The capacity to be aggressive: structured management and profit shifting practices in the firm

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This draft: November 2019

[Latest version]

Abstract

This paper considers the effect of firm's organizational capacity – proxied by structured management practices - on tax planning behavior of multinational firms (MNEs). Management practices improve productivity and hence should increase taxable corporate income of firms. However, better managed firms may also be better at tax avoidance. We show that MNEs operating in a high-tax countries exhibit a negative relationship between reported profits and structured management practices, while the opposite relationship exists for MNEs operating in low-tax countries. These patterns are consistent with better managed firms shifting profits out of high-tax locations into low-tax locations. This adds a novel explanation for why some firms are more likely to engage in aggressive tax planning, with implications to the cost-benefit analysis of government-funded management upgrading projects.[1]

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[1]We would like to thank Michael Deveruex, Maria Guadalupe and Andre Seidel for their comments on a preliminary version of this paper. Further thanks to the participants of International Institute of Public Finance Annual Congress and European Economic Association Congress for their helpful suggestions. We gratefully acknowledge funding from the Cornell Centre for Social Sciences.

1 Introduction

The revelations from Panama and Paradise papers exposed a sizable amount of international tax avoidance by firms, and in particular multinational enterprises (MNEs). Despite a multilateral effort to curb such practices, the extent of profit shifting has been increasing over time (Clausing [2016], OECD [2017]).[2] While recent evidence suggests that the size of profit shifting is substantial [Torslov et al., 2018], we still have much to understand about the types of firms that are the largest profit-shifters, and what drives and enables them. Bilicka [2019] finds that there are no observable differences between aggressive tax avoiders and non-aggressive firms, attributing these differences to the unobservable propensity of a firm to be an aggressive tax avoider.

In this paper we explore the relationship between organizational capacity and firms' propensity to engage in profit shifting, proposing a novel explanation for the observed difference in firms' propensity to legally avoid paying corporate taxes. We measure organizational capacity by the level of adoption of structured management practices. As higher adoption of structured management practices improves productivity (Bloom et al. [2013, 2014]), in principle this higher productivity should also increase firm revenues and thus their taxable corporate income. However, firms adopting these more structured management practices could also be more effective at legally avoiding taxation. To study this, we use a unique dataset that matches structured management practices from the World Management Survey (WMS) and fifteen years of detailed firm accounts information from Bureau van Dijk's Orbis.

The profit-shifting literature has shown that it is cost-effective for large MNEs with links to tax havens to report low profits in high-tax countries [Desai et al., 2006, Dowd et al., 2017, Gumpert et al., 2016, Hines and Rice, 1994]. Firms use a variety of strategies to avoid paying corporate taxes, such as debt shifting [Desai et al., 2004, Huizinga et al., 2008], transfer pricing [Cristea and Nguyen, 2016, Davies et al., 2018] and intellectual property location [Dischinger and Riedel, 2011]. Firms adopting higher levels of structured management have more tractable and predictable production plans, which could enable firms to make more effective reallocation decisions to minimize their overall tax bill. Specifically, a firm could report high profits in low-tax countries and low profits in high-tax countries. We find evidence supporting this notion. We focus our analysis on multinational corporations (MNEs) for three reasons: first, they are able to shift profits abroad, unlike domestic firms.[3] Second, due to their international nature and size, they are a reasonably comparable group with publicly available data. Third, MNEs often span several jurisdictions, allowing us to exploit variation in tax rates across jurisdictions and time.

We start by documenting the simple relationship between the adoption of structured management practices in firms and their reported revenues, profits and taxes. We find a strong positive relationship between adoption of structured management practices and revenues at the firm level.

[2] For example, the OECD Base Erosion and Profit Shifting (BEPS) initiative was set up in 2016.

[3] In a companion paper we explore profit shifting between personal and corporate income tax bases for domestic firms.

This is in line with previous literature showing the causal relationship between management and firm productivity [Bloom et al., 2013, Giorcelli, 2019, Gosnell et al., 2016]. This relationship attenuates when we consider returns on assets (ROA) and turns negative when considering the effective tax rates (ETR) — the ratio of tax paid to profits before taxes. This suggests that firms adopting structured management on average generate higher revenues yet pay lower effective tax rates, supporting the idea that productivity-enhancing structured management may also enable firms to lower their tax bill.

To unpack these patterns, we classify firms based on the location of their operations, for every year, identifying whether they operate their production plants in low-tax or high-tax countries. We show that MNEs that operate in high-tax countries exhibit a negative relationship between reported profits and structured management practices. In contrast, we see a positive relationship for MNEs operating in low-tax countries. Further, we classify firms based on the location of their parent company and country of operation, identifying whether they are firms from high-tax *headquarter* (HQ) countries, and whether their *subsidiaries* operate in high- or low-tax countries.

In particular, we focus on MNEs headquartered in high-tax countries with incentives to relocate their profits to their low-tax subsidiaries. We find that MNEs headquartered in high-tax countries that adopt more structured management tend to report being less profitable. Further, a firm headquartered in a high-tax country reports higher profits in its low-tax subsidiaries. This is particularly pronounced in the upper range of structured management measure. We observe the opposite relationship between structured management and profitability for MNEs headquartered in low-tax countries, regardless of where their subsidiaries operate. We corroborate our main result by exploring the relationship through the lens of two different definitions of aggressive tax avoidance. First, we consider firms that report near zero returns on assets (ROA) [Bilicka, 2019, Johannesen et al., 2016]. We find there is a higher incidence of ROAs bunching around zero for firms adopting more structured management in high-tax countries than in low-tax countries. Second, we consider firms that have large disparities between their reported financial and taxable profits. We use book tax differences (BTDs) to measure the disparity [Desai, 2003, Desai and Dharmapala, 2006, 2009]. We find that aggressive tax avoiders headquartered in high-tax countries that adopt more structured management tend to report relatively higher ROA in their low-tax subsidiaries.

In all, our evidence suggests that there is a correlation between firms adopting more structured management practices and engaging in more aggressive tax planning practices. While this evidence is not causal, the patterns we uncover shed light on a new characteristic of profit shifting firms. Firms with structured management consistently locate more of their profits in low-tax countries relative to high-tax countries, minimizing their overall tax bill. This pattern is more pronounced for firms that are headquartered in high-tax countries, suggesting such management practices could be allowing for more aggressive tax planning behavior.

2 Conceptual framework

In this section we discuss the conceptual framework underpinning our empirical investigation. Let us assume that all firms have a common objective function of after-tax profit maximisation that involves production maximization and tax minimization. Reaching those goals is the objective of every manager in each affiliate, both subsidiary and HQ. In addition, the manager at the HQ is responsible for the tax planning strategy of the entire corporate group, in addition to the profit maximization of the production facility present in the headquarter location. Profit shifting, by definition, is only possible for a company with multiple affiliates across various countries. The manager at the HQ must take into account profits from their own production facility as well as subsidiary profits and tax rates across all firm locations.[4]

The HQ manager employs a tax planning strategy to maximize the after-tax profits for the whole group. Such planning is possible if its subsidiaries have tractable and predictable production — or, good *organizational capacity*. Predictability of production, such as being able to request and receive information on accurate production and profits forecasts for different subsidiaries, allows the HQ manager to plan tax liabilities accordingly. Tractability of production, such as having clear production plans with reasonable timelines enables the HQ manager to request specific changes to subsidiary production plans to fit specific target requirements. Having those figures on hand allows the HQ manager to make production targets and profit reallocation decisions between subsidiaries for the current year as well as plan for the following years.

Profit reallocation decisions take three major forms: debt shifting, transfer pricing and patent relocation. For debt shifting, a subsidiary of an MNE located in high-tax country borrows funds from a subsidiary located in low-tax country. Interest payments on this debt are deductible against taxable profits, reducing the tax liability in the high-tax country. The interest payments accrue to the subsidiary in the low-tax country, being taxed at the lower rate and reducing the overall tax liability of the MNE. For transfer pricing, a subsidiary located in high-tax country buys intermediate products from subsidiaries in low-tax countries at prices that are higher than market prices, reducing profits by increasing costs. The low-tax seller earns revenue from the sale which is taxed at lower rates. This strategy relies on mis-pricing (or, inflating) goods relative to their market value and is best achieved using goods that are difficult to price on third party markets, such as intangibles or patents. For patent relocation, MNEs can relocate their patents to low-tax subsidiaries, such that any profits earned on those patents will be taxed at lower rates. Further, royalties for the use of those patents by other subsidiaries will also be taxed at lower tax rates, while the cost of paying the royalties will be deducted against profits in high-tax countries.

The organizational capacity at the subsidiary level allows the HQ manager to use production planning in that subsidiary in the tax planning process. Consistent with a firm's objective to

[4]While a subsidiary can also be involved in tax planning decisions, we assume it is always in conjunction with the HQ as tax planning across borders — profit shifting — involves at least two entities located in different jurisdictions and requires a certain level of coordination.

minimize its overall tax bill, a tax planner will move profits away from the subsidiaries located in high-tax countries to subsidiaries located in low-tax countries. For instance, predictable income streams enable effective debt shifting. Lending to a subsidiary with a clear profit forecast allows the tax planner to predict the appropriate amount of debt to reduce the overall tax liability to near zero, but not as far as leaving the subsidiary reporting negative profits.[5] We explore whether we find patterns consistent with this conceptual framework in the data.

