
EARNINGS MANAGEMENT AND WAGE SUBSIDIES DURING THE COVID-19 PANDEMIC: THE CASE OF CROATIAN HOTELS

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Abstract:

This paper examines the relationship between earnings management and wage subsidies allocated to Croatian hotels during the COVID-19 pandemic. Quarterly financial data available on the Zagreb Stock Exchange and subsidies data provided by the Croatian Employment Office were used to estimate the coefficients of random-effects panel models. The level of earnings management in financial statements was estimated by the modified Jones model. The results show that companies with a higher share of subsidies in total assets have a higher propensity to reduce their magnitude of earnings management. In the context of signed accruals, this finding holds only for companies that managed earnings upwards, while the relationship was not statistically significant regarding their counterparts that managed earnings downwards. Considering all the results, it may be concluded that the earnings management behaviour of hotels indicates their tendency of avoiding unnecessary public scrutiny in times of a crisis. Research also has practical implications for the institutions that regulate the allocation of subsidies and other stakeholders of subsidy recipients.

Key words: *earnings management; financial reporting quality; wage subsidies; government support; coronavirus*

1. Introduction

Extreme measures implemented to curb the spread of coronavirus, such as lockdowns, quarantines, social distancing and travel restrictions, have distorted almost all aspects of life. The COVID-19 pandemic profoundly impacted the corporate sector, seriously affecting growth ability, sustainability and predictability of the economic environment (Burcă, Bogdan, Bunget & Dumitrescu, 2024). The negative impact of this event on international tourism was unprecedented in recent history (Callao, Jarne & Wroblewski, 2025). The financial year 2020 was designated as “the worst year on record

for global tourism” (World Tourism Organization, 2023, p. 5). For comparison, international tourist arrivals plummeted by 72% in 2020 and only 4% during the global financial crisis in 2009 (World Tourism Organization, 2023). The following year was “another challenging year for tourism”, negligibly favourable than the previous year, while a substantial resurgence took place in 2022 (World Tourism Organization, 2023, p. 6). In such circumstances, the necessity for expeditious governmental stabilisation measures emerged worldwide (Cui, Hicks & Norton, 2022).

Besides debt relief, income support and other economic policies, subsidies were often utilized to alleviate repercussions of the COVID-19 crisis (Soeprajitno et al., 2024). When allocating them, the government should ensure fairness and consider of interests of all economic parties involved (Truong, 2025). Despite the discontent capitalists often voice regarding wealth transfers between public resources and private corporations (Pappas, Walker, Xu & Zeng, 2024), the need for government intervention seemed indispensable during this challenging period. The importance of thoughtful manoeuvres was even more emphasised in the case of the Republic of Croatia, considering that it is “one of Europe’s most popular destinations and one of the economies with the highest share of tourism revenues in GDP” (Mikulić, Keček & Žajdela Hrustek, 2023, p. 2).

Although intended to alleviate financial distress, subsidies can also motivate undesired accounting practices in the corporate sector. In order to become eligible for subsidies or increase their amount, companies receiving subsidies on the basis of their financial difficulties are prone to report weaker financial performance and utilise downward earnings management. This is also corroborated by the previous research, such as Zhao, Zhou, Zhao & Zhou (2019) and Jiang, Hu, Zhang & Zhou (2018). However, the corporate sector’s earnings management behaviour is more complex to anticipate during the crisis periods. Research has found both evidence on intensified (Yaşar & Yalçın, 2024) and reduced (Callao et al., 2025) earnings management, as well as upward (Lassoued & Khanchel, 2025) and downward (Danysh-Hashemi, 2023) earnings management during the COVID-19 pandemic. These findings indicate the need for further research in the context of subsidy recipients’ earnings management behaviour during the crisis.

The main objective of this paper is to examine the earnings management behaviour of subsidised companies during the COVID-19 pandemic. Unlike most of the research, which focuses on the use of accounting discretion in acquiring government subsidies, this paper analyses earnings management during the financial crisis. To the authors’ knowledge, existing research did not examine this relationship. Prior research also did not utilize quarterly data, which enables more precise model estimation, especially if subsidies are allocated on a bi-monthly or tri-monthly basis, like wage subsidies during the COVID-19 crisis. Additionally, the COVID-19 crisis was unique given its rapid and pervasive impact on the hotel industry and the research was conducted in a country with an extremely important economic role of tourism. The findings of this research contribute in illuminating the inconclusive relationship of earnings management and crises and complements existing research on the relationship between government subsidies and earnings management. Besides their scientific contribution, findings of this research also have considerable practical implications, primarily for the institutions which regulate the allocation of subsidies, but also for all stakeholders of subsidy recipients.

