# Share without profit?

## Subsidies and the money-to-capability step in Chinese industrial policy

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### Abstract

China supplies 96 per cent of the EU's imported solar panels and 86 per cent of its imported batteries. We ask what the support behind that share left in the firms. We set customs data on EU imports for 2017-2025 beside economic-profit data on Chinese listed firms in nine sectors for 2015-2025. Unlike accounting profit or markups, economic profit charges each firm for the capital it uses. We find that China won three EU import markets as an industry while profit stayed with very few firms. Chinese solar makers earned 11.5 per cent of revenue above their cost of capital over 2015-22 and lost 3.1 per cent over 2023-25, while their share of EU imports held above 95 per cent. Half of that was a polysilicon price spike. In batteries and electric vehicles one firm in each sector, CATL and BYD, earns almost all the positive economic profit. CATL's rivals earn what an ordinary group of large Chinese firms earns, and neither leader disclosed more government grants per dollar of revenue than its rivals. In five of the eight sectors where US or EU makers are listed, they earned more than Chinese makers, though in solar the US maker's margin rests on its own tax credits. Trade and strategy theory predict this pattern when support is open to every firm: support buys entry, and entry competes profit away to buyers. Support that every rival can claim cannot be what a firm's profit rests on. For governments deciding whether to match or offset Chinese support, the question is less how much Beijing spent than what its money could not buy.

**Keywords:** industrial policy; subsidies; China; economic profit; market share; overcapacity; solar; batteries; electric vehicles; countervailing duties

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## Main findings

1. **China took three EU import markets, and only three.** Between 2017-19 and 2023-25 China's share of EU imports from outside the EU rose by 57.5 percentage points in solar, 45.6 in batteries and 36.5 in electric vehicles, and by less than 8 points in the other six sectors.
2. **In solar, share held and profit did not.** Core solar firms earned 11.5 per cent of revenue above their cost of capital over 2015-22, half of it at polysilicon makers in the price spike of 2021-22, and lost 3.1 per cent over 2023-25. Twelve of thirteen were profitable in 2022, none in 2025. China's share of EU imports has stayed above 95 per cent since 2023.
3. **In batteries and electric vehicles, one firm earns the profit.** CATL earned 85.4 per cent of battery makers' positive economic profit over 2015-25, a concentration that fewer than one in ten random groups of large Chinese firms reach. Its rivals earned 0.5 per cent in 2023-25, what an ordinary large Chinese firm earns. BYD earned all the positive economic profit of the five core carmakers. Neither leader disclosed more grants per dollar of revenue than its rivals.
4. **Profit lasts only where an edge cannot be bought.** Of ten solar firms profitable in 2015-22, two still were in 2023-25. In batteries four of six were, and in chip-making equipment eight of eight. A subsidy every rival can claim cannot be that edge.
5. **Foreign rivals with a smaller share often earned more.** US or EU makers out-earned Chinese makers in 2023-25 in five of the eight sectors where they are listed. The solar case cuts both ways: First Solar earned 18.8 per cent of revenue against -3.1 per cent for Chinese makers, but its US production credits exceeded its economic profit.
6. **Buyers abroad collected part of what support paid for.** The value of a tonne of Chinese solar cells and modules imported into the EU fell 61 per cent between 2022 and 2025, a gain for European installers and a loss for European module makers.

## 1. Two accounts of the same market share

On 1 June 2026 the OECD published its database of industrial subsidies and compared them to doping in sport: support, it wrote, risks letting less productive firms win at the expense of more innovative and efficient ones (OECD, 2026). Within two weeks two economists at the CF40 Institute in Beijing replied that the account was flawed and outdated, and that China's new industries would lose little if every subsidy were withdrawn (Zhu & Guo, 2026).

Both texts set out to explain one fact, the share of world markets that Chinese firms have taken in solar panels, batteries, electric vehicles and a growing list of other goods. The two texts disagree less than their language suggests, because they argue three different claims as one.

| Claim | Kind | Where it stands |
|---|---|---|
| Chinese firms received **large subsidies** | Descriptive | Accepted by both. The size of the loan component is disputed, the existence of support is not |
| Subsidies raised the **market share** of the firms that received them | Causal, estimated | Estimated by the OECD across large firms; simulated by IMF staff across sectors, with a smaller weight |
| Subsidies produced the **capability** by which Chinese firms win | Causal, mechanism unstated | Asserted more often than tested |

On the first claim the OECD puts support to Chinese firms at three to eight times that received by firms based in OECD countries, relative to revenue, between 2005 and 2024 (OECD, 2026). CF40 does not deny that support exists. It disputes the largest component, cheap loans, which it says account for 1.6 of the 2.4 percentage points of revenue the OECD attributes to its Chinese sample (Zhu & Guo, 2026).

The loan component matters because nobody observes it. A grant appears in a firm's accounts. A cheap loan is the gap between the interest a firm pays and an estimated market rate, so the subsidy moves with the estimate. Counting direct transfers only, IMF staff put subsidies over 2015-23 at 0.5 per cent of gross output in goods sectors in both China and the United States (Rotunno et al., 2026), though cash subsidies have also been put at 2 per cent of Chinese manufacturing value added in 2023 (Garcia-Macia et al., 2025). The headline gap rests mostly on loans, which is CF40's point. Cheap loans also bear on our own measure: they raise the profit we record (Section 3), so our central finding, that most firms earn too little, is if anything understated.

On the second claim the OECD estimates that one extra percentage point of subsidy relative to revenue adds between 0.04 and 0.13 percentage points of global market share, and that subsidies explain almost 60 per cent of the share gains of Chinese firms (OECD, 2025; OECD, 2026).

But the third claim is where the argument is loudest, and here the two texts point in opposite directions without either testing it. The OECD finds that subsidies raised share while leaving productivity and profitability unchanged, and concludes that the gains "do not arise from efficiency gains" (OECD, 2025). CF40 reads the same absence the other way: if support did not make the firms profitable, something else did, and it names scale, internal cash flow and equity finance.

Two further studies give support a smaller part than the OECD's 60 per cent, though they measure different things. Bank of Italy economists find that support accounts for almost a quarter of the China-specific factors behind the export surge since late 2023, behind falling domestic sales at about 60 per cent (Aprigliano et al., 2026). IMF staff find that the subsidy changes of 2015-23 raise China's share of world exports in strategic sectors from 27 to 29 per cent (Rotunno et al., 2026). In both, support is a cause of China's gains, not the main one.

The same fact is now argued over under another name, a second China shock. Most of that debate runs on aggregates: trade flows, the bilateral surplus, the exchange rate and the size of subsidies (Tordoir & Setser, 2026). A smaller strand looks inside China's industries and finds growth without profit. Bruegel economists find that markups have fallen since 2020 while productivity rose, and that loss-making "zombie" firms survive on bank support or subsidies, holding back consolidation (García-Herrero & Xu, 2026). Economists at the

Federal Reserve Bank of Dallas count nearly 30 per cent of China's industrial firms operating at a loss, against 20 per cent before the pandemic, and ask who is financing them (Davis & Kelly, 2025). This paper belongs to that strand. It does not settle the debate over excess of supply and exit. Its aim is narrower than the politics around it: to bring firm-level evidence to an argument conducted mostly in aggregates.

We do not re-estimate the second claim and cannot settle the third. We ask a question that sits between them and that neither the OECD nor CF40 asks: **where Chinese producers did take the market, what do the firms earn, and which firms earn it?**

The question is the one that those who must respond face. A finance ministry weighing whether to match Chinese support, a trade authority sizing a duty and a board pricing against Chinese rivals need to know what the support produced, not only how much there was. The question also shows how both accounts can be right at once. A sector can hold one firm that needs no help and ten that would not cover their cost of capital even with it. An average misses that sector, and so does a portrait of its leader.

The angle is that of corporate strategy: a strategist judges a market by asking which firms earn more than their capital costs, and why. Applied to the sectors China took, the test adds three things. First, profit is measured against the cost of capital. Accounting losses, markups and interest cover, the measures used so far, charge nothing for the equity a firm employs: a firm can report a profit, or price above its variable cost, and still return less than its investors could earn elsewhere. Economic profit asks the investor's question, whether capital would keep flowing to the firm on market terms, which is the question behind soft budgets and missing exit. Expressed as a share of revenue and computed the same way for every listed firm, it compares sectors of different capital intensity and Chinese firms with their US and EU peers. Second, the paper looks at how profit is divided inside each sector, firm by firm, rather than at sector totals or at the leaders alone. Third, it sets that division beside the share of the EU market each sector took and beside the grants each firm disclosed. To our knowledge these pieces have not been put together before, and the measure leans against our own conclusion (Section 3).

## 2. What each account measures, and what it leaves out

### The OECD: an average effect across the largest firms

The OECD's estimate comes from 482 of the world's largest manufacturers in 14 sectors over 2005 to 2022, about a third of them Chinese (OECD, 2025). The 2026 release extends the database to 525 firms, 15 sectors and 2024 (OECD, 2026).

The effect is an average across all large firms, and a relative one: it compares a firm's subsidy with other firms'. It says nothing about how profit is divided within a sector, and effects shared by a whole sector, such as cheaper inputs or harder competition, are hard to capture this way. If, as we read the design, the treatment is a firm's subsidy relative to its sector's average, the null on productivity is a finding about firms relative to their sector. That inference is ours.

Market share is the firm's share of the sampled firms' revenue, home and foreign sales together, and the OECD notes that most Chinese gains came in the home market, with solar panels, shipbuilding and semiconductors as exceptions (OECD, 2025). Share of the EU import market, which we use, is a different quantity.

The database omits equity injected on non-market terms, which the OECD says is likely to understate support to Chinese firms (OECD, 2025).

On profitability the OECD's finding is a null: total subsidies have no significant contemporaneous effect, and firms "are not translating subsidies into simple windfall profits" (OECD, 2025). Its own descriptive figures show Chinese firms less profitable than others in eight of 14 sectors, and its 2026 report records falling revenue and sizable losses among solar producers in 2024 (OECD, 2026).

## CF40: the leaders, and a group defined by profit

CF40 works from the annual reports of more than 5,300 non-financial firms listed on China's A-share market between 2018 and 2025 (Zhu & Guo, 2026).

The benchmark, CF40 argues, is wrong: the OECD treats China's loan prime rate as a floor when it is closer to a median. The OECD's benchmark does add spreads for credit risk and implicit state guarantees to its base rate (OECD, 2021). On the fact, though, the central bank's own figures support CF40: in March 2026, 48.81 per cent of loans were priced below the loan prime rate and 41.88 per cent above it (People's Bank of China, 2026). The size of the loan subsidy depends on a benchmark that is contestable.

Most of the money, CF40 argues, went to the old economy: construction, utilities and transport took 51.1 per cent of new interest-bearing debt and about two-thirds of government grants. Grants to listed firms peaked in 2022 at 227.2 billion yuan and stood at 175.8 billion in 2025, and the 16 listed solar firms received 6.7 billion in 2024 and 4.9 billion in 2025 as their losses deepened. The winners did not need the money: grants were under 0.5 per cent of listed firms' revenue, and 0.55 per cent of BYD's over eight years (Zhu & Guo, 2026).

CF40 also offers an explanation of its own, which the debate tends to skip. Guo attributes Chinese competitiveness to industrial organisation. One national market holds several stages of development, dense supplier networks shorten feedback, and the home market is large enough to commercialise quickly. Competition is fierce enough to force improvement, and about 1.3 million engineers graduate each year (Guo, 2026). None of this is a subsidy, and none of it is tested here. Guo's account is a claim about how capability accumulates, and it is compatible with what we find about who earns.

Two features limit what CF40's evidence shows. The new economy is defined by R&D intensity and profitability, so a finding that it is profitable is partly built into the sample. And the firms offered as representative are leaders. The objection is an old one in trade theory: once a market is running we observe only the firms that succeeded, and industry profit should be measured inclusive of the losses of those that did not (Grossman, 1986). CF40's own figures concede the point for one sector: its 16 listed solar firms lost 28.7 billion yuan in 2024 and 35.5 billion in 2025 (Zhu & Guo, 2026). The report also counts cash grants and debt only. Tax concessions, land and state equity are outside it.

## What neither measures

The OECD estimates an average across large firms. CF40 points to the firms at the top. Neither looks inside a sector to see how many of its firms earn their cost of capital, and that distribution decides whether support built an industry or a single company. Wide differences among producers of the same good are the rule: within narrowly defined US manufacturing industries, the plant at the 90th percentile of productivity makes almost twice as much with

the same inputs as the plant at the 10th (Syverson, 2011). An average over a sector, or a portrait of its leader, hides where most firms sit.

## 3. How we measure share, profit and support

We put one question to three sources of data: where Chinese producers took market share, did Chinese firms also earn their cost of capital? Appendix A gives the details of each source.

**Sectors and firms.** We study nine sectors defined by product, fixed before the data were analysed: electric vehicles, lithium-ion batteries, solar cells and modules with polysilicon, wind generating sets, ships, integrated circuits, chip-making equipment, industrial robots and steel. A firm is core if it makes the sector's product and adjacent if it makes a dedicated component. Headline figures use core firms: for China in 2023-25, 10 battery makers, 5 carmakers and 14 solar firms, with US and EU peer groups built on the same rules.

