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THE WEALTH DEFENCE INDUSTRY

Accountancy firms and the making of complex corporate structures

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Abstract

In a context of increasing capital mobility, companies build wealth defence strategies to keep economic resources within their circuit. Simultaneously, states compete for the attraction of foreign capital through the offer of specific legal advantages or by positioning themselves as offshore financial centers. Looking at international regulatory competition and wealth defence processes, most studies either focus on states or on corporations and thereby neglect the role of intermediary actors. However, by supplying organisational and tax related innovation, the 'wealth defence industry', as I label it, could be a main driver of the ongoing profit shifting practices. This study looked at the role of accountancy firms, an intermediary actor marked by both, a direct insight into the corporate organisation of their clients, and a close access to the side of regulators. Drawing on information from Orbis, a database covering companies worldwide, the study addressed the difference between the Big Four auditors and smaller auditors in regards to the corporate structure of their clients. To account for country variation, I applied mixed multivariate regression models. The paper shows that clients of the Big Four have a higher use of wealth defence related corporate structures. Furthermore, the influence of the Big Four increases with the size of the client. Drawing on large-scale data, this study provides evidence that the supply of wealth defence strategies by the Big Four is not a rare exception. It is a relationship which has a systematic component.

Keywords: Global Wealth Chains; accountancy firms; regulatory intermediaries; corporate structures; offshore financial centers

1. INTRODUCTION

Imagine if your bakery around the corner told the local tax authorities that the croissants and fresh buns you buy in the morning are coming from Bermuda. You probably would not eat them anymore. Indeed, this story is not told by your local bakery, but by companies such as Google, Apple Inc., General Electrics, Starbucks or Enron. Internationalisation of trade and the increasing importance of financial markets lead to a situation where multinational companies set up complex ownership structures to optimise the coordination of their financial resources. Such wealth defence strategies aim to keep the profits within the company's circuit and to protect them from other actors such as states, stake- and shareholders. While political discussions still circle around the attractiveness of a location in terms of wages or infrastructure, the showdown happens in the realm of taxation and regulatory competition.

States, facing the increasing mobility of financial resources within globally operating companies, react with a set of strategies. Ireland, for example, was in the spotlight of the media in recent years for sweetheart deals it offered to Apple, which allowed the tech company to drop taxes paid on global profits to diminishingly small levels. The deal lost its glamour after the European Commission ordered Apple to pay back €13 billion in taxes (Hancock 2016). Similar arrangements were criticised with regard to other countries. The Netherlands, for example, offered remarkable advantages to Starbucks, whereas Luxembourg was accused by the European Commission to apply unfair competition rules to Fiat (Bowers 2015). These medial outcries represent only the tip of the iceberg. Competition amongst states on offering the best legal and tax-related conditions to attract foreign capital, reveal systemic patterns. Wealth defence and competition have significant distributional consequences, which take place both between corporate actors, creating different opportunities for small and large companies; and between states, involving developing and developed countries, major economies and peripheral island states. As expressed by Murphy (2017), the 'who gets what' of the contemporary global economy is determined not only by physical production but equally by financial production.

To understand the dynamics of wealth defence, I turn to those actors who control the hose of ideas: the 'wealth defence industry'. Between corporate and governmental actors, an industry of suppliers is prospering. This industry is able to provide innovative ideas, strategies and plans that optimise the allocation of profits and other financial resources, while preventing the risk of regulatory intervention. Regulatory intermediaries, as labelled by Abott *et al.* (2017), are actors

who are capable to navigate between regulators and their target and can - but do not have to - exploit this position for their own interests, for example to gain financial benefits. Whether those intermediaries act as a passive supplier of wealth defence strategies which react to an existing demand, or whether, in contrast, they represent an active motor of wealth defence processes, is contested.

Who stands out amongst the suppliers, is the profession of accountants. Their position as intermediaries is created by the states themselves, who impose auditing requirements on corporate actors. As auditors, it follows, they have access to their clients' corporate and organisational structures. The focus of this paper is thus to shed light on the role played by accountancy firms as an intermediary actor between states and companies in the development of wealth defence strategies. In the theoretical part of the paper I discuss how the profession of accountancy firms evolved and which incentives and barriers the profession faces for supplying tax and legal innovation.

In the empirical part of the paper, I address the role of accountancy firms in the provision of wealth defence strategies by looking at differences within the profession. In fact, the profession of accountants has been marked by a transition towards a strong concentration of economic power amongst PwC, EY, Deloitte and KPMG. The Big Four are auditors with a widespread international presence and high annual revenues. Most mechanisms through which accountancy firms can act as a supplier of wealth defence strategies rely on scale and a global presence. This leads us to question the differences in influence between the Big Four and smaller auditors:

Do wealth defence strategies of corporations, which are audited by the Big Four, differ from those audited by smaller accountancy firms?

By looking at this difference, the study shows whether a subgroup of accountancy firms matters in the provision of wealth defence plans. Strategies of companies to protect their economic resources are often reflected in their corporate structures, namely in the complexity of their ownership relations, in the location and in the legal form of their subsidiaries. To study the relationship I perform mixed multivariate regression models. Previous findings on the role of accountancy firms are based on journalistic investigations, leaks or case studies. Using auditor information from Orbis, a database with a worldwide coverage of companies, this study provides large-scale evidence for the role of the Big Four in the development of wealth defence strategies.

The article is structured as follows. Chapter 2 addresses the interplay between companies and states regarding wealth defence strategies and highlights the role of intermediaries therein. Chapter 3 subsequently discusses the trajectory of accountancy firms over the last decades and reflects on how the current position of auditors and in particular of PwC, EY, KPMG, Deloitte leads to incentives and possibilities in supplying wealth defence innovation. Chapter 4 then presents the empirical part of this article, where I examine the influence of the Big Four and smaller auditors on wealth defence strategies of their clients. The discussion section, finally, highlights the new findings and paves the way for further research.

2. 'IN BETWEEN' CORPORATIONS AND STATES

2.1 CORPORATE STRATEGIES

In the past decades, the role and organisation of the corporation in the global economy changed. Production became increasingly fragmented and disintegrated across multiple countries, leading to chains in which goods and services move borders several times. In this context, companies take strategic decisions with regard to the localisation of every production step. Their geographic expansion and the relocation of economic activities is driven by the aim to *"seize differences in costs and resources across countries and achieve a more efficient production"* (Lanz and Miroudot 2011).

The academic literature extensively dealt with changes of trade and production through processes of globalisation. Coining the term of 'Global Value Chains', scholars studied the internationalisation of production by looking at the role of companies in it (Gereffi and Humphrey 2005, Ponte *et al.* 2005, UNCTAD 2013). The production of an iPhone, for example, starts in the U.S. where the design and development of Apple Inc. is based. Once a product is ready to be launched, Apple Inc. acquires raw materials from Europe, China and other Asian countries. The manufacturing process then takes place in China, from where the iPhone is shipped to retail stores across the globe. Some of the production steps are proceeded by companies that belong to Apple Inc., so called subsidiaries, whereas other production steps are outsourced (Minasians 2017). Apple Inc, in comparison to other companies, has a very large network of suppliers. Along with concerns over the location and the functional division of production steps, Global Value Chain theory also questioned the relationships between buyers, suppliers and regulators in each stage of the production process and asks who makes profits, when and where. However, the focus remained mainly on the physical realm of production.

Similar fragmentation processes took place at a different level: in the sphere of finance. In fact, the transnationalisation of physical production was accompanied by an increasing importance of financial markets and an increasing fluidity of finance. In this context, companies have the possibility *"to shift assets, costs, profits, and liabilities across borders" (*Seabrooke and Wigan 2017: p. 2). Profits which are earned in one region can be relocated to another region. With the increasing mobility of finance, companies thus not only take strategic decisions with regards to the production of their goods and services, but also regarding the coordination of their global financial earnings.

The coordination of financial flows is linked to the production of goods and services, but the spheres are not entirely congruent. To a certain extent, the sphere of profits and capital follows idiosyncronatic rules and trajectories (Seabrooke and Wigan 2017). This decoupling of physical and financial production was addressed in the recent theory on Global Wealth Chains (GWC) (Seabrooke and Wigan 2017: p. 2), which defined GWCs as *"transacted forms of capital operating multi-jurisdictionally for the purposes of wealth creation and protection"* (ibidem: p. 2). 'Wealth', here, is conceptualised differently than in most other academic and societal contexts, where wealth refers to individual economic resources such as property, savings and valuable belongings. Seabrooke and Wigan (2014a, 2014b, 2017) mainly use 'wealth' to refer to companies, and to describe all forms of economic resources which are either earned (profits), borrowed (credits) or can be used for further investments or earnings (assets). To illustrate the difference between the physical and the financial production surrounding companies, let's turn back to Apple Inc. In 2013, Apple was subject to investigations by U.S. authorities. The company was accused of shifting profits to Ireland. In numbers, Apple had 4% of their employees based in Ireland and activities in the country accounted for around 1% of the global productivity. Yet the amount of profits routed through Ireland amounted for around 64% of the worldwide profits (Seabrooke and Wigan 2017). This shows that the location of the manufacturing, design and retail of Apple products and the location of the financial gains, resulting from these processes, were strongly decoupled from each other.

One goal of companies' strategies surrounding the coordination of their financial resources is the possibility to protect their wealth from other actors, such as states, share- or stakeholders. The example of Apple Inc. and the re-allocation of profits to Ireland highlight the tax-driven strategies of the company and thus the protection of financial resources from governments. Ireland has a very low corporate tax in comparison to other countries and moreover knows special exemptions (Farrell and McDonald 2016). Setting up a subsidiary in Ireland, Apple Inc. partly managed to prevent the transfer of economic resources to those jurisdictions in which its real economic activity took place. Besides the aim to reduce tax liability on profits, dividends, royalties, interest or licence fees, wealth defence strategies can be set up to seek legal protection for activities, by using jurisdictions which offer efficient and stable corporate laws and reduce compliance costs, or to prevent corporate accountability through the use of regulatory regimes which have low disclosure requirements and offer secrecy. The benefits to which companies

reach out, thus range from low taxes to legal protection or to the provision of low regulatory requirements.

Wealth defence strategies often result in complex ownership structures. In fact, to profit from legal advantages offered by certain countries, companies set up subsidiaries in locations which provide benefits. Subsidiaries, also called affiliates, are entities which are directly owned by the parent company or which are owned by another subsidiary that belongs to the network of the parent company. *"By carefully choosing the location of their affiliates"*, as expressed by Zucman (2014: p.124), multinational companies can reduce their liabilities. In addition to the exploitation of specific benefits in a single jurisdiction, companies can take advantage of country combinations and the complementarities of tax or other legal regimes. Wealth defence on an international level is thus enabled through the exploitation of inconsistencies between tax jurisdictions and treaty networks.

The case of Apple Inc., again, serves as a good example. Ireland is only one particle in a combination of countries which have been used by Apple Inc. to keep their financial resources within their circuit. The entire scheme that Apple Inc. used, is labelled 'the Double-Irish-with-a-Dutch-Sandwich', and represents an ownership structure involving Ireland, the Netherlands and Bermuda (Bloomberg US: October 2010). Apple Inc. has two subsidiaries in Ireland of which one collects royalties on brands and products from U.S. subsidiaries. Due to inconsistencies of law at an international level, the company can shift those profits to a subsidiary in Bermuda, where no taxes are levied on corporate profits. The other subsidiary in Ireland collects profits from sales in Europe. By channelling the profits through the Netherlands back to the first Irish subsidiary, those profits can equally be directed to Bermuda (Zucman 2014). This scheme has been used not only by Apple Inc., but also by other companies such as Google and Adobe Systems. Due to law changes in Ireland following international pressure, the scheme will have to be abolished in the coming years (McDonald 2014). Another mediatised example which hints at the importance of country combinations was provided by the case of General Electrics which used subsidiaries in Switzerland and Hungary to reduce tax obligations (Odehnal 2017).

Complexity in ownership structures of companies also responds to the goal of obscuring activities. A practice related to the aim of generating opacity, is the development of round-tripping ownership structures. Round-tripping requires that a company in country A owns a subsidiary in country B which offers good conditions on the transfer of financial resources. This company then again owns a third company in country A. In consequence, domestic capital turns into foreign capital and faces different conditions (Unctad 2013). Foreign investors in China, for example, are subject of lower tax rates, favourable financial services and better land use rights than domestic investors (Palan *et al*. 2010: p. 181). Also, ownership complexity renders activities more opaque, as stated by Wagener and Watrin (2014): *"The more complex a transaction is structured, the more difficulties a tax authority has to understand the whole structure and the more jurisdictions have to work together to detect illegal practices"* (p.10). Complexity can be developed vertically, resulting in a high depth, with a large number of hierarchical layers in their subsidiary network. Or, companies can develop horizontal complexity, with a wide structure of subsidiaries. Lewellen and Robinson (2014) find that the proportion of complex firms declines, but the companies which have a complex ownership structure increase in complexity. Garcia et al. (2017) provide the example that Anheuser-Busch InBev, a brewing company, has a network of over 680 subsidiaries which spreads across 60 countries. The simplified schema of the Anheuser-Busch InBev's corporate structure has been published by the U.S. security and exchange commission (see annex A).

