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The Automotive Industry in China: Past and Present

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Introduction

In a period of 30 years, China developed from having hardly any automotive production at all to the world's largest producer and market for passenger cars, representing virtually all global original equipment manufacturers (OEMs) and an emerging range of domestic brands and independent manufacturers. Over 21 million passenger cars were produced—and about the same amount sold—in China in 2015, which accounts for almost a third of the global total, both in production and sales.[1] This rapid growth has been historically unprecedented and sparked an interest in China's developmental strategy and industrial policy for the automotive sector (Chin 2010; Thun 2006; Lüthje et al. 2013). At the same time, waves of contraction and expansion of the auto sector workforce, the "socialist" trade union legacy and, last but not least, a landmark strike wave in the South Chinese auto parts sector in 2010 have inspired

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research on labour relations in China's automotive industry (Zhang 2014; Wenten 2016; Jürgens and Krzywdzinski 2016).

This chapter provides an overview of the development of the automotive industry in China and the implications for different stakeholders involved—central and local governments; foreign and domestic automakers; and the local workforce. In the first two sections—which are chronologically divided between the pre- and post–World Trade Organization (WTO) period (2001 being the watershed)—it unfolds how the specific shape of automotive sector development in China has been a result of central and local industrial policymaking, in particular in its early stages. Yet, rather than on industrial policy design *per se*—that could be replicated elsewhere—China's automotive development strategy depended on a favourable international environment coinciding with very unique local preconditions. The sheer size of the Chinese market and overcapacity in most OEMs' home markets provided mixed push and pull incentives for an expansion to China. And the legacy of China's closed, planned economy enabled policymakers to make market access conditional on local manufacturing in joint ventures (JVs) with state-owned enterprises (SOEs). These conditions have resulted in a win-win situation for SOEs and OEMs when it comes to revenue from the constant growth of domestic sales—but since China joined the WTO, the JV success story has found its limits in increasing overcapacity and the inability of SOEs to develop their own competitive brands. Foreign brands continue to dominate the market, but the pressure has increased through the—largely unintentional—growth of smaller locally state-owned and private independent producers; and from an emerging industrial policy focus on new energy vehicles (NEVs).

Although automotive assemblers tend to pay above-average wages, the rapid growth of car manufacturing has rested on a labour-intensive, low-wage model and extensive working hours. Labour relations are characterised by the dysfunctionality of the state-aligned All-China Federation of Trade Unions (ACFTU) and open conflict, in particular along the supply chain. I will shed light on the characteristic production regimes and labour relations, before concluding with an outlook on the future development of the automotive industry in China.

Catching up and Taming Foreign OEMs: The 1980s and 1990s

Maoist China produced only a single passenger car model and never more than 3000 units per year, which were designed for the higher political echelons. The small motor-vehicle industry focused instead on the production of commercial vehicles (Zhongguo Gongchengyuan and National Research Council (U.S.) 2003: 38f.). At the onset of political-economic reforms in 1978, production was dispersed to 56 small and medium-sized assembly plants, which produced 2640 sedan cars annually (Thun 2006: 54). In the same year the Chinese government began to engage global auto manufacturers with two objectives. It planned to mould existing domestic capacity into large-scale conglomerates and a pool of domestic suppliers in order to increase efficiency and economies of scale—and, ultimately, export capacity. And it sought to do so by promoting JVs between domestic SOEs and foreign car manufacturers, with the aim of upgrading technology, managerial skills and research and development (R&D).

Foreign direct investment (FDI) played a significant role in the emergence of automotive manufacturing in China. But given that other late developers equally used FDI to build an automotive industry—for example, Mexico, where foreign OEMs quickly outcompeted domestic producers both in assembly and in components—the relative "success" in China depended on the steering capacity of Chinese policymakers. Initially, nearly all FDI entered China in the form of joint venture agreements, the terms of which were determined by local states in cases of smaller and medium ventures, but by the central authorities in the case of designated "pillar industries" like the automotive sector (Naughton 2007: 410ff.; Thun 2006: 64ff.). Facing strict limits on imports by an import substitution industrialisation (ISI)-like tariff policy (Naughton 2007: 384f.), in order to sell cars in China, foreign OEMs had to manufacture in JVs with a minimum of 50% Chinese ownership. The Chinese government increased its leverage in negotiations by limiting the number of JVs that could be approved at a time; and it partnered each SOE with at least two foreign enterprises to foster internal competition, technology transfer and learning capacity. Finally, local

content requirements were set at 40% for the first year of production, increasing to 60% and 80%, respectively, in years two and three, providing strong incentives for the development of backward linkages (Thun 2006: 63ff.; Chin 2010; Zhang 2014: 35). The expectation that China's domestic market potential would be tempting enough for foreign OEMs to agree to these constraints was initially unmet: in the 1980s and early 1990s, global OEMs remained rather hesitant to invest in China. But this changed dramatically after the mid-1990s, when China's WTO accession became a likely scenario.

