

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

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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, higher adoption of management practices may also enable tax planning. Using a pooled cross-sectional dataset, we show that MNEs operating in low-tax countries exhibit a positive relationship between reported profits and structured management practices, while no discernible relationship exists for MNEs operating in high-tax countries. Using an event study design, we find that firms with more structured management are also more responsive to corporate tax rate changes. These patterns are consistent with the shifting of 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 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 and non-aggressive tax avoiders, attributing 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]. We propose that, as firms adopting higher levels of structured management have more tractable and predictable production plans, this could enable firms to make more effective reallocation decisions to minimize their overall tax bill. Specifically, a firm could optimally allocate a high share of profits in low-tax countries and a low share of profits in high-tax countries.

We study this proposed channel using two complementary approaches. First, we provide novel descriptive evidence to show how MNEs allocate profits across jurisdictions with different tax rates depending on the levels of structured management in place. Second, we show how MNEs' reported profits react to changes in corporate tax rates using an event study design, for firms with different levels of structured management. 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

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

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

data. Third, MNEs often span several jurisdictions, allowing us to exploit variation in tax rates across jurisdictions and time.

We start by documenting a new set of stylized facts on the 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. 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 dissipates completely 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, consistent with 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 low-tax countries exhibit a positive relationship between reported profits and structured management practices. In contrast, we see no discernible relationship for MNEs operating in high-tax countries. This pattern is consistent in the sample of firms where we observe management practice scores for multiple subsidiaries within the same MNE.

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 that adopt more structured management tend to report relatively higher ROA in their low-tax subsidiaries and lower ROA in their high-tax subsidiaries.

Finally, we exploit the panel dimension of our data to consider the effects of reductions in corporate tax rates on reported profits of affected MNEs. Following Fuest et al. [2018] and Serrato and Zidar [2016], we consider the effects of these tax rate cuts on reported ROAs in an event study framework. We find that firms with more structured management in place increase reported ROAs following a corporate tax rate cut, while other firms fail to react as strongly. This is in line with our conceptual framework, in which the tax minimization is easier for firms with more tractable and predictable profits. If our proposed mechanism is true, we would expect firms with structured management in place to be more responsive when adjusting their reported ROAs after a change in the corporate tax rate in one of their subsidiaries.

In all, the patterns we uncover shed new light on a previous unstudied 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 is particularly pronounced in firms that also exhibit aggressive tax behavior, suggesting structured management practices could be allowing for this 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

⁴While 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.

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 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.

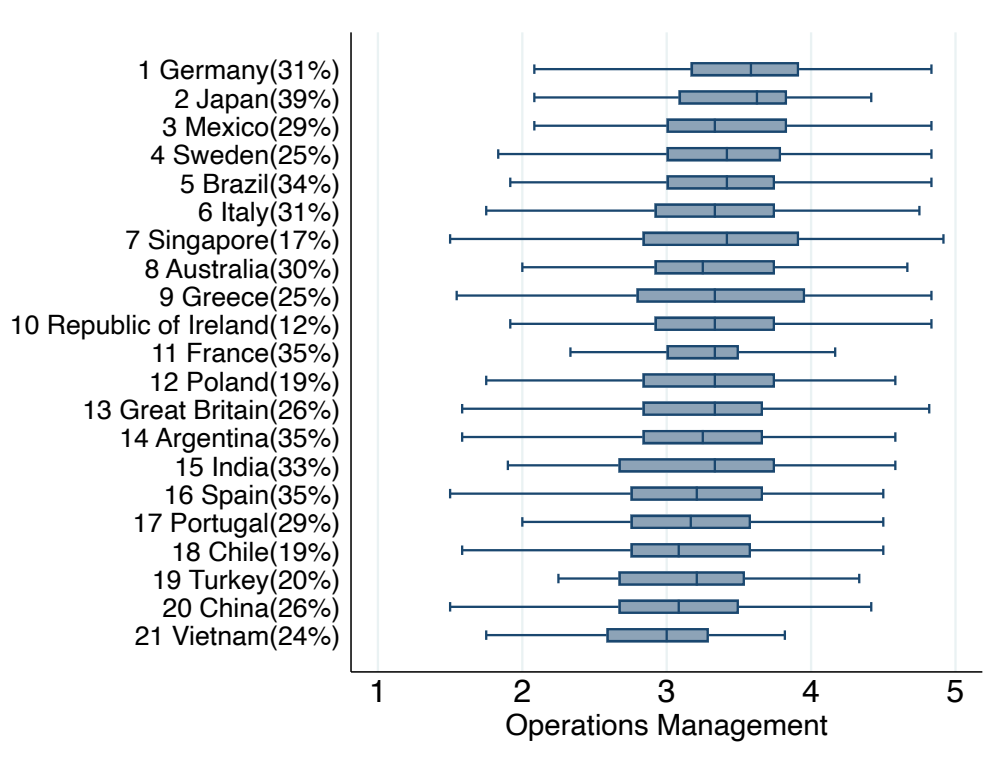
We focus on the 12 topics that directly relate to operations management and exclude the questions relating to people management. We build two indices of operations management: a continuous index with the simple average across the 12 topics, and a binary indicator dividing firms into two groups based 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

⁵Firms 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.

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

Figure 1: Average management score of multinationals with dispersion within countries.



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 1860 firms in total across all countries.

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, with scores ranging from below 2 to almost 5. We report the corporate tax rate for each country next to the country name. The countries with the lowest average management scores do not also have the lowest corporate tax rates in our sample. 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.

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.

⁷We drop African countries from the WMS dataset, as there are few MNEs in the sample with financial data available.

3.2 Firm financials and data structure

3.2.1 Static analysis sample

We match the MNEs from WMS with their financial information from Bureau van Dijk (Orbis) dataset between 2004 and 2019. We matched 1,860 firms in the WMS with at least one year of financial data in Orbis, yielding 27,748 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 1462 unique HQ in Orbis.

Using the location of the HQ and the subsidiary, we merge in country-year corporate tax rates from the Centre for Business Taxation Corporate Tax Database.⁸ We define a high and low tax rate countries using the median tax rate across all countries in each year. We define low tax country-year cells as those with corporate tax rates below median in a given year. Considering the recent corporate tax rate changes among many countries, we allow each country to change from high tax to low tax during the sample period by using the pooled data.⁹ Of the 1860 unique plants, 1649 are operating at subsidiary location while 211 are co-located with the global HQ (see Table 1). We observe only one plant for about 66% of the MNEs in our sample, and two or more for the remainder of the sample.

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).

3.2.2 Dynamic analysis sample

While the “static analysis” sample provides the sharpest distinction and most accurate measurement of adoption of management practices across firms, it severely limits the analysis sample relative to the large availability of financial data. The WMS collects data for a random sample of manufacturing plants and we match the financial data from Orbis at the establishment level, which allows us to directly observe management for only 2% of our full financial sample. To extend our sample and use the full financial information, we follow the insights from Bloom et al. [2019]. The authors show that the largest variation in management practices is attributed to the differences between firms, rather than across establishments within firms. This suggests it is reasonable to calculate the average management score for each MNE in our sample, and assign that value to every subsidiary for which we have financial data.