Besides the location of subsidiaries, country combinations and general complexity, the legal form of subsidiaries can lead to an efficient protection of economic resources from governmental actors and other stakeholders. Previous literature highlighted the role of holding companies, trusts, management and marketing divisions. Holding companies are subsidiaries which own the operating subsidiaries of a parent company and thus usually have few employees and a low or no productivity. Palan *et al*. (2010) as well as the world investment report (Unctad 2016) identified the use of holding companies as a common strategy to shift profits to low-tax

jurisdictions. The growing importance of such corporate forms is, according to the world investment report, linked to various factors, *"including the greater reliance on regional centres to coordinate activities in host countries"* but, the authors claim, *"their frequent location in jurisdictions with low tax rates or favourable fiscal regimes suggest that tax motivations play a key role"* (Unctad 2016: p.21). Holding companies collect dividend income from the operating subsidiaries and transfer it further to the parent company. By choosing a favourable location, taxation on the transfer of dividends can be circumvented. The same logic applies to marketing or management entities, which absorb a high share of profitable activities. A mediatised example was the 'Singapore Sling', a scheme in which capital is channelled through marketing hubs in Singapore (Woolrich 2015). Trusts, alike round-tripping practices, help to obscure the corporate activities. Through trusts, the relationship between the legal owner of an asset and the beneficiary of the asset is rendered opaque (Palan *et al.* 2010). The original purpose of a trust was to give a 'trustful' person the rights to manage one's wealth. In a trust arrangement, a trustee accepts assets from a settlor, with the task to coordinate the assets and to make them available to a third person, to the beneficiaries. It follows that trusts *"are treated legally as private gift relationship"* and subsequently, *"they are very lightly regulated and afford near-complete privacy to the parties involved"* (Harrington 2016: p.4). It is important to note that this list of corporate forms is not comprehensive. Other corporate structures, such as joint ventures and foundations are known to play a role in companies' wealth defence strategies and additionally, there is probably a whole range of corporate innovations which are not yet discussed by the literature.

In brief, wealth defence strategies consist of developing favourable corporate forms, such as holding companies or trusts and in exploiting national legislations or international legal incoherencies by establishing subsidiaries and subsidiary relations in advantageous jurisdictions. Often, it is a combination of legal forms, location and general complexity that leads to an efficient protection of economic resources from governmental actors, stake- or shareholders. The corporate structures and legal forms pointed out in this chapter are linked to wealth defence strategies, but they can also be developed for reasons related to physical production. As such, supply chains and concerns over production and sales play a role in the localisation of subsidiaries. Ownership complexity, for example, can develop over time when affiliates naturally acquire other companies at a lower hierarchical level in the countries in which they operate (Unctad 2016: p. 136; Lewellen and Robinson 2013). Yet, as shown with the example of Apple Inc., companies do actively decouple the financial from the physical production. Mc Barnet and Whelan (1991) describe this as *"operating within loopholes in the law, beyond the reach of the law, or using the fabric of the law itself to create loopholes or innovative techniques which comply totally with the requirements of the rules but nonetheless completely undermine the policy behind it"* (p. 135).

2.2 STATES' RESPONSES

While the growing importance of financial markets enabled companies to render corporate wealth increasingly mobile, rule making remained bound to national borders mainly. States face a limited scope of action with regard to international measures, although there have been efforts of coordination driven by the OECD and the European Union. Where the coordination between different countries is limited or where attempts to coordinate are circumvented, states respond with enhanced competition.

One way of competing for a share of global wealth is to offer lower corporate taxes. This trend has been labelled a 'race to the bottom' (Genschel and Schwarz 2011). Empirical findings show that the corporate tax rates declined in the last decades (Genschel and Schwarz 2011). In the EU-15 countries the corporate tax rates fell from 46% in 1980 to 30% in 2005 (Ganghof and Genschel 2008). Interestingly, the decline in corporate tax rates in those countries did not result in a decline in revenues from corporate taxes (Genschel 2000). There were different attempts in explaining this paradox. According to Norregaard and Khan (2007 in Palan *et al.* 2010), the

lower tax rates have been compensated with a reduction of tax exemptions. Other authors proposed that this trend is the result of a so called 'corporatization', namely the expansion of corporate activities in sectors which have were previously by non-corporate actors (Palan *et al.* 2010). Certain authors see this paradox as the confirmation for the theory, that tax competition is efficient and leads to the attraction of foreign capital. Genschel (2000) proposes the idea of the counterfactual: without competition, tax revenues would be even more on the increase. The increase of revenue from taxes is, according to him, a consequence of the strong growth in corporate profits (Genschel 2000). In this perspective, competition constrained the policy making autonomy of nation states (Apeldoorn and de Graaff 2017), which results in an issue for democratic systems, as the competition undermines *"the ability of electorates to choose between otherwise viable tax alternatives"* (Palan *et al*. 2010: p.158).

Besides changes in the overall corporate tax rate, countries have developed a functional specialisation in the advantages they offer. With regard to taxation, these offers entail for example credits for investments or exemptions on a fraction of the taxable base (Tuomi 2012). Other advantages can entail support in financial services, the provision of secrecy or low regulatory requirements. The extent to which countries participate in this regulatory competition varies. `Regular tax jurisdictions', as I will call them, pursue few competitive strategies to attract foreign capital. Other countries, however, offer strong incentives for companies to consider them for the allocation of their financial resources. Those jurisdictions can be differentiated along two lines: either they attract foreign capital, or they offer conditions to channel capital to third countries. Garcia-Bernardo *et al.* (2017) identified jurisdictions such as the British Virgin Islands, Bermuda or the Cayman Islands to function as sink Offshore Financial Centers (sOFC). Those countries hold a large share of foreign assets and often offer secrecy and low to zero corporate taxes. Complementary to the existence of sinks are countries which allow companies to channel value from one country to another country, by offering low taxes on the transfer of wealth. According to the authors, the Netherlands, the UK, Switzerland, Ireland and Singapore are the most important conduit Offshore Financial Centers (cOFC). The full list of countries and their classification is presented in annex B.

A prevalent position on international tax competition and the development of secrecy jurisdictions entails that this system is efficient and favourable for economic growth at a global level. These conceptions root in neoclassical ideas, which equal competition with efficiency (Palan *et al.* 2010). Competition at an international level is seen to force governments to reconsider the balance between taxation and public services and to better account for the need of the public. Palan *et al.* (2010) affront such conceptions by defining international tax avoidance practices as a 'double zero sum game', both at the governmental and at the corporate level. This implies that *"the tax receipts earned by some territories are tax receipts lost by others; but also, the diminished fiscal burden for some translates into an increased burden on others"* (Palan *et al.* 2010: p. 157). Rather than leading to more efficiency, the international competition around the attraction of foreign capital leads to a redistribution of economic resources. Regulatory advantages are offered mainly to international corporations and to foreign residents. In consequence, advantages provided by certain regulatory regimes are *"used by only a small portion of the population, the wealthy and multinational businesses. International tax competition does not contribute to a saving in taxation at all, but simply contributes to a distributional shift"* (Palan *et al.* 2010: p. 156).

Taking the stance that international regulatory competition does not lead to more efficiency in the first place, but to advantages for some and disadvantages to others, the question should be: who looses and who gains from competition between states? And what are the consequences of it? At the state level, those who gain on the short run are some smaller island states such as Bermuda and the Cayman Islands (Palan *et al.* 2010) and potentially also important conduit jurisdictions such as the Netherlands and the United Kingdom, which profit from rooting investment through their territory (Garcia-Bernardo *et al.* 2017). In regard to the island economies, the offshore business has proven to be a good strategy for development. Yet, according to Palan *et al.* (2010), such economic development strategies lead to 'vulnerable positions', as the economic diversity remains low and is reliant on the offshore income.

For other jurisdictions, the competition results in a loss of income. The provision of public goods such as the construction of roads, education or the support of individuals which are exposed to social or financial risks, is dependent on the capacity of states to levy taxes and impose regulations on corporations and individuals. According to Streeck (2014), the loss of state revenue and the idea *"to kick-start economic growth entailed higher pay and lower tax rates at the top, along with cuts in wages and benefits at the bottom of the income ladder"* (p. 67), have been the main reasons for the increase in state debt over the last years. The losses represent a particularly important issue for developing countries, which are seeing large capital movements going out of their economies (Baker 2005). This wealth transfer, according to Baker (2005), takes place from developing economies towards central banking hubs in developed countries. In brief, states' responses to corporate wealth defence strategies lead to distributional consequences at a global level between countries and regions, at a meso level between smaller and larger companies and at a societal level, between wealthy and less well-off individuals.

2.3 THE WEALTH DEFENCE INDUSTRY

Most academic literature in the field has either focussed on the side of corporations and their strategies to keep economic resources within their own circuit; or on the side of states and consequences for redistribution and autonomous policy making. What has been largely overlooked so far, is the role played by the `wealth defence industry` situated in between. It stands to reason, however, that where there is a demand side, there is also a supply side.

The development of wealth defence plans constitutes a profitable market surrounding multinational companies. The design of such plans is not trivial, as it entails the exploitation of differences between national legislations and depends on the ability of suppliers to *"mitigate challenges to the status of the product"* (Seabrooke 2017). Suppliers, who provide ideas and design plans, have to keep up with legislative changes and detect incoherencies in the international web of treaties between states. Moreover, the construction of wealth defence plans requires a highly technical knowledge and expertise on a broad variety of fields related to taxation, organisational structures and law. It spans different segments of the business, such as financial reporting, technology and human resources, encompasses domestic and foreign operations and involves numerous actors with different interests (Maydew and Shackleford 2005).

Professionals with the capacity to develop and sell wealth defence strategies thus have to know the legislative side as well as the corporate world. Such actors, which can access both the regulators and the target of regulation, are labelled 'regulatory intermediaries' (Abbott *et al.* 2017). Governments and corporate actors rely on them, as they can translate and establish communication between the two groups. From the governmental side, the collaboration with intermediaries is based on the need for an external organ which establishes a connection to the target and helps to implement rules. This is especially the case in policy fields which span multiple jurisdictions (Abbott *et al.* 2017). Intermediaries also monitor whether or not the regulation is followed, *"especially where they possess greater expertise, operational capacity, or access to targets than regulators themselves"* (p.7). In regard to the regulation of wealth defence practices, this is relevant, as in many domains the expertise of intermediary actors exceeds those of governing bodies.

Overall, there are good reasons for regulators to rely on intermediaries. Those bridging actors are more knowledgeable in certain domains and can provide more efficient outcomes at lower costs (Abbott *et al*. 2017). However, the reliance on regulatory intermediaries also bears risks. According to Abbott *et al.* (2017), intermediaries often pursue their own concerns, which "*include both institutional interests, such as compensation and organisational influence, and substantive interests in the area of regulation"* (p.8). In consequence, *"institutional and substantive interests may lead particular intermediaries to ally with the regulator, with the targets, or with other regulatory actors, and to attempt to shape the content of regulation, as well as its implementation, to their own benefit*" (p.8). Responding to a demand from the side of

corporations, such as the provision of audit statement or responding to a governmental quest for expertise regarding a policy issue, intermediaries are prone to develop their own interests in between existing constraints. This, Abbott *et al.* (2017) claim, engenders issues related to effectiveness, legitimacy, accountability, transparency and capture surrounding intermediary actors. Capture in the classical sense occurs when the regulator is captured by its target, for example through lobbying practices. Looking at a situation of regulation which includes intermediary actors, the conception of how one actor can dominate another actor must be reconsidered. Intermediaries can directly influence the regulator to change the rules in favour of their clients, or they can interpret existing rules in a favourable manner for companies in their service.

