

JOURNAL FÜR ENTWICKLUNGSPOLITIK

vol. XXXXI 1-2025

MULTISCALAR UNEVEN DEVELOPMENT AND THE SOCIOSPATIAL FRAGMENTATION OF LABOUR

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Published by:
Mattersburger Kreis für Entwicklungspolitik
an den österreichischen Universitäten

Journal für Entwicklungspolitik (JEP)
Austrian Journal of Development Studies

Publisher: Mattersburger Kreis für Entwicklungspolitik an den österreichischen Universitäten

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This special issue is part of a cooperation project with the Vienna Chamber of Labor.

Contents

- 5 STEFANIE HÜRTGEN, NICOLAS SCHLITZ, NADINE REIS
Multiscalar Uneven Development and the Sociospatial
Fragmentation of Labour
- 24 ANGELA SERRANO ZAPATA, M. SOFÍA LUNA SIACHOQUE
Unpaid Women's Labour driving Value Chain Disintegration in the
Colombian Palm Oil Industry
- 50 CHRISTIN BERNHOLD
Class Differentiation, Fragmentation, and the Probability of Labour
Struggles in Argentina's Soybean Production and Processing
- 70 MÁRTON CZIRFUSZ
Fragmentation of Labour in the Hungarian Battery Industry
- 90 JAN KORDES
Die Produktivität von Anwerbe-Infrastrukturen: Re/Produktion und
Im/Mobilisierung philippinischer Pflegekräfte auf dem Weg nach
Deutschland
- 112 ELEONORA ROLDÁN MENDÍVIL
Imperialism and Super-Exploitation: Situating Migration and
Racism within the German Political Economy

Essays

- 134 PAUL SPERNEAC-WOLFER, AGNES FESSLER
Partikulare Realitäten, universelle Kämpfe: Schnittfelder
gewerkschaftlicher Strategien und Lebensrealitäten migrantischer
Arbeiter:innen in Österreichs Landwirtschaft

148 WOLFGANG KOZAK

Soziale Nachhaltigkeit: Effektivität der Rechtsordnung?

159 Editors and Authors of the Special Issue

164 Publication Details

MÁRTON CZIRFUSZ

Fragmentation of Labour in the Hungarian Battery Industry

ABSTRACT Hungary has emerged as a major global production hub for lithium-ion batteries used in electric vehicles. The paper explores labour fragmentation within the battery industry and demonstrates that three distinct worker groups are produced by the multiscalar labour regime: relatively secure and well-compensated core workers with permanent contracts, domestic agency workers on temporary contracts, and vulnerable migrant agency workers. The analysis focuses on three scales of the multiscalar labour regime: the global political economy, the national scale in which the state regulates labour, and the scale of the factories.

KEYWORDS *Hungary, labour regime, fragmentation, battery, workers*

I. Introduction

In recent years, Hungary has emerged as a major global production site of lithium-ion batteries used in electric vehicles. The Hungarian government views the promotion of battery investments as crucial for safeguarding automotive jobs during the ongoing transition to electric vehicles. In a speech delivered in September 2023, the Prime Minister stated: “If there’s a battery factory next to the car factory, there will be car factory jobs. If not, the factory will close.” (Orbán 2023).

The Government has lauded the arrival of “high-tech” battery industry jobs. However, a bottom-up perspective reveals a different reality, challenging the narrative of homogeneous good quality jobs. Journalists have reported on a high proportion of vulnerable migrant workers from outside the European Union, while agency labour is prevalent among

both migrant and domestic workers. A clear hierarchy exists on the shop floor, ranging from assembly-line operators to shift leaders and engineers. Notably, working conditions in Hungary's battery factories are worse than those in unionised and higher-paid German-owned automotive assembly plants, such as the Audi factory in Győr and the Mercedes-Benz factory in Kecskemét (Tamásné Szabó 2021; Weiler 2023).

The Hungarian government has estimated that around 30,000 new jobs will be created in the Hungarian battery value chain for electric vehicles between 2018 and 2025 (Czirfusz 2023). The expected pace of expansion has been slowed by the downturn in 2024/2025. The value chain in Hungary comprises more than 40 foreign direct investments, primarily from East Asian companies, establishing greenfield factories in industrial parks. While the estimated thirty thousand workers represent a small fraction of Hungary's 4.7 million employees, the sector will significantly influence working conditions in manufacturing, as being a focus area of industrial policy.

