Did work from home "really" work during COVID-19?

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Abstract

Purpose – In this study, we examine whether work from home (WFH) had an impact on firm productivity during the COVID-19 period.

Design/methodology/approach – We employ a panel fixed-effect model using 79,201 firm-quarter observations in a cross-country setting of 68 countries.

Findings – First, we find that firms that employed WFH contributed to real sector growth during the pandemic due to greater capital expenditure compared to otherwise. Second, we find that WFH amenable firms turned over assets better than less WFH amenable firms.

Originality/value – To the best of our knowledge, this is the first study to examine the impact of WFH on firms' investment and efficiency using a cross-country setting.

Keywords Work from home, Capital expenditure, Asset turnover, COVID-19

Paper type Research paper

1. Introduction

The COVID-19 pandemic-induced economic crisis is unprecedented in modern history (Baker *et al.*, 2020; Huynh, Dao, & Nguyen, 2021). The spread of the virus and the subsequent stringent lockdowns severely disrupted firms' operations, impacting global supply chains (Brinca, Duarte, & Faria-e-Castro, 2020; Guan *et al.*, 2020). Unlike previous economic crises, the COVID-19-induced crisis is unique in two ways: (1) it impacted firms' assets and liabilities contemporaneously, and (2) it disrupted the primary mode of workforce interaction - face-to-face. To mitigate the crisis's effects, several firms moved their workforce remotely to continue activity and production. This distinctive crisis and subsequent firm reaction present us with an opportunity to investigate whether firms' ability to pivot to remote working helped during the crisis period. In this study, we examine whether amenability to remote working impacted firm-level activity during the COVID-19 pandemic.

COVID-19 created a supply shock for *"non-essential"* industries because of the lockdowns, quarantines, and stay-at-home orders to curtail the spread of the virus (Dingel & Neiman, 2020; Koren & Pető, 2020). Additionally, global demand, especially for discretionary and durable products, has reduced due to the pandemic-induced disruptions (Guerrieri, Lorenzoni, Straub, & Werning, 2022). Del Rio-Chanona, Mealy, Pichler, Lafond, and

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Farmer (2020) found that the pandemic adversely impacted sectors less amenable to remote working like entertainment and air transportation. Overall, early evidence indicates that COVID-19 resulted in reduced output for the industries that faced an immediate shortfall in supply and demand. Firms that were unable to continue operations had disrupted investment cycles and supplies. Therefore, we expect firms that have adapted via remote working to be better positioned to mitigate the risks of pandemic-induced disruptions.

Firms amenable to working remotely are more likely to invest in future capacity due to their ability to carry out operations even during the pandemic. In the previous major economic crisis, the Global Financial Crisis (GFC), workplace flexibility did not impact firms' decisions, as the GFC did not directly impact daily operations, especially face-to-face work. However, remote work played a central role during the pandemic-induced crisis in the field (Barry, Campello, Graham, & Ma, 2022). Anecdotal evidence also shows that the remote working ability of firms impacts their investment flexibility. Given this context, we expect WFH amenable firms to have better investment flexibility to increase their capital expenditure further to exploit the pandemic-induced growth opportunities (Barry *et al.*, 2022). In this context, Bai, Brynjolfsson, Jin, Steffen, and Wan (2021) show that firms with remote working ability retained a higher share of capital investments during the pandemic period. To illustrate this, in Figure 1, we show investments in capital expenditure pre-COVID-19 and during the COVID-19 shock period. The trends in Figure 1 indicate that teleworkable industries have increased their investments in capital expenditure compared with less teleworkable industries during the COVID-19 shock period.

The defining characteristic of the COVID-19 crisis was that globally governments announced lockdowns, quarantines and stay-at-home orders to reduce the spread of the virus. These restrictions adversely impacted the firms' operations, resulting in reduced sales. Thus,

