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Article:
Gotoh, F. and Li, Y.-W.V. (2026) Chinese and Japanese capitalisms: a comparative analysis of co-ordination problems in vehicle electrification paths. Journal of Contemporary Asia. ISSN: 0047-2336

https://doi.org/10.1080/00472336.2025.2605303

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Journal of Contemporary Asia

ISSN: 0047-2336 (Print) 1752-7554 (Online) Journal homepage: www.tandfonline.com/journals/rjoc20

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To cite this article: Fumihito Gotoh & Yu-wai Vic Li (15 Jan 2026): Chinese and Japanese Capitalisms: A Comparative Analysis of Co-ordination Problems in Vehicle Electrification Paths, Journal of Contemporary Asia, DOI: 10.1080/00472336.2025.2605303

To link to this article: https://doi.org/10.1080/00472336.2025.2605303

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Published online: 15 Jan 2026.

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JOURNAL OF CONTEMPORARY ASIA
https://doi.org/10.1080/00472336.2025.2605303

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Chinese and Japanese Capitalisms: A Comparative Analysis of Co-ordination Problems in Vehicle Electrification Paths

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ABSTRACT

This article investigates the divergent automobile electrification trajectories of China and Japan, the world's largest car exporters. Inspired by Regulation Theory approaches, it analyses how their capitalisms' distinct configurations of socio-economic institutions, including state–economic relations, labour relations, inter-firm competition, financial regimes and the integration into the global economy, have produced different electrification approaches. Supported by Beijing's *de jure* electrification strategies through state policies and regulations, China's automakers have leap-frogged to all-spectrum green vehicles and battery components and dominated global battery electric vehicle production and supply chains. Meanwhile, *de facto* strategies have been dominant in Japan, where electrification emerged through enterprise-led initiatives and market competition. Japan's automakers with globally diversified businesses have responded to vehicle demands and regulations of different markets, focusing on currently profitable hybrid electric vehicles, but have lagged in battery electric vehicle development, with limited backing from the state. This article argues that the divergent electrification paths are attributable to their capitalisms' institutional architectures, which have caused distinctive co-ordination problems (excess capacity, weak consumption and geo-political tensions for China's and Japan's weakened public–private ties and corporate risk-taking). Amid geo-political tensions and competition over advanced technologies, major economies worldwide have increasingly favoured *de jure* strategies, enhancing de-globalisation risk.

KEY WORDS

Automobile electrification; China; comparative capitalism; co-ordination problem; Japan; regulation theory

China became the world's largest automobile exporter by sales units, overtaking Japan, in the first half of 2023. This was epoch-making as China's export expansion was driven by battery electric vehicles (BEVs) and internal combustion engine (ICE)

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vehicles, whereas Japan's consisted mainly of hybrid electric vehicles (HEVs) and ICE vehicles.

New energy vehicles (NEVs) can be broadly defined as a range of vehicles, either partially or fully powered by electricity, including BEVs, plug-in hybrid electric vehicles (PHEVs), HEVs, fuel-cell electric vehicles, and hydrogen engine vehicles, to reduce CO_2 emissions. In 2023, HEVs accounted for the largest portion of NEVs in North America and East Asia, excluding China, while BEVs accounted for the largest share of NEVs in China, Europe, and South America. BEVs have less technological complexity than ICE vehicles and HEVs, allowing China and emerging economies to leapfrog their production (see Altenburg, Bhasin, and Fischer 2012; Meckling and Nahm 2019). Since 2015, BEV sales worldwide have increased twentyfold, and they have gained characteristics of software-defined vehicles (whose functions are enabled primarily by software) under digitalisation (Interview, automobile sector analyst, July 20, 2023; see also Liu, Placke, and Chau 2022).

Such industrial trends are not determined by market/firm-level decisions alone. They are associated with electrification strategies conditioned by domestic factors, including industrial policy and labour relations, and international factors, such as geo-political situations and supra-national institutions (such as the 2015 Paris Agreement on climate change and the World Bank's sustainability initiatives). Hence, the article builds on a central research question: what factors have contributed to China and Japan, the world's two largest automobile-exporting countries, taking divergent electrification trajectories? This article seeks to answer this question by drawing on works on Asian capitalisms that are built on Regulation Theory approaches (see, for example, Boyer and Freyssenet 2002; Lechevalier 2007; Lechevalier and Shibata 2024). It analyses the two nations' electrification strategies in connection with multiple socio-economic institutions that shape the characteristics of their capitalisms and generate co-ordination problems, including forms of competition, labour relations, state–economy relations, financial regimes, and integration into the international regime (Lechevalier 2014; Ten Brink 2019). Different institutional configurations are associated with broadly two types of industrial strategies: *de jure* (state-led) strategies are developed by public organisations and enforced by laws and regulations, while *de facto* (market-based) strategies are formulated in the market as a result of enterprise competition.

Within the automobile industry, electrification started with *de facto* strategies pursued by pioneering firms, such as Toyota Motor's HEVs in the late 1990s and Tesla's North American Charging Standard (NACS). However, recently, *de jure* strategies have gained prominence. China's NEV regulations, the European Green Deal (EGD), and the US Inflation Reduction Act (IRA) under President Joe Biden are notable examples of how states have created and shaped market environments favourable for their home firms by taking advantage of their large domestic markets and strong political power. In the name of decarbonisation and economic security, governments in China, the European Union (EU), and the USA have increasingly intervened in automobile electrification by specifying eligible vehicles (mainly BEVs and PHEVs), components, and minerals, investing in charging infrastructure, and providing subsidies (primarily for BEVs).

To account for China's and Japan's divergent car electrification pathways, this study examines the characteristics of their respective capitalisms – an analytical prism under-appreciated in the literature. For instance, it investigates the state–business relations that enabled the dominance of China's multinational corporations' outbound investment due to the "government-created" and "leapfrogging" advantages (see Buckley et al. 2007; Ramamurti and Hillemanne 2018), and the supply chain re-shoring and diversification of Japanese firms encouraged by the Tokyo government (see Katada, Lim, and Wan 2023).

Due to the Chinese government's strong support based on massive subsidies and legislative measures, the country's automobile industry has come to produce all-spectrum NEVs and battery components and has dominated global BEV production and associated supply chains, capturing over 30% of world car sales volume in 2023 (Japan Automobile Manufacturing Association n.d.). In contrast, Japan's automakers have a globally diversified business portfolio and adeptness at handling different vehicle demands and regulations, producing 27% of global car sales in 2023 (Japan Automobile Manufacturing Association n.d.). The Japanese government shifted industrial policy based on legislation and administrative guidance (non-binding advice) to indirect assistance, providing support for automobile electrification from the 1970s onwards, but the amount of its funding support was modest and mainly used for research and development (R&D) and market introduction (Ahman 2006). Although Japan's automakers' shares in global BEV sales (10 million units in 2023) are small, they are dominant in profitable global HEV sales (approximately 10 million units in 2023), and strong in the USA, Asia, and Europe (*EV Volumes*, January 22, 2024; *Energy News Beat*, May 25, 2025). Toyota has taken a "multi-pathway strategy" to develop BEVs, HEVs, PHEVs, fuel-cell electric vehicles, and hydrogen-engine vehicles. Furthermore, Japan's Green Transformation policy, officially implemented in 2023, includes public and private (mainly debt) investments in next-generation vehicles, including BEVs, and energy storage batteries (METI 2022).

The distinctive electrification trajectories are closely related to the difference between the two countries' capitalisms. The Chinese party-state has exerted strong power to co-ordinate industries and firms, though this has distorted market mechanisms and escalated geo-political tensions with the West by prioritising its political goals, such as civilian–military integration in industrial policy (see Malkin 2022). In contrast, political power in Japan has been more dispersed. Since the late 1990s, the capacity of the bureaucracy and Japan's patient capital to co-ordinate what Vogel (2006) described as its stakeholder capitalism has significantly weakened.[1] This has made it difficult for Japanese original equipment manufacturers (OEMs) to align their various stakeholders (such as parts/software suppliers, electric power companies, and creditor banks) and adapt to changes in the global political economy like the shift to BEVs and digitalisation. In contrast, state–socialist employment relations in China have been replaced by commodified wage labour relations since the 1990s (see Westra 2018). Meanwhile, in Japan, "employment sovereignty management," a corporate governance system prioritising continuous over disruptive innovations, has meant that the long-term employment security central to Japan's wage–labour nexus (the relationship between wages, labour relations, and the broader economic and

institutional contexts) has been maintained, albeit weakened (Dore 2009, 149–151). Furthermore, in addition to abundant loans from its state-owned banks, China has attracted much larger market-based finance (for example, private equities and venture capital) from international and domestic investors than Japan.