The first OEM approached by the Chinese government in the late 1970s was Toyota—but it was unwilling to share its advantage with any other Asian country, focusing instead on expanding in US and European markets (Chin 2010: 60ff.). US automakers, on the other hand, were preoccupied with finding adequate responses to increasing competition at home, which manufacturers like General Motors (GM) and Ford sought in cost-cutting strategies that involved (threats of) relocation—however, not to new markets, but to regions with established supply networks and qualified, non-unionised labour (the South of the US and North of Mexico). Although the American Motor Corporation (Jeep) was the first OEM-Chinese joint venture (1983), it was particularly European carmakers that considered an expansion to China as a solution to offset productivity and sales problems haunting them at home. Two other joint venture agreements were signed in the 1980s between Volkswagen (VW) and the Shanghai Automobile Industry Corporation (SAIC) and Peugeot and Guangzhou Automobile Manufacturing (both 1984)—of which only Volkswagen Shanghai survived.

Up until the mid-1990s the automotive industry in China operated under conditions of soft budget constraints, a protected market and low competition—and therefore, little market pressure on productivity and efficiency. This changed with China's preparation for WTO accession and the anticipated increase in competitive pressure. Overall, public sector profitability reached an all-time low in 1996 (near zero); and new regulations had been enacted in 1994/1995 to address this issue. From 1996 onwards, SOEs were transformed into corporations (i.e. state ownership into shareholdings) and subjected to stricter criteria for profitability and creditworthiness (Naughton 2007: 301ff.). The central government

retained control over, restructured and further enlarged a few conglomerates through forced mergers and acquisitions—including the "big four" of the car industry: First Automotive Works (FAW), Dongfeng, SAIC and Chang'an—and left it to local governments to privatise, merge or close smaller public enterprises under their control. During the 1990s an estimated total of USD 60 billion was invested in the motor vehicle industry (Gallagher 2006: 40); and while Citroen and Daihatsu had entered the market in 1992 and 1996, respectively, the majority of global OEMs joined during or after the period of SOE consolidation.[2]

The dramatic increase in competition not only caused an acceleration of industrial upgrading—because the new entrants chose to produce state-of-the-art models, despite the high costs involved—but also exerted severe pressure on profitability. Both dynamics are well illustrated by the example of Volkswagen. While newer models with shared platforms were gradually introduced elsewhere, Volkswagen continued to produce models with long outdated technology for the Chinese market. In the 1990s, Volkswagen sold its 1980s Santana model at prices well above world market level (166% in 1996, Zhang 2014: 33)—which dropped by over 55% until 2004 (Thun 2006: 211).[3] With increasing competition, the entire automotive industry in China experienced a drop in profits (from 11%–12% in 2000 to 4%–5% in 2005)[4]; and Volkswagen Shanghai's market share fell from 54% in 1996 to less than 18% in 2005 (Zhang 2014: 37f.).

The first phase of industrial policymaking provided the roadmap for the future take-off of JV agreements between domestic SOEs and foreign OEMs. The relative success of the Volkswagen JVs proved the viability of the model to Chinese policymakers—at least in the medium run, for which upgrading and spillover effects were the aim. Concentrated public control and the lure of an untapped domestic market provided Chinese policymakers both with the means and the incentives to attract and tame global OEMs. And for the latter, the VW experience created a precedence that seemed increasingly feasible after the restructuring of public enterprises and the promise of WTO accession had reduced uncertainty. With more and more JVs emerging after the late 1990s, it soon turned out though that one central aim of the Chinese government remained a mere distant possibility: the development of domestic brands.

