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# Effects of financial restrictions on firms' financial resilience against the COVID-19 pandemic: evidence from the European hospitality industry

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## ABSTRACT

The COVID-19 pandemic has severely affected the tourism sector and the survival of hospitality firms. This study examines how hospitality firms' financial characteristics prior to the outbreak of the pandemic determined their financial resilience. We analysed a sample of large European firms operating in the hospitality industry from 2016 to 2020. Using ordinary least squares, we find significant impacts of both COVID-19 incidence (negative) and the strength of the health system (positive) on firms' financial health. Our results show that firms' recent pre-COVID-19 profitability, leverage, tangibility, and liquidity histories are key drivers of their financial health in the presence of this exogenous and extremely negative shock. Furthermore, a contextual macroeconomic factor, the interest rate, introduced as a proxy for external financial restrictions, plays a key role in the effects of liquidity and debt on firms' financial health. With higher interest rates, firms accumulated liquidity during the years prior to the pandemic, making them more resilient to the shock; in contrast, with lower interest rates, a history of limited leverage and tangibility contributed to making hospitality firms more resilient in 2020.

## KEYWORDS

COVID-19; financial health; financial restrictions; hospitality industry

## JEL CLASSIFICATION

L25; L83; G29; I18

## 1. Introduction

The COVID-19 pandemic has had an unprecedented global impact, compelling governments to impose stricter social restrictions to avoid, or at least curb the spread of the virus (EC 2020; Gössling, Scott, and Hall 2020; Wiczorek-Kosmala 2021). Social distance, lockdowns, bans on mass events, and numerous restrictions on travel, including border closures, have had a direct negative effect on businesses. The most adversely impacted sectors were those requiring close personal contact with clients, namely the service sector (EIB 2023). Among them, restrictions on international and national mobility have significantly affected the services provided to tourists and professional travellers. This study focused on accommodation because this service is required by international and national travellers for both tourism and professional purposes, while other extraordinarily affected sectors (Ebeke et al. 2021), such as recreation, transportation, and food, are not only consumed by travellers but also by local residents. Furthermore, some recreation,

transportation, and food services can be partly provided without personal contact (e.g. transport of goods, internet recreation services, and delivery of food; the last two experienced extraordinary growth during and after the lockdowns). Hospitality was selected as the main representative group in the accommodation sector, and we restricted our focus to hotels to obtain a homogeneous sample.

For the concerned industries, during the COVID-19 pandemic, sales decreased dramatically, but payments stemming from regular operating and financial expenses, such as commitments to employees, suppliers, creditors, and investors, remained necessary outflows (Demmou et al. 2021; Ebeke et al. 2021). The depletion of firms' liquidity buffers as the pandemic restrictions and effects prolonged was followed by a liquidity crisis, which, if not addressed, could have jeopardized the long-term viability of many firms and resulted in a global solvency crisis (Demmou et al. 2021).

This study focuses on the financial resilience of European hospitality firms by checking whether

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their financial positions prior to the COVID-19 shock allowed them to maintain a business far from bankruptcy. We then examine the impact of the pandemic's evolution, including the extension of the disease and the response of the sanitary system,<sup>1</sup> on financial resilience, which is proxied by their financial health in relation to their proximity to bankruptcy. Finally, our empirical study includes an analysis of financial restrictions by country as a critical framework for firms to secure liquidity through credit financing.

Only a few key figures are sufficient to reveal a quick overview of the severe impact of COVID-19 on the industry under analysis. In 2018, tourism and travel directly contributed 3.9% to the European Union's (EU's) gross domestic product (GDP) and accounted for 5.1% of total employment. In March 2020, approximately half of the countries closed their borders, while most flights and hospitality activities ceased globally, reducing European tourism business by more than 50% (World Travel & Tourism Council 2022). The hospitality sector requires rescue through public strategies (OECD 2020a, 2020b; Sanabria-Díaz, Aguiar-Quintana, and Araujo-Cabrera 2021). An extensive explanation of COVID-19's impact on hospitality firms can be found in Abbas et al. (2023), who focus on hospitality firms' CSR.

The primary challenge faced by the European tourism industry is resolving the crisis and preserving the continent's competitive position as the world's top tourist destination. Recent studies have found that a firm's characteristics and financial status before a pandemic affect its resilience and survival (Fahlenbrach et al. 2021; Gémard, Moniche, and Morales 2016). Other studies have highlighted the role of liquidity shortfalls during the COVID-19 outbreak in rendering firms financially vulnerable, the variations by sector (Demmou et al. 2021), and the simulation effect of public policies to alleviate the corporate sector from liquidity and solvency risks (Ebeke et al. 2021).

In order to assess the impact of the COVID-19 pandemic on the financial resilience of the European hospitality industry, our model explains

firms' financial health or their proximity to bankruptcy during the critical year of 2020 in terms of the required financial resources compared to those in the previous period (2016–2019). The inclusion of proxies for the severity of the disease (incidence of the COVID-19 pandemic) and the healthcare system's capacity to cope with the pandemic showed significant and opposite effects, as expected. Our results confirm the role of firms' recent histories in profitability, leverage, tangibility, and liquidity as a widely recognized base for firms' drivers of financial health. However, during the current crisis in the hospitality industry due to the COVID-19 pandemic, liquidity, leverage, and the link between them have become pivotal factors for survival (Almeida 2021; Brown, Martinsson, and Thomann 2021). Our primary contribution to the literature lies in our analysis of these factors in the macroeconomic context of financial restrictions, demonstrating that credit interest rates mediate the effect of both factors on firms' financial health.

The analysis of firms' resilience to maintaining financial health against health crises like COVID-19 is of interest to firm managers and a diverse group of stakeholders. On the one hand, the risk of bankruptcy is a grave concern for managers, shareholders, employees, creditors, clients, and suppliers, especially for firms that were profitable before the pandemic and would be profitable again just conditioned on that resilience. On the other hand, the analysis holds paramount importance for policymakers who need to design policies to maintain efficient economic support (Ebeke et al. 2021). It should be noted that a wave of bankruptcies in the most affected sectors would result in long-term negative economic effects such as unemployment, a reduction in growth rates, and cuts to productivity and well-being. The effects of massive corporate defaults and bankruptcies on the financial sector would seriously damage creditors' balance sheets and, consequently, the debt supply market. Simultaneously, government intervention increases public expenses and debt, thus contributing to stress in the debt supply market. These simultaneous effects on the productive, financial,

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<sup>1</sup>A comprehensive analysis of sanitary efforts during the COVID-19 pandemic is exposed in Micah et al. (2023).

and public sectors feed into each other, giving rise to a cascading effect that intensifies with the duration of the pandemic crisis.