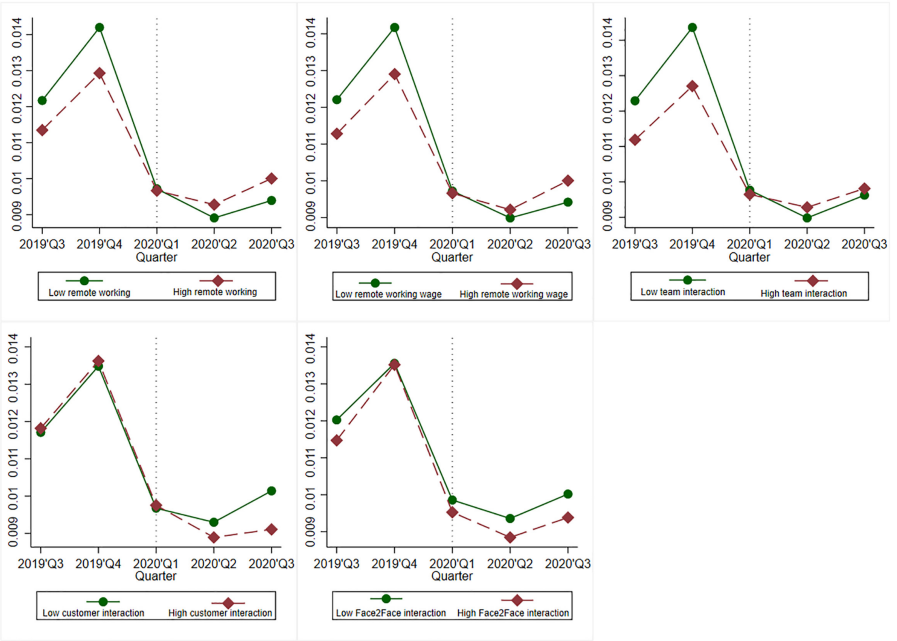


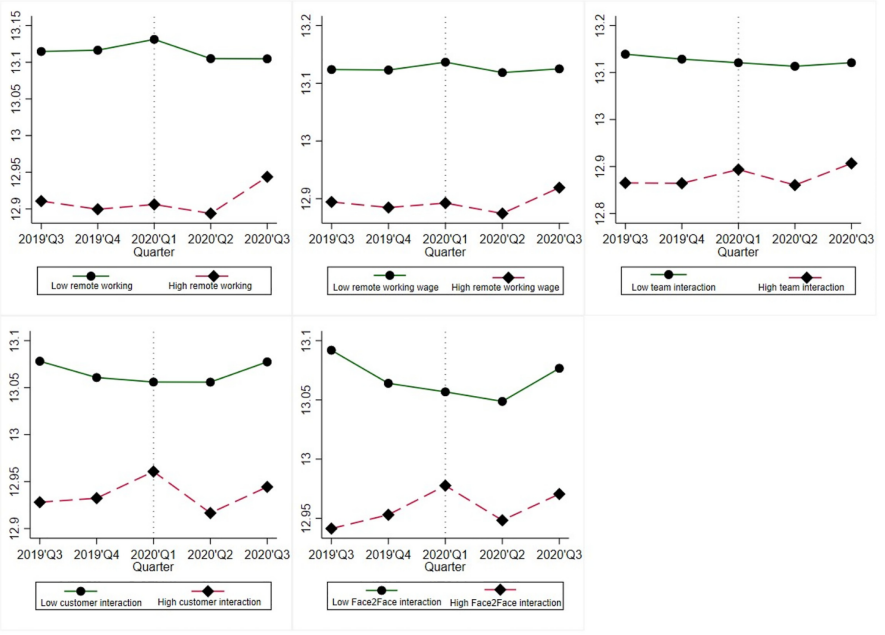
Figure 1.
Parallel trends of average capital expenditure

Source(s): Figure by authors

firms resorted to increased usage of WFH operations. Bai *et al.* (2021) show that the remote working firms have higher resilience during the pandemic. These firms have higher sales, net income, and stock returns than less remote working firms during COVID-19. As the firms amenable to remote working can continue their operations during the pandemic period, we expect such firms to have a higher asset turnover during the COVID-19 shock period than the less amenable firms. To illustrate this, we show in Figure 2 firms' asset turnover in the pre-COVID-19 and COVID-19 shock periods. The trends shown in Figure 2 indicate that firms in industries amenable to remote working have a higher asset turnover compared with less amenable industries during the COVID-19 pandemic. Taken together, it is likely that WFH-amenable firms increased their firm-level activity during the pandemic period.

In this paper, we investigate the impact of remote working amenability on firm activity. We use a sample of 79,201 observations from 68 countries to examine the impact of remote working ability on firm-level activity. Using a difference-in-difference model, we find that firms in industries amenable to remote working increase their capital expenditure and asset turnover during the pandemic. With a large cross-country sample and interactive fixed effects model, the identification strategy provides external validity for our results. The results are robust to various alternative specifications and definitions of industries' remote working abilities.

To the best of our knowledge, this is the first study to examine the impact of remote working amenability on the activity level of firms, and our contribution is as follows. First, we find that remote working firms invest more in capital expenditure during the pandemic period. These firms invest more in future growth opportunities as they continue their operations during the pandemic. Second, the WFH amenable firms have higher asset turnover during COVID-19, indicating higher resilience and capacity utilisation by the WFH



Source(s): Figure by authors

Figure 2.
Parallel trends of average asset turnover

amenable firms during the pandemic. Third, we find that the remote working firms in developed economies exhibit higher capital expenditure and asset turnover than those in emerging economies. This result emphasises the impact of the digital divide between the developed and emerging economies.

Additionally, we also focus on the ability of such firms to increase capital expenditure and asset turnover by remote working firms during the COVID-19 period. Specifically, we show that high WFH amenable firms have higher cash to invest in operations during the pandemic period. Cash holdings help firms reduce the adverse impact of the pandemic and invest more in future opportunities (Fahlenbrach, Rageth, & Stulz, 2021). Furthermore, these firms also have higher debt and tangibility during the pandemic. These findings suggest that WFH - amenable firms become opportunistic during COVID-19 and raise more debt to invest in future growth as they continue their operations. The increased tangibility suggests high debt raising capacity during the pandemic period. Our results support the findings of Cherry, Jiang, Matvos, Piskorski, and Seru (2021) and Gopalakrishnan, Jacob, and Mohapatra (2022).

Our findings also add to the emerging literature of COVID-19 impact on firms, and corporate finance literature. Ding, Levine, Lin, and Xie (2021) showed that firms less exposed to global supply chains and more engaged in corporate social responsibility activities were less adversely impacted by the pandemic. Barry *et al.* (2022) show the impact of corporate flexibility, in terms of, workforce flexibility, investment flexibility and financial flexibility during the pandemic period. This study shows that these factors play a crucial role in business planning and responses to the crisis. Bai *et al.* (2021) show that the firms amenable to WFH show higher resilience in terms of sales, income and returns during COVID-19. Bloom, Fletcher, and Yeh (2021) show heterogeneity in how COVID-19 impacts firms. Offline businesses were more adversely impacted during the pandemic period. Regarding research evidence in corporate finance, previous studies show that the announcement of capital expenditure and the quality of capital expenditure impact the market's reaction to the decision (Chung, Wright, & Charoenwong, 1998; McConnell & Muscarella, 1985). Furthermore, evidence also indicates that creditors impose capital expenditure restrictions when the credit quality of the borrower decreases. It further results in reduced firm investment (González, 2016; Nini, Smith, & Sufi, 2009). Other results also suggest that asset turnover positively impacts the profitability (Alarussi & Alhaderi, 2018; Dickinson, 2011).

In continuation of these results, our study provides imperative evidence that firms can cope with the challenges posed by the COVID-19 shock, and specifically, WFH amenable firms have higher firm-level activity during the crisis period. The rest of the paper is organised as follows. The next section reviews relevant literature and builds on the hypotheses tested in our study. The subsequent section describes the data and the research design employed in our study. Next, we discuss the key findings of our study. In the final section, we conclude with potential insights and learnings for investors and policymakers.

2. Review of relevant literature and hypothesis development

2.1 Work from home and capital expenditure

Even before the breakout of COVID-19, many firms adopted WFH. Bloom, Liang, Roberts, and Ying Jenny (2015) show that firms adopting WFH practices show higher productivity and improved performance. The study shows that adopting modern technology techniques helps improve firm performance. Innovative management practices are essential for firm productivity. Klotz (2016) also show that WFH practices result in increased firm productivity. The COVID-19 induced restrictions adversely impacted firms in general. This resulted in increased volatility of operational revenues and decreased recovery (Ge, Huang, Wang, Jiang, & Liu, 2023). Further, it had a supply chain spillover. Ge *et al.* (2023) show that WFH increases the firm resilience by reducing operational revenue volatility and supply chain disruptions.