3 Data

3.1 Management data

To measure the level of adoption of structured management practices in a firm we use the World Management Survey, a project that has systematically collected data on the adoption of structured management practices in firms since 2004.[6] The WMS focuses on medium- and large-sized firms, drawing a random sample of firms with employment of between 50 and 5,000 workers. The WMS methodology, first described in Bloom and Van Reenen [2007], employs a double-blind, interview-based evaluating tool that defines and scores a set of 18 basic management practices on a scoring grid from one ("little/no formal management practices") to five ("best practice"). The topics covered include adoption of lean manufacturing practices, performance monitoring, target setting and people management.

We focus on the 12 topics that directly relate to operations management and exclude the questions relating to people management. We build two indices of operations management: a continuous index with the simple average across the 12 topics, and a binary indicator dividing firms into two groups based on a methodological cutoff of the practices measured. The indicator takes a value of 1 if the firm scores above 3 on the 1 to 5 scale, or having achieved a minimum level of "structured" management practices, while those with scores below 3 have, at best, an "unstructured" set of practices. The survey collects additional information on ownership and firm organization, though it does not include any financial data.

We use only the MNEs from the WMS sample. They operate in various countries including the US and the UK to Turkey and Argentina.[7] The average MNE in each of the countries in our sample has a structured management operations score between 2.95 and 3.53, suggesting the average MNEs across the countries we study are similarly well managed (Figure 1). However, there is substantial variation in the adoption of management practices across MNEs within countries (Figure 2).

[5] Firms generally avoid reporting negative profits because (i) they care about shareholder perception and thus would prefer a subsidiary not to incur losses, especially if it is in fact involved in profitable activities; (ii) too much debt could increase the likelihood of risky investments and result in potential bankruptcy; (iii) there is a limit on the amount that low-tax subsidiaries can lend.

[6] See Bloom et al. [2014] for a survey.

[7] We drop African countries from the WMS dataset, as the quality of management practices there is substantially lower than in the remainder of the sample.

The WMS has a set of firms with panel data, where they interview the same firm across years. As management is a slow-moving variable and the panel dimension does not constitute a large enough sample for our purposes, we consider management a static variable across years and take the average of the management score across years for firms that have multiple values.

3.2 Firm financials and data structure

We match the MNEs from WMS with their financial information from Bureau van Dijk (Orbis) dataset. We use financial data between 2004 and 2019. We matched **2,068** firms in the WMS with at least one year of financial data in Orbis, yielding **26,251** firm-year observations for the first part of the analysis. Using Bureau van Dijk (Orbis) ownership information from 2019, we match each subsidiary, for which we observe management quality, with a parent company that this MNE affiliate belongs to. We find 2038 unique HQ in Orbis. Using the location of the HQ and the subsidiary, we merge in country-year statutory corporate tax rates from the Centre for Business Taxation Corporate Tax Database.[8]. This is our "baseline sample". We define a high and low statutory tax rate country using median in each year. We define low tax country-year cells as those countries having statutory corporate tax rate below median in a given year. Considering the recent statutory corporate tax rate changes among many countries in the world, we allow each country to change from high tax to low tax during the sample period by using the pooled data.[9]

Of the 2068 unique plants, 1567 are operating at subsidiary location while 501 are co-located with the global HQ (see Table 1). We observe only one plant for about 70% of the MNEs in our sample, and only for the HQ-located plant for about 25% of the sample. For the remainder of the sample we observe at least two or more subsidiaries of the sample firm. We have 13 unique parent firms for which we observe management practices for both the HQ co-located plant and at least one subsidiary.

The main variables of interest include operating revenue, profit and loss before tax (PLBT), total assets and taxation from income statement. We construct our main measure of firm profitability, ROA, as the ratio of profits and loss before tax to total assets. We construct a measure of effective tax rates as the ratio of tax paid to profit and loss before taxes (ETR). Table 2 shows the summary statistics for the baseline sample. The average ROA for firms in our sample is 5.1%, and the median number of employees is 574. The average effective tax rate (ETR) in our sample is 18.3%. This ranges from the low of 7.4% in Ireland and 8.6% in Singapore, known tax havens, to high of 29.1% in Italy and 32.5% in Argentina. The structured management score is highest in highly developed countries, such as Sweden, Germany and Japan. Note that while these are not the countries where firms pay highest ETRs in our sample, they are countries with high corporate statutory tax rates. The structured management score is lowest in Vietnam, Turkey and China. These countries do

[8]For the dataset see: data website and for the information on the dataset see: abstract website.

[9]For instance, UK had 30% statutory corporate tax rate in 2007, but had gradually lowered in main corporate rate to 19% in 2017.

not have the lowest statutory corporate tax rates in our sample and their firms are not reporting lowest ETRs. This is important, as otherwise we could be picking up the simple correlation between more structured management and tax rates in high tax-countries that is unrelated to tax planning practices.

In our baseline sample, 76% of firm-year observations report non-negative profits with the remainder reporting losses. 23.2% of HQ-year observations have negative profits, while this is true for 24% of subsidiary-year observations. Firms with structured management practices in place (a score above 3) have 23% of firm-year observations reporting negative profits, while firms with unstructured management practices in place have 26% of firm-year observations reporting negative profits. Positive profit making firms are on average better managed, as the distribution for positive profits stochastically dominates the one for loss makers. 43% of subsidiaries in the baseline sample are located in high-tax country years, while 40% of headquarters are located in high-tax country years. Of the firms operating in high-tax countries, 48% are headquartered in high-tax countries; of the firms operating in low-tax statutory rate countries, 35% are headquartered in high-tax countries.

3.3 Extended sample: imputing management practices

Using ownership data from Orbis, we build the ownership tree for each global ultimate owner (HQ) of the firms in the WMS sample. For all firms interviewed at least once in the WMS, we determine their HQs and build a dataset of their entire corporate structure — including all majority owned subsidiaries that belong to that parent.[10] We match 87,104 unique subsidiaries to the 2038 unique HQs in the WMS data yielding 593,672 firm-year observations (see Table 3).

In Table 4 we describe the financial characteristics of the larger dataset that includes all corporate groups (Panel A). The average ROA for firms in this sample is 3.7%, ETR is 17%. 72 % of firm-year observations report non-negative profits with the remainder reporting losses. 42% of subsidiaries in the extended sample are located in high-tax country years, while 46% of HQs are located in high-tax country years. Of the firms operating in high-tax countries, 59% are headquartered in high-tax countries; of the firms operating in low-tax countries, 38% are headquartered in high-tax countries. This is similar to the baseline sample proportions and ratios. The ROAs reported in subsidiaries located in low-tax subsidiaries are substantially higher than those in high-tax locations, while reported ETRs of subsidiaries in low-tax countries are significantly lower than those in high-tax countries. This is consistent with firms being taxed at low rates on high profits.

As the WMS collects data for a random sample of manufacturing plants and we match the financial data from Orbis at the establishment level, we directly observe management for only 2% of the full ownership tree. However, under a set of assumptions, we could explore the full financial data available across the ownership tree. We conduct an exercise to extrapolate the measure of management through the ownership tree of the firm and report it as a robustness check. The

[10] We only include affiliates that are majority owned, i.e. the parent company owns 50% of their shares. This is because the parent company needs to have control over the subsidiary to be able to implement profit shifting practices.

strongest assumption would be that all firms under the same HQ have similar levels of adoption of structured management. The WMS collects data on decentralization levels of the firm, allowing us to verify whether this assumption is reasonable. There are four questions relating to decentralization of hiring, sales and marketing, new product introductions, and capital investment decisions. The first three questions are scored on a scale of 1 to 5, with 1 indicating a low level of decentralization (all decisions are taken at the HQ level), 3 indicating a joint level of decision-making, and 5 indicates a high level of decentralization (all decisions are taken at the subsidiary level). The final question is a dollar amount of the maximum allowable capital investment without prior authorization from HQ. While these measures do not speak directly to the adoption of management practices, they are indicative of the level of involvement from the HQ. We take the average of the first three questions as the average decentralization measure. Descriptive statistics for this approach are in Table 4.

Using the set of firms in the WMS for which we have multiple subsidiaries under the same HQ, we show in Figure 15 that there is a large dispersion in the level of adoption of structured management within corporate groups. The average standard deviation of management is 0.38 with the maximum of 1.5, suggesting that a indiscriminate extrapolation would be too coarse. A weaker assumption is that firms under the same HQ with reported low levels of decentralization are likely to adopt similar levels of managerial structures. Bloom et al. [2012] show that different levels of trust between countries of multinational HQs and their subsidiaries affect the level of decentralization, and this could yield different levels of adoption of structured management. Under this assumption, we take the average of management quality for all firms belonging to a particular HQ and assign each subsidiary and the HQ that value. However, we restrict the extrapolation sample only to those firms that have reported a decentralization level of three or below. As a final robustness check, we further restrict the sample to only firms that report a decentralization difference of under 2 points. This would ensure that firms in our sample for which we are extrapolating management all report that decisions are taken centrally. In Table 4 we report descriptive statistics for the sample that this method would generate.