## II. Literature review

As the main objective of this study is to examine hospitality firms' capability to survive the COVID-19 crisis from a financial perspective, the relevant concepts involve financial resilience and its main contributing factors. Financial resilience is the ability to maintain a firm's financial health – that is, low bankruptcy risk – when faced with a sudden shock that curtails sales. Among these factors, liquidity has been found to be the most critical element for the firms' solvency and survival, followed by their access to credit to maintain that liquidity in the absence of (or with depressed) operating activity.

### *Resilience and financial health of the hospitality industry and COVID-19*

Firms become more resilient as a result of historical developmental and strategic terms, such as the ability to learn from others' experiences, understanding the value of prevention, and formalizing planning activities (Herbane 2019). In addition to corporate strategies, characteristics that enable firms to create value and can be identified as strategic resources that improve firms' resilience to an abrupt and negative external shock, such as the COVID-19 pandemic, fall into two dimensions (Song, Yeon, and Lee 2021): financial conditions and ownership structure. Our work focuses on these financial conditions; therefore, we study financial resilience as the ability of a firm to overcome a sudden shock such as COVID-19 by maintaining bankruptcy risk as low as possible at levels similar to those in the pre-shock period. In this context, quantifying a firm's financial health can be also considered its distance from bankruptcy.

The main variables that contribute to firms' financial health (and resilience) are the factors that drive short- and long-term solvency: cash flow, leverage, and profitability. Thus, Acharya and Steffen (2020) find that listed United States (US) firms with low levels of liquidity, high leverage, and a history of low profitability were at

a disadvantage during the COVID-19 shock. The empirical study performed by Lin et al. (2023) shows a significant increase in US firms' operating cycles due to longer collection periods and inventory turnaround times during the pandemic, being the effect weaker for larger firms. In Europe, a wide sample covering several sectors (Demmou et al. 2021) showed that firms would have experienced liquidity shortages after a period of 10 months of confinement measures in absence of policy intervention. This study points to the Accommodation and Food sector as having the highest proportion of firms facing liquidity shortfalls.

For a hospitality business, positive financial conditions include sufficient liquidity to face short-term liabilities, positive solvency to satisfy long-term liabilities, long-term growth, low risk, and the maximization of net income (Hutchinson and Xavier 2006). However, other authors find that financial conditions such as a hospitality firm's capital structure are irrelevant for its later survival, and that only the business cycle determines such a business's survival (Gémar, Moniche, and Morales 2016). Financial flexibility varies by sector (Fahlenbrach et al. 2021); and during crisis periods, a hospitality firm's financial health is particularly challenged as decreases in sales volumes and income translate into a strong need for financial resources to pay relevant fixed costs in this industry (Nicolau 2005). For closely related businesses within the tourism sector, such as restaurants, Song et al. (2021) found that the increased severity of the pandemic remarkably affected their liquidity and operational risks due to decreased sales or even interrupted operations for several months in 2020, and the subsequent shortfalls in the firms' income, whereas Crespi-Cladera et al. (2021) estimated Spanish hospitality firms' financial strength during the COVID-19 pandemic in 2020, focusing on their solvency and liquidity.

The COVID-19 pandemic was an unexpectedly virulent and globally extended shock. It left firms to rely on their own resilience for their financial health; that is, their previous financial strength in terms of first liquidity and then solvency, as time passed and restrictions on production and activity extended from a few months to over a year. Our baseline hypothesis is that financial factors that contribute to both liquidity and solvency will play

a critical role in firms' financial health in 2020. We check the appropriateness of our model in capturing the well-known effect of the pandemic on firms' financial health, thus making this result explicit as a starting point for the two subsequent hypotheses posed in the work.

### **COVID-19, liquidity, and financial restrictions**

In the hospitality industry, the interruption of operations, lockdown, social distance, mobility restrictions, and border closures led to dramatic shortfalls in operating income, producing a steep decrease in liquidity (EC 2020; Wieczorek-Kosmala 2021). It is reasonable that during these economic disruptions, hospitality firms' financial business objectives changed order in the ranking from profitability (Claver-Cortés, Molina-Azorín, and Pereira-Moliner 2006) and its drivers, cost reduction and operational efficiency to liquidity (González-Torres, Rodríguez-Sánchez, and Pelechano-Barahona 2021).

Wieczorek-Kosmala (2021) found that in four European countries, the hospitality industry had low financial slack holdings and serious difficulties in covering their liquidity needs during the COVID-19 pandemic. This author estimates that approximately 25% of the firms in this sector suffered liquidity tensions, with deteriorating financial health. The impact of liquidity constraints on firms was one of the European Commission's (EC's) first concerns when a coordinated economic response was articulated (EC 2020). State aid should reach companies suffering acute liquidity needs and bankruptcy due to the COVID-19 pandemic.

European governments have played a crucial role in hospitality firms' capacity to maintain liquidity through their intervention in economic affairs (financing, tax, and labour measures). Preferential conditions in the form of public guarantees to commercial banks' loans (Mertens, Rubio, and Thiemann 2020), tax delays, reductions, or exemptions (Sanabria-Díaz, Aguiar-Quintana, and Araujo-Cabrera 2021), and labour agreements such as temporary layoffs with subsidized payroll costs (López Ahumada 2020) are examples of these governmental economic measures. The possibility of obtaining public funds on preferential terms,

benefiting from a tax deferral, or negotiating payroll flexibility is especially useful for firms with low levels of solvency in order to preserve liquidity and facilitate survival (González-Torres, Rodríguez-Sánchez, and Pelechano-Barahona 2021).