The WFH amenability also helps small firms survive during the pandemic. Zhang, Gerlowski, and Acs (2022) show that digital resilience helps small firms reduce the probability of default, operational disruptions, and better cash flow position. The study demonstrates WFH adoption as "*creative destruction.*" It also helps reduce COVID-19 distress. WFH mitigates the COVID-19-induced shock by increasing employees' probability of performing their jobs (Alipour, Fadinger, & Schymik, 2021). In addition, WFH practice is positively associated with success during the pandemic period (Kagerl & Starzetz, 2023). Given that the pandemic-induced uncertainty provides disproportionate growth opportunities to the firms that are amenable to working from home, we posit that:

H1. Firms that are more amenable to remote working have higher capital investment intensity than the less amenable firms during COVID-19.

2.2 Asset turnover and work from home

In recent times, ample evidence exists related to WFH amenability and its impact on individuals and firms since the inception of COVID-19. Previous studies show that firms' digital resilience helps improve performance. For instance, Fairlie and Fossen (2022) show that firms suffered from sales losses during the pandemic period. These losses were the largest for firms majorly impacted by the stringent lockdowns imposed during the pandemic to curtail the virus's spread. However, the firms that could shift to online mode increased sales even during the pandemic. The study shows that there is a shift from an in-store business to a digital business during the pandemic. In addition, the number of firms that practised digital interaction has increased more compared with traditional interaction (Gavin, Harrison, Plotkin, Spillecke, & Stanley, 2020). Additionally, the firms amenable to WFH were able to adapt to the pandemic-induced changes. Bai *et al.* (2021) showed that firms with high WFH amenability in the pre-pandemic period performed better during the pandemic. Barrero, Bloom, Davis, and Meyer (2021) and Bloom *et al.* (2021) show that the firms with a stronger WFH amenability continue to grow even after the peak crisis period. Therefore, we posit that more WFH amenable firms generate higher sales from the assets than less WFH amenable firms during COVID-19.

H2. Firms more amenable to remote working have higher asset turnover than the less amenable firms during COVID-19.

2.3 Work from home and the digital divide

Debates on the global digital divide [1] predate COVID-19 pandemic. The United Nations Conference on Trade and Development (UNCTAD), in its Digital Economy Report 2019, impresses on the impact of digital technologies on transforming economic and social activities. Simultaneously, the report warns that "widening digital divides threaten to leave developing countries, and especially least developed countries, further behind". Dingel and Neiman (2020), in their seminal work on working from home clearly articulate the existence of the digital divide – emerging lower-income economies have lower teleworkable jobs. Chiou and Tucker (2020) show that even within a high income economy such as the USA, there is a digital divide between high- and low income households.

On the one hand, the aforementioned anecdotal evidence points to the presence of a digital divide, especially between advanced and developing economies. On the other hand, studies such as Bloom *et al.* (2015), Klotz (2016), Bai *et al.* (2021), Barry *et al.* (2022) clearly point out the positive benefits of work from home amenability, and its impact on various measures of firm performance. During COVID-19, the response by all governments regardless of income level was similar – lock downs, and as a result, working from home. Combining the two perspectives of the digital divide's presence and the impact of work from home on firm

activity and performance, we find this an interesting setting to study whether the digital divide affects the impact of remote working on firm activity. Therefore, we posit that firms domiciled in advanced economies with better access to digital resources (as evidenced by income level/developmental status), relatively fared better in generating better Capex, and turning over assets than firms domiciled in emerging economies.

H3. Work from home amenable firms domiciled in advanced economies have higher capex intensity and asset turnover than WFH amenable firms domiciled in developing economies.

3. Data and methodology

3.1 Data description and summary

We employ a quarterly panel of 79,201 observations from 68 countries [2]. Our sample period starts from January 2017 to December 2020. We define the COVID-19 shock period as Q2′2020 to Q4′2020. We obtain all firm-level variables from Thomson Reuters Eikon and exclude all financial firms from our study. In Table 1, we provide a detailed description of all the variables used in the study. We match all the WFH amenability measures of industries to our sample based on the two-digit North American Industry Classification System (NAICS) code. We winsorize all the financial variables at 1^{st} and 99^{th} percentiles to deal with outliers.

We define *Capital Expenditure* as the ratio of CapEx to assets and *Asset turnover* as the ratio of sales to assets. CapEx equals the expenditure incurred for factories, equipment and intangible assets with a useful life of more than a year.

Our primary explanatory variable is $X_j \times$ COVID-19, where X represents the WFH variables. Our choice of WFH variables stems from the nature of work and activity level of an occupation in an industry. Therefore, we use *Remote working*, *Remote working wage*, *Team interaction*, *Customer interaction*, *Physical presence* and *Face2Face interaction* as proxies for WFH amenability.

Remote working and *Remote working wage* are based on Dingel and Neiman (2020). *Remote working* equals the industry-wise proportion of remote working jobs. *Remote working wage* equals the industry-wise wage proportion of remote working jobs. These measures are based on two surveys collected by the O*NET database for 1,000 occupations in the US. These surveys focus on the factors that influence the nature of work and general type of job behaviour. In addition to this, we use *High remote working* and *High remote working wage*. These dummy variables equal 1 for the above-median values of *Remote working* and *Remote working wage*, respectively, and 0 otherwise.

Further, we use *Team interaction*, *Customer interaction* and *Physical presence* based on Koren and Pető (2020). These measures are based on the communication intensity required in a job. *Team interaction* equals the extent of coordinating the work and guiding subordinates. It is based on the internal communication required with co-workers. *Customer interaction* equals the extent of the requirement of establishing and maintaining interpersonal relationships with the customers. It is based on the external communication with the customers. An industry is classified as less amenable to WFH if it requires high direct customer interaction. *Physical presence* is based on the extent of the requirement of repairing and maintaining electronic and mechanical equipment. We also use *High team interaction*, *High customer interaction* and *High physical presence* based on the median values above-mentioned three measures. These dummy variables equal 1 for the above median values of *Team interaction*, *Customer interaction* and *Physical presence* and 0

otherwise.

