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Shift or Share? Profit Shifting and Workers' Profit-Sharing

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Abstract

This paper quantifies how profit shifting erodes workers' earnings by reducing profit-sharing payouts in French multinational firms. We leverage newly available administrative microdata on the global activity of multinational firms linked to employer-employee data to build a credible counterfactual of profits and profit-sharing absent profit shifting. We estimate that large French multinationals shift 19% of their foreign profits annually to low-tax jurisdictions, resulting in €10.3 billion shifted out of France and €3.7 billion in lost tax revenues. We show that profit shifting reduces annual employees' earnings by 2.6%. Low-income workers are disproportionately affected. The bottom 10% of workers lose 3.2% of wages, compared to 2.3% for top 10% earners. Changing the profit-sharing formula to account for global profitability, rather than subsidiary-level profitability, would increase wages by 4.1% for workers in profit-shifting subsidiaries.

JEL codes: F23, H25, H26
Keywords: Multinational Firms, Profit shifting, Tax revenue, Incidence

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1 Introduction

In a context of declining labor shares and rising inequalities, a debate has emerged between pre-distribution and redistribution policies. Pre-distribution policies, aiming to affect the distribution of pre-tax income before any transfer, seem to prove more effective in redistributing income and lowering inequality (Bozio et al., 2024). In this respect, widely used profit-sharing policies,[1] which incentivize or require firms to distribute a portion of their profits to their employees, have proven successful in redistributing income to workers without incurring any significant distortive effects (Nimier-David et al., 2023). However, because profit-sharing is typically tied to the level of profits reported within a given jurisdiction, employees of multinational enterprises (MNEs) are likely to receive less due to the ability of firms to transfer part of their profits away from high-tax countries to low-tax jurisdictions (Tørsløv et al., 2023). In France, several firms are under investigation for potential fraud on their profit-sharing policies due to profit shifting.[2]

Assessing the effect of profit shifting on profit-sharing compensation is challenging. First, the amounts of profits distributed through profit-sharing schemes are endogenous decisions that might depend on the ability of firms to shift profits abroad. A second empirical challenge lies in the difficulty of constructing a credible counterfactual of reported profits in the absence of tax avoidance, which is not directly observable. In this paper, we address both challenges. We first take advantage of the French institutional setting, where firms with more than 50 employees are legally required to distribute a fixed share of their profits to their workers. We then estimate the magnitude of profit shifting and build a credible firm-level counterfactual profit-sharing amount absent profit shifting by leveraging unique data on global activity for French multinational firms, combined with comprehensive matched employer-employee data.

Our analysis is only possible because of a newly assembled dataset. Our main source of data comes from Country-by-Country Reports (CbCR), which provide detailed information on worldwide activities of MNEs with global revenue exceeding €750 million.

[1] As stated by Nimier-David et al. (2023), tax incentives for firms to share profits exist in Canada and the United States. Profit-sharing is also mandatory in France, Mexico, Peru, Ecuador, and Brazil. In Europe, 39% of firms included in the European Company Survey (representative of all European firms with more than 10 employees and excluding the agricultural sector) state that they have implemented a profit-sharing scheme, 19% that this scheme includes more than 60% of their employees (Houten and Russo, 2020). France is currently extending its mandatory profit-sharing policy to firms with fewer than 50 employees (Guadalupe et al., 2023).

[2] In 2021, a complaint against General Electrics was logded by unions for "fraud against the right to participation [in profits] of employees", after it was accused of transferring 555 million euros ($590 million) of profits from France to Switzerland and Delaware (see Dissent Voice, Mediapart and Le Monde, the investigation by the National Financial Prosecutors' Office is still on-going.) Similarly, Lactalis, a leader in dairy products currently under investigation for tax fraud, is estimated to have deprived each employee of between 17,000 and 35,000 euros in profit-sharing over 17 years (see Collectif Justice, Le Figaro, Lactalis was charged by the National Financial Prosecutors' Office to a fine of 475 million euros, although the investigation regarding employee profit-sharing is still ongoing.)

MNEs report their profits, revenues, assets, and employees in each country where they have a subsidiary. This exhaustive country-by-country breakdown, including all tax havens, provides extremely valuable insights for investigating how MNEs allocate their profits and real activity across the world, establishing CbCR data as the most comprehensive data source to study profit shifting. Other data sources, such as Orbis or administrative ownership information, are often limited to either countries with strict reporting requirements, de facto excluding tax havens and the United States, or to direct ownership, which also disregards a significant number of subsidiaries for the largest and most complex firms (Francois and Vicard, 2025). To the best of our knowledge, we are the first to combine these country-by-country reports with comprehensive administrative tax returns and matched employer-employee data to construct a unique dataset that tracks the allocation of reported profits and real economic activity across all subsidiaries of large French multinational firms. Our data also allows for a detailed mapping of workers and workers' earnings to these firms. Although our sample only includes the largest French companies, representing only 1% of firms in France, we emphasize that these firms are economically highly relevant, accounting for about one-third of total private sector activity and 20% of employment in France.

We first estimate profit shifting at the micro level. We develop a new methodology that builds on the formulary apportionment approach that realigns reported profits and economic activity (Guvenen et al., 2022). We propose a conceptual framework in which MNEs face convex costs of profit shifting and choose to shift their profits across jurisdictions to minimize their global tax burden. This framework provides a transparent methodology that integrates formulary apportionment with tax-incentive conditions derived from the model. In doing so, it enables us to go beyond profitability misalignment that may be unrelated to profit shifting[3] and focus on tax-motivated discrepancies between reported profits and real activity, as opposed to previous work focusing solely on misalignment. Specifically, we estimate each subsidiary's true pre-tax profits by allocating the MNE's global profits proportionally to the subsidiary's share of production costs — measured by payroll and tangible capital costs — while accounting for the tax incentives that MNEs face to reallocate profits across jurisdictions. Our approach makes no *a priori* assumptions about the destination of profit shifting and does not focus exclusively on tax havens.

We then build on our firm-level estimates of profit shifting to estimate the extent to which it affects profit-sharing received by workers in France. To estimate such effects, we exploit the existence of a profit-sharing scheme, which is mandatory in France for firms with more than 50 employees. Under this policy, firms must distribute a pre-

[3]For instance, a subsidiary may report high profits relative to its real activity due to genuine economic factors (e.g., market power or efficiency advantages) or temporary idiosyncratic shocks (e.g., gains from M&A activity, asset sales, or restructuring operations) rather than tax-motivated profit shifting. Our approach distinguishes between these legitimate sources of profitability differences and those driven by tax minimization strategies.

defined share of their "excess profits" to workers according to a legal formula based on subsidiary-level reported profits.[4] This policy is economically significant and affects 30% of private sector employees in France. The direct mechanical link between subsidiary-level reported profits and worker compensation allows us to precisely estimate how profit shifting reduces employee earnings in France. We compute counterfactual profit-sharing amounts that workers would have received absent profit shifting by applying the legal formula to our estimated counterfactual true profits. We then distribute these amounts to individual workers following observed firm-level allocation policies from detailed administrative data. We also acknowledge that in a counterfactual scenario without profit shifting, firms would likely adjust their activity, potentially affecting investment, profits, and employment. To account for these responses, we provide more conservative estimates of profit-sharing losses, incorporating different margins of adjustments that would affect real activities using elasticities drawn from the literature.

Our analysis yields two main findings. First, we estimate that large French multinationals shift €22 billion in profits annually, representing 19% of their foreign profits. More than half of shifted profits flow to five tax havens, namely Switzerland, Singapore, the Netherlands, Hong Kong, and Luxembourg. We find substantial profit shifting out of high-tax countries, with France being the most affected country in our sample. About €10.3 billion per year, or 18% of profits reported domestically, are shifted out of France. As a result, the 314 French MNEs in our sample are responsible for an annual loss of €3.7 billion in tax revenues in France,[5] representing 7% of total corporate tax revenues.[6] This is particularly relevant when compared to the estimated VAT fraud of €6–10 billion (DGFiP), especially given that the corporate income tax accounts for only 14% of total tax receipts in France, while VAT represents 27%. While all firms engage to some extent in profit shifting, we show that 48% of total shifted profits originate from the 15 largest firms in terms of global revenue, or the top 5% of French MNEs subject to CbCR.

Second, we find evidence of significant distributional effects on workers. Profit shifting reduces the annual profit-sharing amount received per employee by €919, equivalent to 2.6% of net wages for workers in shifting subsidiaries. Low-income workers are disproportionately affected relative to their wages: the loss amounts to 3.2% of net wages for the bottom decile, compared to 2.3% for the top decile. These estimates account

[4] Profit-sharing policies appear to mainly be based on subsidiary-level profitability and not global profitability, with the exception of the United States, where firms have some flexibility in how they define their policies.

[5] Our profit shifting estimate is a balance between profits shifted into France (€3.1 bn) and out (€13.3 bn). Firms shifting profits into France are taxed at a very low rate due to special regimes, hence profits shifted in generate a tax gain of only €70M annually. This explains why the ratio of shifted profits to tax revenue losses are not equal to the effective tax rate.

[6] Our estimates only cover a part of total profit shifting since our sample only includes the largest French MNEs and not, in particular, US firms, which may engage in more aggressive tax avoidance (Tørsløv et al., 2023).

for the mechanical effect of profit shifting on reported profitability. We also consider a more sophisticated framework that accounts for potential behavioral responses by firms in response to eliminating profit shifting opportunities, following the investment semi-elasticities with regard to effective tax rate estimated by Suárez Serrato (2018) and tax incidence on wages estimated by Suárez Serrato and Zidar (2023). Even under this conservative scenario, we still find a negative effect of profit shifting on the amount distributed to employees, with a loss of 1.0% of net wages, equivalent to €357 per full-time worker annually. Finally, we show that changing the profit-sharing formula to account for global rather than subsidiary-level profitability would increase net wages of multinational employees by 1.9% overall, and by 4.1% for workers in subsidiaries engaged in outward profit shifting.

Our paper also documents the extent of double-counting in reported profits in CbCR data and its consequences on profit shifting estimation. Due to unclear guidelines at the beginning of its implementation, CbCR data suffer from a critical flaw: the inclusion of intra-group dividends in profit amounts. This double-counting of intra-group dividends artificially inflates profits in both source and destination countries. We address this issue by developing a methodology to correct the profit amounts by relating CbCR data to consolidated financial statements from Orbis that disregard intra-group activity and then correct entity-level profits based on observed profitability and effective tax rates. Our analysis reveals that on average 15% of profits reported in CbCR are double-counted, representing up to 22% of profits in some years. Failing to account for intra-group dividends creates two opposing biases: it inflates tax haven profits, leading to upward bias in profit shifting estimates (Blouin and Robinson, 2023), while simultaneously inflating reported profits in headquarter countries — a high-tax jurisdiction in our study — potentially creating a downward bias. Our paper is the first to properly address the issue of double-counting in CbCR data. Without the correction of intra-group dividends, profit shifting flows are overstated in some tax havens and understated in France, which does not affect the total amount of estimated profit shifting, but the allocation of shifted profits.

Related Literature. First, our paper contributes to the emerging literature on the consequences of profit shifting, which affects the measurement of key economic outcomes like GDP or productivity (Guvenen et al., 2022; Bricongne et al., 2023) and impacts income inequalities. The literature suggests ambiguous effects. On one hand, by reducing tax payments and thus capital costs, profit shifting allows firms to expand investment and employment, leading to higher wages (Souillard, 2022), particularly for high-income earners (Alstadsæter et al., 2025). On the other hand, profit shifting increases opacity around firms' true profitability, enabling them to reduce labor costs in high-tax countries (Lopez Forero and Michallet, 2024), while inflating wages in low-tax countries to substantiate high levels of profits (De Simone and Olbert, 2022; Gschoss-

mann and Pfrang, 2024). We complement these studies by estimating the sign and magnitude of the effect of profit shifting on worker compensation through the specific channel of profit-sharing. Profit-sharing policies, which aim at distributing a share of after-tax profits to workers, are widespread, existing in virtually all European countries, the US, Canada, and Mexico, among others. To our knowledge, this paper is the first to examine the detrimental effect of profit shifting on the amounts of profits distributed to workers. We show that profit shifting has important distributional effects as it substantially reduces the amount of profit-sharing distributed to workers, particularly employees with low wages.

Second, we develop and implement a new robust method to estimate profit shifting using microdata, combining a formulary apportionment method previously used in the literature (Guvenen et al., 2022) with a set of conditions derived from our theoretical model. Our work builds on the profit shifting literature, particularly micro estimates focusing on tax incentives (see e.g. Huizinga and Laeven 2008; Johannesen et al. 2020; Heckemeyer and Overesch 2017 for a literature review). Along the formulary apportionment approach, we compare the profitability of subsidiaries to the overall profitability of the MNEs they belong to, based on the idea that, absent profit shifting, a subsidiary's share in global MNE profits should equal the subsidiary's share in global MNE production costs. We refine this methodology by adding a set of tax conditions derived from our model and implemented with effective tax rates computed from our data. This allows us to go beyond profitability misalignment that may be unrelated to profit shifting and produce estimates that more accurately reflect actual tax incentives. Our paper also offers a finer analysis of the concentration of profit shifting, compared to other studies which focus on larger sets of top firms (Davies et al., 2018; Wier and Erasmus, 2022; Clifford et al., 2025).

Third, while some recent papers use CbCR data (Bratta et al., 2021; Fuest et al., 2022, 2025; Boukal et al., 2024), the treatment of double-counted profits has still not been addressed properly. Our approach allows to provide a roadmap for researchers using this data source to correct CbCR from such double-counting (Blouin and Robinson, 2023).

The paper is organized as follows. Section 2 presents the institutional framework of the profit-sharing policy. Section 3 describes the data. Section 4 provides descriptive evidence of profit shifting and multinationals' profit-sharing behavior. Section 5 proposes a conceptual framework from which we derive the methodology to estimate profit shifting. Section 6 presents the results of our estimations. Section 7 examines the distributional effects on workers. Finally, Section 8 concludes.

2 Mandatory Profit-Sharing in France

Profit-sharing enables workers to benefit from the investments and growth of their companies without requiring equity ownership or increasing fixed labor costs. Under such schemes, firms distribute a portion of their annual profits to their workforce, thereby creating a direct link between corporate profitability and labor compensation. Whether in the form of incentives or legal obligations, these policies are widespread across the world. Data from the European Company Survey indicates that 39% of private firms in Europe offered some profit-sharing mechanisms in 2019 (Houten and Russo, 2020).[7] . In Mexico, firms have to distribute 10% of their taxable income to eligible employees through PTU - Participación de los Trabajadores en las Utilidades (see Europortage). In Germany, the Netherlands, and the United Kingdom, more than 20% of firms share a part of their profits with their employees.[8] Outside Europe, Canada, the United States, Peru, Ecuador and Brazil also implement similar schemes.[9] Additionally, anecdotal evidence shows that it can be used with discretion by some firms such as Delta, United and American Airlines, distributing $2.7 billion to their employees in 2023 (Delta Airlines, 2024).

France was one of the first countries to introduce a mandatory profit-sharing policy in the 1960s to ensure that employees shared the benefits of the high levels of investment and growth of the period. Under this policy, firms with more than 50 employees[10] must distribute a share of their profits to their workers every year.[11] The amount of profits that must be shared among workers is set by the following legal formula computed at the subsidiary level:

$$\text{Profit-sharing} = \frac{1}{2} \times \frac{\text{Wage bill}}{\text{Value added}} \times \Big(\text{Net income} - 5\% \text{ Book equity}\Big) \tag{1}$$

It corresponds to half of the labor share (wage bill over value-added) of the "excess profits" (after-tax profits after deducting 5% of book equity).[12] Therefore, only firms that report positive "excess profits" have to distribute profit-sharing.

Table 1 shows the main statistics of profit-sharing in France. While there are about 3 million firms in France, only 1% of these firms have more than 50 employees and fall under the mandatory profit-sharing policy. However, these firms account for 60% of

[7] The European Company Survey is representative of European firms but excludes the agricultural sector and establishments with fewer than 10 employees.

[8] Source: French Budget Authority.

[9] See International Tax Review and Ligthart et al. (2022); Bryson et al. (2012); Makridis (2025) for a review.

[10] The threshold was originally at 100 employees, and lowered to 50 in 1997. It is applied at the subsidiary level, not at the multinational group level.

[11] We find evidence of significant bunching around this 50 employees threshold, as evidenced in Figure C.1, showing how a 2019 reform modifying the threshold affected the 50 employees bunching.

[12] We do find evidence of a small bunching of taxable income at the 5% of equity threshold (see Figure C.2).

Table 1: Main Figures of Profit-Sharing in France

	Firms	Employees	Revenue	Profit-sharing		
				Amount	Share in profits	Share in wages
	(th)	(th)	(€bn)	(€ per emp.)	(%)	(%)
All firms	3,006	14,645	4.8	628	5.0	2.1
$\geq$ 50 emp.	32	7,966	2.8	1,009	8.8	3.2
$\geq$ 50 emp. & Profit-sharing $>$ 0	14	4,175	1.7	1,931	7.5	5.8

Note: The table includes all firms located in France that filed a corporate income tax return and have at least one employee. The figures are compiled from DADS and BIC-IS data, and correspond to annual averages over the 2016-2022 period. Profits correspond to pre-tax book profits, wages to net wages, and the number of employees to the number of full-time equivalent employees. The last line includes all firms with more than 50 employees that distribute a strictly positive amount of profit sharing. Some firms below the 50-employee threshold do distribute some profit-sharing, but they are marginal.

total private-sector employment. Out of these 32,000 firms, only around 14,000 firms distribute part of their profits to their employees, as they generate "excess profits".[13] Through this mechanism, they distribute an average of 7.5% of their pre-tax profits. As a result, one in three private-sector employee receives a positive amount of profit-sharing, which represents €1,931 on average per year, or 5.8% of their net wages.[14]

Importantly for our study, the amount of mandatory profit-sharing is mechanically increasing with after-tax profits,[15] as shown empirically by Figure 1. By shifting profits out of France, firms can alter their true profitability, thus directly affecting the amounts that MNEs distribute to their employees in France through profit-sharing mechanisms. In the extreme case where a firm shifts all its profits out of France to a low-tax jurisdiction, employees would receive no benefit from profit-sharing at all.

Profit-sharing is then distributed to employees, subject to a cap at approximately €30,000 per capita.[16] Firms decide how to allocate it among their employees, from equal shares to amounts proportional to wages. Using a survey on profit-sharing amounts received at the employee level,[17] we uncover the most common allocation rule within firms. We find that, on average, firms adopt a distribution in which 30% of profit-sharing is distributed equally, and 70% is distributed according to the worker's share in gross wages paid by the firm.[18] We provide more details on our methodology in Appendix C.1. Highly profitable firms can distribute up to €4,000 annually per employee in the top profit-to-wage decile on average as we show on Figure 1.

[13] A few firms with fewer than 50 employees also opt for the profit-sharing policy even though it is not mandatory for them.

[14] Profit-sharing being exempt from most social security contributions, we compare it to net wages. However, firms have to pay 20% "forfait social" of the amount distributed, and employees have to pay 9.70% in CSG and CRDS on the amounts received.

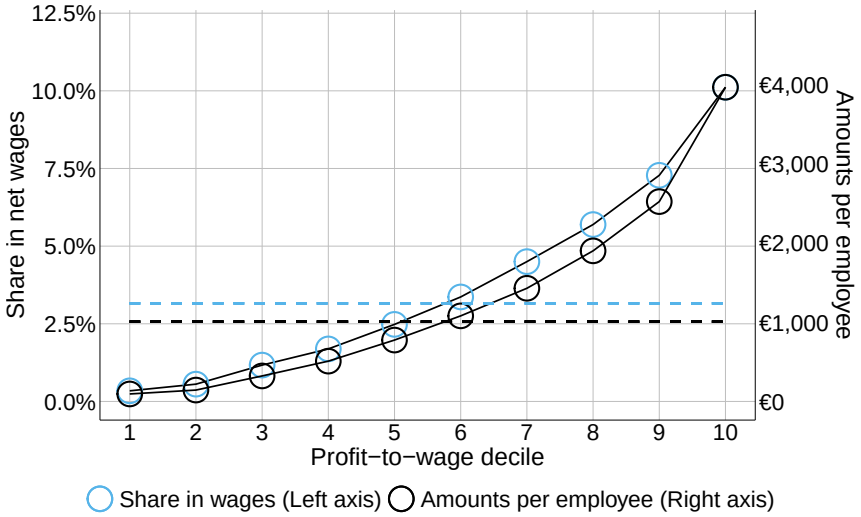
[15] $\frac{\partial \text{Profit-sharing}}{\partial \pi} = \frac{1}{2} W \frac{(\text{VA} - \pi + 5\% B)}{VA^2} \geq 0$ since $C = \text{VA} - \pi \geq 0$, with π equal to net profits, W equal to the wage bill, VA equal to the value added that we consider being equal to $\pi + C$ with C a value independent from π, and B equal to the book equity of the subsidiary.

[16] This cap is set at 75% of the *Plafond de Sécurité Sociale* that is adjusted annually in line with inflation.

[17] ECMOSS, "Enquêtes sur le coût de la main d'œuvre et la structure des salaires".

[18] These orders of magnitude are coherent with a report from the French Social Security Contribution Offices that finds that 37% of firms distribute solely on the share of each employee in total payroll, and 54% of firms adopt a mixed regime (DARES).

Figure 1: Profit-Sharing and Profitability



Note: This graph shows the share of profit-sharing in net wages depending on the level of profitability of the firm, as estimated by the profit-to-wage ratio. It includes all firms with more than 50 employees. The dotted lines are the average share of profit-sharing in net wages and the average amount of profit-sharing per employee.

3 Data

3.1 Country-by-Country Reporting

We estimate profit shifting of French multinational enterprises at the firm level using the newly available Country-by-Country Reporting (CbCR) data. CbCR was implemented in 2016 as part of Action 13 of the OECD/G20 BEPS Project to give tax administrations the information needed to address tax base erosion and profit shifting (BEPS) related risks. Reporting is mandatory for multinational companies with global consolidated revenues of more than €750 million (or equivalent in local currency) in the previous year. Currently, reporting does not entail public disclosure, and CbCRs are only submitted to the respective tax authority and made available to researchers on a confidential basis.[19]

Country-by-country reports are filled out by multinational firms to provide information on their activities in each tax jurisdiction in which they operate. Data is at the MNE-country-year level and includes information on related party revenues,[20] unrelated party revenues,[21] total revenues,[22] profits before income taxes, income tax paid,

[19] Australia and the European Union have passed laws that will make some of the CbCR information publicly available at the firm-level.

[20] Revenue generated from transactions between subsidiaries of the multinational group.

[21] Revenue generated from trade with extra-group firms.

[22] Related plus unrelated party revenues.

income tax accrued, stated capital, accumulated earnings, number of employees, and tangible assets other than cash and cash equivalents. MNEs must also provide qualitative information on the business activities performed in each country, along with the list of constituent entities present.

The availability of exhaustive information on the activity of multinational firms sets Country-by-Country Reporting data as the most comprehensive source of data for research on corporate tax avoidance. Using German country-by-country reporting data, Fuest et al. (2022) show that Orbis, the main alternative source of data for profit shifting research, covers only 26% of German MNEs affiliates, 50% of profits reported in non-havens, 37% of profits reported in European tax havens, and no information on non-European tax havens. The existence of CbCR data considerably advances our understanding of multinational firms' activity and allows for a deeper understanding of tax avoidance behavior, without suffering from the selection bias that Orbis introduces.

Our sample covers the universe of country-by-country reports submitted by French MNEs for the fiscal years 2016 to 2022. It covers 314 privately-owned French MNEs, collectively representing 63,000 subsidiaries spanning 219 countries.[23] Over 2016-2022, these firms generated a worldwide consolidated revenue of €2,140 billion each year on average, equivalent to the average of French GDP across these years (€2,246 billion).[24] They reported a total profit of approximately €174 billion each year on average, of which 65% is booked outside France. Table 2 presents the aggregated figures reported in the French CbCR dataset.

