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Hoa Ho, Christian Hofmann & Nina Schwaiger

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The Covid-19 pandemic and management controls

HOA HO, CHRISTIAN HOFMANN* and NINA SCHWAIGER

LMU Munich, Munich School of Management, Munich, Germany

We examine how firms respond to the Covid-19 pandemic by adjusting their management controls and what the consequences are in terms of firms' resilience to the crisis. We review literature that deals with the influence of the Covid-19 pandemic on business and investigate results from a survey conducted within a large international multi-divisional service firm and the German Business Panel. We find evidence consistent with the claim that the Covid-19 pandemic is associated with a shock to transparency and increased incentive problems. We document firms' adjustments of their management controls in response to the Covid-19 crisis: Action controls are stronger, result controls are more flexible, and cultural controls are weaker. Regarding firms' resilience, we provide supportive evidence that more resilient firms face a smaller shock to transparency, adjust their management controls to a smaller extent, and are associated with stronger cultural controls in terms of higher organisational trust.

Keywords: Covid-19; management controls; resilience
JEL: L22; M12; M41

1. Introduction

The Covid-19 pandemic is a global crisis that is associated with many severe consequences for firms, particularly regarding their business operations and access to finance, but also the application of the tax system. In addition to severe health impacts, national-wide lockdown policies and social distancing regulations have induced an uncertain economic environment, which resulted in government stimulus packages, finance institutes' budget deficits, business temporary closures, and remote work (Chen et al. 2020). Arguably, one of the most drastic economic impacts is with respect to business operations: the Covid-19 pandemic strongly disrupted firms' logistics, production, and the entire supply chain; standard key performance indicators became invalid incentive devices (Czura et al. 2022a); and employees were required to work from home, raising concerns about transparency (Parker 2020).

We argue that the Covid-19 pandemic represents a shock to firms' internal and external transparency, where transparency broadly relates to the quality of information in a sender-receiver

*Corresponding author. Email: ch.hofmann@lmu.de

relationship. More specifically, we suggest that the Covid-19 pandemic increased firms' uncertainty, which, ceteris paribus, reduced transparency in terms of the amount, accuracy, and clarity of the information that is available to firm owners, management, employees, and other stakeholder groups to address the challenges triggered by the pandemic. For instance, when social distancing regulations require employees to work from home, supervisors may have difficulty in accurately assessing their employees' performance due to the physical distance between supervisors and employees. At the peak of the pandemic, firms such as Abbott and GoPro even suspended their earnings guidance, thus disclosing less information to market participants.[1] And the firms who continued to provide earnings guidance likely provided less accurate earnings forecasts. The uncertainty associated with the crisis makes it more difficult for managers to forecast revenues and expenses, and for investors to interpret the available forecasts properly.

Transparency plays an important role in determining the effectiveness of management controls. We argue that the Covid-19 pandemic-related shock to transparency exacerbated various control problems in firms. For example, working from home and the resulting limited monitoring of employees' activities implies incentive problems when appropriate performance measures are missing. Also, a reduced communication between supervisors and employees implies a lack of clarity and associated incentive issues when employees lack direction and motivation. Thus, we expect that firms adjust their management controls in response to the Covid crisis.

This study explores the effects of the Covid-19 pandemic on business by examining how firms respond to the associated crisis in terms of adjusting their management controls and what the consequences are in terms of firms' resilience to the crisis. More specifically, we broadly review literature that deals with the influence of the Covid-19 pandemic on business and investigate results from surveys conducted within a large international multi-divisional service firm and the German Business Panel (GBP).[2]

First, we find evidence consistent with the conclusion that the Covid-19 pandemic is associated with a shock to transparency. For example, from the GBP, for many firms the pandemic involved more explicit and transparent communication with various stakeholder groups. Evidence from the service firm shows reduced informal communication between management and employees, which is countered by an increased quality of vertical and horizontal formal communication. Second, we find evidence suggesting that the Covid-19 pandemic is associated with increased incentive problems, at least for some firms. At the service firm, employees to a large extent use the option to work from home and supervisors struggle with monitoring their employees' actions and assessing their employees' skills.

Third, we find evidence suggesting that firms respond to the challenges triggered by the Covid-19 pandemic by adjusting their management controls. At the service firm, action controls are stronger, result controls are more flexible, and cultural controls are weaker. For example, we find that supervisors rely more strongly on standardised processes affecting multiple organisational units, include employees more actively in the planning process, but make less use of socialisation. While the latter result is likely triggered by social distancing regulations, it

[1] 'Pandemic has companies dropping earnings guidance, and some say it should be nixed altogether,' CNBC April 17 2020 (https://www.cnbc.com/2020/04/17/pandemic-has-companies-dropping-earnings-guidance-and-some-say-it-should-be-nixed-altogether.html, accessed March 18, 2023).

[2] The service firm offers a large and diverse spectrum of technical B2B and B2C services. In 2021, employing more than 25,000 employees, the firm has generated revenues of more than €2.5 billion. The German Business Panel (GBP) is a long-term survey panel which is part of the trans-regional research project TRR266 'Accounting for Transparency' funded by the German Research Foundation (DFG, Deutsche Forschungsgemeinschaft). The GBP surveys participants employed at German firms every six months on questions in the domains of financial accounting, managerial accounting, and taxation.

emphasises the relevance of supervisors' leadership style during the pandemic. From the GBP, we find that many firms adjusted their Key Performance Indicators (KPIs) or even created new KPIs for determining employee compensation or when interacting with external stakeholder groups.

Fourth, we find evidence that more resilient firms adjust their management controls to a smaller extent than less resilient firms, suggesting that more resilient firms face a smaller shock to transparency. While far from a perfect causal identification, the GBP results suggest that more resilient firms use sensitivity and scenario analysis more intensively, presumably giving management more flexibility to deal with the Covid-19 pandemic's consequences. More resilient firms are also characterised by a substantially higher level of organisational trust; presumably, trustful cooperation between management and employees is particularly beneficial in times of a crisis.

The paper is organised as follows. Section 2 highlights the general link between a crisis and the degree of transparency within and across organisations, arguing that the Covid-19 pandemic induced a shock to transparency within firms. Section 3 emphasises the challenges and the incentive problems that various stakeholder groups face during the pandemic, including employees and firm owners or senior management. Section 4 reports on firms' responses, especially with respect to adjusting their management controls, and the effectiveness of these measures in terms of firms' resilience. Section 5 concludes and underlines some implications for the design of management controls during crises.

2. Crises and shocks to transparency

The multiple consequences and characteristics of the Covid-19 pandemic imply a shock to transparency to many organisations. For example, lockdowns and working from home − government policies in response to the Covid outbreak − limit the ability of managers to monitor their employees and provide appropriate incentives. The varied characteristics of the crisis and heightened uncertainty likely imply that managers fail to provide sufficient guidance and clarity to employees, suggesting a lack of transparency within organisations. In this section, we conceptually discuss the characteristics of a crisis, the definition of transparency, and how a crisis affects an organisation's transparency.

2.1. *What constitutes a crisis?*

Literature defines a crisis as a situation that is triggered by a specific, unexpected, and non-routine event (Seeger et al. 1998) that threatens the goals of complex systems such as organisations or societies and, thus, necessitates changes to the system (Murphy 1996). Examples for triggering events include natural hazards (such as the 2010 Deepwater Horizon explosion; the 2010 Eyjafjallajökull eruption; the 2011 Tōhoku earthquake and tsunami; or the 2020 Covid-19 pandemic) and man-made economics shocks (such as the Banking Crisis of 1933; the 1987 Black Monday; the 1992 Black Wednesday; the 1997 Asian financial crisis; the 2000 Dot-com bubble; the 2007 US subprime mortgage crisis; or the 2009–2019 European sovereign debt crisis). The triggering event often occurs abruptly, with little or no warning. In the extreme, the triggering event is described as a 'black swan'-event, i.e. an unpredictable or unforeseen event (Taleb 2001).

