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Organizational capacity and profit shifting

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Abstract
Good organizational capacity drives productivity and potential taxable profits but may also enable multinationals (MNEs) to more efficiently re-allocate profits across tax jurisdictions, lowering actual taxable profits. We show that MNE subsidiaries with better organizational capacity report significantly lower profits and have a higher incidence of bunching around zero reported profitability in high-tax countries. This pattern is not present in low-tax countries. Further, responsiveness to corporate tax rate changes in terms of profit reporting is driven by firms with good organizational capacity. We show our results are consistent with profit-shifting behavior and rule out key alternative channels.

Key words: organisational capacity, productivity, profit sharing, corporate tax
JEL codes: M11, M02, H26, H32

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1 Introduction

Decades of empirical work have consistently shown a clear and significant positive relationship between good managers, good management and productivity (e.g., Adhvaryu et al.; 2022; Bandiera et al.; 2015, 2020; Bloom et al.; 2013, 2016; Dessein and Prat; 2019), but the relationship with profitability is less straightforward. While productivity is a more direct measure of production effectiveness, profitability measures — such as returns on assets (ROA) — inherently include strategic decisions on reporting and may be more reflective of aggressive accounting practices than actual performance (Bertrand and Schoar; 2003).

A robust literature identifies key characteristics that predict whether a firm is likely to engage in these aggressive practices, though the early focus has been primarily on headquarter-level (HQ) decision-makers, determinants, and outcomes (e.g. Armstrong et al.; 2015; Davies et al.; 2018; Dyreng et al.; 2010; Gumpert et al.; 2016). In looking towards estimating the "real" economic impact of these activities on local markets (Bilicka et al.; 2021; Suárez Serrato; 2018), the extent of this impact will necessarily depend on the capacity of subsidiaries to operationalize the profit shifting strategies directed by the HQ. As such, it is crucial to understand the role of local subsidiaries (and their managerial structures) as active, rather than passive, actors in this process.

In this paper, we provide the first evidence on how local-level organizational capacity acts as an important enabler of HQ-level legal tax avoidance activities.[2] Good subsidiary-level management practices, a key measure of organizational capacity, yield productivity and growth benefits but could also enable MNEs to move profits away from the subsidiary if it is in a high-tax jurisdiction. We build a unique dataset of manufacturing MNEs across 21 countries, matching management practices data to fifteen years of detailed firm accounts information. We classify subsidiaries based on the location of their operations; for every year between 2004 and 2018, we identify whether they operate in low- or high-statutory tax rate countries, and build measures that proxy for their use of aggressive accounting practices.[3] As such, we leverage the variation in tax rates across countries and years, as well as the variation in aggressive accounting practices and management across MNEs and their subsidiaries, respectively, to explore how subsidiary-level management enables MNEs to shift profits. Data on management structures comes from the World Management Survey, a survey of productivity-enhancing practices that is collected independently from accounting practices and tax data.[4]

[2]This paper focuses on legal tax *avoidance* and profit shifting practices, not illegal tax *evasion*.

[3]The statutory tax rate we use includes the federal statutory tax rate plus the average of the local tax rate. See CBT Tax Data (2017) for details on the dataset and methodology.

[4]We focus our analysis on MNEs for three reasons: first, they are able to shift profits abroad, unlike

We have three main sets of results. First, we document that the commonly reported average positive relationship between "good" management practices and firm *profitability* only holds in low-tax countries, while the relationship with *productivity* holds in both high- and low-tax jurisdictions.[5] This suggests that subsidiaries adopting good management practices generate higher revenues that, on average, do not translate into higher reported profits outside of lower-tax jurisdictions. Specifically, a well managed subsidiary in a a country with tax rates around the 75th percentile (30%) reports 2.86pp lower profitability relative to a similar subsidiary in a country with tax rate around the 25th percentile (22%). This pattern persists in the sample where we observe management practices for multiple subsidiaries within the same MNE, and it is not present when we consider the sample including only domestic firms. The pattern is also robust to multiple measures of tax rates, including federal statutory corporate tax rate, MNE-level average tax rate, effective marginal tax rate and effective average tax rate (Devereux and Griffith; 1998). We verify that management is not simply proxying for other important observable MNE- and subsidiary-level characteristics — for example, firm size, country, centralization level, CEO skills — and, to be sure, include them as controls in our specifications.

We show that the patterns we observe are consistent with well-managed subsidiaries being actively engaged in the profit shifting activities of their parent company (if any). As main challenge in studying profit shifting practices is that these activities are not directly observable to outsiders, we use three proxies to infer this behavior of "aggressive avoidance": one subsidiary-based measure and two MNE-based measures. Our subsidiary-based proxy measures whether firms have large disparities between their reported financial and taxable profits, that is, large book-tax differences (e.g. Desai and Dharmapala; 2009). Our MNE-based measures include those with each of the following features in their ownership tree: (a) a tax haven location (e.g. Dowd et al.; 2017; Gumpert et al.; 2016; Hines and Rice; 1994) or (b) a large share of financial services subsidiaries (e.g. Demirgüç-Kunt and Huizinga; 2001; Merz and Overesch; 2016). We use these established metrics to simply classify MNEs as likely "aggressive" profit shifters (or, the extensive margin) and explicitly focus on the intensive margin: that is, for "aggressive" MNEs, understanding the extent to which local

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.

[5]We use "good management" here to mean a higher score in the World Management Survey measure, which has been linked to better firm productivity, product quality, average profitability, survival and innovation. The survey focuses on productivity-enhancing practices and does *not* refer to tax or accounting practices. See Scur et al. (2021) for the latest survey. We describe this measure in detail in the Data section. For evidence on the positive relationship between management and firm performance and the average positive relationship with firm profitability, see for example: Bloom et al. (2013); Giorcelli (2019).

management capacity enables them to re-allocate profits across their subsidiaries. We show that "aggressive" MNE drive the patterns we observe and we rule out real productivity differences, local investment incentives and information quality as alternative possible channels driving our results.

Second, using an event study design, we exploit tax rate cuts to estimate the extend to which structured management practices enable firms to respond to tax changes. We find that MNEs with well-managed subsidiaries respond to tax cuts by reporting approximately 66% (2.5pp) higher profits in the subsidiaries operating in those jurisdictions, and that this effect is driven by those that are also classified as aggressive tax avoiders.[6] Further, for profit-making subsidiaries, the *share* of total MNE profits in jurisdictions with tax cuts also increased for well-managed subsidiaries of MNEs. When we repeat the event study exercise with productivity as the outcome variable, we do not find a differential response across management types. Taken together, this evidence is consistent with this response being a result of profit shifting activities by MNEs with well-managed subsidiaries, rather than simply a result of an improvement in general firm environment and productivity. Our interpretation of the event study evidence is that the causal effect of tax cuts on profit reporting in those jurisdictions depends on the quality of management of the subsidiaries of MNEs operating there. That is, the causal inference question of interest is whether the existence of the management structures at the subsidiary level *enables the execution of the MNE tax strategy* directed by HQ managers, rather than whether better management directly induces HQ managers' profit shifting behavior in the first place.[7]

Third, to explain how better management could enable profit shifting, we propose a framework highlighting a mechanism where subsidiaries adopting better management practices have more tractable and predictable production plan. We propose this allows MNEs the flexibility needed to allocate profits according to their tax strategy. We then use the detailed plant-level data on management practices to iteratively consider each practice and its relationship with reported profits in high- and low-tax jurisdictions. Broadly, practices linked to tractability and predictability of production, as well as MNE-related incentives (rather than subsidiary-specific incentives) are most likely to enable profit shifting.

Our findings are distinct from, though complementary to, the literature on the effect of

[6] Fuest et al. (2018) and Suárez Serrato and Zidar (2016) use a similar design to consider the effects of corporate tax rate cuts on wages.

[7] The direct effect of an improvement in management practices on profit reporting in a "relatively stable" tax rate environment is more salient for domestic firms, which is not our focus here. Countries regularly change their tax rates, MNEs have subsidiaries across multiple countries, and organizational change is difficult – management practices are, thus, "sticky" (Gibbons and Henderson; 2012). As such, the question of interest here is: depending on the organizational capacity of the subsidiaries an MNE has, does a tax rate cut affect the allocation of profits?

individual managers and 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: for any given level of organizational capacity, a good manager can be better able to take advantage of it relative to a bad manager. But we propose that even a good manager will not be able to shift profits effectively without the appropriate structures in place. Empirically, we show that the link between good management practices and profit shifting does not vary substantially across firms with different levels of individual manager quality (proxied by executive compensation). We do find, however, that our results are driven by subsidiaries that belong to MNEs with more centralized decision-making.

Our paper contributes to the literatures on the determinants and local impact of profit shifting, as well as the effect of management practices on firm performance. First, the profit shifting literature identifies key characteristics of MNEs that are tied to such activities, for example, links to tax havens (Desai et al.; 2006; Dowd et al.; 2017; Gumpert et al.; 2016; Hines and Rice; 1994), firm size (Bilicka; 2019; Davies et al.; 2018; Wier and Reynolds; 2018), the quality of board and managers (Armstrong et al.; 2015, 2012; Dyreng et al.; 2010; Koester et al.; 2017), information quality (Gallemore and Labro; 2015), and tax advisors (Bustos et al.; 2022). Subsidiary-level factors have received far less attention. We leverage our unique internal firm data to show that the heterogeneity in local-level organizational capacity is an important factor in understanding differences in reported profitability across MNE subsidiaries. Understanding this capacity landscape is, thus, important in estimating the expected effectiveness of tax policies that target tax avoidance and its effects.

Second, there is a vast literature on the strong positive relationship (correlational and causal) between good management practices and firm performance. This relationship is consistent across sectors and countries.[8] Our findings have important implications for this relationship in MNEs, as systematic profit shifting activities by well-managed firms mean the data used in production function estimates may not reflect "actual" values. If so, the relationship between good management and firm performance is likely to have been under-estimated in prior work and, further, this could have implications for estimates of productivity when establishments are part of multinationals (Foster et al.; 2008). Guvenen et al. (2022), for example, show that adjusting for profit shifting activities would boost productivity growth estimates in the US. Our findings suggest the direction of this effect will depend both on tax rates and the landscape of organizational capacity across firms in a given country. Further, beyond productivity, recent studies have started to focus on the relationship between man-

[8]See, for example Bandiera et al. (2020); Bloom et al. (2020); Bloom and Van Reenen (2007); Lemos et al. (2021).

agement practices and alternative outcomes such as labor flows and inequality (e.g. Bender et al.; 2018; Cornwell et al.; 2021). We contribute to this new set of outcomes, providing the first evidence of the relationship between management practices and profit shifting activities.

2 Conceptual framework

In this section we discuss the conceptual framework underpinning our empirical investigation. We focus on multinational firms with physical operations across multiple countries. While our data primarily includes manufacturing firms, our conceptual model applies more generally to firms that have physical operations, such as manufacturing plants or physical stores across multiple jurisdictions.[9] In short, we propose that MNEs need good *organizational capacity* at the subsidiary level to enable effective tax planning across the organization, via both minimizing local tax liabilities and shifting "excess" profits across subsidiaries.

We consider that a firm has *good organizational capacity* when they use, on average, a set of mostly formal management practices in the day-to-day operations of their subsidiaries.[10] Specifically, we propose that practices that support superior tractability and predictability of earnings at the subsidiary level are most closely linked to profit shifting activities, as they enable HQ managers to plan tax liabilities accordingly. This idea is consistent with surveys of CFOs reporting that "repeatable, recurring and consistent earnings" are the most important feature of "earnings quality" (Dichev et al.; 2013). Further, Bloom et al. (2021) find managers in well-managed firms to be better able to make good financial forecasts. However, this is distinct from prior work that finds the quality of the *information environment* enables profit shifting, as measured by HQ-level accuracy and accessibility of earnings data (Gallemore and Labro; 2015; McGuire et al.; 2017). All proxies in this work relate directly to HQ information and not plant-level activities, the latter being a key focus of our paper. In particular, we have detailed measures of the internal processes that govern the information creation, flow and subsequent local-level and HQ-level decisions.

Methods of profit shifting Prior work on profit shifting activities highlights three primary type of actions that are decided at the HQ-level: debt shifting (Desai et al.; 2004; Huizinga et al.; 2008), transfer pricing (Cristea and Nguyen; 2016; Davies et al.; 2018) and

[9] It does *not* extend to, for example, tech firms such as Google or Meta.

[10] "Formal management practices" here implies that there is a clearly determined, formal process in place that governs the day-to-day operations of the plant rather than the manager simply running things in an ad-hoc manner (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.

patent location (Dischinger and Riedel; 2011). 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. It is important to stay *near zero* and avoid being too far into the negative, as firms care about shareholder perception and prefer subsidiaries not to incur losses, especially if they are in fact profitable. There is also a limit on the amount that low-tax subsidiaries can lend, and too much debt could increase the likelihood of risky investments and result in potential bankruptcy. 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.

For transfer pricing, a subsidiary located in a 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 goods (generally inflating) relative to their market value and is best achieved using goods that are difficult to price on third party markets, such as intangibles. This is a popular activity because it is hard for governments to legally detect, but the "mis-prices" must be relatively fixed in the short-run. Too much change in the prices of the same intangibles year-on-year raises red flags with government auditors. For patent location, MNEs can locate their patents in 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 MNEs. As our framework is consistent with profit shifting decisions using any (or all) of the above strategies, we do not need to identify between them but simply need to understand that these are the potential activities that firms engage in to shift profits, and that better organizational capacity

affects the extent to which subsidiaries are capable of executing these HQ directives.

2.1 How plant-level practices matter for 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. The HQ managers make decisions about profit allocations, while plant-level managers make decisions related to production efficiencies. As such, it is unlikely that plant-level managers will implement better management practices with the exclusive goal of enabling profit shifting. A consequence of this is that good management will likely affect the *extent to which* an MNE can engage its subsidiaries in profit shifting activities – the intensive margin – not *whether* they engage in such activities at all — the extensive margin.

Our framework is novel in its explicit treatment of the implementation capacity that individual subsidiaries can offer their parent companies. Prior work focusing on the decisions of HQ managers implicitly assumes that the HQ's directives can be effected as intended (Armstrong et al.; 2012; Desai and Dharmapala; 2006; Koester et al.; 2017). We expand on this in two distinct ways. First, we propose that plant-level heterogeneity in organizational capacity can significantly impact the operationalization (or, execution) of profit shifting strategies. Second, we highlight the tension between organizational design choices that prioritize local-level flexibility (Aghion et al.; 2021) but potentially limit activities that require more centralized control (such as profit shifting).[11]

3 Data

We use two main data sources for this paper: the World Management Survey (WMS), a random sample of mid- to large-sized manufacturers from 21 countries, and Bureau van Dijk's Orbis, a provider of firm-level accounting data. We describe each in turn below. Our primary analysis sample starts with all MNE subsidiaries in the WMS sample for which we have financial data, including at least profit and loss before taxes and total assets. This includes

[11]While profit shifting decisions are made by managers at the HQ and not by individual subsidiary managers, HQ can still adopt local incentive policies that are aligned with their profit allocation goals. For example, HQ can choose to link manager bonuses to MNE performance rather than subsidiary performance.

1,783 subsidiaries, belonging to 1,388 unique parent MNEs and yields 16,076 subsidiary-year observations between 2004 and 2018.[12] For 228 parent MNEs, the WMS includes multiple plants within its sample yielding 617 plants and 6,084 plant-year observations.[13] For a series of robustness checks, we (a) include the set of domestic firm subsidiaries in the WMS located in the set of countries of the primary analysis sample (yielding 2,458 subsidiaries and 16,446 subsidiary-year observations between 2010-2018);[14] (b) include the full set of subsidiaries belonging to a MNE that has at least one observation in the WMS sample (yielding 79,949 subsidiaries and 537,508 subsidiary-year observations). For this extrapolation, we assume that the broad management quality (formal vs. informal, not the specific score) is the same across all subsidiaries within a multinational firm.[15] For our event study analysis, we restrict the latter "extended" sample to only subsidiaries in countries that experienced a single tax rate reduction within the sample period.[16] This yields a sample of over 17,581 subsidiaries with over 115,721 subsidiary-year observations. Table B1 reports summary statistics across all firm-years for the baseline and event study samples. Table B9 includes additional descriptives for the extended sample; as the WMS is a random sample of firms within countries, there are no substantial differences between the baseline and extended samples we use. We also show firms that do not report ROA in Orbis are not different in terms of management scores relative to firms in our analysis samples (Panel C).

3.1 Management data: World Management Survey

To measure organizational capacity 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. 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

[12] 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.

[13] Appendix B3 describes the group structure of the baseline WMS sample.

[14] The domestic firms sample includes only firms located in the countries included in the baseline MNE sample (see Figure B1 for a list of countries). While the WMS has a larger set of domestic firms in its full sample, domestic firms do not face the same reporting requirements as multinationals and thus only a small set have publicly available financial data. A more thorough analysis of tax reporting patterns in domestic firms requires access to country-specific administrative tax records, which we explore in future work.

[15] We thank Nick Bloom for this suggestion. This is not a strong assumption, as Bloom et al. (2019) show that the largest variation in management practices is attributed to the differences between firms, rather than across establishments within firms.

[16] See Appendix B.4 for a more thorough description of the extended sample.

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 focus of the WMS is on measuring practices that are broadly linked to better productivity, and explicitly *do not* address financial matters, reported profits or accounting practices.

Measuring organizational capacity: We measure organizational capacity using data on management practices from the WMS. This project 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 the senior-most manager at the manufacturing plant in a semi-structured conversation about the day-to-day practices followed at their establishment. These managers are senior enough 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.[17] The method is double blind: interviewees do not know they are being scored, and interviewers typically only know the firm's name and phone number. 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.[18]

The conversation follows a set of broad practices spanning operations/monitoring, target setting and people/incentive management 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. 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.

[17] This avoids the manager simply giving the answer she thinks the interviewer wants to hear.

[18] For example, Altig et al. (2020); Ben-David et al. (2013) where response rates in firm surveys range from 0.1% to 13%.

Defining management indices: Following our conceptual framework, we focus on the 12 survey topics that directly relate to operations management, and refer to this index as simply "management". 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 reserve the people management survey topics for 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.[19] 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. We use the terms good management and formal management interchangeably.

Our primary sample includes 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 MNE subsidiary scores in our sample range from 1.25 to 4.92, with the 25th percentile at 2.9 and the 75th percentile at 3.75. 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. This suggests that while the average MNEs across the countries tends to have "formal" practices in place, there is still substantial variation in management practices across firms and countries (Table B1 and Figure B1) 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 better management and tax rates in high tax-countries. As management practices are sticky (Bloom et al.; 2014; Gibbons and Henderson; 2012), we assume they are constant across years (or, at least maintain their tendency towards mostly formal practices in place).[20]

Measuring decentralization and managerial incentives: The WMS collects additional information on decentralization and type of manager incentives. There are three decentralization 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 1 (all decisions are taken at HQ)

[19]The WMS z-score is computed by standardizing each question, taking the average, and standardizing the average (Bloom and Van Reenen; 2007). 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)).