Table 2: Summary Statistics

Year	Nb of MNE	Nb of countries	Nb of subsidiaries (th)		Total revenues (bn€)		Total profits (bn€)		Nb of employees (th)	
			France	Abroad	France	Abroad	France	Abroad	France	Abroad
2016	203	208	24	30	776	1,075	52	91	2,671	4,623
2017	241	212	27	34	849	1,195	61	102	2,997	5,635
2018	243	212	30	36	843	1,273	55	108	2,930	5,998
2019	249	213	31	37	912	1,345	55	120	3,022	6,116
2020	250	214	31	37	829	1,204	26	67	2,948	5,868
2021	255	213	30	38	920	1,306	87	136	2,932	5,894
2022	221	211	26	36	949	1,506	75	180	2,657	5,745
2016-2022	314	219	28	35	868	1,272	59	115	2,880	5,697

Note: Profits are corrected for the double-counting of dividends. Except for the number of MNEs and countries, the last line displays the average across all years.

Although our dataset includes only the top 314 largest French MNEs, they account for a large share of economic activity in France. Table 3 shows the share of activity they capture relative to the 21,000 MNEs operating in the country (including foreign MNEs) and to the 3 million entities (including national groups and standalone businesses), using French tax return data (presented in Section 3.3). Our sample covers more than half of all multinational activity in France and accounts for about one-third of total

[23] We excluded 10 state-owned firms, and 29 firms with no activity in France.
[24] Source: INSEE National Accounts

private sector activity and 20% of total employment. These firms contribute to a large share of corporate tax revenue: they pay 26% of total corporate income tax levied in France, or 44% of the amount paid by multinational firms.

Table 3: Coverage of the French CbCR in Business Activities in France

	Subsidiaries		Revenues		Employees		Profits		CIT	
	(th)	% covered	(bn€)	% covered	(th)	% covered	(bn€)	% covered	(bn€)	% covered
CbCR	26	100	1,538	100	2,600	100	57	100	14	100
French MNEs	92	28	2,369	65	5,192	50	74	77	22	64
All MNEs	127	20	3,260	47	6,925	38	98	58	32	44
All firms	3,112	1	4,778	32	12,737	20	187	30	54	26

Note: The figures of this table are computed from French corporate tax return data (BIC). Profits do not include intra-group dividends. The % covered corresponds to the share that the French CbCR data cover among the activity of all MNEs in France and all non state-owned firms (including non-MNEs). Reported Corporate Income Taxes (CIT) are taxes paid and not taxes accrued. Revenues include both related and unrelated revenues. The number of subsidiaries differ from the number in Table 2 as this table reflects the output of the match between CbCR data and tax returns data.

3.2 Correction for Double-Counted Intra-Group Dividends

Due to the initial unclear guidance of the OECD between 2016 and 2020, intra-firm payments of dividends are not always eliminated from country-by-country reports. As an illustration, income from a subsidiary located in Germany that is distributed to a holding company in Switzerland could be counted both in the profit measures of the German and the Swiss subsidiaries. This double-counting of dividends can distort key indicators of profit shifting, artificially inflating reported profits, especially at the top of the ownership structure (ETBF, 2022), and leading to underestimations of effective tax rates, as dividends are generally not taxed under corporate income tax. Therefore, it is crucial to correct double-counting of equity income, which might be particularly salient for fiscal years prior to 2020 (Delpeuch et al., 2019; Horst and Curatolo, 2020; Blouin and Robinson, 2023).

We therefore develop a methodology to correct country-by-country reports from double-counting (see the Appendix A for further details on our cleaning procedures). First, we detect the inclusion of intra-group dividends in the report of an MNE by comparing CbCR data with global consolidated accounts[25] at the MNE-year level, either from the Orbis database or from hand-collected information found in companies' financial statements. We consider that an MNE includes intra-group dividends in CbCR when there is a good match on the amounts of global revenue, which is not supposed to be affected by double-counting, but higher global profits compared to consolidated accounts.

We then remove intra-group dividends from reported profits at the country level in order to match the global value of consolidated profits. Since the MNEs in our

[25] In consolidated accounts, the multinational is treated as a single entity, and all intra-group dividends are eliminated.

sample are headquartered in France, we systematically include the French subgroup as a recipient of intra-group dividends. Additional recipient countries are identified based on excessive profitability indicators, as detailed in Appendix A. We then reduce reported profits in these countries proportionally to their share in total profits.

We find that, on average, 14.9% of reported profits in CbCR correspond to intra-group dividends (see Table A.5 in the Appendix). In some years, the amount of double-counting reached 22.4% of total reported profits. We also observe a significant reduction in the amount of double-counting in 2022, which is explained by the clarification of OECD guidance after 2020. As expected, we correct profits mainly in France and in global financial centers and tax havens such as the Netherlands, Luxembourg, and Switzerland (see Figure A.1 in the Appendix). Given the magnitude of this phenomenon, this correction is a large improvement compared to existing studies which do not properly correct CbCR data from double-counting (Bratta et al., 2021; Fuest et al., 2022, 2025; Boukal et al., 2024).

3.3 Additional French Administrative Data

We first use other administrative sources to add information on labor costs at the MNE-country-year level, since CbCR only provides information on the number of employees. To do so, we match CbCR data with micro data on wages of subsidiaries located in France and abroad for all MNEs in our sample. For France, we use subsidiary-level tax return data (BIC-IS), and for other countries, we rely on the Outward Foreign Affiliates Statistics (OFATS) at the MNE-country-year level, to recover information on the total compensation to employees[26] paid by each MNE in each country. The details of our matching procedure are provided in Appendix B.2. In particular, thanks to the information that MNEs give on their affiliates (identification numbers and names), complemented with ownership data (LIFI), we were able to recover almost perfectly each subsidiary in France.

We also use our administrative firm-level data (BIC-IS) to recover information on profit-sharing and profitability, as well as on all the variables needed for the reconstruction of profit-sharing - total wage bill, value added, tax profits, and book equity (see Formula 1).

To recover the profit-sharing distribution method used by firms, we use data from ECMOSS, a survey on labor costs and wage structure, which gives us the amounts of profit-sharing distributed at the worker level for a subset of firms (see Appendix C.1). Finally, to distribute profit-sharing losses to employees, we use exhaustive administrative data at the employer-employee level (DADS), which gives us information on wages at the worker level.

[26] Including all social security contributions.

4 From Under-reported Profits to Under-shared Profits

Multinational companies are subject to very different effective tax rates (ETR) around the world (see Figure C.4 in the Appendix), and therefore face strong incentives to shift their profits to low-tax jurisdictions to reduce their global tax payments. Excessive amounts of profits in low-tax jurisdictions, disconnected from real economic activity, are suggestive evidence of profit shifting. To detect such patterns, we examine the allocation of reported profits between countries and compare it to the distribution of real economic activity. Then, to observe how low profitability in high-tax jurisdictions translates into workers' earnings, we compare profit-sharing amounts received by employees of multinational firms in France — which can engage in profit shifting — with those received by employees of purely domestic firms.

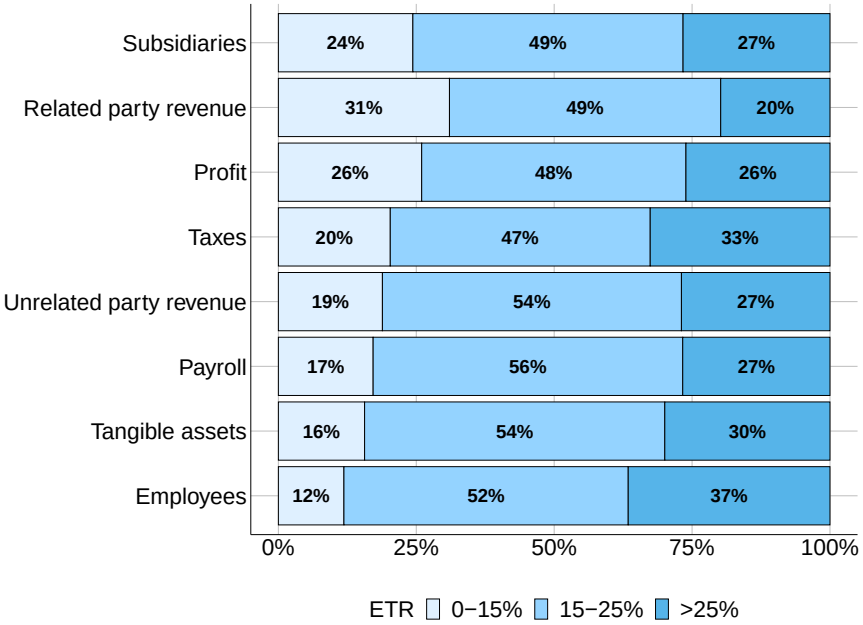
4.1 Misalignment Between Real and Reported Activities

We first examine discrepancies between the location of real activity and profits.Figure 2 shows the distribution of MNEs' foreign activities along the ETR they face in each country by their subgroup.[27] We observe a clear misalignment between profits and real activity in low-tax jurisdictions: 26% of foreign profits are reported in subgroups with ETR below 15% while only 12% of employees and 16% of tangible assets can be found there. We also observe a disproportionate share of related party revenue in low-taxed subgroups (31%), compared to revenue from external trade (19%), suggesting that intra-group transactions may serve as a vehicle to shift profits toward low-tax jurisdictions. We also confirm such misalignment in tax havens (Figure C.5 in the Appendix), despite recent papers pointing toward a reduction in profit shifting towards tax havens and a reallocation of real activity toward low-tax jurisdictions following the introduction of the CbCR requirement (De Simone and Olbert, 2022; Hugger, 2024; Joshi, 2020). Last, we show find that subsidiaries located in tax havens predominantly engage in activities associated with profit shifting, such as holding, financial, and insurance operations (Figure C.6 in the Appendix). These activities are often disconnected from real economic activities, as they require minimal physical presence and are highly mobile.

Consistent with Tørsløv et al. (2023), we find a gap in MNE profitability between tax havens and non-haven countries, measured as the ratio of profits to wages. Over the period, this profit-to-wage ratio fluctuates around 30% in non-haven countries, while it is more than twice as high, between 60 and 75%, in tax havens, as we show on Figure 3. This gap remains even after controlling for other production factors such as tangible assets and market conditions.

[27] In this paper, we use the term subgroup to refer to all subsidiaries of a given multinational enterprise that are located in a given country.

Figure 2: Distribution of Foreign Activity Along Effective Tax Rates



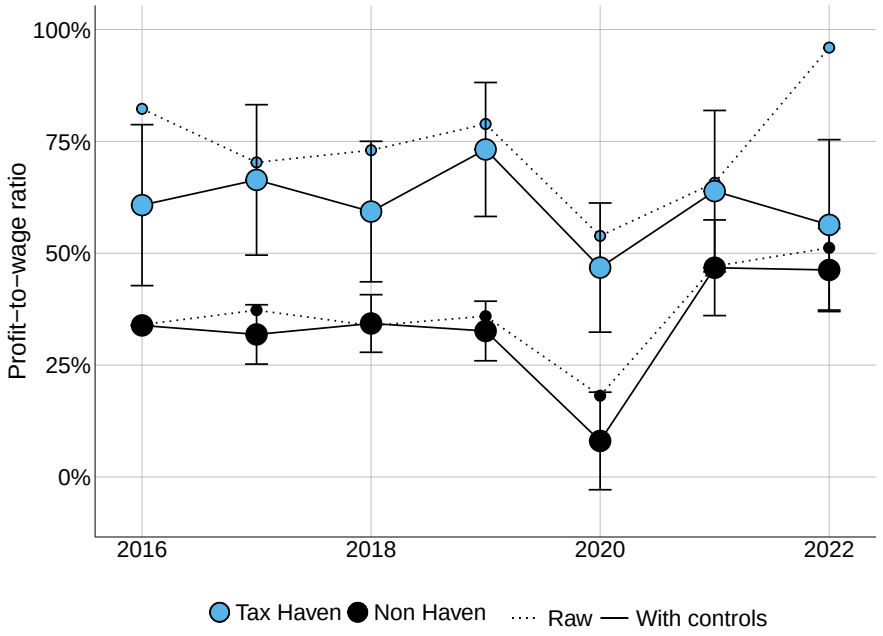
Note: This graph shows the distribution of foreign activity, grouping foreign subgroups by level of effective tax rates (ETR). ETRs are computed at the country-year level as the ratio between tax accrued and profit before tax, computed on profitable subgroups with positive taxes lower than profits. Then, we compute the share of each ETR group in the total of foreign activities, according to different indicators. *Lecture*: 31% of total foreign related party revenues are reported in subgroups located in countries with ETR below 15%.

4.2 Low Profit-Sharing in Multinational Firms

As multinational firms tend to report lower profitability in high-tax countries, compared to domestic firms (Bilicka, 2019), we study how this translates into the amounts of profit-sharing that these firms distribute. To that end, we first reproduce the analysis of Bilicka (2019) and compare the profit-to-assets ratio (measured using taxable income) of MNEs in our CbCR sample and domestic firms, including both domestic groups and standalone firms.[28] We show in Figure 4a that affiliates of multinational firms included in our CbCR sample in France are less profitable than domestic firms compared to their level of assets. We then compare the amounts of profits shared with employees depending on whether the firm is part of a multinational group or not. We find that the ratio of profit-sharing to assets is around twice as high in non-MNE compared to MNE affiliates (see Figure 4b). Finally, we validate these findings in a more comparable sample using propensity score matching, matching firms on assets and industry. We still find a lower profitability, which translates into lower amounts of profit-sharing. This suggests that MNEs' profit shifting behavior may harm workers

[28] We exclude the banking and insurance sector and the public sector, as is common in the literature.

Figure 3: Profit-to-Wage Ratio in Tax Havens and Non-Havens countries



Note: Figure 3 shows our coefficients of interest $\beta_0 + \beta_{1t}$ and $\beta_0 + \beta_{1t} + \beta_{2t}$ of the following model:

$$\frac{\rho_{ift}}{wl_{ift}} = \beta_0 + \beta_{1t} Time_t + \beta_{2t} Time_t \times Haven_i + \beta_3 ln(K_{ift}) + \beta_4 ln(L_{ift}) + \gamma X_{it} + \mu_f + \epsilon_{ift}$$

with ρ_{ift} the reported profit of MNE f in country i at time t, wl_{ift} is the wage bill of MNE f in country i at time t, $Time_t$ time dummy, $Haven_i$ haven dummy, K_{ift} the value of tangible assets, L_{ift} the payroll and X_{it} the log of population, indicator of the market conditions of the country and μ_f MNE fixed effects. We winsorize profit-to-wage ratios at the 5% level to remove outliers. Standard errors are clustered at the MNE level. We show the 95% confidence intervals.

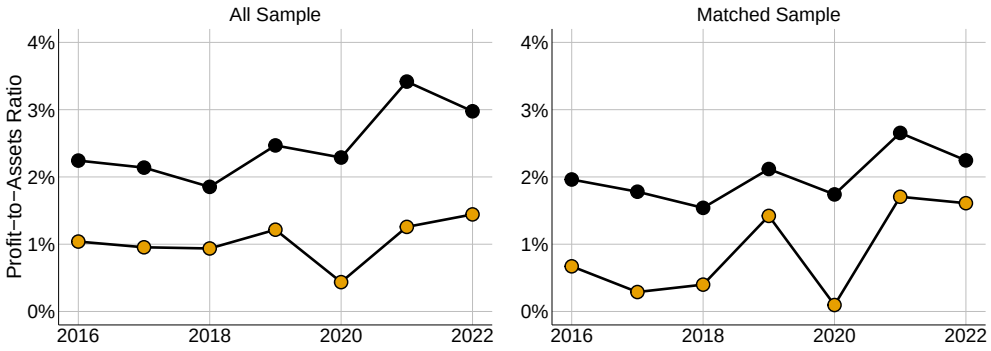
through lower distributed profits via profit-sharing schemes.

5 Conceptual Framework

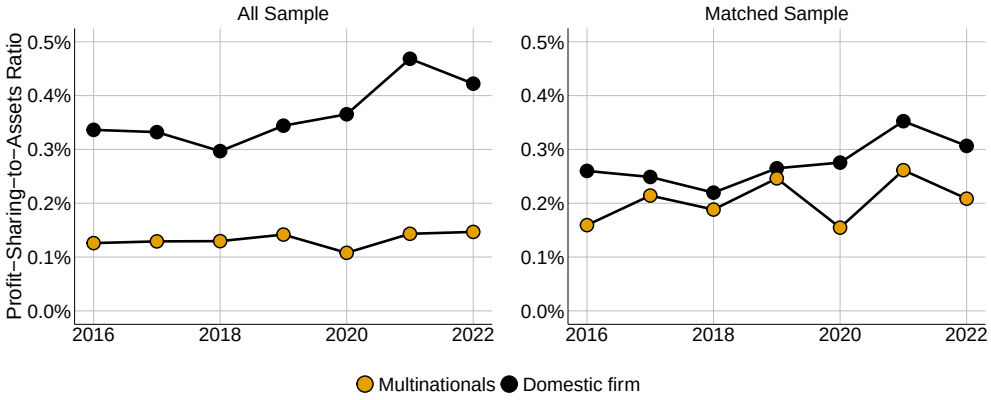
In this section, we present a theoretical framework that allows us to derive our estimation method of profit shifting. We combine insights from the traditional profit shifting literature and the formula apportionment literature to obtain a model-induced formula of profit shifting. We can then bring our model to the data in the next Section, where we show that our methodology yields transparent and robust estimates of profit shifting.

Figure 4: Profit-Sharing and Profits in MNEs and Domestic Firms

(a) Taxable Income-to-Assets Ratio



(b) Profit-Sharing-to-Assets Ratio



Note: These graphs shows the weighted average of the the profit-to-asset ratio (Figure 4a) and profit-sharing-to-assets ratio (Figure 4b) in subsidiaries of firms present in our CbCR sample ("Multinationals") and in domestic firms, which include domestic groups and standalone firms. Profit is here defined as taxable income, as included in the profit-sharing formula. The graphs entitled "All Sample" include all firms. To create the matched sample, we run the following logit regression to predict whether the firm has characteristics associated with being part of a MNE: $MNE_i = \alpha_i + \beta log(assets_{it}) + industry_i + year_t + \epsilon_{it}$. With MNE_i being a dummy equal to one if the affiliate is part of an MNE, $Assets_{it}$ the level of raw total assets of the firm, $industry_i$ NACE 2-digits industry codes fixed effects, and $year_t$ year fixed effects. We rely on a neighborhood matching strategy in which we find, for each MNE affiliate, the closest comparable non-MNE affiliate within a 0.1 radius in terms of the propensity score. Table C.1 displays non-weighted averages.

5.1 Model Setup

We start from the static framework of Huizinga et al. (2008) and Hines and Rice (1994), in which shifting intensifies with rate differentials but is constrained by convex avoidance costs.

Let n denote the number of jurisdictions, indexed by $i = 1, \ldots, n$. The multinational enterprise earns true pre-tax profit π_i in jurisdiction i and faces corporate income tax rate t_i. The MNE generates a true pre-tax profit in country i defined as $\pi_i =$

$R(y_i) - C(y_i)$, with y_i the quantity of goods produced, $R(y_i)$ the revenues generated and $C(y_i)$ the costs of production defined as $C(y_i) = w_i l_i + r_i k_i$, with $w_i l_i$ and $r_i k_i$ the costs of labor and capital respectively. It can also be written as $\pi_i = C(y_i)(\mu_i - 1)$ with $\mu_i = \dfrac{R(y_i)}{C(y_i)}$ the gross markup in country i. As Guvenen et al. (2022), we assume that the gross markup μ_i is constant for a given MNE in all the countries in which it operates, but do not assume markups to be constant across MNEs.

The true profits π_i made by the MNE in country i in a given year then represent the following share of the global pre-tax profits:

$$\frac{\pi_i}{\sum_j \pi_j} = \frac{C(y_i)(\mu_i - 1)}{\sum_j C(y_j)(\mu_j - 1)}$$

To minimize its global tax liability, the firm may reallocate a fraction $s_{ih} \in [0, 1]$ of π_i to jurisdiction h. We assume that profit shifting entails a convex cost in the shifted share, reflecting both compliance-engineering expenditures and increasing audit or reputational exposure as shifted shares grow. Specifically, the per-unit cost parameter $\gamma > 0$ governs the convex curvature in s_{ih}. In addition, firms face a sunk cost of establishing a shifting apparatus F (e.g., a specialized tax team); empirical evidence suggests that $F > 0$ since only sufficiently large firms engage in profit shifting (Davies et al., 2018). If the multinational firm does not engage in profit shifting, these costs will be zero.

We make no assumption regarding the origin or destination countries involved in profit shifting: the firm may shift profits generated in country i to any other country h, and likewise receive profits from any other country k. Consequently, after profit shifting, the firm reports in country i an amount of profit $\rho_i = \pi_i + z_i$, where z_i denotes the net profit shifting flow, defined as:

$$z_i = \underbrace{\sum_k s_{ki}\pi_k}_{\text{Inflows}} - \underbrace{\sum_h s_{ih}\pi_i}_{\text{Outflows}} \tag{2}$$

Here, the first term represents the sum of inbound flows towards country i, while the second term represents total outbound flows. If z_i is positive, the MNE shifts profits towards country i, conversely, if it is negative, it shifts profits out of the country.

Since profit shifting does not alter the global amount of profits of the MNE, we notice that $\sum_j \pi_j = \sum_j \rho_j$. Therefore, we can estimate the true pre-tax profits as the share of production costs multiplied by the global profits of the MNE:

$$\pi_i = \frac{C(y_i)}{\sum_j C(y_j)} \sum_j \rho_j = \frac{w_i l_i + r_i k_i}{\sum_j w_j l_j + r_j k_j} \sum_j \rho_j \tag{3}$$

Intangible assets are not included in our formula because they are less relevant to characterize local production, as there is evidence that the location of intangible assets can be instrumental in profit shifting (Karkinsky and Riedel, 2012; Dischinger et al., 2014; Hebous and Johannesen, 2021).

5.2 Multinational Profit Shifting Problem

We first express the MNE's after-tax objective to maximize the annual worldwide after-tax profit absent profit shifting:

$$\Pi^0 = \sum_{i=1}^{n} (1 - t_i)\, \pi_i$$

Allowing for profit reallocation across jurisdictions, the MNE maximizes its worldwide after-tax profit by solving:

$$\max_{\{s_{ih} \geq 0\}} \sum_{i=1}^{n} \Big[(1 - t_i)\, \rho_i - \sum_{h=1}^{n} \tfrac{\gamma}{2}\, s_{ih}^2\, \pi_i) \Big] - F\, \mathbb{1}_{\{\sum_{i,h} s_{ih} > 0\}} \tag{4}$$

Injecting Equation 2 in the MNE maximization program presented in equation 4 simplifies the problem to:

$$\max_{\{s_{ih} \geq 0\}} \sum_{i=1}^{n} \Big[(1 - t_i)\, \pi_i + \sum_{h=1}^{n} \Big(s_{ih}\, \pi_i\, (t_i - t_h) - \tfrac{\gamma}{2}\, s_{ih}^2\, \pi_i \Big) \Big] - F\, \mathbb{1}_{\{\sum_{i,h} s_{ih} > 0\}}$$

Here, $\mathbb{1}_{\{\sum_{i,h} s_{ih} > 0\}} = 1$ if the firm engages in any profit shifting, and zero otherwise. We assume γ is sufficiently large so that all interior solutions satisfy $\sum_h s_{ih}^* \leq 1$, avoiding corner-constraint issues.

The first-order condition for each (i, h) gives the optimal share of shifted profits:

$$s_{ih}^* = \frac{1}{\gamma} \max\Big\{ t_i - t_h,\, 0 \Big\} \tag{5}$$

Hence, the firm shifts profits from country i towards country h only when $t_i > t_h$, and the shifted share rises with the tax-rate gap but falls with the convex cost parameter. Moreover, this share is independent of the firm size, as in Kato and Haufler (2024). However, the total amount of profits shifted from country i to haven h, $s_{ih}^* \pi_i$, is then proportional to π_i, indicating that larger firms (with higher π_i) shift more in absolute terms.

