Management and Organizational Practices Survey - Colombia 2017-2018

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Summary

Matching the Innovation and Technology Survey EDIT 2017-2018 (acronym in Spanish) with Annual Manufacturing Survey 2018 (EAM), we analyze the relationship between the performance and management at firm level for Colombia in 2018. The management is a significant driver of variation in productivity, development and innovation (R&Di). Also, a statistically significant relationship is observed for the number of export destinations, products and export revenues.

Introduction

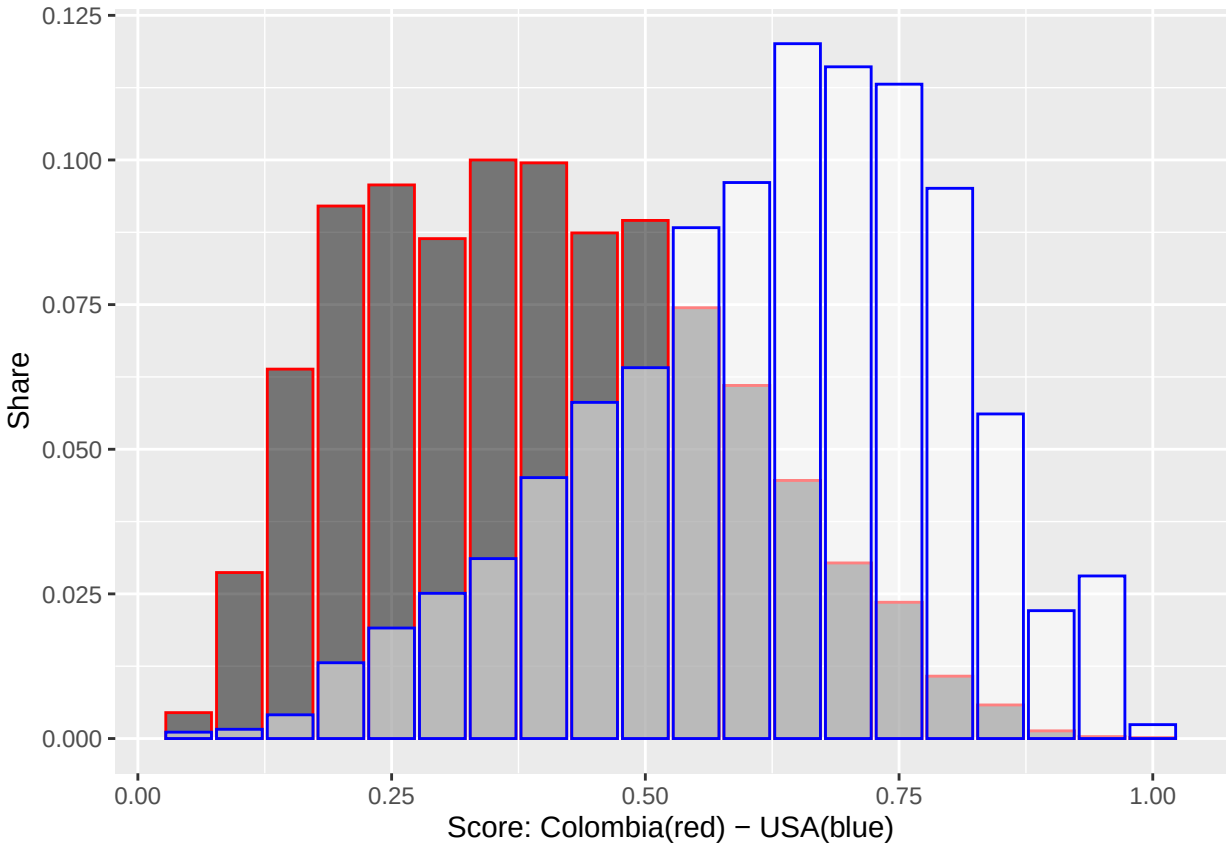
Management and Organizational Practices Survey in Colombia

The Management and Organizational Practices Survey was incorporated for the first time in EDIT 2017 2018 (Innovation and Technology Survey in Colombia for Manufacturing Sector) and published with anonymous data on the website of the Colombian Institute of Statistics (DANE). The EDIT included 16 management questions with two basic areas, which are supported on the idea of the continuous improvement. For our regressions, we aggregate those 16 questions into a single measure, which is called the management score. This score is the unweighted average, where the answer to each question is measured on a scale from 0 to 1.

For our regressions, we aggregate those 16 questions into a single measure, which is called the management score. This score is the unweighted average, where the answer to each question is measured on a scale from 0 to 1, where o is the worst option and 1 the best. Table 1 presents the descriptive statistics of the successful merge between EDIT and EAM, and some characteristics at the signature level. In cases where the firm has more than one establishment, the information is added. For our analysis, we use data with at least eleven non-missing responses to the management questions that also have positive values for outcomes and inputs of the firm.

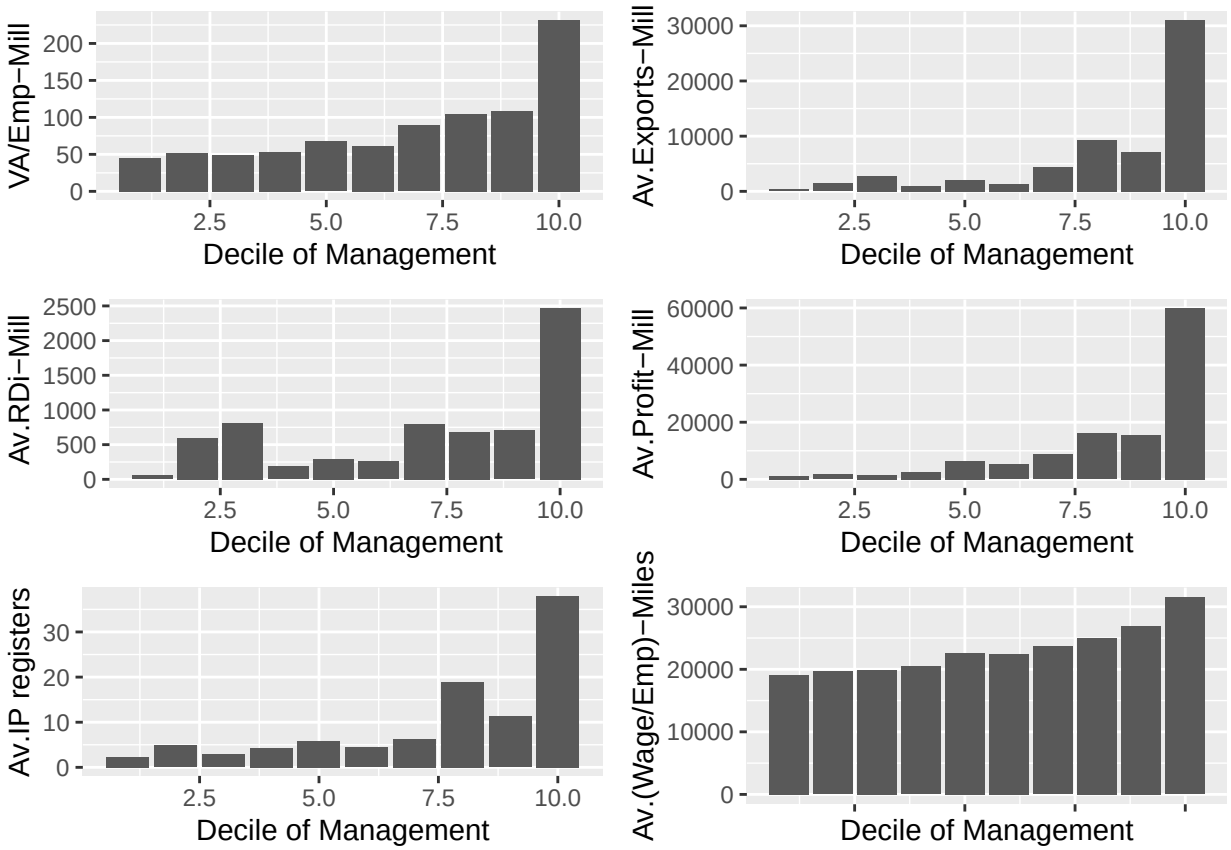
The histogram below shows the distribution for magement score (16 questions). As you can see, the distribution is skewed to the left, where the total number of observations is 7,529 in EDIT. This histogram includes all observations with at least 11 non-missing responses to management questions.