Building National Brands and Finding a Niche for the Future: The Post-WTO Era

Since its accession to the WTO, Chinese industrial policy for the automotive sector has focussed mainly on two issues: the promotion of domestic brands and the development of NEVs and their core components (batteries, transmissions and engines). WTO accession implied the phasing out of import barriers and complicated the clause on 50% minimum public ownership in joint venture agreements. While the clause was retained for terminal assemblers producing for the domestic market, it was loosened for those producing for export—Honda set up a fully owned subsidiary to export its model "Jazz" in 2002 (Hsu 2014: 81)—and abolished for the auto parts industry. Global suppliers, such as Bosch or Denso, began to set up not only joint ventures but also fully owned subsidiaries, followed by global OEMs that manufactured engines and transmissions under full brand ownership. More generally, the government increasingly withdrew from steering the operative functions of automotive SOEs, focussing instead on broader policymaking and market incentives—for example, preferential taxation for the build-up of domestic R&D capacity (C. W. Chang 2011). In fact, the stimulus package during the global crisis of 2008/2009 was the last industrial policy measure that included a programme specifically targeted at the automotive sector.

The automotive industry in the post-WTO era experienced continuous, though gradually slowing, growth. Fixed capital investment grew at almost 14% annually between 2002 and 2007, dropping by half for the period 2007–2012 (*China Automotive Industry Yearbook* 2015; Lüthje and Tian 2015). New entrants and increasing competition drove down the market share of individual joint ventures to about 5%–10% (VW being the exception due to its two large JVs), and the overall share of foreign brands in domestic passenger car sales to about 57.5% (in 2016). Yet, domestic consumer demand continued to grow. Between 2002 and 2007, as well as 2009–2010, overall passenger car sales in China grew by an average of 35% annually, with 2008–2009 sticking out with a 51% increase due to the governmental stimulus package (Lüthje et al. 2013:

35)—slowing down to an internationally still substantial average of 10% for the 2012–2016 period.[5] In 2015, over a third of GM's global vehicle sales occurred in China (GM Communications 2016); and around 40% of the VW Group's profits stemmed from its China business in 2012 and 2013.[6] When it comes to sales and profits, automotive joint ventures continue to be a win-win solution. But the rapid expansion of the Chinese auto sector, in particular after the 2008–2009 governmental stimulus package, which through large infrastructure measures accelerated the opening of so far untapped markets in Western China, created huge overcapacities. Most automotive plants in China have operated, and continue to operate,[7] well below full capacity (at around 80%), in particular those for commercial vehicles, which had an estimated capacity utilisation of 51% in 2015 (Li 2016). In response, the government has recently announced more restrictive investment regulations.[8] At the same time, Chinese policymakers' hopes for technology transfer, domestic R&D and independent brand development have been largely unmet by the large joint ventures.[9] When SAIC entered the *Forbes 500* in 2004, only 2% of its produced passenger cars were domestically developed, while 98% were VW or GM models (Anderson 2012: 79). It is against this background that the term "indigenous brands" first appeared in the 11th Five Year Plan 2006.

While some joint ventures have recently moved towards the creation of separate domestic brands, such as Baojun between GM and SAIC (2010), the important policy shift in the mid-2000s was an increasingly positive view of locally state-owned and private domestic automakers. In the pre-WTO period, their development had been deliberately disincentivised by the focus on SOE consolidation and the reservation of preferential policies and public orders for large JVs. The early developmental trajectories of the four largest independent automakers in China—Chery, Geely, BYD and Great Wall—were therefore significantly different. Chery is a public enterprise owned by the local government of Wuhu, Anhui province. Initially it possessed the centrally granted permit to produce engines, for which it could access local capital and national bank loans. Similar to SAIC, its operative business is directly linked to the local government. In comparison, the government of Baoding, Hebei, has only a minority holding in Great Wall. It provides preferential policies and assists in R&D

through links to local universities, but neither invests directly nor offers access to central loans, nor is it involved in the operative side of the business. BYD and Geely, on the other hand, are fully private and have, similar to Great Wall, raised their capital through the Hong Kong Stock Exchange and recycled profits from their main lines of business—lithium-ion batteries in the case of BYD; and motorcycles in case of Geely (C. W. Chang 2011; Anderson 2012; Hsu 2014).[10] While BYD has had a competitive advantage in the growing NEV market due to its experience with battery production, Geely is arguably the internationally most renowned private Chinese car producer due to its acquisition of Volvo in 2010.

