Management practices and resilience to shocks: Evidence from COVID-19

Andrea Lamorgese
Bank of Italy

Andrea Linarello
Bank of Italy

Megha Patnaik
LUISS University & CEPR

Fabiano Schivardi
LUISS University, EIEF & CEPR

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La struttura produttiva italiana a fronte dei recenti sconvolgimenti globali

Exhibit 1: Plant with Low Management Score

Exhibit 2: Plant with High Management Score

This paper: Does management matter in COVID times?

- Management associated with firm performance in normal times (WMS, US MOPS)
- Do management practices help firms respond better to large shocks?
- Ex-ante, not obvious:
  - \+ tools and information to respond rapidly
  - – may impose excessive structure when flexibility may be valuable
- We focus on COVID-19 in Italy:
  - Social distancing and national lockdown unanticipated by firms.
  - We exploit timing of responses to the BoI annual survey around lockdown.
- Related Literature:
  - Aghion, Bloom, Lucking Sadun & Van Reenen (2021), Bennedsen, Larsen, Schmutte, & Scur (2021), Grover & Karplus (2021), Cette, Lopez, Mairesse & Nicoletti (2020), Englemaier, Galdon-Sanchez, Gil & Kaiser (2020).

Preview of results

- Management associated with higher expected and actual sales growth:
  - $\uparrow$ 1 SD increase in management score $\Rightarrow \uparrow \mathbb{E}$ (Sales growth) by 2.4 p.p. post-lockdown ($\approx 30\%$ of $\mathbb{E}(\Delta SalesGr_{2020})$)
- Why are firms with structured managerial practices more resilient?
  - Management practices associated with higher adoption of strategies to counter the effects of the pandemic including labor-related strategies
- Remote work:
  - Firms with higher management scores: higher remote work prior to the pandemic (2019).
  - Switch more to remote working in 2020, driven by monitoring and incentive components of the score: $\uparrow$ 1 SD management score $\Rightarrow \uparrow$ 2020 remote working by 1.3 p.p ($\approx 11\%$ of $\overline{SW_{2020}}$).

Data

Survey data from the Bank of Italy (2019, 2020):

1. Management and performance in COVID-19:
   - Annual Survey of the Bank of Italy - conducted during spread of COVID-19
   - Expected sales growth
   - Actual sales growth
   - Management score 2019 : 8 question module based on US MOPS
     (Bloom, Brynjolfsson, Foster, Jarmin, Patnaik, Saporta-Eksten, Van Reenen, 2019)
2. COVID response strategies:
   - Strategies firms adopted in response to COVID-19 (including reorganization of labor)
3. Remote work:
   - Share of total employment in remote work prior and during the pandemic

Structured management practices

8 question module derived from the US MOPS (Bloom et al., 2019)

Business practices

We are interested in the main business practices used by your firm **in 2019**. Business practices are defined here as the conduct and practices adopted in the management of the production process for your firm's goods and/or services.

When your firm encountered a problem in the production of its goods and/or services, what happened?
(e.g. when a quality defect was detected in your products and/or services) **PM1**

1 It was solved but no further measures were taken
2 It was solved and further measures were taken to prevent it from happening again
3 It was solved, further measures were taken to prevent it from happening again, and a continuous improvement process was launched to prevent such problems from occurring in the future
4 No measures were taken
5 No such problem ever occurred during production

- 3 dimensions of management:
  - Monitoring: "What do you do when you discover a defect?"
  - Targets: "What are the time frames for production targets?"
  - Incentives: "Do you promote on the basis of tenure or merit?"
- overall MOPS score: unweighted average of all questions and normalized