Fundamentally, the features of Chinese and Japanese capitalisms have been attributed to factors including: (i) the timings of the two countries' integration into the global economy; (ii) their respective dominant elites' interests and capacity to direct the domestic economies; (iii) the differing domestic market size and state–business relations; and (iv) the mobility of capital, labour, and knowledge between companies, which is closely associated with social relations and norms (Naughton and Tsai 2015; Whittaker et al. 2020; Gotoh 2021). Due to political power concentration, China has more quickly developed BEVs but generated conflict with the West because of its hegemonic orientation. In contrast, Japan's automobile industry has geographically diverse businesses in the global economy, and it has adapted to disruptive BEVs in a relatively measured manner. One notable obstacle to Japanese automakers' BEV shift is the automobile and automobile-related industries' enormous employment (5.5 million workers, 8% of Japan's total labour force), which is heavily dependent on petrol cars and HEVs using ICEs.

Both China's and Japan's car electrification strategies have strengths and weaknesses. While Japan's manufacturers have emphasised HEVs and fuel cells over BEVs, growing global policy momentum is pushing even cautious players towards full electrification. Despite unresolved challenges associated with BEVs, including charging infrastructure gaps, rare metal constraints, battery degradation, and limited clean power, Japan's automakers are likely to accelerate their BEV shift. While China and the EU have institutionalised strong pro-BEV policies, US support has wavered – with major subsidies under the Biden administration's IRA being rolled back in the second Donald Trump administration in 2025. Even so, the global trend remains in favour of BEV-focused industrial strategies.

This article begins by examining the distinctive co-ordination problems stemming from the institutional configurations of Chinese and Japanese capitalisms. Subsequently, it contrasts the historical developments of the two countries' automobile industries as well as the Chinese *de jure* strategies and the Japanese *de facto* strategies for car electrification, shedding light on the resulting pathways. Finally, the article summarises their divergent co-ordination problems and vehicle electrification trajectories and the causes.

Co-ordination Problems: Divergent Chinese and Japanese Capitalisms

Classic varieties of capitalism approaches divide national political economies broadly into two types: (i) Anglo-American-style liberal market economies, where the co-ordination of corporate activities depends on hierarchy and market mechanisms; and (ii) co-ordinated market economies like continental Europe and Japan, in which non-market relationships play key roles in the co-ordination of corporate activities (Hall and Soskice 2001, 8). However, these approaches have been criticised for being excessively dichotomous and static (Thelen 2004, 2–4; Whittaker 2024, 10–12). They have

also been critiqued for insufficiently elucidating where Asian capitalisms stand (Peck and Zhang 2013, 358–360; Gomez and De Micheaux 2017, 795–796). Moreover, markets and governments are not exclusive alternatives for economic co-ordination but work together to shape and organise economic activities and outcomes. Contrary to neo-classical economic perspectives, governments play central roles in building institutions, including laws, regulations, norms, and practices, so market creation and dynamism require, rather than are hampered by, governments' business co-ordination (Vogel 2018, 9).

In the Asian context, there are multiple capitalist models. China's state-led capitalism is characterised by state-owned enterprises (SOEs), ownership controls over private firms, top-down management, and extensive state intervention in the financial system (Andreoni, Frattini, and Prodi 2024, 4). In contrast, Japan's networked capitalism features elaborate inter-connections through intra-firm and inter-firm relations, collective management structures, high levels of inter-dependence between employers and employees, managerial delegation to workers, and cross-shareholdings among firms (Walter and Zhang 2012, 16–18; Lechevalier, Debanes, and Shin 2019). Of course, Chinese and Japanese capitalisms have changed over time, based on the evolving configurations of their socio-economic institutions.

Regulation Theory, including works by Aglietta (1998), Boyer and Saillard (2002), and Amable (2018), identifies the hierarchical relations between multiple socio-economic institutions (structured systems, organisations, norms, and practices that shape the behaviour of individuals and organisations in both economic and social spheres). In particular, the approach pays attention to forms of competition (such as inter-firm and inter-region), state–economic relations (like the state–business nexus), the financial regime (state-led and market-based), the wage–labour nexus (shaping employment relations), and the integration of national capitalisms into the global economy and international regimes, and the hierarchy influences the trajectory of national capitalisms. Regulation Theory assumes that national capitalisms are inherently unstable due to co-ordination problems arising from multiple forms of socio-economic institutions, and a mode of regulation (nationally specific configuration of socio-economic institutions) temporarily stabilises and characterises each national capitalism (see Gomez and De Micheaux 2017; Shibata 2022). This perspective has been demonstrated to be suitable for elucidating the transformations of diverse national capitalisms, for instance, the shift from developmentalism to neo-liberalism in Asia (see, for example, Boyer, Uemura, and Isogai 2012; Storz et al. 2013; Gomez and De Micheaux 2017).

Boyer (2012, 190–193) maintains that forms of competition between firms and provinces are at the top of Chinese capitalism's institutional hierarchy, while the wage–labour nexus, in which labour has no autonomy to protect its interests, also plays an important role. Given public authorities' control over entries of capital, the insertion of Chinese capitalism into the global economy is selective and subordinated to other institutions (Boyer 2012, 190–193). However, since the 1990s, the state–business nexus has become increasingly influential, and today, this institution, alongside competition, is dominant in Chinese capitalism (see McNally 2020; Petry 2021). Moreover, multiple factors, including the Global Financial Crisis (GFC), China's rise,

the Paris Climate Agreement (which stipulated reducing emissions by 45% by 2030 and reaching net zero by 2050), and the COVID-19 pandemic, have made state interventionism prevalent also in the West and intensified geo-political tensions between the West and China.

From the 1950s to the 1980s, the wage–labour nexus centred on long-term employment security was at the pinnacle of Japanese capitalism's institutional hierarchy. This was supported by the state–business nexus through industrial policy and the developmentalist financial regime connecting the public and private sectors (Boyer, Uemura, and Isogai 2012, 17). Japanese capitalism prioritised these institutions over inter-firm competition and exogenous factors such as the insertion of national capitalism into the global economy, the international regime, geo-political situations, and energy and economic security (see Whittaker 2024). However, the transition of the US-led international order from embedded liberalism (a combination of open international trade and restricted international capital mobility under the Bretton Woods system) to neo-liberalism (enhanced international capital mobility) eroded the developmentalist financial regime and the state–business nexus. The wage–labour nexus has been weakened by this erosion, but has remained influential within Japanese capitalism as the developmentalist financial regime has not been replaced by an Anglo-American-style market-based financial regime (Interview, credit rating agency official, July 26, 2023). Although the number of non-regular workers has increased, regular workers still enjoy employment stability in Japan (Hoshi and Kashyap 2025, 242).

This study contends that the differences in the institutional architectures of China's and Japan's capitalisms, alongside other factors such as their domestic market size, technology, innovation, and access to rare earths, have contributed to shaping divergent car electrification trajectories. China's strong state co-ordination power and inter-provincial and inter-firm competition have driven automobile electrification but have caused co-ordination problems, that is, market distortion (through, for example, enormous BEV excess production capacity) and enhanced geo-political tensions with the West. Another co-ordination problem is that the commodified wage–labour nexus has curbed domestic consumption, in particular the "Balkanised" and "serialised" labour market condition in which labour has little autonomy to protect its own interests and co-ordinate actions across firms and local settings (Boyer 2012, 192). Meanwhile, the weakened capacity of the Japanese bureaucracy and patient capital to co-ordinate various stakeholders has hampered corporate risk-taking and innovation over the last three decades. Patient capital takes two main forms: developmentalist patient capital (such as that provided by public and private sector banks), contributing mainly to continuous innovations, such as HEVs, and market-based patient capital (supplied by venture capital and private equity funds), providing investment portfolios including equity and other risk capital and sometimes achieving disruptive innovations, including BEVs (see Gotoh 2025). The configuration of socio-economic institutions influences the choice of *de jure* or *de facto* strategy and shapes automobile electrification paths.