Using ownership data from Orbis, we build the ownership tree for each global ultimate owner

⁸For the dataset see: [data website](#) and for the information on the dataset see: [Eureka website](#).

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

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

Firms in the same corporate group count	WMS sample			Extended sample		
	Total factories	Subsidiary factories	HQ factories	Total factories	Subsidiary factories	HQ factories
	N	N	N	N	N	N
1	1222	1024	198	628	555	73
2	312	304	8	296	226	70
3	132	128	4	261	212	49
4	84	83	1	308	259	49
5	55	55	0	290	254	36
6	30	30	0	300	268	32
7	-	-	-	301	271	30
8	16	16	0	320	289	31
9	9	9	0	369	341	28
10-49	-	-	-	13972	13533	439
50-99	-	-	-	14039	13866	173
100-499	-	-	-	36898	36728	170
500+	-	-	-	12013	12009	4
Total	1860	1649	211	79995	78811	1184

Note: Data from ORBIS and the World Management Survey.

(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 almost 80,000 unique subsidiaries to the 1462 unique HQs in the WMS data yielding over 590,000 firm-year observations. For the event study, we restrict this broader sample to only countries that have experienced a single tax reduction over the sample period.

In Table 2 we report the financial characteristics of the datasets that we use in this paper. Panel A reports the statistics for the sample used in the static analysis, including only firms that have a specific management score. Panel B reports the statistics for the broad sample that serves as the basis for the dynamic analysis, while Panel C reports the statistics for the sample specifically used for the event study. The ROAs reported in subsidiaries located in low-tax countries are higher than those in high-tax locations, and substantially higher for firms classified as aggressive tax avoiders. Reported effective tax rates, on the other hand, are lower in low-tax countries relative to high-tax countries.

3.3 Main constructed measures

Profitability: return on assets

We use ROA as our preferred measure of profitability because it is the best available measure of a company’s profitability relative to its size. The tax literature often uses ROA as the main outcome variable when studying profit shifting behavior. The alternative outcome variable is the ETR, which measures the amount of taxes paid relative to a firm’s profits. We focus our analysis on profitability but report additional results using ETR as an outcome variable in the Appendix.

Aggressiveness: bunching near zero ROA and book-tax differences

We use two proxies for profit shifting behavior. An emerging proxy is the incidence of bunching around zero reported accounting profits, especially if those firms are located in high-tax countries (Bilicka [2019], Johannesen et al. [2016]). A more common approach for measuring aggressive tax avoidance is the size of book-tax difference (BTD), which measures 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

¹⁰We 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.

Table 2: Descriptive statistics for each sample

	Obs N	Firms N	HQs N	Empl Median	ROA	PLBT	ETR	Mgmt
Panel A: Management-only sample								
Low tax sub	17067	1243	293	673	0.065	15064	0.165	3.290
High tax sub	13234	905	213	368	0.048	18336	0.209	3.380
Non-aggressive	16052	1136	262	493	0.015	7721	0.247	3.318
Aggressive	12610	868	214	628	0.122	29323	0.105	3.348
Panel B: Extended sample								
Low tax sub	373000	47265	938	103	0.042	15649	0.149	3.290
High tax sub	271464	32729	882	90	0.036	19702	0.202	3.380
Non-aggressive	353578	44414	941	95	-0.002	4463	0.212	3.318
Aggressive	224538	26220	728	107	0.134	38079	0.111	3.348
Panel C: Event study sample								
Low tax sub	53844	6722	136	125	0.056	18522	0.148	3.303
High tax sub	92684	10646	257	84	0.031	24539	0.157	3.356

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.

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 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

4 Empirical evidence: reduced form

We start with our static analysis sample and estimate a 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 use a high tax subsidiary dummy and a continuous variable of the subsidiary corporate tax rate. Table 3 reports the results across the full sample and relevant subsamples. Column (1), (3), (6) and (7) use the full sample, Column (2) includes only firms that have at least two subsidiaries within the same MNE with a measure of management, Column (4) restricts the sample to only that we have classified as “aggressive”, Column (5) restricts the sample to “non-aggressive” firms.

¹¹Blackburne 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.

¹²Note 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.

Table 3: Summary of results, baseline sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	ROA	ROA	ROA	ROA	ROA	Bunching*	Bunching*
Structured management=1	0.019*** (0.004)	0.014 (0.010)	0.053*** (0.013)	0.075*** (0.014)	0.038** (0.019)	-0.036*** (0.009)	-0.152*** (0.029)
High tax sub	-0.000 (0.007)	0.024** (0.011)				-0.020 (0.019)	
Structured management=1 × High tax sub	-0.008 (0.006)	-0.048*** (0.011)				0.046*** (0.014)	
Subsidiary corp tax rate			-0.148** (0.073)	-0.047 (0.082)	-0.280*** (0.094)		-0.169 (0.179)
Structured management=1 × Subsidiary corp tax rate			-0.137*** (0.047)	-0.253*** (0.046)	-0.054 (0.067)		0.504*** (0.107)
Year FE	✓	✓	✓	✓	✓	✓	✓
Country FE	✓		✓	✓	✓	✓	✓
HQ Country FE		✓					
Observations	27748	10036	27748	11426	14849	27748	27748
R-squared	0.0154	0.232	0.0162	0.0326	0.0356	0.0191	0.0195
Sample	Baseline	Baseline within GUO	Baseline	Aggressive	Non-aggressive	Baseline	Baseline

