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Abstract

Corporate tax avoidance has regularly been accused of aggravating income inequalities. Yet, systematic evidence on this matter is still lacking. To fill this gap, the present paper explores the effect of profit shifting on employee pay among S&P 1500 companies. The study shows that its effect indeed varies across occupations. Chief executive officers and chief financial officers receive higher compensations when their firm starts operating in tax havens. Non-executive employees, if anything, see their wages fall in the meantime. Furthermore, the inequality-deepening impact of firm entry into tax havens is driven by companies that reward executives on an after-tax basis and more pronounced in intangible-intensive companies. These new findings enrich our understanding of the distributional consequences of profit shifting. They also cast light on the evolution of income inequalities, public opinion about globalization, and ongoing debates on international tax reforms.

JEL-Codes: F160, H260, J300, M120.

Keywords: employee pay, multinational enterprises, profit shifting, tax havens, income inequalities.

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1 Introduction

The past decades have witnessed the emergence of multinational enterprises (MNEs), the digitalization of economic activities, and the development of offshore financial centers (OFCs).[1] All three have fueled corporate tax avoidance and contributed to the surge of profit shifting activities (Sikka, 2003; Argilés-Bosch, Somoza, Ravenda, and García-Blandón, 2020). MNEs exploit loopholes, mismatches in tax rules, and other legal technicalities to move income across borders and artificially book profits in low-tax jurisdictions. These practices are now under the glare of public spotlight due to the recent data leaks, the persistence of budget deficits in the US and in Europe, and the rise of income inequalities. The topic has become even more salient in the wake of the COVID-19 pandemic (Collier, Pirlot, and Vella, 2020). The methods employed by profit shifting MNEs are relatively well-documented in the existing literature (Dharmapala, 2014; Riedel, 2018; Beer, de Mooij, and Liu, 2020). They for instance involve transfer mispricing, debt shifting, corporate inversions, and treaty shopping. In total, public authorities of non-OFCs might lose up to $300 billion of tax revenues as a result of profit shifting (Garcia-Bernardo and Janskỳ, 2022). The consequences of profit shifting beyond tax revenues, however, remain largely ignored. In particular, little is known about the distributional impact of profit shifting.

This paper empirically examines the effect of profit shifting on both employee pay and within-firm pay inequalities. Through the lens of a collective bargaining model, profit shifting exerts two opposite effects on wages. On the one hand, corporate income taxes dwindle and the overall surplus to be shared between the firm and its employees increases (positive effect). On the other hand, the relocation of profits overseas gives the firm private information on profitability and thereby generates an information asymmetry that deteriorates the bargaining power of employees (negative effect). The literature predicts that the second effect dominates and that workers, as a consequence, should receive lower wages (Krautheim and Schmidt-Eisenlohr, 2016). A caveat is that workers are generally homogeneous in such models. Notably, no distinction is made between executive and non-executive employees. In this paper, I argue that the effect is most likely to be heterogeneous across workers. We know that some executives are compensated on an after-tax basis to alleviate the agency costs associated with moral hazard and adverse selection (Gaertner, 2014, and references therein). In addition, the adverse effect is less conceivable for chief executive officers (CEOs) and chief financial

1. "Offshore financial centers" and "tax havens" are used interchangeably. They refer to jurisdictions characterized by low corporate income taxes and financial opacity.

officers (CFOs). They have clear information about the profitability of the firm since they supervise economic and financial operations themselves. Accordingly, from an theoretical viewpoint, profit shifting should increase the compensation of top executives and especially that of top executives paid on an after-tax basis. If anything, it should also decrease the wage of non-executive employees – who constitute the overwhelming majority of employees – and thus worsen income inequalities.

There is to date no study that confronts these predictions with data. The present paper is a first step in this direction. To test their empirical validity, I first compile a database on the financial statements, executives, and foreign subsidiaries of companies listed on the Standard & Poor's (S&P) 1500 index between 1993 and 2013. The data originate from three complementary sources: Compustat, ExecuComp, and Exhibit 21 reports. Compustat provides access to balance sheets, income statements, and cash flows of all US-listed firms. ExecuComp, as the name hints, contains details about the function and compensation of executives working for S&P 1500 firms. Exhibit 21 reports annually filled by US-listed firms to the Securities and Exchange Commission (SEC) allow reconstructing the worldwide network of their subsidiaries. Armed with this rich database, I then quantify the impact of firm entry into tax havens on employee pay, while separating CEOs and CFOs from non-executive employees. Entry into tax havens is seen as an intensification of profit shifting activities that reduces corporate income taxes, something for which I provide suggestive evidence. Furthermore, the effect of firm presence in OFCs on employee pay is purged of confounding factors thanks to a wide array of controls as well as executive, firm, and year fixed effects.

The baseline results are in line with the aforementioned hypotheses. Compensations of CEOs and CFOs go up when their firm starts operating in OFCs. The increase is mainly driven by MNEs using after-tax compensation incentives. In these companies, I estimate a 8 percent increase post entry. The increase mostly takes the form of higher non-equity incentive plans (i.e., cash paid and tied to financial performance). The pattern contrasts with the one observed for non-executive employees. Overall payments to non-executive employees, if anything, decrease in the meantime. The reduction amounts to 3 percent maximum. Profit shifting therefore accentuates within-corporation income inequalities. Moreover, evidence attests that inequalities widen more remarkably in intangible-intensive MNEs. Again, this observation is consistent with earlier work revealing that a strategic management of intellectual property (IP) and a relocation of rights offer supplementary opportunities to route income through tax-friendly jurisdictions (e.g., Dischinger and Riedel, 2011; Karkinsky and Riedel, 2012; Griffith, Miller, and O'Connell,

2014; Alstadsæter, Barrios, Nicodème, Skonieczna, and Vezzani, 2018).

The inequality-deepening effect of profit shifting is corroborated by multiple sensitivity tests. It cannot be explained by a decline in total employment and holds when scrutinizing more directly the executive-to-average-worker pay ratio. In addition, it holds with alternative sets of tax havens. The benchmark exercise builds on Dyreng and Lindsey (2009) and categorizes 46 foreign countries as tax havens. Adopting the classification elaborated by Hines and Rice (1994) yields the same conclusions. The same conclusions are also reached after removing six tax havens, namely: Hong-Kong, Ireland, Luxembourg, Malaysia, Singapore, and Switzerland. Workhorse international trade theories argue that foreign direct investments (FDIs) should be principally directed to large and central countries (Brainard, 1993; Head and Mayer, 2004; Helpman, Melitz, and Yeaple, 2004). Given that Hong-Kong, Ireland, Luxembourg, Malaysia, Singapore, and Switzerland are relatively large and central, FDIs of S&P 1500 firms in these countries may very well be unrelated to tax avoidance. Conversely, it is fair to assume that investments in small and remote islands in the likes of Bahamas have little economic substance and fall within the sole scope of profit shifting. I further verify that executive turnover prior to entry into tax havens and a potential reshuffling of activities to low-cost countries do not contaminate the results. Lastly, I confirm that employee pay does not depend on future profit shifting activities. The latter test certifies that there are no pre-existing trends influencing the results, guarantees that entry into tax havens is uncorrelated with past (executive-)firm-year unobserved shocks, and greatly alleviates reverse causality concerns (Gaertner, 2014; Hsieh and Willis, 2015).

These findings are new and relevant for policymaking. First, they shed light on the evolution of income inequalities (Alvaredo, Chancel, Piketty, Saez, and Zucman, 2017; Hoffmann, Lee, and Lemieux, 2020). The CEO-to-worker compensation ratio has increased fourfold between 1989 and 2017 and the surge of executive compensation has nurtured the growth of top 1 percent incomes (Mishel and Wolfe, 2019). The causes of rising inequalities have received particular attention and the globalization process has recurrently been evoked as one of the factors behind this phenomenon (Jaumotte, Lall, and Papageorgiou, 2013). Corporate tax avoidance has often been accused of aggravating income inequalities too,[2] but systematic evidence on this topic is scant. The present paper

2. See this European Parliament headline: https://www.europarl.europa.eu/news/en/headlines/economy/20191213STO69020/corporate-taxes-meps-want-to-tackle-tax-avoidance-by-big-companies, this Oxfam article: https://www.oxfam.org/en/inequality-and-poverty-hidden-costs-tax-dodging, and this column: https://inequality.org/research/6-facts-corporate-tax-avoidance/.

fills this void and uncovers a new mechanism whereby globalization fosters inequalities. In a sense, it might help understand the escalating hostility toward MNEs and globalization (Helpman, 2017; Rodrik, 2018; Walter, 2021). Second, the conclusions may enrich ongoing discussions about the international taxation system. Both scholars and policymakers acknowledge that the current system, inherited from the early 20th century, is outdated. It offers MNEs the opportunity to transfer profits to low- or no-tax jurisdictions and avoid taxes. Reforms are discussed at the international level to deal with these issues and finally align the tax system with the way economic activities are carried out nowadays. Perhaps surprisingly, their impact assessments tend to focus on two outcomes: countries' tax revenues and attractiveness (e.g., OECD, 2020). The paper puts an emphasis on a neglected dimension and asserts that such reforms could also be useful for curbing within-country income inequalities. They could fulfill Sustainable Development Goal 10 indirectly through the redistribution of tax revenues and more directly through employee pay.

Literature and contributions The paper resonates with two strands of the literature. An old body of the literature in public economics tackles the incidence of corporate income taxation and its effect on wages. The taxation of profits can theoretically affect wages through two channels: a direct one, through rent sharing (Arulampalam, Devereux, and Maffini, 2012; Azémar and Hubbard, 2015; Fuest, Peichl, and Siegloch, 2018), and an indirect one, through capital reallocation (Harberger, 1962; Clausing, 2013; Gravelle, 2013). On the one hand, corporate income taxes compress wages by undermining the quasi-rent over which workers and firms bargain. On the other hand, an increase in corporate income taxes results in capital outflows. Capital outflows in turn decrease the capital-labor ratio, labor marginal productivity, and wages. Hence, both channels entail that the burden is passed onto workers to some extent. The capital reallocation story is not pertinent in the context of profit shifting because facilities are rarely revamped. Should we interpret profit shifting as a reduction in tax rates, rent sharing models would predict a positive effect of profit shifting on wages. Against this background, I show that profit shifting is in fact detrimental for the vast majority of employees. It means that we cannot consider profit shifting as a simple tax cut through the lens of these models. The latter need to be revisited and extended. Although the size of the pie increases, most of workers also have a weaker bargaining power, and the share of the pie they receive diminishes (Krautheim and Schmidt-Eisenlohr, 2016).[3] The empirical findings bear out that this mechanism must be

3. Anecdotal evidence goes along these lines. For example, on October 23, 2018, McDonald's employees in France launched a "McManif" and protested against "the tax evasion by which the company

taken into account when delving into the nexus between profit shifting and employee pay.

