

# Management and Organizational Practices Survey - Colombia 2017-2018

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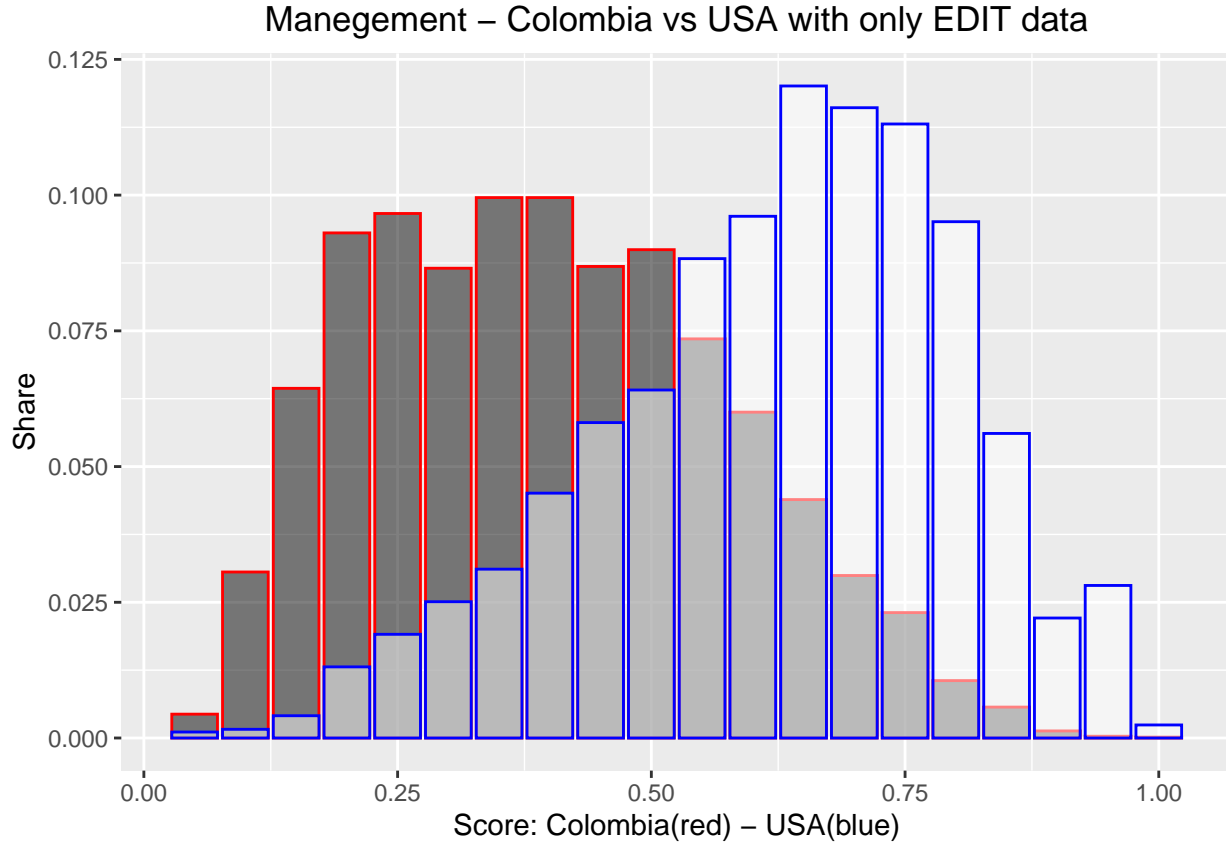
7/21/2020

Table 1: Descriptive Statistics (1)

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 all observations with at least 11 non-missing responses to management questions and a successful match to EAM.

The next histogram shows the distribution for management 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.



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.