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

Figure 2: Revenues, ROA, ETR and management: all firms

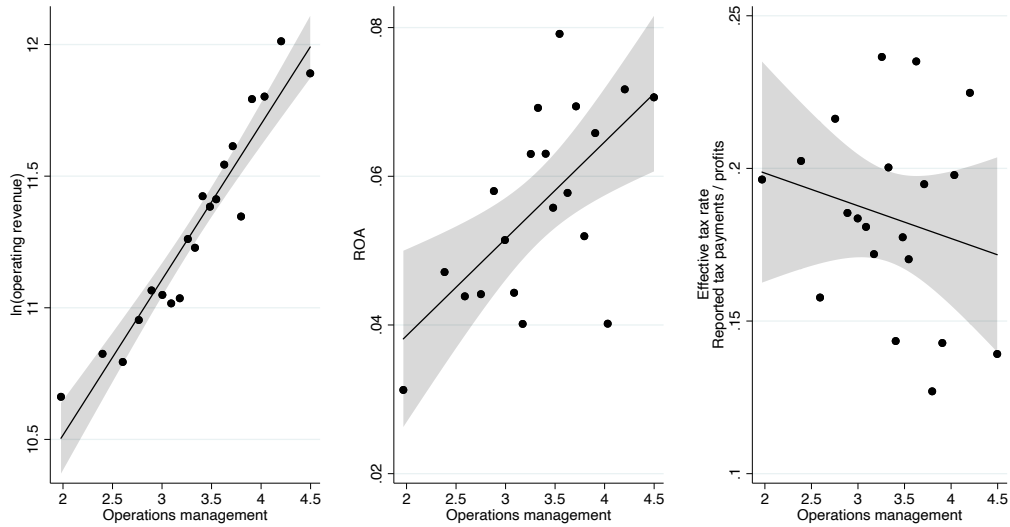
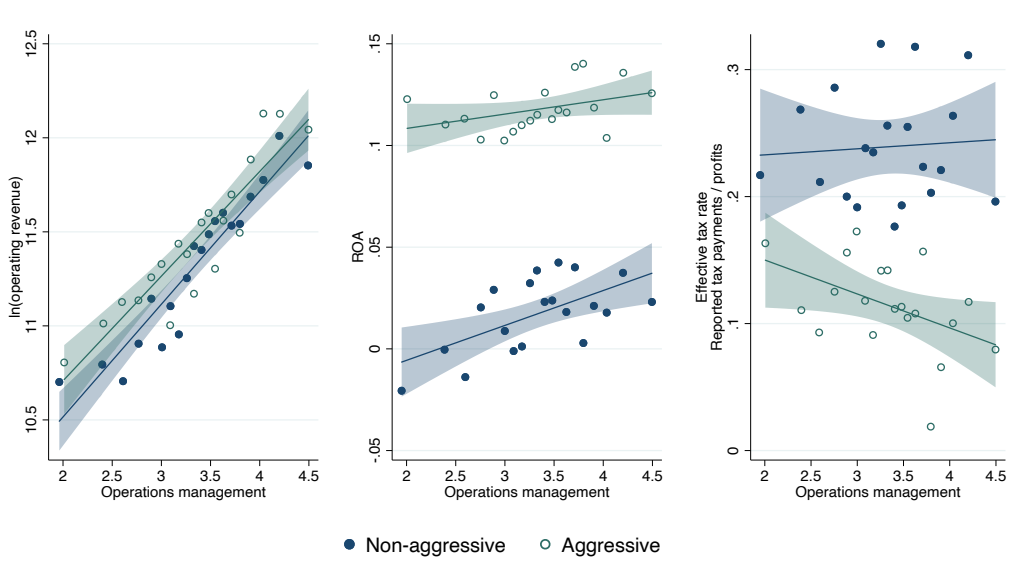


Figure 3: Revenues, ROA, ETR and management: by aggressive category



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.

4.1 Relationship between management and profitability

Table 3 suggests there is a positive and strong correlation between management practices and profitability. More generally, Figure 2 depicts the relationship between management and operating

revenue, ROA and effective tax rates (ETR) using the continuous management measure. While still consistent with the coefficients in Table 3, the relationship between ROA and management practices is noisier than the simpler relationship between operating revenue and management. Further, we find effectively no relationship between management practices and effective tax rates (ETRs) — if anything, the relationship is negative. Effective tax rates are often used in profit shifting literature to illustrate how little tax MNEs pay in various jurisdictions relative to the tax rates. Higher turnover generated by firms with more structured management practices does not necessarily translate into higher taxable profits.

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. Column (1) and (2) shows the interaction between the structured management indicator with a high-tax subsidiary indicator and Column (3) shows the interaction with the continuous subsidiary corporate tax rate. All interaction terms are negative suggesting that, in high tax environments, firms with structured management report lower ROAs. The contrasting relationship is clear in Figure 4, where we plot the local linear regressions separately for subsidiaries in low-tax countries and high-tax countries. There is a clear positive relationship between structured management and ROA in low-tax subsidiaries, while no discernible pattern exists in high-tax subsidiaries.

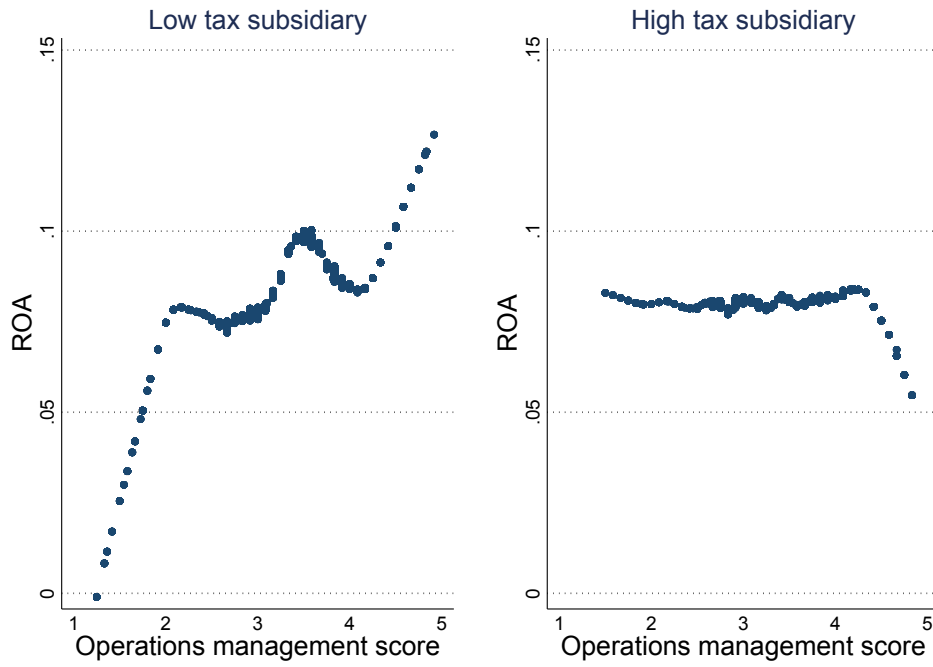
This is not simply a story of location: our descriptive statistics show that firms with more structured management are not systematically located in low-tax rate countries. Hence, we interpret our findings as evidence that these MNEs are likely to shift profits from high-tax countries to low-tax countries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

Column (2) of Table 3 includes HQ fixed effects. The coefficient on the interaction term suggests that, within a given multinational, a subsidiary with structured management located in a high-tax country reports 0.048 lower ROA relative to a subsidiary without structured management practices. 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, consistent with our parametric results.