Another line of inquiry, nascent and fast-growing, studies the profit shifting activities of MNEs. It shows that MNEs locate their IP rights in tax havens, manipulate transfer prices, record sales in low-tax countries, and proceed with intra-firm loans, treaty shopping, and corporate inversions to minimize tax expenses (Dharmapala, 2014; Riedel, 2018; Beer et al., 2020). Numerous papers identify the techniques of profit shifting, but only a fistful of papers investigate the consequences of profit shifting. They look at its repercussions for firm value (Desai and Dharmapala, 2009; Blaufus, Möhlmann, and Schwäbe, 2019; Hasan, Lobo, and Qiu, 2021), risk (Cao, Feng, Lu, and Shan, 2021), investments (Overesch, 2009; Goldbach, Nagengast, Steinmüller, and Wamser, 2019), innovation (Li, Ma, and Shevlin, 2021), industry concentration (Martin, Parenti, and Toubal, 2022), and macroeconomic statistics (Guvenen, Mataloni, Rassier, and Ruhl, 2017; Bricongne, Delpeuch, and Forero, 2021). The closest paper in this stream of research is the one of Krautheim and Schmidt-Eisenlohr (2016). The authors address the effect of profit shifting on wages from a theoretical perspective. The present paper complements theirs by allowing for heterogeneous workers and providing micro-data evidence.

The remainder of the paper is organized as follows. In section 2, I propose a simple model to illustrate the channels whereby profit shifting can influence employee pay and to formulate a couple of hypotheses. The two next sections explore their empirical validity. Section 3 introduces the data, while section 4 lays out the econometric approach and the results. Section 5 lastly concludes.

2 Theoretical background

I use a plain vanilla model of collective bargaining to examine how profit shifting can in theory affect employee pay. I then derive two hypotheses that will be empirically tested in the ensuing sections.

despoils its employees." See `https://www.bfmtv.com/economie/emploi/le-siege-de-mc-donald-s-france-fait-face-a-une-mc-manif-de-salaries_AN-201810230051.html`.

2.1 Conceptual framework

Consider the case of a single firm. The firm produces a good by employing L workers, each paid w. The firm makes a post-tax profit $\pi(w,t)$, t being its effective tax rate (ETR). Naturally, assume that $\partial\pi(w,t)/\partial w < 0$ and $\partial\pi(w,t)/\partial t < 0$.

Let $\bar{\pi}$ be the outside option of the firm, i.e., the maximum profit it would receive if it unilaterally withdraws from the negotiations. Symmetrically, denote $u(.)$ the utility of workers and $\bar{w}$ their outside option. The firm and its workers bargain over the wage w. The Nash-bargaining wage w^* solves the problem:

$$\begin{aligned} \max_{w} \quad & [L\,(u(w)-u(\bar{w}))]^{\kappa}\,[\pi(w,t)-\bar{\pi}] \\ s.t. \quad & w \geq \bar{w} \\ & \pi(w,t) \geq \bar{\pi} \end{aligned}$$

$\kappa > 0$ symbolizes the relative bargaining power of workers and the inequalities represent the participation constraints. Assume that the firm always participates, i.e., $\pi(\bar{w},t) \geq \bar{\pi}$. The first-order condition for maximization gives:

$$\kappa \frac{u'(w)}{u(w)-u(\bar{w})}\,(\pi(w,t)-\bar{\pi}) - L = 0$$

Note that $u'(w)\,(w-\bar{w}) \approx u(w)-u(\bar{w})$. The solution w^* then verifies:

$$w^* = \bar{w} + \kappa \frac{(\pi(w^*,t)-\bar{\pi})}{L} \equiv \bar{w} + \kappa S \tag{1}$$

Equation (1) says that the negotiated wage is equal to the non-cooperative payoff of workers $\bar{w}$ plus a share κ of the quasi-rent per worker S. This share is increasing in the bargaining power of workers.

2.2 Testable predictions

Hypothesis 1: The effect of firm entry into tax havens on employee pay varies across occupations. Entry into tax havens erodes the wages of non-executive employees but improves the compensation of executives, especially that of executives paid on an after-tax basis.

Profit shifting increases the quasi-rent S via a reduction in the ETR t. Under full information and all other things being equal, it follows from equation (1) that profit shifting

increases wages. Interestingly, Krautheim and Schmidt-Eisenlohr (2016) state that S is not the only variable altered by profit shifting in equation (1). There is in fact another less intuitive force at play. Income shifting, besides reducing ETRs (higher S), generates an informational rent for the firm that strengthens its bargaining power (lower κ). This is because profits are not perfectly observed by workers once they are shifted overseas by the firm. As a result, it becomes optimal for workers not to put the firm at risk to prevent a situation in which there is no production and no surplus, and they accept a lower share of the surplus. I refer the reader to Krautheim and Schmidt-Eisenlohr (2016) for formal derivations and more details on the neutral bargaining solution.

Profit shifting thus triggers two conflicting effects. The surplus becomes larger, i.e., the size of the pie increases, but the bargaining power of workers deteriorates, i.e., the proportion of the pie that workers get decreases. The total effect is ambiguous and ultimately hinges on the extent to which profit shifting weakens the bargaining power of workers. In their paper, Krautheim and Schmidt-Eisenlohr (2016) claim that the harmful effect dominates and wages go down as a consequence.

One limitation of their analysis is that they do not allow for heterogeneous workers. The adverse effect passing through κ is plausible for the bulk of employees but arguably negligible for top executives. Executives are the ones in charge of overseeing business strategies and running financial operations. As such, they should have a very good idea of the profitability of their firm. On top of that, some executives are precisely paid on an after-tax basis to align their interests to those of the firm, so the positive effect of profit shifting on pay should even be stronger for these individuals. We thus expect uneven effects of profit shifting on employee pay. Top executives should be rewarded when their firm engages in profit shifting, whereas non-executive employees should see their wages fall.

Hypothesis 2: The inequality-deepening effect of entry into tax havens is amplified in intangible-intensive MNEs.

MNEs employ various techniques to artificially move profits toward no- or low-tax countries (e.g., transfer mispricing, debt shifting, corporate inversions, see Dharmapala, 2014; Riedel, 2018; Beer et al., 2020). A very well-known method used by profit shifting MNEs involves intangible assets. Research and development activities are conducted in some countries, and IP rights are then transferred to tax-friendly jurisdictions. This way, profits initially generated in high-tax countries can be recorded in OFCs

thanks to the tax deductibility of royalty payments, and the average ETR of MNEs shrinks.

There is compelling evidence on the existence of IP-related profit shifting schemes (Dischinger and Riedel, 2011; Karkinsky and Riedel, 2012; Griffith et al., 2014; Alstadsæter et al., 2018). Prior research also suggests that IP-related profit shifting is one of the most important profit shifting channels (Beer and Loeprick, 2015; Heckemeyer and Overesch, 2017; Barrios and d'Andria, 2020). There are at least two reasons why intangible assets particularly fuel profit shifting. They are highly mobile by nature. Furthermore, transfer pricing rules are hardly enforceable for IP-related transactions. The prices at which transactions between related parties take place are regulated in most countries. They should be in line with the arm's length principle. It means that the price paid by one party to another related party should be identical to the price that would have been set between unrelated parties to guarantee that transfer prices are based on market values. However, establishing a benchmark price for IP-related transactions between related parties is a difficult exercise for the regulator because there are very few similar IP-related transactions that occur between unrelated parties and can be used for comparison. Hence, I posit that the inequality-deepening effect of entry into OFCs is exacerbated in intangible-intensive corporations.

3 Data

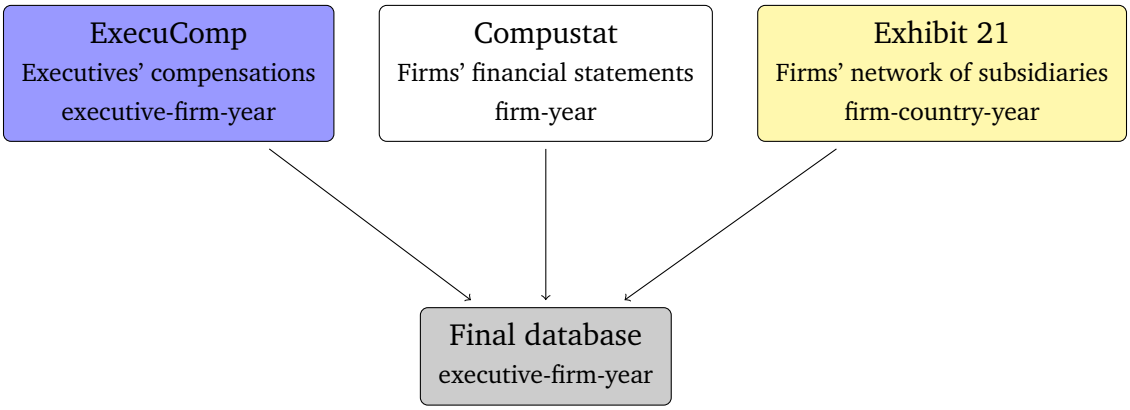
We now turn to the empirical analysis. To confront hypotheses 1 and 2 with data, I first construct a database on the financial statements, foreign subsidiaries, and executives of S&P 1500 companies between 1993 and 2013. This section explains where the data come from and then outlines a set of facts on firm presence in OFCs.

3.1 Sources

The data originate from three distinct sources: ExecuComp, Compustat, and Exhibit 21 filings (see figure 1).

ExecuComp ExecuComp comprises executives of S&P 1500 companies. It couples personal (e.g., age and gender) with professional (e.g., title and compensation) information. Because these firms make up approximately 90 percent of US market capitalization, the dataset allows us to track executives over time and across the largest US publicly listed firms. This feature proves useful because US-listed enterprises are the most likely to en-