From the perspective of an organisation, the event and the associated crisis cause an unstable and dangerous situation that is associated with a high level of uncertainty. Specifically, given the low probability of many crisis-triggering events and the extremely varied nature of crises, organisations often do not invest adequately in precautionary measures for a particular crisis and, thus, lack a clear plan for how to deal with a given crisis and how to communicate with its stakeholders in times of a crisis.

2.2. *How to define transparency?*

Schnackenberg and Tomlinson (2016) define transparency as the quality of information in a sender-receiver relationship in terms of disclosure (i.e. the availability, accessibility, and visibility of the information to the receiver), accuracy (i.e. the precision, reliability, and validity of the information disclosed by the sender), and clarity (i.e. the understandability and comprehensibility of the information to the receiver). From this view, transparency is a multi-dimensional construct that emphasises key characteristics of the information. In a business context, the sender may refer to an organisation and the receiver includes the organisation's stakeholders such as its employees and managers as well as the organisation's shareholders, debtholders, suppliers, customers, (tax) authorities and regulators, and the society at large.

For example, for a publicly listed firm, releasing financial reports is a means to communicate with its shareholders. The firm can increase the transparency of the financial reports to its shareholders by releasing quarterly rather than annual financial reports, by releasing audited rather than unaudited financial reports, and by using standardised rather than fluctuating terminology in the financial reports. In other words, availability, accuracy, and clarity of the information characterise the financial report's transparency to the firm's shareholders.

Emphasising the receiver of the information, relevance and timeliness are additional important informational characteristics, as the information should be catered to the decision problem at hand and be available in time for the decision. In other words, transparency prevails if the right information is *available* to the decision-maker at the right time. In turn, understanding the relevance of the information for the receiver's decision making can trigger strategic considerations of the sender. That is, the sender creates transparency if doing so is in the sender's best interest.[3]

2.3. *How does a crisis affect an organization's transparency?*

A crisis that threatens the goal of an organisation often triggers organisational changes. Initially, due to the unpredictability of the specific characteristics, magnitude, and nature of the crisis, it is regularly unclear to the organisation's management what adjustments are most effective to deal with the crisis in the short-run and will enable the organisation to achieve its goals in the long-run. This uncertainty does not only apply to the organisation's management, but also to its stakeholders. What's more, many crises also affect the organisation's stakeholders directly, thus amplifying their concern about the organisational changes that will be implemented.

More specifically, a crisis often requires structural changes in communication and information systems. To the extent that the fundamental environment changes drastically, the pre-existing information system before the crisis becomes suboptimal or even obsolete during the crisis. This implies that, in times of a crisis, if the sender-receiver relationship relates to the *same* information as before the crisis (ceteris paribus), then the quality of information to the recipients is of lower value and the recipients experience a more opaque situation (relative to the situation prior to the crisis). For example, if a firm experiences a substantial drop in demand accompanied with drastically curtailed operations, then not disclosing revised personnel adjustments to the workforce (and only referring to conventional promotion and dismissal procedures)

[3]Oates and Tuck (2019) discuss whether increased 'tax transparency' – the transparency about the tax affairs of multinational corporations – is a means to address corporate tax avoidance.

will leave many employees with opaque career prospects. In line with this argument, Bedford et al. (2022) find that role ambiguity, i.e. the gap between the information available and the information needed to perform a task, increases at the onset of a crisis.

Firms can increase their external transparency by increasing the number of voluntary disclosures to their investors and various stakeholder groups, including customers and the communities in which they operate. For example, Van der Stede (2011) focuses on the financial crisis of 2008 and argues that an increased demand or pressure for disclosures is one of the main implications of the crisis. Such voluntary disclosures include timely information on the impact of the crisis on businesses and describe firms' responses in the short-term as well as their strategies in the medium- to long-term. The improvement in external disclosures and transparency is critical for stakeholders to assess how well firms respond to the crisis and how these adjustments mitigate the adverse economic effects on firms' performance. Firms can increase their internal transparency by using a townhall meeting to explain to the workforce how management intends to deal with the crisis. The external transparency is highly intertwined with the internal transparency: The demand for external transparency, e.g. through stakeholders' demand for information, improves the quality of information being collected, which in turn can be used to increase internal transparency.

2.4. *Survey evidence*

In this subsection, we examine survey evidence from the *German Business Panel (GBP)* to empirically investigate the transparency implications of the Covid-19 pandemic. The GBP is a long-term survey panel of the research initiative 'Accounting for Transparency,' funded by the German Research Foundation (DFG). Starting in July 2020, participants employed at German firms are surveyed twice per year on questions in the domain of financial accounting, managerial accounting, and taxation, aiming at increasing our understanding on how firms behave especially when being exposed to regulation.

In Table 1, we present descriptive evidence on several questions from the second GBP survey wave regarding the impact of the Covid-19 pandemic and firms' associated adjustments.[4] Respondents were asked whether the Covid-19 pandemic led to (a) a discontinuation or interruption of medium- and long-term financial plans, (b) a greater use of sensitivity and/or scenario analyses, and (c) more explicit and transparent communication (0 = no, 1 = yes). Respondents were also asked at what point in time the Covid-19 pandemic was considered first within the firm (differentiating between the first half of 2020, the second half of 2020, the period after the second half of 2020, and no effect during these time periods). In terms of specific adjustments, the GBP considers four dimensions: variable compensation; internal planning and analyses; credit agreements; and communication to stakeholders.

Regarding the Covid-19 pandemic's impact, we find a statistically significant (p-value < 0.01) impact in all three dimensions: 32% of the respondents indicate that they had to discontinue or interrupt their medium- and long-tern financial plans; 13% indicate that they more strongly made use of sensitivity and/or scenario analyses; and 27% indicate that they invested into more explicit and transparent communication. These findings highlight the broad and multidimensional impact of the Covid-19 pandemic on firms and provide first (indirect) evidence that the pandemic is associated with an increase in transparency requirements. The pandemic's

[4]The second survey wave was distributed from November 16th 2020 to June 24th 2021. In the first survey wave from July to October 2020, roughly 10,000 firms participated in the survey. For more information on the GBP see https://gbpanel.org/page/e.

Table 1. Survey evidence from the German Business Panel: Covid-19 and transparency.

Survey question	Mean
How far do you agree with the following statement concerning the effect of the corona crisis on your company in 2020? The Corona crisis led to … *(0 = No, 1 = Yes)*	
discontinuation or interruption of medium- and long-term financial plans	0.32^{+++}
greater use of sensitivity and/or scenario analyses	0.13^{+++}
more explicit and transparent communication	0.27^{+++}
At what point in time has and/or is the Corona crisis first been considered within your company? *(1 = in the first half of 2020, 2 = in the second half of 2020, 3 = after the second half of 2020, 4 = does not apply to us)*	
determining variable compensation	2.85
internal planning and analyses	1.91
credit agreements	3.19
communication to stakeholders	2.34

Notes: Table 1 presents mean statistics based on survey data from the German Business Panel. More specifically, it reports on the association between Covid-19 and transparency. $^{+++}$, $^{++}$, $^{+}$ indicate a mean that is statistically significant different from 0 at the 1, 5, 10% level, correspondingly. The mean statistics are adjusted for survey weights to increase the generalizability of the findings.

impact might seem to be low, on average. We acknowledge the possibility that the impact was more pronounced in the first half of the survey period (i.e. November 2020 through February 2021) and that the impact of the Covid-19 pandemic varies by industry (e.g. the fair organisers, travel agencies, and catering services; Bischof et al. 2021).