4.3 Aggressive Tax Planning

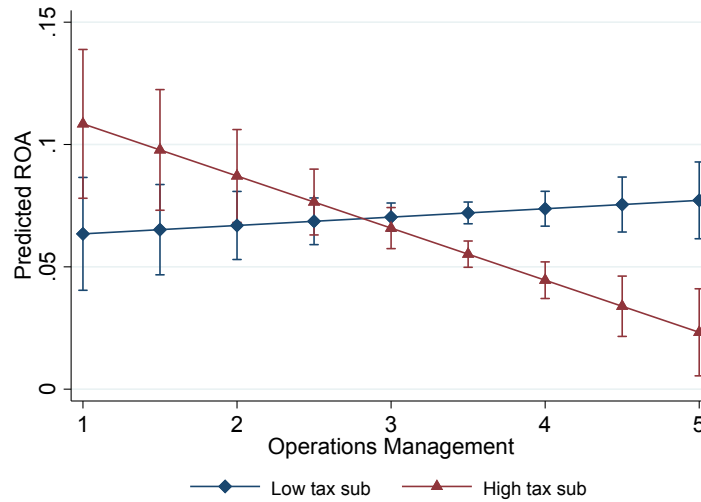
We interpret the evidence as suggestive that firms with structured management may be better at tax planning. This relationship is likely to be starker when considering aggressive and non-aggressive tax planners. We categorize the firms in our sample by this definition and repeat the exercise of Figure 2 in Figure 3. The relationship between management practices and operating revenue is not statistically different between the two types of firms, though we see vastly different relationships for

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

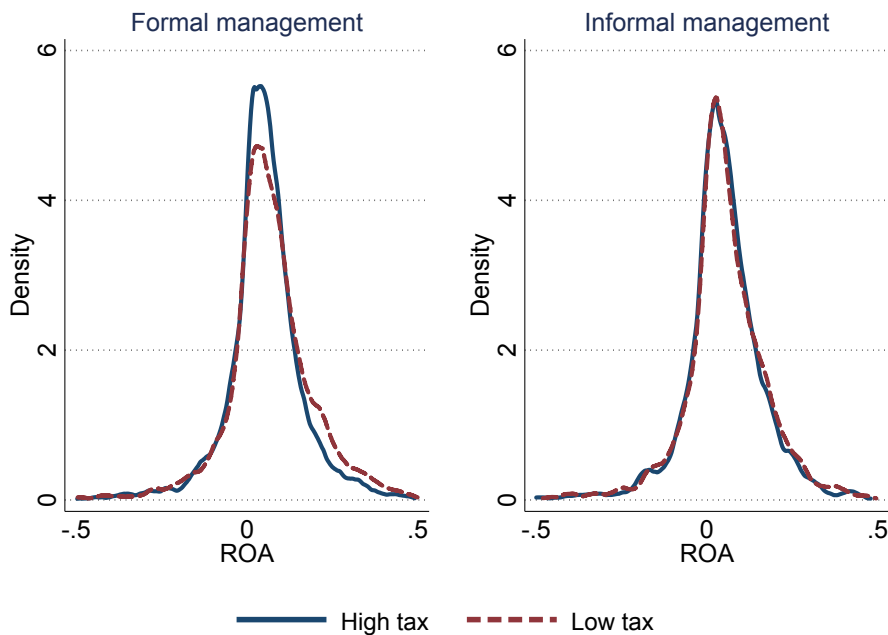


Note: Data from the World Management Survey and Orbis. Firms in baseline sample with at least two observations within a GUO corporate group (HQ and subsidiary, or at least two subsidiaries).

ROA and ETR. The level of reported ROA for aggressive firms is higher than for non-aggressive firms, and both have a positive relationship. The non-aggressive firms show no relationship between ETR and management practices, while we see evidence of a negative relationship for aggressive firms. Similarly, Columns (4) and (5) in Table 3 show the relationship between subsidiary corporate tax rates, structured management and ROA for the samples of aggressive and non-aggressive firms. The interaction coefficient suggests that firms with structured management would report 0.018 lower ROA for a 10% higher subsidiary tax rate.

Columns (6) and (7) use the propensity of MNEs to report near zero ROAs as a proxy for tax avoidance behavior. We report the results of a linear probability model with an indicator taking a value of 1 if ROA is within 0.05 percentage points of zero as an outcome variable. The interaction coefficients suggest that firms with formal management have a significantly higher probability of reporting near zero ROA in high tax countries. In Figure 6 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 6 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.

Figure 6: 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.

To understand differences in profit reporting between the two types of firms we combine the two approaches and plot the distribution of ROA for firms with structured and unstructured management, by the aggressive and non-aggressive classification in Figure 7a. The figure suggests that the bunching around zero ROA evident in the distribution of firms with formal management is driven by firms that are also classified as aggressive tax avoiders.

5 Empirical evidence: event study

The reduced form evidence indicates that the level of management practices adopted by a firm is correlated with the profit reporting behaviour. In particular, firms tend to report lower profits in countries with higher tax rates. The pooling across years yields a static analysis of the stock of profit allocated to each type of jurisdiction across all years. However, profit shifting is a dynamic exercise, and changes year to year in response to corporate tax rate changes across all jurisdictions where the MNE operates. We exploit the time dimension of our data to consider the firm’s response in allocation of profits across jurisdictions after a tax cut in the subsidiary’s jurisdiction. We define an *event* as a change in the corporate tax rate relative to the previous year for that particular country. According to our conceptual framework, a reduction in a tax rate should induce a subsidiary to report more profits in that country (all else equal). We expect this behavior to manifest in firms with formal management practices in place, as they are the only set of firms that have the tractability and predictability of profits that would enable an efficient reallocation of profits.

We conduct an event study exercise using changes in the corporate tax rates across various subsidiary locations of MNEs and estimate the following specification:

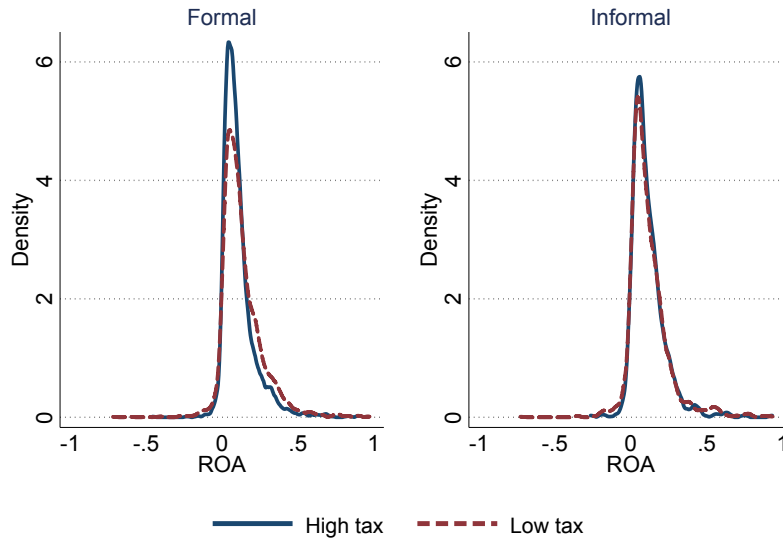
$$ROA_{j,t} = \alpha + \sum_{\kappa=-4}^4 \delta_t \mathbb{1}[t = \kappa] + \sigma_1 X'_{jt} + \eta_t + \epsilon_{jt} \quad (2)$$

where $ROA_{i,t}$ is the return on assets for firm j at time t . $\sum_{\kappa=-4}^4 \mathbb{1}[t = \kappa]$ is a series of year dummies that equal one when the tax reform was κ years away, with the dummy variable corresponding to $\kappa = -1$ as the omitted category. X'_{it} is a set of firm- and country-level control variables (including GDP growth, cost of capital, investment as share of GDP in both subsidiary and HQ countries), η_t is a year fixed effect, and ϵ_{jt} is the error term.