FIGURE 1 – Construction of the database

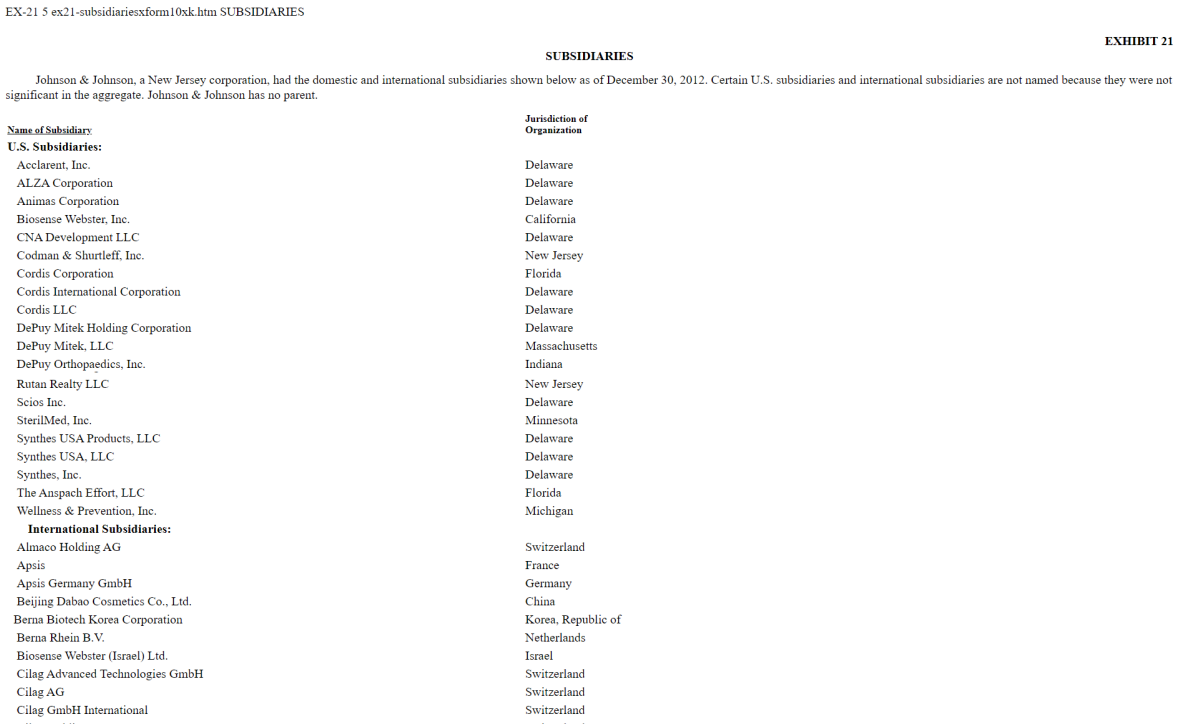


gage in tax haven FDIs and profit shifting. The international trade literature acknowledges that becoming multinational is a costly process that merely the largest and most productive firms can initiate (Helpman et al., 2004). The same logic applies to profit shifting. Moving profits across borders for tax saving purposes requires an in-depth knowledge of tax codes and regulations. Anecdotal evidence shows that MNEs must recruit expensive experts to exploit legal technicalities and build income shifting schemes. It is for instance worth recalling that Caterpillar paid PricewaterhouseCoopers $55 million for developing its tax dodging strategy (US Senate Permanent Subcommittee on Investigations, 2014). For this reason, only the largest MNEs can find profitable to pay these costs and undertake such activities through tax haven subsidiaries (Krautheim and Schmidt-Eisenlohr, 2011; Langenmayr, 2015; Gumpert, Hines, and Schnitzer, 2016; Jones, Temouri, and Cobham, 2018; Bilicka, Devereux, and Guceri, 2020). [4]

Compustat The second data source, Compustat, consists of balance sheets, income statements, and cash flows of publicly held corporations in North America since the 1950s. Its vast coverage and richness make it frequent in accounting, economics, finance, international business, and management. The data are consolidated at the firm level. I extract from Compustat S&P 1500 companies' total employment, labor expenses, and income taxes. I also retain their global assets, sales, and pre-tax income, all of which gauge firms' economic activities worldwide and will be notably used as control variables in the econometric exercise.

4. On the other side of the spectrum, small and medium-sized enterprises (SMEs) are more prone to turn to informality and *evade* taxes. Tax evasion differs from tax avoidance insofar as it is always illegal. It requires little knowledge of the tax code, while tax avoidance is precisely about taking advantage of legal technicalities (e.g., loopholes and mismatches between tax systems in the specific case of profit shifting).

FIGURE 2 – Non-exhaustive list of the significant subsidiaries reported by Johnson & Johnson in Exhibit 21 filings in 2012



EX-21 5 ex21-subsidiariesxform10xk.htm SUBSIDIARIES

EXHIBIT 21

SUBSIDIARIES

Johnson & Johnson, a New Jersey corporation, had the domestic and international subsidiaries shown below as of December 30, 2012. Certain U.S. subsidiaries and international subsidiaries are not named because they were not significant in the aggregate. Johnson & Johnson has no parent.

Name of Subsidiary	Jurisdiction of Organization
U.S. Subsidiaries:	
Acclarent, Inc.	Delaware
ALZA Corporation	Delaware
Animas Corporation	Delaware
Biosense Webster, Inc.	California
CNA Development LLC	Delaware
Codman & Shurtleff, Inc.	New Jersey
Cordis Corporation	Florida
Cordis International Corporation	Delaware
Cordis LLC	Delaware
DePuy Mitek Holding Corporation	Delaware
DePuy Mitek, LLC	Massachusetts
DePuy Orthopaedics, Inc.	Indiana
Rutan Realty LLC	New Jersey
Scios Inc.	Delaware
SterilMed, Inc.	Minnesota
Synthes USA Products, LLC	Delaware
Synthes USA, LLC	Delaware
Synthes, Inc.	Delaware
The Anspach Effort, LLC	Florida
Wellness & Prevention, Inc.	Michigan
International Subsidiaries:	
Almaco Holding AG	Switzerland
Apsis	France
Apsis Germany GmbH	Germany
Beijing Dabao Cosmetics Co., Ltd.	China
Berna Biotech Korea Corporation	Korea, Republic of
Berna Rhein B.V.	Netherlands
Biosense Webster (Israel) Ltd.	Israel
Cilag Advanced Technologies GmbH	Switzerland
Cilag AG	Switzerland
Cilag GmbH International	Switzerland

Source: https://www.sec.gov/Archives/edgar/data/200406/000020040613000038/ex21-subsidiariesxform10xk.htm.

Exhibit 21 I merge ExecuComp and Compustat data with Exhibit 21 filings to have an overview of the location of S&P 1500 firms' subsidiaries. The SEC obliges US-listed corporations to divulge every year in Exhibit 21 of Form 10-K a list of their significant subsidiaries, be they inside or outside the US. A subsidiary is considered significant if its assets represent at least 10 percent of all assets or if its income exceeds 10 percent of consolidated income. Moreover, any subsidiary is deemed significant if by combining all undisclosed subsidiaries into one composite subsidiary, the latter accounts for at least 10 percent of assets or revenues. Therefore, Exhibit 21 filings include subsidiaries where at least 90 percent of firms' consolidated assets and revenues are recorded and give a faithful picture of the worldwide network of US-listed companies' subsidiaries. The reports are electronically filed since 1993 and publicly available on the Electronic Data Gathering, Analysis, and Retrieval (EDGAR) platform of the SEC (see figure 2 for an example). In this paper, I leverage an updated version of the database produced by Dyreng and Lindsey (2009) that spans the 1993-2013 period.

TABLE 1 – List of tax havens (Dyreng and Lindsey, 2009)

Andorra, Anguilla, Antigua and Barbuda, Aruba, Bahamas, Bahrain, Barbados, Belize, Bermuda, Cayman Islands, Cook Islands, Costa Rica, Cyprus, Dominica, Gibraltar, Grenada, Guernsey, Hong Kong, Ireland, Isle of Man, Jersey, Lebanon, Liberia, Liechtenstein, Luxembourg, Macau, Malaysia, Malta, Marshall Islands, Mauritius, Monaco, Montserrat, Nauru, Netherlands Antilles, Niue, Panama, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Samoa, San Marino, Seychelles, Singapore, Switzerland, Turks and Caicos Islands, Vanuatu.

Once assembled, the final database contains 31,978 executives linked to 3,665 enterprises listed on the S&P 1500 index between 1993 and 2013. 46 foreign jurisdictions are treated as tax havens (see table 1). A jurisdiction is defined as a tax haven if it appears on the list elaborated by Dyreng and Lindsey (2009). The authors cross the classifications of the Organization for Economic Cooperation and Development (OECD), International Monetary Fund (IMF), the US Stop Tax Havens Abuse Act, and the Tax Research Organization (TRO) for 2008. They label a country as a tax haven if it appears at least twice.

One caveat is that firms may have incentives to under-report tax haven subsidiaries in Exhibit 21. Dyreng, Hoopes, Langetieg, and Wilde (2020) assert that most disclosures in Exhibit 21 are accurate, even for OFCs. Another shortcoming of the data pertains to the fact that, due to the reporting threshold, what seems to be a new entry into an OFC could actually be an existing subsidiary reaching the threshold. Insofar as companies are not obliged to uncover financial information at the subsidiary level, this is not something that can be checked. Note, however, that presence in OFCs does not necessarily mean that companies start profit shifting activities. Companies can still move profits between non-OFCs for tax saving purposes. That is why entry into OFCs does not exactly reflect the extensive margin of profit shifting. Rather, presence in OFCs in this paper should be seen as an intensification of profit shifting activities. A third limitation is that some firms physically present in tax havens might not be involved in profit shifting. Given that most of tax havens are tiny jurisdictions (see table 1 and stylized fact 1 below), such subsidiaries are unlikely to appear due to the 10 percent threshold. In addition, we will see that firms established in OFCs systematically pay lower corporate income taxes than their peers (see stylized fact 5 below) and that the findings are robust to the elimination of the largest OFCs (Hong Kong, Ireland, Luxembourg, Malaysia, Singapore, and Switzerland).

3.2 Stylized facts

The database described above reveals various patterns. Not surprisingly, the stylized facts highlighted by Souillard (2022b) on a broader set of US-listed firms carry over to the restricted case of S&P 1500 firms.

Stylized fact 1: OFCs concentrate a high number of S&P 1500 companies despite their small size and isolation.

Typical international trade theories predict that large and central [5] countries should attract more FDIs than their counterparts (Brainard, 1993; Head and Mayer, 2004; Helpman et al., 2004). We thus expect S&P 1500 corporations to be mostly located in large and central countries. Figure 3a plots the relationship between countries' attractiveness (y-axis), size (x-axis), and connectedness (bubble size). The correlation between attractiveness, size, and connectedness is clearer after taking into account corporate income taxation and distinguishing tax havens (in blue) from the rest (in black). Among non-haven countries, attractiveness seems to go hand in hand with size and connectedness. Furthermore, the fact that OFCs host more S&P 1500 firms than non-haven countries of comparable size and connectedness suggests that the unique opportunities they provide for tax dodging (low corporate income tax rates and financial secrecy) are key to better grasp the geography of FDIs.

Stylized fact 2: The number of S&P 1500 companies in OFCs is growing over time, and these firms are on average larger and more productive.

