

# Organizational capacity and firm profitability: evidence from multinationals

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## Abstract

This paper analyses the effect of a firm's organizational capacity on reported profitability of multinational enterprises (MNEs). Better organizational practices improve productivity and, in principle, increase potential taxable profits of firms. However, higher adoption of these practices may also enable more efficient allocation of profits across tax jurisdictions. We present new evidence that MNE subsidiaries with better practices, located in high-tax countries report significantly lower profits and have higher incidence of bunching around zero returns on assets. This is in contrast with the positive relationship with firm performance in these subsidiaries. We show these results are driven by patterns consistent with profit shifting behavior. Using an event study design, we find that firms with better practices are more responsive to corporate tax rate changes. Our results suggest organizational capacity, especially monitoring-related practices, enable firms to engage in shifting profits away from their high-tax subsidiaries.<sup>1</sup>

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# 1 Introduction

Understanding heterogeneity in firm performance is one of the oldest topics in economics, and the unique role of managers is highlighted in the earliest papers (Walker; 1887). Decades of empirical work have consistently shown a clear and significant positive relationship between good managers, good management and productivity (e.g., Bandiera et al.; 2015; Bloom et al.; 2013, 2016; Dessein and Prat; 2019; Ichniowski et al.; 1997), but the relationship with profitability has been more mixed (e.g., Adams et al.; 2005; Armstrong et al.; 2012; Bloom, Genakos, Sadun and Van Reenen; 2012; Dyreng et al.; 2010; Koester et al.; 2017). While productivity is a more straightforward measure of production effectiveness, profitability measures — such as returns on assets — inherently include strategic decisions on reporting and may be more reflective of “aggressive accounting practices” than actual performance (Bertrand and Schoar; 2003).

In this paper, we explore the relationship between organizational capacity and firm profitability across countries with different tax rates, and propose that this capacity is an important enabler of legal tax avoidance by multinationals (MNEs).<sup>2</sup> The literature on legal tax avoidance (and, in particular, profit shifting) has primarily focused on the characteristics of individual managers to explain propensity to engage in these activities (Armstrong et al.; 2012; Desai and Dharmapala; 2006; Dyreng et al.; 2010; Koester et al.; 2017). Other than firm size, studies have found few other firm characteristics to be systematically linked with such practices (Bilicka; 2019). We build a unique dataset of manufacturing multinational enterprises (MNEs) across 21 countries, matching management practices data to fifteen years of detailed firm accounts information and classify the tax regimes the firms operate in, as well as their levels of aggressive accounting practices.<sup>3</sup>

We have three main sets of results. First, we classify firms based on the location of their operations, for every year identifying whether they operate their production subsidiaries in low-statutory tax rate or high- statutory tax rate countries. We document that the strong positive relationship between management practices and firm profitability only holds in low-tax countries, while the relationship with productivity holds in both high- and low-tax jurisdictions.<sup>4</sup> This suggests that firms adopting “good” management practices generate higher revenues that, on average, do not translate into higher reported profits outside of lower tax jurisdictions. This pattern persists in the sample of firms where we observe management practices for multiple subsidiaries within the same MNE. Using an event study design exploiting tax rate cuts across countries, we find that firms respond to tax cuts by reporting higher profits in jurisdictions that enact those cuts, and that this

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<sup>2</sup>This paper focuses on legal tax *avoidance* and profit shifting practices, not illegal tax *evasion*.

<sup>3</sup>We focus our analysis on multinational corporations (MNEs) for three reasons: first, they are able to shift profits abroad, unlike domestic firms. 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 statutory tax rates across jurisdictions and time.

<sup>4</sup>For evidence on the positive relationship between management and firm performance and the average positive relationship with firm profitability, see (e.g., Bloom et al.; 2013, 2014; Giorcelli; 2019).

increased reporting is driven by the better managed firms.<sup>5</sup>

Second, we explore three possible channels that could explain the heterogeneity in profit reporting across tax jurisdictions: real productivity differences, local investment incentives, or profit shifting. We find no evidence that differences in profit reporting across high and low tax countries are driven by differential real productivity or local investment incentive take-up, so we turn our attention to profit shifting. A main challenge in studying profit shifting practices is that the activities are not directly observable to firm outsiders. However, there are certain firm behaviors that are indicative of “aggressive avoidance.” The measures we use include firms that have large disparities between their reported financial and taxable profits (large book-tax differences) (Desai; 2003; Desai and Dharmapala; 2006, 2009); MNEs that have tax haven subsidiaries or headquarters in their ownership tree (Desai et al.; 2006; Dowd et al.; 2017; Gumpert et al.; 2016; Hines and Rice; 1994); and firms that report ROAs near zero (Bilicka; 2019; Johannesen et al.; 2020). We show that the patterns we uncover in reporting practices of firms with better management are driven by firms that also exhibit these “aggressive” behaviors.

To consider how better management could enable profit shifting, we propose a simple framework where firms adopting better management practices have more tractable and predictable production plans and we use the detailed data on management practices to iteratively consider each practice. We document that the set of practices related to monitoring production are most consistently correlated with lower profitability in high-tax countries. Broadly, practices linked to tractability and predictability of production, as well as firm-related incentives (and not plant-related incentives) are most likely to enable profit shifting.

Our findings are distinct from, though complementary to, the literature on the effect of individual managers, or manager-specific qualities on profit shifting. While this literature focuses on the characteristics of individuals who are in the position of manager, we focus on the organizational structure those managers operate in. There could certainly be an interaction effect; that is, a “better” manager could be more able to take advantage of a given level of organizational structure, relative to a “worse” manager. But we propose that even a good manager will not be able to shift profits effectively without the appropriate organizational structure in place. Empirically, we show that the effect of organizational capacity on profit shifting does not vary substantially across firms with different levels of individual manager quality proxied by executive compensation, though results are driven by MNEs with higher degrees of centralization. Thus, the effects of organizational capacity on profit shifting are of first order importance.

Our paper contributes to the literatures on profit shifting and the effect of management practices on firm performance. First, the profit shifting literature finds that large MNEs with links to tax havens tend to report low profits in high-tax countries (Desai et al.; 2006; Dowd et al.; 2017; Gumpert et al.; 2016; Hines and Rice; 1994), but beyond firm size there is scant evidence on what

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<sup>5</sup>Fuest et al. (2018) and Serrato and Zidar (2016) use a similar design to consider the effects of corporate tax rate cuts on wages.

characteristics enable profit shifting (Bilicka; 2019; Wier and Reynolds; 2018). There is evidence on a variety of strategies that firms can use 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). Our paper provides a mechanism that enables firms to use these various tools more (or less) effectively. Second, there is a vast literature on the strong positive relationship (correlational and causal) between these “formal” management practices and firm performance. This relationship is consistent across sectors and countries.<sup>6</sup> More recently, studies have started to focus on the relationship between these practices and outcomes other than productivity, such as labor flows (Bender et al.; 2018; Cornwell et al.; 2021) and inequality (Bloom et al.; 2020). We contribute to this new set of outcomes, providing the first evidence of the relationship between these management practices and tax planning activities.

This question has substantial policy relevance from a micro as well as macro perspective. At the micro level, management upgrading projects have come into vogue motivated by the potential of large gains in productivity.<sup>7</sup> As governments tax firm profits rather than productivity, the relationship between better management and potentially lower corporate tax revenues matters for the cost-benefit calculus. From a macro-perspective, our results suggest that heterogeneity in firm management quality can mediate the effectiveness of corporate tax cuts and should be taken in to account when devising such policies.

## 2 Conceptual framework

In this section we discuss the conceptual framework underpinning our empirical investigation. In short, we propose that MNE subsidiaries need good *organizational capacity* to enable effective tax planning, including local tax minimization and shifting of “excess” profits across subsidiaries. We consider that a firm has “good” organizational capacity (henceforth, *better managed*) when they use a set of formal management practices in their day-to-day operations of their subsidiaries.<sup>8</sup> To minimize their tax burden, firms will first aim to lower their *local* tax liabilities as much as possible using, for example, investment incentives and local tax law provisions particular to their operation. Once firms exhaust local options, they will consider whether and how much of their excess profits to move to other jurisdictions under the MNEs global operations.

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<sup>6</sup>See Scur et al. (2021) for a summary.

<sup>7</sup>For example, since 2014 there were 15 operations projects relating to improving management practices “funded” by the World Bank, amounting to 2.6 billion dollars in direct lending. There were also a further 26 technical assistance, advisory services and knowledge management projects (without specific costs attached to them). Knack et al. (2020) reviews the relevance of the World Bank’s non-lending instruments.

<sup>8</sup>“Formal management practices” here implies that there is a set, formal process in place that governs different practices rather than the manager simply running things as they see fit on a day to day basis (that is, *informally*). For example, we would consider a firm that has a specific set of key performance indicators that are measured weekly a “formal” practice, and a loose set of indicators that a manager tends to track whenever they feel is necessary an “informal” practice. Section 3 describes the data in more detail, including further examples.

## 2.1 Methods of profit shifting

Profit reallocation decisions take three major forms: debt shifting, transfer pricing and patent location. To provide context, we briefly outline each strategy and how organizational capacity can influence a firm's ability to use it.

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. In our context, predictable income streams enable effective debt shifting as 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. Note that 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. Having formalized processes that outline a set of production indicators to be regularly tracked and monitored, as well as clear and linked targets across the firm and divisions allows for such planning to take place and enables potential short-term adjustments when necessary.

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. For patent location, MNEs can locate 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. In our context, mis-pricing of goods relies on knowing production levels and feasibility of trade between locations, while determining the amount of royalty payments is easier when one can track firm productivity.

There is no dataset available that would allow for clear identification of which strategies firms are using, as some of these practices remain opaque even within firms. As our framework is consistent with profit shifting decisions using any (or all) the above strategies, we do not need to identify between them but simply need to understand that these are the potential channels through which organizational capacity affects the extent of profit shifting by MNEs.

## 2.2 Organizational capacity and tax planning activities

We propose that 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 available 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. We describe the specific measures of tractability and predictability of production in the next section. As it is unlikely that managers will implement particular management practices exclusively to be able to engage in profit shifting, we do not expect reverse causality to be an issue in our framework.

Our framework implies that better management, via more tractable and predictable production, enables firms to carry out effective tax planning and thus shift a larger share of profits, as they seek to maximize their after-tax profits. We propose that the potential effect of management on profit shifting activities is causal in the same spirit as the effect of management on productivity is causal. For example, in [Bloom et al. \(2013\)](#) a random sample of firms were provided with professional management consulting and the authors find a causal relationship between “better management” and firm performance, as the treated firms experienced a bump of 13% in productivity and expanded their operations within the first year. This improvement in performance naturally happened via the managers who implemented the changes and the employees who became more efficient in their production activities. In our context, better management would affect profit shifting in a similar manner, in that the shifting happens via the managers who decide on the allocation of profits. However, it is the existence of the “good management” structures that make such reallocations possible. To be sure, this is not to imply that we draw causal inference from the correlations presented in this paper, but rather to provide clarity on how we perceive the chain of causality in this context.

Further, our framework is distinct from the literature that considers the effect of individual managers, or manager-specific quality on profit shifting ([Armstrong et al.; 2015](#); [Desai and Dharmapala; 2006](#); [Koester et al.; 2017](#)). This literature implicitly assumes that when a decision is made at the HQ, it can be enacted by all subsidiaries (that is, subsidiary managers). We show that firm heterogeneity in management quality at the subsidiary level can significantly impact the operationalization of profit shifting strategies. While there could be an interaction effect such that a “better” manager could take more advantage of a given level of organizational structure relative to a “worse” manager, even a good manager will not *be able* to shift profits effectively without a minimum level of organizational structure. Further, profit shifting decisions are made by managers at the HQ and not by individual subsidiary managers, but HQ may adopt local incentive policies that are aligned with these decisions. For example, setting manager bonuses relative to MNE performance rather than

subsidiary performance. As such, we expect that firms with higher degrees of centralized decision-making are also more likely to be able to engage in profit shifting behavior. Thus, we suggest that the effect that organization capacity has on profit shifting is still of first order importance.

## 3 Data

### 3.1 Management data

To measure the level of adoption of 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.<sup>9</sup> 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 (see Table C1 and C2 for the full list of questions and the explanation of the measures).

The WMS project systematically collects comparable and time-consistent data on the types of practices used at thousands of manufacturing plants. It uses an interview-based survey tool, where highly trained interviewers engage a middle manager in a semi-structured conversation about the day-to-day practices followed at their establishment. The respondent managers were those who were senior enough in their establishment to have decision powers, but not too senior so as to be detached from the day-to-day running of the establishment. The most common respondent is either the plant general manager or operations manager. The survey is set up as an interview, and the questions although structured, are mostly open-ended so the manager being interviewed is not guided towards what a high or low scoring answer might be.<sup>10</sup> The method is double blind on the side of the interviewees, but also the interviewers who will not typically know anything about the organization in advance. The average WMS response rate is usually between 40 and 50 percent, which is extremely high considering that many firms surveys typically get far lower response rates.<sup>11</sup>

The conversation follows a set of broad practices spanning operations/monitoring, target setting and people/incentive management practices. Each broad sector has between 18 and 20 topics and each is scored on a scale of 1 (little to no structure/“weak practices”) to 5 (well-structured/“best practices”). The WMS does not measure the skills of the *manager* but rather measures the processes embedded in each managerial practice in place within the establishment.

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<sup>9</sup>See Bloom et al. (2014) for a survey.

<sup>10</sup>This avoids the manager simply giving the answer she thinks the interviewer wants to hear.

<sup>11</sup>For example, Altig et al. (2020); Ben-David et al. (2013); Bloom, Bunn, Chen, Mizen, Smietanka and Thwaites (2019) where response rates in firm surveys range from 0.1% to 13%.

Broadly, the scores for each management topic imply the following: A score between 1 to 2 refers to an establishment with practically no structured management practices or very weak management practices implemented; a score between 2 to 3 refers to an establishment with some informal practices implemented, but these practices consist mostly of a reactive approach to managing the organization; a score between 3 to 4 refers to an establishment that has a good, formal management process in place (though not yet often or consistent enough) and these practices consist mostly a proactive approach to managing the organization; a score between 4 to 5 refers to well-defined strong practices in place which are often seen as best practices in the sector.

Following our framework, we focus on the 12 topics that directly relate to operations management and exclude the questions relating to people management from the primary analysis. We use the term “management” to refer to the index of these 12 operations management questions throughout this paper. These are the practices that relate to the tractability and predictability of production, including monitoring and target-setting practices (such as having key performance indicators that are measured and tracked regularly and related targets that link HQ to shop-floor goals). We use the people management index (and its 6 specific practices) in our discussion of mechanisms.

We build two indices of management: a continuous index with the double-standardized average across the 12 topics, and a binary indicator dividing firms into two groups based on a methodological cutoff of the practices measured.<sup>12</sup> 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 “formal” management practices, while those with scores below 3 have, at best, an “informal” set of practices.<sup>13</sup> We use good management and formal management interchangeably.

The survey collects additional information on decentralization and manager incentives though it does not include any financial data. The decentralization variable is a standardized average of three questions that measure at which level a set of key decisions are made for the firm. The three decisions are: (a) new product introductions, (b) sales and marketing, (c) hiring of new full time workers. The scoring follows a similar 1 to 5 scale, where 1 means all decisions are taken at HQ, 3 means decisions are equally shared and a score of 5 means the plant manager has complete authority over these decisions.<sup>14</sup> The survey also collects three variables on specific manager incentives: (i) the average size of managerial bonuses, (ii) the share of the managerial bonus tied to overall company performance and (iii) the share of the managerial bonus that is tied to plant-specific performance.

We use only firms that are subsidiaries of MNEs from the WMS sample. They operate in various countries in North America, Europe, Latin America and Asia. The average MNE in each of the countries in our sample has a management operations score between 2.95 and 3.53, suggesting the

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<sup>12</sup>The WMS z-score is computed by standardizing each question, taking the average, and standardizing the average. The binary indicator comes from the methodological cutoff used in the scoring of each question by the WMS interviewers (as in [Cornwell et al. \(2021\)](#)).

<sup>13</sup>We do not split firms into more granular bands of management using the integer cutoff points. This is because the majority of MNEs in our formal category lie between scores of 3-4, with very few firms having scores above 4.

<sup>14</sup>This measure has been validated and used in other work ([Aghion et al.; 2021](#); [Bloom, Sadun and Van Reenen; 2012](#)).



average MNEs across the countries we study tend to have “formal” practices in place. However, there is substantial variation in the adoption of management practices across MNEs within countries, with scores ranging from below 2 to almost 5. Figure 1 reports the distribution of scores across countries, including the corporate tax rate for each country next to the country name. The average management score for firms in high-tax subsidiaries is 3.41 and the score for firms in low-tax subsidiaries is 3.32. While this difference is statistically significant, its magnitude is small and, on average, the countries with the lowest average management scores do not also have the lowest corporate tax rates in the sample. This should alleviate the concern that our results could be simply picking up a correlation between more “formal” management and tax rates in high tax-countries. As management practices is generally a slow moving variable, we consider it to be constant across years and take the average of the management score across years for firms that have multiple values.<sup>15</sup>

## 3.2 Firm financials and data structure

### 3.2.1 Main analysis sample

We match the subsidiaries of MNEs from WMS with their financial information from Bureau van Dijk (Orbis) dataset between 2004 and 2019. We matched 1,783 firms in the WMS with at least one year of financial data in Orbis, yielding over 16,000 firm-year observations for the first part of the analysis. Using Orbis ownership information from 2019, we match each subsidiary for which we observe a management score with a parent company that this MNE affiliate belongs to. Our sample includes 1,388 unique parent companies.<sup>16</sup>

Using the location of the HQ and the subsidiary, we merge in country-year corporate statutory tax rates from the Centre for Business Taxation Corporate Tax Database.<sup>17</sup> We define low tax country-year cells as those with statutory corporate tax rates below median in a given year, and high tax country-year cells as those with tax rates above median in a given year. As such, a particular country will be classified as high or low tax on an annual basis, depending on their relative tax rate in each year.<sup>18</sup> Of the 1,783 unique plants, 1,572 are operating at subsidiary location while 211 are co-located with the global HQ. We observe only one plant for about 65% of the MNEs in our sample, and two or more for the remainder of the sample.