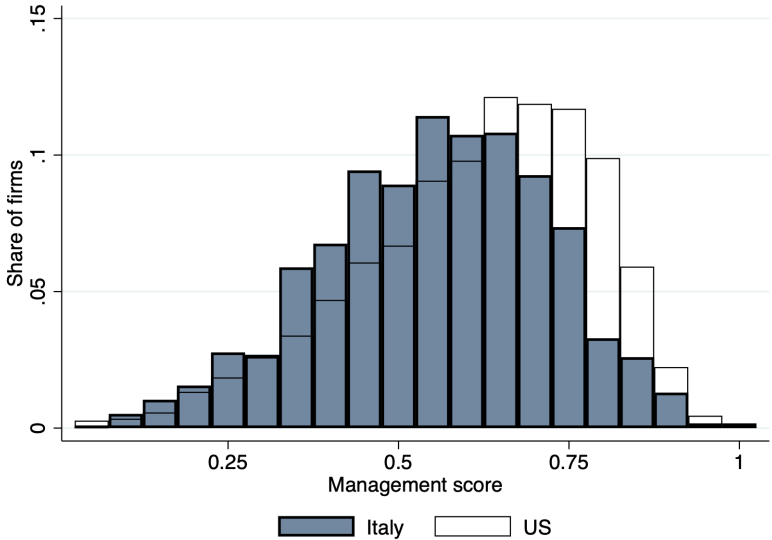
Structured management practices

- We closely follow the scoring mechanism of Bloom et al. (2019)

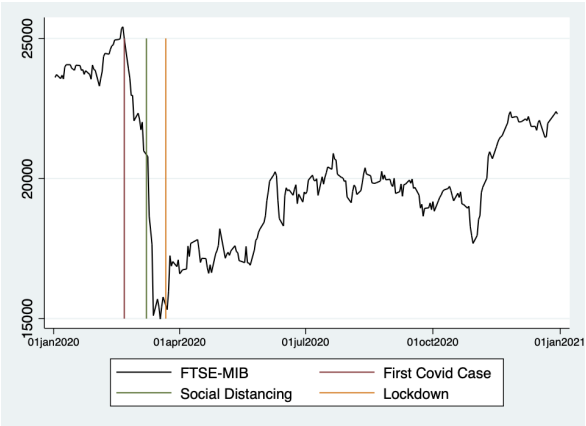
	Question	Score
1	In 2015, what generally best describes what happened at this business when a production problem arose?	
a	We fixed it but did not take further action	1/3
b	We fixed it and took action to make sure that it did not happen again	2/3
c	We fixed it and took action to make sure that it did not happen again, and had a continuous improvement process to anticipate problems like these in advance	1
d	No action was taken	0

- complete responses: at least 5 of the 8 questions
- overall MOPS score computed as the unweighted average of all questions
- normalized to have mean zero and standard deviation 1
- low scores indicating lower use of structured management practices

