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The Effects of Management Practices on Effective Tax Rates: Evidence from Ecuador*

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Abstract

This paper examines the effects of management practices on effective tax rates (ETR) in a sample of medium- and large-size manufacturing firms in Ecuador. We use a novel data set on management practice scores matched with administrative tax data from the Superintendence of Companies and the Internal Revenue Service of Ecuador based on firms' tax filings. We find that better management practices are positively associated with effective tax rates, defined as the share of tax obligations to profits. This result is robust under various specifications controlling for different covariates and to different measures of effective tax rates. Furthermore, our findings indicate that the use of fiscal incentives is positively associated with higher effective tax rates. However, firms that use fiscal incentives are able to flatten or reduce their effective tax rates as management practices improve. Overall, our findings suggest that government-sponsored policies that seek to promote better management practices may be self-sustaining if the expected additional tax revenue as a result of firms' realizing higher profits is able to cover the cost of the programs.

Keywords: management practices, tax obligations, tax incentives, productivity
JEL Codes: D22, H2, L2, M2

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1 Introduction

The number of studies of management practices has grown in recent years, in large part due to increased data availability at the firm level, which resulted from an effort to collect more comprehensive information on managerial practices (Bloom et al., 2014, 2016). Most of the literature on management practices has focused on understanding the large productivity differences across firms, industries, and countries (Bloom et al., 2014; Lemos and Scur, 2014; Bloom et al., 2016; Broszeit et al., 2019).[1] The empirical evidence shows that better management practices are associated with higher firm productivity and profits, which are important to the fostering of economic growth (Bloom and Van Reenen, 2007; Bilicka and Scur, 2020).

Better management practices, practices and the resulting higher profits, however, can also affect tax obligations, tax payments, and effective tax rates (ETR). There is a vast literature that examines the determinants of effective tax rates. A number of studies explore the impact of firm size on ETR (Zimmerman, 1983; Omer et al., 1993; Kim and Limpaphayom, 1998; Mascagni and Mengistu, 2019). Another strand of the literature examines the role of firm ownership, in particular family-ownership, on effective tax rates (Annuar et al., 2014; Gaaya et al., 2017). A more recent branch of studies examines the relationship between management practices and tax planning behavior, emphasizing multinational firms and potential tax avoidance behavior (Bilicka and Scur, 2020). However, there are no studies that explore the relationship between management practices and effective tax rates to our knowledge.

This paper examines the effects of management practice scores on effective tax rates in a sample of medium- and large-size manufacturing firms in Ecuador. To explore this topic, we use a novel, cross-sectional data set containing information on firm-level management practices collected jointly by the Inter-American Development Bank (IADB) and the Center for Economic Performance as part of the World Management Survey (WMS) initiative in

[1] Influential studies such as Hsieh and Klenow (2009) state that aggregate productivity gaps between countries are explained by intra-industry productivity differences arising from resource misallocation across plants.

the years 2018 and 2019. We combine this data set with administrative tax data from the Superintendence of Companies and the Internal Revenue Service (IRS)[2] of Ecuador to broaden the scope of firms' financial information to include information on firms' revenue, costs, profits, and tax obligations and payments.

To better understand the channels of impact of better management practices on effective tax rates, we explore different hypotheses, as higher profits may or may not lead to higher tax obligations and thus higher effective tax rates. On the one hand, higher profits could lead to higher taxable income, leading to higher tax obligations and payments (Bilicka and Scur, 2020). However, different provisions in country's tax and labor codes can reduce effective tax liability (i.e., distribution of profits between employees). Additionally, firms with better management practices tend to make use of the different fiscal incentives available in each country's tax structure (Mayende, 2013). On the other hand, firms with better management practices may engage in aggressive tax planning by finding loopholes in the tax structure or, in the case of multinational firms, by shifting profits out of high-tax countries into low-tax countries (Bilicka and Scur, 2020). To explore these hypotheses, we examine the relationship between effective tax rates, defined as tax obligation as a share of profits, and management practice scores[3] within a regression framework. Additionally, we explore the use of fiscal incentives, understood in this study as spending or other activities that can be deducted from firms' gross earnings contemplated in the Ecuadorian tax code.

Our results show a strong, positive relationship between better management practices and ETR. The results are robust to various definitions of ETR and to including additional covariates as controls. Furthermore, firms' characteristics such as firm size, multinational status, and output export share are negatively and statistically significantly related to effective tax rates. Additionally, our results suggest that fiscal incentives are positively associated with effective tax rates on firms that use them. However, the impact of the use of fiscal incentives

[2]In Ecuador, these are referred to as La Superintendencia de Compañías and Servicio de Rentas Internas del Ecuador (SRI), respectively.

[3]Management scores range from 1 to 5, with 1 reflecting the poorest management practices and 5 reflecting the best.

is conditional on management practice scores.

Our results suggest that firms that use fiscal incentives are able to flatten or reduce their effective tax rates as they improve their management practices, compared to firms that do not use fiscal incentives. To better understand these results, we simulate effective tax rates for firms that use and do not use fiscal incentives based on the model parameters. The simulation results suggest a positive relationship between ETR and management practice scores for both firms that do and do not use fiscal incentives. Furthermore, the simulation results indicate that firms using fiscal incentives pay higher taxes at lower management practice score levels. However, past a certain management score threshold,[4] firms that use fiscal incentives pay lower effective rates than firms that do not use fiscal incentives.

Overall, our findings suggest that government-sponsored policies that seek to promote better management practices may be self-sustaining. Furthermore, better management practices could lead to productivity gains, which can ultimately translate into economic growth and higher living standards.

The contribution of this paper is twofold. First, this research contributes to the small but growing literature that seeks to understand management practices' role in a firm's performance. Second, very little is known about management practices and effective tax rates in Ecuador. To our knowledge, this is the first study using this novel set of data of firms in Ecuador to explore these relationships. More research needs to be done in this area to understand whether this positive relationship between management practices and effective tax rates can be found in other nonmanufacturing sectors in Ecuador as well as in other countries.

The rest of the paper is structured as follows: the next section presents a brief description of corporate taxes and the tax structure in Ecuador. Section 3 presents the data used in this study, while Section 4 explores the distribution of management practice scores, its four aspects, and the relationship between management practices and effective tax rates. Section

[4]As stated in note 3 on p. 2, a score of 1 reflects the poorest management practices and 5 the best; 3 is identified as the threshold score.

5 presents a description of the empirical framework, and section 6 presents and discusses the results. Section 7 concludes the paper with a discussion of policy implications, the present study's limitations, and future research.

