

Subsidies and Geopolitics

Subsidies, local content issues and supply chains

In anticipation of the passing of an industrial subsidy package under the US Inflation Reduction Act (IRA), the Biden administration sought to encourage foreign investment to the US. Production subsidies would be provided on a national treatment basis for friendly countries (i.e., as a means of decoupling from China).

During a visit by US president Biden in South Korea in May 2022, Hyundai announced a \$10.5bn investment to build the company's first dedicated EV plant (a big plant to be in Georgia that would start production in 2025) and a battery manufacturing facility also in the US. The president thanked Hyundai's chairman Chung Eui-sun and noted that 'the US would not let you down'. This statement was widely broadcast in Korea [1][2].

The IRA passed into law in Aug 2022, but the law included provisions that did let down the chairman. Under IRA there are tax incentives for producers to build new manufacturing plants of electric vehicles (EVs). In addition, there were tax credits for buyers of EVs of up to \$7500. However, there were new standards that were required for an EV to meet to earn their buyer the tax credit. The change was meant to encourage Americans to buy electric and to give carmakers more reason to bring their factories and supply chains into the US's orbit. None of the South Korean cars would qualify [1].

The tax credits would be eligible for EVs assembled in the US, Canada, and Mexico. Cars assembled in South Korea would not be, and Hyundai's Georgia plant was not scheduled to begin production until 2025, making the company's EVs ineligible for the subsidies until then. This seemed like a renege of the conditions offered prior to the investment. When the law was signed and enacted, it seemed clear to the company that it was being discriminated against, which would provoke emotional and political repercussions [2].

Second, in Jan 2023 two additional local content criteria would have to be met, each worth half of the \$7500. Battery components totalling 50% of the value of the bits and pieces that are used to make these cars' lithium-ion cells must also be manufactured or assembled in North America. And 40% of the critical mineral used in the battery must be sourced either from those countries or from one with which the US has a free-trade agreement. Both requirements will get stricter over time. Moreover, EVs using any components from a "foreign entity of concern" such as China or Russia will be ineligible from 2024 [1].

Hyundai and its affiliate Kia account for 9% of the US EV market, the biggest share of any automaker not called Tesla, which commands a whopping 71%. Ford, a US carmaker, is next with 6%. Mr. Chung was reportedly speeding up plans to build his cars on US soil, but until the cars start rolling out of factories, local rivals eligible for big subsidies will have an advantage [1].

The batter requirements are the bigger problem. China produces three-quarters of the world's lithium-ion batteries and is involved in the mining, processing or refining of half the cobalt, graphite and lithium crucial to batter production. It is likely to continue making the lion's share of the world's lithium-ion batteries until at least 2030, reckons the International Energy Agency, a forecaster [1].

Countries friendly with the US, such as Australia, Chile, and south Korea itself, do have capacity to produce some of the minerals used in batteries. They stand to profit. Some South Korean battery-makers have announced an accelerated shift to North America, where the IRA would provide them with subsidies too, but they can also woo business that would otherwise have gone to Chinese manufacturers. But all of that will take time. Targets should be ambitious, but the ones set by the IRA are "way beyond the reality the industry is facing", complaints Yeon Han-woo, a former trade minister of South Korea [1].

The IRA makes the US for vulnerable for both violations of WTO rules and the terms of the countries' bilateral free-trade agreement. South Korean officials have launched a flurry of lobbying. However, with the difficulty of amending the legislation, it is more likely that the US will have to find more "creative solutions" to avoid the WTO from weighing in [1].

Subsidies for multiple economic challenges

The economic challenges in the 2020s require policy responses that address inflation, shoring up supply chains, industrial innovation and job creation, climate change, national security and preparation for future crises or economic shocks. The pandemic exposed the fragility of international supply chains. The frequency of climate shocks the world over has also disrupted supply chains. Russia's invasion of Ukraine exposed strategic dependencies of some countries to regional energy and commodity markets. China becoming the factory to the world hollowed out the industrial base of mature economies and stifled aspiring developing countries seeking growth through industrialization. The rise of China has exposed it as a strategic rival as China has graduated from simple manufacturing to producer of high-valued, cutting-edge technological products with military application.