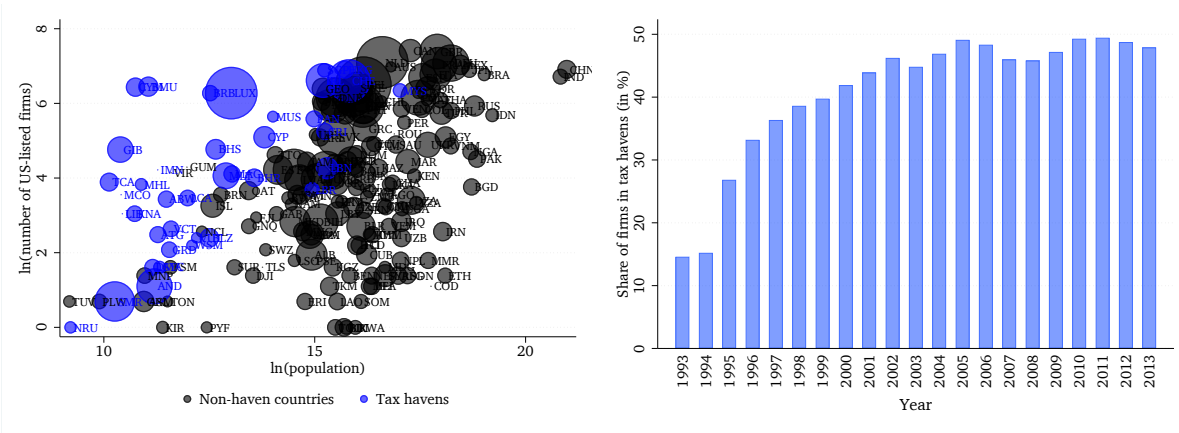
Out of the 3,665 firms that constitute the sample, 420 companies always had at least one tax haven subsidiary. 1,441 firms entered OFCs for the first time at some point between 1993 and 2013 and 1,724 enterprises never disclosed any physical presence in tax havens. [6] In total, the share of firms operating in OFCs increased threefold, passing from 15 percent in 1993 to 48 percent in 2013 (see figure 3b). The soaring activity in OFCs concurs with the view that profit shifting practices of US MNEs escalated in the 1990s and 2000s, partly due to the introduction of the "check-the-box" (CTB) regulations in 1997 (Grubert, 2012; Klassen and Laplante, 2012). The CTB regulations, originally

5. In these models, a country is perceived as central if it is surrounded by many large countries.

6. The remaining 80 companies were first implanted in OFCs and then exited. Among the 1,441 firms that entered tax havens for the first time between 1993 and 2013, 74 firms left tax havens at a later stage and the status changed multiple times for 46 firms. The findings of this paper are not affected by these outliers. More details are available upon request.

FIGURE 3 – Presence of S&P 1500 companies in foreign countries

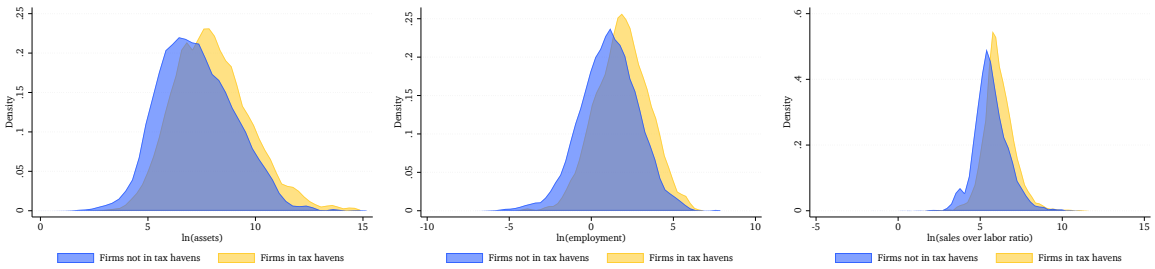
(a) All foreign countries (b) OFCs



Notes: On the left, population size data are from 2003 and come from the World Bank. Bubble size for country c is proportional to $\sum_j GDP_{j,2003}/dist_{jc}$ after standardization of the two components (data from the GeoDist database of CEPII). See section 3 for more details.

FIGURE 4 – Distribution of firm size and productivity

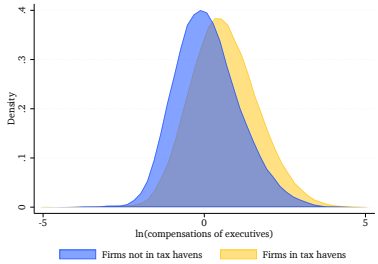
(a) Assets (b) Employment (c) Productivity



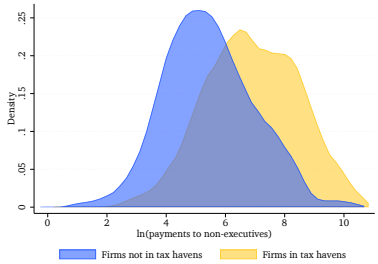
Notes: This figure plots the distribution of firm size (as measured by assets and employment) and firm productivity (as measured by the sales over labor ratio). In Compustat, assets are given by the variable denoted AT, employment is given by the variable denoted EMP, and sales are given by the variable denoted $SALE$. Employment is expressed in thousands, while assets and sales are measured in million US dollars. See section 3 for more details.

FIGURE 5 – Distribution of employee pay

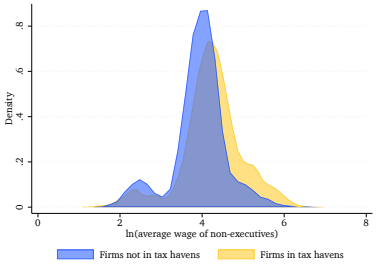
(a) Compensations of executive employees



(b) Total payments to non-executive employees



(c) Average wage of non-executive employees



Notes: This figure plots the distribution of executive and non-executive employee pay. Executives' compensations and total payments to non-executive employees are in million US dollars. The average wage of non-executive employees is defined as the ratio of $payments$ (in million US dollars) to employment (in thousands and labeled EMP in Compustat). See section 3 for more details.

intended to simplify the entity classification process, had the unintended consequence of facilitating the tax avoidance of US MNEs through hybrid entities. The expansion of S&P 1500 companies in tax havens also proves useful for the present analysis. It will allow us to scrutinize and compare the evolution of wages in two types of firms: those entering tax havens for the first time between 1993 and 2013, and those whose presence in OFCs remains constant.

Moreover, S&P 1500 corporations declaring subsidiaries in tax havens are on average larger in terms of assets and employment. They are more productive too (see figure 4). The correlation between firm size/productivity and presence in OFCs directly echoes with the profit shifting literature, according to which only the largest and most productive MNEs engage in aggressive tax planning and tax-motivated income shifting (Krautheim and Schmidt-Eisenlohr, 2011; Langenmayr, 2015). They form an inner circle of superstar firms big enough to generate a substantial share of overall profits, artificially shift profits across borders, and drive macroeconomic aggregates (Di Giovanni, Levchenko, and Mejean, 2017; Guvenen et al., 2017; Bricongne et al., 2021).

Stylized fact 3: S&P 1500 companies implanted in tax havens pay higher wages on average.

Figure 5 finally brings employee pay into the picture. It visualizes three distributions: the compensation of executives, total payments to non-executive employees, and the average pay of non-executives. The $TDC1$ variable in ExecuComp offers a full overview

of executive compensation as it encompasses salaries, bonuses, stock and option awards, non-equity incentive plans, pensions, and other pay.[7] Total payments to non-executive employees are pinned down after taking the difference between all payments to employees (corresponding to the variable XLR in Compustat) and compensations received by executives in the same year. Denote $compensation_{e,i,t}$ the compensation of executive e working for firm i in year t. Payments to non-executive employees in firm i and year t are given by:

$$payments_{i,t} = XLR_{i,t} - \sum_{e} compensation_{e,i,t} = XLR_{i,t} - \sum_{e} TDC1_{e,i,t}$$

Primary evidence in figure 5 is mixed. Together, the graphs exhibit a positive correlation between presence in tax havens and employee pay. The correlation between presence in OFCs and executive compensation coincides with hypothesis 1. On the contrary, the fact that payments to non-executive employees are higher in firms implanted in tax havens is at first sight not consistent with hypothesis 1. Nonetheless, the correlation may simply be spurious. Firms in tax havens are larger and more productive (see stylized fact 3), and it is well-known that the most productive firms pay higher wages (Oi and Idson, 1999; Helpman, Itskhoki, Muendler, and Redding, 2017). Hence, the correlation may have nothing to do with profit shifting *per se* and the effect of profit shifting on employee pay requires further investigation.

Stylized fact 4: Firms with low ETRs pay higher wages to executive and non-executives employees.

Before moving to the next step of the analysis, we still need to verify a couple of issues to guarantee that the theoretical mechanisms formulated in section 2 can rationalize the future results. First, we must check that low-ETR firms pay higher wages than their peers. If corporate income taxes reduce the surplus shared between the firm and its workers, then ETRs should exert a negative impact on compensations and total payments to non-executive employees. Two equations are regressed to this end:

$$ln(compensation_{e,i,t}) = \alpha ETR_{i,t} + \lambda X_{e,i,t} + \upsilon_e + \phi_i + \psi_t + \epsilon_{e,i,t} \quad (2)$$

$$ln(payments_{i,t}) = \zeta ETR_{i,t} + \lambda X_{i,t} + \phi_i + \psi_t + \epsilon_{i,t} \quad (3)$$

7. The calculation method of $TDC1$ changed in 2006 subsequent to the promulgation of Financial Accounting Statement 123R. The variable is corrected accordingly with the procedure described in Gabaix, Landier, and Sauvagnat (2014).

$ETR_{i,t}$ is the ETR reported by firm i in year t.[8] X is a vector of controls whose objective is to clean the effect from confounding factors and to make sure that we are comparing firms which, albeit having different ETRs, have similar profile (more details in the next section). The results are attached in Appendix table AT1 and confirm that employee pay is inversely related to ETRs.

Stylized fact 5: Entry into tax havens leads to a decrease in ETRs.

Another crucial element that needs to be validated to support the toy model in section 2 is that profit shifting translates into a decline in ETRs. If establishing a physical presence in OFCs does not allow the firm to alleviate its tax burden, then profit shifting can in theory affect wages only negatively and indirectly through a change in the relative bargaining of workers. Perhaps more importantly, the profit shifting variable would be hard to interpret. It would indeed suggest that the presence of S&P 1500 companies in OFCs does not generally fall within the scope of profit shifting. In the same spirit of Souillard (2022b), I regress firm-year level ETRs on the tax haven dummy variable, controlling for firms' sales, assets, pre-tax income, number of subsidiaries in non-OFCs, and tax loss carryforward. Reassuringly, the regressions reveal that entry into tax havens leads to a drop in ETRs (see Appendix table AT2).

4 Causal effect of profit shifting on employee pay

Section 4 goes from correlation to causation to properly evaluate the empirical validity of hypotheses 1 and 2. I begin with the average effect of profit shifting on executive and non-executive pay (hypothesis 1). I clarify the identification strategy and then discuss the results. Next, I focus on the role of intangible assets (hypothesis 2).

4.1 Average effect: equations

I quantify the average effect of profit shifting on employee pay with two equations, as I separate executive and non-executive employees.

8. ETR is constructed with the variables labeled TXT (tax expense), PI (pre-tax income), and SPI (special items) in Compustat. Alternative ETRs (e.g., cash ETRs) yield concordant results and more details are available upon request.

