

KIEL POLICY BRIEF

Frank Bickenbach, Dirk Dohse,
Rolf J. Langhammer, and Wan-Hsin Liu

Foul Play? On the Scale and Scope of Industrial Subsidies in China



Nr. 173 April 2024

OVERVIEW/ÜBERBLICK

- China has become a world leader in photovoltaics and battery cell production and seeks to achieve the same position in other green-tech industries such as electric vehicles, wind turbines, and railway rolling stock. Massive subsidies are a key instrument of the Chinese government to achieve this goal. They have led to harsh criticism in the West, however.
- To better assess whether China plays “foul” or “fair”, we assemble data on overall industrial subsidies in China from different sources and provide new data based on the Chinese government’s reviews of purchase subsidies for electric vehicles and on the annual reports of China’s leading producers of electric vehicles and wind turbines.
- Overall, industrial subsidies in China are several times higher than those in large EU and OECD countries. The size of the estimated difference ranges from a ratio of at least three to four in conservative estimates to a ratio of as high as nine in more encompassing studies.
- Even according to a very conservative estimate, counting only the more easily quantifiable subsidy instruments, industrial subsidies add up to about Euro 221 bn or 1.73% of Chinese GDP in 2019.
- Government subsidies are omnipresent in China, and more than 99% of listed firms in China received direct government subsidies in 2022.
- Battery electric vehicles (BEV), wind turbines, and railway rolling stock receive extensive government support, including both demand-side subsidies and supply-side subsidies. In combination with other support measures, these subsidies have allowed Chinese firms to scale up rapidly, to dominate the Chinese market, and to facilitate increasing expansion into EU markets.
- There has recently been a massive increase of direct government subsidies to some of the dominant Chinese green-tech companies. Direct subsidies to the car maker BYD increased from about Euro 0.2 bn in 2020 to Euro 2.1 bn in 2022. Direct subsidies to Mingyang (wind turbines) increased from Euro 0.02 bn in 2020 to Euro 0.05 bn in 2022.
- The above-named numbers clearly understate the true scale and scope of green-tech subsidies in China. BYD, for example, also benefits from subsidies provided to battery producers (cheaper input components) and from purchase incentives to BEV buyers (higher demand).
- Further channels of government support include the preferential access to critical raw materials, forced technology transfers, strategic use of public procurement and preferential treatment of domestic firms in administrative procedures.
- The EU has recently launched an anti-subsidy probe against BEV imports from China. We recommend the EU to use this probe to negotiate with the Chinese government and to

induce it to abolish public support measures that are seen particularly harmful by the EU. Given China's relative strength in green-tech industries, its currently fragile macroeconomic situation and its tensions with the US, there is a realistic chance for such negotiations to be successful.

Keywords: China, industrial subsidies, battery electric vehicles, wind turbines, railway rolling stock, EU anti-subsidy proceeding

- China ist weltweit führend in der Produktion von Photovoltaikanlagen und Batteriezellen und strebt eine Führungsrolle auch in anderen grünen Technologiebranchen (Elektrofahrzeuge, Windturbinen, Schienenfahrzeuge) an. Um dies zu erreichen, setzt die chinesische Regierung massive Subventionen ein. Diese stoßen im Westen jedoch auf scharfe Kritik.
- Um besser einschätzen zu können, ob China „foul“ oder „fair“ spielt, stellen wir Daten über Industriesubventionen in China aus verschiedenen Quellen zusammen und liefern neue Daten basierend auf den jüngsten Veröffentlichungen der chinesischen Regierung zu Kaufsubventionen für Elektroautos und den Jahresberichten führender chinesischer Hersteller von Elektroautos und Windturbinen.
- Insgesamt sind die Industriesubventionen in China um ein Vielfaches höher als in den großen EU- und OECD-Ländern. Das Verhältnis reicht vom mindestens Drei- bis Vierfachen in konservativen Schätzungen bis hin zum Neunfachen in umfassenderen Studien.
- Selbst nach einer sehr konservativen Schätzung, bei der nur die leichter quantifizierbaren Subventionsinstrumente berücksichtigt werden, beliefen sich die Industriesubventionen in China im Jahr 2019 auf rund 221 Mrd. Euro oder 1,73 Prozent des chinesischen BIP.
- Staatliche Subventionen sind in China allgegenwärtig. Mehr als 99 Prozent der börsennotierten Unternehmen in China erhielten im Jahr 2022 direkte staatliche Subventionen.
- Produzenten von batteriebetriebenen Elektrofahrzeugen (BEV), Windturbinen und Schienenfahrzeugen erhalten umfangreiche staatliche Unterstützung sowohl in Form nachfrageseitiger Subventionen als auch angebotsseitiger Subventionen. In Kombination mit anderen Unterstützungsmaßnahmen haben es diese Subventionen chinesischen Unternehmen ermöglicht, schnell zu expandieren, den chinesischen Markt zu dominieren und den Eintritt in EU-Märkte zu erleichtern.
- Die direkten staatlichen Subventionen für einige der dominierenden chinesischen Hersteller grüner Technologieprodukte sind zuletzt deutlich gestiegen. Die direkten Subventionen für den Elektroautohersteller BYD stiegen von ca. 220 Millionen Euro im Jahr 2020 auf 2,1 Mrd. Euro im Jahr 2022, die für den Windkraftanlagenbauer Mingyang von 20 Millionen Euro im Jahr 2020 auf 52 Millionen Euro im Jahr 2022.
- Die genannten Zahlen erfassen das wahre Ausmaß und den Umfang der Subventionen für grüne Technologien in China jedoch nur unzureichend. So profitierte beispielsweise BYD

auch von Subventionen für Batteriehersteller (billigere Komponenten) und von Kaufanreizen für Elektroautos (erhöhte Nachfrage).

- Chinesische Unternehmen profitieren zudem von weiteren staatlichen Unterstützungsmaßnahmen wie dem bevorzugten Zugang zu kritischen Rohstoffen, einem teils erzwungenen Technologietransfer und der Vorzugsbehandlung einheimischer Unternehmen in öffentlichen Vergabe- und Verwaltungsverfahren.
- Die EU betreibt derzeit ein Antisubventionsverfahren gegen BEV-Importe aus China. Die EU sollte dieses Verfahren nutzen, um mit der chinesischen Regierung in Verhandlungen einzutreten und sie zur Abschaffung von Subventionen zu bewegen, die aus Sicht der EU besonders schädlich sind. Angesichts der relativen Stärke Chinas in grünen Technologien, seiner gegenwärtigen makroökonomisch fragilen Lage und seiner Spannungen mit den USA besteht eine realistische Chance, dass solche Verhandlungen erfolgreich sein werden.

Schlüsselwörter: China, Industriesubventionen, batteriebetriebene Elektrofahrzeuge, Windturbinen, Schienenfahrzeuge, Antisubventionsverfahren der EU

Frank Bickenbach

Kiel Institute for the World Economy
Kiellinie 66
24105 Kiel
Tel.: +49 431 8814 274
Email: frank.bickenbach@ifw-kiel.de

**Dirk Dohse**

Corresponding author
Kiel Institute for the World Economy
Kiellinie 66
24105 Kiel
Tel.: +49 431 8814 460
Email: dirk.dohse@ifw-kiel.de

**Rolf J. Langhammer**

Kiel Institute for the World Economy
Kiellinie 66
24105 Kiel
Tel.: +49 431 8814 203
Email: rolf.langhammer@ifw-kiel.de

**Wan-Hsin Liu**

Corresponding author
Kiel Institute for the World Economy
Kiellinie 66
24105 Kiel
Tel.: +49 431 8814 269
Email: wan-hsin.liu@ifw-kiel.de



FOUL PLAY? ON THE SCALE AND SCOPE OF INDUSTRIAL SUBSIDIES IN CHINA

Frank Bickenbach, Dirk Dohse, Rolf J. Langhammer, and Wan-Hsin Liu¹

1 MOTIVATION

Green technologies are increasingly at the center of international trade and technology policy. The Chinese government has recognized the future importance of such technologies and the related industries early on and is particularly active in this area. China has become a world leader in photovoltaics and battery cell production and is trying to do the same in electric vehicles, railway rolling stock and wind power. Subsidies are a key instrument in the Chinese government's strategy to support the development of these industries. The massive subsidization of Chinese companies has led to fierce criticism in the West, however.

The European Commission accuses the Chinese government of distorting competition with subsidies for electric cars and has launched an investigation into public support for electric cars in China. The President of the European Commission Ursula von der Leyen said in her "State of the Union Address" that global markets were being "flooded with cheaper Chinese electric cars," posing a possible threat to the European Union's fledgling and promising electric car industry (European Commission, 2023c). The anti-subsidy investigation is therefore intended to determine whether manufacturers of battery electric vehicles (BEV) in China benefit from countervailable—i.e., specific and advantageous to the receiving companies—subsidies and whether these are causing or threatening to cause economic damage to BEV manufacturers in the European Union (EU) (European Commission, 2023a).

Similar discussions have been held regarding subsidies to Chinese producers of railway rolling stock and of wind turbines. In February 2024, the European Commission had launched an investigation into China Railway Rolling Stock Corporation (CRRC) for allegedly using subsidies to undercut European competitors in a public procurement procedure (European Commission, 2024a). With respect to wind turbines, no official anti-subsidy investigation has been launched so far. However, leading EU officials have argued that massive subsidies to Chinese manufacturers are encouraging cheap imports from China into the EU, driving European wind turbine manufacturers to the brink of ruin (Financial Times, 2023).

Even though these allegations are to be taken seriously, the data situation is currently highly unsatisfactory and the requirements for legally secure interventions by the European Commission, i.e., the imposition of countervailing duties on Chinese imports, are high. And even if the

¹ We thank Holger Görg, Klaus Schrader and Moritz Schularick for helpful comments and Michaela Rank for excellent assistance in editing the manuscript.

requirements for legally secure interventions were met, the question still arises as to whether import restrictions would actually be in the long-term interests of the European (and especially the German) industry and consumers.

The central prerequisite for an adequate analysis and adequate policy measures is reliable data on the scale and structure of Chinese subsidies in the areas mentioned. The available data is currently scarce, partly misleading and even contradictory. Tracking Chinese subsidies is a tough and challenging task for researchers because the Chinese subsidy system is highly complex and intransparent.

