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Federico Alberto Merchan Alvarez

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ABSTRACT

INTERNATIONAL MANAGERIAL SKILL AND BIG COLOMBIAN EXPORTING FIRMS' PERFORMANCE, 2006-2014*

Federico Alberto Merchan Alvarez

This paper proposes and estimates a two-step methodology to measure international managerial skill and calculate its impact on firm performance, using a sample of the biggest private Colombian exporting firms. The first step quantifies the manager's organizational capital contribution to improve *production efficiency* (ability to assemble inputs into final goods) and/or *quality capacity* (skill to make high quality goods) mechanisms described by Bloom et al. (2021), through the median of export unit value regression residuals at firm-year level multiplied by -1 for products that compete in the international market by price. Then, second step firm performance regression results indicate that: i) international managerial quality has a significative and robust positive effect on total exported value via intensive margin, ii) exported value elasticity relative to international managerial quality is statistically equal than exported value elasticity relative to exogenous global demand shocks, and iii) better managers in the international market do not necessarily upgrade export quality.

Keywords: management practices, quality vs price competition, firm's performance, intensive margin, exporting.

JEL classification: F16, F10, M11, M12, L25

Federico Alberto Merchan Alvarez
Kiel Institute for the World Economy
Kiellinie 66
D-24105 Kiel, Germany
Email: federico.merchan@ifw-kiel.de
www.ifw-kiel.de

* PhD student at Kiel University (Germany). Junior researcher at the Institute for the World Economy (IFW) (federico.merchan@ifw-kiel.de). The author thanks the valuable comments of Holger Görg, Robert Gold, Victor Gimenez-Perales, Inga Heiland and all participants at the IFW Research Seminar.

1 Introduction

One of the principal methodological challenges that managerial economics literature faced for many years was to measure accurately the executive talent. Although this limitation has been gradually solved in the last decades due to the collection of different specialized management surveys,[1] none of these surveys inquire into specific management practices involved in the production of exported products. Although the World Management Survey (WMS)[2] and the German Management and Organizational Practices Survey (GMOP)[3] ask about export share relative to operating income and basic information about firm activity abroad, those surveys do not distinguish between firms' management practices involved in the goods sold in the local and international market. However, export management is a research topic that should be analyzed in more depth, as some economic hypotheses indicate that big exporting firms have incentives to export different goods than the ones sold in the local market and to implement different managerial practices for both type of goods.

For example, *learning by exporting* (LBE) indicates that when firms start exporting, their productivity could increase due to different mechanisms: learning processes from foreign customers and rivals, improving product quality, shipment size adjustment (De Loecker, 2013), adopting new technologies, acquiring important information about foreign markets, and upgrading product designs (Tse et al., 2017). Although literature has shown mixed results about LBE existence,[4] the evidence that favor its existence is not conclusive about two aspects: i) which mechanism is driven LBE,[5] and ii) if productivity gains and knowledge acquired in the international market by LBE can be implemented in the overall production process, or if there is an upgrade just in the firms' international market segment.

Also, the Alchian – Allen theorem states that the demand of high-quality goods relative to low-quality substitute goods will rise if per unit transaction costs are constant because high-quality goods become relatively cheaper. Miljkovic & Gomez (2019) found validity of this theorem for Brazilian coffee exports, and there is also supporting evidence for Colombian coffee exports.[6] On a larger scale, Hummels & Skiba (2004) proved the Alchian – Allen theorem's validity with a disaggregated bilateral trade data for six

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[1] Like the World Management Survey (WMS), which is the biggest survey around the globe to measure managerial practices in a consistent way for 20,000 manufacturing firms in 34 countries (Bloom & Van Reenen, 2007), the Management and Organizational Practices Survey (MOPC) by the US Census Bureau (Buffington et al., 2017), the German Management and Organizational Practices Survey (GMOP) (Broszeit et al., 2019), or the National Survey on Productivity and Competitiveness of Micro, Small, and Medium-size Enterprises in Mexico (Bloom et al., 2022), among others.

[2] See World Management Survey (WMS) questionnaire: worldmanagementsurvey.org

[3] See German Management and Organizational Practices Survey (GMOP) questionnaire: *infas_Fragebogen_Morg_5078_20141020_.indd (iab.de)*

[4] Wagner (2007) indicates that empirical evidence underlines self-selection into exporting market mechanisms (just the more productive firms are able to export), but there is no conclusive proof that exports enhance productivity. Nevertheless, later studies like De Loecker (2013) for Slovenia, Tse et al. (2017) for China, and Fernandez & Isgut (2015) for Colombia report positive LBE evidence.

[5] De Loecker (2013) points out strategic decisions pertinent to innovativeness, production capability, and human capital, while Hovhannisyan & Mendez (2019) focuses on workers' training.

[6] Colombia is the third-largest exporting coffee country in the world; however, most of the high-quality Colombian coffee is exported and Colombian inhabitant drink low-quality imported coffee: https://www.bbc.com/mundo/noticias-america-latina-51622198.

importing countries with all exporters. Therefore, firms' managers would have incentives to promote high-quality export goods, assuming that the Alchian – Allen theorem is always valid.[7]

Additionally, good managers in the local market do not necessarily export efficiently because it requires further skills and knowledge.[8] In this sense, managerial practices involved in the production and distribution of exported goods are different than the managerial practices for goods sold in the local market, however, specialized management surveys are not measuring those differences and the academic evidence about this aspect is scarce. In this context, this paper contributes by proposing an original methodology to estimate managerial quality specifically in the international market and to calculate its impact on different firm outcomes. As far as I know, only three papers relate international firm outcomes with management quality using large firm samples.[9]

On one hand, Bloom et al. (2021) prove that better managed firms have higher probability to export, they export at higher value, export a higher number of products and import higher inputs quality, using a merged sample of the WMS, customs and financial statements for a set of American and Chinese firms. Also, they calculate that management has large explanatory power on different trade outcomes than TFP. On the other hand, Görg & Hanley (2017) explore firm trade outcomes and management relationship from the opposite causality direction, finding that switching into exporting between 2008 and 2013 impacts positively the German management performance using the GMOP. Moreover, Sala & Yalcin (2014) constructed a "*managerial input*" proxy variable based on the firm manager's international experience obtained from rich Denmark payroll panel database, finding that managerial input is as important as productivity and fixed costs of a firm's selection into the international market.

In contrast, the methodology implemented in this paper attempts to measure the international managerial skill and its impact on different firm outcomes[10] through a two-step procedure, in which the export unit value is decomposed into its predicted and residual components, and then a sophisticated way to aggregate the residuals at firm-year level is used as independent variable in a second step firm performance regression.[11] More specifically, the international managerial quality is calculated through the median of detailed export unit value regression residuals multiplied by -1 for those products that compete internationally by price, which is a proxy variable of the degree to which the organizational capital invested by the manager allows to improve international production efficiency and/or quality capacity mechanisms described by Bloom et al. (2021).[12] For this purpose, an expanded version of

[7] The evidence about Alchian-Allen theorem is not conclusive. Theoretically, Borcherding & Silberberg (1978) show that introduction of a third good could vitiate the Alchian – Allen theorem's validity. Empirically, Lawson & Raymer (2006) do not find evidence of this theorem based on daily sales information at a single gasoline station which sold three gasoline types.

[8] "*Learn how to export*" section from The International Trade Administration (US government) provides an overview of all required steps, procedures and skills for exporting: Learn How To Export (trade.gov)

[9] Most of the export management empirical research has been done by case studies with small sample sizes; the median sample of the 16 most influential empirical articles about this subject is 202 firms, based on Leonidou et al. (2010) classification (see appendix table 1A).

[10] Exported value, number of exported products, number of export country destinations, number of country destinations-exported products, Herfindahl-Hirschman Index (HHI) calculated at firm level, exports of quality goods relative to total exports, profit rate and imported inputs unit value.

[11] See Chen et al. (2018) for a literature review of the two-step procedure implementation in the empirical accounting and finance research.

[12] A robustness analysis weights the exported goods based on Rauch (1999) good classification, considering that managers are more able to differentiate the export price for differentiated commodities than for homogeneous goods.

Baldwin & Ito (2011) methodology to classify products that compete in the international market by price and quality is explained and calculated.

This empirical approach brings some advantages: the methodology could be replicated for other countries without survey collection costs and it is possible to compare international managerial quality relevance on firm's performance relative to other internal and external explanatory variables.[13] Nevertheless, it is not possible to calculate the international managerial quality variable for non-exporting firms, hence this paper does not contribute to self-selecting into exporting literature. Also, the potential omitted variable bias, measurement error, and sampling bias derived from the two-step econometric approach are discussed and solved across the document.

This paper proceeds as follows. The next section includes the theoretical framework, section III describes the data, section IV defines the international managerial quality calculation and the baseline econometric specification, section V presents the results and section VI concludes.

2 Theoretical framework

Bloom et al. (2021) is the most recent theoretical approach to describe trade and management dynamics. Their baseline model makes some standard assumptions about variety's demand for representative consumers, and foreign countries' expenditure for each good. Also, the model assumes that each firm receives an exogenous managerial ability $\varphi \epsilon (0, \infty)$ from distribution $g(\varphi)$ at the firm level, and an i.i.d vector firm-product specific expertise level $\lambda_i \epsilon (0, \infty)$ from distribution $z(\lambda)$. It is supposed that managerial ability is equal to TFP. Finally, φ level determines the *production efficiency* (ability to assemble inputs into final goods) and *quality capacity* (capacity to make high-quality goods).

Then, it is assumed that producing one unit of physical output requires $(\varphi\lambda_i)^{-\delta}$ units of labor with wage normalized to 1. Also, firms can produce one quality unit $q_i(\varphi, \lambda_i) = (\varphi\lambda_i)^{\theta}$ at a marginal cost of $(\varphi\lambda_i)^{\theta-\delta}$ workers. δ measures the degree to which good management lowers input requirements, and θ reflects the management magnitude skill to enhance firms' capacity to produce higher-quality goods. The firms' profit maximization leads to the next optimal export price of good *i* to destination country *j:*

$$p_{ij}(\varphi, \lambda_i)^* = \frac{\tau_j(\varphi\lambda_i)^{\theta-\delta}}{\alpha} \qquad (1)$$

where τ_j are *j*'s country iceberg trade cost, and α is the CES exponent of the consumer utility function. The difference between θ and δ will determine the optimal export price charged by the firm. If $\theta = 0$ and $\delta > 0$, effective management improves the firm's efficiency but not product quality and the optimal price will decrease. If $\theta > 0$ and $\delta = 0$, management improves product quality and the optimal price will increase. Finally, when $\theta > 0$ and $\delta > 0$, both management mechanisms are active, and the export price will vary based on which parameter is larger.

Examples of management policies that increase production efficiency include "*optimizing inventory control, synchronizing and monitoring production targets across manufacturing stages, reducing*

[13] Following the literature recommendation: "*Export performance should be assessed at two broad levels – the external environment level and the internal level. However, there is a lack of agreement on the domains and measurement of the determinants of export performance*" (Coelho et al., 2008, p.363)

wastage, incentivizing workers, etc." (Bloom et al. 2021, p.7), and strategies that upgrade quality capacity measured in the parameter θ cover "*tightening quality control, facilitating specialized assembly, minimizing costly mistakes, etc.*" (Bloom et al. 2021, p.3). Intuitively, the managerial knowledge stock that allows to implement these strategies in a successful way is what the academic literature has referred as organizational capital, a non-traditional intangible asset that has been broadly defined.[14]

The methodological section of this paper does not estimate directly any Bloom et al. (2021) parameter, but incorporates the theoretical concept that better managers in the international market boost production efficiency and quality capacity mechanisms. This paper assumes that managers expands *production efficiency* minimizing exported price of products that compete in the international market by price and expands *quality capacity* maximizing exported price of products that compete in the international market by quality via improvements in organizational capital. This assumption follow the sign of the correlation between the three parameters (p_{ji}, θ, δ) described in optimal price equation 1, but it is different from the original Bloom et al. (2021) approach which considered and estimated δ and θ as firm-invariant structural parameters.