In this respect, the multi-level perspective from transition studies complements the Regulation Theory framework employed in this study. While Regulation Theory

emphasises how specific configurations of capitalism condition industrial trajectories, a multi-level perspective sheds light on the dynamic interactions among niche innovations (such as emerging technologies driven by firms), established socio-technical regimes (dominant regulatory frameworks, industry practices, and the like) and wider landscape pressures (such as environmental imperatives, energy security, and global policy trends) (see Geels 2002; 2011; Berkeley et al. 2017). Taken together, these perspectives offer a richer understanding of why electrification unfolds unevenly across national contexts. In Japan, the automobile industry constitutes a core national "regime" tightly embedded in economic, employment, and social institutions, making disruptive transitions away from ICE vehicles institutionally constrained. In contrast, the Chinese state has leveraged landscape pressures of decarbonisation to bypass legacy systems and foster a new industrial regime around NEVs. These divergent approaches reflect not only differing strategic choices but also the distinct institutional architectures underpinning Chinese and Japanese capitalisms. Many scholars, including Naughton and Tsai (2015) and Petry (2021), now describe China as a state–capitalist economy. However, there were more entrepreneurial elements in the 1980s when township and village enterprises in rural China were politically independent (Huang 2008, 10). As witnessed in the automobile industry, decision-making and administrative authorities were fragmented in the early reform years, but they became more centralised, shaped by top-down political and regulatory co-ordination that deliberately adopted neo-liberal policies to accelerate the party-state's economic transformation agendas since the early 1990s (Chu and So 2010, 55–60). Such neo-liberal policies have made commodified wage labour dominant in the Chinese economy since the 1990s (Pauls 2022, 274–275).

Among the three social ties that connect people and provide them with support and protection – family and kinship, intermediary organisations outside kinship (such as agrarian villages and companies), and the state – Fukuyama (1995, 62–67) argues that the Chinese have tended to rely on the first and third, in contrast to the Japanese dependence on the second tie. Several authors, including Miyakawa (1955, 540–544), Jing and Luo (1978, 218) and Gruin (2019, 37–42), point to Imperial China's economic liberalisation, such as the development of the monetary economy, the diffusion of markets and the erosion of intermediary organisations, weakening the protection of people. In contemporary China, following the reform and opening up in 1978, the party-state reduced intermediary organisations' (such as SOEs and communes) protection of people, pursued drastic job cuts, consolidation, and privatisation, and welcomed enormous foreign direct investment (FDI) inflows (see Gotoh 2021). The result was a marriage of neo-statist and neo-liberal measures in economic policies, including tariffs, investment restrictions, sovereign wealth funds, state-owned venture capital, and strategic industrial planning (McNally 2020, 282–283).

Since the early 2000s, the party-state has drastically strengthened its grip over Chinese private sector firms through numerous central and local governments' shareholding firms, which hold minority stakes in, monitor, and influence the decision-making of these firms (Chen and Rithmire 2020, 258–259). It has also promoted civilian–military integration to boost the international competitiveness of high-tech and defence industries (Malkin 2022, 544). Indeed, China's rapid integration of artificial

intelligence into autonomous vehicles was viewed by the US government as an attempt to promote civilian–military integration and led to escalated rivalry between the two countries (Sayler 2020).

The heavy concentration of power in the party-state has both positive and negative effects for Chinese capitalism and the global economy. The central government's economic planning, industrial policy, and dominance over finance and strategic industries enable the economy to respond promptly to international and domestic changes and boost specific industries faster than market-based economies. Numerous local governments are also involved in competition over economic performance, inviting foreign capital to their jurisdictions, supporting local companies in their localities, and influencing the evolution of the central government's policymaking by demonstrating through pilot programmes successful local policy before being approved centrally (Kennedy 2010, 472). However, excessive central and local government intervention has often caused side effects such as excess production capacity, the expansion of public and private debt, and local protectionism, as China's automobile industry modernisation and NEV sector development demonstrated (see Chu 2011; Gotoh and Li 2023).

In contrast, while Johnson (1982) considered Japan a developmental state, given its political power dispersion and strong attachments to intermediary social organisations, Japan between the 1950s and 1980s can be better characterised as stakeholder capitalism operated through public–private networks (see Samuels 1987; Okimoto 1989). Networks and collaboration between the state and businesses were critical to rapid economic growth, yet the Ministry of International Trade and Industry (MITI) was constrained by its relatively small workforce, small budget, and weak legal and regulatory capacity (Gotoh 2019, 19–20). Furthermore, in contrast to China's integration into the global economy under neo-liberal globalisation, Japan's re-incorporation into the world economy in the 1950s was influenced by American-led embedded liberalism, which fit well with Japanese social norms and ingrained the interests of anti-free market elites (Whittaker et al. 2020, 67). However, Japanese socio-historical norms, such as strong in-group favouritism (attachments to intermediary organisations) and systemic support (ruling elites' support and protection of subordinates in exchange for the latter's obedience and loyalty), which shape its networked capitalism, constrain the mobility of capital, labour, and knowledge and conflict with Anglo-American neo-liberalism promoting capital mobility and capitalist dominance (Gotoh 2021, 409).

Until the 1980s, the state bureaucracy and developmentalist patient capital played key co-ordination roles in Japan's networked stakeholder capitalism. However, their co-ordination capacities were eroded by multiple factors, including scandals involving Ministry of Finance (MOF) officials in the 1990s, the 2001 MOF breakup, strong American criticism of Japan's government intervention, the shift of the Ministry of Economy, Trade and Industry (METI, succeeding MITI) from industrial policy to competition policy, the prolonged economic stagnation, the Basel capital accords that restricted major banks' risk-taking, and the demise of the three long-term credit banks (see Gotoh 2025). Despite the relatively weakened banking power and Dore's (2009) perception that Japan shifted from employment sovereignty to shareholder

Table 1. Current institutional hierarchy of Chinese and Japanese capitalisms

Institutional hierarchy	Chinese capitalism (since 2012)	Japanese capitalism (since 1998)
Dominant/influential	State–business nexus Forms of competition	Wage–labour nexus (employment sovereignty has been weakened, but is still influential)
Middle	Wage–labour nexus (labour commodification) Financial regime	State–business nexus Insertion into the global economy
Subordinate to others	Insertion into the global economy	Financial regime Forms of competition

Source: Authors' compilation, based on Boyer (2012, 193).

sovereignty management, corporate governance in Japan has remained bank-centred, closely associated with Japanese social norms and employment sovereignty management (Interview, Chieko Matsuda, a former consulting firm partner, July 14, 2025). Nevertheless, due to the weakened co-ordination capacities of the bureaucracy and patient capital, as well as the underdevelopment of shareholder-based corporate governance, which allows for strong risk-taking and a focus on profit maximisation, Japan's corporate sector has become more risk-averse and status quo-oriented.

Another significant development in Japanese capitalism has been the increasing dualist corporate landscape in which big businesses have become increasingly integrated into the global economy and small- and medium-sized companies have been left behind in the domestic market, facing an aging society and depopulation. According to the Japan External Trade Organization (JETRO 2019), 182 listed companies' proportion of overseas sales to total sales reached 59.3% in 2018. Also, the outstanding value of Japan's outward FDI has increased sixfold to exceed US$2 trillion over the last two decades. By contrast, the entire corporate sector's overseas sales rate in 2021, based on a JETRO (2022) questionnaire, was only 18.9%, which means that small- and medium-sized businesses have limited access to and penetration of overseas markets. These suggest that the close Japanese inter-firm ties have been loosened, while the government's influence over big businesses has decreased.

Although the government's decreased co-ordination capacity was one reason for Japan's "lost decades," it has re-activated economic and financial statecraft to prevent its economic decline and balance China's growing influence in Asia over the last 10 years. These include initiatives to boost Japan's competitiveness in infrastructure export to other Asian countries, bolster market-based patient capital, and encourage Japanese firms' reshoring and diversification policies of international supply chains (Interview, Financial Services Agency official, July 24, 2023; see also Todo and Inoue 2021; Gotoh 2025).

The divergence between Chinese and Japanese capitalisms stems from distinctive socio-historical factors, resulting in different institutional configurations that, in turn, lead to divergent car electrification strategies. Table 1 illustrates the current institutional hierarchy of Chinese and Japanese capitalisms. Japan's weakened government–business co-ordination and employment sovereignty have held back BEV development, although its major automakers have globally diversified businesses and are adept at responding to market demands and regulations of multiple markets. In contrast, China's state-led co-ordination, characterised by strong central intervention

combined with intense inter-provincial and inter-firm competition, has arguably facilitated the rapid expansion and consolidation of its electric vehicle industry. While this has enabled domestic firms to become globally competitive, such a model has also raised concerns about industrial fragmentation and overcapacity, and the sustainability of state-supported growth.