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 following 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. It plots the overlapping histogram of firm management scores for Colombia (2018) and the United States (2010) according to Bloom (2019). While the Colombian management score (from 1 to 16 questions) was 0.37, for the U.S was 0.61, which implies that the distribution of Colombia is skewed to the left compared to the United States.



Performance measures

We divide the performance into four groups, a) productivity: production, sales, value added, total factor productivity where we analyze using a production function b) Innovation: investment on research, development and innovation (RDi) and intellectual properties register, which are inputs and outputs for a firm, c) market competition: management as a dependent variable of external and domestic competition d) trade: exports, imports, number of products sold abroad, destinations, destination product pairs, exports over product destination pairs and exports at top destination-product, where we explore the linkages between management and international trade.



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We investigate whether management competence is correlated with those measures of performance. We do not attribute a causal interpretation to the results, instead, it replicates the most of regression from Bloom (2019) and Manova (2020), which allows compare coefficients between Colombia and the United States.

Productivity

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 start by running a basic regression of labor productivity (measured as log(output/employee)) on management score, where the first column is calculated with industry fixed effects, the second with location fixed effects and the third without fixed effects. This is repeated for 4 to 6 and 7 to 9 columns, with dependent variable log (sales/employees) and profit/sales, respectively.

Table 1: Semi-elasticities from bottom to top

Dependent Variable	Coefficient	From 25pctl to 75pctl
Output / Emp	0.24	6.55%
Value Added / Emp	0.64	17.47%
Exports - For exporters	1.82	49.69%
Exports - For entire #sample:(1+Exp)	4.82	131.59%
Products - For exporters	0.94	25.66%
Products- For entire sample:(1+Exp)	0.8	21.84%
Destinations - For exporters	0.92	25.12%
Destinations - For #entire sample:(1+Exp)	0.76	20.75%

Innovation

The Appendix shows a positive correlation with measures of innovation such as investment on RDi as well as the intellectual property registers. This reflects that management practices keep a strong link with inputs and outputs of innovation, and it serves a good predictor of those variables.

Market competition

We specify the possible links between trade liberalization and plant level productivity. Using the firm level measures of TFP, we estimate the competitive pressure using the China Import Share, where its sign is negative (Appendix).

Trade

We examine the relationship between firms' management practices and export performance, testing four propositions:

Proposition 1: Better managed firms are more likely to export. Proposition 2: Better managed firms export more products to more destination markets and earn higher export revenues Proposition 3: The management is more important determinant in heterogeneous industries than homogeneous Proposition 4: Better management exporters reduce the effect of geographic distance on a gravity equation apprach.

Data

Empirical Strategy

Summary Statistics

Using the column 1 from Table Firm Management Scores and Performance (1)-Appendix, we find a highly significant coefficient of 0,24, suggesting that whether other variables remain constant, a point increase in our management score from bottom to top group, in other words, from percentile 25 to 75, is associated with a 0.24 * (0.504-0.231): 6.55% increase in labor productivity. The Table "Semi-elasticities from bottom to top" shows the changes in exports, products and destinations when increasing the Management Score.

Appendix

Table 2: 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
Multiplant	6,034	0.044	0.206	0	0	0	1
Destinations	2,076	7.730	10.809	1.000	1.000	9.000	110.000
Products	2,076	9.124	18.858	1.000	2.000	9.000	340.000
Dest-Prod	2,076	34.251	126.804	1.000	2.000	25.000	2,795.000
Exporters	6,030	0.357	0.479	0.000	0.000	1.000	1.000
Import/Input	6,030	0.078	0.221	0.000	0.000	0.001	8.591
Export/Sales	6,030	0.070	0.168	0.000	0.000	0.038	1.000

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.