3 Data

The sample used in this paper is a merge of the next two public Colombian datasets, which are open to download to any citizen:[15]

- Customs data: Exports (imports) disaggregated at HS 10-digit product - country destination (origin)- firm id level. It includes traded value and exported (imported) quantity. The information was provided by the Colombian National Administrative Statistics Department (DANE by its acronym in Spanish). The imported and exported value were deflated based on the US GDP deflator (2014 is the base year).
- *Big private firms' financial statements*: The Business Information and Reporting System (SIREM by its acronym in Spanish) reports the financial statements (balance sheet, income statement, and cash flow) for the supervised firms by the Colombian Companies Superintendence. The principal criterion to supervise a firm is that its total assets or operating income exceeds 30,000 current legal Colombian minimum wages. The published information passed the internal validation process defined by the entity. One limitation of this dataset is that it does not include total number of employees, so operating expenses is used as a proxy variable.[16] The variables used in this dataset were deflated using an industrial-specific annual Producer Price Index (PPI) reported by the Colombian Central Bank (2014 is the base year).

[14] On one hand, Dessein & Prat (2022) define organizational capital as an intangible productive asset that can be produced only with the firm's top management leadership input, including: i) relational contracts, ii) corporate culture, iii) firm-specific human capital, or iv) firm capabilities. On the other hand, Black & Lynch (2005) define the organizational capital as the firm's organizational structure that contributes to the productive capacity, including: work force training, employee voice, and work design (including the use of cross-functional processes).

[15] Data was downloaded in February 2021.

[16] The Colombian government shared the Colombian payroll data (PILA, by its acronym in Spanish) for the big private Colombian exporting firms included in this paper with an anonymous firm-id to guarantee anonymization. Therefore, it was not possible to merge it with the databases described above. This payroll database would also allow to include remuneration and supply labor data into the analysis, like wage, and reported worked and vacation days.

Figures 1 and 2 show the historical participation of big private Colombian exporting firms relative to total exporting firms and total exported value. On annual average, big private exporting firms represent 42% of total exporting firms with valid firm ID[17] (around 3,529 of 8,339 firms per year) and 63% of total exported value (81% excluding the largest exporting firm[18]). Also, big private Colombian exporting firms export higher value, export more products, export more products to more countries, and report lower export concentration than other exporting firms (see appendix table 2A). Additionally, big private exporting firms have larger fixed assets, larger operating income, larger non-tangible assets, and lower TFP than big private not exporting firms (see appendix table 3A). The lower TFP suggests that higher productivity is not leading firms to export.[19] It is suggested as a future research topic to explore this correlation from a causal approach and to analyze TFP patterns for another time horizon.

Figure 1. Total Colombian exports disaggregated by firm classification

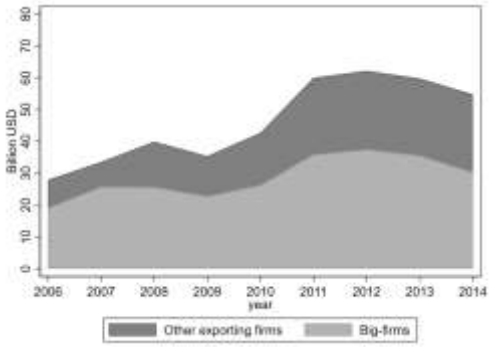
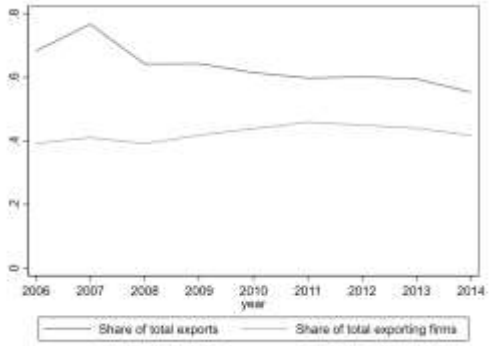


Figure 2. Big exporting Colombian firms relative to total exporting firms



Source: Colombian National Administrative Statistics Department (DANE by its acronym in Spanish), Colombian Companies Superintendence and own calculations. Note: Total exporting firms exclude firm ID (NIT) with less than 9 digits, which are low magnitude transactions made by individuals (not firms).

[17] The valid firm ID ("NIT") is composed by a 9-digit random number plus a verification digit. It is not homogeneous the way firms report the NIT in the custom database (only some firms report verification digit), while it is homogeneous the way the firms report the NIT in the financial statements dataset (all firms do not report verification digit). It was excluded from the customs data exported ID with less than 9 digits, which are low magnitude export transactions made by individuals (not firms).

[18] The financial statements dataset does not include the biggest Colombian exporting firm (*Ecopetrol*) which on annual average accounts for 22.7% of the total exported value, since its ownership has public and private participation.

[19] Only valid for the biggest private Colombian firms' sub-sample. It is possible that productivity leads to exporting at the aggregate level.

4 Methodology

As TFP is one of the most relevant economic variables, the way to measure it has been one of the most debated academic topics since 1940's (Mahadevan, 2003). Although the basic approach of using the production function residual as a proxy variable has been widely criticized,[20] most recent methodologies resolve some issues of the basic approach but still rely on the error/residual calculation.[21] In the same way, empirical accounting and finance papers have measured other relevant unknown variables based on regressions residuals, and some of them include it as independent variable in a second regression: "*numerous studies use residuals from a first-step regression as independent variables in a second regression. For example, residuals or transformed residuals, proxying for constructs such as accrual quality, discretionary accruals, managerial ability, etc, are commonly used as independent variables of interest in regression models*" (Chen et al., 2018, p.8).

This paper applies the two-step methodology just described to measure managerial skill in the international market and its impact on firm performance. In first place, the international managerial quality is computed as the median of export unit value regression residuals for each firm-year, multiplied by -1 for those markets that compete in the international market by price. Basically, the fraction of the export unit value not attributable to a set of firm characteristics and a group of detailed fixed effects is used as proxy variable of the quality manager's strategies and manager's organizational capital contribution to maximize: i) *quality capacity*: the higher residual, the better management for the quality competition products, and ii) *production efficiency*: the lower residual, the better management for the price competition products. Then, this international managerial quality variable is included as an explanatory variable in international firms' performance regression.

The steps of the methodology are described below. Also, the potential econometric issues derived from the two-step estimation (omitted variable bias, measurement error, and sampling bias) are addressed.

4.1 Classifying markets as price or quality competition

Baldwin & Ito (2011) classify markets based on an export unit value regression for each HS 6-digit, in which destination country's GDP, destination country's GDP per capita, distance between exporter and importer and year fixed effects are included as explanatory variables, using customs data for each of the world's top 8 exporters plus Australia. The distance coefficient will indicate if the market competes internationally by price or quality. The theoretical foundation to use distance as the key determinant variable is that traditional heterogeneous firm trade models, like Melitz (2003), state that higher productivity firms produce cheaper goods, while the qualitative heterogeneous firm trade model predicts that more productive firms sell more expensive goods. As only the more productive firms find it profitable to serve more remote destinations, the distance will indicate if the good is competing internationally by price (negative distance coefficient) or by quality (positive distance coefficient).

This paper expands Baldwin & Ito (2011) market classification methodology adding three innovations. First, a dummy variable indicating if the destination country is contiguous to Colombia was

[20] "*It is nothing more than a measure of what we do not know*" Mahadevan (2003, p.366).

[21] Mollisi & Rovigatti (2017) group methodologies to calculate TFP in: i) fixed effects, ii) instrumental variables, and iii) control function approaches.

included due to Colombia's strong political tensions with neighboring countries for those years. Then, the next regression was estimated for each market HS 6-digit:

$$ln\ unit\ value\ (UV)_{pkt} = \beta_o + \beta_1 ln\ distance_{kt} + \beta_2 GDP_{kt} + \beta_3 GDPpc_{kt} + \beta_4 Contiguity_{kt} + \partial_t + \in_{pkt} \qquad (2)$$

where subscript p denotes HS 10-dig product, t year, k destination country, and ∂_t are year fixed effects. Secondly, the unit of observation for each regression (HS 10-digit product – destination country) has a higher disaggregation level than original Baldwin & Ito (2011) HS aggregation (HS 6-digit product – destination country). This difference is implemented considering that Colombia export lower number of products than top world exporters, consequently, the probability to get a significant distance coefficient is lower if the same HS aggregation level is kept because the sample size would be smaller.[22]

Third and most important, export unit value regression described in equation 2 was estimated for broader market aggrupation (HS 5-digit, HS 4-digit, HS 3-digit, HS 2-digit, HS 1-digit), and then the markets (HS 6-digit) were classified according to the regression of the respective narrower market aggrupation in which the distance coefficient was significative.[23] The market classification is more precise as the regression aggrupation level is narrower (HS - 6 dig is preferable to HS - 5 digit), but it is less likely to get a significative distance coefficient because the sample for each regression is smaller. This modified methodology allows to classify all markets - compared to Baldwin & Ito (2011) - and still takes advantage of the highly disaggregated Colombian customs data characteristics, as the unit of observation of all regressions is HS 10 dig product – destination country.

In total, 7074 regressions were estimated where 18% of the markets were classified at the initial HS 6-digit aggrupation level, 10% at HS 5-digit, 24% at HS 4-digit, 29% at HS 3-digit, 10% at HS 2-digit, 6% at HS 1-digit and the remaining 3% using the whole sample regression (table 1). The market classification results indicate that 55% of the markets compete by quality and 45% by price. Also, the annual average percentage of quality competition products' export value relative to total exported value for the big private Colombian exporting firms is 30% (while for the other exporting firms is 27%), and the trend slightly decreased during the analyzed time horizon for both types of firms (Figure 3).

[22] Distance will also have a selection effect working with disaggregated HS 10-digit level data: "*the distance-price-gradient prediction stems from product/firm selection, not from firms' pricing behavior*" (Baldwin & Ito, 2011, p.114).

[23] For example, there are six potential estimations of equation 2 associated with the HS code ABCDEF (one for all p (HS 10 digit product) belonging to HS 1 digit (A), one for all p belonging to HS 2 digit (AB), one for all p belonging to HS 3 digit (ABC), one for all p belonging to HS 4 digit (ABCD), one for all p belonging to HS 5 digit (ABCDE), and one for all p belonging to HS 6 digit (ABCDEF)). Initially, the HS code (ABCDEF) is classified as price or quality competition if the distance coefficient of equation 2 estimated for all p belonging to HS 6 digit (ABCDEF) is significative. If not, the HS code (ABCDEF) is classified as price or quality competition if the distance coefficient of equation 2 estimated for all p belonging to HS 5 digit (ABCDE) is significative. If not, the HS code (ABCDEF) is classified as price or quality competition if the distance coefficient of equation 2 estimated for all p belonging to HS 4 digit (ABCD) is significative, and so on. In the most pessimistic scenario, the HS code (ABCDEF) is classified as price or quality competition according to the distance coefficient of the regression using the whole sample.

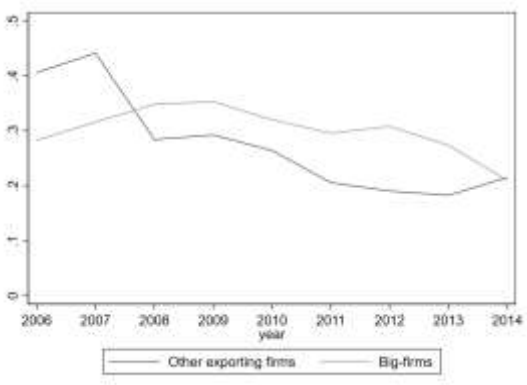
Table 1. Market classification (price or quality competition)

HS aggrupation level per regression	Number of markets classified[1]	Percentage of markets classified relative to total markets	Number of groups in each HS aggrupation level	Number of regressions[2]	Median observations per regression	Average observations per regression
HS6-dig	898	18.43	4,872	3,258	27	65
HS5-dig	474	9.73	3,402	2,486	52	129
HS4-dig	1,151	23.62	1,215	1,049	216	454
HS3-dig	1,419	29.13	174	173	1,738	2,506
HS2-dig	477	9.79	97	97	4,317	8,277
HS1-dig	296	6.08	10	10	25,674	34,913
Whole sample	157	3.22	1	1	291,888	291,888

Classification	Number of markets	Percentage of markets
Price competition	2,173	44.6
Quality competition	2,699	55.4
Total	4,872	100

[1]The markets classified as price (quality) competition are those whose distance coefficient is significant and negative (positive) in equation 2. [2] The number of regressions could not match with the number of groups in each HS aggrupation level if the sample is insufficiently to estimate equation 2 for certain groups.