Last, we also use *Face2Face interaction* as a proxy for WFH amenability of industries. We use this measure based on Avdiu and Nayyar (2020). *Face2Face interaction* is based on the

Variable	Definition and construction	Data source	Observations	Mean	SD	Median	Min	Max
Asset turnover	Ratio of sales to total assets of the firm	Thomson Reuters	79201	0.262	0.177	0.223	0.017	0.983
Capital expenditure (%)	Expenditures for factories, equipment, software development costs and intangible assets that have a useful life of more than one year as percentage of total assets	Thomson Reuters	53497	1.176	1.284	0.788	0.000	7.291
Remote working	A measure based on the industry-wise proportion of remote working jobs	Dingel and Neiman (2020)	79201	0.332	0.228	0.277	0.018	0.930
Remote working wage	A measure based on industry-wise wage proportion of remote working jobs	Dingel and Neiman (2020)	79201	0.423	0.237	0.399	0.038	0.959
Team interaction	A measure based on the internal communication with co-workers	Koren and Pető (2020)	78803	22.619	11.080	18.000	5.000	50.000
Customer interaction	A measure based on the external communication with customers	Koren and Pető (2020)	78803	18.604	19.886	8.000	3.000	90.000
Face2Face interaction	A measure based on the extent of personal relationships required or working directly with public in an occupation	Avdiu and Nayyar (2020)	79201	1.050	0.195	0.968	0.832	1.719
High remote working	A dummy variable that equals 1 for above-median *Remote working* score and 0 otherwise	Dingel and Neiman (2020)	79201	0.536	0.499	1.000	0.000	1.000

(*continued*)

Table 1.
Variable definitions, data sources and summary statistics

Variable	Definition and construction	Data source	Observations	Mean	SD	Median	Min	Max
High remote working wage	A dummy variable that equals 1 for above-median *Remote working wage* score and 0 otherwise	Dingel and Neiman (2020)	79201	0.517	0.500	1.000	0.000	1.000
High team interaction	A dummy variable that equals 1 for above-median *Team interaction* score and 0 otherwise	Koren and Pető (2020)	78803	0.500	0.500	0.000	0.000	1.000
High customer interaction	A dummy variable that equals 1 for above-median *Customer interaction* score and 0 otherwise	Koren and Pető (2020)	78803	0.483	0.500	0.000	0.000	1.000
High Face2Face interaction	A dummy variable that equals 1 for above-median *Face2Face interaction* and 0 otherwise	Avdiu and Nayyar (2020)	79201	0.558	0.497	1.000	0.000	1.000
Liquidity	Cash and cash equivalents scaled by total assets	Thomson Reuters	79201	0.146	0.146	0.101	0.000	0.675
Leverage	Debt-to-Equity ratio of the firm	Thomson Reuters	79201	0.752	1.335	0.406	−3.151	8.245
Profitability	Earnings before interest, tax, depreciation and amortisation (EBITDA) scaled by total assets of the firm	Thomson Reuters	79201	0.024	0.027	0.023	−0.088	0.111
Size	Logarithm of total assets of the firm (USD)	Thomson Reuters	79201	13.291	2.019	13.223	6.891	17.812
Δ Tangibility	Change in tangibility scaled by total assets	Thomson Reuters	75602	0.004	0.025	0.001	−0.072	0.148
Δ Debt	Change in debt scaled by total assets	Thomson Reuters	75877	0.005	0.044	0.000	−0.129	0.220
Δ Cash	Change in cash scaled by total assets	Thomson Reuters	76871	0.004	0.047	0.0000	−0.142	0.213

Table 1. **Source(s):** Authors' computations

extent of the requirement of working directly with others or influencing others. Again, we use *high Face2Face interaction* based on the median value of *Face2Face interaction*. It equals 1 for the above-median value of *Face2Face interaction* and 0 otherwise. We match all the WFH amenability measures to our sample based on the two-digit NAICS code.

We use *Liquidity*, *Leverage*, *Profitability* and *Size* as firm-level control variables. *Liquidity* equals cash and cash equivalents scaled by the total assets of the firm. *Leverage* and *Profitability* equal the debt-to-equity ratio and Earnings before interest, tax, depreciation and amortisation (EBITDA) scaled by total assets, respectively. We define *Size* as the logarithm of the total assets of the firms. Table 1 describes all the variables used in the study. We winsorize all the financial variables employed in our study at 1^{st} and 99^{th} percentiles to deal with outliers.

In Table 1, we also show the summary statistics. The average asset turnover is 0.26, which indicates that the firms in our sample are good at generating revenue from their assets. The average capital expenditure is 1.17% of the assets. The average remote working score and face2face interaction score are 0.33 and 1.05, respectively. The median value of remote working variables and high face2face interaction is 1, indicating that half of the sample firms are more amenable to WFH. However, according to the communication intensity variables of WFH amenability, 75 percentile of the firms in our sample are less amenable to WFH. The average size of firms in our sample is 13.92. The average profitability of firms in our sample is 0.02.

3.2 Empirical methodology

We use a difference-in-differences (DiD) method to study the impact of teleworkability of industries on firms' activities. We employ the following empirical estimation model:

$$Y_{i,t} = \beta_0 + \beta_1 X_j \times COVID-19_t + \beta_2 Z_{i,t-1} + \delta_i + \gamma_{cyq} + \epsilon_{it} \quad (1)$$

where Y represents firm activities as measured by (1) capital expenditure and (2) asset turnover. Capital expenditure scaled by assets captures the investment intensity of the firms (Fazzari, Hubbard, Petersen, Blinder, & Poterba, 1988) and asset turnover captures the activity and operating performance of firms (Albuquerque, Koskinen, & Zhang, 2020). Our variable of interest is $X_j \times$ COVID-19 where X represents the WFH amenability measures for industry j. *COVID-19* is a dummy variable that equals 1 for the COVID-19 shock period and 0 otherwise. Z denotes a set of firm-level controls, lagged by one quarter to mitigate potential endogeneity concerns.

We control for firm-level time-invariant heterogeneity denoted by δ_i. Furthermore, we also control for time-variant changes at the country-year-quarter level represented by γ_{cyq}. These interactive fixed effects control for any unobserved time-variant changes at the country-year-quarter level besides the time and country-level changes in isolation [3]. The saturated model helps us isolate the impact of industries' teleworkability on firms' activities during COVID-19 shock period and also improves the identification strategy employed in our study [4]. Robust standard errors, which control for heteroscedasticity, are clustered at the firm-level to control for autocorrelation in the error structure.

3.3 Parallel trends

Figure 1 shows the parallel trends of capital expenditure in the pre-COVID-19 and COVID-19 periods. We document increased capital expenditure for firms in industries that are more amenable to WFH. For instance, firms in industries requiring high face2face interaction have lower capital expenditure during the COVID-19 period than those in industries requiring low face2face interaction.

Figure 2 shows the parallel trends of the asset turnover ratio in the pre-COVID-19 and COVID-19 periods. The parallel trends are based on the dummy variables used for WFH variables. The parallel trends are based on high remote working, high remote working wage, high team interaction, high physical presence and High Face2Face interaction. We find that asset turnover has increased for firms in the teleworkable industries during the COVID-19 period. For instance, firms in industries that are more remote working have higher asset turnover relative to firms in industries that are less remote working.