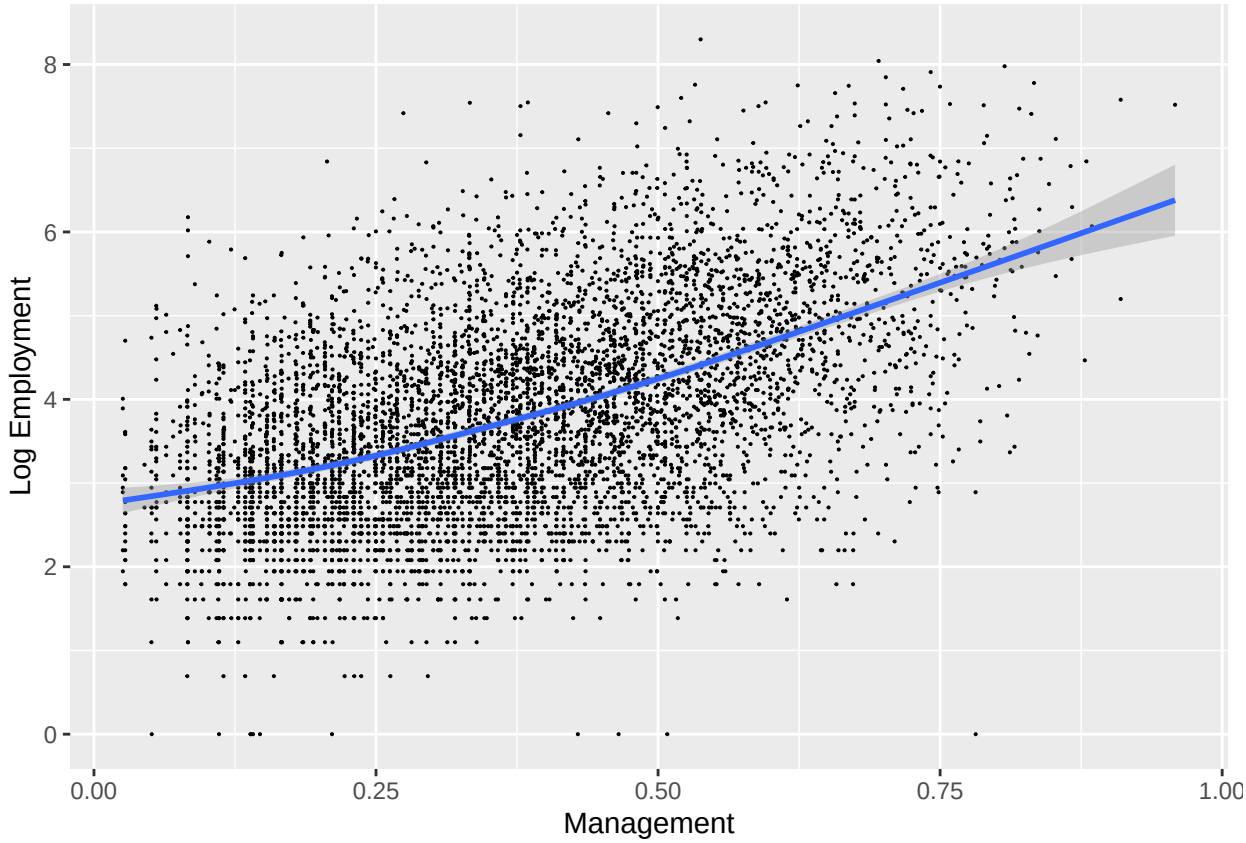

Table 3: Firm Management Scores and Performance (1)

	Ln(Output/Emp)			Ln(Sales/Emp)			Profit/Sales		
	1	2	3	4	5	6	7	8	9
Management	0.24***	0.24***	0.25***	0.25***	0.25***	0.26***	−0.01	0.02	0.01
	(0.03)	(0.03)	(0.04)	(0.03)	(0.04)	(0.04)	(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
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(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)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.03)	(0.03)	(0.03)
Ln(Employment)	0.05***	0.05***	0.05***	0.04***	0.04***	0.05***	0.01	0.01	0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Degree	0.23***	0.47***	0.46***	0.27***	0.54***	0.52***	−0.07	−0.16	−0.15
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.11)	(0.12)	(0.12)
R^2	0.87	0.86	0.86	0.87	0.85	0.85	0.07	0.03	0.03
Adj. R^2	0.87	0.86	0.86	0.86	0.85	0.85	0.05	0.03	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 (clustered at firm level). 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. The regressions include clustered standard errors by firm

Table 4: Firm Management Scores and Performance (2)

	Log(VA/Emp)			Log(1+IP Registers)			Log(1+RDi/Emp)		
	1	2	3	4	5	6	7	8	9
Management	0.64***	0.69***	0.71***	0.51***	0.55***	0.55***	2.94***	2.93***	3.07***
	(0.09)	(0.09)	(0.09)	(0.12)	(0.11)	(0.12)	(0.53)	(0.40)	(0.56)
Ln(Cap/Emp)	0.21***	0.24***	0.24***	0.09***	0.09***	0.09***	0.19*	0.33***	0.33***
	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.01)	(0.09)	(0.03)	(0.07)
Ln(Employment)	0.18***	0.17***	0.18***	0.33***	0.32***	0.32***	0.11	0.07	0.09
	(0.01)	(0.01)	(0.01)	(0.04)	(0.02)	(0.02)	(0.09)	(0.10)	(0.08)
Degree	0.89***	1.39***	1.39***	1.06***	2.11***	2.11***	1.54	2.79***	2.64**
	(0.15)	(0.15)	(0.14)	(0.24)	(0.25)	(0.22)	(0.99)	(0.51)	(0.81)
R^2	0.33	0.28	0.27	0.42	0.29	0.28	0.17	0.08	0.07
Adj. R^2	0.31	0.28	0.27	0.39	0.28	0.28	0.11	0.07	0.07
Num. obs.	5988	5988	5988	2534	2534	2534	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.The regressions include clustered standard errors by firm

Table 5: Drivers of Productivity Variation

	Log(VA/Emp)			
	1	2	3	4
Management	1.950***	1.687***	1.694***	1.652***
	(0.080)	(0.084)	(0.084)	(0.083)
RDi		0.044***	0.043***	0.038***
		(0.005)	(0.004)	(0.004)
ICT/Emp			0.000	0.000
			(0.000)	(0.000)
Degree				1.517***
				(0.148)
R^2	0.101	0.115	0.116	0.139
Adj. R^2	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). Independent 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. The regressions include standard errors clustered by firm

Table 6: Drivers of Total Factor Productivity

	Revenue-based Total Factor Productivity - RTFP			
	1	2	3	4
Management	0.127***	0.121***	0.123***	0.123***
	(0.027)	(0.028)	(0.028)	(0.028)
RDi		0.001	0.001	0.001
		(0.002)	(0.001)	(0.001)
ICT/Emp			0.000	0.000
			(0.000)	(0.000)
Degree				−0.000
				(0.059)
R^2	0.082	0.082	0.082	0.082
Adj. R^2	0.062	0.062	0.062	0.062
Num. obs.	5834	5834	5834	5834

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$.
OLS coefficients with standard errors in parentheses. Dependent variable is firm level TFP built from industry firm-level. Independent variables are management score, RDi 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.The regressions include standard errors clusterd by firm and fixed effects for industry

Table 7: China Import Share and Management

	Management	
	1	2
China Import Share	-0.097^{**}	-0.031^{*}
	(0.033)	(0.015)
Ln(Cap/Emp)		0.013^{***}
		(0.002)
Ln(Employment)		0.070^{***}
		(0.003)
Degree		0.149^{***}
		(0.022)
R^2	0.011	0.300
Adj. R^2	0.011	0.299
Num. obs.	5654	5654

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$.
The China Import Share means imports from China / Total imports for each industry (4 digits CIIU rev4). This table uses this China Import Share without controls:column (1), and with full controls:column (2). We estimated the China Import Share according to the Import Origin published by DANE and matched them to the firm four digits CIIU4 codes.The regressions include clustered standard errors by industry (four digits).