4 Empirical evidence

We start with our baseline sample and estimate a simple reduced form model correlating the ROA of each firm to structured management practices, the tax rate in the subsidiary and the interaction between the two:

$$ROA_{it} = \alpha + \beta_1 M_i + \beta_2 HTSub_{ct} + \beta_3 M_i \times HTSub_{ct} + \eta_c + \delta_t \quad (1)$$

where ROA_{it} is the returns on assets, M_i is structured management, $HTSub_{ct}$ is an indicator equal to 1 if the tax rate in the country of the subsidiary is larger than the median tax rate in that year across the countries in our sample, η_c are country fixed effects and δ_t are year fixed effects. In

all specifications we use binary management score, where we define formal management as scores of 3 or above. We consider both the high tax subsidiary dummy and a continuous variable called subsidiary corporate tax rate. The continuous variable is the statutory corporate tax rate in the subsidiary. Table 5 uses the baseline sample. In columns 1-3 and 7 we use all firms, in column 4 we use a sub-sample of high tax HQ only, in columns 5 and 6 we use sub-samples of firms with BTDs above median (column 5) and below median (column 6). We describe each set of results in turn, and complement the average results with non-parametric analysis illustrating the relationship across the distribution.

4.1 Relationship between management and ROA

We find that there is a positive and strong correlation between management practices and operating revenues in our sample (Figure 3), consistent with the literature on management and productivity. This relationship is relatively noisier when we consider profitability (ROA) as the outcome variable. Column (1) in Table 5 shows that this is a statistically significant relationship. However, we find a negative correlation between management practices and effective tax rates (ETRs). Effective tax rates are often used in profit shifting literature to illustrate how little tax MNEs pay in various jurisdictions relative to the statutory tax rates. It is clear that higher turnover generated by firms with more structured management practices does not necessarily translate into higher taxable profits. In fact, it seems to actually enable firms to lower their ETRs and effectively pay lower tax rates than firms adopting fewer structured management practices.

4.2 Relationship between management and ROA by country tax rates

The relationship between profitability and management is driven by firms operating in low-tax countries. In Table 5 we report the coefficient for the interaction between the structured management indicator with a high-tax subsidiary indicator (Column 1) and with the subsidiary corporate tax rate (Column 3). Both interaction terms are negative, suggesting that in high tax environments firms with structured management firms report lower ROAs. The contrasting relationship is clear in Figure 4, where we plot the local linear regression results separately for subsidiaries in low-tax countries and high-tax countries. There is a clear negative relationship between structured management and ROA in high-tax subsidiaries, with an almost matching positive relationship between structured management and ROA in low-tax subsidiaries.

This is not simply a story of location: our descriptive statistics show that firms with more structured management are not systematically located in low-tax rate countries. Hence, we interpret our findings as evidence that these MNEs are likely to shift profits from high-tax countries to low-tax countries in order to minimize their overall tax bill.

4.2.1 Differences across subsidiaries belonging to the same HQ

While our first result pools all subsidiaries together, we can take advantage of the ownership structure of our dataset and limit the sample only to MNE groups for which we observe more than one subsidiary. We have 622 firms that belong to approximately 230 different MNE groups. Column (2) of Table 5 includes HQ fixed effects, enabling us to pick up a differential allocation of profits between subsidiaries belonging to the same firm. Controlling for HQ fixed effects, the coefficient on the interaction term suggests that a firm with structured management located in a high-tax country reports 0.022 lower ROA relative to a firm without structured management practices. As the average ROA in high-tax subsidiaries in the baseline sample is 0.032, the coefficient represents a reduction in ROA of almost 70%.

Figure 5 plots the marginal effects of structured management on predicted ROA for high-tax and low-tax subsidiaries, across the distribution of management scores. There is a clear negative relationship between higher management scores and predicted ROA in high-tax countries. The differences between low-tax and high-tax subsidiaries are statistically significant beyond a management score of 3. This is consistent with our regression results using the indicator of structured management instead of the continuous measure.

4.2.2 Differences across HQs by country tax rates

We split the sample of MNEs by headquarter location, in particular, we divide our MNEs into those headquartered in high-tax parent and low-tax parent countries. In Column (4) of Table 5 we consider only MNEs headquartered in high-tax countries and find that the interaction effect between structured management and subsidiary corporate tax rate is still negative, though the average effect is less precisely estimated. To consider the relationship throughout the management distribution, we plot the local linear regression in Figure 6 for MNEs headquartered in high-tax countries (left-hand side panel) and MNEs headquartered in low-tax countries (right-hand side panel). We show the relationship for low-tax subsidiaries and high-tax subsidiaries separately for each set of HQs.

There are two clear patterns: first, a negative relationship between structured management and reported ROA for firms headquartered in high-tax countries. Second, a positive relationship between ROA and structured management in firms headquartered in low-tax countries. Further, the level of the reported ROA of high tax subsidiaries belonging to high-tax HQs is almost entirely below the level of reported ROA of low-tax subsidiaries. We do not observe any difference in reported ROAs between firms operating in high- or low-tax countries headquartered in low-tax countries.

4.3 Aggressive Tax Planning

We interpret the evidence thus far as suggestive that firms with structured management may be better at tax planning. This relationship is likely to be starker when considering aggressive and non-aggressive tax planners. We consider two proxies for aggressive tax planning.

4.3.1 Measuring aggressiveness: bunching around zero ROA

In this section we compare the propensity of MNEs to report near zero ROAs. Previous literature has noted that a large share of firms reporting near zero accounting profits can suggest profit shifting, especially if those firms are located in high-tax countries (Johannesen et al. [2016]). We plot the distributions of ROAs around zero for two groups of firms: those with structured management structures in place and those with unstructured management structures in place, and compare MNE subsidiaries operating in high-tax countries and those operating in low-tax countries. Figure 7 shows that, for firms with structured management in place, a larger share of MNEs operating in high-tax countries reports near zero ROAs relative to MNEs operating in low-tax countries. No such pattern is apparent in firms with unstructured management, consistent with a profit shifting pattern.

4.3.2 Measuring aggressiveness: above median BTDs

A second proxy for aggressive tax avoidance we use the size of book-tax difference (BTD) measuring the difference between pre-tax book earnings and taxable income. The literature has linked this measure with tax-planning activities of MNEs, and in particular Manzon and Plesko [2002] show that approximated measures of demand for tax shelters help explain the variation in BTDs across firms. These measures have been subsequently used in the literature to approximate for aggressive tax planning. Desai and Dharmapala [2006] show that increases in incentive compensation tend to reduce the level of tax sheltering, Desai and Dharmapala [2009] show that the effect of tax avoidance on firm value is a function of firm governance. Desai [2003] points out further that the size of BTDs is related to managerial motives associated with earnings management. Thus, BTDs have been shown to be reliable proxies for both tax sheltering and earnings management and are thus an appropriate tool to use in the context of analyzing the relationship between management and tax planning practices.[11]

We calculate BTDs following the literature and subtract from the pre-tax profits the current tax expense grossed up by the statutory rate. We calculate the size of that difference for each firm, adjusting for deferred taxes where firms report them, to create permanent book tax differences. We then scale the size of this difference by firm's total assets and divide the sample into firms with larger than median BTDs and smaller than median BTDs. We classify firms with larger than median BTDs aggressive avoiders and those with below median BTDs as non-aggressive firms.[12]

Columns (5) and (6) in Table 5 report the coefficients on the interaction terms between structured management and corporate tax rates for firms that have BTDs above and below median, respectively.

[11] Blackburne and Blouin [2016] and Erickson et al. [2004] show that traditional BTD measures may not always be a reliable signal of earnings manipulation. BTDs of companies that were committing some tax fraud are not larger than those companies that did not. In the context of this paper, this means that there may be firms that we have classified as non-aggressive avoiders that may be aggressively tax planning. This would bias the findings against our hypothesis.

[12] Note that we have experimented with dividing the sample into top 25% as being aggressive avoider and bottom 25% as not. The results are not sensitive to these various sample cuts.

It is clear that the negative results from previous regressions are driven by firms with BTD above median — the tax aggressive ones. The interaction coefficient suggests that firms with structured management would report 0.025 lower ROA for a 10% higher subsidiary tax rate.

In Figure 8 we show the marginal effects from the regression of ROAs on the interaction between management and BTD above median separately for firms operating in high-tax countries and low-tax countries. We find that aggressive tax avoiders with structured management report significantly higher ROAs in low-tax countries than non-aggressive firms. In turn, in high-tax countries there is no significant difference between aggressive avoiders and non-aggressive firms in terms of the relationship between ROA and management quality. However, there is a negative relationship between structured management and ROAs for aggressive tax avoiders operating in high-tax countries.

Aggressive tax avoiders with structured management practices in place report very high ROAs in low-tax countries, while reporting very low ROAs in high-tax countries. In contrast, firms that we identify as non-aggressive with structured management practices in place report very similar ROAs in high-tax and low-tax subsidiaries countries. This is consistent with the hypothesis that aggressive avoiders are involved in tax planning practices to minimize their tax bill and that these practices are more prevalent among firms with more structured management practices.

Further2, in Column (7) of Table 5 we consider a model in which ROA is a function of structured management and whether an MNE is an aggressive avoider (BTD above median) or non-aggressive firm (BTD below median). The relationship between structured management and ROA in positive and firms with high BTDs have on average higher ROAs. The negative interaction term between the indicator for BTD being above median and structured management implies that the relationship between ROA and management is less pronounced for more aggressive avoiders. Aggressive avoiders with more structured management practices are likely to have lower ROAs.

