity*, saying: "What to produce, how, and for whom would be no problem if resources were unlimited, if an infinite quantity of each good could be produced, or if the needs of every human being could be completely satisfied".<sup>58</sup> Therefore: "There would be no economic goods, i.e. if there are no goods that are relatively scarce, no economic study would be necessary, there would be no need to "economise". All goods would be *free goods*, like water or air".<sup>59</sup>

The study conducted by the RAND Corporation analysts mentioned above outlines the content that should be included in the development of a defence economy, which is completely up to date. In summary, the issues to be addressed are the following: (1) to make a defence policy in relation to global needs; (2) to analyse the limitation of available resources; (3) to study budgetary constraints and their effect on operational needs; (4) to establish the consequent effects of defence policy: increased inflation, reduction of resources needed in other areas, economic inequality, etc.(5) define the criteria for efficiency in defence policy decisions; (6) consider other aspects that are difficult to analyse, such as geopolitical uncertainties, changes in strategic design, changes in political decisions, etc.; (7) incorporate the "time resource", when and when defence systems and their operational capabilities will be needed; and (8) introduce into the scheme other issues such as alliances, new threats, emerging technologies, etc.

When considering aspects of uncertainty, especially after the end of the Cold War and, in particular, today's changing geopolitics, it has generally been observed that situations of risk have arisen, whether due to changing or surprising threats or to changes in the environment. These situations do not apply to countries under *defensive stress*, i.e. countries with potential permanent threats, but to countries far from conflict zones, which nevertheless have to equip themselves with defence and security elements in accordance with their own needs.

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<sup>57</sup> SAMUELSON, P. *Economics*. McGraw-Hill Book Company, Inc. New York, 1948, pp. 12-13.

<sup>58</sup> *Ibid.*, pp. 16.

<sup>59</sup> It should be noted that Samuelson made this statement about water and air in 1948. Today, in 2025, both water and air are considered scarce goods, hence taxes on water consumption and purification, or taxes on air and greenhouse gas emissions.

Notwithstanding the above comments, in general, especially in many European countries, defence budgets in real terms have been broadly constant or declining. In contrast, costs for military personnel and other inputs have been rising. So the defence industry in general has suffered from this policy in recent years, particularly in terms of reduced orders for military equipment and systems. This has been reflected in the needs expressed by NATO.

In addition, the reduction of compulsory military service and the shift to volunteer forces have led on one hand to inequalities in relation to other groups, and on the other hand to certain disadvantages in military employment.

While we are talking about Europe, contrary to what has happened elsewhere, for example in China or the United States, the operational dispersion according to the needs of each European country has brought, in addition, enormous operational disadvantages, with multiple redundant systems, apart from their interoperability difficulties.<sup>60</sup> A situation that is not so much a problem of budget, although there are important differences, but of fragmentation and its consequent inefficiencies, as shown in Figure 13.

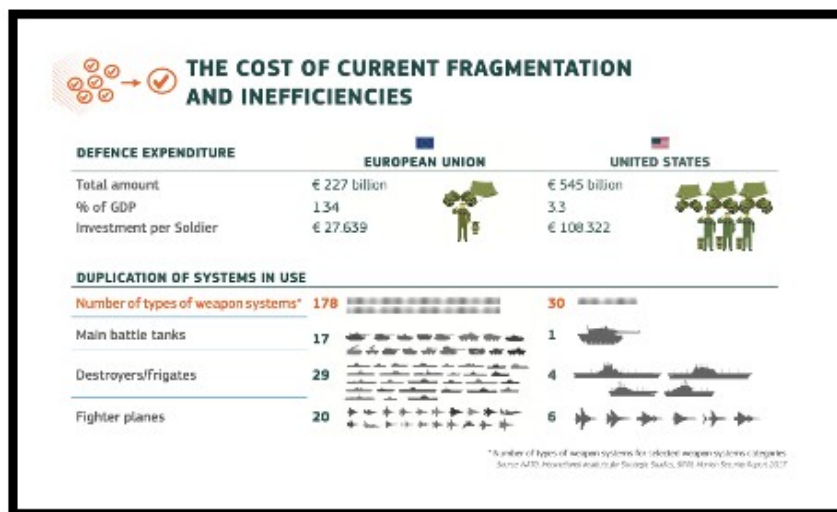


Figure 13

Comparison between US and EU weapons systems<sup>61</sup>

<sup>60</sup> <https://defence-industry-space.ec.europa.eu/system/files/2021-04/20210429%20-%20EDF%20Factsheet.pdf>. Last accessed 27 February 2025.