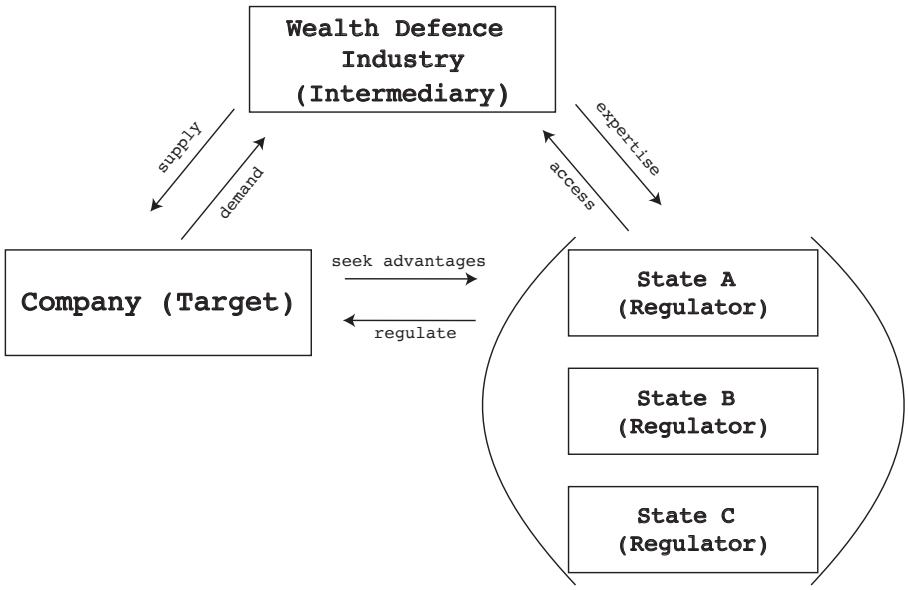


Figure 1: Schematic illustration on the interplay between companies, states and the wealth defence industry in a multi-jurisdictional policy field

Whereas the branch of literature on intermediaries is focusing mainly on their participation in regulatory processes on the governmental side, the literature on Professional Service Firms (PSFs) shows how (often the same) actors work as suppliers on the side of the regulated targets (Muzio *et al.* 2011; Seabrooke 2014; Suddaby and Viale 2011 and Von Nordenflycht 2010). PSFs are characterised through a high knowledge intensity, low capital intensity and a professionalised workforce (Von Nordenflycht 2010). The growing interest in this subset of professions is explained by the view that *"PSFs play an important role in developing human capital, creating innovative business services, reshaping government institutions, establishing and interpreting the rules of financial markets and setting legal, accounting and other professional standards"* (Barrett and Hinings 2015). The second point, namely that PSFs provide 'innovative business services', highlights the potential of the industry to implement new ideas and develop new 'organizational structures and systems' (Barrett and Hinings 2015). The possibility of those professionals to provide innovative ideas is enabled through - but also conditional on - knowledge as a strategic resource. The interaction and coordination with other actors is important for PSFs, because innovation most often requires a co-production of knowledge with the client or even with competitors (Barrett and Hinings 2015). It is through these interactions, that a supplier can improve its knowledge about a companies' situation and legal environments.

The knowledge intensity and the 'in between position' of professionals such as lawyers, accountants and other intermediary actors, opens up possibilities to act as a supplier of tax and legal innovation and thus to be part of the wealth defence industry. The extent to which

intermediaries use their position for their own financial or power related interests, or for serving the interests of their income providers, is contested. Intermediaries could play a marginal role by supporting ongoing processes of wealth defence, or in contrast, they could present a main motor of the process, creating new demand and opportunities for their clients. In an economic system where financial production is increasingly important, power is shifting to those who are in control of the knowledge in the field. It is therefore necessary to look at the domain of finance, law and accounting in the process of wealth defence and to shed light onto the potential suppliers of strategies that allow companies to shift wealth to advantageous locations.

3. ACCOUNTANCY FIRMS AS INTERMEDIARIES

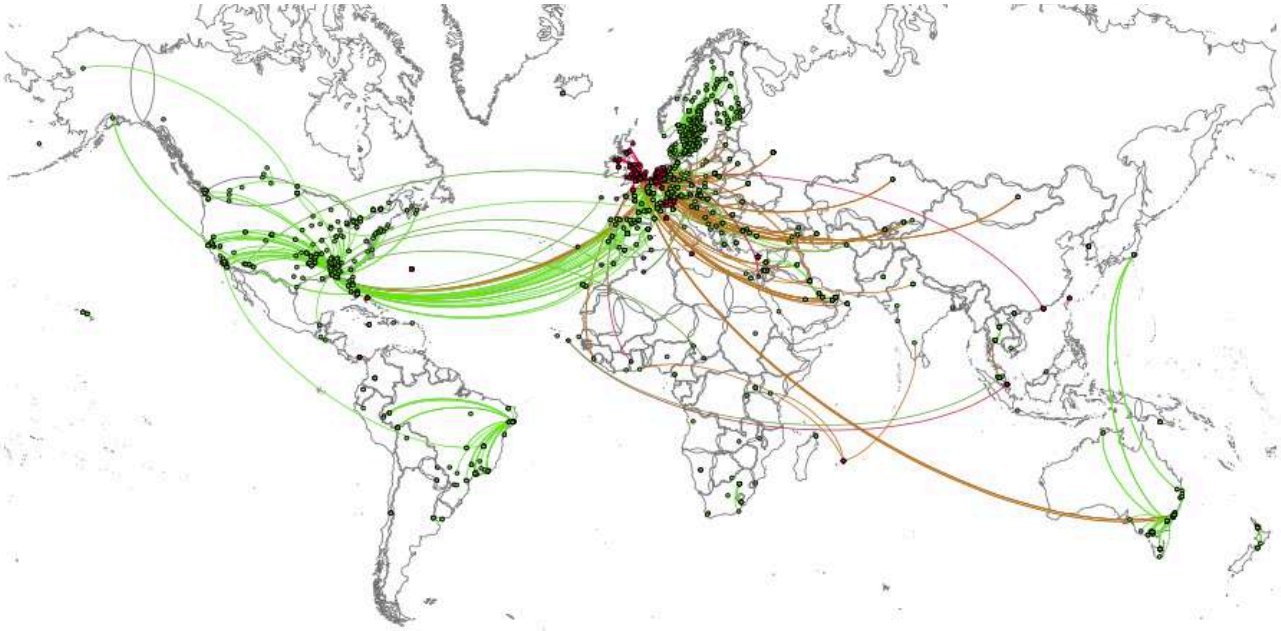
Amongst the various intermediary actors and potential suppliers of wealth defence strategies one actor stands out: the profession of accountants. Accountancy firms defend an image of neutrality, of an independent expert guild in the service of the public with the task to contribute to economic stability. Yet, the profession has been subject to profound changes over time. Originally a pure supervisory organ offering auditing services to clients, accountancy firms faced strong incentives to develop into more lucrative business opportunities. In consequence, their pronounced quest for independence suffered from several drawbacks caused by accounting scandals in the last years. This chapter addresses the changing role of accountancy firms in the global economy and discusses the pressures, incentives and limits of the profession to engage in the supply of wealth defence plans.

3.1 THE TRANSFORMATION OF THE PROFESSION

Accountancy firms emerged as a response to the demand for audit services. In cases of insolvencies or liquidation, an independent agent was asked to arbitrate between the different parties. The professional orientation of the auditor started to change from the 1970s onwards. Until then, accountants operated mainly within national borders, with a traditionally high presence in the UK and the US, and the regulation of accountants and audit requirements had been defined by national governments (Strange 1996). With the increasing internationalisation of trade, companies grew in size and complexity (Teck-Heang and Ali 2008). Following their clients, accountancy firms spread around the globe.

How the international presence of large accountancy firms looks today, is displayed in Figure 2 which shows the location of PricewaterhouseCoopers offices worldwide. The map shows where the offices are based and illustrates how internationally present and interlinked PwC is. Smaller accountancy firms, such as Grant Thornton are also spread over multiple jurisdictions, but to a minor extent than for example PwC (see annex C). The map also illustrates that the largest auditors do have a presence in offshore financial centers (OFCs). Offices which are located in OFCs are coloured in red, whereas offices which are based in regular tax jurisdictions are coloured in green. In a recent report, Murphy and Stausholm (2017) systematically analysed the location of the largest auditors in offshore jurisdictions, finding that they are overrepresented in those locations measured by either GDP or population. The number of offices, the authors find, is higher than expected in OFCs, especially in the British Virgin Island and the Cayman Islands.

The phase of internationalisation which lead to the wide-spread presence displayed on the map, was accompanied by other changes in policy regimes. Tracing the trajectory of the accountancy profession in the UK, Sikka and Willmott (1995) state that in pursuit of monetarist policies, regulations on commercialisation and advertising, which defined the scope of competition between accountancy firms, were abolished during this time: *"Accountancy firms were now expected to take an unequivocally commercial approach to the sale of their services"* (p. 562). In consequence, accountancy firms diversified their services and increased the share of activities in the domain of consultancy and tax advise, services for which fees are higher than for audit provision.



Notes: The nodes represent the offices and the lines represent the ownership relations towards the global ultimate owner. In green are the offices located in regular tax jurisdictions and in red are the offices located in Offshore Financial Centers. Data retrieved from Orbis (2015)

During the same period, accountancy firms increased in size and power through mergers amongst the largest firms. The leading auditors today, called the Big Four, are by name Deloitte, PwC, EY and KPMG. They present higher revenues than some smaller states present in GDP per year. Estimates propose that the total revenue of all Big Four auditors amounted to 120bn Euro in 2016 (Murphy and Stausholm 2017). There is a large gap in size and market share between Big Four other accountancy firms which operate in more than one country, such as BDO, RSM or Grant Thornton. The market share of the Big Four is estimated to amount up to around 66% (Grotto 2015), whereas all other auditors together have a market share of 34%. For the Big Four, 36% of income is due to audit services, 23% to tax services and 41% to other consulting services (Murphy and Stausholm 2017). The audit service consists of an evaluation of the financial statement of the client. Auditing, as described by Power (1997), serves primarily as a check which is needed in an economic relationship between several parties which can not rely on trust. The accountant has to ensure that the financial reports give a 'full and fair view' of the company's financial statement (Strange 1996) while guaranteeing independence from the subject matter. Tax services include the filing of tax returns, the provision of information concerning certain tax treatments, but also "*the design and implementation of tax strategies designed to manage tax liabilities"* (Maydew and Shackelford 2005: p.9). Consulting, according to Maydew and Shackelford (2005), represents the activity with the highest margins. It entails the restructuration of organisations and *"shifting income across jurisdictions or time, or reclassifying the tax treatment of transactions"* (*ibidem*: p.9).

A series of accounting scandals brought the regulation of accountancy firms on the political agenda of multiple governments. A prominent example was the bankruptcy of Enron, an U.S. based energy company, at that time audited by Arthur Andersen. After the collapse of Enron and subsequently the demise of Arthur Andersen, the U.S. set up the Sarbanes-Oxley act. The law passed in 2002 to restore independence of the accountancy profession and restricted the possibility of auditors to provide certain services to their clients. Amongst those restrictions were for example the design of financial information systems or the provision of legal services, yet the provision of tax services to clients was not prohibited (Maydew and Shackelford 2005). In Europe, restrictions on auditor activities have been imposed at the level of the European

Union. Amongst other regulatory measures, a EU commission proposal that was published in June 2017 introduces the obligation for intermediary actors to report on aggressive tax planning of their clients (European Commission 2017). The consequences of these legislative changes and their impact on the supply of consulting and tax services remain contested.

In sum, the profession of accountants which has traditionally been an independent, neutral expert guild, has undergone significant changes over the last decades. At present, accountancy firms are exposed to strong commercial pressures and competition, which incentivises them to court for new clients and profitable orders through attractive service offers. There are considerable differences within the profession of accountants. The Big Four - KPMG, EY, Deloitte and PwC - which accrued economic importance through mergers and diversification of services, stand out not only by their size, but also by their global spread and their presence in offshore jurisdictions.

3.2 A PASSIVE SUPPLIER OR AN ACTIVE STRATEGIST?

The transformation of the profession of accountants, with the emergence of the Big Four auditors, begs one question: How strong is their influence in the development of wealth defence plans? The following section looks at possibilities for accountancy firms, and especially for the Big Four auditors, to develop, provide and spread wealth defence strategies.

3.2.1 'Creative accounting' and legal innovation

Due to the limited reach of regulatory actors and the high complexity of information in the development of wealth defence strategies, there is room for 'creative accounting' and legal innovation. With the required expertise in financial reporting, tax regulation and organisational structures, accountancy firms are in a favourable position to spot loopholes and actively develop and spread wealth defence strategies.

Decisive for the role of accountancy firms in the development of wealth protection plans is their intermediary position. Although other actors, such as lawyers or banks, share intermediary traits, the access of accountants to regulators and companies is peculiar. Throughout history, the accounting profession has navigated forth and back between state actors and corporate actors. As auditors, accountancy firms accumulate a high level of knowledge about their clients. They have direct inside views in the structure and the activities of the companies they audit, which they can in turn use for the provision of consulting or tax services. Also, the auditor occupies a favourable position in the tax related network of employees within a company. The auditor is often in contact with the tax director, which typically selects the tax provider (Maydew and Shackelford 2005).

Regulatory restrictions which have been implemented by states over the last years, such as Sarbanes-Oxley, could affect the 'knowledge spillover' advantage of accountancy firms. Studies which looked at the period 2001-2004 and 2004-2007 found that auditors provide less tax services to their clients. At the same time, the share of fees from tax services is rising, which means that the accountancy profession is gaining market shares by providing tax services to other companies (Maydew and Shackelford 2005, Bedard and Paquette 2011 in Hogan and Noga 2012). These regulatory changes could imply that if the auditor is at the same time providing audit and tax services, the regulatory supervision will be more strict and thus, external accountancy firms would supply riskier products than internal auditors (Klassen 2016). Despite a decline in tax services provided by the auditor, the contact with clients remains an advantage for accountants.