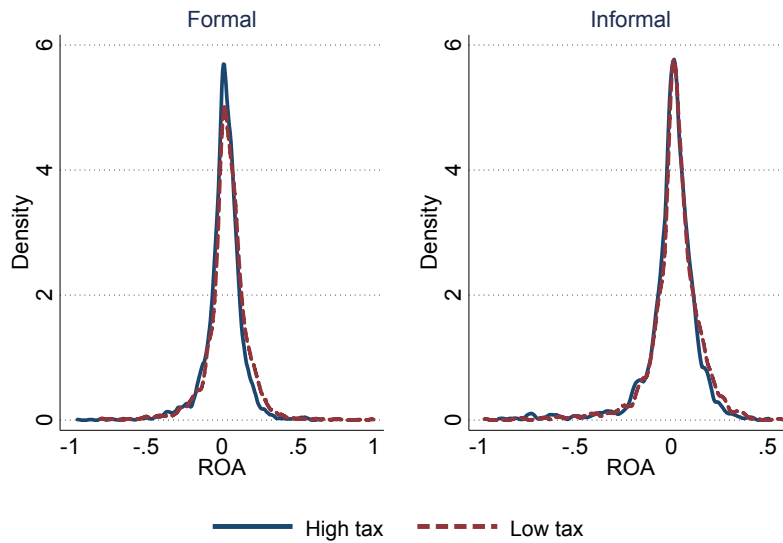
Our coefficients of interest are the δ_t , as they measure the average change in reported profits relative to the κ year before or after the reform across the subsidiaries in our sample. Following McCrary [2007], we bin event dummies at endpoints of the event window (in our case, at $t = -4$ and $t = 4$) such that the end dummies include all reforms occurring 4 or more years beyond the window. This is to account for the different timing of tax rate cuts across countries, which yields

Figure 7: Bunching of ROA around zero for aggressive firms with formal management

(a) Aggressive



(b) Non-aggressive



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

an unbalanced panel for event times.¹³

For the event study, we use the extended sample described in the data section where we assign the average of the management scores for the available subsidiaries to all subsidiaries within an MNE’s ownership tree. This is a more appropriate sample for this analysis for two reasons: (i) it is a much larger panel, making the event study design feasible, and (ii) the event study explores dynamic decisions at the MNE level and thus requires inclusion of the financial data of as many subsidiaries as possible.

Within this larger sample, we focus on the subsidiaries in countries that have had only one tax cut in the event window. It is the simplest iteration of this exercise with the most straightforward interpretation. Restricting our analysis to this subset of countries avoids issues related to possible anticipation of tax changes as well as slow and staggered sequential introductions of large tax rate cuts (such as the large 9% UK tax cut scheduled to be rolled in smaller pieces on an annual basis from 2010 to 2022). In our sample country-year tax rates, almost 31% of the country-year combinations do not have any tax rate changes, about 18% have one tax rate change, 26% have between two and five tax changes, and about 7% have more than five tax rate changes (Figure 8a). The majority of the tax rate changes are tax cuts (Figure 8b), with just under 3% of the country-year observations including a tax increase.¹⁴

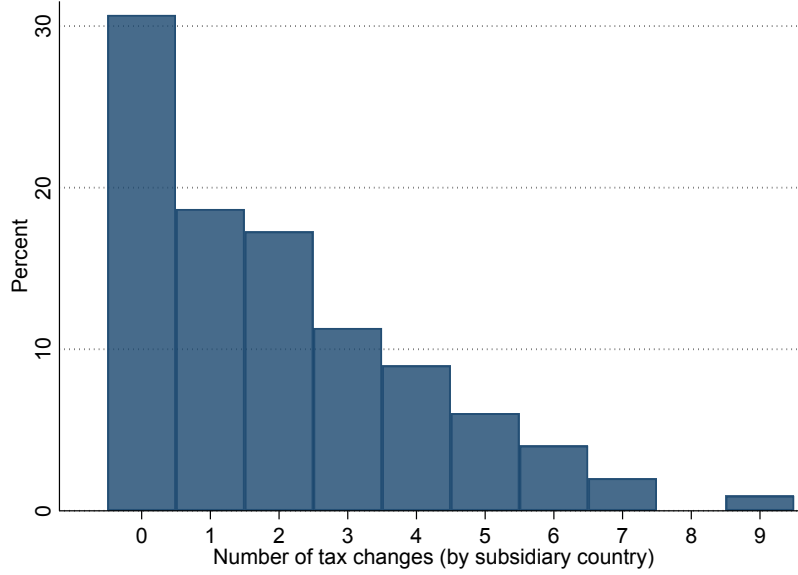
Figure 9 shows the coefficient plot of the time event dummy variables from $t = -3$ to $t = 3$, excluding $t = 1$. The sample only includes subsidiaries in country-years that experienced a tax rate cut, and the interpretation of each coefficient is the reported profits relative to the year prior to the tax cut. We do not include a control group in our event study analysis sample, as it is not clear what set of firms would constitute an appropriate control group. For example, if we were to use the set of country-years that did not experience any tax rate cuts, they would include mostly high tax countries, such as the US, France or Sweden. These are countries where MNEs tend to report lower profits anyway, not yielding a useful control group.

We show results for all subsidiaries in circles, subsidiaries with formal management in squares, and subsidiaries with informal management in triangles. There is no evidence of a pre-trend in periods before the tax rate cut, but there is a clear positive and statistically significant trend starting from $t = 1$ forward. This trend is likely driven by firms with formal management in place, as the coefficients are similar across the two specifications. Firms with informal management in place, on the other hand, show a delayed positive trend but that is not statistically different from zero. The coefficients from the specification using only firms with informal management are, however, imprecise and we cannot suggest they are statistically different from the coefficients using