4. Results and discussion

We show the results related to Equation (1) in this section. The results related to asset turnover and capital expenditure are presented in Table 2. We repeat the analysis with continuous measures of amenability. These results are shown in Table 3. Furthermore, we divide our sample into firms in advanced economies and emerging economies based on the IMF classification. We show the subsample analysis results in Table 4.

4.1 WFH amenability and activity

In Table 2, we illustrate the results related to the impact of COVID-19 on capital expenditure (see columns (1)-(5)). Our results indicate an increase in firms' capital expenditure in industries more

	Capital expenditure					Asset turnover				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
High remote working × COVID-19	0.176***					0.013***				
	(0.032)					(0.002)				
High remote working wage × COVID-19		0.147***					0.012***			
		(0.032)					(0.002)			
High team interaction × COVID-19			0.144***					0.013***		
			(0.033)					(0.002)		
High customer interaction × COVID-19				−0.124***					−0.015***	
				(0.031)					(0.002)	
High Face2Face interaction × COVID-19					−0.072**					−0.011***
					(0.031)					(0.002)
Liquidity	0.432***	0.431***	0.418***	0.410***	0.418***	−0.085***	−0.085***	−0.086***	−0.087***	−0.086***
	(0.114)	(0.114)	(0.115)	(0.115)	(0.114)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
Leverage	−0.022***	−0.023***	−0.024***	−0.023***	−0.023***	−0.002**	−0.002**	−0.002**	−0.002**	−0.002**
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Profitability	1.109***	1.126***	1.149***	1.195***	1.205***	0.129***	0.130***	0.136***	0.139***	0.135***
	(0.388)	(0.388)	(0.391)	(0.391)	(0.388)	(0.028)	(0.028)	(0.028)	(0.028)	(0.028)
Size	0.013	0.013	0.012	0.012	0.013	−0.003***	−0.003***	−0.003***	−0.003***	−0.003***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.932***	0.936***	0.948***	0.957***	0.946***	0.315***	0.315***	0.314***	0.315***	0.316***
	(0.134)	(0.134)	(0.135)	(0.135)	(0.134)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-year-quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	53,407	53,407	53,137	53,137	53,407	79,201	79,201	78,876	78,876	79,201
Adjusted R^2	0.521	0.521	0.521	0.521	0.521	0.915	0.915	0.915	0.915	0.915

Table 2. WFH amenability and activity

Note(s): The dependent variable in columns (1)-(5) is Capital expenditure and that in columns (6)-(10) is Asset turnover. The description of all variables is presented in Table 1. The standard errors are shown in parenthesis, which are clustered at the firm level. ***, **, *denotes significance level at 1, 5 and 10% respectively

Source(s): Authors' computations

	(1)	(2)	(3)	(4)	(5)
Panel A – capital expenditure					
Remote working × COVID-19	0.316*** (0.070)				
Remote working wage × COVID-19		0.332*** (0.068)			
Team interaction × COVID-19			0.005*** (0.002)		
Customer interaction × COVID-19				−0.005*** (0.001)	
Face2Face interaction × COVID-19					−0.539*** (0.075)
Firm-level controls	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes
Country-year-quarter fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	53,407	53,407	53,137	53,137	53,407
Adjusted R^2	0.522	0.522	0.522	0.522	0.522
Panel B – asset turnover					
Remote working × COVID-19	0.038*** (0.005)				
Remote working wage × COVID-19		0.038*** (0.005)			
Team interaction × COVID-19			0.001*** (0.000)		
Customer interaction × COVID-19				−0.001*** (0.000)	
Face2Face interaction × COVID-19					−0.080*** (0.007)
Firm-level controls	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes
Country-year-quarter fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	79,201	79,201	78,876	78,876	79,201
Adjusted R^2	0.915	0.915	0.915	0.915	0.915

Note(s): The dependent variable in Panel A is Capital expenditure and that in Panel B is Asset turnover. The description of all variables is presented in Table 1. The standard errors are shown in parenthesis, which are clustered at the firm level. ***, **, *denotes significance level at 1, 5 and 10% respectively

Source(s): Authors' computations

Table 3. WFH amenability and activity: Estimations with continuous measure of amenability

amenable to WFH. Table 2 shows that capital expenditure increased by 0.176% during the COVID-19 shock period for firms in industries amenable to remote working. Such an increase during the pandemic period is about 15% of the average capital expenditure for firms in our sample. Moreover, our results show that it declined by 0.124 and 0.072% for firms in industries that require high customer interaction and high face2face interaction. Our results are robust and consistent across countries, suggesting WFH amenability's global impact on real sector growth. Firms with the benefits of amenable operations can likely continue expanding to capture growth opportunities during uncertain times. The increase in investment intensity by the remote working firms is imperative to improve the long-term growth prospects during the pandemic (Curran, 2021). These results support hypothesis 1.

Longer-term investment will be driven by trends such as supply chain diversification or accelerated automation in the service sector as workforce age.

	Developed economies					Emerging economies				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A – capital expenditure										
High remote working × COVID-19	0.207***					0.064				
	(0.035)					(0.072)				
High remote working wage × COVID-19		0.171***					0.044			
		(0.034)					(0.071)			
High team interaction × COVID-19			0.116***					0.167**		
			(0.035)					(0.074)		
High customer interaction × COVID-19				−0.132***					−0.114*	
				(0.034)					(0.069)	
High Face2Face interaction × COVID-19					−0.134***					0.049
					(0.033)					(0.071)
Firm-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-year-quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	32,355	32,355	32,126	32,126	32,355	19,136	19,136	19,114	19,114	19,136
Adjusted R^2	0.552	0.552	0.552	0.552	0.552	0.495	0.495	0.495	0.495	0.495
Panel B – asset turnover										
High remote working × COVID-19	0.017***					0.002				
	(0.003)					(0.004)				
High remote working wage × COVID-19		0.016***					0.001			
		(0.003)					(0.004)			
High team interaction × COVID-19			0.016***					0.004		
			(0.003)					(0.005)		
High customer interaction × COVID-19				−0.015***					−0.017***	
				(0.003)					(0.005)	
High Face2Face interaction × COVID-19					−0.013***					−0.006
					(0.003)					(0.005)
Firm-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-year-quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	56,819	56,819	56,534	56,534	56,819	20,120	20,120	20,099	20,099	20,120
Adjusted R^2	0.918	0.918	0.918	0.918	0.918	0.903	0.903	0.903	0.903	0.903

Table 4.
WFH amenability and activity: Developed vs emerging market economies

Note(s): The dependent variable in Panel A is Capital expenditure and that in Panel B is Asset turnover. Columns (1)-(5) show the results related to developed economies and columns (6)-(10) show the results related to emerging economies. The description of all variables is presented in Table 1. The standard errors are shown in parenthesis, which are clustered at the firm level. ***, **, *denotes significance level at 1, 5 and 10% respectively

Source(s): Authors' computations

Our results suggest that firms in teleworkable industries have substantially increased their investment intensity. The social distancing norms imposed during COVID-19 have shifted the focus to remote working. Accordingly, firms more amenable to WFH increase their capital expenditure to increase their income generating capacity.

