INDERSCIENCE PUBLISHERS
Linking academia, business and industry through research

International Journal of Computational Economics and Econometrics

ISSN online: 1757-1189 - ISSN print: 1757-1170
https://www.inderscience.com/ijcee

Heterogeneous impacts of the COVID-19 pandemic on financial performance among European hotels

Tomáš Heryán, Petra Růčková, Jana Šimáková

DOI: 10.1504/IJCEE.2024.10063831

Article History:

Received:	06 September 2023
Last revised:	09 December 2023
Accepted:	20 January 2024
Published online:	17 March 2025

Heterogeneous impacts of the COVID-19 pandemic on financial performance among European hotels

Tomáš Heryán*, Petra Růčková and Jana Šimáková

Department of Finance and Accounting,
School of Business Administration in Karvina,
Silesian University in Opava, Czechia
Email: heryan@opf.slu.cz
Email: ruckova@opf.slu.cz
Email: simakova@opf.slu.cz
*Corresponding author

Abstract: The purpose of the paper is to investigate whether there would have been differences in the change of shareholders' funds caused by the COVID-19 pandemic in Europe among medium-sized hotels. Annual data for 17 European countries have been obtained from the Bureau van Dijk Orbis database and clustered with epidemiological data from NUTS-3 regions among selected countries. Using heterogeneous difference-in-differences with cohorts, the average treatment effect on treated has been estimated with panel data. Specifically, differences between the levels of shareholders' funds and the impact of the moderation effect between return on equity and dividends during the pandemic considering the morbidity among pandemic patients in selected regions. The results have suggested that the impact of the pandemic varies between hotels with a high concentration of ownership structure having a major owner and those with a low concentration and dispersed ownership structure.

Keywords: heterogeneous impacts; COVID-19 pandemic; European hotels; financial performance; heterogeneous DiD models; difference-in-differences; cohorts.

Reference to this paper should be made as follows: Heryán, T., Růčková, P. and Šimáková, J. (2025) 'Heterogeneous impacts of the COVID-19 pandemic on financial performance among European hotels', *Int. J. Computational Economics and Econometrics*, Vol. 15, Nos. 1/2, pp.18–33.

Biographical notes: Tomáš Heryán is an Assistant Professor at the Silesian University in Opava, School of Business Administration in Karvina (SU SBA). His research focuses on corporate finance, financial markets, and monetary economics. As a statistician, he has been active in medical research as well.

Petra Růčková is an Associate Professor at SU SBA. Her research focuses on corporate finance and corporate governance. She is a member of the Scientific Council at SU SBA.

Jana Šimáková is an Assistant Professor and the Vice-dean for International Relations at SU SBA. She is further a guarantor of the professional study program in Innovative Entrepreneurship, where she facilitates the team academy principles, a concept based on a unique Finnish approach to entrepreneurial education. Her research focuses on international finance and monetary policy.

This paper is a revised and expanded version of a paper entitled 'Heterogeneous impact of the COVID-19 pandemic on performance among European hotels' presented at the International Conference on Applied Economics (ICOAE), Brno, Czech Republic, 29 June–1 July 2023.

1 Introduction

As the COVID-19 pandemic negatively affected tourism globally, hotels were not the exception, in particular (Anderson et al., 2020; Jiang and Wen, 2020). Nevertheless, some hotel owners run the tourism business as their secondary business, while they are also running their primary business in a different field. If their primary business was suffering from the pandemic, some of them would have reduced shareholder funds in hotels, even in the period affected by the pandemic crisis. However, differences can arise from a different level of ownership concentration. Hotels with a higher concentrated ownership structure and a major owner could have a different policy from those with a lower concentrated structure and dispersed ownership (Miller and Rock, 1985; Leland, 1998; Ang et al., 2000; La Porta et al., 2000; Mitton, 2004; McKnight and Weir, 2009).

This paper aims to investigate whether there would have been differences in the change of shareholders' funds caused by the COVID-19 pandemic in Europe among medium-sized hotels. The study contributes in several ways:

1 The different ownership structures between hotels have been investigated in the literature, and yet no research has investigated the impact of different policy changes, especially during the COVID-19 pandemic.

2 Presenting empirical data on the effects of the pandemic on hotel financial management across ownership structures.

3 Estimating the average treatment effect on treated using financial data concerning epidemiological data has been estimated, when in particular treatment binary variables have been developed according to epidemiological data from NUTS-3 regions among European countries and heterogeneous difference-in-differences.

4 Investigating the link between dividends, return on equity (ROE), and the effect of the pandemic on shareholder funds, adding to the body of knowledge on the relationship between financial and epidemiological data in the context of the travel and tourism industry.

In general, a reduction in shareholder funds has been apparent in hotels that have highly concentrated ownership structures amid the COVID-19 pandemic. Hotels with less concentrated ownership structures tended to maintain their performance and increased equity during the pandemic. Hence, the oversight of financial management during the pandemic would have been undermined by majority ownership.

The structure of this study is as follows. After the introduction, epidemiological literature related to the tourism sector, as well as corporate finance literature with the intention of ownership structure, is reviewed in Section 2. Data and methods are described in Section 3, while the empirical results are discussed in more detail in Section 4. The closing remarks include some limitations and future research in this field.

2 Theoretical background

2.1 Epidemiological studies related to tourism industry

According to Anderson et al. (2020), the key task of epidemiologists in the fight against the COVID-19 pandemic was to help policymakers decide on the main tools to mitigate the pandemic to minimise disease and related mortality, avoid an epidemic peak that protects the health sector, and also mitigate the effects on the economy to an unmanageable level, which is related to the flattening of epidemic curves. Some measures, however, affect selected industries on a much larger scale, where we are undoubtedly talking about an industry such as tourism. Ioannides and Gyimioty (2020) state that the COVID-19 pandemic has stopped global mobility on an unprecedented scale, causing serious disruption to the neoliberal market mechanisms of global tourism. This situation, for a change, led to the decline of some mainstream business formats and, at the same time, to the emergence of others. Based on a review of recent recovery processes from the crisis, the tourism industry is likely to rebound from this sudden market shock, mainly due to various forms of government intervention.

