Finding Shell Companies: mapping the global geography of shell companies

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Abstract

This note examines the global prevalence and distribution of shell companies, which are often used for illicit financial activities like tax evasion. Using business registry data for over 200 jurisdictions, including individual US states, we construct an indicator of shell company prevalence based on the number of registered companies per capita. We find that known tax havens like the British Virgin Islands and the Cayman Islands have extremely high rates of company presence per adult. Zooming in on Europe reveals Estonia as a lesser-known host for shell companies, besides flagging known conduit countries like Luxembourg and Cyprus. A unique decomposition of US states also shows Delaware and Wyoming are potentially hosting a large number of shell companies. Indicative for the role of shell companies in international tax evasion, our shell company prevalence indicator correlates with jurisdiction characteristics catering tax evasion, such as low corporate tax rate and aggressive tax treaties.

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1 Introduction

Recent high-profile leaks like the Panama Papers and Pandora Papers have revealed that shell companies play a major role in tax avoidance and criminal activities. However, leaked data sources are sporadic and do not provide systematic geographical coverage to fully understand the scale and distribution of these entities, leaving potential blind spots in mapping global shell company networks used by wealthy individuals and multinationals.

Identifying high-risk jurisdictions can help policymakers prioritize transparency reforms where they are most needed and correctly identify avoidance behaviors. This note provides a broader perspective on global shell company activity by answering the question: in which countries is the prevalence of shell companies highest?

To answer this question we develop a straightforward yet novel methodology leveraging an underutilized data source - national corporate registries. Unlike existing work focused on generic tax haven listings, we develop indicators tailored to pinpointing jurisdictions likely to host large shell company populations specifically. In particular, we propose using the number of registered entities with a limited liability legal structure[1] per capita as a red flag for potential shell activity. Intuitively, if legal entity registrations vastly exceed the adult population, it signals inflated activity beyond what domestic economic fundamentals can support.

While simple, per capita company density provides a readily constructible data-driven indicator using just population and incorporation data. A striking advantage of the metric simplicity is that the wide availability of such data allows an extremely broad country coverage. We compile registrations across over 200 jurisdictions including major economies and tax havens, uniquely disaggregating the United States into individual states and Canada into individual provinces. Such a breakdown into subnational states and regions would not be possible using macro-statistics reported at the country level, such as foreign direct investment flows.

A data-driven approach to identifying tax haven/offshore jurisdictions is essential, as it offers a more objective indication than lists composed by international organizations (Zorome, 2007; Garcia-Bernando et al., 2017). In the literature, several attempts to create data-driven indicators for tax haven/offshore jurisdictions have been made. Zorome (2007) calculates the ratio between net financial sector exports and national income, defining an ”offshore financial center” as ”a country or jurisdiction that provides financial services to nonresidents on a scale that is incommensurate with the size and the financing of its domestic economy” (Zorome, 2007, p.7). Garcia-Bernando et al. (2017) use Orbis data to map international ownership chains, identifying jurisdictions functioning as destinations for profit shifting or as hub jurisdictions for international financial flows. Garcia Alvarado and Mandel (2022) use the Panama Papers data applied to network theory to identify offshore jurisdictions and quantify their importance but are limited by the representativeness and coverage of the leaks. By constructing indicators approximating shell prevalence, we aim to spotlight vulnerabilities that should be policy priorities.

Notably, our work closely relates to the World Bank's Entrepreneurship Database, which also examines company registrations per capita. However, the World Bank interprets this as a measure of productive

[1] We exclude sole proprietorship as limited liability structures. A Sole proprietorship is an enterprise owned exclusively by one natural person and in which there is no legal distinction between the owner and the business entity.

entrepreneurship facilitating growth. In contrast, our study exploits per capita company prevalence as an indicator of shell company activity potentially linked to tax avoidance and evasion, ownership concealment, fraud, and other illicit financial flows.

Our main findings show that globally, small tax havens exhibit company registration densities far exceeding major economies. The extremes seen in well-known tax havens likely reflect inflated shell activity rather than fundamentally higher entrepreneurship. A higher shell company prevalence correlates with tax haven indicators and our top jurisdictions largely correspond to jurisdictions featured in lists of tax havens and non-cooperative jurisdictions. The importance of a data-driven approach to compiling such lists is illustrated by the fact that we identify Delaware as one of the jurisdictions with the highest shell company prevalence, while this jurisdiction is not included in any of the tax haven lists we consider. In the future, integrating additional attributes like ownership, employees, and revenue as data improves can strengthen these initial findings.

These findings are not without limitations. To cover many jurisdictions, we draw data from multiple sources. These data are cleaned extensively and double-checked for consistency, but differences between sources and countries may still arise due to differences in reporting requirements. Additionally, we do not identify entities with no real economic activity directly, meaning differences in the entity per capita ratios between jurisdictions could partly be driven by the level of entrepreneurship, the size of the informal economy and general business conditions. In the results, however, we show tax havens exhibit entity per capita rates exceeding other jurisdictions by an order of magnitude that cannot be justified by differences in real activities.

This note is structured as follows: section 2 describes what a shell company is and reviews the literature on their uses, section 3 explains the methodology and describes data sources, 4 describes the results and finally section 9 concludes.

2 What is a shell company?

A shell company, also known as a ”mailbox company”, is formally defined by the OECD as an entity registered in a jurisdiction that carries out little to no economic activity there. Specifically, shells have no substantive operations, physical assets, or employees in their country of incorporation. Instead, they exist primarily as entities on paper, used for transactions and asset holding, generally to exploit regulations, create opaque ownership structures, or reduce tax obligations.

2.1 How are shell companies (mis-)used?

Shell companies enable questionable to outright illicit activities by three primary groups: multinational corporations, high-net-worth individuals, and criminal enterprises. Each leverages the anonymity and opacity shells provide around beneficial ownership to serve different ends.

For multinationals, shells facilitate sophisticated tax avoidance strategies to maximize after-tax profits. Francois and Vicard (2023) show that affiliates of multinationals with more complex ownership networks are more likely to report zero profits, shifting income away from high-tax jurisdictions. This

highlights how only multinationals with intricate webs of companies can successfully shift profits, while those with flatter structures do not display similar tax avoidance patterns. By manipulating intrafirm transfer prices within a corporate structure laden with shells, profits can be shifted to lower-tax jurisdictions with minimal real economic activity (Hebous and Johannesen, 2021; Lejour and van 't Riet, 2023). Dividend stripping schemes transfer share ownership to shells temporarily around dividend dates, enabling reduced taxable dividend income. Mischaracterizing the nature of transactions to obtain tax advantages also grows easier behind the veil shells provide. Demeré et al. (2020) estimate these tactics used by US parent company shells lower total tax payments by 6%.

Wealthy individuals are not far behind in exploiting shells, primarily using them to avoid regulations, conceal assets and dodge taxes (see Harrington (2016) for an overview). Johannesen et al. (2023) estimates US households alone hold $4 trillion in anonymous foreign accounts, with most funds funneled through jurisdictions considered tax havens. Analyzing leaked Isle of Man bank data, Collin (2021) found over 90% of foreign wealth held there was in shell companies or trusts set up for individuals. Needing shells less for moving funds undetected, and more for obscuring ownership from authorities.

Finally, criminal enterprises leverage shells to enable outright illegal activities like money laundering, corruption, terrorism financing and more. The opacity shells provide is key to disguising sources and destinations of illicit funds (Jancsics, 2016; Findley et al., 2014). As Tiwari et al. (2020) highlights, shell involvement in money laundering schemes deserves more regulatory and research focus.

The common thread across all groups is shells provide secrecy regarding "beneficial" ownership, frustrating authorities while enabling questionable activities to outright crimes. For instance, real estate buyers in the UK and US can remain anonymous by owning property through shells, despite regulations attempting to pinpoint ultimate owners (Agrawal et al., 2021; Collin et al., 2022; Johannesen et al., 2022; Advani et al., 2023). This anonymity allows individuals to conceal wealth from tax agencies and other oversight bodies. Holding real estate in the UK anonymously allows individuals to circumvent disclosure of their wealth to tax authorities following the implementation of the Common Reporting Standard (CRS) (Bomare and Le Guern Herry, 2022).

Remarkably, "secret shopper" style experiments by Sharman (2010) and Allred et al. (2017) uncovered it was relatively easy to set up anonymous shell companies, with some OECD countries demonstrating lower compliance than offshores perceived as tax havens. The magnitude of financial flows enabled by shells is substantial, with Damgaard et al. (2024) estimating over 40% of global foreign direct investment passes through envelopes of opacity-shell companies.

3 Measuring shell-company pervalence

3.1 Methodology

To estimate shell company prevalence across jurisdictions, we develop a straightforward indicator leveraging the number of limited liability entities registered per capita. Critically, limited liability shields owners' assets, creating separate legal entities useful for opaque holding structures that can limit tax obligations and disclosure requirements.

Specifically, for over 150 countries and major US states, we obtain data on the total number of registered legal entities from sources like company registries, business databases, and official statistics. We then divide this by the working age population (aged 15-64) to calculate a per capita number of active companies. The logic behind this measure is simple: in situations where the number of businesses is disproportionate to the working age population, it suggests many companies are not engaging in substantive economic activity. Excessively high company formation rates per capita thus flag jurisdictions at higher risk of hosting large shell company populations.

While a blunt metric, per capita company density provides a readily constructible indicator using minimal data for broad country coverage. The simplicity of the metric also comes with limitations. We do not identify entities with no real economic activity directly, meaning elevated levels of entity per capita ratios will partly be driven by higher levels of entrepreneurship, the size of the informal economy and general business conditions. In the results, however, we show tax havens exhibit entity per capita rates exceeding other jurisdictions by a degree that cannot be justified by differences in real activities.

To inspect if our metric indeed signals illicit shell company prevalence, we check if the jurisdictions with a high company per capita ratio align with existing lists of tax havens/offshore jurisdictions. These lists are drawn from both academic work and official grey/black lists.