[20]For WMS firms with panel data we take the average across years. Unfortunately, the sample size that includes panel data is not large enough to allow us to look at changes in management.

to 5 (plant manager has complete authority over these decisions) scale, where 3 means decisions are equally shared between HQ and the plant (Aghion et al.; 2021; Bloom, Sadun and Van Reenen; 2012). We focus on the non-HR decentralization measures (a and b) and our decentralization measure is an average of the two scores. 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.

3.2 Firm characteristics and financial measures

Profitability, performance and investment measures: We measure subsidiary profitability using return on assets (ROA). This data comes from Orbis BvD's compilation of subsidiary unconsolidated financial statements. ROA is defined as profit and losses before taxes divided by total assets.[21] We also build a measure of subsidiary-level effective tax rates (ETR), which measure the amount of taxes paid relative to a subsidiary's profits. We use this measure in additional analyses the Appendix B, though throughout the paper we focus on understanding differences in subsidiary reported profitability as our primary outcome of interest. We measure performance using the log of sales per employee and measure investment using the annual growth rate of fixed assets.

Opportunities for tax aggressiveness We use three proxies for aggressive tax avoidance behavior: one subsidiary-based measure and two MNE-based measures. Our subsidiary-based proxy relies on realized profit metrics and follows a commonly used approach in the accounting literature: calculating the size of book-tax difference (BTD), which measures the difference between pre-tax book earnings and taxable income. This measure has been linked with tax-planning activities of MNEs. For example, 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 proxy for aggressive tax planning. Desai (2003) shows 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.[22]

[21] Blouin and Robinson (2020) discuss that in Orbis BvD income from lower-tier affiliates may be at least partially duplicated. Given that we only use tier 1, upper-level affiliates in the 'extended sample', this should alleviate concerns regarding double counting in our samples.

[22] 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

BTDs are calculated by subtracting a subsidiary's current tax expense from their pre-tax profits and multiply this value 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 classify firms with larger than median BTDs as more likely to be aggressive tax avoiders and those with below median BTDs as likely to be non-aggressive avoiders.[23]

While having a subsidiary-level measure is instructive, the ultimate decision regarding profit allocations is done at the HQ level. As such, the next two metrics we use are MNE-level proxies, measuring the relative opportunity for profit shifting based on the location of MNE subsidiaries. One proxy in this set 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. Under this definition, we classify a firm as being aggressive when an MNE has at least one tax haven subsidiary (or HQ) in the firm ownership tree. The majority of MNEs in our sample have tax havens in their firm structure, which is consistent with evidence from previous literature (e.g. Desai et al.; 2006).[24] Another proxy at the MNE-level is the share of subsidiaries that provide primarily financial services within an MNE. In principle, MNEs with an above median share of financial services subsidiaries have a broader set of affiliates that can serve as desirable "profit destinations" for shifted profits.

Country-year tax rates: Using the location of the HQ and the subsidiary, we use country-year corporate statutory tax rates from the Centre for Business Taxation Corporate Tax Database to define high- and low-tax environments.[25] Specifically, we use the federal statutory corporate tax rates for each country and add an average of the sub-national tax rates, following the CBT Tax Data (2017) methodology. In the robustness section, we show that our results are robust to excluding the sub-national averages, using the MNE-level averaged of statutory tax rates, as well as using average or marginal effective tax rates. 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

classified as non-aggressive avoiders that may be aggressively tax planning. This would bias the findings against our hypothesis.

[23]Our results are not sensitive to choosing alternative thresholds such as classifying the top 25% as being aggressive avoiders and bottom 25% as non-aggressive.

[24]While Orbis has poor coverage of *financial* information for tax haven subsidiaries (Torslov et al.; 2018), we only need to know the *existence* of such subsidiaries and this more basic information is well reported. In our sample, just over 50% of MNEs have at least one subsidiary in a tax haven, and just over 70% of our subsidiaries belong to an MNE with a subsidiary in a tax haven.

[25]For domestic firms, the HQ and any subsidiaries will have a common country of operation by definition. The data is available in the CBT website.

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.[26]

4 Main Results

4.1 Management and profitability across tax jurisdictions

The core relationship between management and firm performance has been consistently estimated across and within countries. The correlation between management and profitability is lower than the correlation between management and operating revenue (see, for example, Bloom, Genakos, Sadun and Van Reenen (2012)). Broadly, this suggests that higher turnover generated by firms with better management practices does not necessarily translate into higher reported profitability — or, at least not everywhere.

4.1.1 Reduced form evidence:

To unpack these patterns, we estimate a reduced form model correlating the ROA of each firm to their management quality, the tax rate faced by the subsidiary and the interaction between the two. In this specification, we take advantage of the variation in tax rates across countries and years and the variation in management practices across subsidiaries to identify the effects on management practices on firm profitability. We estimate the following:

$$ROA_{ict} = \alpha + \beta_1 M_i + \beta_2 TaxRate_{ct} + \beta_3 M_i \times TaxRate_{ct} + \gamma_1 X_{it} + \eta_c + \delta_t + \varepsilon_{ict} \quad (1)$$

where ROA_{it} is the returns on assets, M_i is management score indicator, $TaxRate_{ct}$ is the statutory corporate tax rate that subsidiary i faces in country c at time t (henceforth, tax rate), X_{it} includes firm-level controls. η_c are country fixed effects and δ_t are year fixed effects. Firm-level controls include: log of the subsidiary number of employees, the log of subsidiary fixed 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 1.[27] We verify

[26] 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). To highlight the variation in statutory tax rates that we use in this paper, we provide a list of countries and years in each cell in Table B4.

[27] 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). In our primary analysis using our baseline sample, we use robust standard errors but cluster at the subsidiary level in the "extended sample" specification

that our management measure is not simply proxying for other observable characteristics and provide additional analysis on this concern in the Appendix (specifically, Tables B2 and B10). Nonetheless, we include multiple controls for firm characteristics as listed above, and, where appropriate, include MNE fixed effects to help account for parent-specific time-invariant unobserved characteristics.

Pooled OLS: Columns (1) to (3) start with the full sample of firms in the WMS, including all MNE and domestic subsidiaries with financial information. Column (1) affirms the positive correlation between better management and *average* reported profitability, as well as average higher profitability of MNEs. It also shows that reported profitability is significantly lower in higher-tax countries. Column (2) includes an interaction between the MNE indicator and the tax rate, and while the coefficient on the interaction is not significantly different from zero, it is negative. Column (3), in turn, includes an interaction between the management indicator and the tax rate, and the coefficient is significant and negative. These results suggest that the variation in reported profits across tax jurisdictions is not simply driven by firm ownership, and a firm's organizational capacity explains an important part of this variation.

In Columns (4) and (5) we split the sample into domestic firms (that is, firms that have operations exclusively within the country where they are headquartered) and MNEs. It is clear that the negative interaction coefficient of management and tax rate is driven by MNEs. Specifically, the coefficients in Column (5) imply that if we were to move a firm with good management from a country at the 25th percentile value of corporate tax rates (22%) to a country at the 75th percentile of tax rates (30%), they would report almost 3 percentage points lower ROA in the higher tax country. This is an almost 50% reduction in reported profitability relative to the sample mean.

Figure 1a depicts the relationship in Column (5) across the distribution of the management score. We plot the local linear regressions of management scores on profitability for MNE 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 B2).[28]

Our results are robust to using various measures of tax rates (Figure 2 and Table B5).

and cluster at the MNE level when we use the consolidated sample.

[28]We also verify that better managed subsidiaries in high-tax countries tend to have lower variability in reported profits across the sample years, consistent with our conceptual framework (Figure B4).

We iterate across different measures of exposure to corporate tax rates at the country and MNE level. At the country level, we use the federal statutory tax rates, effective marginal tax rates and the effective average tax rates. At the MNE level, we use the average of the statutory tax rates that an MNE is subject to across all the countries where it operates. This specification allows us to include country-year fixed effects to alleviate concerns about the differences in business cycles across countries where the MNE operates.[29] The results between these two specifications are virtually unchanged. We then confirm robustness of our specification to using continuous rather than binary measure of management. Finally, we plot the coefficients of the binary management measure from sub-samples of low tax and high tax countries (as shown in Figure 1a), instead of interactions.

In Column (6) we use the "extended sample" to observe the location of profits reported for the *full set* of subsidiaries belonging to the MNEs in the WMS across both high- and low-tax countries. As the full sample includes subsidiaries outside the manufacturing sector, in this specification we include industry fixed effects. The coefficients on the interaction term between this "full sample" and the random sample from the WMS-specific subsidiaries in Column (5) are not significantly different from each other. The magnitudes imply that if we were to move a firm with good management from a country at the 25th percentile value of corporate tax rates (21%) to a country at the 75th percentile of tax rates (31.5%), they would report 2.2 percentage points lower ROA in the higher tax country. This is approximately a 60% reduction in reported profitability relative to the sample mean, suggesting that, in our context, sample selection is unlikely to be an issue.[30] Further, as we assume the same level of management quality in all subsidiaries within the MNE in the extended sample, this helps allay concerns that our results are entirely driven by selective adoption of formal management in specific plants for the purpose of profit shifting.

Pooled cross sectional data allows us to observe the *allocation* of reported profits, but not the *re-allocation* of these profits across jurisdictions within MNEs. While the specific re-allocation of profits across individual subsidiaries is inherently unobservable, we conduct two further exercises to get closer to understanding this pattern.

Within-MNE variation: First, in Column (7) of Table 1 we use the smaller sample in the WMS that includes multiple subsidiaries within the same MNE and run the same specification as in Column (5) but include MNE fixed effects. The interaction term is still significant and remarkably similar in magnitude to the coefficient in the specification with

[29]Note we do not weight this by the size of the operations as this is beyond the scope of our data. Also, we cannot include country-year fixed effects in the baseline specifications, since the variation in statutory tax rates that we use for identification is at that level.

[30]See Table B9: descriptive statistics for both the baseline and extended samples are similar.

the full subsidiary sample in Column (6). The implied change in reported profitability when moving a well-managed subsidiary from a country at the 25th percentile value of corporate tax rates (22%) to a country at the 75th percentile of tax rates (30%) is about 64% relative to the sample mean.[31] The relationship is also evident across the distribution of management scores: Figure 1b shows that, including MNE fixed effects, well-managed subsidiaries located in high-tax countries report lower profits. Figure B3 repeats the robustness exercise, and the coefficient magnitudes are consistent.

4.1.2 Event study evidence:

Second, in a dynamic setting, we can exploit the time dimension of our data to consider the effect of a tax rate cut on the allocation of profits across jurisdictions, holding firm management quality constant.[32] In the context of our framework, the relevant causal inference question is understanding how management practices enable firms to respond to tax changes. We use an event study design to estimate firms' responsiveness in their reported profits following a tax cut in a jurisdiction they operate in. Our event is defined as a corporate tax rate cut relative to the rate in the previous year for a particular country. A reduction in a tax rate should induce a subsidiary to report more profits in that country (all else equal), and our conceptual framework predicts that this behavior would primarily manifest in better managed firms, as they have the tractability and predictability practices needed to enable an efficient reallocation of profits.

We leverage the variation in tax rates across years, across the two management types to identify the effects of tax rate cuts for the subsidiaries in our event study sample. As such, we estimate the following specification:

$$RepProfit_{it} = \alpha + \sum_{\kappa=-4}^{4} \delta_t \mathbb{1}[t=\kappa] + \sum_{\kappa=-4}^{4} \beta_t \left(\mathbb{1}[t=\kappa] \times M_i\right) + \sigma_1 X_{it}^{'} + \eta_c + \delta_t + \epsilon_{it} \qquad (2)$$

where $RepProfit_{it}$ is one of two key outcome variables: the first outcome variable is reported return on assets (ROA) for subsidiary i at time t. The second outcome variable is the share of reported profits in the jurisdiction where subsidiary i operates relative to the sum of all

[31] While we cannot include MNE fixed effects in Column (6) as we average management quality at the MNE-level in the extended sample, we repeat the exercise splitting the sample between formal and informal management. The negative relationship between reported profits and tax rates is relatively stronger for well-managed firms (Table B11).

[32] This is a reasonable assumption in the short to medium run, as management practices have been shown to be remarkably sticky and organizational change is notoriously difficult (Gibbons and Henderson; 2012).

positive profits reported across all subsidiaries in our sample.[33] $\sum_{\kappa=-4}^{4} \mathbb{1}[t = \kappa]$ is a series of year dummies that equal one when the tax reform was κ years away, with the dummy variable corresponding to $\kappa = -1$ as the omitted category. M_i is the management score indicator. $X_{it}^{'}$ 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), η_c are country fixed effects, δ_t are year fixed effects, and ϵ_{it} is the error term.

The coefficients of interest are the β_t: they estimate the difference in the reported profits between subsidiaries that are formally and informally managed, κ years before or after the reform. 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 any 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.[34]

Our event study sample focuses 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.[35] We implement this restriction at the subsidiary level, such that those experiencing 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 sample period.[36]

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

[33] We opt for using the sum of reported profits from the entire available ownership tree rather than using reported consolidated profits from HQ to understand the re-allocation question. Using the sum of available profits from subsidiaries simplifies the interpretation of the relationship we estimate here.

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

[35] For example, the UK scheduled an 11 percentage point tax cut to be implemented on a one-percentage point annual reduction from 2010 to 2022.

[36] In our sample, a firm located in a country with tax cuts in 2009 and 2013 (i.e., Sweden), for example, 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 C1b.

synthetic group for each of those weighting the outcomes of each of those event studies.[37] 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.[38]

Starting with ROA as the outcome variable, in Figure 3a we plot the coefficients of interest, β_t, from $t = -3$ to $t = 3$, setting $t - 1$ as the reference time period (highlighted by the dashed line). As the sample only includes subsidiaries in country-years that experienced a tax rate cut, the interpretation of each coefficient is the change in reported profits relative to the year prior to the tax cut across the sample, for formal subsidiaries relative to informally managed subsidiaries. Specifically, compared to the reference year, subsidiaries with formal management practices in place reported just over 2.5pp higher ROA one year after the reform relative to informally managed subsidiaries in the same time period. This pattern holds relatively constant up to three years following the tax cut.[39] This is an economically significant difference: the mean ROA for formally managed firms in the pre-period is 0.042. The event study results suggest subsidiaries with formal management in place increase their reported profits by about 66% in the post-period following a tax cut relative to subsidiaries with mostly informal practices.

Figure 3b, in turn, repeats the analysis using the share of reported profits in the subsidiary relative to the total MNE profits as an outcome variable. The result shows that, in places that become newly lower-taxed, firms report more profits *relative to other profitable subsidiaries* in the MNE, if they are well-managed. Specifically, subsidiaries belonging to firms with formal management practices in place accounted for reported profits amounting to 3pp higher than the share reported in the reference year, relative to firms with informally managed subsidiaries.[40]

While these results show that firms in newly lower-tax jurisdictions report being more profitable – in an absolute as well as relative sense, if this higher profitability was entirely a function of higher "real" economic activity, we would expect to see a similar pattern in the productivity outcomes. We do not see such a pattern: in Appendix B we repeat the

[37] As in, for example, Campos et al. (2014); Dube and Zipperer (2015).

[38] 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 et al.; 2022; Callaway and Sant'Anna; 2021; de Chaisemartin and D'Haultfoeuille; 2022; 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.

[39] This result is driven by an immediate response in reported profits from formally managed subsidiaries, while informally managed subsidiaries take until period $t = +2$ to $t = +3$ to show a significant response. The average post-period coefficient for subsidiaries with formal management is 0.028. We report individual time coefficients in Table B7.

[40] Though as this sample only includes subsidiaries with positive profits, these results should be interpreted with some caution.

exercise with productivity as the outcome variable, and find no differential response across management types.[41]

Taken together, these patterns are consistent with re-allocation of profits across subsidiaries following a tax-cut in the subsidiary's jurisdiction. This re-allocation is driven by firms with formal management practices in place. We conducted a series of robustness and sensitivity checks with various definitions of event windows and event definitions, including accounting for multiple tax changes within the sample period, accounting for the size of the tax change, limiting the sample to a balanced sample and considering a tax hike instead of a tax cut. The results all yield consistent patterns (Figure B5).

4.2 Explaining reporting patterns: evidence for profit shifting

In our conceptual framework we propose that better management practices at the subsidiary level enable MNEs to more effectively re-allocate their profits across the tax jurisdictions where they operate. The main challenge in this literature is that profit shifting is inherently not observable as firm accounts only report final, "post-shifted" profits. However, in Section 4.1 we document clear differential patterns in profit reporting across high-tax and low-tax jurisdictions by MNEs subsidiaries with mostly formal or informal management practices in place. To consider whether these patterns are consistent with profit shifting activities, we rely on other behaviors that can be indicative of a strategic corporate focus on minimizing tax liabilities. If the MNE engages in profit shifting activities, we expect their subsidiaries with formal management to report relatively lower profits in higher tax countries. For MNEs that are not likely to be engaging in profit shifting activities, however, we would expect there to be no differential profit reporting. In this section, we repeat the exercises from Section 4.1 using one subsidiary-level and two MNE-level proxies for tax aggressiveness in the reduced form analysis, and only the two MNE-level aggressiveness proxies in the event study analysis.

Reduced form evidence: Panel A in Table 2 reports the results using ROA as the outcome variable. We iterate through our three aggressiveness proxies, with aggressive firms in Columns (1) to (3) and non-aggressive firms in Columns (4) to (6). Column (1) uses the haven aggressiveness proxy, and the interaction coefficient suggests that, among the subsidiaries belonging to an aggressive MNE, those that also have formal management practices in place report 0.026 lower ROA in jurisdictions with 10% higher tax rates relative to

[41] See Figure B6. We show that firm performance increases following a tax cut, but not differentially so between firms with formal and informal management practices in place.

those with informal practices in those jurisdictions. The corresponding coefficient for non-aggressive firms is positive (0.18) though not significantly different from zero. The next two columns in Table 2 report results using an additional MNE-level aggressiveness proxy and a subsidiary-level proxy. The results are remarkably consistent across the MNE-level measures as well as the subsidiary-level measure, suggesting that the latter is appropriately proxying for HQ-level decisions on profit shifting. An alternative specification for Columns (3) and (6) uses the continuous management measure, which allows for a distributional exposition of the correlations and the results are consistent across the distribution (Figure 4a for the pooled specification and Figure 4b for the within-MNE specification).

An alternative outcome follows from a relatively new approach focusing on the incidence of bunching around zero reported accounting profits (Bilicka; 2019; Johannesen et al.; 2020). This stems from the idea that firms looking to minimize their tax liabilities will try to report their accounting profits as close to zero as possible. In Panel B we define the outcome variable as "near zero" if ROA is within 0.05 percentage points of zero and repeat the same specifications as in Panel A across all aggressiveness proxies. The interaction coefficient in Column (1), for example, suggests that well-managed subsidiaries belonging to an aggressive MNE are nearly 5 percentage points more likely to report near-zero ROA for every 10 percent increase in tax rates.