For example, Jiang and Wen (2020) present an innovative research agenda in the tourism industry from three dimensions: artificial intelligence (AI) and robotics, hygiene and cleanliness and health, and health care. First, different types of AI (mechanical thinking and feeling) could open up different research streams at the intersection of health crises and hotel management in light of the COVID-19 pandemic. Additionally, this article recommends that researchers go beyond typical views on the antecedents and results of hotel hygiene and cleanliness and dig into guest perceptions of the cleanliness of specific hotel surfaces. Furthermore, a deeper analysis of the evolving relationship between hotels and the healthcare sector is warranted. Gretzel et al. (2020) propose revolutionary e-tourism research, considering the transformative potential of the ongoing crisis. Governments around the world have implemented various restrictions, affecting travel and tourism significantly (Gössling et al., 2020). Therefore, despite gradual re-openings, financial stability, particularly for hotels, remains a pressing concern amid evolving circumstances.

Fan et al. (2018) point to the fact that even in a so-called post-pandemic era, there is still an unfulfilled need for greater investments in preparedness for major epidemics and pandemics. The definition of the terms used in this article is crucial. Losses represent the consequences of the pandemic in terms of lost income or loss of life. Costs, on the other hand, are expenses spent on preparing for or recovering from a pandemic. Arguments in favour of such investments were largely based on estimates of the loss of national income that could occur as a result of a major epidemic or pandemic, even before the arrival of the global COVID-19 disease pandemic. Most previous economic studies of global influenza pandemics have focused on income losses through reductions in workforce size and productivity, increases in absenteeism, and, importantly, as a result of individual and social measures that interrupt transmission but disrupt economic activity. Although indicators such as gross national income per capita capture the impact of the pandemic on income, they also do not capture the value of changes in individual mortality risk. Bloom and Cadarette (2019) state that even fear of infection itself can result in social distancing or the closure of schools, businesses, commercial facilities, transport, and public services. All of this disrupts economic and other socially valuable activities. Concerns about the spread of even a relatively limited outbreak can lead to reduced trade. Travel and tourism

to regions affected by outbreaks are also likely to decline. The economic risks of epidemics are not trivial. Investments in the research and development of biomedical countermeasures such as vaccines, antimicrobials, diagnostics, monoclonal antibodies, and other new treatments or platform technologies explain the main responses to infectious disease threats. However, investments in tourism in the form of e-tourism can not only mitigate the impact of tourism on the environment but also prevent possible losses, even at the regional level of subunits of individual economies.

Coker et al. (2011) also highlighted emerging infectious diseases that took a high public health and economic toll. Severe acute respiratory syndrome quickly decimated the region's tourism industry. Among the recommendations, they also stated that investment must be sustained to ensure robust, resilient, and flexible institutional capacity. At this time, they could not even imagine the impact of a pandemic on the scale of the COVID-19 pandemic. The policymakers, not only of the European Union, should have thought and learned from the previous scenario, which was certainly not the last case in the history of mankind. After all, in essence, humans differ from animals in their own culture, which includes getting to know different cultures precisely through travel. Even the multinational corporation Meta, whose product portfolio is based on neural networks, has completely changed the perception of interpersonal relations not only of this generation and the next but has also indicated signs of the need for a global change in the perception of culture over the past 20 years. This is also why support for the transformation of tourism is in place.

2.2 Importance of the ownership structure

The devastating impact of the COVID-19 pandemic on various industries, particularly the global hotel and tourism sector, has been extensively studied. Nhamo et al. (2020) conducted an analysis that revealed widespread disruptions through critical document analysis and machine learning data tracking hotel reservations. The study highlighted the unprecedented challenges facing hotels, marked by massive cancellations and record-low bookings in the major online travel agencies. This situation has led to a significant financial strain on hotels, necessitating the cancellation of dividend payments and deferred capital expenditure to prevent industry collapse. The far-reaching financial implications of the pandemic extend beyond immediate losses, prompting concerns about the industry's capacity to contribute to sustainable economic development. The urgency of tailor-made financial strategies and support mechanisms is emphasised to ensure the long-term financial resilience of hotels.

Building on the understanding that effective financial strategies are imperative for mitigating the impacts of crises, including the ownership structure, Faturohman and Noviandy (2022) investigated the capital structure of 26 active companies in Indonesia's severely affected hotel, restaurant, and tourism sector during the pandemic. Their study, using a random-effects model, uncovered correlations between various firm-specific characteristics and capital structure components such as book leverage, debt-to-equity ratio (DER), and net equity. Despite the significant disruptions caused by the pandemic, the research found no direct relationship between capital structure and the pandemic, suggesting that the pandemic did not influence capital decisions during the observed period.

However, Jin et al. (2021) explored the profound impact of the COVID-19 outbreak on the tourism industry. Their quasi-natural experiment, using a propensity score matching difference-in-differences model (PSM-DiD), revealed that the pandemic significantly exacerbated the performance decline of tourism companies compared to other industries. The study also investigated the heterogeneous effects of the pandemic on the operating performance of tourism companies, considering variations in enterprise equity, board characteristics, supervision mechanisms, and executive salary incentive levels.

These findings collectively underscore the need for a nuanced understanding of how ownership structures and related ownership concentration interact with financial strategies during crises, offering valuable insight for companies navigating the challenges posed by global pandemics. According to McKnight and Weir (2009), ownership concentration refers to the distribution and concentration of ownership rights in a company among its shareholders. It is a measure of the degree to which ownership is held by a small number of shareholders, as is supposed to be at a higher level, or is widely dispersed among many shareholders, as it is at a lower level. They argue that ownership concentration is an important aspect of corporate governance and can have significant implications for the decision-making process and the control of a company. Ownership concentration can be analysed using various metrics, including the percentage of shares held by the largest shareholders or the Herfindahl-Hirschman Index (HHI), which measures the market concentration of ownership. However, in this paper, the independence indicator is reported by the Bureau van Dijk within the Orbis database.