Besides their access to corporate actors, accountants have strong ties to regulators. The relation between states and accountancy firms has its roots in the monopoly on statutory audits which is secured through state regulation. Those audits are legally required, which implies that states

impose audit rules on companies and therefore generate the demand for services provided by accountancy firms. Also, governments rely on accountancy firms as policy experts. As a result, accountancy firms are a prime example of an intermediary actor which has access to both spheres, the one of state actors, and the sphere of corporate entities. In this position accountancy firms can detect and develop wealth defence strategies for clients while evaluating the financial risks of such innovations: *"the supplier's multi-jurisdictional and cross-disciplinary (accounting, law, tax, supply chain management) expertise is a great asset in avoiding regulatory interventions"* (Seabrooke and Wigan 2017: p. 15).

Wealth defence innovations entail various strategies. They can reach from the development of favourable corporate structures and ownership chains to pure manipulations of accounts, so called 'creative accounting'. As described by Strange (1996), occasions for 'creative accounting' already appeared in the 1970s in the U.S. context. The inflation during this period provoked difficulties to judge the market value of existing stocks, and led to a broad leeway for accountants to present the financial statement in suitable ways for their clients. Some accountancy firms at that time skilfully used this scope for interpretation in favour of their - or their clients' - interests. Another example of creative accounting has been discussed by Sikka and Willmott (2013), showing that PricewaterhouseCoopers developed sophisticated innovation for its client SABMIller, one of the largest beer companies worldwide. The company was accused of avoiding large sums of tax money in African countries and India, after using a tax product labelled 'Total Tax Contribution'. This tax plan, developed and sold by PwC, enabled the company to present a very high tax bill by including various imaginary taxes into the final tax statement, while the actual amount of taxes paid remained low (Sikka and Willmott 2013).

Other wealth defence plans focus on the exploitation of international differences in tax regimes and on advantages provided by single jurisdictions. For the provision of such strategies, the size and global presence of accountancy firms are an important asset. Big Four auditors thus have a stronger position than smaller accountancy firms. Jones *et al.* (forthcoming) contribute to the rare findings which examine the influence of accountancy firms on their clients' corporate structure. The authors look at the difference between Big Four accountancy firms and other auditors and find that companies with a Big Four auditor have more subsidiaries in tax havens than companies with any other auditors. Their brief argument in supporting this difference is that *"the Big Four stand out, since they may not only provide technical support and confirmation of tax strategies, helping MNEs to navigate the regulatory environment, but are often also the creators and vendors of particular strategies"*.

Tax schemes, and in particular plans which involve corporate structures, require a high knowledge of both, companies and the legislative environment of numerous jurisdictions. The line between wealth defence and fraud is thin, and thus supplying wealth defence products involving corporate structures require a close link to the regulatory sphere. Due to the importance of knowledge on multiple jurisdictions, it is likely that there is a difference in the capacity to develop wealth defence plans between the Big Four and smaller auditors, which are exceeded by KPMG, EY, Deloitte and PwC in both size and geographic expansion.

3.2.2 Spreading products across the network

The importance of suppliers of wealth defence strategies depends not only on their capacity to develop products, but also on their ability to market and sell innovations across a broad range of clients. Theoretically, ideas and inventions can spread through copy-past mechanisms. However, as the information concerning wealth defence schemes is often highly complex and technical, legal innovations, involving particular jurisdictions and corporate forms, are likely to be marketed within circles of professional networks.

The possibility of marketing products across the network strongly depends on how the network is constituted. It is the organisational and functional structure of an accountancy firm which determines to what extent knowledge can be shared across professionals operating in different

jurisdictions. The higher the coordination and interaction between sub-entities, the likelier is the occurrence of information exchange between different entities and thus the spread of innovation. The structure of accountancy firms is somewhat understudied and there is considerable disagreement on the relationship between organisational and functional form of those companies.

Stewart (2006) in line with findings on PSFs, suggests that accountancy firms should be understood as networks of firms with a high autonomy, which share not much more than the brand. In this conception, the knowledge transfer within accountancy firms is limited. As opposed to that, Murphy and Stausholm (2017) found that the Big Four appear to have a central body which controls lower hierarchical levels by imposing common standards, issuing licences and monitoring intellectual property. With this set-up, the exchange and transfer of innovation is much likelier. Moreover, Moore and Birkinshaw (1998) discovered that PSFs construct what they call 'centers of excellence' which systematically gather knowledge on innovative products and future possibilities of product development. Tracing an investigative process held by the U.S. Justice Department against KPMG in 2002, Sikka and Willmott (2013) reveal insights in the internal organisational structure of KPMG. The development of tax schemes at the time of the investigation in 2002 at KPMG was centred around a 'Tax Innovation Centre', where income targets were set and *"staff were incentivised to submit ideas for new schemes"* (Sikka and Willmott 2013: p. 429).

The inclination of accountancy firms to market wealth defence plans is highlighted by Sikka and Mitchell (2011) claiming that certain schemes are 'produced off the shelf' and 'mass marketed'. Employees are trained in selling the tax products to clients and are rewarded by success rate. Some schemes have been uncovered by court cases. Sikka (2013) quotes a comment of the U.S. Senate in 2009, stating: *"we found a large number of tax advisors cooking up one complex scheme after another packaging them up as generic tax products with boiler plate legal and tax opinion letters, and then undertaking elaborate marketing schemes to peddle these products to literally thousands of persons across the country".*

Evidence for the practice of accountancy firms to market innovation and tax schemes across their network is also established by Brown and Drake (2013). Researching how companies can maintain low tax rates on the long run, the authors apply a network analytic approach to study how information is diffused across companies. The authors argue that *"interlocks [between board members] with network partners that also share a common local auditor are likely to be more influential because, as a common third party, auditors bring expertise, legitimacy, and trust to the interlock relationship"* (Brown and Drake 2013: p. 488). As such, Brown and Drake (2013) attribute only a passive role to the auditors, presenting them as actors which facilitate the knowledge exchange between board interlocks. Yet they find that indeed, information is spread through shared auditors.

3.2.3 Establishing access channels

Being involved in policy processes as experts, accountancy firms establish a broad network of contacts to policy makers. A mechanism which has been neglected by the literature on the role of accountants so far, is that accountancy firms can provide assistance in establishing deals with authorities in different countries.

States have a range of measures which they can apply to attract foreign capital. One strategy is to respond to companies quest for legal certainty and to offer so called 'tax rulings'. Those arrangements seek to provide stability by agreeing on conditions for a transaction or a tax treatment (EU ECON study 2015). 'Advanced pricing agreements' (APAs) for example pre-define the price of a trade which takes place within a group. Besides the official agreements, other arrangements are made. Sometimes, this is done during the audit process: *„In practice, many other 'tax arrangements' are made – without any framework – between the taxpayer and the local tax inspector before a specific transaction takes place or before filing the tax return, after a tax*

mediation process, in court, within a horizontal monitoring process, or, within the context of a tax audit" (EU ECON study 2015: p.6). Thus, agreements are subject of mutual negotiation and take place both formally and informally.

In the detection, and in the access provision to such constructions, accountancy firms can play an important role. On their international website, PwC advertise their skills in helping clients with access to Advanced Pricing Agreements (APAs): *"We have substantial experience helping companies across a diverse range of industries obtain APAs covering a broad spectrum of intercompany transactions. Many of our professionals hail from academia, industry, and prominent positions within governments—including senior-level positions in governmental agencies responsible for administering APAs"* (Pwc 2016). PwC assures the clients that a collaboration with them will provide their clients' access to those special treatments: *„We can work with you to develop strategies at both the global and local level, and guide you through the process of requesting APAs to help you ensure successful outcomes"* (PwC 2016).

That accountancy firms are involved in the establishment of such deals was revealed through information leaks, such as the Luxembourg leaks. Confidential documents accessed by investigative journalists suggest that in the case of Luxembourg, PwC was an important player. The accountants of PwC arranged around 548 tax rulings for their clients between 2002 and 2010, involving high sums of investment (Wayne *et al.* 2014). The leaked documents revealed that negotiations took place in form of private meetings between accountants and tax authorities for which PwC had prepared extensive reports on financial strategies in favour of their clients (*ibidem*).

3.3 PROPOSITIONS

Wealth defence, or the protection of economic resources by companies from state actors, share- and stakeholders, is a lucrative business for the industry of suppliers. Previous chapters addressed the trajectory of accountancy firms over time, pointing at the heterogeneity within the profession, and looked at the position of accountancy firms to act as a supplier of tax and legal innovation. Through their contact with clients and simultaneously the proximity to governmental actors, accountancy firms are in a privileged position to be part of the wealth defence industry. There are also barriers to their involvement. Regulatory changes over the last decade, for example, restricted the provision of tax and consulting of auditors to their clients. Based on the theoretical considerations and previous findings developed in this chapter, I will hereby establish a set of expectations.

The audit and consulting market is dominated by the Big Four accountancy firms. Those firms, namely PwC, Deloitte, EY and KPMG, share characteristics which might play an important role for the supply of wealth defence strategies. Their size enables them to reach a higher level of knowledge intensity which is both rewarded by regulators who need expert advise and by companies, which rely on expertise in regard to corporate structures, international law and taxation. The widespread geographic presence of the Big Four auditors equally enhances their knowledge about strategies which span multiple countries. It strengthens their capacity to provide access channels to regulatory authorities in advantageous jurisdictions and moreover presents them with the possibility to spread new products across a larger network of offices to their clients. This leads me to question the distinctive role of the Big Four in the supply of wealth defence strategies. I expect that companies which are audited by one of the Big Four have a higher prevalence of corporate structures which relate to the protection of economic resources.

Most likely, this difference between Big Four auditors and other auditors varies across contexts. I expect that auditors provide more efficient solutions for bigger companies than for smaller companies. The size of companies is correlated with their revenue, from which follows that larger clients represent more lucrative business opportunities than small companies. The larger the client, the more opportune the wealth defence strategies provided by auditors. I expect that

any type of auditor is likely to provide better wealth defence plans to large and profitable companies, but - I suggest - Big Four auditors are more efficient in doing so.

4. RELATING THE BIG FOUR TO CORPORATE STRUCTURES

Most previous evidence on the role of accountancy firms in the supply of wealth defence strategies was based on findings with a limited external validity, such as journalistic investigations, leaks or case studies. The insights that they revealed propose that accountancy firms are not a passive supplier, but an active strategist with proper interests and incentives. In order to extend this work, this study aimed to establish quantitative evidence for the relationship between accountancy firms and the wealth defence strategies of their audit clients.

4.1 RESEARCH DESIGN

To look at the role of accountancy firms as a supplier of wealth defence strategies, this study focused on the relationship between auditors and features of their clients' corporate structure. Multinational companies are required to file financial audits and thus have to be linked to an auditor. In consequence, the auditor influence can not be studied by comparing companies with and without auditors. By looking at the difference between the Big Four and smaller auditors, it is possible to overcome this methodological issue and to see if a subgroup of accountancy firms matter in the provision of wealth defence plans. Wealth defence plans reflect in corporate structures. Thus, the study looked at how clients of different auditors make use of particular legal forms and how they locate their subsidiaries in jurisdictions which offer advantageous tax and legal regimes.

The dependent variables which I examined are a range of features that relate to wealth defence: the use of sink OFCs, conduit OFCs and the construction of particular legal forms, namely holding subsidiaries and management entities. With regard to the classification of jurisdictions in sink-, conduit- and regular jurisdictions, this study followed the findings of Garcia *et al.* (2017) (see annex B). Further, I looked at measures of general complexity of corporate structures, which are the depth and the width of the subsidiary network. Finally, I looked at the use of country-combinations, in particular at round-tripping practices (see annex D for a schematic example of wealth defence related feature for Apple Inc.). Here I distinguished between round-tripping practices which involve any kind of country combination and round-tripping practices which lead through a conduit.

	General features						Country combinations	
	Number of OFCs	Number of holdings	Number of trusts	Number of management subsidiaries	Debth of subsidiary NW	Width of subsidiary NW	Round tripping	Round tripping with conduit
Big 4 Auditor	+	+	+	+	+	+	+	+
Multiple Auditor	+	+	+	+	+	+	+	+
Auditor influence with increasing GUO Size	+	+	+	+	+	+	+	+
GUO size	+	+	+	+	+	+	+	+
GUO age	+	+	+	+	+	+	+	+
GUO sector	?	?	?	?	?	?	?	?
GUO location	?	?	?	?	?	?	?	?

Figure 3: Visualisation of expectations

The main independent variable is the auditor of the company and indicates whether the auditor is one of the Big Four or another auditor. Also, the models include a variable on the auditor influence according to the size of the company, whereby the size is measured in terms of number of subsidiaries. The propositions in regard to ownership features which are related to wealth defence strategies are displayed in figure 3.

To separate the expected relations from other influences, I considered several confounders. First, I controlled for the influence of multiple auditors. The literature on PSFs highlights the importance of collaboration and interaction between suppliers of products which are marked by a high knowledge intensity. In a field where the complexity of information is high, the coordination between different actors might enhance the provision of successful tax avoidance strategies. I expected that companies with multiple auditors have a higher level of practices which are related to wealth defence than companies with only one single auditor. Second, I controlled for the location of the parent company. Lewellen and Robinson (2013) argue that transaction costs proxied through geographic distance, cultural ties, language or religion and bilateral trade agreements have an impact on the expansion decisions taken by multinational companies.

