Available online at www.ijournalse.org

Emerging Science Journal

(ISSN: 2610-9182)

Vol. 9, No. 1, February, 2025

Food Supply Chain: Possible Impact and Consequence Analysis of Reducing Working Hours of Food Retailers

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Abstract

Grocery shops constantly follow trends and developments in consumer demand; therefore, solutions are sought to enhance food retailing, and one solution is to limit the working hours of supermarkets to balance the interests of stakeholders and those employed in the food supply chain. Accordingly, the present research aims to identify the possible socio-economic impact of reducing the working hours of food supermarkets in Latvia. The research analyzed primary information sources: publicly available information from databases and annual reports by companies from the industry. Three potential scenarios were designed to identify the socio-economic impact of reducing the working hours of supermarkets. The research found that if the working hours of the four leading food supermarkets (Maxima, Rimi, Lidl, Sky) in Latvia were reduced, their turnover, market shares, and taxes paid to the national government, as well as the hours worked by their employees, would decrease, thereby leading to some redundancies causing some negative socio-economic consequences. The novelty of the research is that retail is an essential link in the food supply chain from farm to fork, making food available to consumers. The calculations show that we should be careful when reducing the working hours of supermarkets because this has socio-economic consequences. It is also necessary to evaluate the attitude of consumers.

Keywords:
Food Supply Chain;
Food Retail;
Working Hours;
Socioeconomic Impact.

Article History:

Received:	13	August	2024
Revised:	12	December	2024
Accepted:	19	December	2024
Published:	01	February	2025

1- Introduction

The Food and Agriculture Organization of the United Nations (FAO) defines agri-food systems as all the interconnected activities and actors involved in getting food from field to fork; their actors are invaluable for agricultural products and associated off-farm activities, e.g., food storage, post-harvest processing, transport, processing, sale, marketing, disposal, and consumption. This also highlights the critical role of economic, social, and environmental factors in shaping the food supply system from farm to fork [1]. Although food systems are dynamic and complex, food needs to be stored, transported, processed, and marketed to avoid loss and waste while giving significant new employment opportunities and income growth opportunities [2]. The physical availability of food is one of the four components of food security: it refers to the "supply side" of food security. It is determined by food output and stock and net trade-in food [3]. Food availability often involves buying power, transport and market infrastructure development, and specific food distribution. At the micro level (individuals and households), food demand is shaped by consumer preferences. In contrast, at the meso level (industries), it is supplied by food processing, logistics, storage, and marketing companies [4].

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DOI: http://dx.doi.org/10.28991/ESJ-2025-09-01-05

Supermarkets and grocery shops follow trends and developments in consumer demand. As consumers worldwide continue to change, food retailers must keep up with the changes [5]. Globalization processes strongly influence this sector; global retailers have contributed to developing regional supermarket chains in many countries and have a major impact on agricultural output worldwide. Supermarket chains prefer dealing with a few reliable suppliers rather than hundreds of small farms [6]. Retail is a key link between producers and consumers, and what retailers prefer to put on their shelves and how they perform can affect the use of natural resources and environmental impacts throughout the food value chain [7, 8]. Consumers look for innovative food products in large retail chains (hypermarkets and supermarkets), paying attention to the quality and the price of the products on offer [9]. Food retailing is one of the segments that directly impacts the availability of food products throughout the country [10]. In recent years, the supermarket segment has become increasingly competitive, determined by the average basket size and the frequency of shop visits. The distance of the household to the shop, previous experience in the shop, advertised special offers, price expectations for shopping, and the number of brands available are all factors that positively influence the choice of the shop [11, 12]. In addition, accessibility by car is the most essential attribute [13] for grocery shop owners to consider.

Since 2020, consumer behavior has changed significantly because of the COVID-19 pandemic, Russia's invasion of Ukraine, high energy prices, and inflation. Although agricultural production in Latvia is stable [14], these and similar factors have undoubtedly affected it. They could affect traditional food retailing, as food supply chains were significantly disrupted [15, 16], posing a threat to overall food security [17]. As a high proportion of consumers has begun to increasingly use online delivery services and the leading retail players have been able to deliver goods through their delivery services or third-party on-demand courier companies, consumers' buying power has decreased and they have tried to save and plan their daily purchases [4, 18-20]. All this has led to new strategies for retailers to cope with inflation and other shocks, further affecting relationships with suppliers, customers, and competitors and their financial performance [20]. Therefore, the behavior of retailers has a particular impact on the consumption of food, especially the sale of locally produced and fresh products. For example, Polish consumers are likelier to buy local products in large retail chain shops than in shops owned by small producers [21]. The global food and grocery retail market was valued at USD 11,932.5 billion in 2023 and is expected to grow at a compound annual growth rate (CAGR) of 3.2% between 2024 and 2030 [22]. This determines the crucial role of food retail in the overall agri-food system. Solutions are, therefore, continuously being sought to enhance food retailing, and one solution is to limit the working hours of supermarkets to balance the interests of stakeholders and those employed in the food supply chain.

Accordingly, the present *research aims* to identify the consequences and possible socio-economic impacts of reducing the working hours of food supermarkets in Latvia.

The following *research question* was formulated: What are the consequences and possible socio-economic impacts of reducing the working hours of food supermarkets on employment, supermarket performance indicators, and the economy in Latvia?

The novelty of the research is based on the fact that retail is an essential link in the food supply chain from farm to fork, making food available to consumers. However, this segment must balance the interests of retailers, company employees, and consumers. One way of doing this is to set optimal working hours that convenience consumers, attract employees, and deliver the best results for retailers, thereby creating better synergies between all the stakeholders and identifying the socio-economic impacts of reducing supermarket working hours.

The paper is structured in four consecutive sections. The *Literature Review* gives insight into the theoretical and regulatory aspects of setting the working hours of food supermarkets. It explains the interdisciplinary problems that closely relate to the operation of one stage in the food supply chain – food retail. The *Research Methodology* section focuses on the methodological framework, the specific research tasks, and applied methods. The *Results* section shows the authors' empirical research. The findings reveal the situation in the Latvian food retail industry and estimate the possible socio-economic impacts of reducing the working hours of food supermarkets. The authors' recommendations for mitigating the risks of reducing the working hours of food supermarkets are presented in the *Conclusions*, which, according to the authors, are also applicable to other EU retail companies.

