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LABOUR PRODUCTIVITY DYNAMIC IN RETAIL TRADE: RESULTS OF EMPIRICAL STUDY IN CROATIA

DINAMIKA RADNE PRODUKTIVNOSTI U TRGOVINI NA MALO: REZULTATI EMPIRIJSKE STUDIJE U HRVATSKOJ

ABSTRACT: The purpose of this study is to demonstrate how part-time work in the retail store reflects on labour productivity. It was motivated by very low labour productivity in the retail sector in Croatia (57% of the EU average). The operational data on customer frequency and working hours are the business data requested and obtained from a retail chain in Croatia, more precisely the data derived from the chain's business intelligence (BI) analytical system. Bivariate correlation statistical analysis was used to compare the productivity of five similar stores with different workforce structures. The goal was to show the impact of part-time work on productivity. The results confirm that part-time employment provides a proportion of effective hours that can increase the store's productivity. The gross margin proved to be a limitation to the dynamics of labour productivity, which means that the introduction of part-time work will negatively affect the margin after reaching a certain proportion. Retail management can use the contribution for strategic purposes to shape the workforce structure and as an operational input in the timetable scheduling to improve productivity. Empirical validation focused on a single format is considered a study limitation. The paper presents an exhaustive analysis of operating data from the retail business, which can be a valid input for driving the macro-level productivity of the entire retail sector.

KEYWORDS: labour productivity, retail sector, store, part-time work, full-time workers

SAŽETAK: Svrha je istražiti kako se rad na nepuno radno vrijeme u prodavaonici odražava na radnu produktivnost. Motivacija proizlazi iz vrlo niske radne produktivnosti u trgovini na malo u Hrvatskoj (57 % prosjeka EU-a). Operativni podatci o frekvenciji kupaca i radnim satima za empirijsku studiju poslovni su podaci zatraženi i prikupljeni od maloprodajnog lanca u Hrvatskoj, koji ih je izveo iz svog analitičkog sustava poslovne

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inteligencije (BI). Koristila se statistička analiza bivarijantne korelacije kako bi se uspo-redila produktivnost rada između pet sličnih prodavaonica s različitom strukturom radne snage. Cilj je bio pokazati utjecaj zastupljenosti nepunog radnog vremena na produktivnost rada. Rezultati potvrđuju da rad na nepuno radno vrijeme omogućuje proporciju efektivnih sati koja može povećati radnu produktivnost prodavaonice. Bruto marža pokazala se kao ograničenje za dinamiku radne produktivnosti, što znači da će uvođenje rada na nepuno radno vrijeme negativno utjecati na maržu nakon zauzimanja određenog udjela radnih sati. Maloprodajni menadžment može iskoristiti doprinos rada u strateške svrhe za oblikovanje strukture radne snage i kao uzor za operativni raspored rada kako bi poboljšao produktiv-nost. Empirijska validacija usmjerena je na jedan format, što predstavlja ograničenje studije. Rad sadrži iscrpnu analizu poslovnih podataka iz poslovanja trgovaca na malo čiji rezultati mogu biti vrijedan input u praksi na makrorazini za povećanje produktivnosti čitavog trgo-vinskog sektora.

KLJUČNE RIJEČI: produktivnost rada, sektor trgovine na malo, prodavaonica, rad na nepuno radno vrijeme, stalni radnici

1. INTRODUCTION

Retail is a labour-intensive and low-wage industry. Thus, managing the workforce and working schedule are strategic and operational challenges for retail management. Due to a low barrier for workers to start and leave the job compared to other industries, employment of part-time workers is quite attractive and challenging at the same time. Another specific feature of retailing is an uneven workload during the day and week, as seen from the em-pirical data presented in Graph 1. Therefore, it is vital to provide an organisational response to workload peaks and falls. Labour productivity may increase when fine adjustments of the workforce structure (i.e., the ratio between full-time and part-time work) and working schedule match operational peaks and falls in the retail store. The main parameters of workforce dynamic boost are the frequency of shoppers and business process requirements (e.g., morning opening).