3.2 Data sources

Our dataset is composed of meticulously collected data on formally registered active legal entities with limited liability legal structures. The data is collected from a range of sources. The primary input is official sources that gather and aggregate information on the number of businesses present in their countries. Second, we rely on business registries for the most recent year available. If not downloadable directly, registry data is obtained through web-scraping. Where official business registries are not available, we use data from the World Bank. While these sources are readily available in developed countries, they become progressively scarcer in smaller jurisdictions. In instances where official statistics were limited or nonexistent, we complemented our dataset with information extracted from leaks.

For the final indicator, we use the most recent available data points, providing coverage ranging from 2020 to 2023 in most cases, with few exceptions (Bahamas, St. Kitts and Nevis) dating to 2016 where we rely on leaked data.[2]

When computing and collecting the number of limited liability entities we exclude sole proprietors, which are often reported together with legal entities or in business registries but do not constitute a separate legal entity from the natural person. We only include active entities, dropping a source when information on the entity status is unavailable. For US states, we exclude ”foreign companies” that are required to register in a state to operate, even when they have no legal entity incorporated in that state.

A striking feature of the resulting dataset is its geographical coverage. Our data compilation process covered over 200 jurisdictions, including US states, encompassing major economies and renowned tax havens. Notably, we have striven to ensure comprehensive geographical representation. Population data, drawn from the United Nations, the World Bank, and national statistics offices, is employed to

[2]The administrations of the countries in question were contacted but we received no answer yet.

calculate per capita rates.

Working with company registry data entails certain challenges due to variations in definitions and reporting standards across jurisdictions. Discrepancies may arise from different practices, the exclusion of smaller entities, or variations in reporting requirements. These disparities can potentially lead to an underestimation of company numbers in developing countries. Whenever we can collect several data points for a single jurisdiction we cross- and double-check sources extensively to minimize discrepancies and maximize consistency. For a more comprehensive understanding of the data collection and cleaning process, please refer to the information provided in Appendix A.

4 Global overview of the shell companies indicator

Table 1 and the map in figure 1 provide an overview of entity per capita rates across the 229 jurisdictions covered. On average, we observe 235 registered corporations, Limited Liability Companies, limited partnerships and similar entities per 1,000 working age individuals across the full sample. Medians and averages weighted by population size reveal most people reside in countries with far lower company densities. To get a sense of normal entity per capita rates: the median jurisdiction exhibits 79 entities per 1,000 working age residents, while the population-weighted mean sits at 30 per 1,000 – one-eighth the unweighted average. In major economies like France and Germany, the entity per capita rate is 69 and 22 respectively.

The discrepancy between the simple and weighted average hints at how smaller jurisdictions drive up the total average incorporation rate. We also see significant variation across continents. Europe, North America and Oceania show far higher entity density than Africa, Asia and South America by both weighted and unweighted averages.

Table 1: Shell companies indicator: summary statistics by continent

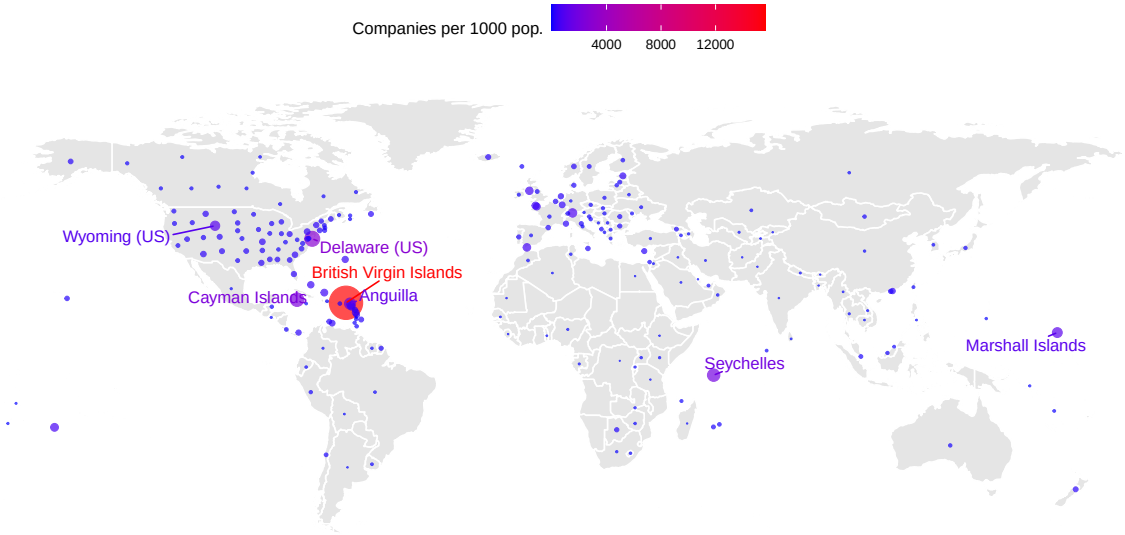
Continent	N. Jurisdictions	Mean	Weighted Mean	Median
Africa	26	100	13	17
Asia	40	40	14	14
Europe	50	152	58	90
North America	81	476	128	180
Oceania	9	248	100	40
South America	10	45	33	31
Total	229	235	30	79

Note: The indicator is calculated as the number of limited liability entities in a jurisdiction, divided by the size of its working population, times 1,000. The weighted mean rate weights the entity per capita indicator by the working age population in each jurisdiction.

4.1 Where are shell companies most prevalent?

Our analysis of per capita company formation data reveals extraordinarily high registration rates in recognized tax havens compared to other jurisdictions. Mapping shell companies globally hint to the concentration of potential shell company activity in a select few territories (Figure 1). Despite their small populations, small island tax havens emerge as hotspots of inflated company prevalence. While not providing definitive proof, these extremes strongly suggest that these jurisdictions host substantial populations of shell companies.

Figure 1: Companies per capita world overview

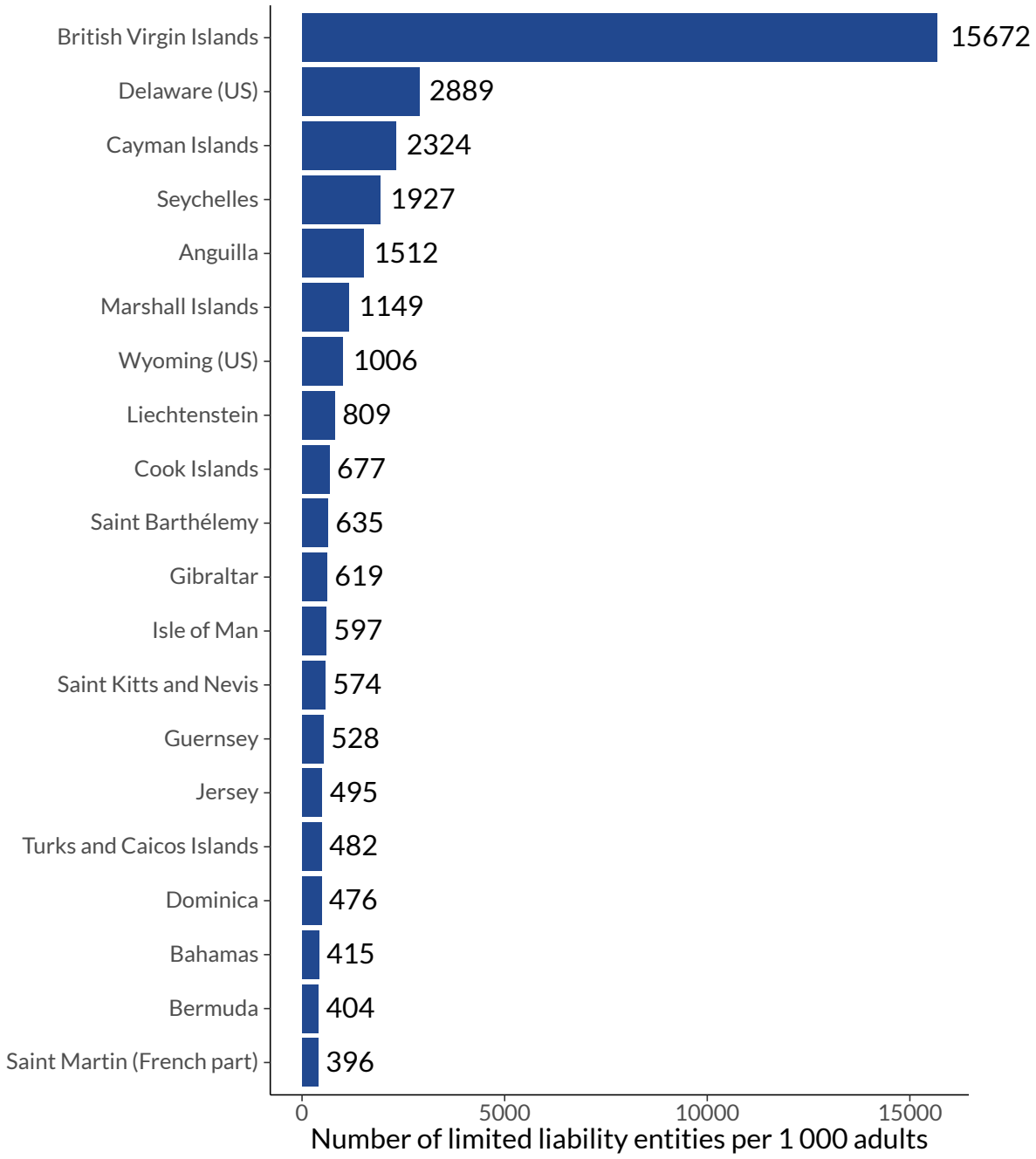


Note: The circle size and color intensity are proportional to the shell companies indicator.
Source: Shell companies indicator, 2023

The British Virgin Islands (BVI) claims the top position globally, accounting for a mere 0.0005% of the world's population but housing 0.3% of the registered companies in our sample. This mirrors prior findings underscoring the BVI's outsized role in offshore financial leaks (Garcia Alvarado and Mandel, 2022) and foreign direct investment flows (Lejour, 2023). Other tax havens including the Cayman Islands, Delaware, Cook Islands, and Anguilla also exhibit extreme company registration densities (Figure 2).

