Driving the Green Transition

Green Industrial Policy as a Vehicle of Geoeconomic Strategy

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Abstract

This thesis investigates how green industrial policy strategies in the electric vehicle (EV) sector across Germany and China are shaped by domestic macroeconomic and political dynamics, and geoeconomic and -political tensions. Within a global environment of resurgent interest in industrial policy, driven by the dual developments of the green transition and intensifying global political and economic competition, the EV sector has emerged as a focal point which connects climate goals, economic transformations, and strategic autonomy. The paper utilizes a novel multi-level analytical framework that integrates insights from three distinct but complementary bodies of literature: Green Industrial Policy, the Growth Model Perspective, and Economic Statecraft. These insights are synthesized and mobilized to capture the interplay between policy instruments, national growth models and social blocs, and global power competition. Methodologically, the thesis employs a comparative, qualitative case study of the cases, Germany and China. The cases represent two globally significant industrial powers in terms of the global car sector. The research is based on qualitative document analysis, based on policy documents and supplemented by reports and academic literature, and triangulated with relevant quantitative indicators. The analysis unfolds across three levels: at the policy level, the paper analyses and compares the instruments, strategies, and institutional configurations of green industrial strategies in both countries. At the state level, we analyze how these industrial policy strategies are shaped and constrained by the underlying political economic structures, like the growth models and social blocs. At the global level, we explore how green industrial policies are weaponized as forms of economic statecraft, which enables states to secure industrial sovereignty and technological leadership in a volatile global order. The paper's findings reveal significant variation across the cases. As China's approach is long-term, vertically integrated and transformative, China's strategy intends to reposition itself at the global frontier of green technology. Contrastingly, Germany's approach is cautious, market-conforming and defensive, as Germany emphasizes shielding its incumbent industries within a fiscally constrained policy space. Crucially, this paper finds that industrial policy has re-emerged, not just as a simple tool of economic policy, but as a vital strategic instrument of states to manage climate change, technological disruptions, and global tensions. Moreover, the thesis argues that green industrial policy cannot be fully understood apart from the broader macroeconomic logics and ideological trajectories that shape state capacity and policy choices. Finally, the paper contributes to the contemporary debates on the role of the state in the green transition, through transformative industrial policy. The paper also contributes with its theoretical synthesis, which it bases its analytical framework on, as well as the unique and previously unexplored analytical findings of the paper. It also calls for further research into how different political economies reconcile decarbonization with strategic autonomy, especially under conditions of international rivalry and economic transformation.

List of abbreviations and acronyms

BReg	Bundesregierung
BRI	Belt and Road Initiative
CCP	Chinese Communist Party
CDU	Christian Democratic Union
CIM	Charging Infrastructure Masterplan
CPE	Comparative Political Economy
CRMA	Critical Raw Materials Act
CSU	Christian Social Union
EC	European Commission
ECA	European Chips Act
EV	Electric Vehicle
FDI	Foreign Direct Investment
FYP	Five-Year-Plan
GDIP	Green Deal Industrial Plan
GMP	Growth Model Perspective
GDP	Gross Domestic Product
IEA	International Energy Agency
ICCT	International Council of Clean Transportation
ICE	Internal Combustion Engine
ICT	Information and Communications Technology
IPE	International Political Economy
IRA	Inflation Reduction Act
ITA	International Trade Administration
WTO	World Trade Organization
MiC	Made-in-China (2025)
MIIT	Ministry of Industry and Information Technology
MOST	Ministry of Science and Technology
NEV	New Energy Vehicle
NZIA	Net Zero Industry Act
OEC	Observatory of Economic Complexity
PHEV	Plug-in Hybrid Electric Vehicles
PKE	Post-Keynesian Economics
PRC	People's Republic of China
R&D	Research and Development
RMB	Renminbi
SEZ	Special Economic Zone
SOE	State-Owned Enterprise
SPD	Social Democratic Party
VoC	Varieties of Capitalism

1. Introduction

The global green transition along with geopolitical and -economic tensions and developments have brought the issue of industrial policy to the forefront of economic governance, after being rendered irrelevant for decades. Industrial policy was considered outdated or incompatible with modern ideas of the liberal market, but now it is a critical policy area used to manage technological competition and navigate international political and economic tensions (McNamara, 2024; Allan et al., 2021). This is especially the case within the green transition, where green industrial technology has become critical for countries' domestic and international strategies (Thurbon et al. (2024). Within green industrial technology, the electric vehicle (EV) sector is one of the most important as it combines decarbonization objectives, national competitiveness, and strategic autonomy converge. This thesis will investigate how green industrial policy towards the EV sector, and its related fields, is shaped by both domestic political economic dynamics and global strategic pressures, focusing on the cases of Germany and China. Upon this background we pose the central research question of this thesis: *How do domestic political economies and geoeconomic tensions shape the green industrial strategies on EVs in Germany and China?*

To answer the research question, this thesis applies a multi-level analytical framework of our own construction, which theoretically synthesizes a domestic and international perspective. The analytical framework integrates insights from prominent literature on Green Industrial Policy, the Growth Model Perspective (GMP), and Economic Statecraft (Rodrik, 2014; Juhász et al. 2024; Allan et al., 2021; Baccaro and Pontusson, 2016; 2019; 2022; Weiss and Thurbon, 2021; Thurbon and Weiss, 2021; Weiss, 2021). The combination of theories provides a lens to analyze policy tools and strategies, and gain a deeper understanding of those insights through their embedding in national growth models and social blocs, as well as the way those industrial policy strategies and tools are used as a strategic tool in the global political economy. Through the analytical framework, the empirical analysis is structured around three levels: the policy level, which examines the design and scope of industrial strategies and policy tools towards the EV sector; the state level, which situates these policies within the context of distinct national political and economic dynamics; and lastly the global level, which explores how these strategies reflect broader geoeconomic and -political logics of competition, technological superiority and interdependence. The broader implications of these analytical findings are then explored in the discussion section.

Methodologically, the thesis is constructed as a qualitative, comparative case study of Germany and China. The cases represent structurally different and globally highly significant industrial economies. Our study draws on a wide range of official policy documents, strategic plans, academic literature, and supplementary data, which is analyzed through a critical realist lens. This approach enables our study to identify underlying mechanisms across policy design, institutional configurations, and global positioning, rather than relying on surface-level correlations. Finally, our thesis aims to contribute to the ongoing debate and understanding of the role of the state through industrial policy in the green transition. Through our demonstration of how industrial policy no longer just serves as a domestic economic tool, but rather as an increasingly significant vehicle for countries to navigate the overlapping political and economic challenges of decarbonization, industrial transformation, technological disruptions and global strategic rivalries.

2. Literature review

2.1 Geopolitics and industrial policy

Arguing against traditional views of industrial policy interventions which primarily associate it with centralized states, showing that modern growth strategies are increasingly shaped by the sector-specific challenges faced by policymakers, Allan and Nahm (2025) examine the resurgence of industrial policymaking, particularly in the context of emerging low-carbon industries. This shift has led to a mix of state-led and firm-driven approaches, with significant implications for global economic governance (Allan and Nahm, 2025). They propose a theoretical framework that identifies the key dimensions of industrial policy strategies: the orientation of policy (targeted or open-ended) and the primary agents driving decision-making (government or firms). They suggest that the choice of strategy is influenced by the level of uncertainty and the domestic industry's position in global supply chains (Allan and Nahm, 2025). They explore case studies from China, the EU, and other countries to show how different strategies are used for supporting the development of green industries. These cases show how countries utilize a combination of targeted and open-ended measures, depending on the specific challenges of industrial development they face, as well as the level of technological uncertainty (Allan and Nahm, 2025). This research provides useful insights on how modern industrial policy is created in order to navigate the complexities of the interplay between national capabilities and global market dynamics, especially in the rapidly evolving sector of green technologies. By moving beyond traditional classifications of economic policy, their article contributes to a deeper understanding of the strategic use of industrial policy in fostering competitive advantages in new global industries.

Continuing the study of geopolitics' influence on the state's new role in capitalism, Alami et al. (2021) explore the increasing influence of state-backed entities, such as state-owned enterprises and sovereign wealth funds, in global economic activities. This increasing influence is a sign of a move toward a 'new state capitalist normal', according to the authors, which is redefining the power dynamics between states and corporations across the global economy and is associated with rising geopolitical tensions (Alami et al. 2021). This 'new state capitalism' is characterized by an integration of state-controlled capital into global production and finance networks, significantly influencing global economic governance. These developments are part of a broader 'geo-economic' world order, marked by the securitization of economic policy and a resurgence of economic nationalism, evident in areas like trade and technology policy. The shift in the US-China economic relationship underlines these changes, where economic tools are increasingly weaponized for geopolitical purposes. This also challenges the traditional view of state capitalist interventions merely as economic tools for domestic development. Instead, contemporary state capitalism has profound geopolitical implications that extend beyond simple narratives of state versus market or liberal versus illiberal paradigms. By examining the notion of state capitalism, these findings invite a rethinking of how global economic and political power is organized and contested in the 21st century (Alami et al. 2021).

2.2 State capacity and policy

On the topic of state capacity and public policy, Meckling and Nahm (2019) explore the strategic use of technology phaseout announcements in the auto industry. These announcements function as political signals, not only policy measures, aimed at fostering market coordination and reducing uncertainty about the shift from internal combustion engines to EVs. These clustered announcements across various jurisdictions are primarily political, intended to shape industry expectations and accelerate the transition to EVs. This signaling helps align global market actors with new technological standards, influencing industry standards and competitive dynamics (Meckling and Nahm, 2019). Countries differ in their use

of phaseout announcements to position themselves in the global auto market; for instance, China uses these announcements for industrial upgrading to enhance its competitive stance in the EV market, while countries like France focus on industrial renewal to maintain competitiveness in their established auto industries (Meckling and Nahm, 2019).

Continuing the research on state capacity, the concept of strategic state capacity is used to explain how governments implement climate policies despite opposition from powerful interest groups is introduced. Traditional views of state capacity, which focus on bureaucratic capabilities, are insufficient to understand variations in policy implementation. Instead, strategic state capacity, which involves actively managing relationships with interest groups, is crucial for overcoming opposition and achieving policy goals (Meckling and Nahm, 2021). Meckling and Nahm (2021) identify four strategies that states use to counteract opposition: recruiting allies, limiting access, aligning interests, and quieting interests. Each strategy involves different tactics such as granting selective access to allies, delegating policymaking to insulated bureaucracies, changing interest group preferences through signaling and policy feedback, or compensating opposition groups to reduce their resistance. These strategies demonstrate the state's role not just as a regulator but as an active participant in shaping the political landscape to favor certain policy outcomes (Meckling and Nahm, 2021). These strategies are embodied in case studies from climate policy initiatives in the US, California, France, and Germany, showing how they are employed in various political and institutional contexts. This provides a nuanced understanding of how strategic actions by states can facilitate significant policy shifts in areas like climate change, where there is often substantial resistance from well-organized and powerful interest groups (Meckling and Nahm, 2021).

The division of labor between bureaucracies and legislatures in the policy formulation process significantly impacts the ability of states to enact and achieve climate policy goals. Where bureaucracies are empowered to design policy, referred to as bureaucratic policy design, state capacity is enhanced due to their insulation from interest group pressures, which often leads to more effective and cohesive policy outcomes (Meckling and Nahm, 2018a). To make this claim, climate policy progress in California and Germany is compared, highlighting that California's success in meeting its emissions targets is largely due to its model of bureaucratic policy design. In California, the legislature sets broad policy goals while delegating the detailed policy design to specialized agencies like the California Air Resources Board. This approach minimizes legislative capture by interest groups, allowing the board to develop comprehensive strategies across various sectors without undue influence from industry lobbies (Meckling and Nahm, 2018a). On the contrary, Germany's legislative policy design, where the legislature is heavily involved in crafting specific policy measures, has left its climate policy susceptible to capture by industrial interests, particularly in the transport sector. This has blocked Germany from achieving its emissions reduction goals, as the industry opposition has successfully blocked or weakened key measures. This analysis highlights the importance of procedural sources of state capacity in environmental policy, suggesting that shifting the analytical focus from policy implementation to formulation is crucial for understanding variations in policy success among advanced industrialized countries (Meckling and Nahm, 2018a).

The traditional view that bureaucratic autonomy is the primary driver of technological change in mature industries, is being challenged by the patterns of interest intermediation between states and industries that crucially shape state capacity (Meckling and Nahm, 2018b). Meckling and Nahm differentiate between political coordination and political competition as key patterns of state-business relations. Political coordination often results in prioritizing incumbent firms' interests, leading to regulatory capture and weaker interventions. This approach tends to maintain existing technological

standards and can inhibit innovation. In contrast, political competition allows policymakers to forge coalitions with technology challengers, leading to stronger, more transformative policy interventions (Meckling and Nahm, 2018b). Germany's close ties between government and industry led to cautious and limited EV policy intervention, which mainly focused on research and development. On the contrary, the US saw less coordinated and more competitive relations between business and government, which enabled substantial government interventions, such as significant subsidies for EV development and strict emissions regulations, despite traditional automotive industry opposition. This analysis underscores how different state-business relationships can either hinder or facilitate technological innovation and industry transformation, particularly in sectors crucial for environmental sustainability (Meckling and Nahm, 2018b).

2.3 Chinese industrial policy

García-Herrero and Schindowski (2024) analyze how China conducts industrial policy and what implications it has for Europe. One important feature of China's industrial policy is the application of a framework of strategic goals to foster a level playing field between the state economy and the private economy regarding access to financing. China's use of industrial policy has been extensive, leading to success in a variety of sectors, however not all. Despite the vast resources China has employed, García-Herrero and Schindowski (2024) argue it noteworthy that success is not even more pronounced. According to the paper, reasons for this include cronyism and regional protectionism, which have led to inefficiencies in state resource allocation. An important lesson for the EU to take from China is the way in which it aligns economic security with industrial policy, focusing on strategic sectors with long-term planning, which the EU is only starting to incorporate (García-Herrero and Schindowski, 2024). An important objective of Chinese industrial policy has been to upgrade its domestic industrial base, particularly in the context of two major developments: a decelerating economy and strategic competition with the US. Having faced a slowed growth during more than a decade, the Chinese government considers innovation the key solution to maintain economic momentum. Beyond fostering technological leadership, China also aims to eliminate technological chokepoints held by the US. The emphasis on technological self-sufficiency in strategic industries is deeply rooted in China's history, as every leader since the CCP reunified the country in 1949 has prioritized technological independence. This is further strengthened by the government of Xi Jinping, which reinforces the 'never again' mentality, which refers to the determination to prevent a repeat of the 'century of humiliation' (García-Herrero and Schindowski, 2024).

Since 2006, China has launched several major industrial policy initiatives, such as Made in China (MiC) 2025 and the 10,000 Little Giants program, which focus on upgrading domestic high-tech industries. These efforts have been enabled by China's ability to bypass WTO rules, as the WTO's enforcement mechanisms have proven largely ineffective in curbing China's industrial strategies. WTO member states frequently fail to enforce subsidy notification deadlines, and litigation cases can drag on for years, allowing China to continue policies that require foreign firms to transfer technology in exchange for Chinese market access. This, combined with China's surge in domestic value-added exports, has helped the country move ahead in technological capacity, though the authors note that a closer sectoral analysis is necessary to fully understand the impact of the industrial policy (García-Herrero and Schindowski, 2024).

The EV sector is a prime example of China's industrial policy success. By 2022, China accounted for 30% of global EV exports and nearly 80% of global EV battery exports, having rapidly scaled up its industry with strong government backing and massive R&D investment (García-Herrero

and Schindowski, 2024). Chinese manufacturers were able to leapfrog foreign competitors, largely because the EV and battery sector is still a relatively new industry with few dominant incumbents. However, China's industrial policy results have arguably been mixed. While market share and patent numbers indicate progress, China has struggled to achieve true technological breakthroughs in some sectors, such as semiconductors and aerospace engineering, where US and European firms still lead at the technological frontier. In some industries, the political incentives behind industrial policy distort economic efficiency, as local government subsidies often avoid internalizing the objective of the government to prioritize real productivity gains (García-Herrero and Schindowski, 2024). China's industrial policy aims to create globally competitive national champions, but success depends on the openness of foreign markets. The authors compare China's strategy to the 'picking winners' approach used by Taiwan and South Korea in the 1970s, which helped local firms grow into global competitors. However, China differs in two key ways. Firstly, it operates outside the US alliance network, and secondly, its sheer economic size allows it to create not just national champions, but global champions. This has triggered geopolitical concerns, with major global exporters like Germany and South Korea viewing China's industrial rise as an economic threat (García Herrero and Schindowski, 2024).

2.4 European industrial policy

For the EU, the question is what lessons can be drawn from China's industrial policy. While the strong institutional framework of the EU makes it less vulnerable to government-business collusion, its lack of market integration remains a weakness. Furthermore, China's industrial policy has sparked geopolitical backlash, raising concerns that if the EU engages in large-scale subsidies, it could undermine its commitment to multilateral trade rules and face retaliation from key partners. According to the authors, China's industrial policy, thus, presents both an opportunity and a challenge for the EU. (García-Herrero and Schindowski, 2024).

Regarding European industrial policy, McNamara (2024) argues that the EU is going through a fundamental shift away from traditional neoliberal market-making towards a more interventionist industrial and geopolitical strategy. This shift demonstrates the EU's increasing willingness to utilize the state and public sector to shape markets for strategically important sectors like green energy, digital technologies and critical raw materials. This breaks with the previous policy legacy of the EU around market neutrality and competition, as the new industrial strategies acknowledge political choice and distributional outcomes explicitly. The drivers of this significant policy shift are geopolitical pressures, the green and digital transitions, and major crises, like pandemics and wars, which have led the EU to adjust their policy tools and rules regarding industrial policies (McNamara, 2024). McNamara asserts that this reconfiguration marks a significant transformation of EU political authority and puts forth a new trajectory for European integration. She outlines four areas of profound change: the emergence of new political coalitions; the politicization of EU institutions; the challenges to democratic legitimacy; and the EU's growing role as a geopolitical actor. Here, the frontier of research lies in assessing if this activist shift can be sustained within the EU's current political and economic framework, as it lacks traditional state capacities like electoral accountability or robust fiscal power (McNamara, 2024). McNamara's work then encourages scholars to rethink European integration as a contested, state-building project driven by strategic economic governance.

Following this examination of the EU's policy shift, Di Carlo and Schmitz (2023) trace the EC's transformation from a regulatory agent of market-enhancing integration into an active shaper of industrial policy. Through the framework of developmental network states, Di Carlo and Schmitz posit that the EC has expanded its role since the 2010s and especially since a Franco-German realignment.

The EC has expanded its role across four developmental functions: targeted resourcing; brokering innovation; regulatory facilitation; and protection from foreign competition. This new role of the EC breaks with the EU's traditional industrial strategies which focus on horizontal and non-interventionist policy, as the EC now lean towards vertical, mission-oriented policies (Di Carlo and Schmitz, 2023). The core finding of the article is that the timing and variation in EU industrial policy integration can best be explained through a neofunctionalist lens, incorporating functional, cultivated, and political spillovers (Di Carlo and Schmitz, 2023). The article calls for further research into whether these new tools of development the EC has adopted are truly transformational, or just a reactive, incomplete adaptation to growing global competition.

3. Theory

To conduct its comparative analysis of green industrial strategy on EVs in the EU and China, this paper applies a multilayered analytical approach, which comprises three levels of analysis: the global, the state, and the policy level. The framework considers policies nested within state characteristics, which, in turn, are influenced by the dynamics of the global political economy. The theoretical foundation integrates key concepts from prominent literature on Green Industrial Policy (Rodrik, 2014; Juhász et al. 2024; Allan et al., 2021), the Growth Model Perspective (Baccaro and Pontusson, 2016; 2019; 2022), and Economic Statecraft (Weiss and Thurbon, 2021; Thurbon and Weiss, 2021; Weiss, 2021).

3.1 Green Industrial Policy

The concept of green industrial policy is understood by this paper as *"[...] intentional efforts to build specific industries in the green economy [...]"* (Allan et al., 2021: 2). Green industrial policy has important impacts on domestic as well as international political economy through fostering technological change, which affects costs and benefits constellations and influences industrial balance of power (Allan et al. 2021). Unlike traditional environmental regulation, which seeks to mitigate pollution through market-based mechanisms or prohibitions, green industrial policy is inherently transformative. It seeks to build new markets, develop green technologies, and restructure production in ways that both enable decarbonization and promote national economic competitiveness. Meanwhile, the pace of technological change is not only determined by cost, with other key influencing factors including political interests, state power, and elite investment patterns (Allan et al., 2021).

Rodrik (2014) argues that the theoretical justification for green industrial policy is particularly robust, due to the presence of environmental externalities, innovation spillovers, and strategic industrial development imperatives. At the policy level, green industrial policy can be considered instrumental in fostering investments into advanced technologies, including electric vehicles (EVs) and renewable energy, as well as greener manufacturing processes, and supporting infrastructure. He outlines three primary sets of market failures that call for industrial policy initiatives in the green transition: 1) knowledge externalities from innovation that firms cannot fully capture; 2) mispricing of carbon and other environmental externalities; and 3) strategic concerns over global industrial leadership, including first-mover advantages and international rent-shifting. These failures create gaps between private and social return on investment, rendering state support essential for green innovation to occur in the scope that is needed (Rodrik, 2014). The incentives for national governments to pursue green industrial policy are not always aligned with global environmental needs. While global climate mitigation represents a classic public good, the costs and benefits of investing in green technologies are often realized nationally. As Rodrik (2014) notes, this dynamic encourages states to adopt green industrial policy not solely for environmental reasons, but as part of strategic economic efforts to strengthen competitiveness of firms and sectors in the emerging green economy (Rodrik, 2014). Building on this discussion, Allan

et al. (2021) argue that climate action is no longer conceptualized as an economic cost mitigated by carbon pricing, but rather as a strategic means to create jobs, industries, export revenue, and economic growth (Allan et al., 2021).

Thus, green industrial policy becomes embedded within broader geoeconomic logics of competition, technological sovereignty, and export-led development. This strategic dimension is discussed in recent scholarship by Juhász, Lane, and Rodrik (2024), who highlight how modern industrial policy is both a response to and an instrument of macroeconomic and geopolitical transformation. They classify the theoretical rationale for industrial policy into three categories: 1) externalities (e.g., knowledge spillovers and environmental benefits), 2) coordination failures (e.g., complementary investments in supply chains and infrastructure), and 3) public goods provision (e.g. energy systems, education, and R&D). Each of these rationales is salient in the green transition, where emerging technologies like batteries, hydrogen, and renewables require the mobilization of large-scale public and private investments. Moreover, they stress that the political economy of industrial policy is central to its design and implementation, with electoral coalitions, state capacity, and interest group mobilization shaping policy choices. The authors caution that industrial policy is a deeply political process. Echoing concerns from the broader literature on developmental states, they argue that green industrial policy is subject to time inconsistency problems, rent-seeking, and institutional fragilities. Therefore, success in green industrial policy depends not only on economic rationale, but also on the design of governance frameworks promoting transparency, accountability, and strategic flexibility (Juhász, Lane, and Rodrik, 2024). Similarly, Rodrik (2014) proposes institutional mechanisms to overcome these risks, centered around three key principles: 1) embeddedness (active dialogue between state and firms), 2) discipline (clear benchmarks and sunset clauses), and 3) accountability (transparent decision-making and public oversight) (Rodrik, 2014).

Meanwhile, green industrial policy alludes to broader global dynamics, suggesting important linkages between the domestic, policy-level dimension and the international political economy. Allan et al. (2021) argue that green industrial policies aim toward shaping states' positioning in global value chains and power relations, representing a geopolitical scope. They emphasize the growing importance of geopolitical competition in climate politics, noting a *"[...] folding together of state power, technological change, and geopolitical competition [...]"* (Allan et al., 2021: 9). Within the international context of competitive interdependence, states pursue growth and autonomy through the bolstering of domestic industries. This interaction proves essential to analyzing the politics of green industrial policy, as it alludes to the interplay between state action, domestic technology politics, and geopolitical dynamics. Accordingly, green industrial policy plays an important role when analyzing global politics (Allan et al., 2021). This nuanced understanding of green industrial policy as both a corrective mechanism for market failures and a strategic tool for economic interventions enables a richer analysis of how Germany and China approach industrial transformation in the broader context of geostrategic positioning and technological supremacy. Following the outlined theoretical foundation, green industrial policy is not merely about reducing emissions but about building green growth coalitions, pursuing technological primacy, and responding strategically to geoeconomic rivalries in the global political economy.

3.2 The Growth Model Perspective

The Growth Model Perspective (GMP) provides a comprehensive analysis that extends beyond traditional Comparative Political Economy (CPE) by prioritizing an understanding of how different economies leverage exports and domestic consumption to fuel their economic growth. This perspective highlights the significant interaction between these elements and their varying importance across national economies. A key aspect in this framework is the notion of distributive conflict, which suggests

that different growth models, export-led or consumption-led, have distinct implications for income distribution and social conflict. This in turn influences labor markets and the broader economy. In its analysis, the GMP considers the dynamic relations among different drivers of aggregate demand. Changes in one component often influence others, creating a complex interplay that affects overall economic stability and growth. This dynamic perspective enables a deeper understanding of how economies adapt and respond to both external and internal pressures, including shifts in the global economy and changes in domestic institutional arrangements (Baccaro et al.,2022).