One can distinguish between some common forms of ownership concentration (Mitton, 2004). Concentrated ownership, a high ownership concentration in which a small number of shareholders hold a significant proportion of a company's shares. This concentrated ownership may be in the hands of individuals, families, or institutional investors such as mutual funds or pension funds. The concentrated ownership structure can give these shareholders substantial control and influence over the company's strategic decisions related to the capital structure (Leland, 1998). Widely dispersed ownership: Low ownership concentration, in contrast to concentrated ownership, occurs when a large number of shareholders hold small proportions of a company's shares. This structure is typical in publicly traded companies, where shares are available for purchase by individual investors on stock exchanges. Widely dispersed ownership can result in less concentrated control and decision-making authority, with power distributed across a broad base of shareholders (Gugler and Yurtoglu, 2003).

From a different point of view, insider ownership refers to shares held by individuals closely associated with the company, such as founders, executives, or members of the board of directors. High insider ownership can align the interests of management with shareholders and signal their confidence in the company's prospects. It can also impact decision-making and create potential conflicts of interest related to earnings management (Barton and Simko, 2002). On the contrary, institutional investors, such as pension funds, mutual funds, insurance companies, or other outsiders, often hold substantial shares in publicly traded companies. Institutional ownership can influence company decisions and governance practices, as these investors may actively engage in corporate governance activities and exercise their voting rights (Fich and Shivdasani, 2006).

Hence, among others, Ang et al. (2000) highlighted that the level of ownership concentration in a company can impact its governance structure, decision-making processes, and accountability. Highly concentrated ownership may lead to more decisive

actions, but can also increase the risk of self-interest and lack of transparency. On the other hand, widely dispersed ownership can result in dispersed control and potential difficulties in reaching a consensus on important issues (DeAngelo et al., 2004). Striking a balance between concentrated and dispersed ownership is a key consideration for effective corporate governance (Farinha, 2003).

According to recent literature, ownership concentration can significantly affect the financial management of a company in several ways. First, from the point of view of decision-making autonomy, in companies with concentrated ownership, a small group of shareholders may hold a significant amount of control and decision-making power, which can weaken the position of financial management in a company (Miller and Rock, 1985; Fich and Shivdasani, 2006). Furthermore, such a concentration of ownership can allow major shareholders to exert influence over financial management decisions, such as capital structure choices, dividend policies, and investment strategies. Their preferences and priorities may take precedence over other stakeholders, potentially leading to a focus on short-term gains or specific agendas (Francis et al., 2004). Second, ownership concentration can influence the alignment of interests between shareholders and management. When major shareholders have a substantial stake in the company, they are more likely to be motivated to monitor management performance and push for actions that maximise shareholder value (Fich and Shivdasani, 2006). This alignment can result in a more disciplined financial management approach and a greater emphasis on profitability and efficiency.

Third, high ownership concentration can help mitigate agency costs that arise due to conflicts of interest between shareholders and management. In companies with widely dispersed ownership, managers may have more discretion and face weaker monitoring, potentially leading to agency problems. However, concentrated ownership can provide a check on managerial actions since major shareholders closely monitor and influence financial decisions, reducing agency costs (Ang et al., 2000; La Porta et al., 2000). Fourth, ownership concentration can affect a company's ability to access capital markets and capital. If the major shareholders have a strong reputation and financial standing, it can enhance the company's creditworthiness and ease its access to debt financing at favourable terms. Conversely, if major shareholders have limited financial resources or a weak reputation, it may hinder the company's ability to raise external funds and impact its financial management options (Miller and Rock, 1985). Ownership concentration can also influence the time horizon and strategic orientation of financial management. Major shareholders with a long-term perspective and significant stakes in the company can prioritise sustainable growth, research and development, and long-term investments. In contrast, widely dispersed ownership can result in pressure for short-term financial results, potentially leading to a focus on cost-cutting, dividend payouts, and immediate profitability (Grullon et al., 2002).

Finally, Leland (1998) argues that ownership concentration can also influence a company's risk-taking behaviour. The major shareholders may have different risk preferences and risk tolerance levels. Highly concentrated ownership can lead to cautious decision-making to protect significant investments, while widely dispersed ownership may encourage riskier strategies to meet the expectations of a diverse shareholder base. It is important to note that the impact of ownership concentration on financial management is not uniform across all companies. The specific dynamics, objectives, and behaviour of the major shareholders, as well as the governance structures in place, will play a

significant role in determining how ownership concentration affects financial management decisions (Ang et al., 2000; Fich and Shivdasani, 2006; McKnight and Weir, 2009).

3 Data and methods

3.1 Economic and epidemiological data

Epidemiological data has been obtained for 19 European countries, including amounts of cumulative COVID-19 cases per 10,000 inhabitants between their NUTS-3 regions from Naqvi (2021), the open data source of the Nature journal. This author is responsible for updating the Tracker monthly until the countries stop reporting their data. NUTS-3 are broadly defined as municipalities or other subdivisions of districts. However, except for Greece and Poland with NUTS-2, epidemiological and financial data have finally been merged for NUTS-3 regions among 17 countries, particularly Austria, Belgium, Croatia, Czechia, Denmark, Estonia, Finland, France, Germany, Great Britain, Hungary, Ireland, Italy, Netherlands, Norway, Spain, and Switzerland.

Annual financial data from medium-sized European hotels have been obtained from the Orbis financial database of the Bureau van Dijk (BvD), a Moody's analytics company. In particular, shareholders' funds and net profits explore the ROE while excluding one-year lagged net profit to see whether shareholders' funds have been reduced and owners paid dividends. The independence indicator reported by BvD obtains information related to the concentration of the ownership structure, divided into two categories in this case. The first category (A) represents the low concentration of ownership structure, from very dispersed when no owner owns more than 25% of direct or total ownership (including also the indirect ownership among different companies) to still slightly dispersed when no owner does own more than 50%. On the contrary, the second category (D) represents the highly concentrated structure from a slightly concentrated one with a recorded shareholder with a total or a calculated total of over 50% to a very concentrated one with a direct ownership of over 50%.