Across all aggressiveness proxies, the results consistently suggest that well managed subsidiaries belonging to aggressive MNEs are more likely to bunch around zero reported profits in high-tax countries. Conversely, subsidiaries belonging to non-aggressive MNEs show no differential distributions of ROA across high- and low-tax countries. This relationship is most clearly seen in Figure 5, where we plot the distribution of ROA for firms with formal and informal management, in high- and low-tax countries. Between subsidiaries with formal and informal management (Panels A and B respectively), the pronounced bunching pattern for those located in high-tax countries is clearly visible in Panel A but not B. For subsidiaries with formal management, the bunching is evident in the aggressive sample and not evident in the non-aggressive sample — consistent with the statistically significant average relationship in Panel B of Table 2.[42]

Event study evidence: Table 3 reports the results for both event study outcome variables, ROA and share of ROA, for aggressive and non-aggressive MNEs. As the event study analysis uses a measure of management at the MNE-level, we only use two MNE-level aggressiveness proxies in this exercise. For aggressive MNEs, Columns (1) and (2) suggest that subsidiaries

[42]For the bunching analysis we use the BTD aggressiveness measure as it provides the most even sample split at the local level, aiding the visualization of the distributions.

of those MNEs with formal practices report between 0.03 and 0.04 higher ROA in the period after a tax cut was introduced. Columns (3) and (4) suggest that the share of the MNE-level profits reported in these subsidiaries increases by 2.3 to 2.6 percentage points. The post-period effect for all equivalent specifications for non-aggressive MNEs (Columns 5 to 8) are not statistically different from zero. These results suggest that it is better managed subsidiaries that belong to MNEs that can also be classified as aggressive tax avoiders that report differential profits following a tax rate cut, not so with well-managed subsidiaries that belong to non-aggressive MNEs.

4.3 Explaining profit reporting patterns: alternative channels

Our evidence thus far suggests that better managed subsidiaries report lower profitability in high-tax countries, and we show this is most evident in the group of subsidiaries that belong to MNEs that can be considered aggressive tax avoiders. However, the patterns we observe could potentially be explained by other reasons. In this section, we discuss four alternatives — differences in performance, use of investment tax incentives, information environment, and quality of managers — and show that the data is not consistent with these alternative channels. We summarize these results in Table 4.

Performance: "Real" performance differences do not seem to explain lower profitability in high tax countries for well-managed subsidiaries. Column (1) of Table 4 reports the results of our baseline specification with a common measure of productivity, log of sales per employee, as the outcome variable. The interaction term between formal management and corporate tax rate is positive and significant, suggesting that despite having lower profitability, subsidiaries with better management are (if anything) more productive in high-tax countries.[43] Further, repeating the event study exercise suggests there is no significant difference in productivity response between formal and informal management subsidiaries following a tax rate cut (Figure B6).

Investment: In our conceptual framework, we outlined that firms have two primary channels to minimize tax liabilities (local investment tax deductions and 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. While we see local investment tax deductions as part of the story, they do not contribute to our understanding of the difference in reported profits between high and low tax jurisdictions.

[43] 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 B2).

Using fixed asset growth as a proxy for investment, Column (2) reports the results with this alternative outcome variable. While subsidiaries in higher-tax countries have lower investment rates, we do not find evidence that this is *differentially* true for those that have better management.

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 result in 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 report the results in the Appendix (Table B6).[44] 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.

Information environment: There is a discussion in the literature relating to how an MNE's information environment and the quality of information affects profit shifting activities. Our evidence suggests that our management measure is empirically relevant beyond the quality and flow of information. As part of our measure relates to how well information travels throughout the organization, we build a proxy similar to those used in Gallemore and Labro (2015) — Internal Information Quality (IIQ) — and include it as a control in Column (3).[45] Including a control for IIQ does not substantially alter our interaction of interest, suggesting our management measure is capturing variation beyond MNE-level information quality. Another measure of the quality of information a firm has and uses is the type of tax professional a firm hires (Battaglini et al.; 2019; Zwick; 2021). In Column (4) we include a control for whether MNEs hire one of the "big 4" accounting firms as their primary tax advisers. Again, we find that the primary correlation holds, suggesting that our measure is capturing variation beyond simple ability to hire "top advice".

The focus of this literature has been on HQ-level measures of information quality and

[44] 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.

[45] Specifically, we built a measure of the speed with which management released their earnings announcements after their fiscal year closing. We chose this out of the four proxies because it is the only one that could be replicated across our sample. The other three proxies were specific to US listed firms. We include it as an interaction with being a listed firm to get as close as possible to the specification in Gallemore and Labro (2015). The coefficient on the interaction term (-0.024^{***}), omitted from the table for ease of exposition is negative and significant, consistent with the original paper.

flow. Our focus extends to the actions of subsidiary-level managers, which have thus far been assumed to not feature into the profit reporting decisions made at the HQ level. Conceptually, our management measure captures MNE-level information quality but also captures the processes that govern "real actions" on this information by the firm's managers. Our measure is taken at the subsidiary level and includes detailed operations that pertain directly to the generation, dissemination and enactment of strategies based on the information.

The role of individual managers and incentives: Our results suggest that the effect of good subsidiary-level management practices on an MNE's capacity to shift profits is relevant beyond the effect of individual manager quality. Specifically, we focus on management practices that are distinct from individual manager quality as there is a large literature on the role of individual managers on firm's performance (Adams et al.; 2005; Bertrand and Schoar; 2003) and on firm's tax avoidance (Armstrong et al.; 2012; 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 replicating this approach,[46] but we run a simple exercise to consider this channel with available measures of level of centralization from the WMS, and CEO and CFO compensation data from Orbis.

In Columns (5) and (6), we use a WMS proxy for centralization of decision-making described in Section 3 and split the sample into subsidiaries that belong to MNEs that have decisions made primarily jointly or at the plant (more decentralized) or primarily at HQ (more centralized). The interaction term is only significantly negative for subsidiaries that belong to MNEs that make 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.[47]

An alternative measure of the quality of HQ managers used in the literature is the CEO and CFO compensation. 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).[48] This value does not vary over time, and

[46] Our focus is on both private and public firms, and directors data is mostly available for the latter.

[47] Table B2 shows that there is no significant correlation between level of centralization and quality of management.

[48] The average salary in the finance, accounting and legal departments within our sample of MNEs is

only 2.8% of managers hold contemporaneous positions in more than one firm. Column (7) repeats the baseline specification for the sample of firms for which we have executive compensation data to highlight the selectiveness of this sample. The interaction term is still negative and significant, but the magnitude is almost four times larger than the "full sample" baseline coefficient. Still, controlling for CFO compensation (Column 8) or CEO compensation (Column 9) does not meaningfully change the magnitude of the interaction coefficient across specifications.

Summary on channels: Taken together, the patterns of lower profit reporting by better managed subsidiaries that we observe in higher tax countries countries appear to be driven by profit shifting activities of their parent companies. We show that differences in profitability between high- and low- tax countries cannot be attributed to differences in performance, investment, information quality or individual managers and, thus, argue that any further selection or endogeneity biases would have to be fairly complicated to account for these differences.

5 Mechanisms: how management practices enable profit shifting

But how do plant-level management structures affect decisions made at the MNE headquarters? In this section, we consider whether our management measure is picking up fundamental (or "real") practices that *enable* or *constrain* profit shifting activities or whether it is likely to be proxying for other unobservable characteristics such as simply overall "competence". We use enabling to mean that subsidiaries with higher scores in a particular practice are more likely to report lower profits in higher-tax countries relative to lower-tax countries. We use constraining to mean that, despite MNEs looking to minimize reported profits in a higher-tax country, higher scores in a particular practice are correlated with higher subsidiary-level reported profits in the higher-tax country.

5.1 Specific practices and reported profitability

The WMS includes 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

similar to the the CFO average salary.

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 to build a link with the existing literature on managerial incentives. We discuss each set in turn.

The results we describe below are summarized in Figure 6, which plots the coefficients of the interaction term between subsidiary tax rate and each of the each of the 18 management practices from the WMS survey with profitability as outcome variable. We report the interaction coefficients for aggressive MNEs (green circles) and non-aggressive MNEs (orange circles), using the presence of tax haven in MNE ownership tree to define aggressiveness. We include corresponding tables with individual practices and sub-indices in the Appendix: Tables B12 and B13 for profitability and repeat the exercise for productivity in Tables B14 and B15.

Manufacturing competence: lean operations. The closest metric we have to *general competence* is the first two topics in the WMS questionnaire: the interviewer asks the manager 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, 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 suggest that subsidiaries with better lean operations practices that belong to aggressive MNEs report lower profits in higher-tax countries. Subsidiaries that belong to non-aggressive MNEs, however, have a substantial positive relationship. If the patterns we interpret as profit shifting were driven only by overall manufacturing competence, we would expect to see subsidiaries belonging to both aggressive and non-aggressive MNEs 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 6 is significantly negative for all the individual practices for subsidiaries that belong to aggressive MNEs. For subsidiaries that belong to non-aggressive MNEs 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 subsidiary's ability to plan production patterns so they are 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 the average target-setting index is not significant for subsidiaries belonging to neither the aggressive nor non-aggressive MNEs. However, the two practices related to targets that link HQ and subsidiary are significantly negative for subsidiaries that belong to aggressive MNEs. 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 is negative for subsidiaries that belong to aggressive MNEs, though only the three practices including aspects related to performance or promotions seem to enable profit shifting. This is consistent with the literature on managerial incentives for profit shifting, and our evidence suggests that subsidiaries belonging to aggressive MNEs align their incentives to base bonuses on MNE performance instead of local plant performance. Panel B of Table B13 in the Appendix includes an additional three variables related to managerial bonuses in the WMS firms: bonus size (as a share of salary), share of the bonus linked to subsidiary performance and share of the bonus linked to MNE performance. The results suggest that subsidiaries offering larger manager bonuses tend to report lower profits in higher tax countries — but only if the bonuses depend on MNE performance in subsidiaries that belong to aggressive MNEs. This is consistent with our conceptual framework in that subsidiaries need to have the basic set of monitoring and target-setting tools as a platform from which to build effective incentives for their managers.

Summary on mechanisms Our results show that practices linked to tractability and predictability of production (that is, operations), as well as MNE-related incentives (and *not* plant-related incentives) are most likely to enable profit shifting — but only for subsidiaries that belong to MNEs classified as aggressive tax avoiders. The same specifications using productivity as an alternative outcome yield almost the opposite result, suggesting these firms are significantly more productive in "real productivity" terms but not in reported profitability terms.

6 Conclusion

We show that the previously established link between organizational capacity and profitability has an important caveat: for multinationals, it only holds in low-tax countries. We document new patterns of reported profitability across countries taking into account heterogeneity in the quality of management of MNE subsidiaries, and propose that these patterns can be best attributed to profit shifting activities for those MNEs that can be classified as aggressive tax avoiders. We find that practices related to tractable and predictable production and MNE-aligned incentives are most likely to enable such actions. We rule out alternative explanations such as "real" performance differences, differential take-up of local tax incentives, the quality of information environment, or individual manager quality.

Our results have important implications for how we understand the relationship between management and firm performance, as well as how heterogeneity in firm management quality can mediate the effectiveness of tax policy. First, while better subsidiary management may increase firm productivity and "real" profitability, it also seems to reduce reported profitability in high-tax countries. Lower reported profits can lead to lower corporate tax revenues, having potentially important welfare implications. Second, the landscape of firm organizational capacity may significantly impact the effectiveness of national tax cuts, as we find the firms that respond to such cuts tend to be those that are well-managed. Further, total factor productivity estimations require accurate reporting of inputs such as materials and capital. If multinationals are systematically mis-reporting such inputs as a result of profit shifting activities this could have important implications for productivity estimates of this group of firms across jurisdictions with different tax rates. Finally, the results presented in this paper are likely to be lower bound estimates of how large the effect of management is for profit shifting, since profits reported by firms are generally different between tax returns and accounting statements (Bilicka; 2019). Further exploration of the "real" impacts of profit shifting and the local-level determinants of implementation capacity are fruitful areas of further research.

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Table 1: Summary of Baseline Results.

	(1) ROA	(2) ROA	(3) ROA	(4) ROA	(5) ROA	(6) ROA	(7) ROA
Formal management=1	0.007***	0.007***	0.029***	0.017**	0.041***	0.049***	0.037
	(0.002)	(0.002)	(0.007)	(0.008)	(0.015)	(0.007)	(0.030)
Subsidiary corp tax rate	-0.105***	-0.093**	-0.060	0.128***	-0.236***	-0.041	-0.323***
	(0.036)	(0.036)	(0.038)	(0.040)	(0.075)	(0.027)	(0.117)
MNE=1	0.015***	0.021***	0.015***				
	(0.003)	(0.008)	(0.003)				
MNE=1		-0.025					
× Subsidiary corp tax rate		(0.027)					
Formal management=1			-0.078***	-0.038	-0.121**	-0.170***	-0.169*
× Subsidiary corp tax rate			(0.025)	(0.028)	(0.054)	(0.023)	(0.098)
Firm controls	✓	✓	✓	✓	✓	✓	✓
Country FE	✓	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓	✓
MNE FE							✓
25th pctile tax rate					*22%*	*21%*	*22%*
75th pctile tax rate					*30%*	*31.5%*	*30%*
Implied mfx (25th to 75th)					*- 2.86pp*	*- 2.22pp*	*- 3.94pp*
Observations	32522	32522	32522	16446	16076	537508	6084
# subsidiaries	4241	4241	4241	2458	1783	79949	617
Mean	0.045	0.045	0.045	0.031	0.058	0.036	0.061
Sample	**Baseline All**	**Baseline All**	**Baseline All**	**Baseline Domestic**	**Baseline MNE**	**Extended MNE**	**Baseline w/in MNE**

Note: Data from Orbis and the World Management Survey. Baseline sample includes only subsidiaries for which we observe management scores and were directly matched to Orbis financial data. 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 subsidiary 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 use subsidiary-level ROA and include country and year fixed effects. Columns (1) - (3) include all firms in our sample. Column (4) includes only domestic firms. Columns (5) to (7) include only MNEs. Column (6) includes all subsidiaries that belong to an MNE where we observe at least one subsidiary in the WMS (the "extended sample"). Year of accounts for MNEs include 2004-2018, and domestic firms year of accounts include 2010-2018. Firm controls include log of subsidiary employment, log of subsidiary fixed assets and log of number of subsidiaries in the MNE. Firm controls for Column (4) include log of subsidiary employment and log number of domestic production sites. Firm controls for Column (6) also include industry fixed effects (2-digit SIC). Standard errors are robust in all Columns and clustered at the subsidiary level in Column (6). For columns (5) - (7) we also show the corporate tax rate at 25th (low tax) and 75th (high tax) percentile of the sample distribution and the implied change in ROA if we moved a formally managed firm from low to high tax country.

Table 2: Primary Channel: Profit Shifting — Static Analysis.

Panel A: Profitability	Aggressive			Non-Aggressive		
Dep Var: ROA	(1)	(2)	(3)	(4)	(5)	(6)
Formal management=1	0.061***	0.088***	0.066***	-0.020	0.014	0.010
	(0.016)	(0.024)	(0.017)	(0.036)	(0.020)	(0.021)
Subsidiary corp tax rate	-0.215**	0.024	-0.088	-0.131	-0.360***	-0.373***
	(0.084)	(0.118)	(0.087)	(0.155)	(0.105)	(0.103)
Formal management=1	-0.256***	-0.277***	-0.220***	0.184	-0.031	-0.000
× Subsidiary corp tax rate	(0.058)	(0.083)	(0.058)	(0.126)	(0.071)	(0.077)
Observations	*11771*	*6420*	*6741*	*4305*	*9656*	*8477*
# subsidiaries	*1263*	*875*	*1513*	*520*	*1651*	*1590*
Dependent Variable Mean	*0.063*	*0.057*	*0.122*	*0.044*	0.059	*0.017*
Panel B: Bunching						
Dep Var: Near-zero ROA = 1	(1)	(2)	(3)	(4)	(5)	(6)
Formal management=1	-0.118***	-0.158**	-0.149***	-0.038	-0.067	-0.057
	(0.043)	(0.063)	(0.053)	(0.089)	(0.049)	(0.057)
Subsidiary corp tax rate	-0.013	-0.338	-0.245	0.552	0.542**	0.351
	(0.247)	(0.374)	(0.301)	(0.435)	(0.272)	(0.302)
Formal management=1	0.496***	0.514**	0.503***	-0.084	0.213	0.185
× Subsidiary corp tax rate	(0.161)	(0.234)	(0.190)	(0.322)	(0.180)	(0.209)
Observations	*11771*	*6420*	*6741*	*4305*	*9656*	*8477*
# subsidiaries	*1263*	*875*	*1513*	*520*	*1651*	*1590*
Dependent Variable Mean	*0.346*	*0.372*	*0.268*	*0.392*	*0.349*	*0.421*
Aggressiveness measure	**Has Haven**	**FinShare ≥ median**	**BTD ≥ median**	**No Haven**	**FinShare < median**	**BTD < median**
Firm controls	✓	✓	✓	✓	✓	✓
Country FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓

Note: Data from Orbis and the World Management Survey. Panel A outcome variable is Return on Assets (ROA), the ratio of profit and loss before taxes to total assets. Panel B outcome variable is = 1 when the ROA is "near zero" (±0.05). Formal management = 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. Columns 1-3 include subsidiaries belonging to MNEs classified as "aggressive" using each of the three proxies: MNE has at least one subsidiary in a tax haven, MNE has above-median share of subsidiaries in financial services, subsidiary has above-median book-tax differences (BTD). Columns 4-6 include subsidiaries belonging to MNEs classified as "non-aggressive", defined as the opposite of the aggressive definitions. All specifications include country and year fixed effects. Firm controls include log of subsidiary employment, log of subsidiary fixed assets and log of number of subsidiaries in the MNE.

Table 3: Primary Channel: Profit Shifting — Dynamic Analysis.

	Aggressive firms				Non-Aggressive firms			
	(1) ROA	(2) ROA	(3) ROA share	(4) ROA share	(5) ROA	(6) ROA	(7) ROA share	(8) ROA share
Formal management=1	-0.024***	-0.034***	-0.031***	-0.036***	-0.006	-0.008	0.026	-0.020
	(0.004)	(0.005)	(0.009)	(0.011)	(0.012)	(0.006)	(0.038)	(0.014)
POST tax cut=1	-0.011	-0.007	-0.025**	-0.034**	-0.007	-0.005	-0.019	-0.026
	(0.008)	(0.010)	(0.011)	(0.015)	(0.019)	(0.011)	(0.045)	(0.017)
Formal management=1	0.030***	0.039***	0.023**	0.026*	0.011	0.008	-0.048	0.020
× POST tax cut=1	(0.008)	(0.010)	(0.011)	(0.014)	(0.018)	(0.011)	(0.044)	(0.018)
Year FE	✓	✓	✓	✓	✓	✓	✓	✓
Subsidiary controls	✓	✓	✓	✓	✓	✓	✓	✓
Country level controls	✓	✓	✓	✓	✓	✓	✓	✓
Observations	96476	67071	26096	17569	4063	33468	1096	9623
# subsidiaries	16861	12136	16861	12136	720	5445	720	5445
Dependent Variable Mean	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029
Aggressiveness measure	**Haven**	**Fin share**	**Haven**	**Fin share**	**Haven**	**Fin share**	**Haven**	**Fin share**

Note: Data from Orbis and the World Management Survey. This table includes only the subsidiaries in the Event Study sample, i.e., 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 subsidiaries belonging to MNEs that have at least one subsidiary in a tax haven in columns (1) and (3) and MNEs that have above median share of financial subsidiaries in columns (2) and (4). Non-aggressive firms are defined as subsidiaries that belong to MNEs that do not have any subsidiaries in a tax haven in columns (5) and (7) and MNEs that have below median share of financial subsidiaries in columns (6) and (8). The event considered here is subsidiaries 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 columns (1), (2), (5) and (6) is ROA (returns on assets) which is the ratio of profit and loss before taxes and total assets. In columns (3), (4), (7) and (8), the outcome variable is ROA share which is the share of profits in all MNE profits for each subsidiary. Firm controls include log of subsidiary employment, log of subsidiary fixed assets and log of number of subsidiaries in the MNE. Standard errors are clustered at the subsidiary level in all columns.