Unlike other theories of CPE that emphasize uniform economic structures or responses, GMP underscores the diversity and variability of growth models among different countries. This diversity is not only evident in the varying strategic reliance on exports, consumption or other growth drivers but also in how these growth models evolve over time in response to changing economic conditions. GMP integrates these macroeconomic dynamics into its analysis, arguing that traditional CPE has overly focused on supply-side institutions while neglecting significant demand-side factors that drive economic growth (Baccaro et al., 2022). Furthermore, GMP considers the historical development of economic systems, acknowledging that past economic and social policies, institutional arrangements, and international conditions have significantly shaped current economic trajectories. This historical and institutional context is critical in understanding the options available to policymakers today. By incorporating these elements, GMP provides a richer, more nuanced view of economic growth and development that captures the complexities of modern economies. In the literature on growth models and similarly alternative approaches to CPE, terms like growth models, growth drivers, countries' business models, growth regimes are used to describe similar but slightly different phenomena (Baccaro et al., 2022). Therefore, it is important for our analysis to clearly define what we see as a growth model.

Based on the foundational work by Baccaro and Pontusson (2016; 2019; 2022), as well as further elaborations by Stockhammer and Onaran (2022), a growth model within the GMP is a coherent and relatively stable configuration of economic institutions, policies, and distributional arrangements that collectively sustain a particular set of growth drivers. Those growth drivers are sources of demand in the economy such as consumption, exports, government spending and investment, and FDI. Growth models are not only the sum of policy outputs or economic performance indicators in the GMP, growth models represent the outcome of social, institutional, and political choices that channel growth through specific macroeconomic components. A growth model then implies a dominant growth strategy led by one of the demand drivers of growth, which is actively maintained by a constellation of policies which are meant to support and strengthen the model. The growth model is upheld by underlying coalitions of interest groups, the social blocs, which derive material and political benefits from the prevailing growth model. A key insight of both the GMP literature and PKE is that growth is led by demand in the economy, which means that long-term economic development is then fundamentally shaped by the conditions of that demand. PKE theory adds that demand not only drives the short-run output, but it also influences long-term productivity and supply conditions via mechanisms such as induced technological change and path dependence. Therefore, a growth model also includes assumptions about the macroeconomic feedback effects of demand on the supply side, in contrast to mainstream theories that emphasize a return to supply-side equilibrium (Stockhammer and Onaran, 2022).

Social blocs are critical in shaping and sustaining growth models within the national economies of countries. Social blocs are composed of aligned constituents and interest groups, which together build the foundation for a national economy's growth model. The social bloc builds and maintains the support base for the growth model of a nation. The dominant social bloc then successfully transmits its sectoral interests into 'national economic interests'. Within such a social bloc, the larger business interests of the leading export businesses would typically be the dominant actor within the bloc. This growth model centered on export-led growth is then typically backed by such a coalition, actively advocating for, and sustaining, policies designed to enhance export capacities. This cohesive effort among diverse groups

helps maintain the strategic direction and expansion of export activities (Baccaro and Pontusson, 2019). This also ingrains this specific economic structure of the political economy and can build inertia which can make it hard to restructure the economy away from that growth model due to the dominant social bloc (Bohle and Regan, 2021).

Social blocs can function through 'quiet politics', where interest groups are able to significantly influence public policy. Quiet politics refers to how important political decisions and policy-making can occur 'behind the scenes' with business and corporate elites having a significant influence in the process (Culpepper, 2010; Ibsen et al., 2021). Culpepper (2010) posits that business elites are able to exert significant influence in low-salience political issues, which issues of the economy, corporate governance and industry usually are. Similarly to Bohle and Regan (2021) and Baccaro and Pontusson (2019; 2022), we incorporate the concept of quiet politics into the GMP framework to help explain the mechanism in which social blocs are able to negotiate with the state and policymakers for industrial policy supportive of the social bloc's key interests, which then underpin the growth model. (Baccaro and Pontusson, 2019, 2022; Bohle and Regan, 2021). Social blocs for GMP is rooted in a Gramscian analysis of political economy, where a Gramscian analysis contributes with an understanding of how a powerful group of elites within a society builds consent for a political and economic structure, which maintains and entrenches the elites' hegemony in society. Baccaro and Pontusson's work is based on this understanding of social blocs, regarding a fight over distributional outcomes and an understanding of power-dynamics between producers and labour (Baccaro and Pontusson, 2016; 2019; 2022). However, a successful dominant social bloc in the GMP is cross-sectional in the sense that to derive its support from a base that does not just include a small section of the economically privileged in society (May et al., 2024).

According to Baccaro and Pontusson, the social bloc becomes hegemonic when it includes a larger part of society into the group and offers them benefits, they otherwise would miss out on (Baccaro and Pontusson, 2019; May et al., 2024). This understanding of state-society relations and building consent for a growth model set forth by the economic elite of society follows a Gramscian tradition. In Gramscian analysis of political economy, this relationship between the state and society is crucial because the (civil) society is instrumental in shaping economic conditions beyond the formal mechanisms of the state apparatus. Hence, from a Gramscian perspective, if one is to fully understand a growth model, it is imperative to understand the politics that lie behind it. Similarly, with a Gramscian perspective, one can dismiss the notion that political interests are a simple derivation of economic conditions, yet one would also avoid claiming that the political is entirely independent from the economic arena. Rooted in Gramsci's theory of cultural hegemony, the state, and civil society, one can understand the social bloc as an alliance based on collaborative dynamic between the state and civil society. Baccaro and Pontusson's use of the term social bloc addresses a similar issue of understanding the economic structure through the political structure. All this raises the issue that growth models need to be understood through the lens of politics, which is what a solid concept of social blocs allows for (May et al., 2024).

A flaw of most CPE literature is its focus on OECD-countries and a theoretical scope that only seriously concerns itself with liberal democracies. Theories with such limitations obviously makes it difficult to analyse and contrast political economies of countries that follow a different approach than liberal democratic capitalist one. The GMP framework deals with this and offers a more holistic theory to look beyond liberal democratic OECD-countries. However, social blocs, as developed by Baccaro and Pontusson, only have a seriously developed framework for understanding a social bloc of a liberal democratic society. GMP literature has so far largely overlooked Gramsci's differentiation of state-society complexes, treating his Western-centric concepts as universally applicable. This is significant, since these complexes are crucial to the stabilization and hegemony of growth models and the social blocs behind them. Gramsci emphasizes that societal and state structures are deeply intertwined with

specific types of conflicts and competitions, which underscore the necessity to consider political differences across political systems when using GMP (Fontana, 2010). Although potentially oversimplified, such a Gramscian framework is vital for understanding the influence of social blocs in shaping growth models, particularly in the context of a country which does not follow a liberal democratic political economy (May et al., 2024). Our analytical framework includes both liberal democracies like Germany, and other political systems, i.e. China. This Gramscian addition helps us analyze China's political and economic system and its social bloc due to its theory on how soft power is derived in less developed, or differently shaped, civil societies where the state has a grander role in society in general.

In our case, analyzing the Chinese political economy and its social bloc, it is beneficial to include Gramscian thought into the analytical framework of this paper. The dynamic of China's civic society and economic and political elites functions significantly differently to that of a liberal democracy, and our analytical framework sets out to accommodate this. Social blocs play a key role in the negotiation and implementation of economic policies, that are fundamental to various growth models. However, in recent GMP literature, social blocs have been downplayed and actual growth models and macroeconomics have been the center of attention (Baccaro et al., 2022; May et al., 2024). Additionally, Baccaro and Pontusson also criticized their own work for not theorizing social blocs sufficiently (Baccaro and Pontusson, 2016, 2019). For the purpose of our study of industrial policies through an analytical framework informed by GMP, the concept of social blocs is critical. As we aim to understand the politics behind the policy and how different constellations of social blocs in rather similar growth models produce significantly different policies and produce equally different economic outcomes.

Adaptability to economic shifts is another area where social blocs exert significant influence. During times of economic downturns or shifts in the global market, well-organized social blocs can effectively lobby for policy adjustments to mitigate adverse impacts, seize new opportunities or defend their current business model and market share. This ability is essential for the resilience and flexibility of the growth model, allowing the political economy to respond dynamically to both external pressures and internal changes. The composition and power dynamics within social blocs also have significant effects on the distributional outcomes of growth models (Baccaro and Pontusson, 2016, 2019).

Social blocs within the GMP are active, dynamic forces that shape, maintain, and transform the economic strategies of states. Due to the complex interplay of economic and social interests, these blocs lay the foundation to the structure and policy orientations of various economies. A deeper understanding of these social blocs offers valuable insights into the comparative stability and effectiveness of growth models across different national contexts, highlighting their importance in the broader economic landscape. There exists no ideational primacy between growth models and social blocs, but rather they grow and adapt in tandem and affect each other (Baccaro and Pontusson, 2019).

3.3 Economic Statecraft

Recent scholarly contributions to international political economy (IPE) literature suggest that the global political economy is undergoing a pronounced geoeconomic turn, representing a transformation in the operations of global affairs (Babić et al., 2022, 2024; Weiss, 2021). The shift marks a tendency of divergence from neoliberal logics of globalization toward a landscape in which economic instruments are leveraged by states in the pursuit of supremacy. Accordingly, the evolving global landscape is now increasingly shaped by geoeconomic characteristics, extending beyond traditional state-centered military power measures of geopolitics (Babić et al., 2022). Babić et al. (2024) argue that these structural changes call for further theory-building, implying the need to reconsider existing conceptual and theoretical tools to extend beyond the narrow focus on the security dimension of geoeconomics. To

better understand the geoeconomic turn, the authors emphasize the *"[...] political economy roots that need to be brought to the foreground"* (Babic et al., 2024: 1). As such, geoeconomics represents the external, systemic context where states engage in economic statecraft and industrial policy. Following this logic, these measures are not taken in a vacuum of domestic dynamics, but in a global strategic arena shaped by rival states' actions and the mobilization of global power resources.

To examine the geostrategic arena in light of the geoeconomic turn, the global level of analysis draws on the notion of economic statecraft as conceptualized by Elizabeth Thurbon and Linda Weiss (Weiss, 2021; Thurbon and Weiss, 2021; Weiss and Thurbon, 2021). Following their conceptualization, this paper understands economic statecraft as *"[...] government initiatives designed to reach for or push the high-tech frontier in order to fend off, outflank, or move in step with clearly defined rival powers - whether such rivalry is primarily economic or military"* (Weiss and Thurbon, 2021: 474). The authors repurpose the concept of economic statecraft, going beyond the conventional usage, by which it primarily applies to discussions relating to global economic frictions, involving sanctions, tariffs, and protectionist measures (Thurbon and Weiss, 2021). They argue that the traditional application of the concept solely considers the foreign policy aspect, thereby missing a necessary element that is the domestic domain (Weiss and Thurbon, 2021). Accordingly, their extended definition of economic statecraft rests on the claim that efforts of economic statecraft should include technology initiatives with a domestic focus, serving as a response to particular international threats. Considering a global system with state competition, geoeconomic issues can importantly come to prompt economic state activity focused on the domestic level. To exemplify this, the authors point to accounts of economic statecraft in the US and Korea. Whereas the former engages in the practice both domestically and abroad in efforts to project power, the latter does not necessarily base its economic statecraft on geopolitical goals as opposed to geoeconomic ones.

The expanded concept of economic statecraft thus incorporates *"[...] the making and growing of markets at the techno-industrial frontier for geoeconomic objectives"* (Thurbon and Weiss, 2021: 109) and rests on four main pillars. Firstly, the classical understanding of the concept of 'development' implies a continuous process, in which the state has more to gain from actively assuming various tasks rather than taking a purely regulatory approach. Secondly, the supportive role of the state grows in importance at the frontier of technology where calculable risk is characterized by certain degrees of uncertainty. This reasoning suggests that in pursuing high-tech dominance, economic governance includes state efforts to create and sustain markets at the technological frontier by assistance mechanisms relating to network coordination and public procurement among others. Thirdly, the task of market creation and growth at the high-tech frontier is nested fretfully between the differing concepts of 'marketcraft', which prioritizes regulation and rulemaking, and 'statecraft', which, in turn, represents a geopolitically focused view on foreign economic policy. They present two main arguments as to how the conceptualization of economic statecraft can be expanded beyond its mainstream application. Firstly, they argue that *"[...] the tools of economic statecraft are not exclusively internationally focused [...]"* (Thurbon and Weiss, 2021: 109). Secondly, they note that *"[...] the drivers of state action are not exclusively geopolitical"* (Thurbon and Weiss, 2021: 109). The fourth strand of the argument proposes that a state may engage in economic statecraft on a domestic level with an aim to safeguard its global positioning via economic bolstering. This implies the activation of policy mechanisms aimed toward economy-building initiatives and technology development on the domestic plane, representing a refocus on the application of domestic policy to exercise economic statecraft in a global setting in which economic rivals are clearly identified (Thurbon and Weiss, 2021).

In the emerging geoeconomic landscape, Weiss (2021) emphasizes the distinction between traditional industrial policy and the practice of economic statecraft. She posits that the concept of industrial policy has come to be understood as implying most types of state support to economic entities, without considering the underlying motivations. This arguably makes the differences in states'

approaches and goals more unclear. Beyond Northeast Asian states, mechanisms qualifying as industrial policy tend to be underpinned by domestic drivers rather than external ones, as governments seek to support specific sectors in order to safeguard or advance certain domestic political and economic objectives, such as jobs or electoral gains. Furthermore, they argue that in instances where industrial policy is externally driven, the notion is often employed to follow policies of leading states or conveyed as a mitigating response to overarching issues such as climate change or globalization.

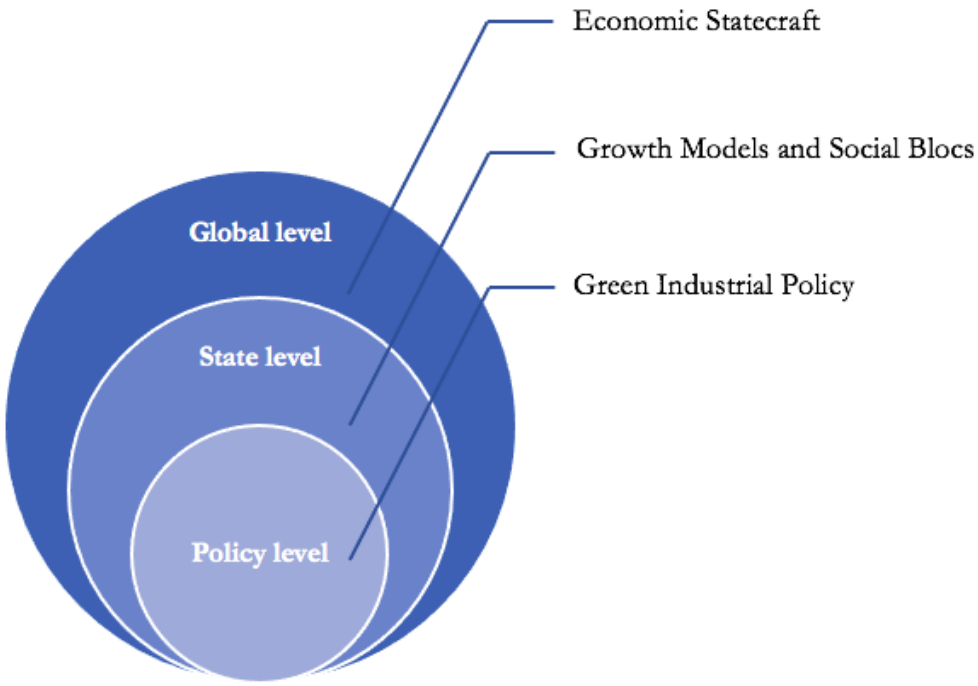
While industrial policy may or may not be aimed toward international competition, a defining characteristic of statecraft is that the international competitive pressures of the state are of geopolitical or geoeconomic nature. Economic statecraft, then, is inherently a response to external challenges and rivalries. In this setting, domestic techno-industrial capacities are mobilized to sustain a strategic position in a global arena marked by rising geopolitical tensions. Weiss (2021) alludes to geostrategies of the US following the emergence of China as a geopolitical threat. The US case implies geopolitical drivers of statecraft, albeit with a domestic policy focus: for nationally based actors to secure their placement at the technological forefront. Unlike traditional industrial policy, economic statecraft is understood to entail *"[...] acute awareness of the geopolitical challenges facing the nation [...]"* (Weiss, 2021: 14) and represents an admixture of domestic policy instruments with geostrategic objectives. Applying this logic to the comparative case study of this paper is therefore increasingly useful to examine Germany's and China's industrial strategies in the context of rising geoeconomic tensions in the global arena (Weiss, 2021).

The outlined theoretical underpinnings of economic statecraft are incorporated in the synthesized analytical framework of this paper, offering a theoretical avenue which allows for a deeper understanding of the geostrategic and industrial interactions at the global and state level. The comparative analysis of this paper examines to what extent potential (in)congruences between industrial policy and statecraft occur at the intersection of the foreign and domestic arena. Therefore, it is useful to support industrial policy analysis with the expanded concept of economic statecraft, as the former arguably lacks reference to the driving geoeconomic aims behind its instrumental function (Thurbon and Weiss, 2021). By connecting industrial policy instruments to geoeconomic strategies and outcomes, this theoretical application facilitates a rich analysis of geostrategic drivers within the scope of green industrial policy.

3.4 Analytical framework

The analytical framework devised in this paper portrays a multilayered analytical approach with a synthesized theoretical foundation, resting on key elements from the concepts of Green Industrial Policy (Rodrik, 2014; Juhász et al. 2024; Allan et al., 2021), the Growth Model Perspective (Baccaro and Pontusson, 2016; 2019; 2022), and Economic Statecraft (Weiss and Thurbon, 2021; Thurbon and Weiss, 2021; Weiss, 2021). The stacked visualization represents a layered theoretical approach to the comparative analysis. Each analytical level is nested within the context of its surrounding atmosphere. This implies that the empirically observed policy level configurations are situated within the context of specific state dynamics, which, by extension, interact with the global political arena.

Figure 1. Multilayered analytical framework with integrated theoretical foundation



Source: Authors' own

3.5 Integration of theories

The combination of economic statecraft and the GMP functions effectively to guide our analytical framework due to each theory's ability to compensate for the other's limitations which enriches the overall analysis. Thurbon and Weiss' conceptualization of economic statecraft provides the paper with a strong lens to examine how states position themselves strategically in a competitive global economic environment with emphasis on the proactive role states play in shaping economic outcomes at the international level through targeted initiatives aimed at technology and industrial leadership, which is driven by geoeconomic and -political considerations. Therefore, it allows our analysis to capture the strategic interactions and rivalries on the global level that profoundly influence domestic industrial policy. However, economic statecraft does not capture a detailed understanding of how domestic dynamics influence the success or failure of such state-led strategies. Here, the GMP fills an important gap and allows us to capture critical information. GMP directs attention to domestic factors, notably the growth model itself, as well as the pivotal role of social blocs and their distributive coalitions, which shape and sustain the economic structures within national contexts. It furthermore provides theorization for how domestic political coalitions negotiate, support, or contest state policies. GMP then aids our analysis in unpacking the domestic political-economic conditions that determine the specific form and effectiveness of industrial strategies at the state-level. Through our combination of economic statecraft and GMP, we develop a robust, multi-level analytical toolkit. Economic statecraft understands state interventions within a global strategic context by highlighting how external competitive pressures shape state behavior. Simultaneously, GMP anchors these state actions within domestic contexts, by focusing on how domestic social and political coalitions influence policy choices, effectiveness, and resilience. This allows our analysis to comprehensively understand both the external strategic rationales guiding industrial policy and the internal political-economic dynamics shaping its implementation and outcomes.

The theoretical views of Rodrik (2014), Juhász et al. (2024), and Allen et al. (2021) on green industrial policy similarly provide an ideal analytical lens for examining the policy-level dimension which we add to our analysis. It articulates a rationale for why and how states engage in deliberate structural economic transformations. Green industrial policy involves targeted governmental policy measures with the aim of fostering technological advancement, reshaping industrial structures, and enhancing economic competitiveness in sectors critical for sustainability. For this approach, the centrality of state-driven policy interventions, such as subsidies, public investment, and regulatory frameworks, aimed at achieving environmental, technological, and economic objectives. Thus, the theory explicitly captures the nuanced ways through which states actively engineer the domestic economy at the policy level. Pairing these insights with GMP and economic statecraft greatly enhances our analytical framework by bridging targeted policy interventions with broader domestic political-economic structures, and domestic political-economic structures with states' strategic global positioning. The GMP argues that growth models are the agglomeration of diverse economic policies designed to sustain a particular economic structure, typically driven by social blocs that represent cross-sectoral coalitions of aligned economic and political interests. Integrating the green industrial policy framework into GMP allows us to trace how targeted sectoral policies not only contribute to specific technological or environmental objectives but also underpin and reinforce the broader growth model of a nation. Green industrial policy, then, is understood in the frame of a wider growth model and social bloc, to uphold, maintain, and further their desired economic structures and distributive outcomes.

Together, these three theories together create a structured, layered and integrated analytical framework to utilize for the analysis. The framework shows coherence, with the policy-level analysis allowing us to assess the structure and mechanisms of green industrial policies themselves; the state-level analysis situating those policies within national growth models and the power of social blocs; and the global-level analysis allowing us to situate the state-level analysis within the external pressures and strategic positioning which can shape domestic policy design. Thus, our synthesized analytical framework enables us to trace how green industrial policy emerges at the intersection of national political economies and the evolving global geoeconomic order, offering a comprehensive and context-sensitive approach to analyzing structural economic transformation in Germany and China.

4. Methodology and data

4.1 Research design and case selection

This paper conducts a comparative case study focusing on Germany and China, comprising two leading industrial powers at the forefront of the green transition. Germany sits within the multilevel governance framework of the supranational state that is the EU and is characterized by a coordinated market economy with a strong export-oriented growth model (Baccaro and Pontusson, 2016). In contrast, China represents a state-capitalist system with centralized policy authority, vertically integrated SOEs, and a longstanding developmental state tradition (Wang et al., 2022). The comparison between Germany and China thus enables the identification of structurally embedded mechanisms and context-dependent policy pathways through which green industrial policy is shaped in diverging settings. The analysis is then conducted in three levels: the policy, state, and global level. For its research method, the thesis adopts a qualitative approach, while integrating quantitative elements to support our inferences and provide triangulation. The case study is thus primarily qualitative, as the sampling mainly comprises qualitative analysis of official state documents, including policies, strategies, plans, and guidelines, non-state documents, including policy briefs, white papers, and research institute reports, and academic literature. Meanwhile, the qualitative empirics are supported with additional quantitative data, including EV market data and other relevant statistics pertaining to Germany and China.

To conduct our comparative case study, we select Germany - within the EU institutional framework - and China as two strategically significant cases in the global shift toward EVs and green industrial transformation. The selection of the two cases is not based on a formal typology of either most-different or most-similar systems design (Seawright and Gerring, 2008) but on the argument that they are paradigmatic cases, each representing a global automotive industrial force. While Germany and China embody distinct political-economic systems, institutional settings, and structural constraints, they converge in the use of industrial policy to drive green technological transformation, particularly in the EV sector. This renders them crucial cases for understanding how industrial strategy is shaped under conditions of global geoeconomic competition. Both Germany and China are among the global leading producers and exporters of cars (OEC, 2025c). As such, the global technological race implies that EVs can increasingly be defined not simply as climate policy imperatives but strategic instruments through which states pursue broader geopolitical and economic objectives. In this setting, EVs represent an avenue through which states seek to secure a place at the technological frontier, reshape supply chains, reduce interdependencies, and influence the geoeconomic realm. Therefore, studying Germany and China is not only relevant for understanding green industrial policy, but for exploring the emerging notion of economic statecraft in an era of green transition and geopolitical rivalries. Accordingly, the cases are selected as they allow us to examine how structurally, politically, and institutionally different state actors mobilize green industrial policy in pursuit of national and global objectives. Whereas Germany is a coordinated market economy (Hall and Soskice, 2001) embedded in the EU, China embodies an authoritarian state-capitalist model. Meanwhile, both states are actively engaging in industrial policy initiatives toward the EV sector, albeit through different logics of state-market coordination, state ownership, and institutional formations; Germany operates within a liberal-democratic institutional structure with corporatist elements (Münchau, 2024), while China relies on state ownership and vertically integrated governance mechanisms (Wang et al., 2022). This comparative logic allows for causal inferences to be drawn regarding the role of domestic political economy in shaping industrial strategies in the context of geoeconomic pressures. Meanwhile, the aim of this logic is not to isolate a single variable, but to uncover the mechanisms embedded in each context that give rise to different approaches to state-supported green transition with the overarching pursuit of geostrategic outcomes. Thus, the thesis adopts an exploratory methodological positioning, seeking to uncover how green industrial policy interacts with broader issues of geoeconomic competition and techno-industrial supremacy, addressing the central question of how domestic political economies and geoeconomic dynamics interact to shape green industrial policy revolving around EVs.