The descriptive statistics in Appendix illustrate interesting findings related to differences between those hotels with a high concentration of the ownership structure to those with a low concentration of the ownership structure, based on the BvD independence indicator. Surely, in 2019 there were no treatment variables according to the equations below. According to that, we have only one dataset differentiated exactly between these two categories of hotels. The median of both logarithmic shareholders' funds and ROE is slightly higher for those hotels with a major owner. However, a wider IQR means a higher level of variability among the obtained data. The next two years are different due to the pandemic, so new two categories have appeared for hotels in the less and the most affected NUTS-3 regions according to the number of cumulative cases of COVID-19 (a lower and upper 33rd percentile per 100,000 inhabitants within each country). Foremost, what should be highlighted, hotels with negative values of shareholders' funds are excluded from the ROE evaluation. Otherwise, negative values of both net profit, as well as the funds and their share, give us contrary positive values for financial performance, which is useless and wrong. This is the main reason for the decrease in the number of observations in 2020 and 2021 compared to the total number in 2019. Such missing observations have decreased the shares of dummies to lower levels of

33%. However, using natural logarithms of the funds excludes these negative values. Although it makes sense that the median ROE was negative during the pandemic in 2020 due to losses in the tourism industry, it is positive in 2021. Although the variability of the data is greater within the pandemic, profitability is especially affected within these high-COVID-intensity NUTS regions. Nevertheless, the medians of the shareholders' funds increased from those in 2019 in all cases.

The median values themselves do not give us any argument related to the different trends of the shareholders' funds, particularly for those hotels that shared their profits in 2019 or during the pandemic. All this gives us motivation for further investigation using the heterogeneous difference-in-differences (DiD) for the 2020 and 2021 cohorts of hotels, separately.

3.2 Heterogeneous difference-in-differences with cohorts

In general, the average effect of treatment while investigating cohorts is primarily focused on differences between treated and never-treated (infinite) groups according to equation (1):

$$TE_{gt} = Y_t(g) - Y_t(\infty),\ g = q, ..., T;\ t = q, ..., T \tag{1}$$

when for any t, $Y_t(\infty)$ is the outcome, the natural logarithm of shareholders' funds in the control state (a group never treated). Otherwise, having one pre-treatment period in 2019 and $T = 3$. Therefore, T periods without units treated in $t = 2019$, when the first unit is treated at $t = q < T$, while also covering $q = T$ (without staggering). Once a unit is subjected to the treatment, it remains in place.

In this particular case, following tests of two assumptions, no effect in anticipation of the treatment (NA) and parallel trends (PT) within the pre-treatment period, the two-way fixed effects heterogeneous DiD model with two cohorts and covariates, while using panel data to estimate ATET is described according to Wooldridge (2021) by equation (2):

$$\begin{aligned} E\left(Y_{it} \middle| D_{iq}, ..., D_{iT}, X_i\right) = {} & \boldsymbol{\eta} + \sum_{g=q}^{T} \boldsymbol{\lambda_g} D_{ig} + X_i \boldsymbol{\kappa} + \sum_{g=q}^{T} \left(D_{ig} \bullet \dot{\mathrm{X}}_{ig}\right) \boldsymbol{\xi_g} \\ & + \sum_{s=2}^{T} \boldsymbol{\theta_s} fs_t + \sum_{s=2}^{T} \left(fs_t \bullet X_i\right) \boldsymbol{\pi_t} \\ & + \sum_{g=q}^{T} \sum_{s=g}^{T} \boldsymbol{\tau_{gs}} \left(W_{it} \bullet D_{ig} \bullet fs_t\right) \\ & + \sum_{g=q}^{T} \sum_{s=g}^{T} \boldsymbol{\tau_{gs}} \left(W_{it} \bullet D_{ig} \bullet fs_t \bullet \dot{\mathrm{X}}_{ig}\right) \boldsymbol{\rho_{gs}} \\ \dot{\mathrm{X}} = {} & X_i - E\left(X_i \middle| D_{ig} = 1\right) \end{aligned} \tag{2}$$

where our dependent variable Y_{it} is the natural logarithm of shareholders' funds of i companies in time t. Among independent covariates X_i the ROE is observed with a moderation effect on binary controls giving us information on whether a company paid dividends and decreased shareholders' funds. As ROE itself is explored as a share of net

profit in shareholders' funds in particular, it is possible to measure the pandemic impacts on the shareholders' funds of hotels in general. The indicator D_{iT} equals one if an observation is treated or zero otherwise. Two cohorts g are observed simultaneously

1 for 2020, when D_{iT} equals one in 2020 as well as in 2021

2 D_{iT} equals one only in 2021.

The model consists of incorporating interactions between the treatment, D_{iT}, cohort, D_{ig}, post-treatment periods, fs_t, and our covariates. Whereas two symbols ξ_g and π_t stand for demeaning fixed effect in the panel cross-section related to the sum of λ_g and period fixed effect effects related to the κ coefficient, τ_{gs} means the cohort-time average treatment effects on the treated (ATET), and ρ_{gs} are the cohort-demeaning post-treatment periods, both including time-varying treatment indicator W_{it}.

Although D_{iT} is explored within NUTS-3 units, the clustering at higher levels of the country according to the policy differences. However, treatment D_{iT} in our case means a negative impact of the COVID-19 pandemic when hotels from those regions below the 33rd percentile of the average morbidity, specifically the number of cases per 100,000 inhabitants, have been compared with the rest of the sample as low-COVID-19 sensitive regions within each country, and on the contrary, hotels from those regions above the 67th percentile of the average morbidity have been compared to the rest of the sample as high-COVID-19 sensitive regions.