<sup>61</sup> *Ibid.*

So it is clear that it is necessary to implement an economy of defence, not in terms of "economising", but in the essential (at least in the European Union and its member countries) implementation of an integrated and multidimensional defence economic system, applying economic methods as is done in other sectors and industries, understanding the security and defence needs of each country, and making a detailed analysis of what these two concepts really mean; naturally taking into account the scarcity of resources, the particular economic situation of each country and carrying out the necessary *soft power* offered by promoting peace, stability and equity between nations. Diplomacy and defence as a solution to conflicts.

### **The use of artificial intelligence (AI) in optimising the defence economy**

The defence and industry sector mainly uses AI in the various weapon systems and in activities related to decision-making in logistical or operational processes. However, given that strategic decisions on military equipment needs are driven by strategies to improve specific defence and security conditions, there is a general dysfunction between existing budgetary capabilities and the real needs in weapon systems, technologies, and endowments required to address existing threats and risks, especially at a time when Europe is facing a new phase in its defence policies.

In this sense, given the need to develop a defence economics strategy that optimises defence and security needs with a sustainable economic scheme over time, it is advisable to analyse and subsequently develop an artificial intelligence system that acts as an "agent" or "advisor" to the General Staff, facilitating optimised decision-making at the highest levels of these bodies throughout the entire defence economics framework.

The following is a proposal to reflect on this need, which could be structured according to an artificial intelligence-based support system that we will call DERT (Defence Economics Right Tracking) for the General Staff.

Such an AI system could be structured according to an architecture such as the following (Figure 14). It should be borne in mind that this is merely a sketch intended to provide food for thought on this need, which, if necessary, should be explored in more detail in terms of its real feasibility and that of its components.

The heart of the system could be a neural network managing the data and experience of dozens of years of mission design and operation, staff strategies and defence policies, including weapons systems, industry activities, strategic decisions, etc. to which simulation and optimisation models would be added to provide the best decisions in an uncertain state of affairs (*expectations*) as is the case in today's defence world; considering, among others, the optimisation of resource allocation, and also incorporating the uncertainties arising from threats, budget levels, etc., in order to finally arrive at the definition of the best possible defence strategy, in order to finally define the strategy required by the military staff.

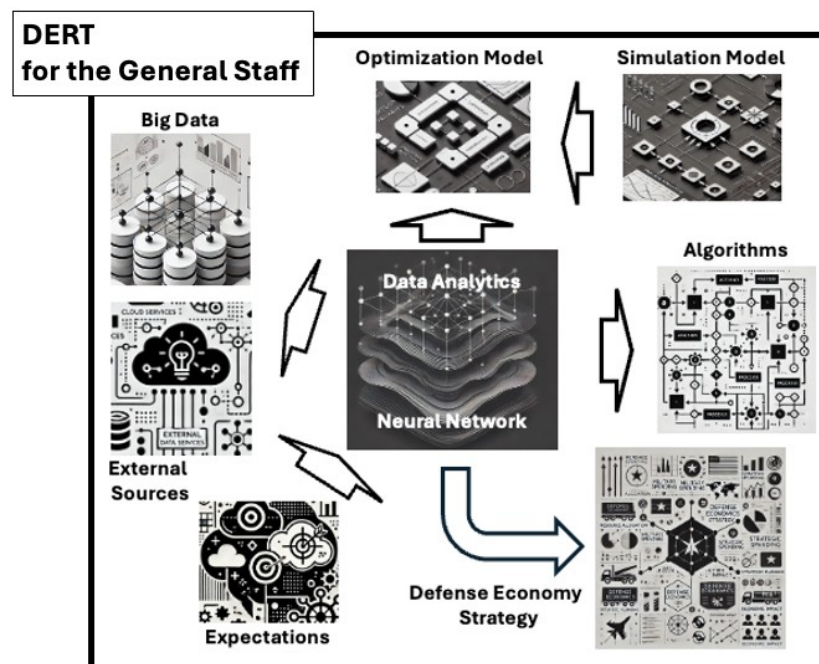


Figure 14

Proposed structure of a possible Artificial Intelligence System DERT (Defence Economics Right Tracking)