Thus, the cases of Germany and China are selected on the basis of theoretical relevance and empirical salience. Theoretically, the cases represent diverging types in comparative capitalism and state theory conceptualization. Empirically, both cases can be considered at the forefront of the global green industrial transformation. They exhibit proactive green industrial policy strategies within key strategic industries, herein the EV sector. Moreover, both Germany and China are key players in geoeconomic competition shaping green technology markets. Together, these two cases enable identification of common challenges and divergent institutional and structural configurations. In sum, the two cases allow us to generate insights into how green industrial policy is shaped by both domestic political economy and the dynamics of global geoeconomic competition.

4.2 Philosophy of science

This thesis employs a critical realist philosophy of science position, serving as the foundation for the research problem, the analytical framework, and the empirical strategy of this study. Critical realism provides a robust ontological and epistemological framework that aligns with the core ambition of this study, namely, to analyze how deep-lying structural mechanisms in the geoeconomic and political

domains shape the evolution of green industrial strategies in Germany and China. Such strategies emerge not only from observable events, but from underlying causal structures and interactions that may be unobservable, context-based, and historically contingent.

Critical realism asserts a fundamental ontological distinction between the real, the actual, and the empirical. As outlined by Sayer (2000), the real comprises the underlying objects, structures and causal powers that exist whether or not they can be empirically observed. The actual consists of events that occur whether or not they are experienced, and the empirical is the domain of experienced phenomena. Contrasting other 'flat' ontologies, this 'stratified ontology' (Sayer, 2000) is particularly relevant for the purpose of this study of geoeconomic tensions and industrial strategy, where mechanisms such as state capacity, domestic political structuring, or global systemic competition do not necessarily manifest in immediate or regular empirical patterns yet exert significant influence on industrial outcomes.

This philosophical position distinguishes critical realism from (strong) positivism, which assumes the objective existence of external social reality, in which only observable phenomena exist; and (strong) constructivism, according to which the existence of social phenomena relies on socially constructed meaning and human ideas deriving from ideational and discursive interpretations of social reality (Buch-Hansen, 2023). This thesis works from the assumption that policy outcomes are shaped by complex constellations of both material and ideational mechanisms, including historically shaped growth models, global power dynamics, and institutional path dependencies. In this view, such phenomena cannot be adequately grasped without a realist typology implying the existence of underlying structures and causal mechanisms.

In terms of epistemology, the stance of critical realism recognizes that while reality exists independently of our knowledge of it (the intransitive dimension), our understandings (the transitive dimension) are provisional and subject to revision, as "*[...] the world should not be conflated with our experience of it [...]*" (Sayer, 2000: 11). Following this reasoning, this study does not aim to uncover universal laws, but to generate context-dependent inferences about industrial strategy through an abductive mode of reasoning. Abductive reasoning addresses the limitations of both inductive and deductive approaches, enabling iterative engagement of theoretical foundation with empirical material, eliciting theory-building through a process of dialectical shuttling (Clark et al., 2021).

The critical realist position also informs our approach to causation. Rather than adhering to a regularity view of causation, in which causality is established through observable cause-and-effect relationships, this paper focuses on uncovering the generative mechanisms that produce observable outcomes under particular conditions. Thus, causation is understood as contingent and context-dependent, rather than deterministic (Sayer, 2000). This enables our research to explain, for example, why green industrial policies may produce diverging effects in different contexts (Germany vs. China), depending on institutional configurations, structural constraints, and political constellations. Moreover, critical realism insists on a double hermeneutic, implying that social phenomena encompass both an ideational and a material dimension. In this sense, meaning is constituted not only by the social world but also by material interests, structural constraints, and institutional settings. Accordingly, the interpretive dimension of critical realism seeks to differentiate itself from the reductionist view of interpretivism (Sayer, 2000). Following this view, this study, for instance, acknowledges that while industrial policy narratives may be discursively framed, this does not imply that their dimensions are solely ideational. Rather, it investigates the structural and geoeconomic conditions that make such discourses politically salient and effective.

In sum, adopting a critical realist philosophy of science position offers this study a coherent and robust foundation for its exploration of green industrial policy and geoeconomic interactions. This view enables an analytical approach that is ontologically grounded, epistemologically reflexive, and

normatively engaged; thereby aligning with the core objective of explaining how geoeconomic tensions and domestic political economies shape industrial strategy in a global era of green transition.

4.3 Data collection and analytical strategy

The empirical basis of our thesis is built through a structured comparative case study of Germany and China. Given our qualitative research approach, both cases are constructed primarily from qualitative data, while supplemented from selected quantitative material. The aim of the data strategy is not only to document and describe industrial policy developments, but to generate theoretically informed interpretations of the two states' mobilization of green industrial policy, particularly on the EV sector, in the context of economic statecraft. This aligns with the abductive and explanatory logic of the study, in which theory and empirical material is approached through an iterative process to identify mechanisms through which domestic political economies engage with systemic geoeconomic pressures. Our approach to data collection is to construct each empirical case by systematically gathering and analyzing relevant documents and supporting material. Given Germany's embeddedness within the EU institutional framework, the empirical material for its case encompasses both national-level and EU-level policies, strategies, plans, and guidelines. In the case of China, the focus is primarily on national-level policies and strategies, but the analysis also draws on local-level policy developments where they prove relevant in regards to shaping implementation of influencing the EV transition in China. This reflects the multilevel governance architecture of Chinese industrial policy, where subnational actors may exercise certain levels of discretion within the bounds of overarching national strategies (Jin, 2023).

The material used in both cases draws on official state-published documents, non-state published documents, and academic literature. For both cases, the data collection process was somewhat complex due to language barriers and limited availability of official translations provided by the governments directly. Both in the case of Germany and China, some national-level strategy documents are available in English, while several are not. For the case of Germany, however, the process was facilitated due to EU-level official material being easily accessible through public digital repositories, providing original material for analysis. To address this, our data collection relies on credible secondary sources providing translation, interpretation, and contextualization of the policy and strategy insights we wish to analyze. These include the Center for Security and Emerging Technology (CSET), the International Council of Green Transportation (ICCT), the International Energy Agency (IEA), the Observatory of Economic Complexity (OEC), a series of research centers and institutes, select online-published articles, as well as peer-reviewed academic studies. Thus, in addition to official documents, we integrate a range of non-state material, including policy briefs, reports, white papers, and online publications and articles. These sources are not considered substitutes for official material, but as supplementary empirical inputs to help triangulate findings, situate and contextualize policy content, and examine state industrial strategies in their relevant historical and contemporary settings. In this regard, the IEA's online policy database has proven particularly useful, offering a structured overview of national policies, regulatory frameworks, and strategic documents across both cases[1]. To support the qualitative document analysis, we also incorporate selected quantitative data, mainly comprising EV market statistics. This data helps provide a contextual background and further triangulate our qualitative insights. In terms of the analytical process, it entailed a theoretically-guided coding at the document level, drawing on the operationalized theoretical concepts to explore how the themes of relevance emerge within the empirical material. In addition to this, our data collection approach included searching for academic literature in various online repositories, including CBS' online library and

[1] https://www.iea.org/policies

Google Scholar. This process thus derives from our analytical framework embodying the intersection of green industrial policy, growth models and social blocs, and economic statecraft, representing in combination the policy, state, and global level of analysis. This method of content analysis then enabled our iterative engagement between the theory and the data, allowing us to use the theory-driven approach to aptly provide further categorization of themes for the purpose of structuring each analytical level of the comparative case study.

As for limitations concerning our data collection and analytical strategy, we acknowledge that our approach implies a relatively high degree of reliance on non-state material but argue that it nonetheless supports a methodologically justified and transparent procedure, enabling access, descriptions, and interpretations of relevant policy content while maintaining analytical integrity. While we make extensive use of English-language and translated documents, some relevant German and Chinese material respectively remain inaccessible for the purpose of this study, due to linguistic barriers. To mitigate this, we prioritize sources offering reliable interpretations and translation, while cross-referencing and triangulating these where possible. Furthermore, while subnational policy in China plays a significant role in implementation, the analytical focus of this thesis remains primarily on the national-level strategy, as it provides the broader framework within which local initiatives are situated. Meanwhile, local-level material is addressed to some extent, in contexts where they prove materially relevant to implementation trajectories, or where they enable valuable analytical insights into the execution of national-level strategy.

In sum, the data collection and analytical strategy of this thesis enables the construction of its theoretically guided and empirically grounded comparative case study. Our strategy reflects the complexity and embeddedness of green industrial policy, while remaining consistent with the critical realist position and abductive logic of the study. Accordingly, the strategy represents an explanatory approach aimed at identifying the structural, institutional, political-economic, and geoeconomic mechanisms that influence and shape the green industrial strategies on the EV sector of Germany and China in the green transition.

4.4 Operationalization

4.4.1 Economic Statecraft

Through the lens of the scholarship of Elizabeth Thurbon and Linda Weiss, this paper applies the concept of economic statecraft to its analysis, primarily emphasizing the following assumptions pertaining to state actors in the global political economy: 1) specific foreign economic rivals are clearly identified, 2) states leverage economic tools to achieve and sustain leadership the high-tech industrial frontier and to defend global export competitiveness, and 3) strategic industrial development in the domestic arena is motivated by geoeconomic or geopolitical goals (Thurbon and Weiss, 2021). To apply the notion of economic statecraft to the comparative case study of this paper, some of its key elements are operationalized with a set of observable indicators. These indicators provide a guideline for the comparative case study, enabling us to draw analytical inferences through the lens of the observable indicators, rooted in the understanding of economic statecraft of this paper. This way, we are able to systematically apply economic statecraft to our global level analysis and examine how the theoretical tenets emerge within the qualitative data.

One of the applied indicators regards the identification of strategic rivals. Through analysis of the empirical material, the objective is to observe references to foreign competition, paying particular attention to their framing. Thereby, the indicator of strategic rival identification can allow for inferences to be drawn regarding perceived external pressures and how they are reflected in and interact with the industrial strategy of the state. Another indicator involves evaluating the role of the state in building

and expanding markets at the high-tech frontier. Observing this indicator includes identifying key targeted action toward strategic development of the EV sector, levels of public investment into this sector, as well as observing other supporting mechanisms, such as R&D programs, innovation schemes, and public procurement initiatives aimed toward fostering development of key advanced technologies. Furthermore, we assess the mobilization of domestic economic tools for strategic purposes, serving as an indicator of the degree of which the examined state can be argued to engage in economic statecraft. This implies evaluating the use of policy instruments such as subsidies, tax incentives, export financing, and strategic regulation. This allows for exploring how strategic techno-industrial ambitions of the state can be traced through analysis of the strategic state documents. Furthermore, the scope and framing of these instruments is observed in order to draw inferences on the magnitude of industrial support mechanisms and otherwise strategic development programs aimed toward the EV sector specifically.

Additionally, the comparative analysis involves observing the geoeconomic framing of the states' domestic industrial strategies. Using this indicator, the objective is to determine to what extent green industrial strategies are justified in terms of bolstering global competitiveness, pursuing strategic autonomy, or mitigating supply chain interdependence. This indicator allows for observing how the empirical state documents on green industrial strategy portray global competition, security imperatives, and economic sovereignty within the scope of the global EV market. Furthermore, it gives way for exploring the interaction between geopolitics, geoeconomics, and domestic policy on advanced technology adjacent to the EV sector. By examining these themes, the paper can observe the extent of geostrategic economic integration that occurs at the intersection of the global and the state level, thereby leveraging the layered structure of the analytical framework and enriching the synthesized theoretical approach.

Through this structured operationalization of economic statecraft, the paper ensures that its analysis is able to capture both the internal economic rationale behind green industrial policy as well as how it interacts with and is embedded in the broader dynamics of global geostrategic rivalry. This approach contributes to the coherence of the analytical framework of this paper for comparing how Germany and China engage in green industrial policies as instruments of economic statecraft, linking domestic industrial strategy to global level processes of systemic rivalry and geostrategic competition.

4.4.2 Growth Model Perspective

4.4.2.1 Growth models

In this paper, a growth model is defined as the overarching economic strategy on which a country bases its economy on to achieve and sustain economic growth. The different growth models are then characterised by the main demand driver of growth in the economy, which could stem from e.g. consumption, exports, government spending, or FDI. The growth model then has an institutional infrastructure set up to maintain and further the emphasised demand driver which the economy's growth is primarily based on. A country's growth model is backed up by, and inextricably linked to its (dominant) social bloc (Baccaro and Pontusson, 2019).

Essentially, the growth model is defined by the demand drivers of it, however the institutional infrastructure and framework behind it plays a key role in supporting the efforts of expanding the growth through those demand drivers. One can then see the growth model, or the institutional set-up behind the demand factors, as an agglomeration of individual policies all enacted in order to support the overall growth model and dominant or prioritized sectors of the economy. Understanding e.g. a tariff, subsidy, labour market reform, or monetary policy on its own gives a much narrower understanding of it, than if one analyses these individual policies through the lens of an overall economic objective, such as supporting the growth model of the country. Then the individual policies to analyse can in

agglomeration combine to show a greater picture of a national growth model, and a structural transformation of an economy, than could be found by simply analysing the policy individually. Thus, in our paper, we will then characterize the growth model through the demand drivers which is the main driver of growth in the economy, and in turn understand the network of economic policies as a set-up to enhance and support the growth model. To operationalize the concept of a growth model, we will look at sectoral compositions of economies and the relative growth in sectors, and the effects of it on the wider economy. In our analytical framework, the concept of growth models helps us by allowing us to understand and analyze the policy-level through the overall concept of growth models. The concept of growth models in and of itself also provides us a lens to analyze the state-level through its framework of different political economies and their strategies to achieve growth.

For policy-level analysis, we also look towards the growth model and its institutional framework. The growth model is the economic strategy of a country upon which growth is based. Growth models become institutionalized as policies and bureaus are set up to aid and further the growth model. So, understanding policy-level analysis through the lens of a greater network of policies all set to bring about the same structural transformation or furthering of the drivers of growth in an economy is very useful. Within specified growth models, structural transformations can still take place while maintaining the same main demand driver of growth and same institutional set-up.

4.4.2.2 Social blocs

This paper understands a social bloc as the aligned but varied interest groups and constituents across sectors and classes that foster, and maintain, the political support for a certain economic structure (growth model) of the national economy. Since different sectoral interest groups have different policy preferences and policy outcomes affect one differently depending on your sectoral affiliation, having the political power to exert influence over policymaking and policy outcomes can be crucial for an interest group. In the constellation of social blocs, interests within the bloc are not equal but rather have a vertical hierarchy, where big and powerful business interests often trump labour or social interests due to their relative power and influence (Baccaro and Pontusson, 2019).

Social blocs play a key role in determining the policy preferences the state pursues and how the state goes about a structural transformation of the economy. Viewing overall policy packages, the policy preferences and pursued policy goals of states in their green transitions through the lens of the growth model and social bloc can give greater insight into the factors that determine policies of structural transformations, such as wide-ranging industrial policy. Operationalizing a concept such as a social bloc can be complex, since it is often an informal event or system which is difficult to capture in a satisfactory way, quantitatively. Our Gramscian additions to Baccaro and Pontusson's concept of social blocs helps us to go beyond the already established ways of understanding and analyzing social blocs of Western or liberal democratic countries. Since China's political economy and civil society functions markedly differently and does not adhere to liberal democratic values, such an addition is crucial to correctly include the dominant social bloc of China into our analysis. Given the opaque nature of the 'quiet politics' of how social blocs function, our operationalization of social blocs involves a more qualitative assessment of the interest groups within the political economies of countries, and how they stand to benefit from the current growth model, the economic structure of the country, and enacted policies. Given the internal hierarchy within social blocs, we will also determine the relative strengths of the different interest groups within the social blocs to better understand the social bloc and the way it can affect the growth model.

4.4.3 Green Industrial Policy

To empirically analyze green industrial policy, this paper operationalizes the concept through a series of themes reflecting the theoretical underpinnings discussed above. The policy-level analysis thus draws on the concept of green industrial following the literature of Rodrik (2014), Juhász, Lane, Rodrik (2024), and Allen et al. (2021), with analytical focus on three main themes: 1) the degree of state intervention and support mechanisms; 2) the strategies for fostering technological development and sectoral upgrading; and 3) the strategic framing and coordination of industrial initiatives. For each country, these dimensions are systematically assessed based on official policy documents, investment programs, sectoral strategies, and institutional arrangements. For the purpose of coherent analytical structuring, the policy-level analysis is further categorized into four main areas, which is elaborated on in the analysis section.

Accordingly, the scale and nature of direct state support for green technologies is identified. This includes public R&D funding, direct subsidies for EVs, procurement policies, and infrastructure investments related to the EV sector. The presence of substantial fiscal allocations serves as an indicator of policy commitment to techno-industrial transformation. Furthermore, institutional arrangements facilitating state-business coordination in green sectors are observed. Drawing on Rodrik's (2014) concept of embeddedness, we assess the degree of structured public-private interactions, the presence of sector-specific agencies or missions, and other mechanisms between firms and the state. Moreover, the strategic framing of green industrial policies is analyzed. We examine whether green industrial strategies are justified in terms of geopolitical competition, economic security, or national technological leadership, and observe indicators of a geoeconomic orientation. Additionally, the extent of green industrial policy coalitions is examined. This includes identifying sectors and interest groups supporting green policy initiatives, particularly through the lens of growth models and social blocs. This indicator serves the objective to explore linkages between industry associations and state-led efforts and observe how industrial policy benefits are framed.

Together, these dimensions allow for evaluating the strategic intent of green industrial policy in Germany and China, enabling comparative analysis of how industrial policy design reflects different political economies, institutional capacities, and geopolitical positions. Through this operationalization, we link theoretical considerations of correcting market failures and strategizing within geoeconomic competition to concrete policy practices shaping the configurations of the global EV sector.

4.5 Quality criteria

Following the typology of critical realism, which does not assume singular, objective accounts of social reality, the paper takes an adapted approach to evaluating our research quality. Rather than following the logic often applied to quantitative research, involving the quality criteria of reliability, validity, and generalizability, our evaluation of research quality is conducted through the lens of the criteria of trustworthiness and authenticity as proposed by Lincoln and Guba (1985). According to Clark et al. (2021), merely applying the criteria of reliability and validity to qualitative research is widely recognized among researchers as not appropriate. To overcome limitations of adhering to reliability and validity alone, Lincoln and Guba accordingly provide an alternative position to qualitative research assessment (Clark et al., 2021), which better aligns with the ontological and epistemological positioning of this study.

The first of the two pillars, trustworthiness, comprises four criteria, each paralleling equivalent criteria for quantitative research: 1) credibility, 2) transferability, 3) dependability, and 4) confirmability (Clark et al., 2021). Together, they provide for a solid foundation of assessing the integrity and plausibility of our qualitative findings without adhering to positivist standards of causality and objective

truths. The thesis addresses credibility by triangulating empirical findings across a variety of sources, including a wide range of policies, strategies, plans, programs, and guidelines, as well as supporting quantitative indicators, such as EV market data and other data related to the automotive industry. Meanwhile, with the use of an abductive logic of reasoning, through iterative engagement between the theory and the empirical data, the paper ensures that qualitative findings are theoretically grounded rather than merely descriptive. Transferability is aimed for through contextually rich and theoretically informed case studies of Germany and China. While the findings cannot be considered statistically generalizable, the thesis aims to identify potential underlying causal mechanisms that may to some degree be transferable to other political economies undergoing green industrial transformations facing geoeconomic pressures. Meanwhile, the study faces a limitation in terms of generalizability, considering the inferences drawn from this particular comparative case study are highly bound by structural specificities, rendering it difficult to generalize our findings across fundamentally different institutional settings and political-economic state configurations. Dependability is pursued through transparency of the research process, including motivating our case selection, structuring a synthesized analytical framework with coherent theoretical integration, and the theoretically grounded empirical analysis of the data collected, which the constructed analytical framework enables us to carry out systematically through operationalized indicators and categorization of the inspected data. The criteria for confirmability is addressed through reflexivity regarding the role of theory and inference, where the aim is to identify underlying mechanisms, albeit without assuming full objectivity.

The second pillar of authenticity involves a wider dimension regarding the broader political impact of our research (Clark et al., 2021). The paper meets the fairness criterion by representing multiple aspects within green industrial policy, including economic competitiveness, technological leadership, and geostrategic positioning, without narrowing in on a single explanatory narrative. The thesis also contributes to ontological and educative authenticity in the sense that it helps to unravel the institutional and geoeconomic conditions shaping industrial policy in a global setting increasingly characterized by strategic interdependence and rivalry. However, we do not aim to fulfill the catalytic or tactical authenticity criteria, as this would require direct engagement with affected stakeholders or drawing prescriptive inferences from our research.

Thus, this study aims to meet core standards of qualitative research quality, following the critical realist position and the evaluative framework of Lincoln and Guba. The paper offers a transparent and reflexively approached exploration of how green industrial policy is shaped at the intersection of domestic political economy and global geoeconomic pressure. However, we acknowledge that there is some degree of limitations regarding positioning of the paper and exhaustive stakeholder representation but nevertheless argue that this does not undermine the explanatory value of the research, as the critical realist commitment is consistently held through our abductive approach, theoretical engagement, and methodological reflexivity.

5. Analysis

5.1 Policy level: Green Industrial Policy

Through our integrated analytical framework developed in the theory section, this section of the paper proceeds with the analysis of the policy-level configuration of green industrial strategies, focused on the EV sector in Germany and China. The analysis aims to assess how each country designs and implements green industrial policies to support structural transformation of the economy and build our foundation to understand how these policies reflect broader strategic, political-economic, and institutional contexts. The analysis follows along three main dimensions, utilizing the operationalized

theoretical foundation of green industrial policy: 1) the degree of state intervention and support mechanisms; 2) the strategies for fostering technological development and sectoral upgrading; and 3) the strategic framing and coordination of industrial initiatives. Accordingly, the policy-level analysis proceeds in three parts. Firstly, the German green industrial policies related to EVs are examined, with a focus on the structure and mechanisms utilized to support the EV transition. Secondly, China's green industrial policy efforts are analyzed in a similar manner. Thirdly, the section concludes with a comparative discussion, which identifies the key similarities and differences between our cases. This structured approach enables a grounded comparison of how green industrial policy is designed and mobilized across two different political economies.

Further supporting our analytical coherence, the analysis is conducted in a systematic way to analyze the structure of EV policy design, by categorizing varied policy instruments into four overarching types: 1) strategic frameworks, 2) incentives and financial support, 3) infrastructure development, and 4) critical minerals, battery and semiconductor supply chains. The categories show the multi-dimensional functions of industrial policies and aim to capture the full range of the policies meant to cause a transformational shift in the economy in a systematic manner that can be compared across countries. This grouping of policies gives a clear analytical distinction between the different functions of the policies. The different functions are then: setting national visions and targets (strategic frameworks), altering market behavior (incentives), creating necessary physical conditions for adoption (infrastructure), and securing upstream inputs critical to the long-term viability of the sector (critical minerals and batteries). This typology draws on established understandings of green industrial policy, where successful sectoral transformations require simultaneous interventions across several domains (Rodrik, 2014). Strategic frameworks provide a political commitment and coordination; incentives address the market failures and the adoption barriers; infrastructure development ensures that technological change is practically feasible and also address adoption barriers; and securing access to critical inputs safeguards technological sovereignty and supply chain resilience. By organizing the analysis along these four dimensions, the paper can systematically compare Germany and China's industrial strategies, while respecting the layered and multi-scalar nature of industrial policy in the EV sector.

5.1.1 Germany

Germany became one of the global technological leaders of the 20th century with a strong industrial economy, based on its excellence in mechanical and chemical engineering. This positioned Germany as the hub of high-end manufacturing, with cars becoming its largest export source, totaling 11% ($174bn) of total German exports alone. Taken together, machines and vehicles represent $430bn and $334bn respectively out of Germany's total 2023 export of $1,57tn (OEC, 2025a). However, the shift away from ICE-cars towards EVs challenges the German industrial model, as its core competence of mechanical engineering is less significant in EVs, compared to ICE-cars (Münchau, 2024). Germany has deployed a range of new industrial policy instruments in order to protect and maintain its superiority within the car sector, while transforming its car manufacturing to EV production. Germany's green industrial policy focuses on maintaining the competitiveness of its domestic car manufacturers within the emerging EV market, while linking these industrial policies with wider climate goals and EU-level green transition frameworks, seeing EVs as a vehicle to drive the German green transition. Recent geopolitical and economic developments have prompted Germany, and the EU, to take a more active approach to industrial policy, where the state takes a greater responsibility in shaping the market, fostering infrastructure development and supporting technological upgrading (McNamara, 2024). The paper then examines Germany's green industrial policies to gain an understanding of how it attempts to structurally transform its car sector given the disruptive technological paradigm of EVs.