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<sup>15</sup>While the WMS has a set of firms with panel data, the sample size is not large enough to allow us to look at changes in management.

<sup>16</sup>We require unconsolidated subsidiary level data to analyze differences in the allocation of profits between firm subsidiaries. Thus, we are unable to use Compustat for the US, which includes consolidated level data.

<sup>17</sup>The data is available in the [CBT website](#). For further data documentation see the [Eureka website](#).

<sup>18</sup>For instance, UK had 30% corporate tax rate in 2007 (above median tax rate), but had gradually lowered its main corporate rate to 19% in 2017 (below median tax rate).

### 3.2.2 Event study sample

While the “main analysis” sample provides the sharpest distinction and most accurate measurement of management practices across firms, it 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. However, Bloom, Brynjolfsson, Foster, Jarmin, Patnaik, Saporta-Eksten and Van Reenen (2019) show that the largest variation in management practices is attributed to the differences between firms, rather than across establishments within firms. This suggests the average management score for a subsidiary in our sample is a reasonable proxy for all other subsidiaries within that MNE.<sup>19</sup>

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<sup>20</sup> that belong to that parent (e.g. Aminadav and Papaioannou; 2020; Belenzon et al.; 2018). We match just under 58,000 unique subsidiaries to the HQs in the WMS data yielding over 346,000 firm-year observations. For the event study, we restrict this broader sample to only subsidiaries that experienced a single tax rate reduction within the sample period for which we observe full data for that subsidiary. This yields a sample of over 17,500 subsidiaries with over 115,000 firm-year observations.

Table 1 reports summary statistics across all firm-years in the two main samples used in this paper. Panel A reports the statistics for the sample used in the baseline analysis, including only firms that have a directly-measured management score. Panel B reports the statistics for event study sample. We highlight the average values of the main variables in our analysis between subsidiaries in low tax country-years, high tax country-years, and firms that are classified as aggressive and non-aggressive for each year. Of note is that the differences in management scores and share of firms with formal practices are small in magnitude between high- and low-tax country-years, as well as between aggressive and non-aggressive types.

### 3.3 Main constructed measures

**Profitability, performance and investment measures:** Return on assets (ROA) is our preferred measure of firm profitability, as is common in the productivity literature as well as the tax and profit shifting literature. It is defined as profit and losses before taxes divided by total assets. An alternative outcome variable in the tax literature is the effective tax rate (ETR), which measures the amount of taxes paid relative to a firm’s profits. Effective tax rates are often used in profit shifting literature to illustrate how little tax MNEs pay in various jurisdictions relative to the tax

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<sup>19</sup>We check the robustness of our main results to this larger sample in the Online Appendix.

<sup>20</sup>Majority ownership means that the the parent company owns 50% of the shares of the subsidiary.

rates. We focus our analysis on profitability but report additional results using ETR as an outcome variable in the Appendix. We measure performance using the logarithm of sales per employee. We proxy for investment using the annual growth rate of fixed assets.

**Aggressiveness: book-tax differences, tax havens and bunching near zero ROA** We use three proxies for aggressive tax avoidance behavior. Our first proxy follows the most commonly used approach and uses 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 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.<sup>21</sup>

We calculate BTDs following the literature and subtract from the pre-tax profits the current tax expense grossed up by the corporate tax 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 as more likely to be aggressive avoiders and those with below median BTDs as likely to be non-aggressive firms.<sup>22</sup>

A second proxy for aggressive tax avoidance is the use of tax havens by multinational firms. [Gumpert et al. \(2016\)](#); [Hines and Rice \(1994\)](#) show that having a tax haven in the firm structure signifies behaviour consistent with more aggressive profit shifting. We use this proxy as a dummy indicator that takes value 1 when an MNE has at least one tax haven subsidiary in the firm ownership tree or if it has a parent headquartered in tax haven. Note, that BTD is a firm level proxy for tax aggressiveness, while presence of tax haven is an MNE level proxy. Most of MNEs in our sample have tax havens in their firm structure, which is consistent with evidence from previous literature ([Desai et al.; 2006](#); [Gumpert et al.; 2016](#)).<sup>23</sup>

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<sup>21</sup>[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.

<sup>22</sup>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.

<sup>23</sup>Note that Orbis dataset has very poor coverage of financial information for tax haven subsidiaries, as discussed by [Torslov et al. \(2018\)](#). However, firms do report the presence of tax have subsidiaries in Orbis data and we use only

Our third proxy follows a relatively recent approach and measures the incidence of bunching around zero reported accounting profits (Bilicka; 2019; Johannesen et al.; 2020). This approach has the benefit of having the lowest data requirements, as it simply uses the distribution of ROAs across the sample. It is also the most straightforward, as the non-parametric analysis does not require additional assumptions to be imposed for the classification of firms. The only assumption is that firms looking to minimize their tax liabilities aim to report as close to zero accounting profits as possible.

## 4 Management and profitability in MNEs across tax jurisdictions

### 4.1 Reduced form evidence

The core relationship between management and firm performance (measured by log of revenue and ROA) has been consistently estimated across and within countries, and we replicate this result in Figure 2. The correlation between management and profitability is noisier than the simpler correlation between management and operating revenue. Broadly, this suggests that higher turnover generated by firms with better management practices does not necessarily translate into higher reported profitability. To unpack these patterns, we estimate a reduced form model correlating the ROA of each firm to their management scores, the tax rate in the subsidiary and the interaction between the two:

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

where  $ROA_{it}$  is the returns on assets,  $M_i$  is management score indicator,  $CTRate_{ct}$  is the statutory corporate tax rate in country  $c$  at time  $t$ ,  $X_{it}$  includes firm level and MNE level controls.  $\eta_c$  are country fixed effects and  $\delta_t$  are year fixed effects. Firm level controls include: log of the number of employees, the log of total assets, and log of the total number of subsidiaries that MNE has. The management score indicator takes a value of 1 if the firm’s score is equal to or above a value of 3, interpreted as having on average “formal” practices in place. We run the reduced form model across the main set of samples used in this paper and report the results in Table 2.<sup>24</sup>

Column (1) re-affirms the positive correlation between formal management and *average* profitability. Columns (2) and (3) include an interaction with the country statutory corporate tax rate, and the negative coefficients on the interaction terms suggest that firms with formal management report significantly lower profits in higher tax countries. For example, the coefficients in Column (3) imply that if we were to move a firm with formal management from a country at the 25th percentile value of corporate tax rates (approximately 22%) to a country at the 75th percentile of

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this information.

<sup>24</sup>We use different standard error clustering across different specifications depending on the sample we use and the variation we explore, following Abadie et al. (2017). We use robust standard errors in the baseline specifications, but cluster at the MNE level when we explore the within-MNE variation.

tax rates (approximately 30%), they would report almost 3 percentage points lower ROA in the higher tax country. Figure 3a depicts this relationship across the distribution of the management score. We plot the local linear regressions of management scores on profitability for subsidiaries in low-tax and high-tax country-years separately. The commonly documented relationship between management and profitability seems to be primarily driven by firms located in low-tax countries, while no discernible pattern exists for firms located in high-tax countries. This stands in stark contrast to the relationship between management and performance, where there is no differential pattern between high- or low-tax countries (Figure 3b).

Pooled cross sectional data allows us to observe the *location* of reported profits, but not the *allocation* of these profits across jurisdictions within MNEs. This is a concern if firms with formal management are more likely to locate in high- or low-tax jurisdictions for reasons that are unobserved. To partially address this concern, in Column (4) we restrict the sample to the set of MNEs in the WMS sample for which we observe multiple subsidiaries belonging to the same MNEs and run a model with MNE fixed effects.<sup>25</sup> The coefficient on the interaction term with the binary management measure is significantly negative, and we plot the marginal effects of the continuous measure of management for high- and low-tax subsidiaries in Figure 4. The differences are statistically significant beyond a management score of 3, consistent with Table 2. We interpret this as suggestive evidence that these MNEs are likely to shift profits from their high-tax subsidiaries to low-tax subsidiaries in order to minimize their overall tax bill.

## 4.2 Event study evidence

The reduced form evidence indicates that formal management practices are correlated with profit shifting behaviour. In particular, firms with formal management tend to report lower profits in countries with higher tax rates. This 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 process, and MNEs reallocate profits often in response to corporate tax rate changes across all jurisdictions where they operate. As such, the relevant causal inference question is understanding how management practices enable firms to respond to tax changes. We exploit the time dimension of our data to consider the effect of a tax rate cut on the allocation of profits across jurisdictions. 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 estimate the following specification:

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<sup>25</sup>This comes with the caveat that the sample includes only 617 firms and 6,084 firm-year observations, representing approximately one-third of the total baseline sample.

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

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  $\kappa$  years away, with the dummy variable corresponding to  $\kappa = -1$  as the omitted category.  $X'_{jt}$  is a set of firm- and country-level controls (including GDP growth, cost of capital, investment as share of GDP in both subsidiary and HQ countries),  $\eta_t$  is a year fixed effect, and  $\epsilon_{jt}$  is the error term.

The coefficients of interest are the  $\delta_t$ , as they measure the average change in reported profits relative to the  $\kappa$  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 an unbalanced panel for event times.<sup>26</sup>

We use the event study sample described in [Section 3](#) focusing on the subsidiaries in countries that 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 11 percentage point UK tax cut scheduled to be rolled in smaller pieces on an annual basis from 2010 to 2022). However, this restriction is applied at the firm level, such that firms that experienced only one tax rate cut in their “sample lifetime” are also included even if the country they are located in had multiple tax changes throughout the entire sample period.<sup>27</sup>

We do not include a control group in our event study analysis sample. There are several reasons for not doing so. First, the ideal control group would include firms located in countries where no tax rate changes occurred during our sample period. Most countries have between 1 to 3 tax rate cuts between 2005 - 2018, with only 7 countries not enacting any changes in this period. This would not constitute a representative group of countries relative to those with tax cuts. Second, our event times span different years across different countries. If we built a synthetic control group for any one particular country, it is not clear how this would apply to other countries with different time lines and reference years. In principle it could be possible to treat each tax rate cut as a separate event and construct a synthetic group for each of those weighting the outcomes of each of those event

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<sup>26</sup>The binning at the end-points of the window is the reason we do not plot the endpoint estimates in the event study graphs.

<sup>27</sup>For example, a firm located in Sweden — a country with tax cuts in 2009 and 2013 — could still be in the sample if the firm only reports data between 2004 and 2011 and not after, or between 2010 and 2017, but not before. We include a map of the countries included in our event study sample in [Figure B2a](#).

studies.<sup>28</sup> However, the data requirement of such an approach are too stringent for our context and thus we favor the more straightforward approach of omitting a control group.<sup>29</sup> We use the variation in tax rate changes and between different management types to identify the effects of tax rate cuts for the firms in our event study sample.

Table 3 reports the results for the simple pre- and post- analysis, averaging across the relevant time periods. Columns (1, 4 and 7) include only country and year fixed effects, Columns (2, 5 and 8) add firm and macro-level controls and Columns (3, 6 and 9) add MNE fixed effects. Columns 1-3 include the full sample, while columns 4-6 focus on aggressive firms and columns 7-9 on non-aggressive firms, using the tax haven definition of aggressiveness. The coefficient on the interaction between the formal management indicator and the post-tax cut indicator is positive in Columns 1-3 which indicates that firm profitability increases after a tax rate cut. The coefficients in Column (2) suggest that, following a tax rate cut, firms with formal practices in place report 1.8 percentage points higher ROA in those jurisdictions in the post-period. This positive response is driven by aggressive firms, while we see no reported profitability response from non-aggressive firms. Looking at the within-MNE correlations in Column (3), the results are the closest we can get to understanding reallocation patterns across subsidiaries of the same MNE. While the coefficient value halves, it is still significant in the post-period for firms with formal management (p value = 0.052). This is also driven by aggressive firms (Columns 6 and 9).<sup>30</sup>

Figure 5a shows the coefficient plots of the time event dummy variables from  $t = -3$  to  $t = 3$ , setting  $t - 1$  as the reference time period (highlighted by the dashed line). Panel (a) plots event dummy coefficients separately for firms with formal and informal management in place. As the sample only includes subsidiaries in country-years that experienced a tax rate cut, the interpretation of each coefficient is the reported profits relative to the year prior to the tax cut. Subsidiaries with formal management are represented by white diamonds, and subsidiaries with informal management are represented by shaded diamonds. There is no evidence of a significant pre-trend in periods before the tax rate cut, but there is a clear positive and statistically significant response starting from  $t = 0$  onward for firms with formal management. Firms with informal management in place show a delayed positive response, which is not statistically different from zero until period  $t = +2$ . In Panel (b) we plot that the difference between firms with formal and informal management. Again there is no pre-trend in the difference, and it is statistically significant in all post time periods.

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

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<sup>28</sup>As in, for example, Campos et al. (2014); Dube and Zipperer (2015)

<sup>29</sup>Given the staggered nature of the tax rate cuts we analyze, including a control group brings with it a concern that the estimated effects may be contaminated when “already-treated” observations act as control group (Borusyak and Jaravel; Working Paper; Callaway and Sant’Anna; 2020; de Chaisemartin and D’Haultfoeuille; 2020; Sun and Abraham; 2020). These problems arise from negative weights in the computation of the average treatment effect. As such, we instead opt for a conservative sample selection that allows for the clearest interpretation of the differential patterns we are concerned with.

<sup>30</sup>Note that the Event Study sample includes a different set of countries (and tax rates) relative to the baseline sample (see Figure B2) and thus the coefficients are not directly comparable.

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. These results are summarized in Figure B4 in the Appendix.

### 4.3 Channels of low profit reporting

Our evidence thus far suggests that better managed firms report lower profitability in high-tax countries. While this is consistent with these firms being better at profit shifting, these patterns could also be explained by other reasons. In this section, we discuss two potential alternatives — differences in performance and differences in ability to take advantage of investment tax incentives — and show why we believe the data is most consistent with the profit shifting channel. We summarize these results in Table 4.

**Performance** Panel A of Table 4 reports the results of our baseline specification with productivity and investment as outcome variables. Starting with Columns (1) and (2), the outcome variable is the log of sales per employee. The interaction term between formal management and corporate tax rate is positive and significant, suggesting that despite having lower profitability, better managed firms have (if anything) higher productivity in high-tax countries.<sup>31</sup> A similar pattern in the dynamic exercise with our event study suggests there is no significant difference in productivity response following a tax rate cut (Panel D of Figure 5). Thus, “real” performance differences do not seem to explain lower profitability in high tax countries for better managed firms.

**Investment** In our conceptual framework, we outlined that firms have two primary channels to minimize tax liabilities (local investment tax deductions or profit shifting) and management practices could work through either channel. Firms could use tax law provisions within their jurisdictions to lower their taxable profits at a first instance. Using fixed asset growth as a proxy for investment, Columns (3) and (4) report the results with this alternative outcome variable. We show that firms in higher-tax countries have lower investment rates, but we do not find evidence that this is *differentially* true for firms that have formal management in place. Another useful variable for insight into this question is the amount that a firm claims as depreciation in a year, though data for this variable is quite limited. In principle, the difference between a firm’s reported EBIT (earnings before interest and taxes) and EBITDA (earnings before interest, taxes and depreciation of assets) should give us the depreciation amount claimed. However, in practice these lines are not always reported in income statements and thus we have a large share of missing values. Profit and loss statements, where ROA comes from, are relatively more complete and another reason ROA is a more commonly used metric. Still, we run an exercise of iterating through these various outcomes and

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<sup>31</sup>To be sure, there is a clear positive relationship between management and productivity in both low- and high-tax countries, though the level of productivity is higher in high-tax countries (Figure 3b).



report the results in the Appendix (Table B2).<sup>32</sup> For this selected sample of firms, the interaction coefficient between management and the tax rate suggests depreciation plays only a minor role in explaining the differences we are interested in. As such, we see deductions from investment as part of the story, but not contributing to our understanding of the difference in reported profits between high and low tax jurisdictions.

**Profit shifting** Once firms exhaust local options, they will consider whether and how much of their excess profits to move to other jurisdictions under the MNEs global operations.<sup>33</sup> First, in Panel B of Table 4 we repeat the specification from Column (3) in Table 2 for the sub-samples of firms across two definitions of aggressive avoidance behavior detailed in Section 3. In Columns (1) and (2) we proxy for aggressive behavior with above- and below-median BTDs, and in Columns (3) and (4) with the presence of tax haven in the firm ownership tree. The interaction coefficients suggest that firms with formal management report significantly lower ROAs in higher tax environments, but that relationship is entirely driven by firms that are more likely to be aggressive. We find no significant relationship for firms that are less likely to be aggressive.

Second, we plot the distributions of ROAs around zero for two groups of firms: those with formal management in place and those with informal management 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 formal 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 informal management. Consistent with profit shifting behavior, we show the bunching patterns are driven by firms classified as “aggressive” (Figure 7).<sup>34</sup> We also run a regression analogue of these non-parametric plots in Panel C of Table 4. Here, we report results of 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. As in Panel B, in Columns (1) and (2) we proxy for aggressive behavior with above- and below-median BTDs, and in Columns (3) and (4) with the presence of tax haven in the firm ownership tree. The interaction coefficient between formal management and subsidiary corporate tax rate is positive and significant only for firms that are classified as aggressive. These results are consistent with the non-parametric results.

