



Detecting Profit Shifting in Administrative Data: A South African Perspective

TAX JUSTICE NETWORK WORKING PAPER #2026-02

JULY 2026

Matthew Amalitinga Abagna

Tax Justice Network, London, United Kingdom. E-mail:
matthew@taxjustice.net.

Miroslav Palanský

Institute of Economic Studies, Faculty of Social Sciences, Charles
University, Prague, Czech Republic; Tax Justice Network, London, United
Kingdom. E-mail: miroslav@taxjustice.net.

Ronald B. Davies

University College Dublin, Dublin, Ireland, and Skatteforsk, Norway.
E-mail: ronald.davies@ucd.ie.

Detecting Profit Shifting in Administrative Data: A South African Perspective

Matthew Amalitinga Abagna* Miroslav Palanský† Ronald B. Davies‡

20th July 2026

Abstract

This paper develops a data-driven methodology for detecting potential profit shifting by multinational enterprises in South Africa. Drawing on detailed administrative tax and customs data, we construct a series of red-flag indicators based on firm-level profitability, intra-group transactions, and trade with tax haven jurisdictions. A firm is flagged only if it persistently reports profits below its industry average while exhibiting at least one additional red flag related to related-party debt, service payments, or haven-linked trade. Although less than 1% of multinational enterprises are flagged, this small subset accounts for a disproportionately large share of potential tax revenue at risk. The approach offers a practical and replicable framework for tax administrations in developing countries seeking to prioritize audits and strengthen domestic resource mobilization using existing administrative data.

Keywords: profit shifting, multinational enterprises, corporate income tax, administrative data, developing countries, South Africa

JEL classification codes: F23, H25, H26, O55

Acknowledgements: The authors are grateful to Nadine Riedel and Hayley Erasmus for carefully reviewing the first draft and providing valuable comments that have significantly improved this version of the paper. We also wish to thank Ms Megan Shongwe for her assistance with running the codes at the data lab. Financial support from UNU-WIDER under the SA-TIED Workstream 1–3 is gratefully acknowledged. The views expressed in this paper are those of the authors alone, and any remaining errors or omissions are their sole responsibility.

1 Introduction

Multinational enterprises (MNEs) are widely recognised for shifting profits from high-tax countries to low- or zero-tax jurisdictions, commonly referred to as tax havens, to minimize their global tax liabilities. This practice severs the link between the geographical location of economic activity and the jurisdiction in which profits are declared, thereby eroding national tax

*Tax Justice Network, London, United Kingdom. E-mail: matthew@taxjustice.net.

†Institute of Economic Studies, Faculty of Social Sciences, Charles University, Prague, Czech Republic; Tax Justice Network, London, United Kingdom. E-mail: miroslav@taxjustice.net.

‡University College Dublin, Dublin, Ireland, and Skatteforsk, Norway. E-mail: ronald.davies@ucd.ie.

bases and compromising the fiscal capacity of the affected states. Recent estimates highlight the magnitude of profit shifting. Tørsløv et al. (2022) estimated that nearly 40% of MNE profits are improperly declared in tax havens, leading to global tax revenue losses of up to USD 245 billion annually. Johannesen et al. (2020) and Garcia-Bernardo and Janský (2024) note that developing countries are disproportionately affected, losing a higher share of corporate tax revenues to profit shifting while battling limited technical and institutional capacity to respond.

Given the scale of these losses and the limited enforcement capacity among developing countries, we ask a fundamental question: how can tax authorities in developing countries efficiently detect potential profit-shifting behaviour among MNEs using existing administrative data? To address this, we introduce a probabilistic detection framework grounded in the premise that profit-shifting MNEs display a distinct combination of observable characteristics. First, such firms are typically part of corporate groups with affiliates in low-tax jurisdictions, as documented by Chaisse and Ji (2020). Second, they exhibit disproportionate profitability, reporting unusually high profits in low-tax countries and persistently low profits in high-tax jurisdictions (Bilicka, 2019; Alstadsæter et al., 2022). Third, they make extensive use of well-known profit-shifting channels, including intra-group trade with tax havens, excessive internal debt financing, and payments for the use of foreign-held intellectual property.

We transform the observable characteristics described above into measurable indicators of potential profit shifting, drawing on firm-level administrative data. Using panel regression techniques, we construct firm-level and industry-specific benchmarks for profitability, tax haven exposure, and intra-firm trade activity. Specifically, profitability benchmarks for firms are derived from regressions of return on assets (ROA) and return on wages (ROW) on industry-year fixed effects, firm age, and MNE status. This allows us to identify firms that consistently exhibit low profitability, i.e., those with a mean profit at least two standard deviations below their industry average. Similarly, tax haven exposure and intra-firm trade intensity are benchmarked by regressing the value of imports from tax havens, normalized by firm size, on the same set of covariates. Firms with positive residuals that are at least two standard deviations above the industry average are identified as having unusually high import intensity from low-tax jurisdictions or elevated levels of intra-group transactions.

Firms that consistently report profitability below the sectoral benchmark, import disproportionately from tax havens, or engage extensively in intra-firm trade are flagged as exhibiting potential profit-shifting behaviour. While we recognise that one-time low profitability may, in some cases, reflect legitimate business challenges or temporary downturns, a persistent pattern of underperformance provides stronger evidence of potential profit shifting, particularly when accompanied by significant related-party transactions and trade with affiliates in tax havens (Davies et al., 2018; Newman et al., 2023; Delis et al., 2024).

Furthermore, we develop a composite risk ranking of firms based on the number of red flags detected and the estimated potential tax losses associated with each firm, based on the assumption that their profitability should be equivalent to their industry average. Firms that exhibit more red flags are considered more likely to engage in profit-shifting practices. We subsequently aggregated the number of high-risk firms and estimated the potential tax revenues that may be recovered through targeted audits, standardized per firm. This exercise is designed

to assist tax authorities in optimizing audit and enforcement strategies by focusing on identifying firms with the highest risk scores and revenue losses. This is particularly relevant in resource-constrained settings, where prioritizing enforcement efforts towards firms with both elevated risk and high estimated revenue implications offers a more efficient and cost-effective approach to addressing tax avoidance.

We focus exclusively on MNEs rather than both MNEs and domestic firms because local firms do not have the opportunity to shift profits into lower tax jurisdictions. By definition, profit shifting involves the reallocation of income across jurisdictions for tax purposes. This channel is unavailable to purely domestic firms whose activities are restricted by national borders. Although we acknowledge that domestic firms may also engage in forms of tax avoidance that similarly erode the tax base, such as under-reporting revenues or inflating deductible expenses, these behaviours differ fundamentally from cross-border profit shifting. Our methodology focuses on MNEs whose operations and ownership structures create opportunities for profit shifting through well-documented conduits, such as intra-group trade, intercompany debt financing, and payments for intellectual property or management services.¹

We test our methodology using firm-level data from South Africa, a middle-income country where concerns about corporate tax base erosion are increasingly pronounced, yet the capacity for tax enforcement remains constrained. As one of Africa’s largest and most diversified economies, South Africa has witnessed sustained inflows of multinational investment alongside the increased scrutiny of profit-shifting practices and aggressive tax planning. Simultaneously, its tax authority faces resource and capacity limitations common to many developing countries, highlighting the need for an efficient, data-driven approach to risk detection and enforcement. Importantly, South Africa provides unusually rich administrative datasets, covering corporate income tax (CIT) returns, customs declarations, and firm-level financial statements, allowing the construction of our profit-shifting indicators and the testing of the proposed framework.

Our analysis suggests that less than 1% of the MNEs in the sample exhibit patterns consistent with profit-shifting behaviour. Differences in firm identification across diagnostic dimensions, including profitability thresholds, related-party debt, trade with tax havens, and payments for management services and royalties, are relatively modest. When using ROA as the benchmark for profitability, 2,328 firms are flagged at least once, while 1,576 firms are flagged when using ROW as an alternative profitability measure. When combining both profitability measures, 458 firms are consistently flagged as suspicious. It is not possible to determine the exact amount of revenue that may be lost from these firms, as only a full tax audit can confirm whether they are actually shifting profits and the extent of any recoverable revenue. However, if these flagged firms are indeed shifting profits out of South Africa and if our methodology, which relies on industry averages, is sound, the associated revenue loss could be approximately ZAR 5.29 billion. Notably, the top 44 firms, representing around 10% of the highest-risk group (ranked by red-flag intensity and estimated potential revenue loss), account for 63.5% of the total potential tax revenue at risk within the broader sample of flagged firms.