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

Table 2: Databases

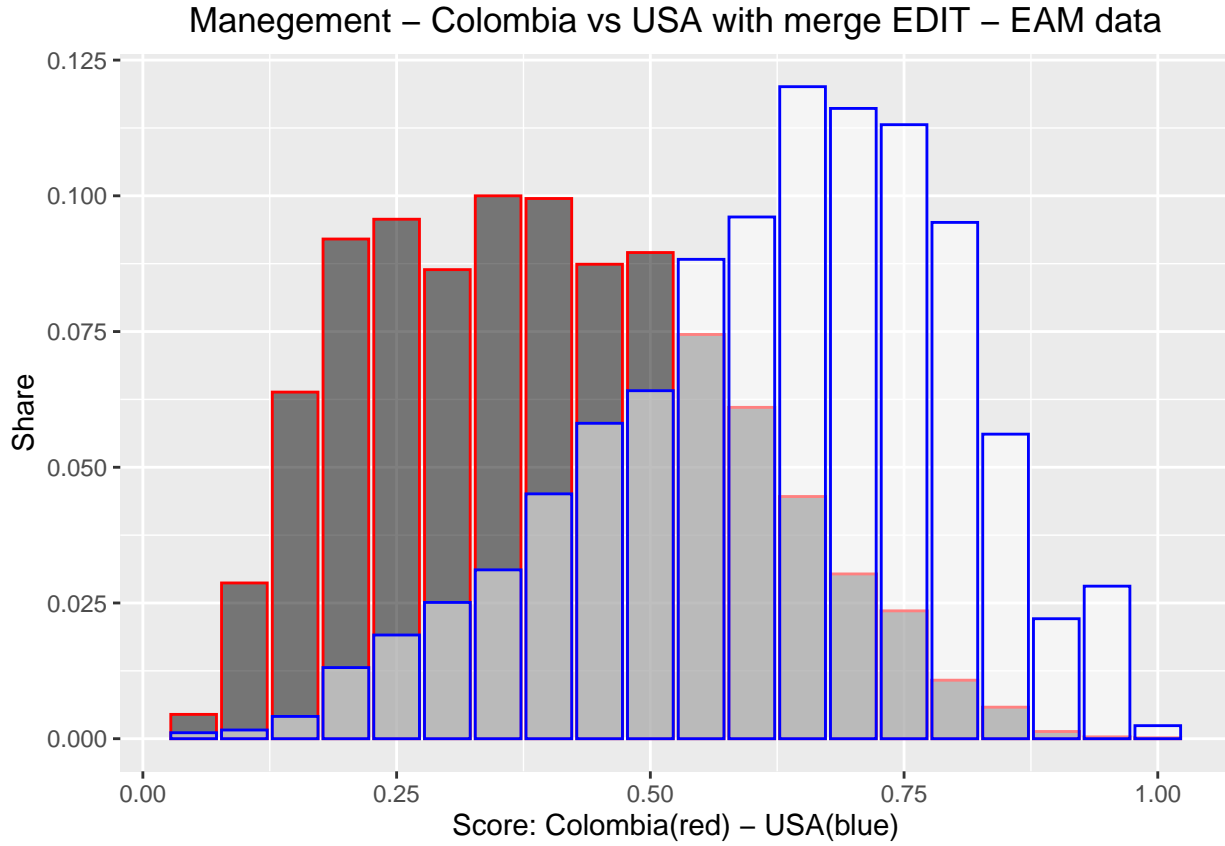
Database	n
EDIT 1:All observations	7,529
EDIT 2:At least 11 non-missing values	6,148
EAM 1:All observations	7,911
EAM 2:Collapsed data	7,256
Merge EDIT 2 - EAM 2	6,034

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.

Table 3: Descriptive Statistics (2)

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
Total Sales	6,012	40,262.150	270,955.800	8.280	1,273.361	15,685.710	11,679,283.000
Value Added	6,012	15,133.510	73,532.850	0.091	554.676	6,923.818	3,058,511.000
Exports/Sales	6,012	0.068	0.163	0	0	0.04	1
RD <sub>i</sub> /Sales	1,750	0.010	0.023	0.000	0.0002	0.010	0.381

Note: For the merge between EDIT and EAM, this table shows the descriptive statistics for Total Sales Value Added in millions of colombian pesos, value of exported products/Sales and value of investment on research, development and innovation (RD<sub>i</sub>)/Sales.