Columns (6)-(10) in Table 2 show the results related to the impact of WFH amenability of industries on the asset turnover of firms. Our results suggest that asset turnover significantly increased for firms in industries more amenable to WFH. For instance, asset turnover increased by 0.013 units for firms in industries amenable to flexible operations in terms of jobs performed at remote locations. Furthermore, our results show that asset turnover declined by 0.015 units and 0.011 units for firms in industries that require high customer interaction and high face2face interaction (less amenable to remote working) during COVID-19 shock period. Our results are in favour of hypothesis 2.

The possible explanation for our results is the shift to a remote working culture caused by COVID-19-induced shock (Brynjolfsson *et al.*, 2020). Firms operating remotely can increase their sales disproportionately (e.g. technology). This indicates higher capacity utilisation by the remote working firms during the COVID-19 shock period. Conversely, firms in industries that are less amenable to WFH are adversely impacted by the pandemic and consequently face a decline in asset turnover.

We also repeat our analysis using continuous measures of WFH amenability (see Table 3). Panel A in Table 3 shows the results with capital expenditure as the dependent variable, and panel B shows the results with asset turnover as the dependent variable. The results suggest that asset turnover and capital expenditure increase for firms in teleworkable industries during the COVID-19 shock period. On the contrary, it decreases for firms in industries less amenable to WFH. For instance, a one-unit increase in the face2face interaction results is 0.565% points (1.050×0.539) decrease in capital expenditure relative to its mean. Similarly, a one-unit increase in the face2face interaction results in a 0.084 unit (1.050×0.080) decrease in asset turnover relative to its mean. Our results are consistent with the findings shown in Table 2.

4.2 Do developed market firms fare better than emerging market firms?

The teleworkability of industries likely has a pronounced impact on firms in developed economies as these firms enjoy higher productivity and growth benefits. Therefore, we test whether the remote working amenability of firms in developed economies has a prominent impact on capital expenditure and asset turnover compared with firms in emerging economies during COVID-19. We divide the sample into developed or emerging economies based on the classification provided by the International Monetary Fund (IMF).

We repeat our baseline estimation for subsamples based on firms domiciled in developed and emerging economies. Table 4, panel A shows the results with capital expenditure as the dependent variable, and panel B shows the results with asset turnover as the dependent variable. Our results show that highly teleworkable firms in developed economies have higher capital expenditure and asset turnover during the COVID-19 shock period. For instance, during the pandemic, capital expenditure and asset turnover increased by 0.207% and 0.017 units for highly remote working firms in developed economies. These results support hypothesis 3.

One possible explanation is the vast digital divide in emerging markets that may constrain teleworkability in general. Our findings complement the findings of Dingel and Neiman (2020) that the number of jobs that can be performed remotely is significantly lower in emerging market economies than in developed economies. Hence, it is unsurprising to see higher activity levels in the developed economies.

4.3 Drivers of investment behaviour

We conduct several tests to analyse the drivers of investment behaviour of firms during the COVID-19 period. Fisher (1933) show that there exists a collateral channel through which the assets impact the natural activities of a firm. The reduced collateral capacity of firms reduces the debt taking capacity of firms, which in turn, reduces the investment capacity of firms (Bernanke & Gertler, 1990; Gan, 2007; Kiyotaki & Moore, 1997). In line with this argument, we check whether WFH amenable firms have higher collateral and debt-taking capacity during the COVID-19 period. We show the results in Table A2. Our results suggest that the remote working firms have higher tangibility, representing firms' collateral capacity during COVID-19. The remote working firms exhibit 0.2% higher tangibility than the less remote working firms during the pandemic. Furthermore, we also find that WFH - amenable firms have increased debt during the pandemic. These results are shown in Table A3, suggesting that such firms with high debt capacity invest more in future growth opportunities during the COVID-19 period. The remote working firms exhibited 0.3% higher debt than the less remote working firms during the pandemic. In addition, our results also show that WFH amenable firms have higher cash holdings during the pandemic period to invest in the operations (please see Table A4). Such firms show 0.2% higher cash than the less WFH amenable firms during the pandemic period. We show that the firms' investment behaviour is mainly driven by the tangibility, debt, and liquidity during the COVID-19 period. Our results align with the findings of Huang and Mazouz (2018) and Gan (2007).

4.4 Robustness tests

We conduct a set of robustness tests to check the validity of our results. First, we conduct a robustness test by introducing a change in the treatment window. As COVID-19 had a substantial impact in some of the countries in early 2020, we define *COVID-19* period starting from Q1′2020 to Q4′2020 as 1 and 0 otherwise. We repeat our baseline estimation considering the early impact of COVID-19. Table A5 shows the robustness test results. We find consistent results with the findings shown in Table 2.

Second, we conduct a propensity score matching (PSM) analysis. It is likely that there exist differences in the firm's characteristics in the groups divided based on the remote working ability. To illustrate this, we show the mean differences in the firm characteristics in Table A6. The top panel shows the mean differences before conducting PSM. There exist significant differences in the means of leverage and size. To address this concern, we run PSM in two steps. In the first step, we run a logistic regression and use the estimated propensity scores to match the treated and control groups. In the second step, we use the matched sample of treated and control groups, which are otherwise similar but only differ in firm-level activities, and re-estimate Equation (1) [5]. We show the propensity score matching results in Table A7. Additionally, the mean differences shown in the bottom panel of Table A6 also illustrate our results. We report that the results are consistent with our baseline findings. Last, we re-estimate the baseline equation by clustering the standard errors at the industry-level. As the firm characteristics tend to be correlated with an industry, there is potential for our estimates to be biased. Therefore, we cluster the standard errors at the industry-level and show the results in Table A8. We find that our results are consistent with the results shown in Table 2.