2- Literature Review

Restricting supermarkets' working hours on weekends has been controversial worldwide for many years. The regulations governing shopping hours vary worldwide, e.g., shopping on Sundays. The countries that regulate retailing on Sundays and/or public holidays apply a range of exceptions, which indicates that balancing the different interests of employees, consumers, and retailers is a challenge. Several European countries have preferred to deregulate the working hours because of the national labor market and employment regulations and sectoral regulation in terms of the working hours of retail companies [23]. In Germany, scientists have shown the employment effect of deregulating shopping hours [24, 25], but Flores & Wenzel (2016) note that prices can increase due to the deregulation of shopping hours [26]. Strategic Gears (Management Consultancy) stress that deregulating business hours is the most popular global direction in most successful economies [27], Deržanauskienė & Vainė (2018) recognizing that the regulation would fail to a

greater or lesser extent [28]. At the same time, some countries have introduced retail working hour restrictions over the last ten years to give retail employees more free time for leisure. However, there is no clear evidence of the advantages or disadvantages of regulating the working hours of retail companies. Besides, foreign research studies conducted so far do not give a single opinion on working hours for retail shops. Some research studies show that restricting retail working hours hurts consumers' choice of shopping time [26], employee earnings [28], retail turnover and costs [23], public finances, and the economy as a whole [27]; however, there are also benefits related to social welfare, employee protection, employment for women [27], and cultural and family values [23, 24], as well as an increase in the competitiveness of small producers and retailers [26, 27].

European Union (EU) legislation allows each Member State to set its policy on working on Sundays. In the EU, the Working Time Directive prescribes working time: weekly rest is required after six days of work. The European Court of Justice, in its case law dating back to the 1980s, has not confirmed that Sunday should be a mandatory day of rest. The European Commission (EC) believes that the choice of a shopping day relates to historical, cultural, tourist, social, and religious considerations; therefore, setting working days and hours is left to the discretion of each Member State. It should be noted that the EC does not impose regulations on retailing in the Member States. However, the EC recommends the abolition of bans on retail working hours, which is considered one of the three main recommendations to increase retail competition and stimulate a more open single retail market. The EC also highlights an increase in competition through e-commerce, stating that restrictions on retail working hours impose a heavy burden on companies, negatively impacting productivity and lowering competitiveness compared with e-commerce [29].

In 2023, retail working hours were set in nineteen European countries. However, it is essential to point out that in most cases, the regulation means shorter working hours or restrictions on certain public holidays rather than a regular ban on one day of the week. In most cases, the countries also apply several exceptions to their retail prohibitions depending on the product category, locations of shops, retail outlets, retail space, etc. A complete ban on retail on Sundays is quite rare in Europe. However, even in countries with strict restrictions on retailing, e.g., Germany, Austria, and Spain, some exceptions relax the rules on working hours [28].

Since 2012, nine European countries have taken measures to reduce or abolish their retail working hours restrictions. They are as follows: Denmark, Sweden, Finland, Italy, the Netherlands, Portugal, Spain, Belgium, and Ireland. The scientific literature refers to liberalization concerning easing or completely lifting restrictions on retail working hours [30, 31]. The deregulation of retail working hours continues, and many countries periodically reduce the restrictions. It should be noted that, for example, in Spain, Great Britain, and Germany, restrictions on retail operations are not decided at the national level but at the level of federal states; therefore, the working hours of shops could differ significantly across the federal states and cities [24, 25].

Possible restrictions on retail working hours were also discussed in Lithuania from 2017 to 2018. A Lithuanian Free Market Institute study found that a ban on working hours on Sundays and/or public holidays could reduce the number of retail jobs by 5% and the wages associated with higher pay on weekends and public holidays. As a result, the initiative to limit retail working hours was rejected in Lithuania [25]. In contrast, in 2018 in Poland, a retail ban was imposed on Sundays, setting a 3-year transition period. The introduced restrictions have strongly polarized Polish consumers, and various workarounds are sought to circumvent them. Therefore, the law is still controversial and has been continuously debated since it was passed [32].

Restrictions on retail working hours are becoming particularly relevant due to tougher competition in Internet commerce. Some scientists in their research studies [33], along with retailers [34], have suggested that restrictions on retail working hours must be removed to maintain the competitiveness of face-to-face retail, regardless of its scale, with Internet retailing.

Limiting the working hours of supermarkets on weekends and holidays has been publicly discussed to identify the possibilities of ensuring equal rights for those employed in retailing to spend weekends and holidays with family and friends [35, 36]. However, the experience in Hungary shows that time spent with family and friends does not necessarily increase, as 88% of the surveyed consumers indicated that imposing a ban on shop working hours on Sundays did not contribute to family time. The research study also found consumer dissatisfaction (80% of the respondents) with restrictions on shopping on other days and the inconvenience caused by crowding, queues, and unnecessary time wasted in crowded shops [36]. It should be noted that due to public pressure, the restrictions on supermarket working hours were abolished in Hungary after one year.

Restrictions on retail working hours could also be viewed from an economic perspective as a potential competitive factor for local small and medium food producers and retailers. Small and medium companies seek to prevent large shopping centers from being open on Sundays, thus wanting protection against competition from large retailers [37]. There are opposite views in Great Britain, as retail restrictions on holidays are considered outdated and irrelevant to the public's needs. At the same time, other researchers emphasize that the restrictions would increase the volume of cross-border trade, as people living near the borders would shop in a neighboring country [27]. Researcher Khan (2018) points

out that the liberalization of working hours for retail companies contributes to economic and employment performance in a country and the turnover of companies of all sizes while highlighting the challenges of removing restrictions on retailers' working hours. The main benefits for retailers include more sales, the possibility to distribute fixed costs over more days, using premises more efficiently, and meeting consumer demand [38]. According to scholars, similar views are held in Germany [24, 25], the Netherlands [31], Poland [32], the UK [38], and Finland [39].

Based on the literature, the present authors have identified the existence of a gap in terms of quantifiable socio-economic factors; for instance, Finland estimated the change in the number of employees while ignoring possible employment and other tax payment amount changes due to implementing the working hour limitation and later lifting it. The authors have attempted with the scenarios to estimate not only possible changes in employment but also in factors attributable to the social, income tax, and value-added tax amounts to be lost to the state budget and sector.

Based on the theoretical studies the authors considered in the analysis, it is not simply mathematically reducing employees, for instance, but considering that some part of them would be distributed to be employed on other days; for that reason, the authors introduced the correction coefficient in that respect.