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<sup>32</sup>We show the sample is selected (Column 3 reports the same specification as in Column 1 using only the firms with EBIT and EBITDA data available), so results should be interpreted with caution.

<sup>33</sup>In our conceptual framework we do not need to distinguish between the possible *modes* of profit shifting that firms use, but rather assume that firms will use whatever modes are available and suit them best. A deeper exploration of these modes is outside the scope of this paper. However, a simple comparison of ROA with EBIT can shed some light on the use of debt shifting by MNEs. Again with the caveat that data is extremely limited for this exercise, we compare firms that have made data on both their ROA (from profit and loss statement) and EBIT (from income statement) available to shed some light on the use of interest deductability by MNEs (Table B2). For this selected sample of firms, there is limited evidence that interest deductability plays a role. Magnitude-size, the interaction coefficient for EBIT as an outcome variable in Column 4 is smaller than the coefficient for ROA in Column 3, but not statistically significant.

<sup>34</sup>We use the definition of aggressiveness based on having BTD above median, and we report the Haven definition in the Appendix, Figure B1.

#### 4.4 The role of individual managers

Our paper focuses on management practices that are distinct from individual manager quality as there is a large literature on the role of individual managers and accountants on firm’s performance (Bertrand and Schoar; 2003; Zwick; 2021) and on firm’s tax avoidance (Dyreng et al.; 2010; Koester et al.; 2017). In this literature, the effects of individual managers are separated from that of firm specific characteristics by exploiting the movement of managers across firms. Data constraints prevent us from engaging in such an exercise in detail,<sup>35</sup> but we repeat our main analysis for the 282 firms for which we have CEO and CFO compensation data from Orbis (Table 5).

The Orbis directors data includes the latest information on position and salary of various executive managers, but is often missing the time frame in which they serve. As such, we cannot build a panel of executive compensation and aggregate over the executive team, as in Armstrong et al. (2012); Desai and Dharmapala (2006). Instead, we consider the latest current average salary within Chief Executive Officers (CEOs) and Chief Financial Officers (CFOs).<sup>36</sup> This value does not vary over time, and only 2.8% of managers hold contemporaneous positions in more than one firm. Column (1) repeats the specification from Column (3), Panel A in Table 2, while column (2) repeats the specification, but only for the sample of firms for which we have executive compensation data. The interaction term is still negative and significant, but the magnitude is almost four times larger, suggesting it is a highly selected sample of firms. Still, controlling for CFO compensation (Column 3) or CEO compensation (Column 4) does not change the magnitude of the interaction coefficient across specifications. These results suggest that the effect of formal management practices on a firm’s capacity to shift profits is relevant beyond the effect of individual manager quality.

An alternative measure of the role of HQ managers is the level of centralization of decision-making. In Columns (5) and (6), we use a WMS proxy for centralization described in Section 3 and split the sample into firms that have decisions made primarily jointly or at the plant (decentralized) or primarily at HQ (centralized). The interaction term is only significantly negative for firms that make their decisions primarily at the HQ. This is consistent with our conceptual framework, where we argue that decisions about allocation of profits across subsidiaries (and consequently profit shifting) are taken at the parent level but need good management structures at the local level to be effectively executed.

### 5 Mechanisms: which practices enable or constrain profit shifting?

The patterns we find are consistent with better managed firms engaging in profit shifting practices. In this section we provide an exploratory analysis of the specific types of practices that could be enabling or constraining the allocation of reported profits across subsidiaries. The WMS includes

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<sup>35</sup>Our focus is on both private and public firms, and directors data is mostly available for the latter.

<sup>36</sup>The average salary in the finance, accounting and legal departments within our sample of MNEs is similar to the CFO average salary.

individual measures for 18 different management practices across four broad areas, as discussed in Section 3: lean manufacturing, production monitoring, target-setting and people management. Each practice carries a wealth of information about the inner workings of the firm. Thus far we have aggregated the 12 operations-related questions into a single index, but there are three distinct “sub-areas” within the operations section. For this exercise, we also use the remaining 6 questions related to people management. We discuss each set in turn.

The results we describe below are summarized in three figures. Figure 8 presents the coefficients on the interaction term between subsidiary tax rate and each of the four aggregate indices of management quality. We show those interaction coefficients for all firms (blue diamonds), aggressive firms (green triangles) and non-aggressive firms (orange circles). We use a presence of tax haven in MNE ownership tree to define aggressiveness. We repeat the exercise for profitability in Figure 9 and for performance in Figure 10, reporting the interaction coefficients for subsidiary tax rate and each of the 18 management practices from the WMS survey.<sup>37</sup>

**Is it management, or just general competence?** While we propose in our conceptual framework that tractable and predictable production processes enable profit shifting, one possibility is that our index is simply a proxy for “having one’s act together”. That is, firms do a number of things well, including management and other unobservable profit shifting-related activities, and our measure is a proxy for this overall “fiscal competence”. In this scenario, our index provides little tangible information to elucidating what profit-shifters actually do. However, if our conceptual framework is accurate, only a subset of the practices that make up the index would enable profit shifting, and exploring the individual practices would help in further understanding these often-obfuscated patterns. In this scenario, individual practices can either be “enabling” or “constraining” profit shifting. We use “enabling” to mean that firms with higher scores in a particular practice are more likely to report lower profits in high-tax countries relative to low-tax countries. We use “constraining” to mean that, despite firms looking to minimize reported profits in a high-tax jurisdiction, higher scores in a particular practice are correlated with higher reported profits. Broadly, our results show that practices linked to tractability and predictability of production (that is, operations), as well as firm-related incentives (and not plant-related incentives) are most likely to enable profit shifting — but only for firms also classified as aggressive tax avoiders. However, the same specifications using productivity as an alternative outcome yield almost the opposite result, suggesting these firms are significantly more productive in real terms but not in reported profitability terms. We focus on the profitability results below.

**Manufacturing competence: lean operations** The closest metric we have to “having one’s act together” is the first two topics in the WMS questionnaire: the interviewer asks the manager

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<sup>37</sup>We include the corresponding tables in the Appendix: Tables B3 and B4 for profitability and in Tables B5 and B6 for performance.

to describe the production process in their firm, and further probes about the adoption of modern manufacturing best practices and the rationale for adoption. A lower score on these topics suggests a firm has relatively rudimentary production processes, with little automation and independent (ad-hoc) introduction of new processes and practices, and the adoption of practices was primarily a necessary response. A higher score implies a firm has effective and optimized production systems (including modern manufacturing processes such as just-in-time production, automation and flexible support systems), and their introduction was borne out of a proactive competitiveness drive.

The results in Figure 8 suggest that aggressive firms with better lean operations practices report lower profits in higher-tax countries. Non-aggressive firms, however, have a substantial positive relationship. This pattern is consistent for the individual practices making up the index (Figure 9). If the patterns we interpret as profit shifting were driven only by “general competence”, we would expect to see both aggressive and non-aggressive firms to have a negative correlation.

**Tractability and Predictability: monitoring and target-setting practices** The next set of practices, aggregated in the monitoring index, measure the quality and rigour of performance tracking at the firm. The five processes measured here include the set of key performance metrics used and recorded at the firm, the frequency of measurement as well as the structure, quality and follow-up of managerial performance meetings. A lower score on these topics suggests a firm has an inadequate number of performance indicators (either too few or too many) tracked with inadequate regularity (or not tracked at all), and little to no structure in managerial performance review meetings. A higher score implies a firm has a reasonable number of performance indicators that reflect their overall performance, tracked with regular oversight and structured review meetings including clear documentation of outcomes and accountability of follow-up plans.

The coefficient on the interaction term in Figure 8 is significantly negative for aggressive firms, as are all the individual practices in Figure 9. For non-aggressive firms we find no significant relationship on average, and only one of the individual questions is significant (and positive). This is consistent with our conceptual framework that focuses on predictability and tractability of production as important enablers of profit shifting. The practices in this index directly measure a firm’s ability to plan production patterns so they predictable and consistent, but also be able to adjust their production levels on short-notice to act on policy directives from HQ.

The set of practices relating to target-setting provide a more nuanced picture. The five practices in this index broadly measure the type, construction and time horizon of targets and goals of the organization (both plant and firm). The first two practices measure linkages between HQ and the plant level targets. More specifically, firms with higher scores in “types of targets” tend to include shareholder concerns in their target-setting, while those with lower scores primarily focus on operational and local financial goals. Firms with higher scores in “interconnection of targets” tend to build targets that iteratively link the work on the shop floor to the overall firm targets. The other three topics, however, are primarily measuring plant-specific practices relating to the time

horizon of goals, the difficulty of plant-specific goals and how clear and understandable the goals are to shop-floor workers. Firms with higher scores on these practices have short, medium and long-term horizons, targets that are tough but achievable and shopfloor workers have a good understanding of their targets and those of the plant. Firms with lower scores mostly focus on short-run goals, have targets that are either too easy or too hard, and shopfloor workers are unlikely to understand their goals or those of the plant.

The interaction coefficient on target-setting index is not significant for neither aggressive nor non-aggressive firms. However, the two practices related to targets that link HQ and subsidiary are significantly negative for aggressive firms. This is consistent with our conceptual framework, as a focus on shareholder value and strong linkages between plant and HQ goals would enable better reallocation of profits across subsidiaries. These latter three measures, however, speak to specific local goals of the manufacturing plant, and thus would not necessarily have a direct relationship with profit reporting decisions coming from the HQ.

**Incentives and alignment: people management** The last set of practices in the survey relate to people management. The topics cover how firms find and recruit good workers, evaluate performance to reward and promote good employees as well as deal with poor performers, and how firms retain their top talent. While these practices relate primarily to the shopfloor workers, three questions include aspects related to managerial incentives as well (rewarding performance, promotions and distinctive workplace). Firms with higher scores on these three practices would discuss having performance-based rewards and professional development for at least their managers (even if shopfloor are rewarded based on tenure), and creating a “distinctive value proposition” that attracts top talent to their firm instead of competitors. Firms with higher scores on the other three practices would have regular local performance assessments of their shopfloor workers, address underperformance quickly, and go to great lengths to retain their best workers in their plant.

The interaction effect for the overall index in Figure 8 is negative for aggressive firms, though only the three practices including aspects related to performance or promotions seem to enable profit shifting. One possibility is that aggressive firms align their incentives to base bonuses on MNE performance instead of local plant performance. Evidence suggests this is likely the case, as we can verify with the WMS measures of bonus allocation.<sup>38</sup> This is consistent with our conceptual framework in that firms need to have the basic set of monitoring and target-setting tools as a platform from which to build effective incentives for their managers. While this allows for a link to the complementary literature on managerial fixed effects driving profit shifting, it is outside the scope of this paper and we leave further exploration of this interaction to future work.

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<sup>38</sup>Panel B of Tables B4 shows that firms offering larger manager bonuses tend to report lower profits in higher tax countries — but only if the bonuses depend on MNE performance and only in case of aggressive firms.

## 6 Conclusion

In this paper, we revisit the relationship between management practices and firm performance, focusing on the link with firm profitability. We document that there are substantial and significant differences in reported profitability depending on the statutory tax rates of the subsidiary location for multinational firms. We find the link between better management and higher reported profitability is only present in low-tax jurisdictions. We find evidence that this behavior is consistent with better managed firms being more able to engage in profit shifting activities. Practices related to tractable and predictable production, as well as properly aligned incentives are most likely to enable such actions. Using an event study design, we show better managed firms are also more likely to respond to a tax cut with reporting higher profits in the newly-lower tax jurisdiction. We consider possible determinants of this pattern, and rule out that this is driven by “real” performance differences. We also do not find evidence of differential take-up of local tax incentives.

The results in this paper are important from a policy perspective. Our results suggest that, while better firm management may increase firm productivity and “real” profitability, they also seem to reduce reported profitability in high-tax countries. Lower reported profits can lead to lower corporate tax revenues, having potentially important welfare implications. Further, this is relevant for countries engaging in government-funded policies to improve management quality of firms. While we are not suggesting that governments should stop funding these projects altogether, an understanding of the multiple potential effects of management beyond productivity should factor into the cost-benefit analysis.

More generally, the results presented in this paper are likely to be lower bound estimates of how large the effect of management is for profit shifting. This is because profits reported by firms are generally different between tax returns and accounting statements, as [Bilicka \(2019\)](#) shows. This difference is markedly larger for multinational firms and thus the evidence shown here may be even more pronounced with tax returns data instead of accounting data for reported MNE profits. Replicating this exercise with tax records data is a fruitful area of future work.

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## Tables and figures

Table 1: Descriptive statistics for each sample

	Low tax vs High tax				Aggressive vs Non-Aggressive			
	Low tax Mean	High tax Mean	Low tax N	High tax N	Non-Agg Mean	Agg Mean	Non-Agg N	Agg N
<b>Panel A: Management-only sample</b>								
Employment	1445.03	921.59	10771	5305	1124.32	1563.32	8477	6741
Profit & Loss before tax	16707.74	19471.80	10771	5305	8267.07	31069.29	8477	6741
Return on Assets	0.06	0.05	10771	5305	0.02	0.12	8477	6741
Effective Tax Rate	0.17	0.22	10017	5199	0.25	0.11	8475	6741
Management	3.32	3.41	10771	5305	3.34	3.38	8477	6741
Formal mgmt = 1	0.74	0.79	10771	5305	0.75	0.77	8477	6741
<b>Panel B: Event study sample</b>								
Employment	713.47	943.15	49225	79625	644.38	1152.57	63765	53141
Profit & Loss before tax	19043.44	21687.37	49227	79629	2954.02	41999.02	63767	53143
Return on Assets	0.05	0.01	49227	79629	-0.04	0.13	63767	53143
Effective Tax Rate	0.16	0.15	41874	73991	0.18	0.12	62751	53114
Management (avg)	3.47	3.42	49227	79629	3.44	3.44	63767	53143
Formal mgmt (avg) = 1	0.84	0.84	49227	79629	0.84	0.85	63767	53143

*Note:* Data from the World Management Survey (2004-2014) matched with Orbis (2004 to 2018). The Effective Tax Rate is the ratio of reported tax payments to profit and loss before taxes. Management is the average for the WMS operations management questions (including lean management, monitoring and target-setting). Panel A shows descriptive statistics for the sample for which we observe management measures at the firm level. Panel B show descriptive statistics for the firms in our Event Study; that is, firms that are located in countries that experienced one tax rate cut throughout the sample period. Low tax subsidiaries are firms located in countries with below median statutory corporate tax rate in a given year. High tax subsidiaries are firms located in countries with above median statutory corporate tax rate in a given year. Non-aggressive are firms with book tax difference (BTD) below median in a given year and Aggressive are firms with BTD above median in a given year.

Table 2: Summary of baseline results with ROA as the outcome variable

	(1) ROA	(2) ROA	(3) ROA	(4) ROA
Formal management=1	0.015*** (0.003)	0.052*** (0.015)	0.041*** (0.015)	0.037 (0.030)
Subsidiary corp tax rate	-0.316*** (0.063)	-0.213*** (0.075)	-0.236*** (0.075)	-0.323*** (0.117)
Formal management=1 × Subsidiary corp tax rate		-0.140*** (0.054)	-0.121** (0.054)	-0.169* (0.098)
Country FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
Firm controls			✓	✓
Observations	16076	16076	16076	6084
# firms	1783	1783	1783	617
Mean	0.058	0.058	0.058	0.061
Sample	<b>Baseline</b>	<b>Baseline</b>	<b>Baseline</b>	<b>Baseline within GUO</b>

*Note:* Data from Orbis and the World Management Survey. WMS sample includes only firms for which we observe management scores and were directly matched in both WMS and Orbis. Formal management = 1 is a dummy equal to one when the average for the WMS operations management questions (including lean management, monitoring and target-setting) is 3 or above, on a scale of 1 to 5. Subsidiary corp tax rate is the annual statutory corporate tax rate in the country where a firm is operating. The outcome variable in all columns is Returns on Assets (ROA) which is the ratio of profit and loss before taxes and total assets. All specifications include country and year fixed effects. Firm controls include log of employment, log of fixed assets and log of number of subsidiaries in the MNE. Standard errors are robust in columns 1-3 and clustered at the MNE level in column 4.

Table 3: Pre-post summary table, event study sample

<b>Dependent variable: ROA</b>	All firms			Aggressive firms			Non-Aggressive firms		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Formal management=1	-0.023** (0.010)	-0.022*** (0.008)		-0.024** (0.011)	-0.024*** (0.008)		-0.003 (0.012)	-0.006 (0.013)	
POST tax cut=1	-0.008 (0.011)	-0.010 (0.010)	0.002 (0.007)	-0.011 (0.011)	-0.011 (0.010)	0.003 (0.008)	0.001 (0.018)	-0.007 (0.020)	-0.024 (0.018)
Formal management=1 × POST tax cut=1	0.023** (0.011)	0.028*** (0.011)	0.014* (0.007)	0.026** (0.012)	0.030*** (0.011)	0.013* (0.008)	-0.000 (0.022)	0.011 (0.022)	0.020 (0.016)
Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Country FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Macro controls		✓	✓		✓	✓		✓	✓
Firm controls		✓	✓		✓	✓		✓	✓
MNE control			✓			✓			✓
Observations	115721	100539	100539	110767	96476	96476	4954	4063	4063
# firms	17581	17581	17581	16861	16861	16861	720	720	720
Dependent Variable Mean	0.030	0.030	0.030	0.030	0.030	0.030	0.051	0.051	0.051

*Note:* Data from Orbis and the World Management Survey. This table includes only the firms in the Event Study sample, which includes all subsidiaries belonging to an MNE that has at least one plant observed in the WMS. Management data is then averaged across all subsidiaries within an MNE. Aggressive firms are defined as having a subsidiary in a tax haven. Non-aggressive firms are defined as not having any subsidiaries in a tax haven. The event considered here is firms that experienced one tax rate cut during the sample period. POST is a dummy equal to 1 in the years after the tax rate cut. The outcome variable in all columns is ROA (returns on assets) which is the ratio of profit and loss before taxes and total assets. Firm controls include log of employment, log of fixed assets and log of number of subsidiaries in the MNE. Standard errors are clustered at the MNE level in Columns 3, 6 and 9 and robust otherwise.