In seeking a "modern industrial strategy" the US is joining other countries in supporting sectors deemed "foundational to economic growth" and "strategic from a national security perspective". Co-operation with partners ensures that capacity is built in these sectors, and have resilience and are inclusive, yet diversified to create supply chains through the mobilization of investment for the clean energy transition, digital infrastructure, and stopping a race to the bottom in corporate tax, labour standards, and environmental protections [3].

The West is doling out enormous subsidies to manufacturers, especially chipmakers and those behind green technologies, such as batteries. They say they are fighting climate change, enhancing national security and correcting for four decades of globalisation during which workers suffered and growth slowed. In the emerging world, governments hope that subsidies can secure a foothold in supply chains as worried Westerners move production out of China [4].

The sums being spent are vast and growing. Since they were signed into law, the estimated ten-year cost of the US's green subsidies has risen by at least two-thirds, and is likely to pass \$1trn. The Biden administration has also expanded the eligibility for chipmaking subsidies. In June 2023 Germany increased its handout to Intel to build a chip plant, from €6.8bn (\$7.6bn) to €9.9bn. India's central government is subsidising a Micron factory in Gujarat to "assemble and test" chips, spending an amount equal to a quarter of its annual budget for

higher education. Eventually, the UK's opposition Labour Party wants to lavish £28bn (\$36bn) a year on green handouts which, as a share of GDP, would be nearly ten times more than the US's [4].

The US welcomes subsidy cooperation, saying the world needs green technologies and a diversified supply of chips. It is true that an ocean of public money is bound to accelerate the green transition and reshape supply chains in ways that should increase the security of democracies [4].



In ideal conditions, promoting manufacturing can add to innovation and growth. Towards the end of the 20th century South Korea and Taiwan caught up with the West thanks to the careful promotion of manufacturing exports. In industries like planemaking the enormous costs of entry and uncertain future demand can justify support for new firms, as when Europe backed Airbus in the 1970s. Likewise, targeted help can boost national security [4].

But today's schemes are likely either to fail or to prove needlessly costly. Countries subsidising chips and batteries are not pursuing catch-up growth but fighting over cutting-edge technology. The market for electric vehicles and batteries is unlikely to become an Airbus-Boeing style duopoly. In the 1980s protectionists argued that Japan would dominate the strategically vital semiconductor industry, owing to its subsidised mastery of memory-chip making. It did not turn out that way [4].

Duplicating production reduces specialisation, raising costs and hitting economic growth. Some analysts expect the price of a chip produced in Texas to be 30% higher than one made in Taiwan. The Biden administration is belatedly seeking ways to open up its electric-vehicle subsidies to carmakers from friendly countries. But most of the "Buy American" requirements are written into laws that may be all but impossible to amend. And they are being copied. A decade ago about 9,000 protectionist measures were in place worldwide, reckons Global Trade Alert, a charity. Today there are around 35,000.

European leaders think they must match the US or face catastrophic deindustrialisation. They have forgotten the logic of comparative advantage, which guarantees that countries will always have something to export, no matter how many cheques foreign governments write or how productive their trading partners become. Denmark has no car industry to speak of, but gdp per person is 11% higher than in Germany. Even the benefits to workers are overstated, because manufacturing jobs no longer pay a premium over comparable service work [4].

The potential for the manufacturing obsession to backfire is enormous. The state of New York spent nearly \$1bn building a solar-panel factory which Tesla pays \$1 a year to rent. The idea was to create a manufacturing hub but the project has returned only 54 cents in benefits per dollar spent; according to the *Wall Street Journal*, the only new nearby business is a coffee shop. India's

attempt to boost its mobile-phone industry appears to have brought mainly low-value assembly work. The lesson from South Korea is that national champions must be exposed to global competition and allowed to fail. The temptation today will be to protect them, come what may [4].