The productive model of the independent carmakers has rested primarily on a low-cost strategy fuelled by cheap labour, low-quality components and low R&D costs—the latter mainly because in the initial stages they purchased engines and transmissions from established JVs and infringed the intellectual property rights of global OEMs by copying the design of platforms and components (C. W. Chang 2011: 6ff.). Lacking skilled personnel, they also relied on poaching experienced engineers from JVs (Anderson 2012). Yet, although the individual sales volumes of China's independent carmakers are comparably small, they are more profitable than the independent brands of the large SOEs. The latter continue to depend on the sales of their foreign JV partners' brands, while only the domestic brands of Chang'an and Guangzhou Auto have ever been profitable (i.e. in any given year).[11] According to the Chinese Association of Automotive Manufacturers (CAAM), the market share of Chinese brands was 42.5% for the first seven months of 2016[12]—but extremely dispersed between smaller independent producers: in 2009, BYD, Geely, Chery and Great Wall only had a combined market share of 15% (C. Chang 2016). These companies are also largely responsible for the small, but growing exports of finished vehicles, which are mainly sold to other emerging markets—and are qualitatively still lagging behind OEM products (with Honda and GM taking the lead of global OEM exports from China). That, on the other hand, OEM exports from China remain limited has multiple reasons, including continuously growing sales in China's domestic market; restrictive licensing agreements; and resistance from unions in the OEM's home countries that fear a global price war (Wenten 2016). Recent efforts to export cars made in China, in

particular the house brands of domestic producers (both SOEs and private), have moreover been curbed by the radical change in US trade policy towards targeted tariffs on Chinese products.

Pro-active policies for independent manufacturers remained limited during the 2000s, but this changed with the stimulus package of 2009/2010. It included a 10% discount for the purchase of light trucks in exchange for an older vehicle and lowered the purchase tax for cars with an engine of 1.6 litres or less from 10% to 5%. Both measures particularly matched the product range of indigenous brands, which was amplified by the announcement of substantial subsidies for the sale of plug-in hybrids and electric cars in 2010—targeting not only two traditional SOEs (SAIC and FAW), but also BYD, Chery and Geely (Chang 2011, 2016). More generally, the emerging focus on energy-saving and new energy vehicles, in particular electric ones, seems to be tilting the balance of forces in favour of independent producers. The first post-WTO five-year plan made NEV development a strategic R&D objective, providing central government funding to car producers and research institutions. The initial efforts focussed mainly on developing assembly capacity, although Dongfeng and BYD were early movers in setting up R&D centres for NEVs in this period. As a result, BYD's F3M model was the first indigenous hybrid car to hit the market in late 2008 (Liu and Kokko 2013; Nieuwenhuis and Lin 2015). During the 2006–2011 plan, the Chinese government mobilised RMB 11.1 billion (around USD 1.5 billion) for NEV R&D, of which two-thirds went into the development of batteries and powertrains (Nieuwenhuis and Lin 2015). The 12th and 13th plans have cemented the focus of NEV development on electric vehicles; improvements in their core technology (battery density and temperature adaptability); and an expansion of charging facilities and EV usage in public transport. For the 2012–2020 period, the production and sales of five million NEVs has been envisioned—a target not unlikely to be met, given that the annual production of electric vehicles alone was 680,000 in 2017 (Babones 2018). More ambitious, however, is the projected reduction of fuel consumption to 5 litres/100 km by 2020. To both ends, the government assists with central to local subsidies; tax breaks; and large public orders of electric vehicles (Chang 2016)—which now include traditional hybrids as well.[13] Private consumers in select

larger cities benefit from central and local subsidies towards the purchase of NEVs and, in particular, from free and fast licensing, which compares favourably to the high costs and long waiting time for a conventional car registration. To address the critical issue of EV's limited mileage per charge (about 160 km), the government has undertaken to install a growing network of charging stations,[14] mainly via the two conglomerates State Grid and China Southern Power Grid, which are facing competition from large Chinese oil companies that have entered the game (Liu and Kokko 2013; Nieuwenhuis and Lin 2015). In this context, it is also significant that 90% of the world market for chargers is made up of devices using either the Chinese or Japanese charging standard, which the two governments have recently agreed to unify (*Nikkei Asian Review* 2018), potentially setting a global standard. On a wider scale, NEV production also benefits from China's geopolitical strategy of encouraging public and private mining companies to secure access to essential primary resources abroad, such as cobalt or lithium, and of expanding processing capacities at home.[15] In short, governmental support for NEV production is unambiguous—which also has to be interpreted in light of the developmental limits imposed by the JV-driven model.

China's recent ambitious high-tech development agenda *Made in China 2025* (*MiC 2025*) formulates targets specifically for the NEV industry, namely, progress in automation, innovation, quality and use of information technology.[16] Markedly, as Butollo and Lüthje (2017) have argued, *MiC 2025* diverges from prior industrial policy in two regards. It replaces the attempt to link into and climb up existing value chains (which are dominated by foreign players) with the aim of building China-centred global value chains based on Chinese lead firms and R&D. And it shifts focus from the traditional players of SOEs and large conglomerates to medium-sized private or local state-owned enterprises. This addresses the fact that most JVs have long been reluctant to develop and build NEVs in China.[17] Only Toyota has been producing (and importing) hybrid vehicles on a larger scale since 2005, while GM, VW and other European carmakers have only very recently begun to plan the production of NEVs in China. So far, the powerful SOEs and their foreign partners continue to expand conventional vehicle production and are likely to resist an encroachment of their market leadership.