**Profit.** Profit is economic profit as computed by the Crux of Capitalism project: operating income plus R&D expense, after tax, less the cost of the capital the firm employs (Baumgartner et al., 2024). Zero on this measure is not failure. A zero means investors earn what they could earn from their next best opportunity (Besanko et al., 2013). Below zero, a firm will be unable to go on attracting capital (Barney, 2014), and a sector that stays there for years raises the question of who is financing it. Two features of the measure favour supported firms: R&D is added back, and the cost of debt is the firm's own interest bill, so cheap credit raises measured profit. True margins in supported sectors are, if anything, lower than the ones we report. The benchmark is China's rest of economy, about 4,600 listed firms a year, which earned 2.3 per cent in 2023-25.

**Share and prices.** China's share of the EU market is its share of EU-27 imports from outside the EU, from monthly customs data for 2017 to 2025 (Trade Data Monitor, 2026a), compared between 2017-19 and 2023-25. The measure records where goods are made, so it includes the output of foreign-owned plants in China. A second extract, covering the customs records of 127 countries from 1997 (Trade Data Monitor, 2026b), gives China's share outside the EU, its own records of trade and the value per kilogram of its exports.

**Support.** Support comes from the Global Trade Alert database (Global Trade Alert, 2026), which since 2008 has recorded government measures, subsidies included, for every major economy, each built from an official source. After filters close to those of Rotunno and Ruta (2024), it holds 8,618 Chinese subsidy measures. Like every source on Chinese support, it sees what is made public, largely grants, better than loans that are not disclosed (OECD, 2025; Chimits, 2023). We therefore use it for what it measures well: the presence, form and level of government of support, counted and not valued. One part of it does carry amounts. Chinese listed firms must disclose the government grants they receive, and the database records each disclosure of USD 10 million or more as a measure naming the firm, the year and the amount. We match these records to the core firms of four sectors to ask whether the leaders received more than their rivals.

### What the design cannot show

The comparison is descriptive. It cannot say what share or profit would have been without subsidies. Nor can it separate two readings of a low margin: firms made cheaper by support, or capable firms whose gains pass to buyers through price competition. That would need

cost or productivity data instead of only import prices. Disclosed grants are also not all support: loans, land, equity and procurement are not in them.

## 4. Why money does not become capability

Why would support that reaches every firm in a sector leave only one of them profitable? The strategy literature has an answer, and it does not depend on anything particular to China: **support that every rival can claim cannot be what a firm's profit rests on.**

### Support open to all buys entry

Where incumbents earn a profit and others can enter, they do, "until incremental profits just cover fixed costs" (Besanko et al., 2013). A grant, a cheap loan or a tax holiday that any firm in a designated sector can obtain lowers the cost of entering and of staying. The subsidy does not change this arithmetic. It speeds entry up. China's planning agency has described the result in its own words. On 27 November 2025 it counted more than 150 makers of humanoid robots, over half of them start-ups or entrants from other industries, warned against highly repetitive products crowding onto the market, and announced mechanisms for both entry and exit (Xinhua, 2025b).

Trade theory reached the same point from its own side. The case for subsidising exporters, which the OECD cites (OECD, 2025), is that support can shift profit from a foreign rival to a domestic firm. The critique made inside that literature is that entry dissipates the profit, and that the entrants a subsidy attracts are most likely to come from the subsidising country itself. Their competition drives down the export price, so the gain passes to foreign buyers (Grossman, 1986). Section 5.6 shows that fall in EU import prices for solar modules and electric cars.

Resource theory explains why. A resource sustains an advantage only if rivals face a cost disadvantage in obtaining it (Barney, 2014). A subsidy offered on similar terms to every producer fails that test by construction, and so does most of what it buys: machine tools and robots can be purchased in supply markets and are usually not costly to imitate (Barney, 2014). If entry and imitation were unimpeded, economic profits would converge to zero (Besanko et al., 2013). Our data come close to that prediction for every firm except the top earner: 0.5 per cent in batteries, and below zero in six of the nine sectors (Section 5.4). Solar is the textbook case. Prices are driven towards marginal cost when at least two of three conditions hold: many sellers, a product buyers treat as homogeneous, and excess capacity (Besanko et al., 2013). A solar module meets all three, with world capacity in 2024 at more than twice demand (OECD, 2026).

### What money can buy, and what protects the one

A subsidy is a resource, and the management literature is specific about what resources do. Christensen and Overdorf divide what an organisation can do into its resources, its processes and its values, the last being "the standards by which employees set priorities". A firm whose overheads require a 40 per cent gross margin learns to kill projects that promise less, and no cheque changes that rule (Christensen & Overdorf, 2000). Resources "can be hired and fired, bought and sold" (Christensen, 2000). Processes and values cannot. Lazonick's innovative enterprise has the same shape: of its three conditions, strategic control, organisational integration and financial commitment, only the third is money (Lazonick, 2002, 2017). Teece is the most direct. Dynamic capabilities "cannot generally be bought" and "must be built, or at least assembled" (Teece, 2009). Kim's study of Korean

firms judges the intensity of learning effort more important than the knowledge a firm already has. Knowledge can be licensed. Effort cannot, though a state can provoke it by setting goals firms can barely meet (Kim, 1997). None of these texts is about governments. The inference that a grant supplies resources and nothing else is ours.

What protects a profitable firm is an isolating mechanism, which is to a firm what an entry barrier is to an industry (Besanko et al., 2013). Two kinds fit our data: know-how acquired through cumulative experience, which cannot be traded, and the learning curve, by which the firm with the most past sales reaches the lowest unit cost and widens the gap with each sale (Besanko et al., 2013). Both fit a battery maker that took 62.9 per cent of its sector's revenue and 90.4 per cent of its positive economic profit over 2023-25 (Section 5.3). We do not observe which mechanism protects CATL or BYD. Sutton's account of market structure suggests which sectors can hold such a firm at all: where firms can sink chosen amounts into quality or brand, an industry evolves from "thousands of undifferentiated competitors" to a few leaders and a competitive fringe (Besanko et al., 2013). A car or a battery pack is bought on quality, safety and reputation. A solar module is sold by the watt. The Sutton account is a conjecture that fits Section 5, and we do not test it. What the theory does supply is the reason the subsidy cannot be the mechanism: every rival has it too.

### When support does create an advantage

Support can found a lasting advantage when it goes to one firm, once, in conditions that cannot recur. Barney's example is Caterpillar, which built its worldwide service network with government support during the Second World War, a network rivals could not later duplicate at the same cost (Barney, 1991). Porter likewise lists "preferential government subsidies" among the cost advantages an established firm can hold over entrants (Porter, 1980). The word that matters is preferential. Japan's semiconductor industry in the 1970s, the case most often set against this view, fits it: stable capital "in a closed domestic market" let Japanese firms enter the United States, and the protected home market cushioned their errors (Borrus et al., 1986). Their advantage was something foreign rivals could not obtain. We cannot see whether a protected home market plays that part for Chinese firms today, because their home and export margins are not reported separately. Support given to many firms, year after year, competes itself away, and the Global Trade Alert records show Chinese grants in all nine sectors and every year, to many single firms (Section 5.8). A sceptic of our argument should look for a sector where support went early to one firm and was withheld from others. The closest case in our data is American, not Chinese: First Solar, whose production credits, earned behind a tariff wall that keeps out most rivals, exceeded its economic profit in 2023-24 (Section 5.5).

Strategic trade theory, the body of work most favourable to subsidising an industry, states its own conditions. Three of Spencer's can be scored for the sectors where China gained share.

| Spencer's condition | What it requires | Solar | Electric vehicles | Batteries |
|---|---|---|---|---|
| 1. Returns exceed the cost of the subsidy | "Substantial barriers to entry", at least for a period | Met while the industry grew (11.5 per cent, 2015-22); not met since (-3.1 per cent, 2023-25), before counting any subsidy | Not met for the wider group (1.0 per cent, 2023-25); one firm earns it | Met for the sector (8.5 per cent, 2023-25); one firm earns it |
| 2. Foreign rivals cut back | Subsidy leads foreign firms to reduce capacity and output | Met: 96 per cent of EU imports | Met in part: 41 per cent | Met: 86 per cent |
| 3. Domestic industry at least as concentrated as its foreign rival | The exporting industry is as concentrated as, or more concentrated than, the foreign one | Not established; 14 listed core firms | Not established; 17 listed carmakers | Not established; 10 listed firms |

Source: Spencer (1986) for the conditions; Section 5 for the figures. Conditions 4 to 7 concern input prices, cost advantage and R&D spillovers, which our data do not reach.

The second condition is the one the OECD measures, and it is met. The first is the one that makes a subsidy worth its cost, and it turns on barriers to entry. In solar it held while demand outran capacity and failed once capacity caught up, because nothing had stopped the entry. A policy can win the rival's market and still not keep what it earned there.

## Four objections

**Rivalry built the export position.** The strongest objection is Porter's. His ten-country study associated lasting advantage with vigorous domestic rivalry and found few national champions that were internationally competitive (Porter, 1990). Studwell adds a mechanism from East Asia. Governments subsidised many firms, tested them by making them export and "concentrated on weeding out losers rather than picking winners". Korea's state helped found half a dozen carmakers and let most of them die, and the survivor is Hyundai (Studwell, 2013). On this reading thin margins are how the export position was built, and China is partway through the cull. We accept most of this. Chinese solar, battery and car makers pass Studwell's export test, and the cull is the half our evidence leaves open. But Porter credits the rivalry and not the money: subsidy "is rarely associated with true competitive advantage" (Porter, 1990). And the Chinese evidence most favourable to dispersed support, that subsidies spread across the firms of competitive sectors raised productivity growth in 1998-2007 (Aghion et al., 2015), concerns productivity. Rivalry can raise productivity while competing away profit, and profit is what we measure.

**Losses are an investment in learning.** A firm on a steep learning curve may price below short-run cost and "prosper in the long run" (Besanko et al., 2013). The argument predicts losses first and then profit, for the firm with the most cumulative volume. Batteries fit that order. Solar shows the opposite: its firms earned 4.8 per cent in 2015-20 and 16.0 per cent in the polysilicon spike of 2021-22, and lose money now, on a product whose price has fallen by about 27 per cent with each doubling of world output for 45 years (Fraunhofer ISE, 2026). A learning curve protects a leader only when followers cannot ride it too.

**Profit is not the point.** Krugman's case for activist policy has two legs, rent and external economies, and under the second a sector can be worth supporting without earning exceptional returns itself (Krugman, 1986). Economic profit measures rent, and our data say nothing about spillovers. Two observations bound the argument without settling it. A benefit that travels through lower prices goes to foreign buyers too: European importers paid 61 per cent less for a tonne of Chinese solar cells and modules in 2025 than in 2022 (Section 5.6). A benefit that is knowledge counts for the country only if it stays there. Our claim is about what firms earn. It is not a verdict on whether the policy was worth its cost to China.

**The capacity has other causes.** Duplicated capacity has three explanations, and they differ in who pays. Support caused it, and taxpayers pay. Scale caused it: where the leaders' investment is too small to drive out higher-cost firms, an industry is "plagued by overcapacity" with no state in the story (Chandler, 1990). Or households pay, through the transfer from China's consumers to manufacturers' profits that Klein and Pettis describe (Klein & Pettis, 2020). Once built, capacity stays, because governments press firms not to disinvest, to keep jobs (Porter, 1980). Where many governments each back their own firms, the outcome is a collectively wasteful subsidy war (Aubert et al., 2011), in which taking what government offers is rational for each firm (Rugman & Gestrin, 1991). The Global Trade Alert records suggest the same game is played among China's provinces and cities (Section 5.8). Our data add one fact: whoever else bears the cost, the suppliers of capital to these firms are not being paid for it.

### A soft budget is not the same as a large subsidy

A subsidy is a flow of money. A soft budget constraint is a firm's expectation that its losses will be covered by an organisation that stands ready to do so, through subsidies, tax concessions, soft credit or tolerated arrears. A rescue nobody expected does not qualify (Kornai et al., 2003). A government can cut the first means while loosening the others. Softness has specific consequences: less effort to cut costs, an inflated appetite for investment, and exit that does not happen. The same survey reports two results that fit China. Competition among regional governments for investment tends to harden firms' budget constraints at the cost of excessive infrastructure investment, and hardening through competition among many firms leaves excess capacity (Kornai et al., 2003).

Our evidence shows both halves. In profit the constraint looks hard: the solar leaders of 2022 lose money now, and their grants fell as their losses grew. In survival it looks soft. One consultancy counts 129 brands selling new-energy vehicles in China in 2024 and expects 15 to be financially viable by 2030, noting that local governments may go on supporting the rest for the sake of jobs and suppliers (AlixPartners, 2025). Our firms show the same softness. Of the core firms still in the data in 2025, eleven of fifteen steelmakers, three of four wind-turbine makers and four of ten battery makers had earned less than their cost of capital for at least three years running. Aggregate data point the same way: loss-making firms held nearly 11 per cent of China's manufacturing assets in 2025, up from just over 4 per cent in 2019 (Davis & Kelly, 2025). Capacity utilisation in 2025 was 73.2 per cent in car making and 73.8 per cent in electrical machinery, against 74.4 per cent for industry as a whole (National Bureau of Statistics, 2026). Losses are not forcing capacity out.