5. Conclusion

In this article, we investigate the impact of WFH amenability of firms and their activity during the COVID-19 pandemic and document two important findings. First, firms more

amenable to WFH contribute to real sector growth, as we document that their capital expenditure is significantly higher during this period compared to firms that are less amenable to WFH. Second, firms more amenable to WFH, turnover assets more than firms less amenable to WFH. Our results are consistent and robust to (1) model specifications and (2) alternate variable specifications. While work from home might be a transitory phenomenon, the activity levels of firms that were more adaptable to flexible modes of operations reveal the benefits of operational flexibility. The insights from the study help to reinforce the benefits of amenable operations in mitigating the adverse consequences of a crisis.

Notes

1. Economic and social inequalities caused by ability/inability to access digital resources.
2. Table A1 provides the country-wise distribution of our sample.
3. see Gormley and Matsa (2014).
4. The interactive fixed effects is conducted using *Reghdfe* package in Stata.
5. Figure A1 shows the sample distribution before and after propensity score matching.

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(The Appendix follows overleaf)

Appendix

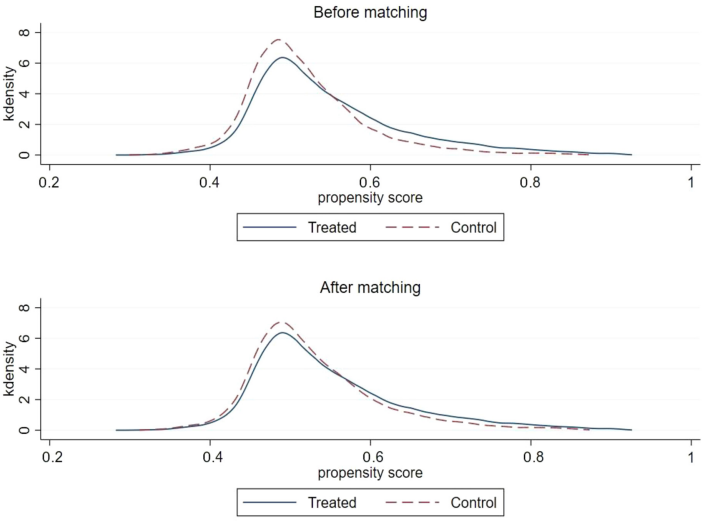

Figure A1.
Propensity score matching

Note(s): The figure displays the sample distribution before and after matching based on the propensity score matching. The top panel shows the sample distribution before matching. The bottom panel shows the sample distribution after matching based on propensity scores

Source(s): Figure by authors

Country	Observations	Country	Observations
Argentina	267	Kuwait	12
Austria	205	Latvia	34
Bangladesh	99	Lithuania	61
Belgium	74	Luxembourg	71
Bermuda	165	Malaysia	360
Bosnia and Herzegovina	14	Mexico	557
Brazil	745	Monaco	18
Bulgaria	112	Netherlands	126
Canada	702	Nigeria	75
CavmanIslands	47	Norway	376
Chile	403	Oman	51
China	9,394	Pakistan	32
Colombia	127	Peru	251
Croatia	287	Philippines	200
Cyprus	46	Poland	944
Denmark	262	Portugal	91
Egypt	360	Republic of Serbia	14
Estonia	89	Romania	95
Finland	368	Russia	532
France	92	Saudi Arabia	330
Germany	1,511	Singapore	297
Ghana	6	Slovenia	55
Greece	71	Spain	25
HongKong	69	SriLanka	310
Hungary	30	Sweden	649
Iceland	90	Switzerland	109
India	100	Taiwan	6,128
Indonesia	964	Thailand	2,467
Ireland	129	Turkey	894
Italy	69	Ukraine	8
Jamaica	31	United Arab Emirates	32
Japan	26,331	United Kingdom	165
Jordan	142	United States of America	18,524
Kazakhstan	55	Vietnam	1,852
		Total	79,201

Source(s): Authors' computations

Table A1. Country-wise distribution of sample

	(1)	(2)	(3)	(4)	(5)
High remote working × COVID-19	0.002***				
	(0.001)				
High remote working wage × COVID-19		0.002***			
		(0.001)			
High team interaction × COVID-19			0.002***		
			(0.001)		
High customer interaction × COVID-19				−0.004***	
				(0.001)	
High Face2Face interaction × COVID-19					−0.004***
					(0.001)
Liquidity	0.031***	0.031***	0.030***	0.030***	0.031***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Leverage	−0.001***	−0.001***	−0.001***	−0.001***	−0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Profitability	0.030***	0.030***	0.033***	0.033***	0.031***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Size	0.014***	0.014***	0.014***	0.014***	0.014***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Constant	−0.188***	−0.188***	−0.186***	−0.188***	−0.190***
	(0.013)	(0.013)	(0.013)	(0.014)	(0.013)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes
Country-year-quarter fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	75,602	75,602	75,285	75,285	75,602
Adjusted R^2	0.195	0.195	0.194	0.194	0.195

Note(s): The dependent variable is Δ tangibility. *COVID-19* equals 1 for Q2'2020 - Q4'2020 and 0 otherwise. The description of all variables is presented in Table 1. The standard errors are shown in parenthesis, which are clustered at the industry level. ***, **, * denotes significance level at 1, 5 and 10% respectively
Source(s): Authors' computations

Table A2.
Tangibility and WFH amenability

	(1)	(2)	(3)	(4)	(5)
High remote working × COVID-19	0.003***				
	(0.001)				
High remote working wage × COVID-19		0.004***			
		(0.001)			
High team interaction × COVID-19			0.001		
			(0.001)		
High customer interaction × COVID-19				0.001	
				(0.001)	
High Face2Face interaction × COVID-19					−0.003**
					(0.001)
Liquidity	−0.024***	−0.023***	−0.025***	−0.025***	−0.024***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Profitability	−0.049***	−0.049***	−0.046***	−0.045***	−0.048***
	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)
Size	0.027***	0.027***	0.027***	0.027***	0.027***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Constant	−0.349***	−0.349***	−0.349***	−0.349***	−0.350***
	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes
Country-year-quarter fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	75,877	75,877	75,559	75,559	75,877
Adjusted R^2	0.055	0.055	0.055	0.055	0.055

Note(s): The dependent variable is Δ debt. *COVID-19* equals 1 for Q2'2020 - Q4'2020 and 0 otherwise. The description of all variables is presented in Table 1. The standard errors are shown in parenthesis, which are clustered at the industry level. ***, ** and *denotes significance level at 1, 5 and 10%, respectively
Source(s): Authors' computations