At the same time, a range of new NEV start-ups have sprung up; but as of now, none have commenced production. Nio is one of them, exceptionally aiming at the upscale market, which has been served mostly by Tesla and BMW imports. Most indigenous private producers of NEVs are likely to continue targeting the lower and mid-end of the market, while premium NEVs will remain the domain of foreign OEMs. But the viability of indigenous brands and their development of NEV capacity have to be seen in light of the small company size and fragmentation of the sector. R&D remains moderate if compared to large global OEMs: in 2004 it accounted for only 1.5% of overall investment in the Chinese auto sector; and in 2012 all domestic brands combined reached just about 60% of the R&D investment of Volkswagen alone (Nieuwenhuis and Lin 2015: 117). Foreign brands such as Toyota or VW are likely to dominate the mid-market segment and provide strong competition for domestic brands, which could jeopardise the position of independent producers in the *MiC 2025* agenda. Such contradictions are likely to intensify with the recent entry of Tesla: in July 2018 it announced the approval for a fully foreign owned—and Tesla's merely second—assembly plant near Shanghai, with a planned capacity of 500,000 units.[18] This is part of a landmark shift in Chinese industrial policy *vis-à-vis* the automotive sector, as the cap on foreign ownership is to be phased out by 2022, potentially strengthening global OEMs against domestic competitors.[19] If, however, *MiC 2025* works more or less as planned, NEV production could emancipate domestic brands through intellectual property rights, providing a competitive edge over foreign OEMs and circumventing the technologically unlikely (and economically unwise) catch-up in combustion engine technology.

In retrospect, the post-WTO era demonstrated that the JV model has been successful in building a variegated automotive industry in China; and that these JVs possessed sufficient self-management capacity to be gradually released from central industrial policymaking. Yet, the failure of JVs to develop independent brands or innovative products—particularly NEVs—has prompted a policy shift. Independent (private) producers have increasingly been recognised as dynamic modernisers, receiving tax breaks and subsidies, although the government does not preclude the JV eligibility for these tools, once they decided to venture into the NEV

business. It remains to be seen if China can establish and maintain a competitive edge in NEV technology, and what ripple effects increasing exports from China could cause for the global automotive sector.

Production Process and Employment Relations

Research on the production regimes of automotive companies in China remains limited, in particular where labour relations are concerned (Lüthje et al. 2013; Zhang 2014; Wenten 2016; Jürgens and Krzywdzinski 2016). The best information is available for large European and East Asian JVs; and the following paragraphs mainly apply to these producers.

In the typical managerial division of labour between the Chinese and foreign side of an automotive JV, foreign personnel is represented in most departments alongside Chinese managers, with the exception of human resources (HR) and the state-aligned trade union.[20] There is a general trend towards lean production systems, if this characterisation is reserved for issues such as outsourcing; just-in-time/-sequence (JIT/JIS) production; multi-purpose machinery and robotics; and a smaller workforce. For reasons of cost efficiency—and where the nature of operations permits it—many international JVs follow more labour-intensive regimes and have lower automation rates than in their home countries (Lüthje et al. 2013). In 2013, automation in the body shop of a European JV could, for example, be as low as 27% for older models, which made it the most labour-intensive department in the factory.[21] Although all international joint ventures officially follow lean systems—and have applied *kanban* processes—job rotation, polyvalent skilling and *kaizen* only seem to be applied in Japanese JVs, while, in practice, limited task ranges and training dominate at European and American JVs, as well as at domestic producers (Lüthje et al. 2013; Wenten 2016). At a European JV, workers were grouped into teams of various sizes (usually around 15), but these were mere administrative units subjected to a strict hierarchy. Job rotation was absent; *kaizen* and multi-skilling were unnecessary due to Taylorised work flows and a limited task range. In the given example, high-volume production of certain models permitted assembly to be reserved for single models—requiring workers with low skill levels only (Wenten 2016). Labour productivity

can thus differ strongly between older plants and newer greenfield sites with higher automation rates and state-of-the-art technology (Oliver et al. 2009; Lüthje et al. 2013).