The firm engages in profit shifting if the tax benefits offset the costs of engaging in

tax avoidance, hence $\Pi^{PS} > \Pi^0$, which implies

$$\sum_{i=1}^{n} \pi_i \left(\sum_{h=1}^{n} \frac{(t_i - t_h)^2}{2\gamma} \right) > F$$

It follows that firms will only shift profits if net tax benefits exceed the fixed costs. This creates a minimum threshold for the tax rate differential that must be exceeded before profit shifting becomes profitable. In addition, larger firms are more likely to engage in profit shifting, as they can spread the fixed costs over a wider earnings base. This is observed in the profit shifting condition, where higher values of π_i make it easier to overcome the fixed costs.

5.3 Measure of Tax Incentives to Shift Profits

We first characterize misalignment where reported profits ρ_i do not match the predicted true profits π_i, based on the formula shown in Equation 3. The gap between reported and real profits provides us with an MNE-country level estimate of profit misalignment. Positive amounts of misalignment could partially reflect genuine economic productivity rather than tax avoidance behavior.

To then characterize whether jurisdiction i serves as a net destination or origin of shifted profits, we can characterize the net shifting flow defined in Equation 2 by substituting the optimal shifting shares found in Equation 5:

$$z_i = \frac{1}{\gamma} \Big[\sum_{k:t_k > t_i} \pi_k \left(t_k - t_i \right) - \sum_{h:t_h < t_i} \pi_i \left(t_i - t_h \right) \Big].$$

The right-hand side reveals the dynamics of profit shifting behavior: a multinational enterprise will shift more profits into country i when it earns substantial profits π_k in high-tax jurisdictions (where $t_k > t_i$), while it will shift less profits into country i when it generates significant profits π_i there that could benefit from relocation to lower-tax countries (where $t_h < t_i$). Since profit shifting incurs positive costs γ, the MNE's tax incentives for shifting profits to country i depend on balancing total inbound against outbound profit flows. Therefore, we define the tax incentives $\mathcal{T}_i$ to assess whether or not country i is a net recipient of shifted profits:

$$\mathcal{T}_i = \sum_{k:t_k > t_i} \pi_k \left(t_k - t_i \right) - \sum_{h:t_h < t_i} \pi_i \left(t_i - t_h \right) \tag{6}$$

When $\mathcal{T}_i$ is positive, the MNE has an overall incentive to shift profits in country i. We therefore classify positive misalignment as shifted profits. Conversely, when $\mathcal{T}_i$ is

negative, only negative misalignment is classified as shifted profits.[29]

This tax condition cancels out misaligned profits that do not coincide with tax incentives. However, to ensure the balance of inflows and outflows at the MNE-year level, we adjust the magnitude of profit shifting so that the total inward flows exactly offset the outward flows at the global level.[30]

5.4 Profit-Sharing Role in Shifting Decisions

We next extend the model to incorporate profit-sharing schemes. Firms are required to distribute a share ϕ_i of their pre-tax reported profits ρ_i to their employees in country i. For instance, ϕ_i is equal to 5% on average in France (see Table 1).[31] Under this specification, the share ϕ_i of profits distributed to employees can vary across countries, across MNEs, and over time.

The multinational firm maximizes its global after-tax and after-profit-sharing profits. An important institutional feature is that profit-sharing contributions are deductible from the corporate income tax base in most countries. Using the previous notation, after-tax and after-profit-sharing profits in country i are defined by:

$$\rho_i - \phi_i \, \rho_i - t_i \, (\rho_i - \phi_i \, \rho_i)$$

The MNE's maximization problem can therefore be written as:

$$\max_{\{s_{ih} \geq 0\}} \sum_{i=1}^{n} \Big[(1-t_i)(1-\phi_i)\rho_i - \sum_{h=1}^{n} \frac{\gamma}{2} \, s_{ih}^2 \, \pi_i \Big] - F \, \mathbb{1}_{\{\sum_{i,h} s_{ih} > 0\}}$$

This maximization problem is identical to equation 4, except that the MNE now faces an adjusted effective rate that accounts for profit-sharing contributions: $\tilde{t}_i = t_i + (1 - t_i) \, \phi_i$. We solve the problem using the same procedure and obtain at the

[29] Formally, we apply the following tax condition to the misalignment estimates:

$$\zeta_i = \begin{cases} \rho_i - \pi_i & \text{if } \rho_i - \pi_i > 0 \text{ and } \mathcal{T}_i > 0 \\ \rho_i - \pi_i & \text{if } \rho_i - \pi_i < 0 \text{ and } \mathcal{T}_i < 0 \\ 0 & \text{otherwise} \end{cases}$$

[30] In practice, denoting $Z^+ = \sum_{j|\zeta_j > 0} \zeta_j$ total inflows, and $Z^- = \sum_{j|\zeta_j < 0} \zeta_j$ total outflows, our estimate of profits shifted by the MNE in country i is defined as:

$$z_i = \begin{cases} \frac{\min(Z^+, Z^-)}{Z^+} (\rho_i - \pi_i) & \text{if } \rho_i - \pi_i > 0 \text{ and } \mathcal{T}_i > 0 \\ \frac{\min(Z^+, Z^-)}{Z^-} (\rho_i - \pi_i) & \text{if } \rho_i - \pi_i < 0 \text{ and } \mathcal{T}_i < 0 \\ 0 & \text{otherwise} \end{cases}$$

[31] Profit-sharing is usually defined at the subsidiary-level. Without loss of generality, we consider here a setting where profit-sharing is defined at the MNE-country level.

optimum, analogously to equation 5:

$$\tilde{s}^*_{ih} = \frac{1}{\gamma} \max\Big\{(t_i - t_h) + \Big((1 - t_i)\,\phi_i - (1 - t_h)\,\phi_h\Big),\, 0\Big\} \tag{7}$$

The measure of tax incentives faced by MNEs also changes due to profit-sharing schemes: the effective tax rates t_i in the tax condition 6 are replaced by the adjusted $\tilde{t}_i$.

Equation 7 reveals two effects of profit-sharing on shifting behavior. Higher profit-sharing obligations in country i relative to haven h raise the optimal share of profits shifted from i to h. Yet, because profit-sharing is deductible from the corporate tax base, its effective cost declines with the corporate tax rate, thereby encouraging MNEs to distribute profits to employees in high-tax jurisdictions.

6 Profit Shifting Estimation and Tax Revenue Losses

6.1 Methodology

Measure of allocation factors. Our apportionment formula (Equation 3) is based on each country's share of total factor inputs within the MNE. The first production factor we account for is total compensation of employees, including all social security contributions. As compensation of employees reflects both the number of employees and the wages paid, we account for differences in economic activity and economic context across countries and industries. Our second factor of production is capital. To have a measure of the annual cost of capital, we combine the measure of fixed tangible assets from our CbCR data,[32] with the level of investment in tangible assets from OFATS. We find an average cost of capital for these firms of $r = 0.13$.

In our main specification, we assume that rates of return to assets do not vary from country to country or across MNEs. In Appendix E.1, we relax this assumption and use country-specific rates of return. We also test the formula with alternative production costs. Specifically, in Appendix E.1 we test the robustness of our results against the following specifications: (1) we only use labor as an apportionment factor, as in the preferred specification in Guvenen et al. (2022), (2) we only use tangible assets as an apportionment factor, (3) we use unrelated-party revenue as the sole factor.

[32] Fixed Tangible Assets in CbCR is equivalent to net Property Plant and Equipment stocks in other datasets. According to OECD BEPS Action 13, the variable "Tangible Assets other than Cash and Cash Equivalents" is defined as the "*[. . .] sum of the net book values of tangible assets of all the Constituent Entities resident for tax purposes in the relevant tax jurisdiction*" (OECD, 2015).

Estimation of profit misalignment. We compute misalignment estimates m_i at the MNE-country-year level as the difference between reported profits and our measure of true profits. Country-level aggregation of firm misalignment $M_i = \sum_{\text{all MNEs}} m_i$ mitigates firm-specific reporting noise, isolating systematic profit deviations unexplained by production factors. The global misalignment measure $M = \sum_{i|M_i>0} M_i$ aggregates positive country residuals annually, capturing cross-border reallocation patterns.

Estimation of tax-motivated profit shifting. We derive our estimate of profit shifting by applying the tax condition 6 in Section 5.3 to the misalignment estimates. The tax condition is computed at the MNE-country-year level, with our measures of true pre-tax profits defined in Section 5.1, and the firm's effective tax rate t_i estimated in country i over the period. The effective tax rate is computed as the sum of taxes accrued by the MNE in country i over the period, divided by its total reported profits in that country, including only years when the MNE is profitable in country i and pays positive taxes that are less than the amount of reported profits.[33]

We test our measure of tax incentive $\mathcal{T}_i$ by running several robustness checks in Appendix E.3, and we find consistent estimates. Specifically, we implement a more complex measure that accounts for mandatory profit-sharing, as described in Section 5.4. In addition, we compute an alternative measure of tax incentive as the difference between the effective tax rate faced by the MNE in country i and the MNE's global effective tax rate.

As with profit misalignment, we can aggregate these estimates at the country level across all MNEs in our sample to identify countries receiving the highest amount of shifted profits: $Z_i = \sum_{\text{all MNEs}} z_i$. Finally, we compute our global amount of profit shifting as the sum over the countries for which we find positive shifting: $Z = \sum_{i|Z_i>0} Z_i$.

6.2 Profit Shifting by French MNEs

We estimate misalignment m_i and profit shifting z_i following the methodology described in Section 5.3. Table 4 presents our estimates of both misaligned profits and shifted profits of all French MNEs in our sample. We find an annual amount of €34 billion of misaligned profits for these firms, corresponding to 20% of their global profits or 30% of their foreign profits. Of these misaligned profits, €21.5 billion is shifted for tax reasons. As a result, we find that the 314 largest French multinational firms shift around 12% of their global profits, or 19% of their profits booked abroad.

More than half of total profit shifting is booked in five tax havens: three European countries, Switzerland, Luxembourg, the Netherlands, and two Asian financial hubs,

[33] We divide the 2016-2022 period into sub-periods for countries where the statutory tax rate varies by more than 2pp.

Table 4: Annual Results by Region

Region	Reported profits	Tax accrued	Misaligned profits		Shifted profits		Tax gains	
			(bn€)	(%)	(bn€)	(%)	(bn€)	(%)
France	58.7	15.9	-14.2	-24	-10.3	-18	-3.7	-23
United States	13.2	4	-7.1	-54	-4.7	-36	-1.1	-28
Rest of Americas	5.2	2.7	-2.6	-50	-1.5	-29	-0.6	-22
Germany	7.2	2.2	-0.4	-6	-1	-14	-0.3	-14
Italy	8.1	2.4	0.6	7	-0.9	-11	-0.4	-17
Africa	7.1	3.7	0.7	10	-0.1	-1	-0.2	-5
Switzerland	6.5	1	3.1	48	3.4	52	0.4	40
Singapore	4.1	0.4	2.6	63	2.9	71	0.2	50
Netherlands	3.4	0.8	2.3	68	2	59	0.1	12
Other tax havens	3.2	1.3	0	0	1.8	56	-0.1	-8
Hong Kong	3	0.5	1.4	47	1.7	57	0.2	40
Luxembourg	2.2	0.4	1.5	68	1.7	77	0.1	25
Rest of Europe	17.9	5.4	3.1	17	1.6	9	0	0
Rest of Asia & Oceania	23.1	8.4	6.3	27	1.4	6	-0.1	-1
Ireland	2.3	0.3	1.5	65	1.2	52	0.2	67
United Kingdom	7.7	2.1	1.2	16	0.6	8	0	0
Global	172.9	51.5	34	20	21.5	12	-5.3	-10

Note: This table presents average amounts of misaligned and shifted profits and tax revenue gains and losses for the period 2016-2022. It shows the countries with the highest amounts of shifted profits, while grouping the remaining ones by geographical regions. The countries are ranked by the largest profit shifting outflows at the top and the largest inflows at the bottom. The MNE-country-year level estimates are first aggregated at the region-year level and then averaged over the years. All amounts are expressed in billion euros, except for percentages: the shares of misaligned and shifted profits are calculated relative to reported profits, while the percentage of tax gains is measured over tax accrued. Global estimates correspond to the sum over the regions for total reported profits, tax accrued and tax gains. However, since misaligned and shifted flows sum up to zero, global estimates for these variables correspond to M and Z as defined in Section 6.1.

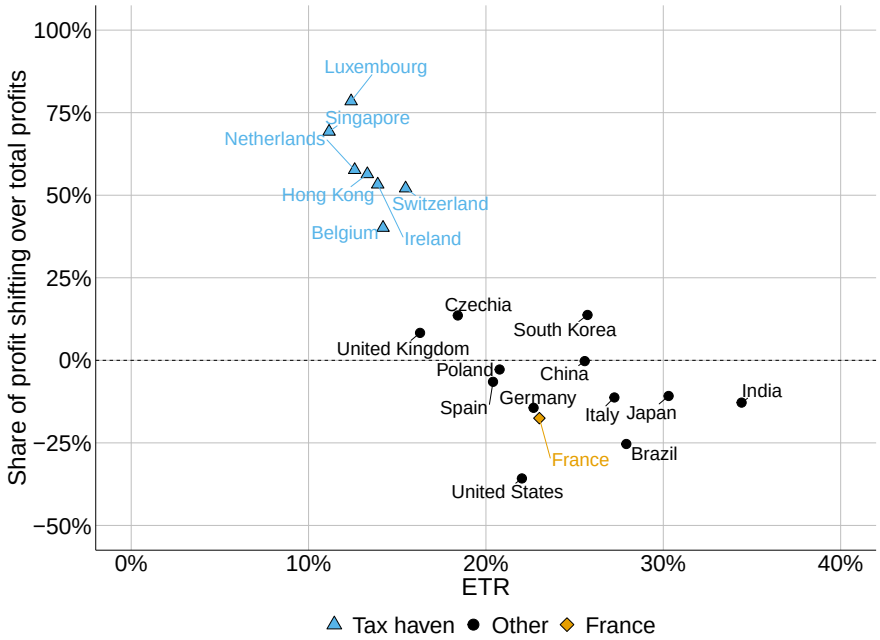
Singapore and Hong Kong. Figure 5 shows how profits reported by French MNEs are distorted by profit shifting. In particular, more than 75% of the profits reported by these French multinationals in Luxembourg and Singapore are shifted profits. Shifted profits account for more than 50% of profits reported in the Netherlands, Ireland, and Switzerland. Below the horizontal zero line are the countries that lose from these avoidance practices.

Figure D.1 shows that tax havens tend to exhibit extremely high profitability and that this misalignment of profits relative to real activity is associated with low effective tax rates (Figure D.2). We also provide in Appendix D.3 the evolution of profit shifting over time. We find that shifted profits are quite stable over our sample period, at around €20 billion, while misaligned profits fluctuate between €25 and €40 billion.

6.3 Tax revenue implications

We now turn to estimating the tax revenue losses due to profit shifting. To do so, we reallocate the missing profits to their country of origin and apply the effective tax

Figure 5: Share of Profit Shifting among Reported Profits



Note: This graph shows the share of shifted profits in the total amount of profits reported in each country, for the 20 countries where French MNEs report the largest amounts of profits. For each country, we compute the amount of shifted profits over the period, divided by the total amount of profits reported there. The x-axis ranks the countries according to their average ETR over the period. We compute ETRs at the country-year level by summing all taxes accrued reported in a given country in a given year, divided by the sum of all profits reported in that country in the same year. We include in the calculation only the subsidiaries reporting positive profits and a positive tax liability that does not exceed the amount of profits. *Lecture:* 77% of profits reported in Luxembourg by large French MNEs are shifted for tax reasons, the MNEs facing there an average ETR of 12%.

rate faced by the MNE in that jurisdiction.[34] When a country receives shifted profits, we measure a tax gain rather than a loss. The underlying assumption is that the ETR would remain unchanged in the absence of profit shifting. This likely provides a lower bound for tax losses, since our ETR measure includes tax credits in the denominator (tax credits are included in the profit variable in CbCR). If firms exhaust their tax credits before shifting the remaining profits to low-tax jurisdictions, the ETR applied to repatriated profits would in fact be higher, as no further tax credits could be claimed.[35]

Table 4 shows that large French MNEs are responsible for €10.3 billion of profits shifted out of France, equivalent to 18% of their reported profits in the country. These missing profits result in an annual loss of €3.7 billion in corporate tax revenue in France,

[34]The ETR is computed at the MNE–country level over the whole period to smooth potential losses carry-forwards.

[35]We also estimate the tax losses by applying the statutory tax rate instead of the effective tax rates on repatriated profits in the Table D.1 in the Appendix.

equivalent to around 7% of total corporate tax revenues[36] (see Table 3). Our profit shifting estimate is a balance between profits shifted in France (€3.1 billion) and out (€13.3 billion), as detailed in Table D.1 in the Appendix. Firms shifting profits in France are taxed at a very low rate in France due to special regimes, and hence, these shifted profits incur a tax gain of only €70 million each year. This explains why the ratio of shifted profits and tax revenue losses is not equivalent to the effective tax rate.

It is important to note that this estimate only accounts for the 314 largest French MNEs, and therefore excludes smaller French MNEs as well as all foreign MNEs operating in France. If all other MNEs were to shift the same share of their profits, this would amount to €16.6 billion of shifted profits in total (see Table 3), and the associated losses in corporate income taxes would amount to a total loss of €5 billion, or 9% of corporate income tax revenues.[37] This is likely a lower-bound estimate because foreign MNEs may shift a larger share of their profits out of France. Indeed, we provide suggestive evidence of this fact in Figure D.5 in the Appendix, as we find that US MNEs exhibit a much larger gap between their worldwide profitability and their French subsidiaries' profitability, measured by the profit-to-wage ratio, than French MNEs.

Finally, we show in Figure D.6 the tax savings generated by profit shifting activities for MNEs. We find that, absent profit shifting, the global ETR of these firms would increase by about 3pp, from an average of 23% to 26% over the period.

6.4 Profit Shifting and Firm Size

We investigate the relationship between profit shifting and firm size, to see whether the largest firms are the most aggressive in profit shifting as suggested by Wier and Erasmus (2022). We find in Figure 6a that the 314 largest French MNEs shift around 17% of their global profits to reduce their tax payments, and that this share is roughly constant across all deciles of global revenues. Nonetheless, our data include only the largest French MNEs, which might be more tax aggressive than medium-sized MNEs. This result is in line with our theoretical model and Kato and Haufler (2024), according to which, once MNEs have an incentive to shift profits, they all shift the same portion of their profits, independently of their size.

However, if we examine the contribution of multinational companies to global profit shifting according to their size, we observe that the largest firms are responsible for the vast majority of profit shifting (Figure 6b). Indeed, the top 5% of multinational companies in terms of global revenues, the largest 15 MNEs, contributes to 48% of total profit shifting, and the top 10%, or about 30 MNEs, contribute to more than 70% of all shifted profits. The top 20% of MNEs accounts for almost 85% of total shifted

[36] Or 9.5% of total corporate tax revenues net of tax credits.

[37] €3.7 billion for French MNEs plus 21.2% (the average French ETR) of €6.3 billion of shifted profits by other MNEs.

profits, while all other deciles each accounts for less than 5%. This is not because larger MNEs shift more of their profits, but because profits are highly concentrated in the hands of a small number of firms. Our results are consistent with Clifford et al. (2025) who find that profit shifting is highly concentrated among the firms subject to the global minimum tax, which are also subject to CbCR. Our analysis goes one step further to show that even among these firms, only a handful of them truly matter for profit shifting.

These results suggest that firms' revenue is a good proxy for profit shifting. As we show in Figure C.8, the top 5% of firms in terms of revenue contribute to 45-50% of total profits. As such, we provide support for using revenue as an inclusion metric in reforms targeted at the most harmful profit shifters.

6.5 Mechanisms

We now investigate how these firms shift profits. There are three main channels through which MNEs can engage in profit shifting. Companies can use transfer pricing of intra-firm traded goods (Bernard et al., 2006; Cristea and Nguyen, 2016; Vicard, 2015; Davies et al., 2018; Wier, 2020; Liu et al., 2020), locate intangibles assets in tax havens (Karkinsky and Riedel, 2012; Dischinger et al., 2014; Hebous and Johannesen, 2021) and use intra-firm debt shifting (Huizinga et al., 2008; Fuest et al., 2011). We already have some descriptive evidence of the transfer pricing channel in Figure 2 since intra-firm revenues are disproportionately reported in low-tax jurisdictions (and in tax havens in Figure C.5 in the Appendix).

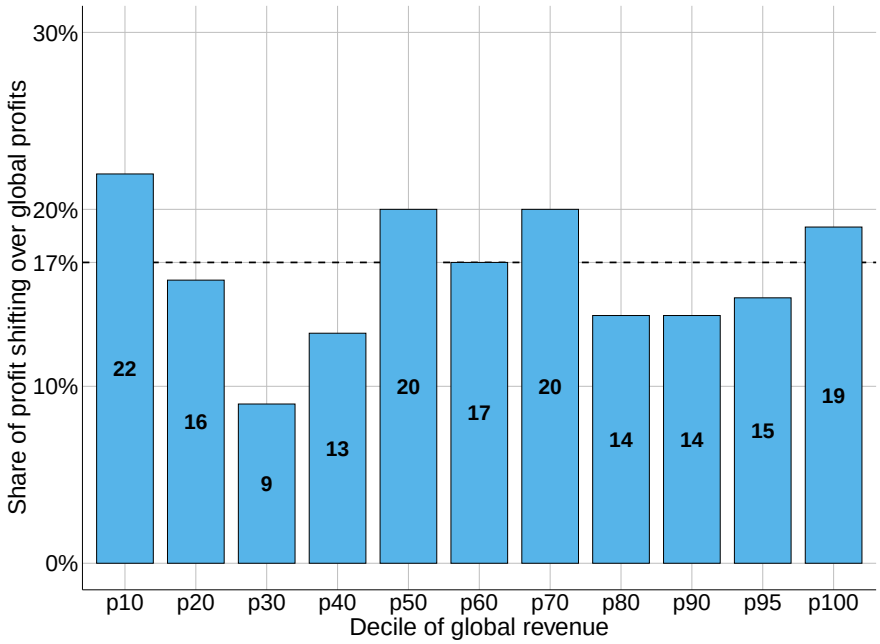
We use the information on business activities provided in CbCR data and show descriptively in Figure C.6 in the Appendix that some activities are prevalent in tax havens, such as insurance and shareholding activities, but also financial services and intellectual property holding, suggesting that these entities might be vehicles for profit shifting. We estimate the types of business activities that are the most correlated with profit shifting practices by running the following regressions for each business activity:

$$log(z_{ift}) = \alpha + \beta Activity_{ift} + \gamma X_{ift} + u_f + v_t + \epsilon_{ift} \tag{8}$$

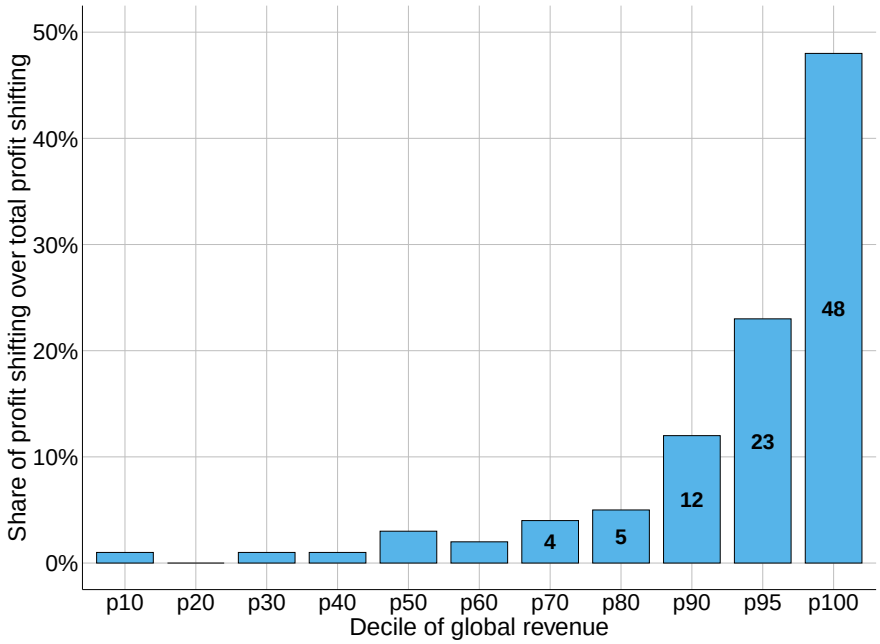
with z_{ift} the positive amount of profits shifted by MNE f in country i at time t, Activity_{ift} a dummy variable indicating whether the firm f has a subsidiary engaging in this activity in country i at time t, X_{ift} a vector of control variables including logarithms of payroll and tangible assets (plus one), u_f and v_t are firm and year fixed effects respectively. Since a subsidiary can engage in multiple business activities, we include activity dummies one at a time rather than all simultaneously in the regression. Additionally, we run the same regression with country fixed effects to separate the specific effect of business activities from country characteristics.