Figure 3. Quality competition products exports relative to total exports



Source: Colombian National Administrative Statistics Department (DANE by its acronym in Spanish), Colombian Companies Superintendence and own calculations. The product classification follows the methodology explained in section 4.1.

4.2 International managerial quality estimation

In first place, it is estimated the export unit value (EUV) regression as follows:

$$ln\,EUV_{pfkt} = \beta_o + \beta_1 ln\,GDP_{kt} + \beta_2 ln\,GDPpc_{kt} + \beta_3 tf_{p*kt} + \Gamma X_{ft} + \theta New_{pfkt} + \varphi Number\_p\_k_{pfkt} + \partial_p + \partial_f + \partial_k + \partial_t + \epsilon_{pfkt} \quad (3)$$

where subscript p denotes HS 10-digit product, p* HS 6-digit product, f firm, k destination country, and t year. $ln\,GDP_{kt}$ and $ln\,GDPpc_{kt}$ are destination country variables that vary over time (GDP and GDP per capita). $Tariff_{p*kt}$[24] is the ad-valorem import tariff imposed by destination country k to product p*. Firm level variables X_{ft} include log fixed assets, log operating expenses, log non-tangible assets, mark-

[24] Source from tariff dataset is Feodora's Teti's Global Tariff database (Teti, 2020). Product level aggregation is HS 6-digit.

up and TFP (calculated based on Levinsohn & Petrin (2003) methodology).[25] New_{ftkp} includes three independent and mutually exclusive dummies which identify new export decisions made by firm *f* in year *t* to control for the adjustment cost of innovating: i) if it is a new product *p* exported to an "old" country destination *k*, ii) if it is an "old" product *p* exported to a new country destination *k,* or iii) if it is a new product *p* exported to a new country destination *k*. $Number\_p\_k_{ftkp}$ include the number of products that firm *f* exported in year *t*, the number of destination countries to which firm *f* exported in year *t*, and the number of product-destination countries to which firm *f* exported in year *t.* Finally, ∂_k are destination country fixed effects, ∂_p HS 10-digit product fixed effects, ∂_f firm fixed effects, and ∂_t year fixed effects (FE). Robust standard errors are clustered at country destination – year level.

The baseline export unit value regression is shown in column 1 of table 2. Columns 2 add double fixed effects (FE) interactions between destination country, product, year and firm FE, and column 3 triple FE interactions. Column 4 keep the fixed effects of column 3 but excludes TFP.[26] As the international managerial quality variable is intended to calculate manager's organizational capital contribution to increase production efficiency and quality capacity of the exported products by the firm across years, the double and triple fixed effects interactions added in column 2 and 3 do not absorb this variation because none of them is defined as the combination of firm FE with a time-changing variable FE. These additional fixed effects control for unobserved characteristics of particular combinations between product, year, destination country and firm, which are orthogonal from manager's control and impact export unit value.

For example, product-year FE in column 2 are included because of large unit value differences between products: "*they take out all observed and unobserved global factors that might change the relative unit values over time. For instance, if the relative price of computers to pencils goes down in year t due to technological progress or changes in demand, this effect will be absorbed by the product-year fixed effect*" (Harding & Javorcik, 2012, p.970). Also, product-firm-country destination FE allows to control for the average unit value of each product sold by each firm to each country destination. Consequently, the omitted variable bias is reduced when international managerial quality is calculated with residuals from column 2 and 3 because the corresponding regressions include double and triple FE interactions which are relevant export unit value determinants.

Then, modified residuals $\hat{v}_{pkft}$ are defined as described in equation 4 based on original equation 3 residuals ($\hat{\epsilon}_{pkft}$). Once the components of $\hat{v}_{pkft}$ are ascending ordered for each firm-year, the baseline international managerial quality is calculated as the median of $\hat{v}_{pkft}$ for each firm *f* in year *t* (equation 5A and 5B):

$$\hat{v}_{pkft} = \begin{cases} \hat{\epsilon}_{p1kft}, & where\ p1\ is\ the\ set\ of\ exported\ products\ by\ firm\ f\ in\ year\ t\ that\ compete\ by\ quality \\ \hat{\epsilon}_{p2kft} * (-1), & where\ \ p2\ is\ the\ set\ of\ exported\ products\ by\ firm\ f\ in\ year\ t\ that\ compete\ \ by\ price \end{cases} \quad (4)$$

[25] TFP calculation was calculated with *prodest* Stata command (Mollisi & Rovigatti, 2017). See appendix table 4A for results.

[26] One of the disadvantages of the methodology proposed in this paper is that TFP inclusion in the export unit value regression raises a trade-off. On one hand, it is redundant because international managerial talent is one of the TFP components. On other hand, it is relevant because its inclusion allows that equation 3 residuals do not capture non-international managerial TFP components. Since TFP components cannot be split, the only feasible solution is to calculate export unit value regression with and without TFP and show both results.

$$International\ managerial\ quality\ (IMQ)_{ft} = \frac{n+1^{th}}{2}\ obs\left(\hat{v}_{pkft}\right)\ for\ odd\ number\ of\ observations \quad (5A)$$

$$International\ managerial\ quality\ (IMQ)_{ft} = \frac{\frac{n^{th}}{2}+(\frac{n}{2}+1)^{th}}{2}\ obs\left(\hat{v}_{pkft}\right)\ for\ even\ number\ of\ observations \quad (5B)$$

Initially, $\hat{v}_{pkft}$ are aggregated by the median to not bias the calculation with outliers, evading to define a good manager as the one who is able to guide the firm to export only some products high above its capabilities. Nevertheless, firms' performance regressions results are calculated when modified residuals $\hat{v}_{pkft}$ are aggregated by the simple average as robustness check. Also, an alternative international managerial quality is defined as the median of the modified residuals $\hat{v}_{pkft}$ multiplied by a factor α based on Rauch (1999) good classification, where α is higher for those products in which there is higher international market arbitrage and the manager can influence the exported price in a higher proportion: $\alpha_{differentiated\ producs} > \alpha_{referenced\ price} > \alpha_{organized\ exchange}$. That is to say, it is more likely that a manager reaches to export at better prices than his (her) competitors the differentiated products than the homogeneous, because the last ones possess an international referenced price and their market behave in a more competitive way. The factor α is obtained from the coefficient of the variable links (dummy which takes the value of one if both countries share a language or colonial tie) on bilateral trade value in original Rauch (1999) regression.[27]

Figure 4 shows binned scatter plots between international managerial quality obtained from the third export unit value regression (IMQ3) in the x-axis, and eight different firms' outcomes in the y-axis. Most of the flat fit lines indicates null correlation between IMQ3 and exported value, number of exported products, number of destination countries' exports, number of export products - destination countries, imported inputs unit value, and Herfindahl-Hirschman Index (HHI) (squaring the share of each product-destination country observation in total firms' exports and then summing the obtained numbers). Profit rate and export quality share (exported value of products that compete in the international market by quality relative to total exported value) have a positive simple correlation with IMQ3, suggesting that better international managed firms are more profitable and export higher quality goods.

Additionally, figure 5 shows that IMQ3 is not correlated with some of the variables included in its calculation (operating expenses, fixed assets, non-tangible assets and TFP), indicating that IMQ3 is exogeneous and there is null multicollinearity in firm performance regressions explained in the next section. Also, the null correlation between firms' size and international managerial quality can be attributed to the fact that the metric described in this paper does not increase simply because the firm exports more products. On the contrary, the metric is identifying that small exporters can export more efficiently relative to their firm's capabilities than big exporters. In this sense, efforts made by the government[28] to provide symmetrical information to all firms about exporting process (independently of their market power) are important for empowering small exporters.

[27] See table 6 in Rauch (1999). For the liberal definition: 0.598 (organized exchange), 0.604 (referenced price) and 0.875 (differentiated commodities). For the conservative definition: 0.425 (organized exchange), 0.66 (referenced price) and 0.866 (differentiated commodities)