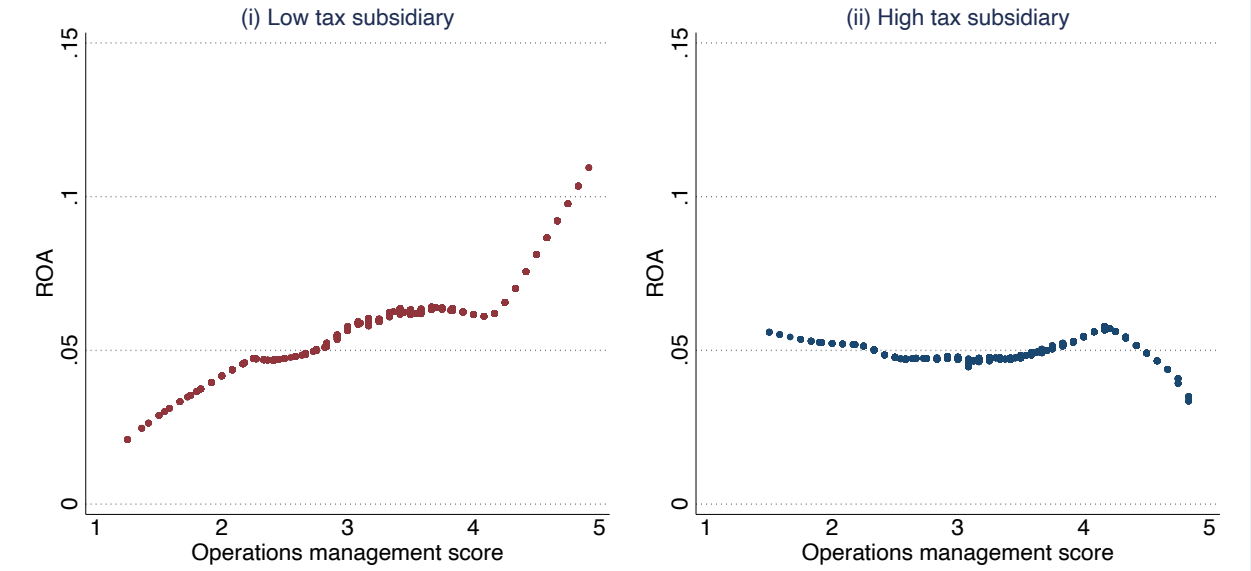
Table 4: Alternative Channels: Productivity, Investment, Individual Managers.

	Alternative outcomes		Information		Centralization		Executives		
	(1) Ln(SPE)	(2) FxAGr	(3) ROA	(4) ROA	(5) ROA	(6) ROA	(7) ROA	(8) ROA	(9) ROA
Formal management=1	-0.140	0.014	0.038**	0.040***	0.057***	0.018	0.115***	0.117***	0.114***
	(0.109)	(0.013)	(0.015)	(0.015)	(0.021)	(0.021)	(0.043)	(0.043)	(0.043)
Subs corp tax rate	-1.058**	-0.184**	-0.200***	-0.239***	-0.217**	-0.254**	-0.171	-0.168	-0.168
	(0.493)	(0.076)	(0.075)	(0.074)	(0.100)	(0.113)	(0.179)	(0.178)	(0.178)
Formal management=1	0.980**	-0.068	-0.111**	-0.124**	-0.181**	-0.030	-0.448***	-0.456***	-0.449***
× Subs corp tax rate	(0.382)	(0.047)	(0.055)	(0.054)	(0.074)	(0.081)	(0.143)	(0.143)	(0.143)
Additional controls									
Info Quality x listed			✓						
Big 4 adviser = 1				✓					
Ln(CFO compensation)								✓	
Ln(CEO compensation)									✓
Subsidiary controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Country FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Observations	15620	12964	15652	16076	9214	6862	3434	3434	3434
# subsidiaries	1759	1721	1712	1783	1019	764	321	321	321
Dependent Variable Mean	12.370	0.076	0.058	0.058	0.056	0.060	0.067	0.067	0.067
Sample	**Baseline MNE**	**Baseline MNE**	**Baseline MNE**	**Baseline MNE**	**Baseline Centr.**	**Baseline Decentr.**	**Executive Comp.**	**Executive Comp.**	**Executive Comp.**

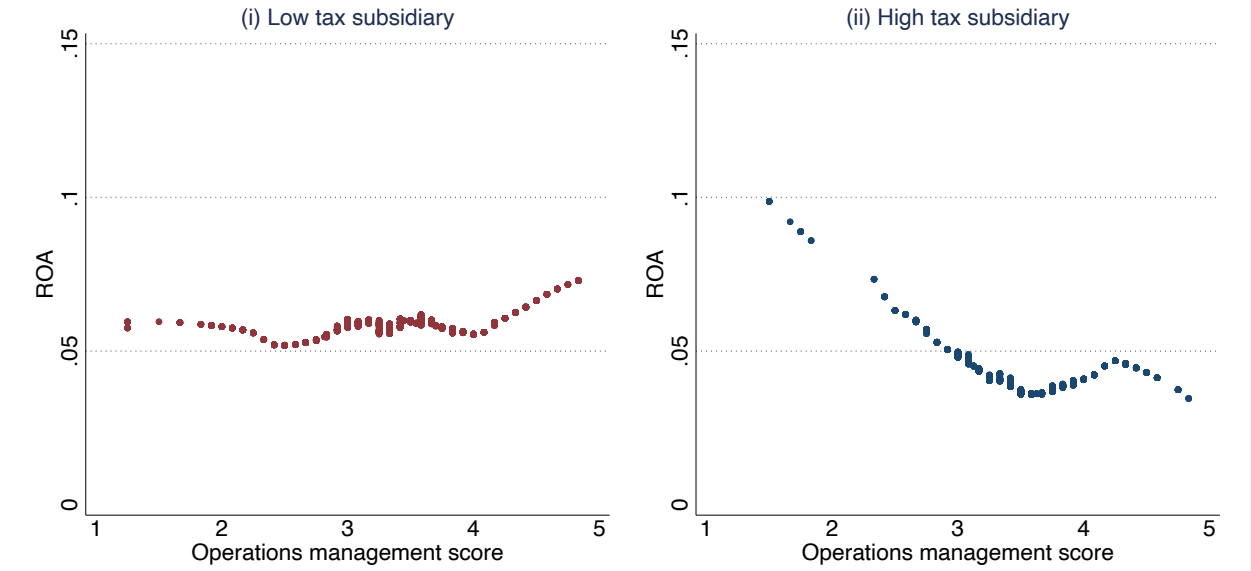
Note: Data from Orbis and the World Management Survey. **Samples**: Baseline sample includes only subsidiaries for which we observe management scores and were directly matched to Orbis financial data. Baseline decentralized and centralized samples include only subsidiaries that belong to MNEs that scored above 3 and below 3 (respectively) on the WMS centralization measure, including decision making in terms of new product introductions and sales and marketing. Executive Comp sample includes only subsidiaries in the baseline sample for which we also have executive compensation data from Orbis. **Variables**: 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. Subs corp tax rate is the annual statutory corporate tax rate in the country where a subsidiary is operating. ln(CFO compensation) and ln(CEO compensation) are the natural logarithm of compensation for chief executive and financial officers. The dependant variable in Column (1) is log of sales per employee, in Column (2) growth rate of fixed assets and in Columns (3) - (9) it is ROA (returns on assets). IIQ is a proxy for internal information quality from Gallemore and Labro (2015). Listed is an indicator for subsidiaries belonging to MNEs that are listed in the stock market. Big 4 adviser is an indicator for subsidiaries which have one of Ernst & Young, KPMG, PWC, or Deloitte as auditors or advisors. **Base controls** include firm controls (log of subsidiary employment, log of subsidiary fixed assets and log of number of subsidiaries in the MNE), country fixed effects and year fixed effects. Standard errors are robust in all columns.

Figure 1: ROA and Operations Management in Low- and High-tax Country-years.

(a) All subsidiaries, pooled

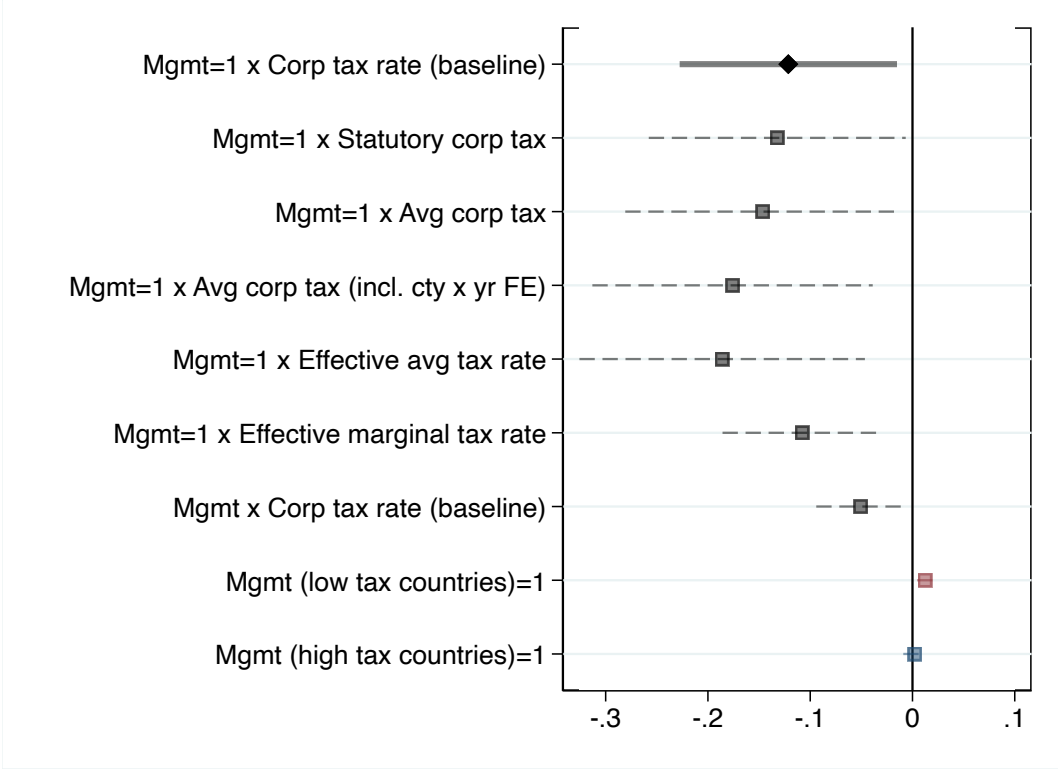


(b) Within-MNE only



Note: Data from the World Management Survey and Orbis. Sample includes only subsidiaries for which we observe management scores and were directly matched in both WMS and Orbis. Operations management is the average for the WMS operations management questions (including lean management, monitoring and target-setting). ROA is the ratio of profit and loss to total assets. Low tax subsidiaries are located in countries with below median statutory corporate tax rate for a given year. High tax subsidiaries are 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 0.75. Panel (a) includes all subsidiaries in the baseline WMS sample: $N_{(i)} = 10,771$ and $N_{(ii)} = 5,305$. Panel (b) includes only subsidiaries in the baseline WMS sample that belong to MNEs that have more than two subsidiaries in the sample: $N_{(i)} = 4,170$ and $N_{(ii)} = 1,914$.

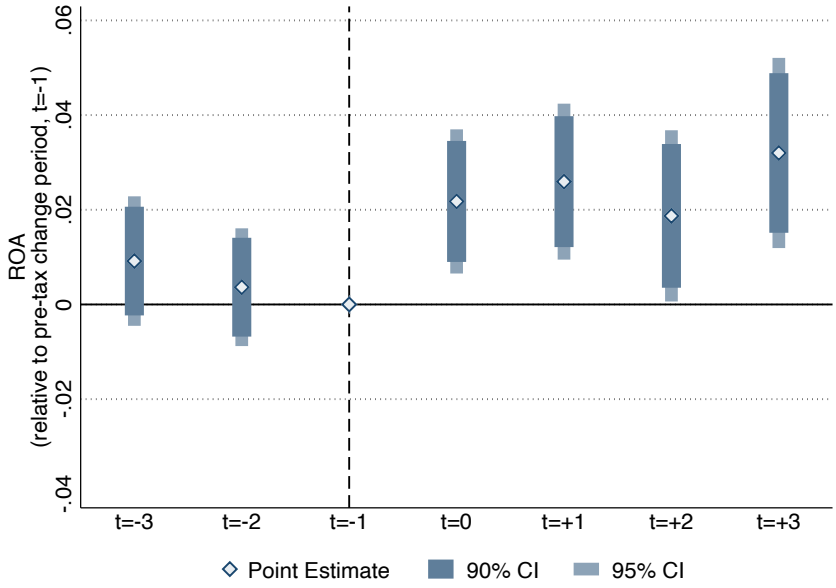
Figure 2: Summary of main specification robustness to different key measures.



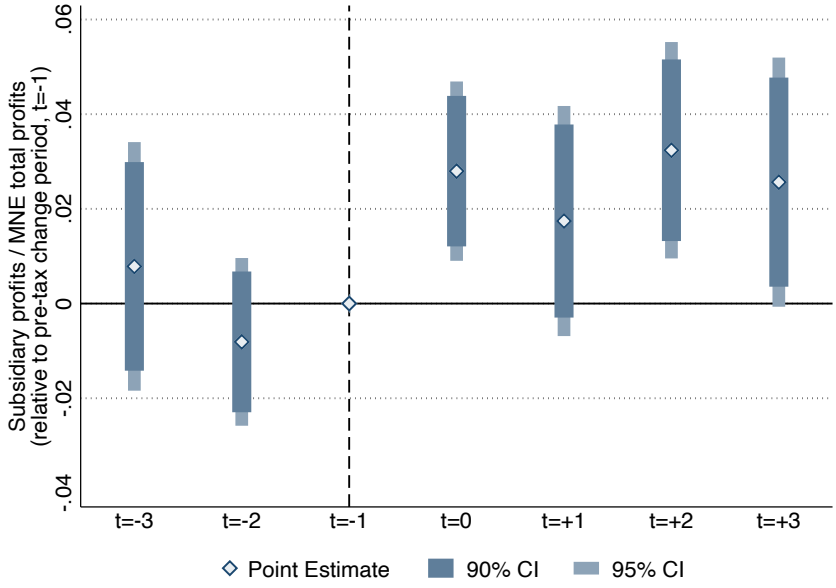
Note: Data from the World Management Survey and Orbis. Black markers represent the interaction coefficient from each regression that repeats the baseline specification in Column (5) of Table 1. Diamond marker represents the baseline regression. Square markers represent different iterations. Red and Blue square markers represent the level coefficients of management (not interactions) for the sub-samples of low-tax and high-tax countries, respectively. Mgmt = 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. Mgmt is the continuous version of this variable. Corp tax rate is the annual statutory corporate tax rate in the country where a subsidiary is operating which includes the average of local tax rates. Statutory corp tax is the annual federal statutory corporate tax rate. Avg corp tax is the average of all corp tax rates that an MNE that a subsidiary belongs to faces. This variable is firm specific. Effective avg tax rate and Effective marginal tax rate come from the CBT Tax Database and are based on Devereux and Griffith (1998). The outcome variable in all columns is Returns on Assets (ROA) which is the ratio of profit and loss before taxes and total assets. Year of accounts for MNEs include 2004-2018. Firm controls include log of subsidiary employment, log of subsidiary fixed assets and log of number of subsidiaries in the MNE. Standard errors are robust in all Columns.

Figure 3: Event Study: Tax Cuts and Reported Profits.

(a) Reported Profitability in Jurisdiction of Tax Cut



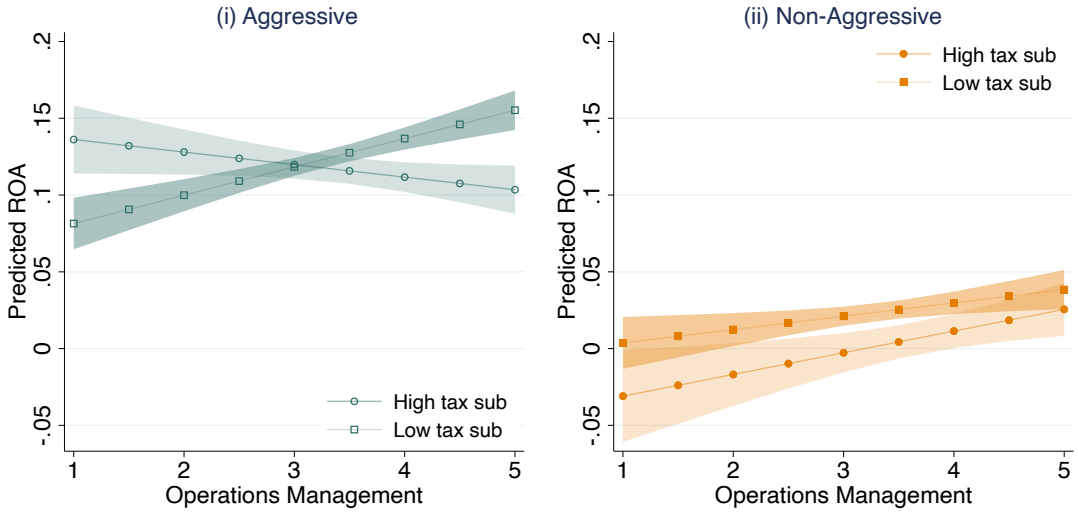
(b) Share of Reported Profits in Jurisdiction of Tax Cut



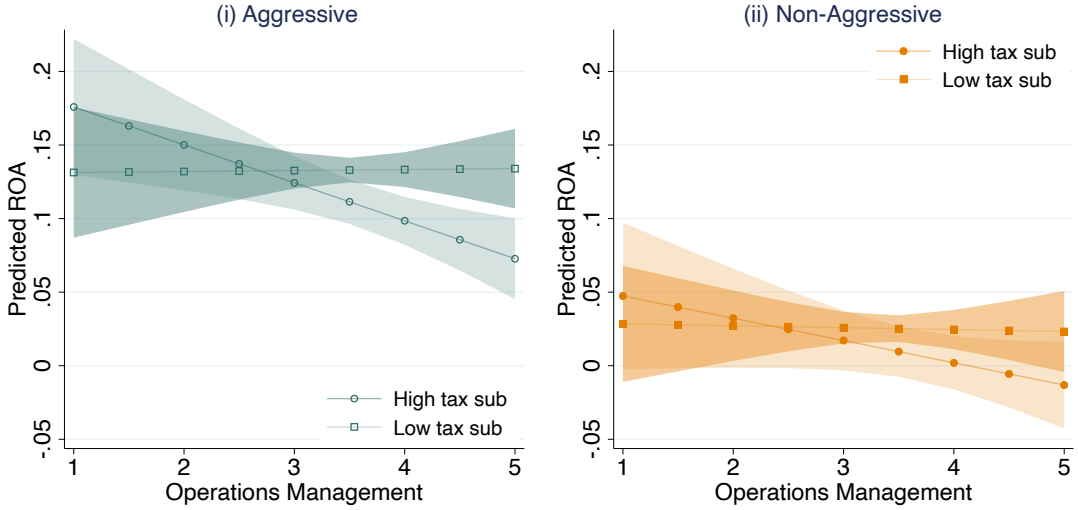
Note: Data from the World Management Survey and Orbis. This figure plots yearly coefficients from event study estimation, where the outcome variable in Panel (a) is ROA (returns on assets). ROA is the ratio of profit and loss before taxes and total assets. In Panel (b), the outcome variable is the share of profits in all MNE profits reported in each subsidiary. In both panels, we plot the coefficients for the estimated difference between formal and informal management subsidiaries and cluster standard errors at the subsidiary level.