Table 4: Potential channels: productivity, investment, profit shifting

<b>Panel A:</b>	(1)	(2)	(3)	(4)
<b>Productivity and Investment</b>	Ln(sales/employee)		Fixed Asset	Growth
Formal management=1	-0.195 (0.140)	-0.140 (0.109)	0.019 (0.013)	0.014 (0.013)
Subsidiary corp tax rate	-1.021* (0.576)	-1.058** (0.493)	-0.186** (0.076)	-0.184** (0.076)
Formal management=1 × Subsidiary corp tax rate	1.074** (0.486)	0.980** (0.382)	-0.078 (0.047)	-0.068 (0.047)
<i>Firm controls</i>		✓		✓
<i>Observations</i>	15620	15620	12964	12964
<i># firms</i>	1759	1759	1721	1721
<i>Dependent Variable Mean</i>	12.370	12.370	0.076	0.076
<b>Panel B: Profitability</b>	Return on Assets (ROA)			
Formal management=1	0.066*** (0.017)	0.010 (0.021)	0.061*** (0.016)	-0.020 (0.036)
Subsidiary corp tax rate	-0.088 (0.087)	-0.373*** (0.103)	-0.215** (0.084)	-0.131 (0.155)
Formal management=1 × Subsidiary corp tax rate	-0.220*** (0.058)	-0.000 (0.077)	-0.256*** (0.058)	0.184 (0.126)
<i>Firm controls</i>	✓	✓	✓	✓
<i>Observations</i>	6741	8477	11771	4305
<i># firms</i>	1513	3103	2137	1783
<i>Dependent Variable Mean</i>	0.122	0.017	0.063	0.044
<i>Sample</i>	<i>BTD&gt;median</i>	<i>BTD&lt;median</i>	<i>Haven</i>	<i>No Haven</i>
<b>Panel C: Bunching</b>	Near-zero ROA = 1			
Formal management=1	-0.149*** (0.053)	-0.057 (0.057)	-0.118*** (0.043)	-0.038 (0.089)
Subsidiary corp tax rate	-0.245 (0.301)	0.351 (0.302)	-0.013 (0.247)	0.552 (0.435)
Formal management=1 × Subsidiary corp tax rate	0.503*** (0.190)	0.185 (0.209)	0.496*** (0.161)	-0.084 (0.322)
<i>Firm controls</i>	✓	✓	✓	✓
<i>Observations</i>	6741	8477	11771	4305
<i># firms</i>	1513	1590	1263	520
<i>Dependent Variable Mean</i>	0.268	0.421	0.346	0.392
<i>Sample</i>	<i>BTD&gt;median</i>	<i>BTD&lt;median</i>	<i>Haven</i>	<i>No Haven</i>
Country FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓

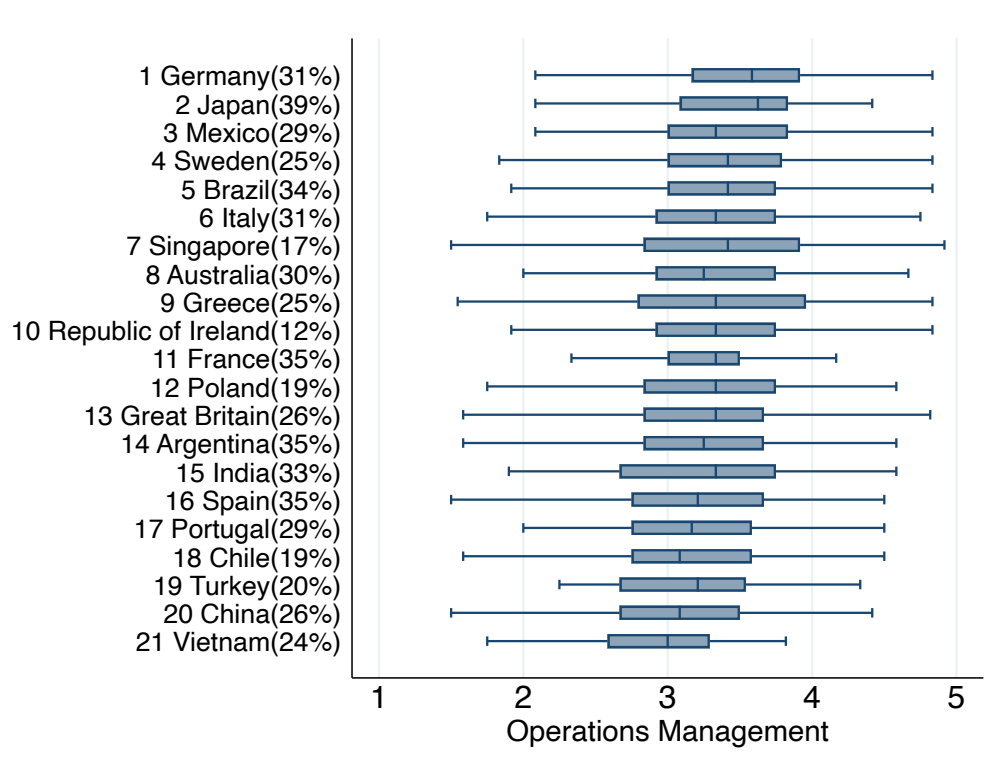
*Note:* Data from Orbis and the World Management Survey. Panel A outcome variables in Columns 1 and 2 are log of sales per employee, and in Columns 3 and 4 the outcome variable is the annual growth rate of fixed assets. Panel B outcome variable is Return on Assets (ROA), the ratio of profit and loss before taxes to total assets. Panel C outcome variable is a dummy variable = 1 when the ROA is “near zero” ( $0 \pm 0.05$ ). Formal management = 1 is a dummy = 1 when the average for the WMS operations management questions (including lean management, monitoring and target-setting) is 3 or above, on a scale of 1 to 5. Subsidiary corp tax rate is the annual statutory corporate tax rate in the country where a subsidiary is operating. Panel A includes all firms in our baseline sample. Panels B and C separates the sample into “aggressive” (Columns 1 and 3) and “non-aggressive” (Columns 2 and 4) classifications, defined by firms having book tax differences (BTD) above or below median (respectively) and having a subsidiary in a tax haven or not (respectively). All specifications include country and year fixed effects. Firm controls include log of employment, log of fixed assets and log of number of subsidiaries in the MNE.

Table 5: Summary of baseline results: role of individual managers

	(1)	(2)	(3)	(4)	(5)	(6)
	ROA	ROA	ROA	ROA	ROA	ROA
Formal management=1	0.041*** (0.015)	0.115*** (0.043)	0.117*** (0.043)	0.114*** (0.043)	0.009 (0.019)	0.062*** (0.022)
Subsidiary corp tax rate	-0.236*** (0.075)	-0.171 (0.179)	-0.168 (0.178)	-0.168 (0.178)	-0.300*** (0.106)	-0.167 (0.105)
Formal management=1 × Subsidiary corp tax rate	-0.121** (0.054)	-0.448*** (0.143)	-0.456*** (0.143)	-0.449*** (0.143)	-0.004 (0.072)	-0.198** (0.078)
Ln(CFO compensation)			-0.014*** (0.005)			
Ln(CEO compensation)				0.010 (0.007)		
Country FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
Firm controls	✓	✓	✓	✓	✓	✓
Observations	16076	3434	3434	3434	7372	8704
# firms	1783	321	321	321	821	962
Dependent Variable Mean	0.058	0.067	0.067	0.067	0.060	0.056
<b>Sample</b>	<b>Baseline</b>	<b>CEO/CFO data</b>	<b>CEO/CFO data</b>	<b>CEO/CFO data</b>	<b>Decentralized</b>	<b>Centralized</b>

*Note:* Data from Orbis and the World Management Survey. WMS sample includes only firms for which we observe management scores and were directly matched in both WMS and Orbis. Column (1) repeats Column (3) from Table 2 for reference. Column (2)-(4) restrict the sample to firms with CEO/CFO compensation data. Columns (5) and (6) include only firms with WMS centralization measure above and below a score of 3, respectively. The WMS centralization measure is a score from 1 (most centralized) to 5 (most decentralized). Formal management = 1 is a dummy equal to one when the average for the WMS operations management questions (including lean management, monitoring and target-setting) is 3 or above, on a scale of 1 to 5. Subsidiary corp tax rate is the annual statutory corporate tax rate in the country where a firm is operating. Ln(CFO compensation) is the natural logarithm of chief finance officer compensation, ln(CEO compensation) is the natural logarithm of chief executive officer compensation. The outcome variable in all columns is Returns on Assets (ROA) which is the ratio of profit and loss before taxes and total assets. All specifications include country and year fixed effects. Firm controls include log of employment, log of fixed assets and log of number of subsidiaries in the MNE. Standard errors are robust in all columns.

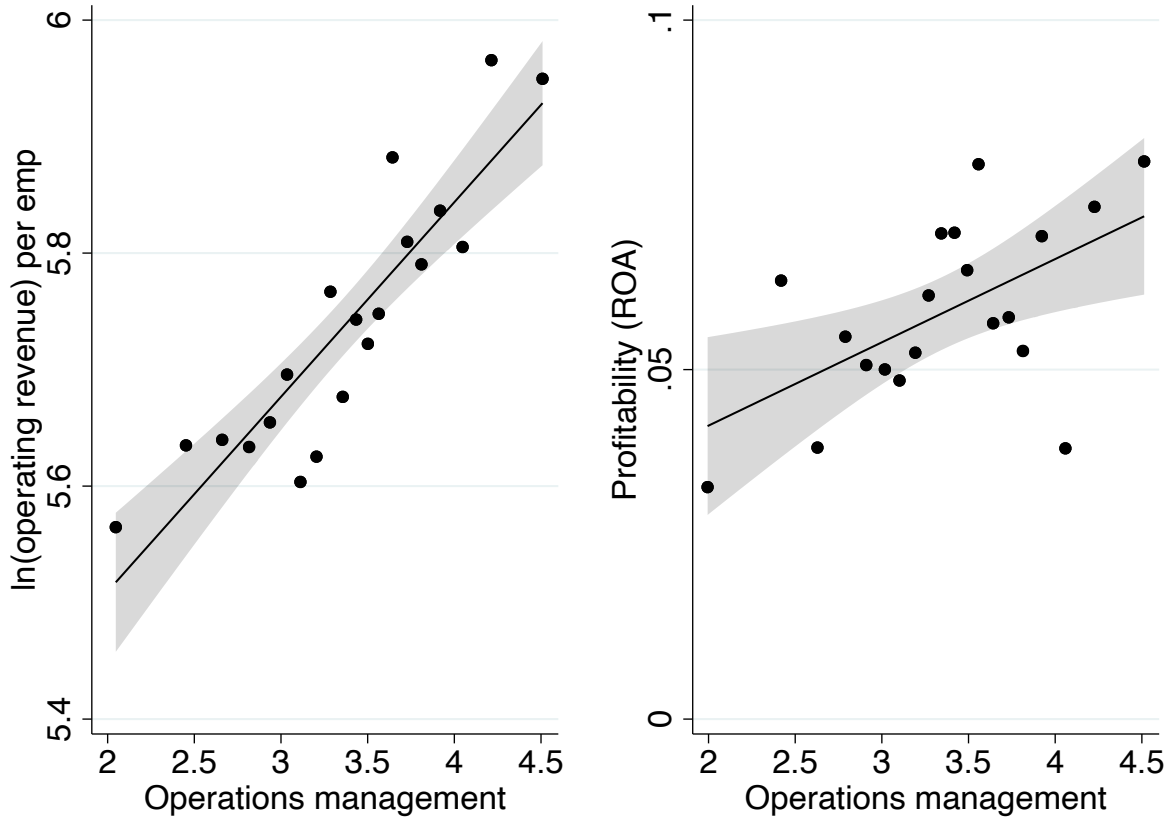
Figure 1: Average management score of multinationals with dispersion within countries.



*Note:* In brackets next to country names we show the average statutory corporate tax rates across 2004 - 2019 from the Center for Business Taxation Tax Database. Data plotted comes from the World Management Survey. Management is the average for the WMS operations management questions (including lean management, monitoring and target-setting). There is 1,860 firms in total across all countries. Each row shows the average management score for all firms in each country (dark blue) and the bars show the standard deviation in management scores across firms in each country.



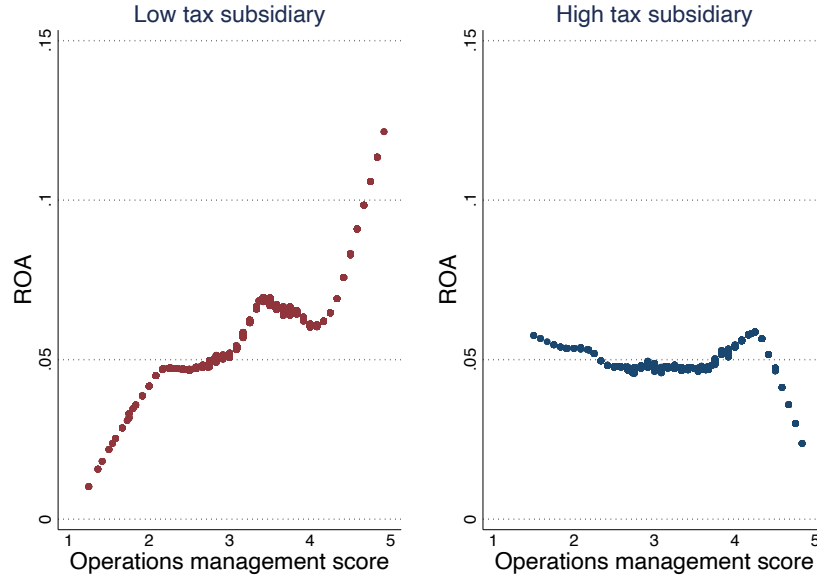
Figure 2: Revenues, ROA, and management



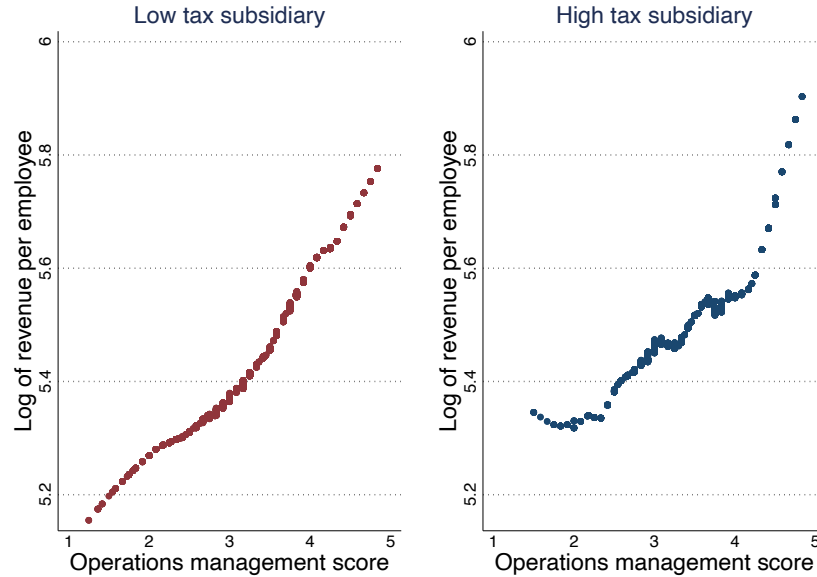
*Note:* Data from the World Management Survey and Orbis. Firm productivity is measured by log of revenues per employee. ROA is the ratio of profit and loss before taxes and total assets. This figure plots the binned scatterplot of each relationship, with management divided into 20 bins. The line shows the fitted OLS line, and the shaded area is the confidence intervals.