The BVI's popularity stems primarily from exempting essentially all forms of corporate income while allowing tax-free flows of interest, royalties, and dividends (Kuria, 2021). However, the astonishing prevalence of shell entities likely owes specifically to the BVI's status as the pioneer of the International Business Company (IBC). IBCs face minimal to zero tax obligations, reporting requirements, or disclosure rules, while being straightforward to establish even with a single founder, owner and director. By law, they cannot conduct domestic BVI business. The seminal 1984 *BVI International Business Companies Act* catalyzed the islands' emergence as a tax haven hub for nominally foreign entities (Darius and Williams, 1997; Laffite, 2023).

Figure 2: Top 20 jurisdictions worldwide



Note: For Bahamas and St Kitts and Nevis the data used to construct the indicator refers to 2016, for all other countries it is between 2020 and 2023.

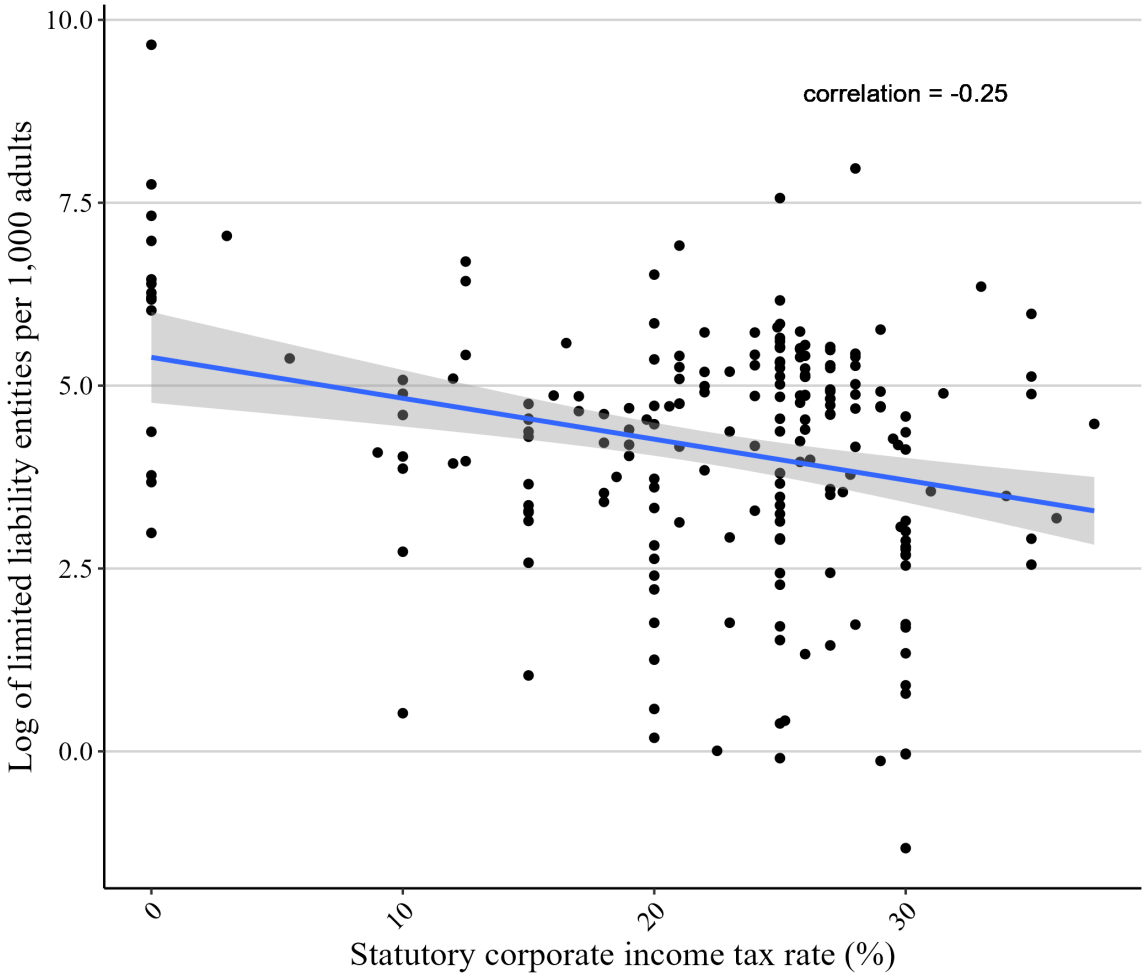
Source: Shell companies indicator, 2023.

5 What makes jurisdictions attractive for shell companies?

As discussed in Section 2, shell companies can be used for tax avoidance, ownership concealment, and fraud. Jurisdictions with little to no corporate taxes, lax regulation, and/or high financial secrecy offer desirable conditions for such activities. Zooming in on corporate taxes, we see that jurisdictions with a lower statutory corporate income tax rate tend to have a higher shell company prevalence (Figure 3).

The statutory rate, however, does not tell the whole story. The Tax Justice Network publishes indexes based on numerous indicators related to factors making a jurisdiction accommodative for corporate tax evasion, allowing us the inspect how shell company prevalence correlates with these factors.

Figure 3: Correlation between shell company prevalence and the statutory corporate income tax rate



Note: This figure shows the relation between the statutory corporate income tax rate in each jurisdiction (in 2020 and 2022 for US states) and the entity per capita metric. The corporate income taxes of all jurisdictions including US states, where federal and state taxes are combined, are included, except Canadian provinces. This leaves a total of 215 jurisdictions.
Source: Shell companies indicator, The corporate income tax rates are drawn and double checked from the OECD database on corporate income tax rates, the corporate tax rates table from KPMG and Tax Foundation, from which we also draw the combined state and federal taxes in US states.

The limited liability company to working population rate strongly correlates with the Corporate Tax

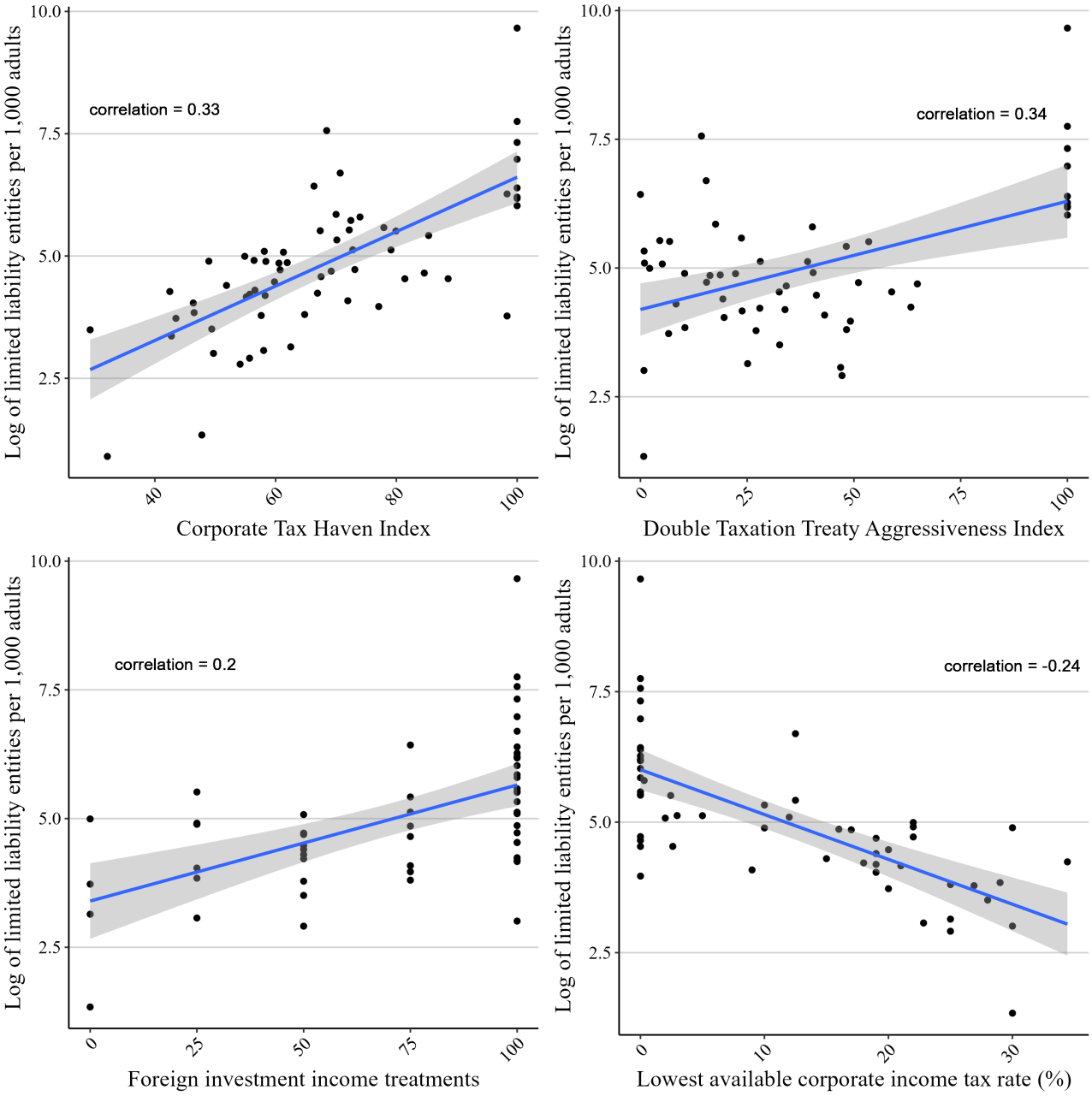
Haven Index 2019 (first panel, Figure 4). This index combines indicators such as low tax rates, exemption provisions, lax reporting requirements and lack of withholding taxes on interest, dividend, and royalty flows to construct a score indicating the degree to which a jurisdiction caters to corporate tax abuse. The fact that our metric strongly correlates with the Corporate Tax Haven Index indicates it is, at least partially, capable of identifying jurisdictions hosting harmful shell companies. Note that the index is available for 64 jurisdictions studied by the Tax Justice Network. The figure hence reflects a subsample of our total sample, already selecting jurisdictions with higher tax evasion risks.