## Geopolitics and finance

Geopolitics in the 21st century, and more specifically in this year of 2025 and the near future, has nothing to do with the situations of the last century or even the early years of this century. Finance and technology are aspects that dominate today's geopolitical space in multiple directions.

In fact, for example, the war in Ukraine following Russia's invasion, with Europe in a belligerent mode, and the United States in a strategy of seeking a "peace through

strength”, apart from the almost forgotten conflicts, such as the events in the Middle East (Israel, Gaza, Lebanon, etc.), as well as the multiple technological, economic, and why not also cultural conflicts between China and the United States, some of which have been indicated above, are a clear demonstration of today's global geopolitical problems.

In parallel to these situations, the role of finance, as we have seen, plays a determining role. Added to this are the currency wars, and the commercial elements that are forcing the United States to establish a new economic framework (tariffs) to avoid the trade deficits the country is facing, which opens up new geopolitical conflicts. As an example, Figure 15 shows the state of the US-China trade relationship since 1985.

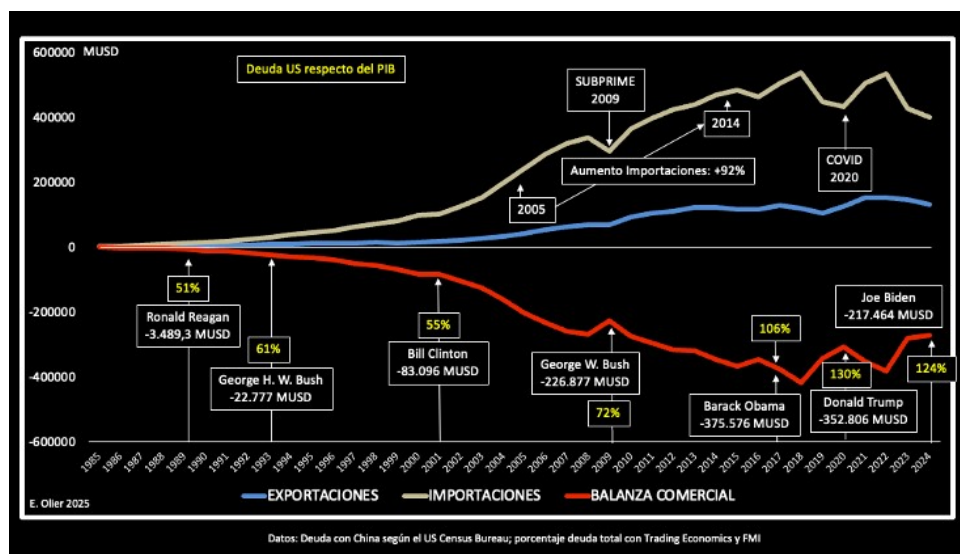


Figure 15  
 China-US trade balance 1985-2024 and US debt-to-GDP ratio<sup>62</sup>

All of the above, and what has been said in this paper so far, reflects the importance of economics and finance in the geopolitical context. An aspect that is generally taken for granted and no longer considered as an essential element in the "defence and security" equation, as the emphasis is placed on international relations and the power games that take place there, forgetting that geo-economics is the key to many of today's geopolitical situations.