Firm size rises with Management –Non-Linear fit

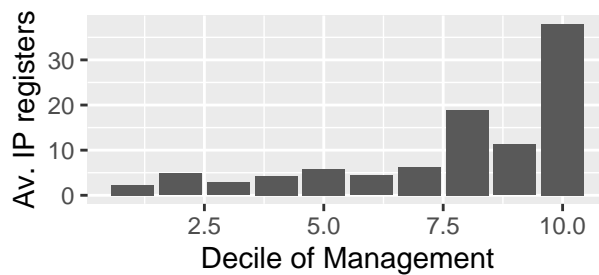
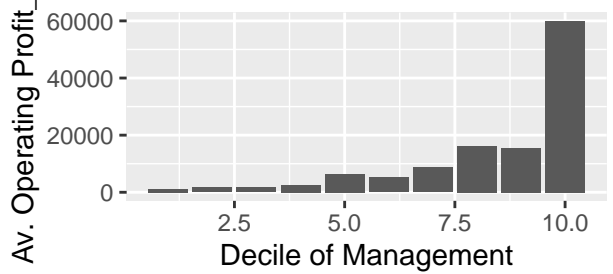
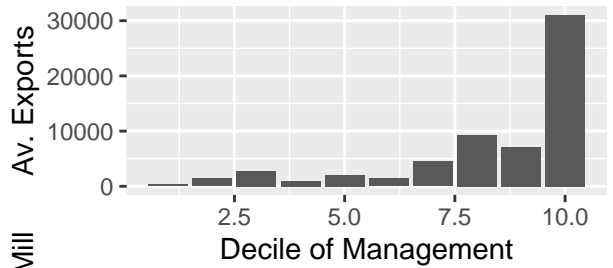
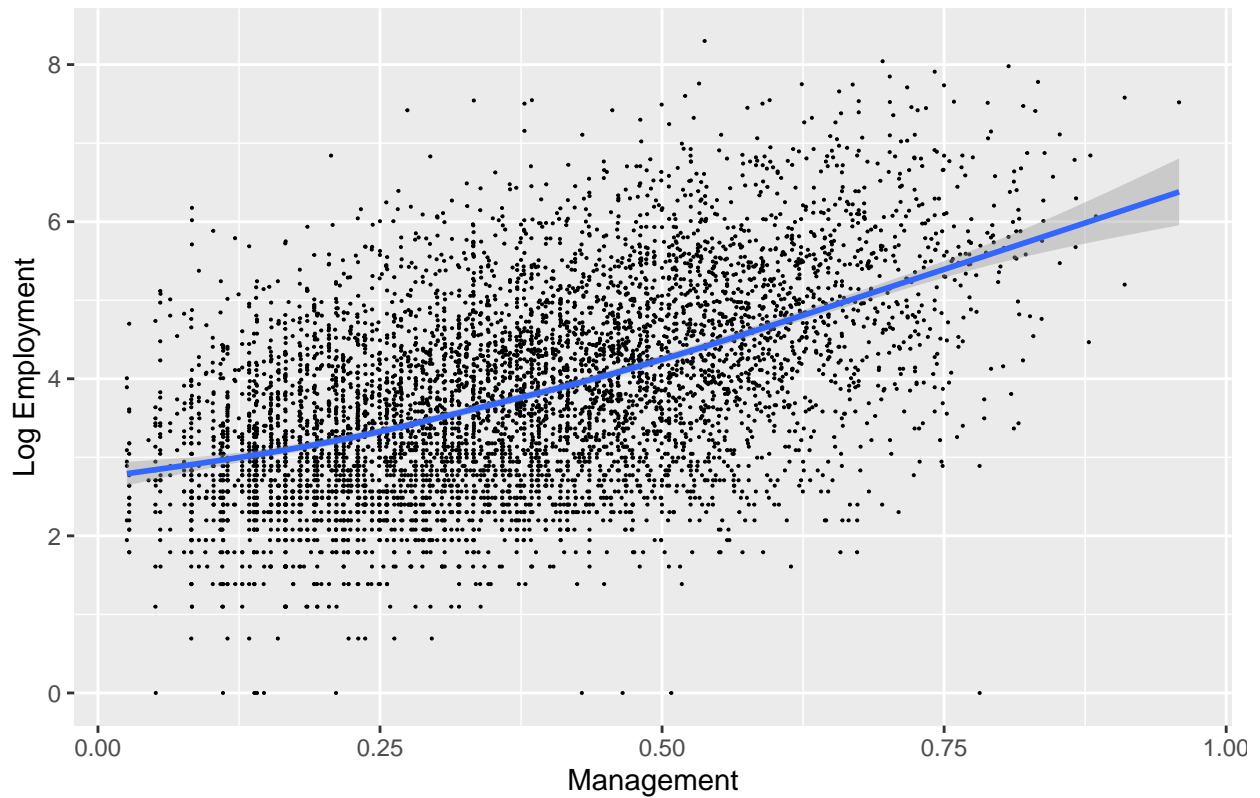