In this setting, we consider two competing reasons for cash holdings based on the theoretical framework developed in the literature under the tradeoff theory (Dittmar, Mahrt-Smith, and Servaes 2003): the precautionary motive, when firms maintain liquid resources when external capital is difficult to obtain (and is consequently expensive) (Acharya, Almeida, and Campello 2007; Almeida, Campello, and Weisbach 2004), or a firm is exposed to policy uncertainty (Duong et al. 2020); and the agency problem (effect of asymmetric information), when managers use cash to repay debt and are forced to raise capital from the market under a stricter scrutiny to avoid a possible misuse of cash holdings (Attig et al. 2021). Previous studies have documented a progressive increase in the cash ratio in US firms and have identified that the main causes thereof are the declines in inventories and capital expenditures in parallel with increases in R&D expenditures and cash-flow risk, thus supporting the precautionary thesis (Bates, Kahle, and Stulz 2009). By contrast, in periods of high policy uncertainty, Javadi et al. (2021) find a reduction in cash holdings, consistent with the agency reasoning, in firms from 19 developed countries (excluding the US).

Empirical studies have also highlighted that macroeconomic and microeconomic factors play a role in determining a firm's liquidity. On the one hand, a country-wide dimension such as weak shareholder protection has been found to impact cash holdings (Dittmar, Mahrt-Smith, and Servaes 2003; Kalcheva and Lins 2007). During the COVID-19 shock, a relevant macroeconomic factor is the impact of government policies on corporate liquidity, which is especially oriented to the protection of small and medium-sized enterprises (SMEs) and severely affected sectors (Javadi et al. 2021). On the other hand, the COVID-19 effect is partly firm-specific, operating on a firm's initial levels of liquidity and leverage (Guerini et al. 2020), as we analysed in the previous section.

For the first hypothesis, we introduce a macroeconomic factor that is critical in the



financial choice between liquidity and debt, being a measure of external financial constraints: the credit interest rate. According to some authors (Acharya, Almeida, and Campello 2007; Almeida, Campello, and Weisbach 2002, 2004), financially constrained firms save a proportion of their cash flows to undertake future investments, and this pattern is stressed during recessions. However, a cash-position irrelevance is found for financially unconstrained firms (Almeida, Campello, and Weisbach 2002).

We argue that if firms had increased their liquidity based on the precautionary motive triggered by financial restrictions during the years prior to the COVID-19 pandemic, this effect should have been exacerbated by the exogenous macroeconomic shock from the COVID-19 pandemic. Therefore, during the imposed lockdown and social-distance regulations, hospitality firms in countries with more financial restrictions (manifested in higher interest rates) would be better positioned to face their financial obligations due to their larger accumulated cash reserves.

**H1.** During the COVID-19 pandemic, according to precautionary motive, higher liquidity in firms with external financial restrictions is expected to play a role in the firms' financial health.

### **COVID-19, debt, and financial restrictions**

Debt is a complementary element to be considered with liquidity in the presence of an external shock such as the COVID-19 pandemic, as credit is a way of obtaining the liquidity required for financial resilience (Acharya and Steffen 2020; Gull et al. 2023). Thus, for example, US companies reacted to the COVID-19 cash-flow shock by increasing their cash holdings through additional issues of long-term debt (Almeida 2021).

With the liquidity risk due to the COVID-19 restrictions, creditors would have been monitoring firms more often (applying covenants and revocation clauses) (Acharya et al. 2014). However, the public strategies designed to rescue the tourism sector included financing to businesses (specially SMEs) to ensure a continuation of their activities

(Sanabria-Díaz, Aguiar-Quintana, and Araujo-Cabrera 2021). These financing measures have been applied differently by each country; however, credit lines, guarantees, and moratoria in debt redemption have contributed to considerably soften the consequences of credit monitoring in many countries.

In the US, non-financial firms initially adopted a precautionary attitude during the COVID-19 pandemic, obtaining cash through bank credit lines; however, the attitude changed following the adoption of governmental policies (Acharya and Steffen 2020), when firms behaved according to their different ratings: the highest-rated firms raised capital from the capital markets (issuing bonds and equity), whereas the lowest-quality firms and non-investment-grade firms had to take out term loans from banks or use their credit lines.

The theoretical support for the relationship between liquidity and debt is provided by two capital-structure constructs: the financing hierarchy view and tradeoff theory (Dittmar, Mahrt-Smith, and Servaes 2003). Under the financing hierarchy view, cash holdings can be considered as 'negative debt' and both elements share some explanatory variables (with opposite signs) in empirical studies (Opler et al. 1999). Under the tradeoff theory, other authors propose cash-debt substitutability, explaining that cash and debt policies can be jointly determined and both can be used for hedging (Acharya, Almeida, and Campello 2007). In this alternative theory, the costly access to capital markets and credit generally, with the deadweight costs due to information and contracting frictions, is a strong argument for addressing a firm's financing decisions. Another relevant argument for the tradeoff theory regarding the agency conflict, which concerns the choice between cash holdings and external credit, is that credit comes under the creditors' scrutiny (Duong et al. 2020).

As in the previous section, we incorporate the macroeconomic element of financial restrictions. According to Campello et al. (2010), it is more difficult for constrained firms to borrow, and therefore they increase the use of credit lines instead of long-term debt and, in case of need, they reduce investments.

Financial restrictions determine a firm's preference for the accumulation of cash over debt

reduction. Thus, high hedging needs in constrained firms are expected to induce the firms to accumulate cash flows thus generating a positive correlation between liquidity and debt (the generation of cash flows improves debt capacity), whereas low hedging needs in constrained firms generate a negative correlation between liquidity and debt (liquidity can be used to reduce outstanding debt) (Acharya, Almeida, and Campello 2007).

Mixed evidence is found in Europe. In Sweden, governmental programmes of temporary lending and tax deferment have succeeded in providing liquidity for firms with lower cash reserves and less unused slack in their credit lines (Brown, Martinsson, and Thomann 2021). Although debt levels have increased, this has not produced subsequent financial distress or bankruptcy. In Spain, the COVID-19 shock more seriously affected small, young, and less productive firms (Fernández-Cerezo et al. 2021). An interesting result of these authors' survey is that more indebted firms that were not excessively impacted by the COVID-19 shock appreciated the usefulness of public-guaranteed loans. For the whole EU, non-financial, listed firms show an increase in loan repayments as a consequence of the COVID-19 shock (Chang, Gan, and Mohsin 2022).