¹While we are aware of other domestic avenues that local firms can use to reduce their overall tax burden, including establishing affiliates in Special Economic Zones (SEZs), which benefit from lower corporate tax rates relative to the rest of the country, we do not currently incorporate this into our analysis because the available data do not identify firms affiliated with SEZs.

Across sectors, the incidence of potential profit-shifting behaviour is unevenly distributed. The wholesale and retail trade sector accounts for the largest share of flagged firms (28.2%), followed by services (26.4%) and manufacturing (15.3%), together representing more than two thirds of all high-risk firms. The concentration of flagged firms in these sectors likely reflects their deep integration into global value chains and their high volume of cross-border transactions, which increase opportunities for transfer mispricing and other intra-group profit allocation practices. In contrast, sectors such as construction (11.6%); utilities and transport (6.8%); agriculture, forestry, and fishing (4.8%); and finance, insurance, and real estate (5.2%) show lower levels of exposure, while mining (1.8%) appears to be the least affected, possibly due to its capital-intensive structure, stringent reporting requirements, and limited engagement in intra-firm trade.

Our methodology provides a robust data-driven foundation for improving the effectiveness of tax enforcement in South Africa. By isolating a small subset of high-risk MNEs responsible for a disproportionately large share of potential tax revenue losses, the analysis presents a practical framework for targeted audits that potentially maximizes fiscal returns while minimizing administrative burden, aligning with South Africa’s broader policy objectives of promoting tax fairness and reducing tax base erosion. Further, our approach is a scalable tool that can inform future audit planning, guide resource allocation, and support risk-based compliance strategies, thus assisting the South African Revenue Service (SARS) with improving the efficiency and fairness of tax administration, which supports fiscal sustainability and the delivery of essential public services.

This study contributes to the existing literature in two primary ways. First, it provides firm-level evidence on potential profit-shifting behaviour by MNEs. While much of the existing literature focuses on aggregate or macro-level estimates of profit shifting (e.g., Bilicka (2019); Alstadsæter et al. (2022); Tax Justice Network (2024); Mvunabandi et al. (2024)), our approach moves beyond high-level diagnostics to offer a granular, firm-specific detection framework. This distinction is particularly important in the context of developing countries, where audit capacity is constrained, and enforcement resources must be deployed with maximum efficiency.

Second, our profit-shifting detection framework is constructed exclusively from existing administrative data, thereby eliminating the need for additional disclosures or resource-intensive investigations. The methodology can be readily updated as new data become available or as enforcement priorities evolve in response to policy changes. Unlike conventional approaches that rely on arbitrary thresholds, our method identifies statistically significant deviations in profitability, trade flows, and tax haven exposure, thereby improving the precision and relevance of detection. This makes the approach particularly well-suited for implementation in resource-constrained environments.

Our study relates to the growing literature on profit shifting in low- and middle-income countries, where the challenges of detection and enforcement are particularly acute. Johannesen et al. (2020) highlight the disproportionate impact of profit shifting on developing countries, citing limitations such as inadequate technical capacity, insufficient resources, and restricted access to relevant data. Jansky and Prats (2015), using firm-level data from India, find that MNEs with links to tax havens report significantly lower profitability and tax payments per

unit of assets, evidence consistent with systematic profit shifting. A recent study by Garcia-Bernardo and Janský (2024) addresses longstanding methodological and data limitations in global profit-shifting estimates by applying a nonlinear profit-to-tax rate elasticity framework to newly released country-by-country reporting (CbCR) data. Their findings indicate that approximately USD 1 trillion in profits were shifted to tax havens in 2016 alone, resulting in estimated global tax revenue losses between USD 200–300 billion. Notably, the inclusion of low- and lower-middle-income countries in the dataset reinforces the salience of this issue in the development space. Building on this evidence, our study advances a transparent and replicable methodology for identifying profit-shifting firms at the country level.

In the South African context, Wier (2020) provides firm-level evidence of transfer mispricing, estimating that under-reporting related to imports alone accounts for approximately 0.5% of CIT revenue losses. Most relevant to our analysis is the recent work by Wier and Erasmus (2023), which leverages comprehensive administrative tax data to demonstrate that profit shifting is highly concentrated among a small number of dominant MNEs. This finding reinforces our core argument: that a well-targeted enforcement strategy, grounded in high-quality administrative data, can yield substantial fiscal dividends by focusing on a relatively small cohort of high-risk firms.

The remainder of the paper is structured as follows. Section 2 provides institutional context on profit shifting in South Africa, with an emphasis on the country’s exposure to tax base erosion and enforcement challenges. Section 3 outlines the conceptual framework underpinning our methodology, while Section 4 describes the data sources used and presents key descriptive statistics. Section 5 outlines the empirical methodology, detailing the construction of firm-level red-flag indicators based on profitability and tax haven exposure. Section 6 presents the main results, including the number and characteristics of flagged firms and the number of high-risk MNEs suitable for audit prioritization, and Section 7 concludes with a summary of key findings and their policy implications.

2 Institutional background

South Africa is the most industrialized economy in Africa and is classified as an upper-middle-income country, with a gross domestic product (GDP) of approximately USD 400 billion. South Africa’s tax-to-GDP ratio is approximately 27%, which is well above the African average of 16% but remains below the Organisation for Economic Co-operation and Development (OECD) member country average of 34%.² Like all countries, South Africa depends on tax revenue to fund government operations, provide essential public services, sustain social programmes, and promote economic growth, making taxation central to the country’s fiscal stability and long-term development.

Corporate income tax (CIT) is a particularly important component of domestic revenue in the country. According to the National Treasury, CIT accounts for approximately 19% of total tax revenue, nearly one fifth of the overall tax base.³ These revenues contribute to funding

²See [Revenue Statistics in Africa: Key findings for South Africa 2024](#).

³For more information on South African tax statistics, see [Tax Statistics 2024](#), published by the National Treasury and SARS.

public investment in infrastructure, social protection, and essential services, while ensuring fiscal sustainability. The statutory CIT rate, which has declined from 28% to 27%, illustrates the inherent trade-off between sustaining domestic revenue generation and fostering international competitiveness to attract foreign direct investment.⁴

South Africa hosts a substantial number of MNEs operating in various sectors, including mining, manufacturing, finance, and information technology.⁵ These firms are deeply embedded within global value chains, contributing to investment, employment creation, and technological innovation in the country. Nevertheless, their complex cross-border economic and corporate structures render the domestic tax base highly susceptible to base erosion and profit shifting. Through mechanisms such as transfer mispricing, inflated intra-group service and royalty payments, and the strategic uses of low-tax jurisdictions, MNEs operating in South Africa are able to reallocate taxable profits into countries with lower CIT, thereby reducing their effective tax liabilities. Importantly, these practices often occur without any commensurate relocation of substantive economic activity, undermining both revenue mobilization and the equity of the tax system.

Recent estimates have shown that many MNEs shift a substantial share of their profits from South Africa to tax havens. Alstadsæter et al. (2023) find that approximately 7.4% of South Africa's CIT revenue is lost annually to tax havens, while the Tax Justice Network (2024) reports total losses of around USD 1.3 billion in 2021 due to profit shifting. Annual data from the EU Tax Observatory, illustrated in Figure 1, show a rising trend of profits being shifted out of South Africa into lower-tax jurisdictions. This revenue leakage weakens fiscal capacity and limits the government's ability to invest in infrastructure, education, and health. Ultimately, the leakage constrains inclusive economic development and slows progress in addressing inequalities and poverty.