Figure 6: Profit Shifting by Firm Size

(a) Share of Profit Shifting over Global Profits by Firm Size Decile

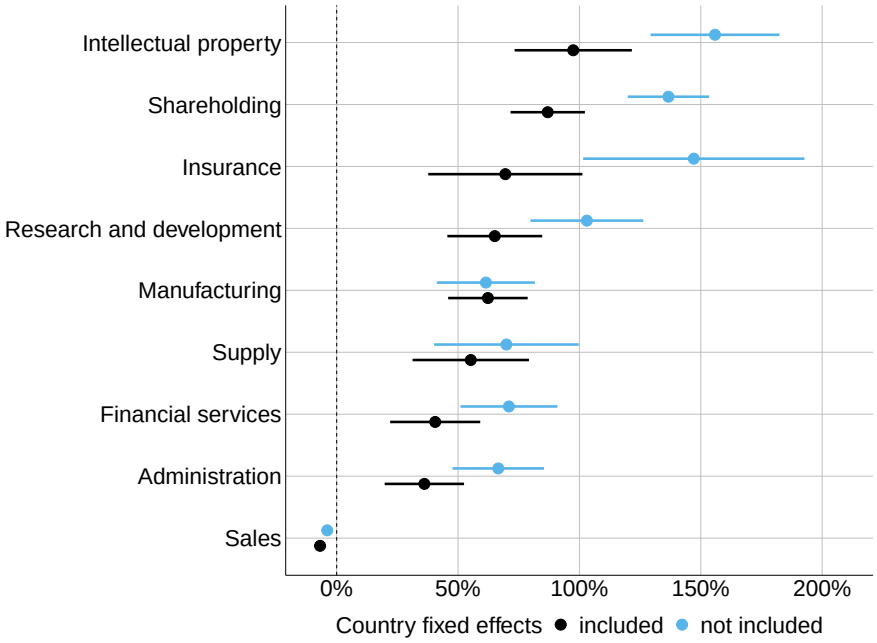


(b) Contribution by Decile to Total Amount of Profit Shifting



Note: In both figures, MNEs are gathered by decile of global revenue, with the top decile split into two groups. We average the amounts over the period 2016-2022. For instance, group 100 gathers the top 5% of MNEs in terms of average revenue over the whole period. In Figure 6a, we compute for each decile the ratio of the sum of positive shifted profits over the MNEs in the decile, divided by their global profits. In Figure 6b, we compute for each decile its contribution to total profit shifting as the sum of all positive shifted profits estimated for the MNEs in the decile, divided by the values for all MNEs in our sample.

Figure 7: Correlation Between Profit Shifting Practices and Business Activities



Note: This figure plots the coefficients β from equation 8 with the 95% confidence intervals. *Lecture:* Having a subsidiary that conducts research and development activities corresponds to 100% more shifted profits compared to subsidiaries operating other business activities, when we do not account for country fixed effects. Focusing on within-country variation, the magnitude is 60% more in shifted profits.

Figure 7 shows our estimates. We find that engaging in intellectual property, shareholding, and insurance activities leads to higher estimates of profit shifting. Shifted profits towards entities that perform intellectual property holding activities, shareholding or insurance activities are on average 150% higher than those estimated in other subsidiaries. Adding country fixed effects and focusing on within-country variation in reported profits by activity performed, we also find that subsidiaries performing intellectual property holding activities, shareholding, or insurance activities shift on average 75-100% more profits than other subsidiaries in the same country.

6.6 Robustness

We run alternative specifications to support our main estimation method, and present the results in Table E.1 in the Appendix.

Alternative apportionment factors. We first test different apportionment formulas. In our baseline specification, production costs are measured as the sum of labor and tangible capital costs, assuming a constant rate of return on capital across countries. To

assess the robustness of this choice, we compare our results with alternative apportionment formulas (Section E.1 in the Appendix). First, following Guvenen et al. (2022), we use payroll as the sole apportionment factor; we then apply an alternative specification using only tangible capital costs. Both approaches yield a similar global estimate of €22 bn of profits shifted. We also test a specification based on unrelated-party revenue as the apportionment factor, which produces a slightly lower global estimate of €19 bn. This result is consistent with the fact that profit shifting can occur through transactions with unrelated parties, by setting up sales in a tax haven, for instance, making this variable a biased predictor of true profitability (Laffitte and Toubal, 2022). Finally, we also test the robustness of our results when we include country-specific capital rates of return from Chari and Rhee (2020) and get similar estimates.

Estimates of country-specific productivity. We also relax the assumption of constant markup across countries within multinational groups in two alternative specifications. First, we incorporate country-level markup estimates from De Loecker and Eeckhout (2018). While global results remain similar, the estimated amount shifted out of France is substantially lower (€6 bn instead of €10 bn). These findings are consistent since markup estimates themselves may be biased by profit shifting behavior. Second, we use country-level productivity estimates of purely domestic firms, which are unaffected by profit shifting, following Tørsløv et al. (2023). This approach produces a higher global estimate (€26 bn), largely driven by the very low local profitability estimated for Switzerland. In France, the estimated local profitability is also very low, and it results in close to null amount of profits being shifted out of France. Nonetheless, this approach is limited by the accuracy of local productivity estimates derived from macro-level data, which do not align with the firm-level profitability we observe for domestic companies in France. Therefore, given the lack of accurate country-level productivity measures, we keep the assumption of constant productivity across countries, within an MNE, in our main specification.

Alternative measures of tax incentives. Our baseline measure of tax incentives is derived from the model presented in Section 5.3. As a robustness check, we implement a refined measure of tax incentives that incorporates profit-sharing obligations, as described in Section 5.4. Due to data limitations, we account for profit-sharing only in France, even though such schemes exist in other countries. Since this exercise aims solely to assess the potential bias in our profit-shifting estimates from omitting profit-sharing, we simply model mandatory profit-sharing as a constant 5% of reported profits for all MNEs.[38] Therefore, we can adjust MNEs' liabilities in France while leaving tax liabilities in other countries unchanged. Incorporating profit-sharing in the shifting incentives slightly increases global profit shifting estimates (€23 bn instead of €22 bn),

[38] It corresponds to the average ratio of profit-sharing over reported profits shown in Table 1.

especially in France (€14 bn of profits shifted out instead of €10 bn). Given that profit-sharing schemes are typically implemented in high-tax jurisdictions (Houten and Russo, 2020), omitting them in our main specification is conservative, as it underestimates the actual incentives to shift profits.

In addition, we also try a simpler indicator of the tax incentives for an MNE to shift profits out of country i, defined as the difference between the MNE's ETR in country i and its global ETR (see Section E.3 in the Appendix). With this alternative specification, the estimated global amount of profit shifting is higher, €26 billion, while the cross-country distribution of shifted profits is largely unchanged.

Accounting for wage shifting. We also estimate profit shifting using a corrected measure of wages to account for "*wage shifting*". Multinational firms have some incentives to artificially inflates the labor costs in tax havens in order to substantiate the high level of profits they report there (Gschossmann and Pfrang, 2024; De Simone and Olbert, 2022). We indeed find evidence that wages are systematically higher in tax havens than in non-haven countries, as we show in Figure E.1 in the Appendix. We estimate that the wage premium in tax havens is equivalent to about €25,000 per employee, or 40% of the average annual wage. We correct wages in tax havens by the premium and re-estimate profit shifting. We detail the methodology in Appendix E.4. The total amount of shifted profits increases by €2 billion, to reach a global value of €23.4 billion, leading to higher missing profits in France of €11 billion, against €10 billion before.

Correction of double-counted profits. Finally, we run our analysis on the amounts of reported profits uncorrected for double-counting of intra-group dividends. The global estimate of profit shifting is similar, at €23 billion compared to €22 billion. This results from the fact that intra-group dividends both increase reported profits in tax havens, and in France — the headquarter country of the MNEs in our sample. Not accounting for double-counted intra-group dividends indeed lowers the estimated amount of profits shifted out of France from €10 bn to €9 bn.

7 Distributional Effects on Workers

By decreasing reported profits where employees are located, profit shifting mechanically decreases the amounts of profit-sharing that employees in France receive. In this section, we estimate the amounts lost by employees.

7.1 Estimation of Profit-Sharing Losses

We estimate the loss in profit-sharing in France due to profit shifting by comparing the actual profit-sharing amount to a counterfactual amount that would have been received absent profit shifting.

Estimation of shifted profits at the subsidiary-level. We first reallocate shifted profits to their source subsidiaries, by producing subsidiary-level profit shifting estimates using the same methodology as at the subgroup level[39] (defined in Section 6). Specifically, we compute misalignment estimates by attributing to each subsidiary a share in global profits of the multinational firm to which it belongs equal to its share in global production costs. We use data at the subsidiary level from French corporate tax returns for all the subsidiaries of large French MNEs that are located in France.[40] Since the apportionment formula is linear with the share in global costs, all misaligned profits computed at the subsidiary level of a multinational firm sum up to the profit misalignment computed at the subgroup level. We then estimate the amount of profits shifted by each subsidiary by allocating to it a share of the subgroup's total shifted profits equal to its share of the subgroup's misaligned profits, since the tax incentive is the same for all subsidiaries in France.

Figure 8 summarizes the results of our shifting estimates at the subsidiary level.[41] We find that 23% of the French subsidiaries shift profits out of France, and they account for 37% of workers employed by the large MNEs in our sample, and 40% of the payroll. In contrast, 64% of subsidiaries do not engage in profit shifting, but they represent half of the production costs. We also find that 14% of the subsidiaries shift profits towards France. Indeed, France offers some tax advantages in certain sectors that make it profitable for some MNEs to over-report profits in France.

Estimation of profit-sharing losses. We estimate the loss in profit-sharing as the difference between its counterfactual and actual values. Profit shifting affects two key components of the profit-sharing formula presented in Equation (1): after-tax profits and value added. We then compute the counterfactual profit-sharing values with this formula and compare them to the actual amounts distributed by firms. To ensure that the gap does not stem from discrepancies between formula-based and reported values,[42] we also compute the baseline profit-sharing amount with the formula using reported profits, instead of using the actual distributed amounts observed in the data. The granularity of our administrative data allows us to satisfactorily approximate the

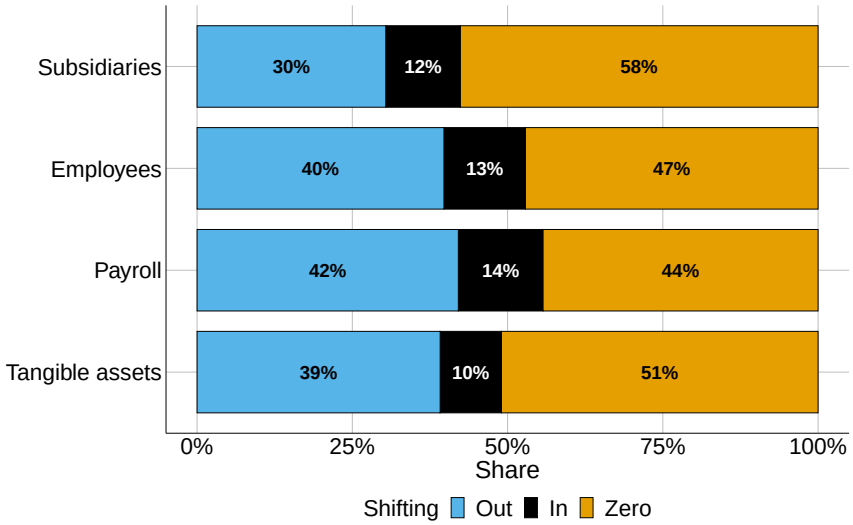
[39] A subgroup consists of all subsidiaries of a given MNE located in a specific country.

[40] We rescale subsidiary-level data that come from French corporate tax returns to match subgroup-level amounts reported in CbCR.

[41] Figure F.2 in the Appendix shows the allocation based on misalignment.

[42] Firms have some leeway to distribute more in profit-sharing than the formula predicts.

Figure 8: Profit Shifting Behavior at the Subsidiary Level



Note: The top bar of the graph shows the share of subsidiaries that are shifting profits out of France (in blue), into France (in black), and not engaged in profit shifting (in orange). The three other bars show how employment, payroll, and tangible assets are distributed according to the subsidiaries' shifting behaviors. *Lecture:* 37% of the French-located employees of the large French MNEs are working in a subsidiary shifting profits out of France.

actual profit-sharing amounts with the legal formula (see Figure F.1 in the Appendix).

We estimate that each employee in subsidiaries shifting profits out of France loses on average €919 per year in profit-sharing, corresponding to 2.6% of their net wages (column "Main scenario" in Table 5). On the contrary, subsidiaries shifting profits into France experience gains in profit-sharing. We estimate that workers in firms shifting profits into France benefit from an increase in profit-sharing by €864, equivalent to 2.4% of net wages. However, since there are more employees working in outward shifting firms, the overall effect of profit shifting on profit-sharing is negative.

Table 5: Annual Loss per Employee in Profit-Sharing due to Profit Shifting

Firms	Number of employees	Profit-sharing amount	Profit-sharing loss			
			Main scenario		Scenario with real responses	
	(th)	(€ per FTE)	(€ per FTE)	(% net wage)	(€ per FTE)	(% net wage)
Shifter out	787	490	919	2.6	357	1
Shifter in	237	2,107	-864	-2.4	-1,169	-3.3
All	2,103	912	246	0.7	6	0.02

Note: The table includes only French-based subsidiaries of CbCR-reporting MNEs with more than 50 employees. We present the results separately for inward and outward-shifting subsidiaries. There are also non-shifting subsidiaries, that are included in the last line *All*. Number of employees correspond to the number of full-time equivalents. All amounts in euros are annual averages per full-time equivalent. The profit-sharing amounts correspond to our estimated value using reported profits in French corporate tax returns. Negative amounts in profit-sharing loss represent gains due to profit shifting.

Accounting for real responses of shutting down access to profit shifting. Shutting down access to profit shifting opportunities would lead to an increase in the effective tax rate on profits generated in France, which would affect the level of wages (Suárez Serrato and Zidar, 2023; Fuest et al., 2018). It would also mechanically increase capital costs for multinational firms in high-tax countries, potentially leading to reduced investment and ultimately lower true profits. Our first counterfactual scenario can thus be interpreted as an upper bound of profit-sharing losses due to profit shifting, as it does not account for firms' real responses to eliminating profit shifting opportunities. In this alternative specification, we incorporate such real responses by relying on the semi-elasticity of investment with respect to tax rates from Suárez Serrato (2018) and the tax incidence on wages of Suárez Serrato and Zidar (2023). This revised estimate can be interpreted as a lower bound, since it is based on elasticities estimated in the United States, where higher institutional flexibility in the labor market likely amplifies employment responses compared to France (Piketty, 2020).

To model firms' real responses to the end of profit shifting, we first estimate the resulting increase in their effective tax rate on profits generated in France. We compute this change at the MNE-year level. For a French subsidiary that shifts part of its profits abroad, the effective tax rate it faces combines the French ETR on reported profits and the weighted average of foreign ETRs applied to shifted profits. The latter is calculated as the average foreign ETR weighted by the amount of profits shifted to each destination country. The overall ETR of a shifting firm is thus the weighted average of the French ETR on domestic positive profits plus the ETR on shifted profits (see Appendix F.3 for details). The increase in ETR resulting from profit shifting elimination are reported in Table F.1 in the Appendix: on average, the gap amounts to 2.1pp across all firms, and up to 4.4pp among shifting firms.[43] It is worth noting that this approach is extremely conservative, modeling an increase of ETR as if our subsidiaries were directly affected, while in our setting, firms are only indirectly affected since this increase is happening at the global level. In our case, since profits are being repatriated to France, investment, wages, and employment could increase in France.

We then estimate a counterfactual amount of true profits generated by French subsidiaries, after reallocating shifted profits and accounting for firms' real responses. To do so, we build on the work of Suárez Serrato (2018), which, to our knowledge, provides the only estimate of firms' responses in a context where a tax increase results from removing profit shifting opportunities. The study examines the repeal of §936, which curtails US MNEs' ability to shift profits to Puerto Rico. Following this reform, affected firms faced an average rise of 3.5pp in their global effective tax rate, similar to what we find for French MNEs' subsidiaries (see Table F.1 in the Appendix). Suárez Serrato (2018) shows that this increase leads to a significant drop in investment, with a semi-elasticity of –1.77. We assume that a decrease in investment translates into an

[43] These values are weighted averages over true profits.

equivalent decrease in profits and we apply this semi-elasticity to reduce the amounts of true profits in our alternative counterfactual scenario.

We also account for the effect of the increase in ETR on wages using the results of Suárez Serrato and Zidar (2023), according to which 35% of the tax burden is borne by employees. We thus compute the amount of tax increase faced by shifting MNEs after shutting down profit shifting opportunities, and reduce employee wages in their French subsidiaries by 35% of this amount, leading to a reduction of 1.16% of gross wages for outward shifting firms. The real tax incidence on wages in France is very likely to be lower than in the US, due to higher labor market rigidity and a relatively higher minimum wage (Piketty, 2020).

Accounting for the incidence on profits, value added, and wages, we find that employees of firms shifting profits out of France still lose €357 of profit-sharing every year, equivalent to 1% of their net wages (column "Scenario with real responses" in Table 5). This value includes the loss in profit-sharing due to profit shifting, plus the estimated gains in wages due to profit shifting with the tax incidence of Suárez Serrato and Zidar (2023). It corresponds to a decrease of 42% of the counterfactual amount of profit-sharing. Therefore, even under strong assumptions regarding the adjustment of profits and inputs, our results show that employees still face substantial earning losses from profit shifting.

7.2 Distribution of Profit-Sharing Losses to Workers

We examine the distributional impact of profit shifting by allocating the resulting loss in profit-sharing across employees, based on the allocation method firms most commonly use. We use the allocation method estimated in Appendix C.1 where 30% of profit-sharing is distributed equally, and 70% is distributed according to the worker's share in gross wages paid by the firm to distribute the amount of our subsidiary-level estimates of profit-sharing to workers.

First, we analyze the heterogeneity of profit-sharing losses by occupation in Table 6. We group the 2.1 million workers in French subsidiaries of CbCR firms in four job categories: blue-collar workers, mid-level employees, managers, and top executives. We find important heterogeneity in profit-sharing losses across occupations. Blue-collar workers in shifting firms are the most affected by profit shifting, losing between 3.2% and 1.6% of their net wages, depending on whether real responses are included, compared to around 1.2–0.3% for top executives.

We also group the workforce by deciles of annual net wages. More than one third of workers work for subsidiaries that shift profits out of France, 11% in inward shifting ones, and the rest in subsidiaries that do not use such tax avoidance schemes. We also find that high-income earners tend to work slightly more for shifting firms than

Table 6: Annual Profit-Sharing Loss in Outward-Shifting Firms by Occupation

Occupation	Number of employees	Profit sharing amount	Profit-sharing loss			
			Main scenario		Scenario with real responses	
	(th)	(€ per FTE)	(€ per FTE)	(% net wage)	(€ per FTE)	(% net wage)
Blue collar	194	438	776	3.2	395	1.6
Mid-level workers	352	422	745	2.8	323	1.2
Managers	237	631	1,284	2.3	375	0.7
Top executives	1	951	2,308	1.2	538	0.3

Note: The table includes only French-based subsidiaries of CbCR-reporting MNEs with more than 50 employees that shift profits out of France. Number of employees correspond of number of full-time equivalents. All amounts in euros are annual averages per full-time equivalent (FTE). The profit sharing amounts correspond to our estimated value using reported profits in French corporate tax returns.

low-income earners (see Figure F.3 in the Appendix).

We distribute profit-sharing losses to workers and then compute the average loss by decile of net wages in Figure 9. We present the results for all workers (black bars) and focus specifically on employees in subsidiaries that shift profits out of France (blue bars). Given the relatively progressive distribution method adopted by firms, lower-income workers receive a larger share of profit-sharing relative to their wages compared to higher-income earners. As a result, employees in the bottom decile (net annual wage below €15,000) working in outward-shifting subsidiaries experience the largest relative losses of 3.2% of their net wages per year, compared to 2.3% for those in the top decile (net wage above €50,000) (Figure 9a). In absolute terms, however, losses are larger at the top: workers in the top decile lose €1,747 annually, while those in the bottom decile lose €444 (Figure 9b).

7.3 Gains of Switching to a Worldwide Definition of Profit-Sharing

7.3.1 Rationale and Mechanism

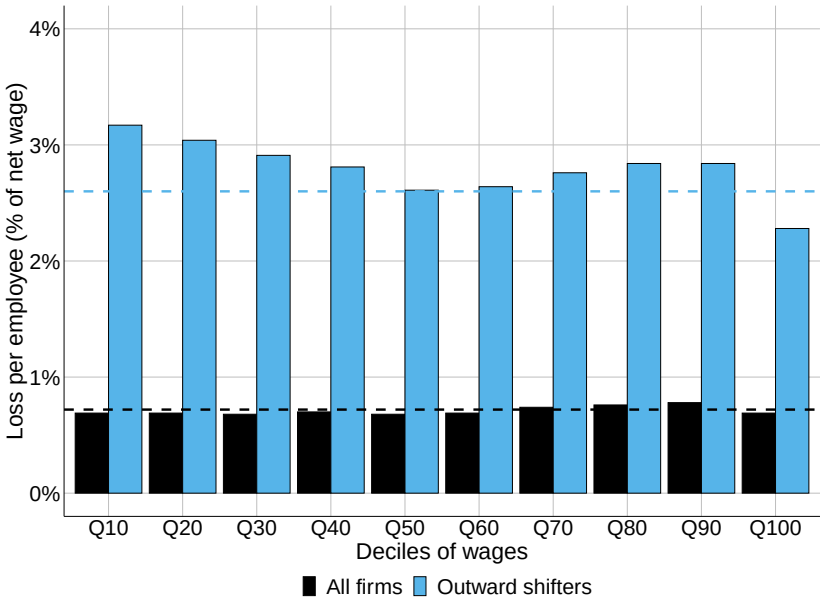
We have shown that profit-sharing amounts distributed to employees are negatively impacted by profit shifting. While eliminating profit shifting opportunities may be a long-term process, a more immediate and easily implementable policy to tackle negative effects on profit-sharing would be to adjust the legal formula. Instead of using the easily manipulable subsidiary-level profitability, we propose to rely on the multinational group's global profitability. Under a worldwide profit-sharing formula, workers would receive profit-sharing based on the entire multinational group's profits $\Pi = \sum_i \pi_i$ rather than subsidiary-level reported profits ρ_i. Specifically, the subsidiary located in country i would distribute a share ϕ_i of global MNE's profits to its employees:

$$\max_{\{s_{ih}\}} \sum_{i=1}^{n} \left[(1-t_i)\left(\rho_i - \phi_i \Pi\right) - \sum_{h=1}^{n} \frac{\gamma}{2} s_{ih}^2 \pi_i \right] - F \mathbb{1}_{\{\sum_{i,h} s_{ih} > 0\}} \tag{9}$$

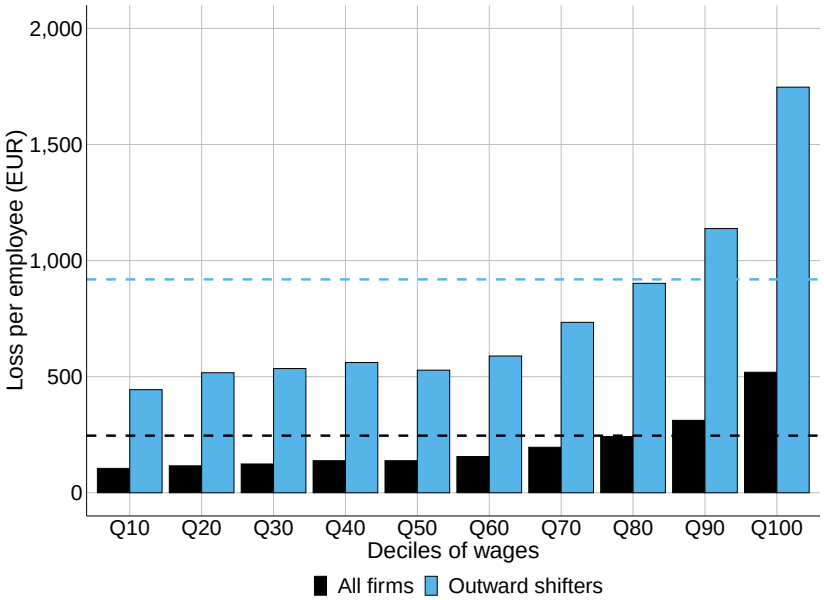
Note that $\Pi = \sum_j \rho_j$ (global reported profits) is independent of how profits are

Figure 9: Distribution of Profit-Sharing Losses by Decile of Net Wages

(a) In Share of Net Wage



(b) In Amounts



Note: The graphs display the profit-sharing losses by decile of workers' net wages. The losses are computed using our main counterfactual that does not account for firms' real responses. The graphs include all employees working in French subsidiaries with more than 50 employees of the French CbCR-eligible MNEs. The black bars include all subsidiaries, and the blue bars focus on those shifting profits out of France. The dashed lines indicate the mean value for workers over all deciles.