[28] See ProColombia: Portal de Exportaciones | Colombia Trade

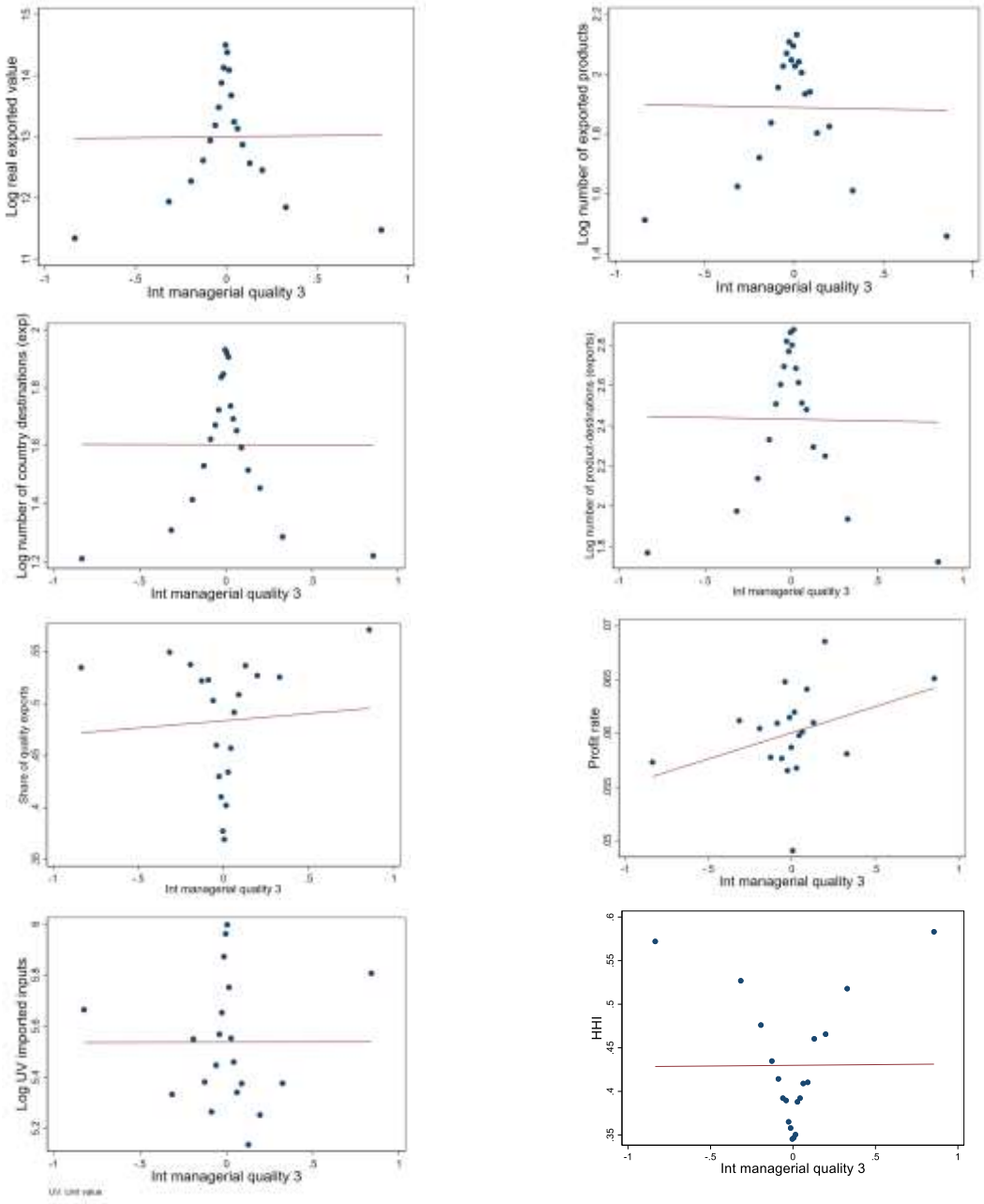
Table 2. Export unit value regression

	(1)	(2)	(3)	(4)
VARIABLES	Log (export unit value + 1)			
Log GDP	-0.0436			
	(0.102)			
Log GDPpc	0.0485			
	(0.127)			
Applied tariff (ad-valorem component)	-0.00139	0.000516		
	(0.000861)	(0.00120)		
Log real stock non-tangible assets (USD)	0.00212**	0.000999	0.000542	0.000523
	(0.000872)	(0.000712)	(0.000795)	(0.000799)
Log real stock property, plant and equipment (USD)	9.50e-05	-0.0247**	-0.0298***	0.00364
	(0.0130)	(0.0105)	(0.0109)	(0.00228)
Log real operating expenses (USD)	0.00215	-0.00134	0.000879	-0.00619
	(0.00777)	(0.00612)	(0.00678)	(0.00700)
Mark-up (operating income / sales cost)	0.00145**	-1.69e-05	2.71e-05	0.00284
	(0.000585)	(0.00306)	(0.00302)	(0.00279)
Dummy new product	-0.0139*	0.0456***		
	(0.00717)	(0.0158)		
Dummy new destination	0.0621***			
	(0.00995)			
Dummy new product-destination	0.00916			
	(0.0134)			
Number of products - countries destination	-0.000198*	-0.000422***	-0.000326***	-0.000322***
	(0.000117)	(9.67e-05)	(9.76e-05)	(9.78e-05)
Number of countries destination	0.000304	-1.51e-05	-0.000738	-0.000854
	(0.00143)	(0.00107)	(0.00111)	(0.00112)
Number of products	-0.000614	0.000631*	0.000430	0.000445
	(0.000457)	(0.000370)	(0.000419)	(0.000420)
TFP (Levinsohn & Petrin, 2003)	-0.0161	-0.169***	-0.204***	
	(0.0753)	(0.0603)	(0.0634)	
Observations	449,736	371,845	231,250	231,250
R-squared	0.751	0.911	0.931	0.931
Country destination fixed effects	Yes	No^r	No^r	No^r
Product fixed effects	Yes	No^r	No^r	No^r
Year fixed effects	Yes	No^r	No^r	No^r
Firm fixed effects	Yes	No^r	No^r	No^r
Product-Firm fixed effects	No	Yes	No^r	No^r
Product- country destination fixed effects	No	Yes	No^r	No^r
Product - year fixed effects	No	Yes	No^r	No^r
Country destination - year fixed effects	No	Yes	No^r	No^r
Firm- country destination fixed effects	No	Yes	No^r	No^r
Product-firm-country destination fixed effects	No	No	Yes	Yes
Product-year- country destination fixed effects	No	No	Yes	Yes

Export unit value = exported value / quantity. Robust standard errors in parentheses clustered at country destination-year level. No^r: redundant fixed effects.

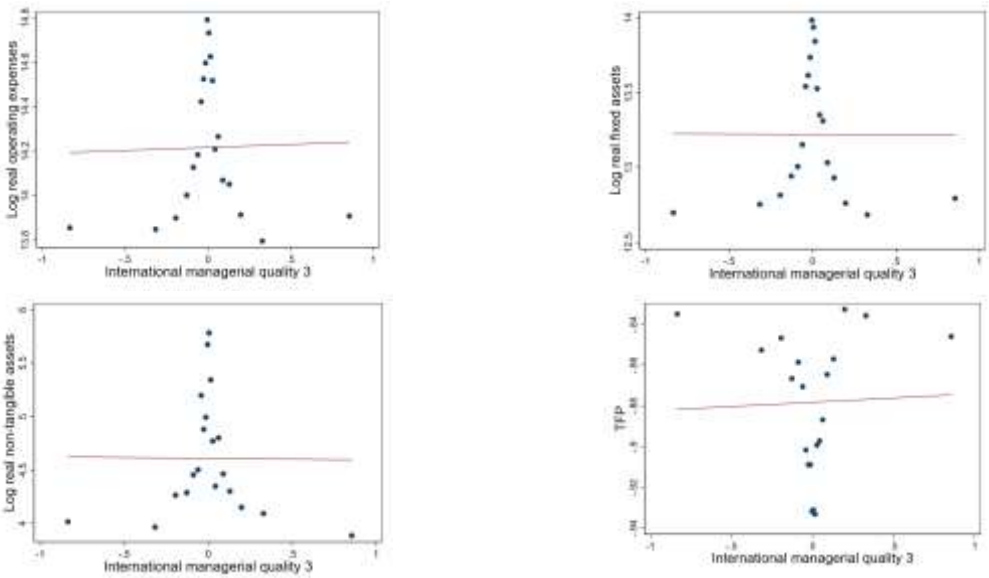
*** p<0.01, ** p<0.05, * p<0.1

Figure 4. Binned scatter plots between international managerial quality and firm performance measures



Note: Profit rate is defined as operating profit relative to operating income. *Share of quality exports* is defined as exported value of products that compete internationally by quality relative to total exported value, and the *Herfindahl-Hirschman Index (HHI)* is calculated squaring the share of each of product-destination country observation in total firms' exports and then summing the obtained numbers.

Figure 5. Binned scatter plots between international managerial quality and explanatory variables



Note: TFP calculation based on Levinsohn & Petrin (2003) methodology. See appendix A4.

4.3 International firm performance regression

The firms' performance baseline regression is:

$$log\, Y_{ft} = \beta_o + \beta_1 IMQ3_{ft} + \beta_2 Log\ global\ demand\ exp_{ft} + \Gamma X_{ft} + \partial_f + \partial_{st} + v_{ft} \qquad (6)$$

where firm outcome (Y) includes the dependent variables graphed and defined before: i) log exported value, ii) number of exported products, iii) number of export destination countries, iv) number of exported products-destination countries, v) Herfindahl-Hirschman Index (HHI) for exports, vi) quality exports share, vii) profit rate, and viii) simple average of imported inputs unit value. $IMQ3_{ft}$ is the international managerial quality described in equation 5 estimated with the residuals from the third export unit value regression (column 3 – table 2). X_{ft} is a vector of firm-level characteristics including log fixed assets, log non-tangible assets, log operating expenses, and TFP clean of international management component.[29] ∂_f are firm fixed effects and ∂_{ts} are industry[30]-year fixed effects, which absorb annual industry shocks allowing comparisons within industry-year.

$Log\ global\ demand\ exp_{ft}$ measures the degree to which the global market is demanding the products exported by the firm. It is exogeneous from manager decision (by construction) and it allows to calculate the importance of external factors on firm performance. It is defined as $Log\ global\ demand\ exp_{ft} = \sum_{kp} \ln(ID_{kpt}) share\_exp_{p,t=0}$, where $share\_exp_{p,t=0}$ is the share of product *p* exported to country *k* in total exports of firm *f* in its first sample year, and ID_{kpt} is the imported value of country *k* of product *p* in year *t* excluding Colombian exports. Figure 6 shows that international managerial quality is not correlated with exogenous external demand shocks, highlighting that IMQ measures innate manager quality not influenced by external conditions. Finally, table 5A (appendix) presents descriptive statistics for dependent and independent variables included in the regressions.

[29] It is calculated as the residual of a regression of TFP on international managerial quality as in Bloom et al. (2021).

[30] ISIC 3 digit.

Two econometric issues emerge from this specification. First, IMQ *could* be measuring international managerial quality plus other omitted variable(s), because it is calculated based on residuals. For this reason, baseline firm performance regressions (equation 6) includes IMQ3, which is the international managerial quality variable with the lowest omitted variable bias as explained before. Additionally, Jennings et al (2020) warn about the potential negative impact of the combination of one variable with measurement error and fixed effects with higher absorption level[31] on inflating coefficients and distorting inferences. However, the absorption rate of the fixed effects described in equation 6 with international managerial qualities is on average 10%, which is way below the threshold pointed by Jennings et al (2020) (90%).[32]

Secondly, the standard errors could be understated because the independent variable of interest (IMQ) is a generated regressor (estimates) subject to sampling bias. Although Chen et al. (2023) proof that there is not standard error bias when the generated regressor is calculated based on residuals and absolute residuals, IMQ is generated based on a particular adjustment in which the price competition products' residuals are multiplied by -1. Consequently, the standard error for β_1 coefficient is calculated through bootstrapping as a robustness check of the robust standard errors clustered at firm level.

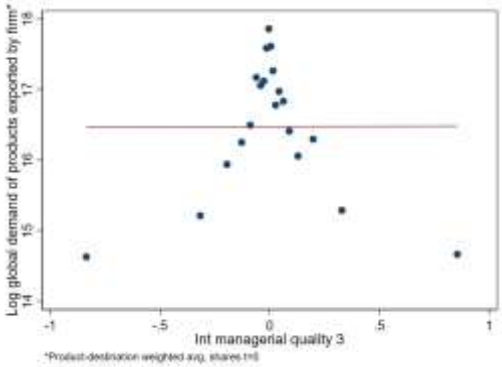
For this purpose, β_1 coefficient in equation 6 was estimated through an alternative econometric procedure based on the Frisch-Waugh-Lovell theorem in order to make computational easier the bootstrapping calculation. First, a regression is estimated where the dependent variable is the residual of a regression of Y on the other equation 6 explanatory variables ($\beta_2 ln\ Ext\ Demand\ exp_{ft} + \Gamma X_{ft} + \partial_f + \partial_{st} + v_{ft}$), and the independent variable is the residual of a regression of IMQ3 on the other equation 6 explanatory variables ($\beta_2 ln\ Ext\ Demand\ exp_{ft} + \Gamma X_{ft} + \partial_f + \partial_{ft} + v_{ft}$), which will estimate the same β_1 coefficient and it is feasible to bootstrap standard errors in Stata.

Additionally, two placebo tests were included. First, firm' equity was added as an additional dependent variable in order to check that IMQ does not have a statistically significantly effect on variables which theoretically should not affect. Secondly, a placebo IMQ was constructed following the same procedure described above but with imported unit value residuals (see table 6A), in order to verify that only original IMQ has explanatory power on the dependent variables. In both cases, β_1 coefficients should be non-statistically significative.

[31] The absorption rate is defined as the R-squared from a regression of the independent variable of interest on fixed effects. In this case, the absorption rate is the R-squared from a regression of international managerial quality on firm and industry-year fixed effects.

[32] Jennings et al (2020) state that absorption levels above 90% produce biased coefficients and wrong statistical inference. The absorption rates of the fixed effects described in equation 6 with international managerial qualities are below 30% (29.4%, 7.1%, 7.4%, 7.6%, 7.5%, 6.3%, and 7.4%)

Figure 6. Binned scatter plot between firm international managerial quality and exogenous global demand of products exported by firm



Note: The y-axis variable is defined as $Log\ global\ demand_{ft} = \sum_{kp} \ln(ID_{kpt}) share\_exp_{p,t=0}$, where $share\_exp_{p,t=0}$ is the share of product *p* exported to country *k* in total exports of firm *f* in its first sample year, and ID_{kpt} is the imported value of country *k* of product *p* in year *t* excluding Colombian exports. International managerial quality in x-axis is defined as in equation 5.

5 Results

Table 3 shows the estimation of international firms' performance regression described in equation 6. The results indicate that 1% increase in international managerial quality (IMQ) raises 0.07% the firm exported value (column 1) and decreases 0.01% the number of exported products (column 2). Both results imply that better managers in the international market focus in maximizing the production efficiency and quality capacity mechanisms for a reduced quantity of products, leading firms to increase exported value and profit rate (column 7) via intensive margin. Also, this 'export prioritization strategy' is independent of exported good's quality, as non-significant coefficient of IMQ on export quality share indicates (column 6).

The negative IMQ effect on extensive margin measures contradicts previous empirical findings, like Bloom et al. (2021), but are partially aligned with some heterogeneous firms with beachhead costs theoretical models, like Baldwin & Forslid (2010), which found an '*anti-variety*' globalization effect. Similarly, the null IMQ effect on export quality share somehow also contradicts previous empirical findings, which highlight that "*countries that latch on to higher productivity goods will perform better*" (Hausmman et al., 2007, p.3)[33] and question the Alchian-Allen theorem validity described at the introduction.[34] While these findings suggest that upgrading quality exports and increasing the number of exported products could not be the most profitable and efficient manager's decision, this conclusion should be interpreted in a short-term framework and does not deny the potential long-term aggregate benefits of upgrading quality exports (Hausmman et al. 2007), especially in an emerging economy (Sutton, 2007) as Colombia.