Regarding the pandemic-induced adjustments and their timing, the findings suggest that firms were first forced by the Covid-19 pandemic to adjust their internal planning and analyses, followed by changes in their communication to stakeholders, adjusting variable compensation and, finally, by adjusting their credit agreements.[5] Again, the responses suggest that the crisis affected early on the within-firm transparency (requiring revised planning and analyses), followed by the external transparency (requiring adjusted communication with stakeholders).

3. Covid-19 pandemic and incentive problems

In this section, we discuss the Covid-19 pandemic's consequences for various stakeholder groups, substantiated by descriptive survey evidence from an international service firm comprising multiple divisions. We argue that the pandemic-induced shock to transparency amplifies incentive problems within firms due to employees' lack of information, motivation, and direction and support from senior management. The incentive issues and other control problems are interrelated and arise partly from the lack of transparency. For example, if existing performance

[5]We note that we include in the statistics the answer category 4 which states 'does not apply to us'. This answer category may indicate that firms do not worry about this type of adjustment since there is – simply by definition – no impact on the firm in this dimension. However, this is arguably only possible for the answer category (c) credit agreements as some firms may not have credit agreements. The other three categories refer to rather broad adjustments associated with Covid-19 which plausibly apply to most if not all firms.

measures become less accurate during a crisis, managers may face the challenge of how to incentivize their employees. In addition, if managers fail to disclose timely and appropriate guidance during a crisis, their employees may suffer from a lack of direction and motivation (Bonet and Salvador 2017).

The sudden outbreak of Covid-19 coupled with abrupt, strict governmental regulations implied a substantial increase in restrictions and uncertainty for many stakeholders. Not only did investors suffer from the capital market's negative responses to the crisis, but they were also exposed to the volatility of the stock market and the uncertainty of future market regulations, which influenced their investment decisions (Dash and Maitra 2022, Sinha and Mandal 2021).

Many firms had to shut down their in-person operations and employees had to work from home due to the lockdown order. One major disruption for firms, particularly for boards of directors, senior management, and employees, was with respect to the incentive systems. The questions of how to design relevant performance measures and how to motivate employees in times of crisis were of utmost importance and urgency at the onset of the Covid-19 pandemic.[6]

3.1. *The impact on employees*

During the Covid-19 pandemic, working from home (WFH) became a prominent feature of work. The proportion of employees within an organisation who participated in WFH rapidly increased throughout the first few months of the Covid-19 pandemic. Prior to the pandemic, only few employees at least partly worked from home, ranging from 12% in Germany to 25% in Sweden (Brenke 2016). This number rose substantially during the pandemic: In Germany, the proportion of employees who partly or entirely worked from home rose to 34% in April 2020 (Schröder et al. 2020); in the US, there was a significant increase in the paid full days worked from home from five percent to over 60% in May 2020 (Barrero et al. 2021).[7]

Despite an increasing prevalence of WFH, evidence on its effectiveness in normal times and in times of crises has been mixed. Several studies document a positive association between WFH and outcomes such as employees' productivity (Bloom et al. 2015, Angelici and Profeta 2020), job satisfaction (Brownson 2004), and organisational commitment (Martin and MacDonnell 2012). Bloom et al. (2015) study the effects of WFH in a Chinese firm and document an increase in employees' productivity and job satisfaction. Flassak et al. (2022) document that WFH increases the time employees spend in meetings but also employees' ability to focus on their work. Barrero et al. (2021) suggest that WFH is beneficial for employees, firm owners, and the society at large. In contrast, some studies find a negative effect of WFH on employees' engagement at work. Gibbs et al. (2021) investigate the effect of working from home on employee productivity. They find that employee productivity declines by 8–19%, employees participate in more short-term, large-group meetings and in fewer small-group meetings with their supervisors and have less time to focus on their work. Altogether, these findings suggest that while WFH is likely to stick in the future, its effectiveness is context-specific and presumably depends on the availability of appropriate management controls that accompany WFH for employees.

WFH may also impede the internal exchange of information due to the difficulty of coordination. The lockdown has resulted in a shift towards online communication: much of on-site

[6]In the following, we also include literature that discusses working from home and predates the Covid-19 pandemic as well as literature that considers firms' responses to crises other than the Covid-19 pandemic.
[7]In addition, for some occupations the nature of tasks has evolved: Employees are now responsible for additional tasks, for example, informing clients about the social distancing regulations and promoting mask-wearing and hand-washing habits to the public.

work was modified to WFH mediated by digital platforms, such as Zoom, for coordination (Parker 2020). As suggested by Zimmerman (2011), reliance on virtual communication makes strong interpersonal relationships among team members particularly important, yet also hard to achieve in virtual teams. While the shift towards WFH and online communication fosters more fluid and diffuse forms of collaboration (Foss 2021, Muzio and Doh 2021), such arrangements pose challenges for harmonious and effective collaborations among employees and hampers information exchange between employees and their supervisors (Dulebohn and Hoch 2017). In turn, due to the lack of vertical information exchange, supervisors are less effective in providing direction and support for their employees (Bonet and Salvador 2017).

The information exchange is also reduced because of less horizontal communication among peers (Gajendran and Harrison 2007). From a meta-analysis of 46 field studies involving more than 12,000 employees, Gajendran and Harrison (2007) find that telecommuting within virtual teams impairs the relationship among co-workers because of the decrease in face-to-face communication, which is considered to deliver the highest social presence and information richness. Consistent with these findings, Gibbs et al. (2021) show that during the Covid-19 pandemic, WFH is associated with higher communication costs among employees. In turn, reduced horizontal communication makes it more difficult for employees to identify with the firm and reduces the effectiveness of mutual monitoring among peers (Flassak et al. 2022).

An example of a group of employees at firms is internal auditors. The Covid-19 pandemic-induced transparency shock may have negatively impacted the effectiveness of internal audits. Fundamentally, severe disruptions of operations and information systems increase the likelihood for erroneous audits. Travel restrictions and requirements to stay at home pose further challenges to the audit engagement. In addition, the shock to transparency likely exacerbated the information asymmetry between firm managers and internal auditors, creating opportunities for both firm managers and auditors to engage in fraudulent behaviour. A larger uncertainty about future earnings and other fundamental elements of financial reports makes it easier for firm managers to hide overly optimistic forecasts. Auditors may undertake limited audit procedures to address audit risks (Kend and Nguyen 2022), or they may increase audit delays in response to Covid-19 restrictions (Harjoto and Laksmana 2022). As a result, it is arguably harder for auditors to obtain reasonable assurance that the financial reports are free from material misstatements.

However, in contrast to intuition, Eulerich and Wood (2022) find that internal auditors in Germany perceive no difference between remote and in-person audits in terms of efficiency, effectiveness, and stakeholder's reliance during the crisis. This surprising finding may be explained by firms' highly digitalised processes. Consistent with this insight, Elaoud and Jarboui (2022) identify digitisation through teleworking and teleconferences as influential post-Covid strategies for auditors.

On a different note, the physical distance caused by the Covid-19 pandemic reduces the sense of group belonging at work and causes professional isolation, which, in turn, may reduce employee motivation and job performance (Golden et al. 2008).