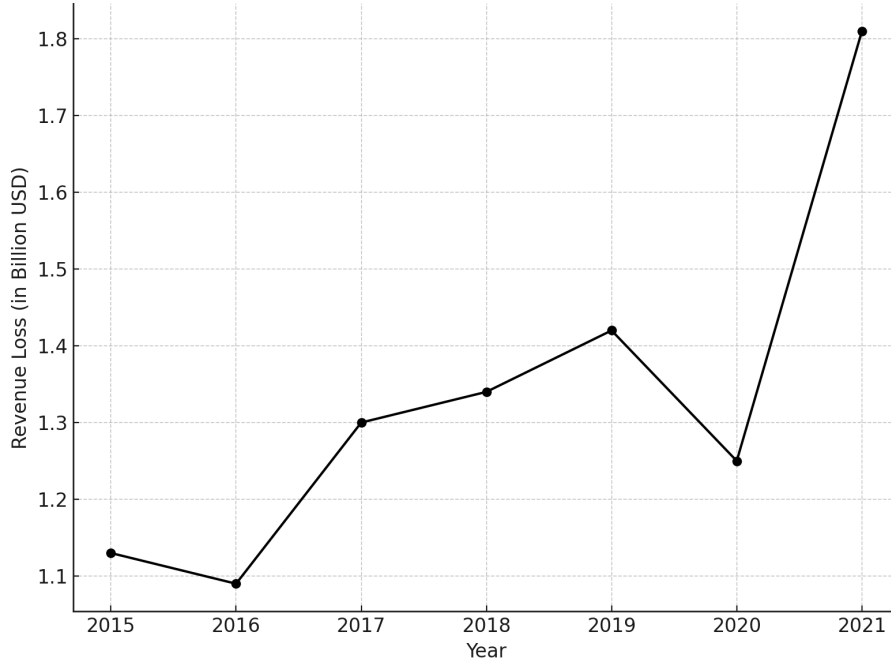
Concerns over profit shifting and base erosion have increasingly attracted the attention of South African policymakers, tax administrators, and international observers. For example, the Davis Tax Committee highlighted the vulnerability of the country's tax base to sophisticated avoidance strategies, particularly by MNEs. These firms exploit weaknesses in transfer pricing enforcement and engage in regulatory arbitrage to reduce their tax liabilities (Davis Tax Committee, 2015). Common practices include inflating royalty and management fees to offshore affiliates and using aggressive intra-group debt financing, both of which systematically reduce the profits reported in South Africa and, consequently, the taxes paid (Reynolds and Wier, 2016; Wier, 2020).

Over the past two decades, South Africa has introduced important reforms to strengthen its institutional response to base erosion and profit shifting. Thin capitalization and transfer pricing rules were first adopted in 1995 and later consolidated in 2012 to align with the OECD Transfer Pricing Guidelines. Controlled foreign company (CFC) regulations were introduced in 1997 to support the shift from a source-based system of taxation to one based on worldwide income. More recently, SARS has incorporated key elements of the OECD/G20 Base Erosion and Profit Shifting (BEPS) Action Plan, including country-by-country reporting requirements

⁴For more information, consult the [Budget Speech 2022](#).

⁵See [APRI Report 2024](#).

Figure 1. Estimated corporate tax revenue losses to tax havens



Source: Author's construction based on data from [The Atlas of the Offshore World](#).

for large multinational companies and the implementation of the global minimum tax (GMT) of 15% for MNEs.⁶ Collectively, these reforms have harmonized South Africa's tax framework to align with international standards, thus improving transparency and strengthening the country's capacity to address base erosion and profit shifting more effectively.

In summary, South Africa's position as the most industrialized and globally integrated economy on the continent makes it both a leading destination for multinational investment and a focal point for profit-shifting concerns. Although the country maintains a relatively high tax-to-GDP ratio compared to the regional average, sustained revenue losses arising from base erosion continue to weaken fiscal capacity and constrain inclusive growth. Over the past two decades, the government has implemented comprehensive reforms, strengthening transfer pricing and controlled foreign company regulations, and adopting key elements of the OECD/G20 BEPS framework to align its tax system with international standards and improve transparency. Nevertheless, profit shifting remains a policy challenge with far-reaching implications for revenue mobilization and equity. This issue, coupled with the availability of rich administrative datasets including CIT filings, customs declarations, and firm-level financial accounts, makes South Africa an ideal empirical setting for testing our data-driven methodology.

3 Conceptual framework

In this section, we introduce a straightforward yet adaptable framework for developing profit-shifting indicators that can be implemented using the types of administrative data typically accessible to tax authorities. The framework does not aim to capture all possible forms of tax

⁶See [KPMG Tax and Legal News Alert 2022](#).

avoidance. Instead, it provides a tractable structure that highlights the key mechanisms through which MNEs erode domestic tax bases and links these mechanisms to observable patterns in firm-level tax returns, financial statements, and customs records. By focusing on commonly reported variables, such as revenues, costs, intra-group transactions, and cross-border trade and payments, the framework provides a systematic foundation for detecting behavioural anomalies that may indicate profit shifting.

To motivate this approach, consider an MNE operating in South Africa where the CIT rate is t and an affiliate of this MNE operating in a jurisdiction with a lower rate $t^* < t$. The South African affiliate earns revenues from two sources: domestic sales (d) and exports (e). Exports may be directed to unaffiliated third parties (e_u) or to other affiliates within the same multinational group (e_a). Although South African data do not distinguish between these categories, these distinctions in the framework are conceptually important for identifying potential channels that MNEs use to shift profit out of the country.

On the cost side, the South African affiliate incurs three types of expenditure. First, it incurs domestic costs (c), such as labour or locally sourced inputs. The second cost incurred is imports (i), which can again be broken down into imports from unaffiliated firms (i_u) and intra-firm imports (i_a). Third, cross-border payments to related parties for items not classified as imports (p), including interest on intra-group debt and royalties for the use of intellectual property. While the data usually only record aggregate amounts, this decomposition is useful for interpreting possible profit-shifting behaviour.⁷

Abstracting from revenues and costs unrelated to South Africa, after-tax global profits can be written as:

$$\pi = (1 - t)(d + e_u + e_a - c - i_u - i_a - p) + (1 - t^*)(i_a + p - e_a) \quad (1)$$

Since $t > t^*$, Equation 1 illustrates the basic incentive: global after-tax profits increase when an MNE under-reports the value of affiliate exports and/or over-reports the value of intra-firm imports and payments, such as debt interest or royalties. In other words, affiliates in South Africa, which has a relatively high CIT rate of 27%, have an incentive to shift revenues outwards and costs inwards.

This framework can be extended to account for more realistic tax treatments (e.g., accelerated depreciation, Research and Development deductions), costs of engaging in profit shifting (see Allingham and Sandmo (1972)), or dynamic considerations such as loss carryforwards and carrybacks. While these refinements would make the model more realistic, their absence does not alter the fundamental prediction that MNE affiliates in high-tax countries like South Africa will attempt to erode the local tax base by manipulating intra-group trade and payments. This leads to a set of testable predictions about the observable behaviour of profit-shifting firms:

Prediction 1 *Profit shifters will report lower taxable profits in South Africa than would normally be expected.*

⁷Profit shifting can also occur when affiliates extend loans or license intellectual property to related parties at below-market terms, but such cases are expected to be relatively rare in the current setting and are not explicitly modelled here.

Prediction 2 *Profit shifters will report lower exports than would normally be expected.*

Prediction 3 *Profit shifters will report higher imports than would normally be expected.*

Prediction 4 *Profit shifters will report higher intra-group debt payments than would normally be expected.*

Prediction 5 *Profit shifters will report higher royalty and other intellectual-property-related payments than would normally be expected.*

Although the above predictions highlight the main channels of profit shifting, an important challenge lies in distinguishing genuinely abnormal behaviour from that which merely reflects a standard production framework. Firms combine capital, labour, and imported intermediates in predictable proportions, and profitability and productivity are positively correlated. Profit shifting through inflated intra-group transactions, such as overstated imports, artificially raises reported costs without altering real production, thereby lowering the ROA and often pushing taxable profits towards zero. This makes an abnormally low ROA a red flag, even though we acknowledge that a low ROA can also stem from genuinely low productivity. Therefore, additional benchmarks are needed. We address this concern in our methodology section. Consequently, firms with an unusually low ROA are considered potential profit shifters. The same logic extends to cross-border trade and other forms of intra-group transactions, including excessive debt servicing and royalty payments, which, when disproportionate to the industry average, provide further indications of potential aggressive tax avoidance.