Equation for executives The first equation is:

$$\begin{aligned} ln(compensation_{e,i,t}) &= \alpha TH_{i,t} + \beta \mathbb{1}_{e,i,t}^{CEO/CFO} \times TH_{i,t} + \gamma \mathbb{1}_{e,i,t}^{CEO/CFO,\ after\text{-}tax} \times TH_{i,t} \quad (4) \\ &\quad + \lambda X_{e,i,t} + \upsilon_e + \phi_i + \psi_t + \epsilon_{e,i,t} \end{aligned}$$

The left-hand side variable $compensation_{e,i,t}$ is the compensation of executive e working for S&P 1500 company i in year t. On the right-hand side, $TH_{i,t}$ is a dummy variable equal to 1 if firm i has at least one subsidiary located in a tax haven in year t. $\mathbb{1}_{e,i,t}^{CEO/CFO}$ is a binary variable equal to 1 if executive e is the CEO or the CFO of firm i in year t. I allow for asymmetric effects across executives and the accent is placed on these C-level executives in the rest of the paper. The split is motivated by the fact that CEOs and CFOs are the highest-ranking executives who set the "tone at the top" (Dyreng, Hanlon, and Maydew, 2010). $\mathbb{1}_{e,i,t}^{CEO/CFO,\ after\text{-}tax}$ interacts the previous variable with a (time-invariant) dichotomous equal to 1 if firm i compensates its executives on an after-tax basis. As mentioned earlier, such executives might be rewarded to a higher degree as activities carried out in tax havens precisely aim at lightening the tax burden. A caveat is that after-tax incentives are not directly observable. Drawing on Gaertner (2014), firms paying their executives on an after-tax basis are identified based on the firm-specific sensitivity of executive compensation to total income tax expense conditional on pre-tax income. Firms whose sensitivities are negative and statistically significant at the 5 percent level are coded as after-tax incentive firms. [9]

A vector of controls and a battery of fixed effects are inserted to minimize endogeneity. $X_{e,i,t}$ is composed of executive- and firm-year-specific variables. It comprises executives' age and within-firm experience, two CEO and CFO dummies, as well as firms' assets, sales, pre-tax income (in logarithm), and number of foreign subsidiaries in non-OFCs. [10] The latter variable ensures that the effect is specific to entry into tax havens and does not capture any effect induced by the (simultaneous) expansion of MNEs in non-OFCs. The executive fixed effects υ_e absorb fixed characteristics of executives like education. The firm fixed effects ϕ_i neutralize systematic differences in compensations across companies. Companies paying executives on an after-tax basis make executives bear additional risk, so they might have to pay a premium to get them accept the contract. The firm-level fixed effects, together with the other independent variables, should capture such thing (among others). Lastly, year fixed effects correct for global trends in compensations and macroeconomic shocks.

9. Modifying the significance threshold is innocuous. More details are available upon request.

10. By construction, loss-making firms are ruled out. Nevertheless, the results are preserved if assets, sales, and pre-tax income are integrated without the logarithm transformation.

The coefficients of interest, α, β, and γ, express changes in compensations (in percentage) subsequent to firm entry into tax havens. Their estimation requires variation in $TH_{i,t}$, i.e., switching firms. Take two executives e and e' having common attributes and working respectively for firms i and i', also comparable so that $X_{e,i,t} - X_{e,i,t-1} \approx X_{e',i',t} - X_{e',i',t-1}$. Assume that firm i had no tax haven subsidiary in year $t-1$ but enters tax havens in year t, while the network of subsidiaries of firm i' in tax havens remains untouched. The identification relies on the assumption that, absent firm i's entry into tax havens in year t, the compensations of executives e and e' would have evolved similarly between years $t-1$ and t.

Equation for non-executives I investigate the impact of firm entry into tax havens on non-executive employee pay with the model:

$$ln(payments_{i,t}) = \zeta TH_{i,t} + \lambda X_{i,t} + \phi_i + \psi_t + \epsilon_{i,t} \quad (5)$$

The dependent variable $payments_{i,t}$ stands for all payments made by firm i in year t to non-executive employees. The independent variables mirror those introduced in equation (4), except that the vector $X_{i,t}$ includes only firm-specific controls this time because the analysis is performed at the firm-year level.

4.2 Average effect: results

Benchmark results The estimation results of equations (4) and (5), fully reported in Appendix table AT3, are best summarized by figure 6. They lend credence to hypothesis 1. The left part of the graph outlines the effect of firm entry into tax havens on the compensation of CEOs and CFOs paid on an after-tax basis ($\hat{\alpha} + \hat{\beta} + \hat{\gamma}$, second bar) and CEOs and CFOs not receiving after-tax incentives ($\hat{\alpha} + \hat{\beta}$, first bar). The compensation of CEOs and CFOs in after-tax incentive firms grows by 8 percent when these firms establish a physical presence in tax havens. The point estimate is statistically significant at the 5 percent level. Appendix figure AF1 goes a step further and zooms in on seven subcomponents: salary, bonuses, non-equity incentive plans, pensions, option awards, stock awards, and other pay. Non-equity incentive plans seem to be the key factor behind the rise of CEOs' and CFOs' compensations in after-tax incentive firms.[11] This pattern further strengthens the surplus sharing story put forward in section 2. By contrast,

11. In ExecuComp, non-equity incentive plans are disclosed in the year that the compensation was earned, are contingent on achieving performance targets (as opposed to bonuses), and exclude stock-based pay (as opposed to long-term incentive plans).

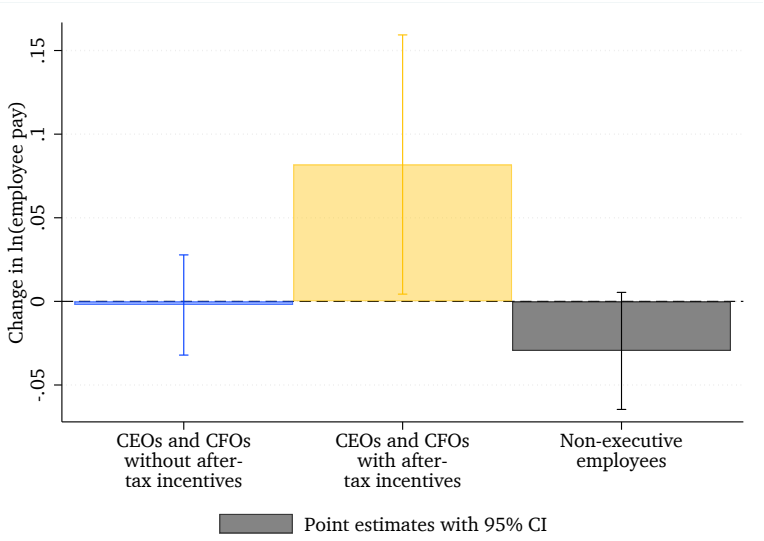
compensations of other CEOs and CFOs hardly vary. As for the remaining executives, the downward shift in Appendix table AT3 should be interpreted with caution as their function is poorly reported in ExecuComp and $\hat{\alpha}$ is statistically significant only at the 10 percent level.

The right part of figure 6 ($\hat{\zeta}$, third bar) reveals that overall wages of non-executive employees fall by 3 percent in the meantime. The coefficient is significant at the 10 percent level too. In Appendix table AT4, I show that total employment (labeled EMP in Compustat) rises by 2 percent post entry into tax havens. Consequently, the decline in total payments to non-executive employees cannot be explained by job cuts and the average wage, if anything, decreases by around 5 percent ($= 0.97 \times 0.98$). The rise in total employment following entry into OFCs resonates with Suárez Serrato (2019), who shows that anti profit shifting measures might reduce domestic employment. Here, the data are consolidated at the worldwide level and do not make it possible to disentangle domestic and foreign employment.

It is also worth noting that the coefficients associated with the covariates coincide with our expectations. For example, the results validate the existence of a compensation premium for top C-level executives. The premium amounts to 43 and 21 percent respectively for CEOs and CFOs. In addition, we notice a positive relationship between firms' activities worldwide broadly defined and employee pay.

Alternative dependent variables Six distinct exercises, reviewed hereafter, gauge and support the robustness of the findings. First, I re-estimate equation (4) by writing executives' earnings as a ratio of their firm's average wage. Although such an equation does not reflect the effect of firm entry into tax havens on the level of employee pay, looking at the gap between executives and other employees enables us to explore the impact on within-firm pay inequalities more directly. Combined, the regression results above imply a 14 percent increase ($= 1.08/0.95$) in the pay gap between CEOs and CFOs and non-executive employees in after-tax incentive companies. The results of the new equation, to be found in Appendix table AT5 column (1), report an effect of comparable magnitude. They show that the relative compensation of CEOs and CFOs in after-tax incentive companies increase by 18 percent post entry and this increase is statistically significant at the 5 percent level. In the same vein, I replace in equation (5) overall payments to non-executive employees by the average wage of non-executives, equal to $payments_{i,t}/employment_{i,t}$. The results in Appendix table AT5 column (2) slightly diverge from the benchmark ones. They signal that the average wage of non-executive

FIGURE 6 – Benchmark results



Notes: The figure depicts the effect of firm entry into OFCs on employee pay, see equations (4) and (5). The first bar depicts the regression result for $\hat{\alpha}+\hat{\beta}$, the second bar for $\hat{\alpha}+\hat{\beta}+\hat{\gamma}$, and the third bar for $\hat{\zeta}$. The full results are given in Appendix table AT3 and standard errors are clustered at the firm level. See section 4 for more details.

employees does not significantly fluctuate post entry into tax havens. They thus suggest that the benchmark estimate for equation (5) should be considered as a lower-bound value. This notwithstanding, they do not query the inequality-deepening effect of profit shifting between executive and non-executive employees.

Alternative tax haven classifications Another series of tests revises the group of tax havens. There is to date no unique definition of tax havens because a low statutory corporate income tax rate is not a sufficient condition to be treated as a tax haven. Other criteria are determinant (e.g., minimal reporting of information, lack of transparency obligations, few effective exchanges of information); and since they are sometimes difficult to assess, characterizing a country as a tax haven can be an arbitrary task. That is why I reproduce the results when adopting the classification proposed by Hines and Rice (1994).[12] A complementary exercise eliminates six major tax havens, as in Souillard (2022b). Hong Kong, Ireland, Luxembourg, Malaysia, Singapore, and Switzerland are large OFCs and well-connected to the rest of the world. Therefore, FDIs of US-listed firms in these countries do not necessarily reflect tax avoiding strategies. On the opposite, FDIs in small and

12. The two lists share 37 tax havens in common. Unlike Dyreng and Lindsey (2009), Hines and Rice (1994) integrate the British Virgin Islands, Jordan, Maldives, and Saint Martin. Furthermore, they do not integrate Aruba, Costa Rica, Malaysia, Mauritius, Nauru, Niue, Samoa, San Marino, and Seychelles.

isolated jurisdictions such as the Marshall Islands are more prone to have no economic substance and to be utterly motivated by tax purposes. These OFCs attract a high number of companies that is indeed disproportionate with what international trade theories would predict (see stylized fact 1). The results are displayed in Appendix figure AF2 and attached in Appendix tables AT8 and AT9. They globally match the benchmark ones, both economically and statistically. Hence, the inequality-deepening effect of profit shifting on employee pay is robust across tax haven classifications.