The transformation of automotive jobs in the context of the green transition has garnered wide scholarly attention. The first body of literature has focused on the opening of new resource frontiers, particularly in the Global South. Electric vehicle battery value chains originate in the mining sector of Latin America, Africa and Southeast Asia with heterogeneous employment forms ranging from contract workers to freelancers. This evolving labour regime ensures that capital continues to appropriate surplus value (Arboleda 2020; Dietz/Prause 2023). A second body of literature has compared the characteristics of battery manufacturing and electric vehicle assembly jobs between East Asia and Europe (Galgóczi 2023; Lüthje 2022; Pardi 2023). A third body of work has explored how existing automotive jobs are transformed during the shift to electromobility. This literature, with empirical studies from Global North countries, has noted varying strategies employed by companies, workers and unions in maintaining jobs and improving working conditions along the supply chain (Blöcker et al. 2020; Klebaner et al. 2021; Krzywdzinski et al. 2023). However, Central and Eastern Europe remains underrepresented in all three areas of study, despite the region's role in automotive manufacturing relocated from core countries and in electric vehicle assembly (Czirfusz 2023; Gerócs/Pinkasz 2019; Pavlínek 2023; Szalavetz 2022).

This paper examines labour fragmentation in the battery industry, exploring its origins in the multiscalar labour regime. Labour fragmentation is understood as the intra-class differentiation of worker groups (Lier 2007; Pattenden 2018). Labour regime is conceptualised broadly, encompassing labour processes within the workplace as well as the wider multiscalar political economy that regulates labour and power relations in global production networks (Baglioni et al. 2022; Smith et al. 2018). Hungary, positioned at the periphery of Europe, offers a compelling case study of how an emerging industry reshuffles existing fault lines among worker groups. In doing so, this paper contributes to a broader literature on uneven geographical development within the European Union from a labour geography perspective (Hürtgen 2021; Kapitsinis/Gialis 2023), offering a case study on the expansion of the “green economy” (Gregson et al. 2016; Pianta/Lucchese 2020).

The structure of this paper is as follows. First, a multiscalar understanding of labour fragmentation and the labour regime in electric vehicle battery value chains is introduced. Following this, an analysis of three worker groups in the Hungarian battery value chain is provided. These groups are core workers, domestic agency workers and migrant agency workers from outside the European Union. The conclusion discusses the implications of labour fragmentation on constrained labour agency within the multiscalar labour regime.

2. Labour fragmentation in the multiscalar battery labour regime

Labour fragmentation in the Hungarian battery value chain occurs within the context of a newly established, multiscalar battery labour regime. This section reviews literature on the geography of labour regimes and extends these ideas to electric vehicle battery value chains. The concept of the labour regime has been present in social sciences, including geography, since the 1970s. Over time, the usage of the term has evolved in response to changes in the social relations of production. Baglioni et al. (2022) trace the historical development of this concept, beginning with Michael Burawoy’s “factory regime” in the 1970s, which examined not only the factory, but also broader political contexts of production. In the

1990s, the focus expanded to the local and regional scales, incorporating the geographically specific institutionalisation of labour markets. The most recent developments discuss labour regimes in relation to global production networks, highlighting their spatial fragmentation. This paper follows this contemporary approach, focusing on how global production networks of electric vehicle batteries are structured in relation to labour.

To understand how labour regimes intersect with global production networks, Smith et al. (2018) propose a nested scalar approach. The first scale examines the workplace labour regime, i.e., the labour process within workplaces. The second scale, the regional political economy of labour control, considers local labour markets and the social reproduction of labour within local and regional economies. The third scale, the national political economy, includes state policies and national labour laws. Smith et al. (ibid.) argue that such a multiscale approach allows for a more comprehensive understanding of global production networks and company strategies from a labour perspective.

The geographical and sectoral specificities of electric vehicle battery production in Hungary require a modification to the framework proposed by Smith et al. (ibid.). First, the regional scale is less relevant, due to Hungary's centralised political system, which diminishes the importance of the locality in the governance of capital and labour. Second, there is a need to add the global political economy of labour control as a structuring principle. This is due to the significant role of foreign-owned companies in Hungary's battery sector and the geopolitical turbulences affecting the industry.