Finally, to understand differences in profit reporting between the two types of firms we plot the distribution of ROA for firms with structured an unstructured management, by the aggressive and non-aggressive classification. Figure 9a includes only firms with structured management, and shows that aggressive avoiders are more likely to bunch at zero ROAs in high-tax countries relative to those in low-tax countries. In contrast, for non-aggressive firms there is no difference in ROA distributions between high-tax and low-tax countries. Further, the ROA distributions for all but aggressive avoiders in high-tax countries look similar.

Figure 9b plots the equivalent distributions for firms with unstructured management. There is no difference in ROA distributions for aggressive avoiders between high-tax and low-tax countries. For non-aggressive firms, there is a smaller mass of firms around zero ROAs in high-tax countries than in low-tax countries. Further, the ROA distributions for all but non-aggressive firms in high-tax countries look similar. This is consistent with a notion that non-aggressive firms may report high profits in high tax jurisdictions simply because their businesses are profitable there.

5 Robustness checks

We repeat the empirical exercise with the extended sample, and confirm that the results are robust. Table 6 reports the results. They are consistent in terms of the direction of the effect, though as the sample is substantially larger the results are more precisely estimated and sometimes show larger coefficients. We include the replication of the graphical evidence with the extended sample in the Appendix.

Further, Table 7 in the Appendix shows that these results hold when we use effective tax rates (ETRs) as dependant variable. The results are consistent with evidence from Figure 3, where the correlation between ETRs and structured management was negative in high tax countries. We show that this effect is also statistically significant and large in magnitude.

6 Discussion

In this paper, we present evidence that is suggestive of the presence of tax (avoidance) planning practices among firms with more structured management practices in our sample. This is the first look at the issues of profit shifting and aggressive tax avoidance from an organizational economics lens. Using proprietary accounting data, we have shown correlations between measures associated with profit shifting behaviour and structured management, which we use as a proxy for a firm's organizational capacity.

The results in this paper are important from a policy perspective. Management has been shown to improve productivity and this has resulted in multiple countries introducing government funded policies to improve management quality of firms. However, our results suggest that, in addition to increasing revenues, more formal management practices at the firm level may lead to lower reported profits and effective tax rates in high tax countries. This means that governments in high tax countries, may struggle to raise enough corporate tax revenues, as MNEs contribute a large proportion of corporate tax revenues (for example, close to 90% in the UK, see Bilicka [2019]).

The literature shows that using accounting data to uncover profit shifting practices comes with its own limitations. Profits reported by firms are generally different between tax returns and accounting statements. Bilicka [2019] shows that accounting profits overstate what is reported for tax purposes on tax returns. This difference is markedly larger for multinational firms. This has two main implications for our work. First, the evidence shown here may be even more pronounced, if we use tax returns data instead of accounting data for reported MNE profits. Second, having only accounting level data prevents us from identifying potential tax avoiders carefully, as proxies from accounting data are unreliable.

One solution is to use administrative data instead, as in Bilicka [2019]. She identifies zero taxable profit reporting firms in the UK as aggressive tax avoiders. In a companion project, we conduct an alternative exploration of the relationship presented in this paper, using a combination

of three detailed datasets from the UK: HMRC (UK tax authorities) administrative tax data, FAME accounting data, and the WMS UK and ONS (Office for National Statistics) MOPS data. We think the UK is a good case study for four reasons. First, the UK makes the full population of tax returns available to researchers. The set of firms in Orbis data with available financial information is skewed towards MNEs, as the share of MNEs in the sample is much higher than in the random sample of WMS data for a number of countries. This means that in this paper, we focus on MNEs only for WMS data. Having access to full population of tax returns enables us to consider domestic firms in addition to MNEs. Second, the UK corporate tax rate has been cut substantially from 30% in 2007 to 20% in 2015, moving the UK from a high-tax to a low-tax environment during the sample period. This would allow us to study the relationship between tax planning practices and management in both high and low tax environments and how it changes as tax rates change. Third, UK has introduced a anti-tax avoidance regulation in 2010, which we could explore as a natural experiment. Fourth, the WMS has over 1,000 observations for UK firms, including 4 waves of panel data (2004, 2006, 2010, 2014) and the ONS also has new data on management practices from 2018 onwards (ONS MOPS data). This combined dataset will allow us to conduct a substantially more comprehensive exploration of our research question.

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Table 1: Descriptive Statistics: corporate group structure for firms in the WMS sample

Firms in the same corporate group count	**Total factories** N	**Subsidiary factories** N	**HQ factories** N
1	1446	958	488
2	294	286	8
3	129	125	4
4	84	83	1
5	60	60	0
6	30	30	0
8	16	16	0
9	9	9	0
Total	**2068**	**1567**	**501**

Note: Data from ORBIS and the World Management Survey.

Table 2: Descriptive statistics for the baseline sample, by country

	Obs N	**Firms N**	**HQs N**	**Years Avg N**	**ROA**	**Empl Median**	**PLBT**	**Effective Tax rate**	**Mgmt**
Argentina	182	27	4	8	0.134	435	32995	0.325	3.44
Australia	1435	93	33	17	0.027	706	42772	0.207	3.33
Brazil	309	53	19	7	0.023	456	19253	0.130	3.43
Canada	15	1	0	15	0.040	1469	51502	-0.302	3.17
Chile	203	25	7	12	0.090	1000	43833	0.201	3.23
China	1185	150	104	10	0.065	700	17753	0.145	3.06
France	812	54	20	16	0.049	200	5715	0.211	3.28
Germany	2322	176	75	15	0.063	468	28490	0.159	3.53
Great Britain	6181	437	125	16	0.058	212	12082	0.183	3.26
Greece	1339	98	45	16	0.006	237	5824	0.195	3.26
India	488	44	29	13	0.062	500	13064	0.253	3.23
Ireland	720	57	18	15	0.073	164	13772	0.074	3.23
Italy	2599	175	65	16	0.038	255	9215	0.291	3.33
Japan	459	36	16	13	0.064	396	23188	0.285	3.42
Mexico	74	26	6	5	0.083	550	25310	0.261	3.39
New Zealand	27	2	0	14	0.072	300	24511	0.500	3.50
Poland	1087	77	30	16	0.050	340	4489	0.180	3.26
Portugal	928	65	20	15	0.033	213	12193	0.141	3.25
Singapore	1514	160	43	12	0.071	5000	23417	0.086	3.36
Spain	1231	85	23	15	0.053	184	9878	0.166	3.20
Sweden	2662	173	39	17	0.081	244	15620	0.198	3.40
Turkey	140	15	9	11	0.052	301	501	0.190	2.96
United States	40	5	0	11	0.097	3383	98582	0.239	3.22
Vietnam	381	34	23	12	0.066	215	1600	0.118	2.95

Note: Data from Orbis and the World Management Survey. The total number of observations is the count of firm-year available data points (total from column 2), though not all firms have all years available. To arrive at the summary statistics in this table, we first averaged across the values for each firm across all years with available data, and then averaged across countries.

Table 3: Descriptive Statistics: corporate group structure for firms in the extended sample

Firms in the same corporate group count	**Total factories** N	**Subsidiary factories** N	**HQ factories** N
1	580	186	394
2	266	196	70
3	246	196	50
4	288	239	49
5	270	235	35
6	282	251	31
7	294	263	31
8	312	281	31
9	342	316	26
10-49	13763	13322	441
50-99	13625	13458	167
100-499	35622	35458	164
500+	21214	21211	3
Total	**87104**	**85612**	**1492**

Note: Data from ORBIS and the World Management Survey.

Table 4: Descriptive statistics for each sample

	Obs N	Firms N	HQs N	ROA	Empl Median	PLBT	ETR
Management-only sample							
Low tax sub	14972	1200	436	0.062	765	14422	0.168
High tax sub	11361	868	319	0.046	374	18027	0.210
Low tax GUO	15723	1279	547	0.050	517	16078	0.185
High tax GUO	10610	789	208	0.062	712	15828	0.191
Extended sample, low decentralization score							
Low tax sub	256283	40241	670	0.040	102	17934	0.154
High tax sub	181080	24383	618	0.032	90	18279	0.195
Low tax GUO	242220	38721	793	0.033	96	18881	0.166
High tax GUO	195143	25903	495	0.041	98	17079	0.177

Note: Data from the World Management Survey (2004-2014) matched with Orbis (2004 to 2018). Headquarters are defined as the global ultimate owner identified in Orbis. ROA is the return on assets: ratio of profit and loss before taxes and total assets. PLBT is the profit and loss before taxes. ETR is the Effective Tax Rate: ratio of reported tax payments to profit and loss before taxes.