This last comment brings us, as a paradigmatic example, to what we could call the "rare earths war". These are the seventeen metals of the periodic table (fifteen lanthanides plus

<sup>62</sup> OLIER, E. *International economy in 2025. Op. cit.*

scandium and yttrium), which have special and similar chemical properties, such as high melting and boiling points (figure 16), which are essential in a large number of applications.<sup>63</sup>

The geopolitical problem, however, stems from their dispersion in terms of the location of these metals. In 2021, the world had an estimated 116 million tonnes of these materials, 38 % of which were in China, followed by Vietnam (19 %), Brazil (18 %), and Russia (10%). With the characteristic that the largest producer is China by far, which made the United States dependent on essential elements for the technology industry, automobile, energy, etc. (in 2020 China produced 140,000 tonnes of rare earths, while the United States reached only 38,000 tonnes).<sup>64</sup>

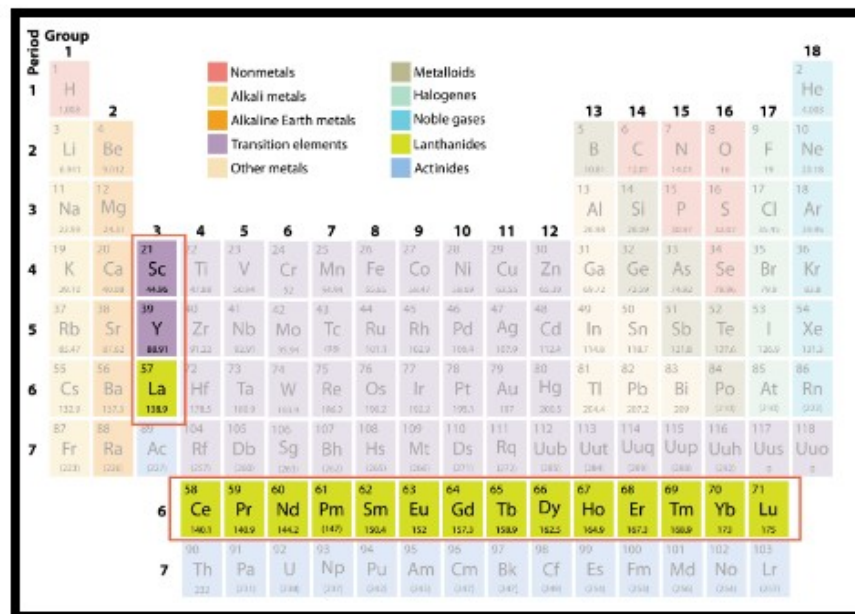


Figure 16

Rare earths in the periodic table of chemical elements<sup>65</sup>

It is in this context that the controversy over the agreement between the United States and Ukraine over strategic minerals<sup>66</sup> arises, which, as the Aljazeera figure (figure 17)

<sup>63</sup> A full description can be found in D. A. Atwood (Ed.) *The Rare Earth Elements. Fundamentals and Applications*. John Wiley & Sons, Ltd. United Kingdom, 2012.

<sup>64</sup> LEPAN, N. "Rare Earth Elements. Where in the World Are They?", Visual Capitalist. November 23, 2021. <https://www.visualcapitalist.com/rare-earth-elements-where-in-the-world-are-they/>. Last accessed 14 March 2025.

<sup>65</sup> <https://www.rareelementresources.com/rare-earth-elements>. Last accessed 14 March 2025.

<sup>66</sup> THE CONVERSATION. "US-Ukraine deal highlights Ukraine's wealth of critical minerals, but extracting them isn't so simple". <https://theconversation.com/us-ukraine-deal-highlights-ukraines-wealth-of-critical-minerals-but-extracting-them-isnt-so-simple-250996>. Last accessed 14 March 2025.

shows, could have an economic value of between 14.8 *trillion* and 26 *trillion* dollars. Although given the war situation in Ukraine, a significant part is under Russian control as shown in Figure 18.

However, finance is again emerging in relation to these strategic materials. See, for example, the agreement signed between Ukraine and BlackRock a year and a half ago, according to which BlackRock Financial Market Advisory will support the Ukrainian Development Fund after the conflict is over. Ukrainian President Volodymyr Zelensky was there on 5 May 2023 for the creation of an investment fund that would serve to restore Ukraine's economy with the participation of public and private capital. A clear demonstration of the importance of economics and finance in 21st century geopolitics.