2. Literature review

The first cases of coronavirus were detected in December 2019, and its rapid spread led the World Health Organization's (WHO) to declare a COVID-19 pandemic on 11th March 2020 (World Health Organization, n.d.). The COVID-19 measures that were indispensable at the given moment resulted in a sharp decrease by 12.1% in the European Union (Eurostat, 2020). Among the most affected industries was the hospitality (Bartik et al., 2020; Chetty et al., 2022, in Bayat, Goergen, Koutroumpis & Wei, 2025). Within the wide range of repercussions of the unexpected and sudden occurrence of the COVID-19 pandemic (IMF, 2020, in Bayat et al., 2025), like a sharp decline of profits (Bayat et al., 2025) and cash flows (Ntantamis & Zhou, 2022), the labour market was severely affected (Larrimore, Mortenson & Splinter, 2022). Thus, job retention policies were implemented worldwide (Corti et al., 2023; Drahokoupil & Müller, 2021; Müller et al., 2022, in Vogtenhuber, Steiber & Mühlböck, 2024).

2.1. Institutional Framework of COVID-19 Wage Subsidies in the Republic of Croatia

The Croatian Employment Service (HZZ) had an important role in controlling the repercussions of the COVID-19 pandemic. Using their official website, they have addressed their public call to the potential recipients of measures, Support for preservation of jobs in activities affected by the Coronavirus and Retention of employees in activities with reduced economic activity, intended to alleviate the consequences caused by the COVID-19 pandemic. Companies eligible to apply for these measures were defined by their activities. The allocation of support was restricted to certain activities, among which Section I – Activities of providing accommodation and food preparation and service was also included. The Mentioned Section comprises Class 55.10 – Hotels and similar accommodation, which includes hotels that were used as observational units in this paper. Considering that the sudden outbreak of COVID-19 demanded rapid reactions, certain conditions of the first public call were more lenient than in later public calls. In 2020, when the crisis was most severe, the amount of support was 4,000.00 HRK (equivalent of 530,89 EUR), while in 2021 categories of support were introduced, ranging from 2,000.00 HRK (equivalent of 265,45 EUR) to 4,000.00 HRK, depending on the percentage of income decrease as the key item among the application criteria for these supports. In the first public call, the threshold value of income decrease was defined at 20%, then the rest of the year 2020 at the level of 50% and in 2021 it was partitioned into five intervals ranging from 40% to 60% and more, used to determine the amount of support, as mentioned previously. Similarly, wage subsidies in Canada had the principal eligibility criterion of reduction of monthly revenues compared to the prespecified months on the eve of the COVID-19 pandemic (Mawani & Hajee, 2025).

The conditions under which the support will be terminated were also defined for the support recipients (e.g. dividend payments, stock repurchases and executive bonus payments). In the context of dividend payments, Wong and Wong (2021) investigated the recipients of the COVID-19 wage subsidies in New Zealand and questioned some of them from a moral and ethical standpoint. Although the examined companies received them in accordance with legal rules, wage subsidies were not necessary for them, given that they

had a favourable financial performance and performed dividend pay-out. The regulation in the Republic of Croatia was set in a manner to avoid situations similar to New Zealand. Comparably, Canada also did not restrict corporate cash pay-outs (Ntantamis & Zhou, 2022). In that sense, Mawani and Fan (2023) found the positive relationship between the amount of dividend pay-out and reluctance to disclose the amount of wage subsidies received.

2.2. Review of Previous Research and Hypothesis Development

There are two research flows to be examined in the context of this research: the utilization of accounting discretion in times of financial crises and in the context of receiving subsidies.

Analysis of earnings management during financial crises is a rather complex matter since existing research findings are inconclusive. Some studies indicate a stimulating effect of crises on manipulative activities (e.g. Yan, Liu, Wang, Zhang & Zheng, 2022; Taylor, Awuye & Cudjoe, 2023), while others suggest that companies refrain from managing earnings (e.g. Filip & Raffournier, 2014; Cimini, 2015). During crises, earnings management incentives differ significantly – some companies decrease income to conduct “big bath” activities or retain government subsidies, while others increase their financial result to attract investors driven by uncertainty (Silva, Weffort, Flores & Silva, 2014).