Missing values Next, I cope with missing data. The number of observations is rather low in equation (5)/figure 6 (third bar)/Appendix table AT3 because only 16 percent of companies in the sample disclose total staff expenses. To overcome this shortcoming, I calculate industry-year averages of the total labor costs to employment ratio and impute missing values by multiplying these averages with firm-level employment. The employment variable being well-filled, this methodology borrowed from Donangelo, Gourio, Kehrig, and Palacios (2019) allows increasing the size of the sample fivefold. The regression results are visible in Appendix table AT6 and concur with the reference ones. They corroborate that the (potentially) negative impact on firm entry into tax havens on non-executive pay cannot be attributed to a reporting problem.

Relocation to low-cost countries For some companies, profit shifting might be accompanied by a relocation of activities to low-cost countries. The treatment variable could partly capture this and thereby reduce $\hat{\zeta}$, even with the number of subsidiaries in non-OFCs already embedded in the regressors. In Appendix table AT7, I extend equation (5) to better adjust for labor cost differentials across countries. To this end, I retrieve data on gross monthly minimum wages from the International Labour Organization (ILO) and compute a proxy for the average cost of labor faced by firm i in year t:

$$average\ cost_{i,t} = \frac{\sum_c FDI_{i,c,t} \times minwage_{c,t}}{\sum_c FDI_{i,c,t}}$$

$FDI_{i,c,t}$ represents the number of firm i's subsidiaries in country c and year t. Controlling for the average value of labor costs and total employment, the novel point estimate is similar to the benchmark one and more importantly never significantly positive. The conclusion is intact if GDP per capita (World Bank), more exhaustive, is used in lieu of the minimum wage. [13]

13. Many countries are missing in the ILO database. Among others, Mexico is not covered and data prior to 2015 for Germany are unavailable. As a consequence, both countries are dropped in the computation of $average\ cost_{i,t}$. Moreover, note that the correlation between $minwage_{c,t}$ and $GDP\ per\ capita_{c,t}$, both in

Executive turnover Another threat to identification, specific to equation (4) this time, is that some firms appoint new executives before entering tax havens. Souillard (2022a) provides evidence that (i) firms recruit executives expert in tax dodging and tax haven FDIs to step up their tax planning activities in OFCs and (ii) executives with international experience receive higher compensations all other things being equal. The increase in executive compensation detected after firm entry into tax havens could then arise from the fact that firms hire more costly executives before investing in tax havens. To alleviate the problem caused by such turnover, equation (4) is regressed on the subsample of executives who stayed in the firm during the five years preceding entry into tax havens. The results are to be seen in Appendix figure AF3 and align with the ones reported thus far. They attest that endogenous executive mobility is unlikely to drive the main results.

Parallel trends In equations (6) and (7), I scrutinize the evolution of employee pay prior to firm entry into tax havens. An issue hitherto glossed over is that the benchmark results could be ascribable to pre-existing trends. To check that this is not the case, a collection of leading values is inserted into equations (4) and (5):

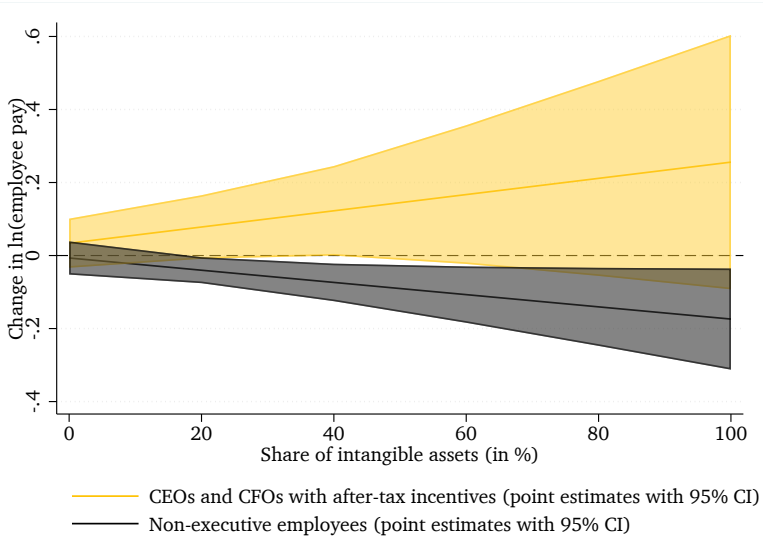
$$\begin{aligned} ln(compensation_{e,i,t}) &= \sum_{k=0}^{5} \alpha_k TH_{i,t}^{t+k} + \sum_{k=0}^{5} \beta_k \mathbb{1}_{e,i,t}^{CEO/CFO} \times TH_{i,t}^{t+k} \\ &\quad + \sum_{k=0}^{5} \gamma_k \mathbb{1}_{e,i,t}^{CEO/CFO,\ after\text{-}tax} \times TH_{i,t}^{t+k} + \lambda X_{e,i,t} + \upsilon_e + \phi_i + \psi_t + \epsilon_{e,i,t} \end{aligned} \tag{6}$$

$$ln(payments_{i,t}) = \sum_{k=0}^{5} \zeta_k TH_{i,t}^{t+k} + \lambda X_{i,t} + \phi_i + \psi_t + \epsilon_{i,t} \tag{7}$$

$TH_{i,t}^{t+k}$ ($k \in \{0, ..., 5\}$) is a dichotomous variable equal to 1 in year t if firm i has at least one subsidiary incorporated in a tax haven in year $t+k$. The variables inform on the dynamics of the effect and serve as a placebo test. If the coefficients associated with the $TH_{i,t}^{t+k} (k \geq 1)$ variables are not statistically different from zero, then the evolution of employee pay does not depend on future profit shifting activities. The regression results point in this direction. None of the $\{\alpha_k, \beta_k, \gamma_k, \zeta_k, k \in \{1, ..., 5\}\}$ coefficients is significant at the 5 percent level (see Appendix figures AF4 and AF5), and the p-values of the joint significance tests are equal to 25 and 54 percent respectively. The absence of pre-trends is preserved if we expand or narrow the five-year window and substantiates that employee pay does not systematically change before entry into OFCs. It also confirms that the treatment variable does not pick up the effect of unobserved (executive-)firm-year shocks and more generally mitigates endogeneity concerns.

US dollars, is equal to 0.93.

FIGURE 7 – The amplifying effect of intangible assets



Notes: The figure depicts the change in employee pay after entry into tax havens according to intensity in intangible assets. The full results are given in Appendix table AT10 and standard errors are clustered at the firm level. See section 4 for more details.

4.3 The role of intangible assets

Before concluding, I examine whether intangible assets exacerbate the impact of firm presence in OFCs on employee pay and inequalities (hypothesis 2). I interact in equations (4) and (5) the treatment variables with a variable $INTANGIBLES_{i,t}$ denoting the firm-level intangibles ($INTAN$ in Compustat) to total assets ratio (AT in Compustat).[14] The regression results laid out in figure 7 and Appendix table AT10 show that the effect of entry into OFCs is magnified in intangible-intensive firms.

Take two firms i and i' entering OFCs at some point and paying their executives on an after-tax basis. Assume that i is in the first quartile of the intangible intensity distribution (i.e., $INTANGIBLES_{i,t} \approx 0.01$) and that i' is in the third quartile of the intangible intensity distribution (i.e., $INTANGIBLES_{i,t} \approx 0.26$). The point estimates reveal that total payments to non-executive employees would remain almost the same in firm i post entry into OFCs (point estimate equal to -0.01, standard error equal to 0.02), while non-executive employees in firm i' would experience a 5 percent loss in terms of total payments (standard error equal to 0.02). Furthermore, the compensations of the CEO and

14. The first quartile corresponds to 1 percent, the median to 8 percent, the third quartile to 26 percent, and the maximum value is 93 percent.

CFO would grow by 4 percent in firm i (standard error equal to 0.06) and by 9 percent in firm i' (standard error equal to 0.04).

5 Conclusion

In the existing literature, the effect of profit shifting on employee pay has been studied merely from a theoretical perspective (Krautheim and Schmidt-Eisenlohr, 2016). The present paper bridges the gap between theory and data and empirically investigates the impact of profit shifting on both employee pay and within-firm pay inequalities. I first outline a toy model to clarify the potential mechanisms at play. On this basis, I derive two testable hypotheses and I assess their validity with data on S&P 1500 firms' financial statements, foreign subsidiaries, and executives. The results are threefold. First, compensations of CEOs and CFOs remunerated on an after-tax basis go up when their firm establishes subsidiaries in tax havens. Second, wages of non-executive employees, if anything, decline in the meantime. Third, the inequality-deepening effect of firm entry into OFCs is more pronounced in intangible-intensive firms.

The findings are in line with our predictions and carry policy-relevant implications. Because they indicate that profit shifting widens within-firm pay inequalities, they also suggest that the development of profit shifting partly explains the rise of income inequalities observed during the last decades. At the same time, they unveil a new mechanism whereby globalization fosters income inequalities and justify the implementation of anti profit shifting reforms as an instrument to curb income inequalities.

More work is needed in this direction. Ascertaining the validity of the results with alternative databases would be a valuable and useful exercise. Opening the category of non-executive employees is another promising task for future research. Owing to data limitations, it is not possible to distinguish low- and high-skilled non-executive employees in this analysis. Leveraging employer-employee data could shed more light on this and help us better fathom the distributional consequences of profit shifting.

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Appendix

TABLE AT1 – ETRs and employee pay

Column	(1)	(2)
Dependent variable	$ln(compensation_{e,i,t})$	$ln(payments_{i,t})$
$ETR_{i,t}$	-0.05^{c}	-0.05^{c}
	(0.03)	(0.03)
Controls	Yes	Yes
Executive FEs	Yes	No
Firm FEs	Yes	Yes
Year FEs	Yes	Yes
R^2	0.83	0.98
No. of obs.	89,358	4,116

Notes: Regression results of equations (2) and (3). As is customary in the literature, values of $ETR_{i,t}$ outside the [0,1] interval are omitted. Controls include firms' assets, sales, and profits (in logarithm), and the number of subsidiaries in non-OFCs. In column (1), they also include a CEO dummy, a CFO dummy, as well as executives' age and within-firm experience. Standard errors, in parentheses, are clustered at the firm level. $^{d}p < 0.15$, $^{c}p < 0.10$, $^{b}p < 0.05$, $^{a}p < 0.01$. See sytlized fact 4 and section 3 for more details.