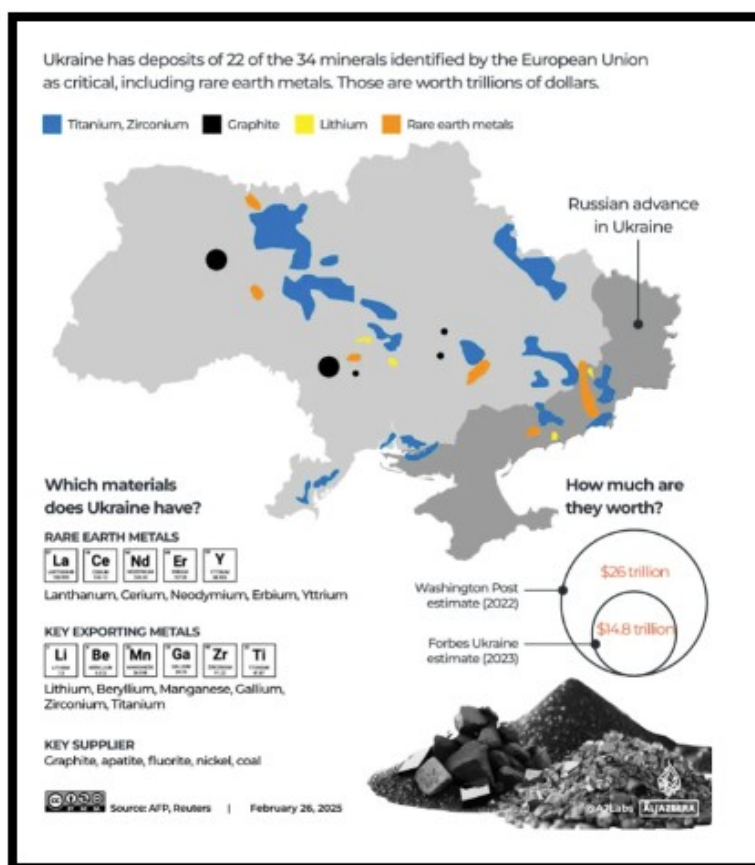


Figure 17  
 Strategic minerals in Ukraine<sup>67</sup>

<sup>67</sup> ALJAZEERA. *Mapping Ukraine's rare earth and critical minerals.*  
<https://www.aljazeera.com/news/2025/2/28/mapping-ukraines-rare-earth-and-critical-minerals>.  
 Visited on 15 March 2025.

## Conclusions

This study, which for reasons of space we have limited, puts into perspective the relationship between finance and economics in a horizontal way, where we find the centre of the defence economy and its relationship with technology and the geopolitics of conflicts. For example, the European Union's proposal aims to mobilise 800 billion euros for Europe's defence<sup>68</sup>. This is a fact that is fully in line with European defence and security needs, given that US policy is showing signs of profound changes. Decisions that have much to do with the conflict that has led to the war in Ukraine and the Ukrainian response through military action in Russia, both in the Kursk region and with the latest drone launches over Moscow.<sup>69</sup>

From all of the above, this author would like to recommend the need to systematically approach the analysis geopolitical events from a financial perspective as well, developing a defence economics discipline that would provide an additional vision to other analyses more oriented towards international relations or geostrategy, so that these different perspectives could complement each other in order to have a more complete analysis of the geopolitical situation and its possible evolution over time. And in this sense, as briefly discussed in section 8 above, it might be advisable to build an artificial intelligence system that could serve to support the decisions of the Military Staff, which should be taken in an optimised manner, incorporating all the elements in play.

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<sup>68</sup> [www.france24.com/en/live-news/20250304-eu-chief-unveils-800-billion-euro-plan-to-rearm-europe](https://www.france24.com/en/live-news/20250304-eu-chief-unveils-800-billion-euro-plan-to-rearm-europe). Last accessed 15 March 2025.

<sup>69</sup> <https://www.bbc.com/news/articles/ce8y655p52do>. Last accessed 15 March 2025.