The current paper assembles data on overall industrial subsidies in China from different sources and provides some new data based on the analysis of the Chinese government's most recent final reviews of purchase subsidies for new energy vehicles and the annual reports of the most important Chinese companies in the electric car and wind energy sectors.

The data shows that overall industrial subsidies in China are significantly higher than those in large EU/OECD countries. Depending on the type of subsidies covered and the data sources and methods used, the estimates vary greatly between the different studies, however. For 2019, even according to a very conservative estimate, Chinese industrial subsidies amount to about Euro 221 bn or 1.73% of Chinese GDP (DiPippo et al., 2022). Relative to GDP, industrial subsidies in China would thus be at least three to four times higher than in large EU/OECD countries. According to a more encompassing study (OECD, 2021), the ratio could be as high as nine (relative to company sales). And this does still not include several forms of particularly hard to quantify government support measures which are arguably also of importance particularly in China. The Chinese government heavily subsidizes companies in the fields of electromobility, rolling stock and wind power, and makes the payment of subsidies conditional on production in China. With BYD (electric cars), CRRC (rolling stock) and Mingyang (offshore wind turbines), Chinese companies have got to dominate the Chinese home market for their products and are increasingly penetrating export markets as well. And even as the Chinese central government has recently abolished some of the large demand-side subsidies in these sectors—such as purchase subsidies for BEV or preferential feed-in tariffs in wind power—central and regional governments continue to support these industries through various other forms of direct and indirect subsidies. Direct subsidies to some of the dominant Chinese companies in these sectors, such as BYD for BEV or Mingyang for offshore wind turbines, have even been increased recently, helping these companies in their attempts to expand beyond China and gain a presence in EU markets.

We attempt to quantify Chinese industrial subsidies in Section 2 and discuss the challenges and potential policy response of Chinese industrial subsidies for the EU in Section 3.

2 QUANTIFICATION OF CHINESE INDUSTRIAL SUBSIDIES

2.1 CHINA'S OVERALL INDUSTRIAL SUBSIDIES IN A COMPARATIVE PERSPECTIVE

Chinese industries receive considerable public support in the form of direct and indirect subsidies. Despite considerable problems in quantifying many forms of support (see Section 2.3 for details), there can be little doubt that overall industrial subsidies in China are significantly higher than those in the European Union (EU) or in the countries of the OECD, more generally. A recent study by the Center for Strategic & International Studies (CSIS) “aims to quantify the size of total industrial policy spending in China and compare it to other economies” (DiPippo et al., 2022: 1). The study considers government support provided to industry in the form of (i) direct subsidies, (ii) government support for R&D, (iii) R&D tax incentives, (iv) other tax incentives, (v) below-market credit to SOEs (State-owned Enterprises), (vi) support through state investment funds (Government Guidance Funds (GGF)), and (vii) “China-specific factors”, which include, most notably, below market land sales.² Estimates for some of these types of support are clearly lower bounds as some elements are not quantifiable.³

For China, the study estimates public support for industry to add up to at least RMB 1.71 trillion, equivalent to about Euro 221.3 bn at nominal exchange rates, or 1.73% of GDP in 2019, “even when applying a conservative methodology and counting only quantifiable factors” (DiPippo et al., 2022: 9, 33–34).⁴

- This is far higher than estimated support in the other leading economies in the sample, both in absolute terms and as a percent of GDP (see Figure 1a). Relative to GDP, public support is about three times higher in China than in France (0.55%) and about four times higher than in Germany (0.41%) or the United States (US) (0.39%).
- In absolute terms, the US comes second, with an estimated government support equaling about Euro 75 bn (USD 84 bn), which is about a third of China's support spending (Figure 1b). In Germany and France government support amounts to Euro 14.3 bn and Euro 13.3 bn, respectively, broadly one-sixteenth of the level of support in China.
- As to the relative importance of the different instruments in China, three instruments stand out: below-market credit to SOEs with 0.52% of GDP, and direct subsidies and

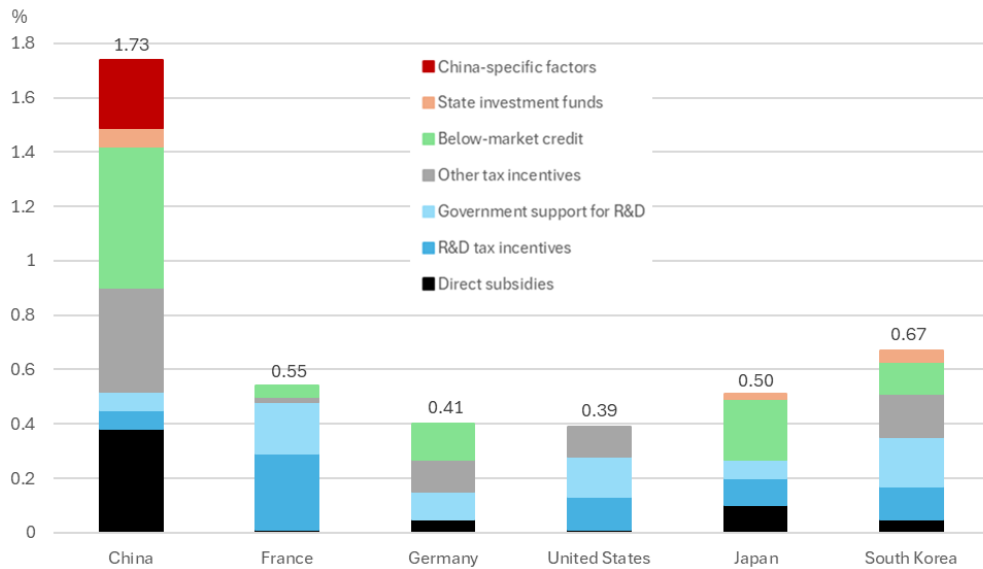
² The China-specific factors also include “SOE net payables” and (implicit subsidies through) debt-equity swaps, which are of only minor importance, however. For a description of the different support categories as well as the sources and methodology/assumptions used see DiPippo et al. (2022).

³ For example, direct subsidies and tax incentives do only include support for (listed and non-listed) SOEs and listed private firms but not support for non-listed private firms, such as most SMEs (Small and Medium-sized Enterprises). Support in the form of below-market credits covers only support for SOEs, not that for private firms. Further support instruments are fully excluded as “not quantifiable”. These are, e.g., the support provided through the foregoing of dividends from SOEs, through the government procurement skewed towards domestic firms, or through localization or joint venture requirements (DiPippo et al., 2022: 19–20).

⁴ Without the “China-specific” factors the estimate would be 1.48% of GDP.

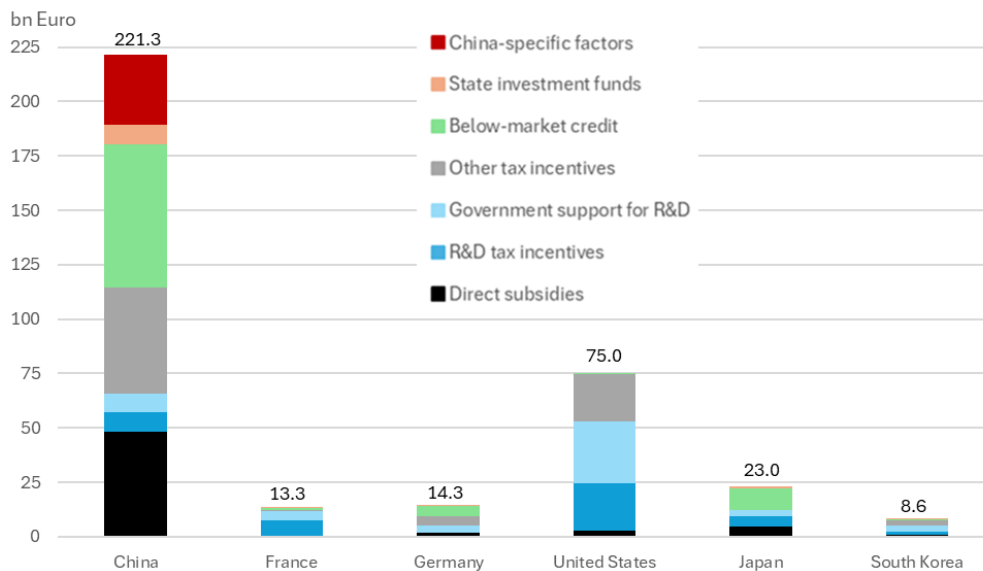
other tax incentives with 0.38% of GDP each.⁵ R&D tax incentives and government support for R&D are relatively low in China, with 0.07% of GDP each.

Figure 1a:
Industrial support spending in China and key OECD countries, 2019 (% of GDP)



Source: DiPippo et al. (2022); own illustration.

Figure 1b:
Industrial support spending in China and key OECD countries, 2019 (bn Euro)



Source: DiPippo et al. (2022) and Deutsche Bundesbank (2024); own calculation in Euro and own illustration.

⁵ “China specific factors” amount to 0.25% of GDP. Main instruments, here, are “below market land sales” (technically leases) with about 0.21% of GDP. “SOE Net Payables” account for 0.04% of GDP; Debt-Equity Swaps are negligible in size.

As can be seen from Figure 1, the Chinese support structure differs strongly from that in the US and France, in which R&D tax incentives and government support for R&D are the largest support elements. For Germany the support structure is somewhat closer to that of China. Like for China, below-market-credits and other tax incentives are the largest support elements for Germany (though amounts are much smaller than those for China both in absolute terms and relative to GDP). Different from China, however, direct subsidies are much less important in Germany, whereas government support for R&D is relatively more important in Germany than in China. Thus, excluding government support that is related to R&D, which can be more easily justified economically, the difference between the level of subsidies between China and the other countries becomes even larger. Relative to GDP, these “hard” subsidies amount to about 1.59% in China compared to only 0.31% in Germany and just 0.08% in France and 0.12% in the US.