TABLE AT2 – ETRs and presence in OFCs

Dependent variable	$ETR_{i,t}$
$TH_{i,t}$	-0.05^{a}
	(0.01)
Controls	Yes
Firm FEs	Yes
Year FEs	Yes
R^2	0.20
No. of obs.	17,746

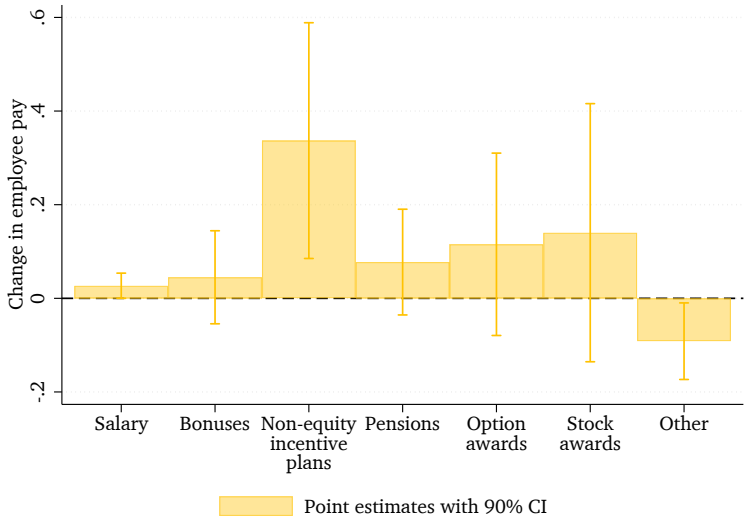
Notes: As is customary in the literature, values of $ETR_{i,t}$ outside the [0,1] interval are omitted. Controls include firms' assets, sales, and profits (in logarithm), the number of subsidiaries in non-OFCs, and a dichotomous variable for tax loss carryforward. Standard errors, in parentheses, are clustered at the firm level. $^{d}p < 0.15$, $^{c}p < 0.10$, $^{b}p < 0.05$, $^{a}p < 0.01$. See stylized fact 5 and section 3 for more details.

TABLE AT3 – Benchmark results

Column	(1)	(2)
Dependent variable	$ln(compensation_{e,i,t})$	$ln(payments_{i,t})$
$TH_{i,t}$	-0.03^{c}	-0.03^{c}
	(0.01)	(0.02)
$\mathbb{1}_{e,i,t}^{CEO/CFO} \times TH_{i,t}$	0.02	
	(0.02)	
$\mathbb{1}_{e,i,t}^{CEO/CFO,\ after\text{-}tax} \times TH_{i,t}$	0.08^{c}	
	(0.05)	
$ln(assets_{i,t})$	0.12^{a}	0.20^{a}
	(0.02)	(0.04)
$ln(sales_{i,t})$	0.08^{a}	0.74^{a}
	(0.03)	(0.05)
$ln(\textit{pre-tax income}_{i,t})$	0.11^{a}	-0.03^{a}
	(6.59e-3)	(7.29e-3)
$\textit{Subsidiaries in non-OFCs}_{i,t}$	2.50e-4^{b}	6.78e-5
	(1.16e-4)	(5.59e-5)
$age_{e,t}$	1.95e-3	
	(8.03e-3)	
$experience_{e,i,t}$	3.04e-4	
	(8.41e-4)	
$CEO_{e,i,t}$	0.43^{a}	
	(0.02)	
$CFO_{e,i,t}$	0.21^{a}	
	(0.02)	
Executive FEs	Yes	No
Firm FEs	Yes	Yes
Year FEs	Yes	Yes
R^2	0.83	0.99
No. of obs.	101,232	5,248

Notes: Regression results of equations (4) and (5). Standard errors, in parentheses, are clustered at the firm level. $^{d}p < 0.15$, $^{c}p < 0.10$, $^{b}p < 0.05$, $^{a}p < 0.01$. See section 4 for more details.

FIGURE AF1 – Benchmark results by subcomponent



Notes: Effect of firm entry into OFCs on seven compensation subcomponents (for CEOs and CFOs in after-tax incentive firms). The coefficients are obtained by replacing the dependent variable from equation (4) with the corresponding subcomponent. The dependent variables are in million US dollars and the standard errors are clustered at the firm level. See section 4 for more details.

TABLE AT4 – Employment effect of firm entry into tax havens

Dependent variable	$ln(employment_{i,t})$
$TH_{i,t}$	0.02^{b}
	(0.01)
$ln(assets_{i,t})$	0.29^{a}
	(0.02)
$ln(sales_{i,t})$	0.62^{a}
	(0.03)
$ln(pre\text{-}tax\ income_{i,t})$	-0.04^{a}
	(4.23e-3)
$Subsidiaries\ in\ non\text{-}OFCs_{i,t}$	6.78e-5
	(1.16e-4)
Firm FEs	Yes
Year FEs	Yes
R^2	0.98
No. of obs.	30,261

Notes: Regression results obtained after replacing the dependent variable from equation (5) with the employment variable. Standard errors, in parentheses, are clustered at the firm level. $^{d}p < 0.15$, $^{c}p < 0.10$, $^{b}p < 0.05$, $^{a}p < 0.01$. See section 4 for more details.

TABLE AT5 – Effect of firm entry into tax havens on within-firm inequalities and the average wage of non-executive employees

Column	(1)	(2)
Dependent variable	$ln\left(\frac{compensation_{e,i,t}}{total\ payments\ to\ employees_{i,t}/employment_{i,t}}\right)$	$ln\left(\frac{payments_{i,t}}{employment_{i,t}}\right)$
$TH_{i,t}$	-0.09^{c}	4.29e-3
	(0.05)	(0.17)
$\mathbb{1}_{e,i,t}^{CEO/CFO} \times TH_{i,t}$	0.21^{a}	
	(0.03)	
$\mathbb{1}_{e,i,t}^{CEO/CFO,\ after\text{-}tax} \times TH_{i,t}$	0.05	
	(0.08)	
$ln(assets_{i,t})$	0.06	-0.11^{a}
	(0.07)	(0.03)
$ln(sales_{i,t})$	0.05	0.20^{a}
	(0.08)	(0.04)
$ln(pre\text{-}tax\ income_{i,t})$	0.11^{a}	-4.68e-3
	(0.02)	(5.83e-3)
$Subsidiaries\ in\ non\text{-}OFCs_{i,t}$	3.64e-06	-1.11e-4^{c}
	(3.06e-4)	(5.67e-5)
$age_{e,t}$	-0.01	
	(0.01)	
$experience_{e,i,t}$	2.80e-3	
	(2.01e-3)	
$CEO_{e,i,t}$	0.43^{a}	
	(0.04)	
$CFO_{e,i,t}$	0.22^{a}	
	(0.04)	
Executive FEs	Yes	No
Firm FEs	Yes	Yes
Year FEs	Yes	Yes
R^2	0.85	0.95
No. of obs.	17,700	5,073

Notes: Regression results obtained after replacing in column (1) the dependent variable from equation (4) with the executive-to-average-worker pay ratio and in column (2) the dependent variable from equation (5) with the average wage. Standard errors, in parentheses, are clustered at the firm level. $^{d}p < 0.15$, $^{c}p < 0.10$, $^{b}p < 0.05$, $^{a}p < 0.01$. See section 4 for more details.

TABLE AT6 – Sensitivity test: imputed labor costs

Dependent variable	$ln\left(\widetilde{payments}_{i,t}\right)$
$TH_{i,t}$	-0.03^{c}
	(0.02)
$ln(assets_{i,t})$	0.29^{a}
	(0.04)
$ln(sales_{i,t})$	0.67^{a}
	(0.05)
$ln(\textit{pre-tax income}_{i,t})$	-0.06^{a}
	(7.43e-3)
$\textit{Subsidiaries in non-OFCs}_{i,t}$	2.96e-04^{b}
	(1.54e-4)
Firm FEs	Yes
Year FEs	Yes
R^2	0.94
No. of obs.	25,458

Notes: Regression results of equation (5) obtained after imputing missing values of the dependent variable. Standard errors, in parentheses, are clustered at the firm level. $^{d}p < 0.15$, $^{c}p < 0.10$, $^{b}p < 0.05$, $^{a}p < 0.01$. See section 4 for more details.

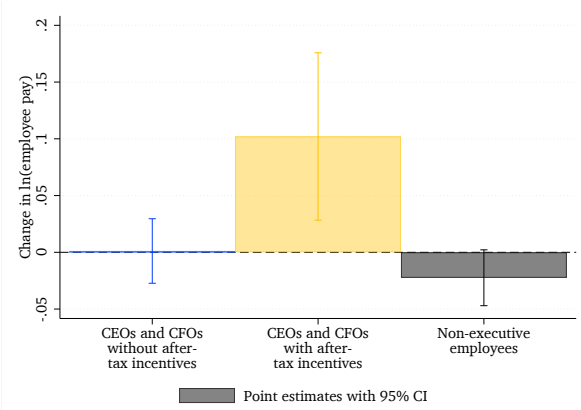
TABLE AT7 – Sensitivity test: adjusting for relocation effects

Column	(1)	(2)
Dependent variable	$ln(payments_{i,t})$	$ln(payments_{i,t})$
$TH_{i,t}$	-0.04^{b}	-0.03^{c}
	(0.02)	(0.02)
$ln(assets_{i,t})$	0.20^{a}	0.22^{a}
	(0.03)	(0.04)
$ln(sales_{i,t})$	0.74^{a}	0.71^{a}
	(0.04)	(0.05)
$ln(\textit{pre-tax income}_{i,t})$	-0.03^{a}	-0.03^{a}
	(6.66e-3)	(7.16e-3)
$\textit{Subsidiaries in non-OFCs}_{i,t}$	2.38e-5	1.64e-5
	(6.43e-5)	(6.44e-5)
$ln(employment_{i,t})$	0.49^{a}	0.49^{a}
	(0.04)	(0.04)
$average\ cost\ (ILO)_{i,t}$	-2.02e-5	
	(2.32e-5)	
$average\ cost\ (World\ Bank)_{i,t}$		6.25e-7
		(4.57e-7)
Firm FEs	Yes	Yes
Year FEs	Yes	Yes
R^2	0.99	0.99
No. of obs.	4,798	5,059

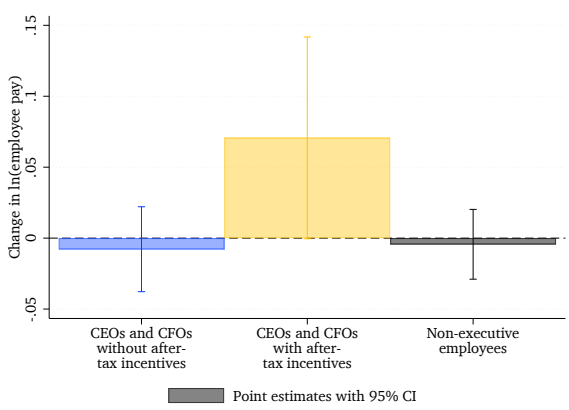
Notes: Regression results of equation (5) obtained after controlling for disparities in labor costs across countries. Standard errors, in parentheses, are clustered at the firm level. $^{d}p < 0.15$, $^{c}p < 0.10$, $^{b}p < 0.05$, $^{a}p < 0.01$. See section 4 for more details.

FIGURE AF2 – Sensitivity test: alternative tax haven classifications

(a) List of Hines and Rice (1994)



(b) Exclusion of six tax havens



Notes: Regression results for $\hat{\alpha} + \hat{\beta}$ (equation (4), first bar), $\hat{\alpha} + \hat{\beta} + \hat{\gamma}$ (equation (4), second bar), and $\hat{\zeta}$ (equation (5), third bar) when the OFC classification is modified. The full results are given in Appendix tables AT8 and AT9. See section 4 for more details.