Table A3. Debt and WFH amenability

	(1)	(2)	(3)	(4)	(5)
High remote working × COVID-19	0.002*				
	(0.001)				
High remote working wage × COVID-19		0.002*			
		(0.001)			
High team interaction × COVID-19			0.001		
			(0.001)		
High customer interaction × COVID-19				0.003**	
				(0.001)	
High Face2Face interaction × COVID-19					0.002
					(0.001)
Leverage	−0.000	−0.000	−0.000	−0.000	−0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Profitability	0.129***	0.129***	0.127***	0.127***	0.129***
	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)
Size	−0.017***	−0.017***	−0.017***	−0.017***	−0.017***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Constant	0.223***	0.223***	0.223***	0.224***	0.224***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes
Country-year-quarter fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	76,871	76,871	76,552	76,552	76,871
Adjusted R^2	0.014	0.014	0.014	0.014	0.014

Note(s): The dependent variable is Δ cash holdings. *COVID-19* equals 1 for Q2'2020 - Q4'2020 and 0 otherwise. The description of all variables is presented in Table 1. The standard errors are shown in parenthesis, which are clustered at the industry level. ***, ** and *denotes significance level at 1, 5 and 10% respectively
Source(s): Authors' computations

Table A4. Cash holdings and WFH amenability

Table A5.
Robustness test results

	Capital expenditure					Asset turnover				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
High remote working × COVID-19	0.163***					0.015***				
	(0.029)					(0.002)				
High remote working wage × COVID-19		0.136***					0.014***			
		(0.029)					(0.002)			
High team interaction × COVID-19			0.152***					0.015***		
			(0.030)					(0.002)		
High customer interaction × COVID-19				−0.118***					−0.010***	
				(0.029)					(0.002)	
High Face2Face interaction × COVID-19					−0.062**					−0.009***
					(0.029)					(0.002)
Liquidity	0.434***	0.432***	0.420***	0.407***	0.417***	−0.085***	−0.085***	−0.086***	−0.087***	−0.086***
	(0.114)	(0.114)	(0.115)	(0.115)	(0.114)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
Leverage	−0.023***	−0.023***	−0.024***	−0.023***	−0.023***	−0.002**	−0.002**	−0.002**	−0.002**	−0.002**
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Profitability	1.108***	1.123***	1.143***	1.200***	1.205***	0.129***	0.129***	0.136***	0.140***	0.136***
	(0.388)	(0.388)	(0.391)	(0.391)	(0.388)	(0.028)	(0.028)	(0.028)	(0.028)	(0.028)
Size	0.013	0.013	0.012	0.013	0.013	−0.003***	−0.003***	−0.003***	−0.003***	−0.003***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.929***	0.933***	0.944***	0.957***	0.947***	0.314***	0.314***	0.313***	0.315***	0.317***
	(0.134)	(0.134)	(0.135)	(0.135)	(0.134)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-year-quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	53,407	53,407	53,137	53,137	53,407	79,201	79,201	78,876	78,876	79,201
Adjusted R^2	0.522	0.522	0.522	0.521	0.522	0.915	0.915	0.916	0.915	0.915

Note(s): The dependent variable in columns (1)-(5) is Capital expenditure and that in columns (6)-(10) is Asset turnover. Here, *COVID-19* equals 1 for Q1'2020 - Q4'2020 and 0 otherwise. The description of all variables is presented in Table 1. The standard errors are shown in parenthesis, which are clustered at the firm level. ***, ** and *denotes significance level at 1, 5 and 10% respectively

Source(s): Authors' computations

Variable	Mean Treated	Mean Control	Mean difference $p > t$
Before PSM			
Liquidity	0.112	0.112	0.846
Leverage	0.862	0.682	0.000
Profitability	0.024	0.024	0.164
Size	13.744	13.595	0.000
After PSM			
Liquidity	0.122	0.124	0.102
Leverage	0.839	0.815	0.101
Profitability	0.024	0.024	0.396
Size	13.777	13.841	0.001

Note(s): The top panel shows the mean of firm characteristics in the treated and control groups divided based the remote working ability before conducting the propensity score matching analysis. The bottom panel shows the mean of firm characteristics in the treated and control groups divided based the remote working ability after conducting the propensity score matching analysis. The *p*-value denotes the significance of the mean differences

Source(s): Authors' computations

Table A6.
Mean differences

	(1)	(2)
High remote working × COVID-19	0.177***	0.013***
	(0.032)	(0.002)
Liquidity	0.459***	−0.085***
	(0.116)	(0.009)
Leverage	−0.023***	−0.002**
	(0.007)	(0.001)
Profitability	1.110***	0.130***
	(0.390)	(0.028)
Size	0.013	−0.003***
	(0.010)	(0.000)
Constant	0.926***	0.315***
	(0.137)	(0.006)
Firm-level controls	Yes	Yes
Firm fixed effects	Yes	Yes
Country-year-quarter fixed effects	Yes	Yes
Observations	53,277	79,167
Adjusted R^2	0.522	0.915

Note(s): The dependent variable in column (1) is Capital expenditure and that in column (2) is Asset turnover. The classification of *High remote working* firms is based on propensity score matching analysis. The matched sample based on propensity scores is used for estimates shown in the table. The description of all variables is presented in Table 1. The standard errors are shown in parenthesis, which are clustered at the firm level. ***, ** and *denotes significance level at 1, 5 and 10% respectively

Source(s): Authors' computations

Table A7.
Propensity score matching analysis

	Capital expenditure					Asset turnover				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
High remote working × COVID-19	0.176***					0.013*				
	(0.055)					(0.007)				
High remote working wage × COVID-19		0.147**					0.012			
		(0.053)					(0.007)			
High team interaction × COVID-19			0.144**					0.013*		
			(0.058)					(0.007)		
High customer interaction × COVID-19				−0.124*					−0.015*	
				(0.063)					(0.008)	
High Face2Face interaction × COVID-19					−0.072					−0.011
					(0.071)					(0.007)
Firm-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-year-quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	53,407	53,407	53,137	53,137	53,407	79,201	79,201	78,876	78,876	79,201
Adjusted R^2	0.522	0.522	0.522	0.521	0.522	0.915	0.915	0.916	0.915	0.915

Note(s): The dependent variable in columns (1)-(5) is Capital expenditure and that in columns (6)-(10) is Asset turnover. *COVID-19* equals 1 for Q2'2020 – Q4'2020 and 0 otherwise. The description of all variables is presented in Table 1. The standard errors are shown in parenthesis that are clustered at the industry level. ***, ** and *denotes significance level at 1, 5 and 10%, respectively

Source(s): Authors' computations

Table A8.
Industry-wise clustering

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