Table 5: Summary of results, baseline sample

	(1) ROA	(2) ROA	(3) ROA	(4) ROA	(5) ROA	(6) ROA	(7) ROA
Structured management=1	0.018***	-0.001	0.051***	0.022	0.073***	0.051**	0.025***
	(0.004)	(0.009)	(0.015)	(0.022)	(0.015)	(0.021)	(0.004)
High tax subsidiary	-0.006	0.009					
	(0.007)	(0.007)					
Structured management=1	-0.004	-0.022***					
× High tax subsidiary	(0.006)	(0.007)					
Subsidiary Corporate Tax Rate			-0.121	-0.151	-0.038	-0.227**	
			(0.077)	(0.121)	(0.082)	(0.104)	
Structured management=1			-0.127**	-0.077	-0.249***	-0.093	
× Subsidiary corp tax rate			(0.051)	(0.073)	(0.052)	(0.073)	
BTD above median							0.108***
							(0.005)
Structured management=1							-0.018***
× BTD above median							(0.005)
Year x Country FE	✓	✓	✓	✓	✓	✓	✓
HQ FE		✓					
Observations	26333	26333	26333	10610	10989	13899	24888
R-squared	0.0154	0.374	0.0160	0.0199	0.0441	0.0296	0.0926
Sample	**Baseline**	**Baseline**	**Baseline**	**High tax HQ**	**BTD above median**	**BTD below median**	**Baseline**

Note: Data from Orbis and the World Management Survey. Sample includes only directly matched subsidiary or HQ in both WMS and Orbis.

Table 6: Summary of results for extended sample

	(1) ROA	(2) ROA	(3) ROA	(4) ROA	(5) ROA	(6) ROA	(7) ROA
Structured management=1	0.020***	-0.054***	0.082***	0.023**	0.053***	0.109***	0.016***
	(0.002)	(0.018)	(0.006)	(0.009)	(0.006)	(0.008)	(0.002)
High tax subsidiary	0.017***	-0.006**					
	(0.003)	(0.003)					
Structured management=1	-0.017***	-0.001					
× High tax subsidiary	(0.003)	(0.003)					
Subsidiary Corporate Tax Rate			0.039	-0.064	0.050	-0.061	
			(0.031)	(0.044)	(0.032)	(0.042)	
Structured management=1			-0.251***	-0.089***	-0.185***	-0.331***	
× Subsidiary corp tax rate			(0.020)	(0.029)	(0.022)	(0.026)	
BTD above median							0.133***
							(0.002)
Structured management=1							-0.011***
× BTD above median							(0.002)
Year x Country FE	✓	✓	✓	✓	✓	✓	✓
HQ FE		✓					
Observations	437363	437363	437353	195139	156504	239574	396078
R-squared	0.0114	0.0334	0.0118	0.0140	0.0259	0.0389	0.0678
Sample	**Baseline**	**Baseline**	**Baseline**	**High tax HQ**	**BTD above median**	**BTD below median**	**Baseline**

Note: Data from Orbis and the World Management Survey. Sample includes all matched GUOs from WMS and Orbis. Management data is averaged across all firms within a GUO where the subsidiaries report a highly centralized firm (decentralization score below 3 on a scale of 1 to 5).

Figure 1: Average management score of multinationals, by country



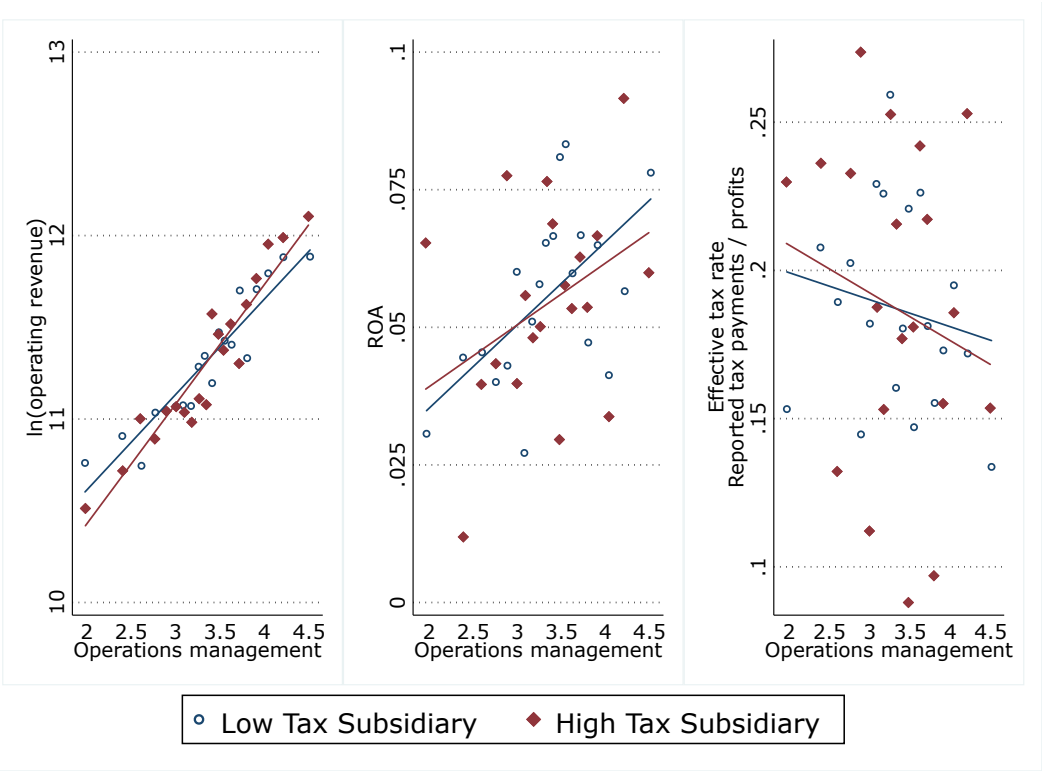
Note: Data from the World Management Survey. Management is the average for the WMS operations management questions (including lean management, monitoring and target-setting). There is 2060 firms in total across all countries.

Figure 2: Dispersion of management practices of multinationals within countries



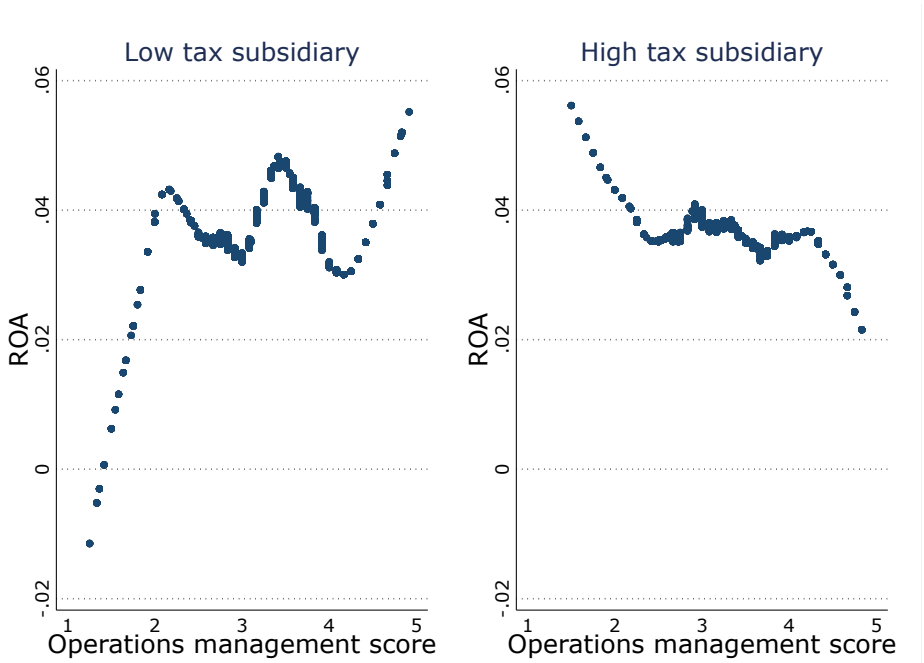
Note: Note: Data from the World Management Survey. Management is the average for the WMS operations management questions (including lean management, monitoring and target-setting). We drop African countries from WMS. There is 2060 firms in total across all countries.

Figure 3: Revenues, ROA, ETR and management, baseline sample



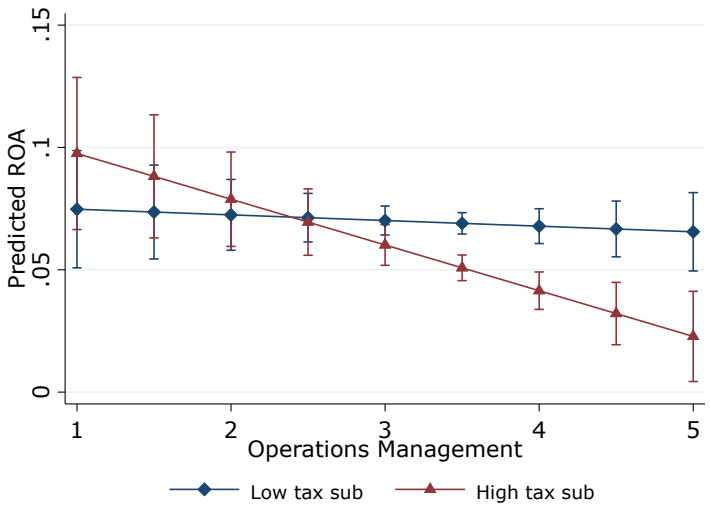
Note: Data from the World Management Survey and Orbis. ROA is the ratio of profit and loss before taxes and total assets. ETR is the reported tax payments over profit and loss before taxes.