In summary, the framework provides a tractable data-driven approach to identifying potential profit shifters using administrative records already typically available to tax authorities. By formalizing the incentives of MNE affiliates operating in high-tax jurisdictions like South Africa, the framework generates a set of clear, testable predictions about observable firm behaviour, namely, lower reported profits and exports alongside inflated imports, intra-group debt, and royalty payments. Importantly, the framework highlights that no single indicator is unequivocal: credible detection requires a combination of benchmarks that distinguish abnormal patterns from legitimate differences in productivity or industry structure. While extensions could capture more complex tax rules or dynamic considerations, the core insight remains: MNEs in high-tax environments have incentives to erode the domestic tax base through mis-priced intra-group trade and payments. This paper provides both a conceptual foundation and a practical toolkit for developing profit-shifting indicators that can inform enforcement strategies in data-constrained settings.

4 Data and descriptive statistics

This section describes the administrative data used to implement our methodology. The data include firm-level tax returns, financial statements, and customs records. In addition to outlining the data, we present key descriptive statistics on multinational and domestic firms, highlighting patterns in profitability, intra-group transactions, and exposure to tax havens.

4.1 Data

First, the dataset includes CIT returns submitted by filing firms with information on total fixed assets and compensation provided by National Treasury and UNU-WIDER (2021). These returns allow us to construct profitability measures such as return on assets (ROA) and return on wages (ROW) as our first red-flag indicator of potential profit shifting. There is also data on other profit-shifting conduits such as intra-firm transactions, interest payments, and royalty payments, enabling the assessment of abnormalities in related-party trade compared to the relevant industry average.

Second, we merged the tax return data with customs records made available by National Treasury and UNU-WIDER (2020), which provide disaggregated international trade flows derived from transaction-level declarations. This linkage is important for capturing abnormal trade patterns with tax havens. Ideally, we prefer this information to be disaggregated by country level and by firm affiliation. Unfortunately, disaggregated information is not available for all firms. We use a dummy variable indicating whether a firm has ever exported to or imported from a tax haven as a complementary measure of haven exposure in addition to the absolute export values.

Third, the dataset contains information on firm ownership structures. We classify a firm as an MNE if it has any form of foreign ownership based on a partnership or membership in a multinational corporation, or is self-declared as an MNE as recorded in the CIT data. However, the data do not include headquarters locations or the full network of foreign affiliates, which limits our ability to map the complete cross-border structure of each MNE. Ideally, detailed information on the geographical distribution of all parent and affiliate entities would be available, allowing a more comprehensive assessment of intra-group interactions across both tax haven and non-tax haven jurisdictions. Given these constraints, the list of tax haven jurisdictions follows the Tax Justice Network’s classification.⁸

Another notable limitation of the data is the absence of information on firms’ affiliations with SEZs. MNEs with affiliates operating within SEZs may have incentives to structure their operations such that a larger share of their economic activity occurs in these zones, where the CIT rate is 15% compared to the standard 27%. Such arrangements provide an opportunity for firms to reduce their overall tax burden internally.⁹

In addition, we employ an industry classification based on the primary industry codes reported in corporate tax returns. We grouped economic activities into the following broad sectors: agriculture, forestry, and fishing; mining; manufacturing; construction; transportation; communications; electricity, gas, and sanitary services (utilities); wholesale and retail trade; services; finance, insurance, and real estate; public administration; and a residual category for non-classifiable activities.

To ensure consistency in our analysis, we apply a set of minimum inclusion criteria. Firms are only retained if they report at least ZAR 2.5 million in turnover and possess a minimum

⁸For more details, visit the [Corporate Tax Haven Index](#) by the Tax Justice Network.

⁹We acknowledge that SEZ firms can be identified in the CIT data through self-declaration, including the application of the reduced 15% tax rate and other preferential provisions. However, our focus in this analysis is on identifying firms outside the SEZs that are affiliated with SEZs, i.e., either through partnership arrangements or parent-subsidiary relationships, as such linkages may also create opportunities for tax reduction or profit shifting.

of ZAR 500,000 in total fixed assets. These thresholds exclude microenterprises and irregular filers that may fall outside the formal tax net. Furthermore, we require that a firm appear in the dataset for at least two distinct years, thus eliminating dormant firms. Only firms that meet all three criteria, thus minimum turnover, minimum asset base, and multi-year presence, are included in the analysis. This ensures that our indicators are based on stable and recurring financial patterns rather than one-off anomalies.

4.2 Descriptive statistics

After applying the sample restrictions, we retain 948,434 firm-year observations, of which 235,035 correspond to domestic firms. In terms of firm counts, the sample comprises 26,565 MNEs, representing approximately 15% of all firms, and 156,704 domestic firms, accounting for the remaining 85%, as shown in Appendix Table A1. In Table 1, we present summary statistics for our key variables. On average, firms report imports from tax havens of approximately ZAR 56,000. Although reported haven imports suggest limited haven-related trade for most firms, the very high dispersion, with maximum haven imports exceeding ZAR 20 billion, suggests that a small subset of firms engage in large-scale haven imports. Related-party debt, on the contrary, averages around ZAR 27.7 million per firm, which also reflects the widespread use of intra-group financing.

On average, firms report interest expenses of approximately ZAR 104,000. Although the reported interest expenses appear modest, it masks considerable heterogeneity, with some firms incurring disproportionately high interest costs. Similarly, management fees average around ZAR 298,000 per firm, reflecting intra-group service charges and head office cost allocations. In contrast, exports to tax havens are relatively small, averaging about ZAR 20,000 per firm, though a few firms record exceptionally high export values to such jurisdictions. When combined, these patterns indicate that tax havens do not serve as major export destinations for most firms operating in South Africa. Lastly, royalty payments average ZAR 264,000 per firm.

Although the average values of the key financial indicators may appear modest, they conceal substantial heterogeneity between firms. For the majority, cross-border financial flows involving tax havens remain minimal; however, a small subset engages in exceptionally large transactions. This pattern is particularly evident in haven imports, where a few firms account for values that reach billions, as well as in related-party debt, royalties, and management fees, where mean figures obscure a heavy concentration of activity among a limited number of dominant firms. Interest expenses and exports to tax havens display similar dispersion, with most firms reporting negligible amounts, while a minority record disproportionately high values. Collectively, these patterns suggest that while the vast majority of firms in South Africa make limited use of the established conduits for profit shifting, a relatively small group drives the bulk of haven-related financial flows, intra-group debt, and interest payments, thereby posing the greatest potential risk to the national tax base.

Building on the conduits of profit shifting outlined above, we now turn to firm-level profitability and size. Table 2 details summary statistics for ROA and ROW, gross profit, and total fixed assets. The average ROA per firm is modest at 1.4%; however, the distribution is highly dispersed, ranging from -472% to 729%. This potential reflects profitable and loss-making firms,

Table 1. Key profit shifting variables for all firms

Variable	Observations	Mean	Std. dev.	Min	Max
Haven imports	948,434	0.056	23.50	0	20,200
Related debt	948,434	27.70	3,210	0	935,000
Interest expense	948,434	0.104	12.90	0	7,990
Management fees	948,434	0.298	19.70	0	7,720
Haven exports	948,434	0.020	1.74	0	589
Royalties	948,434	0.264	17.70	0	10,100

Note: All monetary figures are reported in ZAR millions.
Source: Authors' construction.

differences in sectoral capital intensity, and reporting errors. The ROW is even more extreme, averaging 111% but stretching from large negative percentages to over 42 million per cent. Firms with small wage bills and capital-light, high-margin structures, and the fact that MNEs pay higher wages relative to local firms, may explain this significant variation in the ROW

The size measures of the firms are similarly skewed. The average gross profit is ZAR 25.8 million, yet it ranges from losses of ZAR 1.8 billion to profits exceeding ZAR 94 billion. Fixed assets average ZAR 320 million but range from less than ZAR 1 million to over ZAR 111 trillion, reflecting the presence of small and large firms. These statistics highlight pronounced heterogeneity between firms and the presence of extreme outliers. In view of these stark differences, we normalized the indicators and applied sector-specific benchmarks to identify anomalous patterns that may indicate potential profit shifting.

Table 2. Summary statistics: returns and firm size indicators

Variable	Obs.	Mean	Std. dev.	Min	Max
Return on assets (ROA)	948,434	1.39	2.01	-472.36	729.39
Return on wages (ROW)	948,434	110.65	46210.13	-873,832	42,400,000
Gross profit	948,434	25.8	5.44	-1.810	9.44
Total fixed assets	948,434	3.20	1.37	0.5	111,000,000

Note: All monetary figures are reported in ZAR millions.
Source: Authors' construction.