Figure 3: ROA and operations management in low- and high-tax country-years

(a) Reported Profitability

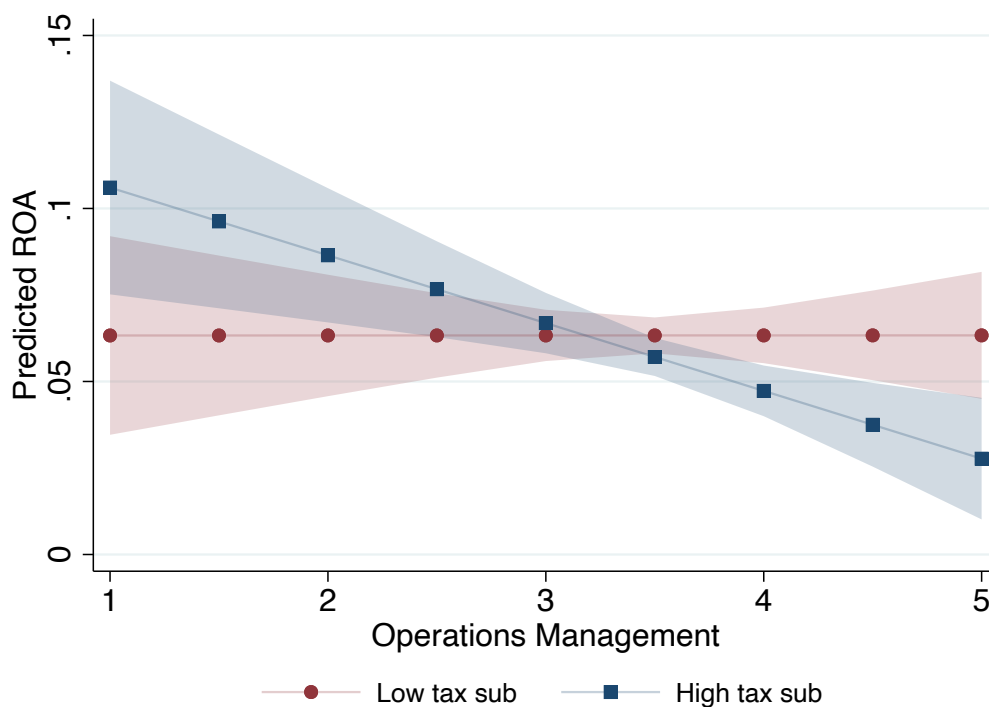


(b) Performance



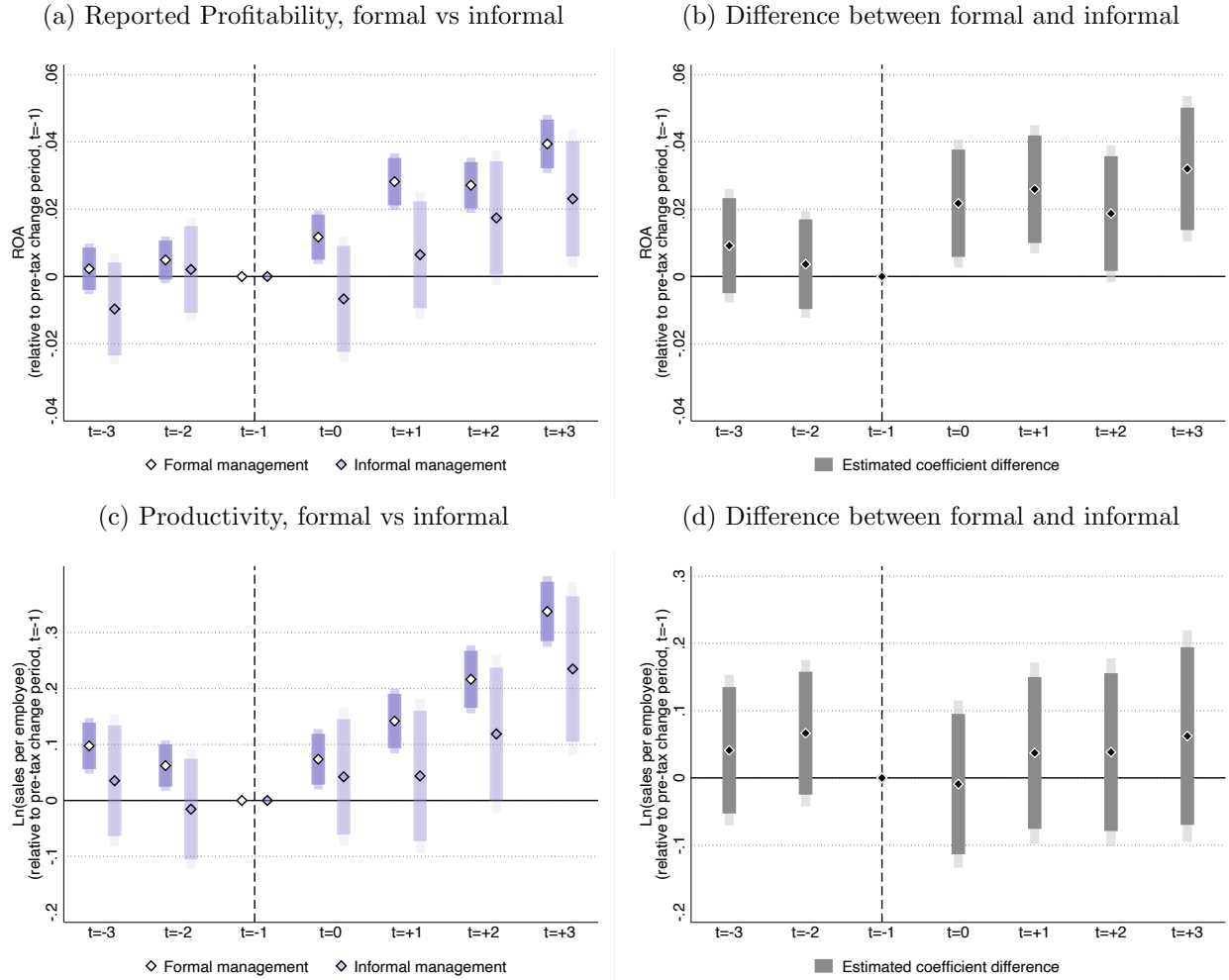
*Note:* Data from the World Management Survey and Orbis. Baseline sample includes only firms for which we observe management scores and were directly matched in both WMS and Orbis. On the horizontal axis we have operations management, which is the average for the WMS operations management questions (including lean management, monitoring and target-setting). On the vertical axis we have ROA in Panel (a), which is the ratio of profit and loss to total assets, and log of revenue (sales) per employee in Panel (b). Low tax subsidiary are firms located in countries with below median statutory corporate tax rate for a given year. High tax subsidiary are firms located in countries with above median statutory corporate tax rate for a given year. The graphs present coefficients from local linear regressions run with bandwidth 0.5.

Figure 4: Within-MNE relationship between management and ROA



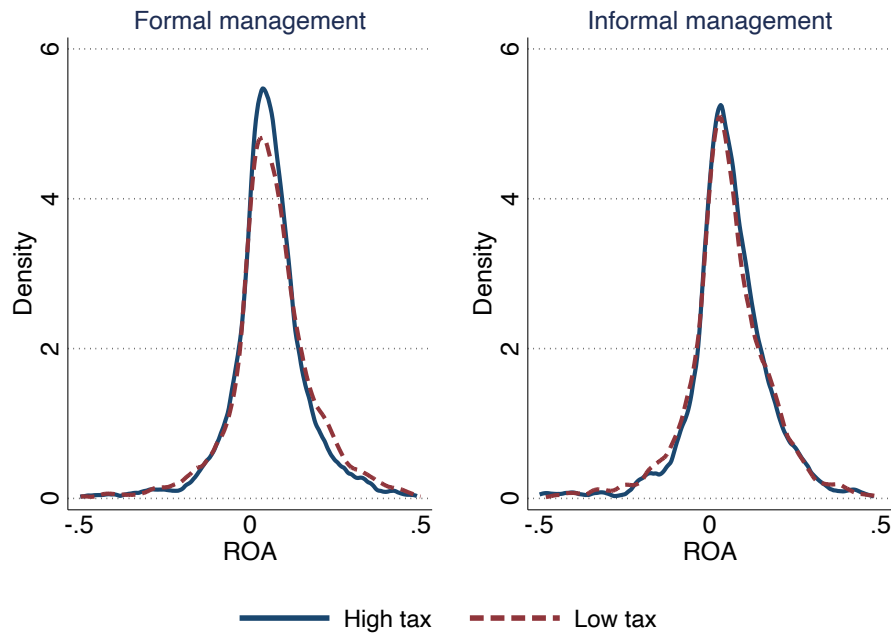
*Note:* Data from the World Management Survey and Orbis. Baseline sample includes only firms that for which we observe management scores and were directly matched in both WMS and Orbis. Here, we limit the sample to MNEs with at least two subsidiaries for which we observe management. The results presented in this graph are marginal effects from the regression of ROA on operations management score interacted with high tax subsidiary dummy using MNE fixed effects. Thus, they show within MNE variation. Each blue square corresponds to the predicted ROA at a given management level for firms located in high tax countries. Each red circle corresponds to the predicted ROA at a given management level for firms located in low tax countries. On the horizontal axis we have operations management score, which is the average for the WMS operations management questions (including lean management, monitoring and target-setting). On the vertical axis we have ROA which is the ratio of profit and loss to total assets. Low tax subsidiary are firms located in countries with below median statutory corporate tax rate for a given year. High tax subsidiary are firms located in countries with above median statutory corporate tax rate for a given year.

Figure 5: Event study: tax cuts, reported profits and productivity.



*Note:* Data from the World Management Survey and Orbis. This figure plots yearly coefficients from event study estimation, where the outcome variables are ROA (returns on assets) in Panels A and B and performance (log of sales per employee) in Panels C and D. ROA is the ratio of profit and loss before taxes and total assets. White diamonds in Panels A and C correspond to coefficients for firms with formal management practices in place, where formal management is defined as a dummy equal to one when the average for the WMS operations management questions (including lean management, monitoring and target-setting) is 3 or above, on a scale of 1 to 5. Shaded diamonds in Panels A and C correspond to coefficients for firms with informal management (scores below 3 on the 1 to 5 scale). In Panels C and D, we plot the coefficients for the estimated difference between formal and informal management firms.

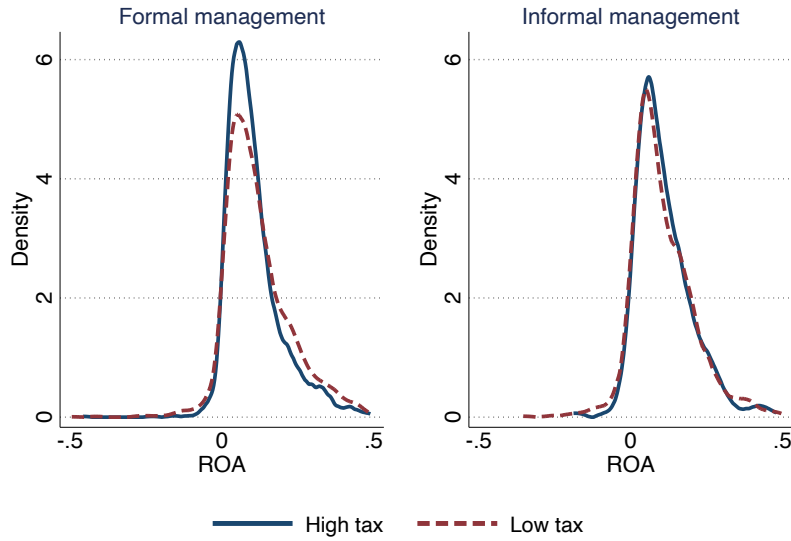
Figure 6: Bunching around zero ROA



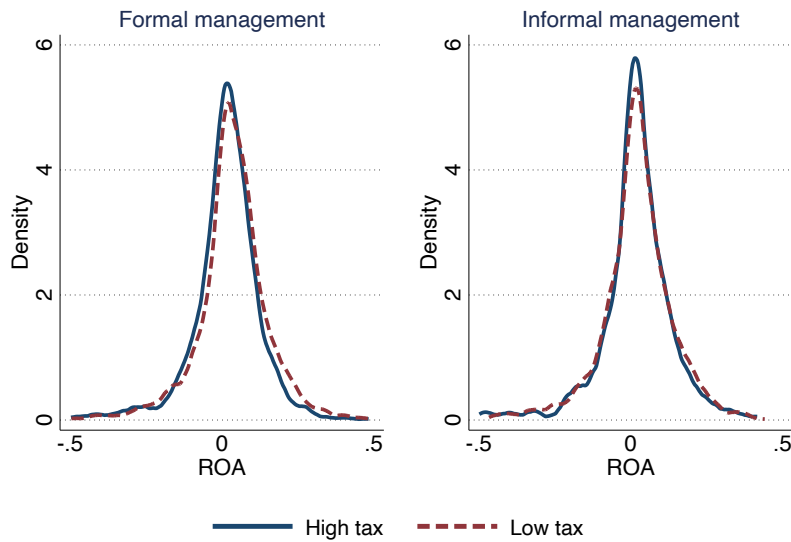
*Note:* Data from the World Management Survey and Orbis. Baseline sample includes only firms that for which we observe management scores and were directly matched in both WMS and Orbis. We plot the distribution of ROA, which is the ratio of profit and loss to total assets. ROA restricted between -0.5 and 0.5. formal management is a dummy equal to one when the average for the WMS operations management questions (including lean management, monitoring and target-setting) is 3 or above, on a scale of 5. High tax is a dummy equal to 1 when the firm is located in a country with above median statutory corporate tax rate. Hence, blue solid lines show the distribution of ROA for subsidiaries in high tax countries, while red dashed lines for subsidiaries in low tax countries.

Figure 7: Bunching of ROA around zero for aggressive firms by management type

(a) Aggressive

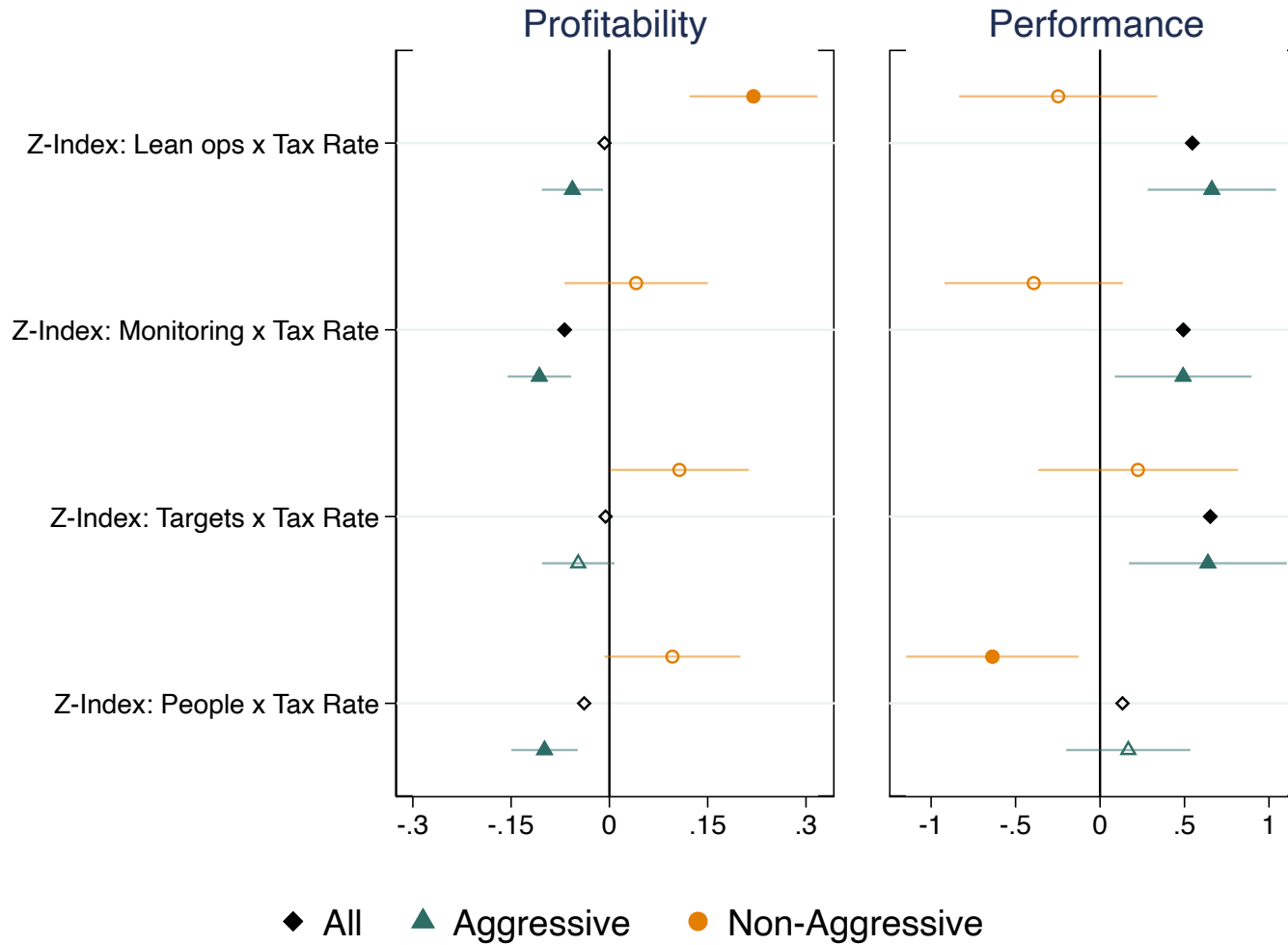


(b) Non-aggressive



*Note:* Data from the World Management Survey and Orbis. Static sample includes only firms that for which we observe management scores and were directly matched in both WMS and Orbis. We plot the distribution of ROA, which is the ratio of profit and loss to total assets. ROA restricted between -1 and 1. formal management is a dummy equal to one when the average for the WMS operations management questions (including lean management, monitoring and target-setting) is 3 or above, on a scale of 5. High tax is a dummy equal to 1 when the firm is located in a country with above median statutory corporate tax rate. Hence, blue solid lines show the distribution of ROA for subsidiaries in high tax countries, while red dashed lines for subsidiaries in low tax countries. In Panel A we show the ROA distributions for aggressive firms and in Panel B for non-aggressive. Non-aggressive are firms with book tax difference (BTD) below median and Aggressive are firms with BTD above median.