Figure 4: ROA and Operations Management in Low- and High-tax Country-Years by Aggressiveness

(a) All subsidiaries, pooled



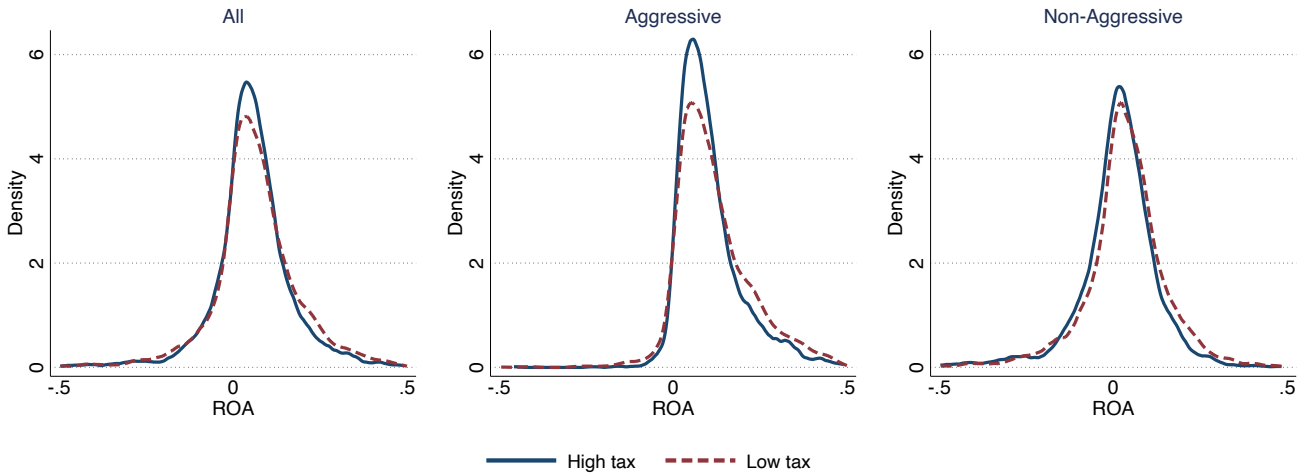
(b) Within-MNE only



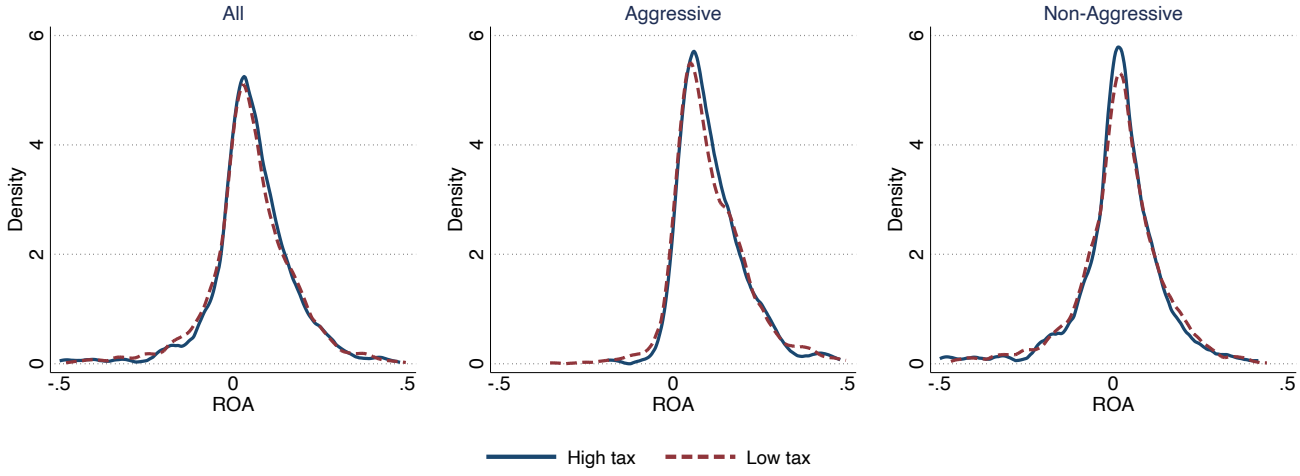
Note: Data from the World Management Survey and Orbis. Baseline sample includes only subsidiaries for which we observe management scores and were directly matched in both WMS and Orbis. Panel (a) includes all subsidiaries in the baseline WMS sample. Panel (b) includes only subsidiaries in the baseline WMS sample that belong to MNEs that have more than two subsidiaries in the sample. The results presented in this graph are marginal effects from the regression of ROA on operations management score by high vs. low corporate tax location. We classify MNEs as "aggressive" if the subsidiary has above-median book-tax differences (BTD). Non-aggressive MNEs are those with subsidiaries with book-tax differences below median. Each square corresponds to the predicted ROA at a given management level for subsidiaries located in high tax countries. Each circle corresponds to the predicted ROA at a given management level for subsidiaries located in low tax countries. Low tax subsidiaries are located in countries with below median statutory corporate tax rate for a given year. High tax subsidiaries are located in countries with above median statutory corporate tax rate for a given year. The operations management score is the average for the WMS operations management questions (including lean management, monitoring and target-setting). ROA is the ratio of profit and loss to total assets.

Figure 5: Bunching of ROA around Zero ROA for Aggressive Firms by Management Type.

(a) Formal management

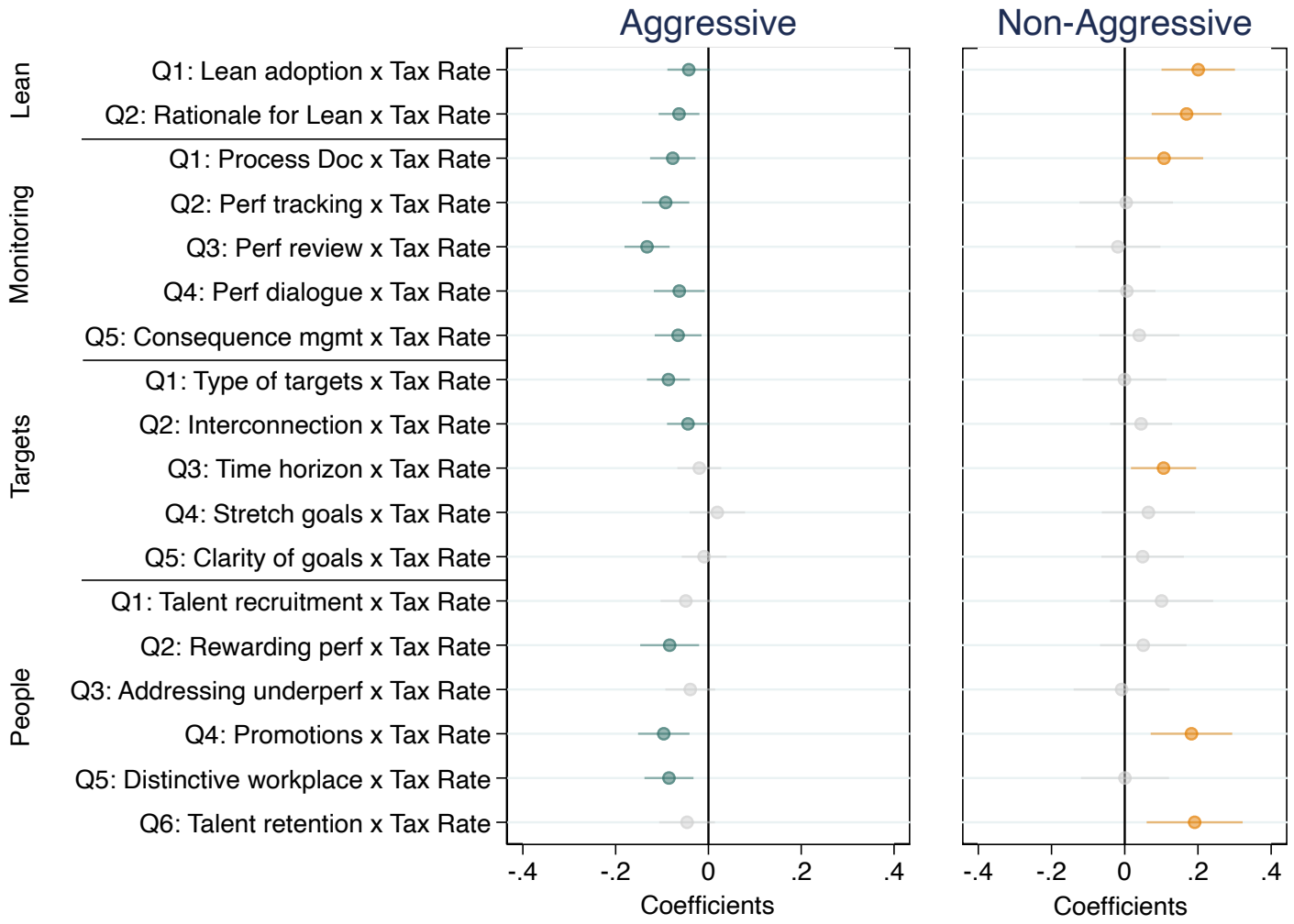


(b) Informal management



Note: Data from the World Management Survey and Orbis. Static sample includes only subsidiaries 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 subsidiary 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 MNEs, while in Panel B, for non-aggressive MNEs. We classify MNEs as "aggressive" if the subsidiary has above-median book-tax differences (BTD). Non-aggressive MNEs are those with subsidiaries with book-tax differences below median.

Figure 6: Mechanisms: Management Practices and Subsidiary Profitability for Aggressive and Non-aggressive MNEs.



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 subsidiary fixed assets, log of subsidiary employment, log of number of subsidiaries) as well as year and industry fixed effects. Aggressive firms are defined as subsidiaries belonging to MNEs that have at least one subsidiary in a tax haven. Non-aggressive firms are defined as subsidiaries that belong to MNEs that do not have any subsidiaries in tax havens. 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 MNE HQs have a common objective function of after-tax profit maximization 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.[49] Let an MNE have two subsidiaries, one in a high tax (with tax rate τ_H) and one in a low tax (with tax rate τ_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 (π) that a firm makes and in the share of profits (α) 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 ($m > 0$). MNEs that have subsidiaries with better management 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 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 MNE 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:

[49] 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.

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

Proposition: Better management increases share of shifted profits α.

Consider the following hypothetical case: a MNE that has 4 subsidiaries, two in high tax-jurisdictions and 2 in low-tax jurisdictions, and only one with good management in each jurisdiction. In minimizing their tax liabilities, this MNE would look to report as much of their profits as possible in *both* of their low-tax subsidiaries. Our framework suggests that they would shift "leftover" profits out of both of their high tax subsidiaries into their low-tax subsidiaries, but the MNE would be able to shift a relatively higher amount from the high-tax subsidiary with good management relative to the one with bad management. Even if the better managed firm had a higher *level* of profits (as a result of its expected higher productivity), they would still be able to shift a larger portion of that higher profit. The reallocation of profits would flow into both low-tax subsidiaries, though our framework suggests that the subsidiary with better management would be better able to absorb these profits.

B Appendix Tables and Figures

B.1 Descriptive Statistics

Table B1: 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
Panel A: Management-only sample								
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
Panel B: Event study sample								
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 subsidiary level. Panel B show descriptive statistics for the subsidiaries in our Event Study; that is, subsidiaries that are located in countries that experienced one tax rate cut throughout the sample period. Low tax subsidiaries are located in countries with below median statutory corporate tax rate in a given year. High tax subsidiaries are located in countries with above median statutory corporate tax rate in a given year. We classify MNEs as "aggressive" if the subsidiary has above-median book-tax differences (BTD). Non-aggressive MNEs are those with subsidiaries with book-tax differences below median.

Table B2: Correlates of Management Practices.

	(1)	(2)	(3)	(4)
	z-management	z-management	Formal management	Formal management
Firm characteristics				
Ln(employment)	0.011	0.010	0.002	0.001
	(0.007)	(0.007)	(0.003)	(0.003)
Ln(fixed assets)	0.005**	0.005**	0.002**	0.002**
	(0.002)	(0.002)	(0.001)	(0.001)
Ln(# subsidiaries)	0.079***	0.048***	0.026***	0.011*
	(0.012)	(0.014)	(0.005)	(0.006)
Fixed asset growth	-0.002	-0.023	0.006	-0.003
	(0.064)	(0.064)	(0.031)	(0.031)
z-centralization	-0.013	-0.011	0.009	0.010
	(0.023)	(0.023)	(0.011)	(0.011)
Aggressiveness				
BTD > median	0.050	0.054	0.009	0.011
	(0.050)	(0.049)	(0.023)	(0.023)
Share of fin subs> median		0.061		0.021
		(0.049)		(0.022)
Share of high tax subs> median		0.051		-0.003
		(0.052)		(0.023)
Has a tax haven subsidiary		0.294***		0.146***
		(0.064)		(0.031)
Tax Rate				
Effective Tax Rate	-0.106	-0.109	-0.052	-0.053
	(0.133)	(0.133)	(0.058)	(0.058)
Subsidiary Corp Tax (median)	0.654	0.399	0.955	0.856
	(1.760)	(1.758)	(0.800)	(0.796)
Observations	1783	1783	1783	1783

Note: Data from Orbis and the World Management Survey. This table shows coefficients from a regression of management practices on a set of explanatory variables. In all columns we average the explanatory variables across all time periods, unless otherwise specified. In columns 1 and 2 the outcome variable is z-management, which is the continuous operations management score. In Columns 3 and 4, the outcome variable is an indicator that takes a value of 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. The WMS z-centralization measure is a score from 1 (most centralized) to 5 (most decentralized). BTD > median is a dummy equal to 1 when book-tax difference is above median. Share of fin > median is a dummy equal to 1 when the share of financial subsidiaries is above median. Share of high tax subs > median is a dummy equal to 1 when the share of subsidiaries located in high-tax countries is above median. Effective tax rate is a ratio of tax liability to profit and loss before taxes. Subsidiary corp tax rate is the median statutory corporate tax rate in the country where a subsidiary is operating. All specifications include country and year fixed effects. Standard errors are robust in all columns.

Table B3: Summary of MNE group structure, WMS data.

Firms in the same corporate group count	**Total factories** N	**Subsidiary factories** N	**HQ factories** N
1	1154	956	198
2	298	290	8
3	132	128	4
4	84	83	1
5	60	60	0
6	30	30	0
8	16	16	0
9	9	9	0
Total	1783	1572	211

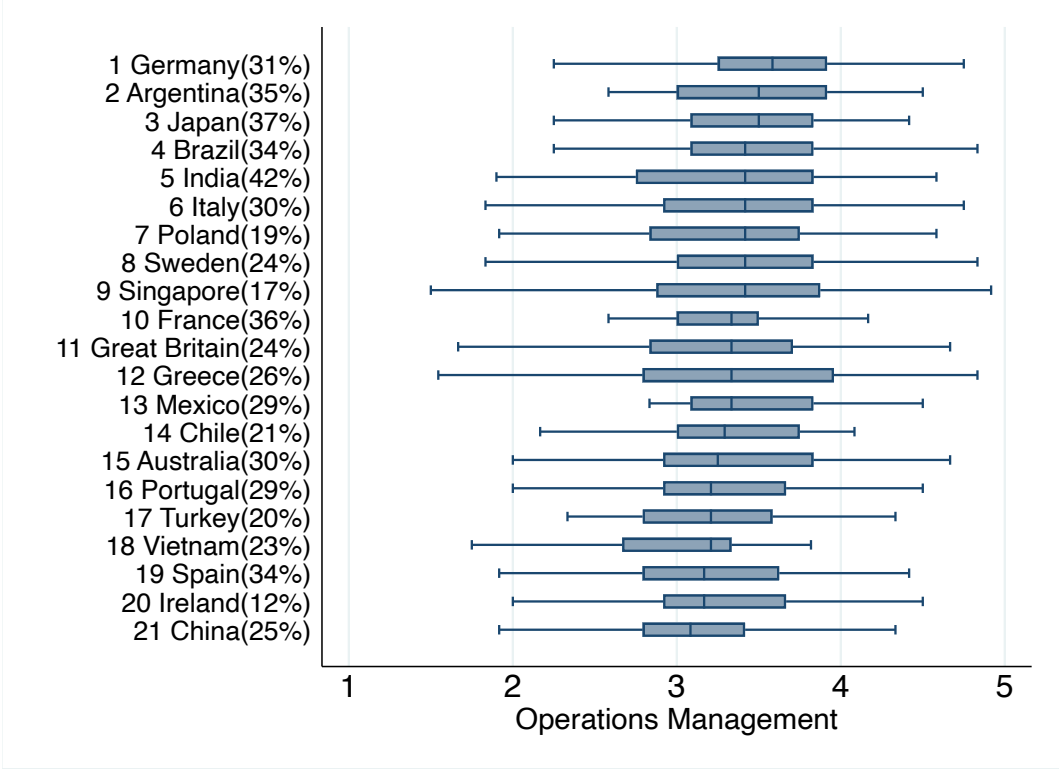
Note: Data from the World Management Survey. This table describes the group structure of the multinational plants (factories) included in the WMS dataset. The first column refers to the number of subsidiaries within the same corporate group (i.e. MNE parent) that have had plants interviewed for the WMS sample. These plants were selected randomly from a country-level sampling frame, independent of corporate group membership. Column 2 includes the count of the total number of plants in the WMS dataset, while columns 3 and 4 report the number of subsidiary and HQ factories that make up the total in column 2. For example, 1,154 MNEs only have 1 plant in the WMS sample, out of which 956 are subsidiary plants and 198 are HQ plants. 149 MNEs have 2 plants in the WMS sample (adding to 298 total factories, as reported in row 2), and so on.