Table 8: Dummies of trade outcomes and Management

	Dummy Exports	Dummy Imports	Dummy Trade
Management	0.274^{***}	0.198^{***}	0.303^{***}
	(0.034)	(0.032)	(0.035)
Ln(Cap/Emp)	0.034^{***}	0.037^{***}	0.037^{***}
	(0.005)	(0.004)	(0.005)
Big=1	0.552^{***}	0.493^{***}	0.520^{***}
	(0.019)	(0.021)	(0.018)
Medium=1	0.292^{***}	0.199^{***}	0.297^{***}
	(0.013)	(0.012)	(0.014)
Degree	0.169^{**}	0.153^{**}	0.169^{**}
	(0.053)	(0.050)	(0.056)
Ln(Wage/Emp)	0.115^{***}	0.120^{***}	0.122^{***}
	(0.014)	(0.012)	(0.014)
R^2	0.390	0.380	0.383
Adj. R^2	0.374	0.363	0.367
Num. obs.	5834	5834	5834

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$.
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 - CIIU 4 (industry) and clustered standard errors by firm

Table 9: Extensive and Intensive Margins for Exporters - With Employment Dummies and Fixed Effects

	LnD	LnP	LnD-P	LnExp	LnExp/D	Ln Exp/P	Ln Exp/D-P	Ln TopD-P
Management	0.94^{***}	0.92^{***}	1.29^{***}	1.82^{***}	0.88^{***}	0.89^{**}	0.52^{*}	1.44^{***}
	(0.15)	(0.15)	(0.20)	(0.33)	(0.25)	(0.28)	(0.23)	(0.31)
Ln(Cap/Emp)	0.02	−0.02	−0.01	0.19^{***}	0.17^{***}	0.21^{***}	0.20^{***}	0.21^{***}
	(0.02)	(0.02)	(0.03)	(0.05)	(0.04)	(0.04)	(0.03)	(0.04)
Big=1	1.13^{***}	1.07^{***}	1.57^{***}	2.80^{***}	1.67^{***}	1.74^{***}	1.23^{***}	2.32^{***}
	(0.08)	(0.08)	(0.11)	(0.17)	(0.12)	(0.14)	(0.12)	(0.15)
Medium=1	0.44^{***}	0.41^{***}	0.62^{***}	1.08^{***}	0.64^{***}	0.66^{***}	0.46^{***}	0.87^{***}
	(0.05)	(0.05)	(0.07)	(0.12)	(0.09)	(0.10)	(0.09)	(0.11)
Degree	1.23^{***}	1.32^{***}	1.80^{***}	1.33^{*}	0.10	0.01	−0.47	0.56
	(0.26)	(0.26)	(0.34)	(0.52)	(0.37)	(0.44)	(0.36)	(0.47)
Ln(Wage/Emp)	0.32^{***}	0.34^{***}	0.49^{***}	0.85^{***}	0.53^{***}	0.51^{***}	0.37^{***}	0.69^{***}
	(0.06)	(0.05)	(0.07)	(0.13)	(0.10)	(0.12)	(0.10)	(0.13)
R^2	0.37	0.38	0.38	0.45	0.39	0.41	0.38	0.43
Adj. R^2	0.32	0.34	0.34	0.41	0.35	0.37	0.34	0.38
Num. obs.	2044	2044	2044	2044	2044	2044	2044	2044

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$.
This table examines the relationship between firms' management practices and the extensive and intensive margins of their exports. LnD:Log of destinations,LnP:Log of products by HS 6 digits,LnD-P: Log of pairs destination-products,LnExp: Log of Exports, LnExp/D: Log(Exports/Destinations,Ln Exp/P:Log(Exports/Products),Ln Exp/D-P:Log(Exports/pairs destination-products),Ln TopD-P:Log(exports in a firm's highest-revenue destination-product).The regressions include dummies employment as a control, where 50<medium<250 workers,big>250 and small<50 is excluded by collinearity. It also has standard errors clustered by firm and fixed effects for industry and region

Table 10: Extensive and Intensive Margins for all firms - With Employment Dummies and Fixed Effects

	Ln(1+D)	Ln(1+P)	Ln(1+DP)	Ln(1+E)	Ln(1+E/D)	Ln(1+E/P)	Ln(1+E/D-P)	Ln(1+TopDP)
Manag	0.80^{***}	0.76^{***}	1.09^{***}	4.82^{***}	4.07^{***}	4.12^{***}	3.76^{***}	4.49^{***}
	(0.07)	(0.07)	(0.10)	(0.46)	(0.41)	(0.41)	(0.38)	(0.43)
Ln(C/E)	0.04^{***}	0.02^{*}	0.04^{**}	0.28^{***}	0.25^{***}	0.26^{***}	0.24^{***}	0.27^{***}
	(0.01)	(0.01)	(0.01)	(0.06)	(0.05)	(0.05)	(0.05)	(0.06)
Big=1	1.13^{***}	1.14^{***}	1.65^{***}	6.42^{***}	5.31^{***}	5.32^{***}	4.77^{***}	5.90^{***}
	(0.06)	(0.06)	(0.08)	(0.30)	(0.26)	(0.26)	(0.24)	(0.28)
Med=1	0.43^{***}	0.46^{***}	0.63^{***}	3.08^{***}	2.70^{***}	2.68^{***}	2.49^{***}	2.88^{***}
	(0.03)	(0.03)	(0.04)	(0.17)	(0.15)	(0.15)	(0.14)	(0.16)
Degree	0.66^{***}	0.72^{***}	1.01^{***}	3.33^{***}	2.68^{***}	2.61^{***}	2.32^{***}	2.95^{***}
	(0.11)	(0.12)	(0.16)	(0.70)	(0.62)	(0.62)	(0.58)	(0.66)
Ln(W/E)	0.27^{***}	0.28^{***}	0.40^{***}	1.59^{***}	1.33^{***}	1.32^{***}	1.19^{***}	1.45^{***}
	(0.03)	(0.03)	(0.04)	(0.19)	(0.17)	(0.17)	(0.16)	(0.18)
R^2	0.39	0.36	0.38	0.37	0.35	0.36	0.35	0.37
Adj. R^2	0.37	0.34	0.36	0.36	0.34	0.34	0.33	0.35
Num. obs.	5835	5835	5835	5835	5835	5835	5835	5835

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$.
This table examines the relationship between firms' management practices and the extensive and intensive margins for the entire sample applying the transformation (1 + variable). D:destinations,P:products by HS 6 digits,DP:pairs destination-products,E:Exports,E/D:Exports/Destinations,E/P:Exports/Products,E/D-P:Exports/pairs destination-products,TopD-P:exports in a firm's highest-revenue destination-product.The regressions include dummies employment as a control, where 50<medium<250 workers,big>250 and small<50 is excluded by collinearity. It also has standard errors clustered by firm and fixed effects for industry and region.