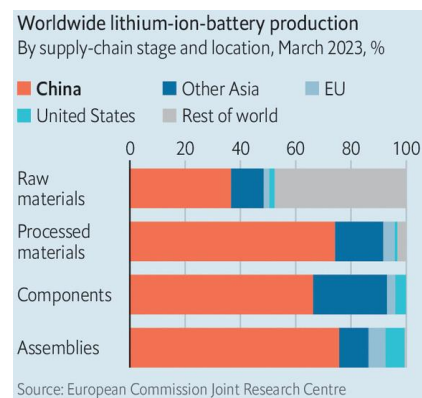
For national security access to vital technologies is worth paying for. Yet unless policymakers are clear about the dangers of subsidies, costs will only get bigger. However well-intentioned those doling out money today, their successors are likely to be less focused and more lobbied. Governments are not wrong to pursue good jobs, the green transition or national security. But if they succumb to the manufacturing delusion, they will leave their countries worse off [4].

Critical materials

Just as oil was weaponised by its suppliers in the 1970s, so China's dominance in the supply and processing of critical minerals could prove threatening. Cobalt, graphite, lithium, nickel, the rare earths and more are called critical for good reason. They are crucial to defence, smart-phones and other digital technologies. A handful are essential to wind turbines, batteries and EVs. A clean-energy future is inconceivable without them [5].

China has a near monopoly on many of these minerals. It supplies nearly 90% of processed rare-earth elements. It is by far the biggest processor of lithium. Plans for new critical-mineral supply chains are being drawn up in multilateral forums such as the Quad grouping of the US, Australia, India and Japan. The focus of much of the strategising, according to the National Bureau of Asian Research, a think-tank, is on three things: "friendshoring", "just in time" to "just in case", and ensuring spare capacity in minerals processing [5].

In response to western actions against China, China has hit back. Between 2009 and 2020 the number of Chinese export controls on the books ballooned ninefold, according to the OECD. Yet those restrictions were haphazard, informal and aimed at narrow targets – random warning shots rather than a strategic offensive. However, the potential for trouble is apparent in China's dominance of some supply chains (see chart, lithium-ion battery production by stage) [6].



US sanctions and subsidies aim to decouple or de-risk from China, making it impossible for Western chip companies to sell Chinese customers cutting-edge semiconductors and the machines to make them. China has responded with its own export controls. In Jul 2023, a pair of metals used in chips and other advanced tech were the latest retaliatory measures taken. The restrictions on the two metals, gallium and germanium, could cause a strategic headache for the US. The rules require exporters to apply for licences to sell the metal

for foreign customers. China produces 98% of the world's raw gallium, a key ingredient in advanced military technology [6].

China needs to tread carefully. The country reimports many of the finished product that are manufactured abroad using rare earths. So, prohibitions could come back to bite Chinese companies. Outright export bans would also prompt the West to build its own relevant production capacity and seek substitutes. This would in the longer term weaken China's hand. Labelling big Western firms with large Chinese operations as "unreliable entities" could jeopardise thousands of Chinese jobs [6].

Reshaping global investment

Rising geopolitical tensions have reshaped investment patterns through subsidies aimed at friend-shoring and restrictions on national security grounds. Foreign direct investment (FDI) has increasingly flowed between geopolitical allies, rather than countries that were geographically close. Rising tensions could be seen in the data, with FDI declining since 2008 and flowing between allies. There has been a notable decline in investment between the US and China since 2015 as the countries increasingly view each other as strategic rivals (see chart, US and China, FDI and venture capital). Tensions have also reduced hot money flows and bank lending between the two largest countries by around 15% [7].



While locating in capitals of friendly countries, a phenomenon known as "friend-shoring" might improve political security, the IMF warned that the trend was likely to reduce the diversity of risks, amplifying the chances of economic downturns. These risks relate to countries and firms seeking to build resilience into their supply chains by trading and investing in countries with a similar mindset. US treasury secretary, Janet Yellen, called for companies that were looking outside the US for investment locations to priorities friend-shoring of supply chains "with countries we know we can count on" [7].

In addition to friend-shoring and subsidies, national security concerns plan to screen investments into China. This aims at building the industrial base in three "force-multiplying" technologies: advanced semiconductors, artificial intelligence (AI) and quantum computing. Geopolitical breaks on US capital are not entirely new. Some companies with ties to China's military are off-limits to investors and the Chips Act bars firms that receive its subsidies from making investments that could benefit China's semiconductor industry. Outbound-investment rules are a necessary extension to the US's patchwork of trade restrictions: if export controls prevent Chinese firms from buying some dual-use technologies and inbound-investment screening stops them snapping up US firms that make them, then US capital should not

be allowed to fund technology's development in China [8].