Panel a: the y axis shows profit-sharing losses as a share of net wages.

Panel b: the amount is per full-time equivalent.

shifted across countries (since $\sum_j z_j = 0$). Therefore, the term $-\phi_i \Pi$ is constant with respect to shifting decisions in country i.

The first-order condition for optimal shifting from country i to country h becomes:

$$s_{ih}^G = \frac{1}{\gamma} \max\Big\{t_i - t_h, 0\Big\} \tag{10}$$

Recall that under a subsidiary-level profit-sharing definition, optimal profit shifting was:

$$\tilde{s}_{ih}^* = \frac{1}{\gamma} \max\Big\{(t_i - t_h) + \Big((1 - t_i)\phi_i - (1 - t_h)\phi_h\Big), 0\Big\} \tag{11}$$

Comparing Equations (11) and (10), we see that:

$$\tilde{s}_{ih}^* - s_{ih}^G = \frac{1}{\gamma}\Big((1 - t_i)\phi_i - (1 - t_h)\phi_h\Big) \tag{12}$$

The subsidiary-level profit-sharing formula creates an additional incentive to shift profits equal to $(1 - t_i)\phi_i - (1 - t_h)\phi_h$. Moving to a worldwide formula eliminates this extra incentive, leaving only the tax-driven incentive to shift from high-tax to low-tax countries.

7.3.2 Quantification

To estimate the potential gains for French workers from this change of the profit-sharing formula, we replace net profits and value added by their values if subsidiaries were as profitable as the whole multinational group. Profitability is defined as the ratio between reported profits and the sum of wages and the cost of tangible assets, as defined in Equation 3 in Section 5.1.

Since workers have less influence on the global profitability of a multinational group than on that of the subsidiary, such a change could reduce the incentives created by the profit-sharing policy for workers to put in more effort. Moreover, higher profit-sharing payments in France could reduce the remaining profits (after tax and after profit-sharing), potentially affecting investment, employment, and wages in later years. However, Nimier-David et al. (2023), who exploit the reduction of the threshold for mandatory profit-sharing from 100 to 50 employees to study the effect of profit-sharing on firms' outcomes, find no effect on productivity or investment. Instead, they show that it increases the labor share while leaving wages unchanged overall.

Building on their results, we make the hypothesis that in our context, an increase in the amounts that firms must distribute to their workers would have no distortionary effects on productivity, investment, and wages. Our context is however different: in Nimier-David et al. (2023), profit only has to be shared if the firm has an "excess"

profitability, while in our case, low-profitability subsidiaries of highly profitable MNEs will have to pay profit-sharing even though they do not make any profit. Our hypothesis thus relies on the fact that there is sufficient intra-group coordination to transfer profits from high-profitability subsidiaries to low-profitability ones.

Implementing this policy might also increase incentives for subsidiaries to bunch at the 50-employee threshold. However, the subsidiaries of multinational groups tend to bunch less at the threshold than other firms (see Figure C.3), possibly because they tend to be larger on average. We hence consider that this employment effect would only be marginal.

We show in Table 7 that this policy would considerably increase the amount of profit-sharing received by workers. Employees of the large French MNEs would gain on average an additional €644 every year through profit-sharing, equivalent to 1.9% of their net wages. For those working in outward shifting subsidiaries, they would experience an increase of 4.1% of their net wages. The relative gains are larger at the bottom of the income distribution, with blue-collar workers in shifting firms gaining up to 5% of their net wages per year.

Table 7: Expected Gains in Profit-Sharing from a Change in the Legal Formula

	All firms			Shifter out		
	Number of employees (th)	Gain of a new formula (€ per FTE)	(% net wage)	Number of employees (th)	Gain of a new formula (€ per FTE)	(% net wage)
Blue collar	563	511	2.2	194	1,220	5
Mid-level workers	908	522	2.0	352	1,174	4.4
Managers	627	933	1.7	240	2,073	3.7
Top executives	3	1,748	1	1	3,369	1.8
All	2,103	644	1.9	787	1,462	4.1

Note: The table includes only French-based subsidiaries of CbCR-reporting MNEs with more than 50 employees. We present the results for all firms, and also focus on outward-shifting subsidiaries. Number of employees correspond of number of full-time equivalents. All amounts in euros are annual averages per full-time equivalent.

Overall, our analysis suggests that profit shifting affects workers through lower earnings in high-tax countries. We also show the distributional consequences of profit shifting: low-income workers are hit the most with profit shifting and face lower distributed earnings through profit-sharing mechanisms relative to high-income workers.

8 Conclusion

This paper provides new evidence on how profit shifting affects workers of multinational firms. We use a newly available and unique micro dataset on the global activity of MNEs, along with an improved apportionment methodology, to estimate profit shifting. We find that 19% of foreign profits of French MNEs are shifted for tax reasons. Matching our micro-level profit shifting estimates to French employer-employee data, we find that workers of subsidiaries engaging in profit shifting lose €900 on average

per year due to the associated loss in profit-sharing, harming more low-wage workers, relative to their wages.

Our findings have two main policy implications. We first show that profit shifting is highly concentrated among the largest firms, reflecting the concentration of profits rather than differences in tax avoidance aggressiveness. This finding is particularly relevant for policymakers seeking to more effectively target multinational tax avoidance practices. Second, we put forward a new profit-sharing formula that would take into account the worldwide profitability of the MNE instead of subsidiary-level profits. This new formula would completely offset the loss associated with profit shifting, and result in an average gain of 1.9% of net wages for all workers of MNEs, and 4.1% for workers of shifting subsidiaries.

Our investigation has uncovered one of the channels through which profit shifting affects the income distribution between workers and firms. More research is needed to arrive at a comprehensive understanding of how global tax competition on corporate income tax rates affects the distribution of wealth and income.

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A Data Cleaning

A.1 General Data Cleaning

As reported by the OECD,[44] common data quality issues include inconsistencies in units, currencies, naming conventions, and missing information. More specific to CbCR are inconsistencies in how companies report tax payments (i.e., with positive or negative signs) and the potential double-counting of intracompany dividends.

We develop data-cleaning techniques that address both general and CbCR-specific data quality issues, enabling the transformation of raw CbCR data into standardized formats suitable for analysis. Properly handling data issues is crucial, as inappropriate treatment could lead to misleading analytical outcomes. For example, unit errors tend to occur more frequently among large multinationals that may report figures in thousands or millions rather than base units.

The tax payment direction issue stems from unclear OECD guidance on whether taxes paid should be reported as positive or negative figures. This significantly impacts the accuracy of the reported tax variable, which is a key analytical component. Similarly, inconsistencies in the reporting of intra-company dividends can artificially inflate or deflate profit figures for certain jurisdictions, skewing subsequent effective tax rate calculations (Blouin and Robinson, 2023). As highlighted by research from different ministries (Italy, UK, Sweden, Netherlands) and Horst and Curatolo (2020); Garcia-Bernardo et al. (2022), these double-counted dividend amounts can be substantial.

The core of our cleaning methodology involves benchmarking CbCR data against companies consolidated financial accounts, which eliminates all intragroup transactions and provides a singular entity perspective. This comparison isolates companies that likely include intracompany dividends, enabling the estimation of double-counted amounts.

A.2 Cleaning of Double-Counting

One of the main challenges with Country-by-Country data is the presence of double-counting, meaning that some subsidiaries report received dividends in their profits that were already included in the profits of the subsidiary sending those dividends. This issue arose due to initially unclear OECD guidelines, resulting in some of the groups we studied reporting their intra-group dividends twice. To solve this, we compare MNE's total profits in CbCR data with group-level consolidated financial data.

[44] https://www.oecd.org/tax/beps/common-errors-MNFs-cbc-reports.pdf

A.2.1 Match with Consolidated Accounts

To match CbCR data with the Orbis database, we use the firm's tax identification number (SIREN). First, we perform an exact match based on the SIREN. For firms where an exact match is unavailable, we apply a fuzzy matching technique using company names. Additionally, we manually supplement the dataset with publicly available information to maximize coverage.

On average, we successfully matched 55.6% of our observations to their consolidated accounts each year. However, for some matched firms, profit information remains unavailable. As shown in Table A.1, our dataset covers a significant portion of the main variables: 85.7% of unrelated party revenue, 89.8% of profits, and 81.6% of employees reported in the CbCRs.

Table A.1: Matching of CbCR and Consolidated Accounts

Year	Nb. Obs (%)	Revenues (%)	Profit (%)	Employees (%)
2016	62.6	81.9	81.2	75.7
2017	66.0	85.6	91.7	80.1
2018	67.1	86.1	93.2	81.6
2019	69.1	88.4	93.9	84.9
2020	70.8	85.5	84.9	84.4
2021	69.0	87.3	90.4	83.6
2022	56.1	84.3	89.9	79.4
2016-2022	**55.6**	**85.7**	**89.8**	**81.6**

Note: This table presents the percentage share of multinationals matched to consolidated accounts, showing their representation in key variables.

Table A.2 presents the distribution of the ratios between CbCR and consolidated values for unrelated party revenues, profits, and employees. The mean ratio for profits (1.41) is significantly higher than that for revenues (1.11) and employees (1.09), indicating larger discrepancies between CbCR and consolidated data for profit figures, possibly due to the inclusion of dividends. In contrast, the ratios for revenues and employees demonstrate more consistency, with mean values close to 1, indicating a generally good match between the two data sources. Specifically, the revenue ratios range from the 10th percentile (0.98) to the 90th percentile (1.20), and the employee ratios range from the 10th percentile (0.90) to the 90th percentile (1.11), showing tighter distributions compared to profits. Overall, while profit figures exhibit more variability, the data for revenues and employees align more closely between CbCR and Orbis.

We rely on the comparison between the revenue reported in consolidated accounts and in CbCR to ensure the quality of the information before identifying firms with potential inclusion of dividend payments. We differentiate between high-quality and low-quality matches based on the ratio of CbCR unrelated party revenues to consolidated revenues. If the ratio between unrelated party revenues and consolidated group

Table A.2: Ratios between CbCR and Consolidated Accounts

	Mean	Median	Q10	Q25	Q75	Q90
Unrelated party revenue	1.10	1.05	0.98	1.00	1.10	1.20
Profit	1.41	1.03	0.50	0.92	1.53	2.47
Number of employees	1.09	1.00	0.90	0.98	1.02	1.11

Note: The table presents the distribution of the ratios between CbCR and Orbis values for revenues, profit, and number of employees at the consolidated level. A ratio larger than 1 indicates that CbCR values are larger than those found in consolidated accounts for a given multinational.

revenues falls between 0.7 and 1.3, we categorize the match quality as high. Firms with a good match on revenue represent most of our observations in terms of total revenue, profits, and employees.

A.2.2 Identifying Groups with Potential Inclusion of Intracompany Dividends

To assess the potential inclusion of intracompany dividends in the profit variable and estimate their size, we classify multinationals into three distinct groups based on specific criteria. This analysis aims to provide insights into the presence and magnitude of intracompany dividends within the dataset. The three groups are defined as follows:

1. **Dividends included**: This group consists of multinationals with a high-quality match on revenues and a ratio of CbCR profit to consolidated profit ($\frac{Profit_{CbCR}}{Profit_{conso}}$) exceeding 1.05. In such cases, there is a high probability that intracompany dividends are included in the reported profit figure.

2. **Dividends excluded**: This group consists of multinationals with a high-quality match on revenues and a ratio of CbCR profit to consolidated profit ($\frac{Profit_{CbCR}}{Profit_{conso}}$) lower than 1.05. For these multinationals, intracompany dividends are most likely excluded from the reported profit.

3. **Other**: multinationals falling into this category are excluded from the dividends analysis due to potential matching issues between the CbCR data and the Orbis dataset.

A.2.3 Estimation of Double-Counting

For each multinational that potentially includes intra-group dividends, we estimate the amount of double-counted profit by calculating the difference between the aggregated values reported in the Country-by-Country Reports and the consolidated figures and show this in Table A.3.

Table A.4: Annual Results of Alternative Methods (in billion €)

Year	Category	Nb. Obs	Revenues		Profit		Double Counting
			CbCR ($bn)	Orbis ($bn)	CbCR ($bn)	Orbis ($bn)	($bn)
2016	In	55	353.1	341.7	53.5	24.7	26.5
2016	No Match	76	334.4	0.0	27.0	0.0	0.0
2016	Out	72	1163.5	1075.4	89.5	92.8	0.0
2017	In	64	510.2	480.0	65.0	33.2	28.7
2017	No Match	82	294.4	0.0	13.5	0.0	0.0
2017	Out	95	1239.7	1132.2	113.3	136.2	0.0
2018	In	66	542.2	495.8	77.6	42.2	30.3
2018	No Match	80	294.5	0.0	11.2	0.0	0.0
2018	Out	97	1279.4	1161.8	104.7	109.1	0.0
2019	In	62	477.2	456.1	69.3	38.5	25.7
2019	No Match	77	261.2	0.0	10.7	0.0	0.0
2019	Out	110	1518.9	1392.9	120.7	115.4	0.0
2020	In	41	287.8	267.5	40.6	12.2	26.7
2020	No Match	73	295.1	0.0	13.9	0.0	0.0
2020	Out	136	1450.9	1315.9	64.6	57.0	0.0
2021	In	59	438.9	432.9	97.6	57.4	37.6
2021	No Match	79	283.7	0.0	21.4	0.0	0.0
2021	Out	117	1503.7	1374.3	141.1	143.8	0.0
2022	In	45	719.7	690.7	120.5	88.0	23.4
2022	No Match	97	385.5	0.0	25.8	0.0	0.0
2022	Out	79	1349.2	1304.5	132.2	131.7	0.0
2016-2022	**In**	**137**	**475.6**	**452.1**	**74.9**	**42.3**	**28.4**
2016-2022	**No Match**	**163**	**307.0**	**0.0**	**17.6**	**0.0**	**0.0**
2016-2022	**Out**	**179**	**1357.9**	**1251.0**	**109.4**	**112.3**	**0.0**

Note: This table shows the amounts of profits and revenues covered in CbCR and Orbis as well as our estimated amounts of double counting.

Table A.5: Share of Double Counted Profits

Year	Profits in CbCR	Double counted profits	Share in profits of firms with double counting	Share in matched profits	Share in total profits
	(Bn €)	(Bn €)	(%)	(%)	(%)
2016	170	26.5	49.5	18.5	15.6
2017	191.8	28.7	32.1	16.1	15.0
2018	193.5	30.3	39.0	16.6	15.7
2019	200.7	25.7	37.1	6.7	12.8
2020	119.1	26.7	65.8	25.4	22.4
2021	260.1	37.6	38.5	15.8	14.5
2022	278.5	23.4	19.4	9.3	8.4
2016-2022	202.0	28.4	40.2	15.5	14.9

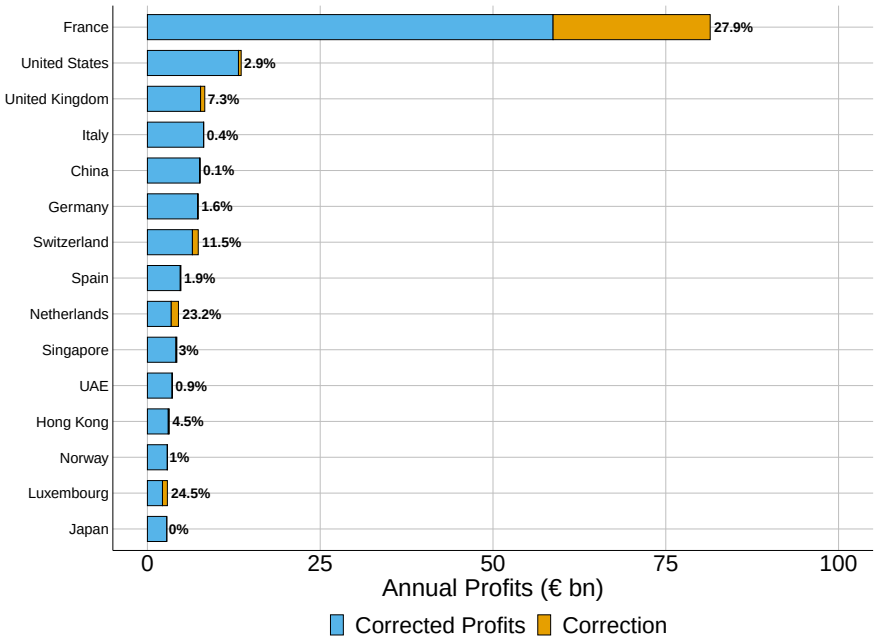
Note: This table presents the total amount of profits reported in CbCR, the total amount of double counted profits and the share of double counted profits in profits matched to Orbis, based on Table A.3. The last line shows the average over the period 2016-2022.

Table A.5 shows the overall amount of double-counted profits. We observe that double-counting represents on average 40% of total profits for MNEs in which we observe double-counting. In aggregate, considering multinationals for which we have a good match on revenues, double-counted profits account for 14.9% of total reported

profits in CbCR. There is however substantial variance across time. In some years, double-counted profits represent up to 25.4% of profits that we are able to match to Orbis, or 22.4% of total reported profits. We find that the quality of CbCR data is improving over time, with 43 to 27% of MNEs double-counting their profits between 2016 and 2018, down to 23-20% in 2021 and 2022.

We assume that the inclusion of dividends will result in observations with very high profitability and low effective tax rates (ETRs). Based on this assumption, we select problematic countries within each multinational to correct for double-counted dividends. Specifically, within each multinational, we flag subsidiaries in the bottom 30th percentile of ETRs and the top 30th percentile of profitability (calculated as profit over total revenue). For these selected jurisdictions, plus the ultimate parent in France, we treat the double-counted dividends as distributed income, allocating amounts pro rata based on reported profit.

Figure A.1: Correction of Double-Counting per Country



Note: The graph presents the amount of double-counting correction averaged over the available years, only for companies potentially including dividends. The graph shows the top 20 countries in terms of profit. The sum of the yellow and blue bars shows the total profits before the double-counting correction. The blue bars show the corrected amount of profits we use in our estimation of profit shifting.

The inclusion of dividends poses challenges, especially for countries serving as holding hubs that are instrumental for dividend repatriation for multinational corporations. We use the share of holding companies in total companies as an indicator for the location of double-counted profits.

Figure A.1 shows the distribution of total profits (both potentially including and ex-

cluding intra-group dividends). It shows that the amount of profits is largely corrected for some countries, notably the Netherlands, Switzerland, and Luxembourg.

A.2.4 Validation of Double-Counting Cleaning Methodology

To validate our method, we first use the comments of the groups in their CbCR reports. We check that the groups indicating that they double-counted their intra-group dividends are indeed identified as such by our methodology. Out of the over 15 MNEs that reported information on whether they include intra-company dividends, our correction was correct in more than 75% of the cases. We also use the share of holding companies in total companies as an indicator of potential double-counted profits. We expect countries that have many holding activities to receive a lot of dividends. Figure A.2 shows that holding companies are very prevalent in tax havens, consistent with our top countries, for which we observe a lot of double-counted profits.

We then compare the pre-tax book income we observe in the French tax returns data (BIC) to the corrected and uncorrected amounts of pre-tax profits reported in CbCR. We show this in Figure A.3. We observe that before correcting for double-counting, CbCR profits in France are, on average, larger than the pre-tax profits reported in tax returns data.[45] Atfer implementing our methodology, we find that profits in CbCR are aligned with profits reported in tax returns. Similarly, we confirm that we capture the right firms by showing that, for firms for which we do not identify any double-counting, the profits reported in CbCR match the profits reported in tax returns.

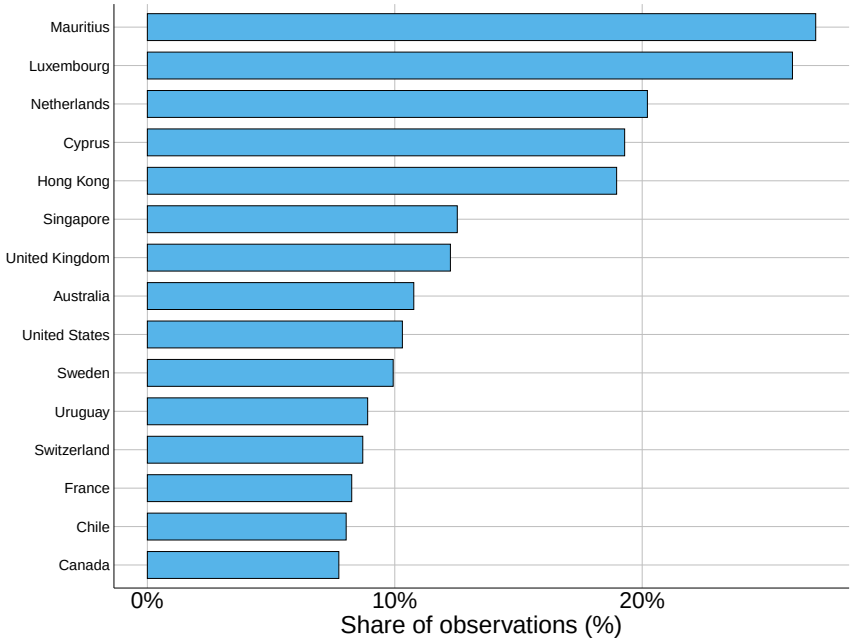
We then compare effective tax rates and profitability of the corrected groups with groups that did not double-count their intra-group dividends. Table A.6 shows, as expected, that the ETR of firms for which we observe double-counting is much lower than for those without double-counting. After correction, the ETR is much closer to the ETR for observations where there is no double-counting. Table A.7 also shows that firms that include intra-company dividends have a higher profitability than other firms to have a lower ETR.

A.2.5 Comparison with Existing Estimates

When comparing our findings with previous estimates of double-counting, we observe variations depending on the specific dataset and jurisdiction analyzed. The following are some notable comparisons:

[45] In France, all firms have to submit an income statement to the tax authority, which enables us to recover their pre-tax book income, which should correspond to the pre-tax profit variable in CbCR.

Figure A.2: Share of Holding Activity Among Subsidiaries by Country



Note: This figure shows the share of subsidiaries having a holding activity in all subsidiaries per country. It includes countries with more than 50 multinational firms per year from 2016 to 2022.