In terms of employment numbers, the industry experienced a drop of 25% between 1997 and 2001 as an effect of the consolidation of the late 1990s (Zhang 2014: 36). But by 2014, it had increased again by a factor of 2.5 to a total of 3.38 million workers (excluding employment in motorcycle manufacturing, *China Automotive Industry Yearbook* 2015: 426). In total, 78 facilities had workforces of over 10,000 workers—some exceeding 20,000 (Wenten 2016)—but newer greenfield plants are "leaner", with 5000–8000 employees (ibid.; *China Automotive Industry Yearbook* 2015; Lüthje et al. 2013). Dispatch workers—owing the title to their being "dispatched" from labour agencies on a temporary basis—can make up to 25%–30% of the predominantly male and comparatively young workforce (the average age of blue-collar workers is usually in the early 30s); and most manufacturers use a large number of vocational school students on half- or one-year internships on the line (up to a third in labour-intensive departments, Zhang 2014: 70).

Wages in terminal assemblers can be considered low by international standards, although they are usually amongst the highest locally available sources of income. According to Zhang (2014: 76), there is a hierarchy between European/American JVs that paid a median annual cash income of RMB 62,354 (USD 9652) in 2011, and East Asian JVs (RMB 31,433/USD 6615) and domestic enterprises (RMB 31,433/USD 4866). Wages in the auto parts sector are between 50% and 75% of those in terminal assemblers, depending on the position in the supply chain—which is similar to the ratio in other emerging markets, such as Mexico (Covarrubias V. 2019; Juárez Núñez 2012). However, wages have risen continuously over the last decade. According to Lüthje and Tian (2015: 256), on average, labour productivity surpassed wage growth by more than 10% per annum between 1997 and 2002; and 3.5% between 2002 and 2007. But this trend reversed for the periods of 2007 and 2012, when, on average, wages per capita outgrew productivity by 2.9% per annum. And while both growth rates have continuously slowed down since 1997 (ibid.), wage increases are still substantial: in 2016 the average annual wage of automotive employees in

China was RMB 74,463/USD 11,050—an increase of 17.6% in only two years (*China Labour Statistical Yearbook* various).[22] Hourly wages for comparable tasks now range between USD 4.20 and USD 9 in terminal assembly plants (in 2017), which puts them ahead of labour costs in Mexico or India.[23]

With differences in detail, all major JVs have performance-related remuneration systems, in which the fluctuating part of the salary (bonuses, premiums, overtime etc.) makes up about 50% or more. In many cases, including the large JVs, the base wage is set at the local minimum wage for ordinary workers. Seniority only plays a secondary role, if at all. Workers' incomes are stratified according to position (engineers, assembly line workers etc.) and/or employment status (formal, dispatch workers and interns), mainly via different entitlements to bonuses and premiums. There is no automatism for wage increases in any terminal assembler in China—neither through productivity linkages nor through sales (although many foreign JVs distribute large profit-dependent bonuses at managerial discretion)—and workers, in particular women, might end up not receiving a wage increase in a decade (Wenten 2016). Despite the recent wage growth in the industry, in absolute terms working-class incomes are still low, reinforcing the middle- to up-market orientation of most auto producers in China, as well as an extension of (subprime) consumer credit—to an extent that a government crackdown on peer-to-peer lending has been blamed for the decline in vehicle sales in the first half of 2018.[24]

Working conditions and occupational safety and health (OHS) standards in JVs are generally better than in domestic enterprises (Lüthje et al. 2013; Nichols and Zhao 2010), especially in recently erected factory halls with state-of-the-art machinery. However, in some cases (apparently not in East Asian JVs, Lüthje et al. 2013), working hours can be very long—a large European JV, for example, runs a three-shift system with 13 consecutive working days plus extra hours for rework, and consequently, only one rest day every two weeks (Wenten 2016). More generally, regular working days of 10–11 hours or more are no exception.

Promotions and further training of formal workers in all JVs are based on individual performance evaluations and are generally slow, limited and very competitive—but possible. This primarily serves the aim of

stabilising the skilled segment of the workforce (Zhang 2014: 107ff.). For example, a German JV offers career paths for formal workers to become supervisors, "expert workers" (similar to the German *Facharbeiter*) or managers, which involves releasing workers for further education and results in officially accredited certificates (Jürgens and Krzywdzinski 2015, 2016). An East Asian JV, on the other hand, organises promotions and further training according to employment status—production, maintenance and white-collar workers—without mobility between categories, and without external schooling or certificates (ibid.). For dispatch workers, however, permanency, promotions and additional training are distant aims and require up to ten years of continuous work experience in the company. And, more generally, only very basic training tends to be comprehensive—which can be cut short to a few days for dispatch workers (Wenten 2016). This can be explained by the Taylorised task range and hierarchical work organisation; and it is particularly true for dispatch workers, who are more likely to quit (Wenten 2016),[25] despite the fact that turnover rates in European and American JVs are generally very low (Lüthje et al. 2013; Wenten 2016).