2 Corporate Taxes and the Tax Structure in Ecuador

Ecuador is characterized by an economy that highly depends on oil.[5] Thus, Ecuador's economic performance and fiscal stance are strongly correlated with changes in oil prices. In the last decade, the government has introduced various tax structure changes to shore up the country's resilience in relation to volatile oil prices and improve revenue collection, such as new tax incentives on top of those already in place. As a consequence, government revenues in Ecuador have grown since 2008 (World Bank, 2018). As of 2018, the tax-to-GDP ratio was on the order of 20.6% in Ecuador, with "Taxes on income, profits and capital gains," which include corporate income tax collection, accounting for about 4.8% (OECD, 2020).[6]

The corporate income tax structure to which Ecuadorian firms are subject to is detailed in the *"Ley Orgánica de Régimen Tributario Interno (LORTI)"* (Organic Law of the Regime of Internal Tax) and its regulations. Under this regime, firms must declare their revenues and costs to calculate and declare their profits. Profits or earnings before taxes are then adjusted by exempt income, deductions, and nondeductible expenses[7] covered by the law and its regulations. Additionally, firms are entitled per Ecuadorian labor law to deduct the portion of their profit that is distributed to their employees (up to 15% of profits must be distributed, according to the Código de trabajo, art. 97). Exempt income and deductions are considered "fiscal incentives," as both can reduce taxable profit and the decision to

[5] Ecuador is the fifth-largest oil producer in Latin America and the OPEC member with the lowest level of production (World Bank, 2018)

[6] Given their high vulnerability to shocks in oil prices, corporate income taxes in Ecuador follows the trend of international oil prices (Deza et al., 2020). For instance, while corporate tax collection has shown a fairly stable pattern since the mid-2000s, it peaked in 2014, but has been decelerating ever since, in line with the slowdown in oil prices in international markets that flagged the end of the "commodity prices super-cycle" (Deza et al., 2020, pp. 1).

[7] These are expenses deducted but added back up to the tax base because they ended up being nondeductible.

take advantage of either is entirely up to the firm (explained in greater detail below). The resulting balance constitutes the taxable profit. The nominal tax rate, at 22% until 2017 2017 —the latest year for which our administrative data are available— and adjusted to 25% in 2018, is then applied to the taxable profit to generate the firm's tax obligation. Finally, if the firm decides to reinvest a portion of the profit, that amount is taxed at a rate that is 10 percentage points lower than the statutory rate. This process for calculating tax obligations can also be seen in Figure 2.1 below:

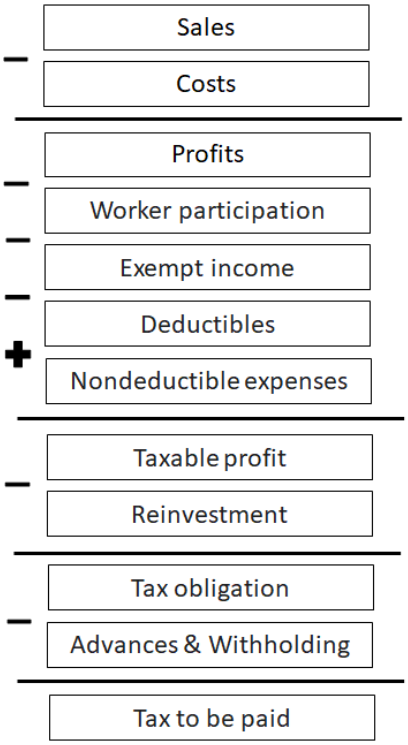

Fig 2.1. Tax Structure of Ecuador
Source: Deza et al. (2020)

One particularity in the Ecuadorian tax regime is that, until 2019, firms had to pay a mandatory minimum advance payment toward their tax obligation during the fiscal year (*anticipo del impuesto a la renta*). The amount was calculated as the sum of 0.2% of the total equity, 0.2% of the total deductible costs and expenses for income tax purposes, 0.4% of total assets, and 0.4% of total taxable income for income tax purposes, based on the firm's reporting from the previous fiscal. In addition to this, during the fiscal year a certain

percentage of a firms' taxable profit is withheld by gents accredited by the Internal Revenue Service of Ecuador against the firm's tax obligations.

Tax incentives and benefits in the corporate income tax regime in Ecuador amounted to about 1.2% of GDP in 2016 (Deza et al., 2020). Furthermore, several tax incentives were introduced that year in the Código Orgánico de Producción y Comercio e Inversiones (COPCI; Organic Code of Production, Trade, and Investments) to support firms affected by the economic deceleration after the drop in international oil prices. Since then, the main tax incentives available in Ecuador are (1) exempt dividends, (2) other exempt rents, (3) amortization of tax losses, (4) deductions, (5) deductions for the hiring of employees and people with disabilities, (6) accelerated depreciation, and (7) reinvestment of profits, which is taxed at the lower rate mentioned above.

Because of these characteristics of the Ecuadorian tax structure and the different fiscal incentives that the system provides, the effective tax rate paid by firms might be different from the nominal tax rate established by the IRS.[8] Also, firms with different management practices might face different effective tax rates as well, which is the focus of our paper. Here, we explore the relationship between effective tax rates and management practices to estimate the impact of better management practices on ETR.

3 Data

This study uses a novel cross-sectional data set containing information on firm-level management practices collected jointly by the Inter-American Development Bank (IADB) and the Center for Economic Performance as part of the World Management Survey (WMS) initiative in the years 2018 and 2019 (Beverinotti et al., 2020). We combine this data set with administrative tax data from the Superintendence of Companies and the Internal Revenue Service (IRS) to broaden the scope of the firms' financial information to include information

[8]For instance, Deza et al. (2020), using similar administrative data, study the distribution of effective tax rates within industries and firm size categories. The authors find that firms pay a median effective tax rate that is very close to the nominal rate regardless of size or industry.

on the firms revenue, costs, profits, and tax obligations and payments.

The data on firm-level management practices were collected through phone surveys of a sample of medium- and large-size firms in Ecuador.[9] As part of the WMS project, the surveys included a number of questions on the various aspects of management practices in order to capture the intricacies of good management practices in countries worldwide. The WMS was designed to explore the large and persistent productivity differences between firms observed on multiple levels (e.g., within and between countries or within sectors in a country) and sought to identify the role management practices may play in such productivity differences (Bloom et al., 2016).

Managers of manufacturing firms were surveyed on the following four aspects of managerial practices: (1) operations, (2) monitoring, (3) people, and (4) targets.[10] Operations captures the firm's optimization capacity in the production lines and the value added generation. Monitoring captures how well firms' performance monitoring systems inform day-to-day operations. People refers to the firms' ability to attract and manage human capital. Lastly, targets refer to a measure of how tightly firms' targets are linked to the companies' wider objectives.