Table 4: Firm Management Scores and Performance

	Ln(Output/Emp)			Ln(Sales/Emp)			Profit/Sales		
	1	2	3	4	5	6	7	8	9
Management	0.24*** (0.03)	0.24*** (0.03)	0.25*** (0.03)	0.25*** (0.03)	0.25*** (0.03)	0.26*** (0.03)	-0.01 (0.06)	0.01 (0.06)	0.01 (0.06)
Ln(Cap/Emp)	0.05*** (0.00)	0.05*** (0.00)	0.05*** (0.00)	0.05*** (0.00)	0.05*** (0.00)	0.05*** (0.00)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)
Ln(Input/Emp)	0.67*** (0.01)	0.68*** (0.00)	0.68*** (0.00)	0.66*** (0.01)	0.67*** (0.00)	0.67*** (0.00)	0.12*** (0.01)	0.10*** (0.01)	0.10*** (0.01)
Ln(Employment)	0.05*** (0.00)	0.05*** (0.00)	0.05*** (0.00)	0.04*** (0.00)	0.04*** (0.00)	0.05*** (0.00)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)
Degree	0.23*** (0.05)	0.47*** (0.05)	0.46*** (0.05)	0.27*** (0.05)	0.54*** (0.05)	0.52*** (0.05)	-0.07 (0.08)	-0.16* (0.08)	-0.15 (0.08)
R <sup>2</sup>	0.81	0.85	0.86	0.81	0.84	0.85	0.04	0.03	0.03
Adj. R <sup>2</sup>	0.81	0.85	0.86	0.80	0.84	0.85	0.01	0.02	0.03
Num. obs.	5988	5988	5988	5988	5988	5988	5988	5988	5988

\*\*\*  $p < 0.001$ ; \*\*  $p < 0.01$ ; \*  $p < 0.05$ .

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

Suppose that the firm production function is:

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

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:

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

We calculate this equation by estimating an OLS regression

[1] 2136

Table 5: Firm Management Scores and Performance

	Log(VA/Emp)			(Profits/sales)			RDi/Emp		
	1	2	3	4	5	6	7	8	9
Management	0.64*** (0.08)	0.69*** (0.08)	0.71*** (0.08)	0.05 (0.06)	0.06 (0.06)	0.06 (0.06)	2.94*** (0.56)	2.95*** (0.56)	3.07*** (0.55)
Ln(Cap/Emp)	0.21*** (0.01)	0.24*** (0.01)	0.24*** (0.01)	0.03*** (0.01)	0.03*** (0.01)	0.02*** (0.01)	0.19* (0.08)	0.34*** (0.07)	0.33*** (0.07)
Ln(Employment)	0.18*** (0.01)	0.17*** (0.01)	0.18*** (0.01)	0.03*** (0.01)	0.02* (0.01)	0.02** (0.01)	0.11 (0.08)	0.07 (0.08)	0.09 (0.07)
Degree	0.89*** (0.12)	1.39*** (0.11)	1.39*** (0.11)	0.05 (0.09)	-0.04 (0.08)	-0.03 (0.08)	1.54 (0.86)	2.72*** (0.78)	2.64*** (0.77)
R <sup>2</sup>	0.20	0.25	0.27	0.01	0.01	0.01	0.05	0.07	0.07
Adj. R <sup>2</sup>	0.18	0.25	0.27	-0.02	0.00	0.01	-0.03	0.05	0.07
Num. obs.	5988	5988	5988	5988	5988	5988	1749	1749	1749