Conversely, research on the relationship between earnings management and government subsidies indicates overwhelming evidence of downward earnings management in an effort to obtain government subsidies (Zhao et al., 2019; Jiang et al., 2018). Additionally, weak corporate governance and institutional background facilitate these manipulative activities (Zhao et al., 2019), as well as the political connections in the case of poor performers (Jiang et al., 2018). Pappas et al. (2024) asserted that receiving government subsidies increases political costs and found that subsidized companies avoid public scrutiny through earnings smoothing. Dak-Adzaklo, Gee, Nduakoh, Obiri-Yeboah & Oforu (2025) found that companies manipulate their non-GAAP earnings per share to present reduced profitability to avoid political costs. Mawani and Hajee (2025) examined how the “design flaw in the Canadian COVID-19 pandemic subsidy programs”, enabling the usage of either the cash basis accounting or the accrual accounting in the measurement of accounting items, affected companies’ eligibility for wage subsidies (p. 425). Dimitropoulos (2025) showed that a shift of the financial reporting regime could result in an increase in earnings management, leading to a higher government subsidy.

Drawing on the political cost hypothesis by Watts and Zimmerman, Pappas et al. (2024) assert that “the fear of public scrutiny and its associated costs and the desire for wealth transfers in the regulatory process motivate firms to manage earnings using discretionary accounting choices” (p. 1482). Dak-Adzaklo et al. (2025) assumed that political costs incentivize subsidized firms to decrease their financial results. As evident from the previous research, the companies are generally driven to manage earnings in a manner that ensures them governmental subsidies. Subsequently, companies that have a higher share of subsidies in their total assets are, generally, more motivated to retain them in the following period. Furthermore, in the context of political hypothesis, companies receiving government aid are likely to refrain from upward earnings management to evade

regulatory and political scrutiny (Ozili, 2021). Scrutiny of investors should be higher during the low-sentiment periods, making this form of earnings management more costly (Simpson, 2013). Also, shareholders' are more tolerant regarding financial performance during the financial crisis and their expectations are recalibrated (Ozili, 2021). This was confirmed by the research of Liu and Sun (2022), who found decrease of upward earnings management and increase of downward earnings management during the COVID-19 pandemic. This can also be explained in the context of signaling hypothesis, given that financial reporting quality is strategically increased to strengthen investors' trust during the financial crises (Arthur, Tang & Lin, 2015). Considering previous assertions in this chapter, research hypotheses were established as follows:

Hypothesis 1a: There is a statistically significant negative relationship between upward earnings management and the share of wage subsidies in their total assets.

Hypothesis 1b: There is a statistically significant positive relationship between downward earnings management and the share of wage subsidies in their total assets.

3. Methodology

3.1. Data and Sample

The research sample comprises companies listed on the Zagreb Stock Exchange classified in the activity 55.10.0 – Hotels and similar accommodation according to the National Classification of Activities (Official Gazzette, 2007) during the period from 2019 to 2021. Data on wage subsidies was collected from the Croatian Employment Service's (HZZ) official website, while financial data was gathered from the quarterly financial statements provided through the Zagreb Stock Exchange official webpage. Quarterly financial data from the second quarter of 2019 to the fourth quarter of 2021 was considered for the analysis. The periods before the COVID-19 crisis were included to increase the panel model robustness. The entire population of 25 hotel companies listed on the stock market in February 2025 was considered and, due to the missing data, the final sample comprised 205 observations. All of these hotels were wage subsidies recipients in more than four months during the examined period.

3.2. Definition and Measurement of Earnings Management

Earnings management can be defined as “purposeful intervention in the external financial reporting process, with the intent of obtaining some private gain” (Schipper, 1989, str. 92). Considering the direction of discretionary accruals, earnings management can be classified in upward earnings management, when discretionary accruals have positive value, and downward earnings management, when discretionary accruals have negative value (Bansal & Ali, 2021). Given that the modified Jones model is designated as highly efficient in comparison to the other accrual-based approaches (Ahmad & Kumari, 2025), it was utilized to measure earnings management (Hu, Xue & Liu, 2022):

$$TA_{i,t}/A_{i,t-1} = \beta_0 (1/A_{i,t-1}) + \beta_1 [(\Delta REV_{i,t} - \Delta REC_{i,t})/A_{i,t-1}] + \beta_2 (PPE_{i,t}/A_{i,t-1}) + \varepsilon_{i,t} \quad (1)$$

where $TA_{i,t}$ are the total accruals, “ $A_{i,t-1}$ is the lagged total assets, $\Delta REV_{i,t}$ is the change in revenues, $\Delta REC_{i,t}$ is the change in accounting receivables, and $PPE_{i,t}$ is net

property, plant and equipment” (Hu et al., 2022, p. 3617). Total accruals were calculated as “the difference between the current operating profit and the net cash flow from operating activities” (Yang, Wen, Jiang & Zhang, 2022, p. 1197). Besides the signed accruals for measuring upward and downward earnings management, absolute discretionary accruals were also applied in this research following the approach used by Bigus and Hillebrand (2017), Garcia Osma, Scarlat & Shields (2020) and Yu, Kwak, Park & Zang (2021).