3.2. *The impact on firm owners and senior management*

Firm owners and senior management faced increased uncertainty–both external and internal–during the pandemic. Baker et al. (2020) document that the impact of the pandemic was due to the heightened uncertainty at the global level. Using three indicators that capture market uncertainty (i.e. stock market volatility, newspaper-based economic uncertainty, and subjective uncertainty in surveys about business expectations), they report a substantial increase in economic external uncertainty. For example, stock market volatility increased by about 500% from 15 January 2020 to 31 March 2020. Similarly, Fetzer et al. (2021) quantify a substantial increase in economic anxiety among businesses at the onset of the Covid-19 pandemic. The global supply chains were heavily disrupted due to limited movements of goods at the global scale, affecting firms' production operations. Consumers' spending cuts due to income and job loss and their preferences for low prices, especially in a recession, hurt firms' demand. Both the supply shock and the demand shock, along with the uncertain duration and effectiveness of government interventions and policies, added to firms' uncertainty.

In response to the adverse effects of the pandemic, many firms suffered from many layoffs to cut costs. For those employees who were able to maintain their jobs, firm owners and senior management faced new challenges of how to monitor employees under remote work, and how to provide the right incentives for employees during the pandemic. Remote work, such as WFH, makes employees' actions less observable, obscures teams' progress, and thus limits the use of direct monitoring (Greer and Payne 2014, Allen et al. 2015). Flexible work arrangements imply that teams are less collocated, and thus management often has less information regarding teams' performance and progress, which makes it hard for them to exert influence over team processes and team dynamics (Zaccaro and Bader 2003, Zigurs 2003).

3.3. *Survey evidence*

In this subsection, we provide descriptive evidence on the change of incentive problems within firms in response to the Covid-19 pandemic. We rely on data from the survey among employees in the back office of a large international multi-divisional service firm.[8] The firm offers a large and diverse spectrum of technical B2B and B2C services. In 2021, the firm has generated revenues of more than €2.5 billion. In the survey, we asked back-office employees about the prevalence of working from home in 2021 (during the pandemic) as compared to 2019 (before the pandemic). We asked employees with supervisory function about their use of management controls and employees without supervisory function about their exposure to management controls in 2021 as compared to 2019.[9]

We investigate three types of incentive problems within firms and how they have changed from 2019 to 2021. First, we examine the change in the possibility, freedom, and actual use of working from home from 2019 to 2021. Second, we explore the change in the extent to which supervisors can monitor employees' tasks, measure employees' outcomes, and assess employees' skills in 2019 as compared to 2021. Third, we examine how within-firm communication has changed from 2019 to 2021. We report on the findings in Table 2.

In Panel A, we present the descriptive statistics associated with working from home. We find that the actual use of working from home has statistically significantly (p-value < 0.01) increased from 2019 to 2021. While employees have worked from home close to five hours per week in 2019, they have worked from home almost 27 hours per week in 2021. The responses suggest that the increase in WFH is explained by changed job characteristics that allowed working from home (p-value < 0.01) and the freedom to use the working from home option (p-value < 0.01).

In Panel B, we report on the change in the extent to which supervisors can monitor employees in 2019 as compared to 2021, captured by the extent to which employee actions are observable, employee outcomes are measurable, and employee skills are assessable. We find that supervisors were less able to observe employees' actions in 2021 as compared to 2019 (p-value < 0.01 for

[8]We distributed the online survey in March and April 2021 among 3459 employees with and without supervisory function with a response rate of roughly 60 percent.
[9]We expect that the survey insights generalize to other firms, including manufacturing firms, as the surveyed employees engage in back-office activities that are present in many firms (e.g., HR, accounting, marketing).

Table 2. Survey evidence from a large international multi-divisional service firm: Covid-19 and incentive problems.

Survey question	2019	2021	diff./sign.
Panel A: Working from home			
How many hours did you work from home per week?	4.84	26.66	21.82***
To what extent did the nature of your job allow you to work from home?	3.87	5.29	1.41***
To what extent did you feel free to use the working from home option?	2.62	6.11	3.49***
Panel B: Monitorability			
Please indicate to what extent you agree with the following statements:			
You can observe the actions your subordinates take to achieve results.	4.70	3.87	−0.83***
By observing the actions you can distinguish effective and ineffective subordinates.	4.66	4.10	−0.56***
You are familiar with the relation between the actions performed by subordinates and the subsequent outcomes.	5.32	5.07	−0.25**
Please indicate to what extent you agree or disagree with the following statements:			
Standards of desirable performance for your subordinates are well defined.	5.07	5.15	0.08
Result measures accurately depict how well your subordinates have performed.	4.62	4.62	0.01
You have several objective indicators available that measure how well your subordinates are performing.	4.23	4.23	0.00
How confident are you in assessing the skills of your subordinates?	5.75	5.60	−0.16*
Panel C: Communication			
Please indicate to what extent you agree with the following statements:			
Information is well communicated from the top management level to the lower levels.	4.36	4.52	0.16***
Information is well communicated across organisational units (e.g. teams, departments).	4.53	4.68	0.15***
Indicate to what extent informal communications is used in passing information up and down the hierarchy.	4.49	4.36	−0.13**

Notes: Table 2 presents descriptive statistics on the association between Covid-19 and incentive problems based on survey data from a large international multi-divisional service firm. Panel A reports on the change in (the possibility to use) working from home from 2019 to 2021. Panel B reports on the change in employees' monitorability from 2019 to 2021. Panel C reports on the change in communication from 2019 to 2021. The statistics rely on the responses of all employees (with and without supervisory function) except for the questions related to monitorability where we report on data at the supervisor level. Except for the question related to the actual use of working from home all items are measured at a 1–7 Likert scale. ***, **, * indicate a statistically significant difference between the means at the 1, 5, 10% level, correspondingly.

questions 1 and 2 and p-value < 0.05 for question 3 on action observability). We also find that supervisors were less confident in their assessment of employees' skills (p-value < 0.10). However, we do not find that supervisors were less able to measure the outcomes of their employees' actions in 2021 as compared to 2019 (p-value > 0.10).

In Panel C, we report on the change in communication from 2019 to 2021. We find that the quality of vertical and horizontal communication within the hierarchy has increased (p-value < 0.01). However, we also find that the extent of informal communication to pass information along the hierarchy has decreased from 2019 to 2021 (p-value < 0.05). Taken together, these findings suggest that the lack of informal communication during the pandemic was – at least partly –

replaced by some type of formal communication to pass information along the hierarchy and across organisational units.

The descriptive evidence suggests that the Covid-19 pandemic is associated with increased incentive problems, as supervisors struggle with monitoring their employees' actions and assessing their employees' skills. The firm at the research site increased the quality of vertical and horizontal communication to address the shock to transparency caused by the crisis. However, the lack of informal communication – even if partly replaced by formal communication – may have detrimental long-term consequences for management's ability to identify employees who merit a promotion and, thus, employee motivation.

4. Firms' responses to the Covid-19 pandemic

The Covid-19 pandemic-induced transparency shock and the resulting incentive problems may render the existing management controls obsolete and prompt firms to adapt their management control systems. In this section, we consider how firms modify the existing management controls to be better suited to a time of crisis.

4.1. *Adjustment of management controls*

In general, the Covid-19 pandemic has increased the awareness of the importance and role of management controls to navigate through a crisis and to maintain the continuous functioning of an organisation (see, for example, reviews by Leoni et al. 2021, 2022). Management controls include procedures, methods, and devices that align employees' behaviours with the organisation's strategies and objectives (Anthony and Govindarajan 2007, Merchant and Van der Stede 2017). Passetti et al. (2021) explore the role of management controls during the lockdown period, highlighting the role of facilitating internal coordination, redefining operational practices, and promoting clear objectives and results. Khelly et al. (2021) study the moderating effect of supervisory control tightness on the relation between remote work and perceived productivity change. Kober and Thambar (2022) argue that management controls can and should be mobilised to simultaneously manage short-term and long-term objectives during the crisis. Foss (2021) emphasises that the Covid-19 pandemic will imply both short-term and long-term consequences to firms' organisational designs.