Due to the emergency macroeconomic policies implemented by the EU and European countries concerning banking credit, business support

materialized in a moratorium for firms that could not redeem debt during the pandemic, a standstill of supervisory and scrutiny effects on credit terms and termination clauses (Demmou et al. 2021; Ebeke et al. 2021). We argue that firms with credit capability (financial debt obtained during the period prior to the COVID-19 shock) can maintain and extend credit, thus obtaining funds to preserve the firms' financial health.

**H2.** During the COVID-19 pandemic, when governmental policies were implemented, access to credit in firms with lower external financial restrictions contributed to improving the firms' financial health.

### III. Research design

#### Sample and variables

To illustrate how the COVID-19 shock affected hospitality businesses in 2020, Figure 1 shows the total expenditure on restaurants and hotels by country as a percentage of GDP for the EU (mean value). To provide a graphical image of the dramatic effect of the pandemic shock, the chart includes the evolution of expenditure in the five most affected countries, that is, the countries with the highest rates of expenditure on restaurants and

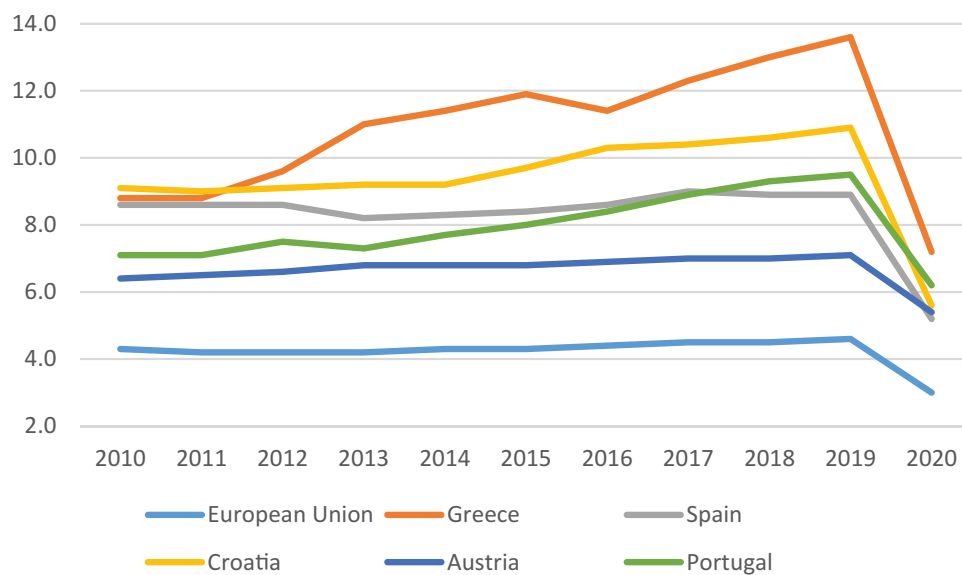


Figure 1. Evolution of expenditures in restaurants and hotels.

hotels according to Eurostat (Greece, Croatia, Spain, Portugal, and Austria), which take part in our sample of 25 European countries. We highlight Greece, Croatia, and Portugal, where the percentage of expenditure on restaurants and hotels decreased by half in 2020 compared with 2019.

This is the context in which the firms analysed in this study operated. Our sample comprises 184 large firms from the hospitality industry (NACE2009, code 5510) located in 25 European countries (see Figure 2) from 2016 to 2020. Financial data were collected from the Amadeus database, whereas data on COVID-19 and other macroeconomic variables were extracted from Statista. Firm-level variables were winsorized at the 1st and 99th percentiles, while variables with missing data were excluded from the sample.

Figure 2 shows the average decrease in sales in 2020 compared to the 2019 level for the sample firms grouped by country. The overall average decrease is  $-58.67\%$ , ranging from the highest drops in Montenegro and Italy to the slightest decreases in Norway and the United Kingdom.

The baseline model tests our hypotheses regarding the effects of previous financial ratios on firm bankruptcy risk in 2020. We extend the model to determine how the COVID-19 pandemic and other

macroeconomic variables affect bankruptcy risk or financial health. The model used to test the hypotheses is as follows:

$$\begin{aligned} Fin\_health_{i2020} = & a_0 + a_1 PROF_{i16-19} + a_2 LEV_{i16-19} \\ & + a_3 TANG_{i16-19} + a_4 LIQ_{i16-19} \\ & + a_5 CDEBT_{i16-19} \\ & + a_6 INT\_Var_{i2020} \\ & + a_7 Incidence\_COVID_{i2020} \\ & + a_8 Beds\_Hospital_{i2020} + \varepsilon_{it} \end{aligned} \quad (1)$$

The dependent variable is the distance to bankruptcy or financial health in 2020 (*Fin\_health*). This is a proxy for a firm's financial health and is measured using Altman (1968) Z-score. This variable was calculated as described by Altman and Sabato (2007). The model incorporates critical variables widely recognized as drivers of firms' financial health, such as profitability, leverage, tangibility, liquidity, and the cost of debt (Olsen, Bellas, and Kish 1983) having shown their potential to predict bankruptcy in the tourism business (Goh, Roni, and Bannigidadmath 2022). Our use of the Z-score as a dependent variable, representative of the comprehensive financial health of a company, is