The multiscale framework of labour regimes provides a broad lens for understanding social relations in global production networks. This paper narrows its focus to labour fragmentation. Fragmentation is one aspect of the labour regime which describes how labour is divided into distinct worker groups. Fragmentation occurs along various dimensions, including employment forms, the technical division of labour, and the geographical separation of workplaces (Lier 2007; Pattenden 2018). This paper explores how three distinct worker groups are produced within the multiscale labour regime in Hungary's electric vehicle battery sector: core workers who hold permanent contracts and enjoy relative job security, and two peripheral groups – domestic agency workers and migrant agency workers

– who are used extensively to cheapen labour power and accommodate fluctuating manufacturing demand.

The Hungarian battery industry presents specificities at each of the three scales of analysis. At the scale of the global political economy, labour fragmentation in a specific geographical and sectoral context of global capitalism is displayed. Hungary, situated on the European periphery, has experienced several rounds of job relocations, leading to reindustrialisation in the 1990s and again after the 2008 financial crisis (Barta et al. 2008; Geröcs/Pinkasz 2019; Pavlínek 2022). The current electric vehicle battery boom, as part of the so-called green economy transition, marks a new phase, driven by foreign direct investment from East Asia. While the transition to electric vehicles slowed in 2024/2025, the long-term trend of green reindustrialisation is likely to continue.

The production of electric vehicles and batteries is embedded in global capitalist accumulation. This process has linked new resource frontiers of the Global South, such as cobalt, lithium and nickel mines, to the automotive value chain (USGS 2024). Midstream activities, such as the chemical refining of minerals for battery production, are concentrated in China (EIU 2023), where anodes and cathodes for batteries are also produced. Battery assembly is largely located in East Asia, with China accounting for over three-quarters of global battery cell manufacturing. As electric vehicle production expands, battery production is being (re)located to other regions, such as Hungary, to be closer to electric car assembly plants.

Second, the relocation of the battery value chain is shaped by the national political economy of labour control. National labour regimes are not isolated cases, but functional positions in the global competition for capital, reproducing global uneven development. The broader process of uneven development has been explored extensively in labour geography literature, which shows that fragmentation and flexibilisation are key features of contemporary capitalist accumulation (Gialis/Leontidou 2016; Hürtgen 2021). Labour flexibility, including variations in working time and agency work, contributes to growing worker insecurity. Fragmentation is evident throughout the battery value chain (Arboleda 2020; Lüthje 2022), where cheapening labour power relies on an increasing use of domestic and transnational migrant workforce.

Hungary competes for investment by offering deregulated, flexibilised, and precarious workers. Repeated changes of the Hungarian Labour Code have facilitated the flexibilisation, particularly favouring large employers in foreign ownership. The recent ‘Slave Law’ amendment in 2018 increased flexibility and contributed to fixing the profitability crisis for companies (Gagyi/Gerőcs 2019). This amendment enabled longer working hours and expanded the use of the time-banking scheme to allow for more flexible shift schedules. Recent modifications to immigration laws have expanded the use of migrant agency workers across various sectors (Bodor 2024).

The third scale of analysis is the workplace regime, which examines how production is organised within firms. The automotive industry has historically been a site of revolutionary changes in workplace labour regimes, from the advent of mass production in early 20th century Fordism to the rise of lean production in the 1970s. The current transition to electric vehicles is characterised by “foxconnisation”. This term, based on industrial practices of electronics manufacturer Foxconn, refers to manufacturing and market control shifts from traditional automotive OEMs to new companies adopting low-wage, standardised production typical of the electronics industry, along with an increased reliance on migrant and unskilled labour (Lüthje 2022). Within battery gigafactories, labour fragmentation is also occurring. These factories, which employ several thousand workers, combine elements of traditional manufacturing sectors (electronics, automotives, chemicals) with complex skill requirements.

The fragmentation of labour at multiple scales has altered labour agency and reshaped opportunity structures of labour protest within the battery sector. While the transition to electric vehicles, along with developments of multiscalar governance, such as due diligence legislation, could potentially strengthen labour agency (Covarrubias et al. 2025; Dörre et al. 2024; Ojeda/Reis 2024), power imbalances within labour regimes, efforts to exploit the green transition to suppress workers’ demands, and dividing the working class through fragmentation limit labour agency and undermine labour organising.

This overview has provided the context and conceptual framework for analysing labour fragmentation in the Hungarian battery value chain. It has argued that a multiscalar approach to labour regimes offers key insights

into how labour fragmentation operates in global production networks of battery production and electric vehicle manufacturing. The next section will present a detailed analysis of how the labour regime produces and reproduces fragmentation through three worker groups in Hungary's battery industry.