Three components of the Corporate Tax Haven Index stand out. First, there is a strong positive correlation between double taxation treaty aggressiveness and shell company prevalence (Figure 4). Tax treaty aggressiveness measures the degree to which double taxation prevention agreements a jurisdiction has with other jurisdictions lead to tax-free flows of interests, dividends and royalties and the degree to which a jurisdiction actively pushed for such exemptions and low rates. Jurisdictions with a high tax treaty aggressiveness score have high company per capita rates, underlying the importance of shell companies are links in international chains.

Second, shell company prevalence tends to be higher among jurisdictions with more accommodative foreign investment income treatment. The Foreign Investment Income Treatment Index measures the degree to which a jurisdiction offers an exemption for worldwide/foreign capital income.

Third, jurisdictions where the lowest available corporate income tax rate is lower exhibit a lower company per capita rate. The lowest available corporate income tax rate takes special regimes and agreements into account, which allows corporations to be taxed at a lower rate than the statutory corporate income tax rate. Looking at the lowest available corporate income tax rate reveals a stronger correlation with shell company prevalence than with the statutory corporate income tax rate (Figure 3). This underlines the importance of (sometimes untransparent) exemptions and preferable regimes employed to decrease the tax burden for (multinational) corporations.

Figure 4: Correlation between shell company prevalence and selected jurisdiction characteristics



Note: The Corporate Tax Haven Index is a combined score of 20 indicators measuring the degree to which a jurisdiction facilitates tax avoidance by multinationals, such as the lowest available corporate income tax rate, capital gains taxes, available exemptions, limitations to interest and royalty deductions tax court secrecy and withholding taxes. A score of 0 means a jurisdiction does not provide any scope for tax avoidance by multinationals, whereas a score of 100 signals maximum catering to tax avoidance. This figure uses the Tax Haven Index 2019, available for 64 jurisdictions (these exclude US states and Canadian provinces). The Double Taxation Treaty Aggressiveness Index measures the degree to which double taxation prevention agreements a jurisdiction has with other jurisdictions lead to tax-free flows of interest, dividends and royalty and the degree to which a jurisdiction actively pushed for such exemptions and low rates, where 100 is zero taxes and high aggressiveness. The Foreign Investment Income Treatment Index measures the degree to which a jurisdiction offers exemptions and credits for worldwide capital income and foreign capital income. The lowest available corporate income tax takes exemptions and rulings into account, which can result in significantly lower rates compared to the statutory corporate income tax rate. A detailed description of all the indicators is available at https://cthi.taxjustice.net/en/how-index-works.
Source: Tax Justice Network

6 Comparison with existing tax haven lists

In this section, we examine if the jurisdictions we identify as high-shell company prevalence jurisdictions coincide with existing lists of tax havens and non-cooperative jurisdictions. To inspect the degree to which our company per capita metric selects jurisdictions that are featured in these lists, we calculate the average company per capita rate for jurisdictions inside a given list to the average rate of all other jurisdictions not named in the list. If high company per capita rate jurisdictions are indeed tax havens or secrecy jurisdictions, then the average rate within a list should be distinctly higher than the average rate outside the list.

For our comparison we use official sources such as the EU and OECD lists of non-cooperative jurisdictions, the IMF list of offshore jurisdictions and the FATF grey list. In addition, we draw on academic tax havens lists or secrecy indicators. See Appendix B for further details.

Table 2: Shell company indicator inside and outside tax haven lists

	Including US states and Canadian provinces			Excluding US states and Canadian provinces		
Official lists	Inside	Outside	Ratio	Inside	Outside	Ratio
IMF	813	112	7.2	813	66	12.3
OECD 2000 (extended)	913	117	7.8	913	75	12.2
OECD 2000	992	131	7.6	992	96	10.3
OECD 2002	481	227	2.1	481	236	2.0
EU	441	222	2.0	441	231	1.9
FATF greylist	206	234	0.9	206	248	0.8
Academic lists						
Garcia Alvarado and Mandel (2022)	1222	142	8.6	1296	122	10.6
Tørsløv et al. (2022)	826	117	7.0	826	74	11.1
Dharmapala and Hines (2009)	826	121	6.8	826	80	10.4
Other lists						
Tax Haven Index list (2021)	490	131	3.7	490	86	5.7
Tax Haven Index top 20	1104	148	7.4	1104	124	8.9
Any list	**380**	**122**	**3.1**	**376**	**62**	**6.1**

Note: This table shows the simple average of the limited liability entities per capita ratio in jurisdictions named within a given list and compares it to all other jurisdictions not named in that list. OECD 2000 (extended) additionally contains jurisdictions (Bermuda, Cayman Islands, Cyprus, Malta, Mauritius, and San Marino) that fit the criteria defining a tax haven according to the OECD, but made advanced commitments to improve their regulation and compliance and were hence excluded from the 2000 list (Hishikawa, 2002). To show the effect of considering US states and Canadian provinces separately, results are shown both when including and excluding these jurisdictions from the sample. Only Garcia Alvarado and Mandel (2022) includes US states in their list (Nevada and Wyoming) but for all lists, including or excluding US states and Canadian provinces has an impact on the shell company prevalence rate outside the list. The ratio is calculated as the rate inside a list divided by the rate outside a list. The final row compares jurisdictions named in any of the lists to jurisdictions not named in any of the lists. A description of all lists and the jurisdictions they contain is given in Appendix B.

Overall, our shell company prevalence metric indeed shows higher average rates in jurisdictions that

are commonly included in tax havens/offshore jurisdictions lists (Table 2). The average entity per capita rate is 3.2 times higher in jurisdictions named in any of the lists considered compared to jurisdictions not named in any of the lists. This difference increases to a ratio of 6.2 when excluding US states and Canadian provinces. In the sample without US states and Canadian provinces, the average entity per capita rate of jurisdictions not named in any list is 62, which is close to the median observed in the total sample. Do note that some jurisdictions not named in any list do exhibit high entity per capita rates. Notably, Delaware and Saint Barthelemy are not mentioned in any list, while both jurisdictions show shell company prevalence rates far exceeding ordinary jurisdictions, with Delaware even being among the top 3 jurisdictions with the highest shell company prevalence in our global sample.

In some lists, the difference in the simple average rate for jurisdictions inside and outside the list is less pronounced than for others. The list of jurisdictions shown by Fernando and Antoine to play a vital role in international tax evasion structures (21 jurisdictions) shows the highest average inside-list rate. This finding underlines the principle that shell companies play an essential role in international tax evasion structures. Also, the IMF list of offshore financial centers and the OECD list of uncooperative tax havens create very clear distinctions between low- and high-shell prevalence jurisdictions. Shrinking the OECD list down from 25 to 7 jurisdictions in 2002 greatly reduces the inside list average rate, as high shell company prevalence jurisdictions such as the British Virgin Islands, the Seychelles, Anguilla and the Cook Islands are dropped from the list.

Similar to the OECD list of 2002, the EU list creates a less clear distinction between jurisdictions with a high or low shell company prevalence. That is despite the EU list targeting jurisdictions facilitating tax avoidance and evasion. The poor selection into low and high shell company prevalence jurisdictions by the EU list can be explained by the exclusion of top jurisdictions such as the British Virgin Islands, the Cayman Islands, the Marshall Islands, Bermuda and Liechtenstein.

The FATF greylist (containing 18 jurisdictions) is unique in having a lower average shell company prevalence rate among jurisdictions inside the list compared to those outside the list. The focus of the FATF list on financial crime and corruption rather than tax avoidance and evasion could explain the less strong separation in shell company prevalence it creates. Of the 20 top jurisdictions identified in Figure 2, the FATF list only contains the Cayman Islands and Gibraltar. It additionally contains many jurisdictions with a low shell company prevalence rate such as South Africa, Jamaica, Nigeria and Congo. Do note the average rate inside the list is still substantially higher than the average among jurisdictions not named in any list.

7 Focus on the United States

Figure 5 presents the results of the shell company indicator focusing on the United States. Among US states, Delaware and Wyoming are clear outliers with over 2,500 and 1000 companies registered per 1,000 adults respectively. By contrast, major economic hubs like California and New York exhibit formation rates below 200 per capita, less than one-tenth of Delaware. This confirms Delaware's outsized role in enabling shell company registrations from across the US, as its 0.3% population accounts for 7% of all domestic incorporations.

Delaware's extreme density of nearly 3 firms per resident adult far surpasses national averages. The unweighted mean companies per 1,000 adults across all US states is 180, while the population-weighted average is 130. Wyoming also exceeds these by a large margin. The enormous gap between leading registration havens like Delaware and most states highlights the concentration of potential US shell activity in *onshore* jurisdictions.

The top spot of Delaware in both the global and US perspective can be explained by Delaware's specialization in pro-business laws ((Eldar and Sukhatme, 2019; Eldar and Magnolfi, 2020). In the US, corporations are domiciled or considered citizens of the state in which they are incorporated. This means that this is where a court will have jurisdiction over the corporation if the corporation is sued. Thus, when forming a corporation some will consider what state laws will be most beneficial to the corporation in the event of a lawsuit and will form the corporation in that jurisdiction.[3] The state of Delaware is a popular place of incorporation for many businesses due to its unique, pro-business tax laws, manager protection and specialization in insolvency law. [4]

Concerning tax avoidance, Delaware can operate as an onshore tax haven for US enterprises. For example, a corporation can set up a firm in Delaware that holds a certain intangible asset: say a certain patented recipe or logo. Next, firms across the US pay royalties to the Delaware firm to be able to use the recipe or logo. These payments deplete the profits of affiliates in other US states, reducing their tax bill. The profit from earning the royalty in Delaware is not taxed, as the income tax law in Delaware explicitly exempts corporations that hold and derive income from intangible investments. This method of tax avoidance is known as "the Delaware loophole" (Weitzman, 2022). Also, investment companies are free from taxes, and in general, any "corporation maintaining a statutory corporate office in the State but not doing business within the State", is tax exempt.[5] If a company is not eligible for any of the exemptions in Delaware, it faces a corporate income tax rate of 8.7%, which is high compared to other states.