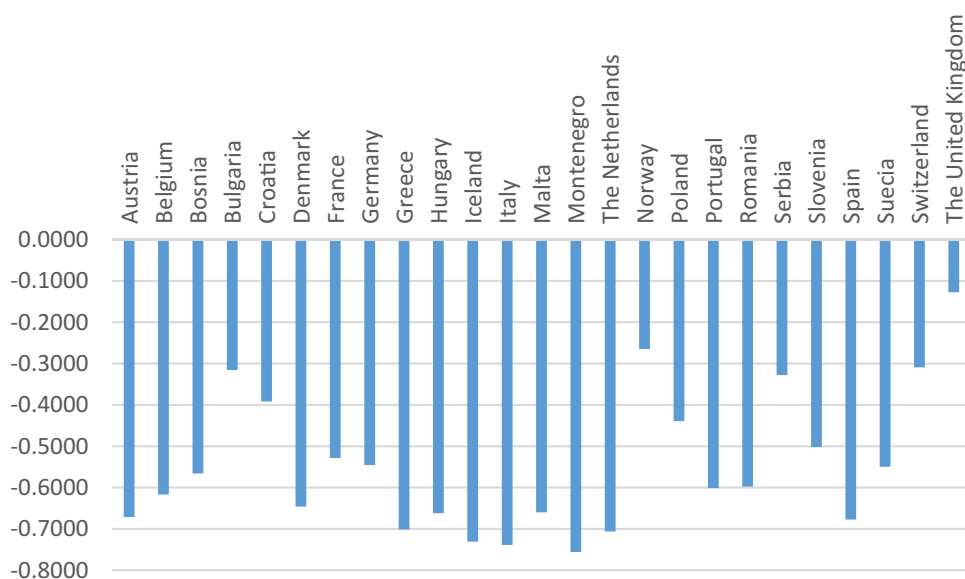


Figure 2. Sales variation in 2020, average value by firm and by country.



in line with McKinsey's use of the Z-score to test firms' performance before and after a crisis and, therefore, to indicate firms' resilience to that crisis (Altman et al. 2020).

To assess how firms' performance and behaviour during the term prior to the COVID-19 pandemic contributed to their resilience in 2020, we used the average values of the explanatory variables during the period 2016–2019. We follow Nguyen et al. (2023) and Demirkan and Platt (2009) to select the variables employed to study financial health: profitability (PROF) is calculated as the mean ratio of earnings before interest, taxes, depreciation, depletion, and amortization to total assets; leverage (LEV) is the mean ratio of total liabilities to total assets<sup>2</sup>; tangibility (TANG) is calculated as the mean ratio of property, plant, and equipment to total assets; liquidity (LIQ) reports the mean ratio of current assets to current liabilities; and, finally, the cost of debt (CDEBT) is computed as the mean ratio of interest expenses to financial debt.

The macroeconomic variables added to the specification are related to the financial scenario and COVID-19 situation. The variation in interest rates (INT\_Var) reports the decrease or increase in the interest rates in 2020 relative to the 2019 values, showing the impact of the financial restrictions

during the COVID-19 shock in Europe. The incidence of the COVID-19 disease (Incidence\_COVID) is calculated by dividing the number of diagnosed cases during the last 14 days by the number of people who were free of the disease during that period. Finally, the last variable (Beds\_Hospital) refers to the national expenses in health divided by the number of beds in hospitals.

## IV. Results and discussion

### Descriptive statistics

Table 1 shows the interest rates by year for the countries in which the sample firms are located. We observe that Iceland, Montenegro, and Romania record the highest interest rates, whereas France, Sweden, and Belgium show the lowest interest rates during the period under study.

In Table 2, we split the sample into two groups: firms located in countries with low interest rates (without financial restrictions) and those located in countries with high interest rates (financial restrictions). We observe that during the prior four-year term, financial health (distance to bankruptcy), economic performance, leverage, and liquidity report higher mean values among firms with less

**Table 1.** Interest rate (financial restrictions) by country and by year.

	2016	2017	2018	2019
Austria	1,920	1,900	1,810	1,630
Belgium	1,720	1,990	1,870	1,630
Bosnia	5,238	4,380	3,790	3,287
Bulgaria	6,393	5,440	4,963	4,549
Croatia	4,780	3,800	3,520	3,070
Denmark	3,500	3,400	3,200	3,000
France	1,320	1,520	1,450	1,130
Germany	1,760	1,830	1,870	1,520
Greece	2,740	2,780	3,010	3,110
Hungary	2,089	1,481	1,471	1,792
Iceland	8,237	7,256	6,955	6,950
Italy	3,496	3,001	2,680	2,603
Malta	2,840	2,800	2,680	2,530
Montenegro	7,972	7,197	6,529	6,175
The Netherlands	2,930	2,470	2,470	1,970
Norway	3,070	3,006	2,926	3,236
Poland	3,300	4,400	4,370	4,390
Portugal	1,770	1,520	1,630	1,090
Romania	5,709	5,565	6,808	7,162
Serbia	5,600	5,000	4,100	3,800
Slovenia	2,330	2,500	2,440	2,350
Spain	2,010	1,950	1,970	1,990
Sweden	1,570	1,560	1,470	1,460
Switzerland	2,647	2,627	2,627	2,633
The United Kingdom	2,160	1,980	2,100	1,920
Total	3,272	3,020	3,042	2,911

<sup>2</sup>We exclude observations with leverage values outside the unit interval.

**Table 2.** Mean values considering financial restrictions.

Financial restrictions	Fin_health 2016–19	Fin_health 2020	Profitability 2016–19	Leverage 2016–19	Liquidity 2016–19	Tangibility 2016–2019
<b>NO</b>	1.9563	0.7349	0.0752	0.5202	5.1016	0.5000
<b>YES</b>	0.8260	-0.1350	0.0580	0.3901	4.2494	0.6866
Total	1.4468	0.3647	0.0676	0.4615	4.7175	0.5841

financial restrictions (cheaper access to credit). As we can appreciate, during 2020, the financial health for firms without financial restrictions remains positive (and even higher than the average value during the pre-COVID-19 period for the other group), whereas firms with financial restrictions reach negative Z-scores.

Table 3 reports the descriptive statistics for the dependent and explanatory variables: the mean, median, standard deviation, minimum, and maximum values. The mean value for financial health in 2020 is 1.23, ranging from -149.29 to 13.51. Considering the explanatory variables during the pre-COVID-19 term (2016–2019), we highlight a mean value for profitability of 5%, leverage close to 50%, a high proportion of tangibility, with a mean value close to 60% and median value of 70%, and a high value for liquidity (4.7806).

Table 4 reports the correlation analysis considering the two groups of firms (for the whole sample in Panel A, for firms located in countries without financial restrictions in Panel B, and for firms located in countries with financial restrictions in Panel C). This table shows the correlation between financial health in 2020 and the mean values of the financial ratios during the pre-pandemic period (from 2016 to 2019) to capture the role of history, development, and strategy (Herbane 2019) or, in other words, the initial financial positions of firms (Guerini et al. 2020) that contribute to their resilience during 2020.