3- Research Methodology

A methodological framework was designed, and the specific research tasks and methods to be applied were defined to achieve the research aim. The following research tasks were set: 1) to examine food retail in Latvia and determine its characteristics; 2) to perform calculations and identify the socio-economic impacts of potential scenarios for reducing the working hours of retail supermarkets in Latvia so that this experience could be used in other countries where discussions about limiting the working hours of supermarkets are still ongoing.

A step-by-step methodology for research is presented in Figure 1.

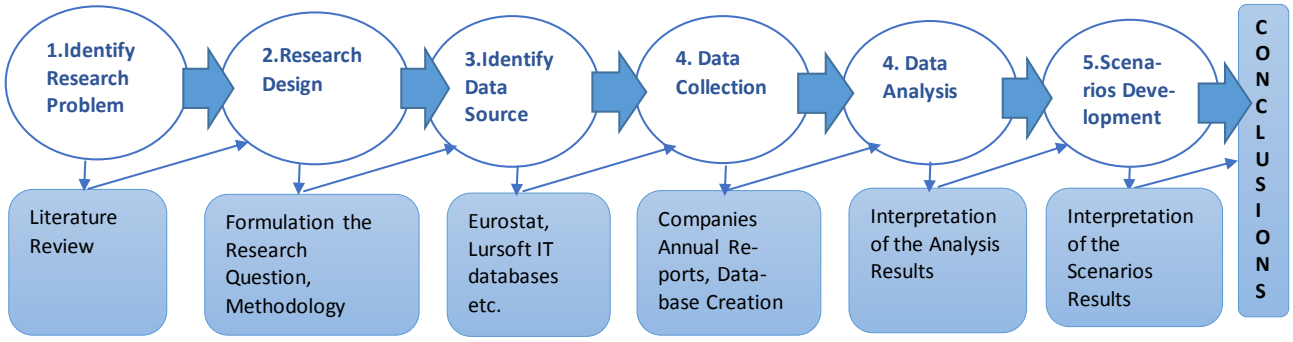


Figure 1. Framework for the research and its main elements (steps)

Data sources. Since there is a limited range of statistical data available about the food retail industry for identifying the impacts of potential restrictions on retail working hours on the industry's economic (market share, turnover, taxes) and social (employment and working hours) performance, primary sources, i.e., publicly available information on companies and their annual reports available in the Lursoft IT database, were analyzed. In Latvia, according to the Law on Annual Statements and Consolidated Annual Statements (2015), each company must prepare an annual statement for each reporting year, approve it, and submit it to the State Revenue Service [40]. Lursoft IT provides access to legal information databases of national importance, such as companies' annual reports. This means that uniform requirements prepare the company's annual reports and reflect accurate and fair information about the relevant company by the law. Therefore, the information from the annual reports about the analyzed companies provides reliable and relevant data to be used in the study.

Given that there is no publicly available information on shop sizes and, therefore, it is impossible to identify the shops' formats, the research assumed that the more significant the retail chain, the higher the turnover is per one store. According to NACE Rev.2, food retailing belongs to section G: Wholesale and retail trade, repair of motor vehicles and motorcycles; class 47.11: Retail sale in non-specialized stores with food, beverages, or tobacco predominating.

Research limitations. The analysis of food retail chains did not include some shops such as Depo, Cenu Klubs, petrol stations, and others where the primary goods sold are not food, but food is also sold. The research did not analyze wholesale outlets that sell food mainly in bulk or to legal entities, e.g., Promo Cash & Carry. The impacts of reducing supermarket working hours on consumers, small grocery shops, and agricultural producers were not analyzed because consumers' opinions are comprehensively reflected in another article by these authors [41].

The research employed the monographic method, analysis, synthesis, induction, and deduction to describe the retail segment and retail chains in Latvia. A concentration ratio (CR) is the sum of market shares held by the largest pre-specified number of firms in a given market [42]. For food supermarkets in Latvia, a CR was estimated based on two

indicators: turnover (CR_1) and the number of employees (CR_2), which were used to identify their indicative market shares based on publicly available information.

The Herfindahl–Hirschman Index (HHI) is one of the most commonly accepted measures of market concentration used by policymakers and in the academic literature. The HHI is calculated by squaring the market share of each firm competing in a specific market and then summing the resulting numbers, as shown in Equation 1. A firm's market share is calculated by dividing the firm's sales by the total sales of all firms in the market. One advantage of the HHI compared with the concentration ratio is that the HHI applies more weight to larger firms. The HHI also uses all firms in a market rather than a subset. If no shops exist in the market, the HHI is excluded [42].

$$HHI=(MarketShareFirm_1)^2+(MarketShareFirm_2)^2+(MarketShareFirm_3)^2+\ldots+(MarketShareFirm_n)^2 \quad (1)$$

Increasing HHI values indicate higher levels of market concentration, with HHI approaching 0 if firms of relatively equal size occupy a market. The HHI reaches its maximum of 10,000 points when a single firm controls a market. For context, the HHI can also measure the equivalent number of equal-sized competitors in the market. For example, an HHI of 1,500 represents 6.6 equal-sized competitors in the relevant market, and an HHI of 2,500 represents four equal-sized competitors (N = 1/HHI*10,000) [42].

The research made assumptions and designed three scenarios to identify indicative changes in the performance of food retail chains regarding turnover, market share, and taxes paid to the government (economic impact) due to possible changes in working hours. The effects of the changes on the workforce of the companies (social impact) were also identified, taking into account that most of the food retail shops operate from 08:00 to 22:00 daily, corresponding to the permitted alcohol sales hours in Latvia. Therefore, the calculation assumed that a shop is open for 14 hours, seven days a week. Three scenarios for reducing the working hours of food supermarkets or closing them on weekends were designed based on expert stakeholder advice: 1) ***Scenario 1*** – it was assumed that food supermarkets would operate reduced working hours on Sundays, halving the current working hours to 7 (shops would be open until 15:00 on Sundays)); 2) ***Scenario 2*** – it was assumed that food supermarkets would be closed on Sundays (working 14 hours less per week); 3) ***Scenario 3*** – it was assumed that food supermarkets are closed on Saturdays and Sundays (working 28 hours less per week) (Table 1).

