

令和 5 年 6 月 26 日現在

機関番号：14301

研究種目：若手研究

研究期間：2019～2022

課題番号：19K13879

研究課題名(和文) The sociopolitical construction of the market of new environmental vehicles in East Asian automotive industries

研究課題名(英文) The sociopolitical construction of the market of new environmental vehicles in East Asian automotive industries

研究代表者

HEIM Stephane (Heim, Stephane)

京都大学・文学研究科・准教授

研究者番号：30767900

交付決定額(研究期間全体)：(直接経費) 3,200,000円

研究成果の概要(和文)：1. The new geopolitics of the auto industry implies a central role of China and new actors that threat the fordist conception of control.
2. A new international division of labor (cheap labor, unskilled workers, and poor employment conditions) that rebalance the fordist labor regime..

研究成果の学術的意義や社会的意義

This research highlights an important dimension of sustainability, the side effects of environmental policies on working conditions. Though many countries and car makers embrace environmentally sustainable policies, those imply new forms of social conflicts and the worsening of working conditions.

研究成果の概要(英文)：1. The new geopolitics of the auto industry implies a central role of China and new actors that threat the fordist conception of control.
2. A new international division of labor (cheap labor, unskilled workers, and poor employment conditions) that rebalance the fordist labor regime.

研究分野：経済社会学

キーワード：Sustainability Automotive industry Labor regimes

様式 C-19、F-19-1、Z-19 (共通)

1. 研究開始当初の背景

Since the Financial Crisis in 2008 and 2009, many governments throughout the world supported their domestic automotive industries with the aim of helping their restructuring towards the production and development of electric vehicles (hereafter, EVs). However, those industrial policies did not translate into the development of large EVs markets until 2019-2020. The traditional car manufacturers (General Motors, Volkswagen Group, Toyota Motors and others) developed few pure electric vehicles (below BEVs), while new actors such as the American firm Tesla, and the Chinese firm BYD started to become serious competitors with only BEVs in their portfolios. Besides, at the start of this research in 2019, China was already on the verge of becoming the core country in the production of EVs and batteries. The central and local governments injected large amounts of subsidies into diverse “special economic zones” in the country to foster this emerging industry. A form of monopoly took shape in different segments of the EVs and lithium-ion battery supply chains, with the emergence of a large dominant battery maker established in 2011, CATL, mining firms specialized in the mining and refining of core raw materials such as Ganfeng Lithium and Tianqi Lithium, and several small firms specialized in the production of anodes, cathodes, and Battery Management Systems.

With this background, this research aimed at investigating this new international division of labor and labor regime in the automotive industry, with the focus on East Asian automotive industries.

2. 研究の目的

This research project, rooted in one of the most vibrant subfields of sociology, economic sociology, aimed at exploring the different trajectories of the development of new environmental vehicles (NEVs, such as hybrids, full battery electrics, hydrogen fuel cells, compressed air, and many other types of powertrain systems) in East Asian automotive industries, and their impacts on their automotive market architectures. The main purpose at the end of this research was to provide several possible developmental trajectories of NEVs markets, compare them, characterize the current emerging actors and institutions, and the interplay between these actors and institutions on the one hand, and firms’ employment relationships, productive organizations, and product strategies on the other. The three main objectives are listed below.

- (1) First, it is crucial not only to explore whether the development of NEVs will curb air pollution, but also its social, economic, and political sustainability aspects (work organization, firms’ strategies, power relations between incumbents and new entrants, political incentives).
- (2) Second, it is necessary to analyze whether new actors and technologies modify (or not) the dominant institutions of the automotive industries (conceptions of control, governance structures, property rights, rules of exchange).
- (3) Third, the political environment should also be inquired, and most specifically the relationship between transport and energy systems and policies.

3. 研究の方法

Originally, the research plan during the four years included both the collection of data on transport and energy policies in East Asian countries, and empirical data on firms’ strategies and public policies in the innovative field of NEVs following a grounded theory approach (Heim, 2022c). After a first year of identification of the main actors in this new segment of the automotive industry, the second and third years (2020-2022) were originally dedicated to in-depth empirical research of those actors in China, Japan, and Korea.

However, though in August 2019 first empirical research in South China (Shenzhen and Huizhou) covering 8 major Chinese battery makers, and several interviews in Japan with Panasonic and Toyota laid the ground for future case studies, the original research plan was disrupted by the Covid-19 pandemic in early 2020. With the restrictions on international travels, but also domestic ones, most of the empirical data collection could not be done as expected. This greatly impacted the dynamics of the research, that turned to a more statistical treatment of available data to compare firms’ strategies. The researcher mostly collected second-hand data from several think tanks and the online automotive industry platform, MarkLines, and Fourin reports for example.

In turn, though the first stage of the research enabled the researcher to build a strong analytical framework (李ほか、2022b), to compare firms and the data collected during the fieldworks, the comparison relied on second-hand data that could hardly be confirmed or infirmed by empirical observations.