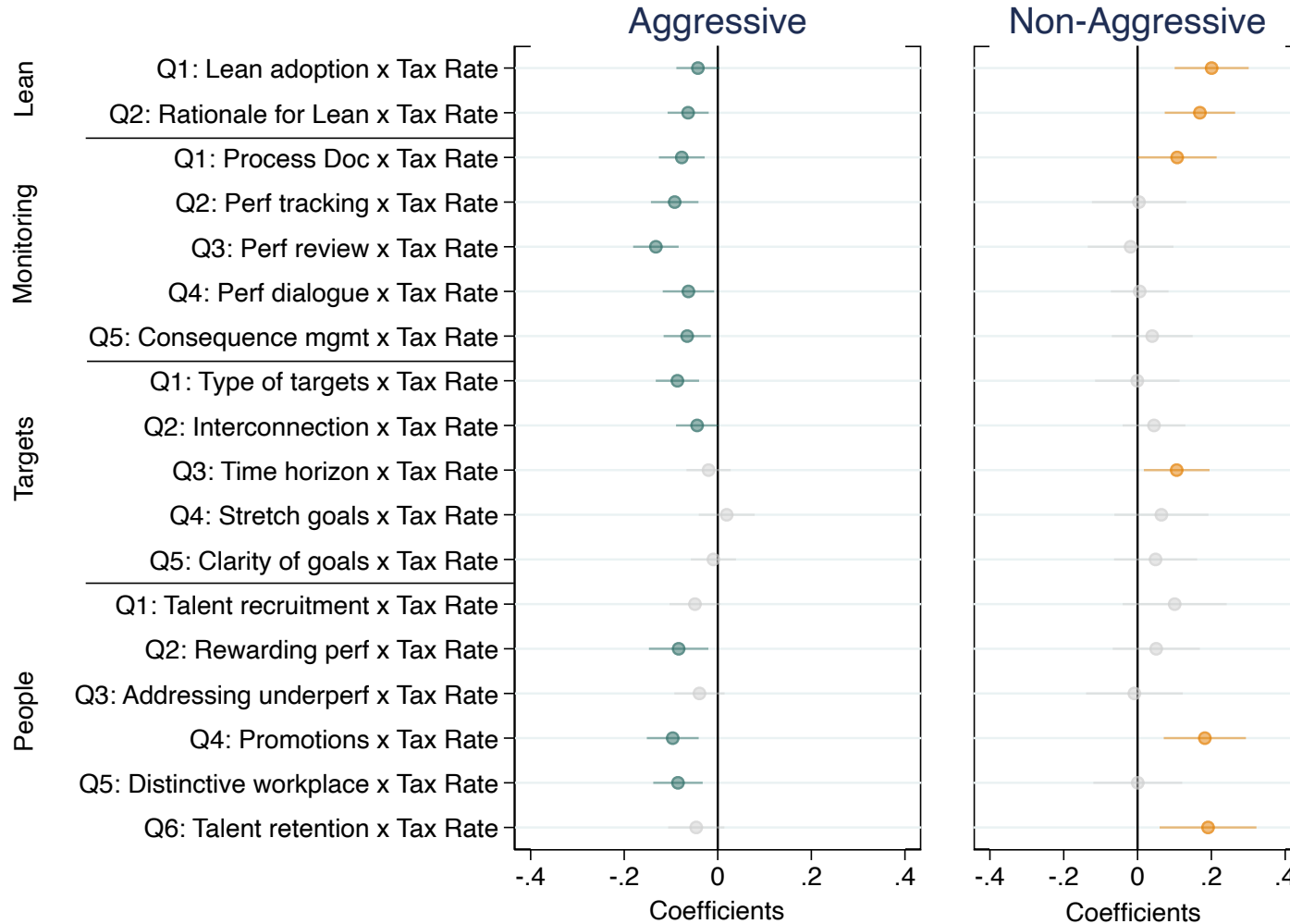
Figure 8: Mechanisms: average management indices vs profitability and performance



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*Note:* Data from the World Management Survey and Orbis. This figure plots the interaction coefficients from a regression of profitability (ROA) and performance (log of sales per employee) on four management indices (lean operations practices, monitoring practices, target setting practices and people management practices), subsidiary corporate tax rates and controls for firm size (log of fixed assets, log of employment, log of number of subsidiaries) as well as year and industry fixed effects. The management indices are the We classify firms as “aggressive” if they have a subsidiary in a tax haven. Diamonds represent regressions including the full sample of firms. Triangles represent regressions including only firms classified as “aggressive”. Circles represent regressions including only firms classified as “non-aggressive”. Hollow markers indicate not statistically significant results at the 5 percent level. Filled markers indicate significant results at the 5 percent level.

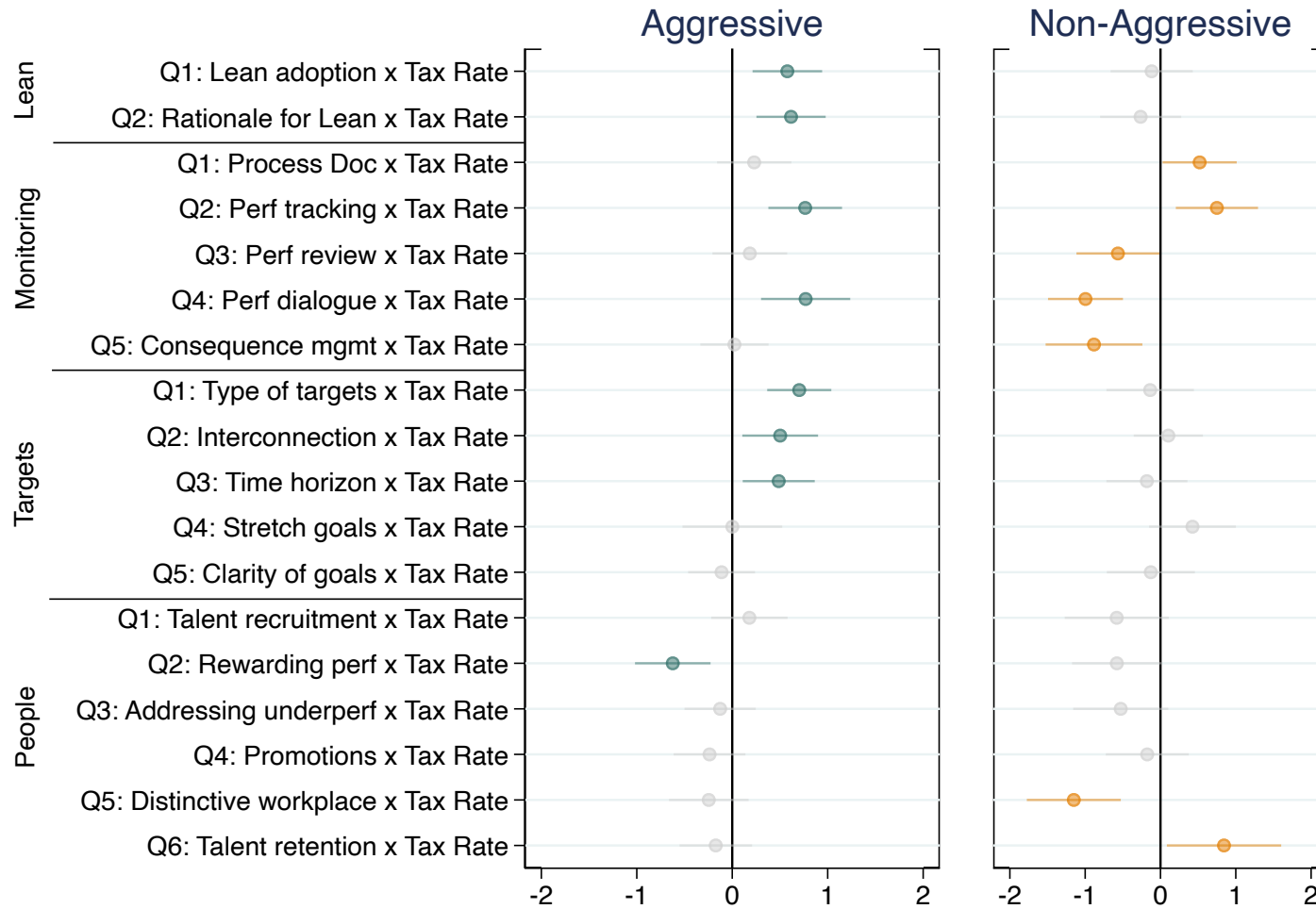
Figure 9: Mechanisms: management practices and firm profitability for aggressive and non-aggressive firms



Note: Data from the World Management Survey and Orbis. This figure plots the interaction coefficients from a regression of profitability (ROA) on each of the 18 individual management topics, subsidiary corporate tax rates and controls for firm size (log of fixed assets, log of employment, log of number of subsidiaries) as well as year and industry fixed effects. We classify firms as “aggressive” if they have a subsidiary in a tax haven. Darker color markers indicate statistically significant coefficients (at the 5 percent level), and light gray markers indicate coefficients that are not significantly different from zero (at the 5 percent level).



Figure 10: Mechanisms: management practices and firm productivity for aggressive and non-aggressive firms



*Note:* Data from the World Management Survey and Orbis. This figure plots the interaction coefficients from a regression of performance (log of sales per employee) on each of the 18 individual management topics, subsidiary corporate tax rates and controls for firm size (log of fixed assets, log of employment, log of number of subsidiaries) as well as year and industry fixed effects. We classify firms as “aggressive” if they have a subsidiary in a tax haven. Darker color markers indicate statistically significant coefficients (at the 5 percent level), and light gray markers indicate coefficients that are not significantly different from zero (at the 5 percent level).

# Appendices

## A Conceptual Framework

Let all subsidiaries have a common objective function of after-tax profit maximisation achieved by maximizing production across all plants and minimizing tax liabilities. The manager at the HQ is responsible for the tax planning strategy of the entire corporate group.<sup>39</sup> Let a firm have two subsidiaries, one in a high tax (with tax rate  $\tau_H$ ) and one in a low tax (with tax rate  $\tau_L$ ) location. The HQ manager wants to minimize its tax liabilities, by reallocating a share,  $\alpha \in [0, 1]$ , of profits from the high tax location to the low tax location. Moving profits is costly and we assume that the cost of profit shifting ( $c$ ) increases in the amount of profits ( $\pi$ ) that a firm makes and in the share of profits ( $\alpha$ ) that a firm shifts at an increasing rate, such that  $\frac{\partial c}{\partial \pi} > 0$ ,  $\frac{\partial c}{\partial \alpha} > 0$ , and  $\frac{\partial^2 c}{\partial \alpha^2} > 0$  (consistent with Hines and Rice (1994); Huizinga et al. (2008)).

We assume that profits are an increasing function of the quality of management ( $m$ ), such that  $\frac{\partial \pi(m)}{\partial m} > 0$  (consistent with Bloom, Sadun and Van Reenen (2012)). We propose that the cost function that the HQ manager faces takes the form  $c(\alpha, m, \pi(m))$ . In particular, we include an additional factor: the quality of management of the MNE ( $m > 0$ ). Firms with better management will face lower costs for shifting profits:  $\frac{dc}{dm} = \frac{\partial c}{\partial m} + \frac{\partial c}{\partial \pi} \frac{\partial \pi(m)}{\partial m} < 0$ . We assume that they are going to have decreasing cost of shifting when the share of shifted profits increases, such that  $\frac{\partial^2 c}{\partial \alpha \partial m} < 0$ , and those that shift more profits in levels are also going to face decreasing costs, such that  $\frac{\partial^2 c}{\partial \alpha \partial \pi} < 0$ .

The firm is minimizing its tax liability:

$$\min_{\alpha \in [0,1]} \tau_H(1 - \alpha)\pi(m) + \tau_L\alpha\pi(m) + c(\alpha, m, \pi(m))$$

The first order condition for this problem is:  $(\tau_L - \tau_H)\pi(m) + \frac{\partial c}{\partial \alpha} = 0$

We use this simple minimization problem to show how management affects the share of shifted profits; that is, the sign of  $\frac{\partial \alpha^*}{\partial m}$ . Thus, we differentiate the FOC with respect to  $m$ , which yields:

$$\frac{\partial \alpha^*}{\partial m} = \frac{-\frac{\partial^2 c}{\partial \alpha \partial m} + (\tau_H - \tau_L)\frac{\partial \pi(m)}{\partial m} - \frac{\partial^2 c}{\partial \alpha \partial \pi} \frac{\partial \pi(m)}{\partial m}}{\frac{\partial^2 c}{\partial \alpha^2}} > 0$$

**Proposition:** Better management increases share of shifted profits  $\alpha$ .

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<sup>39</sup>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.

## B Additional Tables and Figures

Table B1: Pre-post summary table, event study sample, sales per employee

<b>Dependent variable:</b>	All firms			Aggressive firms			Non-Aggressive firms		
ln(sales per employee)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Formal management=1	0.060 (0.142)	0.051 (0.111)		0.052 (0.157)	0.045 (0.121)		0.063 (0.125)	0.078 (0.110)	
POST tax cut=1	0.183 (0.111)	0.157* (0.088)	0.071 (0.054)	0.247** (0.125)	0.222** (0.101)	0.119** (0.060)	-0.180** (0.083)	-0.305*** (0.108)	-0.293*** (0.096)
Formal management=1 × POST tax cut=1	-0.021 (0.136)	-0.028 (0.117)	0.074 (0.057)	-0.068 (0.150)	-0.062 (0.128)	0.044 (0.062)	0.094 (0.110)	0.086 (0.112)	0.154 (0.112)
Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Country FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Firm controls		✓	✓		✓	✓		✓	✓
Macro controls		✓	✓		✓	✓		✓	✓
MNE control			✓			✓			✓
Observations	65131	55803	55803	61622	52939	52939	3509	2864	2864
# firms	11047	11047	11047	10490	10490	10490	557	557	557
Dependent Variable Mean	12.811	12.811	12.811	12.819	12.819	12.819	12.671	12.671	12.671

*Note:* Data from Orbis and the World Management Survey. This table includes only the firms in the Event Study sample, which includes all subsidiaries belonging to an MNE that has at least one plant observed in the WMS. Management data is then averaged across all subsidiaries within an MNE. Aggressive firms are defined as having a subsidiary in a tax haven. Non-aggressive firms are defined as not having any subsidiaries in a tax haven. The event considered here is firms that experienced one tax rate cut during the sample period. POST is a dummy equal to 1 in the years after the tax rate cut. The outcome variable in all columns is ROA (returns on assets) which is the ratio of profit and loss before taxes and total assets. Firm controls include log of employment, log of fixed assets and log of number of subsidiaries in the MNE. Standard errors are clustered at the MNE level in Columns 3, 6 and 9 and robust otherwise.

Table B2: Understanding the channels: alternative measure of profitability

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	ROA	ROA*	ROA	EBIT	EBITDA	Depreciation	ETR
Formal management=1	0.041*** (0.015)	0.040*** (0.016)	0.084** (0.036)	0.074** (0.033)	0.071** (0.032)	-0.008 (0.007)	0.059* (0.035)
Subsidiary corp tax rate	-0.236*** (0.075)	-0.221*** (0.079)	0.221 (0.156)	0.121 (0.138)	0.072 (0.133)	-0.067** (0.032)	0.848*** (0.216)
Formal management=1 × Subsidiary corp tax rate	-0.121** (0.054)	-0.117** (0.056)	-0.208* (0.122)	-0.182 (0.112)	-0.159 (0.107)	0.043* (0.024)	-0.296** (0.131)
Country FE	✓	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓	✓
Firm controls	✓	✓	✓	✓	✓	✓	✓
MNE controls	✓	✓	✓	✓	✓	✓	✓
Observations	16076	14129	4741	4741	4741	4741	15216
# firms	1783	1783	517	517	517	517	1750
Dependent Variable Mean	0.058	0.055	0.059	0.061	0.103	0.042	0.187

*Note:* Data from Orbis and the World Management Survey. WMS sample includes only firms for which we observe management scores and were directly matched in both WMS and Orbis. Formal management = 1 is a dummy equal to one when the average for the WMS operations management questions (including lean management, monitoring and target-setting) is 3 or above, on a scale of 1 to 5. Subsidiary corp tax rate is the annual statutory corporate tax rate in the country where a firm is operating. The outcome variable in columns 1-3 is Returns on Assets (ROA) which is the ratio of profit and loss before taxes and total assets. In column 4 outcome variable is EBIT, which is earnings before interest and tax, in column 5 it is EBITDA which is earnings before interest, tax and depreciation, in column 6 the outcome variable is depreciation, which is the difference between EBITA and EBIT, in column 7 the outcome variable is ETR (effective tax rate) which is the ratio of tax liability to profit and loss before taxes. In column 3, we limit the sample to only firms for which we observe both EBIT and EBITDA. All specifications include country and year fixed effects. Firm controls include log of employment, log of fixed assets and log of number of subsidiaries in the MNE. Standard errors are robust in all columns.