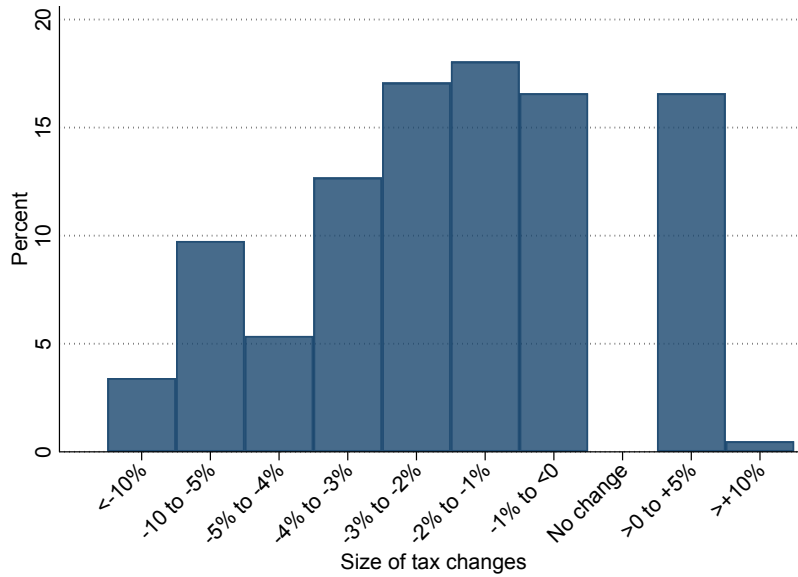
¹³The binning at the end-points of the window is the reason we do not plot the endpoint estimates in the event study graphs.

¹⁴Further, these tax rate increases were mainly small (over 80% under 2 percentage points) and often introduced as a surcharge on corporate tax rate or a local tax increase in response to poor macroeconomic conditions within a country. In contrast, tax rate cuts are often a part of package of larger tax reforms aiming to make a country a more competitive tax system (for example, the announced tax cuts in the UK from 2009).

Figure 8: Number and scale of tax changes between 2004 and 2016



(a) Number of tax changes



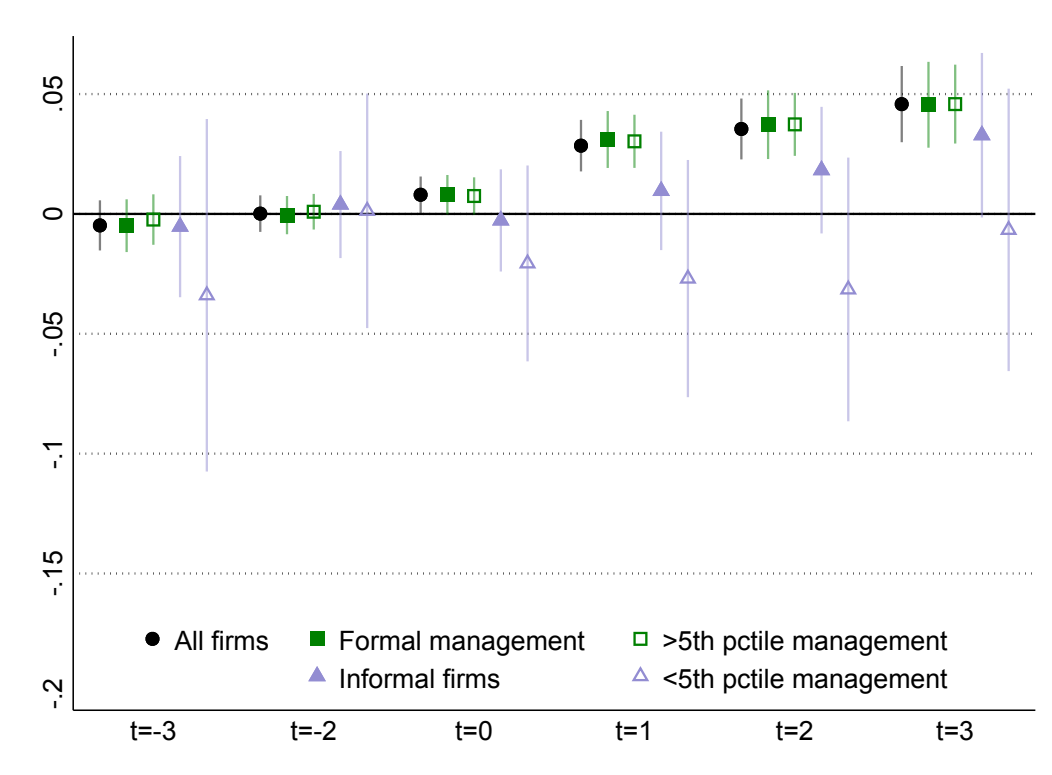
(b) Scale of tax changes

Note: Data from Orbis and the Oxford Centre for Business Taxation.

the sample of firms with formal management.

To further unpack these differences, we explore an alternative definition of “good management” focusing on the tails of the distribution as in [Bender et al. \[2018\]](#). This is especially salient in our MNE sample as the majority of multinationals adopt some basic level of formal management practices. While we see results that are consistent with our conceptual framework when separating firms under the formal and informal management definition, we may expect the MNEs at the bottom of the distribution of this well-managed sample are the least likely to be able to respond to changes in tax rates. These are firms with management scores below 2.5, suggesting there are no areas of operations management that are properly formalized. The hollow squares and triangles show the point estimates of the coefficients for regressions using the sample of firms above and below the 5th percentile of the management distribution respectively. There is no discernible trend in the profit reporting behavior of the “worst managed” firms, and this is a statistically significant difference from those above the 5th percentile.¹⁵

Figure 9: Event study: tax cuts and reported profits



Note: Data from Orbis and the Oxford Centre for Business Taxation.

We conducted a series of robustness and sensitivity checks with various definitions of event

¹⁵This is also consistent with emerging evidence suggesting that most of the profit shifting is done by primarily the “most successful” (largest) multinationals ([Wier and Reynolds \[2018\]](#)).

windows and event definitions. We conducted the following exercises using the same definition of *event*: accounting for multiple tax changes within the sample period, accounting for the size of the tax change, including only subsidiaries in a balanced sample. We also conducted exercises changing the definition of the event to a tax increase rather than a tax cut, and to an event when the tax rate fell below the median tax rate that each MNE is exposed to (rather than the yearly median). We report the results of these exercises in the appendix.

Finally, we explore the propensity of subsidiaries to report near-zero profits in response to a tax cut. Figure A1a shows the results for the samples of firms with formal management in all countries in our sample, as well as only those in high tax country-years and low tax country years. The results suggest that subsidiaries in this sample located in high tax countries are less likely to report near-zero profits after a tax cut. There are no discernible patterns in the response of firms with informal management in place (Figure A1c). These results are consistent with the bunching graphs in Figure 6, where firms with formal management were more likely to bunch around zero ROAs when the tax rates were higher than the median. This implies that a drop in in a corporate tax rate should induce a firm to reduce the likelihood of reporting near zero ROAs.