Table 11: Extensive and Intensive Margins for Non-Complex Products

	LnD	LnP	LnD-P	LnExp	LnExp/D	Ln Exp/P	Ln Exp/D-P	Ln TopD-P
Management	0.62**	0.79***	1.03***	1.02*	0.39	0.23	−0.01	0.71
	(0.21)	(0.21)	(0.27)	(0.50)	(0.39)	(0.44)	(0.37)	(0.47)
Ln(Cap/Emp)	0.01	−0.05	−0.04	0.20**	0.19***	0.25***	0.24***	0.24***
	(0.03)	(0.03)	(0.04)	(0.06)	(0.05)	(0.06)	(0.05)	(0.06)
Big=1	1.33***	1.15***	1.79***	3.08***	1.75***	1.93***	1.29***	2.51***
	(0.11)	(0.11)	(0.15)	(0.25)	(0.20)	(0.22)	(0.20)	(0.24)
Medium=1	0.48***	0.34***	0.63***	1.05***	0.57***	0.71***	0.42**	0.81***
	(0.08)	(0.07)	(0.10)	(0.19)	(0.15)	(0.17)	(0.14)	(0.18)
Degree	1.32**	0.95*	1.61**	0.93	−0.39	−0.03	−0.69	0.14
	(0.43)	(0.43)	(0.58)	(0.81)	(0.60)	(0.75)	(0.65)	(0.77)
Ln(Wage/Emp)	0.32***	0.34***	0.49***	0.93***	0.61***	0.59***	0.43**	0.74***
	(0.08)	(0.07)	(0.09)	(0.19)	(0.15)	(0.17)	(0.14)	(0.18)
R^2	0.42	0.47	0.46	0.48	0.42	0.45	0.42	0.46
Adj. R^2	0.34	0.40	0.39	0.42	0.34	0.38	0.35	0.39
Num. obs.	1011	1011	1011	1011	1011	1011	1011	1011

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$.

This table examines the relationship between firms' management practices and the extensive and intensive margins of their exports. We usetwo sources: The product complexity index from Atlas of Economic Complexity and the HS-CIIU4 conversion table from DANE. Since thecomplexity index varies at the level of HS code, and the product-transaction database contains the HS code by firm-product, we estimate theaverage complexity index by firm.Of 2021 exporting firms, 1,011 are below the median complexity index and 1,010 are above. This table uses a sub-sample, where the productshave a complexity index lower than its median. LnD:Log of destinations,LnP:Log of products by HS 6 digits,LnD-P: Log of pairs destination-products,LnExp: Log of Exports, LnExp/D: Log(Exports/Destinations,Ln Exp/P:Log(Exports/Products),Ln Exp/D-P:Log(Exports/pairsdestination-products),Ln TopD-P:Log(exports in a firm's highest-revenue destination-product).The regressions include dummies employment asa control, where medium is between 50 and 250 workers,big greater than 250 and small less than 50, which is excluded by collinearity. It also hasstandard errors clustered by firm and fixed effects for industry and region.

Table 12: Extensive and Intensive Margins for Complex Products

	LnD	LnP	LnD-P	LnExp	LnExp/D	Ln Exp/P	Ln Exp/D-P	Ln TopD-P
Management	1.14***	0.99***	1.42***	2.38***	1.25***	1.39***	0.97**	2.00***
	(0.22)	(0.23)	(0.30)	(0.48)	(0.34)	(0.38)	(0.31)	(0.42)
Ln(Cap/Emp)	0.04	0.03	0.04	0.21**	0.17**	0.19**	0.18***	0.21**
	(0.04)	(0.03)	(0.05)	(0.08)	(0.05)	(0.07)	(0.05)	(0.07)
Big=1	0.99***	1.03***	1.44***	2.59***	1.60***	1.56***	1.15***	2.16***
	(0.12)	(0.12)	(0.16)	(0.25)	(0.17)	(0.21)	(0.16)	(0.22)
Medium=1	0.40***	0.47***	0.62***	1.07***	0.67***	0.60***	0.45***	0.88***
	(0.08)	(0.08)	(0.11)	(0.17)	(0.12)	(0.14)	(0.11)	(0.15)
Degree	1.13**	1.39***	1.78***	1.33	0.21	−0.06	−0.45	0.63
	(0.35)	(0.36)	(0.47)	(0.74)	(0.52)	(0.60)	(0.48)	(0.65)
Ln(Wage/Emp)	0.33***	0.32***	0.47***	0.75***	0.42**	0.43*	0.28*	0.59**
	(0.10)	(0.09)	(0.13)	(0.20)	(0.14)	(0.17)	(0.14)	(0.18)
R^2	0.39	0.38	0.40	0.47	0.43	0.42	0.39	0.46
Adj. R^2	0.31	0.30	0.32	0.40	0.36	0.34	0.31	0.39
Num. obs.	1010	1010	1010	1010	1010	1010	1010	1010

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$.

This table examines the relationship between firms' management practices and the extensive and intensive margins of their exports. We usetwo sources: The product complexity index from Atlas of Economic Complexity and the HS-CIIU4 conversion table from DANE. Since thecomplexity index varies at the level of HS code, and the product-transaction database contains the HS code by firm-product, we estimate theaverage complexity index by firm.Of 2021 exporting firms, 1,011 are below the median complexity index and 1,010 are above.This table uses a sub-sample, where the prod-ucts have a product complexity index greater than its median.LnD:Log of destinations,LnP:Log of products by HS 6 digits,LnD-P:Log of pairs destination-products,LnExp: Log of Exports, LnExp/D: Log(Exports/Destinations,Ln Exp/P:Log(Exports/Products),Ln Exp/D-P:Log(Exports/pairs destination-products),Ln TopD-P:Log(exports in a firm's highest-revenue destination-product).The regressions include dum-mies employment as a control, where medium is between 50 and 250 workers,big greater than 250 and small less than 50, which is excluded bycollinearity. It also has standard errors clustered by firm and fixed effects for industry and region.