Regarding Wyoming, at least part of its elevated shell company prevalence is likely to be caused by the anonymity and secrecy available in Wyoming. The name and address of the director of the firm do not have to be listed in the incorporation form. Instead, the name and address of a registered agent (which may be a company) have to be filed.[6] The registered agent is the point of contact for all legal correspondence of the firm and is the only person/entity knowing the identity of the ultimate beneficial owner of the entity. Such a high degree of secrecy poses risks. Several news reports have linked (digital) criminal activity to shell companies held in Wyoming.[7] Combined with very lax trust legislation (Hofri-Winogradow, 2020), the corporate anonymity also enables tax and sanction evasion by wealthy individuals.[8]

However, recent legislation like the Corporate Transparency Act, which takes effect in January 2024, aims to enhance ownership transparency by requiring certain corporations and LLCs to report beneficial ownership information to the Financial Crimes Enforcement Network (FinCEN). This will make it

[3] https://www.law.cornell.edu/wex/domestic_corporation

[4] See also https://corplaw.delaware.gov/delaware-court-chancery-supreme-court/

[5] See Delaware State Tax Code, section 1902, Title 30, available online at https://delcode.delaware.gov/

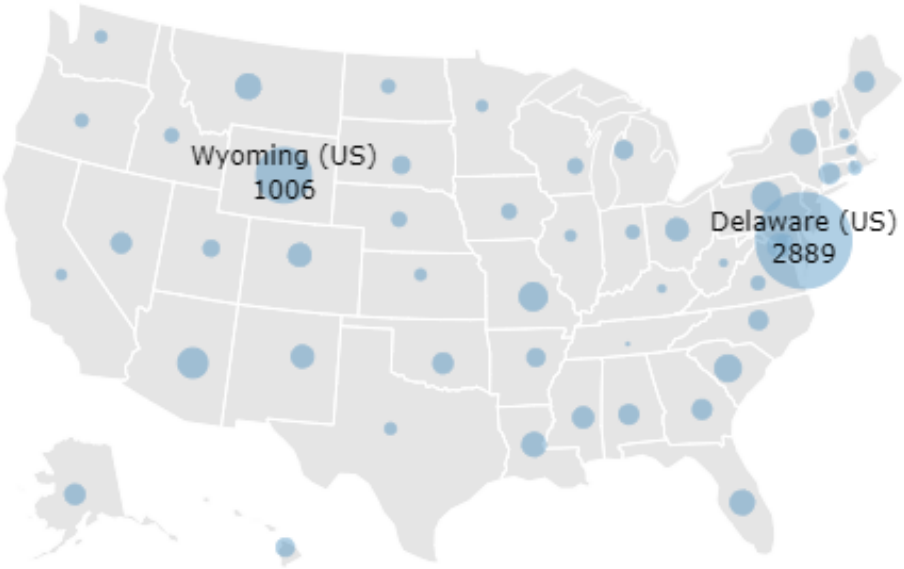
[6] Source

[7] See for example, Reuters,2023 and WashingtonPost,2022.

[8] See WashingtonPost,2021.

more difficult for criminals to hide behind opaque business structures and help combat money laundering, tax evasion, and other financial crimes. In addition, individual states could consider reforms – for example, more stringent requirements around identifying directors and owners on company formation documents could help mitigate risks while still allowing legitimate business activities.

Figure 5: Companies per capita in US states



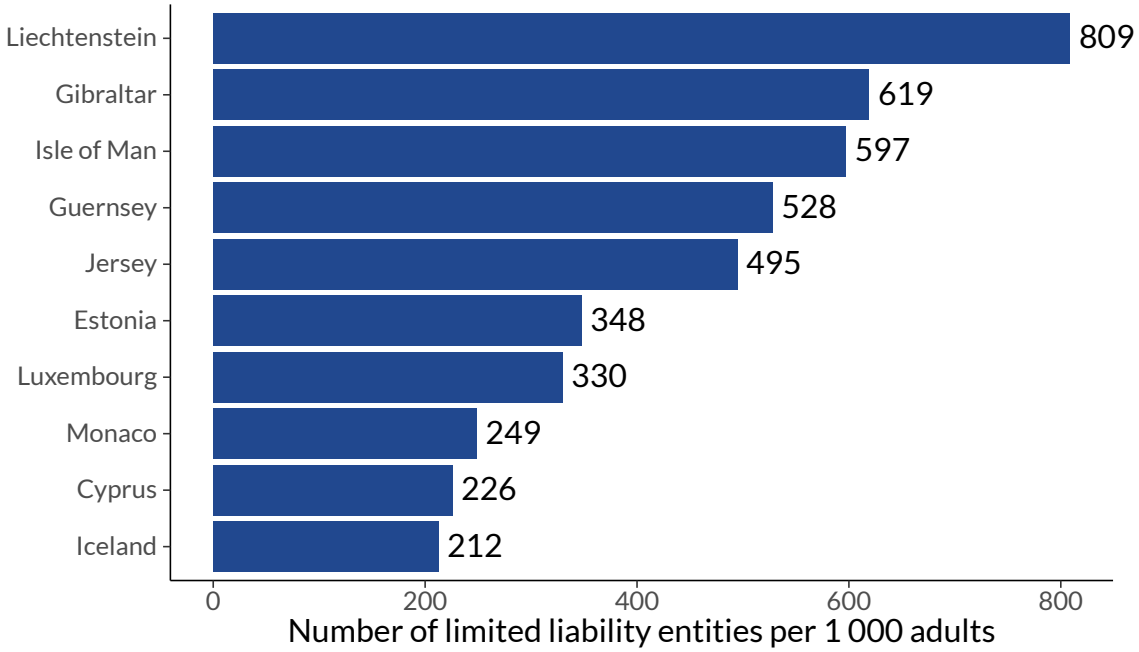
Note: The map plots the shell companies indicator in each US state. The circle sizes are proportional to the indicator.
Source: Shell companies indicator,2023

8 Focus on Europe

Turning to Europe, from figure 6 it is clear that the highest-risk jurisdictions in Europe are mostly well-known tax havens. British crown dependencies like Jersey and Guernsey rank among the top with 474 and 497 companies per 1,000 adults respectively. By contrast, the unweighted European average is much lower, 148 while the average weighted by population is lower than 100. Other well-known tax havens Luxembourg, Monaco, and Cyprus also show elevated rates of firms per capita compared to other major economies.

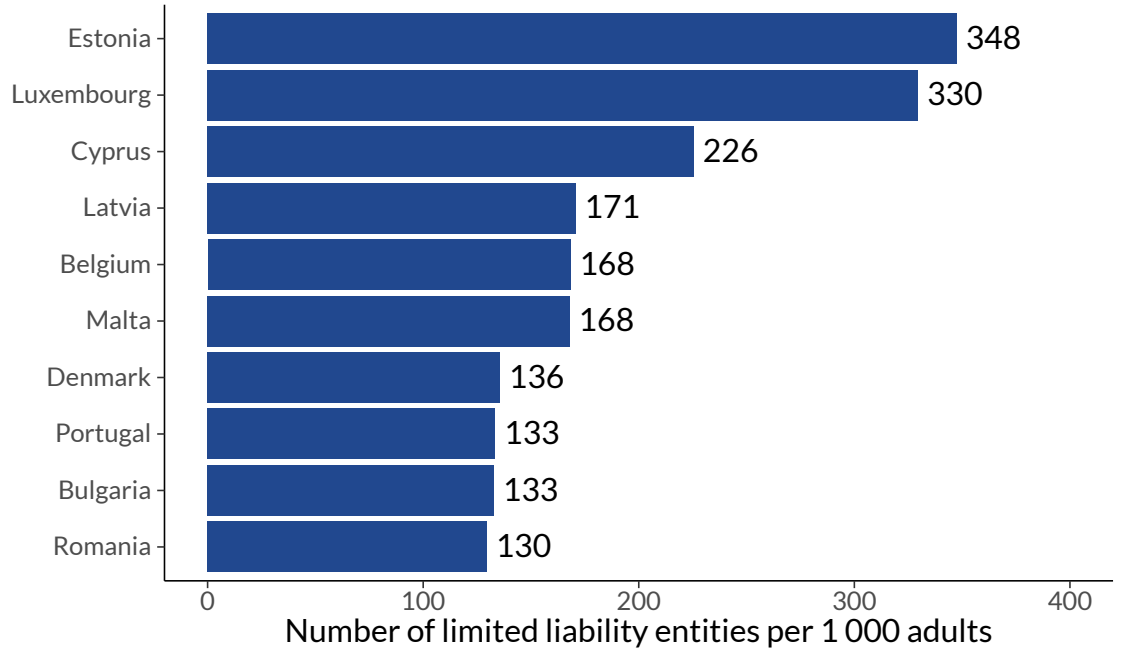
Liechtenstein dominates the shell company prevalence ranking. It offers several tax schemes that render it an attractive shell company host. First, Liechtenstein offers the ”Anstalt” legal entity type, which has no shareholders or board members and is not liable to any taxes when solely undertaking investment activities. Those seeking anonymity can set up a ”Stiftung”, which is a foundation type that with a

Figure 6: Top 10 jurisdictions in Europe



Source: Shell companies indicator, 2023

Figure 7: Top 10 jurisdictions in EU 27



Source: Shell companies indicator, 2023

high level of secrecy regarding its beneficiaries. Dividends distributed to residents and non-residents are not taxable and there is no withholding tax on dividends, interest, and royalties (including most tax

treaties)(IBFD (2023)).

Liechtenstein also offers private asset structures (PVS), which is a legal entity that does not undertake any economic activity but only holds financial assets, shares in other entities, cash or bank account balances. A PVS is only required to pay an annual tax of 1,800 CHF and is not liable to any further taxes. The condition for setting up a PVS is that the shareholders or beneficiaries have no influence on the management of the PVS.

In terms of risks related to shell companies, according to the latest MONEYVAL report[9] recent legal changes have curtailed use of shell companies due to awareness of their higher risk of being used to facilitate newly criminalized transactions. However, understanding of how this residual risk has changed is limited. Supervision of trust and company service providers also needs improvement to prevent misuse of legal persons/arrangements. The authorities rely partly on trust and company service providers submitting accurate beneficial ownership info to registers, but oversight of their Customer Due Diligence performance has been insufficient.