Italy distribution versus US

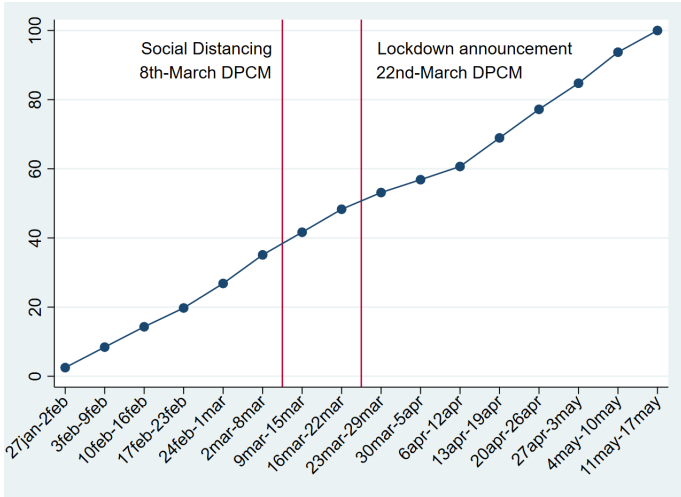


COVID-19 in Italy



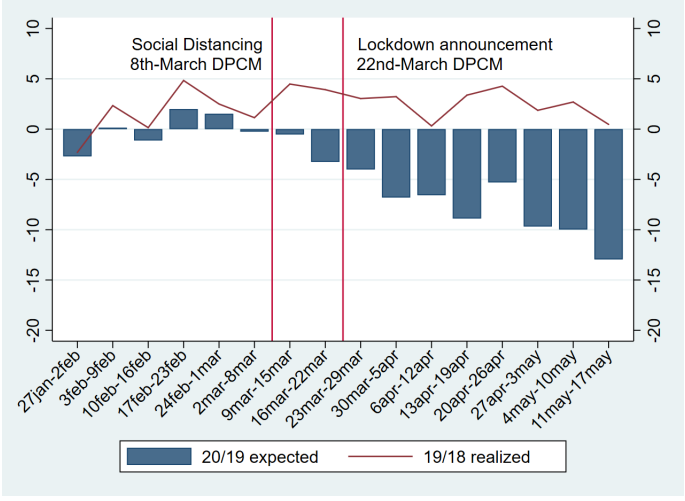
Note: The y-axis shows the value of the main Italian stock market index for 2020. The first COVID case occurred on February 21st, the widespread social distancing measures in Italy were introduced on March 8th, and the national lockdown on March 22nd.

INVIND: Share of respondents by week



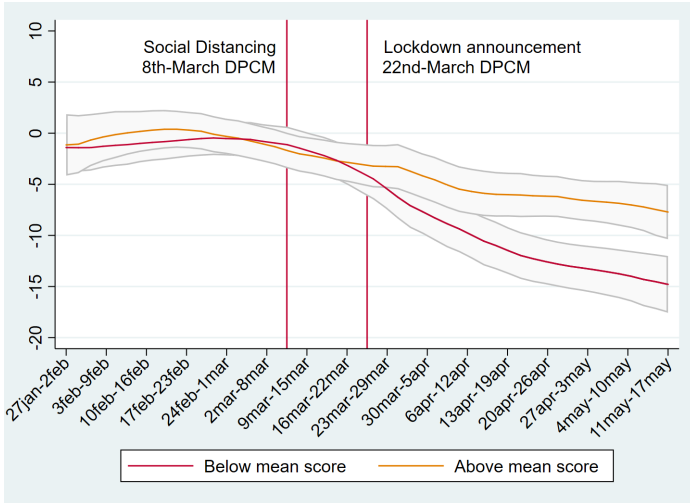
Note: Share of responses over time for 1803 firms who answered the INVIND survey with management score. Vertical lines correspond to dates of the introduction of social distancing measure (8th March) and the announcement of the general lockdown (22nd March) in Italy.

Expected sales growth by week of response



Note: Blue bars indicate the average 2020 YoY expected sales growth. Red line shows the average 2019 YoY sales growth. Vertical lines correspond to the announcement dates of widespread social-distancing restrictions in Italy (March 8$^{\text{th}}$) and country-wide lockdown (March 22$^{\text{nd}}$) in Italy.

Management and sales in COVID-19



Note: Smoothed values with confidence bands of kernel-weighted local polynomial regressions of 2020 YoY expected sales growth on week of response for firms in two groups, those with above the mean management score, and those with below it.

Management & performance in COVID-19

We estimate:

$$\text{SalesGr}_i = \alpha_0 + \alpha_1 \text{Manag}_i + \alpha_2 \text{Manag}_i * \mathbb{1}_{LD} + \alpha_3' X_i + W_i + (S_i + P_i) * (1 + \mathbb{1}_{LD}) + \epsilon_i \quad (1)$$

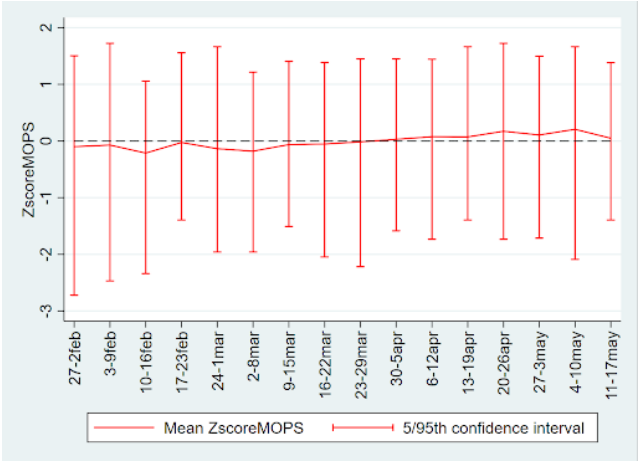
- SalesGr_i is the measure of firm's i (expected) sales growth
- Manag_i is the management score
- $\mathbb{1}_{LD}$: indicated variable for lockdown: 1 if firm responded after 22nd March
- X_i is a vector of 2019 controls (log employment, productivity , export and +ve profits)
- W_i week of response fixed effects
- S_i 3-digit sectoral fixed effects
- P_i provinces fixed effects