Table B3: Table of coefficients: interaction between individual management practices and tax rate

	<b>All</b>		<b>Aggressive</b>		<b>Non-Aggressive</b>	
	ROA		ROA		ROA	
	(1)	(2)	(3)	(4)	(5)	(6)
Z-Index: Lean ops $\times$ Tax Rate	-0.015 (0.022)	-0.007 (0.022)	-0.056** (0.024)	-0.089*** (0.026)	0.220*** (0.050)	0.076** (0.031)
Q1: Lean adoption $\times$ Tax Rate	-0.001 (0.021)	0.006 (0.021)	-0.042* (0.024)	-0.065** (0.026)	0.201*** (0.051)	0.067** (0.029)
Q2: Rationale for Lean $\times$ Tax Rate	-0.030 (0.021)	-0.022 (0.021)	-0.063*** (0.022)	-0.097*** (0.025)	0.169*** (0.049)	0.067** (0.029)
Z-Index: Monitoring $\times$ Tax Rate	-0.074*** (0.022)	-0.068*** (0.022)	-0.107*** (0.025)	-0.121*** (0.027)	0.041 (0.056)	-0.003 (0.029)
Q1: Process Doc $\times$ Tax Rate	-0.045** (0.022)	-0.037 (0.023)	-0.077*** (0.025)	-0.028 (0.025)	0.107** (0.055)	0.002 (0.028)
Q2: Perf tracking $\times$ Tax Rate	-0.059** (0.024)	-0.053** (0.024)	-0.092*** (0.026)	-0.125*** (0.026)	0.004 (0.065)	0.053* (0.032)
Q3: Perf review $\times$ Tax Rate	-0.100*** (0.023)	-0.096*** (0.022)	-0.132*** (0.025)	-0.123*** (0.027)	-0.019 (0.059)	-0.076** (0.032)
Q4: Perf dialogue $\times$ Tax Rate	-0.048** (0.024)	-0.045* (0.024)	-0.063** (0.028)	-0.152*** (0.029)	0.006 (0.040)	0.070** (0.032)
Q5: Consequence mgmt $\times$ Tax Rate	-0.048** (0.023)	-0.040* (0.023)	-0.065** (0.026)	-0.056** (0.028)	0.040 (0.056)	-0.054* (0.028)
Z-Index: Targets $\times$ Tax Rate	-0.011 (0.025)	-0.006 (0.025)	-0.048* (0.028)	-0.110*** (0.031)	0.107** (0.054)	0.051 (0.034)
Q1: Type of targets $\times$ Tax Rate	-0.065*** (0.022)	-0.062*** (0.022)	-0.086*** (0.024)	-0.070*** (0.026)	-0.001 (0.058)	-0.047 (0.029)
Q2: Interconnection $\times$ Tax Rate	-0.007 (0.020)	-0.001 (0.020)	-0.044* (0.023)	-0.043 (0.026)	0.045 (0.043)	0.029 (0.025)
Q3: Time horizon $\times$ Tax Rate	-0.001 (0.022)	0.004 (0.021)	-0.020 (0.024)	-0.091*** (0.026)	0.106** (0.045)	0.045 (0.030)
Q4: Stretch goals $\times$ Tax Rate	0.047* (0.028)	0.050* (0.027)	0.019 (0.030)	-0.076** (0.030)	0.065 (0.065)	0.094*** (0.036)
Q5: Clarity of goals $\times$ Tax Rate	-0.010 (0.022)	-0.007 (0.022)	-0.009 (0.025)	-0.063** (0.028)	0.049 (0.057)	0.030 (0.030)
<i>Observations</i>	<i>16057</i>	<i>16057</i>	<i>11752</i>	<i>6737</i>	<i>4305</i>	<i>8465</i>
<i># firms</i>	<i>1781</i>	<i>1781</i>	<i>1261</i>	<i>1512</i>	<i>520</i>	<i>1588</i>
<i>Dependent Variable Mean</i>	<i>0.058</i>	<i>0.058</i>	<i>0.063</i>	<i>0.122</i>	<i>0.044</i>	<i>0.017</i>
Aggressiveness measure			<b>Tax Haven</b>	<b>BTD</b>	<b>Tax Haven</b>	<b>BTD</b>
Country FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
Firm controls		✓	✓	✓	✓	✓

*Note:* Data from Orbis and the World Management Survey. Tax rate is the statutory corporate tax rate in the country where a firm is operating. The definition of each management practice is in Table C1. The outcome variable in all columns is ROA (returns on assets) which is the ratio of profit and loss before taxes and total assets. In columns 3 and 4 aggressive firms are those with tax haven as part of their ownership structure or those with above median book tax difference (BTD) respectively. In columns 5 and 6 non-aggressive firms are those without tax havens as part of their ownership structure or those with below median book tax difference (BTD) respectively. Firm controls include log of employment, log of fixed assets and log of number of subsidiaries in the MNE. Standard errors are robust in all columns.

Table B4: Table of coefficients: interaction between individual management practices and tax rate

	All		Aggressive		Non-Aggressive	
	ROA		ROA		ROA	
	(1)	(2)	(3)	(4)	(5)	(6)
Z-Index: People $\times$ Tax Rate	-0.039*	-0.038*	-0.099***	-0.101***	0.096*	0.044
	(0.023)	(0.023)	(0.026)	(0.031)	(0.053)	(0.029)
Q1: Talent recruitment $\times$ Tax Rate	-0.054**	-0.051**	-0.089***	-0.096***	0.017	0.009
	(0.021)	(0.021)	(0.023)	(0.027)	(0.059)	(0.028)
Q2: Rewarding perf $\times$ Tax Rate	-0.024	-0.022	-0.063**	-0.103***	0.073	0.075**
	(0.025)	(0.024)	(0.028)	(0.031)	(0.052)	(0.032)
Q3: Addressing underperf $\times$ Tax Rate	-0.027	-0.017	-0.033	-0.028	-0.019	-0.014
	(0.022)	(0.022)	(0.024)	(0.026)	(0.051)	(0.029)
Q4: Promotions $\times$ Tax Rate	-0.041*	-0.038*	-0.094***	-0.084***	0.109**	0.023
	(0.023)	(0.023)	(0.026)	(0.028)	(0.046)	(0.032)
Q5: Distinctive workplace $\times$ Tax Rate	-0.069***	-0.073***	-0.116***	-0.097***	-0.013	0.008
	(0.022)	(0.022)	(0.024)	(0.027)	(0.051)	(0.029)
Q6: Talent retention $\times$ Tax Rate	0.007	0.006	-0.046*	-0.066**	0.209***	0.061**
	(0.024)	(0.024)	(0.026)	(0.030)	(0.062)	(0.031)
<i>Observations</i>	16053	16053	11756	6728	4297	8467
<i># firms</i>	1781	1781	1262	1511	519	1588
<i>Dependent Variable Mean</i>	0.058	0.058	0.063	0.122	0.044	0.017
Bonus size $\times$ Tax Rate	-0.415***	-0.472***	-0.311*	-0.236	-1.915***	-0.127
	(0.158)	(0.161)	(0.177)	(0.207)	(0.384)	(0.202)
Bonus share: sub perf $\times$ Tax Rate	-0.146	-0.137	-0.022	0.074	-0.681*	-0.270
	(0.151)	(0.150)	(0.166)	(0.235)	(0.353)	(0.173)
Bonus share: MNE perf $\times$ Tax Rate	-0.321***	-0.304***	-0.237**	-0.266***	-0.297	-0.098
	(0.090)	(0.090)	(0.109)	(0.091)	(0.221)	(0.140)
<i>Observations</i>	8112	8112	6048	3428	2064	4139
<i># firms</i>	894	894	649	761	245	793
<i>Dependent Variable Mean</i>	0.060	0.060	0.067	0.128	0.038	0.017
Aggressive measure			<b>Tax Haven</b>	<b>BTD</b>	<b>Tax Haven</b>	<b>BTD</b>
Country FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
Firm controls		✓	✓	✓	✓	✓

*Note:* Data from Orbis and the World Management Survey. Tax rate is the statutory corporate tax rate in the country where a firm is operating. The definition of each management practice is in Table C1. The outcome variable in all columns is ROA (returns on assets) which is the ratio of profit and loss before taxes and total assets. In columns 3 and 4 aggressive firms are those with tax haven as part of their ownership structure or those with above median book tax difference (BTD) respectively. In columns 5 and 6 non-aggressive firms are those without tax havens as part of their ownership structure or those with below median book tax difference (BTD) respectively. Firm controls include log of employment, log of fixed assets and log of number of subsidiaries in the MNE. Standard errors are robust in all columns.

Table B5: Table of coefficients: interaction between individual management practices and tax rate

	All		Aggressive		Non-Aggressive	
	ln(sales per employee) (1)	ln(sales per employee) (2)	ln(sales per employee) (3)	ln(sales per employee) (4)	ln(sales per employee) (5)	ln(sales per employee) (6)
Z-Index: Lean ops $\times$ Tax Rate	0.749*** (0.216)	0.547*** (0.170)	0.663*** (0.194)	-0.101 (0.217)	-0.248 (0.299)	1.240*** (0.261)
Q1: Lean adoption $\times$ Tax Rate	0.560*** (0.206)	0.480*** (0.162)	0.577*** (0.186)	-0.080 (0.214)	-0.117 (0.278)	1.129*** (0.236)
Q2: Rationale for Lean $\times$ Tax Rate	0.762*** (0.202)	0.480*** (0.161)	0.616*** (0.185)	-0.101 (0.200)	-0.264 (0.275)	1.055*** (0.257)
Z-Index: Monitoring $\times$ Tax Rate	0.373* (0.216)	0.493*** (0.178)	0.492** (0.207)	0.113 (0.229)	-0.392 (0.269)	0.794*** (0.261)
Q1: Process Doc $\times$ Tax Rate	0.182 (0.201)	0.418** (0.167)	0.230 (0.198)	0.017 (0.227)	0.520** (0.251)	0.742*** (0.234)
Q2: Perf tracking $\times$ Tax Rate	0.737*** (0.208)	0.854*** (0.169)	0.764*** (0.197)	0.267 (0.208)	0.749*** (0.278)	1.139*** (0.249)
Q3: Perf review $\times$ Tax Rate	0.075 (0.210)	0.164 (0.170)	0.184 (0.200)	-0.162 (0.211)	-0.565** (0.281)	0.580** (0.251)
Q4: Perf dialogue $\times$ Tax Rate	0.504** (0.240)	0.476** (0.195)	0.769*** (0.238)	0.249 (0.233)	-0.996*** (0.254)	0.681** (0.307)
Q5: Consequence mgmt $\times$ Tax Rate	-0.101 (0.193)	-0.029 (0.157)	0.023 (0.182)	0.010 (0.206)	-0.883*** (0.328)	-0.042 (0.221)
Z-Index: Targets $\times$ Tax Rate	0.804*** (0.245)	0.652*** (0.203)	0.638*** (0.238)	0.262 (0.244)	0.224 (0.301)	1.165*** (0.310)
Q1: Type of targets $\times$ Tax Rate	0.922*** (0.188)	0.582*** (0.153)	0.702*** (0.171)	0.191 (0.208)	-0.137 (0.296)	0.845*** (0.210)
Q2: Interconnection $\times$ Tax Rate	0.757*** (0.208)	0.571*** (0.169)	0.502** (0.202)	0.282 (0.216)	0.104 (0.234)	0.963*** (0.243)
Q3: Time horizon $\times$ Tax Rate	0.553*** (0.203)	0.429** (0.168)	0.487** (0.193)	0.151 (0.213)	-0.180 (0.274)	0.830*** (0.252)
Q4: Stretch goals $\times$ Tax Rate	-0.266 (0.257)	0.183 (0.216)	0.001 (0.266)	0.230 (0.242)	0.425 (0.294)	0.321 (0.350)
Q5: Clarity of goals $\times$ Tax Rate	-0.021 (0.192)	-0.118 (0.155)	-0.112 (0.179)	-0.315 (0.206)	-0.128 (0.298)	0.141 (0.219)
<i>Observations</i>	<i>15601</i>	<i>15601</i>	<i>11394</i>	<i>6600</i>	<i>4207</i>	<i>8275</i>
<i># firms</i>	<i>1757</i>	<i>1757</i>	<i>1246</i>	<i>1494</i>	<i>511</i>	<i>1570</i>
<i>Dependent Variable Mean</i>	<i>12.370</i>	<i>12.370</i>	<i>12.400</i>	<i>12.416</i>	<i>12.288</i>	<i>12.377</i>
Aggressive measure			<b>Tax Haven</b>	<b>BTD</b>	<b>Tax Haven</b>	<b>BTD</b>
Country FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
Firm controls		✓	✓	✓	✓	✓

*Note:* Data from Orbis and the World Management Survey. Tax rate is the statutory corporate tax rate in the country where a firm is operating. The definition of each management practice is in Table C1. The outcome variable in all columns is ROA (returns on assets) which is the ratio of profit and loss before taxes and total assets. In columns 3 and 4 aggressive firms are those with tax haven as part of their ownership structure or those with above median book tax difference (BTD) respectively. In columns 5 and 6 non-aggressive firms are those without tax havens as part of their ownership structure or those with below median book tax difference (BTD) respectively. Firm controls include log of employment, log of fixed assets and log of number of subsidiaries in the MNE. Standard errors are robust in all columns.

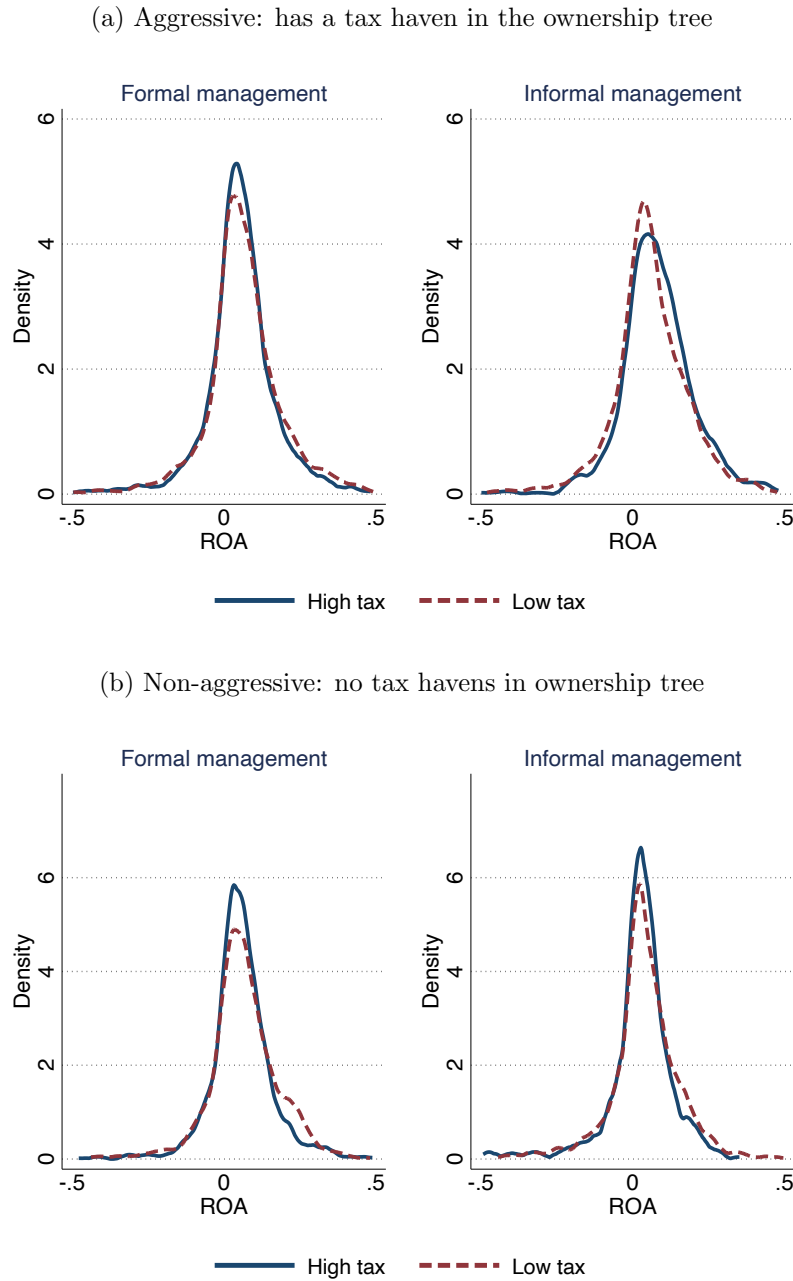


Table B6: Table of coefficients: interaction between individual management practices and tax rate

	All		Aggressive		Non-Aggressive	
	ln(sales per employee) (1)	ln(sales per employee) (2)	ln(sales per employee) (3)	ln(sales per employee) (4)	ln(sales per employee) (5)	ln(sales per employee) (6)
Z-Index: People $\times$ Tax Rate	-0.074 (0.196)	0.133 (0.160)	0.167 (0.188)	-0.085 (0.214)	-0.637** (0.260)	0.447* (0.231)
Q1: Talent recruitment $\times$ Tax Rate	0.058 (0.201)	0.080 (0.159)	0.178 (0.183)	-0.111 (0.205)	-0.662** (0.303)	0.488** (0.222)
Q2: Rewarding perf $\times$ Tax Rate	-0.190 (0.182)	-0.190 (0.154)	-0.142 (0.185)	-0.613*** (0.204)	-0.478* (0.284)	0.035 (0.204)
Q3: Addressing underperf $\times$ Tax Rate	0.107 (0.175)	-0.019 (0.144)	-0.033 (0.167)	0.294 (0.189)	-0.637** (0.251)	-0.414** (0.205)
Q4: Promotions $\times$ Tax Rate	-0.318* (0.185)	-0.125 (0.153)	-0.033 (0.181)	-0.380* (0.202)	-0.678*** (0.259)	0.185 (0.218)
Q5: Distinctive workplace $\times$ Tax Rate	-0.400* (0.216)	-0.020 (0.169)	-0.017 (0.197)	-0.152 (0.224)	-0.665** (0.291)	0.553** (0.241)
Q6: Talent retention $\times$ Tax Rate	0.047 (0.186)	0.488*** (0.152)	0.385** (0.170)	0.181 (0.193)	0.987*** (0.367)	0.682*** (0.212)
<i>Observations</i>	<i>15597</i>	<i>15597</i>	<i>11398</i>	<i>6591</i>	<i>4199</i>	<i>8277</i>
<i># firms</i>	<i>1757</i>	<i>1757</i>	<i>1247</i>	<i>1493</i>	<i>510</i>	<i>1570</i>
<i>Dependent Variable Mean</i>	<i>12.369</i>	<i>12.369</i>	<i>12.400</i>	<i>12.415</i>	<i>12.287</i>	<i>12.377</i>
Bonus size $\times$ Tax Rate	1.677 (1.468)	0.929 (0.960)	0.800 (1.037)	-0.314 (1.310)	0.128 (2.341)	3.041** (1.391)
Bonus share: sub perf $\times$ Tax Rate	-3.783*** (1.168)	-3.068*** (0.995)	-3.802*** (1.154)	-0.170 (1.570)	-2.930 (2.800)	-3.068** (1.259)
Bonus share: MNE perf $\times$ Tax Rate	-0.986 (0.755)	-1.055* (0.592)	-2.258*** (0.726)	-1.329* (0.733)	1.650 (1.073)	0.328 (0.978)
<i>Observations</i>	<i>7803</i>	<i>7803</i>	<i>5813</i>	<i>3327</i>	<i>1990</i>	<i>4021</i>
<i># firms</i>	<i>877</i>	<i>877</i>	<i>638</i>	<i>751</i>	<i>239</i>	<i>780</i>
<i>Dependent Variable Mean</i>	<i>12.336</i>	<i>12.336</i>	<i>12.349</i>	<i>12.393</i>	<i>12.298</i>	<i>12.347</i>
Aggressive measure			<b>Tax Haven</b>	<b>BTD</b>	<b>Tax Haven</b>	<b>BTD</b>
Country FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
Firm controls		✓	✓	✓	✓	✓

*Note:* Data from Orbis and the World Management Survey. Tax rate is the statutory corporate tax rate in the country where a firm is operating. The definition of each management practice is in Table C1. The outcome variable in all columns is ROA (returns on assets) which is the ratio of profit and loss before taxes and total assets. In columns 3 and 4 aggressive firms are those with tax haven as part of their ownership structure or those with above median book tax difference (BTD) respectively. In columns 5 and 6 non-aggressive firms are those without tax havens as part of their ownership structure or those with below median book tax difference (BTD) respectively. Firm controls include log of employment, log of fixed assets and log of number of subsidiaries in the MNE. Standard errors are robust in all columns.