Third, I controlled for sector as the company's income mobility could play a role in regards to wealth defence strategies. Wagener and Watrin (2014) point out that income mobile sectors such as the pharmaceutical, high-tech and service industries could be more prone to pursue tax avoidance strategies and complex ownership structures. Also, I controlled for age, which could be influential in regard to width and depth of the ownership chains. This is the case if the development of subsidiary networks follows a logic of 'the historical accident', where the acquisition of lower level subsidiaries happens over time (Unctad 2016: p. 136; Lewellen and Robinson 2013). Similarly, a larger subsidiary network is likely to result in a higher number of all features under study, thus I included size of the company in the models. Table 1 shows the overview on all variables included in the models, on transformations which have been performed on them, as well as on the main descriptive statistics.

Dependent variables

Variables	Min	Max	Mean	SD	Description
Number of OFCs	0	6166	29.9	123.7	The variable counts the number of subsidiaries in OFCs (conduit and sink). The country of the GUO is excluded as an OFC. The variable is log10() transformed.
Number of holdings	0	1496	7.6	32.1	The variable counts the number of holding companies (NACE_REV 64.2). The variable is log10() transformed.
Number of management subsidiaries	0	2268	7.4	37.4	The variable counts the number of managament subsidiaries (NACE_REV 70.1 and 70.2). The variable is log10() transformed.
Debth of subsidiary NW	1	8	1.2	0.6	The variable counts the maximum debth of the ownership chain. The variable is log10() transformed.
Width of subsidiary NW	1	2604	14.7	49.0	The variable counts the maximum width of the ownership chain. The variable is log10() transformed.
Round tripping	0	8	0.007	0.123	A chain where ownership goes from country A to another country back to country A. For example: DE:ES:DE.
Round tripping with conduit	0	3	0.002	0.056	A chain where ownership goes from country A through a conduit back to country A. For example: DE:IE:DE.

Independent variables

Variables	Min	Max	Mean	SD	Description
Big 4 auditor	0	1	0.42	0.49	Companies with a Big Four auditor (1) and companies with another auditor (0).
Multiple auditor	0	1	0.12	0.33	Companies with multiple auditors (1) and companies with a singel auditor (0). Companies with multiple auditors from both Big Four auditors and other auditors were excluded.
GUO size	3	33565	229	756	This indicates the total subsidiary size. The GUO size differs between models: GUO size=(total size)-(number of features). All size variables have been log10() transformed.
GUO age	0	822	27.5	26.6	Age of the GUO is calculated by substracting the year of incorporation from 2015.
GUO sector					All sectors with less than 300 observations were merged into the category "other activities".
Administrative and support services	0	1	0.03	0.2	
Construction	0	1	0.03	0.2	
Electricity	0	1	0.01	0.1	
Financial and insurance activities	0	1	0.19	0.4	
Information and communication	0	1	0.08	0.3	
Manufacturing	0	1	0.30	0.5	
Mining and quarrying	0	1	0.04	0.2	
Other activities (regrouped)	0	1	0.05	0.2	
Real estate activities	0	1	0.04	0.2	
Retail trade	0	1	0.10	0.3	
Professional and scientific activities	0	1	0.11	0.3	
Transportation and storage	0	1	0.03	0.2	
GUO location					The location of the GUO by single countries. There are 121 countries in total.

Table 1: Measurement and descriptive statistics of dependent and independent variables

4.2 DATA SOURCE AND SAMPLE SELECTION

4.2.1 Data source

I extracted the data from Orbis, a database covering a large variety of information on over 200 million corporate entities around the globe. Bureau van Dijk, who maintains the database, assembles the information from various sources (Bureau van Dijk 2016). The company records which provide the data for this study stem from regulatory reports by public institutions. Companies have to disclose certain information in order to meet administrative requirements.

A major advantage of the ORBIS database is its broad coverage of countries and sectors and the level of comparability between measures. It is important, however, to note that the quality of information varies between regions and across companies of different size. Data quality is lower for smaller companies and for low income countries (Garcia-Bernardo *et al.* 2017). Of particular interest for this study was the information on ownership structures of firms and on the accountancy firms responsible for their audits. I retrieved information on ownership chains for each global ultimate owner (GUO) by counting the country combinations that occur in their

ownership. The ownership relation at the subsidiary level was set at a threshold of 50%. To give an example, the information 'DE-CH-HK: 1' indicates that in the ownership network of a particular company a German subsidiary (or the parent company itself) holds a subsidiary in Switzerland with a share higher than 50%, which holds a subsidiary in Hong-Kong, again with a share of over 50%. This particular country combination occurs once in this example. The study also used additional information on the corporate entities, such as the date of incorporation, the sector and location.

4.2.2 Sample selection

To study companies and their corporate structure, it was necessary to define in a first step what 'a company' is. As the focus was on corporate structures which are linked to wealth defence, only companies which operate in more than one country were of interest for this study. For conceptual and technical clarity I looked at the global ultimate owners (GUO), labelled 'parent companies' in the theory chapter. Those are companies which are not owned by other firms and have at least one subsidiary owned by over 50%. I only included companies in the sample with at least one subsidiary in a foreign country (i.e. with a cross-border ownership link). Also, companies were only included in the sample if information on their auditor was available. Other inclusion criteria were that the companies have an active status and that there was information available on their location, sector and date of incorporation. Additionally, companies which have multiple auditors that entail both Big Four auditors and other auditors, were excluded from the sample. The resulting datasets contain 28'725 GUOs for the models on general corporate features and 23'851 GUOs for the country combination models on round-tripping practices. The second sample is smaller, because no information was available on the ownership relation of the subsidiary network for certain companies.

Global Ultimate Owners - companies that hold over 50% of other companies with a foreign subsidiary which is owned at over 50% shares (status = active)	488856	100%
Auditor is available	44212	9.0%
Auditor is a company	37062	7.6%
Information on subsidiaries is available	31765	6.5%
Auditor is not both a Big Four and an other auditor	29780	6.1%
Models on general features		
Information on age, sector and region is available	28725	5.9%
Models on country combinations		
Information on subsidiary chains is available	24732	5.1%
Information on age, sector and region is available	23851	4.9%

Figure 3: Sampling procedure with the number and percentage of observations

4.3 ANALYTICAL FRAMEWORK

To study the influence of auditors on their clients corporate structures, I ran mixed regression models. Those models allow to look at the relationship between two variables of interest, while controlling for other factors. This is crucial, as a variation in size or sector amongst clients of different auditors could confound the relation of interest. I chose a focused approach, whereby only few variables are included in the model, all of which can be argued for on theoretical grounds to influence the ownership features under study. For each ownership feature I ran

regression models in a step-wise procedure, first without and then with an interaction effect between the auditor and the size of the company. To control for the differences between countries, I chose a hierarchical model, allowing the intercepts of each country to vary. This accounts for the idea that the observations are nested in countries and that initial levels of corporate features vary for companies located in different countries.

4.4 RESULTS

The descriptive screening of the data revealed an interesting connection between the localisation of the GUO and the auditor responsible for the company. It is important to note that data on the audit provider was only available for 9% of the companies and thus the percentages presented here must be read as an approximation. Figure 4a shows the number of clients per auditor for each country. The first block of countries are 'regular tax jurisdictions'. In around one third of the countries, more than half of the companies are audited by either Deloitte, KPMG, EY or PwC. The percentage of clients is overall higher in the block on sink OFCs and lower in the block on conduit OFCs. Figure 4b shows the share of clients for each auditor weighted by revenue. The difference to figure 4a points out two things. First, Big Four accountancy firms are responsible for companies with high revenues in most countries. And second, this is even stronger for companies which are based in sink or conduit jurisdictions.

Relating back to the mechanism of providing access to authorities for their clients, let's take a look at Luxembourg. Leaks have shown that PwC arranged over 548 tax deals between their clients and the tax authorities in informal meetings between 2002 to 2010. PwC, as shown in Figure 4b, is responsible for companies which hold only a minor share of total revenue of the companies based in Luxembourg. It is thus possible that for example Deloitte, which audits the clients with the highest proportion in total revenue, have been equally important, or even a more important access provider than PwC.

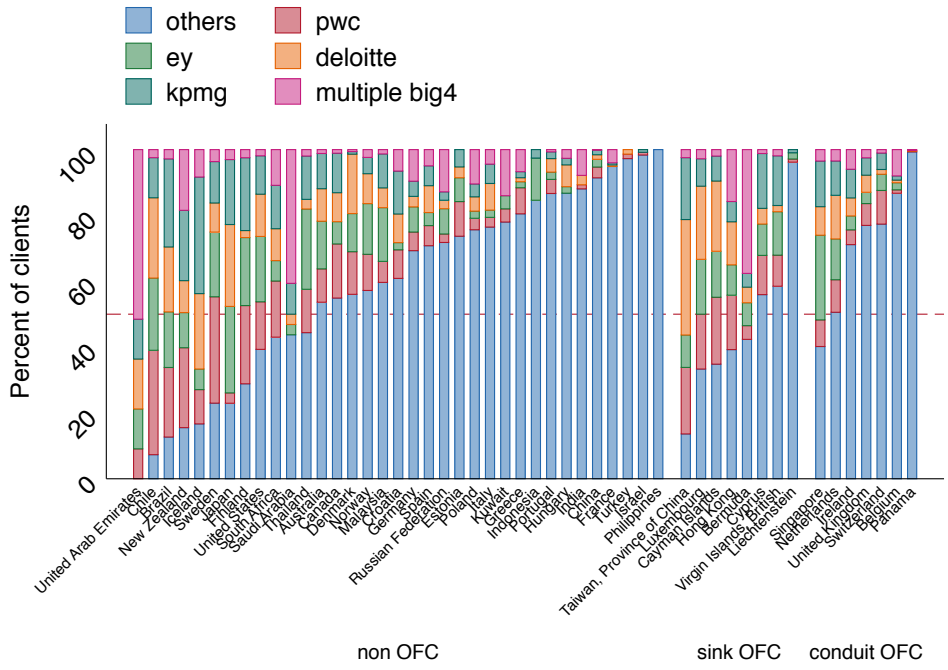


Figure 4a: Share of clients across countries for PwC, EY, Deloitte, KPMG and 'other auditors

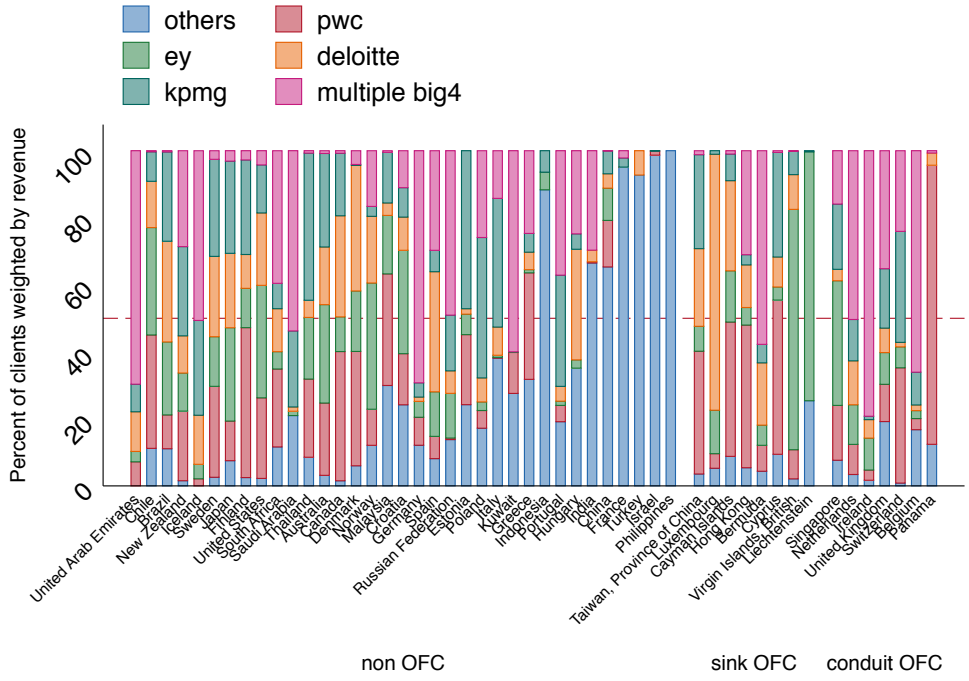
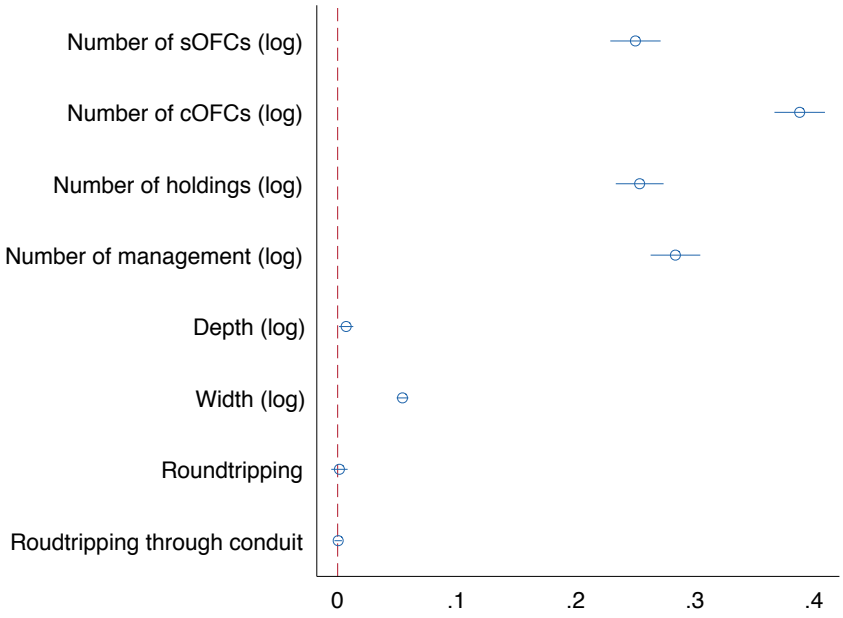


Figure 4b: Share of clients across countries for PwC, EY, Deloitte, KPMG and 'other auditors weighted by revenue. Notes: Data extracted from Orbis (2015)

Applying mixed regression models I studied the set of expectations formulated in the chapter 3.3. Concerning the first proposition, I looked at the relation between auditors and corporate features of clients that are linked to wealth defence strategies. I found that the Big Four auditors are positively related to the use of sink OFCs, conduit OFCs, holdings and management entities. Keeping all other variables constant, companies which are audited by a Big Four auditor have on average 12% more subsidiaries located in sink jurisdictions, 67% more in conduit OFCs, they have 17% more holding entities and 13% more management entities than companies which are audited by any other auditor (p=0.00). Effects of the auditor on width and depth of the subsidiary network are very weak and negative. Both models on round-tripping practices show non significant auditor effects.