We normalize each firm's financial indicators by its total assets to mitigate the influence of firm size and enable a more comparable assessment of financial performance across firms. Table 3 reports a comparative analysis of key asset-adjusted indicators for domestic and foreign-affiliated firms. Although both groups display similar ROA averages (1.389 and 1.385, respectively), the standard deviation is notably higher among MNEs (2.418 versus 1.860 for domestic firms). This indicates greater variability in profitability among foreign-affiliated firms operating in South Africa. MNEs also exhibit substantially higher haven-related imports relative to assets (0.00119 compared to 0.00021 for domestic firms), along with much greater variability. In contrast, other asset-normalized indicators, such as intra-group debt, interest payments, royalties, management fees, and exports to tax havens, show no statistically significant differences between domestic

and foreign-affiliated firms.

Table 3. Comparison of normalized indicators: domestic firms vs MNEs

Variable	Domestic firms			MNEs		
	Obs	Mean	Std. dev.	Obs	Mean	Std. dev.
Return on assets	713,399	1.389	1.860	235,035	1.385	2.418
Haven imports	713,399	0.000211	0.02316	235,035	0.001187	0.32988
Debt	713,399	0.3927	0.8934	235,035	0.3918	0.8883
Interest	713,399	0.000013	0.00175	235,035	0.000577	0.09005
Royalties	713,399	0.00233	0.03692	235,035	0.00233	0.04053
Management	713,399	0.00383	0.07396	235,035	0.00354	0.16511
Haven exports	713,399	0.000593	0.04295	235,035	0.000720	0.05793

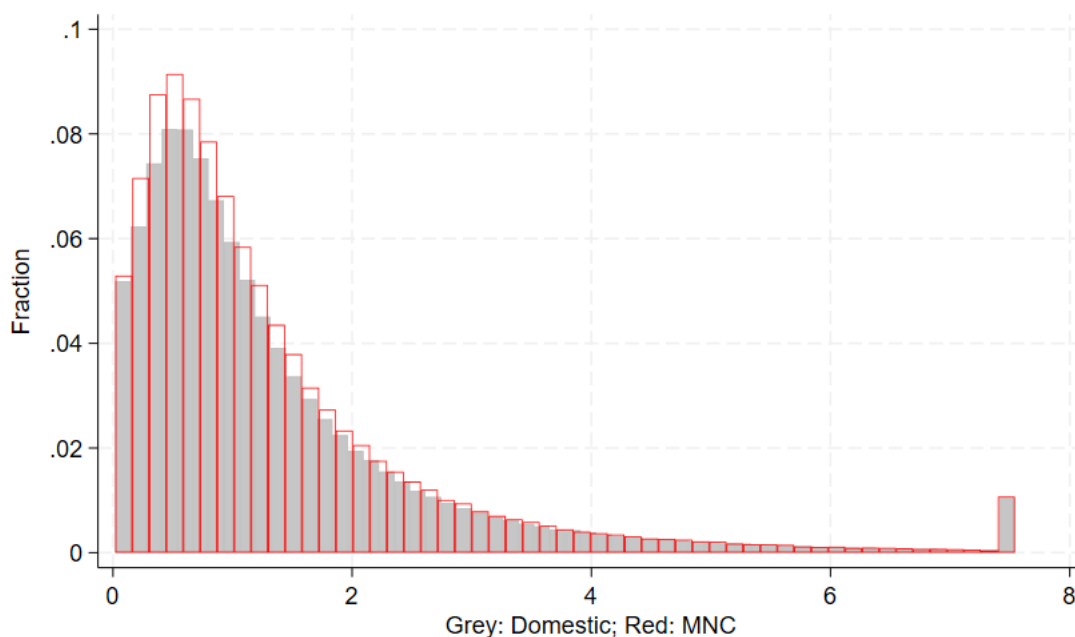
Note: All monetary figures are reported in ZAR millions.

Source: Authors' construction.

Given the presence of extreme values in the summary statistics, indicating substantial outliers, we winsorize the data to reduce the influence of these extreme values on our analysis. Specifically, financial variables used to construct key ratios (e.g., profits, wages, and related financial flows) are winsorized at the 1st and 95th percentiles. Observations below the 1st percentile and above the 95th percentile are adjusted to these cut-off values. This reduces the disproportionate impact of extreme observations that may otherwise distort the empirical results or lead to misleading interpretations, while retaining the overall shape of the data distribution.

Figure 2 presents the winsorized distribution of ROA for domestic firms (grey bars) and MNEs (red outline). Both groups exhibit a pronounced right-skewed distribution, with most firms clustered around zero, indicating low profitability relative to their asset base. A small number of domestic firms record exceptionally high returns up to eight times their assets, whereas such extreme performance is less common among MNE affiliates. On average, MNEs report lower asset-based profitability than domestic firms, a pattern that challenges the conventional expectation of MNEs being the most profitable firms. We present similar statistics for ROW in Appendix Figure A1.

Figure 2. Return on assets for MNEs and local firms



Source: Author's construction based on South African tax administrative data.

In general, the descriptive evidence highlights substantial heterogeneity between firms, with most reporting limited cross-border transactions and modest profitability, while a small subset, mainly MNE affiliates, accounts for disproportionately large financial flows. Even after normalization and winsorization, MNEs exhibit a lower, but more dispersed, average profitability than domestic firms, consistent with patterns suggestive of profit-shifting behaviour.

5 Methodology

This section presents the empirical framework for identifying firms that may be engaged in profit-shifting activities. The approach relies on linked administrative tax, customs, and financial return data to construct a set of industry-specific benchmarks and red-flag indicators. Firm-level metrics, normalized by size and adjusted for observable characteristics, are benchmarked against their industry-year peers. Persistent and multidimensional deviations from these norms are interpreted as indicators of elevated audit risk.

5.1 Establishing benchmarks for normal performance

We distinguish between MNEs and purely domestic firms as the first step in our methodology. In our tax data, MNEs are identified using a binary variable indicating whether a firm is part of an international corporate group. This classification is based on foreign ownership criteria, including formal group membership, partnerships, or self-declaration in tax filings. Firms that meet one or more of these criteria are classified as MNEs, while those that do not meet any are categorized as domestic. Importantly, a firm must be identified as an MNE before it can be assessed against any of the six red flags described below. As noted earlier, our analysis focuses exclusively on MNEs, since domestic firms lack the opportunity to shift profits outside of South Africa.

The first red flag in our detection framework focuses on identifying firms that exhibit abnormally low profitability using corporate tax return data. We begin by establishing a benchmark for normal profitability through an econometric model that estimates expected firm performance. Specifically, we perform a regression on the ROA, defined as gross profit divided by total fixed assets, on industry-year fixed effects and firm-level controls, including firm age and multinational status, as shown in Equation 2:

$$Y_{it} = \beta \text{Industry}_{it} + \text{Age}_{it} + \text{MNE}_i + \varepsilon_{it} \quad (2)$$

In this specification, Industry_{it} captures industry-year fixed effects, Age_{it} denotes the age of firm i in year t , and MNE_i is a binary indicator for multinational status. The residual term, ε_{it} , reflects firm-specific deviations from the expected profitability benchmark. We perform the same regression using the ROW, our alternative measure of profitability.

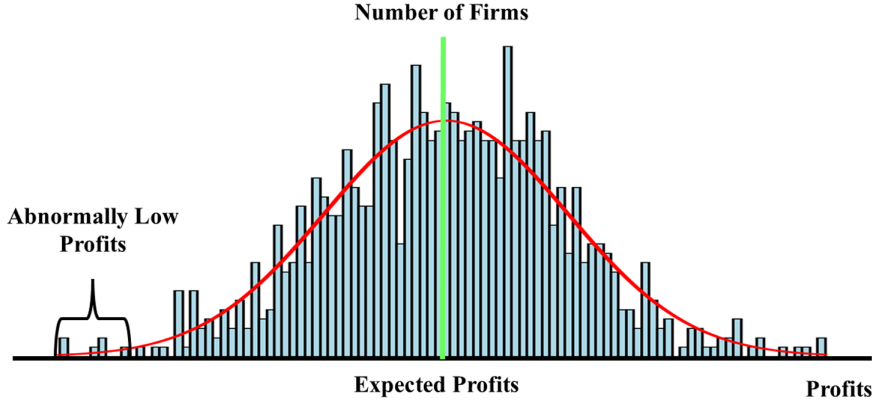
For comparability between firms on different scales, we normalize all financial variables by total fixed assets. This standardization facilitates a consistent assessment of profitability using ROA, with industry-year coefficients serving as reference points for normal profitability.