Management and sales growth in COVID-19

	Expected sales growth					Actual
		Full sample	Excl. week 12&13	Before	After	
Management	1.725***	1.111**	0.905	1.026	2.407***	1.469***
	(0.467)	(0.553)	(0.660)	(0.666)	(0.651)	(0.487)
Management*$\mathbb{1}_{LD}$		1.202*	1.686**			
		(0.702)	(0.784)			
log(emp)$_{2019}$	0.0821	0.0540	-0.226	-0.723	0.257	-0.142
	(0.357)	(0.359)	(0.405)	(0.564)	(0.529)	(0.435)
log(rev/emp)$_{2019}$	0.658	0.649	0.648	-0.793	2.209**	1.201
	(0.548)	(0.555)	(0.596)	(0.886)	(0.908)	(1.031)
$\mathbb{1}_{Exporter_{2019}}$	-0.409	-0.430	-1.521	-1.763	-1.593	-1.983
	(1.112)	(1.107)	(1.389)	(1.653)	(1.700)	(1.534)
$\mathbb{1}_{Profits_{2019}>0}$	-1.619	-1.626	-2.082**	-0.432	-4.153**	2.639*
	(0.996)	(0.988)	(1.029)	(1.125)	(1.709)	(1.448)
Observations	1803	1803	1596	751	845	1549

Note: $\mathbb{1}_{LD}$ takes value 1 if the firm answered the 2020 INVIND survey after 22$^{\text{nd}}$ March. Employment is based on headcount; revenues refer to total sales, both are measured in 2019. $\mathbb{1}_{Exporter}$ is 1 for firms reporting in 2019 positive export sales, $\mathbb{1}_{Profits}$ is one for firms reporting strong or modest profits in 2019. Sectors are defined according the 3-digit Nace rev. 2 classification. Provinces refers to NUTS3 Eurostat classification. Regressions include fixed effects for being conducted over phone or email. Column (4) includes week up to the 15th of March (i.e. week 11), column (5) include week starting from the 30th of March (i.e. week 14). Standard errors are clustered at the 3-digit industry level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Management score by week of response



Note: The y-axis shows the average management score with the corresponding 95% confidence interval taken across firms responding in the week reported on the x-axis. The sample consists of 1803 firms which responded to the INVIND survey with complete responses to the management module.

Management and expectation error

	(1)	(2)	(3)	(4)	(5)
Management	-0.002	-0.006	-0.011	-0.006	-0.007
	(0.007)	(0.010)	(0.011)	(0.012)	(0.010)
Management*$\mathbb{1}_{LD}$		0.009	0.008		
		(0.015)	(0.016)		
Log(Employment)	-0.003	-0.003	-0.009	-0.012	-0.004
	(0.008)	(0.008)	(0.009)	(0.014)	(0.009)
$\mathbb{1}_{Exporter}$	-0.007	-0.008	-0.020	-0.001	-0.033
	(0.022)	(0.022)	(0.024)	(0.033)	(0.034)
$\mathbb{1}_{Profits>0}$	-0.074***	-0.074***	-0.082***	-0.107***	-0.051*
	(0.023)	(0.023)	(0.024)	(0.034)	(0.026)
Log(Revenue/Employment)	0.009	0.009	0.002	-0.018	0.029
	(0.020)	(0.020)	(0.020)	(0.029)	(0.023)
Observations	1523	1523	1332	636	696