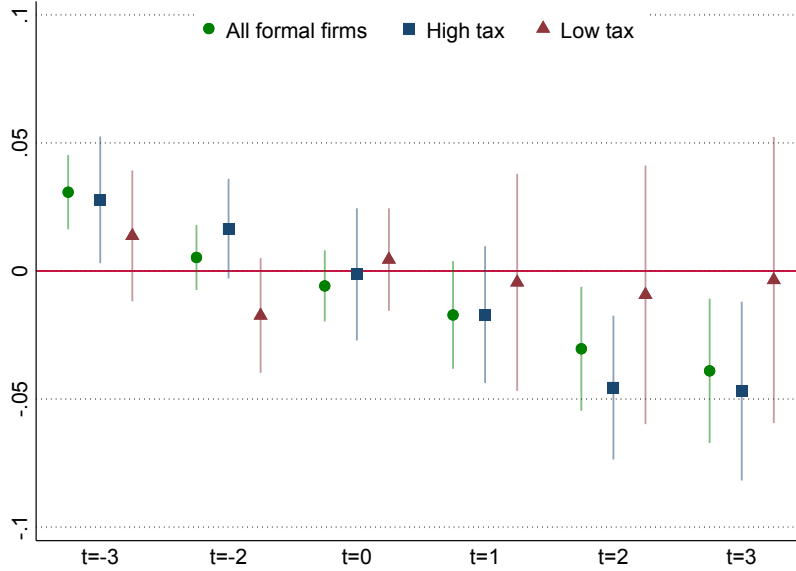
6 Discussion

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.

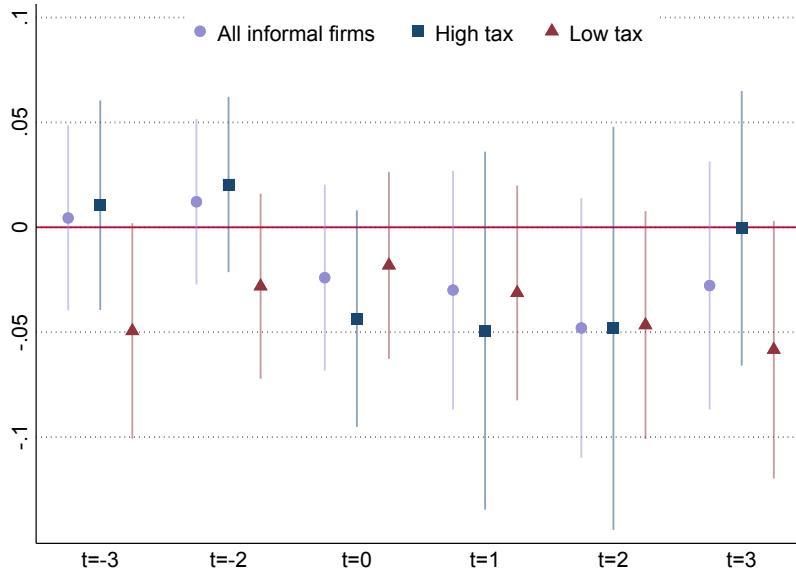
The results in this paper are important from a policy perspective. Management has been shown to improve productivity and this has resulted in multiple countries introducing government funded policies to improve management quality of firms. However, our results suggest that, in addition to increasing 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

Figure 10: Event study: tax cuts and the propensity to report zero profits



(a) Firms with formal management



(b) Firms with informal management

Note: Data from Orbis and the Oxford Centre for Business Taxation.

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.

References

- Stefan Bender, Nicholas Bloom, David Card, John Van Reenen, and Stefanie Wolter. Management practices, workforce selection, and productivity. *Journal of Labor Economics*, 36(S1):S371–S409, 2018.
- Katarzyna Anna Bilicka. Comparing uk tax returns of foreign multinationals to matched domestic firms. *American Economic Review*, 109(8):2921–53, August 2019.
- Terrence Blackburne and Jennifer Blouin. Understanding the Informativeness of Book-Tax Differences. Technical report, 2016.
- Nicholas Bloom and John Van Reenen. Measuring and explaining management practices across firms and countries. *The Quarterly Journal of Economics*, 122:1351–1408, 2007.
- Nicholas Bloom, Benn Eifert, Aprajit Mahajan, David McKenzie, and John Roberts. Does management matter? evidence from india. *The Quarterly Journal of Economics*, 128:1–51, 2013.
- Nicholas Bloom, Renata Lemos, Raffaella Sadun, Daniela Scur, and John Van Reenen. The new empirical economics of management. *Journal of the European Economic Association*, 12(4), 2014.
- Nicholas Bloom, Erik Brynjolfsson, Lucia Foster, Ron Jarmin, Megha Patnaik, Itay Saporta-Eksten, and John Van Reenen. What drives differences in management practices? *American Economic Review*, 109(5):1648–83, May 2019. doi: 10.1257/aer.20170491. URL <http://www.aeaweb.org/articles?id=10.1257/aer.20170491>.
- Kimberly Clausing. The effect of profit shifting on the corporate tax base in the united states and beyond. *National Tax Journal*, 69(4):905–934, 2016.
- Anca D. Cristea and Daniel X. Nguyen. Transfer Pricing by Multinational Firms: New Evidence from Foreign Firm Ownerships. *American Economic Journal: Economic Policy*, 8(3):170–202, August 2016.
- Ronald B. Davies, Julien Martin, Mathieu Parenti, and Farid Toubal. Knocking on tax haven’s door: Multinational firms and transfer pricing. *The Review of Economics and Statistics*, 100(1): 120–134, 2018.
- Mihir A. Desai. The divergence between book income and tax income. *Tax Policy and the Economy*, 17:169–206, 2003. doi: 10.1086/tpe.17.20140508.
- Mihir A. Desai and Dhammika Dharmapala. Corporate tax avoidance and high-powered incentives. *Journal of Financial Economics*, 79(1):145 – 179, 2006.

- Mihir A Desai and Dhammika Dharmapala. Corporate Tax Avoidance and Firm Value. *The Review of Economics and Statistics*, 91(3):537–546, August 2009.
- Mihir A. Desai, C. Fritz Foley, and James R. Hines. A Multinational Perspective on Capital Structure Choice and Internal Capital Markets. *Journal of Finance*, 59(6):2451–2487, December 2004.
- Mihir A. Desai, C. Fritz Foley, and James Jr. Hines. The demand for tax haven operations. *Journal of Public Economics*, 90(3):513–531, February 2006.
- Matthias Dischinger and Nadine Riedel. Corporate taxes and the location of intangible assets within multinational firms. *Journal of Public Economics*, 95(7):691 – 707, 2011.
- Tim Dowd, Paul Landefeld, and Anne Moore. Profit shifting of u.s. multinationals. *Journal of Public Economics*, 148:1 – 13, 2017. ISSN 0047-2727.
- Merle Erickson, Michelle Hanlon, and Edward L. Maydew. How much will firms pay for earnings that do not exist? evidence of taxes paid on allegedly fraudulent earnings. *The Accounting Review*, 79(2):387–408, 2004.
- Clemens Fuest, Andreas Peichl, and Sebastian Siegloch. Do Higher Corporate Taxes Reduce Wages? Micro Evidence from Germany. *American Economic Review*, 108(2):393–418, February 2018.
- Michela Giorcelli. The long-term effects of management and technology transfers. *American Economic Review*, 109(1):121–52, January 2019. doi: 10.1257/aer.20170619.
- Greer K Gosnell, John A List, and Robert Metcalfe. A new approach to an age-old problem: Solving externalities by incenting workers directly. Working Paper 22316, National Bureau of Economic Research, June 2016.
- Anna Gumpert, James R. Hines Jr., and Monika Schnitzer. Multinational firms and tax havens. *The Review of Economics and Statistics*, 98(4):713–727, 2016.
- James R. Hines and Eric M. Rice. Fiscal Paradise: Foreign Tax Havens and American Business. *The Quarterly Journal of Economics*, 109(1):149–182, 1994.
- Harry Huizinga, Luc Laeven, and Gaetan Nicodeme. Capital structure and international debt shifting. *Journal of Financial Economics*, 88(1):80–118, April 2008.
- Niels Johannesen, Thomas Tørsløv, and Ludvig Wier. Are less developed countries more exposed to multinational tax avoidance? 2016(22), March 2016. ISSN 1798-7237.
- Gil B. Manzon, Jr. and George A. Plesko. The Relation between Financial and Tax Reporting Measures of Income. *Tax Law Review*, 55(2), 2002.