Figure 1 The proportions of customers in the store during the day (7-21h) and the week
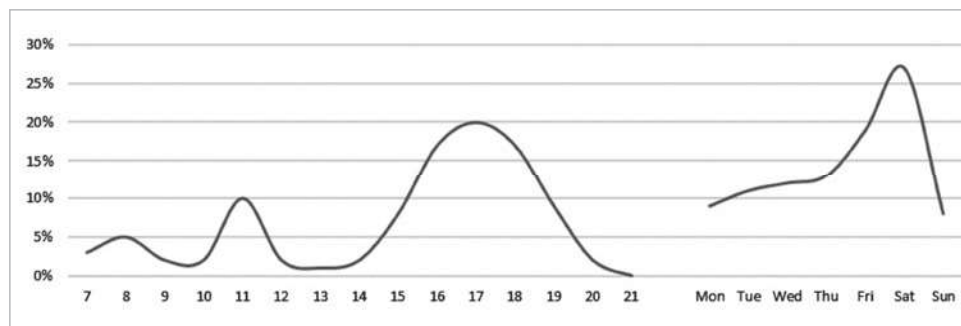
Source: analysis of empirical data obtained from the targeted company.

The motivation for the research is the very low labour productivity in the retail sector in Croatia according to recent data from Eurostat (2022a). Analysing the labour productivity of retail stores and seeking an advantageous engagement of full-time and part-time work concerning revenues and margin realised may be beneficial in boosting the productivity of the entire sector. Generally, below-average productivity in the labour-intensive sector is treated as a weakness (Knežević, Naletina & Damić, 2016; Moreno, 2010). However, Devicienti et al. (2020) argue that part-time employees provide greater scheduling flexibility, meet market demands more efficiently, and reduce wage and benefit costs. In addition, they claim that part-time workers may be more productive than full-time workers due to stress reductions from working fewer hours.

In conditions of high competition among retailers, one of the ways to increase productivity is the flexible workforce scheduling that matches the nature of the business process (Ratchford, 2003). Another way is the intensive use of modern retail technology, but its pace of introduction could be faster (Moreno, 2010). Finally, to bring up productivity, a company should rely on organisational flexibility (Ingene, 1985, Maican & Orth, 2017; Friebel, Heinz, & Zubanov, 2021).

The objective is to test a relationship between workforce variables and labour productivity at the micro level. The outcome could be reflected on the macro level of the economic sector. For the results to be directly related to the problem, output per employee or "turnover per worker" will be analysed as a standard indicator in statistical methodology (OECD, 2001) and retail management (Levy, Weitz & Grewal, 2018). The hypotheses test the correlations of the number of part-time workers, their working hours in the daily schedule, and the proportion of working hours, with turnover per worker and gross margin per worker indicators. It is presumed that a store could improve productivity rate if management instigates to a certain extent a higher proportion of part-time hours.

Empirical research was carried out using business data obtained and extracted from the business intelligence (BI) system of the Croatian retail chain registered in NACE Rev. 2 G47.1.[1] Management extracted customer frequency, workforce, turnover and gross margin data from the company's data warehouse. The dataset covered five grocery stores of the same format, namely supermarkets. Each store practised a different proportion of part-time workers and hours in the observed period. Bivariate correlation statistical analysis was used to compare labour productivity between five similar stores.

2. LITERATURE REVIEW

Productivity is an output-to-input relationship measure reported in different ways. Vujović (2022) showed that highly productive companies entered the market more easily because they attracted labour and capital more efficiently. In analyses of aggregated productivity values, two criteria are most widespread, total-factor productivity and labour productivity. On disaggregated level, labour productivity can be compared on an institutional

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[1]   According to the European standard classification of productive economic activities, Revision 2 – NACE Rev. 2, classification section G indicates "Wholesale and retail trade; repair of motor vehicles and motorcycles", division 47 indicates "Retail trade, except of motor vehicles and motorcycles" and group 47.1 indicates activities of "Retail sale in non-specialised stores".

level (Berlingieri, Calligaris & Criscuolo, 2018). Amin (2015) used "output per worker" to analyse the increase in productivity of small shops. Aggregated low productivity is the result of the situation at the micro level (OECD, 2001). A micro-level includes a company or store-level performance.

According to the retail productivity theory (Bucklin, 1980; Achabal, Heineke & McIntyre, 1984; Ingene, 1985; Marcan & Orh, 2015), work efficiency is considered one of the productivity factors. So far, many authors have examined the applicability of various productivity measures in retail, such as managerial ability, technology, human capital, and regulation. Although all these factors are essential, more is needed to know about their interrelationship (Mishra & Ansari, 2013). The application of the correlation between productivity and the variables considered to influence it is mostly documented (Bartelsman & Doms, 2000). In the context of the liberalisation of the retail market, management should be able to manage workers, labour relations, and work schedules freely without regulatory restrictions. However, in a social market economy, regulation may be motivated by social, not only economic, reasons, such as the protection of workers' rights (e.g., non-working Sunday).