Without financial restrictions (lower interest rates), all four factors, profitability, leverage, tangibility, and liquidity, are significantly related to firms' financial health in 2020. A history of higher profitability and liquidity and lower leverage and tangibility seems to contribute to the hospitality firms' resilience. We highlight the significant negative correlation between liquidity and leverage, indicating the use of liquidity to redeem debt during the pre-COVID-19 four years. Tangibility also shows positive relationships with profitability and leverage, suggesting that during the pre-COVID-19 four-year period, the hospitality firms made profitable use of productive assets and could use tangible assets as collateral to obtain debt.

By contrast, in the case of more expensive access to credit, only previous profitability and limited leverage appear as significant for firms' resilience in 2020. The negative link between profitability and both tangibility and liquidity suggests a heavy load of the deadweight costs from tangible assets, while the nonsignificant relationship between leverage and tangibility indicates that the role of tangible assets as collateral is not as relevant for hospitality firms in more restrictive financial settings. We highlight a stronger negative correlation between tangibility and liquidity, suggesting disinvestment as a more relevant source of liquidity in the presence of financial restrictions.

**Table 3.** Descriptive statistics.

Variables	Mean	Median	Standard Dev.	Min	Max
Fin_health	1.2293	1.6490	7.0701	-149.2850	13.5017
PROF	0.0500	0.0407	0.0864	-0.2518	0.3180
LEV	0.4687	0.4538	0.3004	0.0014	1.0000
TANG	0.5872	0.7016	0.3377	0.0000	0.9917
LIQ	4.7806	1.0685	17.5103	0.0181	144.4278
CDEBT	0.0353	0.0022	0.1994	0.0000	1.7399
INT_Var	-0.0608	-0.0482	0.1143	-0.0900	0.2500
Incidence_COVID	521.7235	377.1000	259.5067	45.0100	953.5000
Hospital_beds	2.6154	2.7500	1.0658	0.7536	5.0000

**Table 4.** Correlation analysis between financial health in 2020 and financial ratios from 2016 to 2019.

	Fin_health2020	PROF16–19	LEV16–19	TANG16–19	LIQ16–19	CDEBT16–19
<b>Panel A. Correlation analysis (full sample)</b>						
Fin_health2020	1					
PROF16–19	0.1590*	1				
LEV16–19	–0.2958*	–0.0004	1			
TANG16–19	0.0211	–0.0027	–0.0385	1		
LIQ16–19	0.1068	–0.1246*	–0.2032*	–0.2746*	1	
CDEBT16–19	–0.0213	0.1042*	0.0683*	0.0199	0.1093*	1
<b>Panel B. Correlation analysis for firms in countries without financial restrictions</b>						
Fin_health2020	1					
PROF16–19	0.1736*	1				
LEV16–19	–0.5833*	–0.1767*	1			
TANG16–19	–0.1808*	0.1125*	0.0715*	1		
LIQ16–19	0.2820*	–0.1213*	–0.3168*	–0.2137*	1	
CDEBT16–19	–0.0490	0.1474*	0.0159	0.0267	0.1333*	1
<b>Panel C. Correlation analysis for firms in countries with financial restrictions</b>						
Fin_health2020	1					
PROF16–19	0.1721*	1				
LEV16–19	–0.2708*	0.1809*	1			
TANG16–19	0.1393	–0.0845*	–0.0306	1		
LIQ16–19	0.0564	–0.1946*	–0.0571	–0.4034*	1	
CDEBT16–19	0.1053	–0.0517	0.1409*	0.0799	–0.0032	1

**Table 5.** Collinearity analysis.

Variable	VIF	Tolerance
PROF16–19	1.07	0.9362
LEV16–19	1.24	0.8054
TANG16–19	1.10	0.9096
LIQ16–19	1.14	0.8744
CDEBT16–19	1.06	0.9463
INT_Var	1.04	0.9630
Incidence_COVID	1.58	0.6324
Beds_hospital	1.76	0.5690
Mean VIF	1.25	

Table 5 reports the variance inflation factor (VIF), showing values lower than 2 for the variables included in our baseline model, indicating a lack of multicollinearity.

### Financial resilience in 2020

We apply ordinary least squares (OLS) with robust standard errors, following Lewis and Linzer (2005). Table 6 reports the results of the baseline analyses. Specifically, the first column of this table shows the results for profitability (PROF), leverage (LEV), tangible assets (TANG), liquidity (LIQ), and cost of debt (CDEBT) using their average values for the pre-COVID-19 four years. Higher ratios of profitability and liquidity during the period before the crisis (2016–2019) are significantly associated with a higher financial health, suggesting that previous

profitability and liquidity contribute to a lower probability of bankruptcy when a firm faces a sudden crisis. Meanwhile, leverage and tangibility show negative and significant effects on financial health, suggesting that firms with higher levels of leverage and tangible assets in the years prior to the crisis increase their probability of bankruptcy during the shock year. This is consistent with the heavy load of costs derived from tangible assets (Hutchinson and Xavier 2006; Nicolau 2005) and their financing debts when hospitality firms experience decreasing or disappearing income (Nguyen et al. 2023). Last, the pre-COVID-19 cost of debt reports a nonsignificant value in the regression, indicating a lack of impact on the firms' financial health in 2020.

In the second column, we incorporate a macroeconomic factor that considers the variation in interest rates to assess access to financing. The nonsignificant coefficient indicates that this is not a factor in the firms' financial health.