As such, rather than treating state intervention as a discrete causal factor behind industrial success or failure, Regulation Theory allows an examination of how historically specific configurations of capitalism shape industrial transformation. Since the 2007–2008 GFC, scholars have re-evaluated the role of the state in addressing "market failures" in areas such as innovation, infrastructure, and climate transition (see, for example, Stiglitz 2009; Mazzucato 2013; Vogel 2018). In contrast, other economists have cautioned against the risks of "government failure," including inefficiencies and moral hazard. Regulation Theory provides a lens to analyse the co-evolution of state strategies, industrial structures, and labour–capital relations within national growth regimes. From this view, state co-ordination is not inherently beneficial or detrimental, but part of a broader institutional ensemble that mediates developmental outcomes. This approach also helps explain how similar policy tools can yield divergent effects depending on their institutional conditions and sets the stage for analysing how national trajectories in car electrification.

De Jure and *De Facto* Electrification Strategies

East Asia's regional economic integration occurred *de facto*, driven by private sector activities of international trade and investment after the early 1980s (Yoshimatsu 2005, 260). At the same time, the region also witnessed *de jure* institutional regional co-operation between public-sector authorities through trade commitments between states, like in Europe, generating occasional tension with the *de facto* corporate networks that sustained regional trade and production until the 2007–2008 GFC (see Higgott 1997; Breslin and Higgott 2000). However, with China's growing neo-statist policies in the 2010s and the intensified US–China rivalry, *de jure* power has resurged in the EU and the USA, challenging the prevailing order of the regional and global political economy.

Automobile electrification has witnessed a similar transition from the *de facto* corporate power to the *de jure* power of public-sector authorities over the last two decades. Both Japanese OEMs' HEV development in the late 1990s and Tesla's development of NACS in 2012 took place *de facto*, as part of their decades-long projects to produce affordable and environmentally friendly vehicles. NACS was open to all other US electric vehicle makers in 2021 after it out-competed the Combined Charging System, a rival charging standard developed by the European Automobile Manufacturers Association. This contrasts with Beijing's *de jure* car electrification through interventionist industrial policy, which enabled China's domestic automobile industry to enhance its global competitiveness (see Chu 2011). Well aware of its monopoly on electric vehicle batteries and components supply, China's government has seized the opportunity to create national NEV standards by working closely with automakers and component suppliers. The resultant NEV regulations, first released in

Table 2. Transnationality Indices of German, US, and Japanese automakers

	Location	Transnationality Index (%)	
		2006	2018
Volkswagen	EU	56	60
Daimler(Chrysler)	EU/USA	29	60
BMW	EU	67	56
General Motors	USA	34	27
Ford	USA	49	38
Toyota	Japan	49	65
Honda	Japan	69	77
Nissan	Japan	61	71

Sources: UNCTAD (n.d.).

2009, govern not just upstream activities like the supply chain of raw materials and battery designs but also downstream production and sales and were supplemented by multiple standards on charging infrastructure and power storage systems for China's NEVs, mostly BEVs. Beijing's *de jure* strategy has enabled Chinese automakers to overcome the bottlenecks of developing HEVs due to the lack of technology transfers from foreign firms until the early 2000s, catching up with their Western counterparts through stage-skipping and leapfrogging into areas, China has already established competitive advantages (Gallagher 2006, 141–145; Wang and Kimble 2013, 7–10).

Generally, the more internationalised multinational corporations headquartered in relatively small home markets, such as Japan and South Korea, are, the more vulnerable to *de jure* strategies of major powers with vast home markets of the USA, EU, and China, and are thereby incentivised to deploy *de facto* strategies. This is the case for Japanese automakers. Referring to the 2006 and 2018 Transnationality Indices – the average of foreign assets to total assets, foreign sales to total sales, and foreign employment to total employment – which indicate the reliance on foreign markets, the three major Japanese automakers became more global and hence more vulnerable than their German peers in 2018 (see Table 2) and were increasingly influenced by host countries' regulations. In contrast, US firms were not global and therefore were less susceptible to other countries' *de jure* strategies (Mikler 2009, 17–18).

Meanwhile, Chinese automakers are much less "transnational" than their foreign counterparts, partly because China's NEV market is by far the world's largest. Geely, the first private automaker in China with considerable international market success and active in overseas merger and acquisition activities, is arguably the exception (a Transnationality Index of 54% in 2018, which dipped to 40% in 2023). Most Chinese automakers' Transnationality Indices in 2023 were less than 10%.[2] This suggests that due to their low dependence on overseas markets and their vast home market, Chinese automakers are less vulnerable to US and EU protectionism than their Japanese peers. Indeed, these factors mean that China could retaliate against US and EU restrictions, unlike Japan.

The turn to *de jure* car electrification in the automobile industry was also prompted by industry scandals and regulatory shifts. Notably, the 2015 "Dieselgate," in which Volkswagen was found to have violated the US Clean Air Act by installing illegal software into its diesel engine vehicles to comply with the CO_2 emissions regulations of the USA, Europe, and Asia, has resulted in buy-back programmes costing billions of dollars and a drastic shift in the US market from diesel vehicles to HEVs,

PHEVs, and BEVs (Boretti 2017, 3). European OEMs, particularly German manufacturers, also transitioned their production drastically to BEVs and PHEVs. HEVs, however, were regarded as technically challenging as automakers had to master two inter-related sets of critical powertrain technologies that integrate mechanical engineering (conventional technological expertise for ICE vehicles) with electrical engineering, high-voltage systems, and power electronics (see Krzywdzinski et al. 2023). A growing policy focus on moving beyond ICEs in Europe, China, and India during 2016–2017 coincided with initiatives supporting the transition to BEVs in these economies to different degrees, paving the way for car electrification in the next decade (IEA 2021). For German automakers, their dependence on the Chinese market, which accounted for 30% of their global sales in the late 2010s, also encouraged their heavy BEV investment (Meckling and Nahm 2019, 477). However, these endeavours were compromised by the aggressive overseas expansion of Chinese NEV firms sponsored by the government in Beijing that undercut the competitive advantage of US and European automakers. Chinese major automakers have also enlisted their central and local governments to promote their proprietary technical standards in international standard-setting bodies as part of the country's economic statecraft (Malkin 2022, 560–562).

Consequently, leading powers across the Atlantic shores have introduced powerful *de jure* strategies to stimulate car electrification. Rather than supplanting the existing *de facto* industry standards, initiatives associated with the EU's EGD in 2020, a new growth strategy supported by investment in green technologies and new businesses to achieve climate neutrality by 2050, and the US's Bipartisan Infrastructure Act in 2021 have translated *de facto* requirements into mandatory technical specifications. NACS and the Combined Charging System have become the recognised BEV charging standards in the USA. This invariably favours domestic BEV makers and infrastructure firms by excluding foreign competitors operating on divergent or incompatible technical standards.[3] To cope with such regulatory barriers, Japanese automakers have formed strategic alliances to promote investments in BEV technologies through partnerships with home firms in China, the EU, and the USA to pry open these leading markets now fortified by *de jure* requirements or dominated by competing *de facto* standards.

As such, examining *de facto* and *de jure* electrification strategies pursued by firms and governments is critical for understanding the future of the global NEV industry. In China and Japan, such strategies reflect their distinctive forms of state–business nexuses and exogenous factors, including vulnerability to international pressures. Japanese automakers are more influenced by the host countries' institutional environment (such as protectionist policy) than their Chinese peers, echoing Mikler's (2009, 221) view that "firms' strategies are very much dependent on where they have their home base."

De jure *Electrification in China's Competition-Dominant Economy*

China's automobile industry, pivotal to its industrialisation strategy, has evolved from a state-dominated sector into a global leader in NEVs. As Regulation Theorists such

as Boyer (2012) argue, this transformation was driven by China's competition-led growth model at the top of the institutional hierarchy of its capitalist regime. In the pre-reform era, SOEs like Shanghai ICE Components Company (now SAIC) formed the backbone of domestic automobile production, manufacturing for both civilian and military use (see Chu 2011; Jia-Zheng and Broggi 2025, 214). From the 1980s, facing capital shortages and technological gaps, the government in Beijing shifted to an "inward internationalisation" strategy – leveraging joint ventures with foreign automakers such as American Motors Company and Volkswagen to acquire production know-how and establish a modern industrial base (Chin 2010, 53–54; Chu 2011, 1241–1243). The state simultaneously restructured its approach, transitioning from direct control over production to market-guided development via industrial planning bodies like the National Development and Reform Commission.