The research also focused on one aspect of the original research plan, the impacts of the development of EV markets on working conditions and labor markets in East Asia (Heim, 2019b, 2020a, 2020c, 2020d; 李ほか、2021a), and the overall evolution of the Chinese and Japanese automotive industries, and the Japanese labor market (Heim, 2020b, 2020c, 2022e).

4. 研究成果

Keeping in mind the three original research directions for this research project – i.e. 1. environmental, socioeconomic, and political sustainability, 2. disruptive forces in the automotive industry, 3. industrial policies in transport and energy sectors –, the main results are listed below.

(1) Environmental, socioeconomic, and political sustainability

Though there is a political consensus emerging towards the need to develop EVs to reduce the emissions of air pollutants by the transport sector (European Green Deal 2020; Inflation Reduction Act in USA 2022, etc.), we found out that environmentally sustainable policies often exclude or are in contradiction with socioeconomic dimensions of sustainability. Our research (Heim, 2019b, 2020d; 李ほか、2021a) indicates that the policies targets being the emissions by cars, they only marginally deal with the emissions during the manufacturing stage. Besides, these policies that aim at replacing internal combustion engine cars (below ICE) by no or low emission cars greatly affect the industry in terms of jobs and restructuring processes in developed countries where job polarization has been gaining ground since the 1980s (Heim, 2020c, 2021, 2022e). The traditional fordist labor regime (high wages, social security schemes, labor unionism) is threatened by the implantation of Chinese and Korean battery makers factories in developed countries, and the low level of bargaining of local states with these new actors (Heim, 2022a).

Considering the enterprise-unionism and outsourcing of parts production common in Japan, we showed that inequalities among firms are high in this country (Heim, 2020b), and high risks of plants closures for the smallest firms with high levels of production parts for ICEs. Our research findings indicate that the sharp decrease of smaller suppliers coupled with the remaining wages, and value creation inequalities among Japanese firms in the automotive industry – in other terms the polarization of skills and jobs – is not only due to the introduction of EVs. The international trajectories of the Japanese seven car makers also explains the restructuring of the domestic supply chain. Between 2002 and 2022, the total amount of domestic production increased for Mazda and Subaru, diminished marginally for Toyota, and diminished greatly for Nissan, Honda, Mitsubishi, and Suzuki. Moreover, the share of domestic production on worldwide production for Honda, Nissan and Suzuki dropped from about 50% to less than 25% (respectively 16%, 21%, 24%) during the same period. In turn, this productive globalization indicates that the product policies, productive organizations and employment relations at Honda, Nissan and Suzuki are the results of new compromises among different countries (Heim, 2020b).

Our research also highlights that the EVs product policies follow the traditional “market upper segment’s innovation model”, and target high-income countries and high-income social classes in those countries. They trigger new sources of social conflicts regarding the access to these markets and the growing social polarization when it comes to the purchase of new cars. The research we conducted on the development of EV markets in China (Heim, 2020d) clearly shows that there is an ongoing polarization between large cities and rural areas, the Eastern coastal provinces and the inland provinces, and the high-income and low-income households. The incentives and subsidies schemes to encourage the development of EV markets in China reproduce this polarization.

(2) Disruptive forces in the automotive industry

The second main objective of our research lied in the understanding of the forces that reshape the automotive industry in different regions of the world (Heim, 2019a, 2019b), but more specifically in East Asia (Heim, 2022a, 2022b; 李ほか、2021a, 2021b). It is currently accepted that new actors (or innovators) entering an industry compose the main disruptive forces. When one looks at the current development of the EVs and battery industries, our research clearly points that Chinese private firms are those new actors that disrupt the fordist labor regime and productive organization of the automotive industry. Our 2019 fieldwork in Southern China, suggests that there is a high risk of vertical productive disintegration for the traditional car makers (Heim, 2020d, 2022a; 2022b; 李ほか、2021a, 2022a, 2022b). The empirical data collected during 2019 indicate that, when comparing the Chinese and Japanese battery manufacturing sector, there is a trend of production integration of several productive segments by independent Chinese battery makers.

As for the Japanese side, our findings show that the more collaborative development and division of labor between Japanese car makers and suppliers is reproduced in the EV segment. Chinese battery makers gained a larger and deeper knowledge of the development and production of several subfields of the supply chain (李ほか, 2021a). On the opposite, Japanese battery makers and car makers tend to split among each other different knowledge and focus on specific products. This indicates that the Japanese way of distributive collaboration in their business groups is reproduced in the field of EVs manufacturing (Heim, 2020b). This core institution in Japan is not much affected by new forms of conceptions of control seen in China. However, this is also explained by the higher reliance on hybrid vehicles (HEVs below) in Japan compared with BEVs (Heim, 2022a). In other developed countries, the trend is to favor BEVs, which translates into a decoupling of the product policy and productive organization in Japan and overseas. Finally, Japan is also peculiar when one deals with its degree of openness. Indeed, our research demonstrates that the industrial policies that favor HEVs are also targeted at the exclusion of foreign makers. There are only few BEVs imported from abroad, and no plan to build battery factories by Chinese or Korean makers while they are already invading the U.S. and E.U. In that view, Japan is not that much affected by the electrification of the automotive industry. However, in the long run, should more radical policies in favor of BEVs be introduced in Japan, the impact on the labor regime and productive organization might be like what is seen in U.S. and E.U.

