Management and Organizational Practices Survey - Colombia 2017-2018

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Table 1: Descriptive Statistics

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
Management (1-16)	6,034	0.376	0.176	0.026	0.231	0.504	0.958
No Incentives (1-8)	6,034	0.555	0.198	0.056	0.402	0.701	1.000
Incentives (9-16)	6,034	0.222	0.191	0.000	0.071	0.357	0.952
Size(Firm employment)	6,034	125.502	254.973	0	18	117	4,181
Exporters	6,034	0.328	0.470	0	0	1	1
Multiplant	6,034	0.044	0.206	0	0	0	1

Note:The management score is the unweighted average of the score for each of the 16 questions, where each question is first normalized to be on a 0-1 scale. The sample in all columns is allobservations with at least 11 non-missing responses to management questions and a successful match to EAM.

The next histogram shows the distribution for magement score (16 questions). As you can see, the distribution is skewed to the left, where the total number of observations is 7,529 in EDIT. This histogram includes all observations with at least 11 non-missing responses to management questions.

Manegement – Colombia vs USA with only EDIT data
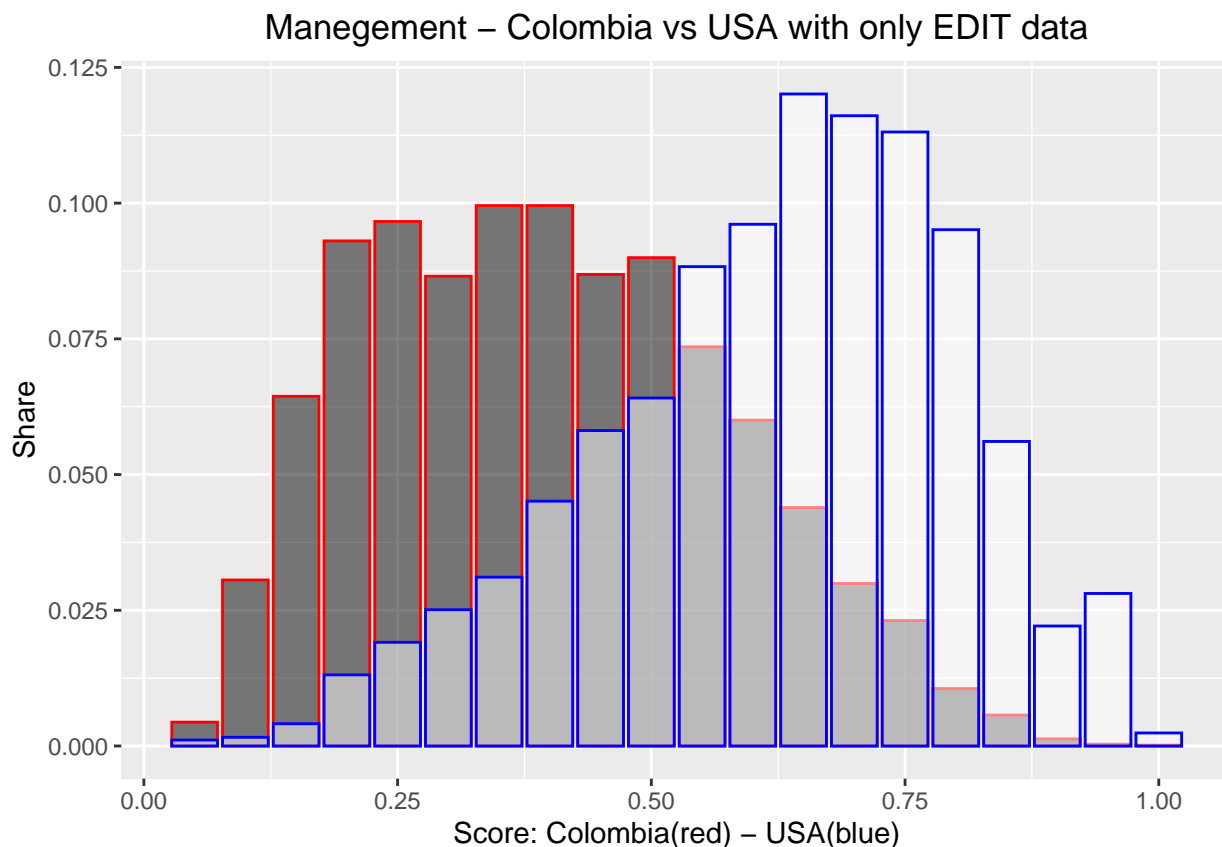
According to Bloom(2019) the average U.S Management score (1-16 questions) is 0.615, the non-incentives (1-8) is 0.643 and the incentives (9-16) is 0.583.