Table 13: Extensive and Intensive Margins with Management - Complexity Interaction

	LnD	LnP	LnD-P	LnExp	LnExp/D	Ln Exp/P	Ln Exp/D-P	Ln TopD-P
Management	0.73***	0.72***	1.09***	1.36**	0.63	0.64	0.27	1.03*
	(0.19)	(0.19)	(0.25)	(0.45)	(0.34)	(0.39)	(0.33)	(0.42)
Ln(Cap/Emp)	0.03	−0.02	−0.01	0.20***	0.17***	0.21***	0.21***	0.21***
	(0.02)	(0.02)	(0.03)	(0.05)	(0.04)	(0.04)	(0.03)	(0.04)
Big=1	1.16***	1.09***	1.61***	2.82***	1.66***	1.73***	1.21***	2.32***
	(0.08)	(0.08)	(0.11)	(0.17)	(0.12)	(0.14)	(0.12)	(0.16)
Medium=1	0.44***	0.41***	0.62***	1.06***	0.63***	0.65***	0.44***	0.85***
	(0.05)	(0.05)	(0.07)	(0.12)	(0.09)	(0.10)	(0.09)	(0.11)
Degree	1.21***	1.29***	1.75***	1.26*	0.05	−0.03	−0.49	0.51
	(0.26)	(0.27)	(0.35)	(0.53)	(0.38)	(0.45)	(0.37)	(0.48)
Ln(Wage/Emp)	0.32***	0.34***	0.49***	0.86***	0.54***	0.52***	0.37***	0.69***
	(0.06)	(0.05)	(0.07)	(0.13)	(0.10)	(0.12)	(0.10)	(0.13)
Complex=1	−0.07	0.01	0.04	−0.25	−0.18	−0.27	−0.29	−0.31
	(0.13)	(0.14)	(0.18)	(0.29)	(0.21)	(0.24)	(0.20)	(0.26)
Man*Compl	0.34	0.33	0.31	0.83	0.50	0.50	0.52	0.79
	(0.26)	(0.26)	(0.35)	(0.57)	(0.42)	(0.48)	(0.40)	(0.52)
R^2	0.38	0.39	0.39	0.45	0.39	0.41	0.38	0.42
Adj. R^2	0.33	0.34	0.35	0.41	0.34	0.36	0.33	0.38
Num. obs.	2021	2021	2021	2021	2021	2021	2021	2021

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$.

This table examines the relationship between firms' management practices and the extensive and intensive margins of their exports. We usetwo sources: The product complexity index from Atlas of Economic Complexity and the HS-CIIU4 conversion table from DANE. Since thecomplexity index varies at the level of HS code, and the product-transaction database contains the HS code by firm-product, we estimate theaverage complexity index by firm.Of 2021 exporting firms, 1,011 are below the median complexity index and 1,010 are above. If the firm has exported any product clas-sified as complex (greater than the median complexity index), this complex dummy is 1, otherwise=0. LnD:Log of destinations,LnP:Logof products by HS 6 digits,LnD-P: Log of pairs destination-products,LnExp: Log of Exports, LnExp/D: Log(Exports/Destinations,LnExp/P:Log(Exports/Products),Ln Exp/D-P:Log(Exports/pairs destination-products),Ln TopD-P:Log(exports in a firm's highest-revenuedestination-product).The regressions include dummies employment as a control, where 50¡medium¡250 workers,big¿250 and small¡50 is excludedby collinearity. It also has standard errors clustered by firm and fixed effects for industry and region.

Table 14: Extensive and Intensive Margins with Management and Complexity Interaction - all firms

	Ln(1+D)	Ln(1+P)	Ln(1+DP)	Ln(1+E)	Ln(1+E/D)	Ln(1+E/P)	Ln(1+E/D-P)	Ln(1+TopDP)
Manag	0.71^{***}	0.68^{***}	1.05^{***}	1.77^{***}	0.88^{***}	0.91^{**}	0.55^{*}	1.42^{***}
	(0.12)	(0.12)	(0.17)	(0.34)	(0.25)	(0.28)	(0.24)	(0.31)
Ln(C/E)	0.02	−0.02	−0.01	0.19^{***}	0.17^{***}	0.21^{***}	0.21^{***}	0.21^{***}
	(0.02)	(0.02)	(0.03)	(0.05)	(0.04)	(0.04)	(0.03)	(0.04)
Big=1	0.93^{***}	0.91^{***}	1.43^{***}	2.82^{***}	1.66^{***}	1.73^{***}	1.21^{***}	2.32^{***}
	(0.06)	(0.07)	(0.09)	(0.17)	(0.12)	(0.14)	(0.12)	(0.16)
Med=1	0.33^{***}	0.33^{***}	0.53^{***}	1.07^{***}	0.63^{***}	0.65^{***}	0.44^{***}	0.85^{***}
	(0.04)	(0.04)	(0.06)	(0.12)	(0.09)	(0.10)	(0.09)	(0.11)
Degree	0.98^{***}	1.07^{***}	1.58^{***}	1.33^{*}	0.10	0.02	−0.46	0.55
	(0.21)	(0.21)	(0.30)	(0.53)	(0.38)	(0.45)	(0.37)	(0.48)
Ln(W/E)	0.26^{***}	0.27^{***}	0.42^{***}	0.85^{***}	0.53^{***}	0.52^{***}	0.37^{***}	0.69^{***}
	(0.04)	(0.04)	(0.06)	(0.13)	(0.10)	(0.12)	(0.10)	(0.13)
Man*Compl	0.07	0.19^{*}	0.14	0.04	−0.04	−0.20	−0.12	0.02
	(0.08)	(0.08)	(0.12)	(0.25)	(0.18)	(0.21)	(0.17)	(0.22)
R^2	0.38	0.39	0.39	0.45	0.39	0.41	0.38	0.42
Adj. R^2	0.33	0.34	0.35	0.41	0.34	0.36	0.33	0.38
Num. obs.	2021	2021	2021	2021	2021	2021	2021	2021

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$.
This table examines the relationship between firms' management practices and the extensive and intensive margins for the entire sample applying the transformation (1 + variable). D:destinations,P:products by HS 6 digits,DP:pairs destination-products,E:Exports,E/D:Exports/Destinations,E/P:Exports/Products,E/D-P:Exports/pairs destination-products,TopD-P:exports in a firm's highest-revenue destination-product.The regressions include dummies employment as a control, where 50<medium<250 workers,big>250 and small<50 is excluded by collinearity. It also has standard errors clustered by firm and fixed effects for industry and region.