\*\*\*  $p < 0.001$ ; \*\*  $p < 0.01$ ; \*  $p < 0.05$ .

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 6: Drivers of Productivity Variation

	Log(VA/Emp)			
	1	2	3	4
Management	1.950*** (0.075)	1.687*** (0.079)	1.694*** (0.079)	1.652*** (0.078)
RDi		0.044*** (0.004)	0.043*** (0.004)	0.038*** (0.004)
ICT/Emp			0.000* (0.000)	0.000 (0.000)
Degree				1.517*** (0.121)
R <sup>2</sup>	0.101	0.115	0.116	0.139
Adj. R <sup>2</sup>	0.100	0.115	0.116	0.138
Num. obs.	6026	6026	6026	6026

\*\*\*  $p < 0.001$ ; \*\*  $p < 0.01$ ; \*  $p < 0.05$ .

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  $\log(1 + \text{RDi intensity})$ , 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 7: Drivers of Total Factor Productivity

	Revenue-based Total Factor Productivity - RTFP			
	1	2	3	4
Management	0.149*** (0.027)	0.130*** (0.028)	0.133*** (0.028)	0.129*** (0.028)
RD <sub>i</sub>		0.003* (0.002)	0.003 (0.002)	0.002 (0.002)
ICT/Emp			0.000 (0.000)	0.000 (0.000)
Degree				0.123** (0.044)
R <sup>2</sup>	0.005	0.006	0.006	0.008
Adj. R <sup>2</sup>	0.005	0.006	0.006	0.007
Num. obs.	5963	5963	5963	5962

\*\*\*  $p < 0.001$ ; \*\*  $p < 0.01$ ; \*  $p < 0.05$ .

OLS coefficients with standard errors in parentheses. Dependent variable is firm level TFP built from industry firm-level. Independent variables are management score, RD<sub>i</sub> measured as  $\log(1 + \text{RD}_i \text{ intensity})$  where RD<sub>i</sub> intensity is the total domestic RD<sub>i</sub> 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 RD<sub>i</sub> and by means for the other variables.

Table 8: Tariffs and Management

	Management	
	1	2
Average Tariff	-0.095** (0.034)	-0.068* (0.029)
Ln(Cap/Emp)		0.013*** (0.001)
Ln(Employment)		0.070*** (0.002)
Degree		0.152*** (0.018)
R <sup>2</sup>	0.001	0.295
Adj. R <sup>2</sup>	0.001	0.295
Num. obs.	5860	5860

\*\*\*  $p < 0.001$ ; \*\*  $p < 0.01$ ; \*  $p < 0.05$ .

The Average Tariff is the average of the tariffs according to the ciu 4 code of the firm. To get the merge between CIU4 and Tariffs, we use tables from DANE and International Trade Centre - ITC. This table uses this Average Tariffs without controls: column (1), and with full controls: column (2).

Table 9: Tariffs and Market competition

	Lerner Index	
	1	2
Average Tariff	0.196 (0.126)	0.258* (0.129)
Management		0.067 (0.057)
Ln(Cap/Emp)		0.026*** (0.007)
Ln(Employment)		0.022** (0.008)
Degree		-0.006 (0.081)
R <sup>2</sup>	0.000	0.008
Adj. R <sup>2</sup>	0.000	0.008
Num. obs.	5860	5860

\*\*\*  $p < 0.001$ ; \*\*  $p < 0.01$ ; \*  $p < 0.05$ .