One potential explanation of this result is that better managers prefer to plan and implement strategies to expand export capacity of products already exported by the firm to known destinations, instead of exploring new markets and/or exporting new products. It is suggested as a future research

[33] Basically, "*countries become what they produce*" *(Hausmman et al., 2007, p.1)*

[34] Although its formal proof would require to recollect detailed freight rate data and run specific econometric models.

topic to include a manager objective prioritization function into theoretical models which allow to derive an optimal manager behavior, and the calculation of a dynamic international managerial quality adding an intertemporal manager discount rate which permits to evaluate the trade-off faced by the manager.

Furthermore, IMQ does not explain significantly the average imported input unit value (column 8), which is expected because if better managers are not upgrading export quality or increasing the number of exported products, they would not require better inputs from the international market. Besides, non-tangible asset is the less significant explanatory variable from the ones included in the regressions, indicating that non-traditional intangible assets, as the organizational capital measured in the IMQ variable, is a more relevant international firms' performance determinant than traditional non-tangible assets measured in the financial statements. Nonetheless, this result could be underestimating the intangible asset effect because of its measurement limitations (Crouzet et al., 2022). In fact, 59% of the big private Colombian exporting firms report null intangible assets.

In comparative terms, figure 7 shows that IMQ coefficients are larger but statistically equal to the coefficient that measures the magnitude to which global market is demanding the products exported by the firm, when exported value is the dependent variable. This suggests that endogenous improvements in the international managerial quality are as important as exogeneous positive international market conditions to boost firm exports. In other words, *talent* and *luck* are both equal significant determinants of international firms' exports. As a future research topic, it is suggested to estimate market and non-market returns, similar to Keller & Olney (2021) for US with executive compensation data, in order to contrast it with figure 7 coefficients.

As robustness check, equation 6 was estimated replacing IMQ3 by other IMQ's. The inferences mentioned before hold in the most important robustness checks: when IMQ is calculated with the residuals of the third unit value regression weighted by the good type according to the liberal Rauch (1999) classification (table 4), and when IMQ is calculated with the simple average of the third unit value regression residuals (table 10A). However, the statistically negative effect of IMQ on extensive margin measures and null effect on export quality does not hold in other supplementary robustness checks: when IMQ is calculated with the median of the first unit value regression residuals (table 7A), and when IMQ is calculated with the median of the second unit value regression residuals (table 8A), confirming that triple fixed effects interaction included in the export unit value regression, that reduce the omitted variable bias, are crucial for reaching these conclusions.[35]

Finally, the placebo tests performed well because none of the international managerial quality variables report significant effect on firms' equity in any of the calculations (column 9), and the IMQ3 calculated with the imported unit value regression residuals (table 6A) does not report any significant effect on most of the dependent variables (table 5). Additionally, the main results are significative when the robust standard errors are bootstrapped with 1,000 replications (table 12A) and 5,000 replications (table 13A) to correct the potential sampling bias.

[35] Two other supplementary robustness checks were calculated: when exported goods are weighted by the conservative Rauch (1999) good classification (table 9A) and when IMQ is calculated with the median of the fourth unit value regression residuals (table 11A). Both results show a non-statistically significative IMQ effect on extensive margin measures, which can be interpreted that in the worst scenario better managers in the international market do not increase the number of exported products, which is not equivalent to reducing it.

Table 3. International managerial quality 3 impact on firms' performance

VARIABLES	(1) Log exported value	(2) Log No. exported products	(3) Log No. destination countries	(4) Log No. products-destination	(5) HHI exports[1]	(6) Quality exports (share)[2]	(7) Profit rate[3]	(8) Log average unit value imported products	(9) Equity (P*)
International managerial quality 3	0.0708***	-0.0151*	0.00301	-0.0162	0.00221	0.00381	0.00432**	-0.0227	-0.00583
	(0.0252)	(0.00913)	(0.00621)	(0.0103)	(0.00443)	(0.00398)	(0.00201)	(0.0420)	(0.00840)
Log global demand of products exported by firm (product-destination weighted avg, shares t=0)	0.0430***	0.0280***	0.0206***	0.0383***	-0.00986***	0.000215	-0.000178	0.0147***	0.00188
	(0.00458)	(0.00181)	(0.00136)	(0.00219)	(0.000783)	(0.000964)	(0.000249)	(0.00529)	(0.00132)
Log real stock property, plant and equipment (USD)	0.598***	0.105***	0.0904***	0.165***	-0.0162***	-0.00624	0.0414***	0.116	0.171***
	(0.0375)	(0.0142)	(0.0109)	(0.0171)	(0.00603)	(0.00432)	(0.00557)	(0.0751)	(0.0224)
Log real stock non-tangible assets (USD)	0.00590**	0.00358***	0.00213**	0.00365**	-0.000575	-0.000377	9.40e-05	0.00378	0.00623***
	(0.00268)	(0.00126)	(0.000830)	(0.00142)	(0.000428)	(0.000389)	(0.000191)	(0.00432)	(0.00122)
Log real operating expenses (USD)	0.233***	0.0643***	0.0565***	0.0994***	-0.0170***	-0.00798**	-0.0138***	0.305***	0.149***
	(0.0377)	(0.0149)	(0.00998)	(0.0175)	(0.00402)	(0.00313)	(0.00366)	(0.0709)	(0.0306)
TFP (excluding int management component)	3.762***	0.633***	0.513***	0.985***	-0.0996***	-0.0433	0.236***	0.0346	0.649***
	(0.231)	(0.0901)	(0.0681)	(0.106)	(0.0368)	(0.0276)	(0.0340)	(0.452)	(0.141)
Observations	19,695	19,695	19,695	19,695	19,695	19,695	19,594	15,724	19,261
R-squared	0.912	0.871	0.899	0.902	0.765	0.903	0.621	0.699	0.968
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses clustered at firm level. P*: placebo test. TFP (excluding int management component) is the residual of a regression of TFP on international managerial quality. *** p<0.01, ** p<0.05, * p<0.1. [1] It is calculated squaring the share of each product-destination country observation in total firms' exports and then summing the obtained numbers, [2] exported value of goods that compete in the international market by quality relative to total exported value, [3] operating profit relative to operating income.

Table 4. International managerial quality (calculated based on liberal Rauch (1999) good classification1) impact on firms' performance

VARIABLES	(1) Log exported value	(2) Log No. exported products	(3) Log No. destination countries	(4) Log No. products-destination	(5) HHI exports[2]	(6) Quality exports (share)[3]	(7) Profit rate[4]	(8) Log average unit value imported products	(9) Equity (P*)
International managerial quality 3 (liberal Rauch classification)	0.0693**	-0.0199*	0.00179	-0.0224*	0.00255	0.00459	0.00316*	-0.0247	-0.00786
	(0.0294)	(0.0105)	(0.00701)	(0.0119)	(0.00502)	(0.00452)	(0.00185)	(0.0456)	(0.00926)
Log global demand of products exported by firm (product-destination weighted avg, shares t=0)	0.0419***	0.0278***	0.0204***	0.0380***	-0.00982***	0.000214	-0.000546**	0.0132**	0.000974
	(0.00466)	(0.00181)	(0.00136)	(0.00220)	(0.000783)	(0.000965)	(0.000218)	(0.00524)	(0.00134)
Log real stock property, plant and equipment (USD)	0.0723***	0.0163***	0.0191***	0.0274***	-0.00234	-5.60e-05	0.0152***	0.130***	0.0885***
	(0.0104)	(0.00411)	(0.00330)	(0.00491)	(0.00180)	(0.00125)	(0.00200)	(0.0201)	(0.00796)
Log real stock non-tangible assets (USD)	0.00628**	0.00365***	0.00218***	0.00375***	-0.000583	-0.000386	-0.000115	0.00354	0.00610***
	(0.00264)	(0.00125)	(0.000826)	(0.00141)	(0.000428)	(0.000389)	(0.000181)	(0.00429)	(0.00120)
Log real operating expenses (USD)	0.711***	0.145***	0.124***	0.226***	-0.0304***	-0.0121***	0.0857***	0.489***	0.305***
	(0.111)	(0.0292)	(0.0212)	(0.0385)	(0.00634)	(0.00429)	(0.00651)	(0.0682)	(0.0558)
TFP (excluding int management component)	0.885***	0.149***	0.129***	0.236***	-0.0254***	-0.00624	0.220***	0.525***	0.367***
	(0.145)	(0.0380)	(0.0288)	(0.0499)	(0.00919)	(0.00621)	(0.0171)	(0.105)	(0.0735)
Observations	19,695	19,695	19,695	19,695	19,695	19,695	19,594	15,724	19,261
R-squared	0.912	0.871	0.899	0.902	0.765	0.903	0.714	0.700	0.969
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses clustered at firm level. P*: placebo test. TFP (excluding int management component) is the residual of a regression of TFP on international managerial quality. [1]The international managerial quality is calculated based on the residuals from third export unit value regression multiplied by (-1) for *price competition* products and by the coefficients of the variable "*links*" (dummy variable which takes the value of one if both countries share a language or colonial tie and zero otherwise) on bilateral trade value for each type of good found by Rauch (1999): 0.598 (organized exchange), 0.604 (referenced price), and 0.875 (differentiated commodities). [2] It is calculated squaring the share of each product-destination country observation in total firms' exports and then summing the obtained numbers, [3] exported value of goods that compete in the international market by quality relative to total exported value, [4] operating profit relative to operating income.

*** p<0.01, ** p<0.05, * p<0.1

Table 5. International managerial quality impact on firms' performance. Placebo test: international managerial quality constructed with the residuals of the imported unit value regression (see table 6A)

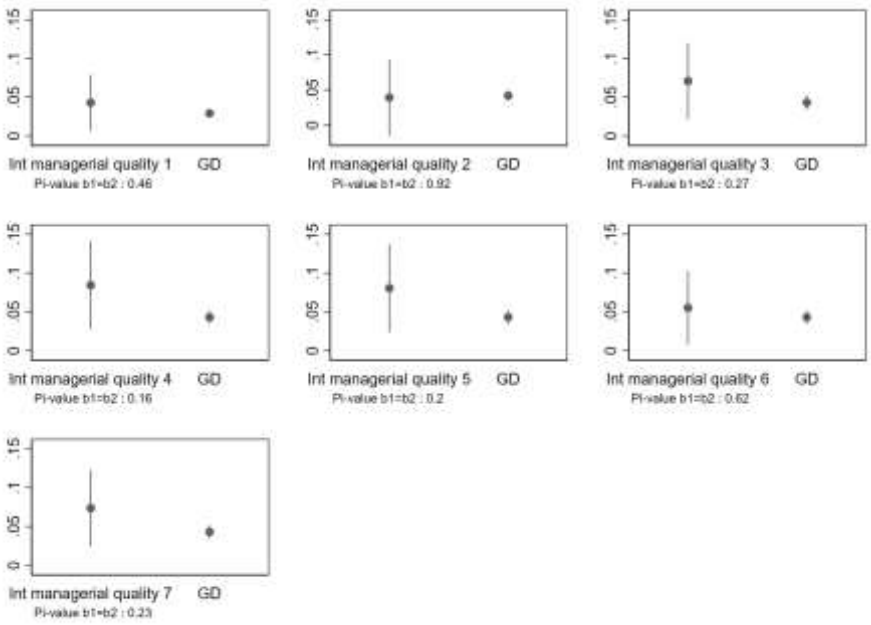
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
VARIABLES	Log exported value	Log No. exported products	Log No. destination countries	Log No. products-destination countries	HHI exports[1]	Quality exports (share)[2]	Profit rate[3]	Log average unit value imported products	Equity (P*)
International managerial quality (residuals of imported unit value regression, see table 6A)	-0.0124	-0.0142	-0.00561	-0.00735	-0.00281	0.0102	-0.00256	0.173**	0.0246*
	(0.0358)	(0.0150)	(0.0129)	(0.0180)	(0.00757)	(0.00679)	(0.00326)	(0.0798)	(0.0142)
Log global demand of products exported by firm (product-destination weighted avg, shares t=0)	0.0412***	0.0295***	0.0177***	0.0359***	-0.00882***	-0.000547	-8.97e-05	0.0119***	0.00140
	(0.00431)	(0.00172)	(0.00137)	(0.00212)	(0.000755)	(0.000887)	(0.000232)	(0.00458)	(0.00138)
Log real stock property, plant and equipment (USD)	0.518***	0.0922***	0.0746***	0.131***	-0.00907	0.00295	0.0376***	0.216***	0.191***
	(0.0544)	(0.0197)	(0.0140)	(0.0229)	(0.00738)	(0.00681)	(0.00635)	(0.0710)	(0.0326)
Log real stock non-tangible assets (USD)	0.00471	0.00389***	0.00257***	0.00414***	-0.000439	-0.000283	0.000121	0.00586	0.00604***
	(0.00296)	(0.00136)	(0.000874)	(0.00151)	(0.000464)	(0.000420)	(0.000186)	(0.00412)	(0.00123)
Log real operating expenses (USD)	0.349***	0.122***	0.0965***	0.174***	-0.0210***	-0.0165***	-0.0138***	0.251***	0.165***
	(0.0567)	(0.0218)	(0.0144)	(0.0263)	(0.00557)	(0.00530)	(0.00476)	(0.0612)	(0.0384)
TFP (excluding int index management component)	3.032***	0.544***	0.357***	0.714***	-0.0440	0.00276	0.203***	0.647	0.716***
	(0.326)	(0.122)	(0.0831)	(0.139)	(0.0447)	(0.0420)	(0.0360)	(0.427)	(0.191)
Observations	16,160	16,160	16,160	16,160	16,160	16,160	16,126	16,160	15,899
R-squared	0.912	0.869	0.905	0.904	0.765	0.904	0.675	0.726	0.968
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses clustered at firm level. P*: placebo test. TFP (excluding int management component) is the residual of a regression of TFP on international managerial quality. [1] It is calculated squaring the share of each product-destination country observation in total firms' exports and then summing the obtained numbers, [2] exported value of goods that compete in the international market by quality relative to total exported value, [3] operating profit relative to operating income.