Table 1. Assumptions for reducing the working hours of food supermarkets or being closed on weekends

Indicator	Scenario 1	Scenario 2	Scenario 3
Reduction of working hours per week	7	14	28
Reduction of working hours per week, %	*7%*	*14%*	*29%*
Reduction of working hours per year	364	728	1456
Correction factor, %*	*25%*	*30%*	*50%*
Total reduction**, %	5%	10%	14%

* An assumption about the correction factor in terms of a % by which the turnover of supermarkets would increase (transfer from non-operating days) on other days when the shops work more intensively due to reducing the working hours of food supermarkets or being closed on holidays if the total retail turnover does not change. Similarly, for employees, the number of employees who would have to work on other days (to transfer their working hours from non-working to other day's hours) because the flow of customers increases in these times. ** Calculations of a total % decrease due to reducing the working hours of food supermarkets or being closed on holidays (e.g., 7%x (1- correction factor 25%) =5%).

4- Results

4-1- Characteristics of Retail Trade in Latvia

In the European context, Latvian companies are relatively small regarding retail turnover (Figure 2). In 2023 in the EU, in terms of expected turnover of supermarkets and grocery shops, France (EUR 241 bln.) ranked first among 26 Member States followed by Germany (EUR 204 bln.), while Estonia ranked 24th behind Latvia with a turnover of EUR 2.8 bln. Lithuania had a turnover of EUR 5 bln., or 79% more than Estonia, and ranked 19th.

The leading indicators of turnover for a country's supermarkets and grocery shops are the total population and buying power, which is mainly determined by the average remuneration level. IBISWorld estimates and projects the turnover of supermarkets and grocery shops in Latvia.

In 2023, IBIS World estimated that the turnover of supermarkets and grocery shops in Latvia was expected to reach EUR 3.2 bln. This was the fourth lowest turnover among the 26 EU Member States analysed, with a projected growth rate of 1.3% in 2023 compared with the previous year. IBISWorld calculations show that the average growth rate for this market segment in Latvia has been 0.3% per year from 2018-2023. Projections indicate that the market is projected to grow at a CAGR of 3.1% during the forecast period 2024-2033 [44].

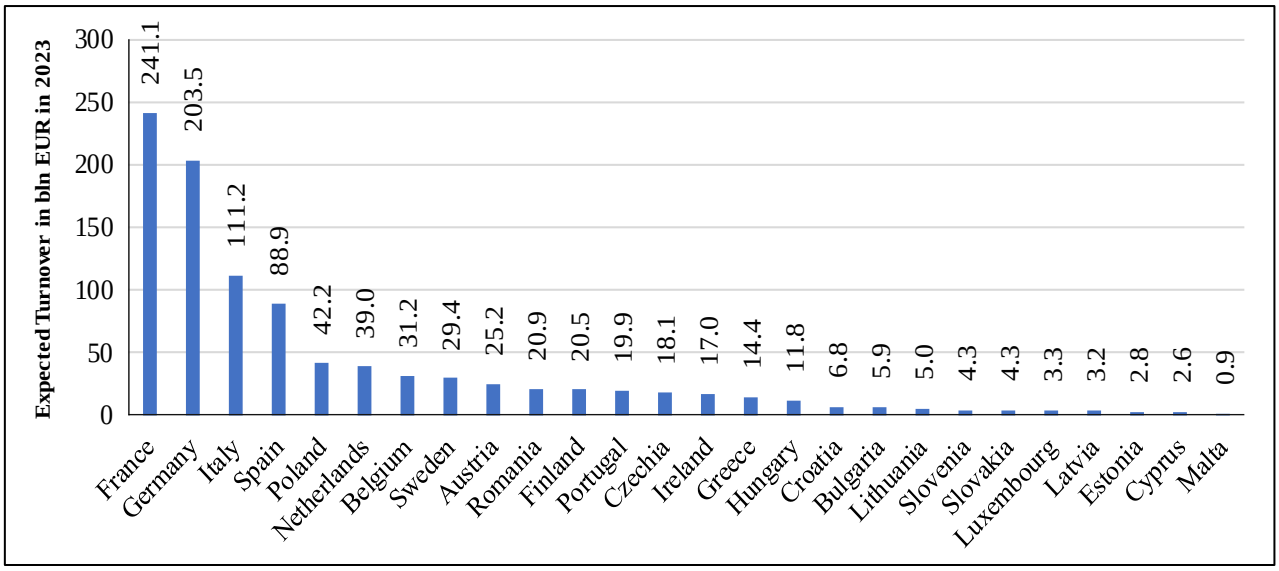
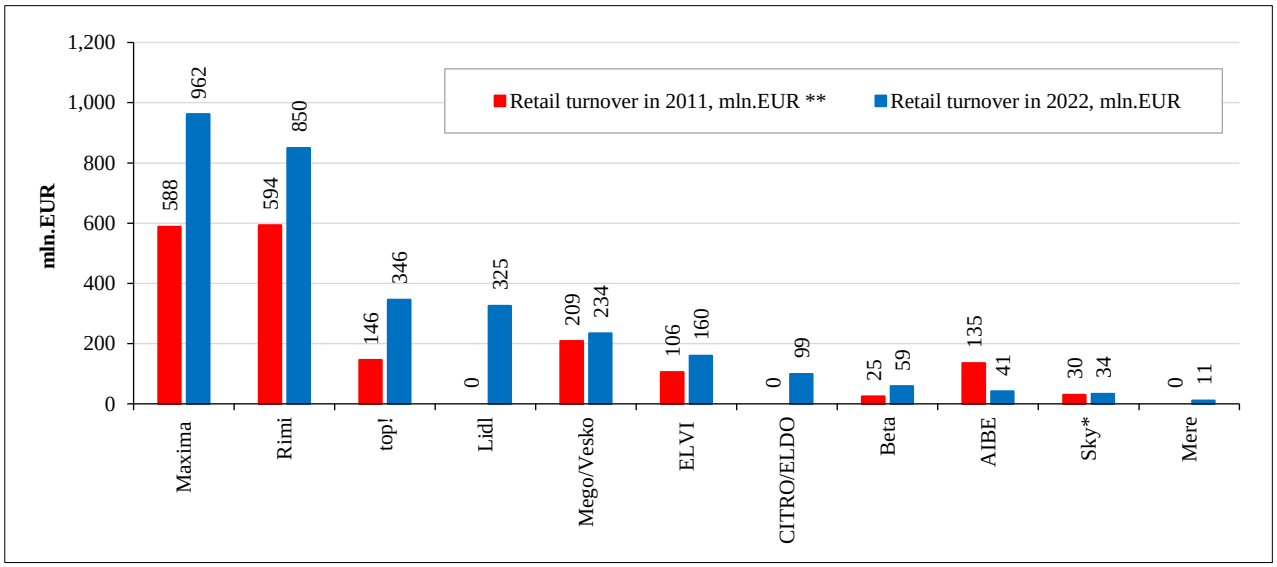