Productivity in retailing can be measured and compared using various relative indicators such as "turnover per worker", "sales per employee", "sales per sq. meter", "sales per working hour", "gross margin per sq. meter" (Levy, Weitz & Grewal, 2018). Employees and the sales area are the most critical inputs in the retail productivity function (Knežević, Knego & Delić, 2014). Dunković & Bernat (2014) argued that productivity in Croatian retail companies could increase due to improved efficiency - through innovations, adopting better technology or increasing managerial skills, particularly organisational.

OECD (2001) uses the aggregate indicator "turnover per employee", generally accepted as a standard statistic for all economic sectors, including retailing. Turnover per employee is an international standard statistical indicator of labour productivity (OECD, 2001; Nestić, 2004), and some authors consider it a key performance indicator, which is why store managers spend more time on human resources and less on customers (Friebel, Heinz & Zubanov, 2021). Turnover is the retail sale of goods in a store in a certain period and includes all reductions, discounts, and returns of goods but does not include VAT.

Retail establishment usually does not expand, and consequently, the organisation rarely grows (Bartelsman & Doms, 2000). Retail organisations constantly yearn to organise work with as few workers as possible to be productive and profitable (Levy, Weitz & Grewal, 2018). It is all about the proportion of effective hours in total working engagement. Effective work denotes the time spent at the workplace that is maximally coordinated with the tasks that need to be completed (Nelen, De Grip, & Fouarge, 2011). Robbins & Judge (2013) argue that only effective work may improve productivity by performing tasks as precisely as possible to achieve a goal. Therefore, an increase in productivity depends on the proportion of effective work.

Low labour productivity in trade is widespread in all CEE countries (Petković, Lovreta, & Pindžo, 2016). The identified research problem is currently low labour productivity in the trade sector in Croatia. It equals only 57 percent of the average at the EU level; however, in the last five years, it grew annually on average by 6 percent (Graph 2). The Netherlands, one of the leading countries in terms of labour productivity in Europe, employed 50 percent of retail workers part-time in 2020, Austria 36 percent, Slovenia 9 percent, and Croatia only 3.6 percent (Eurostat, 2022b). Countries with high labour productivity also have a

significantly higher proportion of part-time workers. The rigid regulatory framework in CEE countries is the most likely reason for the low rates of part-time arrangements (Dobrzanski & Grabowski, 2019). Croatia is among the countries with the lowest rate of part-time work among EU countries (World Bank, 2019). Other countries in the CEE region are also struggling for productivity growth (Petković, Lovreta & Pindžo, 2016).

Figure 2 Turnover per worker in distributive trade and growth rate in the period 2016-2020
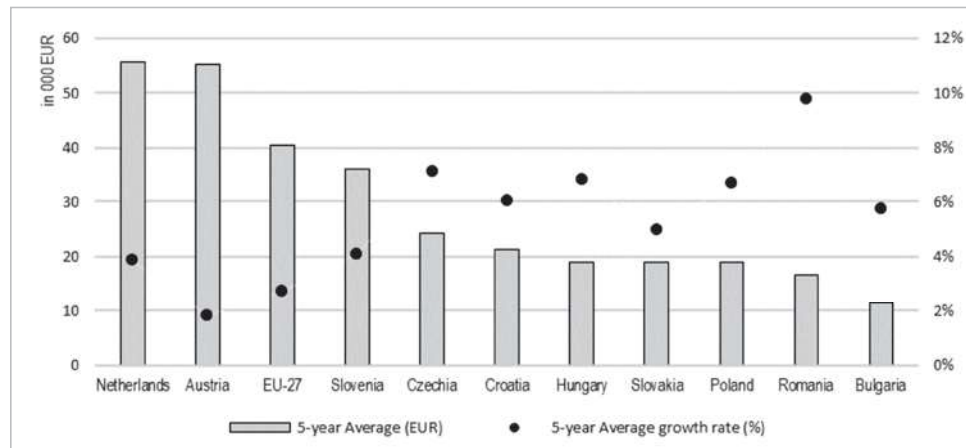
Note: 5-year (2016-2020) average covers the most recent period of available statistical data