In column 3, we add the by-country impact of the COVID-19 incidence and strength of the public health system (Beds\_hospital). We find a negative and significant effect of the COVID-19 incidence on the firms' financial health, indicating how the social-distance measures related to a high incidence impact the hospitality industry, affecting the probability of bankruptcy. Meanwhile, the posi-

**Table 6.** Impact of previous financial ratios on firms' financial health in 2020.

	1	2	3
PROF16–19	11.8836*** [3.8677]	11.7147*** [3.8794]	10.3132*** [3.6452]
LEV16–19	-6.3557*** [1.3088]	-6.2844*** [1.3007]	-6.5849*** [1.3126]
TANG16–19	-1.9476*** [0.7207]	-1.9513*** [0.7263]	-1.6261** [0.7362]
LIQ16–19	0.0422** [0.0165]	0.0435*** [0.0158]	0.0427** [0.0174]
CDEBT16–19	-0.5059 [1.1972]	-0.5825 [1.2133]	-0.5946 [1.1053]
INT_Var		-1.6527 [1.2894]	-1.4788 [1.3499]
Incidence_COVID			-0.0025** [0.0010]
Beds_hospital			0.4424* [0.2628]
Constant	3.9761*** [0.6828]	3.8027*** [0.7044]	4.0243*** [0.9438]
Observations	184	184	184
R squared	0.2963	0.2994	0.3160
R squared adjusted	0.277	0.276	0.285

The variables' definitions are reported in Section III. This table shows the coefficient estimates of panel regressions using robust OLS. Robust standard errors are in parentheses. \*, \*\*, and \*\*\* denote significance at the 10%, 5%, and 1% levels, respectively.

tive and significant coefficient of Beds\_hospital indicates that the strength of the public health system, approximating less strict measures of social distance and a more rapid recovery of the business activity, positively affects the firms' financial health, increasing their distance to bankruptcy.

To test our first and second hypotheses, we repeat our analysis by splitting the sample into firms with high (interest rates above the median) and low (interest rates below the median) financial restrictions (Table 7). Consistent with our prediction (H1), the impact of the past

**Table 7.** Impact of liquidity and leverage on firms' financial health in 2020, considering financial restrictions.

	Financial restrictions	
	YES	NO
PROF16–19	15.3943 [11.3173]	8.4764** [3.8747]
LEV16–19	-3.1603 [2.3963]	-8.8745*** [1.6312]
TANG16–19	-1.3332 [1.1541]	-2.2988** [0.9215]
LIQ16–19	0.4015*** [0.1154]	0.0251 [0.0184]
CDEBT16–19	2.1016*** [0.7211]	-1.2594* [0.6849]
INT_Var	0.2679 [1.4627]	-0.4685 [1.7203]
Incidence_COVID	-0.0030* [0.0016]	0.0002 [0.0010]
Beds_hospital	0.2055 [0.3729]	0.1357 [0.3393]
Constant	2.6693* [1.3436]	5.1511*** [1.5561]
Observations	65	119
R squared	0.3952	0.3689
R squared adjusted	0.309	0.323

The variables' definitions are reported in Section III. This table shows the coefficient estimates of panel regressions using robust OLS. Robust standard errors are in parentheses. \*, \*\*, and \*\*\* denote significance at the 10%, 5%, and 1% levels, respectively.

performance of the financial ratios on the firms' financial health during the shock varies depending on the financial restrictions that affect the macroeconomic scenario in which a firm develops its business. According to the role of liquidity as precautionary funds (Acharya, Almeida, and Campello 2007; Almeida, Campello, and Weisbach 2004), in countries with financial restrictions (higher interest rates), a firm's liquidity history significantly and positively impacts its financial health during the pandemic. This is consistent with the critical role of liquidity for the hospitality industry that has been found from the beginning of the COVID-19 shock (EC 2020; González-Torres, Rodríguez-Sánchez, and Pelechano-Barahona 2021; Guerini et al. 2020; Wiczorek-Kosmala 2021). By contrast, in countries without financial restrictions (lower interest rates), easy and cheap access to financial debt renders a costly accumulation of cash holdings unnecessary and liquidity is not a significant explanatory factor for financial health. This result is consistent with the irrelevance of a cash position for unconstrained firms found by Almeida et al. (2002). In these firms, we do not find support for H2, as the contribution to financial health derives from the control of leverage and tangibility. To analyse this result related to the second hypothesis more in depth, we grouped the hospitality firms in countries without financial restrictions into quartiles of financial health (Table 8). A clear pattern of leverage, liquidity, and tangibility is evidenced across the quartiles, the best group being characterized by remarkably increased liquidity and notably reduced leverage and tangibility. In untabulated results (available on request), we find that liquidity and leverage are negatively and significantly correlated during 2020, but only in countries with cheaper access to credit, which is consistent with Acharya et al.'s (2007) findings for firms with low hedging needs in a constrained macroeconomic scenario, such as the COVID-19 pandemic. Furthermore, liquidity is negatively correlated with tangibility, pointing to disinvestment as a source of liquidity during 2020 in countries both with and without financial restrictions, consistent with the extreme difficulty in borrowing during exogenous, severe crises as described by Campello et al. (2010).

**Table 8.** Mean values of leverage, liquidity, and tangibility by quartiles of financial health in 2020 for firms without financial restrictions.

Quartiles Fin_health2020	Leverage	Liquidity	Tangibility
1	0.9405	0.4002	0.5713
2	0.7112	1.1559	0.6590
3	0.5088	5.2677	0.5788
4	0.2687	15.6808	0.3759
Total	0.6177	5.6886	0.5403

## V. Robustness analyses

To provide further robustness to our results, we repeat Table 7 considering that size and age are suitable and efficient predictors of firms' financial constraint levels (Cheng, Ioannou, and Serafeim 2014; Farre-Mensa and Ljungqvist 2016). Thus, Pettit and Singer (1985) found size as a source of negative impact on the probability of non-payment, considering that large firms are usually more diversified and their cash flows tend to be more stable than those of small ones, and age is an indicator of a firm's lower risk (Bolton and Freixas 2000). We categorize financial constraints using firm size and age, following Hadlock and Pierce (2010). Specifically, we use the size-age (SA) index as follows:  $-0.737\text{Size} + 0.043\text{Size}^2 - 0.040\text{Age}$ , where size is the logarithm of total assets and age is the number of years since a firm was founded. To control for the outliers of the measure, size is replaced by 4.5 billion if this value is exceeded, while age is replaced by 37 years for firms older than this age. We split the sample up into firms above the median value, catalogued as financially constrained, and those below the median of the SA index, as financially unconstrained firms.