5.1.1.1 Strategic frameworks

Germany anchors its approach to EVs in a series of strategic frameworks, which, in agglomeration, articulate the German vision, targets, and priorities for its EV transition. The frameworks see EVs as critical to both climate objectives of reducing greenhouse gasses, as well as a cornerstone in broader industrial and economic modernization strategies. The most significant policy programs are the Klimaschutzprogramm 2030 (Climate Action Program 2030) and the Charging Infrastructure Masterplan (CIM) II. On the EU-level, the Green Deal Industrial Plan (GDIP) and the Net Zero Industry Act (NZIA) similarly set a strategic vision (EC, 2023a; EC, 2024c). The Klimaschutzprogramm was adopted in 2019 and represents the federal government's climate action strategy across sectors. Within the program, transportation is given a decarbonization goal of reducing its emissions by 55% by 2030, measured from 1990 emissions levels. Specifically for EVs, the program sets a goal of achieving 7-10m EVs in use in Germany by 2030. Furthermore it targets 1m publicly available charging stations in Germany (BReg, 2020b). Through these policy signals the government transmits its goals of an EV transition, and its long-term commitment to EVs, to the private sector, which the private sector can then operate in accordance to. This embeds EVs into a broader transport narrative to fix policy issues beyond industrial and economic ones (Drexler et al., 2022).

The CIM II (2022) provides a framework for one of the most pressing issues concerning EV adoption, which is the availability of charging infrastructure. The preceding Masterplan initially echoed the goal of establishing 1m public charging points by 2030, stemming from the Climate Action Program's targets (BReg, 2020a), whereas the CIM II both updates and accelerates this vision, and addresses the failures of the roll-out of charging stations, due to legal, structural, technical and financial obstacles, as well as focusing on critical areas such as urban centers and transportation corridors (BReg, 2022). It is recognized that the success of the EV transition hinges not only on vehicle supply and demand, but on infrastructure sufficiency and convenience to be achieved by setting specific sub-targets for coverage, distance between charging stations, and integration with energy grids (Unterluggauer et al., 2023). The German EV strategy is also increasingly influenced by the developments of the broader EU industrial policy frameworks, with the GDIP articulating the EC's ambition of the EU becoming leaders within clean technologies, explicitly targeting the EV sector and battery sector. The increased flexibility allowed toward state-aid and industrial policy of the plan directly affects Germany's ability to support its EV industry (EC, 2023a; McNamara, 2024; Terzi et al., 2023). Similarly the NZIA presents the target of domestic manufacturing of at least 40% of the EU's net-zero technologies by 2030, again with EVs and batteries seen as critical (EC, 2024c). These frameworks similarly display EVs as critical to a wider EU green transition and function as policy signals, also signaling a greater opportunity for states to conduct industrial policy and use subsidies to bring about a structural transformation.

These strategic frameworks situate the EV sector, and the transition to EVs, within a broader vision of a green transition, and furthermore frames the EV sector as a critical sector for future economic growth, competitiveness, and technological sovereignty. The measurable targets set stable expectations for the industry and for investors, functioning as policy signals. The frameworks also situate Germany's national ambitions within the geoeconomic landscape, which will be expanded upon on the other levels of analysis of the paper. The multi-scalar layering of the national and supranational frameworks also reflects Germany's evolving approach of recognizing that leadership in EVs requires coordinated industrial positioning within global and regional competitive dynamics.

5.1.1.2 Incentives and financial support

Germany has deployed a range of varied incentives and financial support mechanisms designed to influence both producer and consumer behavior towards the policy goal of EVs. The policies primarily

target the cost barriers and the market risks which follow new technologies. Moreover, they aim to stimulate demand for EVs, support fleet conversion, and shift the car market towards EVs in a gradual manner. Financial incentives function to correct market failures and foster early adoption despite the higher costs and limitations on infrastructure. The central policy instruments to achieve this have been the Umweltbonus (Environmental Bonus) and the Innovationsprämie (Innovation Bonus) (BReg, 2020b). In total, these programs provide direct subsidies for the purchase of EVs by offering up to €9.000 per vehicle to consumers with contributions from both the federal government and manufacturers. This significantly lowered the upfront cost of EVs relative to ICE-cars, as the Environmental Bonus and Innovation Bonus influence consumers' purchasing decisions toward EVs and low-emitting options (Samsun et al, 2021). These measures successfully stimulated market behavior, as EV sales in Germany surged dramatically between 2020 and 2022, reaching record market shares (Haan et al., 2025). However, the abrupt end of the subsidy scheme in late 2023 introduces new uncertainties regarding the self-sufficiency of the German EV market (Amelang, 2023).

Germany's use of incentives and financial support goes beyond direct purchase subsidies, as fiscal incentives through the taxation system were also utilized. Its company tax benefits incentive and legislation initiative provide a significant tax reduction of EVs used as company cars. In Germany, around 70% of new car registrations stem from company cars, so this is a vital group of car consumers to sway in order to improve EV adoption. Under this scheme, the taxable benefit rate for company-owned EVs was reduced to 0.25% of the gross list price per month, compared to 1% for conventional cars. With recent adjustments to the scheme proposing to extend the benefits to more expensive EVs (up to €95.000 in value) aimed to further EV adoption (Burra et al., 2024; EC, 2025). This financial incentive, targeted specifically at corporations, can also create a larger market among consumers with a generally larger degree of purchasing power, and then once a company fleets turnover, it creates a second-hand market for EVs which can further rates of EV adoption even more. In addition to the tax incentives aimed at company cars, Germany also implemented an ownership tax benefits initiative for EVs. The scheme exempts private buyers for 10 years of the vehicle circulation tax, after it initially only covered for a five-year period. This measure then focuses on the medium to long-term cost considerations of EV purchasing, as it is not an upfront cost, but a yearly cost reduction over a number of years, aimed to make EV ownership more attractive for consumers over the product's life cycle (EC, 2025). However, the main barrier to EV adoption is the high upfront costs of EVs compared to ICE cars, and EVs are typically already a better economic alternative based on lifetime costs (Qadir et al., 2024)

Germany's public procurement guidelines also function as a way to stimulate the EV industry by dictating public entities using their purchasing power to shape the EV market. Both federal and state-level programs either encourage or mandate that an increasing share of vehicles of the public sector have to be EVs. The public sector's fleet of cars consists of those operated by entities such as the municipalities, postal services, government agencies, etc. Under the Sofortprogramm Saubere Luft 2017-2020 (Immediate Action Programme for Clean Air 2017-2020) supporting electrification of transport and emissions reductions (EC, 2019), municipalities and public transport operators could get up to 75-90% funding for the additional costs of EVs relative to other vehicles. Similarly, commercial drivers, such as craftsmen, could receive up to 60% of the additional costs associated with EVs if their purchase is integrated in a local mobility concept. Additionally, buses for public transport and related services received subsidies for both the purchase and maintenance, relative to 80% of the additional cost of EVs (Becker-Boley and Leutner, 2018). This public procurement policy then serves as both a stable demand for EVs and as a further policy signal from the federal and state governments that it is committed to the EV transition.

Although it is not a subsidy or a direct domestic financial incentive, Germany's EV sector has also begun to benefit from protective industrial policy measures at the EU-level, the key policy being

the EU's decision in 2024 to introduce tariffs on Chinese EVs. The tariffs were imposed following concerns that Chinese firms were receiving significant state support (EC, 2024a). These tariffs are not direct subsidies, but they still help level the playing field by decreasing the price competitiveness of imported EVs, lessening the competition for German producers. For German manufacturers, the result is indirect support through trade policy, rather than through domestic funding alone. This shift marks a change in how modern industrial policy operates beyond financial tools to include market-shaping interventions (McNamara, 2024). This also reflects a broader shift in Europe's industrial strategy, where climate goals, trade policy, and industrial competitiveness are becoming more tightly linked.

5.1.1.3 Infrastructure and developments

Germany has also developed policies aimed to improve the infrastructure that the EV transition critically relies on. Constructing a dense and easy-to-use charging network for EVs helps alleviate two of the main concerns of potential purchasers and barriers to EV adoption, the range and convenience of EVs (Qadir et al., 2024). The German infrastructure policies, headlined by the CIM II, aim to create the needed physical infrastructure for a transition to EVs. The measures are designed to lay the structural foundation for long-term systemic change in transport habits and technology not only to stimulate early adoption (BReg, 2022).

A key regulation to achieve this is the mandate which requires all petrol stations to install EV charging facilities. This measure was announced in 2020 as part of the German COVID-19 recovery package and climate initiatives. The measure then obliges all existing and new tanks to offer EV charging points, which integrates EVs into the already well-developed fuel station network and normalizes EV recharging (Steitz and Taylor, 2020). It also functions to provide the necessary infrastructure to quell the 'range anxiety' of prospective purchasers by ensuring plenty of access to charging facilities. The policy then leverages the already existing car infrastructure to integrate EVs in order to accelerate the geographic spread of charging availability. This embeds EVs further into the already established culture and infrastructure around car-centric mobility in Germany. Germany has also changed building regulations to mandate pre-wiring for EV chargers in new residential and commercial buildings. From 2021 and onwards, all new buildings with parking spaces are mandated to have the necessary infrastructure to allow for installation of EV chargers (Gleiss Lutz, 2021). This policy addresses the infrastructural bottleneck of high costs and bureaucratic process of retrofitting buildings to allow for EV charging. Through this embedding of EV charging infrastructure into general construction regulation, it seeks to lower the barriers to future installation of charging. This improvement then in turn addresses the barrier to EV adoption of limited charging options by making charging access a standard feature both in commercial and residential buildings.

In addition to the regulatory means, Germany also funds a network of both federal and regional expansions of public fast-charging stations. Through programs such as the Deutschlandnetz (Germany Network) initiative, the federal government provides subsidies and tenders for building fast-charging hubs across motorways, urban centers, and rural areas. With the federal government calling for tenders for 1000 fast-charging stations for long distance mobility, as well the federal government providing €200m in funding for private charging facilities. (BReg, 2020b; BReg, 2022). This is in line with the target of 1m public charging points by 2030 of the Klimaschutzprogramm, as well as the CIM II. The Deutschlandnetz has a focus on closing gaps in less profitable regions, ensuring that rural areas and secondary cities are not left behind in the EV transition (BReg, 2022). Geographically equitable access to fast charging facilities is then prioritized, given that a typical barrier to adoption being the lack of availability for people located in rural areas.

5.1.1.4 Critical minerals, battery, and semiconductor supply chains

For the long-term viability and competitiveness of Germany's EV sector, securing reliable and sustainable access to key inputs to EV production such as critical minerals, batteries and semiconductors is vital. The German approach to upstream EV supply chains is largely shaped by EU-level policy, where the Critical Raw Minerals Act (CRMA), Net Zero Industry Act (NZIA), Green Deal Industrial Plan (GDIP), and the European Chips Act (ECA) all function as the main policy papers for securing and reshoring vital supply chains, with the ambition of creating a sovereign and resilient EU industrial base for EVs, among other clean technologies (EC, 2023a; EC, 2023b; EC, 2024b; EC, 2024c).

For this aim, the CRMA is central as it seeks to both diversify and strengthen the EU's access to strategic minerals which are essential for clean technologies, like EV batteries. The CRMA sets benchmarks for 2030, for the strategic raw materials value chain and the diversification of the EU's supplies. This targets a reshoring of supply chains, as well as an implicit decoupling from China's raw materials supply chain, under the guise of stating that the EU's annual consumption of each strategic raw material should not exceed dependence of 65% (EC, 2024b). For Germany, whose EV and battery industries are heavily reliant on imported lithium, cobalt, and rare earths, this framework is critical for mitigating geopolitical risks and ensuring long-term supply stability. The NZIA complements this by setting domestic clean technology production targets as previously mentioned. The policy incentivizes investment in battery production facilities within both Germany and the EU, as well as simplifying permitting for projects of strategic importance (EC, 2024c). This strengthens Germany's ability to build domestic industrial capacity for the EV transition. Similarly, the GDIP provides funding tools, eases EU restrictions on state aid, and crowds in investments into key sectors, such as minerals processing, battery manufacturing and recycling infrastructure. Batteries are recognized explicitly as a sector of strategic industrial importance in the NZIA, which Germany is then a major beneficiary through national projects and EU co-financed schemes (EC, 2023a; EC, 2024c).

Germany has strengthened its domestic production capacity for batteries through subsidies, with the €902m subsidy package (€700m in grants and €202m in guarantees) to Northvolt to build a battery gigafactory serving as a shining example (EC, 2024d). This is targeted at improving and reshoring the battery supply chain which is a key input to EVs. Another German initiative regarding batteries is the Batteriepass (Battery Passport), which is a digital tracking system for battery sustainability and transparency of material sourcing for batteries. It primarily functions as a mechanism to support environmental goals by tracing materials, but it indirectly also strengthens the supply chain via sustainable sourcing and a recycling facility (Zank, 2025). Germany and the EU have also increasingly recognized semiconductors as a critical industrial input as the global economy and industry become more digitized. Semiconductors also serve as a critical upstream input for EVs, as they are essential for the electronic systems that power and operate practically every aspect of EVs. At the EU level, the ECA aims to build an increased EU sovereignty around semiconductors. The ECA sets targets to double Europe's share of global semiconductor production to 20% by 2030. To achieve this, it funds research, pilot lines, and large-scale manufacturing facilities (EC, 2023b). In addition to the ECA, Germany has also implemented national-level measures to build domestic production capacity and attract investment into the sector. The German government has earmarked €20bn in subsidies for the semiconductor sector; this includes significant support for the flagship projects, the new European Semiconductor Manufacturing Company fabrication facility in Dresden (Ersen and Sterling, 2024). Moreover, new funding programs that offer €2bn in grants for further semiconductor R&D and expansion in production capacity have been implemented (Kyriasoglou, 2024). These initiatives aim to ensure a stable, domestic supply chain of semiconductors, which are crucial for the long-term competitiveness of Germany's EV industry.

5.1.2 China

China's emergence as a global leader within EVs and other green industrial technologies is one of the most striking cases of successful structural economic transformations of the 21st century (Nahm, 2021). In less than two decades, China has gone from being a marginal player in the global car industry, to becoming *the* dominant player in both EV production, battery manufacturing, and critical mineral supply chains behind EVs and batteries. Initially, the Chinese industrial policy approach was motivated over concerns over energy security, air pollution in urban areas and industrial upgrading. China's strategic utilization of industrial policy for the EV sector has since produced unparalleled results, as by 2023, China accounted for more than 60% of global EV sales (IEA, 2024). In addition, China is also home to the biggest manufacturers of batteries in the world and dominates the majority share of important critical minerals which are essential for battery and EV production.

This incredible rise of China in the global EV industry is the outcome of a long-term and state-led industrial strategy which has utilized market-shaping industrial policy tools such as massive subsidies, infrastructure investments, regulatory mandates, and a great emphasis on upstream supply chain domination. Strong initiatives for EVs started under the 13th FYP, to consolidate green industrial policy under the NEV Industry Development Plan (2021–2035). The Chinese approach to EVs reflects a systemic, multi-level strategy, which links domestic industrial development to issues of global technological leadership. It is crucial to gain an understanding of how state interventions, industrial policy and global political and economic ambitions, in agglomeration all shape China's EV policies and the future of the global EV industry (Nahm, 2021).

China's political and economic system is often portrayed as one with extremely high degrees of centralization, with practically every decision happening at the very top. However, according to Keyu Jin (2023a), the reality of China is much more nuanced than that. Jin claims that the Chinese system is characterized by a high degree of political centralization, while also having a high degree of economic decentralization. She describes the 'Mayor Economy' in China, where local governments at the municipal and provincial level play an important, active and often entrepreneurial role in the local economy via their shaping and implementation of industrial policy. Especially the economic competition between municipalities and provinces, which the success of Chinese civil servants is predominantly measured on, drive policies on innovation, infrastructure and industrial advancement for key sectors such as EVs. This dynamic of the 'Mayor Economy' can be seen in the public procurement schemes, and the local-level incentives and subsidies (Jin, 2023a). This dynamic will be covered more extensively in the state-level analysis.

5.1.2.1 Strategic framework

The industrial policy strategy of China towards EVs is deeply embedded within a series of long-term national planning documents, which systematically articulate clear targets, visions, and priorities for China's technological and industrial economic transformation. China's combination of successive FYPs, sector-specific industrial strategies, and overarching policy agendas regarding innovation has given a consistent, yet adaptive policy framework which guides the growth of the Chinese EV sector over the past decades (Gomes et al., 2023; Tian et al, 2024). The most detailed account of China's EV ambitions is found within the NEV Industry Development Plan (2021–2035). This plan states explicit goals for both market expansion as well as technological innovation. By 2025, NEVs, which includes EVs, PHEVs, and fuel cell vehicles, are targeted to account for approximately 20% of total new vehicle sales (ICCT, 2021). This goal was emphatically reached, as by the end of 2024 NEVs accounted for 40,9% (12,9m units) of total new car sales in China, of which EVs alone accounted for 10,1m units (Kang, 2025). This result is then more than doubling the initial target. In addition to the targets for adoption and the EV market, the plan emphasizes Chinese domination of the vital core technologies for

EVs, such as battery systems, drive motors, and vehicle operating systems; integration with smart and connected vehicle platforms; and the establishment of internationally competitive Chinese brands. China's broad industrial focus on market share and technological leadership showcase China's ambition not just to electrify their own transportation sector, but to dominate the future global car value chain (ICCT, 2021).

China also launched its broad strategic industrial strategy, Made in China (MiC) 2025 in 2015. In the MiC 2025, NEVs are designated as one of the ten strategic sectors that are critical to China's industrial advancement (CSET, 2022). MiC 2025 also sets explicit targets for national sovereignty and self-sufficiency for technology, and it emphasizes the importance of upgrades for key components like batteries. The plan goes far beyond just EVs, but its inclusion of NEVs as a strategic sector cements the sector's importance and aligns industrial policies such as subsidies, R&D funding, and regulatory incentives in order to foster an internationally competitive, and globally dominant, EV industry (Wübbeke et al., 2016; Yeung, 2018; Sutter, 2024). MiC 2025 posits a clear vision of capturing both domestic market shares, as well as developing firms that can challenge both Western and Asian incumbents in the international car industry for global market share (Yeung, 2018).

Several of the Chinese FYPs function to emphasize and concentrate on EVs, related technologies and supply chains, with the 14th FYP (2021-2025) further consolidating the centrality of EVs within China's strategy of economic modernization. The 14th FYP calls explicitly for accelerating the deployment of NEVs, next-generation battery technologies, and expanding charging infrastructure for EVs (CSET 2021; Gu and Gordon, 2023; Hepburn, et al. 2021). The 14th FYP also positions the EV transition within broader goals of energy security, carbon neutrality, and green growth (CSET, 2021). At the same time it links NEV development to initiatives in renewable energy, digital infrastructure, and urban modernization. The plan does not set quantitative targets for EV sales, but it emphasizes the strategic prioritization of China to build a state-of-the-art EV sector as a main pillar of their green transition (Hepburn, et al. 2021). The 14th FYP builds on the foundations of China's EV vision laid out in the 13th FYP (2016–2020)**.** The 13th FYP emphasized the diversification of energy consumption sources and the need to reduce oil dependence in their transport sector, set initial NEV deployment goals, promoted the construction of charging infrastructure, and encouraged systems of battery recycling. The 13th FYP also integrated electric mobility into China's broader strategies for both energy and environment, which created policy momentum that has since been expanded under subsequent frameworks (CSET, 2016; Koleski, 2017; Busch et al., 2021). The coordinated efforts towards the EV transition of the Chinese government can be traced back as far as 2001 and the 10th FYP. Under the 10th FYP, steps were taken to invest in EV related technologies, and EV technology itself was introduced as a priority science research project (Yang, 2023).

The policy documents regarding the strategic framework of China's EV efforts then show a highly coordinated and multi-layered approach. The industrial transformation of EVs is then embedded within grander visions of industrial upgrading, technological sovereignty and leadership, energy security, and global leadership. The cumulative effect of all the different policy frameworks send clear policy signals about the strategic importance of the EV sector for China to both firms, investors, and local governments.

5.1.2.2 Incentives and financial support

China's strategic utilization of policy tools like subsidies, incentives, financial support, and other market-shaping mechanisms are key reasons behind China's successful scaleup of its EV sector. China's industrial policy strategy demonstrates a systematic approach to influencing both consumer and producer behavior towards the political goals of furthering EVs, through its policy mix of subsidies, regulations, and local government actions. The policy interventions have actively helped in the

structural transformation of their economy via the embedding of EVs as a critical technology far earlier than most other major economies. In addition to this, the policies have also accelerated the rates of EV adoption and industrial advancement in the sector.

Central to the Chinese effort is the National NEV Subsidy Program which was introduced in 2009. The program gave direct purchase subsidies to consumers who bought NEVs. In the early stages, the subsidies for consumers for EVs were RMB60.000 and RMB50.000 for a PHEV. In addition to this, some cities offered additional subsidies for consumers which could be stacked on top of the national subsidies, which is a significant amount that can influence consumer behavior towards NEVs. The subsidy was particularly aimed at urban drivers and public fleets (PRTM, 2011). As the NEV sector evolved and advanced technologically, the subsidy was refitted and became more stringent and dependent on certain performance criteria of the NEVs, such as longer ranges of the cars and higher energy efficiency. The subsidies significantly reduced the upfront costs, which is a key barrier to adoption, the subsidy program accelerated consumer adoption, as well as aiding producers in achieving economies of scale, which enabled domestic companies like BYD to become national champions. However, China does not view the subsidies as permanent solutions for their EV sector, and the subsidies were phased down and altered between 2017 and 2022. China also introduced conditionalities, and phasing out the subsidies sent policy signals to the market to improve their competitiveness, and that the state support is contingent on industrial and technological advancement of the sector (Jin, 2023b).

As the National NEV Subsidy Program was beginning to be phased out, China introduced the structural market mechanism of the Dual Credit Policy in 2018. The policy is a regulatory system targeted at producers, which imposes fuel consumption credits and NEV production credits. Under the policy, companies are mandated to meet annual targets for both types of credits. For fuel consumption, the policy aims to improve the efficiency of manufacturers' ICE-cars, as companies are given a target for their fuel consumption target to reach based on the number at type of ICE-cars they produce and they incur a credit deficit if they fall below the targets. This credit deficit then has to be offset by purchasing credits from companies that outperform their targets and gain a credit surplus. On the NEV production side, the policy aims at accelerating the production and integration of NEVs. This is done through the NEV production credits, where manufacturers face a demand that a certain percentage of their sold vehicles are NEVs. The NEV credits are then based on a variety of factors, such as the type of NEV (EVs being better than PHEVs), the range of the vehicle, energy consumption, and the vehicle weight class. Similar to the fuel consumption credits, if a manufacturer does not meet its annual NEV credit requirements, it must purchase credits from other compliant firms or reduce its ICE vehicle production (Yang et al., 2022; Chen and He, 2022; IEA, 2023b). The Dual Credit system, and the phasing out of the subsidy program shifted the emphasis of policy from consumer behavior to producer behavior. This ensures that even when direct fiscal support declined, the momentum toward EVs would be sustained by regulatory market design.

China's local and provincial governments also played a critical role in China's EV transition, through the implementation of additional EV purchase incentives and fleet electrification mandates. Major cities like Shenzhen, Beijing, and Shanghai introduced their own purchase subsidies, and public procurement mandates (Gomes et al, 2023). These localized incentives structured have created dense regional ecosystems for EV adoption, which reinforce national-level policies and allow space for regional policy experimentation with different market-shaping models. Local initiatives were critical in demonstrating early deployment at scale, particularly in sectors like electric buses and taxis, which helped normalize public perceptions of EV reliability (He et al., 2018; Yang, 2023). Public procurement of NEVs, and in particular EVs, also creates stimulus for the industry through the creation of a strong stable source of demand from public sources for EVs (Yang, 2023). This then creates a stable consumer base for producers to sell EVs to, and reinforce the policy signals surrounding EVs. In addition to public

procurement, major cities introduced their own purchase subsidies as well as license plate incentives, such as waiving lottery systems for EVs. In many places in China where car markets are highly regulated, gaining a license plate for an ICE car can be an extremely difficult and costly process. By exempting EVs from license plate restrictions (lottery), this creates a powerful non-monetary incentive that significantly tilted consumer behavior toward EVs (He et al., 2018).

Beyond China's strategic industrial policy framework, the 13th FYP also further institutionalized these market-shaping policies through expanded funding for charging infrastructure and strengthened support for R&D for battery technologies (CSET, 2016; Busch et al., 2021). In addition, the 13th FYP also crucially emphasized this transition we have shown; the transition toward a more market-based support mechanism through the gradual reduction in consumer subsidies, and the implementation of dual credit systems and other regulatory means to sustain adoption growth, China's policy architecture for incentive and financial support demonstrates a dynamic and adaptive market-shaping strategy. This ensures that market behavior continues to align with national electrification goals even as direct financial support from the state decreases. This strategic mix of policy tools and temporal variance of policies, with subsidies first and then structural mandates, showcases how China's state-led industrial policy model profoundly shaped both consumer preferences and producer strategies. This has then created an EV market far larger and more resilient than demand from a free market without state interference could have achieved.

5.1.2.3 Infrastructure and developments

China has launched an ambitious and state-coordinated buildout of EV infrastructure as a core component of its wider EV strategy, recognizing that mass EV adoption hinges on the infrastructure which creates convenience and accessibility for EVs. These infrastructure policies have sought to systematically eliminate 'range anxiety', integrate EVs into everyday mobility habits, and lower the logistical barriers hindering the switch from ICE-cars to EVs (Chen and Lin, 2022; IEA, 2023a).