The second proposition addressed the idea that the incentives to provide wealth defence strategies increase with growing size of the company. To study this relationship, I introduced an interaction between auditor and the size of the GUO. I found that the effect of the Big Four versus any other auditor increases with the size of the GUO for certain features. This relationship holds namely for the number of sink OFCs, conduit OFCs, holdings, management entities and width of the subsidiary network, as shown in Figure 5. Although small companies also have a higher use of those features if they are audited by one of the Big Four rather than by a smaller auditor, the difference between auditors is stronger for large companies. Amongst all features, this relationship of an increasing auditor effect with increasing size of the company, is strongest for the number of subsidiaries in conduit OFCs. Depth of the subsidiary network, as well as round-tripping practices do not show a significant interaction effect between auditors and size of the GUO.



*p<0.05, ** p<0.01
Source: Orbis
Notes: There is no issue of multicollinearity. The models have been checked for heteroscedasticity and outliers with a high leverage.

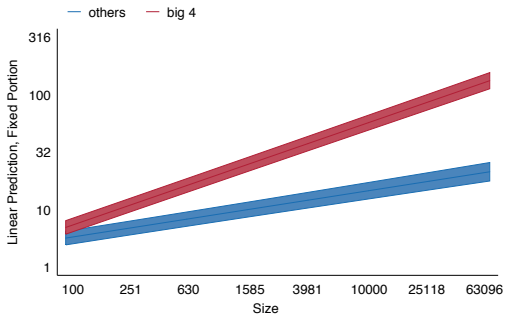
Figure 5: Interaction effects between auditor and size

How this relationship between auditor and companies plays out across companies of different size is shown in separate figures 6.1 to 6.8 for each features. To make an example, let's look at the figure on sink OFCs (6.1). In this model, the size of the GUO was measure as the total of subsidiaries minus the subsidiaries in sink OFCs. A company with 200 non sOFC subsidiaries (size) which is audited by one of the Big Four has on average 47% OFC subsidiaries more than a same-sized other company which is not audited by one of the Big Four auditors. A company with 2000 non sOFC subsidiaries which is audited by one of the Big Four, however, has on average 162% sOFC subsidiaries more than a company audited by another auditor.

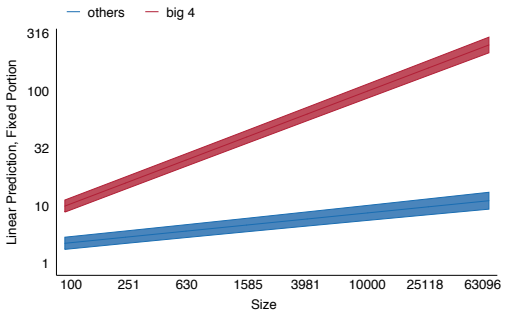
The results provide evidence for a stronger influence of the Big Four auditors in comparison to the influence of any other auditors on the use of localisation strategies, namely the exploitation of conduit and sink jurisdictions, as well as on the use of strategies regarding the corporate form, namely the establishment of holding and management entities. General complexity measures, which are the depth and width of the subsidiary network, do not strongly vary according to the auditor. For the round-tripping country combinations there is no significant difference between Big Four auditors and other auditors (all regression tables are shown in annex E).

Besides the main independent variables, all models included control variables. The regression model on sink OFCs, as shown in table 2, will serve as an example. Model A is calculated without an interaction effect, whereas Model B contains the interaction effect between auditor and size of the GUO. The table shows that the number of subsidiaries in sOFCs varies across sectors. Companies which are in the mining sector have the highest occurrence of sOFCs in their subsidiary network holding all other variables constant. A company which is in the mining sector has on average 54.9% more subsidiaries in sOFCs than a company which is in the domain of electricity (p=0.00). The mining sector is followed by the sectors of transportation, manufacturing and real estate.

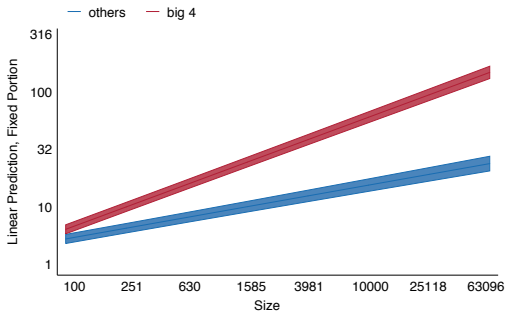
6.1 Effect on number of Subsidiaries in sOFCs



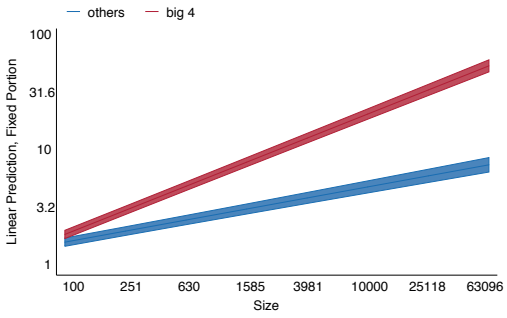
6.2 Effect on number of subsidiaries in cOFCs



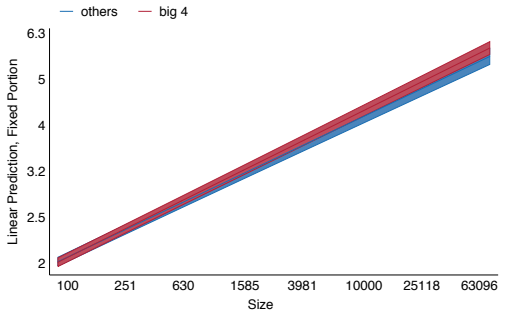
6.3 Effect on number of holdings



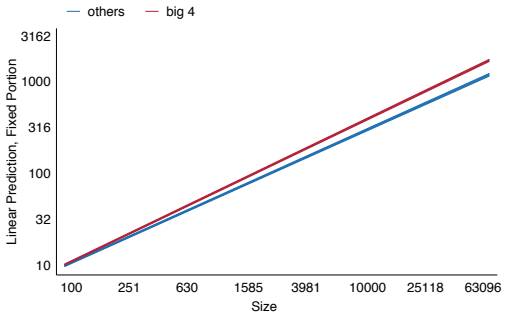
6.4 Effect on number of management subsidiaries



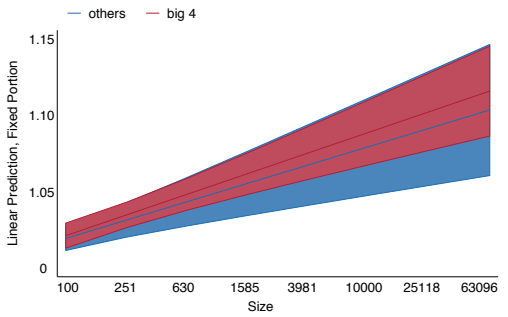
6.5 Effect on debth



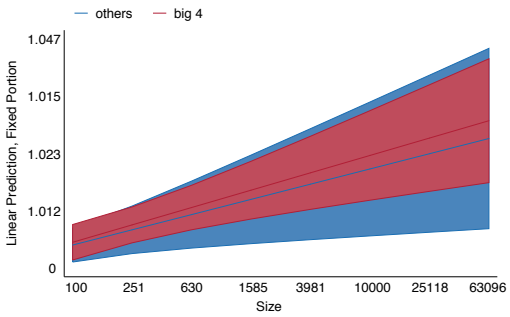
6.6 Effect on width



6.7 Effect on round-tripping



6.8 Effect on round-tripping with conduit



Multivariate regression on number of sink OFC subsidiaries

Number of sOFC subsidiaries per GUO	**Model A** Coefficent (se)	**Model B** Coefficent (se)
Other Auditors	*ref*	
Big Four	0.05**	-0.41**
	(0.01)	(0.02)
Single Auditors	*ref*	
Multiple Auditors	0.07**	0.08**
	(0.01)	(0.01)
Size of GUO	0.36**	0.21**
	(0.01)	(0.01)
Age of GUO	0.04**	0.03**
	(0.01)	(0.01)
Electricity	*ref*	
Administrative and support services	0.05	0.06*
	(0.03)	(0.03)
Construction	0.04	0.05
	(0.03)	(0.03)
Financial and insurance activities	0.08**	0.10**
	(0.03)	(0.03)
Information and communication	0.06*	0.07*
	(0.03)	(0.03)
Manufacturing	0.10**	0.11**
	(0.03)	(0.03)
Mining and quarrying	0.18**	0.19**
	(0.03)	(0.03)
Other activities (regrouped)	0.04	0.05
	(0.03)	(0.03)
Real estate activities	0.09**	0.10**
	(0.03)	(0.03)
Retail trade	0.07**	0.08**
	(0.03)	(0.03)
Professional, scientific and technical activities	0.05	0.07*
	(0.03)	(0.03)
Transportation and storage	0.10**	0.10**
	(0.03)	(0.03)
Big Four X Size		0.25**
		(0.01)
Constant	-0.57**	-0.31**
	(0.04)	(0.04)
sd(country)	0.28**	0.28**
	(0.02)	(0.02)
sd(_cons)	0.47**	0.47**
	(0.00)	(0.00)

N=28725
p <0.05*, p< 0.01**
Source: Orbis
Notes: Number of subsidiaries in sOFC excludes the country of the Global Ultimate Owner

Table 2: Regression models on the number of subsidiaries in sOFCs.

Surprisingly, the financial sector, which is characterised through a high income mobility, does not stand out. It is important to note that the effect size of sectors varies strongly across features. Companies of the financial sector have the highest use of holding subsidiaries and companies in the administrative sector have the highes use of management entities. Back to the sOFCs, the age effect is positive and significant but relatively modest. A company which was founded in 2014 has only 18.7% less subsidiaries in cOFCs than a company which was founded 300 years earlier. In regard to the other models, age only has a significant effect on the number of subsidiaries in cOFCs (for an overview on the age effect on all models see annex F). The variable on multiple auditors was introduced to seize the interplay between different professionals. The analyses show that receiving audit services by multiple accountancy firms rather than by a single one increases the number of sOFC by 20%. The relation with cOFCs is equally positive but slightly weaker than for sOFCs. For the other models, the auditor effect is very weak or not significant (see annex F).

The model on the number of subsidiaries in sOFCs also shows variation between the countries in which GUOs are located. Allowing for random intercepts at the country level, the analyses show that there is a considerable variation in the average occurrence of offshore subsidiaries from one country to another (Figure 7). Companies based in Bermuda, Hong-Kong and Cayman Islands - countries which are themselves well-known sOFCs - have a higher use of other sink jurisdictions. It is important to note that subsidiaries of a company based in Bermuda which are located in Bermuda have not been categorised as sOFC subsidiaries. Thus companies in those jurisidictions use other sOFCs. A GUO which is based in Bermuda, could for example set up subsidiaries in Taiwan or Cayman Islands. The analyses show the same regularity in regard to the usage of cOFCs: GUO's which are located in a conduit jurisdiction make more often use of other conduit jurisdictions than GUO's based in other countries (see annex G).