With aggregated data. Previous studies that used aggregated data have reported the following estimates of double-counting:

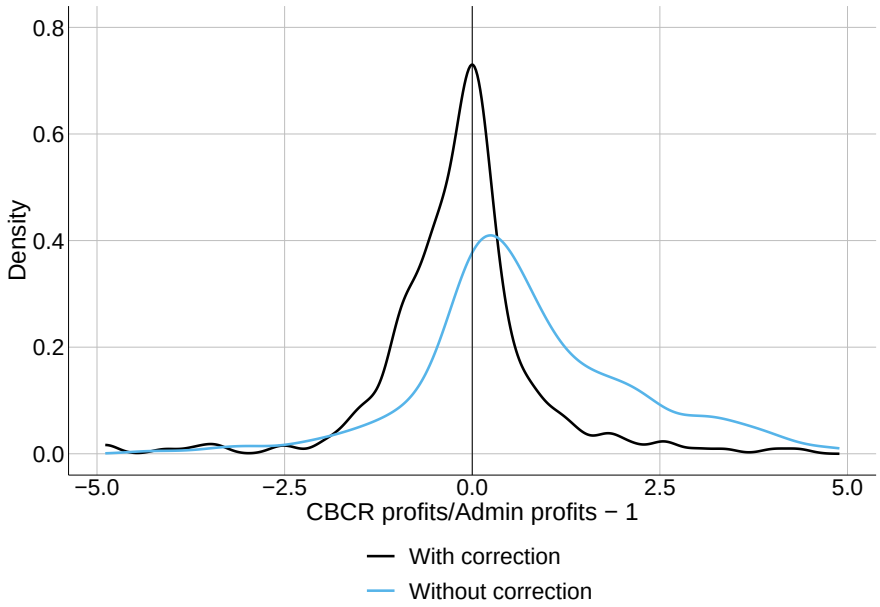
- Horst and Curatolo (2020): Estimated a double-counting rate of 23% (including stateless entities) based on the US Country-by-Country Reporting (CbCR) data for the year 2017.
- Garcia-Bernardo et al. (2022): Found double-counting rates of 49%, 72%, and 47% for the years 2017, 2018, and 2019, respectively (including stateless entities) using US CbCR data.
- Dutch Government: Reported that dividends accounted for 16% of total profit

Table A.6: Descriptive Statistics of Effective Tax Rates (Accrual Basis) - Group level

Variable	N. Obs.	Mean	Median	Q10	Q25	Q75	Q90
ETR dividends in	406	20.2	16.2	5.3	9.7	24.1	32.8
ETR dividends out	516	60.4	27.9	12.8	20.9	36.5	57.5
ETR corrected	406	40.9	24.9	10.7	18.9	33.5	55.5

Note: Descriptive statistics of the effective tax rate calculated at the MNE level using corrected and not corrected profit. "ETR dividends in" indicates MNEs that potentially include dividends, "ETR dividends out" indicates MNEs that do not include dividends, and "ETR corrected" indicates "ETR dividends in" after the correction is applied. We include all observations with positive profit for the years 2016 to 2022.

Figure A.3: Pre-Tax Profits - Validation of the Correction



Notes: This graph shows the distribution of the ratio between book profits in CbCR and profits in administrative data for MNEs we correct for double-counting before and after correction. It shows that this distribution is more centered post correction. We center the distribution around 0, so that a ratio around 0 means that the profits (corrected or uncorrected) reported in CbCR equal the profits reported in BIC.

based on the Dutch CbCR data for the year 2017.

At the parent level. Some tax authorities have provided estimates of double-counted profits at the parent jurisdiction level. These estimates are as follows:

- UK HMRC: Estimated that 49% of domestic CbCR profit reported by UK MNEs was double-counted, with approximately 25% of UK-headquartered groups including dividends. The estimate was based on the UK CbCR data for the year 2017.
- Italy: Reported an average double-counting rate of 38.2% based on the Italian CbCR data for the year 2016.
- Sweden: Identified double-counting rates of 58% for the year 2016 and 52% for the year 2017 based on the Swedish CbCR data.

These comparisons highlight the varying degrees of double-counting observed across different datasets and jurisdictions. The differences in rates can be attributed to vari-

Table A.7: Descriptive Statistics of Profitability - Group Level

Variable	N. Obs.	Mean	Median	Q10	Q25	Q75	Q90
Profitability divid. in	406	14.6	11.5	2.2	5.2	18.0	29.6
Profitability divid. Out	516	9.0	5.7	1.2	2.9	11.6	21.4
Profitability corrected	406	8.5	7.2	1.2	3.1	10.9	16.4

Note: Descriptive statistics of profitability calculated at the MNE level using corrected and not corrected profit divided by total revenues. "Profitability divid. in" indicates MNEs that potentially include dividends, "Profitability dividends out" indicates MNEs that do not include dividends, "Profitability corrected" indicates "Profitability dividends in" after the correction is applied. We include all observations for the years 2016 to 2022.

ations in data quality, matching methodologies, and specific reporting practices within each jurisdiction.

B Data Appendix

B.1 List of tax havens

We use the list provided by Tørsløv et al. (2023). We include five OECD countries (Belgium, Ireland, Luxembourg, Netherlands, and Switzerland) and 36 non-OECD countries or territories, namely Andorra, Anguilla, Antigua and Barbuda, Aruba, The Bahamas, Bahrain, Barbados, Belize, Bermuda, the British Virgin Islands, the Cayman Islands, Curaçao, Cyprus, Gibraltar, Grenada, Guernsey, Hong Kong, the Isle of Man, Jersey, Lebanon, Liechtenstein, Macau, Malta, Marshall Islands, Mauritius, Monaco, Panama, Puerto Rico, Samoa, Seychelles, Singapore, Sint Marteen, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Turks and Caicos, Vanuatu.

B.2 Matching with OFATS and French Administrative Data (BIC-IS)

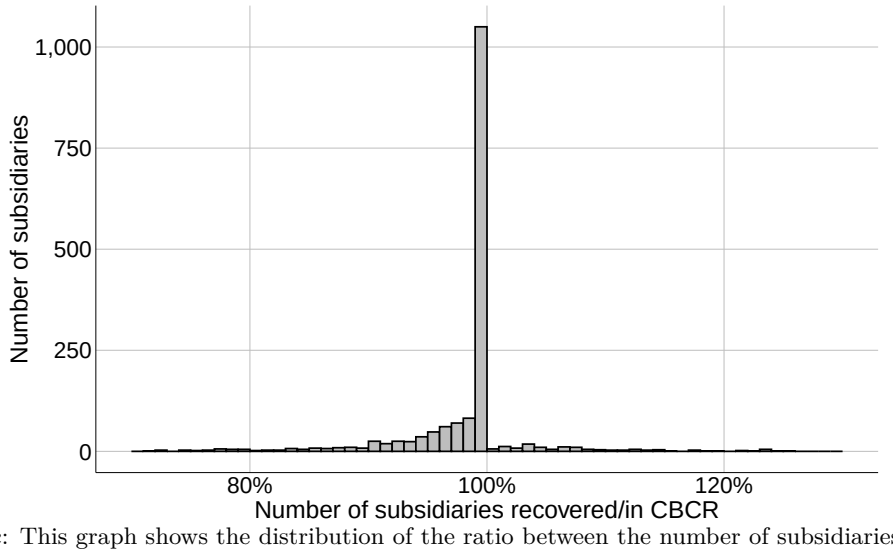
To recover the compensation of employees paid by each group in each country, we match our CbCR data with data from Outward Foreign Affiliates Statistics (OFATS) and French administrative data (LIFI and BIC-IS).

B.2.1 French Subsidiaries

To recover wages paid by French subsidiaries, we merge CBCR to French administrative data. We use the list of subsidiaries that MNEs have to provide in their CBCRs which includes a firm identifier that we can directly match to administrative data for 65% of all subsidiaries×year. We complement this match with a restrictive fuzzy match

on the name of the mentioned subsidiary.[46] This brings our match to 75% of all subsidiaries. For 71% of MNE×year observations the number of subsidiaries recovered was more than 95% of the total number of subsidiaries mentioned. For companies that do not give enough information on their subsidiaries, we use the firm ownership dataset LIFI. We then benchmark our two matches (with LIFI and with the list of subsidiaries) and choose the best match between the two. In the end, 83% of our MNE×year observations come from the list in CBCR, the rest comes from LIFI. Our match is close to perfect, as shown by Figure B.1. We then use information from BIC-IS on total compensation of employees, which definition corresponds to the information contained in OFATS.

Figure B.1: Quality of the Match



Note: This graph shows the distribution of the ratio between the number of subsidiaries we recover in our data and the number of subsidiaries reported in CBCR.

B.2.2 Foreign Subsidiaries

OFATS collects information from the heads of French multinational groups about their subsidiaries abroad for firms in all sectors.[47] The OFATS sample includes an exhaustive stratum of groups with four or more subsidiaries (around 1,600 groups).[48] Out of the 314 MNEs in total for the years 2016-2022, we were able to match 296 with OFATS. For non-matched observations, we use the number of employees provided by CbCR, that we multiply by the median wage at the country-year level computed using OFATS on matched observations.

[46] For the fuzzy match, we only remove generic suffixes for companies such as "SAS", "SNC", etc.

[47] Multinational firms have to report all companies in which the group exercises control, directly or indirectly. All MNEs whose main decision-making center is located in France and that control at least one company based outside France are surveyed. The survey is sent to the parent company or "decision center", or to the company responsible for consolidating data from subsidiaries throughout the group.

[48] See CNIS.

Moreover, 22 small countries are completely missing in OFATS (out of the 221 countries in CbCR). For 20 out of these 22 countries, only 5 MNEs are operating, and for 16 countries, only one or two MNEs are operating. In these cases, we use the average wage computed from official statistics.

B.2.3 Computation of Wages

We proceed in three steps to compute wages:

- We compute the average wage per employee at the MNE×country level in OFATS and in BIC-IS merged to employer-employee data (DADS) to recover the number of employees in full-time equivalents.
- We multiply this average wage by the number of employees in Country-by-Country reports.
- Missing wage data is imputed through linear interpolation at the MNE-country level.
- For remaining missing values, we first estimate wages by multiplying the number of employees by the average wage per employee of the MNE in the country over the period. If data is still missing, we use the median average wage per employee of other MNEs in the same country and year.

C Additional Descriptive Evidence

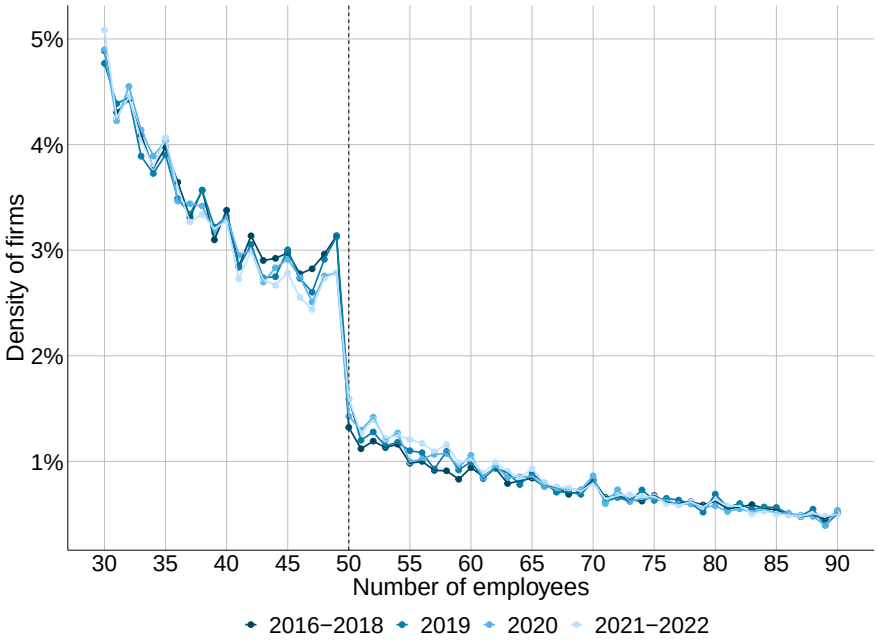
C.1 Profit-Sharing

Table C.1 shows the non-weighted average of the ratio between profits or profit-sharing and assets, wages, and a mix of assets of wages defined as 0.13×assets plus wages, in the whole sample and matched sample separately. We find larger average ratios in domestic firms in the whole sample. When restricting ourselves to matched firms, only the average profit-sharing-to-assets ratio becomes slightly larger in MNEs. It is worth noting that the average ratio between profit sharing and wages remains higher in non-MNEs.

While we do not have exhaustive data on how profit-sharing is distributed among employees, we use a survey conducted by the French statistical office each year over the period 2016-2022, giving this information for a subsample of firms and employees.[49] From this survey, we try to uncover the most common allocation rule within firms. We

[49] *Enquête sur le coût de la main d'œuvre et la structure des salaries* (ECMOSS). It surveys about 10,200 privately-held firms, giving information on 114,600 employees.

Figure C.1: Number of Firms by Size Thresholds



Note: This figure displays the distribution of French firms by size (number of employees), for firms with 30 to 90 employees. It documents a sizeable bunching at the 50 employees threshold, which could be also due to other requirements than profit-sharing. It however shows a slight reduction in the bunching starting in 2019, when a reform relax the 50 employees threshold. After 2018, only firms with more than 50 employees during 5 years have to share profits with their employees.

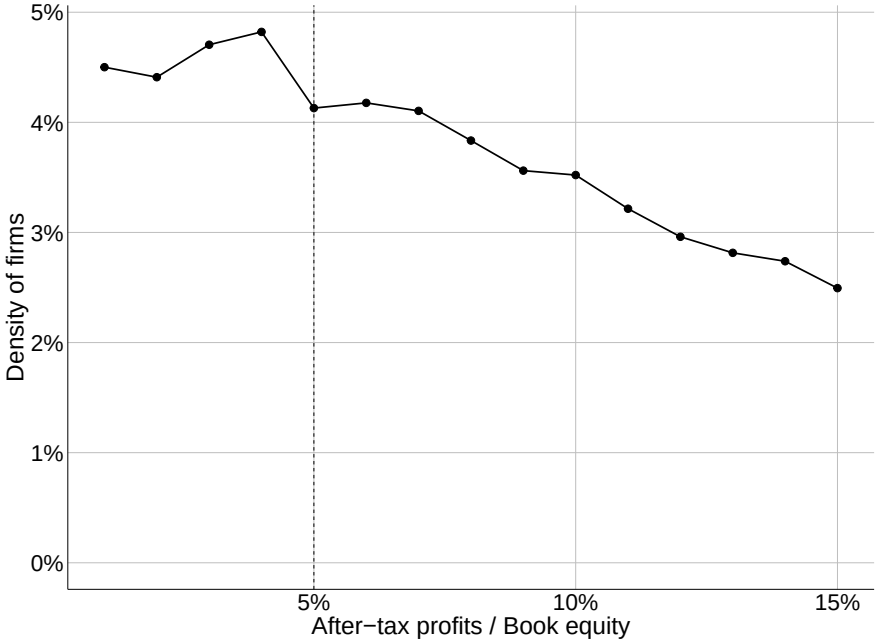
Table C.1: Profit-Sharing and Profits in MNEs and Domestic Firms

	Unmatched Sample		**Matched Sample**	
Variable	Domestic	MNEs	Domestic	MNEs
Observations	60,500	26,741	20,060	20,060
Profit-Sharing				
/ Assets (%)	0.526	0.486	0.470	0.544
/ Wages (%)	2.542	2.431	3.049	2.312
/ Mixed (%)	1.340	1.220	1.316	1.283
Profit				
/ Assets (%)	2.875	0.947	2.760	0.710
/ Wages (%)	18.449	15.439	24.890	8.976
/ Mixed (%)	8.956	4.751	9.057	3.784

Note: This table shows the non-weighted average of the ratios between profit-sharing and total assets, wages, and a mix between the two of 0.13×assets + wages. MNEs include all the subsidiaries of the MNEs included in our CbCR sample. The unmatched sample includes all the firms of more than 50 employees, while the matched sample only includes firms that could be matched through propensity score matching.

see that most firms choose a combination of the two options: equal among employees or proportional to wages. To estimate the weight associated with each option, we run

Figure C.2: Post Tax Profits-to-Equity Ratio



Note: This figure shows the number of firms in each percentile of the ratio between post-tax profits and book equity. It includes all firms with more than 50 employees in France. It shows a small bunching at 5%, which is the threshold above which a firm must share profit with its employees.

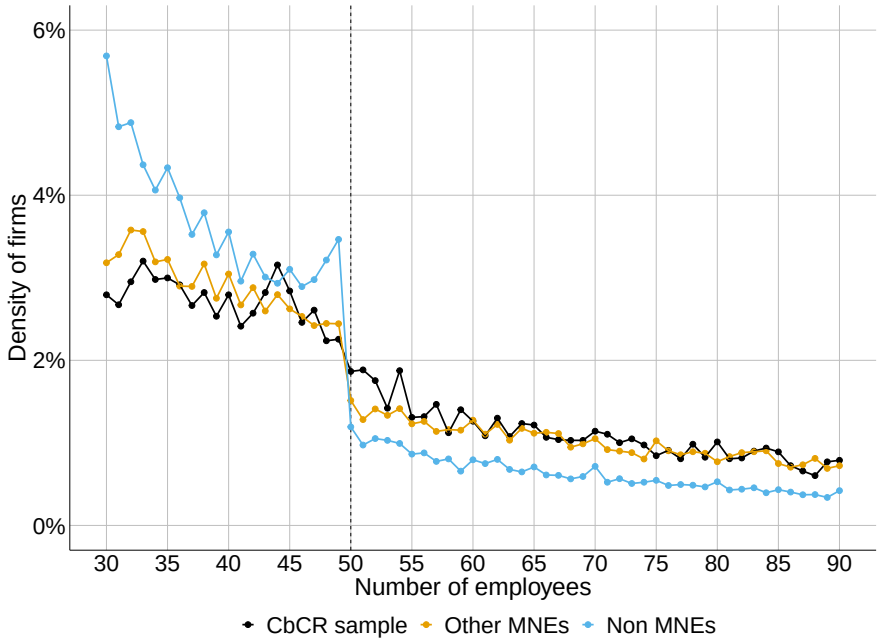
the following regression to predict the employee's share in the firm's profit-sharing:

$$\frac{\text{Profit-sharing}_{ijt}}{\text{Profit-sharing}_{jt}} = \beta_1 \frac{h_{ijt}}{h_{jt}} + \beta_2 \frac{w_{ij}}{w_{jt}} + u_j + v_t + \epsilon_{ijt} \tag{13}$$

with $\text{profit-sharing}_{ijt}$ the amount of profit-sharing received by employee i in firm j at year t, and $\text{profit-sharing}_{jt}$ the total profit-sharing amount distributed by firm j in year t. The explanatory variables are the employee's share in the firm's total full-time equivalents $\frac{h_{ijt}}{h_{jt}}$, and the share in total gross wages $\frac{w_{ijt}}{w_{jt}}$. The specification includes firm and year fixed effects, and standard errors are clustered at the firm-year level.

Table C.2 presents in column (4) the estimated coefficients of Equation 13, as well as alternative specifications with slight variations. Our two explanatory variables provide a good prediction of employees' share in profit-sharing, with an R^2 of about 80% both with and without fixed effects. The estimated coefficients, β_1 and β_2, are 0.26 and 0.69, respectively, and both are highly statistically significant (column (1)). The unexplained component may be attributable to employee seniority in the firm, as specified in the legal document, but this information is not available in our data. We therefore use the following allocation formula to predict the employee's share in profit-sharing:

Figure C.3: Number of Firms by Size Thresholds and Type of Firm



Note: This figure displays the distribution of French firms by size (number of employees), for firms with 30 to 90 employees. Firms are broken down by ownership type, between subsidiaries included in our CbCR sample, subsidiaries of other MNEs, and non-MNE owned.

$$\frac{\text{Profit-sharing}_{ijt}}{\text{Profit-sharing}_{jt}} = 0.3 \cdot \frac{h_{ijt}}{h_{jt}} + 0.7 \cdot \frac{w_{ijt}}{w_{jt}} \tag{14}$$

Table C.2: Prediction of Employees' Share in Profit Sharing

	Share in Profit Sharing					
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	0.002***	0.005***	0.003***			
	(0.0001)	(0.0002)	(0.0002)			
Share in Employees	0.264***		0.949***	0.171***		0.830***
	(0.009)		(0.002)	(0.011)		(0.008)
Share in Wages	0.693***	0.920***		0.686***	0.795***	
	(0.009)	(0.002)		(0.009)	(0.006)	
Firm FE				✓	✓	✓
Year FE				✓	✓	✓
Observations	275,745	275,947	275,745	275,745	275,947	275,745
R^2	0.81	0.80	0.74	0.81	0.81	0.74
Within R^2				0.56	0.55	0.40

Note: $^*p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$

This table summarizes our results estimates on the correlation between the share of each employee in total full time equivalent of the firm, the share of each employee in gross wage bill of the firm, and the share of each employee in total profit sharing distributed by the firm. Standard errors are clustered at the firm × year level.

C.2 CbCR Data

CbCR data reveal the wide range of tax rates faced by multinational companies worldwide. We compute effective tax rates (ETRs) at the year and country level by summing all taxes accrued reported in a given country during the year, divided by the sum of all profits reported in that country in the same year.[50]

We observe that French multinationals face very different ETRs depending on where they book their profits (Figure C.4). In France, we observe that multinationals face a significantly lower ETR than the statutory rate. Additionally, the decline in the corporate income tax rate has led to a small reduction in the ETR. At the beginning of the period, the ETR was 24%, compared to a statutory rate of 33.3%. By 2022, the ETR had dropped to 21%.

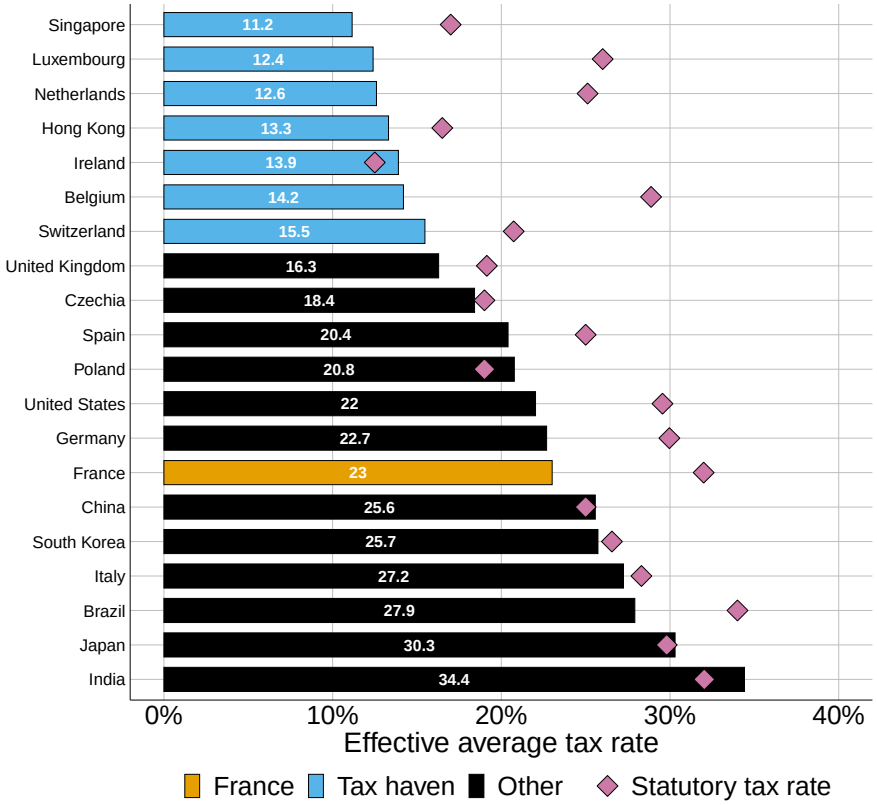
In addition, we observe that French MNEs face lower effective tax rates in tax havens such as Singapore, Luxembourg, Hong Kong, and Switzerland, with ETRs well below the statutory rates. Overall, French MNEs face an average effective tax rate of 23% on their global profits. Several tax havens strike out as having relatively low effective tax rates, much lower than the statutory tax rate, such as Luxembourg or Singapore.

CbCR data provide valuable insights into the location of activities of multinational enterprises, including in tax havens. Figure C.5 shows the distribution of activities carried out by French multinationals around the world. One of the first observations is that a significant proportion of their activities are concentrated in France. On average over the period 2016-2022, 34% of employees, around 45% of payroll, tangible assets and related party revenue, and 34% of profits are located there. Moreover, 22% of foreign profits are booked in tax havens (14% of global profits) while less than 12% of foreign tangible assets are located in tax havens.