A main policy program for its buildout of EV infrastructure is the guidelines for the construction of charging infrastructure of 2015, which marked the central government's first major intervention in order to shape the EV charging ecosystem in China. The policy set a target of deploying charging stations to build a national network of charging infrastructure to support 5m NEVs by 2020. It also set a goal of deploying 4,8m decentralized charging stations (IEA, 2021b). The guidelines also require new residential and commercial buildings to feature built-in EV charging capabilities, as well as requiring that public parking lots dedicate a certain percentage of parking spaces to EV chargers (PRC, 2015). The guidelines caused a wave of infrastructure development, with local and provincial governments and SOEs spearheading the rollout of charging stations. The policy targets of the guidelines were also supported by financial investments that provided expanded financing channels to encourage investment into charging infrastructure (IEA, 2021b; Cui et al., 2024). Moreover, the guidelines have embedded EV charging accessibility into urban environments via the integration of charging station requirements and construction regulations.

The 13th FYP also focused on scaling up EV infrastructure, and explicitly mentions an expansion of the EV charging network as a strategic national policy priority. The 13th FYP called for building a nationwide, intercity fast-charging network, which links together major urban clusters and key transportation corridors (CSET, 2016). This aimed at improving conditions for EV travel both within cities and across regions, which then expands the group of potential EV customers beyond the urban population. This also functions to quell the 'range anxiety' associated with the EV transition. Local governments were mobilized to align with the national targets, and often set even more aggressive quotas for charger-to-vehicle ratios locally and subsidizing charging infrastructure investment directly (CSET, 2016)

China accounted for 70% of global public EV charging in 2023 and is expected to remain a leader with a similar share in 2035 in the stated policy scenarios. The Chinese government has issued development guidelines for the deployment of high-quality EV charging infrastructure, aiming at a 50% increase in the amount of public charging points relative to NEVs, from about 10 in 2023 to around 15 in 2035. China's current public charging infrastructure boasts one of the highest shares of fast-speed charging points, at around 45%. China aims at growing the amount of fast chargers almost six-fold by 2035, while also increasing the amount of slow-charging points significantly by 2035 (IEA, 2024a).

5.1.2.4 Critical minerals, battery, and semiconductor supply chains

To further entrench China's industrial rise in the EV sector, and other clean technologies of strategic political and economic importance, stable, secure, and sovereign supply chains of those clean technologies is critical. Therefore, China has coupled its cleantech industrial strategy, and preempted it, with a great strategic focus on these supply chains. China has developed a proactive and state-coordinated approach to industrial inputs such as critical minerals, batteries, and semiconductors, serving as a cornerstone in its green industrial strategy. China instituted fundamental policy reforms towards rare earth industry development to step into the Chinese domination of cleantech upstream supply chains, with the reforms aimed at consolidating its fragmented rare earth mining sector and putting it under stronger state control. They used a policy mix of production quotas, export restrictions, R&D support for the processing of rare earths, and industry consolidation, which have propelled China into a dominant global position (Mancheri et al., 2013). Currently, it is estimated that China controls 60-70% of the world's rare earth supply (Chang, 2022). Their implementation has then both transformed the domestic industry as well as having far-reaching implications for global supply chains and market dynamics regarding rare earths. Although the reforms do not explicitly focus on EVs, national control over rare earths is critical for the technology behind EVs and similar clean technologies, and thus this has been a solid foundation for China to build their EV sector upon (Mancheri et al., 2013; Howanietz, 2017; Tse, 2011). In addition to the rare earth industrial reform policies, China has also politically targeted lithium as a key resource to control, explicitly prioritizing securing lithium resources, which are essential for battery production. The framework of the Chinese lithium-ion battery value chain has become the guiding light for firms' strategic choices at every stage (Wang, 2022).

Through the policy reforms, China has encouraged both domestic lithium exploration, expanded the Chinese capacity for lithium processing, and promoted overseas acquisitions through SOEs. The ability for battery firms to vertically integrate their supply chains, especially in regards to lithium, is seen as strategically important, both politically and economically (Wang et al,. 2022). This framework on lithium battery value chains, centered on vertical integration and supply chain security and sovereignty and become a guiding light for the strategic choices of Chinese firms at every stage (Wang, 2022). This strategic ambition of lithium battery supply chain control has also pushed Chinese firms to invest. Companies such as Tianqi Lithium and Ganfeng Lithium invested heavily in lithium mines across Australia, Latin America, and Africa, often with state-support (Brunelli et al., 2023; Berg and Sady-Kennedy, 2021). This deeply embedded Chinese firms across global battery supply chains. China has also strategically protected its own nascent lithium battery industry through excluding foreign competitors, as the MIIT, one of the central ministries in coordinating China's NEV policies, implemented 'The Regulations on the Standards of Automotive Power Battery Industry'. The regulations excluded foreign-owned battery manufacturers from the government's subsidies towards NEVs. This pushed mature battery manufacturers like LG Chem and Samsung out of the Chinese market. The regulations then gave the nascent Chinese battery sector a window of opportunity where they were without foreign competition and could build up their own comparative advantages through methods such as technology absorption, economies of scale, and supply chain lock-up effects. Similar

to the subsidies on NEVs in China, the regulations scaled back the protectionist measures as Chinese battery firms have become more competitive. This easing of protectionist policies have allowed foreign battery firms to rejoin the Chinese market and gain access (Wang, 2022).

More recently, China has also implemented policies of battery recycling and traceability management to secure better sustainability and circularity around batteries. The measures establish regulation for a national battery recycling framework, and mandate a tracking system for battery life cycles (IEA, 2024b). The price of the material inputs for batteries, such as lithium, nickel and cobalt increased significantly in 2022, which made battery recycling an attractive business, and therefore there was an urgent need to establish relative standards and regulations (Wang, 2022). Through these policies on battery recycling and traceability management, China aims to reduce future reliance on raw material imports, enhance resource efficiency, and maintain a strategic advantage in critical materials as EV production scales up via their integration of recycling into the supply chain, with the long-term access to recycled cobalt, nickel, and lithium seen as critical for mitigating geopolitical risks and supply bottlenecks associated with battery supply chains (Wang, 2022).

A wider strategic direction regarding the inputs to EVs and similar clean technologies can be seen in both the 13th FYP and the MiC 2025. Each plan emphasizes the political goal of self-sufficiency and technological leadership and sovereignty in energy storage technologies. Battery manufacturing was put forth as a critical sector for putting China at the cutting edge of the global energy transition. The Chinese state also invested heavily into R&D for batteries. Furthermore, the state supported the rise of industrial leaders CATL and BYD, and made sure that the capacity for battery production could be expanded alongside vehicle manufacturing (CSET, 2016; Yeung, 2018; Wübbeke et al., 2016). The NEV Industry Development Plan builds upon the strategic direction through its focus on batteries and the supply chain. The plan places a large emphasis on advancing battery technology and securing a stable supply chain as a cornerstone in the EV transition. The plan promotes a holistic development of the battery supply chain, including the upstream supply of critical minerals such as lithium, cobalt and nickel. It also encourages innovation within battery technology through standardizations, process optimization, and improved manufacturing efficiency (ICCT, 2021). These frameworks and policies aim to position China as a global leader in EV production as well as batteries.

Semiconductors have also risen to the forefront of political importance, given the critical role of semiconductors in cutting-edge technology. A self-sufficient semiconductor industry is also a vital political goal of China, and a key step in its ascent into global cleantech leadership. Regarding EVs, semiconductors are vital for its core functions, such as battery management systems and autonomous driving capabilities. China has then integrated semiconductor development into their greater industrial strategies since the 2010s (Janjeva et al., 2024; Zhang et al., 2025). The MiC 2025 also put forth semiconductors as a priority sector for Chinese commercial and military purposes, and the MiC 2025 sets a target of achieving 70% self-sufficiency in semiconductor production by 2025. To achieve this policy goal, China launched the 'China Integrated Circuit Industry Investment Fund' in 2014 (the Big Fund). The Big Fund operates as a state-led investment vehicle, as it provides equity financing to channel finance into the semiconductor sector. The big fund also builds public-private partnerships to collaborate between SOEs, financial institutions and chipmakers (Wübbeke et al., 2016; Zenglein and Holzman; 2019; Janjeva et al., 2024). Across the Big Fund's three funding phases with distinct policy focuses, the fund has raised over RMB650bn (€80bn) for the development of the semiconductor industry in China. Phase I (2014–2019) raised RMB139bn, and focused on the manufacturing capacity; phase II (2019–2024) raised RMB200bn, and expanded into broader ecosystem development; and the ongoing phase III (launched in 2024) raised RMB341bn, and targets advanced technologies such as AI chips and domestic equipment. Additionally, the big fund has assisted in the scaling-up of Chinese national champions, such as SMIC and Hua Hong, which has been a catalyst for broader industry growth. The Big Fund is a cornerstone in China's industrial policy towards semiconductors, which in

turn lays the foundation for both technological sovereignty in China and Chinese global leadership within technology (Wübbeke et al., 2016; He, 2021). This emphasis on sovereignty regarding semiconductors was added to in the 14th FYP as it reiterates the status of semiconductors as a strategic industry that is also critical for national security. The 14th FYP targets next-generation semiconductor technologies, expanding R&D platforms, and an acceleration of commercialization of domestic semiconductors as alternatives to foreign semiconductors (CSET, 2021). Specifically for the Chinese EV sector, policy initiatives call for EV manufacturers to source semiconductors for their EVs domestically, with Chinese firms rapidly scaling capacities within automotive semiconductor production (Ting-Fang et al., 2024).

5.1.3 Comparative policy-level analysis

As the analysis shows, Germany and China offer two models that both feature similarities and distinct differences of how green industrial policy can be utilized to promote the EV transition. Both Germany and China pursue broadly similar objectives through their EV transition such as decarbonization, technological upgrading, and global competitiveness. However, the scale, intensity, style, and coordination of their industrial policies differ significantly.

In terms of scale and intensity, China's interventionist industrial policy is substantially greater. Already from the early 2000s and onward, China has deployed a long-term strategy that integrates industrial modernization with green technology promotion, by using policy tools ranging from vast consumer subsidies and regulatory mandates to massive infrastructure investment and upstream resource control. The scale of political and economic commitment to achieve its targets, both financially and administratively, dwarfs Germany's efforts. China's industrial policy strategy has led to a profound structural transformation of the EV sector, and has been part of a larger structural transformation of the Chinese economy towards technology; especially green technology. On the other hand, Germany has a quite proactive and deep industrial policy strategy by European standards. However, in comparison to China, Germany operates on a more restrained and limited financial and regulatory scale, which is constrained by both EU rules and regulations, as well as a domestic political constraint surrounding financial policies.

The style of industrial policies used across the cases also have fundamental differences. The Chinese style shows a state-coordinated, vertically integrated and long-term strategic approach, with clear leadership from the central government that can mobilize both local government and the private sector in pursuit of the national policy goals. Several policy plans embed EVs into economic and regulatory frameworks that create fast and enduring behavioral shifts that support the EV transition. Infrastructural developments have been pursued through policy mechanisms that ensure fast and comprehensive deployment of EV charging facilities. Comparatively, Germany's style of industrial policy follows a more market-based approach. It relies more on incentives to influence private sector investment decisions and consumers' behavior. Germany does utilize subsidies and regulations towards the EV transition, but they are not part of the same systematic industrial policy approach of the Chinese. Regarding infrastructure investments, the policies are guided by mandates and regulations that make use of the existing ICE-car-based mobility infrastructure. Germany then relies more on market actors and public-private partnerships for its EV transition. Despite these differences regarding the scale and style of industrial policy frameworks, there are remarkable similarities in the objectives of each country's EV industrial strategies. Both countries use the EV transition as a key tool in the wider green transition, upgrading technologically, and improving their competitiveness in green technological sectors that are key for the future economy. The EV transition is also embedded in larger political goals of technological sovereignty. However, in the case of China, this specific objective was implemented

earlier, which has given it a head start in further developing against Germany. EV technologies are then critical not just for economic growth but also for geopolitical positioning in a carbon-constrained world.

There are also significant differences in terms of the policy instruments used in each country. China's industrial policy framework involves a layered toolkit of subsidies, purchase incentives, fleet electrification mandates, regulatory credit systems, public infrastructure mandates, and upstream mineral acquisition strategies. In this toolkit, many policies also go through different stages of development, to tailor specifically to the needs and failures of the conditions of that time. China also actively cultivates national champions in batteries and semiconductors through direct financial support and preferential policies. In contrast, German industrial policy instruments are more market-compatible. While the instruments themselves are similar to the Chinese, the German approach is shaped by a significantly different institutional environment. As a liberal market economy embedded in the EU, Germany operates within a regulatory framework that, despite new policy preferences, still emphasizes competition neutrality, fiscal restraint, and limits on direct state intervention. Therefore, German industrial policymaking generally works through more indirect methods of incentivization, and the policies are not tied together or vertically integrated in the same manner as they are in China. These constraints on industrial policymaking also reflect the domestic political preferences for minimal disruption of established industries, especially within the general car industry in Germany, where incumbent firms hold considerable influence over policy.

This issue of coordination of the industrial policies is perhaps the sharpest point of divergence between the cases. China's EV industrial policy demonstrates a high degree of vertical coordination between national, provincial, and local levels. This coordination effort is then reinforced by strong links between state-owned banks, enterprises, and policy makers. Germany's coordination is multi-scalar but fragmented, as it balances federal and state-level policy initiatives, and EU directives, as well as a politically powerful incumbent car industry. German policymaking in general bases itself on negotiation and consensus, which also leads to slower, but more politically inclusive and diverse, policy processes.

Taken together, Germany and China share their strategic ambitions for their respective EV sectors, however, they show two distinct pathways of industrial policy strategy and design. Germany's more market-coordinated and politically decentralized approach, and China's state-led, highly coordinated industrial strategy. The differences shown in scale, style, instruments and coordination have profound implications for the speed, success and resilience of each country's structural economic transformation towards EVs.

The comparative analysis is further enriched by applying Lee and Malerba's (2017) concept of catch-up cycles to give a lens to view the divergent trajectories Germany and China have taken for their EV sectors. Lee and Malerba's framework focuses on how latecomer economies can surpass the incumbents through capitalizing on windows of opportunity, which are moments where shifts in technology, demand or institutions can destabilize the existing industrial hierarchies, which gives newcomers a chance to establish themselves. A country's ability to successfully take these windows of opportunities depend on their ability to coordinate policy, industrial actors, and long-term technological upgrading (Lee and Malerba, 2017). In accordance with Lee and Malerba's concepts, China exemplifies the successful latecomer which has quickly evolved from a peripheral player, to a global leader in the sector. The transition within the wider car industry from ICE-cars to EVs represent a clear case of this window of opportunity caused by technological change. Firstly, China has identified this window of opportunity, and then secondly, has mobilized itself through strategic industrial policy frameworks to seize upon this opportunity.

Germany then serves as the example of the path-dependent incumbent that faces structural disruptions within the industry it dominates. Its historically successful car industry, which has been rooted in Germany's excellence in mechanical engineering, and the ICE-car, har created both institutional and economic inertia which slows down systematic change. Germany has utilized industrial

policy to foster and support the car industry's transition from ICE-cars to EVs, however, it has to a large extent had a focus on incremental adaptation rather than broader transformations. These developments are in line with Lee and Malerba's insights; that incumbent leaders tend to slow down responses to new technological paradigms, using defensive actions and relying on their incumbent powers until the window of opportunity closes (Lee and Malerba, 2017). Furthermore, this reactive and defensive policy approach of Germany can also be seen in its slow reactions to policy goals of self-sufficiency and supply chain security. Its policy can be said to be shaped by exogenous pressures such as the Chinese industrial upscaling and upgrading, the US' Inflation Reduction Act (IRA), or its severance of economic ties to Russia (Münchau, 2024). Ultimately, Lee and Malerba's notion of catch-up cycles shows that industrial policy itself is not enough for newcomers to ascend to industrial leadership, but that timing, coherence, and a systemic ambition matters as well (Lee and Malerba, 2017). China's success lies in seeing EVs as a vehicle for economic transformation and global repositioning. Germany, on the other hand, faces the issues of navigating its own EV transition while defending its incumbent position in the global car industry.

5.2 State level: The Growth Model Perspective

To build on our policy-level analysis, this section will shift the analytical focus to the state level by examining how national macroeconomic systems and political coalitions shape and influence the design, ambition, and implementation of the green industrial policies towards the EV sector. The actual used industrial policy tools are the manifestation of an industrial strategy, with both the formation and deployment of those policies being deeply determined by the underlying growth model and social bloc of the country. Utilizing the GMP, and building upon the previous policy-level analysis, this comparative analysis will focus on how the macroeconomic and political dynamics of a country constrain or enable structural economic change. In Germany, its growth model is a coordinated growth model led by exports, which is shaped by corporatist institutions and a negotiated social bloc. For the analysis of China, the focus will be primarily on its export-led growth model, as it expresses itself for the EV sector. However, China has a broader growth model configuration which encompasses a hybrid between an export-led, and a state investment-led as the core drivers of growth. This framework allows us to build an analytical connection between the patterns of industrial policy we found earlier, and the political and economic foundations of the countries. This gives a deeper understanding and context to the divergence we observe across the countries.

The state-level analysis spans across four analytical categories. Firstly, it characterizes the growth model of the countries, through an identification of the primary drivers of growth and its sectors of strategic importance. Secondly, it analyzes the institutional infrastructure set in place to support the growth models, such as labor relations, economic policy frameworks, and systems of governance. Thirdly, it determines the social bloc of each country, the configuration of it, and the hierarchy within it. Finally, these analytical findings will be integrated with the findings of the policy-level analysis, to show how each country's green industrial strategy aligns with, and depends on, the growth model and social bloc. This layered analytical approach enables a comparative understanding of how state-level structures and dynamics shape the formulation, coherence, and transformative potential of industrial policies in the EV sector.

5.2.1 Germany

5.2.1.1 Growth model

Germany is the prime example used to illustrate what an export-led growth model looks like in practice (Baccaro and Pontusson, 2019; 2022). The German growth model is even quite extreme in the degree to which it relies on exports, as exports drive the majority of growth and the institutional framework is set up to support exports. The German growth model is then a deeply institutionalized export-led model. The growth model is underpinned by an undervaluation of the real exchange rate, politics of wage moderation, and a macroeconomic regime which is structurally conservative (Baccaro and Höpner, 2022). The German economy, and economic growth, has since the 1990s been driven by exports, with other factors like private consumption and government spending playing a smaller role. Exports accounted for 75% of total economic growth between 1995 and 2015, while domestic demand posed a negative contribution of -4% to the total economic growth in that period (Baccaro and Höpner, 2022). Since 2010, exports as a share of GDP in Germany has hovered around 40%, with mild fluctuations for individual years giving the lowest percentage of 39,5 in 2010 and highest of 45,8 in 2022 (World Bank, 1960-2023). These developments showcase the structural dependence on demand from external sources for Germany's economy. This is especially the case in their high-value engineering sectors involved with exports like car manufacturing, machinery and chemicals.

The growth model centers on three main pillars. Firstly, the euro's fixed exchange rate prevents nominal appreciation and thus supports real undervaluation against other eurozone countries. The euro also supports German currency undervaluation through its inclusion of peripheral economies that are less advanced and less efficient exporters, which prevents appreciation against other currencies (Baccaro and Pontusson, 2019; 2022; Baccaro and Höpner, 2022). Secondly, Germany's below average inflation levels are enabled to a large extent via the politics of wage restraint. Industrial reforms of the 1990s have also resulted in weaker bargaining positions for labor, which faces more decentralized and less coordinated bargaining and wage-setting structures. These reforms have allowed employers to lower their cost of labor through a more asymmetric power dynamic in wage bargaining, such as concessionary bargaining agreements in favour of employers, and hiring labor with non-collective agreements. (Baccaro and Pontusson, 2019; 2022). Thirdly, this target of low inflation is also helped by the German fiscal rules, with its debt-fetishization, which is exemplified by its 'Schwartze Null' policy. These fiscal rules enforce a strong constraint around public spending and investment and bring about a macroeconomic environment where fiscal discipline trumps the stimulation of domestic consumption through fiscal policy (Baccaro and Höpner, 2022).

Germany ran fiscal surpluses throughout the 2010s and had historically low borrowing costs, while facing economic pressures such as crumbling infrastructures, climate change and the green transition, and a digital revolution, all which required significant investments. However, the German government did not invest or spend significantly on infrastructure, innovation, or climate transition measures. This conservative fiscal policy stance is fundamentally tied to the country's export-oriented macroeconomic logic, wherein an increase of domestic consumption is seen as a potential inflationary risk which could decrease the German price competitiveness (Baccaro and Höpner, 2022). Additionally, EU fiscal rules and competition law, which Germany significantly shaped, further constrain state aid policy options. All this then reduces the ability of Germany to utilize ambitious green industrial policy at a larger scale.

These structures have helped to embed this long-standing exportist ideology within the political economy of Germany. This exportist ideology is deeply embedded within public discourse and economic 'common sense'. It is supported by narratives of national parsimony, debt aversion, and financial restraint (May et al., 2024). The exportist ideology then contributes to further institutionalizing

the export-led German growth model, making it change-resistant, shielding it from political shifts, and reinforcing a political and economic strategy, which favors the interest of the sectors that are internationally competitive. EV policies and industrial strategy should be situated within this GMP framework, as the industrial strategies function to both advance their EV transition, but also to defend the viability of the manufacturing-based export-led German growth model.

5.2.1.2 Institutional infrastructure

Delving further into Germany's export-led growth model shows an institutional framework, which is embedded in, and has historically supported, industrial competitiveness, while constraining a more expansive structural economic transformation. Beyond the above mentioned three main pillars of the growth model, Germany's institutional setup of corporatist labor relations, vocational training and financial system all aid the growth model.

The German system of coordinated labor relations balances the interests of capital and labor, through wage moderation to suit capital, and job stability to suit labor. Additionally, the influence, and consent, of Germany's significant sectoral labor unions are a key feature in these coordinated labor relations. However, since the reforms of the 1990s the relative power has shifted towards employers and away from employees (Baccaro and Pontusson, 2019; 2022). These labor bargains with concessions to capital have given companies improved flexibility, while preserving employment levels, primarily for labor directly involved within the export sectors, such as the car sector (Baccaro and Höpner, 2022). Labor unions also face decreasing relevance, with collective bargaining coverage declining from around 80% of the 1990s to 60% by 2008. This further weakens the redistributive power of organized labor, especially between the domestic-oriented service sector and the export-oriented manufacturing sectors (Baccaro and Pontusson, 2022; Baccaro and Höpner, 2022). Despite this general decline of labor power, codetermination and firm-level bargaining have ensured that the privileged industrial labor unions remain as central actors, by working along this policy of wage moderation and economic competitiveness (Baccaro and Höpner, 2022). The corporatist institutional setup of Germany's vocational training and education system also strengthens the link between the important industrial sectors, the state and the labor market. The German dual education system integrates classroom teaching with company-based apprenticeships, thus creating a pipeline for industry-specific skills which cater to the needs of the critical sectors such as the car industry. This system helps perpetuate the German economic system and growth model; however, it also creates inertia which makes a transition to new economic and technological paradigms more difficult (Baccaro and Pontusson 2022). This embedding of the export sectors into vocational training and education system also means that a structural transformation of the economy and industry require significant changes to the education system and re-skilling of the labor force, something which is often resisted by the major industry incumbents (Münchau 2024; Baccaro and Pontusson, 2022).

The German financial system and its institutional characteristics also play a vital role in maintaining and furthering the manufacturing-based export-led growth model. It does so by providing firms with longer-term and more stable finance made for the capital-intensive industries linked to exports. The German financial system functions primarily through a bank-based system, and not via capital markets, where local and regional banks form closer and longer-term relations with firms. This gives industries more 'patient' capital that does not have the same short-term pressures of shareholders that capital markets have (Hall and Soskice 2001; Deeg, 2005). This financial system lets firms invest more in line with a long-term strategy to increase their productive capacity, in things such as workforce training, machinery and incremental innovation; all of which support the endeavors of seeking improved competitiveness of the industrial export-oriented sectors, like machinery and cars. This institutional financial setup protects German firms from market volatility and supports the coordinated efforts to

improve competitiveness of German industry. However, this financial system is then also less dynamic and also creates a form of industrial inertia, where it is difficult to achieve funding for the structural transformation of industries (Münchau, 2024).

5.2.1.3 Social bloc

This manufacturing-based export-led growth model is maintained through a dominant social bloc which is composed of industrial capital, organized labor in the core manufacturing sectors, as well as centrist political elites. The social bloc is not a flat coalition with equal representations of their respective interests, but rather a vertically structured alliance, where the actors political and economic power and leverage determine their influence and distributive returns from the growth model (Baccaro and Pontusson, 2016; 2019). One can even argue that the German social bloc extends beyond its borders, to include the Central and Eastern European countries that are integrated into the supply chains of the German export sectors through FDI (Bohle and Regan, 2021). The bloc is characterized by its ability to maintain itself through macroeconomic strategy and a political consensus, despite its uneven distribution of privileges (Baccaro and Pontusson, 2016).