3. Fragmented labour in the Hungarian battery industry

The following analysis examines the production of three distinct worker groups within the multiscalar labour regime of the Hungarian battery industry. The first group consists of core workers, employed directly by the battery firms under permanent contracts. These workers generally have relatively stable jobs and are partially unionised. The second group is the domestic peripheral workers, primarily employed by agencies, many of whom have little or no prior experience in the battery or automotive industries. The third group is the migrant peripheral workers: individuals from outside the European Union, employed almost exclusively by agency companies on temporary contracts. This group occupies a more vulnerable position as compared to the other two groups.

3.1 Core workers in the Hungarian battery industry

The first group of workers consists of core employees within companies of the battery value chain. These workers are directly employed by the companies and generally hold permanent contracts. While core worker positions remain relatively stable, working conditions have deteriorated for this group as well. The government, when celebrating investments in the battery sector, often assumes that all new jobs will be core worker positions, which is not the case.

A key factor contributing to these deteriorating conditions is the global political economy of the labour regime. Core workers experience diminished job security and worse working conditions than those typically seen in the idealised, unionised manufacturing jobs of the Global North. The trend of eroding labour rights (Silver/Arrighi 2001), which has persisted for decades, partly explains the low unionisation rates in the greenfield investments. While there is one operational trade union branch of the

VDSZ (Federation of Trade Unions of the Chemical, Energy and Allied Workers) at the two SK On gigafactories, the rate of unionisation remains low. Moreover, the trade union has struggled to mitigate the effects of mass layoffs in 2024 and 2025, although core workers have generally been the last group to be affected. Transnational worker organising across the value chain is still in its nascent stages (IndustriALL Global Union 2023), and Hungarian unions are only beginning to explore how such initiatives can be effectively implemented.

The national scale of the labour regime also exacerbates the deteriorating working conditions for core workers. Recent reforms to the Labour Code in 2019 have led to excessive working hours, with workers potentially required to work up to 400 hours overtime annually. The time-banking scheme allows companies to redistribute shifts over several months without providing adequate monetary compensation (Eurofound 2022). These reforms were largely driven by the lobbying efforts of German capital interests (Gagyí/Gerőcs 2019) and have also benefited East Asian battery investors in Hungary.

The national scale of the labour regime disrupts workers' social reproduction. Weakening state regulations and limited enforcement capacities have resulted in increased short- and long-term occupational health and safety risks for workers. Exposure to carcinogenic substances, for example, poses long-term health risks, borne by the workers themselves. The Hungarian labour inspectorate and disaster management authorities have repeatedly fined Samsung SDI's Hungarian gigafactory for severely risking workers' security and health. Exposure to toxic substances was also found at SK On's Komárom gigafactory and the SungEel Hitech recycling company in recent years (Bodnár 2022, 2023a). However, efforts to mobilise chemical industry knowledge of workers for achieving healthier workplaces have so far been absent, possibly due to the fact that a minority of core workers have prior experience in the chemical sector. Moreover, trade unions and experts lack structured knowledge regarding the specific health risks associated with battery production technologies.

The workplace labour regime also affects the positioning and labour power of core workers. Unlike traditional automotive manufacturing, battery assembly requires fewer skilled workers. Consequently, core workers on automated assembly lines are more vulnerable to substitution

by peripheral worker groups than in traditional automotive workplaces with specialised skilled positions (see also the following sections). The potential for competition between battery factories in the European Union may further diminish labour agency. For example, the Chinese battery company CATL could allocate supply for Mercedes-Benz and BMW between its factories in Germany and Hungary, with the latter plant set to open in 2025. This practice of competition within the European Union has been a longstanding capital strategy in the automotive and electronics industries (Bernaciak 2010; Hürtgen 2005; Mihály 2015), undermining the agency of all worker groups.

The workplace labour regime challenges unionisation processes because of the cross-sectoral characteristics of battery manufacturing. Battery production spans the automotive industry (as the battery is one component of an electric vehicle), chemical industry (as battery charging and recharging is a chemical process), and the electronics industry (as batteries are produced partly by previous electronics industry players, and as the battery includes sophisticated sensors and electronic controls). This cross-sectoral characteristic leads to competition between large sectoral trade unions, such as the metalworkers' trade union VASAS (Hungarian Metalworkers' Federation) and chemical industry trade union VDSZ. Given that unions are organised on a company-by-company basis, without sectoral-level bargaining, this structure results in fragmented unionisation efforts. The competition between unions weakens the prospects for effective organising along the battery supply chain.