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The next table shows the number of observations for each database and our estimates use the merge EDIT-EAM.

Table 2: Databases

| Database	n
EDIT 1:All observations	7,529
EDIT 2:At least 11 non-missing values	6,148
EAM 1:All observations	7,911
EAM 2:Collapsed data	7,256
Merge EDIT 2 - EAM 2	6,034

The next histogram shows the distribution for magement score (16 questions) for Colombia and the United States, using the merge between EDIT and EAM with 6,034 observations.

Manegement – Colombia vs USA with merge EDIT – EAM data

Score: Colombia(red) – USA(blue)
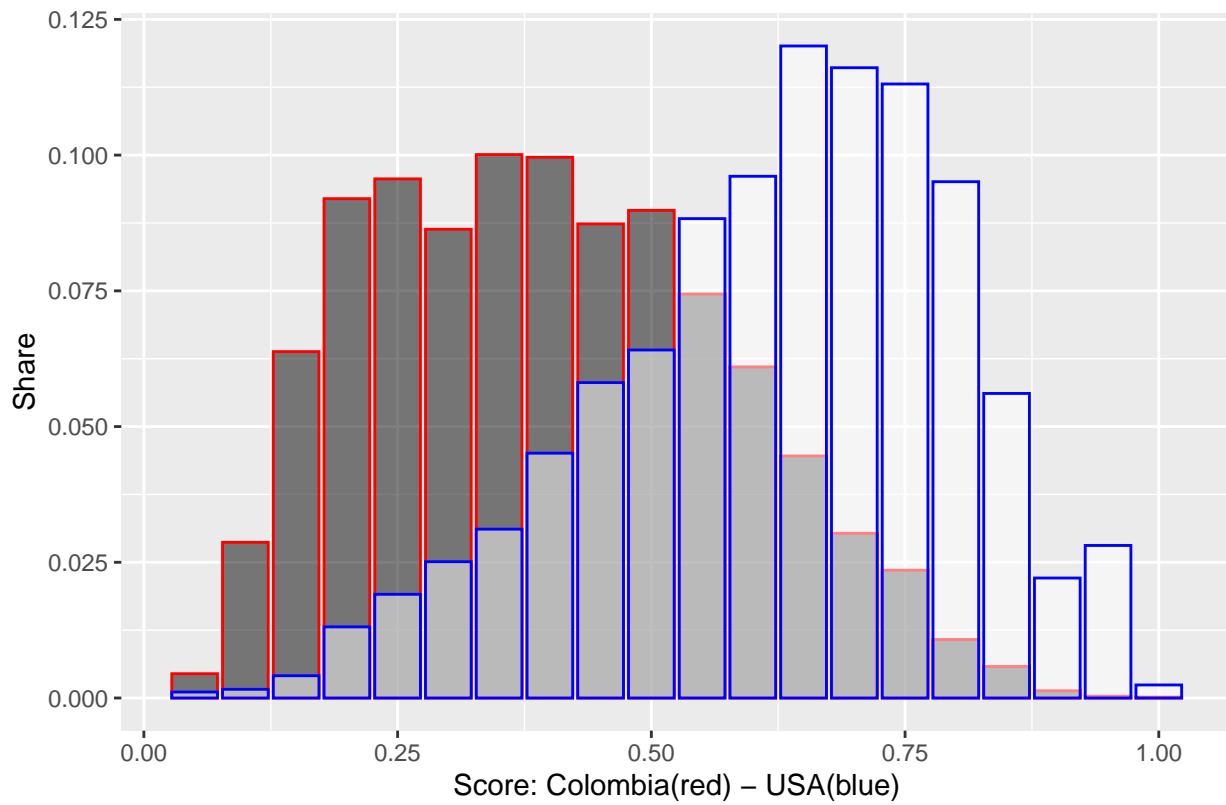
Firm size rises with Management –Non–Linear fit
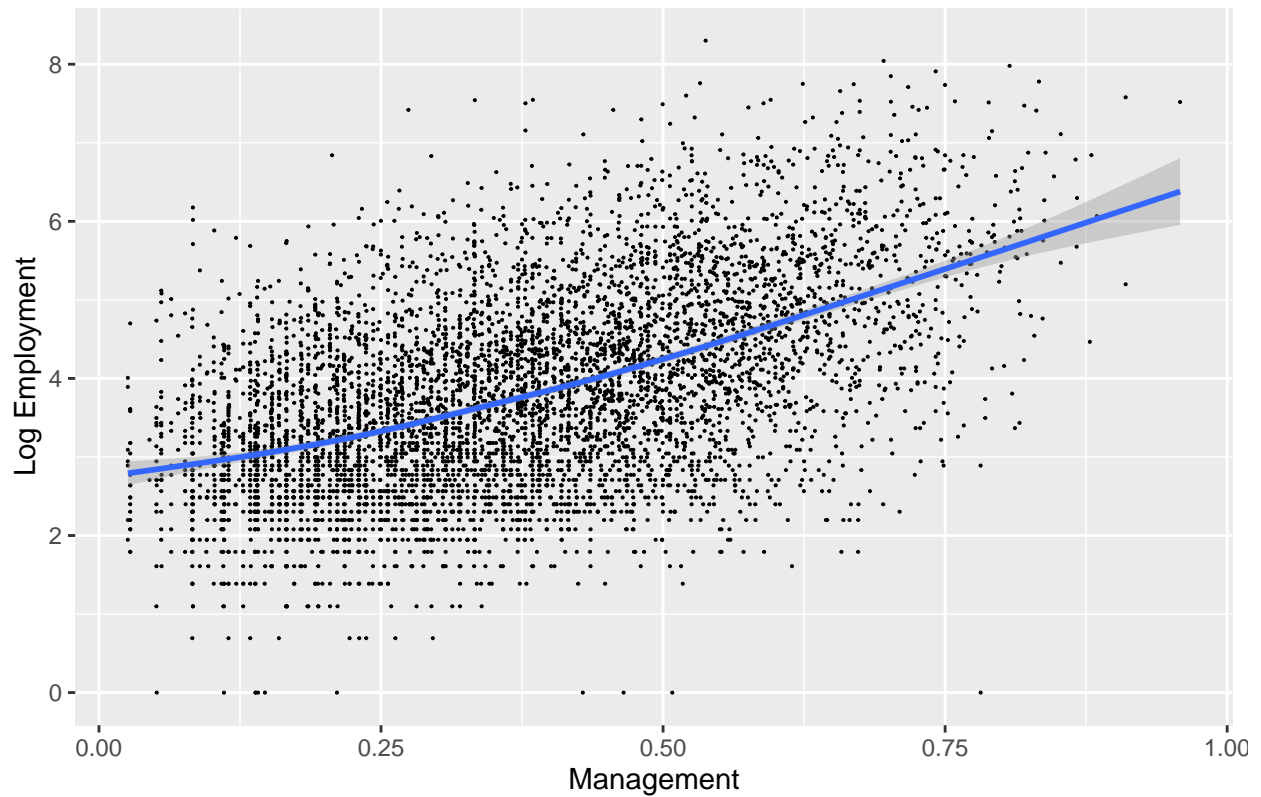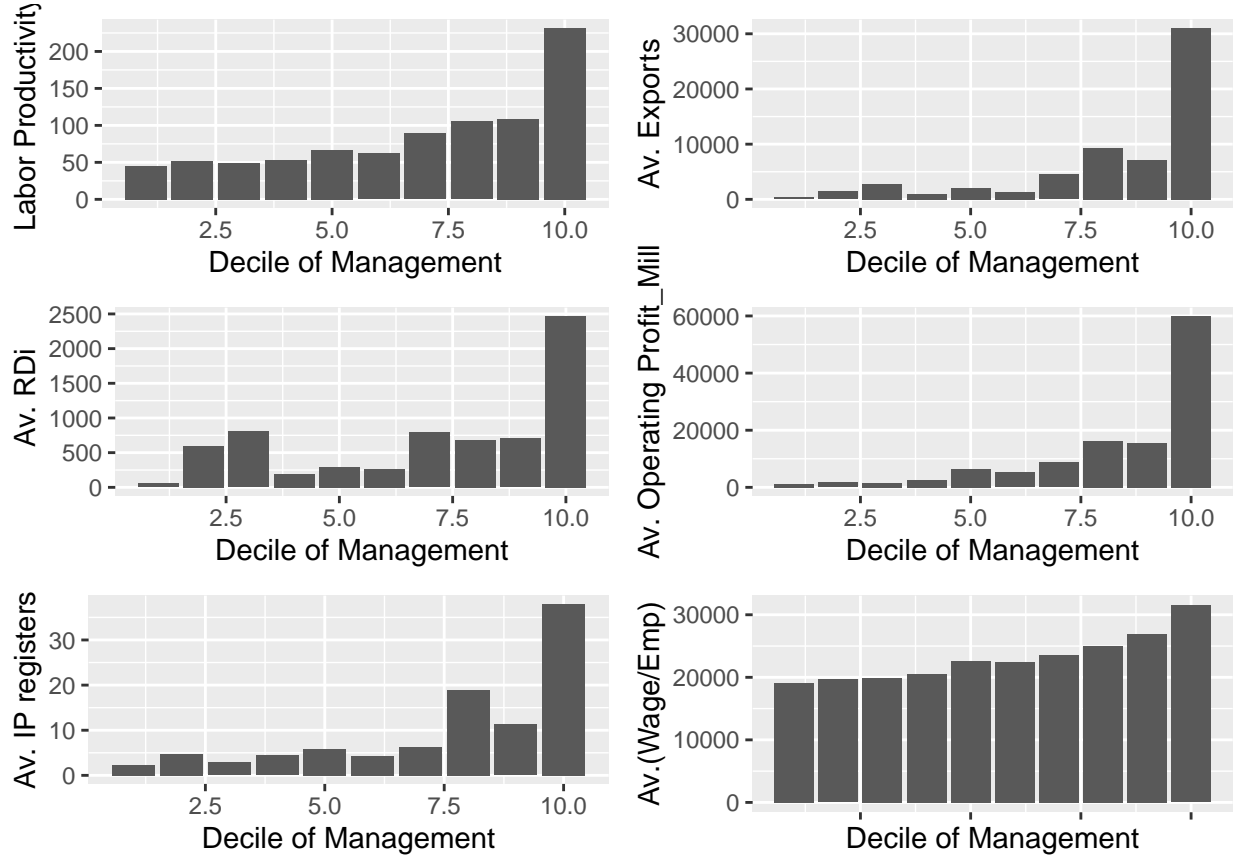
Suppose that the firm production function is:

$$Y_i = A_i K_i^\alpha L_i^\beta I^\gamma e^{\delta M_i} e^{\mu X_i} + \varepsilon_i$$

Where Y_i:Production of firm i A_i: Total factor productivity (Excluding Management Practices) K_i:Fixed assets at final of 2018 L_i:Labor inputs: the total number of employees of firm i I_i:Intermediate inputs X_i:Vector of additional factors: the percent of staff with college degree M_i: Management score (1-16)

Dividing by labor and taking logs we can rewrite this in a form to estimate on the data:

$$log\frac{Y_i}{L_i} = \alpha log\frac{K_i}{L_i} + \gamma log\frac{I_i}{L_i} + (\alpha + \beta + \gamma)logL_i + \delta M_i + \mu X_i + u_i$$

We calculate this equation by estimating an OLS regression

Table 3: Firm Management Scores and Performance

	Ln(Output/Emp)			Ln(Sales/Emp)			Profit/Sales		
	1	2	3	4	5	6	7	8	9
Management	0.24^{***}	0.24^{***}	0.25^{***}	0.24^{***}	0.25^{***}	0.26^{***}	-0.01	0.01	0.01
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.06)	(0.06)	(0.06)
Ln(Cap/Emp)	0.05^{***}	0.05^{***}	0.05^{***}	0.05^{***}	0.05^{***}	0.05^{***}	-0.01	-0.01	-0.01
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)
Ln(Input/Emp)	0.67^{***}	0.68^{***}	0.68^{***}	0.66^{***}	0.67^{***}	0.67^{***}	0.12^{***}	0.10^{***}	0.10^{***}
	(0.01)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)
Ln(Employment)	0.05^{***}	0.05^{***}	0.05^{***}	0.05^{***}	0.04^{***}	0.05^{***}	0.02	0.01	0.01
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)
Degree	0.23^{***}	0.47^{***}	0.46^{***}	0.28^{***}	0.54^{***}	0.52^{***}	-0.04	-0.16^{*}	-0.15
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.08)	(0.08)	(0.08)
R^2	0.81	0.85	0.86	0.81	0.84	0.85	0.04	0.03	0.03
Adj. R^2	0.81	0.85	0.86	0.80	0.84	0.85	0.02	0.02	0.03
Num. obs.	5992	5992	5992	5992	5992	5992	5992	5992	5992

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$.
OLS coefficients with standard errors in parentheses. The management score is the unweighted average of the score for each of the 16 questions, where each question is first normalized to be on a 0–1 scale. The sample is all EDIT observations with at least 11 non-missing responses to management questions and a successful match to EAM, which have positive value added, positive employment, and positive imputed capital. The columns 1-3 mean the models with Industry Fixed Effects, Location Fixed Effects and no Fixed Effects, respectively.This also applies for columns 4-6 and 7-9

Table 4: Firm Management Scores and Performance

	Log(VA/Emp)			(Profits/sales)			RDi/Emp		
	1	2	3	4	5	6	7	8	9
Management	0.63^{***}	0.69^{***}	0.71^{***}	0.05	0.06	0.06	3.14^{***}	2.94^{***}	3.05^{***}
	(0.08)	(0.08)	(0.08)	(0.06)	(0.06)	(0.06)	(0.57)	(0.56)	(0.55)
Ln(Cap/Emp)	0.21^{***}	0.24^{***}	0.25^{***}	0.03^{***}	0.03^{***}	0.02^{***}	0.23^{**}	0.34^{***}	0.33^{***}
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.08)	(0.07)	(0.07)
Ln(Employment)	0.18^{***}	0.17^{***}	0.18^{***}	0.03^{***}	0.02^{*}	0.02^{**}	0.08	0.07	0.09
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.08)	(0.08)	(0.07)
Degree	0.90^{***}	1.39^{***}	1.39^{***}	0.07	-0.04	-0.03	1.51	2.74^{***}	2.66^{***}
	(0.12)	(0.11)	(0.11)	(0.08)	(0.08)	(0.08)	(0.86)	(0.78)	(0.77)
R^2	0.20	0.25	0.27	0.01	0.01	0.01	0.05	0.07	0.07
Adj. R^2	0.19	0.25	0.27	-0.01	0.00	0.01	-0.01	0.05	0.07
Num. obs.	5992	5992	5992	5992	5992	5992	1753	1753	1753