Figure 2. Total expected turnover of supermarkets and grocery shops in EU Member States in 2023, bln. EUR [43]

In Latvia, buyer competition has intensified significantly since 2014 [45]. This was because of: 1) the entry of Lidl into the domestic market, which had the most significant impact on the Maxima and Rimi chains; 2) the entry of the SPAR franchisor and chain; 3) the establishment of Citro/Eldo by three franchisees of the former top! brand. Thus, various franchisors compete for market share and for each individual franchisee because, in recent years, there has been a trend of relatively active switching of franchisee companies, resulting in shops moving from one franchisor to another. Similar trends were observed in other countries; supermarkets must respond to changes in consumer demand, and as consumers increasingly demand convenience, supermarkets must continue to provide it or disappear from the market [5].

As of 12/07/2023, 2180 Latvian companies, including 2140 active ones, were listed in the Lursoft IT Ltd database under NACE Rev. 2 class 47.11, indicating their activity as retail in non-specialized stores with food, beverages, or tobacco predominating [45].

In 2022 in Latvia, Maxima was the largest retail chain with a turnover of EUR 962 mln.; its total turnover was EUR 975 mln., including revenues from other activities. The turnover of Rimi was EUR 850 mln., followed by top! chain companies with EUR 346 mln. and Lidl with EUR 325 mln. (Table 2 and Figure 3). The retail turnover of the top! chain exceeded that of Lidl, and the market shares of the two retail chains in terms of turnover differed slightly: 9.07% for top! and 8.53% for Lidl.



* Sky's annual report for 2021. ** LVL/EUR exchange rate 0.702804

Figure 3. Turnovers of the largest food retailers in Latvia in 2011 and 2022, mln. EUR [46]

Table 2. Turnover, employment and indicative market share (by turnover and by employment) of the largest food retailers in Latvia in 2022 [46]

Retail brand	Retail turnover, mln. EUR	Market share by turnover (CR_1), %	Number of employees	Market share by number of employees (CR_2), %	Position	
					By turnover	By employment
Maxima	962.1	25.2%	6 371	19.6%	1	1
Rimi	850.0	22.3%	5 610	17.3%	2	2
top!	346.0	9.1%	3 668	11.3%	3	3
Lidl	325.4	8.5%	1 665	5.1%	4	6
LaTS*	280.0	7.3%	n.d.	n.d.	5	n.d.
Mego/Vesko**	234.0	6.1%	2 521	7.8%	6	4
ELVI	159.7	4.2%	1 524	4.7%	7	7
CITRO/ELDO	99.3	2.6%	1 733	5.3%	8	5
Beta	59.2	1.6%	810	2.5%	9	8
AIBE	41.3	1.1%	156	0.5%	10	10
Sky*	33.6	0.9%	194	0.6%	11	9
Mere	10.9	0.3%	69	0.2%	12	11

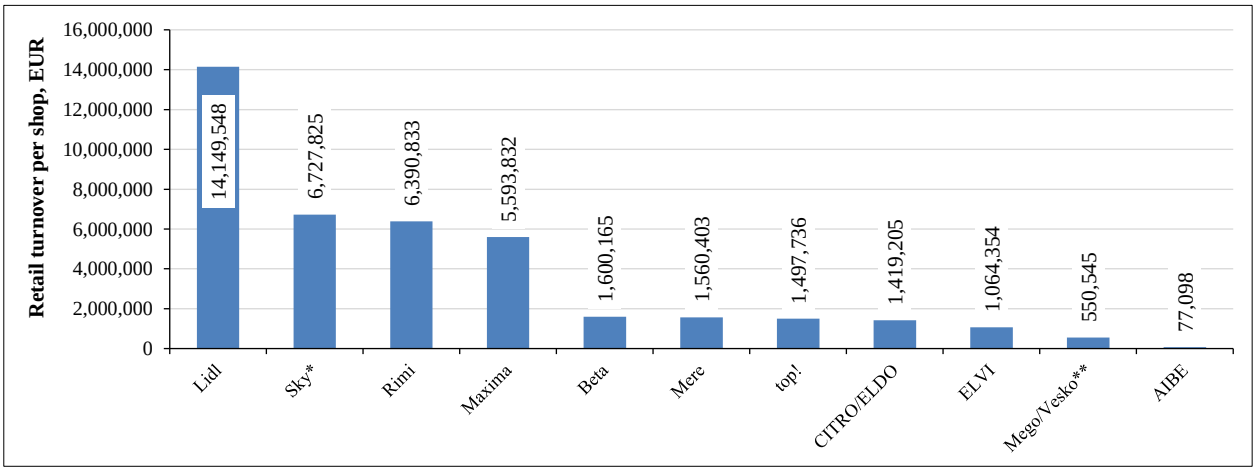
* Data for LaTS are based on a statement by the director of the LaTS retail chain to the newspaper Dienas Bizness on 17/02/2023. ** The turnover of Mego/Vesko includes that of two main legal entities: Baltstor Ltd and Lenoka Ltd; the names and turnovers of other franchise companies are not publicly available. *** Sky's annual report for 2021.

HHI = 1387 and N = 7.2, which indicates that seven companies dominate the market. If the HHI is below 1500, it is considered that particular companies are not dominant in such a market (competitive market), while an index value above 2500 indicates that the market is highly concentrated. The HHI indicates how free competition is in a particular market, and in Latvia, this index value indicates tough competition between companies.

In 2022, in Latvia, the G 47.11 segment employed 32,477 employees; according to Lursoft IT Ltd., Maxima had the largest market share by employment at 20% and turnover at 25%. Rimi has been consistently in 2nd place, with a 17% market share by employment and 22% by turnover. The top! chain was in a stable third place with an 11% market share by employment, which was higher than its market share of 9% by turnover. The most significant decrease in market share was found for the Lidl chain, which was in 6th place by employment (5.1%), behind Mego/Vesko (8%) and CITRO/ELDO (5.3%). Lidl was only slightly ahead of Elvi, yet in terms of turnover, Lidl was in 4th place with a 9% market share.