8.1 Focus on EU 27

Comparing countries within the EU 27 in figure 7, we can see that the top jurisdictions are Estonia, Luxembourg and Cyprus. Of these three, Luxembourg is a well-known conduit country, with an extensive network of tax treaties and FDI flows vastly outsizing its domestic economy (Lejour, 2023). A lesser known jurisdiction is Estonia. One of the main advantageous features of Estonia, is its digitalised economy and government administration, allowing fast registration and incorporation of companies as well as the possibility to open bank accounts remotely. Being a member of the EU, incorporating in Estonia additionally offers quick access to the European market.[10] Simplified and low-cost e-services for incorporating and managing companies, combined with low due diligence and high risk tolerance among corporate service providers reported by the Estonian Financial Intelligence Unit Republic of Estonia (2021) can make it easy and attractive to set up shell companies.

Besides ease of access, Estonia levies no corporate income tax, meaning profits are tax-free when held as retained earnings or reinvested. Instead of taxing corporate income, Estonia taxes the distribution of profits at a rate between 14% and 25%, creating an incentive to incorporate and keep profit in the company to avoid taxation.[11] Dividends paid to non-residents are subject to the distributed profits tax unless the income out of which the dividend is paid is derived from foreign subsidiaries liable to corporate income taxes or dividend taxes.[12] No further withholding taxes apply to dividend or interest

[9] https://www.coe.int/en/web/moneyval/jurisdictions/liechtenstein

[10] Thanks to its business-friendly features, Estonia has been consecutively leading the *International Tax Competitiveness Index* compiled by the Tax Foundation for the past decade

[11] To prevent shareholders and partners from benefiting from retained earnings without distributing profits, not only dividends but also fringe (in kind) benefits, gifts, donations, entertainment benefits non-business expenses are counted as distributed profits. Furthermore (from 2018 onwards), taxes are due on loans issued to shareholders or partners when the ability to repay the loan cannot be proven, or when the loan has a duration of more than 48 months, and the receiver cannot prove the loan is not a hidden form of profit distribution.

[12] For subsidiaries in EEA area countries or Switzerland, it is not required that there are actual taxes paid, the subsidiary only has to be a tax resident. For countries outside the EEA area and Switzerland, there has to be an actual tax liability, or the dividend received by the Estonian entity must have been subject to a withholding tax. The exemption is not available when

payments, while royalties are subject to a 10% withholding tax unless a lower rate is agreed upon in a tax treaty. A zero withholding tax on royalties is agreed upon in tax treaties in Bahrain, Cyprus, Isle of Man, Jersey, Luxembourg, Switzerland and the United Arab Emirates among others (IBFD (2023)).

Among the top jurisdictions with high shell company prevalence in Europe, we also find Cyprus, a jurisdiction known for its secrecy (Schjelderup, 2015; Langenmayr and Zyska, 2023). In particular, Cyprus is known for its "Golden Passport" regime, which allowed any individual investing at least €2 million into the country and passing a lax background check, to acquire the Cypriot nationality.[13] The €2 million investment would often be made in the form of acquiring real estate on the island through a shell company, to obscure the identity of the ultimate owner. One motive to acquire (hidden) real estate in Cyprus is to obscure wealth from the reach of the common reporting standards (CRS) program (Langenmayr and Zyska, 2023). The CRS program stimulates international information sharing on bank account ownership but does not cover real estate, hence making hidden real estate an attractive vehicle for tax evasion. A second example of the use of Cypriot shell companies (also combined with the Golden Passport program) is sanction evasion. Investigations based on leaked data by the International Consortium of Investigative Journalists (ICIJ) and Al Jazeera, revealed that Russian oligarchs made use of the Golden Passport program and held shell companies on Cyprus, among which individuals under sanctions and criminal investigations or/and individuals with a net worth of over $1 billion.

Several measures have been taken over the last years to counter shell companies in Cyprus. The Central Bank of Cyprus requires all credit institutions to comply with anti-money laundering and counter-terrorism financing laws, and has taken steps to enhance its supervision capacity including increasing staffing for its AML/CFT department by 50% by 2022. As a result of the Central Bank's targeted actions, credit institutions have terminated relationships with over 42,000 shell companies, closed over 125,000 bank accounts.

9 Conclusion

This analysis develops a straightforward yet novel methodology to approximate global shell company prevalence using national business registries. We construct a basic indicator - registered limited liability entities per capita - to flag jurisdictions likely to host disproportionate shell company populations.

The findings reveal extraordinarily high company registration densities in well-known tax havens compared to major economies. Specifically, small island financial secrecy jurisdictions like the British Virgin Islands, Cayman Islands and Bermuda exhibit incorporation rates per adult more than an order of magnitude above ordinary countries. Extreme per capita rates suggest inflated shell registrations rather than fundamentally greater entrepreneurship explains offshore financial center extremes.

While simple, comparing total company registrations to working-age residents spotlights anomalous activity and provides initial evidence of potential illicit financial vulnerabilities. Additional attributes like ownership, employees, and revenue could strengthen the methodology as data improves. But even

the foreign subsidiary is resident in a non-cooperative jurisdiction.

[13] Note that Cyprus is not the only jurisdiction offering a citizenship by investment program. Langenmayr and Zyska (2023) additionally identify Antigua and Bermuda, Domenica, Grenada, Malta, Saint Kitts and Nevis, Saint Lucia and Vanuatu as jurisdictions with high-risk citizenship by investment programs.

using just basic prevalence metrics draws overdue attention to lax havens needing tighter regulation.

We validate the shell company risk indicator by showing a strong correlation with accommodative tax policies, regulations, and information sharing. Jurisdictions with high entity per capita broadly align with existing tax haven blacklists, confirming the approach highlights policy priorities. Critically, focusing specifically on shell entities provides more targeted insights than generic haven listings.

By approximating shell prevalence, this data-driven methodology offers authorities an essential tool to identify transparency gaps most enabling global tax abuse and financial crime. The findings underscore the outsized role tiny island havens play in financial opacity. Tackling global shell networks necessitates prioritizing reforms where shell vulnerabilities are most extreme. Recent years have seen a growing global push towards transparency aimed at combatting these challenges. Backed by public outrage, technology tools, and intergovernmental cooperation, notable initiatives include centralized public beneficial ownership registers, country-by-country reporting frameworks, automatic and on-demand exchange of tax information between territories, open contracting data, and strengthened anti-money laundering requirements across financial institutions. Major organizations like the OECD and FATF are also updating international standards around anti-illicit financing best practices (OECD, 2019). While ongoing regulatory gaps and political loopholes exist, these measures collectively combat the misuse of shell companies by increasing accountability across sectors.

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A Data sources

The data used in this study is collected from a range of sources, which are detailed below. For many countries, multiple sources are available, which means a preferred source has to be selected. To make this selection, we define the following source hierarchy: 1) official records, 2) business registries, 3) OpenCorporates, 4) scrapped registries, 5) OCCRP, 6) World Bank, 7) Paradise Papers and 8) Bahamas Leaks. Table 3 shows for which jurisdictions what source was selected as the preferred source. While Orbis data is available, we choose to exclude it from our study as data quality is low (Bajgar et al., 2020), especially for countries where it would be our only source.

Table 3: Jurisdictions per best source in the final sample

Source	Jurisdictions
World Bank	Afghanistan, Albania, Algeria, Argentina, Armenia, Austria, Azerbaijan, Bhutan, Bosnia and Herzegovina, Botswana, Brunei, Chile, Colombia, Costa Rica, Democratic Republic of Congo, Dominica, Ecuador, Egypt, El Salvador, Ethiopia, Gabon, Georgia, Grenada, Hungary, Iran, Iraq, Jordan, Kazakhstan, Kyrgyzstan, Latvia, Lesotho, Lithuania, Madagascar, Mauritania, Mexico, Mongolia, Nepal, Nigeria, North Macedonia, Oman, Peru, Philippines, Russia, Rwanda, Saudi Arabia, Senegal, Serbia, Sierra Leone, Sri Lanka, Suriname, Taiwan, Togo, Trinidad and Tobago, Turkey, Uruguay, Uzbekistan, Zambia, Zimbabwe
OpenCorporates	Alabama (US), Alaska (US), Arizona (US), Arkansas (US), Bangladesh, Belarus, Belgium, Belize, Bolivia, Bulgaria, California (US), Cambodia, Colorado (US), Connecticut (US), Denmark, District of Columbia (US), Dominican Republic, Dubai (UAE), French Guiana, Georgia (US), Greece, Guadeloupe, Hawaii (US), Hong Kong, Idaho (US), Illinois (US), Indiana (US), Iowa (US), Isle of Man, Israel, Jamaica, Japan, Jersey, Kansas (US), Kentucky (US), Louisiana (US), Maine (US), Martinique, Maryland (US), Massachusetts (US), Mauritius, Mayotte, Minnesota (US), Mississippi (US), Missouri (US), Moldova, Montana (US), Montenegro, Nebraska (US), Nevada (US), New Hampshire (US), New Mexico (US), New York (US), New Zealand, North Carolina (US), North Dakota (US), Ohio (US), Oklahoma (US), Oregon (US), Pakistan, Panama, Pennsylvania (US), Puerto Rico, Rhode Island (US), Réunion, Saint Barthélemy, Saint Martin (French part), Saint Pierre and Miquelon, Singapore, Slovakia, South Africa, South Carolina (US), South Dakota (US), Tajikistan, Tanzania, Tennessee (US), Texas (US), Thailand, Tonga, Uganda, Ukraine, Utah (US), Vermont (US), Vietnam, Virginia (US), Washington (US), West Virginia (US), Wisconsin (US), Wyoming (US)
Official records	Alberta (Canada), Andorra, Anguilla, Aruba, Australia, Bonaire, Brazil, British Columbia (Canada), British Virgin Islands, Canada, Cayman Islands, China, Croatia, Curaçao, Cyprus, Czechia, Delaware (US), Estonia, Faroe Islands, Finland, Florida (US), France, Germany, Gibraltar, Guam, Guernsey, Iceland, India, Ireland, Italy, Kenya, Kosovo, Liechtenstein, Luxembourg, Macao, Malaysia, Malta, Manitoba (Canada), Michigan (US), Monaco, Morocco, Myanmar, Netherlands, New Brunswick (Canada), Newfoundland and Labrador (Canada), Northwest Territories (Canada), Norway, Nova Scotia (Canada), Nunavut (Canada), Ontario (Canada), Poland, Portugal, Prince Edward Island (Canada), Quebec (Canada), Romania, San Marino, Saskatchewan (Canada), Seychelles, Sint Maarten (Dutch part), Slovenia, South Korea, Spain, Sweden, Switzerland, Tunisia, Turks and Caicos Islands, United Arab Emirates, United Kingdom, Yukon (Canada)
Bahama Leaks	Bahamas
Paradise Papers	Barbados, Saint Kitts and Nevis
OCCRP	Solomon Islands, Vanuatu
Business registry	Maldives
Scrapped	Bahrain, Bermuda, Cook Islands, Marshall Islands, Saint Lucia, Saint Vincent and the Grenadines, Samoa