In Table 9, the positive and significant coefficient of liquidity for constrained firms (column 1) supports our first hypothesis, showing the relevant role of higher liquidity on the firms' financial health. When external restrictions are added to the internal ones (column 3), we can appreciate that the relationship is remarkably stronger. Regarding the effect of leverage, for hospitality firms of any size and age, our results suggest that limiting leverage is important for their financial health (columns 1 and 2); however, when external restrictions are added, a reduction in debt is significant for firms' financial health only in countries without financial



**Table 9.** Impact of liquidity and leverage on firms' financial health in 2020, considering financial restrictions.

	(1)	(2)	(3)	(4)
	Constrained firms	Unconstrained firms	Constrained firms and financial restrictions	Unconstrained firms without financial restrictions
PROF16–19	15.4057*** [4.2393]	1.0079 [5.7360]	5.5320 [5.3618]	–0.1072 [5.8933]
LEV16–19	–6.6426*** [2.3448]	–7.2327*** [1.6954]	–0.5703 [1.0992]	–8.4851*** [1.4504]
TANG16–19	–0.8310 [0.9534]	–2.5800** [1.1697]	–0.7191 [0.8281]	–3.4870** [1.3176]
LIQ16–19	0.0627*** [0.0078]	–0.0387 [0.0863]	0.4158*** [0.0890]	–0.0404 [0.0913]
CDEBT16–19	–1.4485 [1.2629]	0.1746 [1.3173]	–5.9199* [3.0185]	–1.0165 [1.8060]
INT_VAR	–0.3752 [1.6460]	–4.6290** [1.9620]	–3.0682 [2.3261]	–2.8306 [2.6284]
Incidence_COVID	–0.0024 [0.0015]	–0.0044** [0.0021]	–0.0008 [0.0010]	–0.0000 [0.0031]
Beds_hospital	0.1398 [0.2759]	1.3326** [0.5959]	0.2786 [0.2252]	0.7184 [0.9566]
Constant	4.0932*** [1.3780]	3.8899** [1.5485]	0.8886 [1.1894]	4.3908 [2.6360]
Observations	108	76	40	51
R squared	0.3129	0.4036	0.4889	0.4878
R2 adjusted	0.257	0.332	0.357	0.390

The variables' definitions are reported in Section III. This table shows the coefficient estimates of panel regressions using robust OLS. Robust standard errors are in parentheses. \*, \*\*, and \*\*\* denote significance at the 10%, 5%, and 1% levels, respectively.

restrictions. Our results are consistent with those of Guerini et al. (2020), who point to different effects by size, as small firms increase bankruptcy risk as a result of liquidity problems, whereas large firms increase bankruptcy risk as a result of higher debt levels.

## VI. Conclusions

This study focuses on the financial characteristics that have contributed to hospitality firms' resilience during the COVID-19 pandemic. For a large sample of 184 hospitality firms located in 25 European countries, we find that the recent four-year history of a firm's financial performance and structure significantly contributes to its financial health, proxied by the widely applied Z-score measure.

After incorporating two country-level measures of the COVID-19 outbreak and a relevant financial-framework macro factor, the interest-rate variation, our model evidences a significant and negative effect of the COVID-19 incidence and a significant and positive effect of the strength of the health system, whereas changes in the financial setting do not significantly impact firms' financial health in 2020.

The heavy load of fixed costs in the hospitality industry, jointly with the dramatic decrease in sales and operating income during the COVID-19 shock, stress the critical role of liquidity in the fight for survival. The liquidity required to pay costs during the lockdown and subsequent period of sub-activity may have been obtained by the accumulation of previous returns (for precautionary reasons) and/or externally through credit. Governmental policies have played a major role in preserving the firms' internal liquidity via cost delays, discounts or exemptions, and external access to additional liquidity via guaranteed credit.

In this COVID-19 context, our study is the first to analyse how the financial macroeconomic context, proxied by the credit interest rates, mediates both the accumulation of liquid funds and the access to additional funds via credit, and hence the hospitality firms' resilience during the COVID shock. Specifically, our results show that hospitality firms under financial restrictions (higher interest rates) increased their financial health due to a history of liquidity during the pre-COVID-19 four-year period. For financially constrained firms, leverage and tangibility do not significantly contribute to financial health. By contrast,

hospitality firms under less restricted financial conditions (lower interest rates) are more resilient due to their history of limited debt and tangibility.

The main managerial implications of this study pertain to two aspects of the hospitality industry. The first is the unequivocal role of maintaining a precautionary liquidity level to deal with sudden shocks when credit is restricted. The second involves improving business performance in the context of easier access to credit. Our results contribute a discriminant factor to the literature, through which tangible assets are positively associated with profitability, as hospitality activities are more profitable because the spread between operating returns and financial costs is wider in a low-interest-rate setting. Various stakeholders concerned about the bankruptcy risk of the firm should pay attention to these two critical elements of financial resilience against sudden shocks that stop sales.

Relevant policy implications can be derived from our findings, as they provide an additional variable to refine and improve target cross-cutting policy responses. According to these findings, in countries with high interest rates, facilitating access to debt financing may not be an effective policy measure, even in the hospitality sector, where collateral is available and hence it is a target sector to apply policies in which access to external financing is advisable to deal with liquidity shocks (Demmou et al. 2021). Moreover, considering the suggested key role of disinvestment as a source of liquidity and financial health for the entire sample and the use of liquidity to repay debt in the absence of external financial restrictions, this contrasts with the expectation of a positive relationship between debt and liquidity due to government guarantees of banking credit. Contrasted with the results obtained in the US (with homogeneous conditions and regulations concerning investors' protection, as a unique country), EU countries are subject to homogeneous recommendations by the EU supranational authorities, whereas heterogeneous measures are applied by country, including different levels of stakeholders' protection and enforcement, which have demonstrated a lack of efficiency in rapidly responding to a sudden shock such as the COVID-19 pandemic.

This study has several limitations. First, our sample includes only large hospitality firms when small firms are the most affected by bankruptcy risk as a result of any type of crisis and are also more affected by the pandemic shock (Bloom, Fletcher, and Yeh 2021). Therefore, an interesting extension of our work would be to analyse how financial restrictions affected hospitality SMEs during the COVID-19 crisis. Second, the use of Z-score in our model can be partly affected by the endogeneity problems present in the relationship between contemporaneous accounting variables. Third, this study used only one contextual factor as a moderator of financial resilience to the COVID-19 shock, leaving the potential moderating effect of many other contextual factors on sanitary or other sudden shocks for future studies.

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