3.2 Domestic peripheral workers in the battery industry

Domestic peripheral workers are employed for shorter periods under temporary contracts, primarily through agency companies. They represent the second major worker group within the Hungarian battery value chain. Their peripheral status, in contrast to core workers, is a direct consequence of the multiscale labour regime.

The global political economic scale of the labour regime plays a significant role in shaping the domestic peripheral group, as companies increasingly turn to non-core workers during boom periods. Despite the overall expansion of the battery sector, there are periods of declining demand for batteries. This downturn leads to initial layoffs within the periph-

eral worker group, affecting both domestic and migrant workers. The decline in demand for electric vehicles in Europe since 2024 has resulted in dismissals or the non-renewal of contracts among Hungarian battery industry workers. Due to global dependencies, trade unions and workers have been unable to intervene effectively in such situations.

The national scale of the labour regime has also been crucial in establishing the domestic peripheral worker group, particularly through the legalisation of agency work in Hungary in the early 2000s. By 2023, there were 174,000 agency workers employed in the Hungarian manufacturing sector, 37% of whom held temporary contracts. One-third of agency workers in the Hungarian economy were foreign nationals, who, as discussed below, find themselves in an even more peripheral position. Due to the high turnover of workers in Hungarian manufacturing workplaces, as reported by industry experts and trade unions, companies have increasingly relied on agency workers to meet their staffing needs on the shop floor.

The sector “Manufacture of electrical equipment” (NACE 27), to which the largest battery value chain companies belong, employed 24,000 agency workers in 2023, with 58% of these workers on temporary contracts (Gedei 2024). While exact company-level data on the proportion of agency work is not publicly available, financial reports from these companies provide some insight. For instance, Samsung SDI Hungary’s 2023 financial report indicated that agency work accounted for 42% of combined wages and agency work expenditure. A proportion of one-third was observed at battery component manufacturers such as Shinheung SEC and Inzi Controls.

The fragmentation between core workers and domestic agency workers can also be attributed to the national regulatory framework governing unionisation. In Hungary, unions are organised at the company level; each company is the basic unit for collective bargaining. Agency companies, however, remain largely unorganised, as agency workers, who work at different companies across various occupations and locations, have diverse interests. Occasionally, unions representing core workers may reach agreements with employers that extend to agency workers, but this is not yet the case in the battery industry. In other instances, unions only represent the interests of core workers, as seen during the layoffs at SK On’s Ivánca

factory in May 2024. In this case, several hundred agency workers were dismissed, while the local union celebrated its success in protecting the jobs of direct core workers (VDSZ 2024).

The workplace labour regime has facilitated the expansion of the domestic peripheral group. Industry estimates suggest that 80-90 % of jobs in cell manufacturing are blue-collar positions, with technicians and operators forming the dominant occupational groups (ALBATTIS 2021). According to the financial reports of Hungarian cell manufacturing companies, 70 % of workers are manual workers on the shop floor. This structure allows for greater flexibility of employment, as workers can be substituted with minimal training. Previous studies in the electronics industry have shown that deskilling processes resulting from standardised production and automation lead to increased flexibilisation and a tendency to drive down wages (Lüthje et al. 2013). Similar trends are now evident in the battery sector.

The workplace labour regime has also resulted in the battery industry attracting only specific worker groups, particularly young, single individuals, young couples without children, or male household members. The shift patterns with 12-hour alternating day and night shifts in battery gigafactories and some suppliers make it difficult to organise reproductive work in the household. The rise of domestic migrant workers has led to the creation of new places of social reproduction, such as workers' hostels or other cheap rental accommodations provided "free of charge" by agencies (Meszmán/Fedyuk 2018). Differences in reproductive responsibilities and the associated costs of social reproduction have led to divergent interests and fragmentation between the core worker group and the two peripheral agency worker groups, even when base wages are similar. Core workers, who generally have more care responsibilities, are less able to work overtime, and the absence of "free accommodation" for them results in financially precarious livelihoods. The fragmentation of worker interests has also posed challenges for labour organising, making it unsurprising that no substantial labour protests and labour actions have yet been organised at battery value chain companies.