The industrial capital within the export-focused sectors is at the apex of the German social bloc, such as the firms that are engaged in the car, machinery and chemical sectors. They are then the primary beneficiaries of the export-led growth model. Industrial capital benefits through the undervaluation of the real exchange rate, both within the EU and globally; wage moderation through both an increase in their own bargaining power, and weakening of organized labor through labor market reforms; access to highly skilled labor for industrial purposes; supply chain integration, especially in Central and Eastern Europe; and fiscal policy with a primary goal of low-inflation (Baccaro and Pontusson, 2016; 2019; 2022; Baccaro and Höpner, 2022; Bohle and Regan, 2021). Their dominance extends to both the political and the economic realm. Regarding politics, the industries' interests often get directly correlated with the national interests of the German state, and the industrial elite often enjoy privileged access to top policymakers. Gerhard Schröder was commonly referred to as the Autokanzler, and an executive from the car industry authored the Schröder-government's economic regulation in 2003. During VW's diesel scandal in 2015, the transport minister at the time, Alexander Dobrindt, did not seek confrontation against the corrupt car companies, but rather sought ways to cooperate with them (Münchau, 2024). More recently, in 2023 the then finance minister Christian Linder gave almost hourly updates of EU negotiations regarding the ICE-car phase out by 2035 to the chief of Porsche and VW. Lindner also almost blew up the negotiations over the phaseout, as he insisted on an exemption for Porsche in the phaseout. Later the Porsche and WV chief bragged over the influence that Porsche exerted over the coalition agreement (Münchau, 2024). Industrial capital also benefits from the economic policy enacted to maintain and further the growth model in which they sit on top, such as fostering global competitiveness and in the case of the car sector, protecting it during the transition from ICE-cars to EVs (Baccaro and Höpner, 2022).

Organized labor, primarily within the core sectors within, or sectors related to, exports, also feature within the social bloc. Organized labor holds a weaker but balancing position within the social bloc. Trade unions, such as IG Metall, have institutional representation through the policy of mitbestimmung (co-determination), which grants unions representation on company boards. Trade unions exert power through sectoral bargaining, where they are able to secure wage growth linked to productivity, employment security, and an input in workforce restructuring. However, organized labor is in a structurally subordinate position within the German social bloc. They have been pushed into a political and economic consensus which prioritizes industrial stability and profit, over redistributive efforts towards organized labor. The organized labor that is privileged to be in, or related to, the export industries then best represent their interests when they align with the interests of industrial capital that

is also export related, and they avoid disruptive politics regarding distribution or structural economic transformation (Baccaro and Höpner, 2022; Baccaro and Pontusson, 2019; 2022). Outside of the privileged sectors, unions and non-organized labor, in fields such as logistics, services, and other low-productivity sectors, stand in a much weaker and precarious position. They face wage stagnation, or decline, as well as weakening labor protections. In addition to this, they also face an economic policy of austerity, where economic benefits of the states are eroded, without the compensation of being included in the export-led growth model (Baccaro and Pontusson, 2022). The unprivileged labor can either be classified as marginalized within, or excluded by, the social bloc. Statistics on the developments of German income distribution from 1992 to 2019 back up this placement of privileged and non-privileged labor. Bach et al. (2024) show that the upper middle class (privileged labor) experience a real average income growth of 31%. Parallel to this, the bottom 50% of Germany's income distribution saw their share of national income decrease slightly from 22% to 20% (Bach et al. 2024). Similarly to the unprivileged labor, the economic sectors that are disconnected from the export sectors are also marginalized, or excluded, by the growth model. Those economic sectors that primarily rely on domestic consumption then face an economic and political environment that focuses on the quelling of this growth source in order to foster exports through global competitiveness. Both the political goal of wage moderation, and the financial policy of austerity limit the amount of public and private consumption within the German economy, and therefore shrink the potential growth of sectors that rely on domestic consumption, and not exports (Baccaro and Pontusson, 2019).

Central and Eastern European countries can also be said to be somewhat included within the German social bloc, as they fill an important role and are rewarded for their participation. The massive surpluses that export-oriented German industrial capital gain from international trade cannot be invested back into the German economy, as this investment could be an inflationary risk which could threaten a key pillar of the system. The German export-oriented industrial capital then found that they could tap into the well-trained engineering labor force of Central and Eastern European countries via FDI into those countries, while also exploiting the lower wage levels of those countries. Using FDI to internationalize supply chains of the German export-oriented industrial capital then serves the function to limit inflation in Germany, weaken the power of German organized labor, and utilize efficient and cheap labor force abroad, while also being afforded political and economic incentives of the Central and Eastern European countries who have built up their own growth model to foster German FDI (Bohle and Regan, 2021).

Lastly, the political elites of the centrist parties take on the role as managers of the social bloc. This group of political elites is primarily those of the CDU/CSU and the SPD. The group of political elites do not engage in politics in a traditional manner, wherein they mediate between different social classes, they instead align themselves with the bloc and its vertically integrated interest groups. German centrist politicians also primarily market themselves, and their policies, as better managers of the system, rather than marketing themselves as bringing about transformative change of politics or economics (Mudge, 2018). The political elites then design policies which protect and further the growth model, and perpetuate the social bloc, such as labor reforms and an economic policy of austerity (Baccaro and Pontusson, 2019). As above mentioned, the interests of the export-related sectors typically get correlated with the broader national interests of Germany, and industrial capital of the export-related sectors enjoy a very tight relationship with political elites (Münchau, 2024).

The German social bloc is especially resilient due to its ideological coherence. The ideology of exports is both a material economic strategy, but it is also a form of national economic 'common sense' which is rooted in German identity characteristics such as prudence, quality manufacturing, and global prestige (May et al., 2024). In Germany, there also exists a widespread phobia towards digital technology among both political and industrial elites, which discourage digitalization. This sentiment is well exemplified with Merkel famously claiming in 2013, that the *"Internet is uncharted territory*

for all of us" (Macdougald, 2013). This phobia of digitalization causes institutional lock-in towards the sectors reliant on 20th century technologies like mechanical and chemical engineering (Münchau, 2024). Specifically regarding the car sector, there similarly is a cultural aversion towards EVs as they are seen as an inferior product that does not suit the cultural preferences of the sector. EVs are seen as 'iPads on wheels' and do not require the same degree of mechanical engineering excellence to produce at a high-level as the ICE-cars that German engineers and car manufacturers pride themselves on (Münchau, 2024.) These ideological foundations lock the growth model, sources of exports, and social bloc in place. It also makes the German political economy static, and resistant to change, especially if it threatens the ideology of exportism, or the main members of the social bloc. This is particularly relevant as the EV transition presents a shake-up and reconfiguration of the social bloc, through the structural transformations and nature of the EV sector compared to ICE-cars, as EVs require more digital skills and less mechanical skills compared to ICE-cars. Therefore, the EV transition has faced resistance and the threatened parties will continue to defend against this transition (Münchau, 2024).

Germany's social bloc functions through a vertical hierarchy of influence and distribution, in which export-oriented capital sits the apex of the social bloc, as core industrial labor secures conditional inclusion, and peripheral groups of both capital and labor remain marginalized or excluded. This social bloc and its hierarchy can explain the varied enthusiasm for industrial policy, which supports defensive measures, but resists structural transformations. The configuration of the social bloc can also explain the limited scope for ambitious, redistributive green transformation under the current growth model.

5.2.1.4 Integration of policy-level findings

This paper's section on policy-level analysis found that Germany's green industrial policy towards the EV sector is characterized by a market-based, cautious approach, using policy tools like incentives, direct subsidies, tax regulations, modest infrastructure mandates, and recently also strategic investments and subsidies towards battery manufacturing. The policies present a clear pattern of being market-conformist, sector-specific, and somewhat defensive, with policy design that enables incumbent manufactures to protect their competitive position in the global car industry, while aligning with Germany's larger commitments to decarbonization.

From the analytical lens of GMP that this paper uses, these policies can be understood as expressions of a deeper macroeconomic and political logic, and not just singular policy events. As we have established, the German manufacturing-based export-led growth model requires external competitiveness, internal deflation, and minimal political disruptions to the key export sectors (Baccaro and Pontusson 2019; Baccaro and Höpner 2022). Therefore, given the German growth model's nature, the EV transition is not seen as a structural break, but more as a technological adjustment within the existing growth paradigm that the actors of the social bloc must manage and maintain the status during. This logic can be seen in the policy design, such as the subsidy programs, as those programs aim to stimulate consumer demand for EVs without imposing requirements on car manufacturers to reconfigure the line of cars they produce towards increased EV production. Similarly, the public support going into battery production, such as the Northvolt project, is framed as a public-private partnership to onshore high-value and sector-critical activity onshore, and not as a state-led industrial transformation. The EU-level policies related to EVs, and EU fostered industrial alliances show a similar approach wherein green industries are supported, as they are a means to increase the export base and embed Germany even further into global trade, via the use of industrial policies.

The policy choices, and policy design, are also shaped by the German social bloc. Since the bloc is composed primarily of export-oriented capital and labor within export-oriented industries, both groups in the social bloc have a common interest in defending their privileges within the current growth model in the EV transition (Baccaro and Pontusson 2019; 2022). For capital, their interests are that the

EV transition does not erode Germany's leading position within the global car industry; and for labor, their interest is that the transition does not lead to large scale displacement of labor. In response to the pressures of the EV transition within the broader car industry, the German industrial strategy, and German governance, aims to maintain competitiveness while also preserving employment, rather than redistribute gains or structurally transform the economy. The CIM II also illustrates the approach of embedding the EV transition within the already existing infrastructure towards ICE-cars. In general, the social blocs influence German policymaking towards sectoral gains without significant financial expansion or structural transformations. The interests of Germany's current industrial labor also go against the EV transition as EV manufacturing requires substantially different skills compared to ICE-car manufacturing and generally requires much less labor to manufacture. Through labor's influence in the board rooms via codetermination, labor generally vehemently opposes companies internally transitioning towards EVs (Münchau, 2024).

The German policy preference towards fiscal conservatism also shows itself in the logic behind the withdrawal of consumer subsidies towards EVs in 2023, as the subsidies were pulled due to financial reasons, and not because the competitiveness of EVs had progressed to a point where subsidies were no longer needed (Polyak, 2024). The institutional infrastructure that limits fiscal space for government spending ultimately supports the existing growth model through its anti-inflationary configuration (Baccaro and Höpner, 2022). Similarly, defensive measures of the EU's tariff on Chinese EVs of 2024 can also be seen as supportive of the incumbent position of the German car sector. This shows a willingness of the state to defend the privileged positions of export-oriented capital and labor when their competitiveness is threatened. However, this policy is both reactionary and defensive, since it is caused by the improved competitiveness of Chinese EVs, and because the tariff policy is not linked to a systemic industrial transformation or comes with conditionalities of industrial upgrading to the car sector. Additionally, the industrial capital of the car sector actually opposed the tariffs, as they will likely provoke a Chinese reaction of counter-tariffs. And since Germany is a net-exporter of cars to China, this improvement of competitiveness on the EU market, but decrease of competitiveness on the Chinese market, will likely hurt the German car sector more than it benefits (OEC, 2025a; OEC 2025b).

Conclusively, the German industrial policy strategy towards EVs is determined by the existing macroeconomics of the growth model and political dynamics of the social bloc. Industrial policy is used as a mechanism to preserve the current growth model and the social bloc, and not as a strategy to transform the economy. The industrial policy strategy protects incumbents, stabilizes employment, and aims to maintain global economic status as a highly efficient exporter. Germany engages with the EV transition but does so from a political economic position that strongly resists major disruptions, and whose institutional infrastructure significantly narrows the scope and policy space for ambitious and broader structural transformations.

5.2.2 China

5.2.2.1 Growth model

China's incredible growth trajectory over the last four decades, since the 'reform and opening up' policies of Deng Xiaoping, has been characterized by an extraordinary dynamism, high-degrees of state-involvement and a hybrid growth model (Tan and Conran, 2022). The Chinese economy is a 'system of systems' that combines an export-led growth model, concentrated along their eastern coast and the Special Economic Zones (SEZs), and an investment-led growth model, targeted at the interior, rural, and less economically developed areas within China. The models function in parallel and are reliant upon each other to function (Tan and Conran, 2022). Given the focus on EVs of this paper, this analysis will focus primarily on the export-led growth model of China, that model as the primary driver of

structural economic transformation and industrial upgrading, which is especially relevant for the EV sector.

China's export-led growth model emerged in the 1990s, through an expansion of the SEZs and liberalizations of trade. The export-led growth model was then supercharged through the inclusion of China into the WTO in 2001, China has integrated itself deeply into global value chains, through its strategic positioning as the world's primary manufacturing hub. Through this strategy exports grew from around 20% of GDP in 2001 to around 36% in 2006, since then the export share of Chinese GDP has stabilized at a slightly lower level around 20%, but overall remains high and a significant part of the economic makeup of China (Tan and Conran, 2022; World Bank, 1960-2023). This growth model then positions China's coastal regions, and large cities along the coast, as key nodal points in their own model, as well as key nodal points in global value chains. Initially this was anchored through foreign investments and focused on serving cheap goods to global consumer markets (Tan and Conran, 2022). However, over time the export base of the Chinese export-led growth model has indigenized, as Chinese national champions in politically strategic and high value-added economic sectors, such as CATL in batteries and BYD in EVs, have been fostered and are now able to compete with incumbents on global markets. This showcases the Chinese state's long-term vision of industrial policy strategy to move up the value chain towards domestic production of critical, high value-added sectors (Jin, 2023a).

The growth model for the interior regions of China is investment-led, and the state is the primary investor. The interior regions were generally excluded from the opening up to global markets during China's first phase of liberalizations, as it focused on SEZs along the coast. Then the interior regions became reliant on state-led investments into infrastructure, urbanization projects, as well as projects driven by SOEs. Through this, a growth model for the interior Chinese regions based on investment came about. Although the different growth models do not substitute for each other, this can function as a hedge for Chinese growth, as the government has tended to increase investment in times of weak external demand (Tan and Conran, 2022). This investment-led growth model has also been expanded and somewhat 'exported' as domestic Chinese demand for infrastructure and construction became more saturated. This excess infrastructure and construction capacity have then been 'exported' to other nations, primarily in Central and Southeast Asia, through the BRI (Cai, 2017; Tan and Conran, 2022). Within China, the biggest proponents of expanding the BRI and developing infrastructure abroad have been the interior regions (Jaros and Tan, 2020; Tan and Conran, 2022). Beyond securing demand for the investment-led growth model of China, exporting infrastructure and construction through the BRI also serves purposes of economic statecraft as we will discuss in the global-level analysis.

The EV sector is closely tied to the export-led growth model of the coastal regions, as the sector is both dependent on the growth model, as well as the growth model using the EV sector as a key export to expand the model's success. China's industrial policy strategy towards EVs show a highly coordinated, vertically integrated approach which has been highly successful in fostering and nurturing a globally competitive sector that has strategic relevance for China's political economy. The growth of the EV sector represents a strategic repositioning of China within global value chains, as they move from lower value-added industries towards higher value-added industries, where EVs are a cornerstone. The success of the export-led growth model of China is enabled by some deeper structural conditions, which have allowed China to compete in international markets and grow its economy. Primarily China has utilized its enormous labor force and policies of wage suppression which keeps labor costs low, relative to productivity, strengthening Chinese competitiveness. China has also implemented policies of financial repression, which, among other things, have channeled Chinese household savings into cheap credit for targeted economic sectors. China has also had a strong policy goal of limiting inflation and undervaluing the RMB, a policy target it has pursued through many different policy tools (Jin, 2019). In addition to this, China's long-term industrial strategies, which are spearheaded by large

subsidies, and vertical coordination, has allowed China to industrially upgrade and enabled Chinese firms to compete for exports in a global market (Tan and Conran, 2022, Jin, 2019; 2023a).

The policies which enable the export-led growth model also significantly restrain and limit the capacity for domestic consumption in China. Policies of wage repression, low inflation targeting, financial repression and currency undervaluation all make it so that Chinese consumers have limited purchasing power and spending capacity. Additionally, given China's recent history as a desperately poor country, there remains a high rate of savings in China, especially among the older generations (Jin, 2023a). However, the Chinese state is aiming for a repositioning towards an economic model more based on domestic consumption, however, this shift is difficult to manage politically and implement. As the inertia of the export-led models, the benefactors of the model, and the policies in place to support it, challenge this shift and constrain the policy space to bring about this change in growth driver wanted by the central government of China (Tan and Conran, 2022).

One can then summarize the Chinese model of growth as a hybrid structure, led by both exports and investments. The growth model is dependent upon a range of policies which all improve the conditions for, and competitiveness of, Chinese firms seeking to export to global markets. Within the export-led model, there is a structural economic and industrial transformation taking place, where state-led industrial strategies have caused industrial upgrading and allowed China to generally move up in the global value chain to produce higher value-added products. Through the growth model, one can better understand China's conceptualization and implementation of green industrial policies, which function to both promote exports, but also reposition China to produce a higher degree of politically and economically important high value-added goods. Despite the wishes of another strategic reorientation towards domestic consumption as a prime driver of growth, the inertia of the export-led model makes this shift difficult.

5.2.2.2 Institutional infrastructure

The institutional infrastructure in China is profoundly influenced and shaped by its unique configuration of political centralized and economic decentralized system (Jin, 2023a). The Chinese system can be understood through the concept of 'fragmented authoritarianism', wherein central policy authority is managed through complex networks of bureaucratic bargaining, vertical fragmentation and pluralistic participation (Mertha, 2009). Mertha (2009) showcases that although the Chinese political system retains a formal category of authoritarianism, the implementation of policies happens through an ecosystem of competing ministries, local and provincial governments, and semi-autonomous agencies, that all compete with each other and have their own interests to defend and different institutional mandates. The authoritarian fragmentation then creates 'agency slack', which allows policy space for local discretion and even contestation of policies. The agency slack enables extracting performance, building policy coalitions and strategically using resources across various levels of administration. A result of fragmented authoritarianism and agency slack can be seen in the adaptive governance and policy variance, where central plans, like the FYPs and MiC 2025, are implemented in an environment that contests, negotiates and unevenly implements plans across regions and institutions. This allows for policy experimentation, intra-national competition (between municipalities and provinces) and local adaptations. Here, the institutional infrastructure combines the political centralization and authoritarian form of governance with bottom-up policy space, which allows both vertical coordination and localized flexibility (Mertha, 2009).

The institutional infrastructure that enables and incentivizes intra-national competition is also a key part of the Chinese institutional set-up that drives growth. Jin (2023a) emphasizes that local and provincial governments function as key economic actors that enjoy a large degree of policy space to act autonomously. She also posits that economic growth is the key metric that Chinese policymakers are

measured against if they seek higher political office. Mayors in China then conduct their own industrial policy, by competing for investments, fostering innovation, giving credit and public support, while remaining inside the boundaries of what central authority deems acceptable (Jin, 2023a). This institutional setup has enabled the Chinese party-state to mobilize resources at scale while simultaneously encouraging bottom-up policy experimentation and regional differentiation, factors that have been key to the success of its hybrid growth model. Within this dynamic intra-national competitive development model, local officials are incentivized to support strategic sectors like EVs in order to boost their administrative performance evaluations (Jin, 2023a). This decentralized industrial policy ensures a political environment of industrial development, especially in the coastal provinces that anchor China's export-led growth.

In support of the export-led strategy and the political economic ambition of moving towards high value-added industries, China has built a dense network of government institutions that are focused on industrial upgrading. The National Development and Reform Commission, which conducts macroeconomic planning and formulates industrial priorities, is a key actor within this network of institutions. Ministries, such as the MIIT and the MOST also have a critical role in industrial strategy and technological planning; with the MIIT being critical in formulating and implementing industrial policies towards sectors like EVs, batteries and semiconductors. The MIIT sets technical standards, allocates resources, and oversees sector specific plans, such as the FYPs and the NEV industry development plan (He et al, 2018). MOST manages national scientific and technological developments, such as planning and implementing large-scale scientific and technological projects. The MOST fosters innovation in critical sectors and manages R&D initiatives (Gomes et al., 2023). The then minister of MOST of 2008, Wan Gang, who was an EV-proponent is credited with the national decision to focus heavily on EVs (Yang, 2023). China's SOEs also play a vital role in the pursuit of industrial upgrading. SOEs operate at the nexus of political directives and commercial incentives, thus acting as both an implementer of policy, and as an industrial actor. SOEs receive preferential treatment in access to land, credit, and government support, which allows them to make longer-term investments such as R&D and capacity expansions. In the EV sector and other strategic sectors, serve to absorb risk, build infrastructure, and coordinate larger development projects (Jin, 2019; 2023a; García-Herrero and Schindowski, 2024) China's financial system is also part of the institutional infrastructure, which supports the growth model and the political goals of industrial upgrading. In China there is a strong network of state-supported financial institutions, such as policy banks and industrial investment funds. Chinese policies of financial repression enable banks to give favorable terms of financing to prioritized sectors in the economy (Jin, 2019). This gives a reliable supply of subsidized capital which can help growth and development of the EV sector, along with the battery and semiconductor sectors. China's financial system is also generally characterized by a high degree of state ownership. This allows political means to factor into credit allocation and interest rate setting (Xu, 2018). The Chinese financial system has then been instrumental in providing the necessary capital for these industries to scale rapidly.

Beyond the strong emphasis on upstream inputs for critical technologies for industry, the economic setup of China and the spillover effects from it also indirectly help the EV sector. Since EVs require relatively simple mechanical engineering, their relative disadvantage to Germany in mechanical engineering is not detrimental. For competitiveness in EVs, things like efficient battery management systems, autonomous driving, artificial intelligence and entertainment systems are more critical to enhance user experience. These are issues which primarily require software engineering (Münchau, 2024). Here China has a strong advantage from having built an indigenous technological sector which is beginning to rival the US' sector, and which far outcompete Germany's tech sector (Allison et al., 2021). The spillover effects from the successful Chinese tech industry then supply EV companies with a labor force which is highly skilled within the areas it critically needs, such as digital and software, to further improve the EV sector and compete globally.

5.2.2.3 Social bloc

Determining the Chinese social bloc is a complex task, as the GMP framework is primarily made to understand liberal democratic countries and their political economies. In the same vein, the analytical concepts of the social bloc build on the assumption that the examined country follows a liberal democratic approach. Since this is not the approach China has taken, our paper aims to navigate that through the Gramscian insights that May et al. (2024) provide, which gives a greater theoretical and analytical capacity to understand the Chinese constellation of interest groups which form to maintain and uplift, and benefit from, the growth model (May et al., 2024). In contrast to a liberal democratic political system where the social bloc is formed through electoral politics as well as class-based negotiations, China's social bloc is rooted in the state and civil society plays a limited role. Despite this, the state in China functions differently from other Asian developmental states, and uses an informal network based on public-private coordination which is based on reciprocity (May et al., 2019). The CCP is permeated throughout Chinese society, featuring at the very apex of the Chinese social bloc, as well as much further down the hierarchy of the bloc. The CCP can then coordinate, manage and mediate between interest groups, such as private companies, SOEs, government branches, ministries, etc., in order to align them all towards strategic industrial goals, such as global EV leadership (Yan and Huang, 2017; Pearson et al., 2021).

Who sits at the top of the Chinese social bloc depends on how one defines it. The most powerful interest group in China is the Politburo and the central government who determine much of policymaking and have a high degree of influence in the economy through its political power. This interest group determines the long-term industrial strategies, like the FYPs and the MiC 2025. Measuring after economy and distribution, the apex of the social bloc is then occupied by the high value-added export-oriented industrial capital. The high value-added export-oriented industrial capital is enabled through an industrial policy strategy and an institutional framework which allow it to grow rapidly and compete globally for exports. SOEs engaged in export-oriented sectors can also be argued to feature at the top of the bloc's hierarchy. Given the high degree of political favorability how state-aligned the great export-oriented industrial firms are, and the presence and influence of the CCP within those private firms, it is difficult to separate them entirely from the political system and the state (Yan and Huang, 2017; Pearson et al. 2021).

Further down the hierarchy of the social in terms of political power and distributional outcomes sit the coastal local and provincial governments, along with export-oriented labor. Local and provincial governments are strong and well-connected actors which rely on the economic activity of the export-oriented industrial capital for growth and are therefore well placed within the growth model. Through the concept of authoritarian fragmentation and agency slack, local and provincial governments have a large degree of freedom to pursue industrial policy in line with the state's vision but tailored to local conditions. Given the intra-national competition in China where mayors are judged on economic growth, being placed in a nodal point of the growth model provides a greater platform to achieve economic growth (Jin, 2023a; Tan and Conran, 2022). Coastal local and provincial governments can also utilize their critical position within the growth model to develop their cities beyond just serving exports. Labor within the high value-added export-oriented sectors, such as EVs, also have an important but structurally subordinate role in the social bloc. This group of labor contributes with high skills in critical areas for industrial competitiveness and is rewarded through relatively better wages and increased social benefits. However, labor generally faces wage moderation and also has limited political influence as an interest group (Jin, 2019).