However, as China's automobile market expanded – from 200,000 passenger cars in the 1980s to four million by the early 2000s – policymakers grew increasingly concerned about its implications for energy security and environmental degradation. China's dependency on imported oil, which began in 1993, deepened sharply, reaching 54% by 2010 (Jia-Zheng and Broggi 2025, 19). These vulnerabilities, coupled with mounting air pollution and climate concerns, led to the envisioning of the automotive sector's future around NEVs, which promised both a technological leap and renewed global competitiveness – especially as China faced intensified competition after World Trade Organization accession (see Gallagher 2006; Wang and Kimble 2013).

Consistent with the Regulation Theory perspective, China's shift towards NEVs was not simply the product of state directives but emerged from the dynamic interaction between competition among both local governments and firms, and was bolstered by state policy incentives. The central government's early initiatives, including the "Ten Cities, Thousand Vehicles" programme (2009), catalysed this process by encouraging municipal authorities to subsidise NEV development and production (Jin et al. 2021, 14). Local governments, embedded within a logic of local state corporatism, amplified inter-city and inter-firm rivalry in their efforts to attract investment and cultivate industry champions (Gotoh and Li 2023, 30–31). In cities like Shenzhen, where BYD transformed from a battery manufacturer into a leading NEV producer, local subsidies in the early 2010s covered as much as 50% of production costs. Municipalities like Hefei and Guangzhou similarly raced to create electric vehicle industrial hubs, luring start-ups such as NIO and established players like BYD, and in doing so, replicated the competitive clustering that defined earlier phases of China's industrialisation (*Washington Post*, March 3, 2025).

This competition-driven car electrification also triggered waves of "constructive destruction" within and beyond the automaking sector – as established incumbents like state-owned SAIC and Geely, a leading private firm, were challenged by new private entrants like BYD, NIO, and XPeng, which leveraged domestic information technology capital and foreign venture funding to rapidly gain market share. This sectoral churn, while disruptive, was actively shaped by the central government, which combined selective support for "national champions" with the encouragement of fierce market competition to weed out weaker firms (Doner, Noble, and Ravenhill 2021, 256–257). As one Ministry of Industry and Information Technology (MIIT) official

noted, the state expected that "some firms will fall, some will survive, not all will thrive … that will be left to the market to decide" (cited in Gotoh and Li 2023, 31).

At the same time, the Chinese state exercised anticipatory co-ordination to steer the sector's evolution. Through a multi-layered process, the central government's commissions and ministries like the National Development and Reform Commission and the Ministry of Science and Technology worked with the automobile industry, R&D institutions, and universities to develop the nation's NEV technical standards. Technical roadmaps – such as the 2006 "Three-by-Three" plan that prioritised HEVs, BEVs and fuel-cell electric vehicles – structured the direction of industrial R&D, while subsequent plans (like the 2009 Auto Industry Adjustment and Revitalisation Plan) underscored the NEV development as a strategic objective of the Chinese economy, paving the way for *de jure* electrification (Jin et al. 2021). The central government adopted similar approaches for component makers in the NEV supply chain, in which firms were not only encouraged to compete but also expected to collaborate within state-orchestrated ecosystems to ensure technical compatibility and value-chain integration.

This logic deepened further under Xi Jinping's leadership. *The Made in China 2025* industrial strategy considered car electrification as a cornerstone of techno-nationalist upgrading of the automobile sector (State Council 2015). It promoted domestic brand ascendancy, indigenous innovation, and vertically integrated supply chains, pushing Chinese firms to scale up both technologically and financially. As a result, domestic NEV manufacturers benefited from extensive state backing and were actively encouraged to form alliances to secure financial support and subsidies. Sixteen state-owned automakers joined forces to establish the China Electric Vehicle Alliance, while private manufacturers organised a separate network under the umbrella of the China Association of Automobile Manufacturers (Altenburg, Bhasin, and Fischer 2012, 77). The latter, led by Geely, demonstrated strong innovation capacity, having obtained about 100–200 NEV-related patents in 2023 (*Yicai*, January 10, 2023). By 2023, *The Made in China 2025*'s target had already been attained, with 70% domestic sourcing for NEV components, and component firms like BYD and CATL supplying 60% of global electric vehicle batteries (Boullenois, Black, and Rosen 2025, 63–65).

To foster indigenous NEV innovation, particularly in advanced fields such as artificial intelligence and the Internet of Things, the central government actively promoted the formation of cross-industry coalitions, while ensuring regulatory harmonisation within an increasingly competitive domestic market (World Economic Forum and Accenture 2025, 18). Since the mid-2010s, the Ministry of Science and Technology has spearheaded efforts to advance smart driving, introducing the concept of "vehicle-road-cloud integration" to position China's automobile industry at the forefront of global autonomous driving development – a vision reflected in Baidu's Apollo project that piloted autonomous vehicles in 20 cities by 2023 (World Economic Forum and Accenture 2025, 18). To further enhance the competitiveness of domestic automakers and component suppliers, MIIT took the lead in formulating China's *de jure* technical standards for software-defined vehicles and related infrastructure that fully integrate green and smart driving by 2030. In parallel, MIIT

encouraged both domestic NEV manufacturers and high-tech firms to embrace home standards as part of a broader strategy to mitigate the risks posed by US chip sanctions, which had threatened China's ability to rely on foreign systems in the NEV supply chain (*Xinhua*, June 22, 2023; *Reuters*, October 2, 2023).

Such development would not have been possible without the financial/credit support of the Chinese state. Alongside credit flows from state banks, venture capital and private equity investors – often originating from China's booming technology sector – injected new dynamism into the industry, supporting the growth of many NEV start-ups. NIO secured over US$15 billion in private investment from 2015 onwards. In the first half of 2024, China's NEV makers and component firms raised close to US$3 billion in five venture capital deals, accounting for two-thirds of the top 10 deals in the period (*South China Morning Post*, June 24, 2024). Taking together the diverse types of financial, fiscal and tax supports by the Chinese state, it was estimated that a cumulative total of US$230.9 billion (1,616 billion CNY) was channelled to the NEV sector in 2009–2023 (Kennedy 2024).

However, this growth model – underpinned by competition, state steering, and fiscal and credit levers – also rested on a specific labour–capital relation: a commodified labour–wage nexus that suppressed both production costs and household consumption (Westra 2018, 168–169; Pauls 2022, 269–270). In contrast to Japan's employment sovereignty-centric model, China's growth has relied on flexible, cost-minimised labour to sustain global competitiveness. As over-capacity persisted and cut-throat competition intensified, even top-tier NEV makers like BYD were forced to cut wages, paying salaries below industry averages in China. For lower-tier and smaller NEV manufacturers, workers faced even more precarious conditions, as companies increasingly delayed wage payments and have withheld social insurance contributions and severance pay in recent years. Even CATL, the leading battery producer, resorted to cutting workers' hours to avoid large-scale layoffs (*China Labour Bulletin*, April 3, 2024).

This commodified labour regime reinforced the structural contradictions of the Chinese capitalist system. While low wages enabled affordable NEV exports and fuelled domestic sales growth, which peaked in 2022, they also constrained household purchasing power, limiting the potential for any consumption-led stabilisation of the Chinese economy. This was evident in data for 2023, where household consumption accounted for only 38% of GDP, in stark contrast to Japan's 53%. The lag in wage growth inevitably weighed on China's overall macro-economic prospects, as reflected in its decelerating GDP growth, which fell from 8% in the early 2010s to 5.2% in 2023.

More importantly, these dynamics have contributed to persistent and growing over-capacities with international implications. Nationwide, over 200 domestic NEV firms produced around 9.6 million vehicles in 2023 – a 35.8% year-on-year increase – yet 1.2 million units remained unsold. Except for Tesla, which operated its own production line in China, all of the top 15 NEV brands were domestic or joint-venture automakers, collectively producing 90% of the country's NEVs in 2023 (*Bloomberg*, April 3, 2024).

The "dual circulation" strategy introduced in 2020, in which China aimed to strengthen its domestic production and consumption base while strategically

leveraging global markets, became particularly important for the NEV sector amid rising geo-political tensions and trade disputes (Sebastian 2021, 15–16). Facing constraints on domestic demand and persistent over-capacity, Chinese NEV producers have become increasingly dependent on global markets as they have turned to foreign markets to offload surplus output, pursuing mergers and acquisitions in Europe and other key export destinations to maintain business viability. Firms like SAIC developed their own NEV brands that achieved one million sales overseas (*CarNewsChina*, January 17, 2024), while BYD established footholds in high-growth markets such as Southeast Asia and Central and South America, achieving double-digit growth in these regions (*Reuters,* November 11, 2025). By 2023, NEVs accounted for 24% of China's total auto exports, with export volumes surging to 1.2 million units, and this figure continued to climb in 2024, reaching 1.72 million units by late 2024 (*CarNewsChina*, January 14, 2025).