4 Discussion on empirical results

Technically, Figure 1 illustrates tests for both assumptions to use the difference-in-differences technique, particularly parallel trends within the pre-treatment period before the pandemic COVID-19 affected the market and the assumption of no anticipation. We can see that the no-anticipation assumption is violated in cases b and d below for those high-COVID-19 sensitive NUTS regions. Granger causality tests reject the null hypothesis of no effect in anticipation of treatment. This is also the reason to estimate heterogeneous DiD only for $T = 3$ according to equation 2 from the previous section. Four kinds of models differentiate between:

a High-ownership-concentrated firms among *low*-COVID-19 intensive NUTS-3 regions.

b High-ownership-concentrated firms among *high*-COVID-19 intensive NUTS-3 regions.

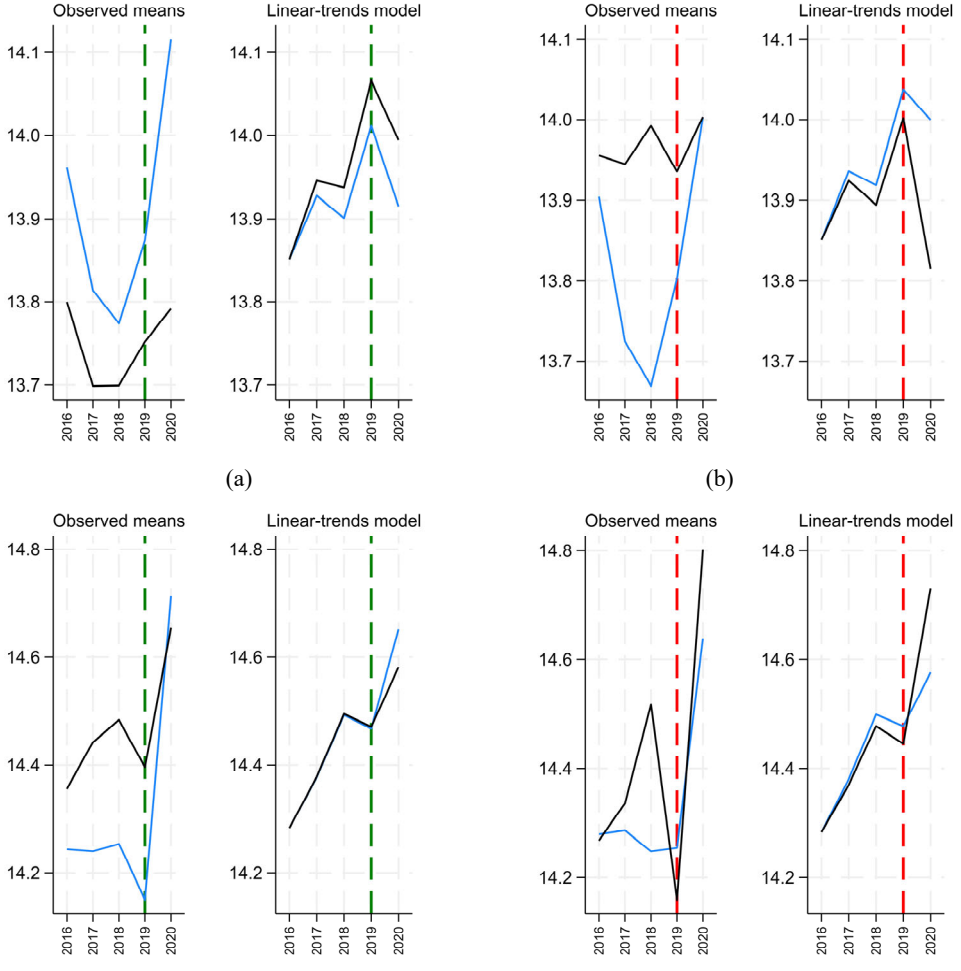
c Low-ownership-concentrated firms among *low*-COVID-19 intensive NUTS-3 regions.

d Low-ownership-concentrated firms among *high*-COVID-19 intensive NUTS-3 regions.

However, the output of the estimation of the heterogeneous difference in differences models in Table 1 has supported our main hypothesis only for the hotels among low-COVID-19 intensive NUTS regions intensive with low COVID-19 where we cannot reject the null hypothesis that the treatment effects in all the pre-treatment periods are zero. Therefore, for the regression adjustment, hotels decreased the funds of their

shareholders during the pandemic period. On the contrary, the shareholders' funds of those low-ownership-concentrated hotels increased during the pandemic. In particular, hotels with a major owner decreased their funds by approximately 11% over the 2020 cohort and even 62% over the 2021 cohort compared to non-treated or never-treated units, that is, compared to hotels from NACE regions affected by the pandemic at a higher level than the 33rd percentile of the number of COVID-19 cases per 100,000 inhabitants of European countries. Although only during the 2020 cohort, our results have shown that they increased about 21% of funds among hotels with dispersed ownership.

Figure 1 Testing assumptions for using ordinal DiD models for log(shareholders' funds), (a) Prob. > F = 0.5614 and 0.8434, (b) Prob. > F = 0.7253 and 0.0029, (c) Prob. > F = 0.9771 and 0.9745, (d) Prob. > F = 0.7777 and 0.0000 (see online version for colours)



Note: Green dashed line for both assumptions accepted; red violated; black curve as treatment; blue curve for controls.

Nevertheless, if some of the units in the sample are those never-treated $Y_t(\infty)$, which is 67% according to our case, we can always identify all cohorts, and the TWFE estimator will always revert to using the control group (never-treated). That is the reason why the results vary from those regression adjusted in Table 1, as well. However, in this case, we can conclude a positive ATET of 31% only for those hotels among low-COVID-19 intensive NUTS regions intensively dependent on low COVID-19 during the 2021 cohort, not 2020. On the other hand, according to the above, using TWFE we can even evaluate hotels among high-COVID-19 intensive NUTS regions, even though pre-assumptions have been violated within using the RA technique. Therefore, we can conclude a positive ATET of 109% in the 2021 cohort.