Table B4: Annual tax rates for countries in the baseline sample.

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Argentina	**0.35**	**0.35**	**0.35**	**0.35**	**0.35**	**0.35**	**0.35**	**0.35**	**0.35**	**0.35**	**0.35**	**0.35**	**0.35**	**0.35**	**0.35**
Australia	0.30	0.30	0.30	**0.30**	**0.30**	**0.30**	0.30	0.30	**0.30**	**0.30**	**0.30**	**0.30**	**0.30**	**0.30**	**0.30**
Brazil	**0.34**	**0.34**	**0.34**	**0.34**	**0.34**	**0.34**	**0.34**	**0.34**	**0.34**	**0.34**	**0.34**	**0.34**	**0.34**	**0.34**	**0.34**
Chile	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.20	0.20	0.20	0.21	0.22	0.24	0.25	**0.27**
China	**0.33**	**0.33**	**0.33**	**0.33**	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
France	**0.35**	**0.35**	**0.34**	**0.34**	**0.34**	**0.34**	**0.34**	**0.34**	**0.36**	**0.36**	**0.38**	**0.38**	**0.38**	**0.34**	**0.44**
Germany	**0.40**	**0.40**	**0.40**	**0.31**	**0.31**	**0.31**	**0.31**	**0.31**	**0.31**	**0.31**	**0.31**	**0.31**	**0.31**	**0.31**	**0.31**
Great Britain	0.30	0.30	0.30	**0.30**	**0.30**	0.28	0.28	0.28	0.26	0.24	0.23	0.21	0.20	0.20	0.19
Greece	**0.35**	**0.32**	0.29	0.25	0.25	0.25	0.24	0.24	0.20	0.26	0.26	0.29	**0.29**	**0.29**	**0.29**
India	.	**0.42**	**0.42**	**0.42**	**0.42**	**0.42**	**0.42**	**0.42**	**0.42**	**0.42**	**0.43**	**0.43**	**0.43**	**0.43**	**0.43**
Ireland	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Italy	**0.37**	**0.37**	**0.37**	**0.37**	**0.31**	**0.31**	**0.31**	**0.31**	**0.30**	**0.30**	**0.30**	**0.30**	**0.30**	0.26	0.26
Japan	.	.	.	.	.	**0.41**	**0.41**	**0.41**	**0.37**	**0.37**	**0.37**	**0.37**	**0.35**	**0.34**	**0.34**
Mexico	**0.33**	0.30	0.29	0.28	0.28	0.28	0.30	0.30	**0.30**	**0.30**	**0.30**	**0.30**	**0.30**	**0.30**	**0.30**
Poland	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19
Portugal	0.29	0.29	0.29	0.29	0.28	0.28	0.28	0.29	0.30	**0.32**	0.30	**0.30**	**0.30**	**0.30**	**0.32**
Singapore	0.22	0.20	0.20	0.20	0.18	0.18	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Spain	**0.40**	**0.40**	**0.40**	**0.38**	**0.36**	**0.36**	**0.36**	**0.35**	**0.35**	**0.35**	**0.35**	**0.33**	**0.29**	**0.29**	**0.29**
Sweden	0.28	0.28	0.28	0.28	0.28	0.26	0.26	0.26	0.26	0.22	0.22	0.22	0.22	0.22	0.22
Turkey	.	.	.	.	.	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.22
Vietnam	.	.	.	.	.	0.25	0.25	0.25	0.25	0.25	0.22	0.22	0.20	0.20	0.20
Median	0.31	0.31	0.31	0.30	0.29	0.28	0.31	0.30	0.30	0.30	0.30	0.29	0.29	0.29	0.26

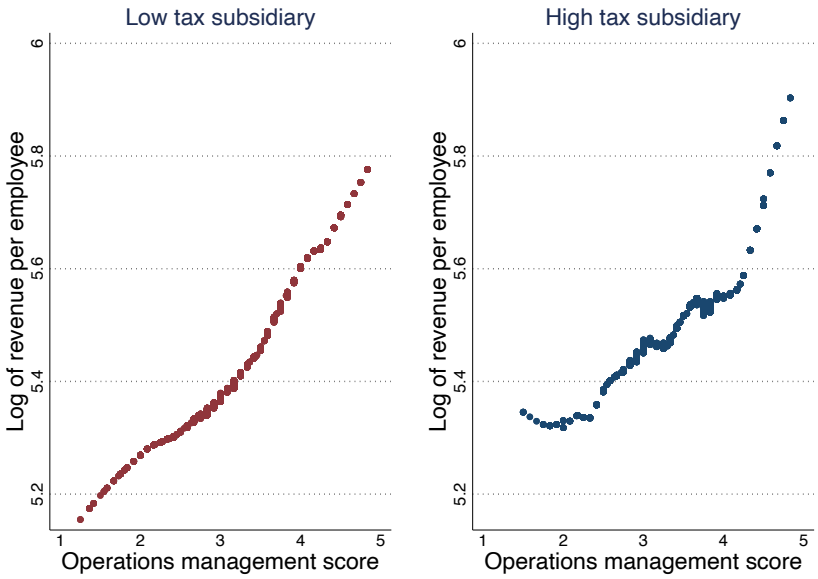
Note: Data from Oxford University Center for Business Taxation Tax Database. This table includes only the countries for which we observe subsidiaries in the WMS and Orbis. Each column reports the statutory corporate tax rate in each country. The last row reports the median corporate statutory tax rate in each year for the countries included in that year's sample. We highlight countries that are classified as high tax rate (above median in the year) in bold. Missing values reflect missing financial information for ROA (returns on assets) in Orbis data and are not included in the median tax rate calculation.

Figure B1: Average Management Score of Multinationals and Dispersion Within Countries.



Note: Data from the World Management Survey and Center for Business Taxation Tax Database. The average statutory corporate tax rates across 2004 - 2019 is noted in brackets next to country names. Subsidiary-level management is the average for the WMS operations management questions (including lean management, monitoring and target-setting). This graph only includes data from subsidiaries belonging to the multinationals in the baseline sample, excluding countries with fewer than 10 observations (US and New Zealand). Each row shows the median and the interquartile range of the management score for all subsidiaries in each country.

Figure B2: Performance and Operations Management in Low- and High-tax Country-years.



Note: Data from the World Management Survey and Orbis. Baseline sample includes only subsidiaries 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 log of revenue (sales) per employee. Low tax subsidiaries are located in countries with below median statutory corporate tax rate for a given year. High tax subsidiaries are 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.

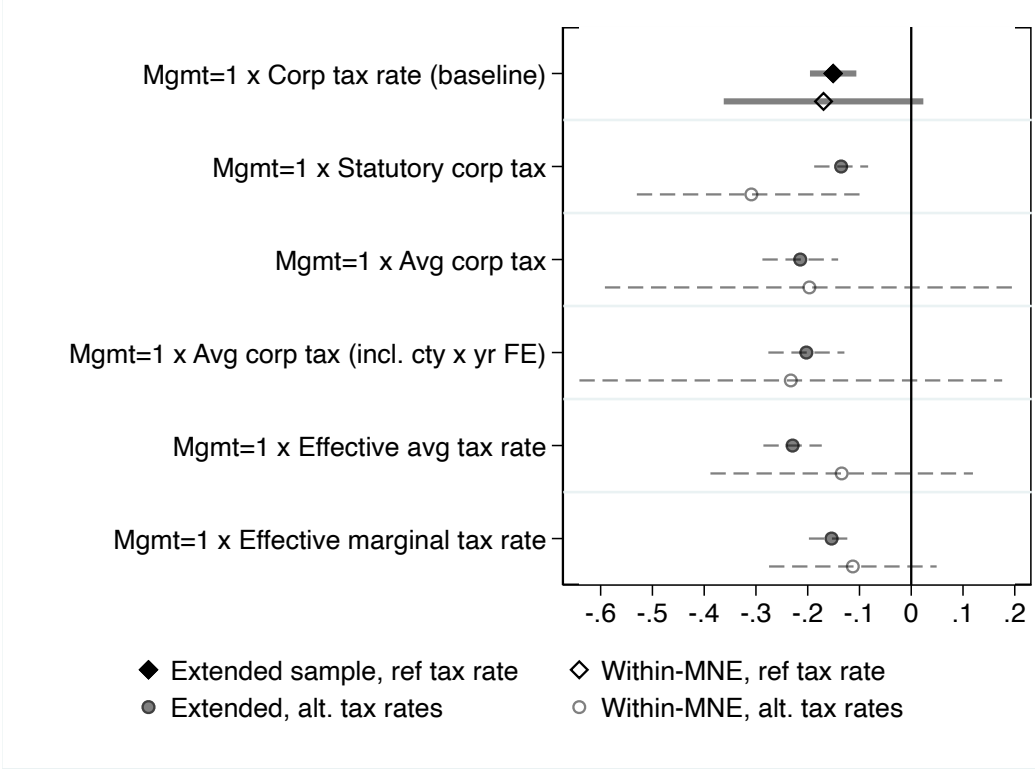
B.2 Robustness to alternative measures

Table B5: The robustness of the main specification to different key measures.

	(1) ROA	(2) ROA	(3) ROA	(4) ROA	(5) ROA	(6) ROA	(7) ROA	(8) ROA	(9) ROA
Formal management=1	0.041***	0.042**	0.050**	0.059***	0.051***	0.023***	0.002	0.012***	
	(0.007)	(0.013)	(0.011)	(0.004)	(0.005)	(0.001)	(0.705)	(0.002)	
Corp tax rate	-0.236***								-0.323***
	(0.002)								(0.000)
Statutory corp tax		-0.234***							
		(0.004)							
Average corp tax			0.280***	0.351***					
			(0.000)	(0.000)					
Effective avg tax rate					-0.037				
					(0.739)				
Effective marginal tax rate						0.061			
						(0.174)			
z-operations management									0.018***
									(0.003)
Interactions with management									
× Corp tax rate	-0.121**								
	(0.025)								
× Statutory corp tax		-0.132**							
		(0.039)							
× Average corp tax			-0.146**	-0.176**					
			(0.033)	(0.012)					
× Corp tax rate									-0.051**
									(0.022)
× Effective avg tax rate					-0.186***				
					(0.009)				
× Effective marginal tax rate						-0.108***			
						(0.007)			
Country FE	✓	✓	✓		✓	✓	✓	✓	✓
Year FE	✓	✓	✓		✓	✓	✓	✓	✓
Firm controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
MNE controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Observations	16076	16076	16076	16055	12653	12653	5305	10771	16076
# firms	1783	1783	1783	1783	1762	1762	798	1447	1783
Mean	0.058	0.058	0.058	0.058	0.057	0.057	0.052	0.061	0.058
Sample	**Baseline**	**Baseline**	**Baseline**	**Baseline**	**Baseline**	**Baseline**	**High Tax**	**Low Tax**	**Baseline**
r-squared	0.0297	0.0295	0.0294	0.0463	0.0308	0.0305	0.0348	0.0278	0.0299

Note: Data from Orbis and the World Management Survey. In all columns we have the baseline sample that includes only subsidiaries for which we observe management scores and were directly matched to Orbis financial data. 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. The operations management is the continuous version of this variable, which we use in column (9). Corp tax rate is the annual statutory corporate tax rate in the country where a subsidiary is operating which includes the average of local tax rates. Statutory corp tax is the annual federal statutory corporate tax rate. Average corp tax is the average of all corp tax rates that an MNE that a subsidiary belongs to faces. This variable is firm specific. Effective avg tax rate and Effective marginal tax rate come from the CBT Tax Database and are based on Devereux and Griffith (1998). 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 use subsidiary-level ROA and include country and year fixed effects, with the exception of column (4) that includes country-year fixed effects. Columns (1) - (6) and (9) include all MNE subsidiaries in our sample. Column (7) includes only subsidiaries located in high tax countries, wile column (8) those located in low tax countries. Year of accounts for MNEs include 2004-2018. Firm controls include log of subsidiary employment, log of subsidiary fixed assets and log of number of subsidiaries in the MNE. Standard errors are robust in all Columns.

Figure B3: Summary of alternative specifications, interaction terms



Note: Data from the World Management Survey and Orbis. Markers represent the interaction coefficient from each regression that repeats the baseline specification in Columns (6) and (7) of Table 1. Diamond marker represents the baseline regression. Circle markers represent different iterations. Filled circles represent the extended sample. Hollow circles represent the within-MNE baseline sample. Mgmt = 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. Corp tax rate is the annual statutory corporate tax rate in the country where a subsidiary is operating which includes the average of local tax rates. Statutory corp tax is the annual federal statutory corporate tax rate. Avg corp tax is the average of all corp tax rates that an MNE that a subsidiary belongs to faces. This variable is firm specific. Effective avg tax rate and Effective marginal tax rate come from the CBT Tax Database and are based on Devereux and Griffith (1998). The outcome variable in all columns is Returns on Assets (ROA) which is the ratio of profit and loss before taxes and total assets. Year of accounts for MNEs include 2004-2018. Firm controls include log of subsidiary employment, log of subsidiary fixed assets and log of number of subsidiaries in the MNE. In addition, in the extended sample, we also include industry fixed effects (2-digit SIC). Standard errors are robust for the within-MNE baseline sample and clustered at the subsidiary level for the extended sample.

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 subsidiaries 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 B6). For this selected sample of subsidiaries, 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.

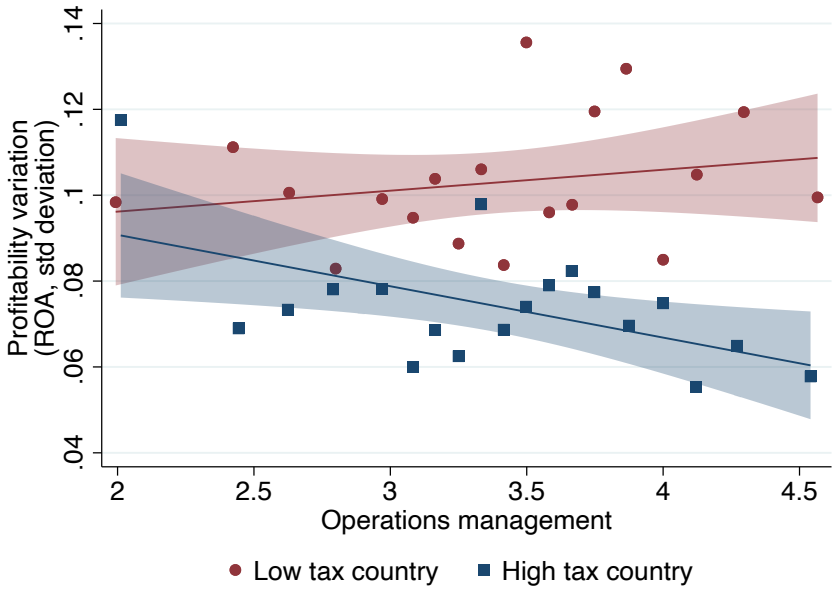
Table B6: Understanding the Channels: Alternative Measures of Profitability.

	(1) ROA	(2) ROA*	(3) ROA	(4) EBIT	(5) EBITDA	(6) Depreciation	(7) ETR
Formal management=1	0.041***	0.040***	0.084**	0.074**	0.071**	-0.008	0.059*
	(0.015)	(0.016)	(0.036)	(0.033)	(0.032)	(0.007)	(0.035)
Subsidiary corp tax rate	-0.236***	-0.221***	0.221	0.121	0.072	-0.067**	0.848***
	(0.075)	(0.079)	(0.156)	(0.138)	(0.133)	(0.032)	(0.216)
Formal management=1	-0.121**	-0.117**	-0.208*	-0.182	-0.159	0.043*	-0.296**
× Subsidiary corp tax rate	(0.054)	(0.056)	(0.122)	(0.112)	(0.107)	(0.024)	(0.131)
Country FE	✓	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓	✓
Firm 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

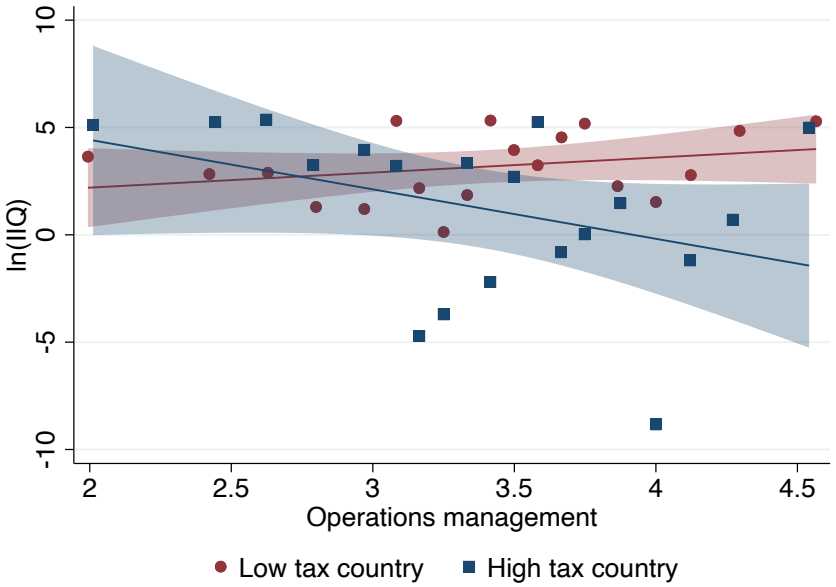
Note: Data from Orbis and the World Management Survey. WMS sample includes only subsidiaries for which we observe management scores and were directly matched in both WMS and Orbis. Formal management = 1 is a dummy equal to one when the average for the WMS operations management questions (including lean 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 subsidiary 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. ROA in Columns (1) and (3) is calculated using contemporaneous profit and loss before taxes and assets, while Column (2) uses lagged assets in the denominator. In Column (4) outcome variable is EBIT, defined as earnings before interest and tax. Column (5) outcome is EBITDA, defined as earnings before interest, tax and depreciation. Column (6) outcome variable is depreciation, calculated as the difference between EBITA and EBIT. Column (7) outcome is Effective Tax Rate (ETR), calculated as the ratio of tax liability to profit and loss before taxes. In Column (3), we limit the sample to only subsidiaries for which we observe both EBIT and EBITDA as a reference point. 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 B4: Predictability and management in high and low tax countries

(a) Profit variability



(b) Information quality



Note: Data from Orbis and the World Management Survey. In Panels (A) and (B) the line depicts the fitted line of best fit (OLS) and the shaded areas are the 95 percent confidence intervals. Squares represent subsidiaries in high tax countries. Circles represent subsidiaries in low tax countries. The x-axis is 20 bins of the operations management WMS measure (average of lean operations, monitoring and target-setting from the WMS). The outcome variable of Panel (A) is the standard deviation of profitability (ROA) across 2004-2018 at the subsidiary level. The outcome variable of Panel (B) is the log of the information quality proxy, IIQ from Gallemore and Labro (2015).