The OECD provides another quantification of China’s overall industrial subsidies in a comparative perspective (OECD, 2021 and 2023a) using publicly available firm-level information for 306 of the world’s largest manufacturing firms in 13 industrial sectors, covering the period 2005–2019.⁶ Almost a quarter (23%) of firms in the sample are from China; 19% are from the EU-27, 16% from the US, and 9% are from Japan.⁷ The study focuses on four key instruments of policy support: (i) tax concession, (ii) government grants, (iii) below-market borrowing and (iv) below-market equity.⁸ In line with the CSIS study,

- the OECD study finds that “industrial firms from China receive disproportionately more support overall than firms based in other jurisdictions covered in the analysis” (OECD, 2023a: 17).
- China offers its large industrial firms relatively more tax concessions, grants and below-market finance than other countries covered in the analysis (OECD, 2021, 2023a; Chimits, 2023):
 - firms-based in China received tax concessions amounting to about 0.75% of their revenues, against 0.32% for OECD-based firms;
 - for government grants the respective shares are more than 0.63% for China and less than 0.1% for the OECD;
 - for below-market borrowing they are more than 2.35% for China and close to 0% for the OECD;
 - for below-market equity, the relative benefit per government-invested firm seems on average to be comparable between China and the OECD, the aggre-

⁶ For most sectors included in the sample, the companies covered account for at least two-thirds of global sales or capacity (OECD, 2021: 27).

⁷ Overall, the “sample’s geographical breakdown closely reflects economies’ respective weights in global manufacturing” (OECD, 2021: 27).

⁸ Of course, loans from state institutions or state property in and of themselves do not constitute state support. The public support derives from government/public creditors or owners acting differently from private creditors or investors. Quantifying support through below-market financing thus requires determining a sometimes hard to obtain benchmark (see OECD, 2021).

gate effect is substantially larger in China, however, due to the much larger number of government-invested firms in China (OECD, 2021: 43). According to Chimits (2023, based on OECD (2021)) a support level of about 0.75% of sales may be considered a reasonable estimate for China.

For the four above-mentioned instruments taken together, the industrial firms from China covered in the sample received government support equivalent to about 4.5% of their revenues. By far the largest part of this support comes in the form of below-market borrowing.

These results suggest that through tax concessions, government grants and below-market borrowing alone, large industrial companies in China may receive almost nine times more government support (relative to company sales) than comparable companies in the OECD. And this does not include support in the form of below-market equity, or through subsidized input prices, preferential treatment in public procurement or other forms of support that are even harder to quantify and to compare internationally (see Section 2.3).

The results of the two studies of CSIS and OECD just described relate to the years 2019 and 2005–2019 respectively. More recent cross-sectoral data for China are available for selected instruments and/or sectors only. A data set provided by Bruegel's China Economic Database (Bruegel, 2024) for the period 2015 to 2022 includes annual aggregate data of direct government subsidies for 5,260 listed companies in 2022 (up from 5,191 listed companies in 2015).

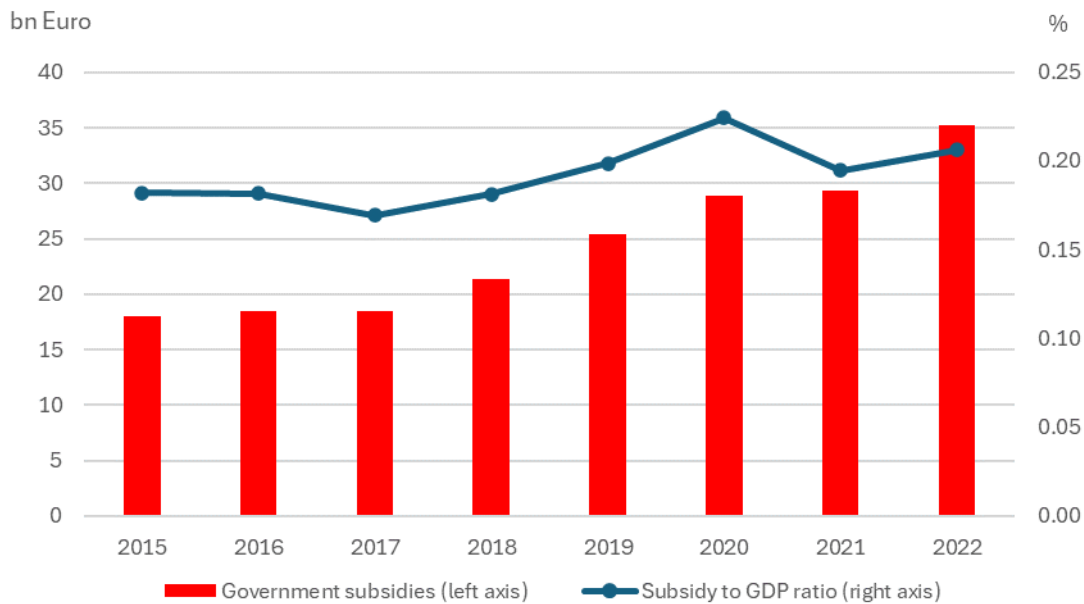
- In 2022, the 5,260 companies in the sample received about Euro 35.3 bn (RMB 250 bn) in direct government subsidies (Figure 2). This is double the amount of 2015.⁹ Relative to 2019, the last year before Covid and the reference year of the above CSIS study, subsidies increased by about 27.3% in 2022, which is more than the increase of Chinese GDP over that same period (22.1%).
- The data also shows that in 2022, almost every listed company (99.2% of listed companies) in the sample reported receiving direct government subsidies.¹⁰

To sum up, existing studies show that overall, industrial subsidies in China are several times higher (relative to GDP or to company sales) than those in large EU/OECD countries. Depending on the type of subsidies covered and the data sources and methods used, the size of the estimated difference varies greatly between the different studies, however. For 2019 (and earlier), the estimates range from a ratio of at least three to four in a conservative estimate of DiPippo et al. (2022) to a ratio that could be as high as nine in a more encompassing study of the OECD (OECD, 2021; 2023a). And this does still not include several forms of particularly hard to quantify government support measures, which are arguably also of importance particularly in China. Focusing on direct subsidies, company annual reports show that almost all (more than 99%) of the 5,260 listed firms covered by the data set have received such subsidies in 2022, and that direct subsidies have further increased recently.

⁹ Relative to GDP subsidies increased from 0.18% of GDP in 2015 to 0.21% in 2022.

¹⁰ In 2019 the respective share was 96.6%.

Figure 2:
Direct subsidies to listed companies in China, 2015–2022 (bn Euro and % of GDP)



Source: Bruegel (2024), National Bureau of Statistics of China (2023) and Deutsche Bundesbank (2024); own calculation (in Euro and subsidy to GDP ratio) and own illustration.

2.2 CHINESE SUBSIDIES IN SELECTED INDUSTRIES

In this section, we will take a closer look at Chinese subsidies in three specific industries, namely *Battery Electric Vehicles (BEV)*; *Wind Turbines*, and the *Railroad Rolling Stock* industry. The three industries have several important parallels: (i) all three industries are decisive for the green transformation of industry (and transport in particular), (ii) the Chinese government considers them as key areas of the “Made in China 2025 Strategy” that warrant special industrial policy support and (iii) for each of these industries, the European Commission has recently launched an official investigation into Chinese subsidies (BEV, rolling stock) or has at least considered such an investigation (wind turbines).¹¹

Battery Electric Vehicles

China’s rise to become the world’s largest market and largest production base for (battery) electric vehicles has been pushed forward by a longstanding concerted government effort to provide demand-side and supply-side subsidies to stimulate the industry (DiPippo et al., 2022). Substantial consumer subsidies and tax breaks to stimulate sales of BEV are, of course, not unique to China but are also widespread within the EU and other Western countries, where

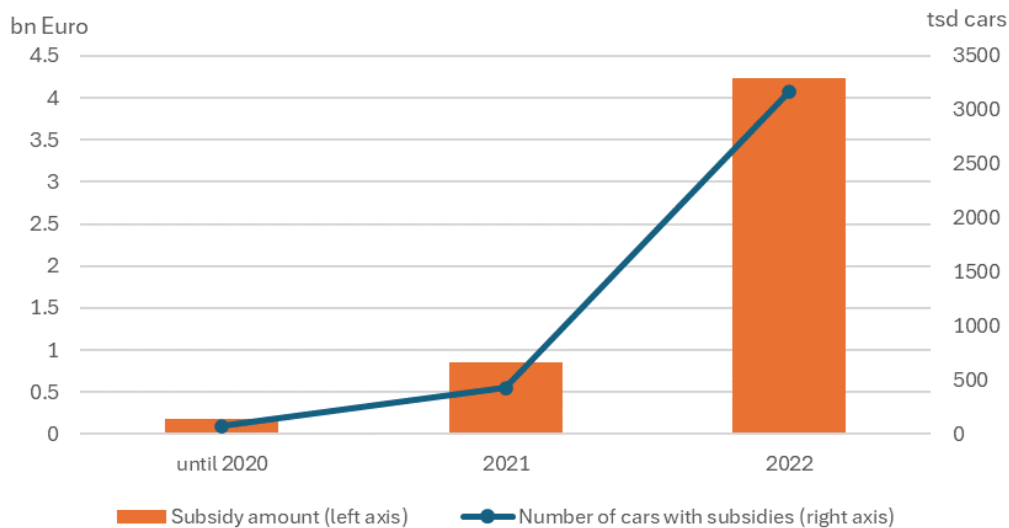
¹¹ The investigation on Chinese subsidies for BEV is based on the EU’s “Anti-subsidy Regulation” (Regulation (EU) 2016/1037), the investigation on subsidies for (a subsidiary of) China’s state-owned rolling stock manufacturing giant CRRC related to a public procurement procedure in Bulgaria and is based on the “Foreign Subsidies Regulation” (Regulation (EU) 2022/2560). For details see Appendix.

(per vehicle) purchase subsidies have often been substantially higher than in China. A distinctive feature of purchase subsidies for BEV in China, however, is that they are paid out directly to manufacturers rather than consumers and they are paid only for electric vehicles produced in China, thereby discriminating against imported cars.