Individual firms' management scores are derived from the average scores of the four aspects. As with the overall score, the scores assigned for each of the four aspects range from 1 to 5, with 1 reflecting the poorest management practice in relation to an aspect and 5 the best.

In addition to management practices, the survey collected a wide range of information on firms' characteristics, such as firm size, firm's age, number of direct competitor firms in the market, and on managers, workers, and employment benefits. This information is potentially useful for the study of the determinants of managerial practices.

In Ecuador, 126 medium- and large-size in the manufacturing sector were surveyed. Of

[9] In addition, the project collected data for Bolivia and Perú.

[10] Please refer to Bloom and Van Reenen (2007) for a more detailed description of the survey methodology. A detailed review of WMS results on management practices in the Andean region is presented by Beverinotti et al. (2020).

these, we were able to obtain complete data set on management practices and finances for 100 firms. The lack of complete information is due to firms' lack of response about certain topics, such as the level of education of nonmanagers and share of output exported, and because of the presence of unprofitable or loss-making firms, which report that their costs are greater than their revenues. Because earnings before taxes are negative, the effective tax rate for these firms is zero. We therefore exclude unprofitable firms from the analysis; doing so is common in the literature as loss-making firms are considered less tax responsive in general (Belz et al., 2017).

Table 3.1 presents the descriptive statistics for the variables considered in this study. In particular, given the study's objective, we present information on effective tax rates, measured as the ratio of tax obligations to profits, management scores, and a variety of firms' and managers' characteristics.

Table 3.1. Descriptive statistics

Variable	***N***	**Mean**	**Std. Dev.**	**Min**	**Max**
Effective tax rate (%)	100	30.005	29.517	15.186	263.345
log(effective tax rate)	100	3.242	0.458	2.720	5.574
Management practice score	100	2.918	0.559	1.611	4.333
Operations score	100	3.395	0.925	1.000	5.000
Monitoring score	100	3.190	0.740	1.600	5.000
Targets score	100	2.930	0.673	1.600	4.800
People score	100	2.522	0.587	1.167	4.167
Firm size	100	219.420	246.142	49.000	1500.000
log(firm size)	100	4.985	0.854	3.892	7.313
# of competitors	100	6.210	3.230	0.000	10.000
Share of output exported	100	11.660	20.688	0.000	100.000
Multinational firm (D)	100	0.080	0.273	0.000	1.000
Uses fiscal incentives (D)	100	0.300	0.461	0.000	1.000
Share of nonmanagers with college degree	100	0.154	0.207	0.000	1.000
Union (D)	100	0.100	0.302	0.000	1.000

Source: Authors' calculations.

Note: D stands for dummy variable. Log is to base e.

The descriptive statistics in Table 3.1 indicate that, on average, medium- and large-size manufacturing firms in Ecuador pay about 30.0% of their profits in taxes. Furthermore, the average management practice score for our sample of medium- and large-size firms is 2.92.

Within management practices, firms scored the highest on the operations aspect, with a mean of 3.39, and the lowest on the people aspect, with a mean of 2.5. The average number of employees in the firms in our sample is 219.

Turning to the firms' environment, organizational structure, and finances, we find that the average number of direct competitors in Ecuador's manufacturing sector is 6. The average share of output exported is 11.7%, indicating that the majority of the firms produce and trade in the domestic market. Around 8% of firms in our sample are multinationals. Furthermore, when examining the proportion of firms that use fiscal incentives, we find that 30% of medium- and large-size firms in our sample made use of some type of fiscal incentives. As previously mentioned, fiscal incentives are understood in this research as spending or performing other actions that can be deducted from firms' gross earnings, thus reducing tax obligations and effective tax rates.

We then consider workers' characteristics and human capital. On average, we find that around 15.4% of nonmanagers in medium- and large-size firms in Ecuador hold a university degree. In addition, we find that around 10% of the firms in our sample have a labor union or have unionized workers.

In the following section, we explore management practices and the individual management aspects in further detail.

4 Management Practices in Ecuador

To better understand management practices in manufacturing firms in Ecuador, in this section we provide an exploratory analysis of management practices and their different aspects and the relationship between management practices and effective tax rates.

We start by exploring the distribution of management practice scores, presented in Figure 4.1. This figure shows a concentration of management practice scores around 3, and the bell-shaped figure indicates that the distribution of management practice scores is normal.[11]

[11]Note that management practice scores, as well as scores for each of the components, are average scores

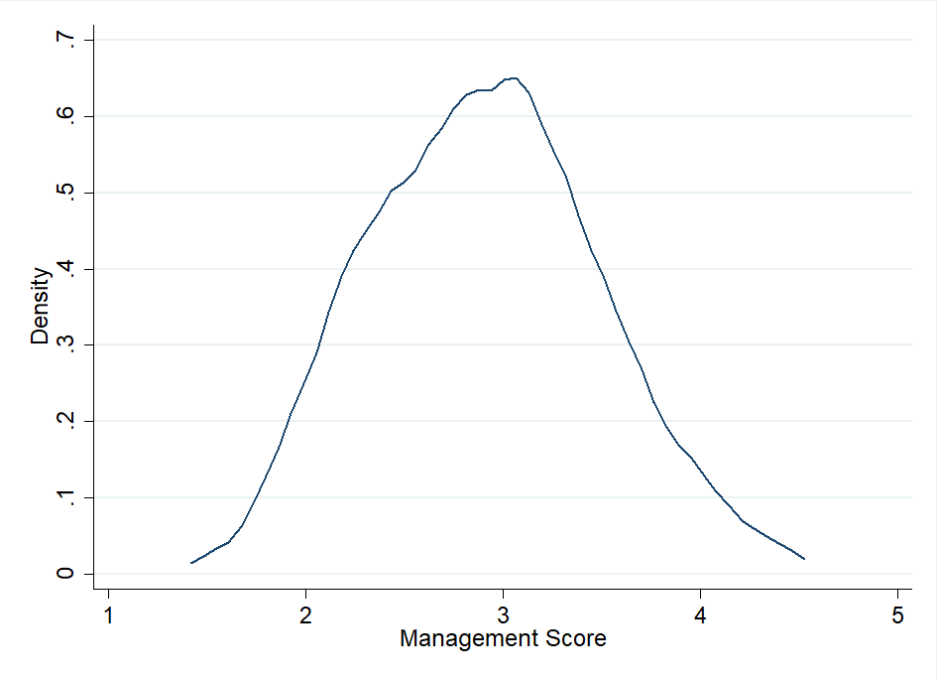

Fig 4.1. Management practice score distribution

We also explore the distribution of scores for each of the four subcategories, which are presented in the histograms below. When analyzing these figures, the distribution of the operations score seems to be more concentrated in the right tail of the distribution than the other subcategories of management practices, as shown in Figure 4.2. In addition, Figure 4.3 appears the be the weakest area for manufacturing firms in Ecuador, while Figures 4.4 and 4.5 both show a high concentration of scores in the middle of the distribution.

of different indicators within each dimension. Because of this, they are continuous variables that range from 1 to 5.