The Chinese authorities have reached the same diagnosis. Rules in force from 1 August 2024 bar local authorities from giving selective subsidies to particular firms without a basis in law (State Council, 2024). In July 2025 the Party's economic commission pledged to "facilitate the orderly exit of outdated production capacities" (Xinhua, 2025a), and the

industry minister pressed fourteen solar manufacturers to the same end (Xinhua, 2025c). On 9 December 2025 the polysilicon makers registered a joint company to pursue what its largest shareholder called "production capacity optimisation" (Reuters, 2025). A leading producer had sold polysilicon in the second quarter of 2025 at USD 4.19 a kilogram that cost it USD 7.26 to make (Daqo New Energy, 2025). Bruegel's assessment is that these measures have not yet solved the problem, because unproductive firms continue to operate (García-Herrero & Xu, 2026).

Softness alone does not decide the outcome. France's nuclear programme of the 1970s ran on what would now be called a soft budget and succeeded, because the firms and institutions it needed were in place. British Leyland, with the same softness and without them, failed (Garcia Calvo & Hancké, 2026). Heavy support and hard competition are therefore not alternatives. A sector can receive a great deal of money, compete away every yuan of profit and still shed too few firms, because what keeps a loss-maker alive is the expectation of rescue and not the size of last year's grant.

### One advantage or two

How can firms that earn nothing take a continent's import market? Advantage over foreign rivals and advantage over domestic rivals are different things. A group of firms can share a cost position that foreign producers cannot match, whether from scale, suppliers, support or all three, and so win the export market. Inside the group no firm is isolated from the others, so the gain passes to buyers through price. Share is won by the group. Profit is kept only by the firm that has something the rest of the group lacks. The reading holds under both explanations of low margins that Section 3 could not separate. The IMF simulation builds the shared advantage in by construction, with productivity rising with the size of the whole sector and no firm earning a profit (Rotunno et al., 2026). The model supplies the share. Our data supply the profit it leaves out.

## 5. New evidence: what the firms earn

In the three markets China took, the firms that earn their cost of capital year after year are few.

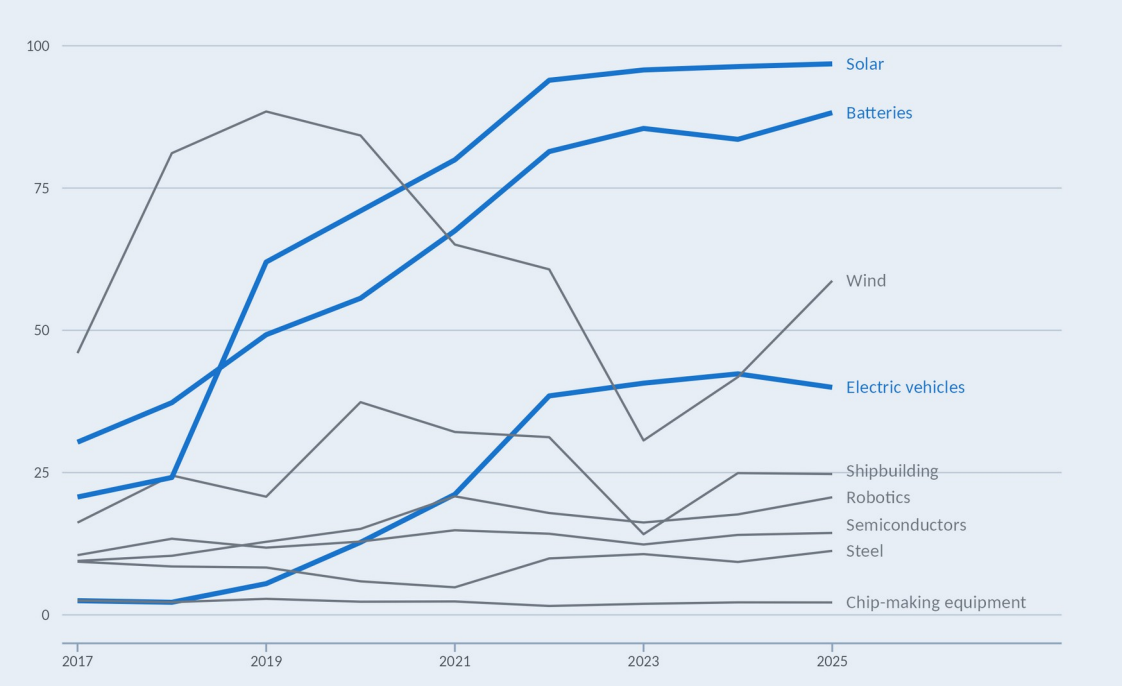
### 5.1 China took three markets: solar, batteries and electric vehicles

In 2019 one dollar in every hundred that the EU spent on imported battery-electric cars bought a car made in China. In 2023 it was fifty-two.

Three of our nine sectors show a shift of that order. Between 2017-19 and 2023-25 China's share of EU imports rose from 38.6 to 96.2 per cent in solar, from 40.4 to 86.0 per cent in batteries, and from 4.4 to 40.9 per cent in electric vehicles (Exhibit 1). In the other six sectors the share moved by less than 8 percentage points, and in wind it fell.

**Exhibit 1. China took three EU import markets; in the other six it gained less than eight points, and in wind it lost ground**

*China's share of EU imports from outside the EU, per cent of value, 2017-2025*

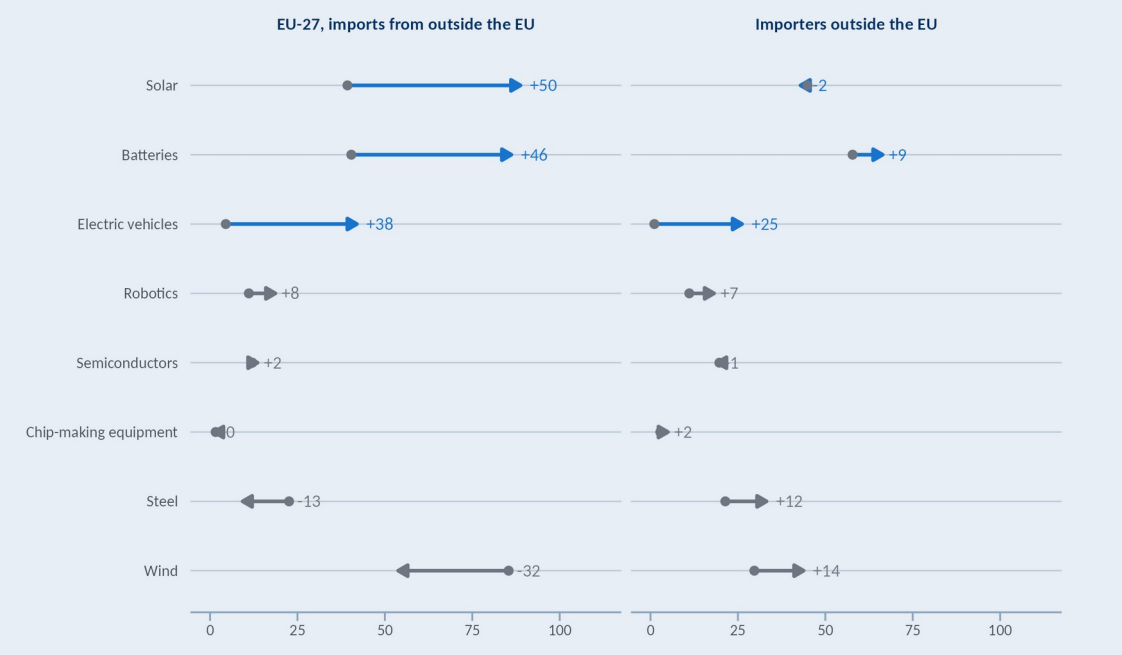



Source: Trade Data Monitor, EU-27 imports from outside the EU; author's calculations. Electric vehicles are battery-electric and plug-in hybrid cars together.

The fall in wind and in steel is particular to the EU. Among importers outside the EU, China's share rose by 14 points in wind and 12 in steel, while its gains in solar and batteries were smaller than in the EU (Exhibit 2). The EU buys little wind equipment from outside, never more than USD 0.8 billion a year since 2015. Where wind competition happens, outside the EU, EU makers' share fell from 65.3 to 48.3 per cent between 2017-19 and 2023-25, and China's rose from 29.7 to 43.8 per cent. In wind the contest is outside Europe.

**Exhibit 2. Outside the EU, China gained less in solar and batteries and more in wind and steel**

*China's share of imports, 2017-19 (dot) to 2023-25 (arrow), per cent of value; labels: change in points*

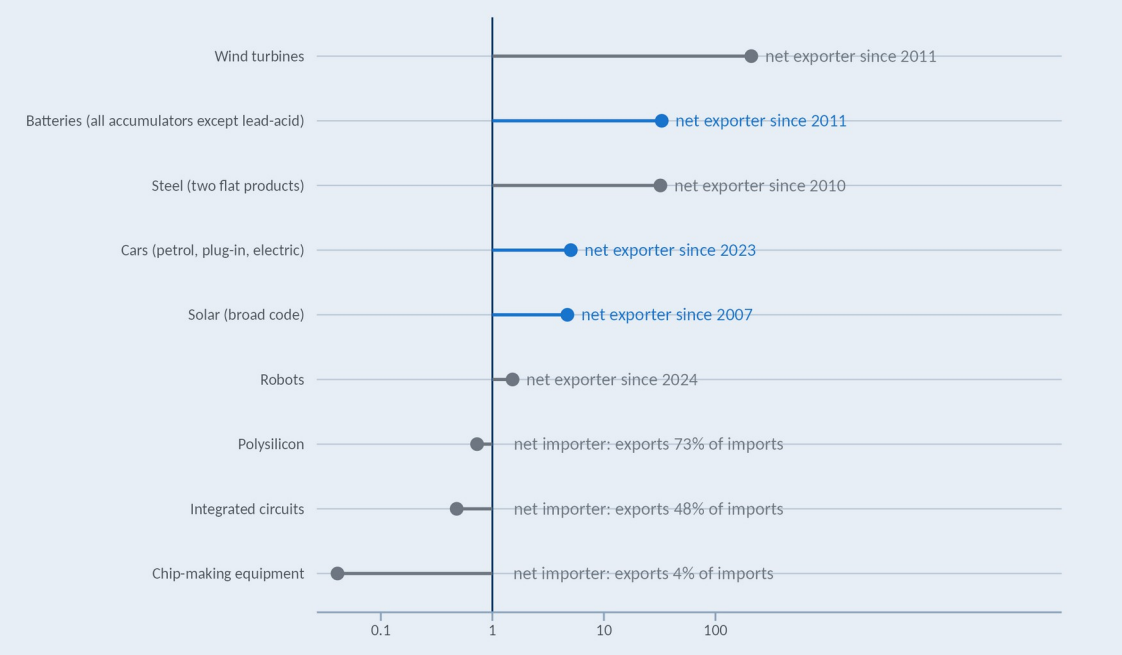



Source: Trade Data Monitor, customs records of all reporting countries, retrieved 8 October 2026; author's calculations. Importers that report every month of 2017-25 (82 outside the EU). Solar is the broad code 854140 and its 2022 successors, which include LEDs; steel is two flat-rolled products; robotics is 847950; ships are not in the extract.

The three sectors were not new to exporting. On China's own customs records, its exports have exceeded its imports in every year since 2007 in the broad product code that holds solar cells, and since 2011 in batteries. In cars the balance turned only in 2023, from a deficit of USD 41.0 billion in 2013 to a surplus of USD 79.7 billion in 2025, on a measure that leaves out diesel cars and non-plug-in hybrids (Exhibit 3). In integrated circuits and chip-making equipment China remains a large net importer: in 2025 its exports were 48 and 4 per cent of its imports.

**Exhibit 3. China has exported more than it imports since 2007 in solar and 2011 in batteries, but only since 2023 in cars**

*China's exports divided by its imports, 2025, value, log scale; the vertical line marks exports equal to imports*




Source: Trade Data Monitor, China's own customs records, retrieved 8 October 2026; author's calculations. Labels give the year from which exports exceeded imports in every year. Cars exclude diesel cars and non-plug-in hybrids, which the extract does not cover. The solar code includes LEDs.

The market share the OECD sets out to explain is real but concentrated in three sectors, and, cars aside, in sectors where China had been a net exporter for more than a decade.

## 5.2 In solar, share held and profit did not

Solar shows the gap between share and profit most clearly. Batteries and electric vehicles held or raised their margins after 2022, while the solar margin turned negative.