Lower in the hierarchy of the social bloc sit smaller and peripheral firms, who have to align with political priorities, but are not granted the same level of state support as a politically important high value-added export-oriented industrial capital. The smaller and peripheral firms face uneven

competition, and if they rely on domestic consumption, they also have their driver of growth limited to support the overall national growth model. The interior regions are also situated low within the social bloc, but not excluded. Even though the export-led growth model has excluded the interior regions, they are included through the creation of an investment-led growth model, parallel to the export-led (Tan and Conran, 2022). Similar to the manner in which the German social bloc can be said to include countries of Central and Eastern Europe through FDI, the same argument can be used for China, through its BRI and FDI investments in Central and Eastern Asia and Africa in particular. Through FDI and the BRI, China includes these countries in Chinese supply chains and value chains (Tan and Conran, 2022; Nugent and Lu, 2021).

At the bottom of the hierarchy of the social bloc, but still included, sits non-privileged labor. In the political pursuit of an export-led growth model, non-privileged labor face wage repression, financial repression and weak social benefits, which all hurt their material interests. Additionally, they face staggering economic inequality in Chinese society. However, the overall success of the Chinese economy in the last four decades, as well as poverty reduction programs enabled by the economic success, have yielded tremendous increases in economic outcomes and living standards, even among weak interest groups like non-privileged labor. Between 1978 and 2015, the average income of the 50% of income distribution of China increase by more than 500% in real terms, however, the share of national income of the bottom 50% dropped from 27% to 15%, highlighting the inequality in China's growth (Piketty et al., 2019).

The bloc's hegemony is maintained through both material economic performance and its political coherence. Economically, the growth model has delivered astronomical levels of sustained and broad growth, and technological advancement, outcomes that secure the compliance of bloc members and help legitimate the CCP leadership (May et al., 2024). Politically, the bloc is held together and coordinated through the permeation of the CCP across all levels of the social bloc, as well as a powerful narrative of a techno-nationalist rejuvenation which is essential to China's sovereignty and development (Yan and Huang, 2017). In addition, the fragmented authoritarianism allows for local policy adaptation which gives some form of political influence in an authoritarian political system. Despite the hegemonic position of the Politburo and the top CCP officials, their goals of transitioning towards a consumption-led growth model has not been successful, primarily due to the resistance of powerful interest groups within the social bloc that benefit tremendously from the current export-led growth model (Tan and Conran, 2022).

5.2.2.4 Integration of policy-level findings

The policy-level analysis of this paper demonstrated that China's green industrial policy towards the EV sector is a system of transformational state interventions and policies which encompass extensive upstream supply chain control, export incentives, and aggressive strategies of industrial scaling up. China utilizes a varied range of policies in a coordinated manner, such as vertically coordinated and broad strategic frameworks, robust and conditional incentives and financial support, expansive infrastructure development projects, as well as a profound emphasis on upstream inputs for critical technologies, like EVs. China's centralized and vertically coordinated industrial policy strategy feature with long-term strategic planning, showcase their political aim of a structural economic transformation, not incremental market adjustments. Their use of policy tools like direct subsidies, consumer incentives, and producer mandates that systematically compel automakers toward EV production highlights China's proactive market shaping as opposed to Germany's market-conformist policy choices.

With our analytical lens of the GMP, these industrial policies reflect the wider macroeconomic and political dynamics of China's hybrid growth model, with a primary focus on export-led growth, and the social bloc which benefits from the growth model. The EV sector function then functions as a key

part of the wider industrial strategic goals of building capabilities within critical sectors for the future, wherein the growth model is used to further develop and industrially upgrade for that aim. This logic can be seen in the design of industrial policies focused at securing upstream supply chain dominance. Reforms to China's rare earths industry and lithium industry have enabled state-supported firms to control critical resources which are essential for batteries and other technologies, which serve the purpose of integrating China into the global supply chains of critical technologies, as well as derisking supply chains for Chinese firms. The design of China's EV-oriented industrial policy also reflects the characteristics of its institutional infrastructure, of vertically integrated and varied state capacity and coordination among ministries, local government, SOEs and private firms. The MIIT and the MOST operationalize sectoral innovation strategies, through allocation of funds, regulations, and management of sectoral development plans. Local governments and SOEs complement this centralized vision by implementing these strategies in a varied and locally specific manner, through competitive policy experimentation, infrastructure investments, and direct financial support. This demonstrates a profound coherence between industrial policy frameworks and the broader macroeconomic objectives of the state. China's industrial policy strategy is also shaped by the interests of a typical social bloc that features a central government, high value-added export-oriented capital, and local coastal governments at the top of the hierarchy. Through measures to include, and derived effects, the growth model is very inclusive and even offers relative tremendous benefits to the lowest positioned interest groups. The social bloc's policy goal of structural economic transformation is pursued through the industrial policy strategies which also center the growth model.

Conclusively, China's industrial policies towards EVs reflect and reinforce its growth model. The industrial policy strategy is transformational and systemic, and aimed to reconfigure industrial sectors and accelerate China's repositioning higher up global value chains. The dynamism allowed for within China's growth model and social bloc, lets their industrial policy strategy target a profound structural transformation to establish global technological leadership and economic dominance in strategic sectors like EVs

5.2.3 Comparative state-level analysis

The comparative analysis across Germany and China showcases how their fundamentally distinct strategies for industrial policy is significantly determined by their growth models and complimentary institutional infrastructures, as well as their social blocs. Even though they both have industrial strategies regarding EVs, and both have an export-led growth model, they differ substantially due to the state-level dynamics.

Germany's growth model is a clear-cut example of an export-led one, with a reliance on manufacturing excellence, wage moderation and currency devaluations. German macroeconomic ideology is conservative and focused on maintaining external competitiveness through internal deflation and fiscal discipline. Consequently, Germany views the EV transition as a technological adjustment for its incumbents, rather than a structural transformation, focusing on defending the existing sectoral advantages without significantly altering the foundations of the economic structure. Contrastingly, China's model is a hybrid model, which primarily is export-led, but a significant part of China also relies on investments for growth. The Chinese model is distinctly transformational, through its ambitious state-orchestrated industrial upgrading in high value-added manufacturing and technological sectors, such as the EV sector. Unlike Germany that already is placed high in global value chains, China's industrial policy aims to reposition their economy higher within global value chains. Both cases suffer from structural inertia due to the successes of their growth model, Germany struggles to adapt their sources of export to 21st century technologies, and China struggles to transition towards having consumption as a demand driver.

Germany has a corporatist institutional infrastructure, with coordinated labor relations, vocational training with strong links to traditional industries, and heavily limiting conservative fiscal policies. This institutional setup reinforces the existing industrial structures that privilege incumbent sectors such as machinery and car manufacturing. German institutions then sustain the incumbent industrial hierarchy and export competitiveness rather than fostering wider structural economic transformation. On the other hand, China's institutional infrastructure reflects its strategic state capacity, as well as Chinese fragmented authoritarianism, which enables local policy experimentation and intra-national competition. Key ministries coordinate with local governments and SOEs, illustrating the vertically integrated but adaptive policy execution. The financial system also supports development through allocation of credit and low interest rates. China's institutions then enable ambitious large-scale industrial transformations, whereas German institutions prevent such transformations to an extent.

The German social bloc is made up of export-oriented industrial capital, privileged organized labor, and the political elites that manage the distributional disputes and gradual reform. This bloc emphasizes stability and incremental adjustments, which are driven by their interests vested deeply in maintaining global competitiveness and sectoral dominance. Labor is conditionally included, with influence contingent upon alignment with the interests of industrial capital and against non-privileged labor. With China's social bloc consisting of the central government, high value-added export-oriented capital and coastal local government. Beyond the core interest groups, the bloc includes privileged labor and interior regions. Furthermore, measures to compensate the interest groups not directly included, such as labor and interior regions. The stability in the Chinese social bloc is maintained through political alignment, inclusive economic performance, and ideological legitimacy promoted by the CCP's narratives of national rejuvenation and techno-nationalism. Unlike Germany's corporatist bargaining and consensus model, China's bloc functions more through hierarchical, but inclusive, integration rather than pluralist negotiation.

Germany's industrial policy strategy towards EVs reflect its macroeconomic and political dynamics, through the policy strategy's market-compatible and cautious approach. Its use of incremental policy tools serves the purposes of defending the already established advantages of incumbents, maintaining global competitiveness and employment stability. The German policies then show the corporatist and fiscally conservative nature of the German model, viewing the EV transition as a technological transition and not a transformation. Comparatively, China's industrial policy is explicitly transformational with ambitious, systematic and coordinated restructuring of industries and the economy. The state's involvement in upstream industries, scaling-up of manufacturing and export-promotion, demonstrate the comprehensive long-term strategies of China. China leverages state coordination, state-owned financial institutions and SOEs, and decentralized execution through competitive regional policy experimentation, resulting in significant structural economic shifts.

5.3 Global level: Economic Statecraft

This section advances the analysis to the global level, wherein green industrial policy, and the countries' growth models and social blocs are analyzed and examined through the lens of Economic Statecraft. This section builds on the policy- and state-level analyses by focusing on how industrial strategies towards EVs function as a vehicle for global strategic positioning. The analysis will draw on our developed concept of economic statecraft, which is understood as state-led efforts to reach, or defend, the high-tech frontier in response to foreign rivals (Weiss and Thurbon, 2021). This approach centers the ability of the state to mobilize green industrial policy for coordinated, long-term national strategies for global competitiveness and strategic autonomy. This could be through measures such as protecting or achieving national competitiveness, reducing foreign dependencies, or the shaping of global markets in one's favor (Thurbon et al., 2024).

The global-level analysis applies the operationalized indicators of economic statecraft which were developed in the theory and builds corresponding analytical categories to base the analysis on. These categories comprise: 1) strategic goals of economic statecraft, determining the international aims of the green industrial policy; 2) instruments of economic statecraft, analyzing the utilized policy tools to achieve the strategic goals; 3) supply chain politics and global industrial control, analyzing how interdependencies are shaped, controlled or resisted; 4) institutional embedding and institutional engagement, analyzing how states interact with international and global rules and institutions. This global-level analysis complements the GMP, as the GMP provides an analytical lens into domestic macrofinancial and political dynamics but it offers very little regarding international perspectives. In the same way that the GMP can situate industrial policy strategies within domestic dynamics, economic statecraft can situate that within global competitive dynamics. Through this, we can gain a better understanding of how states translate domestic interests into international actions, with our cases demonstrating this interplay.

5.3.1 Germany

5.3.1.1 Strategic goals of economic statecraft

Through our previous analyses, and our theoretical framework of economic statecraft, we can consider the strategic objectives of Germany to be distinctively defensive, as Germany is structurally dependent on export-led growth, focused on its high value-added manufacturing; with its car industry the largest source of exports. The EV transition then represents not just a technological disruption, but more fundamentally it represents a strategic risk to the German model of growth. Therefore, the German industrial policy strategy towards EVs focuses on the preservation of its industrial competitiveness in a landscape of technological disruption, and not an aim at transforming the growth model or transitioning to other sectors to be new sources of exports. Germany's industrial strategy is also shaped by, and embedded in, the EU's institutional framework, which affects subsidies, competition, and trade policies. German policymakers have then linked the goals of the wider green transition with their policy preferences of competitiveness. Through the analytical lens of economic statecraft, Germany's industrial policies of subsidy schemes, infrastructure regulations and tariffs, can be seen somewhat as a strategy of geoeconomically driven form of economic statecraft, aiming to defend Germany's incumbent position within global value chains (Weiss and Thurbon, 2021). This geoeconomically driven form of economic statecraft, utilizes industrial policy not to displace rivals, but with a goal of protecting sectoral advantages from diminishing (Weiss and Thurbon, 2021). Despite more recent industrial policy development in both Germany and the EU, Germany's capacity for industrial policy remains under constraint by both the embeddedness of EU rules on trade and competition, as well as the domestic political preference of extreme fiscal conservatism. This somewhat limits Germany's scope for economic statecraft to reactive logics of industrial safeguarding.

5.3.1.2 Instruments of economic statecraft

The constraints which now limit Germany's scope for economic statecraft, institutional embeddedness in EU rules and fiscal conservatism, are vital parts that sustain Germany's export-led growth model and benefit its social bloc. As established, German macroeconomic ideology across the political spectrum centers around debt-fetishization, which translates to policy preferences on aversion to government deficits, despite clear and obvious systemic shortfalls in investment levels. Sustained by the social bloc, this logic suppresses the large-scale public investment and private sector investments into critical areas for Germany's long term geoeconomic competitiveness such as digital infrastructure, green technologies, renewable energies, and military. Germany's retraction of subsidies, which helped boost

EV sales in 2023 due to budgetary concerns, illustrates the fiscal limitations and the implications of that, as sales have dropped after the subsidies ended (Polyak, 2024).

At the policy level, Germany's embeddedness in the EU rules has determined its reliance on indirect, non-punishing, incentive-based instruments that are market-compatible and comply with EU rules on industrial policy. The industrial policies wielded by Germany are not insignificant, but the design of the policies showcase an incrementalist approach. The German industrial policy strategy then reflects a logic of reactive interventions aimed at correcting markets, and not a proactive strategy to dominate industries. On a global level, Germany's limited flexibility on fiscal space and policy space also constrain its ability to respond to emerging rivals. The EU tariffs on Chinese EVs in 2024 is, however, an instance of a defensive response to a rival. Although, as we have shown earlier, this response was contested, due to fears that retaliatory tariffs would hurt Germany relatively harder due to Germany's position as a net-exporter to China. These institutional and macroeconomic constraints then limit policy actions, even when it serves a national geopolitical interest. This negatively affects Germany's ability to implement forward-leaning economic statecraft. The lackluster toolkit of economic statecraft puts Germany far away from the 'ideal type' outlined by Thurbon et al. (2024), which prescribes states to be strategically integrated and performance driven in order to build green industries, as Germany's fragmented and market-conforming approach lack vertical coordination, conditionalities and wider financial frameworks. The 'ideal type' mobilizes the state's resources towards coherent techno-national industrial goals across domestic and international fronts (Thurbon et al., 2024).

Despite its market-compatible and rule-conforming approach, Germany still has some instruments of economic statecraft at its disposal. As Germany is the biggest political and economic power within the EU, and many fellow member states being structurally dependent on the German growth model, primarily Central and Eastern Europe, this gives Germany a sway in EU policymaking, gaining an ability to influence EU trade policy, shape regulation, and further entrench its growth model into EU policy and economy frameworks. Germany then has capabilities in norm-setting and regulatory statecraft, despite its limitations on coordinated techno-nationalist industrial activism. The marketcraft Germany can use is to ensure the effective economic governance through regulation. However, focusing exclusively on marketcraft, limited attention is being paid to what it takes to create and sustain markets at the frontier of technology (Vogel, 2018; Thurbon and Weiss, 2021).

5.3.1.3 Supply chain politics and global industrial control

Germany currently has a high position in global value chains through its industrial strength, which is founded on its engineering excellence. However, this industrial strength is also built on a foundation of structural dependencies. For German industry in general, it has for decades been dependent on imports of cheap Russian energy to fuel its manufacturing and keep prices low to boost German competitiveness (Münchau, 2024). For the car sector, and especially for EVs, Germany also relies on rare earths, lithium and other raw materials. Similarly, Germany also lacks domestic production capacity in semiconductors and battery cells (EC, 2021). As the policy-level analysis showed, Germany has become aware of this strategic vulnerability regarding upstream supply chains inputs and have begun to carry out a strategy of reshoring battery production capacity, diversifying import sources and improving the capacity for recycling of resources. This strategy of supply chain derisking is largely pursued through EU-level industrial policy tools, which is congruent with Germany's FDI strategy, which has expanded its industrial supply chains to Central and Eastern Europe.

However, this strategy uses fragmented and relatively underpowered policy tools, and despite policy ambitions of self-sufficiency and strategic independence, Germany still suffers from a reliance on foreign resources from countries that are considered geostrategic rivals, such as China and Russia

(Fulda, 2024). This reflects a broader issue within the political and economic governance of Germany and the EU, which are the institutional and ideological constraints on state-led coordination and the aversion to structural transformations when the structural transformation conflicts with the interests of the social bloc, primarily export-oriented industrial capital. Germany's supply chain management strategies are shaped more by regulatory measures and risk mitigation, than by motivations to gain structural control of supply chains; Germany then seeks to manage its dependencies, rather than reshape them. This reinforces the view that Germany exercises defensive strategies in the face of technological transformations and geoeconomic pressures.

5.3.1.4 Institutional embedding and engagement

Similarly, Germany's way of engaging with global institutions governance organization also reflects its cautious, market-conforming and institutionally constrained approach, and its utilization of marketcraft in lieu of economic statecraft, as conceptualized by Thurbon and Weiss. Via its membership and governance of the EU, and its strong adherence to WTO rules, Germany's industrial policy strategies are shaped by a legalistic and procedural framework, rather than a strategically proactive approach in shaping global techno-industrial developments. However, through the influence Germany wields within those global institutions, especially the EU, it can somewhat shape those legal and procedural frameworks in a direction which enhances its growth model and benefits its social bloc (Becker, 2023). These embedded institutions are therefore not just external, but to a large degree internalized parts of the German macroeconomic and political identity. Germany has been able to shape core EU rules to conform to its political and economic preferences, such as state aid guidelines, debt and deficit limits, and competition policy (Matthijs, 2022). These frameworks illustrate Germany's ideology of fiscal conservatism and mercantilism and embed a logic of depoliticized market governance free of geoeconomic logics (Münchau, 2024). This has forced smaller and less competitive economies, especially within the EU, to compete against Germany, on terms set by Germany, and which have benefited the Germans massively. This depoliticized form of governance and marketcraft then in turn limits the scope for techno-nationalist industrial policy, as Germany pursues industrial competitiveness through indirect, non-discriminatory policy tools which are compatible with existing norms on trade and competition. However, this limits Germany's capacity to use its domestic industries to support economic transformations and engage in economic statecraft, as German industrial policy limits the scope for connecting industries to broader strategic plans about energy sovereignty, security or technological leadership (Thurbon and Weiss, 2021). The EU tariffs on Chinese EVs highlight this issue, as it was an abnormally defensive move that lacked coherent geoeconomic strategy. The tariff came about as a reaction to the sudden increase in competitiveness of Chinese EVs, and not as part of a broader strategic vision of techno-nationalist industrial development (Momtaz, 2024).

5.3.2 China

5.3.2.1 Strategic goals of economic statecraft

China's economic statecraft goals can be argued to be expansionary and transformative. China's strategy for green industrial policy is aimed at a systemic reposition in the global economy, and not just an isolated strategy for decarbonization or other green objectives, as our policy- and state-level analyses have shown. China then utilizes green industrial policies, with the EV sector being a focal point, to gain technological leadership, to secure supply chain control, and to restructure global value chains in its favor. China's version of economic statecraft is driven by both geoeconomic and -political purposes, with goals of technological autonomy as well as commercial and military primacy. However, China's goals for economic statecraft go beyond enforcing its export dominance, as a strategic priority of the

Chinese state and high-level policymakers is to transition towards a consumption-led growth model supported by endogenous high-tech sectors (Tan and Conran, 2022). This shift is designed to reduce China's economic dependence on external sources of demand for its growth, in an global environment with emerging inwards-oriented trade policies of the US and EU, and the US using the dollar's status as a global reserve currency as a policy tool to discipline and threaten adversarial nations (Varoufakis, 2023, 2025). A move towards a greater reliance on domestic consumption for growth will strengthen China's strategic autonomy and make China more resilient to external pressures, while growing an internal market for its advanced technology industries, such as EVs.

China then has two strategic main goals. Firstly, to utilize its export-led model and its competitiveness to assert dominance in critical global supply chains, while expanding its high value-added technology industries. Secondly, to use this domination of critical supply chains and high value-added sectors to support a shift to a growth model which limits structural dependencies. This showcases the Chinese long-term strategy of state-led industrial upgrading, which our state-level analysis found, where industrial policy is used to increase productivity, cultivate globally competitive domestic companies, and grow a domestic market, all with the intent to ascend the global value chain. The Chinese approach aligns with Thurbon and Weiss' concept of economic statecraft as techno-industrial expansion, wherein state action is used to outpace rivals and gain systemic advantages at the frontier of innovation (Weiss and Thurbon, 2021). China's strategy of economic statecraft combines a short-term goal of industrial upgrading and resource security, with a long-term vision of economic independence.

5.3.2.2 Instruments of economic statecraft

China has a varied and multi-scalar range of industrial policy tools at its disposal to carry out its coordinated strategy of economic statecraft. These instruments serve to both further Chinese techno-industrial development and to affect global value chains. As we found in the policy-level analysis, China extensively uses policies such as production and purchase subsidies, regulatory mandates, coordinated and multi-scalar infrastructure deployment, investment funds for critical technologies, upstream resource control, preferential procurement policies, and mechanisms of excluding advanced foreign companies. The policy instruments are part of a vertically integrated strategy, which aligns central ministries, local governments, SOEs, and private firms with the state's policy goals. This coordinated industrial policy strategy reflects China's mix of political centralization and economic decentralization, where varied economic and political incentives coordinate a wide array of actors behind a centrally defined strategy (Mertha, 2009; Jin, 2023; Yan and Huang, 2017; Pearson et al., 2021). The Chinese policy tools, and the wider approach behind them, show their transformative design, intended to foster global leadership in key technological sectors. China's emergence as global leaders in batteries, critical minerals, and EVs is founded on its strategic use of these industrial policy tools that in agglomeration have structurally transformed the economy and key sectors. China also wields internationally oriented tools of economic statecraft, via its BRI and internationalization of its supply chain through FDI. This embeds dependencies on China through technology standards, platform lock-in, infrastructure design and bilateral trade diplomacy. China's use of these instruments of economic statecraft then enables it to both further demand for its green industrial goods and shape the terms of participation in the green transition for other countries. These internationally oriented instruments exemplify mechanisms of economic statecraft, as the instruments are deployed to project economic power and to strengthen China's long-term strategic position (Weiss and Thurbon, 2021).

5.3.2.3 Supply chain politics and global industrial control

A key part of China's industrial policy strategy, shaped by geopolitics, has been its long-term strategy to build up its domination of upstream supply chain components for important technological sectors,

such as lithium, rare earths and other critical minerals for the EV supply chain. This shows the Chinese use of economic statecraft where it secures critical inputs, not just for domestic consumption, but it also embeds China firmly into other countries' supply chains for important technologies. This then creates asymmetric dependencies which can be leveraged geopolitically. For EVs, China's domination of lithium and batteries is a crucial part of its success. China's state-led and vertically integrated approach aimed to internalize value capture, build technological sovereignty, and center China in global supply chains for important technologies (Nahm, 2021; Wang, 2022).

China's dominance in this field is built on its first-mover advantage as well as its institutional coherence. Firstly, China now reaps the rewards of its early identification of important technologies and their inputs, as the state led industrial upgrading within those sectors of both extraction, processing, innovation and manufacturing. Similarly, China was able to wield its vertical coherence across economic actors to carry out its industrial upgrading. Through this domination of supply chains and its global competitiveness, China is able to center itself within supply chains for important green technologies, such as EVs. This gives China asymmetric relations with other countries, which rely on Chinese-controlled minerals or Chinese-produced technologies. China can then exert a form of latent power through this structural control. Although it is rarely wielded explicitly, China has the capacity to use its control of critical minerals or technologies, and the threat of withholding those, as a mechanism to influence the behavior of foreign countries or firms. This concern over geoeconomic supply chain vulnerabilities has then been a huge motivator for the EU to address through their own industrial policy strategies (EC, 2024b). In this regard, China's strategy for supply chains exemplifies Thurbon and Weiss' economic statecraft, as China proactively builds global dependencies to strengthen national autonomy and its global influence in parallel.

5.3.2.4 Institutional embedding and engagement

The Chinese approach to engagement with global institutions can be seen as highly selective and tactical. Rather than understanding international instructions and their constraints as fixed, China leverages global institutions when it serves its techno-nationalist industrial goals, while circumventing or reshaping the rules of global institutions when those rules do not align with China's strategic actions. Through this pragmatic and selective strategy of engagement, China pursues economic statecraft. China tactically engages with global institutions to advance its domestic goals through international means, while avoiding the rules that constrains its strategic freedom. This both develops its national model of development and projects their power globally.

As the policy- and state-level analyses showed, China's strategy for green industrial policy, especially in the EV and battery sectors, is a strategy of centrally planned, vertically coordinated and state-supported set of policies. China did not allow itself to be limited by rules on global institutions and an adherence to liberal norms, as it incorporated insights from the developmental economic tradition, even when the policies stemming from those insights broke with established global rules on trade and state-support. This strategy can be seen in China's engagement with the WTO, where China uses the WTO not as a constraint, but as a platform to execute its techno-nationalist industrial plan, as China often delays or sidesteps WTO-rule enforcements through legal ambiguity or sheer economic leverage while gaining market access to exports for its industries which it has given advantages through its industrial policies (USTR, 2024).

Beyond China's strategic engagement with traditional global institutions dominated by incumbent countries, it increasingly engages in new bilateral or multilateral platforms like the BRI, the BRICS, and South-South cooperation. Through China's contestation of the Washington Consensus and the Wall Street Consensus, and its offering of an alternative approach to industrial development to the Global South, it can export industrial standards, infrastructure and regulatory templates, as well as create

a greater external demand for Chinese green technology goods (Williamson, 2000; Gabor, 2021; Murphy, 2022). China then engages in externally oriented economic statecraft, where it aligns diplomacy through international aid, trade, and investment with domestic industrial goals. China's positioning in global value chains is not just about mercantilism, but about developing long-term influence over the material and institutional foundations of the global green transition.