Following Merchant and Van der Stede (2017), we classify management control practices in action controls that focus on employees' actions; result controls that focus on the results produced by employees; cultural controls that refer to the values and norms shared among employees; and personnel controls that relate to the type of people employed. We argue and find that the shift towards working from home due to the Covid-19 pandemic amplifies incentive problems within organisations. When employees work from home, supervisors face challenges to observe employees' actions, limiting direct monitoring. Then, certain forms of management controls, such as informal lunch meetings, face-to-face discussions, and direct observations are no longer possible (Delfino and van der Kolk 2021). Consequently, supervisors may adjust their management controls to ensure that employees act in the best interest of the organisation.

4.1.1. *Action controls*

A common theme emerging is that more standardisation takes place during the pandemic. Flassak et al. (2022) provide survey evidence that supervisors increase their use of action controls, that is, supervisors rely more strongly on standardised processes and let employees participate in the planning process. Likewise, Delfino and van der Kolk (2021) provide interview evidence that supervisors more strongly utilise action controls mainly to compensate for the lack of (effective) formal and informal face-to-face controls when employees are working from home.

Coupled with more standardised processes, firms seemingly rely more on digital monitoring. The Covid-19 pandemic undermined traditional face-to-face businesses and rewarded virtual business models (George et al. 2020). Digital tools are increasingly viewed as an appropriate means of accounting and accountability in a crisis. Consistent with this view, Delfino and van der Kolk (2021) document the use of online platforms during the crisis, which provides supervisors the opportunity to monitor their employees more closely than ever before. For instance, they find that employees are more often involved in video calls, which some interview partners perceive as a means to monitor employees. Early evidence on digital monitoring as an accounting tool during the Covid-19 pandemic suggests that workers bear a cost when getting familiar with the digital technology and platforms (Battisti et al. 2022). This is in line with previous findings from the financial crisis showing that an overemphasis on constraining management controls, namely excessive monitoring and performance auditing, results in employees behaving opportunistically by focusing on short-term results (see, e.g. van der Kolk et al. 2015).

4.1.2. *Result controls*

The role and importance of result controls such as performance measures, target setting, and incentive pay have increased in times of uncertainty. At the country level, Parisi and Bekier (2022) explore the role of performance measurement systems in assessing the Covid-19 pandemic-related impact in the context of six European cities, showing how accounting performance measures played an 'adjudicating' (classifying, measuring, comparing) role in managing the pandemic at local and central levels. At the firm level, appropriate KPIs enable and facilitate the increasing adoption of WFH.

Consistent with the broadened autonomy (Flassak et al. 2022), WFH is often accompanied by a higher level of delegation in which companies transfer decision rights to local managers. Organisation design theory would predict a shift towards more performance-dependent salaries and more reliance on output rather than input controls (Jensen and Meckling 1995), stressing the importance of performance measures in aligning firms' objectives and employees' behaviour during the Covid-19 pandemic. Consistent with this view, Groen et al. (2018) provide evidence that flexible work arrangements are positively associated with an emphasis of output controls. Using survey data from the Netherlands, Bedford et al. (2022) suggest that the focus on achieving tighter budget controls increased during the early stages of the Covid pandemic. In contrast, van Triest (2021) does not find evidence of a substantial increase in output control when employees switch to WFH during the Covid-19 pandemic.

Yet KPIs may need to be adjusted or constructed innovatively in response to the pandemic. For instance, Czura et al. (2022a) study a context in which working from home was not feasible during the pandemic and highlight the ineffectiveness of the pre-pandemic performance indicators as result controls. With the changes at the workplace in response to the Covid-19 pandemic, it is crucial that existing KPIs are re-evaluated and adjusted to ensure that they reflect the new strategic priorities. This may imply that firms need to focus on short-term KPIs related to financial and operational performance and on KPIs relating to the resilience of employees and communities.

4.1.3. *Cultural controls*

Firms also adapt cultural controls such as leadership styles to improve internal transparency in times of crisis. The association between leadership and firms' outcomes (e.g. internal transparency and financial performance) is often moderated by environmental uncertainty. Waldman et al. (2001) investigate the extent to which leadership matters in periods of uncertainty. They find that charismatic leadership is positively associated with firms' financial performance in uncertain environments. In the face of a crisis, good leadership helps firms to effectively plan responses, clearly define responsibilities and roles across corporate hierarchies, and establish an effective communication strategy. Such practices allow firms to navigate through the crisis, build up resilience, and minimise the adverse impacts to their businesses.

Conceptually, directive leadership plays an important role for better resilience in times of crisis and uncertainty (Linnenluecke 2017). Stoker et al. (2019, p. 201) define directive leadership as 'the extent to which the leader makes all the decisions concerning group activities, and expects subordinates to simply follow instructions.' In line with this insight, a literature strand on leadership empirically examines how leadership styles have changed in times of crisis and provide supportive evidence that leadership styles become more directive in the presence of high uncertainty. For example, Stoker et al. (2019) analyse a dataset with over 20,000 managers in 980 organisations across 36 countries. They show that, on average, the 2008 financial crisis led to an increase in directive leadership as compared to participative leadership, where directive leadership arguably helps to tackle the issue of environmental uncertainty during the crisis. Similarly, Garretsen et al. (2022) examine the direction of change for leadership styles during the Covid-19 pandemic and find that the pandemic induced an increase in directive leadership.

Past crises such as the 2008 financial crisis or the 2015 MERS outbreak, provide evidence on the effectiveness of crisis management and the desirability of certain leadership traits in times of uncertainty. Most of the existing work concentrates on political leaders during crises. Al Knawy et al. (2019) offers a reflection of harnessing collective leadership during a MERS outbreak in Saudi Arabia, which highlights the role of leaders in developing trust, promoting staff engagement, and sharing knowledge in a crisis. James and Wooten (2010) emphasise three leadership traits to manifest positivity in a crisis: (1) a growth mindset for learning and adapting to unforeseen situations, (2) positive optimism in seeing possibilities in the negative consequences of the crisis, and (3) trustworthiness in developing and expecting trust from subordinates. Bormann et al. (2022) provide evidence that trust allows firms to adapt controls more quickly during the Covid-19 pandemic. Literature also suggests that different leadership competencies are necessary and desirable for different phases of a crisis (Wooten and James 2008). At the peak of the crisis, leaders' ability to make decisions under pressure and to communicate effectively plays an important role, whereas during the recovery phase, promoting organisational resilience through fostering trust and reflective learning becomes crucial.

The Covid-19 pandemic triggered an exogenous shock which has unique features and differs from other past crises in many aspects,[10] giving rise to a need for more transformational leadership traits to deal with the crisis (Dwiedienawati et al. 2021). Jensen et al. (2019) define transformational leadership as 'behaviors that seek to satisfy employees' higher order needs in order to engage them in attaining the organizational goals'. For instance, Ma and Yang (2020) empirically show that even though effective communication continues to have positive effects, leaders who provide a good role model and to whom employees can look up to for guidance help firms

[10]Compared, for example, to the financial crisis 2008, the Covid-19 pandemic is at its core a health crisis. While both, the 2008 financial crisis and the Covid-19 crisis have economic consequences on firms' operations and consumers' spending patterns, the Covid-19 pandemic created health anxiety, which arguably takes a large toll on perceived stress and subjective well-being. In comparison with other health crises that were contained at the local or regional level, the Covid-19 impact is measured at the global scale, affecting all countries and sectors within. Furthermore, and quite uniquely, the Covid-19 pandemic resulted in an unprecedented adaptation of remote work and digital transformation.

perform better at the beginning of the crisis, whereas visionary vision is crucial for the long run of the Covid-19 pandemic. Similarly, Dirani et al. (2020) review the crisis leadership literature and identify role model and vision as essential leadership skills to provide employees with a sense of direction and emotional stability. In addition, they highlight a new role of leaders as technology enablers to swiftly integrate digital transformation within the organisation during the Covid-19 pandemic. In an interview with more than 350 senior executives about their post-Covid strategies, 91% plan to increase investment in digital technology, which will become a significant part of remote working in the coming years (McKinsey, Covid-19 Briefing Note 84, December 8, 2021).