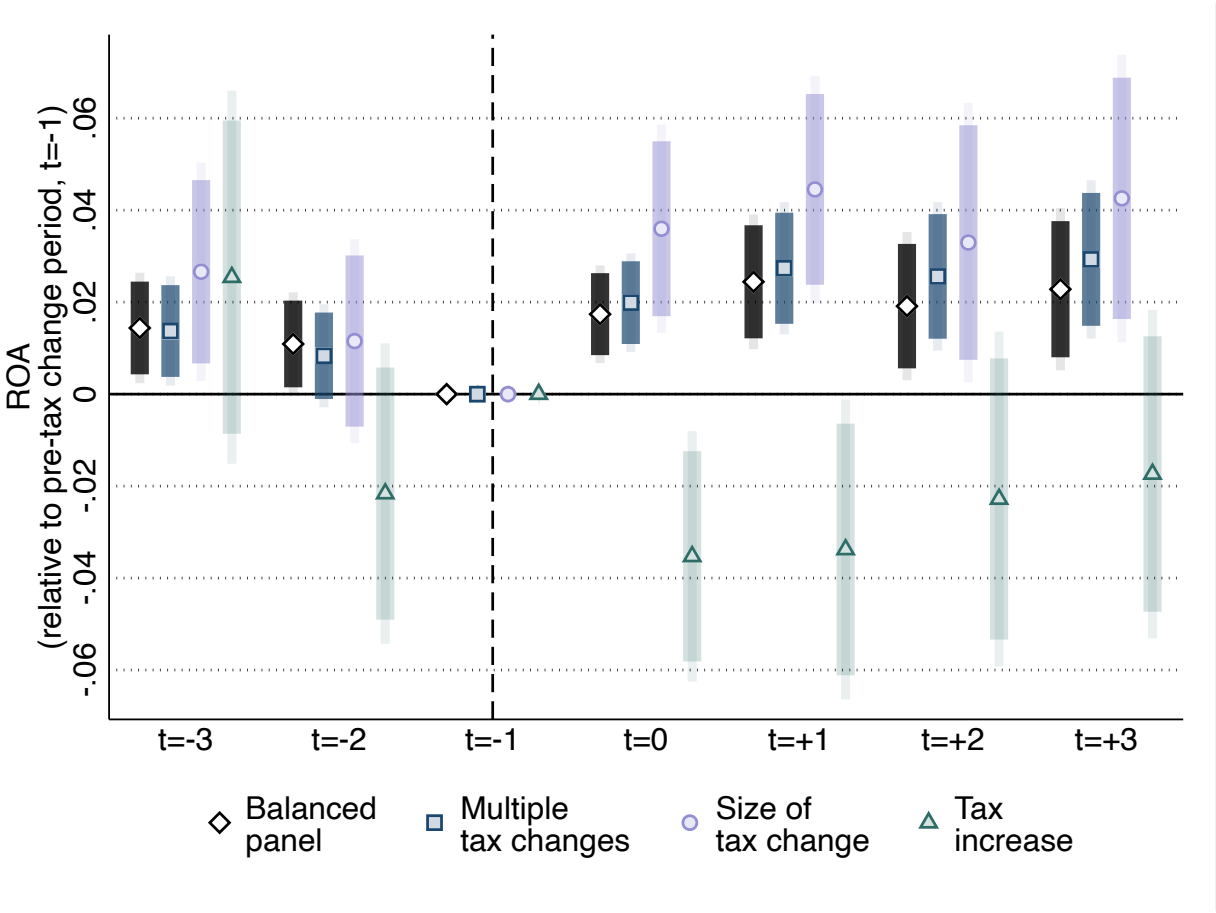
B.3 Additional event study results

Table B7: Event study coefficients.

	Difference		Formal	Informal
	(1) ROA	(2) ROA share	(3) ROA	(4) ROA
	Panel A: Average			
Formal x POST=1	0.028***	0.023**		
	(0.007)	(0.011)		
	Panel B: Annual indicators			
t=-3	0.009	0.008	0.002	-0.010
	(0.007)	(0.013)	(0.003)	(0.007)
t=-2	0.004	-0.008	0.005	0.002
	(0.006)	(0.009)	(0.003)	(0.006)
t=-1 *(omitted)*				
t=0	0.022***	0.028***	0.012***	-0.007
	(0.008)	(0.010)	(0.003)	(0.008)
t=1	0.026***	0.017	0.028***	0.006
	(0.008)	(0.012)	(0.004)	(0.008)
t=2	0.019**	0.032***	0.027***	0.017*
	(0.009)	(0.012)	(0.004)	(0.009)
t=3	0.032***	0.026*	0.039***	0.023**
	(0.010)	(0.013)	(0.004)	(0.010)
Year FE	✓	✓	✓	✓
Macro controls	✓	✓	✓	✓
Firm controls	✓	✓	✓	✓
Observations	109293	29699	91458	17835

Note: Data from Orbis and the World Management Survey. This table includes only the subsidiaries in the Event Study sample, i.e., 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. The event considered here is subsidiaries 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. Each period t=-3 through t=3 refers to -3 years before and after the tax rate, respectively. The outcome variable in columns (1), (3) and (4) is ROA (returns on assets) which is the ratio of profit and loss before taxes and total assets. The outcome variable in Column (2) in ROA share, which is the share of profits of each subsidiary in all profits of the MNE. Columns (1) and (2) report the coefficients on the difference between formally and informally manged subsidiaries. Column (3) reports the coefficients for formally managed subsidiaries only and Column (4) reports the coefficients for informally managed subsidiaries only. 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. Firm controls include log of subsidiary employment, log of subsidiary fixed assets and log of number of subsidiaries in the MNE. Macro controls include GDP growth rate, effective cost of capital for both subsidiary and parent country and investment ratio. Standard errors are clustered at the subsidiary level in all specifications.

Figure B5: Event Study Sensitivity Analysis.



Note: Data from the World Management Survey and Orbis. We plot yearly coefficients from event study estimation of the difference between formal and informal management subsidiaries. Black bars with diamond markers correspond to the event study run only on the observations belonging to a balanced panel. Dark navy bars with square uses a sample that includes multiple tax changes. Lighter lavender bars with circle markers include controls for the size of the tax change. Lightest emerald bars with triangle markers include only subsidiaries facing tax increases. Standard errors are clustered at the subsidiary level in all specifications.

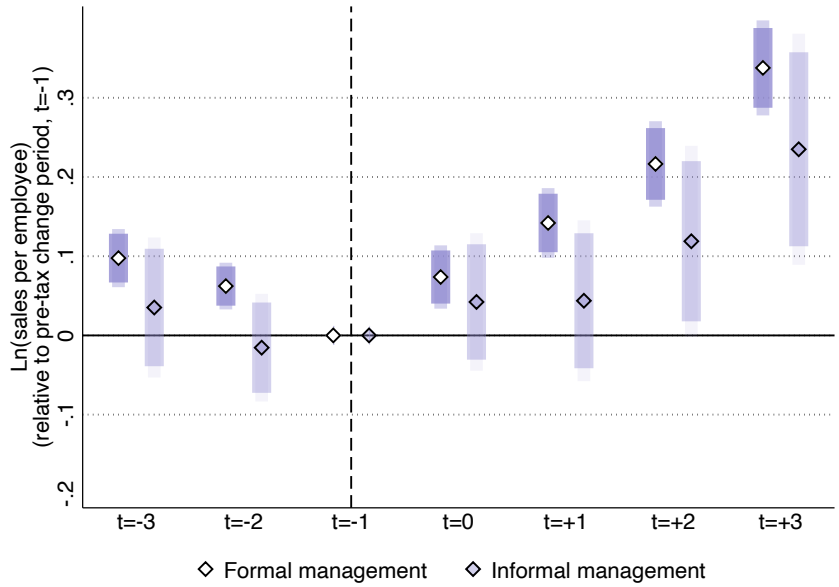
Table B8: Pre-post Summary Table, Event Study Sample, Sales per Employee.

Dependent variable:	All firms	Aggressive firms		Non-Aggressive firms	
ln(sales per employee)	(1)	(2)	(3)	(4)	(5)
Formal management=1	0.051	0.045	0.023	0.078	-0.009
	(0.037)	(0.039)	(0.048)	(0.104)	(0.050)
POST tax cut=1	0.157***	0.222***	0.074	-0.305***	0.053
	(0.057)	(0.063)	(0.079)	(0.109)	(0.080)
Formal management=1	-0.028	-0.062	-0.069	0.086	0.096
× POST tax cut=1	(0.061)	(0.067)	(0.083)	(0.112)	(0.082)
Year FE	✓	✓	✓	✓	✓
Country FE	✓	✓	✓	✓	✓
Macro controls	✓	✓	✓	✓	✓
Firm controls	✓	✓	✓	✓	✓
Observations	55803	52939	33889	2864	21914
# firms	11047	10490	10490	557	557
Dependent Variable Mean	12.370	12.370	12.370	12.370	12.370
Aggressiveness Measure	**N/A**	**Haven**	**FinShare**	**Haven**	**FinShare**

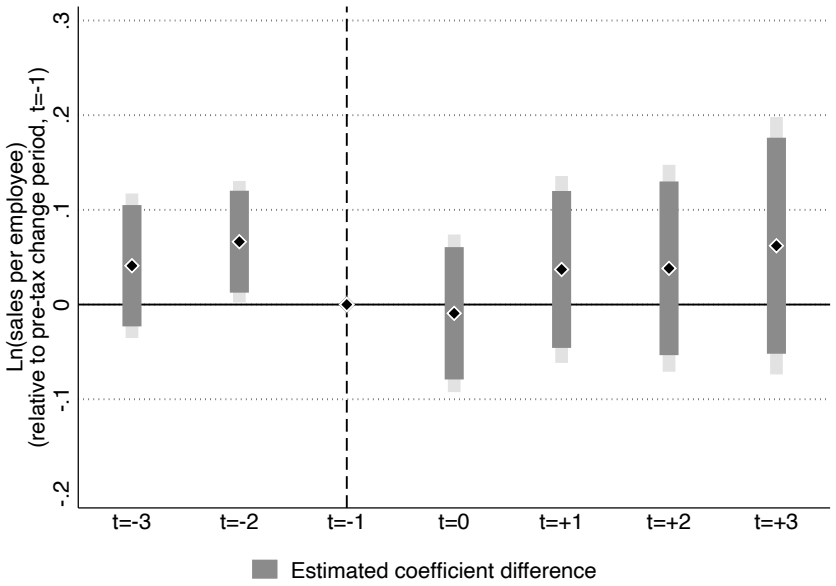
Note: Data from Orbis and the World Management Survey. This table includes only the subsidiaries in the Event Study sample, which includes all subsidiaries belonging to an MNE that has at least one plant observed in the WMS. Management data is then averaged across all subsidiaries within an MNE. Aggressive firms are defined as subsidiaries that belong to MNEs that have a subsidiary in a tax haven (column 2) or have above median share of financial subsidiaries (column 3). Non-aggressive firms are defined as subsidiaries that belong to MNEs that do not have any subsidiaries in a tax haven (column 4) or have below median share of financial subsidiaries (column 5). The event considered here is subsidiaries 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 subsidiary employment, log of subsidiary fixed assets and log of number of subsidiaries in the MNE. Standard errors are clustered at the subsidiary level in all columns.

Figure B6: Event Study: Tax Cuts and Productivity.

(a) Productivity, formal vs informal

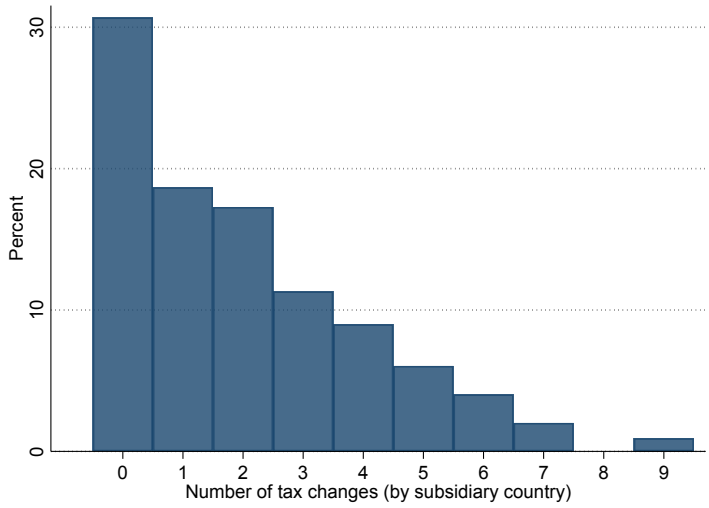


(b) Difference between formal and informal

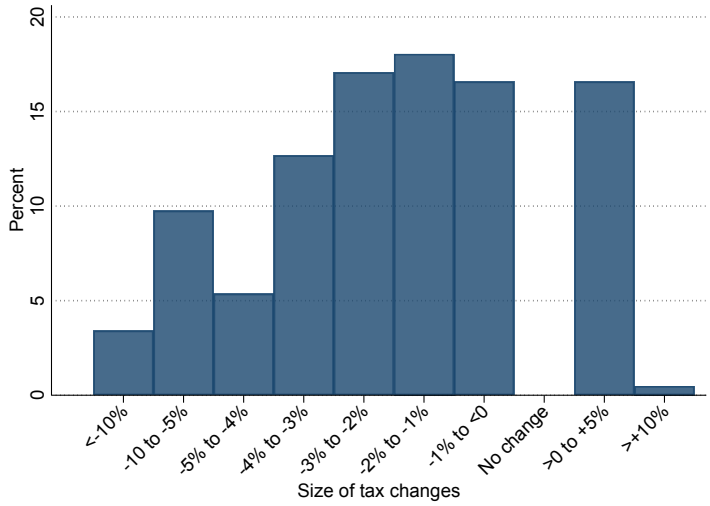


Note: Data from the World Management Survey and Orbis. This figure plots yearly coefficients from event study estimation, where the outcome variable is performance (log of sales per employee). White diamonds in Panel A correspond to coefficients for subsidiaries with formal management practices in place, 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 Panel A correspond to coefficients for subsidiaries with informal management (scores below 3 on the 1 to 5 scale). In Panel B, we plot the coefficients for the estimated difference between formal and informal management subsidiaries. In all specifications, we cluster at the subsidiary level.

Figure B7: Number and scale of tax changes between 2004 and 2016



(a) Number of tax changes



(b) Scale of tax changes

Note: Data from the World Management Survey and Centre for Business Taxation at the University of Oxford. In Panel A we plot the distribution of statutory corporate tax rate changes for subsidiaries in our sample. 30% of subsidiaries in our sample are located in countries with no statutory corporate tax rate changes. 8% of subsidiaries 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 subsidiaries in our sample experienced a tax rate decrease between 0 and 1%. 5% of subsidiaries 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.

B.4 Additional extended sample results

While the "main analysis" sample provides the sharpest distinction and most accurate measurement of management practices across subsidiaries, it severely limits the analysis sample relative to the large availability of financial data. The WMS collects data for a random sample of manufacturing plants and we match the financial data from Orbis at the establishment level, which allows us to directly observe management for only 2% of our full financial sample. However, Bloom et al. (2019) show that the largest variation in management practices is attributed to the differences between MNEs, rather than across establishments within MNEs. This suggests the average management score for a subsidiary in our sample is a reasonable proxy for all other subsidiaries within that MNE. For 95% of MNEs in our sample the standard deviation of management practices within MNEs is less than a point in the WMS scale and about 60% have less than 0.5 a point.

Using ownership data from Orbis, we build the ownership tree for each global ultimate owner (HQ) of the subsidiaries in the WMS sample. For all subsidiaries 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[50] that belong to that parent (e.g. Aminadav and Papaioannou; 2020; Belenzon et al.; 2018). We match 79,949 unique subsidiaries to our 1,388 in the WMS data yielding over 537,000 subsidiary-year observations. Table B9 reports summary statistics for the subsidiary-years in the extended and baseline samples. Panel A reports the statistics for the extended sample. Panel B reports the statistics for the sample used in the baseline analysis, including only subsidiaries that have a "directly-measured" management score. The extended sample is quite similar to the baseline sample in terms of gross profits, management practices (both scores and formal management share), and fairly similar in terms of profitability. Likely as a result of the much larger number of subsidiaries and country coverage, the Effective Tax Rate and measures of aggressiveness are not as similar.

We repeat the analysis using our preferred specification with the Extended Sample in Table B10, repeating the result from Table II, column 5 in Column (1). We include a control for the MNE country of origin (HQ-country fixed effects) in Column (2), and while the coefficient is smaller in magnitude it is still economically and statistically significant. This result further verifies our finding that management is not simply a proxy for the characteristics of the MNE country of origin. In Columns (3) through (7), we include additional sub-sample analysis that is feasible with this larger sample. Column (3) restricts the sample to only subsidiaries that are not in a financial sector (SIC codes 60 to 67). Column (4), in turn, includes only these subsidiaries. The interaction coefficient in Column (3) is similar to that in Column (2), while not significant in Column (4). This suggests that the relationship we uncover is not driven by financial-focused subsidiaries, but rather by the production subsidiaries. Column (5) restricts the sample to only subsidiaries that belong to MNEs classified as aggressive (have at least one subsidiary in a tax haven), and Column (6) includes only subsidiaries that belong to non-aggressive MNEs. Again, the results are consistent with the baseline

[50]Majority ownership means that the the parent company owns 50% of the shares of the subsidiary.

results where the patterns we observe in the aggregate are driven by subsidiaries that belong to aggressive MNEs. Column (7) repeats the exercise including only subsidiaries located away from the headquarters, and the interaction coefficient remains similar to the "reference" result in Column (2).

Table B9: Summary statistics: extended sample and baseline sample

Panel A: Extended sample	Mean	SD	25pct	Median	75pct	N
Employment	756.49	2388.22	45.00	227.00	683.00	537459
Profit & Loss before tax (PLBT)	18170.43	84806.05	-13.00	548.00	4967.00	537508
Return on Assets (ROA)	0.04	0.25	-0.00	0.04	0.12	537508
Effective Tax Rate	0.17	0.44	0.00	0.19	0.29	480230
Aggressiveness (BTD>median) = 1	0.39	0.49	0.00	0.00	1.00	485594
Aggressiveness (tax haven) = 1	0.96	0.20	1.00	1.00	1.00	537508
Subsidiary in high tax country-year = 1	0.36	0.48	0.00	0.00	1.00	537508
Subsidiary in financial sector	0.15	0.36	0.00	0.00	0.00	537508
Management (MNE avg)	3.39	0.53	3.00	3.42	3.75	537508
Formal mgmt (MNE avg) = 1	0.77	0.42	1.00	1.00	1.00	537508
Panel B: Baseline sample						
Employment	1272.30	3379.49	149.00	300.00	786.00	16076
Profit & Loss before tax (PLBT)	17619.87	61955.66	81.00	3431.00	13573.00	16076
Return on Assets (ROA)	0.06	0.17	0.00	0.05	0.12	16076
Effective Tax Rate	0.19	0.45	0.03	0.20	0.30	15216
Aggressiveness (BTD > median) = 1	0.44	0.50	0.00	0.00	1.00	15218
Aggressiveness (tax haven) = 1	0.73	0.44	0.00	1.00	1.00	16076
Subsidiary in high tax country-year = 1	0.33	0.47	0.00	0.00	1.00	16076
Management	3.35	0.62	3.00	3.42	3.75	16076
Formal mgmt = 1	0.76	0.43	1.00	1.00	1.00	16076
Panel C: Out of sample*						
Management	3.32	0.66	2.92	3.33	3.75	17,295
Formal mgmt = 1	0.71	0.45	0.00	1.00	1.00	17,295

Note: Data from Orbis and the World Management Survey. In Panel A, we include extended sample, in Panel B, the baseline sample. Baseline sample includes only subsidiaries for which we observe management scores and were directly matched to Orbis financial data. The extended sample includes all subsidiaries that belong to an MNE where we observe at least one subsidiary in the WMS. In Panel C we include firms for which we have missing ROA to compare out of sample management practices.