While these purchase subsidies have been phased out altogether by the end of 2022, they played an important role in the development phase of the sector.¹² Until 2022, the purchase subsidies for New Energy Vehicles (NEV), which include Battery Electric Vehicles (BEV) as well as Plug-in Hybrid Vehicles (PHEV) and fuel cell vehicles, amounted to about Euro 5.3 bn (RMB 37.8 bn) (Figure 3). Due to the enormous increase in the number of subsidized NEV, the lion's share of the subsidies was paid in 2022, the final year of the policy.

In 2022, purchase subsidies amounting to about Euro 4.2 bn (RMB 30 bn) were allocated to almost 3.2 million NEV, up from Euro 0.9 bn (RMB 6.5 bn) for about 427,000 NEV in 2021, and a total of Euro 0.2 bn (RMB 1.4 bn) for about 75,000 NEV for the aggregate period 2010 to 2020. The average subsidy per NEV decreased over time from about Euro 2,300 between 2010 and 2020 to about Euro 2,000 in 2021 and to Euro 1,300 in 2022.

Figure 3:
Approved NEV Purchase Subsidies in China^a



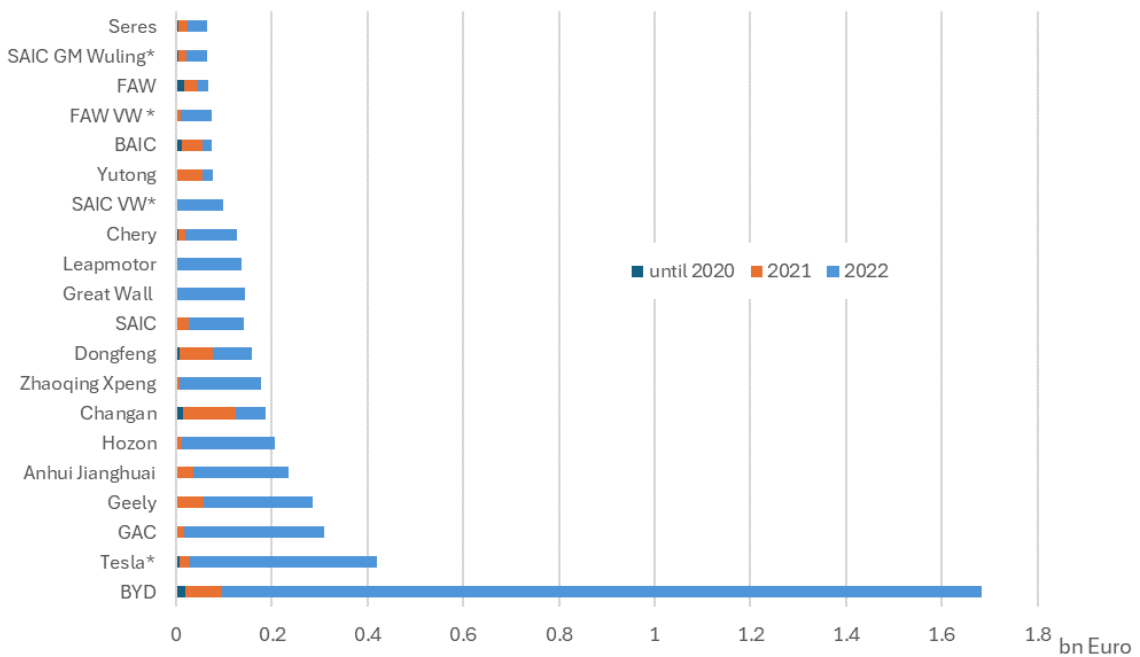
^aThe average exchange rate for 2020 is used for calculating NEV purchase subsidies in Euro for the first period (until 2020).

Source: Ministry of Industry and Information Technology of China (2023; 2024) and Deutsche Bundesbank (2024); own calculations and own illustration.

¹² A recently published study on the “Effectiveness of electric vehicle subsidies in China” uses the variation in purchase subsidy rates by electric driving range, city, and month in China to estimate the effect of purchase subsidies on the adoption of EVs (Zhang et al., 2024). Although the study is restricted to the period January 2016–December 2019 (and does not include the years 2020–2022 in which the overall volume of purchase subsidies was highest), the authors find evidence that the subsidies have led to a substantial uptake in the sales of domestic EVs, while at the same time discouraging the uptake of imported EVs. “Specifically, a 1,000 CNY increase in the per-vehicle purchase subsidy on domestically produced EVs in the same range, city, and month has on average led to a reduction in the corresponding number of imported EV registrations of about 2% ...” (Zhang et al., 2024: 13).

By far the largest recipient of purchase subsidies was Chinese NEV manufacturer BYD, which in 2022 alone received purchase subsidies amounting to Euro 1.6 bn (for about 1.4 million NEV) (Figure 4). The second largest recipient of purchase subsidies was US-headquartered Tesla, which received about Euro 0.4 bn (for about 250,000 BEV produced in its Shanghai Gigafactory). While the ten next highest recipients of purchase subsidies (for the overall period until 2022) are all Chinese, there are also three sino-foreign joint ventures (the two VW joint ventures with FAW and SAIC as well as SAIC GM Wuling) among the top-20 purchase subsidy recipients.¹³

Figure 4:
Approved NEV Purchase Subsidies in China: Top-20 NEV Purchase Subsidy Recipients^a



^a * indicating sino-foreign joint ventures or foreign-owned firms.

Source: Ministry of Industry and Information Technology of China (2023; 2024) and Deutsche Bundesbank (2024); own calculations and own illustration.

The large differences in purchase subsidies received mainly reflect differences in the number of NEV sold and eligible for subsidy. In 2022, Tesla and the three sino-foreign joint ventures taken together received purchase subsidies for about 408,000 NEV, whereas BYD alone received subsidies for 1.4 million NEV. The 16 Chinese NEV manufacturers among the top-20 purchase subsidy recipients combined received subsidies for 2.63 million NEV.¹⁴

Purchase subsidies per vehicle depend on the technology (BEV or PHEV) and the basic design characteristics (e.g., electric range, battery energy density, maximum speed) of individual car

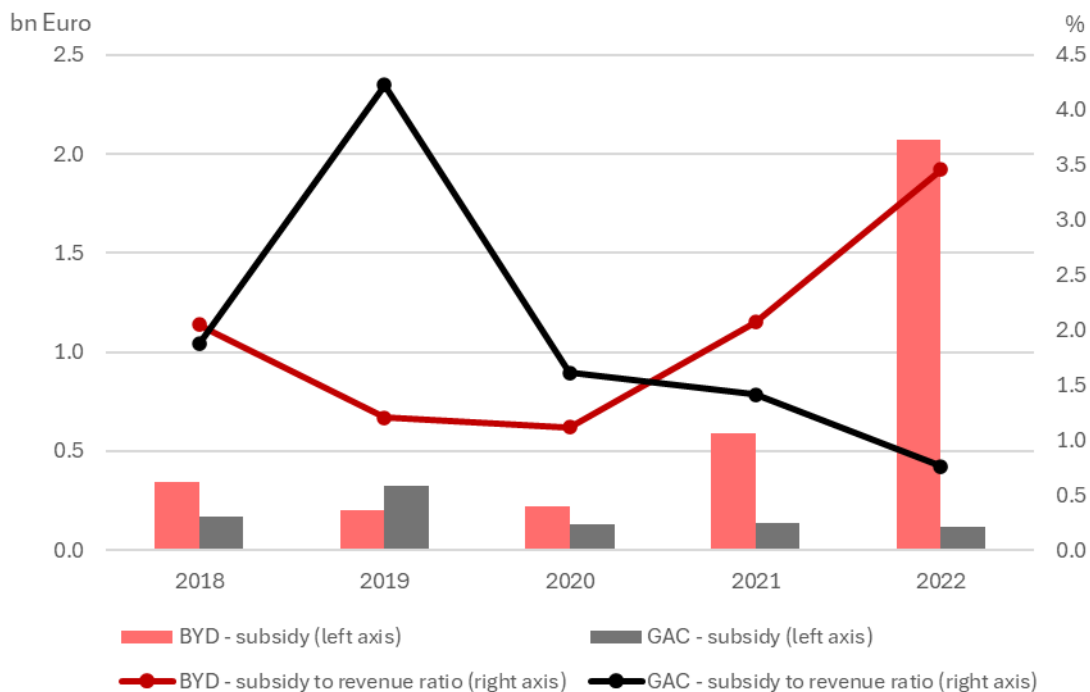
¹³ The top-20 purchase subsidy recipients jointly received about 95% of the total amount of NEV purchase subsidies in 2022. Among the overall 51 NEV manufacturers that received NEV purchase subsidies there were 12 foreign-owned or sino-foreign joint ventures.

¹⁴ The top-20 purchase subsidy recipients jointly accounted for almost 96% of the total number of NEV with purchase subsidies in 2022.

models. More detailed information about the distribution of subsidy rates for the different manufacturers (not displayed here) reveals that BYD received more subsidies than its largest competitors—Tesla and GAC but also compared to VW joint ventures SAIC-VW and FAW-VW—in every relevant subsidy rate class in 2022, reflecting the breadth and competitiveness of the BYD model range. Sales of BYD concentrate in the category of subsidy rates between RMB 10,000 and 15,000 (about Euro 1,400 to 2,100), where it directly competes with Tesla, GAC and the VW joint ventures, which also focus on this category. Until 2022 BYD has significantly expanded its market share lead in this category especially compared to Tesla and VW joint ventures. This reflects BYD's strongly expanding technological and production capacity and rising competitiveness in this important market segment.

Even as purchase subsidies have been phased out, BEV continue to be exempt from the vehicle purchase tax (usually 10% on car price including VAT). More specifically, there will be a complete purchase tax exemption for all NEV, not only but mostly BEV, up to savings of RMB 30,000 (about Euro 3,920) per vehicle in 2024 and 2025. The exemption will be halved in 2026 and 2027. For the four years this incentive package is scheduled to amount to RMB 520 bn (about Euro 68 bn) (China Briefing, 2023).

Figure 5:
Direct Government Subsidies to BYD and GAC, 2018–2022^a



^aGovernment subsidies consist of newly added longer-term government subsidies and new government subsidies of the year disclosed in the annual reports.

Source: BYD annual report 2018–2022 and GAC annual report 2018–2022; Deutsche Bundesbank (2024); own calculations and own illustration.