3.3. Model Specification and Methodology

The variables included in the research and explained in Table 1 could be classified in three categories: dependent, test, and control variables. Earnings management is the dependent variable proxied by discretionary accruals estimated by the modified Jones model. Three test variables regarding wage subsidies were analysed to ensure robustness of the analysis. Also, several control variables were included to increase the precision of the regression model – leverage, company size, return on assets, and cash flows from operating activities. These control variables were deemed relevant in the context of earnings management in the prior literature (Di Meo, 2014; Wang, Li & Chen, 2015; Duong & Pescetto, 2019; Garcia Osma et al, 2020; Yamaguchi, 2022; Poretti, Jérôme & Brousseau, 2023).

Table 1. Review of the variables included in the research

Variable name	Abbreviation	Calculation
Absolute discretionary accruals	AEM	Estimation of absolute discretionary accruals made using the modified Jones model.
Upward earnings management	UEM	Estimation of positive discretionary accruals made using the modified Jones model.
Downward earnings management	DEM	Estimation of negative discretionary accruals made using the modified Jones model.
Wage subsidies ratio	WSR	The ratio of wage subsidies a hotel received and its total assets.
Wage subsidies (dichotomous)	WSD	The dichotomous variable indicates whether a hotel received wage subsidies in a certain quarter.
Number of months	NoM	The number of months a hotel has been receiving wage subsidies.
Leverage	LEV	The sum of short-term and long-term liabilities divided by total assets.
Company size	SIZ	Natural logarithm of total assets.
Return on assets	ROA	Net profit divided by total assets.
Cash flows from operating activities	CFOA	Cash flows from operating activities divided by total assets.

Regression model for hypothesis testing was specified as follows:

$$EM_{i,t} = \beta_0 + \beta_1 * WS_{i,t} + \beta_2 * LEV_{i,t} + \beta_3 * SIZ_{i,t} + \beta_4 * ROA_{i,t} + \beta_5 * CFOA_{i,t} + e_{i,t} \quad (2)$$

where EM denotes three different measures utilized as proxies of discretionary accruals, namely absolute, positive and negative discretionary accruals. WS refers to three different measures utilized as proxies of wage subsidies, namely wage subsidies ratio, wage subsidies as a dichotomous variable, and the number of months wage subsidy was received. LEV signifies the leverage ratio, SIZ represents the company size, ROA stands for profitability ratio, and CFOA refers to cash flow ratio.

Panel regression model was estimated using R language and environment for statistical computing (R Core Team, 2024) which was complemented with several packages such as the plm Package (Croissant & Millo, 2008; Croissant & Millo, 2018), the lm test (Zeileis & Hothorn, 2002), the car package (Fox & Weisberg, 2019) and the stargazer (Hlavac, 2022). Descriptive statistics was calculated using the PAST 4.03 software (Hammer, Harper & Ryan, 2001). Diagnostic panel data testing comprised the Breusch-Godfrey/Wooldridge test for serial correlation in panel models, the Breusch-Pagan test, and the Pesaran CD test for cross-sectional dependence in panels.

4. Results/findings

This section contains the results of descriptive statistics (Table 2), correlation analysis (Table 3), variance inflation factors (Table 4), and panel regression analysis (Table 5). It is evident from Panel A of Table 2 that COVID-19 wage subsidies were most intensively used in the quarters during the 15 months after the COVID-19 outbreak. The need for wage subsidies decreased seasonally in the third quarters, given the increase in hotel activity due to the tourist season.