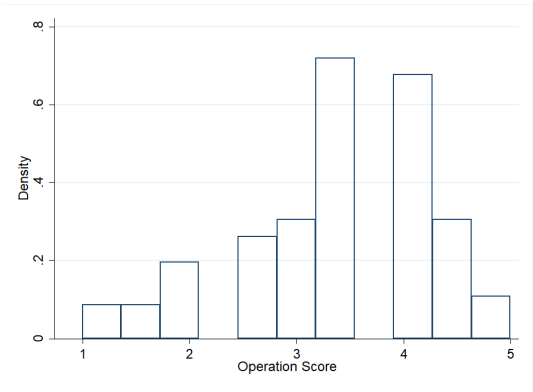

Fig 4.2. Operations score

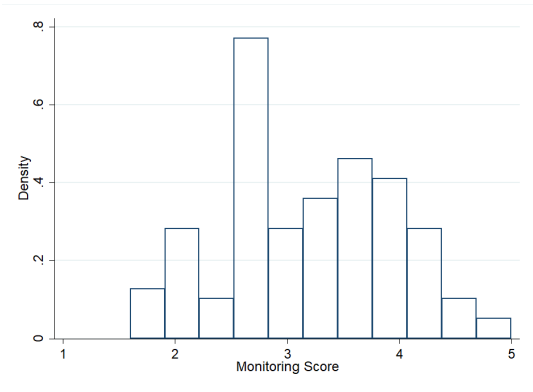

Fig 4.3. Monitoring score

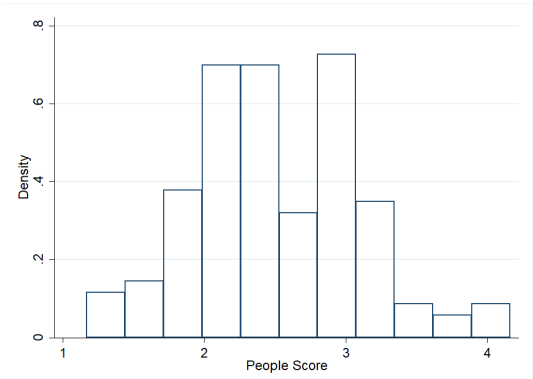

Fig 4.4. People score

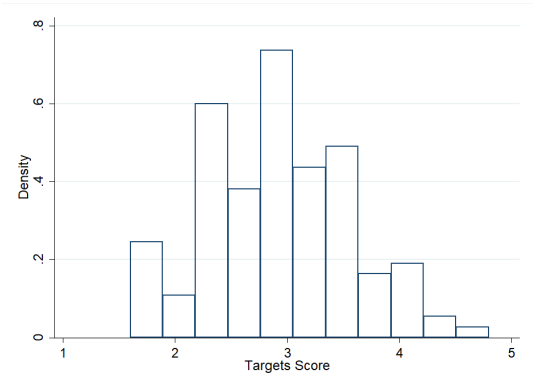

Fig 4.5. Targets score

Finally, we explore the relationship between management practice scores and earnings before taxes graphically. Figure 4.6 shows the relationship between management practice scores and earnings before taxes (profits). From this figure, we observe a positive relationship between management score and earnings before taxes. This indicates that as management practices improve, a firm's profit increases. Figure 4.7, on the other hand, shows the relationship between effective tax rates and management practice score. From this figure, we can see that there appears to be a positive relationship between the two variables. This indicates that as management practices improve, a firm tends to pay higher effective tax rates.

Overall, this exploratory analysis suggests that better management practices improve firms' performance and profits, increasing tax payments in greater magnitude than profits across all levels of management practices. The exception are firms at the highest level of management practices, where the increase in profits outweighs the rise in taxes, due to a more intensive use of fiscal incentives at this level, as well as higher profits redistributed to

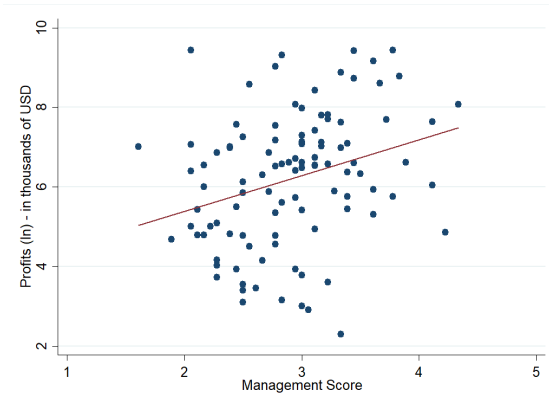

Fig 4.6. Management & profits

Fig 4.7. Management & effective tax rates

employees under the law; all that ultimately erodes the taxable profits for these firms.

5 Empirical Framework

To explore the impact of better management practices on effective tax rates (ETR), we start by considering a modified production function that incorporates management practices[12]

$$Q = f(K, L, M), \tag{1}$$

where Q is output produced, M denotes management practices adopted by the firm, and K and L denote capital and labor inputs, respectively. The profit function of a representative firm is then represented by

$$\pi(P, K, L, M) = P * Q(K, L, M) - C(K, L, M), \tag{2}$$

where profit is the difference between a firm's revenue and costs. Firm's revenue is given by $P * Q$, where P are the price of the output sold and Q is the firm's production level. The firm's cost function, $C()$, depends on the levels of K, L, and M used by the firm.

[12] Bloom and Van Reenen (2007) explore the firm's decision to adopt management practices under profit maximization using a production function that includes management practices.

We then define effective tax rates (ETR) as the ratio of tax obligation (tax) to profits[13] as

$$ETR = \frac{tax}{\pi} = f(P, K, L, M, FI). \tag{3}$$

In Equation 3, ETR is a function of the price of output sold (P) and inputs K and L, as well as management practices (M). We add the use of fiscal incentives, denoted by (FI), which affect tax obligations (tax).

It is important to note that a wide range of definitions of effective tax rates (ETR) has been used in the literature. In the context of our study, we define ETR as the ratio of tax obligations to profits because of its clear interpretation. This measure allows us to capture some of the fiscal incentives that firms are able to use according to the Ecuadorian tax structure that could reduce the firm's tax obligation. While this measure depends on a specific country's accounting rules and regulations, it can be used to compare ETRs across countries with differing statutory taxes and rates and tax bases (Delgado et al., 2018).