Figure 4: ROA and operations management in low- and high-tax country-years



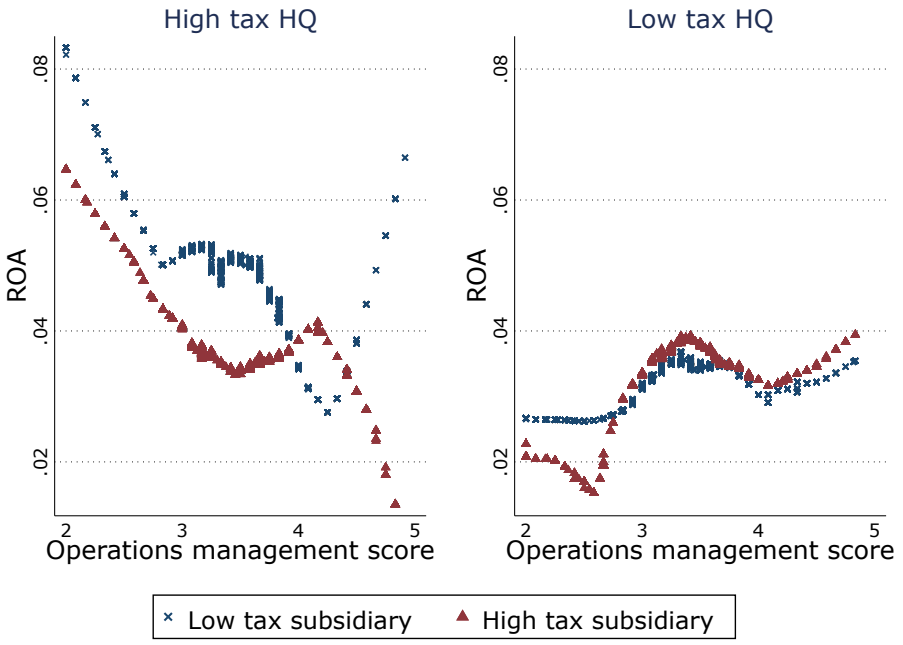
Note: Data from the World Management Survey and Orbis. Baseline sample. Local linear regressions run with bandwidth 0.5.

Figure 5: Within-group relationship between management and ROA



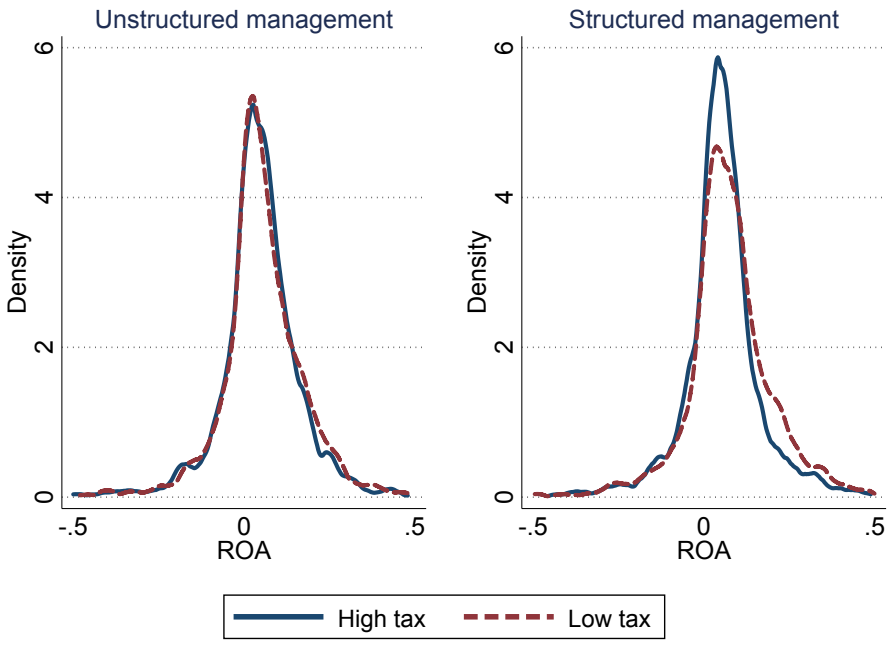
Note: Data from the World Management Survey and Orbis. Firms in baseline sample with at least two observations within a GUO corporate group (HQ and subsidiary, or at least two subsidiaries).

Figure 6: ROA and operations management in subsidiaries by low-tax and high-tax HQ country-year



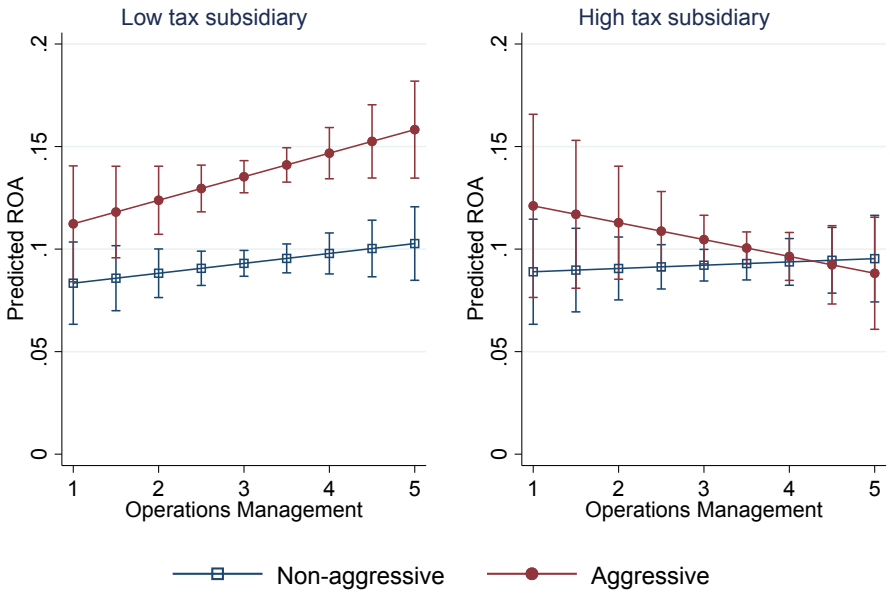
Note: Data from the World Management Survey and Orbis. Baseline sample. Local linear regressions run with bandwidth 0.5.

Figure 7: Bunching around zero ROA for firms with structured management



Note: Data from the World Management Survey and Orbis. Baseline sample. ROA restricted between -0.5 and 0.5.

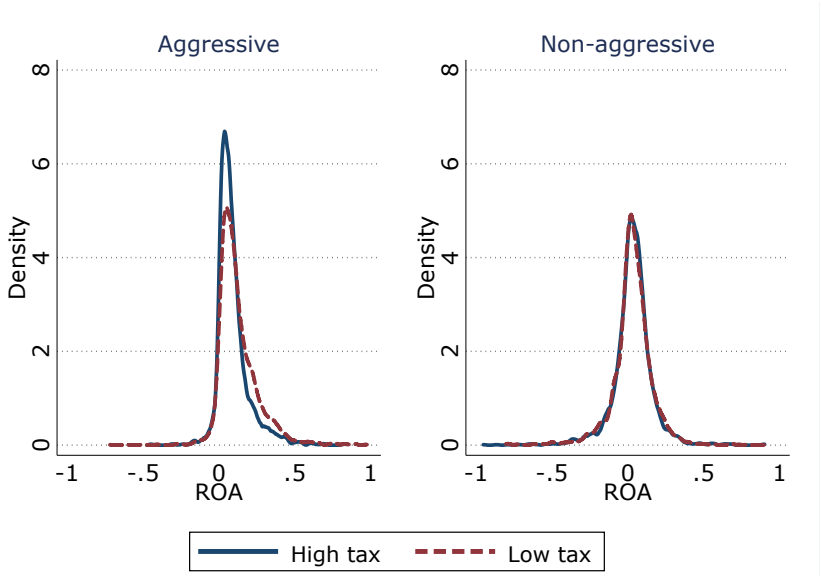
Figure 8: Aggressive tax avoiders from high tax HQs in low- and high-tax subsidiary country-years



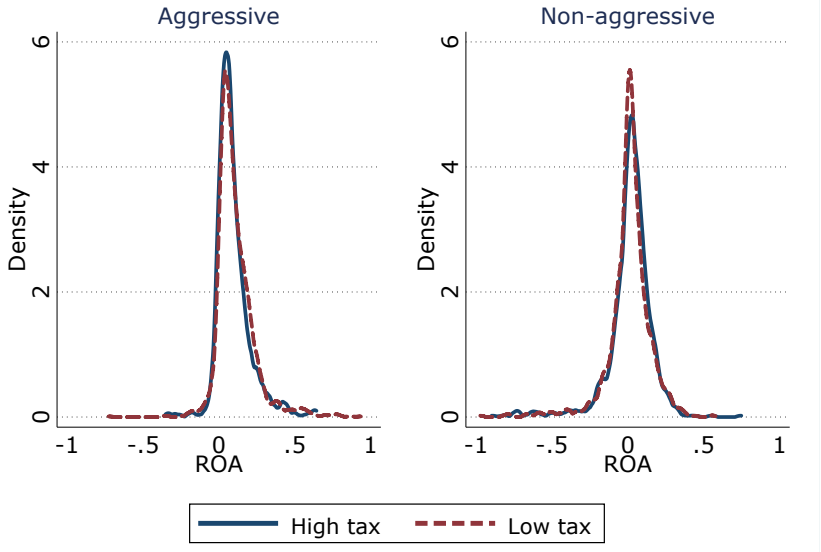
Note: Data from the World Management Survey and Orbis. Baseline sample.