Note: The dependent variable is the expectation error, defined as the difference between realized sales growth in 2020 and the prediction of sales growth in 2020 formed in 2019. $\mathbb{1}_{LD}$ is an indicator variable that takes value 1 if the firm answered the 2020 INVIND survey after 22$^{\text{nd}}$ March. Employment is based on headcount; revenues refer to total sales, for both we take the 2019 value. $\mathbb{1}_{Exporter}$ is equal to 1 for firms reporting in 2019 positive export sales figures, $\mathbb{1}_{Profits}$ is equal to one for firms that reported having strong or modest profits in 2019. Interview type is a dummy for interviews conducted over phone (as opposed to email). Sectors are defined according to the 3-digit Nace rev. 2 classification. Provinces refers to NUTS3 Eurostat classification. Standard errors are clustered at the 3-digit industry level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Drivers of Covid-19 shock

3. In relation to the spread of the Coronavirus, which of the following factors are negatively affecting your firm's business in Italy?
(please indicate up to three factors in order of importance)

1st factor	2nd factor	3rd factor
CVCAN1	CVCAN2	CVCAN3

1. Decrease in foreign demand
2. Decrease in domestic demand
3. Problems in logistics and/or in the functioning of infrastructure
4. Unavailability of labour
5. Delays in the supply of raw materials or intermediate goods
6. Problems relating to liquidity or to the financial structure of the firm
7. None of the above factors

Drivers of Covid-19 shock

	Demand	Supply	Labor	Finance
Management	1.050	1.077	1.106	0.964
	(0.082)	(0.074)	(0.096)	(0.075)
log(employment)	0.894	0.961	1.088	0.811***
	(0.053)	(0.050)	(0.063)	(0.050)
log(revenue/employment)	0.753***	0.854*	0.733***	0.658***
	(0.057)	(0.053)	(0.059)	(0.049)
$\mathbb{1}_{Exporter}$	2.838***	1.922***	2.194***	1.788***
	(0.446)	(0.266)	(0.368)	(0.280)
$\mathbb{1}_{Profits>0}$	0.876	0.871	0.763	0.540***
	(0.155)	(0.136)	(0.140)	(0.091)

Note: Results of the conditional logit regression. Drivers are displayed at the top of each column. The coefficients shown are odds ratios, where the omitted category is *"None of the above drivers"*. Standard errors are shown in parentheses and clustered at 3-digit sector level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Why are better managed firms more resilient?

Relationship between management & response to COVID-19

- What are the possible mechanisms?
  - Short qualitative survey on the same sample: strategies firms adopted or were considering adopting to counteract the negative effects of the pandemic
  - Better managed firms adapted on many dimensions: Demand, Supply, Investment, Labor (including remote work)
- Remote working:
  - Firms picked up a lot of remote working in 2020: 77% firms had no remote working in 2019 and 75% had remote working in 2020.
  - Italy: Firing was not allowed, labor costs for the firm was partially subsidized by government & workers received a share of their full wage

We examine whether the take up of remote work & structured management practices: consistent with monitoring & performance based incentives.

Strategies adopted to counteract Covid-19

5. Which of the following strategies has your firm adopted, or is considering adopting, to contain the negative impact of the spread the Coronavirus on your business in Italy so far? (please indicate up to three strategies in order of importance)

1st strategy	2nd strategy	3rd strategy
CVSTRA1	CVSTRA2	CVSTRA3

1. Revision of prices
2. Revision of sales markets
3. Rethinking of domestic/foreign suppliers
4. Conversion of production activity
5. Changes in logistics (i.e. different transport modes for supplies/deliveries)
6. Staffing policies (e.g. changes in the number of employees/working hours/rotating schedules/recourse to wage supplementation/ remote work
7. Reduction of the degree of utilization of plant and machinery and/or of production
8. Revision of investment plans
9. Extended payment terms for your clients/by your suppliers
10. Extended payment terms by banks and/or granting of new credit lines
11. No strategy has been/will be adopted

Strategies adopted to counteract Covid-19

	Demand	Supply	Labor	Investment	Finance
Management	1.329**	1.375***	1.298**	1.260**	1.053
	(0.134)	(0.106)	(0.105)	(0.105)	(0.077)
log(employment)	0.861	1.124	1.194**	1.243***	0.959
	(0.079)	(0.071)	(0.079)	(0.081)	(0.060)
log(revenue/employment)	0.933	0.791**	0.743***	0.901	0.838*
	(0.087)	(0.059)	(0.056)	(0.073)	(0.060)
$\mathbb{1}_{Exporter}$	2.007***	1.476*	1.010	1.138	1.232
	(0.414)	(0.230)	(0.160)	(0.187)	(0.178)
$\mathbb{1}_{Profits>0}$	0.730	1.013	0.921	1.072	0.709*
	(0.153)	(0.167)	(0.156)	(0.196)	(0.112)