Table 2. Descriptive statistics

Panel A – Quarterly review of wage subsidies disbursed to eligible hotels in Croatia										
Year	Quarter	Average amount (in HRK)		Aggregate amount (in HRK)			Average subsidy duration (in months)			
2020	1st	1,130.634.09		28,265.852.27			0.88			
2020	2nd	3,940.139.69		98,503.492.24			2.88			
2020	3rd	2,457.680.37		61,442.009.26			1.64			
2020	4th	3,917.349.50		97,933.737.44			2.84			
2021	1st	3,421.904.16		85,547.603.94			2.80			
2021	2nd	3,488.356.51		87,208.912.72			2.74			
2021	3rd	1,258.384.35		31,459.608.79			0.84			
2021	4th	9.175.86		229.396.40			0.04			
Total		2,452.953.07		490,590.613.06			1.29			
Panel B – Descriptive statistics of variables included in the research										
Measure	aDA	uwDA	dwDA	WSR	WSD	NoM	LEV	SIZ	ROA	CFOA
Min	0.0001	0.0001	-0.0771	0	0	0	0.01	17.50	-0.34	-0.25
Max	0.1039	0.1039	-0.0001	0.0141	1	3	0.89	24.96	0.37	0.30
Mean	0.0191	0.0196	-0.0192	0.0015	0.57	1.29	0.36	20.21	-0.002	0.02
Median	0.0127	0.0131	-0.0127	0.0003	1	1	0.35	20.30	-0.01	0.0001

Source: Authors' calculation using the Past software package.

The data in Panel B of Table 2 indicate that the average value of absolute discretionary accruals in the research sample (0.01913) is rather low considering that other studies with more industry heterogeneous research samples carried out in the Republic of Croatia reported average values of 0.0441 for the period from 2015 to 2020 (Šušak, Pavić Kramarić & Bartulović, 2023), 0.0483 in 2020 and 0.0509 in 2021 (Filipović, Šušak & Knezović, 2024). Furthermore, the average value of absolute discretionary accruals is even lower (0.01443) if only the COVID-19 years (2020 and 2021) are considered. The average ratio between received subsidies and total assets is higher if only the COVID-19 years are considered (0.0023). On average, the share of total liabilities in total assets was approximately 36%, ROA was slightly negative (-0.002), and the ratio of cash flows to assets was positive (0.02).

Table 3 provides correlation coefficients for every pair of independent variables included in the research. Only the regression coefficient between cash flows of operating activities and return on assets was above the threshold value of 0.5 (Wang et al., 2015), indicating a possible multicollinearity issue. Thus, variance inflation factors were estimated to examine the issue further.

Table 3. Correlation coefficients between the independent variables

Variable	WSR	WSD	NoM	LEV	SIZ	ROA	CFOA
WSR	1						
WSD	-	1					
NoM	-	-	1				
LEV	0,039723	0,003592	0,043608	1			
SIZ	-0,06994	-0,00273	-0,02728	0,28571***	1		
ROA	-0,11708*	-0,0022	-0,13081**	-0,13003**	0,092078	1	
CFOA	-0,30703***	-0,3001***	-0,35613***	-0,1294**	0,28223***	0,53879***	1

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Source: Authors' calculation using the Past software package.

Variance inflation factors presented in Table 4 were calculated for models that used both the modified Jones model (Panel A) and the Jones model (Panel B) for the estimation of the dependent variable. The values indicate the absence of a multicollinearity issue, given that all values are considerably lower than the threshold value of 10 (Li, Zheng & Li, 2021).

Table 4. Variance inflation factors

Panel A – Variance inflation factors for the modified Jones model									
Variable	aDA			uwDA			dwDA		
Model	1	2	3	1	2	3	1	2	3
WSR	1.1406			1.2726			1.2749		
WSD		1.2260			1.3741			1.4104	
NoM			1.2284			1.3472			1.2971
LEV	1.1443	1.1529	1.1481	1.1376	1.1243	1.1041	1.2763	1.2255	1.2276
SIZ	1.2115	1.2467	1.2335	1.2335	1.2408	1.2312	1.4378	1.3644	1.3251
ROA	1.5837	1.6334	1.5819	1.4336	1.4345	1.4367	2.0079	2.3460	2.0710
CFOA	1.9174	2.0983	2.0409	1.7522	1.9615	1.8903	2.7600	3.0789	2.8697

Panel B – Variance inflation factors for the Jones model									
Variable	aDA			uwDA			dwDA		
Model	1	2	3	1	2	3	1	2	3
WSR	1.1406			1.2726			1.2749		
WSD		1.2260			1.3741			1.4104	
NoM			1.2284			1.3472			1.2971
LEV	1.1443	1.1529	1.1481	1.1376	1.1243	1.1041	1.2763	1.2255	1.2276
SIZ	1.2115	1.2467	1.2335	1.2335	1.2408	1.2312	1.4378	1.3644	1.3251
ROA	1.5837	1.6334	1.5819	1.4336	1.4345	1.4367	2.0079	2.3460	2.0710
CFOA	1.9174	2.0983	2.0409	1.7522	1.9615	1.8903	2.7599	3.0789	2.8697

Source: Authors' calculation using the R software package.