Figure 9: Bunching of ROA around zero for aggressive firms with formal management

(a) Structured management



(b) Unstructured management



Note: Data from the World Management Survey and Orbis. Baseline sample. ROA restricted between -1 and -1.

Appendices

A Robustness checks: expanded sample

We show the relationship between structured management and operating revenues is tight in the expanded sample as well as the baseline sample. It is much weaker for ROAs and even weaker for ETRs. We do not observe the negative relationship between ETRs and structured management in this extended sample.

We also find that the negative relationship between ROAs and structured management practices for firms operating in high tax countries is negative, even when we use a proxy for a group quality of management. The positive correlation between ROAs and management for firms operating in low-tax countries does not hold as tightly.

Further, we observe that firms belonging to MNEs HQ in high tax countries tend to report lower ROAs for all but a small region of management scores. This relationship does not hold for firms HQ in low tax countries. The relationship between structured management practices and ROAs is negative for firms HQ in high tax countries, but the relationship is weaker than in the baseline sample.

Finally, we observe large bunching around zero ROAs for formally managed firms operating in high-tax countries relative to low-tax countries. There is no difference between the two tax environments for informally managed firms. Finally, there is significant difference in reported ROA between aggressive tax avoiders and non-aggressive firms HQ in high-tax countries operating in low-tax locations. They report significantly higher ROAs across all structured management scores, apart from those at and below 1. There is also a negative relationship between quality of management and ROAs in low-tax countries. There is no relationship between ROA and structured management practices in high-tax subsidiaries. There is also no significant difference between aggressive and non-aggressive firms there.

Taken together, those results are very similar to the ones using the smaller, baseline sample. Having extended sample with more observations will allow us to obtain statistical significance in regression analysis.

Table 7: Summary of results: effective tax rate

	(1) ETR	(2) ETR	(3) ETR	(4) ETR	(5) ETR	(6) ETR	(7) ETR
Formal management=1	0.008	-0.002	0.076*	0.017	-0.038	0.158***	0.009
	(0.012)	(0.030)	(0.040)	(0.064)	(0.053)	(0.060)	(0.014)
High tax subsidiary	0.039	0.095***					
	(0.025)	(0.031)					
Formal management=1 × High tax subsidiary	-0.053***	-0.092***					
	(0.020)	(0.033)					
Subsidiary corp tax rate			0.998***	0.767*	0.423	1.378***	
			(0.277)	(0.443)	(0.343)	(0.422)	
Formal management=1 × Subsidiary corp tax rate			-0.337**	-0.176	0.018	-0.561***	
			(0.149)	(0.214)	(0.205)	(0.217)	
BTD above median							-0.106***
							(0.016)
Formal management=1 × BTD above median							-0.046**
							(0.019)
Year x Country FE	✓	✓	✓	✓	✓	✓	✓
HQ FE		✓					
Observations	24884	24884	24884	10039	10989	13895	24884
R-squared	0.00890	0.146	0.00918	0.0122	0.00875	0.0109	0.0188
Sample	**Baseline**	**Baseline**	**Baseline**	**High tax HQ**	**BTD above median**	**BTD below median**	**Baseline**

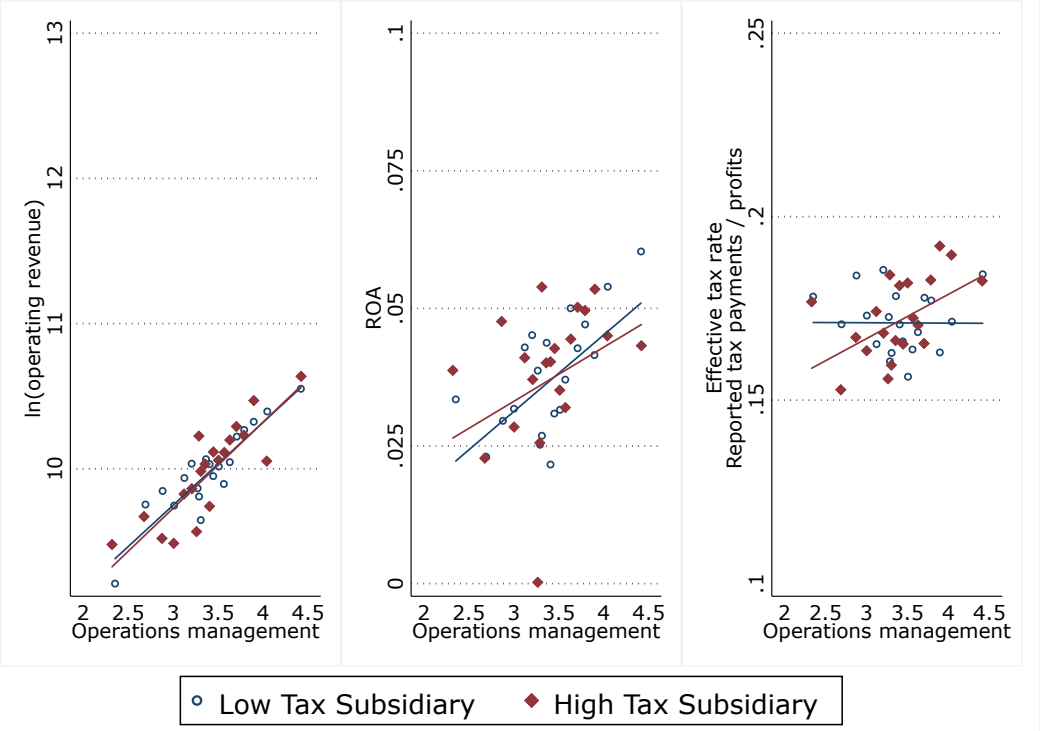
Note: Data from Orbis and the World Management Survey. Sample includes all subsidiary and HQs directly matched between WMS and Orbis. ETR is the Effective Tax Rate.

Table 8: Summary of results for extended sample, full

	(1) ROA	(2) ROA	(3) ROA	(4) ROA	(5) ROA	(6) ROA	(7) ROA
Structured management=1	0.017***	-0.051***	0.074***	0.039***	0.040***	0.103***	0.012***
	(0.002)	(0.018)	(0.005)	(0.008)	(0.005)	(0.006)	(0.001)
High tax subsidiary	0.017***	-0.003					
	(0.003)	(0.002)					
Structured management=1	-0.017***	-0.007***					
× High tax subsidiary	(0.002)	(0.002)					
Subsidiary Corporate Tax Rate			0.049*	-0.013	0.022	-0.016	
			(0.026)	(0.037)	(0.027)	(0.036)	
Structured management=1			-0.236***	-0.129***	-0.137***	-0.325***	
× Subsidiary corp tax rate			(0.016)	(0.024)	(0.018)	(0.021)	
BTD above median							0.131***
							(0.002)
Structured management=1							-0.006***
× BTD above median						(0.002)	
Year x Country FE	✓	✓	✓	✓	✓	✓	✓
HQ FE		✓					
Observations	593672	593672	593661	275879	210852	322828	533680
R-squared	0.00983	0.0346	0.0101	0.0130	0.0250	0.0351	0.0669
Sample	**Baseline**	**Baseline**	**Baseline**	**High tax HQ**	**BTD above median**	**BTD below median**	**Baseline**

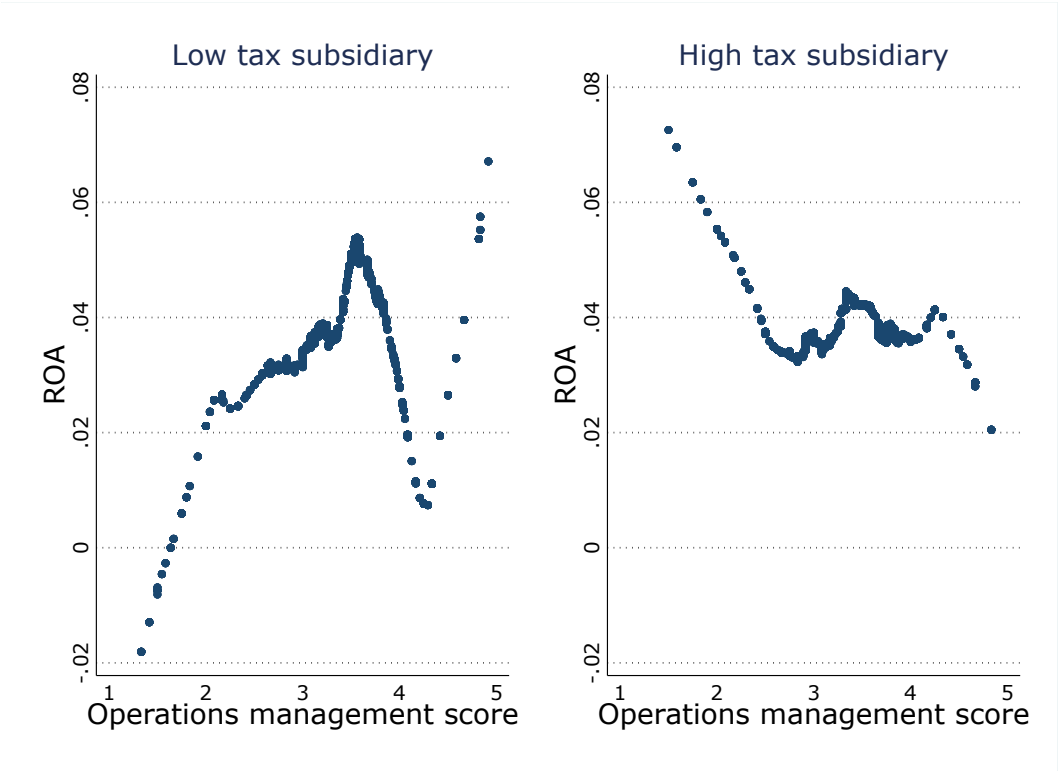
Note: Data from Orbis and the World Management Survey. Sample includes all matched GUOs from WMS and Orbis. Management data is averaged across all firms within a GUO.