5.3.3 Comparative global-level analysis

China has successfully managed to connect its state-led long-term industrial policy strategy, which focuses on green industrial upgrading, to broader national policy objectives, such as techno-national sovereignty, centralizing its supply chains globally, and insulating the nation from geoeconomic pressures. China's efforts to foster globally competitive green industries, such as EVs and batteries, are then embedded within a larger, coordinated strategy of ascending global value chains, and supporting the shift from an export-led growth model to a consumption-led one. This multifaceted strategy showcases China's capacity to align domestic political goals of structural transformations with international goals of strategic repositioning. Contrastingly, Germany lacks this kind of coherence between its industrial policy strategy and international political goals. Its objectives with industrial policy are defensive, with an aim of preserving the global competitiveness of their incumbent firms and sectors and preserving their position in global value chains. We have found that Germany has no goals or strategy of transformational restructuring of the economy or transitioning growth model, but instead focuses on keeping its current industrial strengths in an environment of technological disruptions. Their defensive stance shows the lack of developmental logics which connect domestic industrial goals with international economic positioning. What distinguishes Germany and China is therefore not the presence or absence of industrial capacity, but the presence or absence of strategic intent and institutional alignment.

A main point of divergence between Germany and China is the difference in scale, flexibility, and coherence of their industrial policy tools, and through that, a divergence in the instruments of economic statecraft at their disposal. Both countries use industrial policies, but how they are mobilized for purposes of economic statecraft vary significantly. We have found that China utilizes its instruments for economic statecraft directly. China's use of subsidies, exclusion of foreign competition, regulatory mandates, and supply chain control is connected to its geopolitical repositioning, focused on export dominance, creation of dependencies and the setting of new norms. Internationally, China uses its ascending, strong industrial position for purposes of economic statecraft. Through building bilateral trade diplomacy and the BRI, China reshapes external market structures and strategic alliances in China's favor through outwards-facing instruments of economic statecraft (Murphy, 2022; Thurbon and Weiss, 2021; Weiss and Thurbon, 2021).

On the other hand, we find that Germany, and their instruments of economic statecraft, are constrained through restrictive legal frameworks and macroeconomic ideology, rendering it domestically oriented and compliance focused. Despite rises of strategic rivals and threats, Germany responds with market-compatible and rule-compliant instruments, which lack external focus. The German policy design of EV subsidies or regulatory infrastructure mandates helps competitiveness, but does not exert German influence beyond the national, or EU borders. Germany does, however, exert some influence internationally through its influence in rulemaking in traditional global institutions and especially in the EU (Matthijs, 2022). The German self-imposed constraint of fiscal capacity is also idiosyncratic and stands in contrast to other major economies that are engaged in techno-nationalist industrial competition. China and the US have both utilized expansive and expensive fiscal policy programs to mobilize public and private investment in strategic green technology sectors (Weiss and Thurbon, 2021). Despite Germany's historic surpluses and historically low borrowing costs, it has

consistently underinvested in areas of geoeconomic strategic importance, such as EV technology, due to its debt-phobic macroeconomic regime (Polyak, 2024; Münchau, 2024). This results in China both having more instruments of economic statecraft at its disposal, but also a greater capacity to use them outwardly in order to obtain international political goals, whereas Germany, in turn, lacks the institutional and political tools to connect its industrial policy strategy to economic statecraft.

A key part of China's economic statecraft is the building and controlling of key nodes in global production for strategically important green technologies, such as the upstream inputs in the EV value chain. China's strategic capacity building in resource extraction, processing capacity, and scale of manufacturing has allowed China to center itself in global supply chains. China's domination of critical supply chains has resulted in China having structural power which it can use to exert power in global markets, insulate itself from external shocks, and foster asymmetric dependencies. Germany's approach to supply chains has been a strategy of cautious and regulatory derisking of their supply chains, rather than a restructuring. The efforts are largely shaped by EU frameworks where Germany has significant influence, and Germany has also taken national actions to reshore production of higher-end industrial inputs, such as batteries (EC, 2024b). Germany's strategy towards supply chains then indicates a vision of reducing exposure within the limits of its institutional and ideological constraints, and not a vision of supply chain control. This divergence in each country's approach illustrates a difference in managing dependencies and shaping dependencies, as China constructs leverage and uses interdependence strategically, whereas Germany builds resilience and uses interdependence defensively.

Germany and China also have distinctively different approaches to their engagement with global and international institutions. China engages with international and global institutions in a tactical manner, using those institutions when it benefits its interests; breaking and contesting rules when they restrict China and do not benefit its interests. Beyond this form of engagement in incumbent global regimes, such as the WTO, China also places a large emphasis on shaping alternative international institutions and building bilateral diplomacy through infrastructure deals, regional industrial partnerships, and trade relations. China's approach to institutional engagement and global positioning is then instrumentally flexible, while shaping new norms, which allow China to influence external environments to its interests (Allison et al., 2021; Murphy, 2022). Contrastingly, Germany's engagement with international and global institutions is much more focused on preserving existing rules and structures, through Germany's deep embeddedness in incumbent multilateral institutions, especially the EU. To defend the global competitiveness of incumbent firms and Germany's high position in global value chains, it exerts its influence through negotiated legal frameworks in those institutions that aim to lock in place existing structures, which reinforces its advantageous positioning (Matthijs, 2022). This functions as another example of Germany's industrial strategies trying to lock in place the conditions which Germany built its success on, rather than reorienting itself or global institutions to new geoeconomic pressures. While both countries use their power and influence in their institutional engagement, China uses those institutions as vehicles for strategic adaptation, while Germany uses those institutions as a means to prevent change and retain its privileges.

6. Discussion

The comparative analysis across the three levels of Germany and China's green industrial strategies reveals more than national policy variation; it uncovers structural differences in how Germany and China conceptualize, and operationalize, industrial policy within the current global political and economic setting. Our sectoral analysis of industrial policy strategies towards their EV sectors revealed deeper dynamics of state capacity, institutional constraints, and grand strategies. Our discussion section builds on our analytical findings to explore the broader geopolitical and -economic implications, as the discussion will delve into the return of grand strategy through green industrial policy, the geopolitical

dilemma this faces the EU with, and the threat that paralyzing effects of institutional inertia in a rapidly and drastically changing world order. Each theme addresses how current green industrial strategies go beyond functioning as mere tools of economic reform, but as instruments of geopolitical and -economic position and systemic transformation.

6.1 EVs, state power, and the global green transition

Wars, whether economic or military, mean industry. The age of hyper-globalized supply chains and outsourcing of industries are not strategic nor effective in a global environment ripe with political and economic tensions (Pozsar, 2022a). Our analysis has shown a geopolitical and -economic environment with increased dynamism and realignment in the global hierarchies. In this environment, green economic industries are a crucial means for countries to secure themselves internally, while projecting strength externally. Since cars are the second most traded good after crude petroleum, EVs are a huge part of this as one of the main green technologies to master, and EVs are the subject of industrial policies and wider industrial strategies (OEC, 2025c). EVs, and the resources needed to produce them, have then become a vital technology and resource to control for 21st century geostrategic political economy. States' use of green industrial policy for EVs in pursuit of geoeconomic goals is a central finding of our multi-level comparative analyses of German and Chinese EV industrial strategies. EV industrial policy strategies are not just a technocratic response to a simple market failure, it is a critical tool of economic statecraft for geoeconomic goals, with China exemplifying this best.

In China's case, the EV sector has not just been helped along by the state, it has been constructed, scaled, and weaponized as part of a broader strategic project to: leap up global value chains; decouple Chinese economic growth from external shocks, and Western economic warfare; and embed China at the very center of 21st century industrial supply chains. In a world of digitalization, AI-booms, green transition and decarbonization, EV batteries and semiconductors are becoming not just important industrial goods, they are becoming what oil have been so far in the industrialized world: a lever of structural power (Thurbon et al., 2024). The industrial policy utilized by forward thinking states to capitalize on these structural technological disruptions is not the same kind of industrial policy we have come to understand from neoliberal market societies, with domesticated, efficiency-correcting and limited interventions to fix market failures. This new form of industrial policy is developmental in its nature, it functions as a strategic orchestration which fuses domestic industrial upgrading with international repositioning (Thurbon et al., 2024). In short, a return to grand strategy through means of economic policy.

In this environment, states that still follow traditional neoliberal approaches to industrial policy and industrial upgrading face the prospect of losing their privileged positioning in global value chains to newcomers who have strategically positioned themselves to capitalize on this structural technological disruption. Such is the case of Germany, which has locked itself in the procedural, institutional and legalistic frameworks, that in the 20th century allowed them to capitalize on the structural technological transformation of the ICE-cars and other traditional mechanical technologies in which they were dominant (Münchau, 2024). Germany then pursues an EV strategy that is characterized by its largely self-imposed constraints, through EU-rules, conservative macroeconomic ideology, and a political economy which to a large extent is dominated by and serves their incumbent industrial capital. German industrial policy functions not as a mechanism of transformation, but as a defensive tactic to preserve their existing comparative advantages. The objective is not to create a new growth model, but to retrofit an old one through pressing technological disruptions. Where China sees EVs as a ladder to escape dependency and ascend global value chains, Germany sees them as a cushion to break a fall. The policy tools may look similar, with subsidies, mandates, supply chain policies, but the underlying intent differs profoundly.

China has successfully leveraged and coordinated its hybrid political system and hybrid growth model to act with long-term cohesion. China has deployed a varied set of policy tools across different levels of government to move towards domestic political goals of economic restructuring, while also moving to restructure global dynamics and interdependencies in China's favor. Achieving an effective and globally competitive EV sector is only part of the objective, as achieving that is also a means to increase national autonomy, reduce vulnerabilities and reposition China globally. Despite Germany's incumbent position and strong technological base, it has seen its industrial policy options limited by institutional structures it itself had built. However, and more critically, Germany is also limited through the lack of long-term strategic and visionary thinking, and lack of political courage to unseat current incumbents in its social bloc when technological disruptions threaten the status quo. This has left Germany with their current defensive, market-compatible, sector-specific industrial policy strategy, that is not connected to any geoeconomic goals. In this light, green industrial policy is not converging globally. It is bifurcating between those who can wield it as a grand strategy, and those who treat it as a tool of sectoral management.

6.2 The EU's position in a world of Sino-American power struggle

In this current geopolitical and -economic global landscape, supply chains double as security architecture, and trade deals function as alliance politics (Pozsar, 2022a). In this kind of landscape, The EU, and Germany as the most significant power within the EU, find themselves strategically marooned. Germany and the EU are caught in the power struggle between an inward-turning, carbon-dependent hegemon in the US, and a state-capitalist emerging green superpower in China. This position that the EU and Germany is in, faces them with the issues of achieving their green transition and retaining their global positioning in a shifting global environment.

Politically, culturally, and economically, there remain strong ties between the EU and the US which have stood since the restructuring of global politics since WWII. The US remains Germany's most important partner in NATO, in intelligence-sharing, and in financial architecture (Kaim, 2022). The EU and Germany's main dependencies to the US lies within military protection and export demand. Militarily, Germany and the EU rely on the US for protection through NATO, this quasi-protectorate status of Germany and many other EU member states have allowed those countries to structurally underinvest in their own militaries for decades. This has played directly into the ideals of the export-led growth model and the fiscal conservatism behind it, as a critical state expenditure could be minimized. The US' military hegemony also served to secure globalized supply chains which Germany and the EU benefited from (Pozsar, 2022a). Since unification, and under the US security umbrella, the issue of geopolitics was practically absent from the German corporate and public governance (Münchau, 2024). This is most clearly seen in its extreme dependence on foreign gas for industrial purposes, which made Germany structurally dependent on Russia, to the point where $2tn of German value-added depended on $20bn of Russian gas (Pozsar, 2022a). Since the US' transition from a net exporter to a net importer, the US market has been a critical source of export demand for German industrial goods, especially cars. This similarly has created a structural dependence for Germany on the exports to the US, which much of German economic growth then relies on. Under a stable neoliberal system, these issues of these military and economic dependencies did not show, and in fact Germany benefited massively due to the advantages of these structural dependencies. However, since the first Trump presidency, the US' policy preferences and international engagement have shifted inwards, which has exposed the weaknesses in the dependencies (Gur and Dilek, 2023). Germany and the EU cannot rely on US demand to stimulate their economies, nor can they rely on their quasi-protectorate status under the US.

Another critical friction between Brussels, Berlin, and Washington is their commitment to decarbonization. Carbon-intensive industries account for some of the major sectors in the US economy, like fossil fuel extraction, ICE-car manufacturing, and farming, which decarbonization is politically difficult in the US. Those industries are to a large extent represented by the Republican party, whose current administration is actively fighting against decarbonization and the emergence of green technologies (Colgan et al., 2020). This presents Germany and the EU with a strategic liability as their export-led green industries would rely on US demand and would be vulnerable to US efforts to undermine the European green transition. Through its actions of the past, Germany and the EU are bound politically, militarily, and financially to a power that looks to outright abandon global climate commitments and might seek to destabilize others' efforts to decarbonize.

Through its export-led growth model, Germany also has structural dependencies on China. Firstly, as a source of export-demand for German industrial goods, with cars being a main export. Similar to the US, dependencies on China are also built through the vital role that exports to China play in German economic growth (OEC, 2025a). Secondly, China has helped the austere domestic environment inside Germany and the EU, that the export-led growth model demands. This is through the cheap goods that Germany and other EU member states have imported from China, which eases inflationary pressures, and have helped distributionally marginalized or excluded groups retain some purchasing power and access to cheaper consumer goods (Pozsar, 2022b). The dual transitions of China: firstly, towards increased production of higher value-added goods, can decrease access to the cheaper goods China previously provided at scale; and secondly, their transition to a more self-sufficient consumption-led model, which is dependent on endogenous green technologies, will diminish Chinese demand for export demand for German and EU goods, which their growth is reliant upon. However, regarding decarbonization and the green transition, China offers both clarity and scale in its green industrial strategies. In sectors like EVs, batteries, and renewable energy technology, China is not just growing, it is world-leading. China's idiosyncratic system of authoritarianism has arguably produced greater strategic coherence toward green industrial policy than any Western liberal democracies have. And as we have demonstrated, China's strategy goes beyond domestic settings, and reaches out internationally through bilateral trade ties, the BRI and Global South engagement. China does not conform to western political norms, but it is the only major power in the world treating decarbonization as a strategic national imperative.

With Europe remaining steadfastly committed to an export-led growth model, this puts Germany and the EU in a tricky position wherein it is reliant upon the two major powers fighting a global power struggle. The EU, and Germany in particular, is tethered to one power it cannot trust to stay committed and tempted by another it cannot afford to fully embrace. If Europe follows the US too closely, their green industrial ambitions might struggle under an Atlantic framework mired in carbon-inertia and domestic political instability. If Europe aligns itself too closely with China, this can risk violating the EU's normative identity, and it can risk triggering aggressive US retaliation through trade, security or finance.

The concept of strategic autonomy has increasingly become an EU policy goal (McNamara, 2024). But the cautious and small-scale manner of which this is acted upon is through measures like increased military procurement and semiconductor subsidies. Strategic autonomy in a broader sense is about reclaiming the capacity to chart an independent path in a changing world. The green industrial transition, centering EVs, batteries, and critical minerals, point to the fact that green industries are a form of economic sovereignty. Without strategically autonomous decision-making in who to trade with, how to produce, and what sectors to prioritize with state-support, Germany, and the EU, will not only fail to lead the green industrial transition, it will fail to secure its strategic future trajectory.

6.3 Institutional inertia and the EU's strategic and climate future

This leads us to another critical implication of this paper, which is the inertia and entrenchment of a political economic system that makes it resistant to change. Germany and the EU have an almost romantic ideological investment in austerity and the export-led growth model (Münchau, 2024). This kind of romanticism about a specific political economic structure or growth model does not persist in the US or China. The Chinese realized the strategic importance of first using cheap exports to industrially upgrade to produce high value-added industrial goods, and now use that as a platform to transition their growth model to domestic consumption and are executing that strategic plan despite difficulties (Tan and Conran, 2022). Similarly, the US famously blew up the dollar-denominated global financial system based on gold convertibility when it no longer served its interests and switched to a free-floating currency system (Varoufakis, 2016). The US also realized the structural weaknesses and domestic political pressures of its former economic policies of neoliberal globalization and has since shifted to a new form of protectionist economic policy, relying on tariffs and subsidies (Gur and Dilek, 2022).

This lack of an ability to change strategy or policy when faced with shifting circumstances is a clear vulnerability for Germany and the EU. As across policy domains, from fiscal to industrial planning, to investment in green technology, the EU faces the threat of institutional inertia. The EU, under strong German influence, kept its institutional framework in place after the European debt crisis, and did not allow member states to implement expansive fiscal policy (Varoufakis, 2016). And even after the COVID-19 shock briefly forced Germany and the EU to diverge from the deficit fixation, the EU is now reverting to a fiscal regime designed for a political and economic world that no longer exists (Chang, 2021). The return of debt and deficit rules, without structural reform, signals not a newfound prudence, but a reassertion of institutional path dependence. As we have shown in the analysis, Germany's largely self-imposed constraints heavily limit the degree to which it can conduct economic statecraft, as well as heavily limit the domestic maneuvering they can do. Germany and the EU then continue to behave as if the world still operates according to the outdated rules of the past. This is strikingly obvious in Germany's, and the EU's, slow and lagging response to digital and green technology disruptions. These constraints of Germany and the EU persist, not because they are effective, but because the institutions enforcing them remain untouched.

The EU's recent turn to green industrial policy with the NZIA and GDIP, is a reactive response that mimics the ambition of the US' IRA or China's state-led strategy. However, without matching the fiscal firepower or grand strategy, these plans are becoming hollow vessels. Even as the climate crisis intensifies and the need for mobilization grows, Europe insists on doing industrial policy without industrial-scale spending, as Germany's Schwarze Null preference and the EU's Stability and Growth Pact cast long shadows (Polyak, 2024; Chang, 2021). The EU and Germany then continue to treat green technology as a market opportunity to be managed, rather than as a field of geopolitical competition which requires large-scale mobilization and a grand strategy. This institutional inertia is not just a technical issue, it is a deeply political choice. The preservation of austerity, cautious industrial policy, and the aversion to large-scale public investments are all political choices to accommodate the export-led growth model, and the social bloc which benefits from the status quo. But this choice comes with the cost of becoming strategically irrelevant in geopolitics, in the middle of the emerging green industrial world order. While China builds capacity, and the US decouples, Europe audits its deficits.

7. Conclusion

The thesis set out to explore our central research question of how domestic political economies and geoeconomic tensions shape the green industrial strategies on EVs in Germany and China. Through our

utilization of our multi-level analytical framework, spanning policy, state, and global levels, we have shown how green industrial policy is not just a means for decarbonization, but rather a strategic response to deep structural pressures at both the domestic and international levels. Germany and China each showcase how their green industrial strategy reflects embedded macroeconomic logics, governing social coalitions, and the realities of global power competition, despite the cases' significant differences in political economy and institutional design. At the policy-level, both Germany and China mobilize their green industrial policy through similar types of policy tools, subsidies, infrastructure initiatives, and supply chain policies, but where they differ most significantly, is in the intensity, coherence, and strategic direction of their green industrial policy. China's industrial policy strategy is coordinated, vertically integrated, long-termist, and transformational, driven by a state-led vision for techno-industrial autonomy and primacy in green technologies, such as EVs. Meanwhile, Germany's approach takes a market-conforming and generally defensive stance, through its policy aims to preserve the competitiveness of their incumbent car manufacturers and current status in global value chains, rather than aiming to structurally transform its industries.

At the state-level, the divergent industrial policy strategies of Germany and China are analyzed through their growth models and social blocs. Germany's strongly export-led growth model is reliant upon, and sustained by, its institutions of fiscal conservatism, wage moderation, and a vertically structured and plurally negotiated social bloc, which in turn severely constrain Germany's capacity and ability for proactive industrial policy transformations. In the German setting, the EV transition is seen as a technological adjustment to manage within its industrial advantages. Contrastingly, China's hybrid growth model combines a primarily export-led model with an additional growth model based on (public) investments and has been used as a vehicle for deliberate industrial upgrading and structural economic transformation. Through its multiple levels and various actors, the Chinese state reorganizes economic structures through coordinated strategies, vertically integrated institutional infrastructure, and a hegemonic but inclusive social bloc dominated by the CCP, as well as the high value-added sectors and the coastal regions with high growth that are involved in exports.

At the global level, we find a rather asymmetric use of, and engagement in, economic statecraft, with the political ambitions behind it also differing. Germany uses industrial policy to defend its current status and competitiveness, seeking to protect itself from geoeconomic pressures, while engaging in, and abiding by, multilateral institutions and market-conforming, established norms. By contrast, China's green industrial policy strategy is aimed at strategic geoeconomic and -political expansion. China exemplifies a proactive user of economic statecraft which aims to reconfigure global hierarchies. China does so through its control of critical supply chains, global market penetration, and domestic techno-industrial capacity. Whereas Germany's actions are constrained by its embeddedness in, and ideological adherence to, neoliberal legacies within the WTO, and especially the EU, China's strategy reflects a long-term goal of reducing multiple forms of external dependencies through the fostering of endogenous globally leading technology sectors, identified as critical for future geoeconomic and -political purposes.

These analytical findings then have broader implications for how we can view the evolving domestic and international nature of industrial policy in the age of the green transition and increased global competition. Firstly, it debunks the idea that green industrial policy is an isolated, technical, or environmental issue, and instead situates industrial policy firmly in the arena of sovereignty, technological primacy, geoeconomic competition, and geopolitical influence. Secondly, it reveals the implications for Germany's, and the EU's, current political and economic configuration, which places them in a position of dependency between two major powers that are struggling for global power through political and economic battles. Lastly, it highlights the institutional inertia which debilitates the EU from taking transformative political and economic actions in a time where the status quo neither delivers decarbonization, economic stability, or political security.

7.1 Contributions of the paper

Our thesis contributes to the literature through our analytical findings, which situate industrial policy within both settings of domestic political and economic dynamics, as well as within a setting of geoeconomic and -political pressures. A key contribution of our thesis is the multi-level theoretical framework which integrates green industrial policy with the GMP, which usually has a focus on the demand-side of the economy, whereas industrial policy is the quintessential supply-side economic policy. Exploring industrial policy strategies and tools through the growth model, its institutional setting, and the social bloc reveals a greater context behind the political and economic dynamics that shape and formulate industrial policy. Similarly, the GMP is a relevant and growing field of PKE, which provides a useful analytical lens to understand macroeconomics and distributional coalitions. However, the GMP analysis then has many interesting international implications, but it currently lacks the theoretical underpinnings to properly explore those implications. Our synthesis of GMP and economic statecraft then adds a further analytical lens through which we can understand green industrial policy, as well as the GMP's macroeconomic and political dynamics. Additionally, despite criticizing classical CPE theories for myopically focusing on advanced capitalist economies, the GMP's theoretical foundations for understanding social blocs do not go beyond liberal democratic capitalist societies. Relying on the Gramscian foundations of GMP's social blocs, we have explored the social bloc of China through this bespoke and novel approach. This deeper exploration of China's social bloc, whose nature is substantially different to liberal market democracies, is also a significant contribution of the paper, both in the findings themselves, and the analytical and methodological approach.

7.2 Limitations of the paper

Our thesis provides a deep and rich comparative analysis; however, it is not without its limitations. A main limitation is the access to policy documents in their original languages, as neither of us speak German or Mandarin at an academic level. This made us rely on English translations and interpretations of central policy documents, which were readily available for central policy papers like the FYPs or MiC 2025, but much less so for more peripheral policy papers. It was especially a limitation for our analysis of China, and in addition to that, our primary focus on national-level policies limits our analysis, as much industrial policy development functions at local levels, which we are not able to fully capture despite efforts to include the most relevant parts. Thus, the lack of access to native sources and our limitation of primary data to what is available in English inherently limits the findings of this paper. This limitation is addressed through our triangulation where we rely on secondary policy-relevant material and academic literature, as well as selected relevant quantitative data. Through this, the analysis also remains primarily qualitative and interpretive. Additionally, the dynamic and fast-paced nature of political economy landscapes in both countries, and globally influential third countries, can render parts of the analysis irrelevant with time, as they would need updating to keep relevant in case of new developments. This is especially the case in the responses to the almost weekly shifts in global trade policy environments and green technological competition.

7.3 Suggestions for future research

Future research in this field could extend the work of our thesis in several useful and interesting directions. Firstly, the subnational dynamics can be explored more deeply, as the growth models are usually geographically concentrated. This is especially the case in China where the 'Mayor Economy' can create significant industrial policy variance. Secondly, our comparative framework can be used to analyze other green technology or digital sectors that are of critical importance to future economies and

assess if broader conclusions are similar across sectors. Lastly, scholars could also research how global value chain reconfigurations reshape the implementation and the politics of green industrial policy across a wider set of countries.

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