The effectiveness of transformational leadership during the Covid-19 pandemic has been well documented. Transformational leaders have a positive effect on employees' performance during a crisis, which in turn decreases employees' intention to quit their job (Yücel 2021). The channels through which transformational leaders improve individual and team performance is through higher job autonomy (Alkadash et al. 2020, Van Triest 2021), higher employees' engagement at work, and better adaptability to technological changes (Koekemoer et al. 2021). In terms of mental health, Czura et al. (2022b) document that transformational leaders mitigate a negative shock on employees' performance and build up employees' resilience in a setting where WFH is unfeasible, and employees' day-to-day work is heavily affected. They suggest that the benefit of transformational leadership during a crisis pertains to leaders' ability to communicate a clear and positive vision of the future and to provide clarity regarding organisation's values and practices.

4.1.4. *Survey evidence*

In this subsection, we present survey evidence on the change in management controls in response to the Covid-19 pandemic. We present descriptive evidence from a survey among employees of a large international multi-divisional service firm and from the GBP.

In the survey at the service firm, we asked employees without supervisory function to what extent they were exposed to action controls comprising the theoretical constructs autonomy and standardisation. We also asked employees with (without) supervisory function about their use of (exposure to) result controls relying on the construct tightness. Finally, we asked employees without supervisory function about their perception of cultural controls relying on the construct socialisation. In Panels A1 to A3 of Table 3, we report on the change to the individual questions from 2019 to 2021.

Panel A1 reports on the changes in action controls due to the Covid-19 pandemic. We find some evidence that in 2021, employees perceived more autonomy than in 2019. More specifically, the extent to which employees conducted non-routine activities without the involvement of their supervisor statistically significantly (p-value < 0.05) increased from 2019 to 2021. We also find that activities affecting multiple organisational units (e.g. teams, departments) were more strongly standardised through pre-planning as well as through formal and informal standards, programmes, and procedures in 2021 as compared to 2019 (p-value < 0.01). The findings on standardisation suggest that action controls were stronger in 2021 as compared to 2019. It is plausible that the strengthened action controls are a means to deal with the increased incentive problems due to the crisis.

For result controls (Panel A2), we find that target setting has become more flexible in 2021 as compared to 2019 (p-value < 0.05). We also find that supervisors consulted their employees more frequently about their target achievement in 2021 as compared to 2019 (p-value < 0.05). While the former result suggests that targets were less tight in 2021 compared to 2019, the latter result suggests that targets were tighter in 2021 as compared to 2019. We do not find a significant difference regarding supervisors' requirement to provide explanations for variances from targets and

Table 3. Covid-19 and management controls.

Survey question	2019	2021	diff./sign.
Panel A: Survey evidence from a large international multi-divisional service firm			
Panel A1: Action controls			
To what extent do you conduct non-routine activities without the involvement of your supervisor?	4.80	4.94	0.15**
To what extent do you have the freedom to create your own methods of getting work done if no standard procedures exist?	4.89	4.98	0.09
To what extent are your work activities determined by standardised procedures or processes?	4.58	4.66	0.08
To what extent are the activities between organisational units (e.g. teams, departments) coordinated through pre-planning of activities.	4.1	4.28	0.18***
To what extent are the activities between organisational units (e.g. teams, departments) coordinated through formal and informal standards, programmes or procedures.	4.33	4.52	0.19***
Panel A2: Result controls			
How flexible are the targets that your supervisor sets for you once they have been set?	4.01	4.16	0.15**
How frequently does your supervisor consult you about your target achievement (1: annually – 7: daily)?	2.06	2.15	0.10**
To what extent does your supervisor require you to provide explanations for variances from target performance levels?	3.23	3.28	0.05
To what extent is your evaluation based on the achievement of performance targets?	4.15	4.19	0.04
Panel A3: Cultural controls			
To what extent are training and development processes used to reinforce the objectives, expectations and norms of the company?	4.17	3.92	−0.25***
To what extent are social events and functions used to develop and maintain commitment to the company?	4.78	2.33	−2.45***
To what extent are mentoring, orientation and induction programmes used to acclimatise new employees to acceptable behaviours, routines and norms?	4.31	3.80	−0.51***

Survey question	Mean
Panel B: Survey evidence from the German Business Panel	
Panel B1: Restructuring	
Did your company initiate any of the following restructuring measures in the past calendar year, e.g. due to the economic restrictions in connection with the Covid-19 pandemic? *(0 = Not selected, 1 = Selected)*	
breakdown or reorganisation of business units or departments	0.19^{+++}
establishment or reduction of hierarchy	0.12^{+++}
regrouping tasks into departments	0.28^{+++}
redesign of internal process flows	0.46^{+++}
outsourcing of parts of the company	0.05^{+++}
wage adjustments or employee layoffs	0.24^{+++}

(*Continued*)

Table 3. Continued.

Survey question	Mean
Panel B: Survey evidence from the German Business Panel	
Panel B2: Use of KPIs	
How far do you agree to the following statement concerning the effect of the corona crisis on your company in 2020? When determining variable payments, the corona crisis led to … *(0 = No, 1 = Yes)*	
change in the weighting of KPIs	0.05^{+++}
use of new financial KPIs	0.05^{+++}
use of new non-financial KPIs	0.03^{+++}
adjustment of KPIs	0.05^{+++}
adjustment of objectives	0.20^{+++}
With regard to credit agreements, the corona crisis led to … *(0 = No, 1 = Yes)*	
use of new KPIs	0.06^{+++}
adjustment of existing KPIs	0.04^{+++}
adjustment of KPI thresholds	0.06^{+++}
The Corona crisis led to the following changes in disclosures to external stakeholders … *(0 = No, 1 = Yes)*	
use of new KPIs	0.09^{+++}
use of new non-financial KPIs	0.04^{+++}
adjustment of existing KPIs	0.09^{+++}

Notes: Table 3 presents descriptive statistics on Covid-19 and management controls. Panel A relies on survey data from a large international multi-divisional service firm using the responses of employees without supervisory function. All items are measured at a 1–7 Likert scale. Panel A1 reports on the change in action controls from 2019 to 2021. Panel A2 reports on the change in result controls from 2019 to 2021. Panel A3 reports on the change in cultural controls from 2019 to 2021. Panel B relies on survey data from the German Business Panel. Panel B1 reports on restructuring. Panel B2 reports on the use of KPIs. Except for the questions related to restructuring, the mean statistics are adjusted for survey weights to increase the generalizability of the findings. ***, **, * indicate a statistically significant difference between the means at the 1, 5, 10% level, correspondingly. $^{+++}$, $^{++}$, $^{+}$ indicate a mean that is statistically significant different from 0 at the 1, 5, 10% level, correspondingly.

in the extent to which the employees' evaluation is based on target achievement. Collectively, the results suggest that during the pandemic, supervisors are more likely to revise targets and increase the frequency of following up on target achievements. The results are consistent with a supervisor who is more actively engaged in result controls, suggesting an increased relevance of result controls in times of crisis.