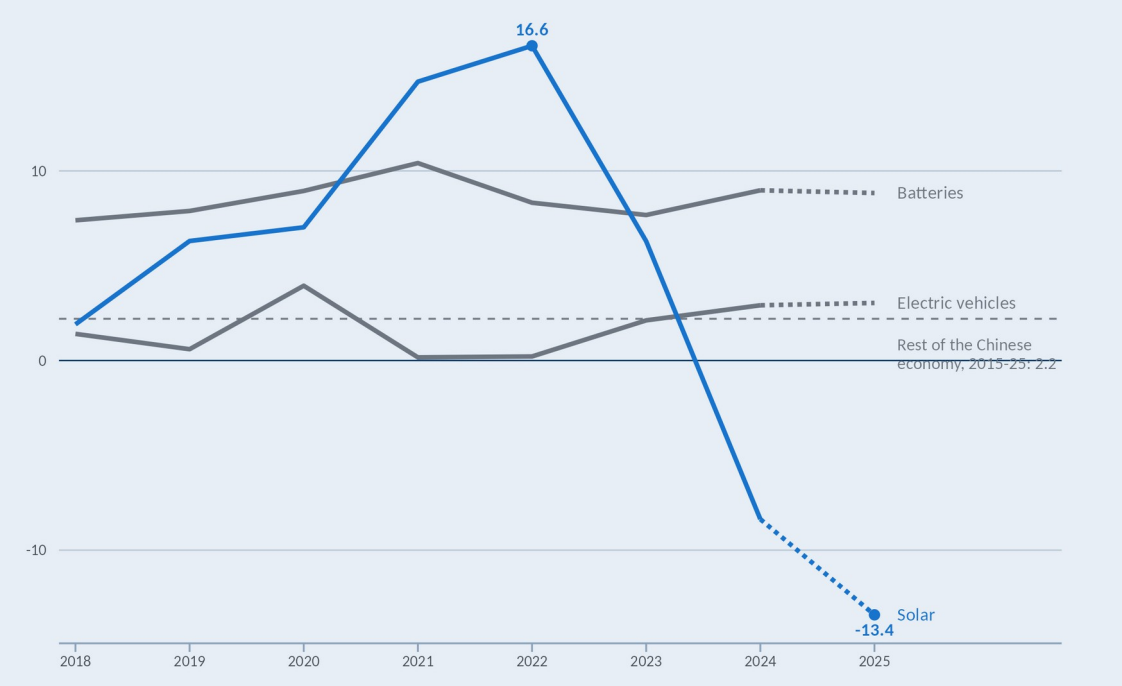
| Core firms, China | Share gain (points) | Margin 2015-22 | Margin 2023-25 | Margin 2015-25 |
|---|---|---|---|---|
| Solar | +57.5 | 11.5 | -3.1 | 4.3 |
| Batteries | +45.6 | 8.8 | 8.5 | 8.6 |
| Electric vehicles | +36.5 | 0.9 | 2.8 | 2.1 |
| Rest of the Chinese economy | | 2.1 | 2.3 | 2.2 |

Margins are economic profit over revenue, per cent. Share gain is the change in China's share of EU imports from outside the EU between 2017-19 and 2023-25.

In 2022 twelve of the thirteen core solar firms in our data earned more than their cost of capital, and together they earned an economic profit of USD 16.2 billion. In 2024 one of them did. In 2025, on incomplete data, none did. The industry's economic profit was USD -5.9 billion in 2024 and USD -8.1 billion in 2025, which together came close to giving back what it had earned in its best year. China's share of EU solar imports was 93.9 per cent in 2022 and has stayed above 95 per cent since. Over the whole decade the industry still earned 4.3 per cent, above the rest of the economy (Exhibits 4 and 5).

**Exhibit 4. Solar makers earned 16.6 per cent of revenue above their cost of capital in 2022 and lost 13.4 per cent in 2025; battery makers' margin held**

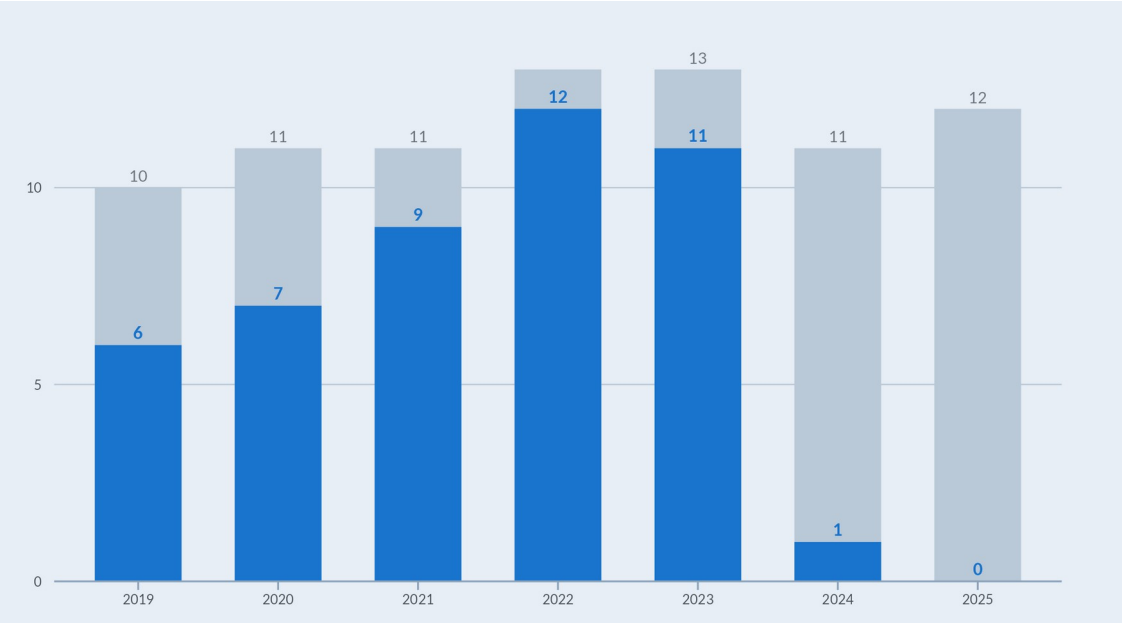
*Economic profit as a share of revenue, Chinese core firms, per cent*




Source: Crux of Capitalism database, IMD; author's calculations. Core firms as defined in Section 3. Dotted segments: 2025 data are incomplete.

**Exhibit 5. Twelve of thirteen Chinese solar makers covered their cost of capital in 2022; none did in 2025**

*Number of core solar firms (light) and of those with economic profit above zero (blue), China*



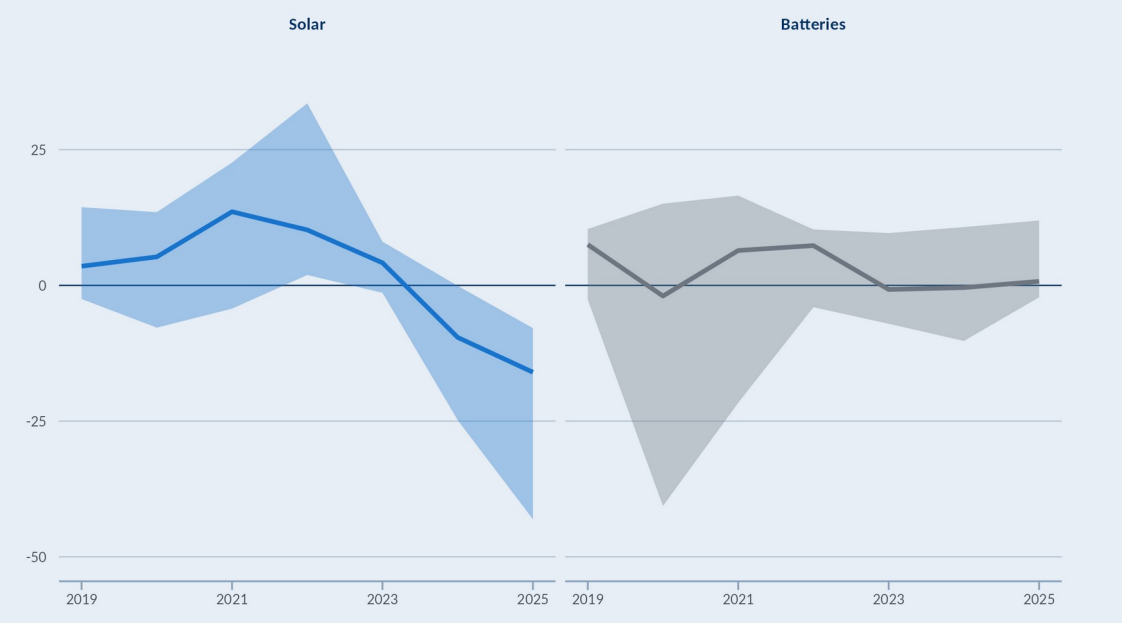

Source: Crux of Capitalism database, IMD; author's calculations. Core firms as defined in Section 3. 2025 data are incomplete.

The fall hit almost every firm, not only the weak ones. In 2024 the solar firm at the 90th percentile of margins had a margin of -0.1 per cent, and in 2025 one of -7.9 per cent. At the 10th percentile, firms lost 25 and 43 per cent of revenue. In batteries, over the same years, the 90th percentile stayed between 10.7 and 12.0 per cent (Exhibit 6). A price war that spares

no firm is what competition among similar producers produces. If a few capable firms were pricing out weaker ones, the strongest firms would have been spared.

**Exhibit 6. The solar price war hit almost every firm: in 2024 the 90th-percentile solar maker earned no economic profit**

*Firm margins, Chinese core firms: median (line) and 10th-90th percentile (band), per cent*




Source: Crux of Capitalism database, IMD; author's calculations. Core firms as defined in Section 3. Years with at least four firms. 2025 data are incomplete.

Half of the boom was one input. The four polysilicon makers in the group (GCL Technology, Tongwei, Daqo and Xinte, with Tongwei also making cells) earned USD 14.0 billion of economic profit over 2015-22, of which USD 13.5 billion came in 2021-22, at a margin of 25 per cent. Those were the years when the spot price of polysilicon rose from a low of USD 6.75 a kilogram in June 2020 to USD 39 in August 2022 (Bernreuter Research, 2023). By the end of 2024 it was below USD 4.50 (PV Tech, n.d.). The makers of wafers, cells and modules show the same rise and fall on a smaller scale: 6.9 per cent in 2015-20, 10.7 per cent in 2021-22, -1.7 per cent in 2023-25 and -10.5 per cent in 2025. The solar boom was partly a commodity cycle, and the collapse reached every stage of the chain.

One explanation needs no subsidy at all. Porter's account of an industry's transition to maturity predicts this sequence: capacity overshoots, price warfare follows, and industry profits fall, "sometimes temporarily and sometimes permanently", with recovery depending on barriers to entry (Porter, 1980). Solar fits the sequence but not its starting point. Porter's transition begins when growth slows. Solar is the fastest-growing source of renewable energy, and its manufacturing capacity in 2024 was still more than twice demand (OECD, 2026). Capacity outran a market that was itself growing fast. The ten firms present in both years took in 26 per cent less revenue in 2024 than in 2022, while the unit value of EU imports fell by half. The fall was in price, not in demand.

Few firms have left. Only two core solar firms, Xinte Energy and Zhejiang Akcome, drop out of the data after 2023, despite two years of losses across the industry. Leaving the data can mean delisting, merger or a gap in coverage, so this is a proxy for exit, not a measure of it. It fits the argument of Section 4 that support and soft budgets slow exit.

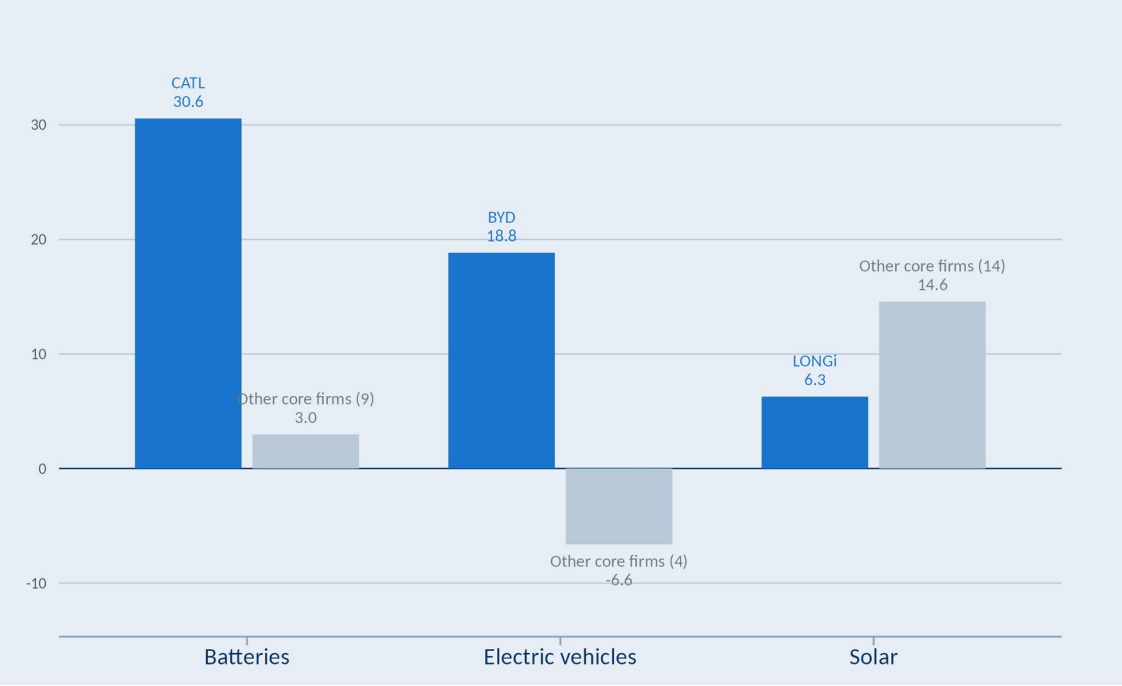
The OECD is right that support went with share. But the first test strategic trade theory sets for a subsidy, returns high enough to repay it, was met only while demand outran capacity (Section 4). Share was kept. The profit that would justify the support was not.