Source: own study of Eurostat data related to labour productivity (online table code: TIN00152)

Part-time work options can provide employers with greater flexibility in responding to market demands. However, it is mainly concentrated in lower-paid sectors of employment and in certain sectors like catering or retailing (OECD, 2010). Part-time is a secondary form of work used when there is a lack of full-time working capacity (Harris, Foster, & Whysall, 2007). Part-time is a government-defined legal form of work. According to the European Framework Agreement on part-time working,[2] the term denotes two types of employment: type (a) when the contract is time-limited (e.g., six months) and type (b) when hours during the working week are shorter than the regular full-time working hours which can be from one hour to a maximum of 39 hours per week. Type (b) corresponds to part-time workers with fewer hours in a working day and fewer days in a week. A study on the usefulness of part-time employment conducted by Nelen, De Grip & Fouarge (2011) found that the deployment of a large proportion of part-time employees increases the efficient distribution of work during the working day and contributes to investment in productivity. Their empirical findings reveal that companies in the service sector with a higher proportion of part-time workers have higher productivity than companies with a large share of full-time employees. In addition, they identified that in the retail sector, there are conditions in which part-time increases the allocation of effective work; for instance, opening hours and hours during lunchtime exceed the full-time work.

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[2]   EUR-Lex Part-time work, available at: https://eur-lex.europa.eu/EN/legal-content/summary/part-time-work.html

The number of workers increases by introducing part-time workers so that management has to supervise and schedule in more complex conditions. The increased costs of employment (e.g., mandatory social security costs) and labour coordination are particularly important when part-time workers are used sequentially (Nelen, De Grip, & Fouarge, 2011). The retailer's gross margin covers these costs, so their amount above a certain level can annul profitability.

Retail trade has a critical role in the performance of the trade sector. Looking at employment in Croatia, the trade sector employed 241 thousand in 2019 which makes it the second largest after the manufacturing sector according to Eurostat (2022b). Retail trade, statistically coded by NACE Rev 2. G47 employed 182 thousand workers in 2019 (Eurostat, 2022c) or 11 percent on a national level (Eurostat, 2022b). Improving performance namely productivity in retailing can affect the productivity in the entire trade sector. The empirical analysis is carried out on data from the supermarket format - specialized food and consumer goods stores classified under subsector G47.1.

There are other factors besides the type of employment for increasing labour productivity in retailing. The presence and politeness of personnel affect the store's attractiveness (Grewal et al., 2020); therefore, managing their working relationships and scheduling working hours are sensitive issues. Satisfaction with the operating schedule affects their performance in front of customers. Therefore, management strives to find workers who are not ready for working time flexibility but also for workplace flexibility and are passionate about organisational culture implementation.

3. HYPOTHESIS AND METHODOLOGY

Four hypotheses are being set to determine how the heterogeneous structure of employment and the daily working schedule (i.e., hours of part-time workers) correlate with "turnover per worker" and "gross margin per worker" indicators. Type (b) of part-time is relevant for hypothesis development. The correlation hypotheses are the following:

$H1_a$: More part-time workers in the store increase turnover per worker.

$H1_b$: The number of part-time hours negatively correlates with turnover per worker.

H2 : The proportion of part-time hours positively correlates with turnover per worker.

H3 : The proportion of part-time hours positively correlates with the gross margin per worker.

Hypotheses $H1_a$ and $H1_b$ are coherent. In other words, only if both are confirmed, organising a larger number of part-time workers working flexibly increases the turnover per worker. H3 is not directly related to the goal of the paper. However, it can help in a more precise interpretation of the results. If the null hypothesis is true, an increase in the share of effective hours does not affect the growth of the "gross margin per worker", and the dynamic deteriorates the margin of a retail organisation.

The data for the analysis were obtained from a retail chain. Due to data confidentiality reasons, management has approved the use of data that emerged before FY 2020; thus, the empirical data covers an out-of-season period Sep-Nov 2019 of 13 weeks. Data were

collected for five supermarkets (selling area 800-1000 sq./m) on sales and gross margin converted to EUR, then the number of workers, employment status, and working hours. Five stores from a set of stores in a retail chain were selected according to three criteria: (1) the same store format without distinction in the level of retail service (i.e., merchandise assortment, prices, location), (2) approximate sales area and (3) that they employ both part-time and full-time employees.