Table 1 Heterogeneous DiD models with cohorts

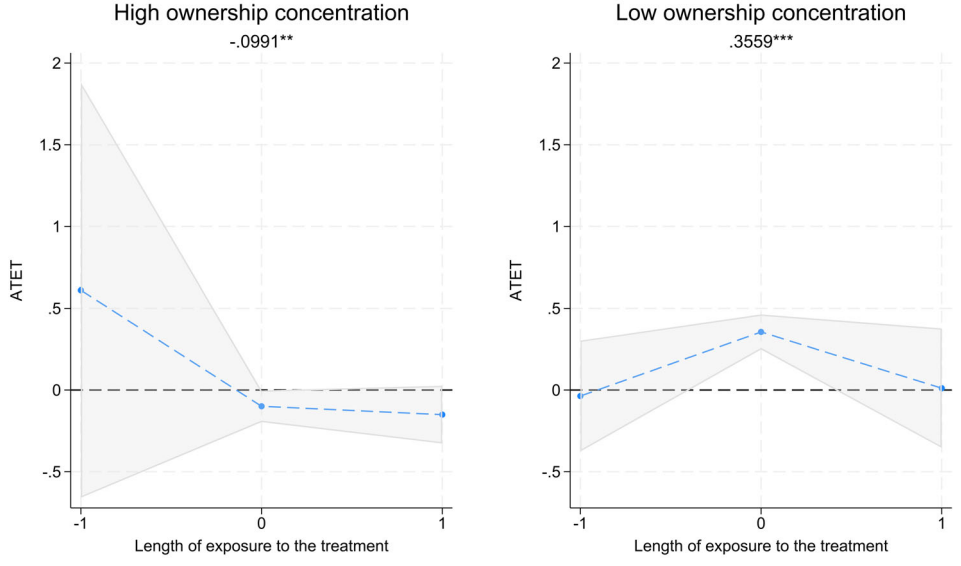
	All companies		*High ownership concentration*		*Low ownership concentration*	
	Low-COVID-19	*High-COVID-19*	*Low-COVID-19*	*High-COVID-19*	*Low-COVID-19*	*High-COVID-19*
RA (regression adjustment)						
2020	0.0086	–0.0299	**–0.1088****	0.0506	0.2149**	–0.1072
2021	–0.4793***	1.2648***	**–0.6237****	1.6635***	–0.0516	1.8500***
NA+PT	*0.0281*	*0.0000*	**0.3457**	*0.0454*	**0.8329**	*0.0000*
∑ firms	13,607	13,556	7,464	7,413	3,255	3,248
TWFE (two-way fixed effects)						
2020	0.0431	–0.0191	–0.0306	0.0752	0.1859	–0.0858
2021	–0.1770	2.9012	–0.3676	1.3011	**0.3071*****	**1.0909*****
∑ firms	14,019	14,019	7,709	7,709	3,340	3,340
Never-treated obs.	23,558	22,491	12,858	12,514	5,679	5,618
2020 obs.	9,541	10,717	5,265	5,682	2,528	2,698
2021 obs.	767	557	464	302	235	108
Countries	19	19	19	19	18	18

Notes: Aggregated ATET of logarithmic shareholders' funds. Due to the violation of no-anticipation within the RA, TWFE models have been estimated.

Finally, we see that one period before the onset of treatment (–1), there is no significant treatment effect or, in other words, no significant effect at any time of exposure before treatment among NUTS regions in Figure 2. This suggests that there is no anticipation of treatment. However, the pre-treatment effect is not zero for hotels with high ownership concentration and its CI is wide. At the beginning of treatment (0) there is a positive effect which appears to increase as the exposure time to treatment increases, especially for hotels with low ownership concentration. However, the situation in the last cohort (1) is not so exceptional compared to the previously treated cohort (0). It could also have been caused by a much smaller number of firms that belong only to the 2021 cohort, but not to the 2020 cohort. The number of firms is equal to the number of observations during the 2021 cohort, whereas it is doubled over 2020 to not have units exiting this cohort.

The shareholder funds of hotels with a major owner decreased by approximately 11% in the case of approximately 35% of hotels within those low-COVID-19 intense European NUTS-3 regions in 2020. In contrast, the shareholder funds of hotels with dispersed ownership increased by approximately 21% in the case of approximately 38% within the same regions in 2020. However, in 2021 another 6% of hotels with a high ownership structure decreased their stockholder funds, even approximately 62%, while 7% of hotels with a low ownership structure increased their funds by approximately 21%, both still within NUTS-3 regions less affected by the pandemic. Overall, according to the usage of the controls giving us information on whether the owners of hotels have some dividends during the estimated period, it is possible to argue that a major owner took advantage of having a dividend compared to those minority owners in hotels with a dispersed ownership structure.

Figure 2 Average treatment effect on treated – low-COVID-19 intensive regions



Very few studies directly address the impact of ownership structure on the efficiency of business performance. The results of the analysis carried out suggest that a less concentrated ownership structure led to greater management efficiency during the pandemic. A study by Yang et al. (2023) suggests that the negative impact of the pandemic was more severe in high-end and newer hotels, which tend to be part of larger units. The study worked with a sample of more than 5,000 hotels in Texas. The study also reported that with a 10% increase in the monthly number of confirmed cases of COVID-19, hotel performance decreased by 0.522%. Hotels in the 'economy' category with excellent ratings experienced the least impact of the pandemic. The study by Ernawati et al. (2022) further suggests that hotels made major operational adjustments to survive the pandemic. The changes were mainly related to changes to the price list and the introduction of flexible reservation conditions. Here, it can be assumed that management in hotels with fragmented ownership structures was more under pressure to take cost-saving measures to maintain the efficiency of the respective hotel. This fact is

also confirmed by the study by Singh and Corsun (2023), who also worked on the impact of COVID-19. However, the same results can be found in the context of other types of crises, which can be illustrated by the study by Song et al. (2011) on the impact of the economic crisis in 2008.