Note: Results of the conditional logit regression. Strategies displayed at the top of each column. The coefficients shown are odds ratios, where the omitted category is *"No strategy will be adopted"*. Standard errors are shown in parentheses and clustered at the 3-digit sector level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

27 In che misura la Vostra azienda ha fatto ricorso ai seguenti strumenti?

		. . . nel 2019?		. . . nel 2020?	
A	Vendite tramite *e-commerce* con sistema EDI (*Electronic Data Interchange*) (in % del fatturato)		P161AA		P161AB
B	Vendite tramite *e-commerce* via web (sito internet dell'impresa o negozio online dell'intermediario) (in % del fatturato)		P161BA		P161BB
C	Utilizzo del lavoro agile (*smart working*) (in % dell'occupazione media)		P161CA		P161CB

***Legenda**: 1 = nulla; 2 = modesta (inferiore al 5%); 3 = poco rilevante (tra il 5 e il 10%); 4 = abbastanza rilevante (tra il 10,1 e il 20%); 5 = rilevante (tra il 20,1 e il 35%); 6 = molto rilevante (tra il 35,1 e il 50%); 7 = estremamente rilevante (superiore al 50%); 9=non so, non intendo rispondere.*

Con **e-commerce** s'intende la vendita di beni o servizi via reti di computer con strumenti o piattaforme destinate a questa specifica funzione. Sono esclusi pertanto gli ordini effettuati tramite e-mail. Il pagamento e la consegna non devono essere necessariamente condotte on-line.

L'**Electronic Data Interchange (EDI)** è una tecnologia B2B (business-to-business) che consiste nell'interscambio di dati relativi a documenti di business (ordini di acquisto, fatture, richieste di preventivi di finanziamento, etc..) in un formato standard e definito in modo da consentirne il trattamento automatico, senza la ricodifica manuale delle informazioni (es. EDIFACT, UBL-Universal Business Language, XML, etc).

Remote working and management score in 2020

Dep var: WFH as % of avg. employment	Management measure				
	Overall		Monitoring	Targets	Incentives
Management	1.452***	1.341***	1.194***	0.594	0.860**
	(0.429)	(0.411)	(0.327)	(0.390)	(0.367)
Log(Employment)	2.937***	2.640***	2.712***	2.853***	2.765***
	(0.396)	(0.371)	(0.373)	(0.360)	(0.377)
Log(Revenue/Employment)	2.804***	2.528***	2.564***	2.594***	2.513***
	(0.569)	(0.524)	(0.526)	(0.538)	(0.524)
$\mathbb{1}_{Exporter}$	0.160	0.342	0.233	0.415	0.513
	(0.740)	(0.723)	(0.726)	(0.742)	(0.743)
$\mathbb{1}_{Profits>0}$	-0.464	-0.249	-0.106	-0.0177	-0.266
	(0.698)	(0.671)	(0.679)	(0.676)	(0.682)
Advanced technologies	1.853**	1.723**	1.924***	2.096***	1.952**
	(0.743)	(0.743)	(0.725)	(0.730)	(0.771)
Skill (% white collar)	0.164***	0.153***	0.154***	0.154***	0.153***
	(0.024)	(0.023)	(0.023)	(0.024)	(0.023)
% Remote work (2019)		0.395***	0.391***	0.396***	0.400***
		(0.056)	(0.056)	(0.055)	(0.057)
Observations	1499	1494	1492	1491	1490

Note: Share of white collar workers from social security data (2019). Advanced technologies takes value one if the firm uses at least one of: cloud computing, big data or artificial intelligence in 2019. Regressions include 3-digit sector and province fixed effects. Standard errors are shown in parentheses and are clustered at the 3-digit sector level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Conclusion

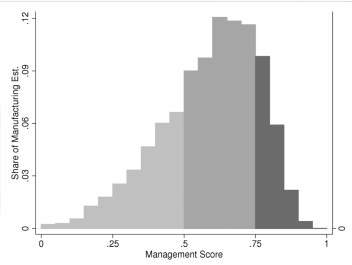
- We find evidence that better managed firms are more resilient to shocks.
- Mechanism: better managed firms adapt more to the new environment.
- In the case of COVID-19 such firms were able to move to remote work more, driven by monitoring and incentives practices.