Consistent with our results, Bedford et al. (2022) document that budget control becomes tighter during the Covid-19 pandemic, suggesting an increased focus on achieving more rigid budget targets. Similar to their findings, our survey shows that supervisors increase the frequency of target monitoring. However, we document mixed evidence on the tightness of result control. In particular, we find that supervisors become more tolerant of deviations from targets. The difference in our results may be simply due to the different samples, or due to the short-term analysis as a response to the pandemic.

Panel A3 reports broad changes to cultural controls due to the Covid-19 pandemic. We find that socialisation has statistically significantly (p-value < 0.01) decreased from 2019 to 2021. More specifically, employees were less strongly involved in training and development processes, they participated less in social events, and they were less strongly involved in mentoring, orientation, and induction programmes. Apparently, the firm at the research site was unable to address the pandemic-related social distancing requirements by establishing online or digitalised socialisation procedures. Hence, the results suggest that the onboarding of new employees and the fostering of identification with the firm have both suffered because of the pandemic.

Collectively, the findings in Panels A1 to A3 suggest that supervisors account for the increase in the incentive problems caused by the Covid-19 pandemic in the short-run by more strongly standardising processes and adjusting target tightness. While these measures may suffice in the short run, the lack of effective cultural controls is likely detrimental in the long run.

Next, we investigate results from the GBP on the questions whether firms, in response to the Covid-19 pandemic, engage in restructuring activities and adjust their use of key performance indicators (KPIs). We report on descriptive evidence in Panels B1 and B2 of Table 3.

We find that many firms have initiated various kinds of restructuring activities (Panel B1). For instance, 19% of the firms report that they have re-organised departments, 12% report about adjustments in the organisational hierarchy, 28% indicate that they have regrouped tasks into departments, and 46% report that they have redesigned or have started to redesign internal process flows. Further restructuring activities relate to outsourcing and adjustments to the workforce.

We also find a statistically significantly proportion (p-value < 0.01) of firms indicating that they have adjusted their KPIs or even set up new KPIs in response to the Covid-19 pandemic to determine variable payments, for credit agreements, and in disclosures to external stakeholders (Panel B2). For instance, for determining variable compensation, five percent of the respondents indicate that they have changed the weighting of KPIs, five (three) percent report that they now use new financial (non-financial) KPIs, five percent indicate that they have adjusted their KPIs, and 20% indicate that they have adjusted the objectives for their employees. New or adjusted KPIs are also used for credit agreements. In terms of disclosures to external stakeholders, nine percent of the respondents indicate that they use new KPIs, four percent indicate that they use new non-financial KPIs, and nine percent indicate that they have adjusted their KPIs.

The restructuring activities are well in line with the notion that a crisis necessitates organisational changes. In addition, the adjustment of organisations' information systems suggests that organisations have started to address the shock to transparency that arguably is associated with a crisis. That said, as organisational changes likely require further adjustments of an organisation's management controls, including the organisation's information system, the association between organisational changes and the organisation's information system remains an open question. In other words, organisational changes may either amplify or attenuate the necessary adjustments of an organisation's information system to deal with the consequences of a crisis.

4.2. *Firm resilience: evidence from the German business panel*

In this subsection, we explore consequences of the Covid-19 pandemic in terms of firms' resilience. Following the literature on resilience, we define resilience as firms' ability to bounce back from an exogenous shock (Akgün and Keskin 2014, Välikangas and Romme 2012). More specifically, resilience relates to the difference between firms' outcomes before and after the crisis (e.g. performance, effectiveness of management controls, etc.). Consequently, resilience captures both firms' resistance, i.e. the change in firms' outcomes at the onset of the crisis, and firms' recovery throughout the crisis.

We argue that adjustments in management controls support firms in building up resilience. In particular, less resilient firms are likely to face a need to adjust their management controls to better adapt to the challenges posed by the crisis, whereas more resilient firms might either already have appropriate management controls in place or their operations are not severely impacted and hence they are able to continue functioning with the existing management controls. Thus, firms' flexibility in terms of management controls plays an important role in their adaptability and resilience during the crisis.

We examine how the Covid-19 pandemic influenced firms' resilience by relying on the GBP survey. In particular, we explore the association between transparency, management controls, and resilience. We present descriptive evidence in Table 4. Panel A compares more and less resilient firms in terms of the specific impact on firms' transparency of the Covid-19 pandemic. Panels B1 and B2 compare more and less resilient firms in terms of their adjustments to result and cultural controls. We label firms to be more (less) resilient when they indicate in the survey that they have already reached (will never reach) their pre-crisis levels in terms of revenues.[11] Evidence in Panel C on firms' intended workforce adjustments substantiates our labelling.

Following Panel A, we find that less resilient firms were more often forced to discontinue or interrupt their medium- and long-term financial plans (p-value < 0.01). In comparison, more resilient firms more strongly made use of sensitivity and/or scenario analyses (p-value < 0.05). We do not find a difference between more and less resilient firms in terms of perceived requirements to more explicitly and transparently communicate with stakeholders. The results suggest that less resilient firms faced a larger shock to transparency than more resilient firms, requiring larger adjustments to their financial plans. Potentially, the availability of sensitivity and scenario analysis allows the more resilient firms to continue using their financial plans.

In terms of result controls (Panel B1), we find that less resilient firms more often adjusted their KPIs to determine variable payments, for credit agreements, and in disclosures to external stakeholders as compared to more resilient firms. More specifically, nine (four) percent of the less (more) resilient firms indicate that they have adjusted their KPIs (p-value < 0.10); 27 (17)% of the less (more) resilient firms indicate that they have adjusted the objectives in variable compensation (p-value < 0.05); ten (five) percent of the less (more) resilient firms indicate that they now use new KPIs in credit agreements (p-value < 0.10); and 13 (seven) percent of the less (more) resilient firms indicate that they have adjusted the existing KPIs in disclosures to external stakeholders (p-value < 0.10). These findings are consistent with the statement that less resilient firms faced a larger shock to transparency than more resilient firms, requiring the former to adjust their KPIs.

We also investigate whether more and less resilient firms differentially adjusted their salary and bonus payments. We find that less resilient firms more likely plan to curtail future salary increases or bonus payments for all kinds of employees, including the management board, middle management, and other employees (p-value < 0.01). These findings are consistent with the statement that less resilient firms need to reduce expenses to make up for the loss in revenues, and they intend to do so by reducing payments to their employees.

In terms of cultural controls (Panel B2), we find broad evidence that more resilient firms are characterised by a significantly higher level of organisational trust (p-value < 0.01) as compared to less resilient firms. For instance, respondents indicate that employees have a lot of trust in managers (8.74 on a scale from 1 to 10 for more resilient firms). As organisational trust is associated with transformational leadership, these findings suggest that more resilient firms are more likely characterised by transformational leadership than less resilient firms. Acknowledging

[11] Using this variable measurement, we do not account for the extent to which firms experienced a decline in revenues due to the Covid-19 pandemic. Few firms/industries did not experience a severe decline in revenues or even experienced an increase in revenues. By definition, these firms did not experience a crisis such that it is inappropriate to refer to firm resilience here. Thus, we acknowledge that in case we have these firms in our sample, they would be classified as more resilient firms. Future research may investigate the role of firm industry in explaining adjustments in management controls.

Table 4. Survey evidence from the German Business Panel: Resilience.