To compare the beneficiary of part-time employees, Nelen, De Grip, & Fouarge (2011) used a correlation coefficient to show that a higher number of contractual work hours (i.e., part-time work hours) means more part-time employees. To test the hypotheses, it is critical to identify the strength or degree of linear association within quantitative series of variables. Due to the rigidity of empirical analysis, it is not realistic to perform regression of variables on productivity when the maximisation function is not applied. Furthermore, part-time work increases fixed costs. Thereby the dynamics of part-time hours have profitability constraints.

A bivariate correlation method is applied for empirical analysis using the Pearson coefficient with a two-tailed significance test. The study includes two variables treated as dependables: (1) standard productivity indicator "turnover per worker (€)" and (2) "gross margin per worker (€)", both calculated according to the following formulas:

$$(1) \; \textit{Turnover per worker} = \frac{\textit{Store turnover}}{\textit{Average number of workers}}$$

$$(2) \; \textit{Gross margin per worker} = \frac{\textit{Turnover-COGS}}{\textit{Average number of workers}}$$

4. RESULTS

The heterogeneity of data relevant to the analysis is presented in Table 1 and Table 2. The first independent variable represents the average number of part-time workers employed in a store in 13 weeks and is labelled as "PT Wrkrs". It sums the number of all part-time workers, whether the administration or shop-floor personnel. The second independent variable is the proportion of part-time hours labelled as "P WHrs PT (%)". Stores are identified from "A" to "E" and ascendingly ranked according to the "P WHrs PT (%)" variable. The store's working hours sum all working hours of both categories, full-time and part-time employees. For example, 10 percent means that part-time workers worked 950 out of 9,500 store hours. The third variable represents an average number of part-time hours per day labelled as "Avg WHrs PT". Despite all stores working seven days, the working week is regulated to five days a week, a parameter taken in the average calculation. In 13 weeks, the parameter in the formula is 65 days. For example, if the total hours of part-time workers equal 2,079 hours and there are 4.3 part-time workers, then 'Avg WHrs PT' equals 7.44 hours per day. Statistical analysis was performed using IBM SPSS. Descriptive statistics are presented in Table 3.

Table 1 Turnover, workforce, and productivity data of five grocery stores

Store	Turnover (€)	FT Wrkrs	PT Wrkrs	FT WHrs	PT WHrs	Avg WHrs PT	P WHrs PT (%)↓	Avg Wrkrs	Turnover Per worker (€)	Dev Avg (%)
A	589.314	15	3,3	7.820	1.656	7,72	17,5	18,2	32.407	-6,63
B	632.979	15	4,3	7.839	2.079	7,44	21,0	19,0	33.318	-4,01
C	441.802	10	4,7	5.231	1.452	4,75	21,8	12,8	34.537	-0,50
D	470.208	10	4,0	5.200	1.510	5,81	22,5	12,9	36.439	4,98
E	534.465	11	5,8	5.677	1.822	4,83	24,3	14,5	36.850	6,16
									Avg 34.710	

Note: Data relates to 13 business weeks starting from Sep 2 till Nov 30, 2019

Columns labels: "Turnover" - Store turnover in period; "FT Wrkrs" - Number of full-time workers; "PT Wrkrs" - Number of part-time workers; "FT WHrs" - Working hours of full-time workers; "PT WHrs" - Working hours of part-time workers; "Avg WHrs PT" - Average number of part-time hours per day; "P WHrs PT" - Proportion of part-time hours in store's total hours; "Avg Wrkrs" – Average number of full-time and equivalent of part-time to full-time workers according to working hours; "Dev Avg" – Deviation percentage rate from the average value of turnover per worker

Source: own study of company data.

Table 2 Gross margin productivity

Store	Gross margin (€)	Per worker (€)	Dev Avg (%)
A	160,824	8,844	-6.51
B	170,651	8,983	-5.05
C	124,588	9,739	2.95
D	127,708	9,897	4.62
E	142,649	9,835	3.97
		Avg 9.460	

Note: Per worker = Gross margin / Avg Wrkrs

Columns labels: "Dev Avg" – Deviation percentage rate from the average gross margin per worker

Source: own study of company data.

Table 3 Descriptive statistics (*N=5*)

	Mean	**SD**
P Whrs PT (%)	21.4	2.5
Turnover per worker (€)	34,710	1,926
Avg Whrs PT	6.25	1.26
PT Wrkrs	4.4	0.93
Gross margin per worker (€)	9,460	504

Source: own study.