Implications: management matters in normal times, also helps respond to shocks

Complementarities between remote work and management important for the new normal

MANAGEMENT RESEARCH

BENCHMARK RESEARCH METHODOLOGY TEAM MEDIA WMS INTERNATIONAL INDIA SURVEY



We are a team of researchers who along with the US Census Bureau studied the implementation of structured management practices in a US-wide establishment level survey. We discovered large variation in the use of structured management practices across establishments of which a large share can be attributed to variation across establishments within the same firm. We also find the use of structured management practices to be related to higher performance in terms of survival, growth and innovation. This project spurred a series of management surveys across the globe including in China, Finland, the UK and Pakistan.

BENCHMARK YOUR COMPANY

Data

The public data for the Management in America is available to researchers through the US Census Bureau site.

Know more +

Latest Research

Latest research on 2010 and 2015 mops shows massive peformance variation across us firms" and then link to the "what drives management practices.

Know more +

Management Research Retweeted

U.S. Census Bureau 14h

Happy #NationalCocoaDay!

According to the 2020 Annual Survey of Manufactures, the #chocolate and chocolate confectionery manufacturing industry had sales of $17.4 billion in 2020.

Explore #CensusEconData on this industry: https://data.census.gov/table?n=31135

Backup

Management and firm performance

	log (output/employment)		profit/sales	EBITDA/assets
	(1)	(2)	(3)	(4)
Management	0.097***	0.033**	0.779*	16.365**
	(0.018)	(0.013)	(0.402)	(6.597)
log(capital/emp)		0.041***	0.422	-8.304
		(0.014)	(0.419)	(7.684)
log(employment)		0.015	0.592**	-8.788***
		(0.014)	(0.263)	(3.337)
log(materials/emp)		0.441***	0.088	13.451
		(0.039)	(0.793)	(8.581)
skills (% white collar workers)		0.005***	-0.019	-0.306
		(0.002)	(0.016)	(0.291)
Observations	1803	1696	1685	1696

Note: The dependent variable is shown at the top of each column, measured in 2019. Output is measured by revenues, employment by headcount of employees. EBITDA is constructed from 2020 INVIND variables. Capital is measured at the book value and the share of white collar workers is taken from the 2018 INVIND survey. EBITDA is measured as value added minus labor costs All regressions include 3-digit industry fixed effects, and standard errors are clustered at the 3-digit industry level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Descriptive statistics

	Mean	Std. deviation	5^{th} percentile	Median	95^{th} percentile
Sales (2019, million EUR)	163.70	1192.79	2.20	20.18	446.69
YoY sales growth 2019	2.50	18.37	-20.84	1.22	28.03
Expected YoY sales growth, 2020	-4.49	17.06	-38.43	0.00	16.20
Management score (2019)	0.00	1.00	-1.90	0.10	1.50
Employees (2019)	482.16	3570.22	22.00	79.00	1185.00
$\mathbb{1}_{Exporter}$	0.66	0.47	0.00	1.00	1.00
$\mathbb{1}_{Profits>0}$	0.74	0.44	0.00	1.00	1.00
YoY sales growth 2020 (Q1-Q3)	-10.06	14.69	-30.00	-9.50	17.00
% Remote work (2019)	1.85	6.41	0.00	0.00	7.50
% Remote work (2020)	11.72	15.62	0.00	2.50	50.00

Notes: Panel (A) describes summary statistics for variables used in the analysis computed over the baseline sample of 1803 firms, who responded to the INVIND survey with complete responses to the management module. Sales are measure in million of EUR in 2019. Expected sales growth is trimmed to within 5 standard deviations. A detailed description of the managment score is in the text and Appendix **??**. Employment is measured by headcount. $\mathbb{1}_{Exporter}$ is equal to 1 for firms reporting in 2019 positive export sales, $\mathbb{1}_{Profits>0}$ is equal to one for firms that reported having strong or modest profits in 2019. Panel (B) reports the summary statistics for variables used in the analysis from the SONDTEL survey. Sales growth refers the the first 3 quarters of 2020, see footnote **??** for a detailed description of this variable. Remote working in 2019 and 2020 refers to the average share of employees working from home in each year as a share of the total workforce.