## 5.3 In batteries and electric vehicles, one firm earns the profit

CATL earned 85.4 per cent of the positive economic profit of Chinese battery makers over 2015 to 2025, and 90.4 per cent in 2023-25, on 62.9 per cent of their revenue. Its margin was between 9 and 14 per cent in every year from 2018. Without CATL the battery margin in 2023-25 is 0.5 per cent, below the rest of the economy. Among the five core carmakers, BYD accounts for all of the positive economic profit earned over the decade. The other four together lost USD 6.6 billion, though two of them, Seres and Leapmotor, turned a profit in 2025. The wider group of eighteen carmakers, which adds the mixed producers, earned 0.4 per cent over the decade (Exhibit 7).

**Exhibit 7. In batteries and electric vehicles one firm earned the decade's economic profit; in solar it was spread across firms**

*Cumulative economic profit of Chinese core firms, 2015-25, USD billion: largest earner and all other core firms*

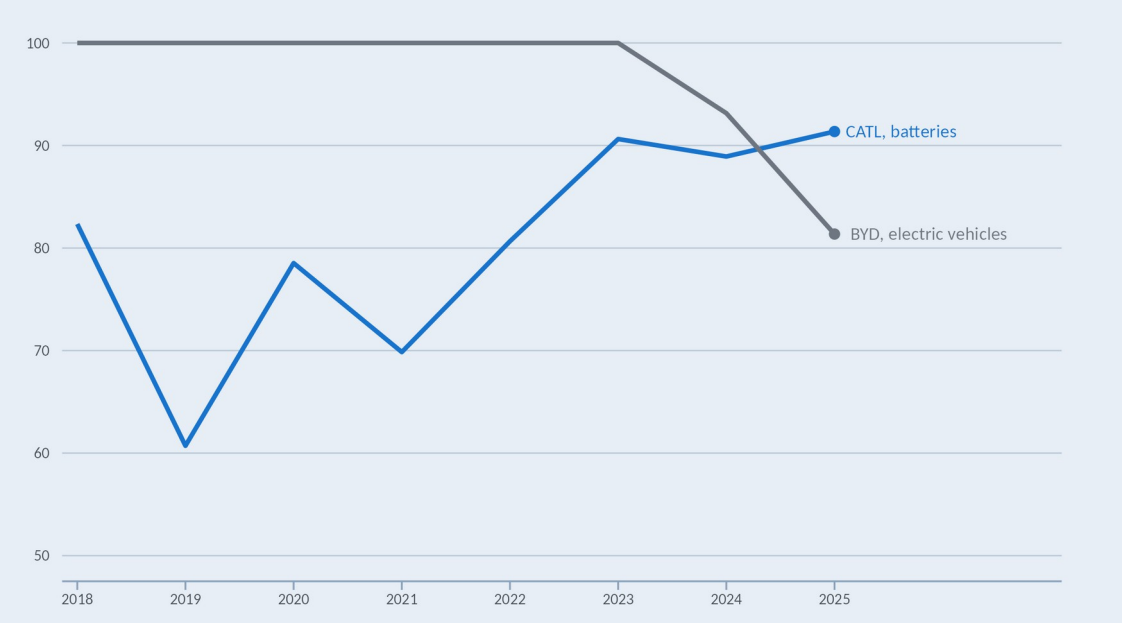



Source: Crux of Capitalism database, IMD; author's calculations. Core firms as defined in Section 3.

The concentration has grown, not eased. CATL's share of the battery sector's positive economic profit rose from 81 per cent in 2022 to 91 per cent in 2025, while its share of the sector's revenue stayed near 60 per cent. In cars, BYD earned all the sector's positive economic profit until 2023. Its share fell to 81 per cent in 2025 as two rivals turned profitable (Exhibit 8).

**Exhibit 8. The largest battery maker's share of the sector's positive economic profit rose from 81 per cent in 2022 to 91 per cent in 2025**

*Largest earner's share of the positive economic profit of Chinese core firms, per cent*




Source: Crux of Capitalism database, IMD; author's calculations. Core firms as defined in Section 3. 100 means only one firm was profitable. 2025 data are incomplete.

Is one firm taking most of a sector's profit unusual? We compare each sector with groups of the same size drawn at random, thousands of times, from the largest quarter of China's other listed firms. In a random group of ten, the top earner takes a median 46 per cent of positive economic profit over 2015-25, and 85 per cent or more in 6.5 per cent of draws, so CATL's 85.4 per cent is unusual. With five firms one draw in five reaches 85 per cent, so BYD's 100 per cent cannot be told apart from chance. Single dominant earners exist abroad too: Tesla among the four US carmakers in our data, and ASML, with 85 per cent, among the five EU makers of chip-making equipment. Solar's profit was less concentrated than chance (28 per cent at LONGi).

What the rest of a sector earns tells more. Without their top earner, random groups earn a median 0.8 per cent in 2023-25. CATL's rivals earned 0.5 per cent, at the 45th percentile: what an ordinary group of large Chinese firms earns. The rivals of the leader in solar, steel and robotics fall in the bottom 7 per cent of random groups, and those in cars and wind in the bottom 14 per cent. Only in chip-making equipment and semiconductors do the rivals earn more than in any random group. CATL is the anomaly, not its sector.

Did the leaders get more support? Over 2015-23, the last year with full records, CATL disclosed grants equal to 1.3 per cent of its revenue, against 1.2 per cent for its rivals together. It received 67 per cent of its sector's disclosed grants, on 64 per cent of the revenue, and earned 81 per cent of the positive economic profit. BYD received less per dollar of revenue than its rivals (0.75 against 1.2 per cent), and so did LONGi and Tongwei in solar.

| Chinese core firms, 2015-23 | Disclosed grants, % of revenue | Share of sector's grants | Share of sector's revenue | Economic-profit margin |
|---|---|---|---|---|
| CATL | 1.3 | 67 | 64 | 11.3 |
| Other battery makers (7) | 1.2 | 33 | 36 | 3.1 |
| Gotion (among them) | 4.7 | 23 | 6 | -1.0 |
| BYD | 0.75 | 84 | 89 | 3.7 |
| Other carmakers (4) | 1.2 | 16 | 11 | -18.0 |
| Solar, all core firms (15) | 0.4 | 100 | 100 | 9.9 |

Source: Global Trade Alert, records of grants disclosed by Shanghai- and Shenzhen-listed firms; Crux of Capitalism database, IMD; author's calculations. Grants of less than USD 10 million in a year and firms listed only in Hong Kong are not recorded and count as zero. Loans, land, equity and procurement are not included.

The firms that received the most per dollar of revenue are not the profitable ones. Gotion disclosed grants of 4.7 per cent of its revenue and earned less than its cost of capital. Across the 26 core firms in batteries, cars, solar and wind with any disclosed grant, the rank correlation between grants per dollar of revenue and economic-profit margin is -0.32. With 26 firms it cannot be told apart from zero, and its sign is the opposite of what leaders made by support would produce. Subtracting every disclosed grant from CATL's economic profit, which overstates their effect because grants are counted before tax, lowers its margin from 11.3 to 10.0 per cent. Disclosed grants cannot explain the leader.

CF40 is right that China's leaders are profitable and do not need support: they are CATL and BYD. But they are exceptions in their sectors, and in batteries the gap between the leader and the rest has widened. Disclosed grants, which went to leaders and laggards in proportion to their size or more to the laggards, do not explain them.

## 5.4 Profit lasts only where rivals cannot copy the edge

If competition were unimpeded, a firm's profit today would say little about its profit tomorrow (Besanko et al., 2013). We compare each firm's margin in 2015-22 with its margin in 2023-25.

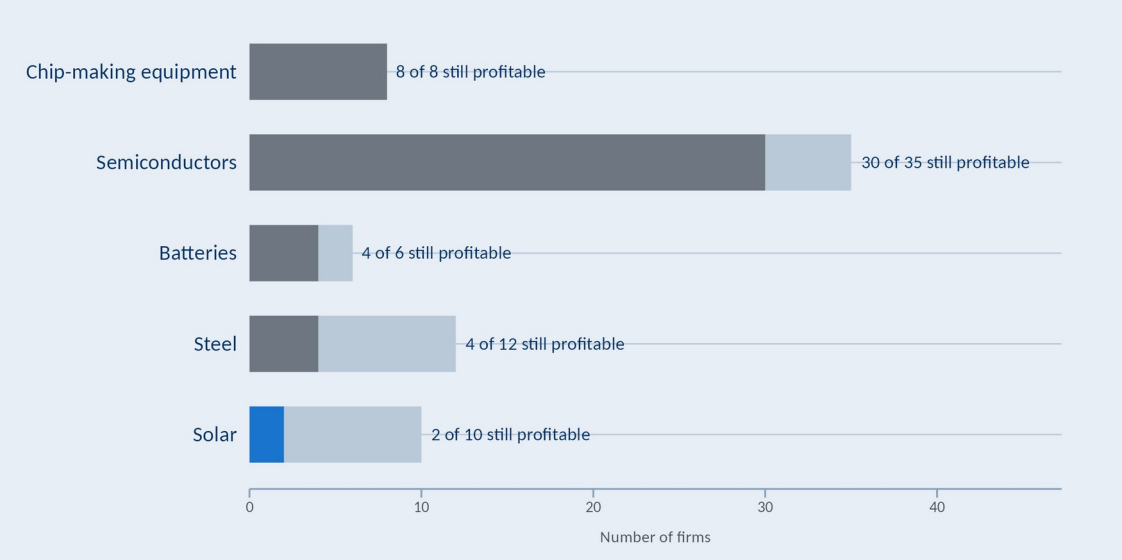
| Core firms, China | Present in both periods | Profitable in 2015-22 | Of those, still profitable in 2023-25 | Rank correlation of margins |
|---|---|---|---|---|
| Solar | 13 | 10 | 2 | -0.01 |
| Batteries | 8 | 6 | 4 | 0.86 |
| Semiconductors | 37 | 35 | 30 | 0.71 |
| Chip-making equipment | 8 | 8 | 8 | 0.90 |
| Steel | 24 | 12 | 4 | 0.77 |

Electric vehicles, wind, robotics and shipbuilding have five firms or fewer in both periods and are left out.

In batteries the ranking of firms barely changed. In solar it was scrambled: the firm with the largest cumulative profit of the decade, LONGi, earned -11.3 per cent in 2025. Nothing protected the leaders of the boom from the firms that entered behind them (Exhibit 9).

**Exhibit 9. Of ten solar makers that were profitable before 2023, two still are; in chip-making equipment all eight are**

*Core firms profitable in 2015-22 (light) and, of those, still profitable in 2023-25 (dark), China*




Source: Crux of Capitalism database, IMD; author's calculations. Core firms as defined in Section 3. Sectors with at least six firms present in both periods.

The sectors that did not gain share look no better, with two exceptions. Core firms in steel (-3.0 per cent), wind (-3.5 per cent) and robotics (-4.6 per cent) earned less than their cost of capital in 2023-25. Chip-making equipment earned 25.2 per cent, and none of its eleven core firms was below its cost of capital in any year from 2023 to 2025. Chip-making equipment is also the sector where China holds the smallest part of the EU import market (2.1 per cent). Semiconductors earned 8.6 per cent, most of it in chip design rather than chip manufacturing: the two largest foundries, SMIC and Hua Hong, earned 1.5 and -1.4 per cent of revenue over the decade. In six of the nine sectors, take out the top earner and the remaining core firms together earned less than their cost of capital in 2023-25. In batteries they earned 0.5 per cent, about what the rest of a random group of large Chinese firms earns (Section 5.3). Semiconductors (6.7 per cent) and chip-making equipment (26.3 per cent) are the exceptions, and the only sectors whose rivals earn more than random groups do.

Widening the groups changes one name. With inverter, glass and tracker makers included, the solar margin in 2023-25 is -0.4 per cent, and more than half of the group's positive economic profit belongs to Sungrow, which makes inverters. In robotics the wider group earns 8.9 per cent, almost all of it at Inovance, a maker of drives and automation equipment. Twice, the profit in a sector sits with a maker of adjacent equipment and not of the product itself. Theory expects this: the returns to an innovation "may accrue to the owners of certain complementary assets" and not to the firm that makes the product, above all where the product itself is easy to copy (Teece, 1986).