TABLE AT8 – Sensitivity test: list of Hines and Rice (1994)

Column	(1)	(2)
Dependent variable	$ln(compensation_{e,i,t})$	$ln(payments_{i,t})$
$TH_{i,t}$	-0.02^{d}	-0.02^{d}
	(0.01)	(0.02)
$\mathbb{1}_{e,i,t}^{CEO/CFO} \times TH_{i,t}$	0.03	
	(0.02)	
$\mathbb{1}_{e,i,t}^{CEO/CFO,\ after\text{-}tax} \times TH_{i,t}$	0.10^{b}	
	(0.05)	
$ln(assets_{i,t})$	0.12^{a}	0.20^{a}
	(0.02)	(0.04)
$ln(sales_{i,t})$	0.08^{a}	0.74^{a}
	(0.03)	(0.05)
$ln(pre\text{-}tax\ income_{i,t})$	0.11^{a}	-0.03^{a}
	(6.59e-3)	(7.28e-3)
$Subsidiaries\ in\ non\text{-}OFCs_{i,t}$	2.31e-4^{c}	6.55e-5
	(1.20e-4)	(5.39e-5)
$age_{e,t}$	1.93e-3	
	(8.03e-3)	
$experience_{e,i,t}$	2.42e-4	
	(9.06e-4)	
$CEO_{e,i,t}$	0.43^{a}	
	(0.02)	
$CFO_{e,i,t}$	0.20^{a}	
	(0.02)	
Executive FEs	Yes	No
Firm FEs	Yes	Yes
Year FEs	Yes	Yes
R^2	0.83	0.99
No. of obs.	101,232	5,248

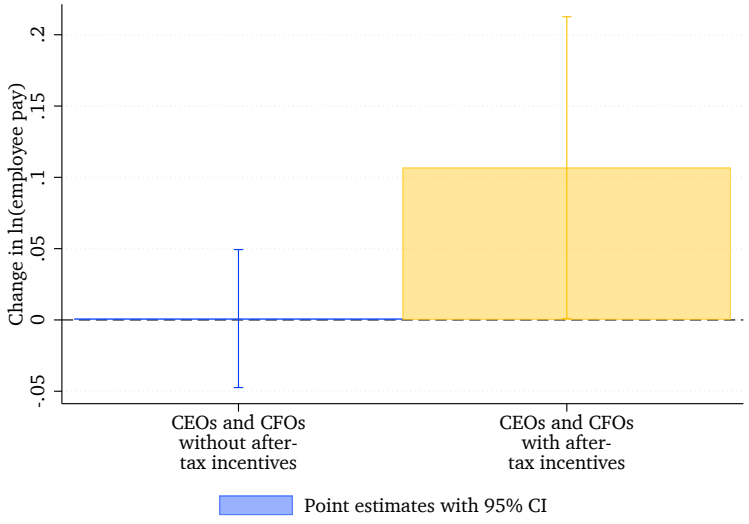
Notes: Regression results of equations (4) and (5) when the OFC classification is modified. Standard errors, in parentheses, are clustered at the firm level. $^{d}p < 0.15$, $^{c}p < 0.10$, $^{b}p < 0.05$, $^{a}p < 0.01$. See section 4 for more details.

TABLE AT9 – Sensitivity test: exclusion of six tax havens

Column	(1)	(2)
Dependent variable	$ln(compensation_{e,i,t})$	$ln(payments_{i,t})$
$TH_{i,t}$	-0.01	-4.35e-3
	(0.02)	(1.85e-2)
$\mathbb{1}_{e,i,t}^{CEO/CFO} \times TH_{i,t}$	4.76e-3	
	(0.02)	
$\mathbb{1}_{e,i,t}^{CEO/CFO,\ after\text{-}tax} \times TH_{i,t}$	0.08[c]	
	(0.04)	
$ln(assets_{i,t})$	0.12[a]	0.20[a]
	(0.02)	(0.04)
$ln(sales_{i,t})$	0.08[a]	0.74[a]
	(0.03)	(0.05)
$ln(pre\text{-}tax\ income_{i,t})$	0.11[a]	-0.03[a]
	(6.59e-3)	(7.25e-3)
$Subsidiaries\ in\ non\text{-}OFCs_{i,t}$	1.94e-4[d]	4.58e-5
	(1.20e-4)	(5.08e-5)
$age_{e,t}$	1.88e-3	
	(8.01e-3)	
$experience_{e,i,t}$	5.63e-4	
	(8.33e-4)	
$CEO_{e,i,t}$	0.44[a]	
	(0.02)	
$CFO_{e,i,t}$	0.22[a]	
	(0.02)	
Executive FEs	Yes	No
Firm FEs	Yes	Yes
Year FEs	Yes	Yes
R^2	0.83	0.99
No. of obs.	101,232	5,248

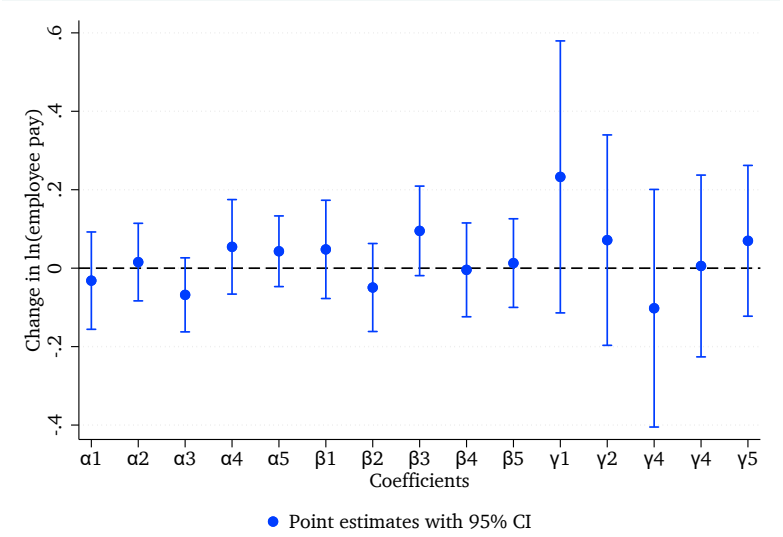
Notes: Regression results of equations (4) and (5) when the OFC classification is modified. Standard errors, in parentheses, are clustered at the firm level. [d] $p < 0.15$, [c] $p < 0.10$, [b] $p < 0.05$, [a] $p < 0.01$. See section 4 for more details.

FIGURE AF3 – Sensitivity test: endogenous executive mobility



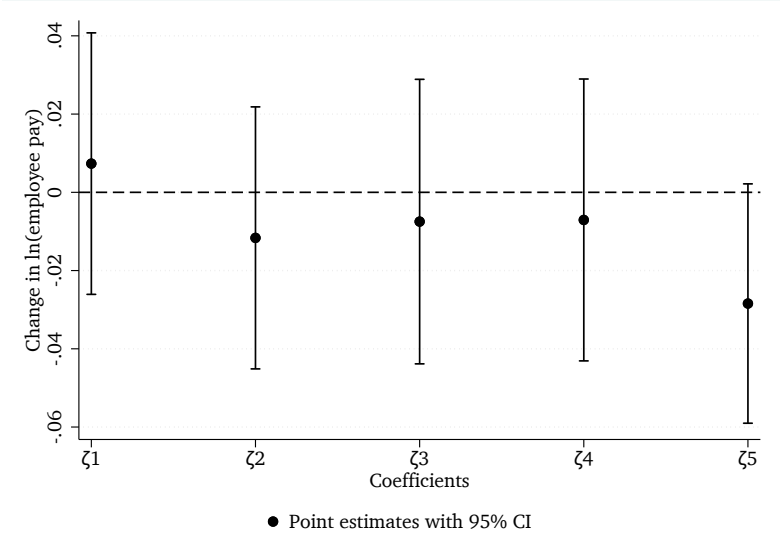
Notes: Regression results for equation (4) when only executives with at least a five-year experience within the company are retained. The first bar depicts $\hat{\alpha}+\hat{\beta}$, while the second bar depicts $\hat{\alpha}+\hat{\beta}+\hat{\gamma}$. Standard errors are clustered at the firm level. See section 4 for more details.

FIGURE AF4 – Sensitivity test: pre-trends in equation (6)



Notes: Regression results for $\hat{\alpha}_k$, $\hat{\beta}_k$, and $\hat{\gamma}_k$, $k \in \{1, ..., 5\}$ in equation (6). Standard errors are clustered at the firm level. See section 4 for more details.

FIGURE AF5 – Sensitivity test: pre-trends in equation (7)



Notes: Regression results for $\hat{\zeta}_k, k \in \{1, ..., 5\}$ in equation (7). Standard errors are clustered at the firm level. See section 4 for more details.

TABLE AT10 – The magnifying effect of intangible assets

Column	(1)	(2)
Dependent variable	$ln(compensation_{e,i,t})$	$ln(payments_{i,t})$
$TH_{i,t}$	-0.01	-0.01
	(0.02)	(0.02)
$TH_{i,t} \times INTANGIBLES_{i,t}$	-0.14^{b}	-0.17^{b}
	(0.06)	(0.08)
$\mathbb{1}_{e,i,t}^{CEO/CFO} \times TH_{i,t}$	0.01	
	(0.02)	
$\mathbb{1}_{e,i,t}^{CEO/CFO} \times TH_{i,t} \times INTANGIBLES_{i,t}$	0.12^{c}	
	(0.07)	
$\mathbb{1}_{e,i,t}^{CEO/CFO,\ after\text{-}tax} \times TH_{i,t}$	0.03	
	(0.06)	
$\mathbb{1}_{e,i,t}^{CEO/CFO,\ after\text{-}tax} \times TH_{i,t} \times INTANGIBLES_{i,t}$	0.25	
	(0.22)	
$ln(assets_{i,t})$	0.11^{a}	0.21^{a}
	(0.03)	(0.04)
$ln(sales_{i,t})$	0.09^{a}	0.74^{a}
	(0.03)	(0.05)
$ln(\textit{pre-tax income}_{i,t})$	0.10^{a}	-0.03^{a}
	(6.88e-3)	(7.41e-3)
$\textit{Subsidiaries in non-OFCs}_{i,t}$	2.45e-4^{b}	8.05e-5
	(1.16e-4)	(5.67e-5)
$age_{e,t}$	3.97e-3	
	(7.83e-3)	
$experience_{e,i,t}$	1.38e-3^{c}	
	(7.81e-4)	
$CEO_{e,i,t}$	0.44^{a}	
	(0.02)	
$CFO_{e,i,t}$	0.21^{a}	
	(0.02)	
Executive FEs	Yes	No
Firm FEs	Yes	Yes
Year FEs	Yes	Yes
R^2	0.83	0.99
No. of obs.	94,793	4,869

Notes: Regression results of equations (4) and (5) when interacting the treatment variable with the firm-level intensity in intangible assets. Standard errors, in parentheses, are clustered at the firm level. $^{d}p < 0.15$, $^{c}p < 0.10$, $^{b}p < 0.05$, $^{a}p < 0.01$. See section 4 for more details.