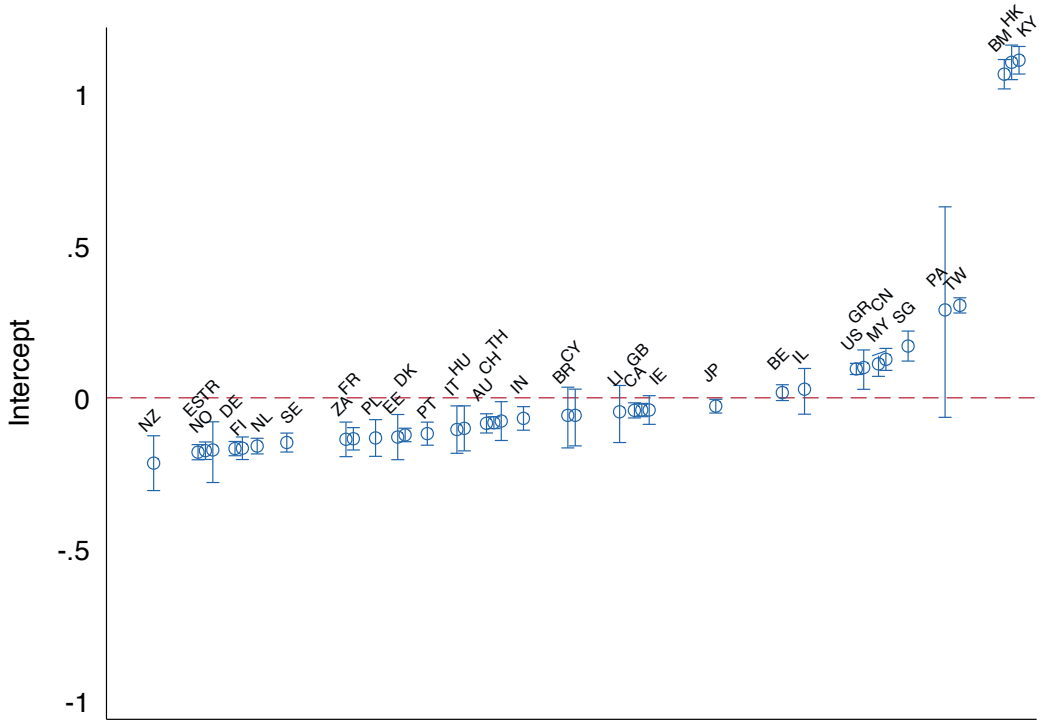


Figure 7: Model on sOFCs - Intercept of countries (location of the GUO)
Notes: Figure includes all countries with more than 60 observations

5. DISCUSSION AND CONCLUSION

This study examined the role of accountancy firms as part of the wealth defence industry, by drawing on a database which covers companies worldwide. In alignment with the first proposition, the multi-level regression models revealed, that there are significant differences between companies which are audited by Deloitte, KPMG, EY or PwC and companies which are audited by smaller accountancy firms in the ways they set up their network of subsidiaries. Companies which are audited by the Big Four show a higher use of sink jurisdictions, which provide secrecy and low corporate taxes. They equally present a higher use of conduit jurisdictions which offer legal certainty, stability and favourable conditions on the transfer of economic wealth. Also, the analyses showed a positive relationship between the Big Four and the use of holding and management subsidiaries by their clients. Holding companies function as ownership hubs and can be used to reduce tax liabilities. Management entities can absorb a large share of profits and thus facilitate the reallocation of profits from the place where they are generated to more favourable jurisdictions.

What are the underlying mechanisms leading to the markedly different impact between Big Four auditors and smaller auditors? As large firms with offices in numerous locations, PwC, Deloitte, KPMG and EY have access to a broader range of countries, which familiarises them with various legal regimes and allows them to establish contacts with the authorities in place. Especially in regard to the use of conduit jurisdictions, the capacity of accountancy firms to establish access channels to the authorities which are in charge of the implementation of regulatory deals with foreign companies could play an important role. The scale of the Big Four represents another advantage over smaller auditors, as they have more resources in understanding their clients organisational structure and to detect opportunities for optimisation including knowledge intensive solutions such as the setting up of holdings or other forms of legal entities.

Interestingly, the Big Four are not related or only weakly related to features on ownership complexity, such as the depth and width of the subsidiary network or round-tripping practices. General ownership complexity can be developed by companies to obscure ownership relations and to generate opacity. This renders the coordination of tax-authorities more difficult and leads - for example in the case of round-tripping practices - to situations where domestic capital is turned into foreign investment, thereby facing more favourable conditions. The models showed that the depth and width of the subsidiary network are mainly explained by the general size of the company. The larger a company is, the higher is the complexity of the ownership structure. What seems somehow evident, just highlights the distinctness of the other findings, where despite the inclusion of size as a control, the Big Four have a significant influence.

Providing evidence for the second pivotal expectation, the study showed that the influence of the Big Four is stronger for larger companies than for small companies. Or - breaking it down - the biggest accountancy firms serve the biggest multinational companies. The relationship, again, holds for the features which relate to spatial strategies (sOFCs and cOFCs) and for the features which include a corporate form (holdings and management entities), but not for features on ownership complexity (depth, width and round-tripping practices). The literature on intermediaries established that actors which are in the position to monitor regulation and enable communication between regulators and targets often develop their own institutional and financial interests (Abbott *et al.* 2017). Following this logic, the higher occurrence of wealth defence features is explained through the mechanism that accountancy firms are more likely to market tax and legal innovation to larger clients because they are more lucrative. It could be argued that this relationship is not important because only few companies have a very large network of subsidiaries. Yet, such a claim disregards the fact, that those few companies amount for a large share of corporate wealth worldwide. According to the World Investment Report (Unctad 2016), less than one percent of transnationally operating companies have more than 100 subsidiaries. In terms of value added, however, these companies account for around 60 percent of all global value (Unctad 2016: p.134). It thus matters, whether or not large companies are enabled to decouple financial production from physical production.

Our results show that the Big Four are most likely a more efficient supplier of wealth defence strategies than their competitors. Yet, the relationship could go either way. It is imaginable that companies which pursue the goal to avoid taxes or seek legal protection turn to one of the Big Four auditor for advice. In this scenario, the profession of accountants is just a passive supplier, whereas the difference between the Big Four and other auditors in their clients ownership structure is explained by the motivation of the clients and the potentially higher efficiency in supply of the Big Four auditors. The image of neutrality which is perpetuated by the profession and the amplification of legal restrictions over the last decade provides support for a version of wealth defence mechanisms which are led by the companies' interests. Alternatively, it is imaginable that the Big Four are active drivers of the wealth defence industry by applying aggressive sales strategies and by marketing products across their network of clients. Considering the increasing pressures for commercialisation that the accountancy firms face and their capacity to collect and manage knowledge through 'centres of excellence', the possibility of accountancy firms to act as active drivers of the wealth defence industry can not be excluded.

In addition to the main findings, the control variables which were included in the models revealed further interesting results. First, the occurrence of wealth defence related features is higher amongst companies which are audited by more than one accountant. This relates to the literature on PSFs, which highlights that knowledge creation and innovation in the field of knowledge intensive services is dependent on interactions between business partners (Barrett and Hinings 2015). It is conceivable that either companies with multiple auditors are subject to more aggressive sales strategies, or that the coordination between auditors leads to an exchange of niche-expertise and thus to a knowledge-enhancement which facilitates the development of wealth defence plans. Second, the mixed model allowed for the detection of differences in intercept levels across countries. Examining the use of sink offshore jurisdictions, the analysis showed that GUOs, which are based in Bermuda, Cayman Islands or Hong-Kong, have a much higher initial use of sink OFCs in the network of their subsidiaries. This implies that setting up a GUO in a sink jurisdiction is an indication for generally higher wealth defence aggressiveness. Third, the use of wealth defence strategies differs across sectors. Most interesting is the prominence of companies in the mining sector for the use of sink OFCs. Mining companies have 54.9% more subsidiaries in sink jurisdictions than companies which belong to the electricity sector. This finding is in line with previous reports which have pointed at enhanced profit shifting practices of the extractive industry. The organisation 'Publish What You Pay' showed that the Indonesian government, as an example, bears high losses in revenues due to tax avoidance practices of companies in the mining sector (Saputra and Abdullah 2015). Whereas the resources are extracted in regions such as Indonesia, profits are channelled to jurisdictions which offer more advantageous conditions through the use of conduits commonly based in Europe. In fact, the largest mining companies finance their activities through the use of Dutch holding entities (Hartlief *et al.* 2015). The findings on the mining companies are thus related to questions regarding the distributional consequences of profit shifting activities at a global level.

The study faced several limitations regarding data quality and availability. The information about the companies and their auditors is only available for 9% of all GUOs. There is no argument pointing at a systematic over- or underrepresentation of companies with auditor information according to relevant characteristics, but the existence of a bias can not be excluded. Also, the results very likely show a lower boundary of the usage of offshore jurisdictions. Particularly sinks are marked through the provision of secrecy, which implies that disclosure requirements are often lower and thus, probably more subsidiaries in OFCs are used than the ones which are recorded in Orbis. Other data issues concern the quality of certain information, such as the number of employees per entity. Information on employees would have been useful to better specify the corporate features, for example to identify the so called 'mailbox companies'. Due to a low reliability of the data quality, this information was not used for the analyses. The same applies to the information on trusts. It would be highly relevant to do research on the usage of trusts as a vehicle for wealth protection by companies. However, the requirements for ownership disclosure are low for trusts in most jurisdictions, which is why this study could not exploit the data registered in Orbis.

Another limitation is that the analyses drew on the audit relationship between companies and accountancy firms. Ideally, the study would have made use of data on fees, indicating the services provided and the income generated for tax, consulting and audit services. The information which I draw the analyses on do not indicate whether or not the accountant provides tax and consulting services to their audit client, nor how high the importance is of the auditor in the provision of these services. There are a handful of studies which did make use of fee level data. Following the Enron scandal, the U.S. authorities requested the publication of financial information for accountancy firms (Maydew and Shackelford 2005; Hogan and Noga 2012). However, for more recent years and for most regions of the world, this type of data is not available. Interestingly, these studies found that the provision of tax services from auditors to their clients was declining. The fine-grained breakdown of fees paid to the auditor allowed them to show that companies have probably moved their tax work to other accountancy firms: tax-fees paid to one's auditor declined during the observed time (Maydew and Shackelford 2005). Combining this insight with our findings, which show that the Big Four do have an impact on their clients corporate structures, there is one option which presents itself, namely that there is a circulation of clients and wealth defence related services between the Big Four accountancy firms.

There are still many open questions to explore, I will here point out three of them. Following up on the quest to understand whether or not accountancy firms supply wealth defence strategies to their clients, it would be of interest to investigate the patterns of country combinations more in detail. The models on round-tripping practices did not reveal a significant difference between clients of the Big Four and clients of smaller auditors. Yet it is possible that this is due mainly to the level of measurement. In this case, analyses on particular combination looking at countries separately would reveal more insights. Moreover, this approach would allow to see whether PwC, Deloitte, EY and KPMG diffuse and protect their wealth defence innovation or whether they are spread through copying mechanisms.

Also, our study showed that companies with multiple auditors have a higher use of most wealth defence related features in their subsidiary network than companies with a single auditor. The fact that there is variation with regard to whether or not a company is audited by a single or by multiple auditors, opens up the door for questions regarding the interplay of suppliers spanning other actors within the wealth defence industry. It would be interesting to better understand how accountancy firms, bankers and lawyers compete against or cooperate with each other. As such it would be relevant to understand how the knowledge-exchange and interplay between those intermediaries results in a higher propensity for companies to build wealth defence strategies and shift wealth across borders.

And finally - turning the intermediary perspective around - it would be of interest to complement the company centred findings by looking at how accountancy firms use their intermediary position to influence the governmental side. Previous studies on regulatory intermediaries have highlighted the influence of intermediary firms in governance issues regarding international labour conditions or environmental standards (Green 2008). Similar questions could be asked regarding the influence of accountancy firms on policy changes which target the wealth defence strategies of companies or the offshore regimes of certain states.

Despite its limitations, this paper makes important contributions to an ongoing issue of societal and economic relevance. Accountancy firms uphold an image of neutrality and perpetuate a picture of an independent supervisory organ which contributes to economic stability. Evidence that this is only half of the story was provided by leaks, journalistic revelations and case studies over the last decade. Mediatised scandals have shown that some accountancy firms happened to act in their own interest or in the interest of their clients, rather than assuring economic stability as a public good. The most prominent of such examples emerged during the collapse of Enron, an U.S based energy giant who at the time was audited by Arthur Andersen. By looking at a database covering most companies worldwide, this study provided quantitative evidence that the involvement of auditors in the development of wealth defence strategies is not just the exception. It is a relationship which has a systematic component and holds across all of the Big

Four auditors. Moreover, the game seems to happen between the biggest players: the Big Four auditors and the largest companies.

Based on the findings of this study, I argue that not only the academic focus, but also the policy considerations about wealth defence, international tax avoidance and regulatory competition should pay more attention to the role of intermediaries. With the most recent proposal on transparency of intermediaries, the European commission is moving towards this direction. Estimating that tax avoidance practices costs public budgets for the EU around €50-70 billion (Dover *et al.* 2015), the commission requested intermediaries to report on the provision of services which are related to wealth defence strategies. Besides this, following Murphy and Saisholm (2017), I claim that intermediaries should move towards higher transparency levels with regard to their activities and to make public where they are located, how many people they employ and how their organisational and functional structure is set up. Ultimately, we should reconsider the prevalent dual conceptions: what is missed out when looking at wealth defence as an issue between states and companies? Maybe we miss just the supply side, but maybe we miss out on one of the main drivers of the ongoing wealth defence processes.