Note: This table shows which sources are used as the final source for each jurisdiction in our study. Jurisdictions are given in alphabetical order. A source is selected as the best source when the data allows us to separate between active and inactive entities and if there is no other source available higher in the ranking of source preference following: 1) official records, 2) business registries, 3) OpenCorporates, 4) scrapped registries, 5) OCCRP, 6) World Bank, 7) Paradise Papers and 8) Bahamas Leaks.

A.1 Aggregated data

We obtain aggregated business registration statistics from national statistical offices, government agencies, offshore financial center reports, and business registry annual reports. These sources provide officially published totals of registered corporations and other legal entities tracked over time at the country and jurisdiction level. The sources are listed in Table 4.

A.1.1 National Statistical Offices

Many countries' national statistics offices publish data on registered/active businesses through annual reports or online databases. For larger countries, these national statistical offices tend to be the source of official business registration statistics, like Statistics Canada and Italy's National Institute of Statistics (ISTAT).

A.1.2 Business Registries and Offshore Financial Center Annual Reports

Government agencies like state registrars and chambers of commerce also collate figures on total registered companies and annual incorporations. For smaller countries, these business registries themselves often publish annual reports summarizing registered company statistics by legal form. Given their huge financial services sectors, major tax havens also contribute substantial business datasets. The Cayman Islands General Registry tracks over 122,000 companies from its offshore jurisdiction. Likewise, the British Virgin Islands Financial Services Commission annual reports contain figures documenting one of the largest company domiciles, with over 400,000 active BVI business companies.

Table 4: Aggregated data: Business registry data sources

Country	Source	Link	Last update
Andorra	Department of Statistics	estadistica.ad	2022
Anguilla	Commercial Registry	commercialregistry.ai	2017
Aruba	Chamber of Commerce	arubachamber.com	2023
Australia	Australian Bureau of Statistics	abs.gov.au	2023
Bonaire	Trade Registry	bonairechamber.com	2023
Brazil	Central Register of Enterprises	ibge.gov.br	2020
British Virgin Islands	Financial Services Commission	bvifsc.vg	2022
Canada	Statistics Canada	statcan.gc.ca	2023
Cayman Islands	General Registry	ciregistry.ky	2023
China	National Bureau of Statistics	stats.gov.cn	2021
Croatia	Register of Business Entities	podaci.dzs.hr	2023
Curaçao	Chamber of Commerce	cbs.cw	2022
Cyprus	Registrar of Companies	companies.gov.cy	2023
Czechia	Business Register	vdb.czso.cz	2023
Delaware (US)	Division of Corporations	corp.delaware.gov	2021
Estonia	Companies Registry	ariregister.rik.ee	2020
Faroe Islands	Company Registration Authority	skraseting.fo	2022
Finland	Statistics Finland	pxdata.stat.fi	2021
France	SIRENE	insee.fr	2023
Germany	Business Register System	genesis.destatis.de	2020
Guam	Bureau of Statistics and Plans	bsp.guam.gov/	2019

Continued on the next page

Country	Source	Link	Last update
Guernsey	Business Registry	guernseyregistry.com	2021
Hong Kong	Companies Register	data.gov.hk	2023
Iceland	Internal Revenue Directorate	px.hagstofa.is	2022
India	Ministry of Corporate Affairs	mca.gov.in	2021
Ireland	Central Statistics Office	data.cso.ie	2020
Italy	National Institute of Statistics (ISTAT)	istat.it	2021
Kenya	Business Registration Service	brs.go.ke	2021
Kosovo	Business Registration Agency	arbk.rks-gov.net	2023
Liechtenstein	Office of Statistics	llv.li	2022
Lithuania	Statistics Lithuania	stat.gov.lt	2021
Luxembourg	Business Register	lbr.lu	2022
Macao	Commerce Registry	gov.mo	2022
Malaysia	Business Registry	ssm.com.my	2022
Malta	Business Registry	nso.gov.mt	2022
Monaco	Trade and Industry Register	monacostatistics.mc	2021
Morocco	OMPIC	barometre.directinfo.ma	2023
Myanmar	Central Statistical Organization	csostat.gov.mm	2020
Netherlands	Chamber of Commerce	opendata.cbs.nl	2023
Norway	Central Coordinating Register	brreg.n	2022
Poland	Business Register	stat.gov.pl	2022
Portugal	Integrated Business Accounts	ine.pt	2021
Romania	Trade Register	onrc.ro	2023
San Marino	Chamber of Commerce	camcom.sm	2022
Sint Maarten	Chamber of Commerce	chamberofcommerce.sx	2021
Slovenia	Business Register	ajpes.si	2023
South Korea	Statistics Korea	kosis.kr	2021
Spain	Central Business Register	ine.es	2022
Sweden	Business Register	scb.se	2023
Switzerland	Commercial Register	ehra.fenceit.ch	2022
Tunisia	RNE	ins.tn	2021
Turks and Caicos Islands	Financial Services Commission	tcifsc.tc	2022
United Arab Emirates	Ministry of Economy	moec.gov.ae	2020
United Kingdom	Companies House	gov.uk	2023
United States, Delaware	Division of Corporations	corp.delaware.gov	2021
United States, Florida	Division of Corporations	dos.myflorida.com	2023

Note: This table presents an overview of data sources containing aggregate statistics on the number of legal entities in a jurisdiction. For each jurisdiction, the name of the source, link to the source, and year of last update.

A.2 Micro data

When aggregated figures are unavailable, we gather microdata by directly accessing business registries to download entity-level information on registration status, type, industry, location, and more. We use this company-specific data to calculate totals of active, non-sole proprietor businesses within each registry, excluding inactive registrations based on status indicators. Where direct registry data cannot be accessed, we access OpenCorporates and leverage the micro data available either online, web scraped or leaked when not present in OpenCorporates.

A.2.1 Business registries

For several jurisdictions, we download data from official business registries directly and compute the aggregate number of active limited liability entities. Data on the status and type of the entity is used

to filter out inactive entities and sole proprietors. When we are unable to differentiate between active and inactive entities, the source is dropped.

A.2.2 Opencorporates

When aggregate statistics or business registries are not available directly, the data is sourced from Opencorporates which makes available a large open database of official company data. The database administers the type of entity per company record, allowing us to filter out sole proprietors. Inactive companies are filtered out based on the status of the entity at the date on which the data was retrieved from the source company registry. For a detailed description of the variables available in Opencorporates, see Data Dictionary: Companies - OpenCorporates Knowledge base.

A.2.3 Web-scrapped business registries

Part of the data used in this paper was obtained through web scraping of public databases in several countries. The web scraping was performed using automated scripts that extracted publicly available information on registered businesses. In this section of the appendix, we provide a complete list of the countries for which data was web scrapped, along with the sources and the dates of extraction.

Anguilla The data used in this paper was extracted on November 26th, 2023 from the Anguilla Commercial Registry (https://cres.gov.ai/bereg/searchbusinesspublic) which is made publicly available by the Government of Anguilla. The data include information on the name, type, date of registration, and status of each business in the registry as of the extraction date.

Belize The data used in this paper was extracted on April 29th, 2023 from the Belize Companies & Corporate Affairs Registry (https://obrs.bccar.bz) which is publicly available and provides information on registered businesses in Belize. The data was collected using a web scraper and includes information on the name, type, date of registration, and status of each business in the registry as of the extraction date.

Cook Islands The data used in this paper was extracted on 23th May 2023 from the Cook Islands Registry Services, which is maintained by the Ministry of Justice. The registry provides information on registered companies in the Cook Islands and is accessible online at https://registry.justice.gov.ck/corp/search.aspx. The data includes variables for Registration Number, Entity name, Status, Registration Date and Type for each registered company in the registry as of the extraction date.

Marshall Islands The data used in this paper was extracted on 19th June 2023 from the Marshall Islands International Registries. The registry provides information on registered companies in the Marshall Islands and is accessible online at https://www.register-iri.com/. The data includes variables for Registration Number, Entity name, Status, Registration Date and Type for each registered company in the registry as of the extraction date.

Samoa The data used in this paper was extracted on July 7th, 2023 from the American Samoa Business Registry Corporate Affairs Registry (https://www.businessregistries.gov.ws/) which is made publicly available by the Ministry of Commerce, Industry & Labour. The data include information on the name, type, date of registration, and status of each business in the registry as of the extraction date.

St. Lucia The data used in this paper was extracted on 12th May 2023 from the St. Lucia Online Company Registry, which is maintained by the Registry of Companies and Intellectual Property. The registry provides information on registered companies in St. Lucia and is accessible online at http://efiling.rocip.gov.lc/#/. The data includes variables for Registration Number, Entity name, Status, Registration Date, Type, and Address for each registered company in the registry as of the extraction date.

St. Vincent and the Grenadines The data used in this paper was extracted on May 3rd, 2023 from the Financial Services Authority's Entity Name Search, which provides information on registered companies in St. Vincent and the Grenadines. The search is accessible online at https://svgfsa.com/company-name-search/. The data includes variables for Name, Registration Number, Type, Status, Formation Date, and Agent for each registered company in the search as of the extraction date.