Such aggressive expansion into overseas markets reflects an asymmetric integration of China's EV firms into the global economy. While this outward push has supported commercial viability and helped alleviate domestic economic imbalances, it has also made the sector vulnerable to intensified geo-political tensions and protectionist measures. Under the Biden administration, the USA levied a 100% tariff and this has increased to up to 250% under the second Trump administration, and the EU has launched subsidy probes and imposed a 45% tariff on Chinese electric vehicle imports (*BBC*, October 4, 2024; *Wall Street Journal*, April 16, 2025).

In this light, the trajectory of car electrification offers a clear illustration of both the strengths and contradictions embedded in China's competition-driven growth regime. As Boyer (2012, 217) described, China's growth reflects a "genuine form of mixed economy," synergising public and private forces. Intense domestic competition, combined with central industrial guidance, enabled the rapid ascent of the NEV sector. At the same time, however, these dynamics aggravated long-standing structural tensions: suppressed wages that constrained domestic consumption, chronic over-capacity that fuelled export dependence, and, ultimately, rising geo-political pushback that now threatens global market access. The future of China's NEV sector will depend not only on continued technological and industrial advances but also on whether the Chinese growth model can mitigate its internal contradictions, including weak domestic demand, persistent over-capacity, as well as mounting pressures from other leading powers.

Internationalisation of Japan's Car Industry and de facto *electrification*

When Johnson (1982) wrote of the success of the MITI-led developmental state model, Japan's automobile industry was an important example. But, unlike the Chinese case, public–private networks better explain Japan's success. The government's influence over its automakers, which are all private sector companies, is weaker than the Chinese government's strong grip over its automobile industry (Chin 2010, 15–17; Shimokawa 2010, 262–266). Apart from Nissan, which historically had close ties with MITI, the automobile industry was less obedient to the government than the heavy machinery and electronics industries in the early post-war period

(Gotoh and Sinclair 2021, 162–165). In the 1950s, smaller automakers thwarted MITI's plan to reorganise the automobile industry into two giant groups, and in the early 1960s, MITI could not prevent the entry of Honda, which ultimately became Japan's third-largest automaker (Noble 2011, 618–619). However, from a Regulation Theory perspective, the state–business nexus (such as MITI's industrial policy) was influential in the early post-war Japanese capitalism. MITI successfully promoted the development and consolidation of the automobile component industry during the 1950s and 1960s, while OEMs such as Toyota and Nissan incorporated component suppliers into their *keiretsu* (corporate groups). The ties between OEMs and component suppliers in Japan remain closer than in the West, where component makers have arm's-length relations with OEMs (see Udagawa 2013).

The Development Bank of Japan, a governmental bank, provided the automobile industry with long-term loans for its development in the 1950s and 1960s. However, private sector banks had collectively advanced much larger loans to the automobile industry than the Development Bank of Japan (Uzawa and Takeda 2009, 114–117). Furthermore, when Japanese OEMs faced financial difficulties in the early post-war period, they were not bailed out by the state but by private sector banks. For example, Mitsui Bank (now Sumitomo Mitsui Financial Group, SMFG) and Tokai Bank (today's Mitsubishi UFJ Financial Group, MUFG) rescued Toyota in the 1949–1950 recession. Mitsubishi Bank also bailed out Honda, which faced a financial crisis due to heavy investment burdens in 1954. Also, Sumitomo Bank bailed out Toyo Kogyo (now Mazda) and mediated its partnership with Ford in the mid-1970s (see Hoshi and Kashyap 2001). However, private sector banks worked with the government, mainly MOF and MITI, and the developmentalist financial regime supported the wage–labour nexus that played a critical role in the industrial growth. These relationships manifested the features of stakeholder capitalism networked by systemic support.

Japan's car exports started to grow in the 1960s and skyrocketed in the 1970s, generating trade friction with the USA and Western Europe. The significant rise in petrol prices due to the oil shocks in the 1970s made fuel-efficient small Japanese cars popular among American consumers, causing American OEMs' financial strain that resulted in the US government bailout of Chrysler and major job cuts during 1979–1980 (Bloomfield 1991, 32–33). The US automobile industry and government implemented *de jure* strategies, including anti-dumping duty measures to restrict the import of Japanese cars (Fujimoto 2003). After negotiations with the US Trade Representative, in 1981, MITI announced the self-restriction of Japan's passenger car exports to the USA over the next three years. Japanese OEMs also established factories and expanded their production capacities in the USA to circumvent protectionist measures and alleviate the negative impact of the yen's appreciation against the US dollar (Shimokawa 2010, 60–64).

Similar trade frictions with Europe, wielding anti-dumping duty measures in the 1970s and 1980s, resulted in the establishment of Japanese automobile factories in countries such as Britain and Turkey (see Klebaner and Ramírez Pérez 2022). In this sense, today's US and EU *de jure* automotive protectionist strategies are nothing new (Crawford 2023). With Japanese automakers' internationalisation from the 1970s

onwards, MITI's grip on them weakened. Since the 1980s, Japanese automakers have established plants in India and China to capture the rapid economic growth of these markets. In 2023, overseas markets accounted for about 70% of Japanese automakers' total production and over 80% of their sales units (Japan Automobile Manufacturing Association n.d.). With the introduction of the Basel capital accords, which restricted financing for risky borrowers, and the late 1990s financial crisis, developmentalist patient capital's support for the Japanese automobile industry has diminished.[4] In the institutional hierarchy of Japanese capitalism, the importance of insertion into the global economy has risen, while that of the state–business nexus and the financial regime has declined.

The tightening of CO_2 emissions regulations in the USA and the EU has also prompted Japanese automakers' car electrification. Notably, in 1990, the California Air Resources Board established the Zero Emission Vehicle programme, aiming to achieve significant emissions reductions from its passenger cars (Bedsworth and Taylor 2007). In response to the Partnership for New Generation of Vehicles, a co-operative research programme established in 1993 between the US government and its three major automakers aimed at producing very fuel-efficient vehicles. This catalysed the launch of Prius by Toyota as the world's first mass HEV model in Japan in 1997, followed by the Honda Insight launched in the US market (Sperling 2001, 250). Yet, the hybrid powertrain dealing with the constantly changing power sources was complicated and costly at that time. Nissan gave up the competition in HEVs with Toyota and Honda, and launched the Leaf, the world's first mass BEV model, in 2010 (Stevens and Fujimoto 2009, 108–109).

Japanese automakers' global HEV sales have eclipsed their global BEV sales. HEVs have been popular with consumers, with significant product quality improvement but requiring little behavioural change (see Gourville 2006). Drivers get low emissions and high resale value and do not need to charge their vehicles. Japanese OEMs have also successfully reduced the costs of their hybrid powertrains over time. In contrast, BEVs, which are "long hauls" (products offering technological leaps but demanding a high degree of behavioural change), have been costly to consumers and have had limited ranges, relatively long charging time, and have been prone to battery degradation and low resale value (see Gourville 2006). The "technology push" for emissions reductions in the Japanese automobile market, due to its fierce competition over fuel efficiency between OEMs, has been stronger than in the US and EU markets, while Japan's "regulation push" in a specific direction (such as BEVs) has been weak (Kurokawa 2012, 29). The weak regulation push reflects the bureaucracy's weakened capacity to co-ordinate Japanese capitalism, discussed above.

As HEVs share many components with ICE vehicles, the shift to HEVs has not disrupted Japanese car component suppliers (Interviews, car component company executives, July 25, 2023). In this sense, HEVs are well-suited for Japan's networked stakeholder capitalism. Japanese OEMs have worked closely with component suppliers and are proficient at integral product architecture, which is conducive to HEV development (see Fujimoto 2003). In contrast, as BEVs do not require many components of ICE vehicles, the transition to BEVs will significantly impact the business and survival of traditional component suppliers. Meanwhile, European OEMs were reluctant

to invest in HEVs before Dieselgate since their modular product architecture worked well through maintaining arm's length relationships with mega-suppliers including Bosch and Valeo (Berggren, Magnusson, and Sushandoyo 2009, 167). Although this was a positive development for Japanese OEMs' global HEV sales, it also intensified the competition between HEVs and BEVs. In the EU zone, the EGD that seeks to end the new sales of vehicles with ICE, including HEVs, would be painful for Japanese OEMs (*Nikkei Asia*, July 15, 2021).