Justin McCrary. The effect of court-ordered hiring quotas on the composition and quality of police. *American Economic Review*, 97(1):318–353, March 2007.

Juan Carlos Suárez Serrato and Owen Zidar. Who Benefits from State Corporate Tax Cuts? A Local Labor Markets Approach with Heterogeneous Firms. *American Economic Review*, 106(9): 2582–2624, September 2016.

Thomas R Torslov, Ludvig S Wier, and Gabriel Zucman. The missing profits of nations. Working Paper 24701, National Bureau of Economic Research, June 2018.

Ludvig Wier and Hayley Reynolds. Big and ‘unprofitable’. Working paper, UNU-WIDER, September 2018.

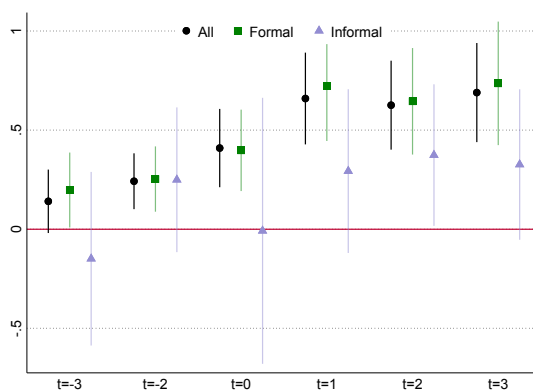
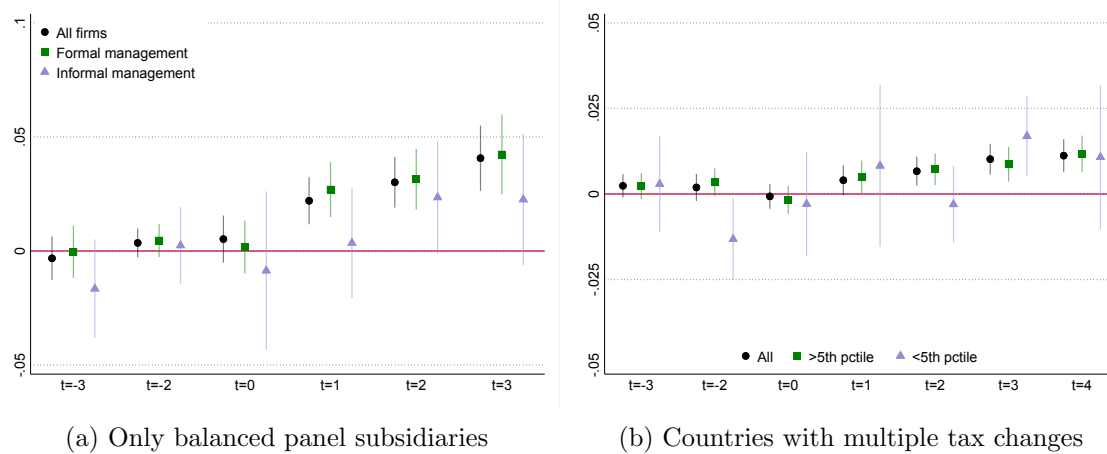
Appendices

Table A1: Summary of results for extended sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	ROA	ROA	ROA	Bunching*	Bunching*	ROA	ROA	ROA
Formal management=1	0.017*** (0.002)	0.074*** (0.005)	0.039*** (0.008)	0.009*** (0.003)	0.015 (0.009)	0.043*** (0.005)	0.097*** (0.006)	0.013*** (0.001)
High tax subsidiary	0.017*** (0.003)			0.015** (0.007)				
Formal management=1 × High tax subsidiary	-0.017*** (0.002)			-0.018*** (0.004)				
Subsidiary Corporate Tax Rate		0.046* (0.026)	-0.012 (0.037)		0.537*** (0.049)	0.017 (0.027)	-0.090** (0.035)	
Formal management=1 × Subsidiary corp tax rate		-0.236*** (0.016)	-0.129*** (0.024)		-0.053* (0.032)	-0.157*** (0.018)	-0.303*** (0.021)	
BTD above median								0.153*** (0.002)
Formal management=1 × BTD above median								-0.009*** (0.002)
Year x Country FE	✓	✓	✓	✓	✓	✓	✓	✓
Observations	591300	591289	275605	400869	400869	206908	324480	531388
R-squared	0.00984	0.0101	0.0130	0.0118	0.0121	0.0216	0.0396	0.0828
Sample	Baseline	Baseline	High tax HQ	Baseline	Baseline	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 A1: Event study sensitivity analysis



Note: Data from Orbis and the Oxford Centre for Business Taxation.

Table A2: Summary of results: effective tax rate

	(1) ETR	(2) ETR	(3) ETR	(4) ETR	(5) ETR
Structured management=1	0.002 (0.012)	0.001 (0.035)	0.057 (0.037)	-0.040 (0.048)	0.125** (0.057)
High tax sub	0.024 (0.025)	0.159*** (0.054)			
Structured management=1 × High tax sub	-0.043** (0.020)	-0.151*** (0.048)			
Subsidiary corp tax rate			1.046*** (0.273)	0.430 (0.339)	1.378*** (0.411)
Structured management=1 × Subsidiary corp tax rate			-0.271** (0.137)	0.050 (0.174)	-0.482** (0.214)
Year FE	✓	✓	✓	✓	✓
Country FE	✓	✓	✓	✓	✓
HQ Country FE					
Observations	26271	9449	26271	11426	14845
R-squared	0.00866	0.0838	0.00910	0.00893	0.0110
Sample	Baseline	Baseline within GUO	Baseline	Aggressive	Non-aggressive

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.