Apart from purchase subsidies (until 2022), there are several other forms of monetary and non-monetary subsidies given to BEV manufacturers. According to the information in BYD’s annual

reports, direct government subsidies to that company accumulated to Euro 3.4 bn (RMB 25 bn) in the period from 2018 to 2022. They increased massively, recently, from about Euro 0.2 bn in 2020 to Euro 0.6 bn in 2021 and to Euro 2.1 bn in 2022 alone (Figure 5). Relative to business revenues this corresponds to an increase of direct subsidies from 1.1% of revenues in 2020 to 3.5% in 2022. Direct subsidies to GAC, the second largest Chinese recipient of NEV purchase subsidies, were very much lower and tended to decrease over recent years. In 2022, direct subsidies to GAC amounted to Euro 0.1 bn (corresponding to 0.76% of business revenues).

Other important forms of government support (not included above) are, e.g., below-market debt and equity¹⁵, the purchase of important inputs (such as steel and EV batteries) at subsidized prices, or (discriminatory) government procurement¹⁶, which are hard to measure, however.

Wind Turbines

In its early phase of development, China's wind turbine industry greatly benefitted from two government support measures, in particular. In the mid-1990s, the Chinese government introduced a purchase guarantee and feed-in-tariff scheme(s) for wind energy as well as strong local content requirements, mandating wind farms to purchase at least 70% domestically manufactured equipment (Li et al., 2023). This resulted in a rapid expansion of installed wind energy capacity (from 1.26 GW in 2005 to 31 GW in 2020) and a rapid growth of the market share of domestic wind turbine manufacturers (from 25% in 2004 to 90% in 2010) (Li et al., 2023).

In the following years, feed-in-tariffs were repeatedly adjusted downwards in accordance with falling wind energy costs. Eventually, the central government has completely abolished (preferential) feed-in tariffs for both onshore wind and offshore wind in 2020 and 2021.¹⁷ In view of the sharp fall in the cost of wind power generation in China, the central government no longer seems to consider specific subsidies on the demand side to be necessary. Several large provinces including Guangdong, Shandong and Zhejiang have announced their own regional subsidy policies to stand in for the national ones, however (Caixin, 2023).

The strict local content requirements have already been revoked in 2009, allowing foreign producers to bid for projects (Li et al., 2023; Scheifele et al., 2022).¹⁸ However, the market share

¹⁵ An example is bailout in 2020 of EV start-up NIO arranged by the Hefei government through three local state-owned investment companies that manage government funds. The companies invested RMB 7 bn to acquire a 24 percent stake in the company. This suggests that below-market equity provided by state investment funds is becoming more important for EVs, especially as direct subsidies are declining and "local governments are seeking new ways to attract and support firms" (DiPippo et al., 2022: 56–57).

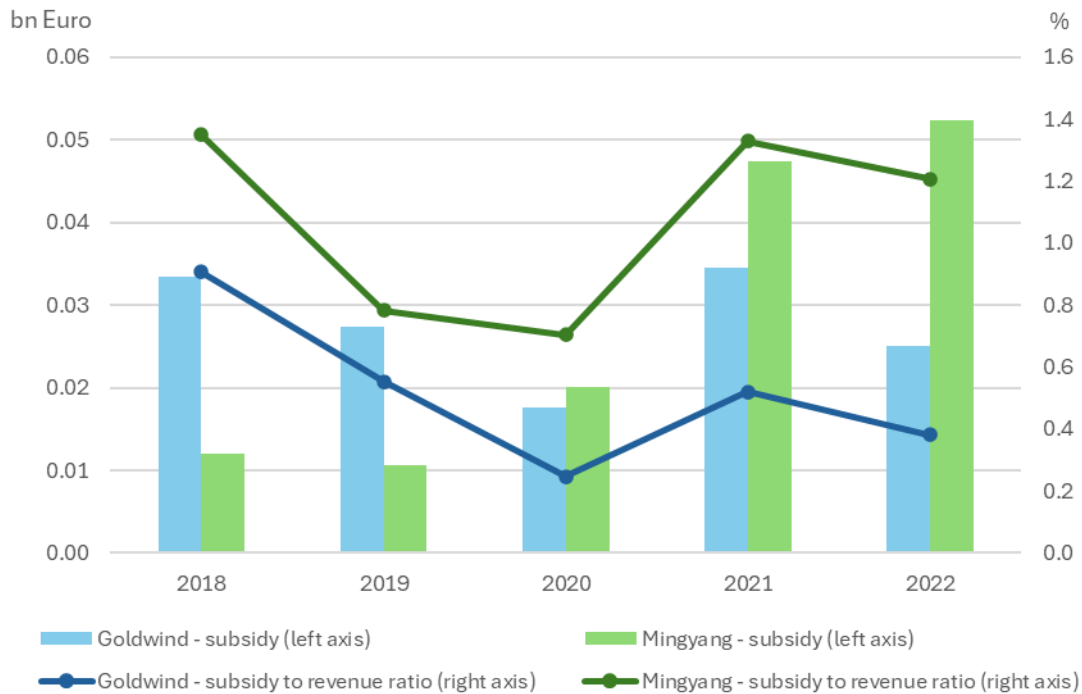
¹⁶ A main beneficiary from this was BYD, which produces both electric passenger vehicles and electric buses. "A forthcoming CSIS report estimates that public procurement of EVs between 2019 and 2021 added up to more than 100 billion RMB" (DiPippo et al., 2022: 55–56).

¹⁷ The feed-in-tariff model is replaced by a grid-parity model in which electricity generated from wind (renewables) will receive the same remuneration as electricity generated from coal-fired power plants (Global Wind Energy Council, 2023).

¹⁸ Statistical analysis by Scheifele et al. (2022) suggests that these local content requirements (LCR) have significantly increased exports of wind energy components from China. The same is true for the exports of the Spanish

of Western turbine manufacturers has fallen even further, allegedly also due to discriminatory treatment by the wind farm operators in award procedures. European wind turbine producers such as Vestas or Siemens Gamesa are still producing wind turbines in China but mostly or even only for export.¹⁹

Figure 6:
Direct Government Subsidies to Goldwind and Mingyang, 2018–2022^a



^aGovernment subsidies consist of newly added longer-term government subsidies and new government subsidies of the year disclosed in the annual reports.

Source: Goldwind annual report 2018–2022 and Mingyang annual report 2018–2022; Deutsche Bundesbank (2024); own calculations and own illustration.

While some important forms of government support for the wind turbine industry in China have thus been abolished for several years now, the central and regional governments continue to support the industry through various other instruments. Chinese governments continue to support turbine manufacturers by substantial direct subsidies, for example. For Goldwind and Mingyang, two of the largest Chinese wind turbine manufacturers, these subsidies accumulated to Euro 0.14 bn each from 2018 to 2022 (Figure 6). For Mingyang these subsidies have even increased substantially over recent years, from Euro 0.02 bn in 2020 to Euro 0.05 bn in 2022. Although these subsidies are much lower in absolute terms than the direct subsidies for

turbine manufacturer Gamesa (today Siemens Gamesa and a subsidiary of Siemens Energy), which also benefitted from LCR, but not for exports from other countries that had also introduced LCR in the wind energy sector.

¹⁹ Already in August 2021, Siemens Gamesa announced that it would continue to produce wind turbines in Tianjin, China, but only for export, e.g., to Japan (Wirtschaftswoche, 2021).

the leading NEV manufacturers (see above), they are of similar size in relation to business revenues as subsidies to the car maker GAC. In 2021 and 2022, subsidies amounted to about 1.2% to 1.3% of business revenues for Mingyang and about 0.4% to 0.5% for Goldwind.

In addition, there is a variety of indirect forms of support for the industry in China. These include preferential land and financing arrangements (below-market debt and equity injections) from central or local governments. Another important form of support for the Chinese wind turbine industry is lower prices for key inputs due to government subsidies or regulations in related industries. This includes, in particular, steel and rare earth materials but also shipping and ship-building, which are essential inputs in the offshore wind industry.

Railway Rolling Stock

The OECD has recently published a report on government support to railway rolling stock manufacturers covering a broad range of support instruments (OECD, 2023b). The study relies on a sample of 22 firms from the rolling stock industry—including two firms that do not produce rolling stock but specialize in signaling and rail control—whose combined revenue represented more than 70% of the global rolling stock market in 2020 (OECD, 2023b). There are two Chinese companies in the sample: (i) China Railway Rolling Stock Corporation (CRRC), a central state enterprise that is the world's largest train manufacturer; and China Railway Signal & Communication Corporation (CRSC), a signaling and rail control supplier and also a state enterprise.²⁰

In quantifying public support the OECD study focuses on three instruments, namely support provided by governments in the form of grants, tax concessions, and below-market finance. Several other forms of support are discussed in the study but are not quantified due to lack of data (see below).

The study found that the 22 companies combined have received about USD 5 bn over the period from 2016 to 2020 (or about USD 1 bn per year) in government grants (34%), tax concessions (54%), and below-market borrowings (12%). Looking at recipient companies the study shows that CRRC obtained as much as 72% of all absolute support, followed by Chinese signaling producer CRSC (9%), and French company Alstom (5%). Even considering differences in firm size²¹ these differences are huge. CRRC received support equivalent to 2.2% of its annual revenue, CRSC 1.6%, and Alstom 0.6%, which is similar to the levels of support obtained by competitors CAF from Spain and Hyundai Rotem from South Korea. Other companies received modest amounts of support representing 0.5% or less of their revenue (OECD, 2023b).

There are also notable differences in the type of support the companies received. This is true, in particular, for the share of support that is related to R&D and which may thus be more easily justified from an economic point of view. Whereas almost all support in the form of grants and

²⁰ Of the other 20 firms eight firms are from the EU, four from the US and eight are from seven other countries.

²¹ CRRC had a market share of nearly 25% of the global rolling stock market in 2020, compared to less than 7% of Alstom.

tax concessions²² received by most European companies²³ are R&D-related, this is true for only slightly more than 25% for CRRC; and less than a third for CRSC (OECD, 2023b).