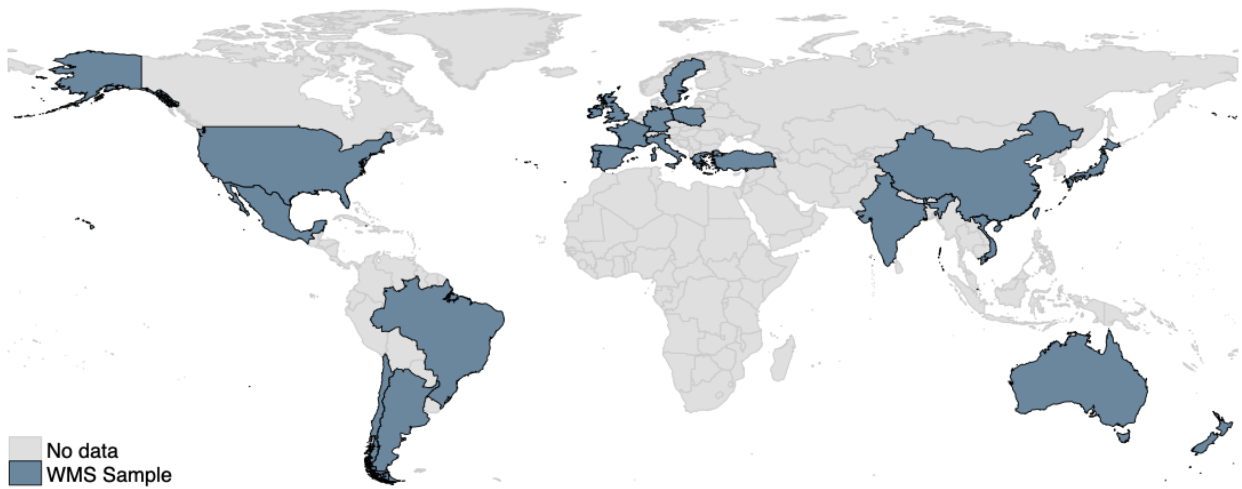
Figure B1: Bunching of ROA around zero for firms in tax havens by management type



*Note:* Data from the World Management Survey and Orbis. Static sample includes only firms that for which we observe management scores and were directly matched in both WMS and Orbis. We plot the distribution of ROA, which is the ratio of profit and loss to total assets. ROA restricted between -1 and 1. Structured management is a dummy equal to one when the average for the WMS operations management questions (including lean management, monitoring and target-setting) is 3 or above, on a scale of 5. High tax is a dummy equal to 1 when the firm is located in a country with above median statutory corporate tax rate. Hence, blue solid lines show the distribution of ROA for subsidiaries in high tax countries, while red dashed lines for subsidiaries in low tax countries. In Panel A we show the ROA distributions for aggressive firms and in Panel B for non-aggressive. Non-aggressive are firms that have no subsidiary or headquarters located in a tax-haven and Aggressive are firms that have at least one subsidiary or headquarter located in a tax haven. Out of 1325 MNEs, 50.61% have at least one unit in a tax haven.

Figure B2: Sample coverage maps

(a) Countries with at least one firm in the WMS sample



(b) Countries with at least one firm in the Event Study sample

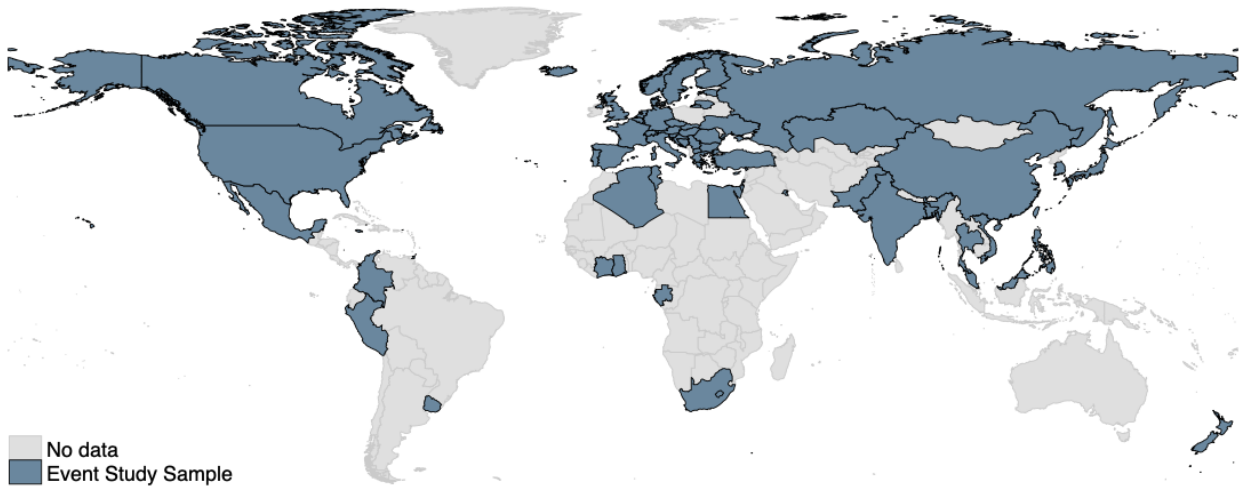
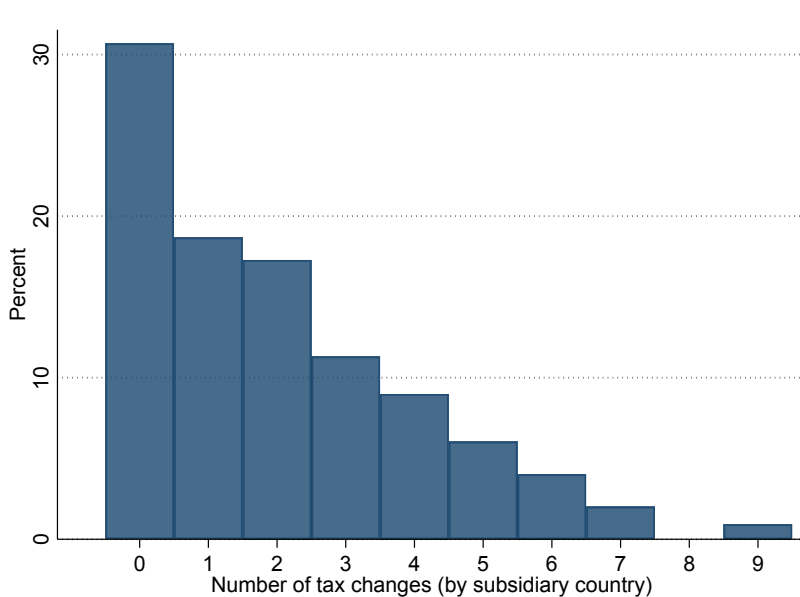
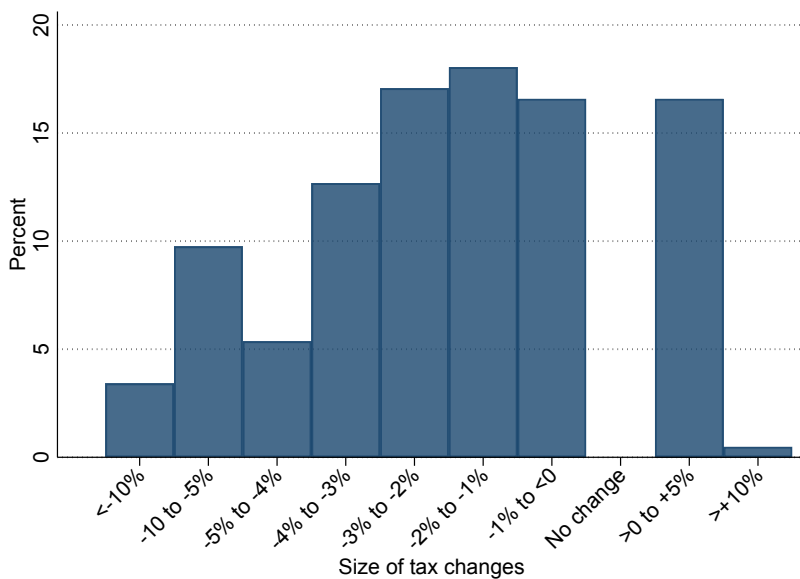


Figure B3: Number and scale of tax changes between 2004 and 2016



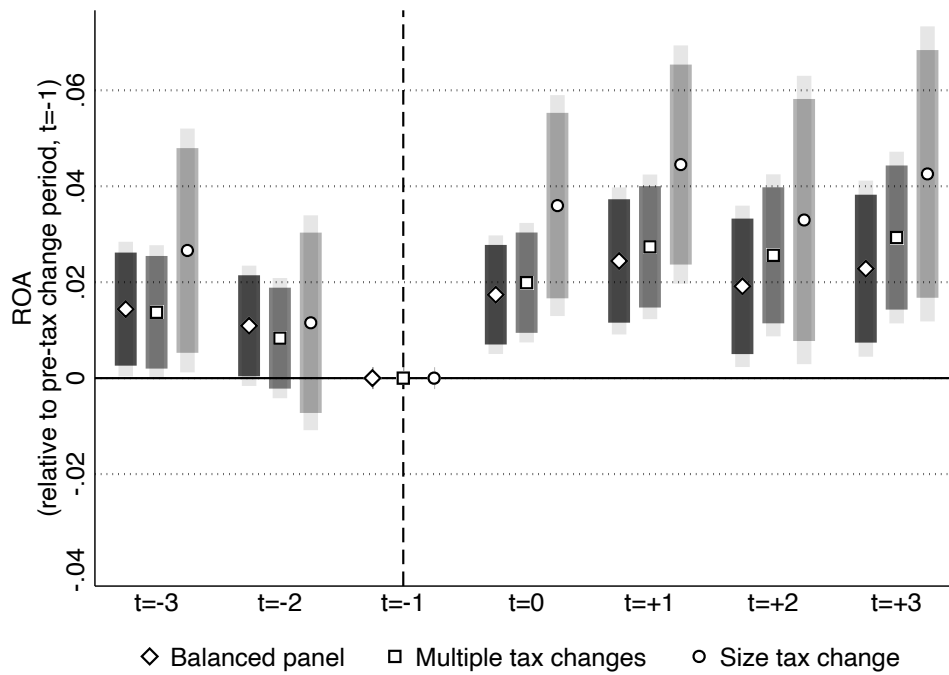
(a) Number of tax changes



(b) Scale of tax changes

*Note:* In Panel A we plot the distribution of statutory corporate tax rate changes for firms in our sample. 30% of firms in our sample is located in countries with no statutory corporate tax rate changes. 8% of firms are located in countries with 4 statutory tax rate changes during the sample period. In Panel B we plot the distribution of the size of tax rate changes. 17% of firms in our sample experienced a tax rate decrease between 0 and 1%. 5% of firms experiences a tax rate decrease of 4-5%. Financial data comes from Orbis and the statutory corporate tax rates data comes from Oxford Centre for Business Taxation.

Figure B4: Event study sensitivity analysis



*Note:* Data from the World Management Survey and Orbis. In this figure we plot yearly coefficients from event study estimation of the difference between formal and informal management firms. Darker bars with diamond markers correspond to the event study run only on the observations belonging to a balanced panel. Mid-dark bars with square uses a sample that includes multiple tax changes. Lighter bars with circle markers include controls for the size of the tax change.

## C Data Appendix: Index questions

Table C1: World Management Survey Questions: Operations management

<b>Q</b>	<b>Question topic</b>	<b>Explanation of scoring</b>
O1	Adoption of modern practices (Lean operations sub-index)	What aspects of manufacturing have been formally introduced, including just-in-time delivery from suppliers, automation, flexible manpower, support systems, attitudes, and behavior?
O2	Rationale for adoption (Lean operations sub-index)	Were modern manufacturing techniques adopted just because others were using them, or are they linked to meeting business objectives like reducing costs and improving quality?
O3	Process problem documentation (Monitoring sub-index)	Are process improvements made only when problems arise, or are they actively sought out for continuous improvement as part of normal business processes?
O4	Performance tracking (Monitoring sub-index)	Is tracking ad hoc and incomplete, or is performance continually tracked and communicated to all staff?
O5	Performance review (Monitoring sub-index)	Is performance reviewed infrequently and only on a success/failure scale, or is performance reviewed continually with an expectation of continuous improvement?
O6	Performance dialogue (Monitoring sub-index)	In review/performance conversations, to what extent are the purpose, data, agenda, and follow-up steps (like coaching) clear to all parties?
O7	Consequence management (Monitoring sub-index)	To what extent does failure to achieve agreed objectives carry consequences, which can include retraining or reassignment to other jobs?
O8	Target balance (Target setting sub-index)	Are the goals exclusively financial, or is there a balance of financial and non-financial targets?
O9	Target interconnection (Target setting sub-index)	Are goals based on accounting value, or are they based on shareholder value in a way that works through business units and ultimately is connected to individual performance expectations?
O10	Target time horizon (Target setting sub-index)	Does top management focus mainly on the short term, or does it visualize short-term targets as a “staircase” toward the main focus on long-term goals?
O11	Target stretching (Target setting sub-index)	Are goals too easy to achieve, especially for some “protected/special” areas of the firm, or are goals demanding but attainable for all parts of the firm?
O12	Performance clarity (Target setting sub-index)	Are performance measures ill-defined, poorly understood, and private, or are they well-defined, clearly communicated, and made public?

Notes: Table contents from Bloom et al. (2014). The Q column refers to the question numbers as we have defined the indices in this paper (operations and people management), and matches the summary statistics in Figure ???. The question topic column includes the topic title and, in parentheses, the WMS sub-index topic. The main difference between our categorization and the WMS is that we bundle the operations sub-practices into one, so we can effectively compare people and non-people practices. The last column includes a more detailed explanation of the types of follow-up questions that are asked of the manager to garner the information required for scoring.

Table C2: World Management Survey Questions: People management

<b>Q</b>	<b>Question topic</b>	<b>Explanation of scoring</b>
P1	Managing human capital (People management sub-index, survey Q13)	To what extent are senior managers evaluated and held accountable for attracting, retaining, and developing talent throughout the organization?
P2	Rewarding high performance (People management sub-index, survey Q14)	To what extent are people in the firm rewarded equally irrespective of performance level, or is performance clearly related to accountability and rewards?
P3	Fixing poor performers (People management sub-index, survey Q15)	Are poor performers rarely removed, or are they retrained and/or moved into different roles or out of the company as soon as the weakness is identified?
P4	Promoting high performers (People management sub-index, survey Q16)	Are people promoted mainly on the basis of tenure, or does the firm actively identify, develop, and promote its top performers?
P5	Attracting human capital (People management sub-index, survey Q17)	Do competitors offer stronger reasons for talented people to join their companies, or does a firm provide a wide range of reasons to encourage talented people to join?
P6	Retaining human capital (People management sub-index, survey Q18)	Does the firm do relatively little to retain top talent, or does it do whatever it takes to retain top talent when they look likely to leave?
B1	What is a manager's bonus as a percentage of salary?	A value between 0 and 1.
B2	What is the % of the bonus that is based on individual performance?	A value between 0 and 1.
B3	What is the % of the bonus that is based on company performance?	A value between 0 and 1.

Notes: Table contents from Bloom et al. (2014). The Q column refers to the question numbers as we have defined the indices in this paper (operations and people management), and matches the summary statistics in Figure ???. The question topic column includes the topic title and, in parentheses, the WMS sub-index topic. The main difference between our categorization and the WMS is that we bundle the operations sub-practices into one, so we can effectively compare people and non-people practices. The last column includes a more detailed explanation of the types of follow-up questions that are asked of the manager to garner the information required for scoring.