For reasons of cost and path dependence from now phased-out local content requirements, most JVs have high degrees of outsourcing and localised supplies, including both Chinese (for lower value parts) and foreign suppliers (for higher value parts), although for upscale models/brands components of strategic technological value are imported (Lüthje et al. 2013; Wenten 2016). Lüthje et al. emphasise that supply chain relations differ: European JVs are characterised by arm's-length relations with independent suppliers; US-American by semi-independent first-tier suppliers that have formed JVs with Chinese SOEs (e.g. Delphi, Visteon); and East Asian JVs by suppliers directly controlled and invested by the terminal assembler. First-tier suppliers, particularly those with an SOE partner, have similar production regimes to terminal assemblers, but labour intensity, overtime and income insecurity increase sharply further down the chain, as does the use of migrant workers (Lüthje et al. 2013: 41f.).

There is only one legal trade union federation—the All-China Federation of Trade Unions (ACFTU)—that represents workers in the auto sector on the enterprise level and in higher-level organs of different

geographical and institutional scales. Industry-wide branches exist on paper but play virtually no practical role. Higher-level officials of the union are civil servants, drawn on a rota from other state departments. With rare exceptions, enterprise union officials in the auto sector are chairmen of the SOE party cell and/or managers. Collective contracts, where they exist, are enterprise contracts. They stipulate the main responsibilities between workers and management, and, sometimes, clarify the broader structure of shift and remuneration systems—in accordance with national and local legislation. They do, however, not specify actual working hours and salaries, which are only revealed to workers in their individual contracts. By and large, the union is defunct as an interest representation of the workforce, which is also reflected in workers ignoring it in cases of discontent. Its main functions are the maintenance of so-called "harmonious" labour relations, the promotion of productivity (e.g. through the organisation of skill contests) and the organisation of social and cultural events (Nichols and Zhao 2010; Lüthje et al. 2013; Zhang 2014; Wenten 2016). These traditional functions of the ACFTU are most clearly reflected in those automakers that have a centrally controlled SOE for a JV partner. This does not, however, imply that labour relations in China's auto sector are peaceful. On the contrary, wildcat strikes in auto parts plants seem to be frequent,[26] having, amongst others, led to the establishment of cross-factory collective bargaining in the Guangzhou area after a large-scale strike wave in 2010 (Wenten 2017). More recently, even assembly plants have experienced strikes, with VW offering permanency to its dispatch workers after a yearlong struggle at its Changchun location (Nü 2018).

In a nutshell, automotive manufacturing in China has for long been based on low-skilled, Taylorised labour and a higher share of manual operations—which is explained by cost efficiency; the continuous production of older models; and high-volume output of singular models. Low productivity could for a long time be offset by low labour cost, but wage growth, decreases in profitability and the anticipation of high-volume production have induced large JVs to install state-of-the-art technology in newly opened production sites. The use of temporary and precarious forms of employment is widespread in the industry, in particular on the lower tiers of the supply chain. Working hours and rhythm

remain intense; and there are hardly any formal mechanisms in place that allow managers or trade union officials to appease workers' grievances, making open conflict likely.

Conclusion

This chapter provided an overview of the main tenets characterising the development of the automotive sector in China, in terms of the industrial policy set up in its initial and more recent stages; related developmental effects; and typical labour relations. The pairing of OEMs with SOEs has proven to be a powerful vehicle for the successful emergence of domestic manufacturing capacity in both assembly and supplies—a strategy that was premised on China's large domestic market and retained control over a small selection of large SOEs that received preferential policies and funding. However, the limitations of this model have become apparent by the failure to emancipate domestic infant industries from dependence on foreign brands. Not without irony, the most dynamic national brands have emerged on the margins of industrial policymaking through mobilising private investments, poaching talent and infringing intellectual property rights. The more recent governmental recognition of their innovative and growth potential has to be seen more as an *ex post facto* adjustment than as a deliberate plan.