On the contrary, a study by Kapopoulos and Laretou (2006) on 175 of the largest Greek firms concluded that the highly concentrated ownership structure is positively related to higher corporate profitability. Our findings could have been caused even by a different policy of creating reserves in hotels when the major owners were unwilling to create financial reserves. Such results supported the argument that the ownership structure is an important factor for corporate governance and can have significant implications for decision-making even within hotels (Leland, 1998; Farinha, 2003; McKnight and Weir, 2009). However, surprisingly, hotels with dispersed ownership structures, paying the dividends ex-ante during the COVID-19 pandemic, reacted in a more supportive way during the crisis and increased their shareholder funds on the contrary, which is in contrast to Gugler and Yurtoglu (2003), Barton and Simko (2002), and Grullon et al. (2002), though support DeAngelo et al. (2004), Miller and Rock (1985), or Fich and Shivdasani (2006). Major owners took advantage of dividend policy even during the pandemic, as was discussed by Francis et al. (2004).

5 Summary and conclusions

The paper aimed to investigate whether there would have been differences in the change of shareholders' funds caused by the COVID-19 pandemic in Europe among medium-sized hotels. The analysis showed that the commonly perceived view that the hotel industry was the most affected business sector in terms of performance during the COVID-19 pandemic is only partially based on truth. Two groups of hotels were considered. The first group represented hotels with a highly concentrated ownership structure, while the second group had a low-concentrated ownership structure. Econometric analysis of causal effects revealed that firms with highly concentrated ownership structures experienced a decrease in shareholders' funds during the COVID-19 pandemic, and hotels with low concentrated ownership structures tended to retain their performance and their equity increased during the COVID-19 pandemic, and vice versa.

The results of the heterogeneous DiD technique indicated that the group of hotels with a concentration of dispersed ownership performed well in terms of efficiency (measured by ROE), as there was a very significant increase in profitability regardless of whether the respective regions were significantly affected by the pandemic or not. Thus, it can be assumed that in hotels with a low concentration of ownership, management is detached from ownership and must significantly address the profitability of hotel operations despite the adverse situation to defend its managerial position. Managers are not 100% in control of decisions about the use of profits; they are constrained in their decisions by the interests of shareholders. In particular, it does not as a rule remain entirely in the company for reinvestment but covers quite naturally the claims of the shareholders. However, from a managerial perspective, strengthening retained earnings creates better conditions in terms of capital cost. Retained earnings create a participation effect on the investment and relatively reduce the risk of the lenders providing the sources of financing for the investment. For hotels with a highly concentrated ownership

structure, the results cannot be generalised though, as the results were not statistically significant in this respect.

However, the limitations of this research are crucial. To fulfil both assumptions, it was not possible to use more pre-pandemic years than just 2019. The no-anticipation effect was violated, but also the linear trend within the pre-treated period in a few cases where the covariates were employed. Nevertheless, further research will focus on differences between particular European countries, i.e., Latin Europe region, and on how the situation could have affected profitability ratios, that is, the return on assets and the return on sales, related to earnings before interest and taxes, concerning the DuPont framework.

Acknowledgements

This paper was supported by the Ministry of Education, Youth, and Sports Czech Republic within the Institutional Support for Long-term Development of a Research Organisation in 2023. The authors are grateful to editors Giovanni Cerulli, Eleonora Pierucci and Nicholas Tsounis, and furthermore, two anonymous referees, for their constructive comments.

References

Anderson, R.M., Heesterbeek, H., Klinkenberg, D. and Hollingsworth, T.D. (2020) 'How will country-based mitigation measures influence the course of the COVID-19 epidemic?', *The Lancet*, Vol. 395, No. 10228, pp.931–934.

Ang, J.S., Cole, R.A. and Lin, J.W. (2000) 'Agency costs and ownership structure', *The Journal of Finance*, Vol. 55, No. 1, pp.81–106.

Barton, J. and Simko, P.J. (2002) *The Balance Sheet as an Earnings Management Constraint*, SSRN, pp.1–37.

Bloom, D.E. and Cadarette, D. (2019) 'Infectious disease threats in the twenty-first century: strengthening the global response', *Frontiers in Immunology*, Vol. 10, No. 1, pp.1664–3224.

Coker, R., Hunter, B.M., Rudge, J.W., Liverani, M. and Hanvoravongchai, P. (2011) 'Emerging infectious diseases in Southeast Asia: regional challenges to control', *The Lancet*, Vol. 307, No. 9765, pp.599–609.

DeAngelo, H., DeAngelo, L. and Skinner, D.J. (2004) 'Are dividends disappearing? Dividend concentration and the consolidation of earnings', *Journal of Financial Economics*, Vol. 72, No. 3, pp.425–456.

Ernawati, N.M., Voda, M., Jendra I.W., Tantri, G.A.D. and Avram, E.L. (2022) 'Hotel recovery post pandemic: is rebranding required', *Journal of Environmental Management and Tourism*, Vol. 13, No. 8, pp.2263–2270.

Fan, V.Y., Jamison, D.T. and Summers, L.H. (2018) 'Pandemic risk: how large are the expected losses?', *Bulletin of the World Health Organization*, Vol. 96, No. 2, pp.129–134.

Farinha, J. (2003) 'Dividend policy, corporate governance and the managerial entrenchment hypothesis: an empirical analysis', *Journal of Business Finance & Accounting*, Vol. 30, Nos. 9–10, pp.1173–1209.

Faturohman, T. and Noviandy, R.Q. (2022) 'An empirical analysis of firm-specific determinants of capital structure before and during COVID-19 pandemic: evidence from listed hotels, restaurants, and tourism entities on the Indonesia Stock Exchange', in *Quantitative Analysis of Social and Financial Market Development (International Symposia in Economic Theory and Econometrics)*, Vol. 30, pp.119–133.

Fich, E.M. and Shivdasani, A. (2006) 'Are busy boards effective monitors?', *The Journal of Finance*, Vol. 61, No. 2, pp.689–724.

Francis, J., LaFond, R., Olsson, P.M. and Schipper, K. (2004) 'Costs of equity and earnings attributes', *The Accounting Review*, Vol. 79, No. 4, pp.967–1010.

Gössling, S. et al. (2002) 'Global environmental consequences of tourism', *Global Environmental Change*, Vol. 12, No. 4, pp.283–302.