The regression results in Table 5 indicate that when the share of subsidies in total assets increases by 1 p.p., the magnitude of earnings management decreases on average by 0.0162. When analysing signed accruals, it is evident that these results are driven by the positive accruals. It can be concluded that when the share of subsidies in total assets increases by 1 p.p., the magnitude of upward earnings management decreases on average by 0.0299. If standard deviation (0,002 for absolute discretionary accruals and 0,00204 for upward discretionary accruals) is taken into account, it means that an increase of one standard deviation leads to a decrease in earnings management by 17% for absolute discretionary accruals and 31% for upward earnings management. Although average total assets of hotels amount 1.594.808.740 HRK which may seem high in comparison to the average amount of 2.452.953 HRK in wage subsidies disbursed to eligible hotels in Croatia presented in Panel A of Table 2, their average net profit of 1.628.367 HRK puts it better in the context of economic significance. Furthermore, the total aggregate amount of 490,590.613 HRK represent substantial government spending. There was no statistically significant relationship between the share of subsidies in total assets and the magnitude of downward earnings management. Results of adjusted R square are comparable with the other research with earnings management as the dependent variable, both for absolute and signed accruals (Xu & Rao, 2021; Yamaguchi, 2022; Jiang, Cai & Zheng, 2024; Ismail, How, Shafie, Ku Ismail & Abdul Wahab, 2024).

Table 5. Regression results

Panel A – Regression results for the modified Jones model									
Variable	aDA			uwDA			dwDA		
Model	1	2	3	1	2	3	1	2	3
WSR	-1.55** (0.659)			-2.24*** (0.824)			-0.030 (0.991)		
WSD		-0.011*** (0.003)			-0.02*** (0.005)			0.004 (0.004)	
NoM			- 0.004*** (0.001)			-0.009*** (0.002)			0.001 (0.002)
LEV	-0.005 (0.01)	-0.007 (0.010)	-0.006 (0.01)	0.014 (0.013)	0.003 (0.011)	0.006 (0.011)	-0.019* (0.012)	-0.021* (0.012)	-0.020* (0.012)
SIZ	-0.001 (0.001)	-0.0003 (0.001)	-0.0004 (0.001)	0.0002 (0.001)	0.002 (0.001)	0.002 (0.001)	-0.003* (0.001)	-0.003** (0.001)	-0.003** (0.001)

ROA	0.05 (0.05)	0.06 (0.05)	0.061 (0.05)	0.389*** (0.084)	0.362*** (0.082)	0.420*** (0.077)	-0.26*** (0.052)	-0.28*** (0.055)	-0.27*** (0.054)
CFOA	0.03 (0.036)	0.014 (0.04)	0.009 (0.04)	-0.34*** (0.060)	-0.40*** (0.059)	-0.42*** (0.056)	0.28*** (0.041)	0.29*** (0.042)	0.29*** (0.042)
Q2	0.005 (0.004)	0.001 (0.004)	0.004 (0.004)	0.002 (0.006)	-0.002 (0.005)	0.006 (0.005)	0.001 (0.005)	0.001 (0.005)	-0.0001 (0.005)
Q3	0.005 (0.005)	0.002 (0.005)	0.003 (0.005)	-0.002 (0.007)	-0.005 (0.007)	-0.008 (0.007)	0.010** (0.005)	0.012** (0.005)	0.012** (0.005)
Q4	0.01*** (0.004)	0.01*** (0.005)	0.01*** (0.004)	0.03*** (0.005)	0.02*** (0.006)	0.03*** (0.005)	-0.004 (0.005)	-0.003 (0.005)	-0.004 (0.005)
Cons.	0.033 (0.024)	0.03 (0.024)	0.03 (0.003)	0.008 (0.029)	-0.001 (0.024)	-0.007 (0.024)	0.066** (0.026)	0.068*** (0.026)	0.067*** (0.026)
N	205	205	205	102	102	102	103	103	103
R2	0.15	0.18	0.19	0.417	0.482	0.530	0.490	0.493	0.493
Adj. R2	0.12	0.15	0.16	0.360	0.432	0.485	0.442	0.446	0.446
F Stat.	35.83***	42.98***	46.94***	59.72***	77.29***	94.13***	83.69***	84.97***	85.05***