Profit lasts where a firm has something rivals cannot buy: know-how built over years of production, as in batteries and chip-making equipment, or a scarce position next to the product, as with Sungrow. A subsidy that every rival can also obtain cannot be that edge (Section 4).

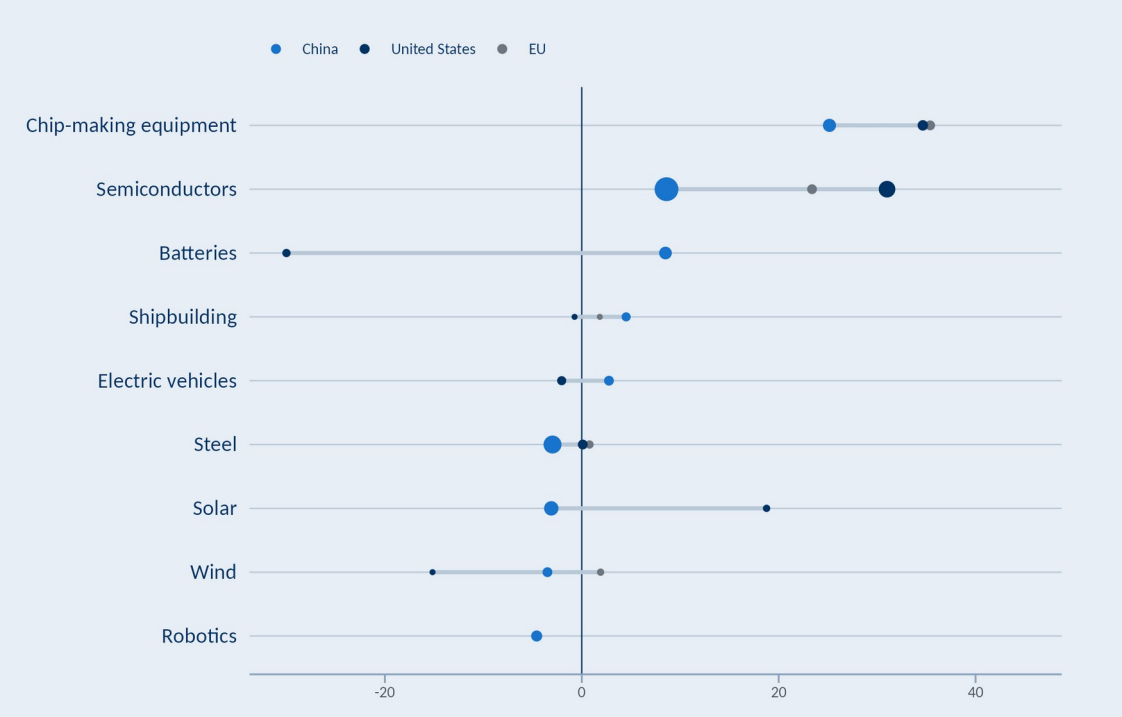
## 5.5 Foreign rivals with a smaller share often earned more

A low margin could reflect the industry rather than China: perhaps nobody earns much making solar panels or steel. The same profit measure for listed US and EU firms in the same

sectors allows a check (Exhibit 10). In chip-making equipment, US and EU makers earned about 35 per cent of revenue against 25 per cent for Chinese makers. In semiconductors US and EU makers earned 31 and 23 per cent against 9 per cent. In steel, US and EU makers earned small positive margins (0.1 and 0.8 per cent) where Chinese makers lost 3.0 per cent, and in wind the EU makers earned 1.9 per cent against -3.5 per cent. In solar the only sizeable listed US maker, First Solar, earned 18.8 per cent against -3.1 per cent for Chinese makers. China earned more in batteries, cars and shipbuilding, where the listed US peers are mostly young, loss-making firms such as Rivian, Lucid and the battery start-ups.

**Exhibit 10. In 2023-25 Chinese makers earned less than their US or EU peers in five of the eight sectors where peers are listed**

*Economic profit as a share of revenue, core firms, 2023-25, per cent; dot size: number of firms*



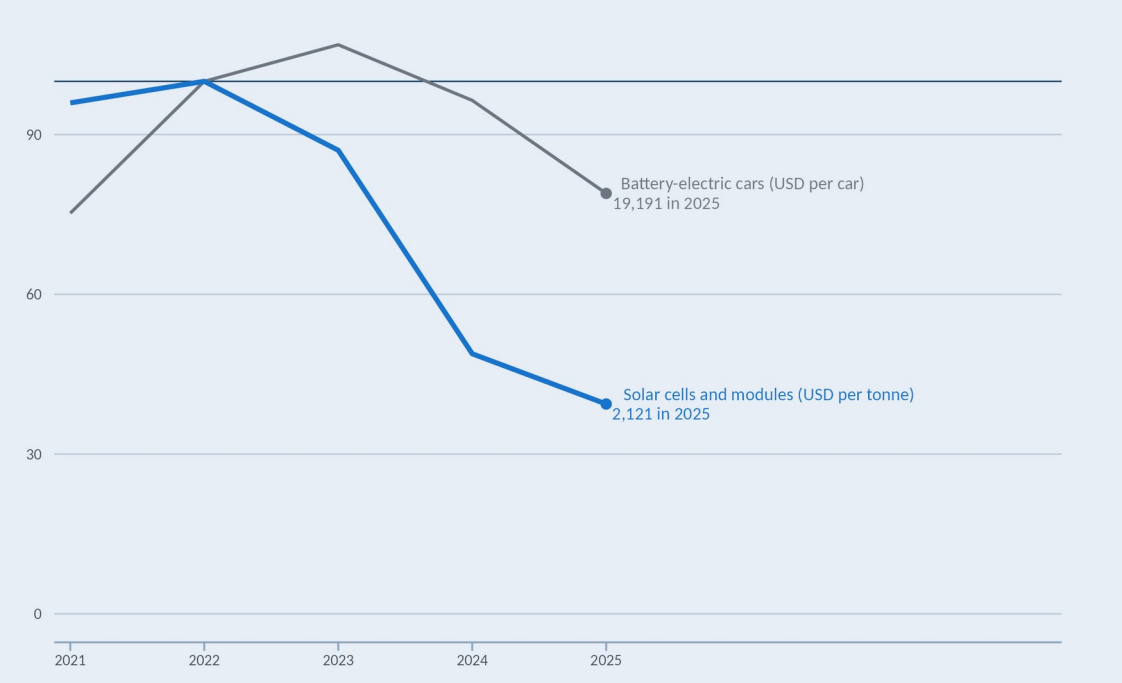

Source: Crux of Capitalism database, IMD; author's calculations. Core firms as defined in Section 3. Values beyond -30 or 45 are drawn at the edge (US batteries: -80.5). Several US and EU sectors hold one or two firms, and the firms differ in product mix and in the markets and policies they face.

The comparison has limits. Several US and EU groups hold one or two firms. First Solar makes a different thin-film technology and sells into a market where Chinese modules face high tariffs, and its margin rests on support. It sold USD 687 million of US advanced manufacturing production credits (Section 45X) for its 2023 output and USD 857 million for its 2024 output (First Solar, 2024, 2025). Its economic profit in those two years was USD 1.27 billion on revenue of USD 7.52 billion. Take the credits away, before any tax adjustment, and the margin goes from 16.9 to about -3.7 per cent, close to the Chinese makers' -3.1. The credit is open to every US producer, but behind tariffs that keep most Chinese modules out it reaches few firms, which is the condition under which Section 4 expects support to create an advantage. Listed foreign peers are survivors of their own competitive shake-outs. The comparison does not say that Chinese firms are less capable. It says that winning a market and earning on it are different things: subsidies can raise China's share, as the OECD estimates, while Chinese makers earn less than the rivals they displaced.

## 5.6 Buyers abroad collected part of the gain

When many subsidised firms compete in an export market, they drive its price down and hand part of the gain to foreign buyers (Grossman, 1986). The prices fit the prediction. The average value of solar cells and modules imported into the EU from China fell from about USD 5,400 a tonne in 2022 to USD 2,100 in 2025, a fall of 61 per cent, and that of a battery-electric car from USD 26,000 in 2023 to USD 19,200 in 2025 (Exhibit 11). China's own records show the value per kilogram of its solar module exports falling by between 50 and 65 per cent from 2022 to 2025 in every group of destinations, from USD 4.82 to USD 1.80 for the EU and from USD 5.32 to USD 1.90 for South-East Asia. In batteries, per kilogram, China's exports fell from USD 28.7 in 2022 to USD 15.7 in 2025 while their weight rose 2.75 times (Trade Data Monitor, 2026b).

**Exhibit 11. The price of Chinese solar imports fell 61 per cent between 2022 and 2025**
*Unit value of EU imports from China, index, 2022 = 100*

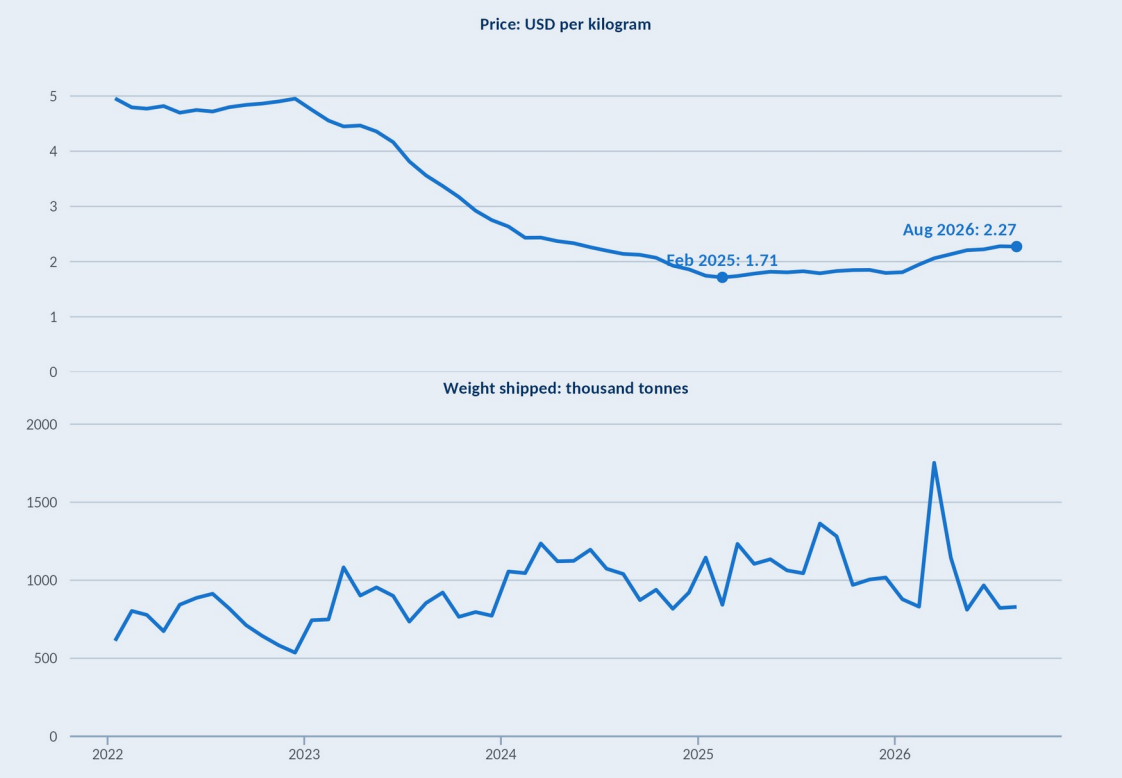



Source: Trade Data Monitor, EU-27 imports from outside the EU; author's calculations. Unit values are value over quantity and also reflect changes in the mix of products.

The fall in solar has since stopped. China's export price of solar modules reached a low of USD 1.71 a kilogram in February 2025 and stood at USD 2.27 in August 2026, while the weight shipped in July and August 2026 was 31 per cent below a year earlier (Exhibit 12). EU importers' own records show the same turn. The price stopped falling before the policy pledge of 1 July 2025 described in Section 4, and heavier modules would also raise a value per kilogram, so these data date the turn but do not explain it.

**Exhibit 12. China's export price of solar modules bottomed at USD 1.71 a kilogram in February 2025 and was USD 2.27 by August 2026**

*China's exports of solar modules (HS 854143), all destinations, by month*




Source: Trade Data Monitor, China's own customs records, retrieved 8 October 2026; author's calculations. Value per kilogram also moves with the weight of the modules shipped, not only with their price.

Neither the OECD nor CF40 dwells on who gained. Bank of Italy economists estimate that the fall in Chinese import prices in 2025 alone lowers euro-area consumer prices of non-energy industrial goods by about 1 per cent over three years (Aprigliano et al., 2026). Part of what Chinese support paid for was collected by buyers abroad: European installers of solar panels among them, with European makers of solar panels among the losers.