Gretzel, U., Fuchs, M., Baggio, R., Hoepken, W., Law, R., Neidhardt, J., Pesonen, J., Zanker, M. and Xiang, Z. (2020) 'E-tourism beyond COVID-19: a call for transformative research', *Information Technology & Tourism*, Vol. 22, pp.187–203.

Grullon, G., Michaely, R. and Swaminathan, B. (2002) 'Are dividend changes a sign of firm maturity?', *The Journal of Business*, Vol. 75, No. 3, pp.387–424.

Gugler, K. and Yurtoglu, B.B. (2003) 'Corporate governance and dividend pay-out policy in Germany', *European Economic Review*, Vol. 47, No. 4, pp.731–758.

Ioannides, D. and Gyimóthy, S. (2020) 'The COVID-19 crisis as an opportunity for escaping the unsustainable global tourism path', *Tourism Geographies*, Vol. 22, No. 3, pp.624–632.

Jiang, Y. and Wen, J. (2020) 'Effects of COVID-19 on hotel marketing and management: a perspective article', *International Journal of Contemporary Hospitality Management*, Vol. 32, No. 8, pp. 2563–2573.

Jin, S., Yuying, G. and Shufeng, X. (2021) 'Corporate governance structure and performance in the tourism industry in the COVID-19 pandemic: an empirical study of Chinese listed companies in China', *Sustainability*, Vol. 13, No. 21, p.11722.

Kapopoulos, P. and S. Lazaretou (2006) 'Corporate ownership structure and firm performance: evidence from Greek Firms', *Research Papers in Economics*, Vol. 15, No. 2, pp.144–158.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A. and Vishny, R.W. (2000) 'Agency problems and dividend policies around the world', *The Journal of Finance*, Vol. 55, No. 1, pp.1–33.

Leland, H.E. (1998) 'Agency costs, risk management and capital structure', *The Journal of Finance*, Vol. 53, No. 4, pp.1213–1243.

McKnight, P.J. and Weir, C. (2009) 'Agency costs, corporate governance mechanisms and ownership structure in large UK publicly quoted companies: a panel data analysis', *The Quarterly Review of Economics and Finance*, Vol. 49, No. 2, pp.139–158.

Miller, M.H. and Rock, K. (1985) 'Dividend policy under asymmetric information', *The Journal of Finance*, Vol. 40, No. 4, pp.1031–1051.

Mitton, T. (2004) 'Corporate governance and dividend policy in emerging markets', *Emerging Markets Review*, Vol. 5, No. 4, pp.409–426.

Naqvi, A. (2021) 'COVID-19 European regional tracker', *Sci. Data*, Vol., No. 8, p.181.

Nhamo, G., Dube, K. and Chikodzi, D. (2020) 'Impacts and Implications of COVID-19 on the global hotel industry and Airbnb', in *Counting the Cost of COVID-19 on the Global Tourism Industry*, pp.183–204, Springer Nature, Cham.

Singh, A. and Corsun D.L. (2023) 'Cross-sectional differences in hotel revenue performance during the COVID-19 pandemic', *Cornell Hospitality Quarterly*, Vol. 64, No. 4, pp.415–435.

Wooldridge, J.M. (2021) *Two-Way Fixed Effects, The Two-Way Mundlak Regression, and Difference-In-Differences Estimators*, Working Paper, 77p, Department of Economics, Michigan State University, East Lansing, MI.

Yang, Y., Li, H. and Roehl, W.S. (2023) 'COVID-19 pandemic and hotel property performance', *International Journal of Contemporary Hospitality Management*, Vol. 36, No. 1, pp.71–90.

Appendix

	High-COVID-19 intensity				*Low-COVID-19 intensity*			
	Never-treated		*Treated*		*Never-treated*		*Treated*	
	Ownership structure concentration				*Ownership structure concentration*			
	High	*Low*	*High*	*Low*	*High*	*Low*	*High*	*Low*
2019								
Median								
Log(Shareholders')	14.06	13.95			14.06	13.95		
ROE	5.19	4.28			5.19	4.28		
Interquartile range								
Log(Shareholders')	4.33	3.62			4.33	3.62		
ROE	25.67	19.41			25.67	19.41		
TOTAL observations	10,796	4,514			10,796	4,514		
2020								
Median								
Log(Shareholders')	14.30	14.26	14.22	14.36	14.26	14.32	14.29	14.24
ROE	–2.99	–1.03	*–3.19*	*–2.21*	–3.13	–1.83	*–2.90*	*–0.64*
Interquartile range								
Log(Shareholders')	4.26	3.58	4.45	3.75	4.38	3.74	4.23	3.47
ROE	28.88	17.29	33.65	19.24	30.90	19.54	29.27	15.79
TOTAL observations	6,473	2,804	3,492	1,496	6,783	2,877	3,182	1,423
No. dummies	1,559	712	839	404	1,612	768	786	348
Share	24%	25%	24%	27%	24%	27%	25%	24%
2021								
Median								
Log(Shareholders')	14.11	14.12	14.14	14.33	14.14	14.29	14.09	14.07
ROE	1.90	2.11	*2.46*	*2.63*	2.22	2.40	*1.84*	*2.25*
Interquartile range								
Log(Shareholders')	3.52	3.14	3.94	3.39	3.75	3.29	3.45	3.06
ROE	23.84	17.80	24.82	18.58	23.93	18.97	24.24	17.01
TOTAL observations	5,254	2,367	3,027	1,271	5,558	2,354	2,723	1,284
No. dummies	1,370	683	771	354	1,393	656	748	381
Share	26%	29%	25%	28%	25%	28%	27%	30%

Notes: Two main categories are the first or the last 33rd percentile of the number of COVID-19 cases per 100,000 inhabitants by the European countries; Log(Shareholders') means logarithm of shareholders' funds; ROE means return of equity measured as net profits on shareholders' funds when negative funds have been deleted from the sample; binary dummies for companies whose lagged shareholders' funds have been lower than its current value (current net profits excluded), and its share on the total number of the observations.