Table B10: Extended sample

	(1) ROA	(2) ROA	(3) ROA	(4) ROA	(5) ROA	(6) ROA	(7) ROA
Formal management=1	0.059***	0.022***	0.018**	0.006	0.022***	0.001	0.021***
	(0.007)	(0.007)	(0.008)	(0.017)	(0.007)	(0.025)	(0.008)
Subsidiary Corp Tax	-0.050*	-0.098***	-0.132***	-0.054	-0.096***	0.009	-0.134***
	(0.028)	(0.028)	(0.031)	(0.072)	(0.029)	(0.105)	(0.031)
Formal management=1	-0.195***	-0.107***	-0.083***	-0.070	-0.113***	0.016	-0.103***
× Subs Corp Tax	(0.023)	(0.024)	(0.026)	(0.059)	(0.025)	(0.085)	(0.026)
Firm controls	✓	✓	✓	✓	✓	✓	✓
Country FE	✓	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓	✓
HQ-country FE		✓	✓	✓	✓	✓	✓
Observations	537508	537508	455649	81859	516010	21498	490461
# firms	79949	79949	67500	12449	76948	3001	73489
Mean	0.036	0.036	0.039	0.018	0.035	0.047	0.035
Sample	**All**	**All**	**Non-fin**	**Fin only**	**Agg**	**Non-Agg**	**Subs**

Note: Data from Orbis and the World Management Survey. The sample in this table includes all subsidiaries belonging to MNEs for which we observe at least one management score in the baseline sample of the WMS. For each MNE, we average across all subsidiaries for which we have at least one management measure in the WMS. Formal management = 1 is a dummy equal to one when the MNE 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. 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 clustered at the subsidiary level. Columns (1) and (2) include all subsidiaries in the "extended" sample. Column (3) includes all subsidiaries that are not in a financial sector (excluding SIC codes 60 to 67). Column (4) includes only subsidiaries in the financial sector. Column (5) includes subsidiaries belonging to MNEs classified as aggressive, defined as having at least one subsidiary in a tax haven. Column (6) includes subsidiaries belonging to MNEs classified as non-aggressive, defined as not having any subsidiaries in a tax haven. Column (7) includes only non-HQ subsidiary locations.

Table B11: Semi-elasticity estimates: management quality heterogeneity.

	Formal management			**Informal management**		
	(1) ROA	(2) ROA	(3) ROA	(4) ROA	(5) ROA	(6) ROA
Subsidiary Corp Tax	-0.151***			-0.100**		
	(0.024)			(0.040)		
Sub Corp Tax - Avg Corp Tax		-0.149***			-0.098**	
		(0.024)			(0.038)	
Sub Corp Tax - HQ Corp Tax			-0.134***			-0.082**
			(0.022)			(0.035)
Country FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
MNE FE	✓	✓	✓	✓	✓	✓
Firm controls	✓	✓	✓	✓	✓	✓
Observations	412538	412538	412538	124959	124959	124959
# MNEs	989	989	989	388	388	388
# subsidiaries	61015	61015	61015	18923	18923	18923

Note: Data from Orbis and the World Management Survey. The sample in this table includes all subsidiaries belonging to MNEs for which we observe at least one management score in the baseline sample of the WMS. Subsidiary corp tax rate is the annual statutory corporate tax rate in the country where a subsidiary is operating. Avg Corporate tax rate is the average of all the statutory tax rates in all locations where the MNE is operating, while HQ corp tax is the corporate tax rate at the headquarter. 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 MNE, 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 clustered at the MNE level. For each MNE, we average across all subsidiaries for which we have at least one management measure in the WMS. Formal management is a dummy equal to one when the MNE 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. Columns (1)-(3) include only subsidiaries with formal management. Column (4)-(6) include only subsidiaries with informal management, i.e. scores below 3.

B.5 Additional mechanism results

Table B12: Individual Management Practices and Tax Rate: Interaction Coefficients.

Table of coefficients: each cell is a unique regression.

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

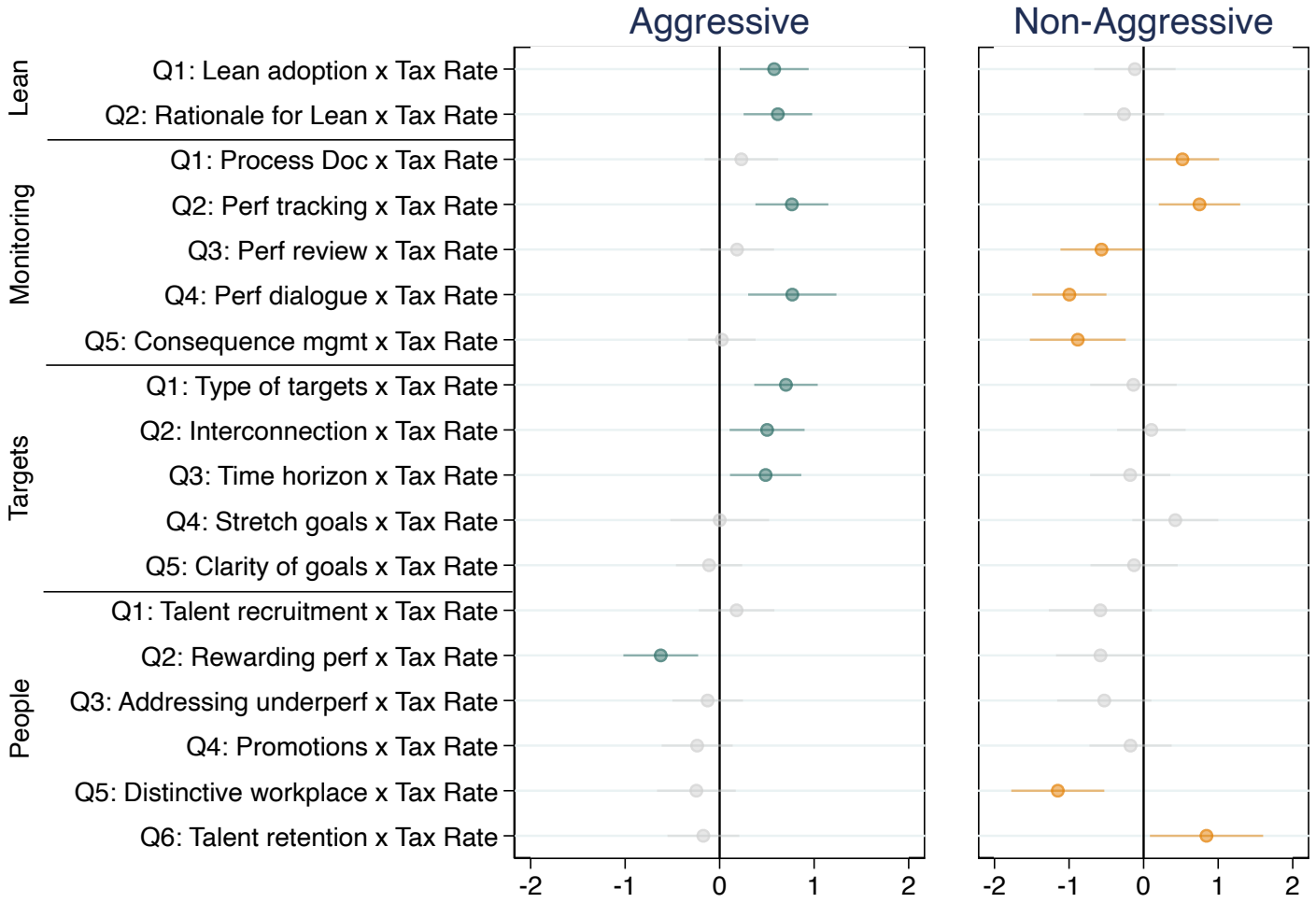
Table B13: Individual Management Practices and Tax Rate: Interaction Coefficients.

Table of coefficients: each cell is a unique regression

	All		**Aggressive**		**Non-Aggressive**	
	ROA		ROA		ROA	
	(1)	(2)	(3)	(4)	(5)	(6)
Z-Index: People × 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 × 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 × 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 × 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 × 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 × 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 × 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)
Observations	*16053*	*16053*	*11756*	*6728*	*4297*	*8467*
# firms	*1781*	*1781*	*1262*	*1511*	*519*	*1588*
Dependent Variable Mean	*0.058*	*0.058*	*0.063*	*0.122*	*0.044*	*0.017*
Bonus size × 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 × 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 × 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)
Observations	*8112*	*8112*	*6048*	*3428*	*2064*	*4139*
# firms	*894*	*894*	*649*	*761*	*245*	*793*
Dependent Variable Mean	*0.060*	*0.060*	*0.067*	*0.128*	*0.038*	*0.017*
Aggressive measure			**Tax Haven**	**BTD**	**Tax Haven**	**BTD**
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 subsidiary 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 subsidiaries that belong to MNEs 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 subsidiaries that belong to MNEs 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 B8: Mechanisms: Management Practices and Subsidiary 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 subsidiaries as "aggressive" if they belong to and MNE that has 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).

Table B14: Table of Coefficients: Interaction Between Individual Management Practices and Tax Rate.

	All		**Aggressive**		**Non-Aggressive**	
	ln(sales per employee)		ln(sales per employee)		ln(sales per employee)	
	(1)	(2)	(3)	(4)	(5)	(6)
Z-Index: Lean ops × Tax Rate	0.749***	0.547***	0.663***	-0.101	-0.248	1.240***
	(0.216)	(0.170)	(0.194)	(0.217)	(0.299)	(0.261)
Q1: Lean adoption × Tax Rate	0.560***	0.480***	0.577***	-0.080	-0.117	1.129***
	(0.206)	(0.162)	(0.186)	(0.214)	(0.278)	(0.236)
Q2: Rationale for Lean × Tax Rate	0.762***	0.480***	0.616***	-0.101	-0.264	1.055***
	(0.202)	(0.161)	(0.185)	(0.200)	(0.275)	(0.257)
Z-Index: Monitoring × Tax Rate	0.373*	0.493***	0.492**	0.113	-0.392	0.794***
	(0.216)	(0.178)	(0.207)	(0.229)	(0.269)	(0.261)
Q1: Process Doc × Tax Rate	0.182	0.418**	0.230	0.017	0.520**	0.742***
	(0.201)	(0.167)	(0.198)	(0.227)	(0.251)	(0.234)
Q2: Perf tracking × Tax Rate	0.737***	0.854***	0.764***	0.267	0.749***	1.139***
	(0.208)	(0.169)	(0.197)	(0.208)	(0.278)	(0.249)
Q3: Perf review × Tax Rate	0.075	0.164	0.184	-0.162	-0.565**	0.580**
	(0.210)	(0.170)	(0.200)	(0.211)	(0.281)	(0.251)
Q4: Perf dialogue × Tax Rate	0.504**	0.476**	0.769***	0.249	-0.996***	0.681**
	(0.240)	(0.195)	(0.238)	(0.233)	(0.254)	(0.307)
Q5: Consequence mgmt × Tax Rate	-0.101	-0.029	0.023	0.010	-0.883***	-0.042
	(0.193)	(0.157)	(0.182)	(0.206)	(0.328)	(0.221)
Z-Index: Targets × Tax Rate	0.804***	0.652***	0.638***	0.262	0.224	1.165***
	(0.245)	(0.203)	(0.238)	(0.244)	(0.301)	(0.310)
Q1: Type of targets × Tax Rate	0.922***	0.582***	0.702***	0.191	-0.137	0.845***
	(0.188)	(0.153)	(0.171)	(0.208)	(0.296)	(0.210)
Q2: Interconnection × Tax Rate	0.757***	0.571***	0.502**	0.282	0.104	0.963***
	(0.208)	(0.169)	(0.202)	(0.216)	(0.234)	(0.243)
Q3: Time horizon × Tax Rate	0.553***	0.429**	0.487**	0.151	-0.180	0.830***
	(0.203)	(0.168)	(0.193)	(0.213)	(0.274)	(0.252)
Q4: Stretch goals × Tax Rate	-0.266	0.183	0.001	0.230	0.425	0.321
	(0.257)	(0.216)	(0.266)	(0.242)	(0.294)	(0.350)
Q5: Clarity of goals × Tax Rate	-0.021	-0.118	-0.112	-0.315	-0.128	0.141
	(0.192)	(0.155)	(0.179)	(0.206)	(0.298)	(0.219)
Observations	*15601*	*15601*	*11394*	*6600*	*4207*	*8275*
# firms	*1757*	*1757*	*1246*	*1494*	*511*	*1570*
Dependent Variable Mean	*12.370*	*12.370*	*12.400*	*12.416*	*12.288*	*12.377*
Aggressive measure			**Tax Haven**	**BTD**	**Tax Haven**	**BTD**
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 subsidiary 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 a subsidiary that belongs to an MNEs with a 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 that belong to MNEs 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 B15: Table of Coefficients: Interaction Between Individual Management Practices and Tax Rate.

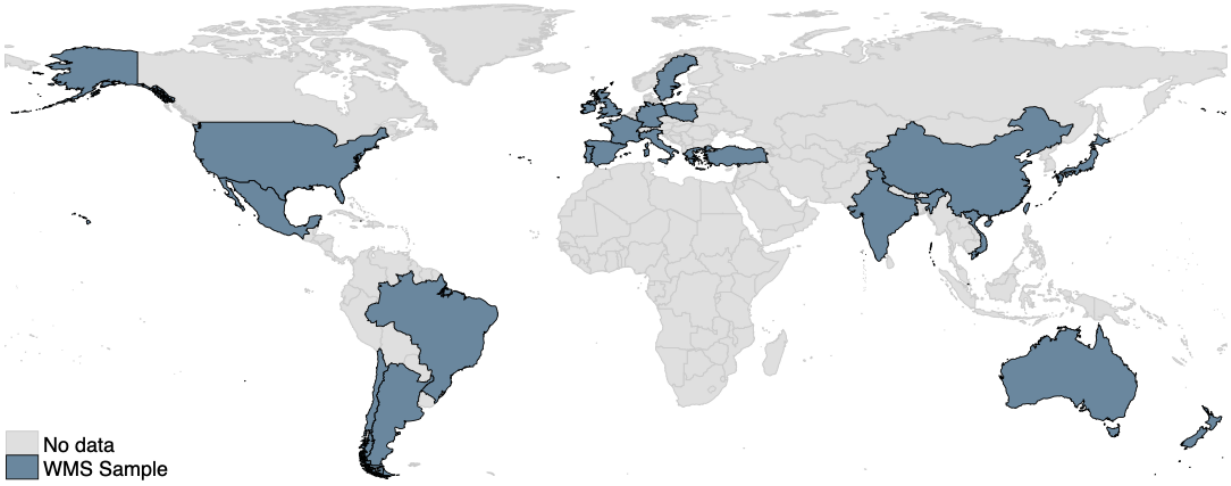
	All		**Aggressive**		**Non-Aggressive**	
	ln(sales per employee)		ln(sales per employee)		ln(sales per employee)	
	(1)	(2)	(3)	(4)	(5)	(6)
Z-Index: People × Tax Rate	-0.074	0.133	0.167	-0.085	-0.637**	0.447*
	(0.196)	(0.160)	(0.188)	(0.214)	(0.260)	(0.231)
Q1: Talent recruitment × Tax Rate	0.058	0.080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

C Survey questions and coverage map

Figure C1: 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

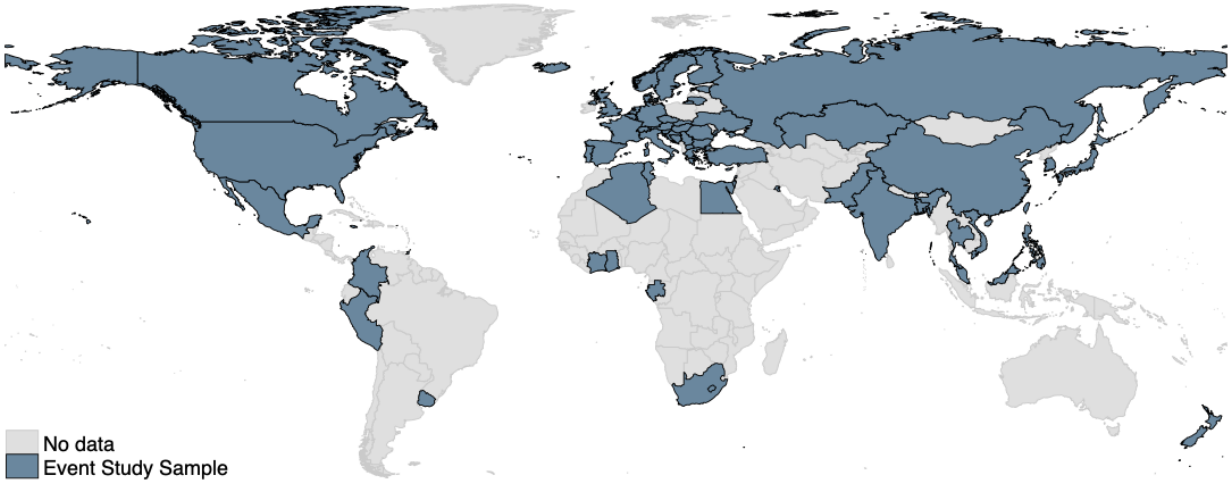


Table C1: World Management Survey Questions: Operations management

Q	Question topic	Explanation of scoring
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 Scur et al. (2021). The Q column refers to the question numbers as we have defined the indices in this paper (operations and people management). 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

Q	Question topic	Explanation of scoring
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.
DC	Decentralization	Where are decisions taken on new product introductions—at the plant, at the CHQ or both? How much of sales and marketing is carried out at the plant level (rather than at the CHQ)? Score 1: All decisions are taken at HQ. Score 3: Decisions are jointly determined. Score 5: All decisions are taken at the plant level. Decentralization score is the average of the two questions.

Notes: Table contents from Scur et al. (2021). The Q column refers to the question numbers as we have defined the indices in this paper (operations and people management). 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.

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