After the Biden administration took power in early 2021, the USA reversed the Trump administration's decision in 2017 to withdraw from the Paris Agreement. This presented tremendous challenges to Japanese OEMs. Although Japan endorsed the Paris Agreement, it took advantage of the Trump administration's negative stance towards environmental sustainability in delaying drastic measures to reduce emissions in the automobile industry (Interview, automobile sector analyst, July 20, 2023). Short of regulatory pressure from the USA, the leading market for Japanese automakers, they slowed BEV development (Murasawa 2022, 30–32). The USA rejoining the Paris Agreement meant Japanese OEMs faced a much different reality. The Bipartisan Infrastructure Act, enacted in November 2021, stipulated investment of US$7.5 billion in electric vehicle charging and over US$7 billion in electric vehicle battery components, critical minerals, and materials (*Reuters*, November 15, 2021). The IRA, enacted in August 2022, includes US$369 billion in incentive support for energy and climate-related programmes to increase domestic manufacturing capacity for the broad-ranging clean energy industries, including BEV and battery production. It also offers a tax credit worth up to US$7,500 to consumers buying eligible BEVs and PHEVs that meet the local content requirements (for example, assembly in North America and origins of critical minerals in the battery). While the IRA aims to reduce exposure to Chinese BEV exports, it has effectively excluded Japanese OEMs' HEVs and their BEVs using batteries whose minerals are extracted in China. Immediately after the IRA announcement, the Japanese government warned that the IRA could deter Japanese OEMs' further investment in the USA, violate international law, and negatively affect the US economy (*Reuters*, November 5, 2022).

The Japanese government's support for car electrification has been weaker than that of the Chinese, EU, and US governments. Analysis of the IEA (2025) database revealed that Japan has introduced only nine national-level policies promoting NEV deployment, significantly fewer than China (27), the EU (21), and the USA (12). In 2010, METI announced the "2010 Next Generation Automobile Strategy" targeting the proportion of the next generation automobiles to total new passenger car sales at 50–70% (HEVs: 30–40%, BEVs and PHEVs: 20–30%) in 2030 and the numbers of respective ordinary and rapid charging points for BEVs and PHEVs at two million and 5,000 by 2020. In 2022, HEVs accounted for 49% of total new passenger car sales, already exceeding the target, but the proportion of BEVs and PHEVs was only 3%. The aggregate number of charging points by March 2023 was around 30,000 (ordinary charging points: 21,000, rapid charging points: 9,000), far below the target (*Nikkei*, September 16, 2023). Due to other governments' aggressive ICE vehicle phase-out plans, from September 2020 to October 2021, the Yoshihide Suga administration was under pressure to announce a strong decarbonisation policy (*Mainichi*

Shimbun, December 3, 2020). Prime Minister Suga declared that the country would see electrified vehicles' (including HEVs) share of new car sales reach 100% by January 2035.

Japan's car electrification has faced serious co-ordination issues between the government and multiple industries. While Toyota and Honda faced what Christensen (1997) identified as the "innovator's dilemma" – the risk of cannibalisation between existing (currently profitable HEVs) and new products (less profitable BEVs that require heavy investment) – the poor co-ordination between the government and the automobile and power industries represented a larger obstacle to BEV development. International pressure and the government's policy to end new ICE vehicle sales by 2035 have, however, stimulated Japanese OEMs to accelerate BEV development. Yet the Japan Automobile Manufacturing Association has insisted that "the enemy is carbon, not ICE," and that Japan needs multiple ways of car electrification including HEVs, PHEVs, BEVs, fuel-cell electric vehicles, and hydrogen engine vehicles because Japan frequently faces electricity crunches and fossil fuel power generation accounts for over 70% of total electricity production (*President Online*, December 21, 2021). Given such circumstances, larger BEV sales will increase CO_2 emissions through more fossil fuel power generation and may cause power shortages. Also, Japanese OEMs must meet various needs in industrialised and emerging economies. The Japanese government focuses on how each industry can reduce emissions, while the Japan Automobile Manufacturing Association considers the effectiveness of car electrification should be measured on a "well-to-wheel" basis (where all greenhouse gas emissions of a vehicle throughout its entire lifecycle, considering all stages from raw material extraction to the use of energy in the vehicle are taken into account), not a "tank-to-wheel" basis (where all greenhouse gas emissions from a vehicle's tank to its wheels are taken into account) (*President Online*, December 21, 2021). In 2023, METI announced subsidies to boost charging points to 300,000 and support the domestic development and production of electric vehicle batteries (*Nikkei*, August 26, 2023). Although this was encouraging for Japanese OEMs, the most important government support for car electrification is to sharply increase the volume of clean electricity through renewable and nuclear power generation.

The Japanese automobile industry faces two other major issues associated with car electrification: the restructuring of the legacy businesses, including ICE vehicle manufacturing and car dealerships, and the construction of supply chains for BEVs as software-defined vehicles (Nakanishi 2023, 201–202). The automobile and related industries had 5.5 million employees in 2022, 8% of the total labour force in Japan. The wage–labour nexus has been weakened but is still influential in Japanese capitalism, unlike the Chinese context. In Japan, legacy businesses are an enormous financial burden on OEMs, and people in these businesses resist the shift to BEVs (Nakanishi 2023, 332–337). METI has supported legacy business restructuring, but employment sovereignty is likely to further delay the transition to BEVs. Moreover, digitalisation, which requires the mobility of capital, labour, and knowledge, has caused contradictions in Japanese capitalism, hampering software development (Gotoh 2025, 1086–1089). Japanese OEMs lack sufficient in-house cost competitiveness and capacities to produce batteries and software that will contribute to new

products and services development (Nakanishi 2023, 316–317). This contrasts with Tesla and BYD's vertically integrated supply chains that contribute to their cost-competitiveness. More risk capital will be needed in Japan to develop vertically integrated supply chains for BEVs than to collaborate with existing suppliers to produce ICE vehicles and HEVs. The escalated geo-political uncertainty presents additional risks to Japanese automakers' horizontal supply chains that encompass international suppliers, including Chinese ones.

Divergent Co-ordination Problems and Electrification Paths

The strong party–state capacity and strong market competition between domestic NEV manufacturers backed by local governments have enabled Chinese capitalism's tight state–business co-ordination. Beijing's *de jure* strategies (such as NEV regulations and support for local battery manufacturers) have significantly accelerated the growth of Chinese BEVs and PHEVs. However, accelerated car electrification has caused serious political and economic backlashes: enormous excess NEV production capacity at home and intensified economic friction with the USA and the EU. Chinese NEVs' price competitiveness is mainly attributed to the industry-wide promotion policy of incentives and subsidies that have made China the world's largest BEV market and dominant player in the global BEV supply chains, as well as commodified labour–wage relations. However, despite massive subsidies, weak domestic consumption cannot sufficiently absorb increased NEV production, amplifying excess capacity and leading to aggressive exports of Chinese NEV manufacturers.

To be sure, China's excess capacity problem is nothing new. Huang (2016) pointed out the excess capacity dumping in steel, shipbuilding, and building materials to other economies. Lacking an explicit international co-ordination mechanism, the China-led Belt and Road Initiative has escalated the geo-political tensions with the USA and other leading economies. More generally, although China benefited from globalisation under the US-led liberal international order, McNally (2020, 296–297) claims that Chinese capitalism's interactions with the liberal order have turned into a tug-of-war between the diverging pressures of national capitalisms' pursuit of developmentalism (neo-mercantilism) and the converging pressures of global corporate power maintaining neo-liberalism. However, it could be argued that China's neo-mercantilism has instigated that of other major powers. As a result of such neo-mercantilistic competition, the USA and EU have also become more interventionist. US–China rivalry over hegemony in East Asia and advanced technology has exacerbated this problem, enhancing the risk of de-globalisation. On a net basis, inward FDI into China dropped by 80% in 2023 from the previous year, which harmed the Chinese economy (*Nikkei Asia*, February 21, 2024). Many foreign automakers have reduced their reliance on China's broad-ranging component makers, with some downsizing operations or exiting entirely in response to overcapacity and fierce BEV price competition in China. For example, brands like Volkswagen and Porsche have seen sharp declines in market share in the country, as rapidly expanding Chinese EV firms aggressively cut prices, prompting foreign manufacturers to reduce their dependence on the local market as production hubs and profit centres (*Reuters*, July 11, 2025).