To estimate ETR from Equation 3, we assume a functional form linear in parameters such as

$$y_i = \alpha + \beta_1 M_i + \beta_2 F_i + \beta_3 M_i F_i +_i X_i + \epsilon_i \tag{4}$$

where y_i is the natural logarithm of ETR defined as the tax obligations of firm i as a share of profits and M_i is the management practice score of firm i.[14] We include a number of proxies for the price of output sold, P, and inputs, K and L, as well as other controls to capture firm heterogeneity. These are included in the matrix, X_i. X_i includes the number of direct competitors, number of firm's employees, firm's age, a dummy variable equal to 1 if the firm is multinational, the share of output exported, a dummy variable equal to 1 if workers

[13] Note that this is not taxable profit, as shown in Figure 2.1.

[14] The decision to consider the dependent variable in logarithmic terms was made based on an exploration of the distribution of tax obligations and the linear in parameters assumption of Equation 4.

in the firm have a union, and the share of nonmanagers with college degrees, which seeks to quantify the quality of human capital of the firm. In addition, F_i is a dummy variable equal to 1 if the firm reported using fiscal incentives. This variable allows us to explore the impact of the use of fiscal incentives on effective tax rates. $M_i F_i$ is an interaction term between management practice score and the use of fiscal incentives, allowing us to capture the differential impacts of management practices on ETRs for firms that use fiscal incentives versus those that do not. Finally, ϵ_i is an error term that captures idiosyncratic effects that the researchers have not observed.

It should be noted that absent an experimental design and longitudinal data, our results should be interpreted with care. The parameter estimates from Equation 4 are likely associations rather than causal effects. Specifically, management practices may influence firm productivity, but more-productive firms may choose better management practices. Nevertheless, our study provides novel estimations of the strong association between management practices and effective tax rates.

6 Results

To explore the relationship between management practices and effective tax rates we estimate equation 4 using the method of least squares. The results of different models for this equation are presented in this section. All reported standard errors are robust to various forms of heteroskedasticity.

In addition to the main results, we present several robustness checks, which include investigating the results using the following two alternative measures of effective tax rates: (1) ETR defined as the ratio of tax to be paid (*impuesto a pagar*) to profits, and (2) ETR defined as the tax paid (*impuesto pagado*) as a share of profits. Finally, using our model results, we simulate the impact of better management practices on ETR for firms that do and do not use fiscal incentives to further illustrate the impact of management practices on

ETRs.

6.1 Effective Tax Rates and Management Practices

Table 6.1 presents the results for different specifications of Equation 4 in Section 5. For all of the regressions presented in Table 6.1, the dependent variable is the natural logarithm of effective tax rates, defined as tax obligation (*impuesto causado*) as a share of profits.[15]

The results presented in Table 6.1 indicate a positive and statistically significant relationship between management practice scores and effective tax rates for the sample of medium- and large-size firms in Ecuador's manufacturing sector. Notably, this association is robust under various specifications controlling for different covariates.

Turning to the results on fiscal incentives and ETRs, our results show that firms that use any fiscal incentive tend to pay higher effective tax rates compared to firms that do not. However, in our sample, firms that choose to utilize fiscal incentives tend to have higher profits and revenues and to vary along other characteristics such as firm size (see Table A3 in the appendix for further comparison).[16] Without the use of fiscal incentives, their ETR likely would have been higher. Thus, firms appear to choose fiscal incentives to reduce their tax payments.

Furthermore, the estimated parameter for the interaction term between the use of fiscal incentives and management practices suggests that firms that use fiscal incentives are able to smooth or reduce their effective tax rates as they improve their management practices. This result could be explained partly by the firms' acquiring greater talent or knowledge to understand and use the fiscal incentives available to them. For instance, even though all firms are entitled to deductions and income exemptions, other incentives such as reinvestment of

[15]The regression results when using the effective tax rate in levels, that is, not using a logarithm transformation, are consistent with the results in this section and are presented in the appendix of this study. However, the log was chosen to better meet the linear in parameters assumption.

[16]Similar studies find that fiscal incentives are positively associated with firms' performance. For instance, a study that examines the use of fiscal incentives in manufacturing firms in Uganda finds that tax incentives positively impact gross sales and value-added measures of firms' performance (Mayende, 2013). Therefore, our findings are consistent with other studies.

Table 6.1. Regression results

Dependent variable: Tax obl./profits (ln)	**(1)**	**(2)**	**(3)**	**(4)**
Management practice score	0.150*	0.220***	0.204***	0.273***
	(0.0781)	(0.0759)	(0.0746)	(0.103)
Incentives (dummy)				0.733*
(=1 if the firm uses fiscal incentives)				(0.407)
Incentive*management				-0.223*
				(0.130)
Firm size (ln)	-0.0865	-0.104*	-0.0922*	-0.0892*
	(0.0578)	(0.0541)	(0.0497)	(0.0518)
Share of output exported	-0.00317**	-0.00365***	-0.00342**	-0.00351*
	(0.00133)	(0.00133)	(0.00138)	(0.00182)
Share of nonmanagers with college degree		-0.659***	-0.644***	-0.649***
		(0.192)	(0.187)	(0.199)
No. of competitors			0.0107	0.0143
			(0.0125)	(0.0129)
Union (dummy)				-0.154
(=1 if firm has unionized workers)				(0.0933)
Multinational firm (dummy)				-0.0741
(=1 if firm is an MNE)				(0.136)
Constant	3.273***	3.263***	3.180***	2.947***
	(0.252)	(0.244)	(0.228)	(0.257)
Observations	100	100	100	100
R-squared	0.064	0.146	0.151	0.177

Note: Robust standard errors in parentheses.
*** p <0.01, ** p < 0.05, * p < 0.1

profits *(reinversión de utilidades)* are a benefit mostly used by firms with higher capital expenditures and investment plans.

Regarding firms' characteristics, the firm's size is negatively related to tax obligations, measured by the log of the number of workers in the firm. This result suggests that as manufacturing firms expand, they tend to pay lower effective tax rates in Ecuador. This result is aligned with the evidence presented by other studies focusing on emergent economies favoring the political power theory that argues a negative relationship between ETR and firm size (Kim and Limpaphayom, 1998; Mascagni and Mengistu, 2019).[17] Furthermore,

[17]Studies such as Zimmerman (1983), and Omer et al. (1993) have explored the relationship between firm size and ETR for firms in the US, providing evidence of a positive relationship. The explanation provided in the literature for this result is that large U.S. firms suffer a sort of "political cost", as they are subjected to larger public visibility and government scrutiny. These explanations are based under the views of the political cost theory (Belz et al., 2019).

this result can partly be explained by the intrinsic characteristics of Ecuador's tax structure. In particular, the country's tax regulations mandate that firms are instructed to distribute a proportion of their profits *(utilidades líquidas)* to their employees. In that sense, larger firms are usually more formal, which implies that their workers are also more likely to be formal and thus be subject to the labor regulations' benefits. With this, larger firms can reduce their tax obligations by a greater amount by redistributing their profits to their employees, and through this, pay lower effective tax rates.