3.3 Migrant peripheral workers in the battery industry

The final worker group in this analysis is the migrant worker group. The global scale of the labour regime plays a significant role in the emer-

gence of this peripheral group through global migration flows. Since the second half of the 2010s, Ukraine has been a key source of migrant labour in Hungary, with a new wave of labour migration occurring following the full-scale war in 2022. In recent years, countries from the Global South have become an increasingly important source of migrant labour. The number of migrant workers from outside the European Union has been rising in battery value chain workplaces as well. In 2020, Ukrainians represented more than 40 % of the workforce at Samsung SDI's factory in Hungary (Tamásné Szabó 2021). More recent reports indicate an increase of workers from Global South countries, such as from the Philippines, Vietnam, Mongolia, and Kyrgyzstan (Bodor 2024; Kiss 2024; VDSZ 2024; Weiler 2023).

The national scale of the labour regime controls the positioning of the migrant worker group through immigration legislation. On January 1, 2024, a new immigration law came into effect that created the “guest worker” category for certain workers arriving from outside the European Union. This category allows workers to stay for a maximum of three years in selected occupations at selected companies, subject to a nationwide quota. Their work and residence permits are linked to their employer, which is typically the agency. Consequently, they must leave the country immediately if they quit their job. Family reunification and applications for permanent residence or other immigration categories are not permitted for these “guest workers”. Immigration paperwork, travel to Hungary, and accommodation are arranged by Hungarian agencies. This national legislative framework limits labour agency, as organising and protesting for workers' rights could result in the termination of contracts, forcing workers to leave the country immediately.

The national scale is also crucial in establishing racial boundaries between worker groups. For the past 10 years, the Hungarian government has ardently promoted anti-immigration rhetoric. However, the labour shortage in the economy has led to an increased, regulated influx of labour immigration from non-European countries. A recent study by Bodor (2024) found that distrust and resentment among Hungarian workers toward migrants stem largely from material concerns, such as fears of wage suppression and competition in workplace efficiency.

The workplace labour regime facilitates the substitution of Hungarian workers with migrant agency workers. The workplace labour regime itself

is structured to rely extensively on migrant agency work. For example, in early 2024, battery component manufacturer Bumchun was reported to have laid off Hungarian agency worker operators in favour of Vietnamese migrant agency workers (Kiss 2024). Although the labour power of agency workers is more costly for battery companies than that of direct employees, their longer working hours and lower turnover rates – due to strict immigration regulations – reduce the companies’ sunk costs. Furthermore, the substitution of Hungarian workers with Global South workers is advantageous for companies due to the “upskilling” effect, as a substantial portion of Global South agency workers arrive with strong English language skills and tertiary education. An analysis of Facebook ads by Global South recruitment companies also revealed that some factories in the electronics and automotive industries specifically seek workers with prior experience in similar jobs in their home countries.

The workplace labour regime can also result in more severe occupational health and safety risks, particularly due to language barriers. In 2023, a grinder explosion at one of SungEel Hitech’s scrap battery recycling factories resulted in two worker fatalities. The explosion occurred during machinery maintenance, where language barriers, the absence of manuals in Hungarian or Ukrainian, and inadequate occupational health and safety training contributed to the accident. Migrant agency workers were involved in the accident (Bodnár 2023b). Similar occupational health and safety issues have been reported at cell manufacturers (Czirfusz 2023). Long-term health-related costs are borne by the healthcare system in the workers’ home countries upon their return, as well as by the workers themselves – not by Hungary. Thus, the cheapening of the labour power through migrant labour entails not only a geographical relocation of workers but also the externalisation of some of the costs of social reproduction.

Regarding labour organising, unions recognise that safeguarding the rights of migrant workers can positively influence the working conditions of the other two worker groups. However, due to the transient nature of the migrant labour force, unions prioritise organising core workers. Some union activities, beyond collective bargaining, such as organising community programmes and providing assistance with everyday life, have proven effective in improving the living conditions of migrant workers (Bodor 2024). Labour protests involving migrant workers in the battery sector are not recorded.

4. Conclusions

This paper analysed the Hungarian battery industry through the lens of labour fragmentation. The main research question explored how the labour regime produces and reproduces labour fragmentation with three worker groups.