Although Doremus and co-authors (1998) argued that the Japanese corporate foundations were reinforced by developmental democracy, strong bureaucracy, and the reciprocity between the state and firms, Japan's public–private networks and its bureaucracy's ability to co-ordinate stakeholders have weakened since the 1990s. Facing the financial crisis and economic slump during the late 1990s and early 2000s, Japan tried to shift to an Anglo-American-style market-based capitalist model. However, many Japanese elites misconceived that the withdrawal of the government could achieve this. Also, the internationalisation of Japanese big businesses, including automakers, through massive outward FDI has weakened the bureaucracy's co-ordination capacity. Japanese automakers have reduced emissions by improving ICE fuel efficiency and increasing HEV sales based on *de facto* strategies with modest R&D subsidies (see Ahman 2006). However, the weak co-ordination between the Japanese government and the automobile and electric power industries has delayed BEV development, which faces considerable challenges. The demand for ICE vehicles and HEVs will not disappear soon, but Japan's OEMs have recently enhanced BEV investments and partnerships (for example, Honda-Sony and Toyota-BYD). In February 2023, Toyota announced the acceleration of BEV development while maintaining its multi-pathway strategy to invest in BEVs, HEVs, PHEVs, fuel-cell electric vehicles, and hydrogen-engine vehicles (*Nikkei*, February 22, 2023). However, these *de facto* industry-level endeavours to co-ordinate car electrification were complicated by China's and the EU's *de jure* strategies that have created enormous excess capacity and caused the BEV price crash.

Indeed, although Japan's government has recently started helping the repatriation of EV supply chains, *de facto* electrification strategies of Japan's OEMs will likely stay on, and they need to make significant BEV investments by using cash flows from HEV and ICE vehicle sales to narrow the competitiveness gap with Chinese BEV makers and the USA's Tesla. Meanwhile, the Japanese government offers consumers subsidies for purchasing NEVs apart from HEVs, but their effectiveness is limited (see Lim et al. 2022). Nevertheless, Japanese OEMs' survival will also require strengthening the government's and patient capital's capacity to better co-ordinate stakeholders. In the fast-changing industry landscape complicated by geo-political tensions, another key issue for the Japanese automobile industry is major BEV makers' (like BYD and Tesla) superiority of vertical supply-chain integration (including in-house production of software, batteries, electric motors, and semiconductors) over horizontal supply-chain collaboration between traditional Japanese OEMs and parts/software suppliers (see Nakanishi 2023). Japan's Green Transformation policy includes large public and private investments in BEV development and renewable energy, but they are mainly debt investments and may not be as impactful as large R&D subsidies and risk capital investments. Accordingly, the Japanese government must assist the automobile industry in scaling back its legacy businesses and developing BEVs by co-ordinating the automobile and electric power industries. Short of notable shifts to *de jure* strategy in Japan, the right combination of the two forms of patient capital is needed for catalysing Japan's car electrification: developmentalist patient capital for restructuring the legacy businesses and market-based for mainstreaming BEVs and software-defined vehicles in Japan.

Conclusion

Inspired by Regulation Theory, this article has argued that the divergent trajectories of China's and Japan's automobile electrification are attributable to different hierarchical relations between multiple socio-economic institutions. It has illustrated the evolving institutional hierarchy of Chinese and Japanese capitalisms. The state–business nexus, inter-firm and inter-province competition, and the "Balkanised" and "serialised" wage–labour nexus are dominant in the institutional structure of Chinese capitalism, which is also supported by the hybrid financial regime of developmentalist and market-based patient capital. In the institutional architecture of Japanese capitalism, the wage–labour nexus under employment sovereignty has been weakened but has remained influential. However, the state–business nexus and the developmentalist financial regime have been eroded, while the integration into the global economy has become increasingly influential. Furthermore, the intensified geo-political tensions have fragmented the global political economy and have made *de jure* strategies more common among major powers. The determinants of the two countries' divergent capitalisms and automobile electrification paths include the timings – that is, the periods of embedded liberalism and neo-liberalism – of their integration into the global economy, the degrees of power concentration, domestic market size, governments' business co-ordination abilities, and the mobility of capital, labour, and knowledge between companies.

Both China's *de jure* and Japan's *de facto* car electrification strategies have strengths and weaknesses. China's strong government capacity to co-ordinate businesses and the resultant *de jure* strategies have enabled technological leapfrogging but caused market distortion and enhanced geo-political tensions with the West. Chinese NEV manufacturers have obtained not only developmentalist patient capital from state-owned banks but also market-based patient capital from domestic and international investors such as private equity funds and venture capital. However, a combination of developmentalism and neo-liberalism has casualised labour, weakening consumption in China. Meanwhile, the Japanese government's and patient capital's eroded capacity to co-ordinate industry stakeholders and the prevalence of *de facto* strategies have allowed Japan's big businesses to integrate increasingly into the global economy since the 1990s but have discouraged OEMs' corporate risk-taking and disruptive innovation. Accordingly, investments in BEVs and other NEVs are mainly from internal cash flows from their existing business portfolios. The comparative case study of the two countries' car electrification has demonstrated that green development involving extensive capital commitments over decades requires a right balance between *de jure* and *de facto* strategies based on state initiatives and market mechanisms: *de facto* strategies alone cannot accelerate decarbonisation; excessive *de jure* strategies may generate quick success but also risk escalating protectionist and interventionist tendencies among major economies. This suggests there will be continuing governmental influence over the development of business systems and industrial growth trajectories in East Asia, along with the dialectical impacts of globalisation on the region's business systems.

It should be noted, however, that this study does not attempt to predict the ultimate outcomes of automobile electrification and the de-globalisation trend of the industry. For the former, the global NEV landscape remains fragmented, and BEVs, while

currently the dominant focus of global electrification strategies, may not represent the final technological endpoint. There are multiple competing NEV platforms and divergent national approaches, making long-term trajectories difficult to anticipate. Similarly, the resurgence of trade protectionism and climate policy reversals, exemplified by the Trump administration's dramatic tariff hikes and anti-climate stance, underscore the volatility of the global trade environment that complicates NEV firms and the larger automobile industry.

Notwithstanding, our analysis echoes a perspective that East Asia's (mainly China's) developmentalism has stoked intensified international competition over advanced technology and influenced the recent EU and US interventionist policies (see McNally 2020; Pape and Petry 2024). However, Europe, the USA, and China have diverse traditions of economic nationalism demonstrated by various historical thinkers, such as Friedrich List, Alexander Hamilton, Henry Carey, and Sun Yat-sen (see Breslin 2011; Helleiner 2021). In this sense, it could be claimed that China's neo-mercantilism has rekindled economic nationalism, once dormant in the USA and Europe. Furthermore, the GFC and the necessity of net zero by 2050 have provided stronger justifications for government interventionism. Nevertheless, major powers' competitive *de jure* strategies favouring home companies have intensified geo-political tensions, which pose the risk of slowing automobile electrification in the longer term. Such strategies will likely slow rather than accelerate global decarbonisation. Moreover, Trump's second administration has presented further uncertainty over the future of global decarbonisation and the global political economy, due to the US re-withdrawal from the Paris Agreement and imposition of higher tariffs on China and other countries. In this increasingly protectionist environment, China is likely to double down on its green transition by further promoting BEV adoption and strengthening its domestic NEV champions. Japan, while continuing to face structural challenges, may be nudged into accelerating its BEV shift to remain competitive amid tightening global standards. As a result, the global NEV landscape will likely become more fragmented and contested, shaped by diverging regulatory regimes, industrial strategies, and geo-political alignments.

Notes

1. Deeg and Hardie (2016, 627) define patient capital as "equity and debt whose providers aim to capture benefits specific to long-term investments and who maintain their investment even in the face of adverse short-term conditions for them."
2. Figures from Transnationality Indices published by the China Association of Enterprises and China Entrepreneur Association are available at: http://www.cec1979.org.cn.
3. In Europe, for example, the Alternative Fuel Infrastructure Regulation was released in 2021, which outlined how electric vehicle charging systems would be designed and operated, and how stations shall be installed. Similarly, the USA's National Electric Vehicle Infrastructure Formula Program, launched in 2022, stipulated the technical specifications of the charging network and its regulatory authorities.
4. For instance, when Nissan faced financial difficulty in the late 1990s, its creditor banks could not bail out the automaker, which was rescued by Renault (see Gotoh and Sinclair 2021).

Acknowledgements

This work was supported by the Great Britain Sasakawa Foundation under grant number 179859.

Disclosure Statement

No potential conflict of interest was reported by the authors.

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