4-2- Scenarios for Reducing the Working Hours of Retail Supermarkets

Various methods are available to identify the size of retail chain stores: floor space, total turnover, or employment. There is no publicly available information on total floor space; therefore, the research employed an efficiency indicator – average turnover per shop in 2022 (Figure 4) – which also indicates the real size by turnover. In Latvia, the top four retail chains, based on this indicator, were Lidl, Sky, Rimi, and Maxima, which were significantly (3.5-8.8-fold) larger than the Beta chain in 5th place in terms of average turnover per shop. It could therefore be concluded that the four retail chains are the most significant players and most likely to be affected by the scenarios for reducing the working hours of food supermarkets or closing them on weekends. Accordingly, the research made indicative estimates of the possible impacts of closing on weekends or reducing the working hours of food supermarkets for the four leading retail chains, calculating the average turnover per shop in 2022. The chains had a significant market share in Latvia in 2022 in terms of retail turnover (57%) and employment (43%).



* Data from Sky's 2021 report. ** Mego/Vesko has additional franchisees operating under the Vesko brand, for which no information was available.

Figure 4. Average turnover of food retail chains per shop in Latvia in 2022, EUR [46]

At the time of analysis, Lidl had the third-fewest stores (twenty-three) among retail chains in Latvia. In contrast, Lidl had substantially higher revenue per store—more than 2.1 times as much revenue in EUR compared to the next largest per-store revenue earner, Sky, the chain with the fewest outlets (only five, all located in Riga, the capital of Latvia). The third and fourth largest retail chains in Latvia by food retail revenue per store and with more even geographical distribution across Latvia were Rimi and Maxima, two dominant competitors in the retail food sector. Both Rimi and Maxima had five to six times more revenue per store than the next chains, Beta and Mere. As a result, the reduction in operating hours is expected to have the most significant impact on these four major retail chains.

4-2-1- Possible Impacts of Closing on Weekends or Reducing the Working Hours of Food Supermarkets on Retail Chain Turnover

For each scenario, the impacts on the four selected retail chains regarding retail turnover and employment were calculated, assuming no change in the segment's total turnover. The calculation results for the scenarios are presented in Tables 3 to 10 and Figure 5.

Table 3. Estimates of a potential decrease in turnovers of food if the working hours are reduced or the supermarkets are closed on weekends

Retailer/ Indicator	Retail turnover in 2022, thou. EUR	Potentially lower turnover, thou. EUR		
		Scenario 1	Scenario 2	Scenario 3
		-5%	-10%	-14%
Maxima	962 139	910 596	865 925	824 691
Rimi	849 981	804 446	764 983	728 555
Lidl	325 440	308 005	292 896	278 948
Sky*	33 639	31 837	30 275	28 834
Total segment turnover, thou. EUR		**3 815 472**		

* Data from the 2021 report by Sky.

Table 4. Wages and labor taxes paid by Maxima, Rimi, Lidl, and Sky to the employees in 2022, thou. EUR [46]

Retailer/ Indicator	Wages and labor taxes paid in 2022, thou. EUR			
	Wages, MSSIC* included	Wages, MSSIC excluded	MSSIC	PIT*
Maxima	91 140	67 812	23 328	9 739
Rimi	63 914	44 773	19 141	8 138
Lidl	36 664	26 991	9 673	4 856
Sky**	3 222	2 420	802	387
Total* **	**194 940**	**141 996**	**52 944**	**23 120**

* MSSIC - mandatory state social insurance contributions, PIT – personal income tax on remuneration. ** Data from the 2021 report by Sky. ***Total by the Maxima, Rimi, Lidl and Sky combined.

Table 5. Calculation results for a potential decrease in employees at food supermarkets if their working hours are reduced or they are closed on weekends

Retailer/ Indicator	Number of employees in 2022	Potential number of employees after layoffs		
		Scenario 1	Scenario 2	Scenario 3
		-5%	-10%	-14%
Maxima	6371	6 030	5 734	5 461
Rimi	5 610	5 309	5 049	4 809
Lidl	1 665	1 576	1 499	1 427
Sky*	194	184	175	166
Total potential employees, layoffs**	**13 840**	***-741***	***-1 384***	***-1 977***

* Data from the 2021 report by Sky. ** Total persons employed in the G 47.11 segment in 2022 – 32 477.

Table 6. Potential market shares of Maxima, Rimi, Lidl, and Sky and their decreases under the scenarios based on 2022 data

Retailer/ Indicator	Indicative market shares by employment			
	2022	Scenario 1	Scenario 2	Scenario 3
Maxima	19.62%	18.57%	17.66%	16.81%
Rimi	17.27%	16.35%	15.55%	14.81%
Lidl	5.13%	4.85%	4.61%	4.39%
Sky*	0.60%	0.57%	0.54%	0.51%

* Data from the 2021 report by Sky.

Table 7. Potential decrease in VAT paid by Maxima, Rimi, Lidl, and Sky to the government budget under the scenarios

Retailer/ Indicator	Potential decrease in VAT paid to the government budget, thou. EUR		
	Scenario 1	Scenario 2	Scenario 3
	-5%	-10%	-14%
Maxima	-10 824	-20 205	-28 864
Rimi	-9 562	-17 850	-25 499
Lidl	-3 661	-6 834	-9 763
Sky*	-378	-706	-1 009
Total	**-24 425**	**-45 595**	**-65 135**

* Data from the 2021 report by Sky.

Table 8. Potential decrease in MSSIC paid by Maxima, Rimi, Lidl, and Sky to the government budget under the scenarios

Retailer/ Indicator	MSSIC paid and a potential decrease therein, thou. EUR			
	MSSIC paid in 2022	Scenario 1	Scenario 2	Scenario 3
		-5%	-10%	-14%
Maxima	23 328	-1250	-2333	-3333
Rimi	19 141	-1025	-1914	-2734
Lidl	9 673	-518	-967	-1382
Sky*	802	-43	-80	-114
Total	**52 944**	**-2 836**	**-5 294**	**-7 563**

* Data from the 2021 report by Sky.