The national-security risk presented by such investments is an open question. So is that of whether Chinese investors could in any case replace the funding if US investors were restricted. Another danger is mission creep. Under the Biden administration, economic and national-security policy have become increasingly indistinguishable. In 2022, the president directed the Committee on Foreign Investment in the US (CFIUS), the US inbound-investment watchdog, to consider wider factors including supply-chain reliance. Scrutinising out-bound investments on the basis of broad standards of national interest could also become unwieldy. Some have suggested using existing sanctions rules instead [8].

Outbound-investment screening is seen a tool for industrial policy. In 2021 a bipartisan group of congressmen introduced a bill to screen outbound investment broad enough to have affected more than 40% of US investment in China. Restrictions on investments not just in advanced technology but in industries including car making and pharmaceuticals [8].

The proliferation of such restrictions does not stop at the US border. Few countries globally place any restriction on out-bound investment, but screening of inbound investment is increasing rapidly. Europe is beefing up its protections: 18 of the EU's 27 members have such rules, covering an increasingly diverse list of "strategic" sectors. The commission's plan for outbound-investment rules threatens a growing tangle of red tape [8].

US investment is already falling. Venture capital flows to China have plummeted by more than 80% since the peak in 2018. As the business environment in China worsens, there is a sign of a reversal, regardless of the effectiveness of the restrictions [8].

Decoupling supply chains

Decoupling the semiconductor supply chain would be "extremely difficult and expensive" if not impossible, an executive at ASML stated. Any single country would struggle to build its won fully self-reliant chip industry. The only way to be successful in semiconductors is through co-operation [9].

ASML's executive vice-president's, Christophe Fouquet, comment came as the US, Japan, the EU, India and China rush to onshore vital semiconductor production in the hope of achieving self-reliance in chips. ASML's success has been its longtime collaboration with critical suppliers such as Zeiss and Cymer and support from chipmaking customers Taiwan Semiconductor Manufacturing Company and US Intel [9].

ASML is the world's exclusive maker of cutting-edge chip equipment known as extreme ultraviolet (EUV) lithography machines, enabling production of advanced semiconductors below the 7-nanometre level. In chipmaking, the smaller the nanometre size, the more advanced and powerful the chips. The mobile chip in the premium iPhone 14 Pro and Nvidia's graphic processors are built with 4nm tech, in which ASML's machines play an indispensable role. Zeiss of Germany is ASML's only supplier of precision mirror systems, one of the most critical optical parts for the EUV machine, while San Diego-based Cymer, which ASML acquired in 2013, is the sole provider of the EUV light source [9].

ASML does the bulk of its production at its headquarters in the Netherlands. None of ASML's smaller peers —

Nikon and Canon of Japan and China's Shanghai Micro Electronics Equipment — can yet match the European supplier's capabilities in cutting-edge lithography. The US has no domestic makers of chip lithography equipment. "We prefer to use the very best suppliers [globally] . . . This is a lot more effective. It allows us to move a lot faster," Fouquet said. "The big difference [in strategy] is Canon and Nikon were trying to do a lot of things by themselves" [9].

While it is open to cross-border collaborations, however, ASML believes that for some of the most sophisticated components it is best to have only one supplier. "The investment in Zeiss to get EUV optics is huge. If you make it in two to three places, the cost doesn't work out any more . . . When it comes to unique technology, we develop partnerships with our suppliers," Fouquet said. "When it comes to less advanced technology, then we will look at multiple suppliers." Zeiss of Germany is ASML's only supplier of critical precision mirror systems, used in various types of lithography machines [9].

The bulk of ASML's production, meanwhile, is done in one place, its headquarters, and Fouquet said it would probably keep the majority — about 80% to 90% — of its production and integration there until at least 2026. Competitors had a high hurdle to clear if they wanted to duplicate its lithography machines [9].

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