Table 15: Extensive and Intensive Margins with Management - OECD Interaction

	LnD	LnP	LnD-P	LnExp	LnExp/D	Ln Exp/P	Ln Exp/D-P	Ln TopD-P
Management	0.25	0.32	0.44	0.19	−0.07	−0.13	−0.26	0.07
	(0.15)	(0.18)	(0.23)	(0.41)	(0.35)	(0.37)	(0.33)	(0.38)
Ln(Cap/Emp)	0.00	−0.04	−0.04	0.15***	0.15***	0.19***	0.19***	0.18***
	(0.02)	(0.02)	(0.03)	(0.04)	(0.04)	(0.04)	(0.03)	(0.04)
Big=1	0.82***	0.87***	1.22***	2.24***	1.42***	1.37***	1.02***	1.85***
	(0.07)	(0.07)	(0.10)	(0.15)	(0.12)	(0.14)	(0.12)	(0.14)
Medium=1	0.32***	0.34***	0.49***	0.89***	0.56***	0.54***	0.39***	0.71***
	(0.05)	(0.05)	(0.06)	(0.11)	(0.09)	(0.10)	(0.09)	(0.11)
Degree	1.08***	1.25***	1.63***	1.06*	−0.03	−0.19	−0.57	0.33
	(0.22)	(0.25)	(0.31)	(0.48)	(0.37)	(0.43)	(0.36)	(0.45)
Ln(Wage/Emp)	0.24***	0.29***	0.39***	0.71***	0.47***	0.43***	0.32**	0.57***
	(0.05)	(0.05)	(0.06)	(0.12)	(0.10)	(0.11)	(0.10)	(0.12)
Ocde=1	0.89***	0.44***	0.97***	1.07***	0.18	0.62**	0.10	0.80***
	(0.10)	(0.12)	(0.15)	(0.25)	(0.20)	(0.22)	(0.19)	(0.23)
Inter(Man*Ocde)	0.54*	0.63*	0.73*	1.85***	1.30**	1.21**	1.11**	1.62***
	(0.22)	(0.25)	(0.31)	(0.52)	(0.42)	(0.46)	(0.40)	(0.49)
R^2	0.57	0.46	0.52	0.54	0.42	0.46	0.40	0.50
Adj. R^2	0.53	0.42	0.49	0.51	0.38	0.42	0.35	0.47
Num. obs.	2021	2021	2021	2021	2021	2021	2021	2021

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$.

This table examines the relationship between firms' management practices and the extensive and intensive margins of their exports, focusing on the interaction between Management and an export destination dummy according to the Organization for Economic Co-operation and Development(No Oecd = 0, Oecd = 1). If the company has exported to a country belonging to the OECD, this destination dummy is 1. Chile was excludeddue to its geographic proximity. LnD:Log of destinations,LnP:Log of products by HS 6 digits,LnD-P: Log of pairs destination-products,LnExp:Log of Exports, LnExp/D: Log(Exports/Destinations,Ln Exp/P:Log(Exports/Products),Ln Exp/D-P:Log(Exports/pairs destination-products),LnTopD-P:Log(exports in a firm's highest-revenue destination-product).The regressions include dummies employment as a control, where mediumless than 250 and greater than 50 workers,big greater than 250 and small is excluded by collinearity. It also has standard errors clustered by firmand fixed effects for industry and region

Table 16: Extensive and Intensive Margins with Management - Contiguity Interaction

	LnD	LnP	LnD-P	LnExp	LnExp/D	Ln Exp/P	Ln Exp/D-P	Ln TopD-P
Management	−0.08	0.17	0.10	−0.31	−0.23	−0.48	−0.41	−0.34
	(0.17)	(0.25)	(0.29)	(0.70)	(0.65)	(0.64)	(0.62)	(0.68)
Ln(Cap/Emp)	0.02	−0.03	−0.02	0.18***	0.16***	0.21***	0.20***	0.20***
	(0.02)	(0.02)	(0.03)	(0.05)	(0.04)	(0.04)	(0.03)	(0.04)
Big=1	0.91***	0.94***	1.32***	2.44***	1.53***	1.50***	1.12***	2.04***
	(0.07)	(0.08)	(0.10)	(0.16)	(0.12)	(0.14)	(0.12)	(0.15)
Medium=1	0.32***	0.34***	0.49***	0.90***	0.58***	0.56***	0.41***	0.73***
	(0.05)	(0.05)	(0.07)	(0.12)	(0.09)	(0.10)	(0.09)	(0.11)
Degree	1.05***	1.23***	1.59***	1.04*	−0.01	−0.19	−0.55	0.34
	(0.23)	(0.26)	(0.33)	(0.50)	(0.37)	(0.44)	(0.37)	(0.46)
Ln(Wage/Emp)	0.24***	0.29***	0.39***	0.72***	0.48***	0.43***	0.33**	0.58***
	(0.05)	(0.05)	(0.07)	(0.12)	(0.10)	(0.11)	(0.10)	(0.12)
Not Cont=1	0.71***	0.36**	0.81***	0.73*	0.02	0.36	−0.08	0.43
	(0.09)	(0.12)	(0.15)	(0.30)	(0.27)	(0.27)	(0.26)	(0.29)
Inter(Man*Not Cont)	1.06***	0.80**	1.24***	2.35**	1.29	1.56*	1.11	2.00**
	(0.21)	(0.29)	(0.34)	(0.75)	(0.68)	(0.69)	(0.65)	(0.72)
R^2	0.51	0.43	0.48	0.50	0.40	0.44	0.38	0.46
Adj. R^2	0.47	0.39	0.45	0.46	0.36	0.39	0.34	0.42
Num. obs.	2021	2021	2021	2021	2021	2021	2021	2021

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$.

This table examines the relationship between firms' management practices and the extensive and intensive margins of their exports,focusing on the interaction between Management and a contiguity dummy (No Contiguity = 1, Contiguity = 0).If the companyhas exported to a country not contiguous to Colombia, this contiguity dummy is 1(Not Contiguity=1), otherwise is 0.LnD:Logof destinations,LnP:Log of products by HS 6 digits,LnD-P: Log of pairs destination-products,LnExp:Log of Exports, LnExp/D:Log(Exports/Destinations,Ln Exp/P:Log(Exports/Products),Ln Exp/D-P:Log(Exports/pairs destination-products),Ln TopD-P:Log(exports in afirm's highest-revenue destination-product).The regressions include dummies employment as a control, where medium less than 250 and greaterthan 50 workers,big greater than 250 and small is excluded by collinearity. It also has standard errors clustered by firm and fixed effects forindustry and region