Table 9. Potential decrease in PIT paid by Maxima, Rimi, Lidl, and Sky to the government budget under the scenarios

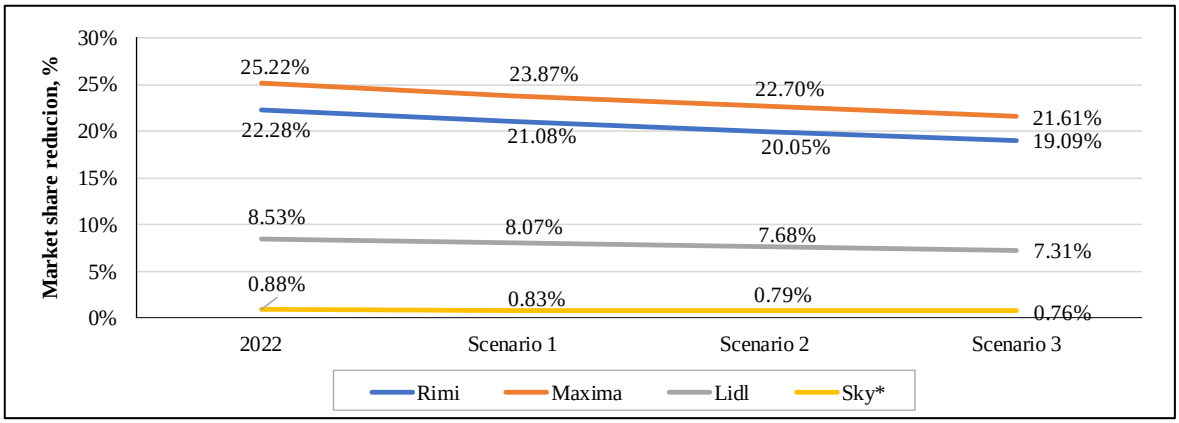
Retailer/ Indicator	PIT paid and a potential decrease therein, thou. EUR			
	PIT paid in 2022	Scenario 1	Scenario 2	Scenario 3
		-5%	-10%	-14%
Rimi	9 739	-436	-814	-1162
Maxima	8 138	-521	-974	-1391
Lidl	4 856	-260	-485	-694
Sky*	387	-21	-39	-55
Total	**23 120**	**-1 238**	**-2 312**	**-3 302**

* Data from the 2021 report by Sky.

Table 10. Potential decrease in VAT and labor taxes paid by Maxima, Rimi, Lidl, and Sky to the national government budget under the scenarios

Retailer/ Indicator	Total potential decrease in VAT, PIT and MSSIC paid, thou. EUR		
	Scenario 1	Scenario 2	Scenario 3
	-5%	-10%	-14%
Rimi	-11 024	-20 577	-29 396
Maxima	-12 596	-23 512	-33 588
Lidl	-4 439	-8 287	-11 839
Sky*	-442	-825	-1 179
Total	**-28 501**	**-53 201**	**-76 002**

* Data from the 2021 report by Sky.



* Data from the 2021 report by Sky.

Figure 5. Potential market shares of Maxima, Rimi, Lidl, and Sky and their corresponding decreases under the scenarios based on 2022 retail turnover data

The calculation results show that under Scenario 1, the total retail turnover of the four supermarket chains would decrease by EUR 116 mln., by EUR 217 mln. under Scenario 2, and by EUR 310 mln. under Scenario 3. The largest losers would be Maxima and Rimi, as their retail turnover in 2022 made up 47% of the total turnover of the four supermarket chains. Accordingly, food accessibility would be impaired to this extent, and consumers would be inconvenienced. Similar findings can be found in the academic literature on Austria – removing restrictions on working hours would increase shop turnover and food purchases, as more time would be allocated for this activity. More shopping hours increase consumer satisfaction [27, 31]. Another opinion is that if retailers extend their working hours, a demand effect is created by a segment of loyal consumers who prefer to shop at night, as prices are higher. Retailers can make extra profits [26]. If retail shops were closed on Sundays, the number of commercial tourists from nearby countries would decrease, and the country would become a less attractive shopping destination [28]. Closing shops on weekends might lead to lower competition; lower efficiency of the shops concerned; increased costs for companies, industries, and the economy [31]; and increased Internet sales [32].

A decrease in retail turnover can also affect the market share of the retail chains concerned in terms of turnover (Figure 5) and, therefore, worsen the financial situation of the shops involved.

Under the most stringent scenario 3 (if food supermarkets close on Saturdays and Sundays), the market share of Maxima would decrease by 3.61 percentage points (from 25.22% to 21.61%), the market share of Rimi would decrease by 3.19 percentage points (from 22.28% to 19.09%), the market share of Lidl would decrease by 1.22 percentage points (from 8.53% to 7.31%) and for Sky the decrease would be 0.12 percentage points (from 0.88% to 0.76%). All four supermarket chains would lose 8.14 percentage points of market share in terms of turnover. This means that all these supermarket chains will lose market power (economic impact), consistent with what has been found in the scientific literature regarding the Netherlands [31], Germany [25], Poland [32], and the U.S. [42].

4-2-2- Possible Impacts of Closing on Weekends or Reducing the Working Hours of Food Supermarkets on Employment and Hours Worked

In 2022, the number of hours worked per year in the retail industry in Latvia was 1711 hours, 8.5% more than the national average (1577 hours). However, retail employees earned EUR 5.55 per hour worked, 34% less than the national average (EUR 8.39). Notably, those employed in the retail industry are paid per hour worked. Therefore, data on wages and labor taxes paid in 2022 were aggregated for the employees of the four supermarket chains analysed (Table 4).

As shown in Table 4, Maxima, Rimi, Lidl, and Sky paid EUR 142 mln. to their employees in 2022; the *MSSIC* was estimated at EUR 52.9 mln., accounting for 50% of the total *MSSIC* (EUR 106 mln.) paid by the G47.11 segment, while the PIT amounted to EUR 23.1 mln., which made up 53% of the total PIT (EUR 43.5 mln.) paid by the G47.11 segment (Lursoft IT Ltd data). This means the four companies analysed were significant social security providers and labor taxpayers in the retail industry.

Reducing the working hours (social impact) of supermarkets allows us to assume that some employees can take on other responsibilities within the company to balance the slightly increased demand for goods on other days of the week (correction factor), while 5%-14% of the employees are likely to experience a decrease in hours worked, which could result in a potential loss of 741-1977 employees at the four supermarkets (Table 5). In the short term, this could burden the government budget, as unemployment benefits must be paid while employees retrain or find new jobs. It is particularly problematic to employ all the personnel at smaller shops, as the specifics of work at a small shop differ from that at a supermarket.

Based on the three possible scenarios, even with the assumption of partial reductions as outlined in Table 1, reducing working hours to half a day on Sundays could result in the laying off of 741 employees. In Scenario 2, the number of layoffs would increase to 1,384; in Scenario 3, it would rise to 1,977 employees. These individuals would likely face unemployment (social impact) and rely on unemployment benefits while searching for new job opportunities, thereby imposing additional economic strain on the social budget (economic impact) alongside broader socio-economic impacts. Similar findings are discussed in the scientific literature: for example, Bossler & Oberfichtner (2014) [24] and Paul (2015) [25], and Khan (2018) [38].