A.3 International organisations

A.3.1 Total number of businesses - World Bank

The World Bank offers a dataset containing the new, total, and closed number of limited liability companies per economy in the period 2006-2020, covering 122 economies (not all economies have observations for all years). The data is available as part of the companies per capita metric the World Bank reports as a measure for entrepreneurship and inspired the metric for shell company prevalence in this study. This dataset covers the period 2006-2020, so is not available for the longer time-series analyses performed in this paper. An additional limitation is that the World Bank data on Canada only includes Quebec and Ontario and the data for China includes Beijing and Shanghai. The data is available at https://www.worldbank.org/en/programs/entrepreneurship.

A.4 Leaks

A.4.1 OCCRP

The Organised Crime and Corruption Reporting Project (OCCRP) is a platform for investigative journalists with a focus on financial crime and corruption. The website hosts a data tool, OCCRP Aleph (https://aleph.occrp.org/), which collects leaked and corporate registry data. From this data tool, we collect registry data of the following jurisdictions: United Arab Emirates, Democratic Republic of Congo, Cook Islands, Solomon Islands, Tonga, Vanuatu, Bahrain, Jordan, Moldova and Slovenia. The OCCRP offers data on more jurisdictions, but not in a downloadable format.

A.4.2 Paradise Papers

The Paradise Papers draw upon leaks from offshore law firms, Appleby and Asiaciti Trust, and 19 corporate registries from secrecy jurisdictions obtained in 2017 by the German newspaper Süddeutsche Zeitung. Part of this leak is made publicly available by the International Consortium of Investigative Journalists (ICIJ). The publicly available dataset (at https://offshoreleaks.icij.org/pages/database) contains over 290,000 records from the Appleby offshore law firm and corporate registries from Aruba,

Bahamas, Barbados, Cook Islands, Malta, Nevis and Samoa. The fact that this data contains leaked corporate registry data, allows us to infer the total number of companies per jurisdiction included in the leak.

A.4.3 Bahamas Leaks

The Bahamas Leaks consist of leaked corporate registry data from the Bahamas, obtained in 2016 by the Süddeutsche Zeitung. The data is made publicly available by the ICIJ, who also merged director and ownership data to the corporate registry. The data is available at https://offshoreleaks.icij.org/pages/database.

A.5 Population data

A.5.1 United Nations

The main source for the population aged 15-64 per jurisdiction is the United Nations (UN). The UN Department of Economic and Social Affairs composes a dataset on the population by age and sex in 236 countries or regions, from which we draw data on the period 1960-2022. The most recent revision of the dataset in 2022, draws on 1,758 population and housing censuses. For years where the UN has no data available, the population is imputed based on the cohort-component method (of Economic and Affairs). For more information on the UN population data, see https://population.un.org/wpp/Methodology/.

A.5.2 World Bank

To complement the UN data, we also consider population data from the World Bank. The working-age population per jurisdiction is provided in the panel dataset on the companies per capita metric calculated by the World Bank as a measure for entrepreneurship, see https://www.worldbank.org/en/programs/entrepreneurship#total. This dataset covers the period 2006-2020, so is not available for the longer time-series analyses performed in this paper. An additional limitation is that the data for Canada only includes Quebec and Ontario and the data for China includes Beijing and Shanghai.

A.5.3 US states and Canadian provinces

For the US and Canada, we have more granular data, on the state and province level respectively. The information on population by US state is drawn from the IPUMS USA population census. This census offers the age distribution per state based on a 1% sample of the population. Per state, the sum of the representativeness weights of all individuals in the age groups 15-64 reflects the total working age population. The data is annual for the years 2000-2021, but only per decade in the years before 2000. To fill the years between 1960, 1970, 1980, 1990, and 2000, we assume a linear development of the population between each measuring point. For 2022 and 2023 we keep the population constant at the 2021 level. For more information on the IPUMS USA population census, see https://usa.ipums.org/usa/index.shtml.

The information on population per Canadian province is drawn from the annual population estimates by Statistics Canada. The data is available for the years 1971-2022 and allows filtering on the age group 15-64. To this dataset, we add two types of imputations. First, the population for the Northwest Territories and Nunavut is reported as one combined province before 1991 (after which the population for both provinces is recorded separately following the separation of Nunavut from the Northwest Territories). To estimate the population in both provinces separately before 1991, we assume the share of each province in their combined population in 1991 remained constant in the years before their separation. Second, we impute the population by province in the years 1960-1970 using the data on the total Canadian population from the UN. Similarly to the state-level imputation, we calculate the share of each province in the total population in 1971 and multiply this share by the total Canadian population in the years 1960-1970. For more information on the Canadian census, see https://www150.statcan.gc.ca/t1/tbl1/en/cv.action?pid=1710000501.

B Tax haven jurisdiction lists

Below we detail all the tax haven and offshore jurisdictions lists we use to compare the outcome of our shell company prevalence measure. Table **??** provides an overview of all jurisdictions mentioned in the lists.

B.1 Official lists

Several international organizations and agencies compose lists of jurisdictions that are deemed uncompliant with financial regulation or high-risk jurisdictions concerning tax evasion, money laundering, and other undesired financial practices. Below we briefly describe each of these lists used in this paper.

FATF grey list The Financial Action Task Force (FATF) is an intergovernmental organization to counter money laundering, terrorist, and proliferation financing. As part of its work, the FATF maintains a list of countries 'under increased monitoring', but who are cooperating in improving their financial system and laws to reduce the risk of money laundering and terrorism financing (Grey List). The list is available on the FATF website and contains 26 jurisdictions.

OECD list of uncooperative tax havens In 2000, the OECD published a list of tax havens that were uncooperative in improving transparency and exchange of information to battle harmful tax practices. Jurisdictions that fit the criteria defining a tax haven according to the OECD, but made advanced commitments to improve their regulation and compliance, were excluded from the initial list Hishikawa (2002). We consider both the initial list including and excluding these jurisdictions (Bermuda, Cayman Islands, Cyprus, Malta, Mauritius, and San Marino). In 2002, the initial list shrunk to Andorra, Liechtenstein, Liberia, Monaco, the Marshall Islands, Nauru and Vanuatu. In the years following, the jurisdictions improved their cooperation, resulting in the removal of Nauru and Vanuatu from the list in 2003, followed by Liberia and the Marshall Islands in 2007. Finally, Andorra, Liechtenstein and Monaco were removed from the list in 2009, meaning no jurisdictions that the OECD deems uncooperative with the effort to increase transparency remain. The list of uncooperative tax havens can be consulted at the archived webpage https://web-archive.oecd.org/2018-06-05/79420-list-of-unco-operative-tax-havens.

htm

IMF Staff Assessments on Offshore Financial Centers (OFC) From 2000 to 2018, the IMF published reports on compliance to financial regulation by a selected group of jurisdictions. The list of jurisdictions covered by these reports is available at https://www.imf.org/external/np/ofca/ofca.aspx and contains 46 jurisdictions. From 2008 onwards, the OFC assessment program was integrated into the Financial Sector Assessment Program (FSAP).

EU list of non-cooperative jurisdictions for tax purposes The EU maintains a list of countries that it deems not to comply with good tax governance criteria: tax transparency, fair taxation and measures against base erosion and profit shifting (BEPS). The list is updated frequently, with the most recent list (containing 16 jurisdictions) and a timeline available at https://www.consilium.europa.eu/en/policies/eu-list-of-non-cooperative-jurisdictions.

B.2 Academic lists

In addition to official lists, the academic literature has produced lists of tax haven jurisdictions. Below we briefly describe each of the papers used and how they define a list of jurisdictions.

Dharmapala and Hines (2009) defines a list of 41 tax haven jurisdictions in their study on the characteristics of countries that become tax havens. The list largely builds on Hines and Rice (1994), which in turn use jurisdictions that are identified as tax havens by the Internal Revenue Service (IRS). The list largely coincides with the OECD list of uncooperative tax havens.

Tørsløv et al. (2022) exploit foreign affiliates statistics to show that, in low-tax countries, affiliates of foreign multinationals are larger than local firms. This excess profitability anomaly is likely caused by multinationals shifting profits to these countries for tax purposes. As such, the authors can identify jurisdictions used as destinations for profit shifting by multinationals as those jurisdictions where excess profitability is especially high. The jurisdictions studied as (potential) tax havens include those listed by Dharmapala and Hines (2009) and adds the Netherlands, Belgium and Puerto Rico (resulting in a total of 41 jurisdictions). These additions prove to be relevant, as the top 8 of these jurisdictions with the highest abnormal profitability of foreign affiliates, in descending order of excess profitability, are Puerto Rico, Ireland, Luxembourg, Switzerland, Singapore, Hong Kong, the Netherlands and Belgium.

Garcia Alvarado and Mandel (2022) use the Panama Paper leaks to analyze the network between the entities covered by the leak. The analysis allows them to identify jurisdictions that play an important role in the international networks of these legal entities. In alphabetical order, the results show many links to the jurisdictions of Anguilla, United Arab Emirates, Bahamas, Belize, British Virgin Islands, Costa Rica, Cyprus, United Kingdom, Hong Kong, Isle of Man, Jersey, Malta, Nevada (US), Niue, New Zealand, Panama, Samoa, Seychelles, Singapore, Uruguay, and Wyoming (US). From these jurisdictions, the British Virgin Islands, Panama, and the Bahamas are the most essential nodes in the international legal constructions. Dominguez et al. (2020) find similar results using the same data.

B.3 Other lists

In addition to the official and academic lists, we also inspect the countries included in the Corporate Tax Haven Index compiled by the Tax Justice Network. This index combines indicators such as low tax rates, exemption provisions, lax reporting requirements and lack of withholding taxes on interest, dividend, and royalty flows to construct a score indicating the degree to which a jurisdiction caters to corporate tax abuse. The fact that our metric strongly correlates with the Corporate Tax Haven Index indicates it is, at least partially, capable of identifying jurisdictions hosting harmful shell companies. For 2021, Tax Justice Network calculates the Corporate Tax Haven Index for 70 jurisdictions.