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$.
OLS coefficients with standard errors in parentheses. The management score is the unweighted average of the score for each of the 16 questions, where each question is first normalized to be on a 0–1 scale. The sample is all EDIT observations with at least 11 non-missing responses to management questions and a successful match to EAM, which have positive value added, positive employment, and positive imputed capital. The columns 1-3 mean the models with Industry Fixed Effects, Location Fixed Effects and no Fixed Effects, respectively.This also applies for columns 4-6 and 7-9.

Table 5: Drivers of Productivity Variation

	Log(VA/Emp)			
	1	2	3	4
Management	1.950***	1.687***	1.694***	1.651***
	(0.075)	(0.079)	(0.079)	(0.078)
RDi		0.044***	0.043***	0.038***
		(0.004)	(0.004)	(0.004)
ICT/Emp			0.000*	0.000
			(0.000)	(0.000)
Degree				1.517***
				(0.121)
R^2	0.101	0.115	0.116	0.139
Adj. R^2	0.100	0.115	0.116	0.138
Num. obs.	6030	6030	6030	6030

***$p < 0.001$; **$p < 0.01$; *$p < 0.05$.
OLS coefficients with standard errors in parentheses.Dependent variable is firm level log(Value Added/Employment). Right-hand-side variables are Management score, RDi is measured as log(1+RDi intensity), where RDi intensity is the total domestic Research, Development and innovation expenditure in 2018 divided by total domestic employment, ICT/Emp is investment per worker (spending on information and communication technology hardware and software per employee), Degree is measured by the share of employees (managers and non-managers) with a college degree.Missing values have been replaced by zero for RDi and by means for the other variables.

Table 6: Product Market Competition and Management

	Management	
	1	2
Lerner Index	0.015***	0.003
	(0.004)	(0.003)
Ln(Cap/Emp)		0.012***
		(0.002)
Ln(Employment		0.068***
		(0.002)
Degree		0.122***
		(0.019)
R^2	0.003	0.260
Adj. R^2	0.003	0.246
Num. obs.	6034	5992

***$p < 0.001$; **$p < 0.01$; *$p < 0.05$.
The Lerner Index is the gross profits over sales, where gross profits equals to production value less material costs and wage costs in 2018.This table uses this Lerner index without controls:column (1), and with four-digit industry fixed effects and full controls:column (2).

Table 7: Drivers of Total Factor Productivity

	Revenue-based Total Factor Productivity			
	1	2	3	4
Management	0.149***	0.131***	0.133***	0.129***
	(0.027)	(0.028)	(0.028)	(0.028)
RDi		0.003*	0.003	0.002
		(0.002)	(0.002)	(0.002)
ICT/Emp			0.000	0.000
			(0.000)	(0.000)
Degree				0.122**
				(0.044)
R^2	0.005	0.006	0.006	0.008
Adj. R^2	0.005	0.006	0.006	0.007
Num. obs.	5967	5967	5967	5966

***$p < 0.001$; **$p < 0.01$; *$p < 0.05$.
OLS coefficients with standard errors in parentheses. Dependent variable is firm level TFP built from industry firm-level. Right-hand side variables are management score, RDi from BRDIS measured as log(1+RDi intensity) where RDi intensity is the total domestic RDi expenditure divided by total domestic employment, IT investment per worker, skill measured by the share of employees (managers and non-managers) with a college degree. Missing values have been replaced by zero for RDi and by means for the other variables.

Graph1. Who is the largest shareholder?

Is the manager the same founder or founder's family member?

Manager Gender