Because profitability differs between sectors and over time, we estimate the expected ROA for each industry-year group, allowing firms to be benchmarked against their sectoral peers. We also control for structural firm-level characteristics, such as age and MNE status, to account for inherent differences in profitability arising from scale economies or tax planning strategies. To reduce the impact of short-term fluctuations, we calculate multi-year averages of each firm's residuals, thus isolating persistent underperformance rather than temporary shocks.

Figure 3 illustrates this conceptual framework through a stylized histogram of firm-level profitability. The green line indicates the benchmark mean, while the red curve depicts the

expected distribution. Our analysis focuses on firms in the left tail of the distribution, those reporting persistently low profitability, typically more than two standard deviations below their industry average. Such firms are flagged as exhibiting abnormal low profitability, thereby triggering the first red flag in our detection framework.

Figure 3. Hypothetical firm profit distribution



Source: Authors' construction.

The second red flag uses customs data to evaluate the extent of a firm's imports from tax haven countries. Specifically, we perform a regression on haven-related imports, normalized by total fixed assets using Equation 2, with the same control variables used in the profitability analysis, including industry-year fixed effects, firm age, and MNE status. The resulting coefficient captures the extent to which a firm's tax haven import behaviour deviates from the expected norm. Firms that consistently report positive residuals of two standard deviations above the industry average of imports from tax haven countries are flagged as potentially engaged in transfer mispricing. We repeat the same procedure for high debt payment using Equation 2 by performing a regression on high debt payments against our control variables as our third red flag. Firms with average debt payments above two standard deviations of their industry average are flagged as having high debt payment and potentially engaging in profit shifting.

The fourth and fifth red flags relate to royalty payments and management fees. Using corporate tax return data, we extract royalty payments and management fees, which we then normalize using total assets. This captures debt-loading strategies, a common profit-shifting mechanism by which MNEs inflate royalties and management fees to related entities. Although it would be ideal to confirm whether these payments are cross-border and involve tax havens, such a disaggregation is not available. After performing a regression of the two using Equation 2, the firms that fall in the top two standard deviations within their industry-year peers (or report positive values under a binary specification) in terms of royalty payments and management fees are flagged as potentially engaged in profit shifting under the fourth and fifth red flags, respectively.

Our sixth red flag relates to unusually low export values, a channel through which profits may be shifted from high-tax jurisdictions to low-tax countries. Using Equation 2, we perform a regression on firm-level exports to tax havens using our control variables and flag the firms whose average exports fall more than two standard deviations below their industry mean. Such

patterns may indicate under-reporting of exports or mispricing in intra-group trade with related affiliates.

In summary, the detection model integrates six complementary red flags capturing different dimensions of potential profit-shifting behaviour. A firm must first be identified as an MNE before being assessed under this framework, as only multinational firms have the capacity to shift profits across jurisdictions for tax purposes. The primary indicator of concern is abnormally low profitability, which is our first red flag. However, a firm is only flagged as a potential profit shifter if this low profitability coincides with at least one additional red flag, such as unusually high haven-related trade, intra-group debt, royalty payments, or management fee payments. This multi-criteria approach reduces false positives and ensures that only MNEs exhibiting systematic patterns consistent with profit-shifting practices are identified for further scrutiny by tax officials.

6 Results and discussion

This section presents the main findings of the study, outlining the number of firms flagged for potential profit-shifting behaviour, the sectors in which they operate, and the estimated potential revenue losses associated with these firms. It also highlights how these results can guide the prioritization of high-risk firms for audit and enforcement based on their relative contribution to potential tax revenue losses.

6.1 Number of firms flagged

A firm is flagged as a potential profit shifter only if it qualifies as an MNE and consistently reports profits below the industry average. Beyond meeting these two conditions, a firm must also trigger at least one additional red flag related to trade with tax havens, intercompany debt, or service payments. Accordingly, all MNEs in the sample are initially assigned a red-flag score of zero, while low-profitability MNEs can receive scores ranging from one to seven, depending on the number of additional indicators they trigger.

We complement our profitability measures and other profit-shifting conduits with two additional criteria. First, firms with average returns in the bottom decile of their industry are classified as low-return firms. This threshold addresses the persistence of extreme values that can distort mean-based measures, even after extensive data cleaning. Second, given the relatively small number of firms engaged in activities such as importing from tax havens or paying royalties, we use binary indicators to capture the mere occurrence of such transactions as an alternative measure, regardless of their magnitude.

Table 4 summarizes the number of firms that trigger each possible red-flag count. The specifications differ according to how the red flags are constructed using regression residuals (“Est”), decile cut-offs (“10%”), or binary indicators (“Dummy”) with ROA serving as the main measure of profitability. Firms with a single red flag are identified as MNEs exhibiting low profitability but no abnormal transactional patterns, and are therefore not classified as potential profit shifters. By contrast, firms triggering two or more red flags up to a maximum of six are considered candidates for further scrutiny, particularly when the flagged activities

involve royalty payments or management fees.

Table 4. Number of red flags

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Flags	ROA						
0	26,565	26,565	26,565	26,565	26,565	26,565	26,565
1	5	2,328	2,328	2,328	2,328	2,328	0
2	2	2,227	2,086	2,034	2,023	1,897	0
3	3	101	193	233	237	334	0
4	0	0	48	54	60	68	0
5	0	0	1	7	6	24	0
6	0	0	0	0	2	5	0
Method							
Returns	Est	10%	10%	10%	10%	10%	10%
Imports	Est	Est	Dummy	Dummy	Dummy	Dummy	Est
Debt	Est	Est	Dummy	Dummy	Dummy	Dummy	Dummy
Royalties	.	.	.	.	Est	Dummy	Dummy
Mgmt	Est	Est	Est	Est	Est	Est	Est
Exports	Est	Est	Est	Est	Est	Est	Est

Source: Authors' construction.

In Column 1, a total of five firms are identified as potential profit shifters. Based on the low-profitability criterion, only two firms are initially flagged, and this number remains unchanged when incorporating imports from tax haven jurisdictions. However, the number of flagged firms increases to five once high debt payments are taken into account. Column 2, which applies a bottom 10% threshold for low ROA, 2,328 firms, approximately 1.3% of the sample, are flagged for potentially engaging in profit shifting. Among these, 2,225 and 96 firms are additionally flagged for exhibiting abnormally high haven imports and debt payments.

In Column 3, we incorporate estimated thresholds using dummy variables to indicate any trade with havens. While the total number of flagged firms (2,328) remains unchanged, additional flags are observed: the number of firms flagged for high debt payment increases to 193, while 48 firms are flagged for high royalty payments and 1 firm for high management fees, all in conjunction with low profitability. While the total number of flagged firms remains the same, the number of firms under each category increases, except for the haven imports category, which has reduced by 63 firms. In Columns 5 and 6, the total number of flagged firms remains unchanged, with 2 and 5 firms being flagged for high management fees and lower exports, respectively. Column 7 returns to the estimated ROA threshold while retaining the expanded set of conduit flags from Column 6. Under this stricter specification, no additional firms are flagged.

We present the ROW results in Appendix Table A2. The total number of firms ever flagged for ROW, our alternative measure for firm profitability, is 1,576, representing 0.9% of our sample. This proportion is slightly lower than what we obtained using ROA, indicating that profitability differences measured relative to labour costs identify a smaller subset of potential profit-shifting firms.

In summary, potential profit shifters represent less than 1% of all MNEs in the dataset. There are only minor differences in the firms identified when comparing the estimated return thresholds with the bottom decile approach, as well as across different conduits such as debt, trade, and management fees. Significantly, the inclusion of royalties does not alter classification outcomes materially.