Figure 10: Revenues, ROA, ETR and management, extended sample with low decentralization



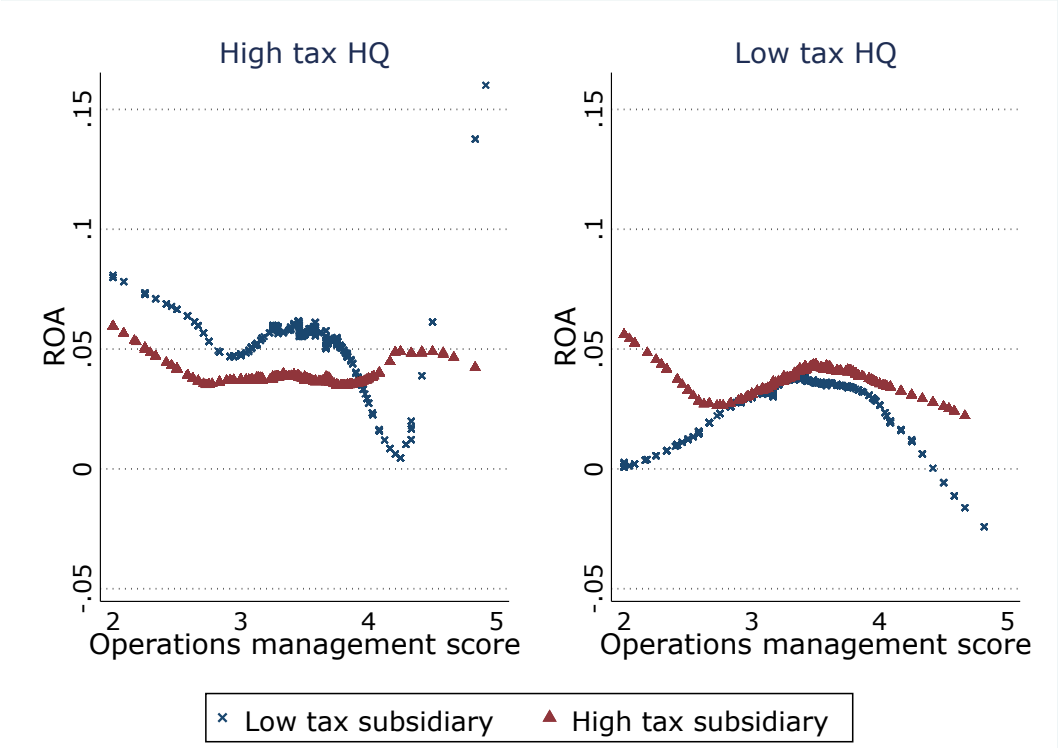
Note: Data from the World Management Survey and Orbis. Extended sample. ROA is the ratio of profit and loss before taxes and total assets. ETR is the reported tax payments over profit and loss before taxes.

Figure 11: ROA and operations management in low- and high-tax country-years, extended sample with low decentralization



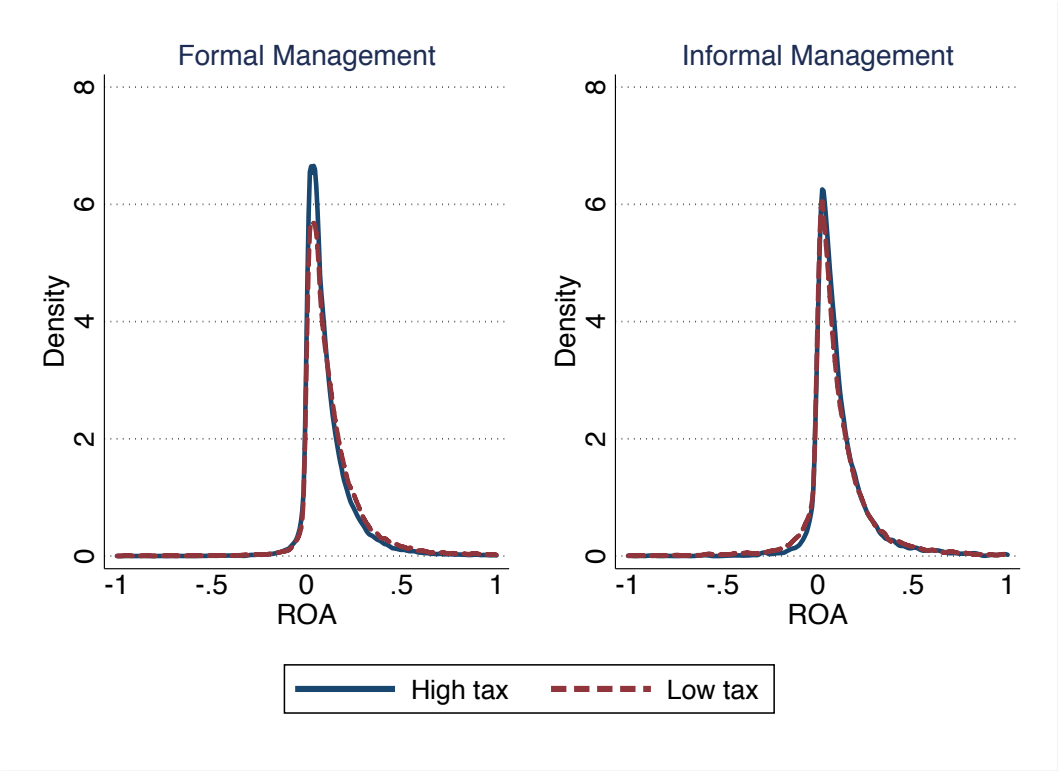
Note: Data from the World Management Survey and Orbis. Extended sample. Local linear regressions run with bandwidth 0.5.

Figure 12: ROA and operations management in subsidiaries by low-tax and high-tax HQ country-year, extended sample with low decentralization



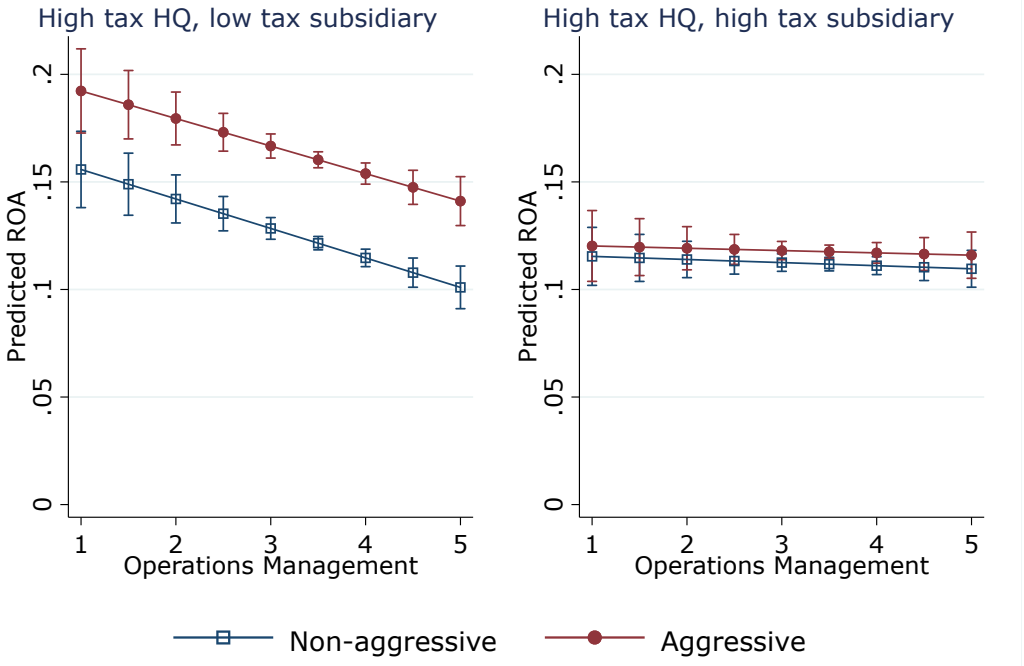
Note: Data from the World Management Survey and Orbis. Extended sample. Local linear regressions run with bandwidth 0.5.

Figure 13: ROA, aggressive tax avoidance and management



Note: Data from the World Management Survey and Orbis. Extended sample.

Figure 14: Plot of marginal effects, extended sample with low decentralization



Note: Data from the World Management Survey and Orbis. Note: Data from Orbis and the World Management Survey. Extended sample includes all matched GUOs from WMS and Orbis. Management data is averaged across all firms within a GUO where the subsidiaries report a highly centralized firm (decentralization score below 3 on a scale of 1 to 5).

Figure 15: Standard deviation of management within corporate group