To test the hypotheses, four relationships are subject to statistical analysis. First, the results of the bivariate correlation between variables are distributed in Table 4. Since the data set has different units of measurement, all variables are transformed by the *ln(x)* function. This is necessary to ensure the accuracy of the results due to the lack of consistency in the units of measurement.

Table 4 Bivariate correlations and hypotheses testing

| Dependable variable		ln(PT Wrkrs)	ln(Avg WHrs PT)	ln(P WHrs PT)
ln(Turnover per worker)	Pearson	.698* (H1$_a$)	-.771* (H1$_b$)	.902* (H2)
	Sig.	.020	.013	.036
ln(Gross margin per worker)	Pearson	.845 (H3)		
	Sig.	.071		

* Correlation is significant at the 0.05 level (2-tailed).

Source: own study.

According to a rough approximation of Pearson's coefficient, if $r>0.7$ or $r<-0.7$, then it indicates a strong relationship between variables (Petz, 1985). Hypotheses H1a and H1b were confirmed by statistical significance ($p<0.05$). There is a strong association between the number of part-time workers and 'turnover per worker' ($r=.696$, $p=.047$). The average number of working hours of part-time workers and 'turnover per worker' are in strong negative correlation ($r=-.952$, $p=.023$). Hypothesis H2 is confirmed ($r=.902$, $p=.036$) too.

According to the correlation test, H3 is not confirmed on $p<0.05$ significance level ($r=.845$, $p=.071$). 'Gross margin per worker' does not significantly correlate with the proportion of part-time hours. The result indicates that gross margin is a limiting factor in a labour productivity dynamic. Above a certain level, the dynamic generates more costs than sales, leading to a profitability deterioration.

Figure 3 Variations of store productivity parameters
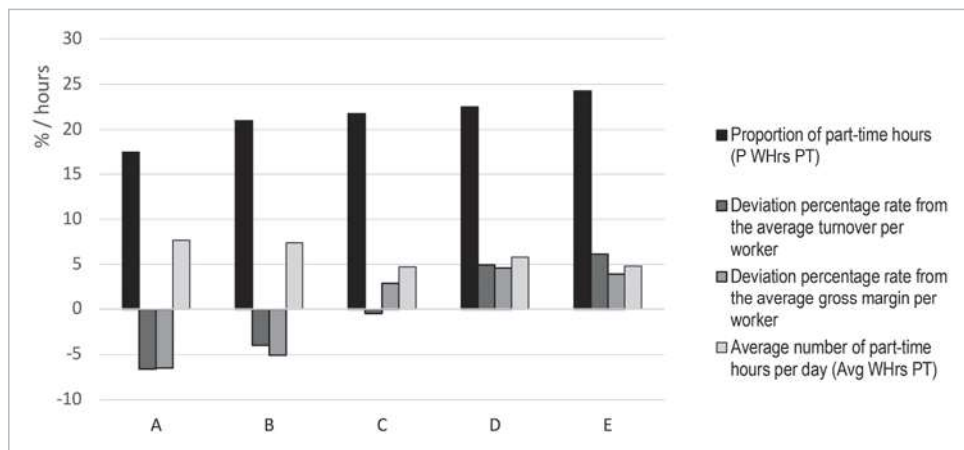
Source: own calculation from Table 1 & Table 2

Competition among stores is presented in Figure 3. It is important to note that for two variables, inverse proportionality applies: (1) a percentage of part-time hours in the store's total hours and (2) an average number of hours of a part-time worker per day. Deviation percentages indicate below and above-average productivity indicators of the corresponding workforce setting. The purpose of the competition is to reveal the relationship between part-

time hours and above-average productivity and profitability performance. Among the observed stores, the lowest productivity rate is recorded in organisation "A", where the lowest portion of part-time hours and the highest average number of part-time hours. The reason may be the employment of part-time workers (type a) to fill full-time positions rather than adapting to a store's operational needs. On the other hand, two stores, D and E, with a higher proportion of part-time hours (over 22%) and a lower number of average part-time hours per day (below 6.0), recorded productivity rates of 4-6% above average. The latter signals more excellent work dynamics because a greater intermittence of the work schedule indicates a more precise adaptation to the organisation's needs.

5. DISCUSSION

The result contributes to the productivity theory in retailing. Dynamic management of the store's workforce structure and daily schedule affects the ratio of effective hours and labour productivity goals.