The OECD study also discusses several other policy instruments used by governments to support the domestic rolling stock industries, for which the amount of support could not be quantified due to lack of information. For all these instruments, there is, at least anecdotal, evidence that they are applied, in particular, by China, however. These instruments include:

- the sale of intermediate inputs (such as, importantly, steel) and land to manufacturers at below-market prices;
- below-market export credits (e.g., preferred loans by public banks to support exports of rail supplies in the context of China's Belt and Road Initiative);
- discriminatory government procurement (giving preference to domestic firms in own government procurement or government support of domestic firms to win public contracts in foreign markets by submitting particularly low bids);
- local content requirements or joint venture requirements and "forced" technology transfer (as in the early stages of the development of China's high-speed rail system²⁴); and
- the selective enforcement of competition policy (in 2015, the SASAC²⁵ decided to merge the then world's two largest rolling stock manufacturers China South Rail Corporation (CSR) and China North Rail Corporation (CNR) to create CRRC as a "rolling-stock national champion" (OECD, 2023b: 29).²⁶

To sum up, the evidence presented for the three selected industries (BEV, wind turbines, and rolling stock) shows that the development of these industries in China has been pushed forward (from an early development stage) by extensive government support, including both demand-side and supply-side subsidies. In combination with other protective measures (local content requirements, joint-venture obligations, discriminatory procurement procedures etc.), these subsidies have allowed Chinese firms in these sectors to scale up rapidly and to get to dominate the Chinese home market for their products. While the Chinese central government has recently abolished some of the large demand-side subsidies in these sectors (such as purchase subsidies for BEV produced in China or preferential feed-in tariffs in wind energy), central and regional governments continue to support these industries through various other forms of direct and indirect subsidies. Direct subsidies to some of the dominant Chinese companies in these sectors, such as BYD for BEV or Mingyang for offshore wind turbines, have even been

²² Note that this does not include support in the form of below-market finance.

²³ This is true, e.g., for Alstom, Talgo or Thales. CAF from Spain and NEWAG from Poland are exceptions as they also received tax concessions/incentives related to additional investments in production facilities (OECD, 2023b).

²⁴ See OECD (2023b: Box 3).

²⁵ The State-owned Assets Supervision and Administration Commission (SASAC) of the State Council is the authority supervising central state enterprises in China.

²⁶ The European Commission, by contrast, blocked the proposed merger between Siemens and Alstom in 2019.

increased recently, helping these companies in their attempts to expand beyond China and gain a presence in EU markets.

2.3 LIMITATIONS AND QUALIFICATIONS

While Sections 2.1 and 2.2 provide important information on the size and development of Chinese subsidies in key industrial sectors, some qualifications and clarifications are appropriate. Researchers are faced with numerous difficulties in fully tracking Chinese subsidies, as the Chinese subsidy system is highly complex and intransparent and defies precise quantification. Subsidies are granted by different constituencies, from the central governmental level down to provinces and municipalities; and they are sometimes mediated by public financial institutions or SOEs.

Possible sources for quantifying direct subsidies are official government documents or the annual reports of listed companies. Official government documents tend to be rather fragmented, however: An open registry of public subsidies does not exist, and subsidies from local governments and support intermediated by SOEs are not adequately recorded (Chimits, 2023). The annual reports of publicly listed companies provide an alternative data source as these companies are obliged to report monetary and non-monetary subsidies obtained from the government. However, a large fraction of Chinese industrial firms are not publicly listed, and the annual reports only reflect direct “official subsidies” and not the various more indirect and hidden measures of support which are omnipresent in China.

Public support is provided on almost all stages of production, implying that producers may not only benefit from subsidies directly provided to them, but may also benefit from subsidies provided to their suppliers (via cheaper input supplies) or customers (via increased demand). Due to the complexity of supply chains, it can be difficult to identify the final beneficiaries of government support. Producers of BEV benefit from subsidies provided to (EV) battery producers (cheaper input components) and from government support to BEV buyers (increased demand). Producers of wind turbines benefit from subsidies provided to steel producers, because steel is an important cost driver for wind projects, accounting for about 90% of the materials used for an offshore wind turbine (Webster, 2023).

This cross-subsidization lowers the input prices of Chinese producers and gives them a competitive advantage. Moreover, Chinese producers benefit from tax breaks, below market credits and below-market equity. OECD estimates suggest that these more indirect forms of support might be several times higher than the direct “official subsidies” (see Section 2.1).

Finally, we need to be aware that there are further channels of support by the Chinese government which give Chinese firms a competitive advantage, but are even harder to quantify. These include the Chinese government's long-term safeguarding of critical raw materials, forced technology transfer, strategic use of public procurement and preferential treatment of domestic firms in administrative procedures. While the use of such policy levers is not unique to China, the comprehensiveness and intensity of their use is unparalleled (Chimits, 2023), and likely to have a substantial impact on the competitiveness of Chinese industries. This implies that the

subsidies discussed in Sections 2.1 and 2.2, however important they are, clearly underestimate the full extent of government support available to Chinese companies.

3 DISCUSSION AND POLICY RECOMMENDATIONS

The empirical evidence presented in this paper confirms concerns and allegations raised by many trading partners against China: China strongly subsidizes those manufacturing industries which rank highly on its economic policy agenda, including many green tech industries. Here industrial policies are targeted to win and defend superiority in green technology, to convert superiority into a leading position as global supplier of key manufactured products, and to become independent of foreign technology. This policy has allowed Chinese green manufacturing industries to scale up rapidly and to start dominating the Chinese home market and increasingly also foreign markets. This is true, e.g., for solar panels or batteries for EVs, where Chinese companies have dominated the EU markets for several years now. And it is increasingly true also for BEV and wind turbines where Chinese companies are only just starting to penetrate EU markets.

The very comprehensive and opaque Chinese subsidy system blurs the difference between domestic subsidies which do not distort trade and subsidies intended to help domestic companies to conquer export markets and thus are trade distortive. Two trading partners stand out, here, as the most important export markets for China, the US and the EU. Each of the two has its own agenda when it comes to dealing with China. The US has set the agenda with a plethora of legislative acts to enforce the “produce in America” strategy. The Inflation Reduction Act is the quantitatively largest one and supports the rise of local content in US non-fossil manufacturing through producer and consumer tax credits. In addition, BEV imported from China face a hefty import tariff of 27.5%.²⁷ Hence, a trade and tech war with China trying to decouple the country from state-of-the-art IT technology is envisaged by the US through, e.g. restricting high tech exports to China and screening US foreign direct investment in China on risks of losing technology superiority.

So far, the EU has no trade or tech war on its agenda. The European Commission has made clear, however, that is prepared to take stronger actions against subsidized imports from China. In line with this, it has officially launched an anti-subsidy investigation into the import of BEV from China in October 2023. And in February 2024, it had launched an investigation into Chinese rolling stock manufacturer CRRC for allegedly using subsidies to undercut European competitors in a public procurement procedure in Bulgaria, applying for the first time the EU’s newly enacted “Foreign Subsidies Regulation”. In the BEV case, the European Commission argues to have found sufficient evidence demonstrating that imports of BEV from China benefit

²⁷ This could be theoretically circumvented, should China produce in Mexico under the US-Mexico-Canada-Agreement (USMCA). Following US policymakers, such circumvention strategy should be made impossible in the future by a so-called “Closing Auto Tariffs Loopholes Act” and a “Strengthening Tariffs on Chinese Autos Act” both directly targeted against Chinese suppliers wherever they produce.

from subsidies that allow them to rapidly increase their market share in the EU thus posing an imminent threat of injury to the EU domestic industry and de-motivating domestic investment into badly needed full electrification (European Commission, 2023a). If these allegations are confirmed in the investigation, the EU could impose retroactive countervailing tariffs against BEV from China.²⁸

Pros and cons of an EU intervention

Seen from the textbook lens, there is a strong case against the introduction of such tariffs (restrictions) on subsidized imports. This is substantiated by the view that subsidies are ‘gifts of the donor’ which raise the real income of recipients of gifts (the European consumers) while strengthening their comparative advantages in other non-subsidized sectors. An increase of tariffs/import restrictions on BEV or other imports of green technology products from China would likely lead at least in the short term to higher costs for green technology products in the EU and could make the green transition of the EU economy more expensive and also slow it down. This applies even more to import restrictions on those green technology products for which the EU industry currently has too little capacity to meet the increasing domestic demand such as EV batteries or wind turbines.

Yet, the textbook lens may neglect a dynamic perspective including geopolitical externalities, path dependencies, and the issue of technology control in key industries.²⁹ Battery cell technology, for example, is not only one of the key technologies in the energy transition, but also qualifies as a general purpose technology (GPT).³⁰ Early mover advantages and spillovers into related sectors (aviation, underwater shipbuilding, medicine) could make it beneficial to push such technologies and to avoid one-sided dependencies on systemic competitors like China. From a geoeconomic perspective, import restrictions reducing the (increase in) imports from China of products vital for the green transition may, in addition, be considered a welcome contribution to reducing the EU’s reliance on China (‘de-risking’). Or it may even be considered necessary for strengthening national security given the espionage or sabotage risks which are

²⁸ The European Commission argues that the multilateral “Agreement on Subsidies and Countervailing Measures” (SCM) in the WTO is overly vague with many loopholes, in particular to an allegedly permissive treatment of Chinese SOEs. It has excluded the option of “price undertaking”, that is to impose on Chinese companies to raise the price of their cars.

²⁹ And it neglects the risk of predatory dumping, that is that Chinese companies would raise the price after having driven EU suppliers out of the market.