The Lerner Index is the gross profits over sales, where gross profits equals to production value less material costs and wage costs in 2018. The Average Tariff is the average of the tariffs according to the CIU4 code of the firm. This table uses average tariffs from International Trade Centre - ITC

Table 10: Logarithms of trade outcomes and Management

	Log(1+Exports)	Log(1+Imports)	Log(1+Exports+Imports)
Management	2.927*** (0.459)	2.375*** (0.445)	3.524*** (0.479)
Ln(Cap/Emp)	0.747*** (0.059)	0.757*** (0.057)	0.817*** (0.061)
Ln(Employment)	2.791*** (0.067)	2.325*** (0.065)	2.970*** (0.070)
Degree	6.191*** (0.692)	5.636*** (0.670)	6.546*** (0.721)
R <sup>2</sup>	0.480	0.439	0.497
Adj. R <sup>2</sup>	0.466	0.425	0.483
Num. obs.	5860	5860	5860

\*\*\*  $p < 0.001$ ; \*\*  $p < 0.01$ ; \*  $p < 0.05$ .

This table examines the relationship between logarithm of (1+value of exported products), logarithm of (1+value of imported inputs) and logarithm of (1+value of exported products + imported inputs) at firm level and firm's management practices. It includes some controls: Ln(Cap/Emp), Ln(Employment) and the percent of staff with college degree. All regressions include fixed effects for firm location (department) and 4 digits - CIU 4 (industry).



Table 11: Dummies of trade outcomes and Management

	Dummy Exports	Dummy Imports	Dummy Trade
Management	0.191*** (0.034)	0.133*** (0.032)	0.211*** (0.035)
Ln(Cap/Emp)	0.044*** (0.004)	0.047*** (0.004)	0.046*** (0.004)
Ln(Employment)	0.176*** (0.005)	0.147*** (0.005)	0.177*** (0.005)
Degree	0.378*** (0.051)	0.364*** (0.048)	0.378*** (0.053)
R <sup>2</sup>	0.402	0.385	0.398
Adj. R <sup>2</sup>	0.386	0.368	0.382
Num. obs.	5860	5860	5860

\*\*\* $p < 0.001$ ; \*\* $p < 0.01$ ; \* $p < 0.05$ .

This table examines the relationship between export status (Dummy Exports = 1 if value of exported products > 0 and 0 otherwise), import status (Dummy Import = 1 if value of imported inputs > 0 and 0 otherwise), trade status (Dummy Trade = 1 if value of exports + imports > 0 and 0 otherwise) and firm's management practices. It includes some controls: Ln(Cap/Emp), Ln(Employment) and the percent of staff with college degree. All regressions include fixed effects for firm location (department) and 4 digits - CIU 4 (industry).

Table 12: Shares of trade outcomes and Management

	Share of exported products	Share of imported inputs	Share of traded
Management	0.050*** (0.014)	0.072*** (0.017)	0.060*** (0.012)
Ln(Cap/Emp)	0.011*** (0.002)	0.017*** (0.002)	0.013*** (0.002)
Ln(Employment)	0.027*** (0.002)	0.043*** (0.002)	0.032*** (0.002)
Degree	0.089*** (0.021)	0.142*** (0.026)	0.108*** (0.018)
R <sup>2</sup>	0.241	0.276	0.287
Adj. R <sup>2</sup>	0.221	0.256	0.267
Num. obs.	5755	5755	5755

\*\*\* $p < 0.001$ ; \*\* $p < 0.01$ ; \* $p < 0.05$ .

This table examines the relationship between Share of exported products = exports/total sales, Share of imported inputs = imports/total inputs, Share of traded = (exports + imports)/(total sales + inputs) and firm's management practices. It includes some controls: Ln(Cap/Emp), Ln(Employment) and the percent of staff with college degree. All regressions include fixed effects for firm location (department) and 4 digits - CIU 4 (industry).