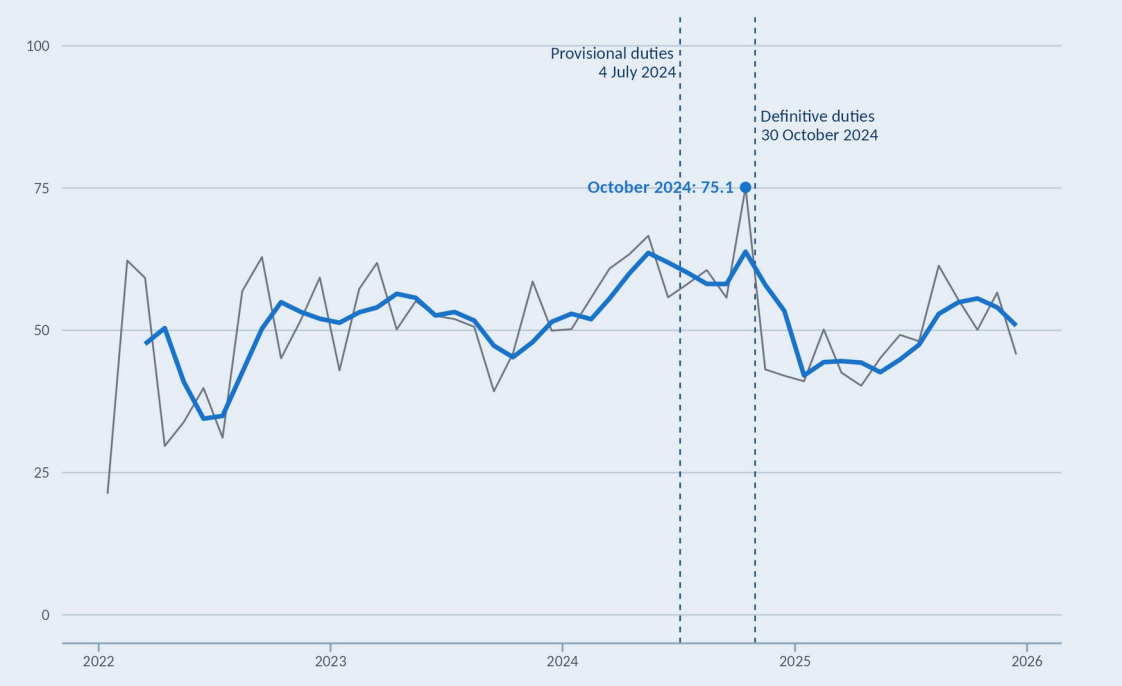
## 5.7 EU duties changed the mix more than the volume

The EU's countervailing duties on Chinese electric cars give a partial test. Provisional duties applied from 4 July 2024 and definitive duties from 30 October 2024, at rates from 7.8 per cent for Tesla's Shanghai plant to 35.3 per cent for SAIC and non-cooperating exporters, with 17.0 per cent for BYD, on top of the 10 per cent customs duty. They cover battery-electric cars, including those with a range-extending engine, and leave plug-in hybrids outside (European Commission, 2024).

China's share of EU imports of battery-electric cars was 52.2 per cent in 2023, 58.4 per cent in 2024 and 49.1 per cent in 2025 (Exhibit 13). It reached 75.1 per cent in October 2024 and fell to 43.1 per cent in November, a pattern consistent with shipments brought forward. Between 2023 and 2025 China's share of plug-in hybrid imports, which the duties do not cover, rose from 11.7 to 29.1 per cent.

**Exhibit 13. China's share of EU imports of battery-electric cars peaked at 75.1 per cent in October 2024, the month of the definitive duties**

*China's share of EU battery-electric car imports, per cent; grey: monthly; blue: three-month average*

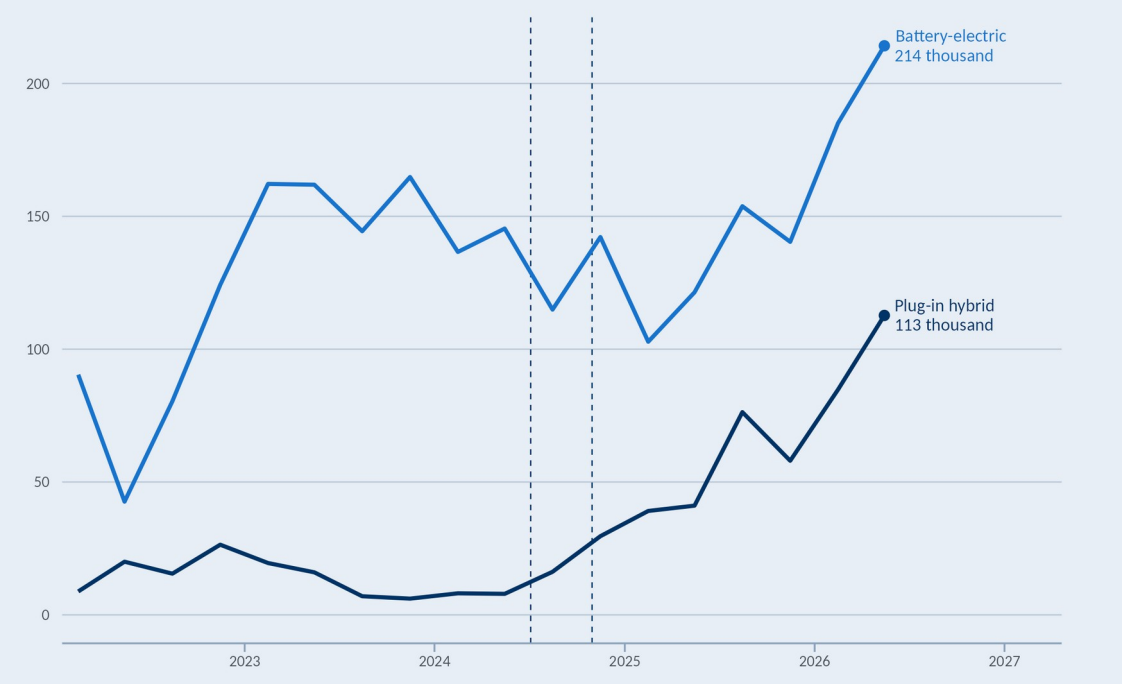



Source: Trade Data Monitor, EU-27 imports from outside the EU; author's calculations. Duty dates: European Commission, Implementing Regulation (EU) 2024/2754.

A share is not a volume. In the second quarter of 2026, two years after the provisional duties, EU countries imported 214,000 battery-electric cars from China, at an average of about USD 20,000 a car. That figure is 47 per cent more than the 145,000 of the second quarter of 2024. Imports of plug-in hybrids rose from 8,000 to 113,000 over the same two years (Exhibit 14). By value, imports of battery-electric cars from China were USD 4.3 billion in that quarter against USD 3.6 billion before the duties (Trade Data Monitor, 2026b).

**Exhibit 14. Two years after the duties, the EU imported 47 per cent more battery-electric cars from China than before them, and 14 times as many plug-in hybrids**

*EU-27 imports of cars from China, thousand cars per quarter; dashed lines: provisional and definitive duties*




Source: Trade Data Monitor, customs records of all reporting countries, retrieved 8 October 2026; author's calculations. Battery-electric: HS 870380; plug-in hybrid: HS 870360 (petrol). Counts are cleaned to USD 2,000-300,000 per car. Duty dates: Implementing Regulation (EU) 2024/2754.

On these figures the duties changed the mix of what China sends more than the amount. A change of mix is what we would expect if the exporters' cost position does not rest mainly on the subsidy the duty offsets. Two years of data from one market cannot establish this, but they are enough to show that trade responded by changing product as well as volume.

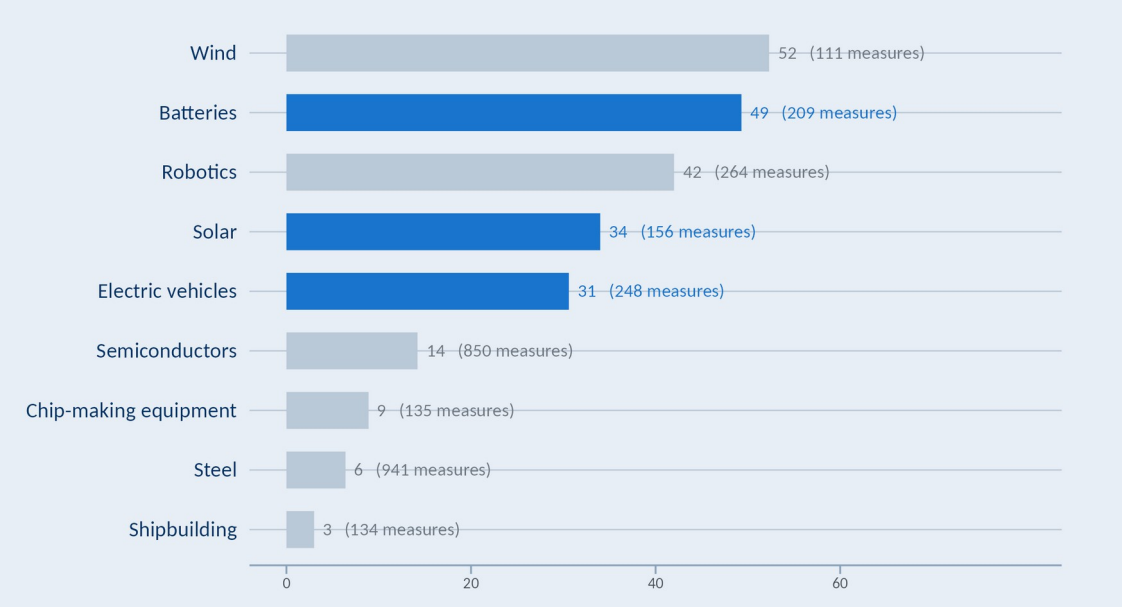
## 5.8 Support was everywhere, and much of it local

The Global Trade Alert records between 53 and 881 national Chinese measures in each sector, and between 60 and 97 per cent of them name a single firm. Support was present in every sector and in every year we observe. Its presence does not distinguish the profitable firm from the others.

The records also show something that firm-level accounts cannot: where the open-ended support comes from. When subnational measures are counted, provinces and cities account for 52 per cent of recorded Chinese measures in wind, 49 per cent in batteries, 42 per cent in robotics, 34 per cent in solar and 31 per cent in electric vehicles. Their share is far lower elsewhere: 14 per cent in semiconductors, 9 per cent in chip-making equipment, 6 per cent in steel and 3 per cent in shipbuilding (Exhibit 15). National measures name a single firm in 90 per cent of cases. Subnational ones do so in 1 per cent: they are schemes open to whoever builds in the locality. All three sectors in which China took the market are among the five where local governments are most active, and local support is the kind any entrant can claim. For electric vehicles, measures are identified from HS 2022 codes where available and from their descriptions otherwise.

**Exhibit 15. Provinces and cities account for 31 to 49 per cent of recorded support in the three sectors where China took the EU market**

*Share of recorded Chinese subsidy measures implemented below the national level, per cent*




Source: Global Trade Alert; author's calculations. Counts of measures, not amounts. Coverage of subnational measures is partial. Measures are assigned to sectors by HS 2022 product codes and by keywords in their descriptions.

Whether that makes local support a fault depends on the test applied. Where the case for support is an external economy of scale, a scheme open to every entrant is the efficient form and a grant to a single champion is not. Our point is narrower: support of this kind cannot be what a single firm's profit rests on.

The pattern is old. In the 1990s, Nolan found China's aspiring large firms facing "a sea of domestic small and medium-sized competitors, competing on price, often protected by local government policy" (Nolan, 2014).

Local governments have a fiscal reason to offer it. Value added tax was 39.1 per cent of China's tax revenue in 2025 (Ministry of Finance, 2026; our calculation from its figures), and since 1 May 2016 the centre and the locality where the tax is paid have each taken half (State Council, 2016). A tax on value added is collected on what a plant produces whether or not the plant earns a profit. That a locality therefore gains from output it does not gain from profit is our inference. We found no study that tests it. Reporting from Shandong describes the other side of the bargain: an investment-promotion official there calls firms that come only for incentives "migratory-bird enterprises" that fly away when the policy changes (People's Daily Online, 2025).

## 5.9 What the evidence settles, and what it does not

Two questions stay open. We could not establish why margins fell in solar or stay low for most carmakers: a firm made cheaper by support and a capable firm forced to hand its gains to buyers produce the same margin, and we found no cost data to tell them apart. Nor are disclosed grants all support. The leaders received no more grants per dollar of revenue than their rivals (Section 5.3), but they could have received more cheap loans, land, equity or public purchases.