Labour fragmentation has been a structural tendency in manufacturing workplaces across Hungary and Eastern Europe, as in other parts of the globe (Andrijasevic/Sacchetto 2017; Hürtgen 2005; Meszmann/Fedyuk 2018; Schling 2022). Case studies across various sectors and geographical contexts have highlighted general patterns and variations in the relationship between global uneven development and the multiscalarity of labour regimes. With the rise of green economy jobs in the European Union, including the electromobility transition in the automotive sector, a new wave of a “race to the bottom” is expected, continuing the trend of fragmented and flexible labour regimes in European manufacturing (Hürtgen 2021). This paper provided evidence from one sector on how the electromobility transition leads to labour fragmentation.

This paper contributed to scholarly debates on multiscalar labour regimes, emphasising the importance of the global scale in analysis. The emergence of East Asian companies in the global electric vehicle value chains, and the associated geopolitical shifts, have made the global scale crucial in understanding global capitalism. In the electric vehicle industry, South Korean and Chinese battery cell manufacturers have emerged as powerful global actors supplying traditional and new car manufacturers. Hungary, at the forefront of these green economy investments, provides a prime example of how the global context shapes labour regimes.

The analysis was grounded in a multiscalar understanding of labour regimes, focusing on labour fragmentation and its relationship to labour agency. By examining three distinct worker groups, core workers, domestic agency workers and migrant agency workers, this paper demonstrated how the current transition to electric vehicles fosters intra-class differentiation (Lier 2007; Pattenden 2018). Contributing to the labour regime debates, it was illustrated how three scales of the labour regime have produced these three worker groups within the battery value chain. It was shown that fragmentation occurs in a multiscalar way, mobilising specific elements of

the production regime (the workplace), the powerful role of the national legislative framework, and uneven global development. The study revealed that, for the sector to function effectively, the fragmentation of workers is essential, limiting collective agency.

In the case of the Hungarian battery value chain, the fragmentation of workers has resulted in individual strategies of workers, such as switching to another job at a different company for marginally better wages. Collective labour agency, aimed at improving working conditions, has remained limited. Unionisation rates are low, and unions struggle to effectively represent all three worker groups, particularly in times of turbulence and decreasing production, as seen in the recent downsizing of 2024/2025. The opportunity structures for trade unions are further constrained by the lack of social dialogue at the national level, as Hungary competes on both the European and global scales with limiting unions' agency. Companies also compete globally by adopting anti-union practices, often leveraging cheap production.

Unionisation efforts have succeeded in some companies, such as at SK On by the chemical industry union VDSZ, and at BMW's upcoming Debrecen electric car assembly factory, set to open in 2025, where VASAS has already established a considerable membership base (IG Metall Leipzig 2023). Both large unions in the battery sector, metalworkers' union VASAS and chemical industry union VDSZ aim to reach out to Global South agency workers and inform them of working conditions in Hungary (Czirfusz 2023). However, building broader local and transnational solidarity between fragmented worker groups, establishing local alliances with workers from other companies, and organising transnationally along the value chain, remain ongoing challenges. We anticipate that the escalating trade wars in 2025, along with European Union initiatives aimed at weakening responsible business conduct regulation to boost corporate competitiveness, will create even more challenging structural conditions for labour agency.

Acknowledgements

This work was supported by the János Bolyai Research Scholarship of the Hungarian Academy of Sciences. It also stems from the DFG-funded

Scientific Network “Global Transformation and Social-Ecological Reproduction: Perspectives from (German) Labour Geography”. I would like to thank the two external reviewers, the three guest editors, Stefanie Hürtgen, Nadine Reis, Nicolas Schlitz, and Christin Bernhold for their insightful comments on earlier versions of this article. Discussions with Linda Szabó and Krisztofer Bodor also shaped the contents of the paper.

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*ABSTRACT Ungarn hat sich in den letzten Jahren zu einem wichtigen globalen Produktionsstandort für Lithium-Ionen-Batterien für Elektrofahrzeuge entwickelt. Der Artikel untersucht die Fragmentierung der Arbeitskräfte in der Batterieindustrie und zeigt, dass das multiskalare Arbeitsregime drei verschiedene Arbeiter*innengruppen hervorbringt: die relativ sichere und gut bezahlte Kernbelegschaft mit unbefristeten Verträgen, ungarische Leiharbeitskräfte mit befristeten Verträgen und vulnerable migrantische Leiharbeitskräfte. Die Analyse fokussiert sich auf drei Scales des multiskalaren Arbeitsregimes: die globale politische Ökonomie, die nationale Ebene mit der staatlichen Regulierung der Arbeit und die Ebene der Fabriken.*

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