In Figure C.6, we plot the distribution of the business activity of the subsidiaries by country type. We differentiate between France, tax havens, and other countries. We observe that activities that tend to be more associated with profit shifting, such as holding activities, financial and insurance activities, are prevalent in tax havens. These activities are likely to be decorrelated from real economic activities as they do not necessarily require much physical presence and are very mobile. In total, 25% of insurance activities are reported in tax havens, against only 7% of manufacturing. Figures C.7 show the distribution of the main variables among the MNEs.

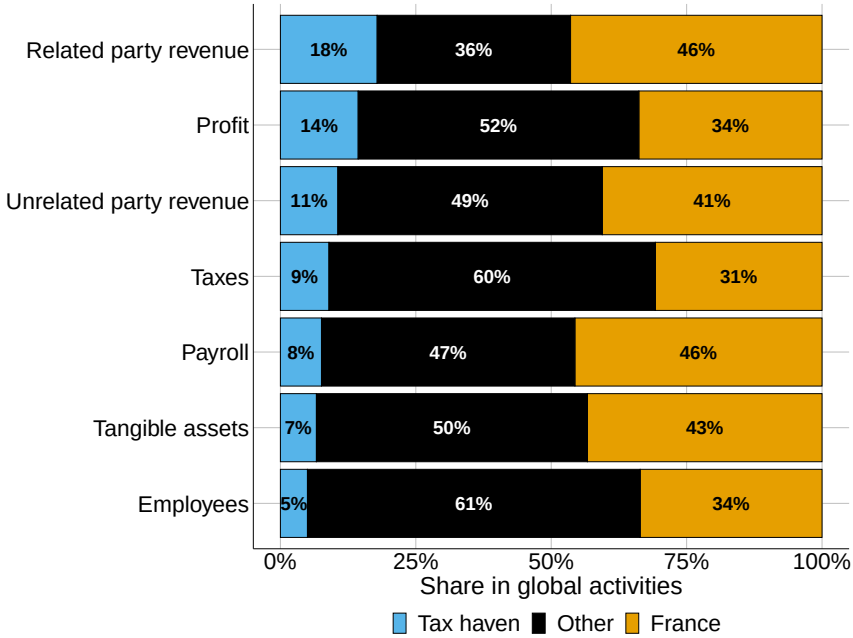
[50] We only include in the calculation the subsidiaries reporting positive profits and a positive tax liability that does not exceed the amount of profits (they account for 64% of our sample, and 92% of observations with positive profits).

Figure C.4: Average Effective Tax Rate by Country



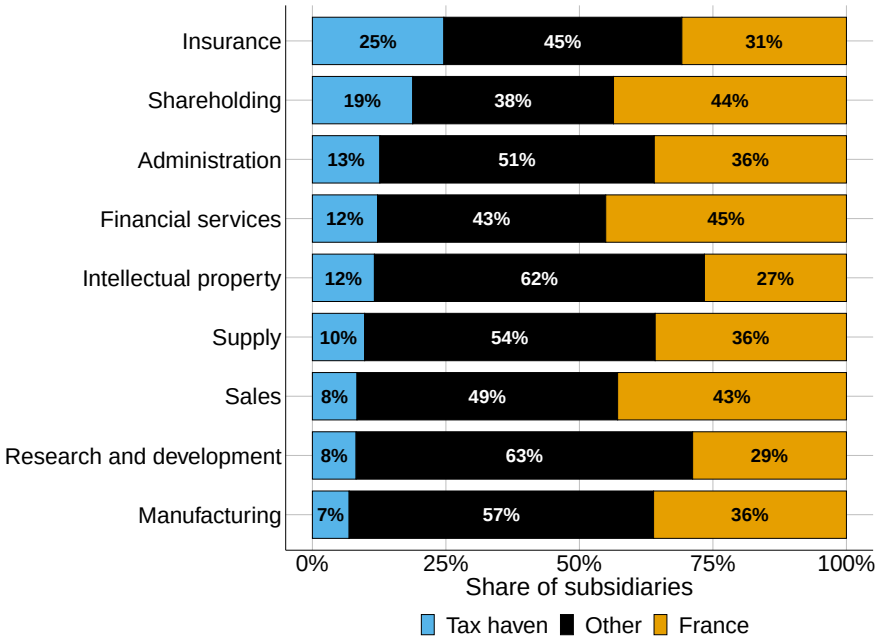
Note: This graph shows the effective tax rates and statutory tax rates of the 20 countries where the French MNEs report the largest profits. The values correspond to the average over the period 2016-2022. ETRs are computed at the year and country level as the sum of tax accrued reported there, divided by the sum of profits, including only subsidiaries that report positive profits and positive accrued tax amount, and a tax amount lower than the reported profit. Statutory tax rates come from Tax Foundation. *Lecture*: between 2016 and 2022, the average effective tax rate in Singapore is 9%, while the statutory tax rate is 17%.

Figure C.5: Misalignment Between Real and Reported Activities in Tax Havens



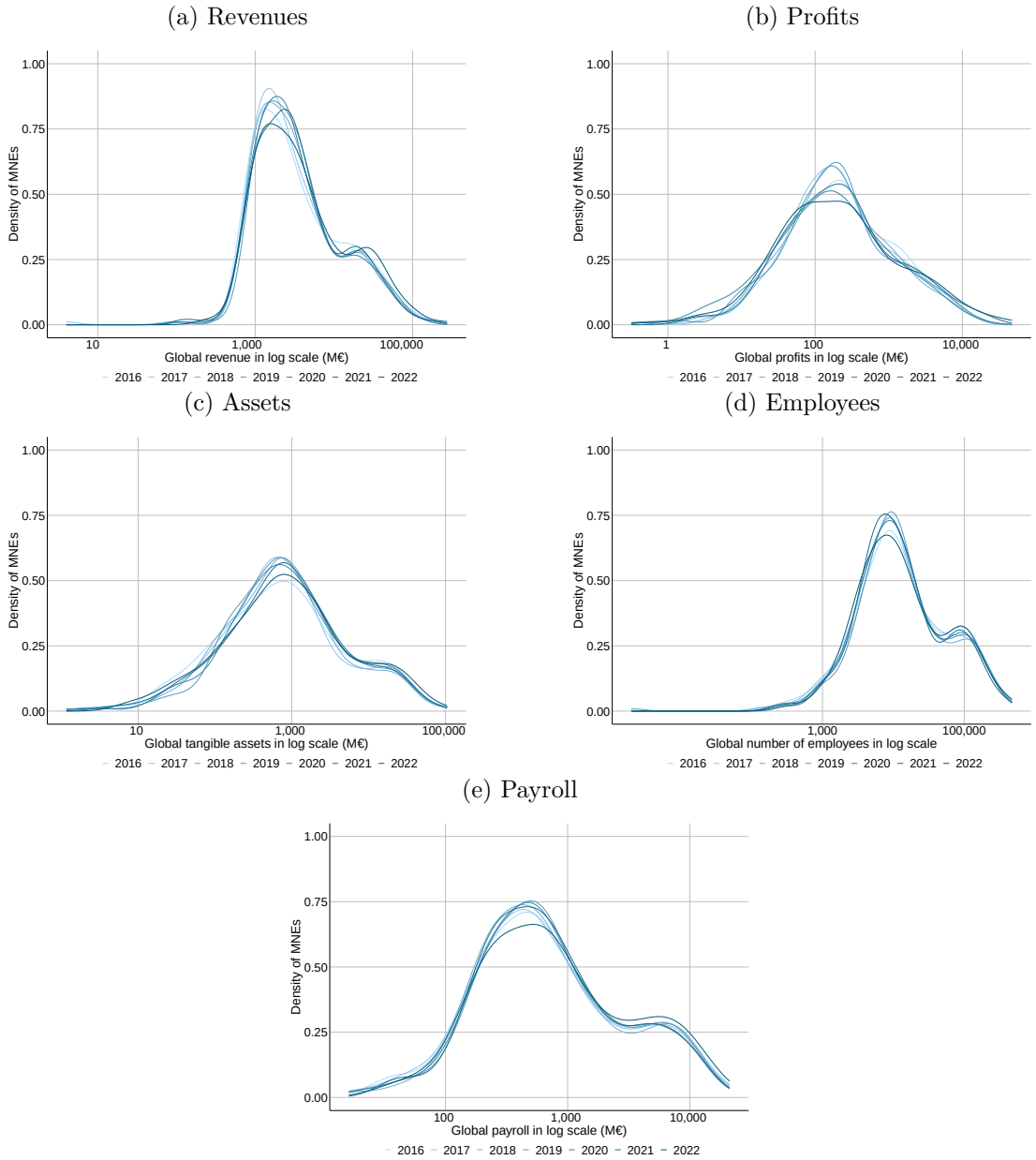
Note: This graph depicts the share of MNE activity in France, tax havens and other countries across key variables. *Lecture*: On average over the period, tax havens accounted for 18% of all related party revenues.

Figure C.6: Business Activities of Subsidiaries



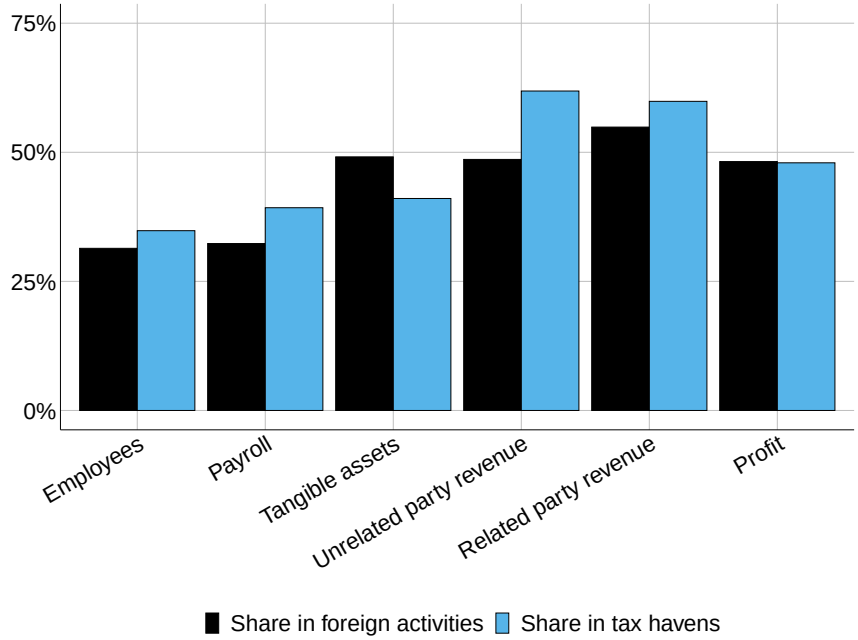
Note: This graph shows the location of subsidiaries according to their business activities. *Lecture:* 13% of subsidiaries involved in administration services are located in tax havens.

Figure C.7: Distributions of Main Variables



Note: These figures show the distribution of revenues, profits, assets, employees and payroll and profits in our sample, for every year of the period.

Figure C.8: Concentration Among the Top 15 of French Multinational Firms



Note: We take the MNEs in the top 15 of the global revenue distribution per year and compute their share in total foreign activities in black bars, and in activities booked in tax havens in blue bars. We average all shares over 2016-2022.

D Additional Results

D.1 Evidence on Misalignment

We estimate the excess profitability of subsidiaries following our methodology presented above. Figure D.1 shows the ratio between total reported profits in a given country over total theoretical profits estimated from real economic activity with our apportionment formula. We find that excess profitability is particularly high in tax havens such as Luxembourg (where MNEs are almost three times more profitable than estimated), the Netherlands, Singapore, Hong Kong and Switzerland.

Figure D.1: Excess Profitability in Tax Havens

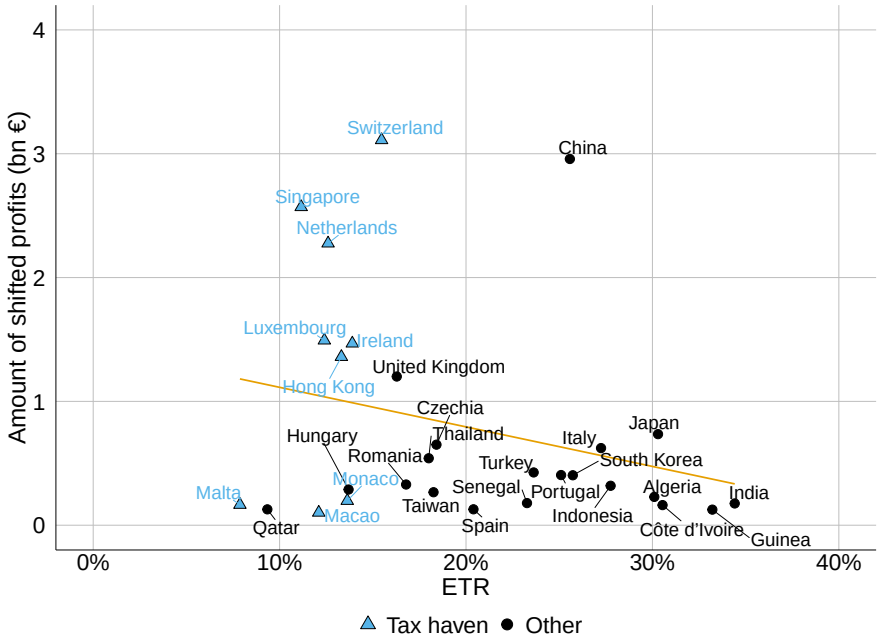
Note: This graph shows on the y-axis the ratio between total profits over the period 2016-2022 reported in a given country and total estimated theoretical profits in that country. The x-axis ranks countries according to the ETR faced by the MNEs there, averaged over the period. Computation of ETRs by country is presented in Figure 5. The graph includes the top 20 countries in terms of profits reported by French MNEs. *Lecture:* over the period, reported profits in France represent only 87% of the counterfactual profits, and the average ETR faced by MNEs in France is 19%.

We also find that the countries attracting the highest amounts of misaligned profits have the lowest effective tax rates. Figure D.2 shows our estimate of the annual amount of misaligned profits in the main destination countries, and highlights the negative correlation with tax rates. The five tax havens mentioned above are the main recipients of profit misalignment by French multinationals.[51] This hints at a potential tax-related

[51] There are some outliers such as China, where we find over €3 billion in misaligned profits. This

justification for such high amounts of reported profits.

Figure D.2: Profit Misalignment and Effective Tax Rate



Note: This graph shows the correlation between profit misalignment and ETR. The amounts of misaligned profits are computed by country without the tax condition, as the sum of all profit differentials (positive and negative) of the French MNEs in the country in a given year, and then the figures are averaged over the period 2016-2022. Computation of ETRs by country is presented in Figure 5. Only countries with an average annual amount of misaligned profits larger than €100 million are represented in the graph. *Lecture:* over the period, €3.3 billion of profits are shifted by French MNEs in Switzerland, where they face an average ETR of 13%.

D.2 Geographical Concentration of Profit Shifting

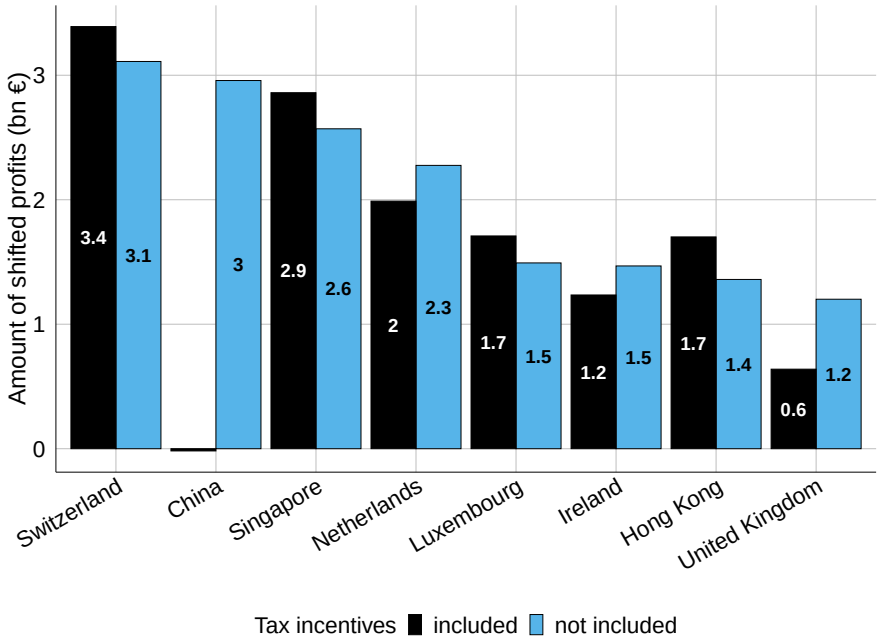
To better understand where French multinationals shift their profits, Figure D.3 shows the annual amount of misaligned and shifted profits for the eight countries that receive highest amount of misalignment. Two third of profit shifting is concentrated in seven major financial centers: Switzerland, Singapore, the Netherlands, Luxembourg, Hong Kong, Luxembourg, Ireland and the UK.

D.3 Evolution of Profit Shifting Practices

We observe in Figure D.4 a slight decline in the amount of misaligned profits in 2020, attributed to the economic impact of the COVID-19 pandemic. This reduction

is consistent with the findings of Garcia-Bernardo and Janský (2024), and might be indicative of other incentives related to special economic zones that we can not document with our data.

Figure D.3: Amounts of Shifted Profits in the Top 8 Destination countries



Note: This graph shows the average annual amounts of shifted profits in the top 8 destination countries, according to our two main estimation methods. In black, we represent estimates that include tax incentives, and in blue, estimates computed directly from the apportionment formula. These results are the balance computed by country between positive shifting (when reported profits exceed theoretical profits) and negative shifting (when reported profits are lower than theoretical profits). *Lecture:* on average over the period, €2.3 billion of profits are shifted to the Netherlands every year; when we restrict to tax-induced shifting, the amount is €2 billion.

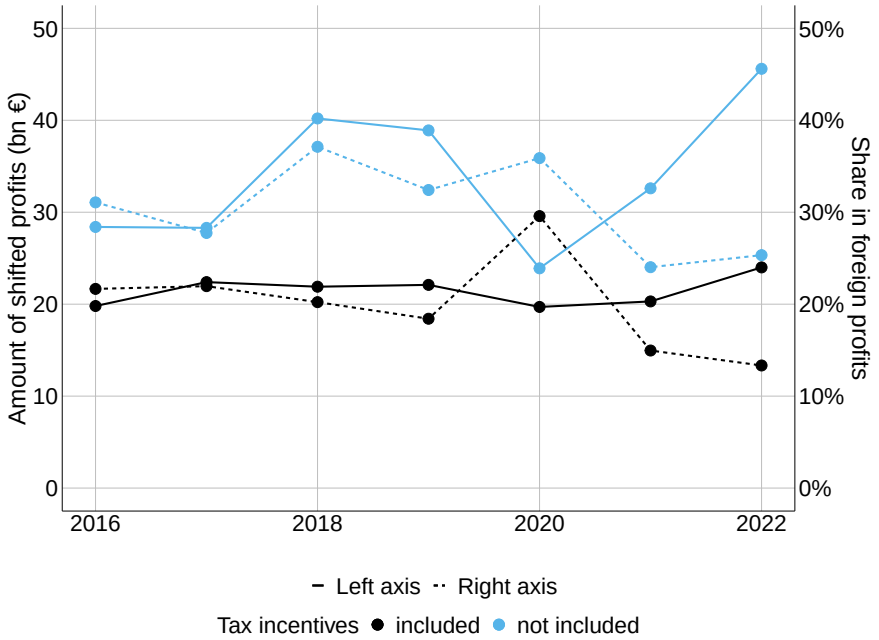
is driven by a decrease in firm profitability during that year rather than a reduction in profit shifting practices, as the share of misaligned profits in foreign profits remains unchanged. In contrast, 2022 exhibits an increase in misaligned profits, primarily driven by a significant rise in profitability within the oil sector.[52] This trend also reflects fluctuations in sector-specific profitability rather than an intensification of profit shifting practices. Moreover, profit shifting estimates are more stable over the 2016-2022 period, indicating no change in tax avoidance practices conducted by the French MNEs.

D.4 Tax Savings Implications for French MNEs

We estimate the effect of profit shifting on taxes paid by MNEs and show the result on Figure D.6. We consider their effective tax rates with and without profit misalignment and compute a counterfactual ETR assuming that profits align with real economic activity and apply the actual country-level EATR to these reallocated profits.

[52] As mentioned in Reuters and Energy Profits.

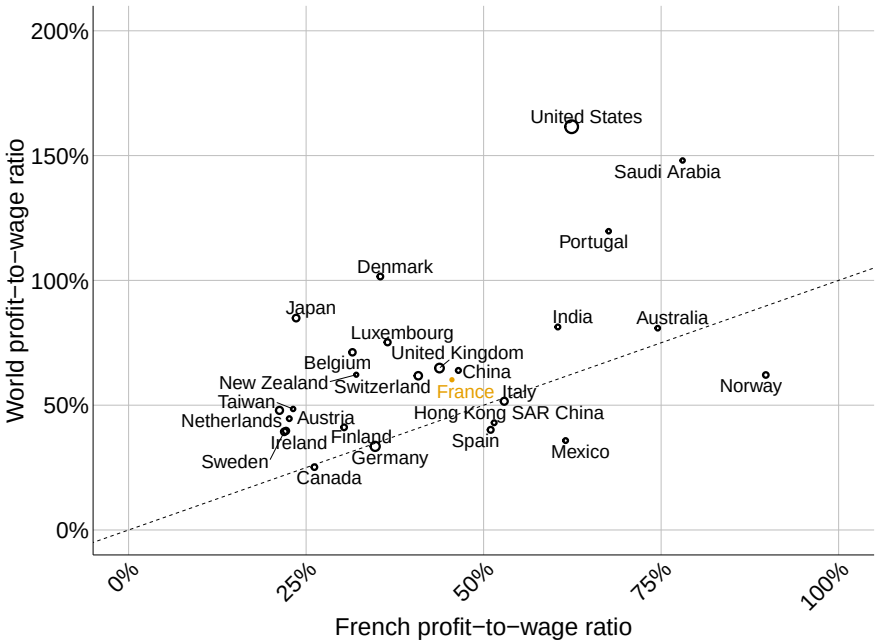
Figure D.4: Global Amounts of Shifted Profits by French MNEs



Note: This graph shows the annual amounts of shifted profits by French MNEs in the world, according to our two main estimation methods. In black, we represent estimates that include tax incentives, and in blue, estimates computed directly from the apportionment formula. The full lines represent the global amounts of shifted profits in euros (left axis). The dashed lines represent the share of shifted profits over foreign profits (right axis). *Lecture:* In 2018, the French MNEs shifted a total amount of €25 billion of profits, which corresponds to 14% of global profits, according to our most conservative estimate.

We find that in the absence of profit shifting, and behavioral responses, the global ETR would increase on average by around 3pp each year on average, which corresponds to a 13.3% increase.