³⁰ According to Cantner and Vanuccini (2012), a GPT permeates different industries and influences technological change and productivity development in these industries (pervasiveness), offers wide scope for improvement over time (improvement) and leads to innovations in a variety of application sectors and technology fields (innovation spawning).

currently being put up against the imports of wind turbines or connected cars (BEV) from China especially in the US (see, e.g., The White House, 2024).^{31, 32}

On the other hand, we also need to consider that the EU has much higher stakes in the Chinese economy than the US as witnessed by the much higher share of EU investment in China and the far greater reliance on imports from China of the EU as compared to the US (Langhammer, 2022). Due to China's strong position as a production base for European firms and as a source of many critical products for the EU market, its retaliatory power against the EU is higher than against the US.³³ Hence, the costs for EU industries and consumers of import restrictions on subsidized Chinese goods could increase considerably if the Chinese government were to respond to with countermeasures such as export restrictions on inputs on which the (green tech) industries in the EU are heavily reliant, such as refined rare earths. Such export restrictions would harm the EU industry not just on the internal EU market but also with respect to its exports to China or third-country markets. And export restrictions on necessary inputs are just one of a myriad of possible countermeasures through which China could harm EU companies in the industry directly affected by EU measures or indeed any other EU companies trading with or producing in China. This is likely one reason for why German automobile manufacturers which are heavily engaged in trading, production and R&D in China are rather skeptical about the EU's investigation into BEV imports from China.³⁴

But even without considering possible Chinese retaliatory measures it is far from clear, whether and to what extent EU industry would actually benefit from restrictions on Chinese imports. Take again the case of EU import duties on BEV from China, for example. First, these tariffs would also affect imports of BEV manufactured by European (German) companies in China.³⁵

³¹ As to the de-risking and national security concerns related to connected EV's or wind turbines, the EU's anti-subsidy (trade defense) measures and the "Foreign Subsidies Regulation" are, in our view, rather inappropriate instruments as these concerns go far beyond the realm of trade policy. We will thus not discuss these issues further here.

³² Another purely EU-internal, but in our view quite relevant, political-economy argument in favor of a more stringent EU action against subsidized imports from China is that without such action, EU policy is likely to find it increasingly difficult to fend off internal EU demands (lobbying activities) for higher subsidies and the promotion of European/national champions to compete with China on equal terms.

³³ Of course, this reliance or dependence is not one-sided. In several respects, the Chinese economy is also reliant on the European or US economies, e.g., as a source of technology or a buyer of Chinese products. A recent estimate suggests that a complete decoupling between China (and her allies) and the West would actually be substantially more costly (in terms of welfare) to China than to the EU or the US (Baqaee et al., 2024).

³⁴ The interests and dependencies of individual German companies or those of a single sector (automotive manufacturing) must not be confused with those of the entire German (or European) economy, of course. For example, whereas almost a quarter of the German automobile industry's FDI was in China in 2019, the China investments of the German automobile industry made up only about 0.8% of German Gross National Expenditures (GNE). Even total German FDI in China amounts to only about 2.7% of GNE and total FDI profits reaped by German companies in China only at about 0.44% (Baqaee et al., 2024).

³⁵ EU imports of BEVs from China have so far been dominated by Western car makers. While Chinese brands are catching up, they still accounted for only slightly more than 40% of BEV imports from China in 2023. The majority of BEV imports from China was still coming from Tesla, Renaults' Dacia, BMW or other international OEMs (Transport and Environment, 2024).

Second, the (direct) effect of EU import tariffs on BEV from China would be restricted to the EU market, only. On third country markets (and in China itself) BEV produced in the EU would still have to compete against subsidized BEV from China without countervailing duties. Third, the effects of import restrictions and thus less intense competition on EU industries' incentives to invest in R&D and in cost efficient production facilities are ambiguous (from a theoretical point of view).

From a purely industrial economics point of view tariff protection or subsidies for the EU industry could be justified if subsidized imports from China would hinder the EU industry to scale up and achieve the economies of scale necessary to compete internationally. In our view, it seems likely, however, that the industry will be able to substantially increase production in the EU despite increasing Chinese imports. Given the strong increase in demand and the comparatively high transport costs for BEV (or for other heavy and large green energy products such as wind turbines) we would expect that manufacturers will expand production near consumers to reduce shipping costs, as technologies mature (Springford and Tordoir, 2023). At least in the medium term we would thus expect companies producing in Europe to have a substantial advantage in serving EU customers (the more so as import tariffs for BEV into the EU now stand at 10% even without additional countervailing duties). We would thus also expect Chinese BEV manufacturers to build up production capacities in Europe to serve the EU market (as we have already observed for Chinese producers of EV batteries).³⁶

What should the EU do?

In our view, there is a case in favor of driving forward the current EU proceeding against BEV imports from China, and to use the information obtained in this proceeding and the pending decision to enter into negotiations with the Chinese government and to try to persuade it to abolish some the Chinese support measures that are particularly harmful to the EU industry. Given the current weak macroeconomic situation in China, the focus of China's government on its political conflicts with the US and, at the same time, the relative strength of China's green product industries, we believe that there is currently a realistic chance for such negotiation to be successful.

³⁶ This assumes that Chinese or European policy does not prevent/prohibit such investments.

REFERENCES

- Baqae, David, Julian Hinz, Benjamin Moll, Moritz Schularick, Feodora A. Teti, Joschka Wanner, and Sihwan Yang (2024). What if? The Effects of a Hard Decoupling from China on the German Economy. Kiel Policy Brief 170. Kiel Institute for the World Economy, Kiel.
- Bruegel (2024). Bruegel China Economic Database. Via Internet (22 March 2024) <<https://www.bruegel.org/dataset/china-economic-database>>.
- Caixin (2023). China's Offshore Wind Sector Gears up for Life after Subsidies, 31 August 2023. Via Internet (25 March 2024) <<https://asia.nikkei.com/Spotlight/Caixin/China-s-offshore-wind-sector-gears-up-for-life-after-subsidies>>.
- Cantner, Uwe, and Simone Vannuccini (2012). A New View of General Purpose Technologies. In: Wagner, Adolf, and Ulrich Heilemann (eds.), *Empirische Makroökonomik und mehr: Festschrift zum 80. Geburtstag von Karl Heinrich Oppenländer*: 71–96. <<https://doi.org/10.1515/9783110504927-007>>.
- Chimits, François (2023). What Do We Know About Chinese Industrial Subsidies? CEPII Policy Brief, N°42, July 2023. <<http://cepii.fr/CEPII/en/publications/pb/abstract.asp?NoDoc=13835>>.
- China Briefing (2023). China Extends NEV Tax Reduction and Exemption Policy to 2027, 28 June 2023. <<https://www.china-briefing.com/news/china-extends-nev-tax-reduction-and-exemption-policy-to-2027/>>
- Deutsche Bundesbank (2024). Exchange Rate Statistics March 2024, Exchange Rate Statistics (bundesbank.de) Via Internet (01 April 2024) <<https://www.bundesbank.de/resource/blob/927760/3d95a8347dbd5b141341266d38d3dd15/mL/2024-03-15-11-36-18-wechselkursstatistik-data.pdf>>
- DiPippo, Gerard, Ilaria Mazzocco, and Scott Kenedy (2022). Red Ink: Estimating Chinese Industrial Policy Spending in Comparative Perspective, Center for Strategic & International Studies (CSIS), Washington, DC. <<https://www.csis.org/analysis/red-ink-estimating-chinese-industrial-policy-spending-comparative-perspective>>.
- Euronews (2023). EU May Probe Foreign Subsidies to Support its Wind Energy Sector, 24 October 2023. Via Internet (25 March 2024) <<https://www.euronews.com/my-europe/2023/10/24/eu-may-probe-foreign-subsidies-to-support-its-wind-energy-sector>>.
- European Commission (2023a). Notice of Initiation of an Anti-subsidy Proceeding Concerning Imports of New Battery Electric Vehicles Designed for the Transport of Persons Originating in the People's Republic of China. Official Journal of the European Union, C/2023/160. <https://eur-lex.europa.eu/legal-content/DE/TXT/?uri=OJ%3AC_202300160>.
- European Commission (2023b). Questions and Answers on the European Wind Power Package, 24 October 2023. <https://ec.europa.eu/commission/presscorner/api/files/document/print/en/qanda_23_5186/QANDA_23_5186_EN.pdf>.
- European Commission (2023c). 2023 State of the Union Address by President von der Leyen. <https://ec.europa.eu/commission/presscorner/detail/en/speech_23_4426>.
- European Commission (2024a). Press Release: Commission Opens First In-depth Investigation under the Foreign Subsidies Regulation, 16 February 2024. <https://ec.europa.eu/commission/presscorner/detail/en/IP_24_887>.
- European Commission (2024b). Statement by Commissioner Breton on withdrawal by CRRC Qingdao Sifang Locomotive Co., Ltd. from Public Procurement Following the Commission's Opening of an Investigation under the Foreign Subsidies Regulation, 26 March 2024. <https://ec.europa.eu/commission/presscorner/detail/en/STATEMENT_24_1729>.
- Financial Times (2023). EU Considers Anti-subsidy Probe into Chinese Wind Turbines. Financial Times Online, 6 October, 2023. <<https://www.ft.com/content/eb76fce3-e237-4c72-9b64-17d894e301ea>>.
- Financial Times (2024). EU Launches Anti-subsidy Probe into Chinese Train Maker, 16 February 2024. <<https://www.ft.com/content/6dbc828f-03bc-4418-bbd0-4ff194d3f830>>.
- Global Wind Energy Council (2023). Global Wind Report 2023. <<https://gwec.net/globalwindreport2023/>>.
- Langhammer, Rolf J. (2022). Reluctant US vs Ambitious German Direct Investment in China – the Tale of Two Strategies? Kiel Policy Brief 162. Kiel Institute for the World Economy, Kiel.
- Li, Aitong, Ying Sun, and Xiaobin Song (2023). Gradual Improvement and Reactive Intervention: China's Policy pathway for Developing the Wind Power Industry. *Renewable Energy* 216: 119068. <<https://doi.org/10.1016/j.renene.2023.119068>>.
- Ministry of Industry and Information Technology of China (2023). Public Announcement on the Final Review of the Clearance of Subsidies for the Promotion and Application of New Energy Vehicles in 2021 and Prior Years and