Table 17: Extensive and Intensive Margins with Management - Language Interaction

	LnD	LnP	LnD-P	LnExp	LnExp/D	Ln Exp/P	Ln Exp/D-P	Ln TopD-P
Management	0.02	0.21	0.21	−0.12	−0.14	−0.33	−0.33	−0.18
	(0.15)	(0.20)	(0.24)	(0.45)	(0.39)	(0.40)	(0.37)	(0.42)
Ln(Cap/Emp)	0.01	−0.03	−0.03	0.17***	0.16***	0.20***	0.20***	0.19***
	(0.02)	(0.02)	(0.03)	(0.04)	(0.04)	(0.04)	(0.03)	(0.04)
Big=1	0.80***	0.87***	1.20***	2.24***	1.45***	1.37***	1.04***	1.86***
	(0.07)	(0.08)	(0.10)	(0.16)	(0.12)	(0.14)	(0.12)	(0.15)
Medium=1	0.30***	0.33***	0.47***	0.86***	0.56***	0.53***	0.39***	0.69***
	(0.05)	(0.05)	(0.06)	(0.11)	(0.09)	(0.10)	(0.09)	(0.11)
Degree	1.15***	1.30***	1.71***	1.18*	0.04	−0.11	−0.52	0.44
	(0.22)	(0.26)	(0.32)	(0.49)	(0.37)	(0.43)	(0.37)	(0.45)
Ln(Wage/Emp)	0.22***	0.28***	0.38***	0.69***	0.47***	0.41***	0.31**	0.56***
	(0.05)	(0.05)	(0.06)	(0.12)	(0.10)	(0.11)	(0.10)	(0.12)
Not Spanish=1	0.76***	0.34**	0.81***	0.83***	0.06	0.49*	0.01	0.58*
	(0.10)	(0.12)	(0.15)	(0.25)	(0.20)	(0.22)	(0.19)	(0.23)
Inter(Man*Not Span)	0.88***	0.78**	1.07***	2.22***	1.34**	1.45**	1.15**	1.92***
	(0.21)	(0.25)	(0.32)	(0.55)	(0.45)	(0.48)	(0.43)	(0.51)
R^2	0.56	0.45	0.51	0.53	0.41	0.46	0.39	0.49
Adj. R^2	0.53	0.41	0.48	0.49	0.37	0.41	0.35	0.45
Num. obs.	2021	2021	2021	2021	2021	2021	2021	2021

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$.

This table examines the relationship between firms' management practices and the extensive and intensive margins of their exports,focusing onthe interaction between Management and a language dummy (Not Spanish = 1, Spanish = 0). If the company has exported to a country whoselanguage is different from Spanish, this language dummy is 1, otherwise is 0. LnD:Log of destinations,LnP:Log of products by HS 6 digits,LnD-P:Log of pairs destination-products,LnExp: Log of Exports, LnExp/D: Log(Exports/Destinations,Ln Exp/P:Log(Exports/Products),Ln Exp/D-P:Log(Exports/pairs destination-products),Ln TopD-P:Log(exports in a firm's highest-revenue destination-product).The regressions include dum-mies employment as a control, where medium less than 250 and greater than 50 workers,big greater than 250 and small is excluded by collinearity.It also has standard errors clustered by firm and fixed effects for industry and region.

Table 18: Exports Revenues with country controls

	Ln Exports			
	1	2	3	4
Management	0.65*	0.82**	4.14*	5.13*
	(0.26)	(0.27)	(1.82)	(2.49)
Ln(Cap/Emp)	0.18***	0.17***	0.16***	0.16***
	(0.04)	(0.04)	(0.04)	(0.04)
Big=1	0.90***	1.13***	1.13***	1.13***
	(0.12)	(0.13)	(0.13)	(0.12)
Medium=1	0.31**	0.39***	0.38***	0.38***
	(0.10)	(0.10)	(0.10)	(0.10)
Degree	0.11	0.66	0.67	0.67
	(0.49)	(0.49)	(0.49)	(0.49)
Ln(Wage/Emp)	0.09	0.14	0.15	0.15
	(0.12)	(0.12)	(0.12)	(0.12)
Ln (GDP of destination)		0.28***	0.28***	0.31***
		(0.02)	(0.02)	(0.05)
Ln Distance		−0.54***	−0.31*	−0.35*
		(0.06)	(0.14)	(0.16)
Common Language=1		0.64***	0.64***	0.64***
		(0.08)	(0.08)	(0.08)
Contiguous=1		0.26***	0.28***	0.28***
		(0.06)	(0.06)	(0.06)
Inter(Manag*Dist)			−0.42	−0.34
			(0.24)	(0.27)
Inter(Manag*Produc)				−0.06
				(0.10)
R^2	0.14	0.20	0.20	0.20
Adj. R^2	0.13	0.19	0.19	0.19
Num. obs.	14502	14502	14502	14502

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$.

This table examines the relationship between exports revenues of each country and firm's management practices. The column 1 has controls at firm level: capital per employees, dummies of size measured by employment(Big=1,Medium=1), the share of staff with college degree and the average wage.This table uses dummies of size (medium less than 250 and greater than 50 workers,big greater tha 250; small less than 50 is excluded by collinearity).The column 2 adds controls at country level: log of GDP of destination country, log of distance between the destination country and Colombia and dummies of common language and geographic contiguity.The regressions include fixed effects for industry and location and standard errors clustered by firm

Table 19: Exports Revenues with country controls-all firms

	Ln (1+Exports)			
	1	2	3	4
Management	1.82***	1.72***	17.33***	14.85***
	(0.32)	(0.30)	(2.25)	(2.60)
Ln(Cap/Emp)	0.28***	0.29***	0.29***	0.29***
	(0.05)	(0.05)	(0.05)	(0.05)
Big=1	2.07***	1.99***	1.92***	1.91***
	(0.16)	(0.16)	(0.16)	(0.16)
Medium=1	1.55***	1.49***	1.40***	1.40***
	(0.14)	(0.14)	(0.13)	(0.13)
Degree	0.13	−0.12	−0.26	−0.28
	(0.58)	(0.57)	(0.59)	(0.59)
Ln(Wage/Emp)	0.35*	0.34**	0.35**	0.34**
	(0.14)	(0.13)	(0.13)	(0.13)
Ln (GDP of destination)		0.18***	0.16***	0.08
		(0.02)	(0.02)	(0.05)
Ln Distance		−0.07	1.07***	1.19***
		(0.06)	(0.20)	(0.21)
Common Language=1		−0.03	−0.03	−0.05
		(0.09)	(0.09)	(0.09)
Contiguous=1		−0.50***	−0.43***	−0.43***
		(0.08)	(0.08)	(0.08)
Inter(Manag*Dist)			−2.04***	−2.26***
			(0.30)	(0.33)
Inter(Manag*Produc)				0.16
				(0.09)
R^2	0.18	0.19	0.20	0.20
Adj. R^2	0.18	0.19	0.20	0.20
Num. obs.	67134	67134	67134	67134

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$.

This table examines the relationship between exports revenues of each country and firm's management practices for all firms (exporters and no exporters) by using Ln (1+Exp). The column 1 has controls at firm level: capital per employees, dummies of size measured by employment(Big=1,Medium=1), the share of staff with college degree and the average wage.This table uses dummies of size (50<medium<250 workers,big>250; small<50 is excluded by collinearity).The column 2 adds controls at country level: log of GDP of destination country, log of distance between the destination country and Colombia and dummies of common language and geographic contiguity.The regressions include fixed effects for industry and location and standard errors clustered by firm