In addition to the results presented above, we find a negative association between the share of output exported and effective tax rates. This result is statistically significant at all conventional levels and suggests that firms that export higher levels of their total production can reduce their effective tax rates. On the basis of similar results, we find a negative relationship between multinational firms and the effective tax rate. Both of these findings on exports and the multinational structure are likely due to larger, international firms' ability to gain beneficial tax treatment. An increasing number of studies analyze multinational firms' tax planning behavior and find evidence that multinational firms tend to divert benefits to lower-tax jurisdictions for reporting to lower their tax payments (Bilicka and Scur, 2020).

Finally, turning to human capital, we find that nonmanagers with college degrees are negatively related to effective tax rates. This could reflect higher levels of efficiency, knowledge, and expertise when filing taxes on the part of employees in positions related to administration and tax filing. Workers in these positions without a college degree could have less experience or be less efficient, and this inefficiency could translate into higher tax obligations, at least partially.

6.2 Robustness Checks

One question that may arise in the context of our study is whether tax obligations are properly capturing the effective tax amount paid by firms. To explore this topic, we run a series of regressions with alternative definitions of effective tax rates. In particular, we

consider two sets of regressions. The first defines effective tax rate as tax to be paid *(impuesto a pagar)* as a share of profits, and the second defines effective tax rate as tax paid at the end of the fiscal year *(impuesto pagado)* as a share of profits. In the first case, taxes to be paid capture the amount of tax that firms owe the government after all the advancements, withholding, and tax credits during the fiscal year are accounted for. The second measure adds interest and fines to the tax to be paid by the company during the fiscal year. The following section presents the results obtained by using these two different definitions of effective tax rates.

6.2.1 *Defining effective tax rates using taxes to be paid*

Table 6.2 presents the results of an alternative specification using the definition of effective tax rates as the ratio of taxes to be paid to profits.[18]

In general, the findings are consistent with our main results and indicate that better management practices are positively associated with higher levels of effective tax rates of manufacturing firms in Ecuador. This result is robust even after controlling for a set of different covariates. None of them were statistically significant at conventional significance levels regarding other firms' characteristics used as covariates. Despite this, the signs of the estimated parameters remain consistent with the evidence presented previously. In particular, while the use of fiscal incentives and the interaction terms between the use of fiscal incentives and management practice scores are not statistically significant, the signs provide evidence of the same relationship with ETR.

6.2.2 *Defining effective tax rates using paid taxes*

Table 6.3 below presents the results of an alternative specification that uses the logarithm of effective tax rates defined as paid taxes as a share of profits, which is the dependent variable

[18]Several firms reported paying zero taxes. To include these firms in our estimation, we imputed for these zeroes the average value of the first percentile of tax payments in the sample of firms reporting positive tax payments.

Table 6.2. Regression results with taxes to be paid

Dependent variable: Tax to be paid/profits (ln)	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Management practice score	0.601*	0.616*	0.638*	0.607*	0.662*	0.944**
	(0.330)	(0.328)	(0.339)	(0.353)	(0.366)	(0.444)
Incentives (dummy)						2.750
(=1 if the firm uses fiscal incentives)						(2.266)
Incentive * management						-0.916
						(0.749)
Share of managers with college degree		0.130	0.0717	0.0527	0.118	0.121
		(0.467)	(0.479)	(0.487)	(0.503)	(0.519)
Manager's age		0.00272	0.00203	0.00146	0.00573	0.00436
		(0.0167)	(0.0171)	(0.0172)	(0.0169)	(0.0172)
Manager's gender (dummy)		0.251	0.253	0.257	0.289	0.334
(=1 if the manager is a male)		(0.571)	(0.573)	(0.568)	(0.575)	(0.512)
Union (dummy)					-1.028*	-1.010
(=1 if firm has unionized workers)					(0.583)	(0.639)
No. of competitors			-0.0236	-0.0195	-0.0227	-0.0125
			(0.0620)	(0.0627)	(0.0624)	(0.0626)
Share of output exported				0.00390	0.00379	0.00381
				(0.00998)	(0.0101)	(0.0115)
Managers' turnover rate					-0.484	-0.470
in previous year					(0.697)	(0.733)
Constant	-2.304**	-2.771**	-2.618*	-2.562*	-2.817**	-3.674**
	(0.941)	(1.301)	(1.374)	(1.390)	(1.398)	(1.506)
Observations	100	99	99	99	99	99
R-squared	0.032	0.039	0.040	0.042	0.072	0.087

Note: Robust standard errors in parentheses.
*** p < 0.01, ** p < 0.05, * p < 0.1

in the regressions. The results obtained when using this alternative definition of effective tax rates are consistent with the previous results presented in this study. There is a strong positive association between better management practices and effective tax rates, even after controlling for a set of different covariates. However, the use of fiscal incentives is no longer statistically significant at conventional significant levels in these sets of regressions, albeit the signs are consistent with our main results.

Regarding other firms' characteristics, in this set of regressions we observe that firm size is negatively associated with ETR. This result is statistically significant at conventional levels. In addition, family-owned firms show a negative association with effective tax rates when defined as the share of paid taxes to profits. These results suggest that in our sample of medium- and large-size firms in the manufacturing sector in Ecuador, family-owned firms appear to be more tax aggressive than their counterparts. This result is consistent with the evidence provided by other studies. For instance, Gaaya et al. (2017) provide evidence that

Table 6.3. Regression Results with Paid Taxes

Dependent variable: Paid Tax/profits (ln)	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Management score	0.934***	1.009***	1.079***	1.026***	1.033***	1.168**
	(0.344)	(0.364)	(0.374)	(0.371)	(0.357)	(0.468)
Incentives (dummy)						1.671
(=1 if the firm uses fiscal incentives)						(2.078)
Incentive*management						-0.457
						(0.675)
Firm Size (ln)	-0.822**	-0.849**	-0.894**	-0.768*	-0.726*	-0.820*
	(0.401)	(0.424)	(0.420)	(0.421)	(0.424)	(0.433)
Share of managers with college degree		-0.0897	-0.228	-0.356	-0.345	-0.390
		(0.516)	(0.546)	(0.531)	(0.520)	(0.535)
Manager's age		0.00967	0.00853	0.0107	0.0148	0.0141
		(0.0179)	(0.0182)	(0.0181)	(0.0181)	(0.0182)
Manager's Gender (dummy)		0.741	0.742	0.605	0.606	0.669
(=1 if the manager is a male)		(0.612)	(0.617)	(0.584)	(0.581)	(0.543)
No. of competitors			-0.0591	-0.0594	-0.0591	-0.0491
			(0.0616)	(0.0603)	(0.0608)	(0.0613)
Family owned (dummy)				-0.746*	-0.813*	-0.764*
(=1 if the firm is owned by a family)				(0.439)	(0.457)	(0.456)
Union (dummy)					-1.121*	-1.190*
(=1 if firm has unionized workers)					(0.638)	(0.670)
Constant	-2.412**	-3.640**	-3.295**	-2.882*	-2.999**	-3.480**
	(0.966)	(1.481)	(1.553)	(1.543)	(1.486)	(1.710)
Observations	100	99	99	99	99	99
R-squared	0.082	0.102	0.110	0.138	0.167	0.174