On the contrary to Japan, our research on China concludes that the development of BEVs was early considered (since 2007-2008) as an opportunity to foster the development of indigenous car and battery makers (Heim, 2020b; 李ほか, 2022a). Though the initial policy to develop the car industry in China in the late 1980s favored joint-ventures between state-owned enterprises and foreign car makers, in the mid-2000s the Chinese government realized that state-owned Chinese firms were not able to catch up with their foreign rivals (Heim, 2020b). The opportunity to give more room of development to Chinese makers was BEVs. Central and local governments did not only distribute generous subsidies to this sector, but they also created barriers to the entry of foreign makers in China. A market of bonus and malus between car makers correlated to the percentage of EVs produced and sold in China, a whitelist of allowed battery makers in China in 2016, and the freeing of purchase of new EVs in large cities compared with ICEs are concrete policies that helped forge the strength of Chinese makers. Those makers created new forms of conceptions of control and rules of transactions (core institutions in a market in development) that are in disfavor to traditional car makers (Heim, 2022a). They also invest into the refining of raw materials and established rules of transactions and purchase contracts that most of the traditional car makers must accept as a *de facto* situation. But more important, they developed along the whole value chain to acquire a comprehensive knowledge and establish technical standards.

This bargaining power acquired by Chinese battery makers is the main disruptive force in the current automotive industry our research discovered. They are also private firms, with less pressure from their shareholders, sources of financing insured by local governments, and with large pools of low-paid workers, and are on the verge to install manufacturing plants in the U.S. and E.U.

(3) Industrial policies in transport and energy sectors

Industrial policies play a large role in the introduction of EVs in developed and developing countries (Heim, 2019a; 2019c). In China, central and local governments turned their policies from subsidies to the final consumers to subsidies to the local and Chinese car and battery makers and their BEVs, to help them acquire independently new technical knowledges (Heim, 2020d).

Though, in the literature, the Chinese capitalism is often characterized as a state capitalism, our research invites social scientists to adopt a more nuanced view and approach. One might not ignore the role of local governments in the allocation of financial resources or the limitation of the market to some players through some policies that act as entry rights. However, most of other case studies on the Chinese EVs industrial policies downplay the indirect state interventionism that our fieldwork brings into light. First, we demonstrate that even though most of the policies in China targeted the development of state-owned enterprises, private Chinese firms became the core actors in this new industrial sector, and establish rules of transactions that are not directly guided by the interests of local governments or their shareholders (李ほか, 2021a; Heim 2022a). Compared to American, European, and Japanese firms, their institutional environment is less impacted by the shareholder value, that has been characterizing the evolution of market capitalism since the 1980s. Besides, their product policies, employment relationships, and productive organizations are not that affected or shaped directly by local governments. Finally, compared with state-owned enterprises, whose emergence was built and limited by the late 1980s joint-venture policies, these firms developed often from small technical appliance suppliers to large firms by capturing the financial

resources of the government, and nurturing their own knowledge. In that vein, our investigation into the Chinese battery and EVs industries invite to consider that the 2010s mark a rupture in the Chinese industrial policies, to foster private initiative rather than state direct interventionism.

As the eyes turn to Japan, our research demonstrates that ordoliberal policies, rather than neoliberal policies, constitute the core of the Japanese public action since the 1980s. This is mostly impacted by international political pressures to liberalize the education, labor, and retail markets. The manufacturing industries in Japan are less affected by deindustrialization than in the U.S. and E.U., however they benefited from a flexibilization of their labor markets and the introduction of new forms of employment to adapt their employment relationships to the growing globalization of supply chains ([Heim, 2020c](#)). Indeed, the Japanese industrial policies shifted away from the export-oriented and high-wage male labor force-centered growth in the mid-1980s. The mid-1980s is characterized by the growth of overseas manufacturing for Japanese car makers and large suppliers, and the restructuring or rescaling of domestic manufacturing bases, but also large protectionism ([Heim, 2020b](#)). After the mid-1980s, industrial and social policies gave the primacy to the flexibilization of the workforce, with a growing dualization of labor markets. The postwar labor market dualization between large firms and small and medium-sized enterprises became also less perceptible following those labor market's flexibilization policies. With the introduction of a new breakthrough technology like EVs, stability of jobs becomes a new reality that our research highlighted, and that our future research projects will investigate more deeply.

5. 主な発表論文等

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〔産業財産権〕

〔その他〕

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6. 研究組織

	氏名 (ローマ字氏名) (研究者番号)	所属研究機関・部局・職 (機関番号)	備考
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7. 科研費を使用して開催した国際研究集会

〔国際研究集会〕 計0件

8. 本研究に関連して実施した国際共同研究の実施状況

共同研究相手国	相手方研究機関
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