Under the most stringent scenario 3 (if food supermarkets close on Saturdays and Sundays), the market share of the Maxima chain (in terms of employment) would decrease by 2.81 percentage points (from 19.62% to 16.81%), the market share of Rimi would decrease by 2.46 percentage points (from 17.27% to 14.81%), the market share of Lidl would decrease by 0.74 percentage points (from 5.13% to 4.39%), and that of Sky would decrease by 0.09 percentage points (from 0.60% to 0.51%). All four supermarket chains would lose 6.10 percentage points of market share by employment. From a social perspective, the possible reduction of supermarket working hours would consequently hurt both the number of employees and their hours worked, potentially leading to a decrease in wages. Furthermore, some researchers stress that not restricting (liberalising) the working hours of grocery shops would have a positive impact: (1) increased employment on average per shop and in the food retail segment as a whole; (2) part-time employees possibly becoming full-time employees in some cases [27]; 3) more hours worked and higher wages [28, 31]; 4) new career opportunities for both young people and women [23]; 5) increased student employment and earning opportunities [28]; 6) more flexibility for consumers [28]. Nevertheless, the adverse effects of not restricting opening hours are also emphasized, e.g., the employees' work and private life balance being disrupted by increased working hours. This would increase competitive pressure on small retailers [23], and it would be not easy to reconcile work and leisure time within families [28].

4-3- Possible Impacts of Reducing the Working Hours of Food Supermarkets or Being Closed on Weekends on Taxes Paid

In Latvia, the VAT rate on fruit and vegetables was set at 5% until the end of 2023 and was due to be abolished from 2024 onwards; therefore, the impact of a potential decrease in retail turnover as a result of reducing the working hours of food supermarkets or being closed on weekends was calculated using a 21% VAT rate to estimate revenue reduction for the government budget.

Under the three scenarios, the VAT not paid to the national government budget would range from EUR 24.4 mln. to EUR 65.1 mln., depending on the scenario implemented (Table 7). The largest and most significant impact of VAT reduction (economic impact) would be observed in Maxima and Rimi, accounting for 83% of the total potential reduction across the four retail chains. This is due to their combined retail turnover, which constitutes 47.5% of the total retail turnover in Latvia (Figure 5).

Under the three scenarios, the MSSIC not paid to the national government budget would range from EUR 2.8 mln. to EUR 7.6 mln., depending on the scenario implemented (Table 8) (economic impact).

Under the three scenarios, the PIT not paid to the national government budget would range from EUR 1.2 mln to EUR 3.3 mln, depending on the scenario implemented (Table 9) (economic impact). Therefore, combined with social and salary-related income tax payments, it will be unreceived from EUR 4.1 mln to EUR 10.9 mln.

Under the three scenarios, if closing on weekends or reducing the working hours of food supermarkets, the total potential decrease in VAT, PIT, and MSSIC paid to the national government budget would range from EUR 28.5 mln. to EUR 76 mln. depending on the scenario implemented (Table 10). The overall economic impact of reducing the working hours of food supermarkets would result in a decrease in turnover, the loss of market share for the supermarkets themselves, and a significant reduction in tax revenue paid to the government budget, which entirely coincides with what has been studied by other scientists [23, 27, 28].

5- Conclusion

Food retail plays an important role in the overall food supply chain, as it is how produced/processed foods reach consumers. It is therefore important to find an optimal solution for the operation of food supermarkets, particularly their working hours, thereby creating synergies between the interests of consumers, employees, and retailers. Failure to balance the interests and make poor decisions could lead to risks for food accessibility, which is one of the key aspects of food security. Moreover, changing supermarket working hours by imposing or removing restrictions might distort competition in the retail industry.

EU legislation allows each Member State to make its policy regarding working on Sundays, as the EC considers the choice of a shopping day to relate to historical, cultural, touristic, social, and religious considerations; therefore, setting working days and hours is left to the discretion of each Member State. Various countries have had different experiences with limiting the working hours of grocery shops. Yet, there are no unambiguous conclusions on the gains or losses arising from regulating the working hours of retail companies. Therefore, there is a need for further research on how to better pursue stakeholders' interests in this important food supply chain link – retail development – based on the present research findings.

The calculations made revealed that in Latvia: 1) in terms of retail turnover in 2023, retail companies were the fourth smallest in Europe; 2) four retail chains (Maxima, Rimi, Lidl, and Sky) with a 57% market share in 2022-2023 are likely to be most affected if closing on weekends or reducing the working hours of food supermarkets; 3) the scenarios for reducing the working hours of food supermarkets showed that this could have: (a) economic consequences, with a decrease in the total retail turnover of the supermarket chains (which is a threat to food accessibility and inconveniences consumers), a decrease in the market share of the supermarkets, and a decrease in the amount of taxes paid to the government budget; (b) social consequences, with a 5%-14% decrease in the hours worked by employees, which could lead to a decrease in wages and the potential loss of up to 1977 employees.

The calculation and assessment methodology proposed by the authors could be applicable to other EU countries for evaluating and discussing potential changes to supermarket operating hours. Given that this issue has been the subject of significant debate across Europe over the past decade, the approach may provide valuable insights for informed decision-making.

6- Declarations

6-1- Author Contributions

Conceptualization, A.P. and I.P.; methodology, A.P.; software, A.P.; validation, L.P., A.N., and S.P.; formal analysis, A.P.; investigation, I.P.; resources, L.P.; data curation, A.P.; writing—original draft preparation, I.P.; writing—review and editing, A.P., L.P., A.N., and S.C.; visualization, A.P.; supervision, L.P.; project administration, L.P.; funding acquisition, L.P. All authors have read and agreed to the published version of the manuscript.

6-2- Data Availability Statement

The data presented in this study are available on request from the corresponding author.

6-3- Funding

The research was promoted with the support of the Ministry of Agriculture of the Republic of Latvia scientific project "The impact of the implementation of diversification of working hours of food supermarkets on the food supply chain", agreement No. 10.9.1-11/23/1984-e.

6-4- Institutional Review Board Statement

Not applicable.

6-5- Informed Consent Statement

Not applicable.

6-6- Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this manuscript. In addition, the ethical issues, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancies have been completely observed by the authors.

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