Panel B – Regression results for the Jones model

Variable	aDA			uwDA			dwDA		
Model	1	2	3	1	2	3	1	2	3
WSR	-2.7*** (0.76)			-2.50*** (0.809)			-0.01 -1.028		
WSD		-0.01*** (0.003)			-0.02*** (0.005)			0.003 (0.004)	
NoM			- 0.004*** (0.001)			-0.01*** (0.002)			0.001 (0.002)
LEV	-0.004 (0.031)	-0.006 (0.01)	-0.006 (0.01)	0.02 (0.012)	0.01 (0.011)	0.01 (0.011)	-0.02 (0.012)	-0.02 (0.012)	-0.02 (0.012)
SIZ	-0.009 (0.007)	-0.0003 (0.001)	-0.0004 (0.001)	-0.0001 (0.001)	0.001 (0.001)	0.002 (0.001)	-0.003* (0.001)	-0.003* (0.001)	-0.003* (0.001)
ROA	-0.04 (0.053)	0.058 (0.05)	0.061 (0.05)	0.38*** (0.083)	0.35*** (0.078)	0.41*** (0.073)	-0.27*** (0.052)	-0.28*** (0.056)	-0.28*** (0.054)
CFOA	0.003 (0.041)	0.012 (0.036)	0.009 (0.036)	-0.36*** (0.059)	-0.42*** (0.057)	-0.44*** (0.055)	0.29*** (0.043)	0.30*** (0.043)	0.30*** (0.043)
Q2	0.006 (0.004)	0.001 (0.004)	0.004 (0.004)	0.002 (0.006)	-0.002 (0.005)	0.01 (0.005)	0.001 (0.005)	0.001 (0.005)	0.00004 (0.005)
Q3	0.007 (0.005)	0.003 (0.005)	0.003 (0.005)	0.0002 (0.007)	-0.003 (0.007)	-0.01 (0.007)	0.01** (0.005)	0.01** (0.005)	0.01** (0.005)
Q4	0.02*** (0.004)	0.01*** (0.005)	0.01*** (0.004)	0.03*** (0.005)	0.02*** (0.005)	0.03*** (0.005)	-0.01 (0.005)	-0.004 (0.005)	-0.01 (0.005)
Cons.		0.03 (0.024)	0.03 (0.025)	0.01 (0.028)	0.001 (0.025)	-0.01 (0.024)	0.06** (0.028)	0.06** (0.028)	0.06** (0.027)
N	205	205	205	102	102	102	103	103	103
R2	0.22	0.19	0.19	0.45	0.52	0.57	0.49	0.49	0.49
Adj. R2	0.08	0.16	0.16	0.39	0.48	0.53	0.44	0.44	0.45
F Stat.	6.03***	46.4***	46.9***	67.80***	92.31***	110.71***	84.97***	85.88***	86.65***

Note: * p < 0.1; ** p < 0.05; *** p < 0.01. DV = Dependent variable.

Source: Authors' calculation using the R software package.

As a part of robustness testing, alternative models with the original Jones model was estimated as a dependent variable, and two additional test variables were used – a dichotomous variable indicating wage subsidies received and the number of months of receiving wage subsidies. Also, quarter dummy variables (Qn) were added to the models to control for seasonality during different quarters of financial reporting. Initial inferences did not change under these alterations.

Table 6. Diagnostic tests

Sample	Entire						Upward DA						Downward DA					
Dep. variable	m. Jones			Jones			m. Jones			Jones			m. Jones			Jones		
Model	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Hausman Test	N	N	N	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N
B-G/W test	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
B-P test	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N

Note: B-G/W test = Breusch-Godfrey/Wooldridge test; B-P test = Breusch-Pagan test; Y = statistically significant at 5 percent; N = not statistically significant at 5 percent.

Conducted panel model diagnostics included the Breusch-Godfrey/Wooldridge test for serial correlation in panel models and the Breusch-Pagan test. In models in which serial correlation or heteroskedasticity were discovered, the coefficient test was applied. Conclusions remained the same as those made for the initial models. Considering the results presented in this section, Hypotheses 1 and 1a were accepted, and Hypothesis 1b was not accepted.

5. Discussions

Several aspects deserve closer consideration when interpreting the results of the research. It is expected that the companies, which are in favourable circumstances to do so, are motivated to become eligible for receiving as much governmental subsidies as possible. In the context of subsidy recipients, downward earnings management is considered more opportunistic because it can secure them additional funds, while upward earnings management moves them away from that objective. Although previous research predominantly showed a tendency of companies to manage earnings downwards in order to retain subsidies (Zhao et al., 2019; Jiang et al., 2018), the findings of this research diverge. The closer scrutiny of financial statements in times of financial crises could be the plausible reason why the hotels which received larger relative amounts of subsidies did not increase downward earnings management, as expected of them. Upward earnings management usually has more negative connotations in comparison to downward earnings management, but this perception reverses in the context of subsidies granted to companies in financial difficulties. Companies that receive higher subsidies attract more public attention. In order to reduce this public attention, companies could refrain from earnings management activities, and this could be the explanation why there was no statistically significant relationship in the case of downward earnings management. On the