Note: Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

family-owned firms tend to engage more in tax avoidance practices in Tunisia. Annuar et al. (2014) provide similar results for Malaysian listed companies.

Finally, unionized workers appear to be negatively associated with effective tax rates. This result could reflect the power that unions can exercise over firms to obtain the legal benefits as set forth by the labor regulations. One such benefit is the redistribution of profits to workers; the Ecuadorian tax structure incentivizes firms to provide this benefit by linking it to a reduction in their effective tax rate.

6.3 Simulations

The key results show that firms with better management practices pay higher effective tax rates. However, the relationship between management practices and tax rates depends on the use of fiscal incentives. In general, firms with low management practice scores face

higher tax rates if they use fiscal incentives. However, as firms utilizing fiscal incentives adopt better management practices, it appears they are able to direct better management towards improve tax planning and ultimately smooth or reduce their tax rates compared to firms with similar management practice scores that choose to not use fiscal incentives.

Governments may seek to provide technical assistance to firms to help them improve their management practices. It may be the case that the increased tax revenues associated with such technical assistance programs offset the costs of the program. In this context, it is worth exploring whether promoting better management practices could still be beneficial for tax collection even when fiscal incentives exist. To understand this, we simulate effective tax rates for firms that do and do not use fiscal incentives based on the model parameters from our main results. Specifically, we use the coefficients from the regression presented in column 4 of Table 6.1 and simulate management practice scores ranging from 1 to 5 (lowest to highest), while holding all other values at their means to predict the effective tax rate at the various levels of management practices.[19] The results of the simulation are presented in Table 6.4 below:

Table 6.4. Simulation results

	Simulated ETRs		
Management scores	**Firms that don't use FI**	**Firms that use FI**	**Difference**
1	27.99%	16.81%	11.18%
2	29.44%	22.08%	7.36%
3	30.96%	29.01%	1.95%
4	32.56%	38.11%	-5.56%
5	34.24%	50.07%	-15.84%

The simulation results show that effective tax rates increase with higher management practice scores for both categories of firms. Firms that use fiscal incentives pay higher taxes at lower management practice levels. However, after a management practice score of 3, firms that use fiscal incentives pay lower effective tax rates than firms that do not use

[19]The original model is log-linear, but we simulate the predictive effective tax rate in levels using exponential transformation and Duan's smearing estimator (Duan, 1983).

fiscal incentives. This relationship can also be seen in Figure 6.1. The orange line shows the predicted effective tax rates for firms that use fiscal incentives at different management practice scores. As in the previous discussions of this study's results, it appears that better managed firms that use fiscal incentives are able to reduce their tax rates compared to firms that do not use fiscal incentives.

Fig 6.1. Simulation results

In addition, we add the blue line in the figure to represent the nominal tax rate. In all these cases, effective tax rates are much higher than nominal tax rates, except for firms with the lowest management practice scores that do not use fiscal incentives. These results suggest that the promotion of better management practices in Ecuador could increase government revenue. Depending on the program costs, a technical assistance program could prove cost-effective, covering the costs of administration and improving firm productivity and profits.

7 Conclusion

In this study, we explore the effects of better management practices on effective tax rates in a sample of medium- and large-size manufacturing firms in Ecuador. To do so, we use a novel data set on management practices collected by the IADB and the Center for Economic

Performance as part of the WMS initiative in the years 2018 and 2019. These data were combined with administrative tax data from the Superintendence of Companies and the IRS of Ecuador.

We examine the impact of management practice scores on effective tax rates within a regression framework that applies the method of least squares. Our findings indicate that better management practices are strongly associated with higher effective tax rates in our sample. These results are robust to various specifications controlling for different covariates and to the use of different measures of effective tax rates: (1) ETR defined as the ratio of tax to be paid (*impuesto a pagar*) to profits, and (2) ETR defined as the tax paid (*impuesto pagado*) as a share of profits. The study documents a strong positive correlation between management practices and effective tax rates. Other variables were also found to be associated with effective tax rates. In particular, the firm's characteristics, such as firm size, share of output exported, and multinational status were negatively related to effective tax rates.

In this study, we also analyze the relationship between fiscal incentives and ETR. Our results suggest that firms that use any fiscal incentives tend to pay higher effective tax rates. However, they also show that firms that use fiscal incentives are able to smooth or reduce their effective tax rates as they improve their management practices. To better illustrate this finding, we simulate effective tax rates for firms that do and do not use fiscal incentives based on the model parameters from our main results. The simulation results indicate that effective tax rates show a positive relationship between ETR and management practice scores for both firms that do not use fiscal incentives. In particular, we find that firms that use fiscal incentives pay higher taxes at lower management practice score levels. However, beyond a management practice score of 3, firms that use fiscal incentives pay lower effective rates than firms that do not use fiscal incentives.

From a policy perspective, our results indicate that government-sponsored programs that provide technical assistance to improve firms' management practices could have societal

gains. The additional revenue that could be obtained through better management practices could be used to sponsor and fund these programs. Additionally, better management practices can lead to productivity gains, laying the foundations for economic expansion and job generation, thus ultimately leading to a better standard of living. More research needs to be done in this area to understand whether this positive relationship between management practices and effective tax rates can be observed in the nonmanufacturing sectors in Ecuador and in all sectors in other countries.

References

Annuar, H. A., Salihu, I. A., and Obid, S. N. S. (2014). Corporate ownership, governance and tax avoidance: An interactive effects. *Procedia-Social and Behavioral Sciences*, 164:150–160.

Belz, T., von Hagen, D., and Steffens, C. (2017). R&D intensity and the effective tax rate: A meta-regression analysis. *Journal of Economic Surveys*, 31(4):988–1010.

Belz, T., von Hagen, D., and Steffens, C. (2019). Taxes and firm size: Political cost or political power? *Journal of Accounting Literature*, 42:1–28.