*** p<0.01, ** p<0.05, * p<0.1

Figure 7. International managerial quality and global demand shocks impact on export performance

Dependent variable: Log exported value



Note 1: This graph shows the 95% confidence interval of the international managerial quality and log global demand (GD) of products exported by firm coefficients on log exported value. $\Gamma X_{ft} + \partial_f + \partial_{st}$ are included as other explanatory variables in the regression (see equation 6).

Note 2: Global demand of products exported by firm (GD) is defined as: $Log\ global\ demand\ (GD)_{ft}$: $\sum_{kp} \ln(ID_{kpt}) share\_exp_{p,t=0}$, where $share\_exp_{p,t=0}$ is the share of product p exported to country k in total exports of firm f in its first firm year sample, and ID_{kpt} is the import demand of country k of product p in year t excluding Colombian exports.

Note 3: International managerial quality 1 is the median of the first unit value regression residuals (column 1 - table 2) multiplied by (-1) for those price competition products, calculated at firm-year level.

International managerial quality 2 is the median of the second unit value regression residuals (column 2 - table 2) multiplied by (-1) for those price competition products, calculated at firm-year level.

International managerial quality 3 is the median of the third unit value regression residuals (column 3 - table 2) multiplied by (-1) for those price competition products, calculated at firm-year level.

International managerial quality 4 is the median of the third unit value regression (column 3 - table 2) multiplied by (-1) for those price competition products and weighted according to the conservative Rauch (1999) good classification, calculated at firm-year level.

International managerial quality 5 is the median of the third unit value regression (column 3 - table 2) multiplied by (-1) for those price competition products and weighted according to the liberal Rauch (1999) good classification, calculated at firm-year level.

International managerial quality 6 is the simple average of the of the third unit value regression residuals (column 4 - table 3) multiplied by (-1) for those price competition products, calculated at firm-year level.

International managerial quality 7 is the median of the of the fourth unit value regression residuals (column 4 - table 2) multiplied by (-1) for those price competition products, calculated at firm-year level.

6 Conclusion

Big exporting firms have incentives to implement different managerial practices for goods sold in the international and local market, nevertheless, specialized management quality surveys are not questioning those differences and the academic evidence about it is scarce. This paper proposes a two-step methodology to measure firm managerial practices quality specifically in the international market and to calculate its impact on firm performance. The international managerial quality is measured with the median of detailed export unit value regressions residuals at firm level (multiplied by -1 for those price competition products). This measurement is a proxy variable of the manager's organizational capital contribution to improve production efficiency and quality capacity mechanisms described by Bloom et al. (2021). In a second step, it is included as an explanatory variable in firms' performance regression. Econometric issues associated with two step estimations (omitted variable bias, measurement error and sampling bias) are discussed and solved across the document.

One intuitively and two counter-intuitive relevant conclusions emerge from the results. First, higher international managerial quality impacts positively the exported value and profit rate, confirming the intuition that better managers in the international market increases firms' exported value and make the firm more profitable. However, better managers in the international market led firms to export lower number of products independently of their quality. That is to say, good managers do not export more quantity, they export better what the firm already sell to know destinations.

This 'export strategy by prioritization' challenges traditional policy recommendations that firms should attempt increasing extensive margin and upgrading exports' quality. Also, it highlights that firms can increase their profitability exporting any product, as long as it is produced efficiently, hence low-quality exports should not be demonized. The 'export strategy by prioritization' could be motivated for efficient managers who are not willing to incur innovating cost but to maximize firms' export process. It is suggested as a future research topic to incorporate a manager objective function which allow to derive an optimal manager behavior into trade and management theoretical models, like Bloom et al. (2021), or into heterogeneous firms with beachhead costs models which predict an 'anti-variety' globalization effect, like Baldwin & Forslid (2010). Also, it is suggested to develop a methodology to calculate a long-term international managerial quality and/or a dynamic international managerial quality, in which some of the conclusions of this paper could not hold.

Another counter-intuitive finding is that a good manager is as important as favorable external conditions to boost exports. In other words, luck and talent are both equal determinants of firms' exported value. Although there are methodological challenges differentiating these components (because there is talent in taking advantage of luck), the results are robust to different specifications. Consequently, firms should implement countercyclical stabilization funds to smooth the impact of changing external conditions. Likewise, it is recommended to link these estimations with executive compensation data and calculate globalization market and not market returns, like Keller & Olney (2021) for US.

Finally, it is suggested to deep into non-traditional intangible assets' and organizational capital (like a firm's culture and structure) measurement, which seem to be a more relevant firm's performance determinant than traditional intangible assets measured in the financial statements. Also, it is suggested that specialized management quality surveys, like WMS and GMOP, include questions about international managerial practices and if they learn by exporting (and how).

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APPENDIX

Table 1A. Literature review – 16 most influential business export empirical research

Num	Paper	Title	Country	Sample
1	Bilkey & Tesar (1977)	The export behavior of smaller-sized Wisconsin manufacturing firms	US	423 small and medium sized Wisconsin manufacturing firms
2	Bonaccorsi (1992)	On the relationship between firm size and export intensity	Italy	Nationwide sample of manufacturing firms
3	Cavusgil (1984a)	Differences among exporting firms based on their degree of internationalization	US	70 midwestern manufacturers (personal interviews with the executives)
4	Cavusgil & Nevin (1981)	Internal determinants of export marketing behavior — An empirical investigation	US	A sample of 816 firms was systematically selected from the 4701 manufacturing firms listed in the classified directory of Wisconsin Manufacture
5	Bello & Gilliland (1997)	The effect of output controls, process controls, and flexibility on export channel performance	US	A series of 20 in-depth field interviews were conducted with export executives (n=375)
6	Reuber & Fischer (1997)	The influence of management team's international experience on internationalization behaviors of SMEs	Canada	Firms to be contacted were identified from a directory of Canada's premier software product firms. The directory listed 164 firms
7	Cooper & Kleinschmidt (1985)	The impact of export strategy on export sales performance	Canada	Managers of 142 firms in the Canadian electronics industry were personally interviewed to obtain data on export strategies and performance
8	Wiedersheim et al. (1978)	Pre-export activity — The first step in internationalization	Australia	The investigation involved a survey of 75 Australian manufacturing firms in five different city locations
9	Cavusgil (1984b)	Organizational characteristics associated with export activity	US	A total of 816 companies had been systematically selected from the 4,701 companies listed in the classified directory of manufacturers in Wisconsin, U.S.A.
10	Cavusgil et al. (1993)	Product and promotion adaptation in export ventures — An empirical investigation	US	In-depth personal interviews were conducted in the midwestern United States (Illinois, Indiana, Michigan, Ohio, and Wisconsin) (n=202)
11	Dichtl et al. (1990)	International orientation as a precondition for export success	Germany	104 firms (interviews to managers)
12	Cavusgil & Naor (1987)	Firm and management characteristics as discriminators of export marketing activity	US	The sampling frame consisted of 795 firms listed in the 1978 Maine Marketing Directory
13	Kujawa & Simpson (1974)	The export decision process: An empirical inquiry	UK	The sample was drawn from the 2047 units selected from a random stratified procedure from the UK manufacturing firms
14	Denis & Depelteau (1985)	Market knowledge diversification and export expansion	Canada	The researchers had access to a data bank of 331 small and middle-sized manufacturing firms located in Quebec
15	Madsen (1989)	Successful export marketing management: Some empirical evidence	Denmark	82 manufacturing firms participated in the survey
16	Reid (1984)	Information acquisition and export entry decision in small firms	Canada	89 small indigenous enterprises in Ontario

Source: Leonidou et al. (2010). The "sample" column was added by this paper.

Table 2A. Annual average descriptive statistics – big exporting firms and other exporting firms (2006 -2014)

Variable	Big-exporting firms	Other exporting firms
Simple average exported value per firm (real USD Dollars)	8,125,589	3,745,987
Median exported value per firm (real USD Dollars)	200,254	31,303
Average exports HHI per firm	0.536	0.703
Median exports HHI per firm	0.482	0.807
Average number of exported products per firm	7.647	4.129
Median number of exported products per firm	3.11	1.56
Average number of country destinations per firm	4.584	2.12
Median number of country destinations per firm	2	1
Average number of product - country destinations per firm	17.78	6.63
Median number of product - country destinations per firm	5	2
Average number of firms	3,529	4,809

Source: Colombian National Administrative Statistics Department (DANE by the acronym in Spanish), Colombian Companies Superintendence and own calculations. The exported value variable was deflated based on the US GDP deflator.

Table 3A. Annual average descriptive statistics – big exporting firms and big non-exporting firms (2006 -2014)

Variable	Big exporting firms	Big non-exporting firms
Simple average property plant equipment (real USD dollars) per firm	7,051,740	1,226,529
Median property plant equipment (real USD dollars) per firm	489,209	148,503
Simple average non-tangible assets (real USD dollars) per firm	932,246	319,084
Median non-tangible assets (real USD dollars) per firm	0	0
Simple average operating expenses (real USD dollars) per firm	5,806,118	1,120,099
Median operating expenses (real USD dollars) per firm	1,077,666	256,975
Simple average TFP	-0.850	-0.574
Median TFP	-0.881	-0.755
Average number of firms	3,529	21,139

Source: Colombian Companies Superintendence and own calculations. The variables used in this dataset were deflated using an industrial-specific annual Producer Price Index (PPI) reported by the Colombian Central Bank. TFP calculated with Levinsohn & Petrin (2003) methodology using "prodest" Stata command (table 4A).

Table 4A. TFP estimation

VARIABLES	(1) Log real operating income (USD)
Log real operating expenses (USD)	0.731***
	(0.00696)
Log real property, plant and equipment (USD)	0.0935***
	(0.00765)
Log real sales cost (USD)	0.338***
	(0.00550)
Observations	222,000
Number of groups	40,859

Source: TFP calculation based on Levinsohn & Petrin (2003) methodology and the prodest Stata command (Mollisi & Rovigatti, 2017). *Free variable* is operating expenses, *state variable* is property plant and equipment, and *proxy variable* is sales cost.