The automotive sector in China is dynamic, but the continuous expansion of conventional vehicle production has created overcapacities; and an increase in OEM exports from China could significantly drive down global prices. The push towards NEV development is likely to aggravate the trend, once the large JVs fully jump on the bandwagon. But NEV technology also has the potential of giving Chinese manufacturers a competitive edge over global OEMs. China's industrial policy, while still reflecting the influence of the large, combustion engine focussed SOEs, has shifted in favour of nascent private NEV producers, complemented by a wider agenda of expanding EV infrastructure and geopolitically assured access to raw materials. What this implies for production regimes and labour relations remains to be seen. For the time being—and despite recent wage increases—the industry still rests on a low wage model, with

a segmented labour force and widespread use of temporary employment, as well as conflictual labour relations. The low(er)-cost model of indigenous brands, as well as the lower skill requirements of the new product, could aggravate this trend and undermine the comparably higher wages of international JVs. Whatever the future holds for the automotive sector in China, significant ripple effects on innovation, profits and employment in the global automotive industry, as a whole, are a matter of certainty.

Notes

1. Based on: http://www.oica.net/wp-content/uploads//Cars-2015-Q4-March-16.pdf; http://www.oica.net/wp-content/uploads//pc-sales-20151.pdf
2. Among the entrants in the late 1990s and early 2000s were GM (1997); Honda (1998); Kia (1999); Fiat (1999); Toyota (2000); Ford/Mazda (2001); Hyundai (2002); Peugeot (re-entered 2003); Nissan (2003); Honda (2003); BMW (2003); DaimlerChrysler (2004); and Renault (2004, after a failed joint venture founded in 1993).
3. Despite the drop in prices, an adapted version of the original Santana was produced until 2010.
4. Profits climbed up to nearly 9% in 2011, with a small slump during the 2008 crisis (Zhang 2014: 37).
5. http://www.oica.net/wp-content/uploads//pc-sales-2016-Q2.pdf
6. VW Annual Reports 2012, 2013.
7. http://www.autonewschina.com/en/article.asp?id=18403
8. http://www.autonewschina.com/en/article.asp?id=18062
9. This has been attributed to the conservative nature of SOEs and the reluctance of foreign OEMs to share state-of-the-art knowledge and technology with their Chinese partners (C. W. Chang 2011).
10. Chang (2011) is therefore keen to emphasise that the indigenous brands did develop *not* as a result of central policymaking, but on the contrary, *despite* central planners' preference for SOE JVs.
11. http://www.autonewschina.com/en/article.asp?id=15251
12. http://www.caam.org.cn/AutomotivesStatistics/20160815/0905197263.html

13. http://www.autonewschina.com/en/article.asp?id=15392
14. Nationwide, there were 214,000 public and 232,000 private charging stations in 2017 (Babones 2018).
15. http://www.autonewschina.com/en/article.asp?id=17359
16. Butollo and Lüthje (2017) have pointed out that *MiC 2025* is effectively more about robotization, automation and a broader restructuring of industrial supply chains than about innovations in cyber-physical systems envisioned in the often compared agendas of other nations, such as Germany's *Industrie 4.0*.
17. As a condition to its opening of a new assembly site in South China, Volkswagen was, for example, required to develop an electric vehicle for sale in China. It, however, only produced a prototype that was never intended for serial production (Xu 2011).
18. http://www.autonewschina.com/en/article.asp?id=17839
19. http://www.autonewschina.com/en/article.asp?id=17488
20. The exemptions are some Japanese producers, such as Honda, in which Japanese management is also represented in HR (Zhang 2014: 103; Lüthje et al. 2013: 95).
21. By now this is likely to have undergone significant changes, both due to increased pressure on productivity and the *MiC 2025* agenda that specifically aims at the increasing robotisation of manufacturing processes.
22. It is worth noting that between 2014 and 2016, employment numbers have shrunk from 250,000 employees in SOEs to 244,000; and from 19,000 to 14,000 in collectively owned enterprises. Meanwhile, employment in "other" units, that is, mainly private firms, has grown from 3.07 million to 3.15 million employees (*China Labour Statistical Yearbook* various). This reflects the broader sectoral reorientation away from SOE dominance to the rise of privately owned players.
23. https://www.autoexpress.co.uk/car-news/98986/the-global-car-manufacturing-wage-gap-what-do-car-factory-workers-earn; http://www.autonewschina.com/en/article.asp?id=16567
24. http://www.autonewschina.com/en/article.asp?id=18072
25. Here, my observations differ slightly from what Jürgens and Krzywdzinski (2015) have argued for a German JV, namely, that it delivers extensive polyvalent skilling as a requirement of lean production systems.
26. In the absence of official statistics, this is based on anecdotal evidence and confirmation by Chinese trade union officials (Wenten 2016).

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