Beverinotti, J., Canavire-Bacarreza, G., and Puerta, A. (2020). Prácticas gerenciales en la región andina.

Bilicka, K. and Scur, D. (2020). Organizational capacity and profit shifting. In *112th Annual Conference on Taxation*. National Tax Association.

Bloom, N., Lemos, R., Sadun, R., Scur, D., and Van Reenen, J. (2014). Jeea-fbbva lecture 2013: The new empirical economics of management. *Journal of the European Economic Association*, 12(4):835–876.

Bloom, N., Lemos, R., Sadun, R., Scur, D., and Van Reenen, J. (2016). International data on measuring management practices. *American Economic Review*, 106(5):152–156.

Bloom, N. and Van Reenen, J. (2007). Measuring and explaining management practices

across firms and countries. *The Quarterly Journal of Economics*, 122(4):1351–1408.

Broszeit, S., Laible, M.-C., Fritsch, U., and Görg, H. (2019). Management practices and productivity in Germany. *German Economic Review*, 20(4):e657–e705.

Delgado, F., Fernandez-Rodrıguez, E., and Martınez-Arias, A. (2018). Corporation effective tax rates and company size: Evidence from Germany. *Economic research-Ekonomska istraživanja*, 31(1):2081–2099.

Deza, M. C., Carrillo-Maldonado, P., and Ruiz-Arranz, M. (2020). Imposición efectiva a las empresas en ecuador. *X-pedientes Económicos*, 4(9):6–30.

Duan, N. (1983). Smearing estimate: A nonparametric retransformation method. *Journal of the American Statistical Association*, 78(383):605–610.

Gaaya, S., Lakhal, N., and Lakhal, F. (2017). Does family ownership reduce corporate tax avoidance? The moderating effect of audit quality. *Managerial Auditing Journal*.

Hsieh, C.-T. and Klenow, P. (2009). Missallocation and manufacturing in TFP in China and India. *Quaterly Journal of Economics*, CXXIV(4).

Kim, K. A. and Limpaphayom, P. (1998). Taxes and firm size in pacific-basin emerging economies. *Journal of International Accounting, Auditing and Taxation*, 7(1):47–68.

Lemos, R. and Scur, D. (2014). Management practices in manufacturing in Mozambique. *London: International Growth Center*.

Mascagni, G. and Mengistu, A. (2019). Effective tax rates and firm size in Ethiopia. *Development Policy Review*, 37:O248–O273.

Mayende, S. (2013). The effects of tax incentives on firm performance: Evidence from Uganda. *Journal of Politics and Law*, 6:95.

OECD (2020). *Revenue Statistics in Latin America and the Caribbean 2020 - Ecuador*. Paris: OECD Publishing.

Omer, T. C., Molloy, K. H., and Ziebart, D. A. (1993). An investigation of the firm size—effective tax rate relation in the 1980s. *Journal of Accounting, Auditing & Finance*, 8(2):167–182.

World Bank (2018). *Ecuador Systematic Country Diagnostic*. Washington, DC: World Bank.

Zimmerman, J. L. (1983). Taxes and firm size. *Journal of Accounting and Economics*, 5:119–149.

Appendix

Table A1. List of variables

Variable	Definition
Management practice score	Ranks from 1 to 5, representing worst to best management practices.
Incentives	Dummy variable that takes the value of 1 if the firm uses fiscal incentives and 0 otherwise.
Incentive * management	Interaction dummy between the dummy variable that captures the use of fiscal incentives and the management practice score of the firm.
Firm size (ln)	Captures the number of workers in the firm.
Share of output exported	ratio of exported production to total production.
Family owned	Dummy variable that takes the value of 1 if the firm is owned by a family and zero otherwise.
Share of nonmanagers with college degree	Ratio of number of nonmanagers with college degree to total number of nonmanagers.
Share of managers with college degree	ratio of number of managers with college degree to total number of managers.
Number of competitors	Number of direct competitors of the firm.
Union	Dummy variable that takes the value of 1 if the firm has unionized workers and 0 otherwise.
Multinational Firm	Dummy variable that takes the value of 1 if the firm is a multinational firm and 0 otherwise.
Manager's age	Age of the firm's manager in years.
Manager's gender	Dummy variable that takes the value of 1 if the manager is male and 0 if female.
Managers' turnover rate in the previous year	Share of managers who left the firm in the year previous to the survey.

Table A2. Regression results with dependent variable in levels

Dependent variable: Tax obl./profits (%)	**(1)**	**(2)**	**(3)**	**(4)**
Management practice score	7.395*	10.52**	9.128**	14.02**
	(3.843)	(4.586)	(3.783)	(5.889)
Incentives (dummy)				43.45**
(=1 if the firm uses fiscal incentives)				(21.21)
Incentive * management				-14.12**
				(7.022)
Firm size (ln)	-5.808	-6.594*	-5.582*	-5.528*
	(3.634)	(3.764)	(3.049)	(3.087)
Share of output exported	-0.0969*	-0.118**	-0.0990	-0.0647
	(0.0521)	(0.0560)	(0.0615)	(0.0928)
Share of non-managers with college degree		-29.24**	-27.97**	-29.21**
		(12.64)	(11.67)	(12.93)
No. of competitors			0.906	1.064
			(0.812)	(0.832)
Union (dummy)				-5.718
(=1 if firm has unionized workers)				(3.737)
Multinational firm (dummy)				-7.233
(=1 if firm is a MNE)				(6.887)
Constant	38.51***	38.06***	31.03***	16.32
	(13.15)	(12.98)	(9.672)	(10.10)
Observations	100	100	100	100
R-squared	0.039	0.078	0.087	0.106

Note: Robust standard errors in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table A3. Characteristics of firms by use of fiscal incentives

	Firms that don't use fiscal incentives	**Firms that use fiscal incentives**
Management score practice	2.86	3.04
Managers' characteristics		
Age	46.28	48.27
Male	88.57	86.67
Tenure (years)	14.94	14.97
Post-tenure (years)	9.87	9.00
Firms' characteristics		
Number of competitors	6.61	5.27
Firm's age	36.49	43.27
Plant's age	30.10	40.57
Number of workers in firm	185.99	297.43
Number of workers in plant	112.06	173.83
% of production exported	6.29	24.20
Owned by founder	44.29	26.67
Owned by 2nd generation of family	28.57	30.00
Owned by private individuals	11.43	16.67
Other type of ownership	15.71	26.67
Share of firms with unionized workers	5.71	20.00
Workers' Characteristics		
Share of managers with college degree (%)	65.49	88.10
Share of nonmanagers with college degree (%)	14.97	16.43
Share of female managers (%)	15.11	21.72
Share of female nonmanagers (%)	25.40	19.63