- the Advance Allocation of Subsidies for the Years 2021-2022 (关于2021及以前年度新能源汽车推广应用补助资金清算审核终审和2021—2022年度补助资金预拨情况的公示), 09 October 2023. Via Internet (05 March 2024). <https://www.miit.gov.cn/zwgk/wjgs/art/2023/art_28940a03395c4866b2606b65f077e322.html>.
- Ministry of Industry and Information Technology of China (2024). Public Announcement on the Final Review of the 2022 New Energy Vehicle Promotion and Application Subsidy Funding Clearance and the Advance Allocation of Subsidies for the years 2016-2022 (关于2022年度新能源汽车推广应用补助资金清算审核终审和2016-2022年度补助资金预拨情况的公示), 27 February 2024. Via Internet (05 March 2024). <https://www.miit.gov.cn/zwgk/wjgs/art/2024/art_aefde322192a4bd3a6b16c34e4bd3852.html>.
- National Bureau of Statistics of China (2023). China Statistical Yearbook 2023. <<https://www.stats.gov.cn/sj/ndsj/2023/indexch.htm>>.
- OECD (2019). Measuring Distortions in International Markets: The Semiconductor Value Chain, OECD Trade Policy Papers, No. 234, OECD Publishing, Paris. <<https://doi.org/10.1787/8fe4491d-en>>.
- OECD (2021). Measuring Distortions in International Markets: Below-market Finance, OECD Trade Policy Papers, No. 247, OECD Publishing, Paris. <<https://doi.org/10.1787/a1a5aa8a-en>>.
- OECD (2023a). Measuring Distortions in International Markets: The Rolling-stock Value Chain, OECD Trade Policy Papers, No. 267, OECD Publishing, Paris. <<https://doi.org/10.1787/fa0ad480-en>>.
- OECD (2023b). Government Support in Industrial Sectors. A Synthesis Report, OECD Trade Policy Papers, No. 270, OECD Publishing, Paris. <<https://www.oecd.org/publications/government-support-in-industrial-sectors-1d28d299-en.htm>>.
- Scheifele, Fabian, Moritz Bräuning and Benedict Probst (2022). The Impact of Local Content Requirements on the Development of Export Competitiveness in Solar and Wind Technologies. *Renewable and Sustainable Energy Reviews* 168: 112831. <<https://doi.org/10.1016/j.rser.2022.112831>>.
- Springford, John, and Sander Tordoir (2023). Europe Can Withstand American and Chinese Subsidies for Green Tech. Centre for European Reform: London, Brussels, Berlin. June 2023. <https://www.cer.eu/sites/default/files/pbrief_JS_ST_green_tech_9.6.23.pdf>.
- Transport & Environment (2024). To Raise or Not to Raise. How Europe Can Use Tariffs as Part of an Industrial Strategy. <https://www.transportenvironment.org/wp-content/uploads/2024/03/2024_03_TE_EV_tariffs_paper.pdf>.
- The White House (2024). Biden-Harris Administration Takes Action to Address Risks of Autos from China and Other Countries of Concern (February 29, 2024). Via Internet (27 March 2024) <<https://www.whitehouse.gov/briefing-room/statements-releases/2024/02/29/fact-sheet-biden-harris-administration-takes-action-to-address-risks-of-autos-from-china-and-other-countries-of-concern/>>.
- Webster, J. (2023). China's Wind Industrial Policy "Succeeded" – But at What Cost? Atlantic Council EnergySource Blog, 1 May 2023. <<https://www.atlanticcouncil.org/blogs/energysource/chinas-wind-industrial-policy-succeeded-but-at-what-cost/>>.
- Wirtschaftswoche (2021). Siemens Gamesa beendet China-Geschäft und plant Preiserhöhung, 27 August 2021. Via Internet (25 March 2024) <<https://www.wiwo.de/unternehmen/industrie/windtochter-von-siemens-energy-siemens-gamesa-beendet-china-geschaeft-und-plant-preiserhoe-hungen/27549856.html>>.
- Zhang, Tong, Paul J. Burke, and Qi Wang (2024). Effectiveness of Electric Vehicle Subsidies in China: A Three-Dimensional Panel Study. *Resource and Energy Economics* 76: 101424.

APPENDIX

EUROPEAN COMMISSION INVESTIGATIONS INTO CHINESE SUBSIDIES IN THE SELECTED INDUSTRIES

For each of the industries covered in Section 2.2, the European Commission has recently launched an official investigation into Chinese subsidies or has at least considered such an investigation.

Battery Electric Vehicles

On 4 October 2023, the European Commission has formally initiated an anti-subsidy proceeding under Article 10(8) of Regulation (EU) 2016/1037³⁷ “on the grounds that imports of new battery electric vehicles (BEV) for the transport of persons originating in the People’s Republic of China are being subsidised and are thereby causing injury to the Union industry” (European Commission, 2023a: 1). According to the Commission’s notice, there is sufficient evidence demonstrating that imports of BEV from China benefit from countervailable subsidies provided by the Chinese government and that those “subsidies have allowed the subsidised imports to rapidly increase their market share in the EU to the detriment of the Union industry ... [posing] ... an imminent threat of injury to an already vulnerable EU industry” (European Commission, 2023a: 1.). “The subsidy practices consist, inter alia, of (1) direct transfer of funds and potential direct transfers of funds or liabilities, (2) government revenue forgone or not collected, and (3) government provision of goods or services for less than adequate remuneration” (European Commission, 2023a: 2.). If the existence of countervailable subsidies and injury caused thereby are finally established in the investigation “and the Union interest calls for intervention ... a definitive countervailing duty shall be imposed by the Commission ...” (Art. 15 of Regulation (EU) 2016/1037). The investigation should normally be concluded within 12 months and, in any event, no later than 13 months from the date of the publication of the Notice (4 October 2023).

The imposition of countervailing duties thus requires the Commission to show (i) the existence of countervailable (specific) subsidies, (ii) an injury or imminent threat of injury to the EU industry caused by these subsidies, and (iii) a Union interest in intervention.

Wind Turbines

In October 2023, there were reports that the European Commission was considering starting an investigation into China’s subsidies for wind turbine manufacturers, similar to the investigation into BEV it had initiated shortly before (Euronews, 2023). The Commission has not done so, however, at least not yet.³⁸ Also in October 2023, the European Commission has launched

³⁷ Regulation (EU) 2016/1037 of the European Parliament and of the Council of 8 June 2016 on protection against subsidised imports from countries not members of the European Union (OJ L 176/55, 30.6.2016).

³⁸ However, already in 2020, the European Commission has imposed anti-dumping and anti-subsidy duties on imports of Glass Fibre Fabrics from China (which are used inter alia in windmill blades) ranging, taken together,

a major initiative to support the EU's own wind industry, including wind turbine manufacturers (the "European Wind Power Package").³⁹ It includes an action plan focusing on six main areas, including the acceleration of wind power employment, access to finance, and a "fair and competitive international environment".⁴⁰ Regarding this last point, the European Commission announced that it will closely monitor trade distortions and make full use of its tools to ensure a level playing field and facilitate EU manufacturer's access to foreign markets, including trade defense instruments and the international Procurement Instrument (European Commission, 2023b)

Rolling Stock

In February 2024, the European Commission had announced the launching of an investigation into Chinese train manufacturer CRRC for allegedly using subsidies to undercut European competitors in a public procurement procedure (European Commission, 2024a). This was to be the first in-depth investigation into the potentially market distortive role of foreign subsidies under the EU's new "Foreign Subsidies Regulation"⁴¹ that entered into force last year. The investigation concerned a public procurement procedure launched by the Bulgarian Ministry of Transport and Communications, relating to the provision of 20 electric trains as well as related maintenance over 15 years and staff training services. The investigation followed a notification submitted to the Commission by CRRC Qingdao Sifang Locomotive Co., Ltd., a subsidiary of Chinese state-owned train manufacturer CRRC, the world's largest train manufacturer. The estimated value of the contract is around BGN 1.2 bn (Euro 610 million).⁴²

If the Commission had found that the CRRC benefited (within the last three years) from distortive foreign (Chinese) subsidies, i.e., subsidies that enable CRRC to "submit a tender that is unduly advantageous" the Commission could have required CRRC to make commitments that remedy the distortion in the internal market or it could have prohibited the award of the contract to CRRC (Article 31 or Regulation EU) 2022/2560).

On 26 March 2024, the European Commission has announced, however, that CRRC Qingdao Sifang Locomotive Co., Ltd had withdrawn from the tender organized by the Bulgarian Ministry, and that the European Commission will therefore close its in-depth investigation (European Commission, 2024b).

between 54.6% and 99.7% (Implementing regulation - 2020/776 - EN - EUR-Lex (europa.eu)). And in December 2021, it has imposed anti-dumping duties ranging from 7.2% to 19.2% on imports of steel wind towers from China (Implementing regulation - 2021/2239 - EN - EUR-Lex (europa.eu)).

³⁹ For the EU Wind Power Package see https://energy.ec.europa.eu/topics/renewable-energy/eu-wind-energy_en#eu-wind-power-package.

⁴⁰ The other three focus areas are improved auction designs for wind farms, skills, and industry engagement and Member States commitments.

⁴¹ Regulation (EU) 2022/2560 of the European Parliament and of the Council of 14 December 2022 on foreign subsidies distorting the internal market.

⁴² According to the Financial Times (2024) the bid of the Chinese company "was 46.7% below the cost estimated by the Bulgarian railways and 47.5% below the price offered by the nearest competitor".

IMPRESSUM

DR. KLAUS SCHRADER

Head of Area Special Topics
Leiter Bereich Schwerpunktanalysen

> klaus.schrader@ifw-kiel.de

Publisher:

Kiel Institute for the World Economy – Leibniz Center for Research on Global Economic Challenges
Kiellinie 66, 24105 Kiel, Germany
Phone +49 (431) 8814-1
Email info@ifw-kiel.de

Head of Editorial Team:

Dr. Klaus Schrader

Editorial Team:

Michaela Rank, Korinna Werner-Schwarz

The Kiel Institute for the World Economy – Leibniz Center for Research on Global Economic Challenges is an independent foundation under the public law of the German federal state of Schleswig-Holstein

Value Added Tax Id.-Number:

DE 251899169

Board of Directors:

Prof. Dr. Moritz Schularick, President, Executive Scientific Director
Birgit Austen, Executive Administrative Director

Photo:

Cover Picture: ©Adobe Stock | B. Panudda

Responsible Supervisory Authority:

Ministry of General Education and Vocational Training, Science, Research and Culture, Schleswig-Holstein



© 2024 Kiel Institute for the World Economy.
All rights reserved.

<https://www.ifw-kiel.de/de/publikationen/kiel-policy-brief/>