Heterogeneity and actual sales growth

	Sales Growth					
	(1)	(2)	(3)	(4)	(5)	(6)
Heterogeneity:		South	Industry	Non-essential	Large	$\mathbb{1}_{Exporter}$
Management	1.536***	1.667***	1.256	1.384**	1.753**	2.014**
	(0.484)	(0.544)	(0.818)	(0.655)	(0.696)	(0.850)
Management×Heterogeneity		-0.297	0.467	0.313	-0.599	-0.782
		(0.743)	(0.966)	(0.783)	(0.899)	(0.945)
Fixed effects						
Sector	Y	Y	Y	Y	Y	Y
Province	Y	Y	Y	Y	Y	Y
Observations	1572	1572	1572	1572	1572	1572

Note: Dep var is YoY sales growth in 2020 relative to the same period in 2019, sourced from the INVIND 2021 survey. The specific heterogeneity is spelled out in the column header. Controls for heterogeneity include: indicator variable that equals 1 if the firm is located in a Southern region (including Sicily and Sardinia); an indicator for firms in the industrial sector defined as section C, D and E of Nace rev. 2 classification; an indicator for Non-Essential sectors that equals 1 if the firm operates in one of the sectors which were obliged to work from remote during the lockdown; Large is an indicator which takes value 1 if the firm's sales are larger than the median value in 2019 computed across all firms; $\mathbb{1}_{Exporter}$ is an indicator that equals 1 if the firm reports foreign sales. All regressions include the heterogeneity term; the interaction between the heterogeneity term and the indicator variable for lockdown, that equals 1 if the firm answered the 2020 INVIND survey after 22$^{\text{nd}}$ March; log of employment and log of labor productivity, measured as output per worker (employment is based on headcount; revenues refer to total sales, for both we take the 2019 value), positive export sales in 2019, an indicator variable equal to one for firms that reported having strong or modest profits in 2019, if the firm operated in a non-essential sector; sector and province fixed effects. Sectors use 3-digit Nace rev. 2 classification. Provinces refers to NUTS3 Eurostat classification. Standard errors are clustered at the 3-digit industry level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Robustness results

	Expected sales growth					
		Interaction			Sample split	
					Before	After
Management	0.893	1.197*	1.179*	1.107*	1.205*	2.903***
	(0.660)	(0.614)	(0.648)	(0.663)	(0.651)	(0.915)
Management*$\mathbb{1}_{LD}$	1.695**	1.595*	1.884**	2.153**		
	(0.790)	(0.809)	(0.802)	(0.837)		
Closed sector	0.249	-0.326	-1.003	-1.456	-2.294	-10.84***
	(2.566)	(2.434)	(2.395)	(2.342)	(2.136)	(3.497)
Closed sector *$\mathbb{1}_{LD}$	-8.172**	-8.622**	-7.882*	-9.421**		
	(3.732)	(4.000)	(4.036)	(3.947)		
log(average wage)		2.498	2.990*	2.685	2.592	3.624
		(1.864)	(1.688)	(1.730)	(2.295)	(3.342)
Skill (% white collar)			0.033	0.031	-0.012	0.078*
			(0.0287)	(0.030)	(0.035)	(0.046)
Average human capital			-5.125	-5.867	-12.84	1.265
			(6.737)	(6.769)	(9.298)	(10.38)
Manager human capital			2.832	3.414	8.301	-1.020
			(5.360)	(5.445)	(8.646)	(6.936)
Advanced technologies				1.021	1.667	0.285
				(1.222)	(1.364)	(1.914)
Observations	1596	1421	1389	1348	665	683