Survey question	More resilient firms Mean	Less resilient firms Mean	diff./sign.
Panel A: Transparency			
How far do you agree with the following statement concerning the effect of the corona crisis on your company in 2020? The Corona crisis led to … *(0 = No, 1 = Yes)*			
discontinuation or interruption of medium- and long-term financial plans	0.19	0.50	−0.30***
greater use of sensitivity and/or scenario analyses	0.22	0.13	0.09**
more explicit and transparent communication	0.30	0.26	0.04
Panel B: Management controls			
Panel B1: Result controls			
How far do you agree to the following statement concerning the effect of the corona crisis on your company in 2020? When determining variable payments, the corona crisis led to … *(0 = No, 1 = Yes)*			
change in the weighting of KPIs	0.05	0.07	−0.02
use of new financial KPIs	0.05	0.06	−0.00
use of new non-financial KPIs	0.03	0.03	0.00
adjustment of KPIs	0.04	0.09	−0.05*
adjustment of objectives	0.17	0.27	−0.10**
With regard to credit agreements, the corona crisis led to … *(0 = No, 1 = Yes)*			
use of new KPIs	0.05	0.10	−0.05*
adjustment of existing KPIs	0.05	0.08	−0.03
adjustment of KPI thresholds	0.07	0.07	0.00
The Corona crisis led to the following changes in disclosures to external stakeholders … *(0 = No, 1 = Yes)*			
use of new KPIs	0.07	0.10	−0.03
use of new non-financial KPIs	0.07	0.05	0.02
adjustment of existing KPIs	0.07	0.13	−0.06*
For which group(s) do you plan a reduction of future salary increases or bonus payments? Multiple answers are possible. *(0 = No, 1 = Yes)*			
salary/bonus reduction management board	0.25	0.43	−0.18***
salary/bonus reduction middle management	0.21	0.38	−0.17***
salary/bonus reduction other employees	0.21	0.42	−0.21***
Panel B2: Cultural controls			
How would you assess your company? *(0 = I do not agree at all, 5 = neutral, 10 = I strongly agree)*			
There is a very high level of trust throughout the company.	8.73	7.72	1.01***

(*Continued*)

Table 4. Continued.

Survey question	More resilient firms Mean	Less resilient firms Mean	diff./sign.
When someone within the company makes a promise, others in the company almost always trust that person to do his/her best to keep the promise.	8.85	8.46	0.39***
In this company, employees have a lot of trust in managers.	8.74	8.33	0.41***
Managers in this company trust their employees to make good decisions.	8.66	8.07	0.59***
Panel C: Workforce adjustment			
Are you currently planning to hire additional employees in the short term (0–12 months)? *(0 = No, 1 = Yes)*	0.44	0.12	0.32***
Are you currently planning to hire additional employees in the medium term (12–24 months)? *(0 = No, 1 = Yes)*	0.56	0.22	0.34***
How many additional employees (in full-time positions) are you planning to hire in the short term (0–12 months)? [0,∞]	2.90	0.64	2.26**
How many additional employees (in full-time positions) are you planning to hire in the medium term (12–24 months)? [0,∞]	9.55	1.46	8.09

Notes: Table 4 presents survey evidence from the German Business Panel on transparency, management controls, and resilience. Panel A presents mean statistics on Covid-19, transparency, and resilience. Panel B presents mean statistics on Covid-19, management controls, and resilience. Panel B1 examines result control. Panel B2 examines cultural control. Panel C presents mean statistics on workforce adjustments. ***, **, * indicate a statistically significant difference between the means at the 1, 5, 10% level, correspondingly.

that the Covid-19 pandemic induced an increase in directive leadership (Garretsen et al. 2022), the findings suggest that less resilient firms are more likely characterised by a directive leadership style. While we document that trust may be beneficial in terms of firm resilience during the crisis, note that too much trust in managers can backfire in other contexts. For example, Bedford et al. (2022) document that when employees trust their managers, their responses to tighter budget controls can lead to a deterioration of their emotional well-being.

Panel C compares more and less resilient firms in terms of their intended adjustments to the workforce. We find that more resilient firms more often plan to hire additional employees both in the short and the long term (p-value < 0.01) and that more resilient firms also plan to hire more employees in the short term (p-value < 0.05). The results substantiate our labelling of firms' resilience based on their survey response regarding the pre-crisis level in revenues.

Collectively, our results suggest that the accounting departments of less resilient firms faced larger challenges in financial planning and performance measurement than similar departments of more resilient firms. Hence, the shock to transparency seems to be smaller for more resilient firms. Also, more resilient firms are characterised by trustful cooperation of employees and management, thus emphasising the effectiveness of a transformational leadership style.

A noteworthy caveat is that these results reflect associations, no causal relations. However, it is plausible that less resilient firms faced larger disruptions and changes to their operations that, consequently, require adjustments to their performance measurement. Also, a plausible benefit of investments in organisational trust are improved relationships between employees and management, which are likely to be beneficial in times of a crisis and contribute to a firm's resilience.

5. Conclusion

This study explores the effects of the Covid-19 pandemic on business. First, we argue that the Covid-19 pandemic constitutes a transparency shock for firms and is associated with amplified incentive problems within firms. Second, by reviewing literature and providing descriptive evidence from a survey conducted within a large international multi-divisional service firm and the German Business Panel, we examine how firms respond to the crisis in terms of adjusting management controls and its consequences in terms of firms' resilience.

Collectively, the findings suggest that the Covid-19 pandemic has increased the awareness of the importance and role of management controls to navigate through crises. For example, firms have responded to the crisis by stronger action controls (e.g. more standardised processes, more strongly making employees participate in the planning process) and adjustments in result controls (e.g. adjustment of existing KPIs, use of new KPIs, adjustments in the tightness of targets). The Covid-19 pandemic is also associated with adjustments in cultural controls as it reduced socialisation processes and changed leadership style requirements, giving rise to more transformational leadership traits to deal with the crisis. Finally, we explore the association between management controls and firm resilience. We find that less resilient firms more strongly adjust result controls (e.g. by adjusting KPIs used to identify bonus payments), whereas more resilient firms are characterised by stronger cultural controls in terms of higher organisational trust. The latter finding suggests that a hitherto underappreciated benefit of investments in organisational trust is the strengthened resilience in times of a crisis.

Against the backdrop of these findings, management controls are important in times of crises. There are two key implications for firms to prepare for crises: First, firms can adjust their management controls in the short-term to address the increase in control problems during crises. In particular, the shortcomings of one control element can be compensated by another control element. For example, managers were able to (efficiently) adjust a few management control practices related to employees' actions and results (such as standardisation or budget tightness) in the short-term to compensate for the lack of employee monitoring. Second, cultural control, in particular trust, was an important asset during the crisis since it reduced the need to implement costly action control to compensate for the lack of monitoring. However, organisational trust takes time to be established and requires long-term planning. Consequently, firms have to make forward-looking and continuous investment in organisational trust in preparation for crises. For example, one way to build organisational trust is through appointing transformational leaders who provide clear employee guidance and motivate employee job engagement. Collectively, these implications substantiate the notion of management controls as a package of interrelated elements.

This study examines the short-term implications of the Covid-19 pandemic for firms' management controls. A limitation is that some management controls can hardly be adjusted in the short-term. Thus, future research may explore the medium- to long-term consequences of the Covid-19 pandemic for firms' management controls. Furthermore, we conduct the survey within one service firm such that the results may not be generalisable across firms. However, since we distributed the survey among back-office employees, the findings are arguably generalisable to other types of businesses and even manufacturing firms. Finally, using data from the German Business Panel, future research may explore whether the extent to which firms were exposed to a demand as compared to a supply shock, changes how firms responded to the crisis in terms of adjusting management controls. For instance, while demand shocks stress liquidity concerns and challenge financial planning, supply shocks may result in supply bottlenecks and challenge operative planning.

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