Figure D.5: Profitability in France and Worldwide



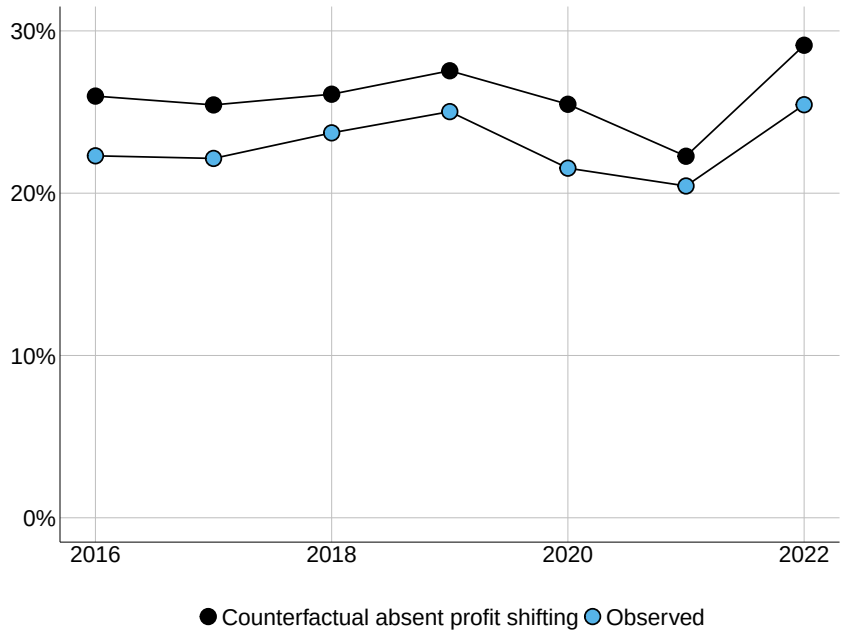
Note: This graph shows the profit-to-wage ratios of French and foreign MNEs in France and at the consolidated level by headquarter country. The size of the point is proportional to the amount of profits in France, except for French multinational firms. It is the result of a match between consolidated-level data and French administrative data at the MNE level between 2016 and 2022. We only select companies with positive profits in France and positive profits worldwide.

Table D.1: Profit Shifting Estimates and Consequences for Tax Revenues (in billion €)

Region	Profit	Taxes	Shifted profits			Tax gains & losses			
			Balance	In	Out	Balance	Gain	Losses	
						ETR	ETR	ETR	STR
France	58,7	15,9	-10,3	3,1	-13,3	-3,7	0,1	-3,8	-4,2
United States	13,2	4	-4,7	0,6	-5,3	-1,1	0,1	-1,2	-1,5
Rest of Americas	5	2,6	-1,7	0,9	-2,3	-0,6	0	-0,8	-0,7
Germany	7,2	2,2	-1	0,2	-1,2	-0,3	0	-0,3	-0,4
Italy	8,1	2,4	-0,9	0,2	-1,1	-0,4	0	-0,4	-0,3
Africa	7,1	3,5	-0,3	0,8	-0,9	-0,2	0	-0,2	-0,1
Switzerland	6,5	1	3,4	3,6	-0,2	0,4	0,4	0	0
Singapore	4,1	0,4	2,9	2,9	-0,1	0,2	0,2	0	0
Netherlands	3,4	0,8	2	2,6	-0,6	0,1	0,2	-0,1	-0,1
Other tax havens	3,2	1,2	1,8	2,9	-1,1	-0,2	0,2	-0,3	-0,3
Hong Kong	3	0,5	1,7	1,7	0	0,2	0,2	0	0
Luxembourg	2,2	0,4	1,7	1,7	0	0,1	0,2	0	0
Rest of Europe	17,8	5,5	1,6	3,3	-1,8	0	0,3	-0,4	-0,4
Rest of Asia & Oceania	23,6	7,9	1,3	3,2	-1,9	-0,4	0,5	-0,6	-0,5
Ireland	2,3	0,3	1,2	1,3	-0,1	0,2	0,2	0	0
United Kingdom	7,7	2,1	0,6	1,7	-1,1	0	0,2	-0,2	-0,2

Note: This table shows the annual amounts of shifted profits by large French MNEs, detailed by country, aggregated region. These results report the net balance between positive and negative amounts of shifted profits (Balance), as well as the positive amounts (In) and the negative amounts (Out). We also compute the consequences for tax revenues. For the losses, we compute them from the ETR faced by the MNEs in the country (ETR), or from the statury tax rates (STR).

Figure D.6: Evolution of Global ETR with and without Profit Shifting



Note: This graph shows the global effective tax rate absent any profit shifting according to the tax-motivated misalignment method. ETRs are computed as the sum of global taxes divided by the sum of taxes paid.

E Details on Robustness Checks

We use alternative estimation methods to support our results. In this Appendix, we propose several methods for estimating the share of subsidiaries' costs in their group and defining the tax condition. Table E.1 shows the global results for each method that we present in more detail below.

In our preferred specification, we estimate the production costs as the sum of labor costs and tangible capital costs. This apportionment formula is the result of a trade-off between accuracy and simplicity. To ensure that our choice is appropriate, we compare our results with those of other specifications that calculate the share of costs differently. First, we check the robustness of our results to the assumption of constant capital rate of return among countries. Then, we try simpler apportionment formulas, one based solely on labor costs and another solely on tangible capital costs, and then different mixtures of the two estimates.

In addition, we test an alternative version of the tax condition, based on more intuitive interpretation of tax incentives. We then explore different measures of MNEs' tax liabilities across countries. Rather than using the ETR at the MNE-country level averaged over the time period, as in our preferred specification, we first adopt a more robust but less specific measure at the country-year level. Conversely, we also test a more granular MNE-country-year level measure, which is more sensitive to data quality variations.

We also provide the results using the amounts of reported profits before our correction for double-counted intra-group dividends. Finally, we provide an estimation of profit shifting after correcting for inflated wages in tax havens.

Table E.1: Annual Results of Alternative Methods (in billion €)

		Apportionment formula				Local Productivity		Tax incentives		Data correction	
	Main	Payroll	Assets	Sales	Country ROR	Markup	Local Profitability	Profit-sharing	Simple Difference	Wage Shifting	Uncorrected
France	-10,3	-9,8	-13,7	-8,1	-10,3	-6,1	-0,5	-13.8	-7,3	-13,1	-8,9
United States	-4,7	-5,9	-0,6	-4,5	-4,6	-5,9	-3,3	-3.9	-3,4	-4,3	-5,6
Rest of Americas	-1,5	-1,2	-1,7	-0,9	-1,5	-0,9	-5,8	-1.2	-2,8	-1,7	-1,7
Germany	-1	-1,3	-0,7	-1,2	-1,1	0	-2	-0.8	-0,4	-1,1	-1,3
Italy	-0,9	-1	-1,1	-0,9	-0,8	-4,9	-2,9	-0.7	-0,2	-0,9	-1,3
Africa	-0,1	0,2	-0,9	1,4	0	0,2	-0,6	0.1	-0,6	-0,2	-0,2
Switzerland	3,4	3,4	3,2	1,4	3,4	1	6,3	3.5	3,8	3,7	3,9
Singapore	2,9	2,8	2,9	2,5	2,8	3,5	2,4	2.9	2,9	3	2,5
Netherlands	2	1,9	2	2,7	2	2,1	3,2	2.4	2,6	2,1	2,8
Other tax havens	1,8	1,7	2	1,7	1,4	0,3	2,3	2.2	1,6	2,7	1,8
Hong Kong	1,7	1,6	2	1,2	1,7	1,8	1,3	1.7	1,8	2,6	1,7
Luxembourg	1,7	1,7	1,8	1,7	1,7	1,7	2,2	1.7	1,7	1,9	2,3
Rest of Europe	1,6	1,8	0,4	0,9	1,6	2,3	-1,2	2.1	1	1,4	1,2
Rest of Asia & Oceania	1,4	1,5	1,9	-0,2	1,4	3,2	-2,6	1.7	0,9	1,3	0,6
Ireland	1,2	1,4	1,2	1,3	1,3	0,9	1	1.2	1,3	1,4	1,4
United Kingdom	0,6	0,6	1,1	0,9	0,7	0,5	0	0.8	2,4	1,1	0,8
Global	21,5	22	22,4	19,4	21,2	21,3	25,5	22.9	26,6	24,2	22,9

Note: This table shows the amounts of shifted profits by large French MNEs, detailed by country, aggregated region, and also at the global level. These results report the net balance between positive and negative amounts of shifted profits, by region. Our main apportionment formula is the one presented in Section 5. "Payroll" means that we only use the cost of labor as an apportionment factor. "Assets" only takes into account tangible assets in the formula. "Sales" only takes into account unrelated-party revenue in the formula. "Country ROR" refers to the method including country-specific costs of capital. "Markup" includes country-year level markups. "Local Profitability" includes measures of profitability of domestic firms. The "Profit-sharing" tax condition correspond to the tax incentives that account for mandatory profit-sharing in France. The "Subgroup" tax condition means that we only consider misalignment when the effective tax rate faced by the MNE in a given country is lower than the its global effective tax rate. "Wage shifting" is the main method including tax incentives after having wages corrected for the wage premium in tax havens. "Uncorrected profits" relies on the same formula as the baseline, but using raw profits, before correcting for intra-firm dividends.

E.1 Robustness Tests on the Apportionment Formula

Alternative apportionment factors. We follow Guvenen et al. (2022) and test an apportionment formula with only labor costs:

$$\text{Payroll: } \hat{\pi}_i = \frac{l_i w_i}{\sum_j l_j w_j} \sum_j \rho_j$$

Then, we compute the complementary formula with tangible capital costs only:

$$\text{Assets: } \hat{\pi}_i = \frac{k_i}{\sum_j k_j} \sum_j \rho_j$$

We also compute an apportionment formula based on unrelated-party revenues:

$$\text{Sales: } \hat{\pi}_i = \frac{y_i}{\sum_j y_j} \sum_j \rho_j$$

Testing country-specific costs of tangible capital. Instead of assuming a constant cost of tangible capital among the MNEs across the world, we use in this robustness check country-specific rates of return. Chari and Rhee (2020) calculated the rate of return on capital at the firm level in a large number of countries, and we use their country estimates in this method. We calculate theoretical profits as follows:

$$\text{Country RoR: } \hat{\pi}_i = \frac{w_i l_i + r_i k_i}{\sum_j w_j l_j + r_j k_j} \sum_j \rho_j$$

E.2 Relaxing the Assumption of Constant Markup Across Countries

Country-level markup estimates. In our main specification, we assume that for a given MNE, gross markups are constant across countries. Consequently, we do not take into account the fact that, for a given amount of production costs, and within a multinational group, one subsidiary can generate more income or may be more productive than another in another country. In particular, we find €3 billion of misaligned profits in China, which could indicate that our apportionment formula underestimates the actual profitability of French multinational firms there. To relax the assumption of constant gross markup across countries, we use country-year-level markup estimates calculated by De Loecker and Eeckhout (2018).

Local profitability of domestic firms. In this specification, we include an indicator of local productivity of domestic firms, that are unaffected by profit shifting, and to

do so we build on the work of Tørsløv et al. (2023). Using macroeconomic data, the authors measure local profitability by country as the ratio of profits generated by local companies to their wage bill. We include these estimates in our formula.

Formally, as shown in Section 5, the real profit of an MNE in country i can be written: $\pi_i = C(y_i)(\mu_i - 1)$, with $C(y_i)$ total costs and μ_i the gross markup. If we consider that labor costs wl represent a α share of total costs (for example, with a Cobb Douglas production function), the profit-to-wage ratio is:

$$\frac{\pi_i}{w_i l_i} = \frac{(\mu_i - 1)}{\alpha_i}$$

We can approximate this ratio by the average profitability of domestic firms in country i, noted ϕ_i, estimated by Tørsløv et al. (2023). Then, we can calculate the theoretical profits generated by MNE in country i using the following formula:

$$\text{Local Profitability: } \hat{\pi}_i = \frac{\phi_i w_i l_i}{\sum_j \phi_j w_j l_j} \sum_j \rho_j$$

E.3 Alternative Measures of Tax Incentives

Accounting for profit-sharing in France. In our baseline measure of tax incentives, we do not include the profit-sharing contributions that MNEs have to distribute to their employees. As a robustness check, we extend the tax condition by using effective tax rates adjusted for profit-sharing. Due to data limitations, we introduce profit-sharing only for France and apply a constant rate of $\phi = 5\%$ across all MNEs and years (see Table 1). This simplified exercise is designed to assess the magnitude of the potential bias, whether upward or downward, introduced by omitting profit-sharing from our tax-incentive specification.

More straightforward tax condition. Although our preferred tax condition is derived from the model, its interpretation is not straightforward, so we compute a more intuitive tax condition in these robustness checks. We evaluate the tax incentive for the MNE to shift profits in country i as the difference between the effective tax rate ETR_i faced by the MNE in country i, with the MNE's global effective tax rate ETR.[53] When $ETR > ETR_i$, we consider that the group has an incentive to shift its profits towards country i, then a positive amount of misaligned profits is qualified as shifted profits. Formally, the profit shifted by the MNE in country i is defined as:

$$\text{Simple Difference: } z_i = \mathbb{1}_{\{(ETR - ETR_i)(\rho_i - \hat{\pi}_i) > 0\}} \times (\rho_i - \hat{\pi}_i)$$

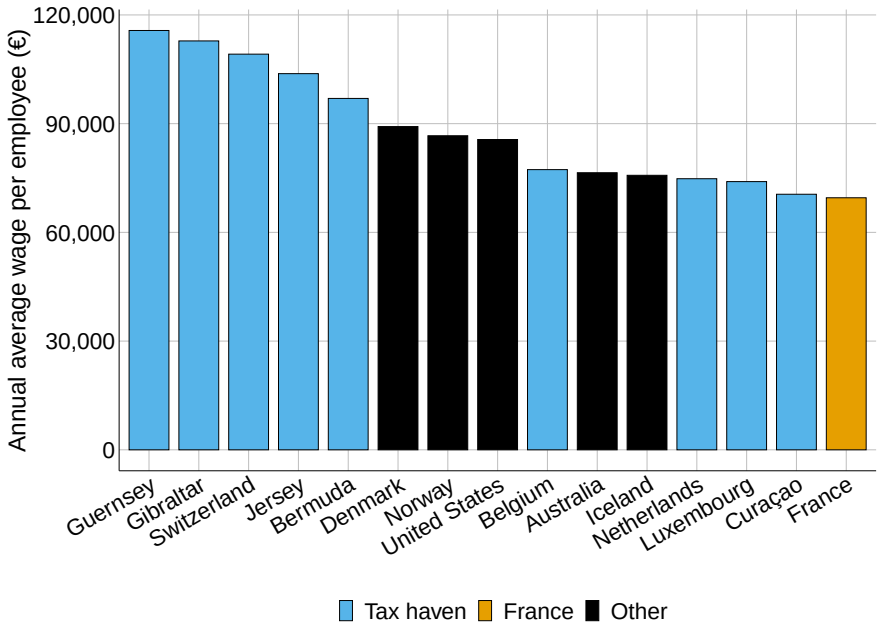
[53] Defined as the sum of taxes accrued by the MNE worldwide divided by its global profit, over profitable subsidiaries that have an ETR between 0 and 1.

We measure the tax liability of an MNE in a given country as the average ETR paid by the MNE in the country over the time period, provided the statutory tax rate remains constant.

E.4 Accounting for the Wage Premium in Tax Havens

Profit shifting tends to distort economic outcomes such as GDP or productivity. It can also affect the labor share and the wage distribution within MNEs across countries. As firms have an increasing incentive to prove that they have some real economic activity in a country to comply with the nexus requirements introduced by OECD BEPS Actions 1 and 7, they may have an incentive to not only shift their profits to tax havens but also report some real costs, such as a high wage bill. Firms may also have an incentive to set up specific employment contracts for some of their executives in tax havens, so they can also lower the tax burden through lower personal income taxes.[54] Descriptively, we find evidence that wages in tax havens are much higher than in non-haven countries in Figure E.1.

Figure E.1: Annual Average Wage



Note: This graph shows the average wage per employee as observed in our CbCR data.

We first estimate the wage premium in a tax haven and correct our measure of production costs to re-estimate the profit shifting quantification. We run the following

[54] Anecdotal evidence of such practices published in Le Monde.

regression on all MNE-coutry-year observations in OECD countries in our sample:

$$w_{i,f,t} = \alpha + \beta Haven_i + \gamma X_{i,f,t} + u_f + v_t + \epsilon_{i,f,t} \tag{15}$$

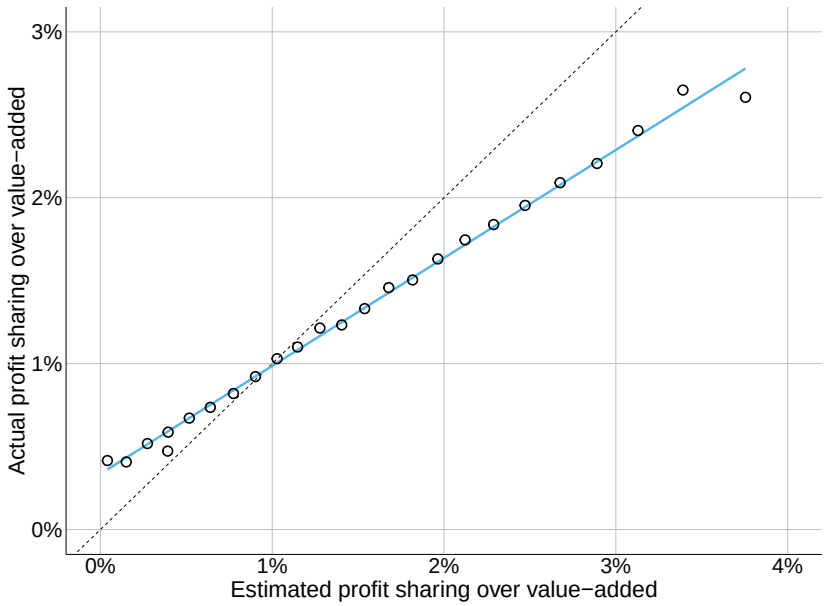
where $w_{i,f,t}$ is the average wage per employee of an MNE f in country i at year t, Tax Haven$_i$ a dummy equal to 1 if country i is a tax haven, $X_{i,f,t}$ is a vector of control variables including amounts of third-party trade revenue and tangible assets. We also add MNE and year fixed effects. We find that the tax haven wage premium is equivalent to about €25,000 or 40% of the average annual income.

We correct wages in tax havens by the premium and re-estimate profit shifting. The global amount of shifted profits increases by about €2 billion, to reach a global value of €23.4 billion, leading to higher missing profits in France of €11.3 billion, against €10.3 billion before (see Table E.1).

F Supplementary Information on Distributional Analysis

F.1 Estimation of Profit-Sharing Amounts

Figure F.1: Estimated to Actual Profit-Sharing Amount



Note: This graph is a binned scatter plot of actual profit-sharing-to-value-added ratios as a function of our predicted ratios at the firm level. The sample corresponds to firms with more than 50 employees between 2016 and 2022. The x-axis corresponds to 50 bins of the ratio between the regulatory formula for profit-sharing reconstituted using the tax files and firms' value added. The sample is winsorized on this estimated ratio at the level of 1%. The y-axis corresponds to the average ratio between profit-sharing actually distributed and value added within each bin.

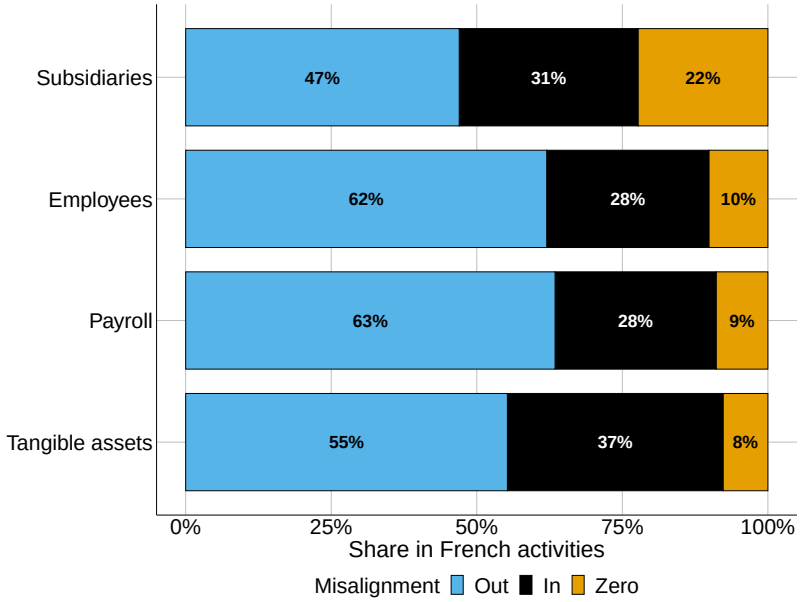
F.2 Estimation of Subsidiaries' Profit Shifting

F.3 Counterfactual Scenario with Incidence on Profits

To estimate the magnitude of the incidence to shutting down profit shifting opportunities on true profits, we compute the resulting change in the ETR for the French subsidiaries. Without profit shifting, the ETR is simply the actual ETR in France. With profit shifting, the real ETR faced by French subsidiaries is determined by the taxes they pay on their true profits divided by their true profits. The taxes paid on true profits include the taxes paid in France on reported profits and the taxes paid abroad on shifted profits.

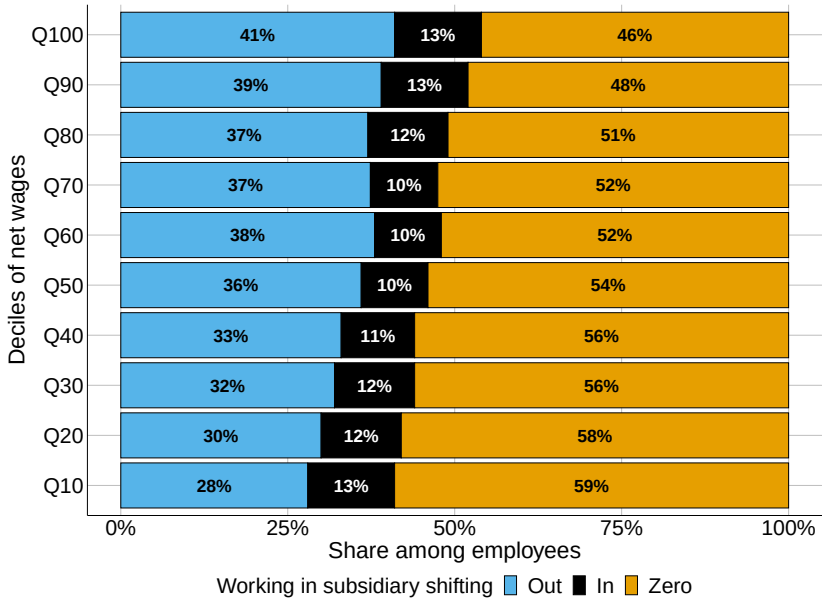
The change in ETR due to profit shifting closure is computed at the MNE-year level with the formula:

Figure F.2: Tax Avoidance Behavior of French Subsidiaries



Note: The graphs include all subsidiaries located in France of large French MNEs subject to CbCR. They show the proportion of the y-axis variables that shift profits out of France, in France, or that do not engage in profit shifting.

Figure F.3: Employees Presence in Shifting Subsidiaries by Decile of Wages



Note: This graph shows the share of employees in shifting subsidiaries, by decile of their net wages. We include all subsidiaries of French MNEs subject to CbCR that have more than 50 employees.

$$\Delta ETR_{FR} = \begin{cases} ETR_{FR} - \dfrac{1}{\pi_{FR}} \left(ETR_{FR} \max(\rho_{FR}, 0) + \displaystyle\sum_{h:z_h>0} ETR_h \frac{z_h}{\displaystyle\sum_{i:z_i>0} z_i} z_{FR} \right) & \text{if } z_{FR} < 0 \\ 0 \text{ otherwise} \end{cases} \tag{16}$$

with ρ_{FR} and π_{FR} respectively the reported and true profits of the MNE in France, z_h the amount of profit shifted by the MNE in country h, z_{FR} the amount shifted in France ($z_{FR} < 0$ implies that the MNE shift profits out of France), and ETR_h the average ETR faced by the MNE in country h over the period, following the notations in Sections 5. Here, we make the hypothesis that all subsidiaries in a multinational group would face the same ETR change in case of profit shifting closure. We find the ETR in France would increase by 4.4pp for subsidiaries of MNEs shifting profits abroad.

Table F.1: ETRs on Shifted Profits

Firms	Actual ETR (%)	Increase in ETR (pp)	Loss in Wages (%)
Shifting out	27.2	4.4	1.1
All	20.8	2.1	0.5

Notes: This Table includes all French subsidiaries of the French CbCR-eligible MNEs, over the period 2016-2022. Column 1 shows the average effective tax rates in France, weighted by reported profits. Column 2 displays the average difference in ETR computed following Equation 16, weighted by the amount of true profits generated in France. Column 3 shows the average loss in wages computed at the subsidiary-level with the difference in ETR and the tax incidence on wages of Suárez Serrato and Zidar (2023).