Table 5A. Descriptive statistics firm-level variables included in the regression

Variable	Mean	p50	SD	Min	Max	N
International managerial quality 1	0.0163	-0.0047	0.7408	-7.0921	7.4910	26,612
International managerial quality 2	0.0027	0.0000	0.3609	-4.3586	4.3586	22,023
International managerial quality 3	0.0019	0.0000	0.3362	-3.8084	3.5384	19,827
International managerial quality 4	0.0019	0.0000	0.2995	-3.2981	3.1892	19,827
International managerial quality 5	0.0020	0.0000	0.2984	-3.3324	3.1892	19,827
International managerial quality 6	0.0023	-0.0001	0.3411	-3.8084	3.5384	19,827
International managerial quality 7	0.0019	0.0002	0.3362	-3.8089	3.5322	19,827
Log (real exported value+1)	12.2058	12.1820	2.7992	0.1043	21.9289	31,449
Log (exported products+1)	1.6043	1.3863	0.9046	0.6931	5.8889	31,449
Log (country destinations+1)	1.3907	1.0986	0.7375	0.6931	4.0431	31,449
Log (product-country destination+1)	2.0288	1.7918	1.1820	0.6931	7.0309	31,449
HHI (based on exports country-destination shares)	0.5378	0.4833	0.3266	0.0146	1.0000	31,449
Quality exports (share)	0.5102	0.5332	0.4277	0.0000	1.0000	31,449
Exports relative to operating income (share)	0.1948	0.0497	0.2860	0.0000	1.0000	31,357
Profit rate	0.0528	0.0613	0.1237	-0.9977	1.0000	31,076
Log global demand of products exported by firm (GD)	13.3816	16.3666	7.9536	0.0000	27.3390	31,449
Log real stock property, plant and equipment (USD)	12.9714	13.0935	2.6279	0.0000	22.8978	31,449
Log real stock non-tangible assets (USD)	4.2458	0.0000	5.7280	0.0000	20.8683	31,449
Log real operating expenses (USD)	13.9996	13.8833	1.7273	0.0000	20.9883	31,449
TFP	-0.8514	-0.8816	0.3665	-3.0079	2.0441	31,449
TFP 1 (excluding int management component)	0.0000	-0.0205	0.3455	-2.1406	2.9104	26,612
TFP 2 (excluding int management component)	0.0000	-0.0212	0.3411	-2.0576	2.9201	22,023
TFP 3 (excluding int management component)	0.0000	-0.0207	0.3405	-1.4786	2.9230	19,827
TFP 4 (excluding int management component)	0.0000	-0.0207	0.3405	-1.4785	2.9226	19,827
TFP 5 (excluding int management component)	0.0000	-0.0207	0.3405	-1.4786	2.9228	19,827
TFP 6 (excluding int management component)	0.0000	-0.0208	0.3405	-1.4785	2.9226	19,827
TFP 7 (excluding int management component)	0.0000	-0.0207	0.3405	-1.4785	2.9230	19,827

Note 1: Global demand of products exported by firm (GD) is defined as: $Log\ global\ demand\ (GD)_{ft}$: $\sum_{kp} \ln(ID_{kpt}) share\_exp_{p,t=0}$, where $share\_exp_{p,t=0}$ is the share of product p exported to country k in total exports of firm f in its first firm year sample, and ID_{kpt} is the import demand of country k of product p in year t excluding Colombian exports.

Note 2: International managerial quality 1 is the median of the first unit value regression residuals (column 1 - table 2) multiplied by (-1) for those price competition products at the firm-year level. International managerial quality 2 is the median of the second unit value regression residuals (column 2 - table 2) multiplied by (-1) for those price competition products at the firm-year level. International managerial quality 3 is the median of the third unit value regression residuals (column 3 - table 2) multiplied by (-1) for those price competition products at the firm-year level. International managerial quality 4 is the median of the third unit value regression (column 3 - table 2) multiplied by (-1) for those price competition products and weighted according to the type of good (based on Rauch good classification, conservative definition) at the firm-year level. International managerial quality 5 is the median of the third unit value regression (column 3 - table 2) multiplied by (-1) for those price competition products and weighted according to the type of good (based on Rauch good classification, liberal definition) at the firm-year level. International managerial quality 6 is the simple average of the of the third unit value regression residuals (column 4 - table 3) multiplied by (-1) for those price competition products at the firm-year level. International managerial quality 7 is the median of the of the fourth unit value regression residuals (column 4 - table 2) multiplied by (-1) for those price competition products (excludes TFP from the export unit value regression) at the firm-year level.

Note 3: Methodology to classify markets that compete in the international market by quality is explained in section 4.1.

Note 4: TFP calculation based on Levinsohn & Petrin (2003) methodology and the prodest Stata command (Mollisi & Rovigatti, 2017). See table 4A.

Note 5: TFP (excluding int management component) is the residual of a TFP regression on international managerial quality.

Table 6A. Import unit value regression

VARIABLES	(1) Log (Unit value + 1)
Log real stock non-tangible assets (USD)	-4.15e-05
	(0.000282)
Log real stock property, plant and equipment (USD)	0.0137***
	(0.00477)
Log real operating expenses (USD)	0.00708
	(0.00487)
TFP, Levinsohn & Petrin (2003)	0.0787***
	(0.0271)
Mark-up (operating income / sales cost)	6.88e-11
	(1.60e-09)
Number of imported products – origin countries	2.59e-06
	(1.61e-05)
Number of origin countries	0.000405
	(0.000391)
Number of imported products	-0.000297***
	(4.79e-05)
Observations	1,707,038
R-squared	0.928
Country origin fixed effects	No
Product fixed effects	No
Year fixed effects	No
Firm fixed effects	No
Product-firm fixed effects	No
Product - country origin fixed effects	No
Product - year fixed effects	No
Country origin - year fixed effects	No
Firm - country origin fixed effects	No
Product-firm-origin fixed effects	Yes
Product-year-country origin fixed effects	Yes

Robust standard errors in parentheses clustered at origin country-year level.

*** p<0.01, ** p<0.05, * p<0.1

Table 7A. International managerial quality 1 impact on firms' performance

VARIABLES	(1) Log exported value	(2) Log No. exported products	(3) Log No. destination countries	(4) Log No. products-destination	(5) HHI exports[1]	(6) Quality exports (share)[2]	(7) Profit rate[3]	(8) Log average unit value imported products	(9) Equity (P*)
International managerial quality 1	0.0430**	-0.0397***	-0.00905***	-0.0446***	0.00635***	0.0102***	0.000640	0.0115	-0.00546
	(0.0185)	(0.00574)	(0.00322)	(0.00631)	(0.00243)	(0.00281)	(0.000989)	(0.0157)	(0.00435)
Log global demand of products exported by firm (product-destination weighted avg, shares t=0)	0.0292***	0.0142***	0.00863***	0.0182***	-0.00548***	-0.00102*	2.33e-05	0.00546*	0.000203
	(0.00295)	(0.00101)	(0.000606)	(0.00113)	(0.000441)	(0.000608)	(0.000147)	(0.00297)	(0.000760)
Log real stock property, plant and equipment (USD)	0.486***	0.0846***	0.0747***	0.130***	-0.0218***	-0.00299	0.0378***	0.164**	0.167***
	(0.0586)	(0.0147)	(0.0108)	(0.0189)	(0.00509)	(0.00485)	(0.00521)	(0.0640)	(0.0208)
Log real stock non-tangible assets (USD)	0.00717**	0.00300***	0.00228***	0.00360***	-0.000437	-0.000745	7.22e-05	0.00570	0.00698***
	(0.00310)	(0.00115)	(0.000745)	(0.00130)	(0.000425)	(0.000461)	(0.000186)	(0.00382)	(0.00113)
Log real operating expenses (USD)	0.263***	0.0653***	0.0577***	0.102***	-0.0192***	-0.00820**	-0.0149***	0.266***	0.162***
	(0.0414)	(0.0135)	(0.00941)	(0.0162)	(0.00403)	(0.00351)	(0.00335)	(0.0537)	(0.0268)
TFP (excluding int management component)	3.122***	0.534***	0.406***	0.777***	-0.132***	-0.0151	0.209***	0.284	0.608***
	(0.380)	(0.0933)	(0.0672)	(0.118)	(0.0315)	(0.0310)	(0.0319)	(0.399)	(0.134)
Observations	25,604	25,604	25,604	25,604	25,604	25,604	25,396	20,546	25,005
R-squared	0.874	0.839	0.888	0.883	0.736	0.837	0.624	0.705	0.966
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses clustered at firm level. P*: placebo test. TFP (excluding int management component) is the residual of a TFP regression on international managerial quality. [1] It is calculated squaring the share of each product-destination country observation in total firms' exports and then summing the obtained numbers, [2] Exported value of goods that compete in the international market by quality relative to total exported value, [3] Operating profit relative to operating income.

*** p<0.01, ** p<0.05, * p<0.1

Table 8A. International managerial quality 2 impact on firms' performance

VARIABLES	(1) Log exported value	(2) Log No. exported products	(3) Log No. destination countries	(4) Log No. products-destination	(5) HHI exports[1]	(6) Quality exports (share)[2]	(7) Profit rate[3]	(8) Log average unit value imported products	(9) Equity (P*)
International managerial quality 2	0.0390	-0.0315***	-0.00344	-0.0338***	0.00183	0.00805**	0.00132	-0.0101	-0.00759
	(0.0279)	(0.00888)	(0.00531)	(0.00971)	(0.00415)	(0.00405)	(0.00175)	(0.0359)	(0.00761)
Log global demand of products exported by firm (product-destination weighted avg, shares t=0)	0.0418***	0.0245***	0.0164***	0.0323***	-0.00890***	-0.00145*	1.21e-05	0.0118***	0.000832
	(0.00378)	(0.00147)	(0.00106)	(0.00173)	(0.000637)	(0.000816)	(0.000206)	(0.00452)	(0.00116)
Log real stock property, plant and equipment (USD)	0.509***	0.0857***	0.0796***	0.138***	-0.0172***	-0.00162	0.0368***	0.0726	0.160***
	(0.0674)	(0.0173)	(0.0131)	(0.0228)	(0.00542)	(0.00466)	(0.00602)	(0.0716)	(0.0240)
Log real stock non-tangible assets (USD)	0.00615**	0.00315***	0.00202**	0.00349**	-0.000322	-0.000526	9.15e-05	0.00538	0.00658***
	(0.00263)	(0.00121)	(0.000798)	(0.00136)	(0.000416)	(0.000406)	(0.000190)	(0.00417)	(0.00119)
Log real operating expenses (USD)	0.259***	0.0682***	0.0596***	0.105***	-0.0182***	-0.00964***	-0.0150***	0.290***	0.161***
	(0.0427)	(0.0151)	(0.0106)	(0.0183)	(0.00406)	(0.00324)	(0.00359)	(0.0658)	(0.0311)
TFP (excluding int management component)	3.207***	0.522***	0.438***	0.822***	-0.102***	-0.0178	0.208***	-0.259	0.569***
	(0.432)	(0.108)	(0.0816)	(0.142)	(0.0332)	(0.0294)	(0.0369)	(0.435)	(0.153)
Observations	21,753	21,753	21,753	21,753	21,753	21,753	21,627	17,412	21,282
R-squared	0.900	0.859	0.892	0.893	0.750	0.891	0.616	0.699	0.966
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses clustered at firm level. P*: placebo test. TFP (excluding int management component) is the residual of a TFP regression on international managerial quality 2. [1] It is calculated squaring the share of each product-destination country observation in total firms' exports and then summing the obtained numbers, [2] Exported value of goods that compete in the international market by quality relative to total exported value, [3] Operating profit relative to operating income.