other side, findings indicated that companies with a greater amount of subsidies granted had decreased their upward earnings management more intensively. There could be a few explanations behind this behaviour regarding earnings management. Besides an effort to retain their high relative amounts of subsidies by keeping the income in control to avoid potential loss of governmental support, this behaviour could be seen in the light of avoiding scrutiny in times of a crisis. Increased public attention companies with higher subsidies draw motivates them to reduce their earnings to avoid questioning their financial situation and, consequently, the necessity to receive subsidies. This is in line with the remark that companies avoid income-increasing earnings management because higher financial results attract more political and regulatory attention (Ozili, 2021). Given that companies have different incentives, it is plausible that companies which would otherwise manage their earnings upwards decided on a higher importance of retaining a higher amount of subsidies than reaching some other business objective which requires managing earnings upward. The results for both upward and downward earnings management are in line with research claiming that manipulative activities reduce during crises, such as Filip and Raffournier (2014) and Cimini (2015). Overall, the earnings management behaviour of hotels indicates their tendency of avoiding unnecessary public scrutiny in times of a crisis.

6. Conclusions

The pervasive influence of the COVID-19 pandemic on all aspects of life has also extended to the business sector. Pandemic-related events triggered an intense financial crisis during which some companies enjoyed considerable financial prosperity, while other industries were adversely affected. Among the industries with the most severe repercussions was the hotel industry. This had created a need for prompt government intervention to alleviate the financial difficulties these companies encountered. Thus, among other measures, governmental wage subsidies were provided by the Croatian Employment Service (HZZ) in the Republic of Croatia, as well as in many other countries worldwide. The opportunity to receive additional cash flows without any business activity is attractive to all companies and may stimulate them to use their accounting discretion to adjust their financial figures in a manner that will secure them additional subsidy funds. This paper complements previous research on corporate earnings management behaviour both in the context of subsidies as well as in the context of financial crises. Results have shown a negative relationship between earnings management and the ratio between subsidies and total assets. More precisely, the relationship between downward earnings management and subsidy ratio was not statistically significant, while the relationship between upward earnings management and subsidy ratio was negative.

Theoretical contribution of the research includes the analysis of earnings management behaviour of subsidised companies during the financial crisis, which was not examined before. The COVID-19 crisis was unique, considering its enormous effect on the hotel industry. Also, quarterly financial data was utilized, enabling higher estimation precision, given that the COVID-19 wage subsidies were allocated on a bi-monthly or tri-monthly basis, and the research was conducted in the Republic of Croatia, one of the leading tourism countries worldwide. In addition to the scientific implications, this research

also has practical implications for governmental administrative bodies authorized to establish wage subsidy regulations and the stakeholders of subsidy recipients. Future subsidy policies should include comparison of financial result of a company with the financial results of other companies operating in its activity and inspections should be sent to those who deviate from average values, companies which receive the highest wage subsidies should also be inspected more carefully and cash flow statement could be included in assessment given its lower susceptibility to manipulation.

Similar to all research in the field of earnings management, this paper also has certain limitations regarding the proxy variables used to estimate the magnitude of earnings management, as well as the endogeneity issues such as the reverse causality which limits causal inference between subsidies and earnings management. The fact that they were not addressed to the full extent was considered during the hypothesis establishment process – relationship between variables was tested instead of causality. Furthermore, omitted variable bias is possible due to the certain factors such as quality of management. Also, only the accrual earnings management was included in this research, but there is possibility that the firms, instead or in combination with it, used real earnings management whose detection is more complex in comparison to the earnings management based on accruals. In order to estimate regression models more precisely, quarterly financial data was used, but the aforementioned data is only available for the companies listed on the stock exchange in the Republic of Croatia. Thus, the results are not generalisable to other companies classified as micro, small, and medium entrepreneurs, as well as to the large companies that are not quoted on the stock exchange. Also, because of small sample of hotels which were all severely affected by the COVID-19 crisis and were recipients of wage subsidies, a control group of non-recipients does not exist. Control group could not be made out of companies which are not listed on the stock exchange given that they do not publically disclose their quarterly financial statements and could differ in their behavior from listed hotels. Furthermore, this paper focused only on the hotel industry in the Republic of Croatia. In order to improve the generalisation of results, future research could consider analysing the relationship between earnings management and subsidies in different countries and/or different industries, on a sample of non-listed companies, and use other measures of earnings management (e.g., real earnings management).

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