6.2 Prioritizing multinational enterprises for auditing

While it may be ideal for SARS to audit all MNEs to ascertain if they actually engaged in profit shifting, such an approach is not practical given resource constraints and the high cost of audits. The core aim of the red-flag methodology developed in this study is to identify firms that exhibit the most concerning signs of profit shifting and prioritize targeted audit efforts. Once high-risk firms are flagged based on systematic indicators of abnormal behaviour, the question becomes how best to allocate limited enforcement capacity. This section addresses this by ranking flagged MNEs according to their estimated revenue-gain potential, allowing SARS to focus on firms whose behaviour is not only suspicious but also exhibits a significant revenue loss.

The estimated revenue gain is derived by multiplying the mean estimated revenue gain per firm by the number of consistently flagged firms. It represents the hypothetical tax revenue that could be recovered if all these firms were confirmed through auditing to have been engaged in profit shifting and then taxed according to the expected profitability levels for their industry at the current 27% CIT rate. Table 5 provides a decile-based summary of estimated revenue gains from 458 flagged MNEs, based on abnormal profitability relative to industry norms using both ROA and ROW. Firms are grouped into ten deciles based on their revenue-gain potential. The distribution is highly skewed: while each decile contains approximately 10% of the firms, the share of total potential tax revenue differs markedly. The bottom 30% of firms together account for less than 2% of the estimated revenue, indicating minimal tax recovery potential from these groups. In contrast, the top 10% of firms (Decile 10) are responsible for more than 60% of the total estimated tax revenue loss, suggesting a significant concentration of profit-shifting behaviour among a small group of MNEs.

Given this concentration, tax authorities should prioritize audit and enforcement resources on firms in the top decile, as targeting just these 44 firms could potentially recover more than ZAR 3 billion in underpaid taxes. Deciles 8 and 9, which collectively represent the next 20% of firms, account for an additional 30% of revenue gains and may also be worthwhile targets. Focusing enforcement resources on the top 30%, roughly 136 firms, would maximize revenue recovery while keeping administrative costs manageable, thus reinforcing the value of data-driven audit targeting strategies that concentrate on high-risk firms with the greatest fiscal impact.

6.3 Flagged firms by sector

In this section, we examine the sectoral distribution of firms flagged for potential profit shifting to identify where tax risks are most concentrated within the South African economy. Given that

Table 5. Distribution of estimated revenue gains by decile

Decile group	Number of firms	% of firms	Revenue gain (ZAR)	% of total revenue gain
1	46	10	19.5 million	0.4
2	46	10	22.2 million	0.4
3	46	10	25.3 million	0.5
4	46	10	30.0 million	0.6
5	46	10	39.3 million	0.7
6	46	10	70.2 million	1.3
7	46	10	120 million	2.3
8	46	10	400 million	7.6
9	46	10	1.2 billion	22.7
10	44	10	3.36 billion	63.5
Total	458	100	5.29 billion	100

Source: Authors' construction.

MNEs operate across industries with varying exposure to cross-border trade, intra-group transactions, and transfer pricing opportunities, a sectoral perspective provides important details into the structural channels through which profit shifting may occur. Analysing the distribution of flagged firms across industry groups allows us to pinpoint sectors where the potential fiscal impact of profit-shifting behaviour is likely to be the greatest and where monitoring and enforcement efforts could be targeted most effectively.

Table 6 summarizes the distribution of firms flagged for potential profit-shifting behaviour across major sectors of the South African economy. The results reveal that the concentration of high-risk firms is not evenly distributed across industries. The wholesale and retail trade sector accounts for the largest proportion of flagged firms (28.2%), followed by services (26.4%), and manufacturing (15.3%). Together, these sectors represent more than two thirds of all firms flagged for potential profit shifting. The prominence of these industries reflects their extensive participation in global value chains and their high volume of cross-border transactions, both of which increase the scope for transfer mispricing and other forms of intra-group profit allocation.

In contrast, the remaining sectors contribute a relatively small share of flagged firms. Construction (11.6%) and utilities and transport (6.8%) show moderate levels of exposure, while agriculture, forestry, and fishing (4.8%) and finance, insurance, and real estate (5.2%) account for a smaller proportion of potential profit-shifting cases. The mining sector, representing only 1.8% of flagged firms, appears less exposed, likely due to its capital-intensive nature, relatively strict reporting obligations, and limited engagement in intra-group trade with offshore affiliates.

7 Conclusion and policy implications

This study presents a practical, data-driven methodology for detecting potential profit shifting by MNEs in South Africa. By leveraging detailed administrative tax and customs data already available to SARS, the approach identifies firms that persistently exhibit indicators consistent

Table 6. Distribution of flagged firms by broad industry

Broad industry	Number of firms	Percent
Agriculture, forestry, & fishing	22	4.80
Mining	8	1.75
Manufacturing	70	15.28
Construction	53	11.57
Utilities & transport	31	6.77
Wholesale & retail trade	129	28.17
Services	121	26.42
Finance, insurance, & real estate	24	5.24
Total	458	100

Source: Authors' construction.

with potential profit-shifting behaviour, such as abnormally low profitability combined with unusually high levels of transactions involving tax havens, intra-group debt, and intellectual property payments. For a firm to be considered as engaging in potential profit shifting, it must be an MNE and consistently report low profitability relative to its industry peers, together with other conduits of profit shifting.

Although less than 1% of MNEs are flagged under our proposed methodology, a small subset of firms accounts for a disproportionately large share of potential tax revenue losses. Specifically, 458 firms consistently trigger red flags in both asset- and wage-based profitability metrics, together representing an estimated ZAR 5.29 billion in potentially lost tax revenue. Remarkably, only 44 of these companies are responsible for more than 60% of that total potential tax loss. These findings highlight that effective tax administration in the context of profit shifting requires targeted enforcement rather than broad-based audits.

Although the proposed methodology offers a practical, data-driven framework for identifying potential profit-shifting behaviour, several limitations are worth acknowledging. First, the administrative data used in this study, although rich, does not include sufficient detail on the underlying conduits through which profit shifting occurs. In particular, the absence of information on the global ownership structures of MNEs limits our ability to distinguish between affiliates operating in low-tax jurisdictions and those in non-haven countries. Similarly, data on intra-firm trade, exports, and imports are not disaggregated by partner country, restricting the extent to which cross-border transactions can be traced to specific tax havens or related-party entities. Information on firms' affiliations with SEZs and other tax-preferred regimes is also not available, which constrains the analysis of location-specific incentives that may interact with profit-shifting behaviour.

The effectiveness of this red-flag methodology ultimately depends on the quality and comprehensiveness of the underlying data. Incomplete, inaccurate, or poorly reported corporate tax filings, particularly in areas such as related-party transactions, debt arrangements, and payments to foreign affiliates, can weaken the precision of risk assessments. Strengthening data integrity through improved compliance monitoring, clearer reporting standards, and enhanced taxpayer guidance is therefore critical to realizing the full potential of this approach.

Beyond data limitations, the estimates presented here should be interpreted as indicative rather than definitive. The identification of firms as potential profit shifters is based on statistical irregularities in profitability and transaction patterns rather than on verified instances of tax avoidance. Only comprehensive audits can confirm whether these firms are genuinely engaged in profit-shifting practices and determine the exact magnitude of the associated tax revenue losses. Nevertheless, by systematically flagging high-risk firms using administrative data, the proposed approach offers a practical screening tool to guide targeted audits and enhance the efficiency of tax enforcement.

From a policy perspective, SARS can leverage the red-flag indicators developed in this study to sharpen its audit selection and enforcement strategy. Given institutional resource constraints, prioritizing high-risk firms, especially those in the top deciles of estimated revenue loss, can significantly improve the return on enforcement efforts. These insights could also inform the design and negotiation of Advance Pricing Agreements (APAs), providing a proactive mechanism to promote compliance and reduce audit disputes.

Finally, the broader relevance of this framework extends well beyond South Africa. The profit-shifting detection methodology presented here offers a replicable, data-driven, and cost-effective tool for tax administrations across the African continent. If adopted and coordinated through regional initiatives, such as the African Tax Administration Forum (ATAF), this approach could lay the foundation for a harmonized regional response to profit shifting, thus strengthening collective bargaining power in global tax negotiations and advancing the goal of fair, transparent, and sustainable corporate taxation in Africa.