*** p<0.01, ** p<0.05, * p<0.1

Table 9A. International managerial quality (calculated based on conservative Rauch (1999) good classification1) impact on firms' performance

VARIABLES	(1) Log exported value	(2) Log No. exported products	(3) Log No. destination countries	(4) Log No. products-destination	(5) HHI exports[1]	(6) Quality exports (share)[2]	(7) Profit rate[3]	(8) Log average unit value imported products	(9) Equity (P*)
Int man quality 3 (conservative Rauch classification)	0.0843***	-0.0171	0.00370	-0.0183	0.00226	0.00434	0.00483**	-0.0242	-0.00540
	(0.0289)	(0.0105)	(0.00702)	(0.0118)	(0.00501)	(0.00452)	(0.00232)	(0.0459)	(0.00959)
Log global demand of products exported by firm (product-destination weighted avg	0.0430***	0.0280***	0.0206***	0.0383***	-0.00986***	0.000216	-0.000177	0.0147***	0.00188
	(0.00458)	(0.00181)	(0.00136)	(0.00219)	(0.000783)	(0.000964)	(0.000249)	(0.00529)	(0.00132)
Log real stock property, plant and equipment (USD)	0.598***	0.105***	0.0904***	0.165***	-0.0162***	-0.00624	0.0414***	0.116	0.171***
	(0.0375)	(0.0142)	(0.0109)	(0.0171)	(0.00603)	(0.00432)	(0.00557)	(0.0751)	(0.0224)
Log real stock non-tangible assets (USD)	0.00590**	0.00358***	0.00213**	0.00365**	-0.000575	-0.000377	9.40e-05	0.00378	0.00623***
	(0.00268)	(0.00126)	(0.000830)	(0.00142)	(0.000428)	(0.000389)	(0.000191)	(0.00432)	(0.00122)
Log real operating expenses (USD)	0.233***	0.0643***	0.0565***	0.0994***	-0.0170***	-0.00798**	-0.0138***	0.305***	0.149***
	(0.0377)	(0.0149)	(0.00998)	(0.0175)	(0.00402)	(0.00313)	(0.00366)	(0.0709)	(0.0306)
TFP (excluding int management component)	3.762***	0.633***	0.513***	0.985***	-0.0996***	-0.0433	0.236***	0.0344	0.649***
	(0.231)	(0.0901)	(0.0681)	(0.106)	(0.0368)	(0.0276)	(0.0340)	(0.452)	(0.141)
Observations	19,695	19,695	19,695	19,695	19,695	19,695	19,594	15,724	19,261
R-squared	0.912	0.871	0.899	0.902	0.765	0.903	0.621	0.699	0.968
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses clustered at firm level. [1]The international managerial quality is calculated based on the residuals from third export unit value regression multiplied by (-1) for price competition products and by the coefficients of the variable "links" (dummy variable which takes the value of one if both countries share a language or colonial tie and zero otherwise) on bilateral trade value for each type of good found by Rauch (1999): 0.425 (organized exchange), 0.66 (referenced price), and 0.866 (differentiated commodities). Conservative definition. [1] It is calculated squaring the share of each product-destination country observation in total firms' exports and then summing the obtained numbers, [2] Exported value of goods that compete in the international market by quality relative to total exported value, [3] Operating profit relative to operating income.

*** p<0.01, ** p<0.05, * p<0.1

Table 10A. International managerial quality 3 impact on firms' performance (EUV residuals aggregated by the simple average)

VARIABLES	(1) Log exported value	(2) Log No. exported products	(3) Log No. destination countries	(4) Log No. products-destination	(5) HHI exports[1]	(6) Quality exports (share)[2]	(7) Profit rate[3]	(8) Log average unit value imported products	(9) Equity (P*)
Int man quality 3 (simple avg)	0.0551**	-0.0159*	0.00159	-0.0206**	0.00298	0.00455	0.00442**	-0.0347	-0.00888
	(0.0244)	(0.00901)	(0.00604)	(0.0101)	(0.00429)	(0.00384)	(0.00196)	(0.0411)	(0.00806)
Log global demand of products exported by firm (product-destination weighted avg	0.0430***	0.0280***	0.0206***	0.0383***	-0.00986***	0.000217	-0.000176	0.0147***	0.00187
	(0.00458)	(0.00181)	(0.00136)	(0.00219)	(0.000783)	(0.000964)	(0.000249)	(0.00529)	(0.00132)
Log real stock property, plant and equipment (USD)	0.598***	0.105***	0.0905***	0.165***	-0.0162***	-0.00623	0.0414***	0.116	0.171***
	(0.0375)	(0.0142)	(0.0109)	(0.0171)	(0.00603)	(0.00432)	(0.00557)	(0.0751)	(0.0224)
Log real stock non-tangible assets (USD)	0.00589**	0.00358***	0.00213**	0.00366***	-0.000576	-0.000378	9.28e-05	0.00379	0.00623***
	(0.00268)	(0.00126)	(0.000830)	(0.00142)	(0.000428)	(0.000389)	(0.000191)	(0.00431)	(0.00122)
Log real operating expenses (USD)	0.233***	0.0643***	0.0565***	0.0994***	-0.0170***	-0.00799**	-0.0138***	0.305***	0.149***
	(0.0377)	(0.0149)	(0.00998)	(0.0175)	(0.00402)	(0.00313)	(0.00366)	(0.0709)	(0.0306)
TFP (excluding int management component)	3.764***	0.632***	0.513***	0.985***	-0.0996***	-0.0432	0.236***	0.0353	0.649***
	(0.231)	(0.0901)	(0.0681)	(0.106)	(0.0368)	(0.0276)	(0.0340)	(0.452)	(0.141)
Observations	19,695	19,695	19,695	19,695	19,695	19,695	19,594	15,724	19,261
R-squared	0.912	0.871	0.899	0.902	0.765	0.903	0.621	0.699	0.968
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses clustered at firm level. P*: placebo test. TFP (excluding int management component) is the residual of a regression of TFP on international managerial quality. EUV: Export unit value. [1] It is calculated squaring the share of each product-destination country observation in total firms' exports and then summing the obtained numbers, [2] Exported value of goods that compete in the international market by quality relative to total exported value, [3] Operating profit relative to operating income.

*** p<0.01, ** p<0.05, * p<0.1

Table 11A. International managerial quality 4 impact on firms' performance (excluding TFP from the export unit value regression)

VARIABLES	(1) Log exported value	(2) Log No. exported products	(3) Log No. destination countries	(4) Log No. products-destination	(5) HHI exports[1]	(6) Quality exports (share)[2]	(7) Profit rate[3]	(8) Log average unit value imported products	(9) Equity (P*)
Int man quality 4 (No-TFP in EUV regression)	0.0737***	-0.0149	0.00386	-0.0154	0.00194	0.00395	0.00431**	-0.0219	-0.00565
	(0.0252)	(0.00913)	(0.00621)	(0.0103)	(0.00443)	(0.00397)	(0.00200)	(0.0420)	(0.00839)
Log global demand of products exported by firm (product-destination weighted avg	0.0430***	0.0280***	0.0206***	0.0383***	-0.00986***	0.000215	-0.000178	0.0147***	0.00188
	(0.00458)	(0.00181)	(0.00136)	(0.00219)	(0.000783)	(0.000964)	(0.000249)	(0.00529)	(0.00132)
Log real stock property, plant and equipment (USD)	0.598***	0.105***	0.0904***	0.165***	-0.0162***	-0.00621	0.0415***	0.115	0.171***
	(0.0375)	(0.0142)	(0.0109)	(0.0171)	(0.00603)	(0.00432)	(0.00557)	(0.0751)	(0.0224)
Log real stock non-tangible assets (USD)	0.00590**	0.00358***	0.00213**	0.00365**	-0.000575	-0.000377	9.39e-05	0.00378	0.00623***
	(0.00268)	(0.00126)	(0.000830)	(0.00142)	(0.000428)	(0.000389)	(0.000191)	(0.00432)	(0.00122)
Log real operating expenses (USD)	0.233***	0.0643***	0.0565***	0.0994***	-0.0170***	-0.00798**	-0.0138***	0.305***	0.149***
	(0.0377)	(0.0149)	(0.00998)	(0.0175)	(0.00402)	(0.00313)	(0.00366)	(0.0709)	(0.0306)
TFP (excluding int management component)	3.764***	0.632***	0.513***	0.984***	-0.0995***	-0.0431	0.236***	0.0335	0.648***
	(0.231)	(0.0901)	(0.0681)	(0.106)	(0.0368)	(0.0276)	(0.0340)	(0.452)	(0.141)
Observations	19,695	19,695	19,695	19,695	19,695	19,695	19,594	15,724	19,261
R-squared	0.912	0.871	0.899	0.902	0.765	0.903	0.621	0.699	0.968
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses clustered at firm level. P*: placebo test. TFP (excluding int management component) is the residual of a regression of TFP on international managerial. EUV: export unit value. [1] It is calculated squaring the share of each product-destination country observation in total firms' exports and then summing the obtained numbers, [2] Exported value of goods that compete in the international market by quality relative to total exported value, [3] Operating profit relative to operating income.

*** p<0.01, ** p<0.05, * p<0.1

Table 12A. International managerial quality 3 residual impact on firms' performance residual, bootstrap standard errors (number of replications = 1000)

VARIABLES	(1) Log real exported value (residual)	(2) Log No. exported products (residual)	(3) Log No. destination countries (residual)	(4) Log No. products-destination countries (residual)	(5) HHI exports (residual)[1]	(6) Quality exports (share)[2] (residual)	(7) Profit rate (residual)[3]	(8) Log average unit value imported products (residual)	(9) Equity (P*) (res)
International managerial quality (res)	0.0708***	-0.0151*	0.00301	-0.0162*	0.00221	0.00381	0.00431***	-0.022	-0.0058
	(0.0237)	(0.00855)	(0.00591)	(0.00960)	(0.00393)	(0.00354)	(0.00158)	(0.0345)	(0.00738)
Observations	19,695	19,695	19,695	19,695	19,695	19,695	19,594	15,724	19,261
R-squared	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Number of replications	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000

Note: Bootstrap errors in parentheses. Constant no reported. Dependent variables are the residual of a regression of each Y on $\beta_2 ln\ Ext\ Demand\ exp_{ft} + \Gamma X_{ft} + \partial_f + \partial_{sy} + v_{fy}$, and the independent variable is the residual of a regression of International Managerial Quality 3 on $\beta_2 ln\ Ext\ Demand\ exp_{ft} + \Gamma X_{ft} + \partial_f + \partial_{sy} + v_{fy}$ (see equation 6). *** p<0.01, ** p<0.05, * p<0.1. P*: placebo test. 1 It is calculated squaring the share of each product-destination country observation in total firms' exports and then summing the obtained numbers, 2 exported value of goods that compete in the international market by quality relative to total exported value, 3 operating profit relative to operating income

Table 13A. International managerial quality 3 residual impact on firms' performance residual, bootstrap standard errors (number of replications = 5000)

VARIABLES	(1) Log exported value (residual)	(2) Log No. exported products (residual)	(3) Log No. destination countries (residual)	(4) Log No. products-destination countries (residual)	(5) HHI exports (residual)[1]	(6) Quality exports (share)[2] (residual)	(7) Profit rate (residual)[3]	(8) Log average unit value imported products (residual)	(9) Equity (P*) (res)
International managerial quality (res)	0.0708**	-0.0151*	0.00301	-0.0162*	0.00221	0.00381	0.00431***	-0.022	-0.0058
	(0.0228)	(0.00845)	(0.00576)	(0.00945)	(0.00396)	(0.00356)	(0.00163)	(0.0347)	(0.0075)
Observations	19,695	19,695	19,695	19,695	19,695	19,695	19,594	15,724	19,261
R-squared	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Number of replications	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000

Note: Bootstrap errors in parentheses. Constant no reported. Dependent variables are the residual of a regression of each Y on $\beta_2 ln\ Ext\ Demand\ exp_{ft} + \Gamma X_{ft} + \partial_f + \partial_{sy} + v_{fy}$, and the independent variable is the residual of a regression of International Managerial Quality 3 on $\beta_2 ln\ Ext\ Demand\ exp_{ft} + \Gamma X_{ft} + \partial_f + \partial_{sy} + v_{fy}$ (see equation 6). *** p<0.01, ** p<0.05, * p<0.1. 1 It is calculated squaring the share of each product-destination country observation in total firms' exports and then summing the obtained numbers, 2 Exported value of goods that compete in the international market by quality relative to total exported value, 3 operating profit relative to operating income.