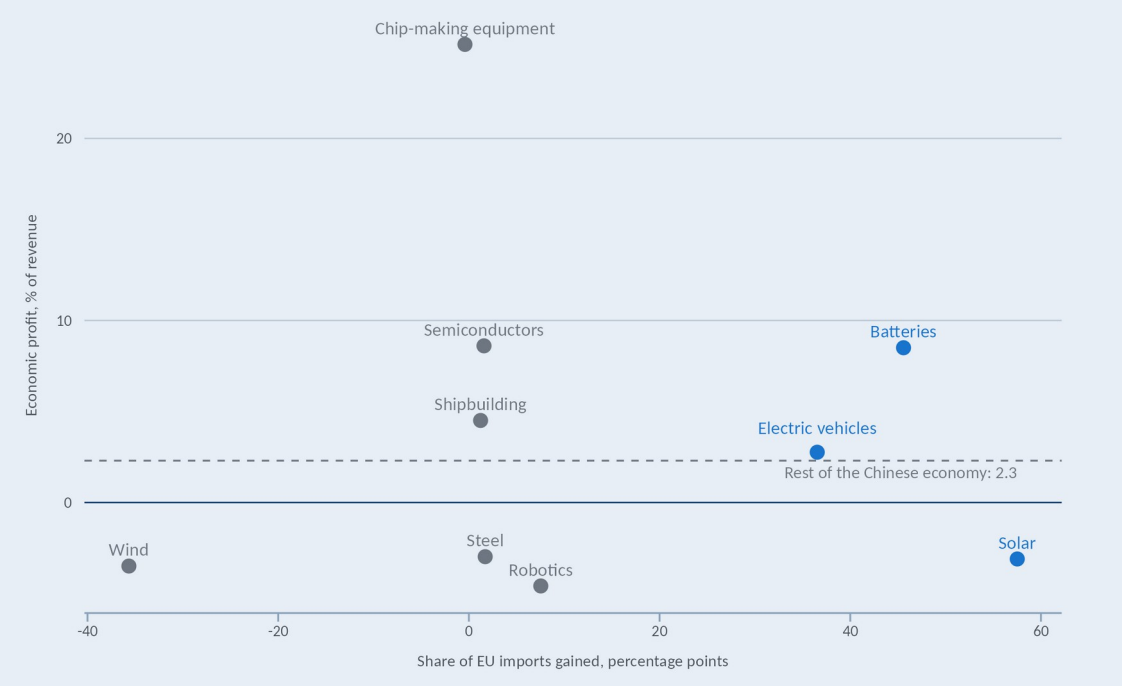
Five further limits bear on how far the result travels. The methodology note does not say whether government grants sit inside operating income, but subtracting every disclosed grant lowers the 2015-22 margin by at most 1.3 points (batteries) and changes one sign: electric vehicles go from 0.9 to -0.1 per cent. BYD makes batteries as well as cars, and its profit cannot be split by segment. Our firms are listed, so the survivor point we raise against CF40 applies to us too: the losses of firms that failed before listing are missing, and industry profit would be lower still. The EU shares may include exports diverted from the United States by its 2025 tariffs. Bank of Italy economists attribute part of the surge to that diversion (Aprigliano et al., 2026), while in the IMF model China's sales to the EU barely change (Rotunno et al., 2026). Last, the design was not fixed in advance. Counts of measures could not rank sectors by support, so after seeing the data we set share against profit instead, and the random-group benchmark, the grant match and the solar split were added after a first draft. The result is a description to be tested on other markets and later years, not a test specified before the data were seen.

The later years have begun. Our profit data end in 2025, and Chinese industrial profits rose sharply in 2026. The rise is concentrated: electronics, on world demand for computing hardware, and upstream raw materials account for most of it (Zhu, 2026). It does not yet show a recovery in solar, batteries or cars, but the accounts for 2026 and 2027 will show whether the margins we report were a trough or a level.

What the evidence does settle is narrower, and it is our main result. Chinese producers took these three markets, and in none of them did the taking leave an industry of firms that earn their cost of capital year after year. In solar the profit of the boom lasted until capacity caught up, and the sector now earns less than the rest of the Chinese economy. In batteries and electric vehicles the sector's margin is above that of the rest of the economy only because of one firm in each (Exhibit 16).

**Exhibit 16. Of the three sectors that took the EU market, only batteries and electric vehicles earned more than the rest of the Chinese economy in 2023-25, each because of one firm**

*Economic-profit margin 2023-25 (per cent) against the share of EU imports gained since 2017-19 (points)*




Source: Crux of Capitalism database, IMD; Trade Data Monitor, EU-27 imports from outside the EU; author's calculations. Core firms as defined in Section 3.

## 6. Conclusion

The debate about Chinese subsidies, and about a second China shock, has been conducted as a contest over one number: how much of China's market share the money explains. We asked what the money left behind in the markets China took. Support went with share, as the OECD finds. It did not create the edge on which China's few consistently profitable firms rest, which is closer to CF40's view. In between lies what both accounts miss: industries that won the export market as a group while most of their firms failed to earn their cost of capital and handed much of the gain to buyers through lower prices. Five points follow, from the one the evidence supports most firmly to the one it supports least.

**Market share is the wrong scoreboard.** Winning a market and earning on it are different things. In five of the eight sectors where they are listed, US and EU makers with a smaller share earned more than the Chinese makers that took the market (Section 5.5). In batteries and electric vehicles the price is set by many Chinese firms that earn less than their cost of capital, but the capability to match belongs to one. In solar no firm is protected, and all of them set the price. Profit sits where the edge cannot be bought: with know-how built over years of production, and with makers of complementary equipment such as inverters, not with makers of a product sold by the watt or the kilowatt-hour.

**Matching subsidies buys output, not profitable firms.** Support that every producer can claim would at best reproduce the Chinese result: output and share without an industry that earns its cost of capital, which is also what the OECD's estimates show (OECD, 2025). Support that is selective, time-bound and tied to something rivals cannot copy has a mechanism (Erhardt et al., 2026). General support does not. Nor is money a substitute for

capability. Northvolt raised about EUR 13 billion and held about EUR 50 billion of orders, yet in 2023 its plant delivered less than 1 per cent of its capacity, and it filed for bankruptcy in March 2025 (Lapi & Vidal, 2027; Näsman et al., 2026; Tagliapietra & Trasi, 2024). The money built a factory. It did not build the processes to run one.

**The distortion lies in how capital is allocated more than in grants.** European producers face prices that do not repay the capital behind them. Chinese firms in these sectors have sold into Europe at margins below their cost of capital, and many are still listed and reporting after three years or more below it (Section 4). Disclosed grants, about one per cent of revenue, are too small to explain that persistence. Who finances it, whether state banks, local governments, shareholders or the firms' own earlier profits, is the question our data cannot answer, and it is where responses should look. Tools sized to grants miss it. A countervailing duty offsets the subsidy found, not the leader's advantage, and investment made to get round it tends to bring assembly rather than know-how (Erhardt et al., 2026). The EU's duties on battery-electric cars shifted Chinese exports towards plug-in hybrids (Section 5.7). A limit on exports, such as the understanding the EU reached with China on 9 October 2026 to moderate exports of hybrids (European Commission, 2026), raises the price in Europe and hands the extra margin to the Chinese exporters allowed to ship.

**Every response moves money at home.** European buyers collected part of what Chinese support paid for: importers paid 61 per cent less for a tonne of Chinese solar cells and modules in 2025 than in 2022 (Section 5.6). A duty or a quota moves that gain from buyers to producers. A government that values the capacity itself, for security or for jobs, may accept a sector that does not pay for its capital. That choice is political, and the size of the foreign subsidy does not settle it. Our evidence shows what such a policy buys.

**Low prices are likely to last.** Exit barriers and cheap credit keep firms in markets they would not now enter (Besanko et al., 2013; OECD, 2025), and China's measures against involution have not yet brought exit. Bruegel sets out two endings: a Darwinian victory, in which weak firms exit and the leaders consolidate, or a prolonged involution, in which protected firms keep returns low for everyone (García-Herrero & Xu, 2026). We have no data on exits, so we cannot say which is coming. If the first, the survivors will be the firms that were profitable all along.

In the markets China took, the share went to the industry and the profit to the few firms with something their rivals could not buy. Support that every rival can claim cannot be what a firm's profit rests on. For everyone else, the question is less how much Beijing spent than which of its firms can earn a profit without the money, and those are very few.

## Appendix A. Data

This appendix gives the detail behind Section 3.

### A.1 Sectors and firms

We study nine sectors defined by product, using HS 2022 codes: electric vehicles, lithium-ion batteries, solar cells and modules with polysilicon, wind generating sets, ships, integrated circuits, chip-making equipment, industrial robots and steel. The list was fixed before the data were analysed.

The profit data identify firms by name only, with no sector code, so we allocate firms to sectors by hand. The allocation rests on about 270 named firms, each checked against its main line of business, and on a recorded review of firms whose names contain a sector

keyword. Semiconductors include chip designers as well as foundries, since both sell the product. A firm is core if it makes the sector's product (cells, cars, modules, turbines, crude steel) and adjacent if it makes a dedicated component or is a carmaker that still sells mostly combustion-engine cars. Dealers, plant operators, materials suppliers and bus and truck makers are left in the rest of the economy.

Headline figures use core firms, and the wider group is the sensitivity check. Four large Chinese carmakers (Geely, NIO, XPeng and Li Auto) are absent from the files, as is every unlisted firm.

### A.2 Profit

Profit is economic profit as defined in Section 3 (Baumgartner et al., 2024). For each sector we report the margin (total economic profit over total revenue) for 2015-22, 2023-25 and the whole period, the share of positive economic profit earned by the top firm, and the margin without that firm. The benchmark, China's rest of economy, holds about 4,600 listed firms a year and earned 2.1 per cent in 2015-22 and 2.3 per cent in 2023-25. Data for 2025 are incomplete (3,923 Chinese firm-years against 5,175 in 2024).

To judge whether a sector's profit is unusually concentrated, we draw thousands of groups of firms at random from the top quarter by revenue of China's rest of economy, each the size of the sector's core group. For each group we compute the same two figures: the top earner's share of positive economic profit, and the margin of the other firms. We report where the sector falls in that distribution. Drawing from all firms rather than the largest quarter raises the median top share for groups of ten over 2015-25 from 46 to 54 per cent and the 90th percentile from 79 to 87 per cent, so against that wider pool CATL's 85.4 per cent is high rather than exceptional.

For solar, we split the core group by stage. The polysilicon makers are GCL Technology, Tongwei, Daqo and Xinte. Tongwei also makes cells, and its profit cannot be split by segment. Counted downstream instead, it changes neither series' direction.

### A.3 Market share and prices

We use two extracts of customs data from the same provider, for different purposes.

**EU imports, 2017 to 2025.** China's share of the EU market is China's share of EU-27 imports from outside the EU, by product code, from monthly customs data for January 2017 to December 2025 (Trade Data Monitor, 2026a). We pool 2017-19 and 2023-25 and report the change in percentage points. The same extract gives the average value of EU imports from China. It supports Exhibits 1, 11, 13 and 16. The measure records where goods were made: imports from China include cars and cells built there by foreign-owned plants, so share of origin is wider than the share of Chinese firms.

**World trade, 1997 to 2026.** A second extract holds the monthly customs records, imports and exports, of the 127 countries the provider covers, from January 1997 to August 2026, at national tariff lines added up to six-digit HS codes (Trade Data Monitor, 2026b). It dates the year from which China's exports of each product have exceeded its imports, and gives China's share of imports outside the EU, China's own trade records and the value per kilogram of its exports (Exhibits 2, 3, 12 and 14). Because coverage grows over time, comparisons of shares use a fixed group of 109 importers that report every month from 2017 to 2025, 82 of them outside the EU. Its codes are narrower than those of the EU extract: steel

is two flat-rolled products, diesel cars, non-plug-in hybrids and ships are not in it, and its solar code before 2022 also holds LEDs.

### A.4 Support

Support comes from the Global Trade Alert database (Global Trade Alert, 2026), which since 2008 has recorded, for every major economy, the government measures that affect foreign commercial interests, subsidies included. Each entry is built from an official source and carries its date, instrument and the products and, where the source names them, the firms concerned. The database is used in research from IMF work on the trade effects of subsidies (Rotunno & Ruta, 2024) to studies of firm entry and innovation (Belloc & Lofaro, 2026; Barwick et al., 2026).

After the filters below, the database holds 8,618 Chinese subsidy measures. We select them on rules close to those of Rotunno and Ruta (2024): measures in chapter L of the international classification of non-tariff measures, given to firms, implemented nationally and rated as distortive.

Every source on Chinese support has a coverage limit. For China the database's records are largely grants reported by listed companies (OECD, 2025), and the activity of local governments, development banks and export-credit agencies is harder to capture (Chimits, 2023). Undisclosed loans cannot be recorded from public documents by anyone, the OECD included. The database does capture the schemes of provinces and cities used in Section 5.8.

We count measures rather than value them, following Rotunno and Ruta, who note that the database records policy changes rather than their monetary value (Rotunno & Ruta, 2024). IMF staff convert counts into values for the broad sectors of their model (Rotunno et al., 2026). Our sectors are narrower, so counts are the more direct measure.

One group of records carries amounts and names. Chinese listed firms must report the government grants they receive, and the database records each disclosure by a Shanghai- or Shenzhen-listed firm with the firm, the year and the amount, converted to US dollars at the year's average exchange rate. The pull holds 6,828 such records for 2009-24. The smallest is USD 10 million, so smaller grants are missing. We matched the records by name to the core firms of batteries, electric vehicles, solar and wind. Twenty-six of 34 firms have at least one record. The other eight are listed only in Hong Kong (such as CALB and GCL Technology) or never disclosed USD 10 million in a year, and count as zero. The 2024 records are incomplete (528 against 637 in 2023, none yet for CATL), so the comparison runs to 2023. The records exclude cheap credit, land, equity injections and public procurement.

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