Part-time workers are a flexible secondary workforce. A certain proportion of part-time work may increase the turnover per employee. Part-time workers should help in service provision during the store's operational peak hours and days; however, they should be promptly released when it diminishes. Gross margin limits the profitability of a highly dynamic organisation. Therefore, the average part-time hourly rate can be used as an indicator of productivity dynamics. In addition to the results obtained, it should also be considered that labour productivity will undoubtedly improve due to the increased use of modern technologies that will replace human engagement in some range (Grewal et al., 2020). The implications expand the results of Nelen, De Grip, & Fouarge (2011) because they also showed that a larger number of part-time hours consequently indicates the presence of a larger number of part-time workers, which means that they fill work capacities at certain periods more efficiently than full-time employees.

Low retail productivity is a problem that entails the emergence of other issues. This was also discussed in their research on the retail trade sector Knežević, Naletina & Damić (2016). It brings unfavourable procurement conditions, lower turnover growth rates, lower gross margins, and higher sales prices than competitors.

The results have managerial implications. Each store has its peaks and falls in operational capacity depending on operations (e.g., store opening, store closing) or customer traffic. These are the main factors in the organisation of the daily schedule. Weekly, peaks occur on Monday morning due to filling shelves and returning regular prices, then displaying promotions on Saturday morning, and then customer frequency peaks on Friday afternoon and Saturday. According to the analysed available data, work in retail stores usually lasts 7 or 8 hours a day and 40 hours a week, and the working hours of full-time workers typically exceed 80 percent. The introduction of part-time work enables greater flexibility and is crucial for adapting the organisation to the workload dynamics. Introducing part-time hours aligning with operational peaks and falls is beneficiary until the cost of such work spills off its turnover effect and starts to deteriorate the gross margin. Deciding on a more dynamic workforce structure and daily schedule may put the value of gross margin per worker in question. Variations in store productivity parameters reveal that the store with

the most flexible workforce structure achieved a 6.16% higher productivity rate than the average. Second, the same store shows that it has the most significant number of part-time workers who work an average of 4.83 hours per day, which is 21% less than the average. Due to the existence of reverse proportionality, it can be concluded that the store's management, with more than 20 percent of part-time workers working less than 5 hours daily, achieves the highest above-average labour productivity.

6. CONCLUSION

Retail stores have an unusual working schedule because there are fluctuations in the number of customers and the intensity of work processes during the day and week. For this reason, there is also a need for the number of workers and the working schedule. Sales per worker will show better results if sales are divided by fewer full-time equivalents. It is a widely used indicator in retail management and statistics. Recent data on the situation in retail trade in Croatia show a concerningly low productivity rate. Hypotheses have proven the existence of some critical correlation relationships. The results suggest that changes in the structure of the workforce by increasing the saturation of part-time work at the micro level should be undertaken to reflect the productivity ratio throughout the retail sector. A strong positive correlation exists between productivity and the number of part-time workers scheduled in the store. In contrast, a strong negative correlation exists concerning the average number of part-time hours.

Aggregated low labour productivity in the Croatian trade sector may be better off if the current balance of full-time and part-time hours is differently dispersed. Data analysis improves understanding of the origins and needs of business cycle fluctuations and opens new horizons in productivity research. One-fifth of the workforce is employed in distributive trade; therefore, increasing labour productivity in companies within the retail sector can significantly affect productivity levels on a broader scale.

The research has limitations. In retail, several productivity indicators can be used (e.g., sales per square meter, sales per hour, average transaction size, ROI, etc.), however, only those labour-related ones were examined. Furthermore, the research covers the supermarket format of one retail chain. Still, other retail formats, such as discount stores with a low-cost strategy and lower retail service levels, have different workforce needs. The results do not predict the optimal ratio of full-time vs part-time workers and corresponding working hours. The contribution of the research would be more precise if productivity were measured separately in multiple periods over the year (e.g., quarterly), as this would also consider the annual dynamic of the workforce, not just daily and weekly ones.

Future research can tackle the problem more broadly than the research limitations. It is essential to understand how various workforce dynamics affect costs and gross margins as they are crucial to management decisions about work schedules. In the pursuit of increasing effective work, there are limits to profitability. Just as earlier research has dealt with correlations, it would be welcomed to investigate in more detail the extent to which managerial ability and regulation affect the level of productivity in retailing. By introducing the linear regression method, it would be possible to determine how much a part-time hour contributes to productivity compared to a full-time one.

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