References

- Allingham, M. G., and Sandmo, A. (1972). ‘Income Tax Evasion: A Theoretical Analysis’. *Journal of Public Economics*, 1(3–4): 323–338. [https://doi.org/10.1016/0047-2727\(72\)90010-2](https://doi.org/10.1016/0047-2727(72)90010-2)
- Alstadsæter, A., Bjørkheim, J. B., Davies, R. B., and Scheuerer, J. (2022). ‘Pennies from Haven: Wages and Profit Shifting’. CESifo Working Paper Series 9590. Munich: CESifo. <https://dx.doi.org/10.2139/ssrn.4042434>
- Alstadsæter, A., Godar, S., Nicolaidis, P., and Zucman, G. (2023). *Global Tax Evasion Report 2024*. Paris: EU Tax Observatory.
- Bilicka, K. A. (2019). ‘Comparing UK Tax Returns of Foreign Multinationals to Matched Domestic Firms’. *American Economic Review*, 109(8): 2921–2953. <https://doi.org/10.1257/aer.20180496>
- Chaisse, J., and Ji, X. (2020). ‘The Pervasive Problem of Special Economic Zones for International Economic Law: Tax, Investment, and Trade Issues’. *World Trade Review*, 19(4): 567–588. <https://doi.org/10.1017/S1474745620000129>
- Davies, R. B., Martin, J., Parenti, M., and Toubal, F. (2018). ‘Knocking on Tax Haven’s Door: Multinational Firms and Transfer Pricing’. *The Review of Economics and Statistics*, 100(1): 120–134. https://doi.org/10.1162/REST_a.00673
- Davis Tax Committee (2015). *Second Interim Report on Base Erosion and Profit Shifting (BEPS) in South Africa*. Johannesburg: Davis Tax Committee.
- Delis, F., Delis, M. D., Laeven, L., and Ongena, S. (2024). ‘Global Evidence on Profit Shifting Within Firms and Across Time’. *Journal of Accounting and Economics*, 79(2–3): 101744. <https://doi.org/10.1016/j.jacceco.2024.101744>
- Garcia-Bernardo, J., and Janský, P. (2024). ‘Profit Shifting of Multinational Corporations Worldwide’. *World Development*, 177: 106527. <https://doi.org/10.1016/j.worlddev.2023.106527>
- Janský, P., and Prats, A. (2015). ‘International Profit-Shifting out of Developing Countries and the Role of Tax Havens’. *Development Policy Review*, 33(3): 271–292. <https://doi.org/10.1111/dpr.12113>
- Johannesen, N., Tørsløv, T., and Wier, L. (2020). ‘Are Less Developed Countries More Exposed to Multinational Tax Avoidance? Method and Evidence from Micro-Data’. *The World Bank Economic Review*, 34(3): 790–809. <https://doi.org/10.1093/wber/lhz002>
- Mvunabandi, J. D., Nomala, B., and Marimuthu, F. (2024). ‘The Effect of Tax Avoidance and Tax Evasion on the Performance of South African Economy’. *International Journal of Economics and Financial Issues*, 14(1): 52–63. <https://doi.org/10.32479/ijefi.15221>
- National Treasury and UNU-WIDER (2020). ‘Customs Transaction-Level Data 2008–2018 [dataset]. Version 4.0’. Pretoria: South African Revenue Service [producer of the original data], 2019. Pretoria: National Treasury and UNU-WIDER [producer and distributor of the harmonized dataset], 2020.
- National Treasury and UNU-WIDER (2021). ‘CIT-IRP5 Firm-Level Panel 2008–2018 [dataset], Version 4.0’. Pretoria: South African Revenue Service [producer of the original data], 2019. Pretoria: National Treasury and UNU-WIDER [producer and distributor of the harmonized dataset], 2021.

- Newman, C., Rand, J., and Tarp, F. (2023). ‘Imports, Supply Chains and Firm Productivity’. *World Development*, 172: 106371. <https://doi.org/10.1016/j.worlddev.2023.106371>
- Reynolds, H., and Wier, L. (2016). ‘Estimating Profit Shifting in South Africa Using Firm-Level Tax Returns’. WIDER Working Paper 2016/128. Helsinki: UNU-WIDER. <https://doi.org/10.35188/UNU-WIDER/2016/172-7>
- Tax Justice Network (2024). *State of Tax Justice 2024*. London: Tax Justice Network. Available at: <https://taxjustice.net/reports/the-state-of-tax-justice-2024/>.
- Tørsløv, T., Wier, L., and Zucman, G. (2022). ‘The Missing Profits of Nations’. *The Review of Economic Studies*, 90(3): 1499–1534. <https://doi.org/10.1093/restud/rdac049>
- Wier, L. (2020). ‘Tax-Motivated Transfer Mispricing in South Africa: Direct Evidence Using Transaction Data’. *Journal of Public Economics*, 184: 104153. <https://doi.org/10.1016/j.jpubeco.2020.104153>
- Wier, L., and Erasmus, H. (2023). ‘The Dominant Role of Large Firms in Profit Shifting’. *IMF Economic Review*, 71: 791–816. <https://doi.org/10.1057/s41308-022-00180-w>

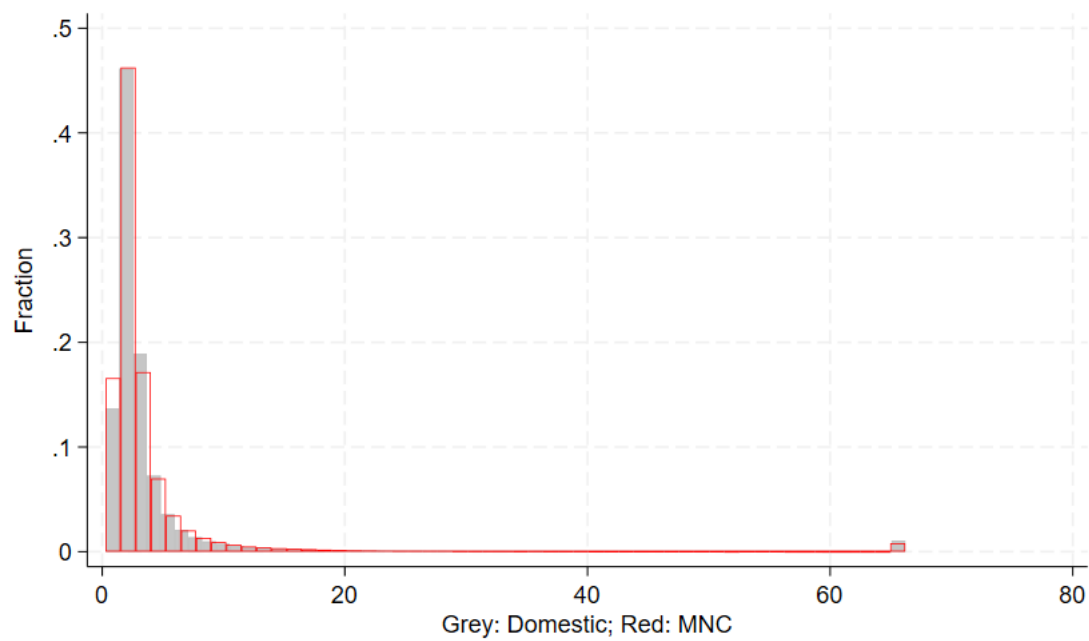
Appendix

Table A1. Distribution of firms by multinational status

MNE status	Frequency	Percent
Domestic firms	156,074	85.45
Multinationals	26,565	14.55
Total	182,639	100.00

Source: Authors' construction.

Figure A1. Return on wages for MNEs and local firms



Source: Author's construction based on South African Tax Administrative data.

Table A2. Number of red flags based on ROW

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Flags	ROW						
0	26,565	26,565	26,565	26,565	26,565	26,565	26,565
1	0	2,328	2,328	2,328	2,328	2,328	0
2	0	1,523	53	0	0	0	0
3	0	1,476	82	18	0	0	0
4	0	1,454	93	28	1	0	0
5	0	1,453	94	28	1	0	0
6	0	1,399	137	30	1	1	0
Method							
Returns	Est	10%	10%	10%	10%	10%	10%
Imports	Est	Est	Dummy	Dummy	Dummy	Dummy	Est
Debt	Est	Est	Dummy	Dummy	Dummy	Dummy	Dummy
Royalties	.	.	.	.	Est	Dummy	Dummy
Management	Est	Est	Est	Est	Est	Est	Est
Exports	Est	Est	Est	Est	Est	Est	Est

Source: Authors' construction.