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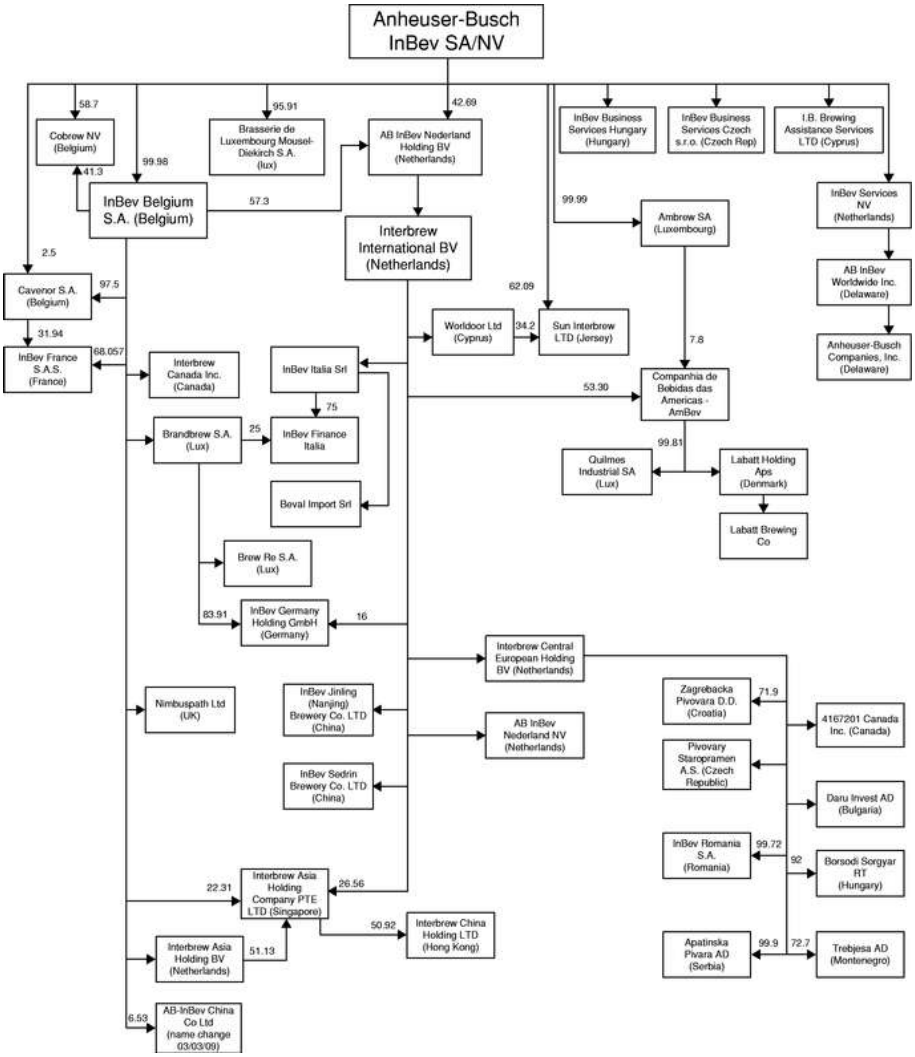
ANNEX

A - Example of a corporate structure: Anheuser InBev



Notes: Simplified scheme of the ownership structure of Anheuser InBev. The figure is provided by the SEC. https://www.sec.gov/Archives/edgar/data/1140467/000104746909008305/a2194526z20fr12b.htm

B - Classification of sOFC and cOFC jurisdictions

Table S3. Comparison of different rankings of countries. 'Dest.' corresponds to the value flowing into the jurisdiction. NN S_c corresponds to the non-normalized sink centrality.

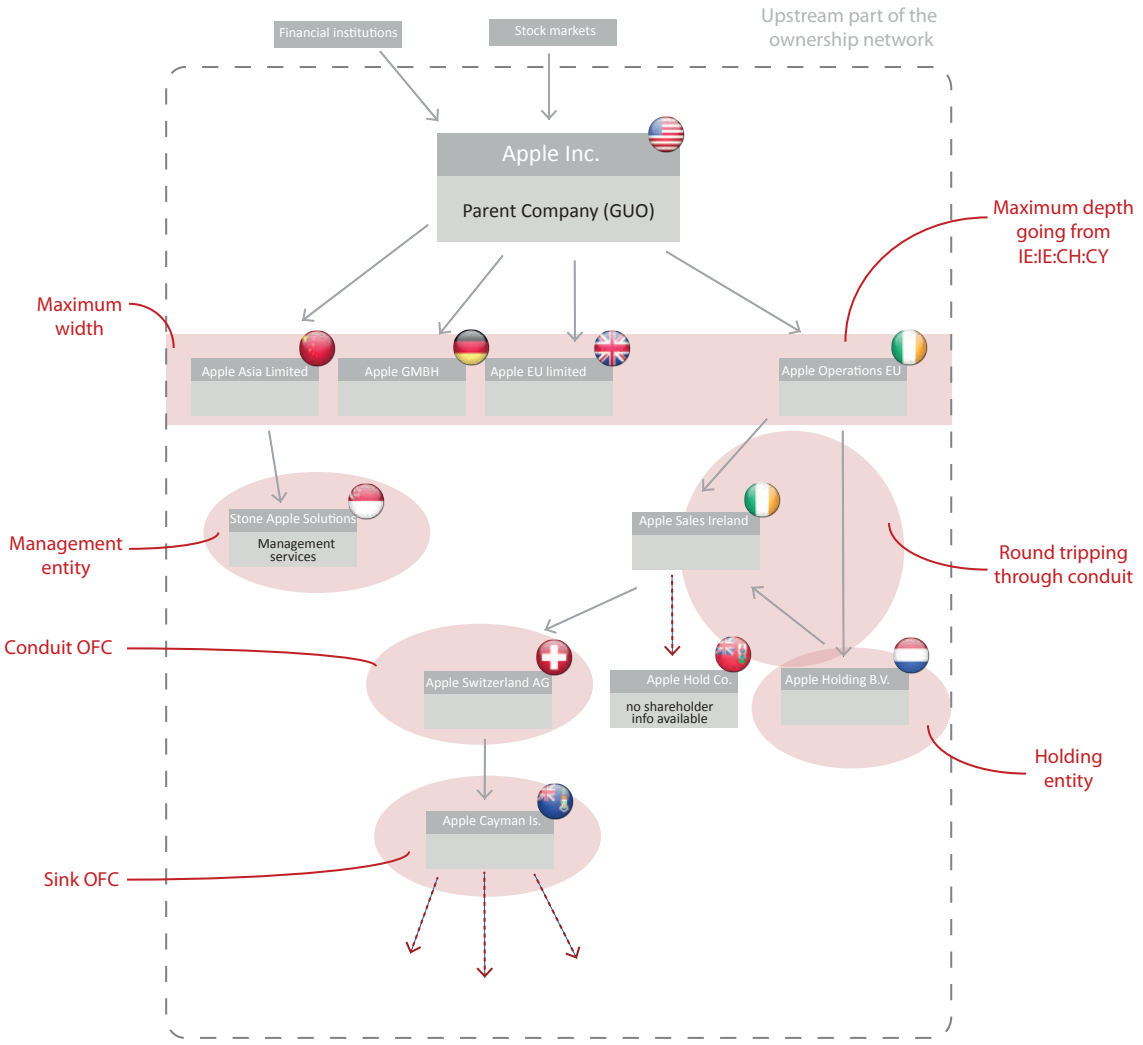
IMF2000 categories; 1: Non-cooperative 2: Below international standards 3: Generally cooperative. *The centrality of Belgium is based on an incorrect classification of one company by the data provider (see Supplementary Information)

	This study	Indicators		$Oxfam_{16}$	FSI_{15}	EU_{15}	IMF_{00}	IMF_{08}	Fichtner
	sink-OFC	Dest.	NN S_c						
Luxembourg	1	$3.2 \cdot 10^{12}$	$8.1 \cdot 10^{11}$	7	6		3	x	5
Hong Kong	2	$1.9 \cdot 10^{12}$	$7.4 \cdot 10^{11}$	9	2		3	x	14
British Virgin Isl.	3	$1.3 \cdot 10^{12}$	$9.4 \cdot 10^{11}$	15	21	x	1	x	1
Bermuda	4	$1.1 \cdot 10^{12}$	$4.1 \cdot 10^{11}$	1	34	x	2	x	3
Cyprus	5	$8.9 \cdot 10^{11}$	$2.8 \cdot 10^{11}$	10	35		1	x	7
Cayman Islands	6	$7.3 \cdot 10^{11}$	$1.5 \cdot 10^{11}$	2	5	x	1	x	2
Jersey	7	$5.5 \cdot 10^{11}$	$4.6 \cdot 10^{11}$	12	16		3	x	11
Taiwan	8	$3.8 \cdot 10^{11}$	$2.3 \cdot 10^{11}$						
Malta	9	$1.7 \cdot 10^{11}$	$1.7 \cdot 10^{11}$		27		2	x	
Mauritius	10	$1.6 \cdot 10^{11}$	$1.6 \cdot 10^{11}$	14	23		1		8
Liechtenstein	11	$1.6 \cdot 10^{11}$	$1.4 \cdot 10^{11}$		36		1	x	
Curaçao	12	$1.5 \cdot 10^{11}$	$6.5 \cdot 10^{10}$	8	70		1	x	6
Bahamas	13	$9.2 \cdot 10^{10}$	$6.5 \cdot 10^{10}$	11	25	x	1	x	9
Samoa	14	$5.7 \cdot 10^{10}$	$3.7 \cdot 10^{10}$		51		1	x	4
Gibraltar	15	$4.9 \cdot 10^{10}$	$1.3 \cdot 10^{10}$		55		2	x	12
Marshall Islands	16	$2.3 \cdot 10^{10}$	$3.7 \cdot 10^{9}$		14		1	x	
Monaco	17	$1.5 \cdot 10^{10}$	$1.3 \cdot 10^{10}$		76	x	2	x	
Liberia	18	$1.4 \cdot 10^{10}$	$6.2 \cdot 10^{9}$		33		x		
Seychelles	19	$1.2 \cdot 10^{10}$	$1.2 \cdot 10^{10}$		72		1	x	
Belize	20	$1.2 \cdot 10^{10}$	$1.1 \cdot 10^{10}$		60	x	1	x	
Guyana	21	$8.1 \cdot 10^{9}$	$8.1 \cdot 10^{9}$						
St Vincent & Gren.	22	$2.2 \cdot 10^{9}$	$2.0 \cdot 10^{9}$		64	x	1	x	
Nauru	23	$1.6 \cdot 10^{9}$	$1.6 \cdot 10^{9}$				1	x	
Anguilla	24	$1.0 \cdot 10^{9}$	$9.3 \cdot 10^{8}$		63	x	1	x	
	conduit-OFC	Non normalized $\overline{C_c}$							
Netherlands	1	$5.3 \cdot 10^{11}$		3	41				15
United Kingdom	2	$2.2 \cdot 10^{12}$			15		x		21
Switzerland	3	$7.9 \cdot 10^{10}$		4	1		3	x	17
Ireland	4	$4.6 \cdot 10^{10}$		6	37		3	x	16
Singapore	5	$4.0 \cdot 10^{10}$		5	4		3	x	20
Belgium*	Small	$2.6 \cdot 10^{11}$			38				19
Panama	Small	$1.6 \cdot 10^{9}$			13	x	1	x	
Guernsey	Small	$9.6 \cdot 10^{8}$			17	x	3	x	10
	non-OFCs								
Barbados				13	22	x	2	x	13
Antigua & Barbuda					65	x	1	x	
Grenada					82	x	x	x	
Montserrat					92	x	x	x	
St. Kitts and Nevis					69	x	1	x	
Turks & Caicos Isl.					68	x	1	x	
US Virgin Islands					50	x			

Table is retrieved from:

Garcia-Bernardo, J., Fichtner, J., Heemskerk E. M. & Takes F. W. (in press). Uncovering Offshore Financial Centers: Conduits and Sinks in the Global Corporate Ownership Network. *Scientific Reports 7.* Retrieved from https://arxiv.org/abs/1703.03016

D - Corporate features related to wealth defence



Notes: Schematic example of Apple Inc. representing the features of wealth defence which are examined in this study. Information from Orbis (2015). All offices are registered in Orbis. The ownership relations represent an approximation.

E - Regression tables of all models

Multivariate regression on number of conduit OFC subsidiaries

Number of cOFC subsidiaries per GUO	**Model A** Coefficent (se)	**Model B** Coefficent (se)
Other Auditors		*ref*
Big Four	0.23**	-0.45**
	(0.01)	(0.02)
Single Auditors		*ref*
Multiple Auditors	0.04**	0.05**
	(0.01)	(0.01)
Size of GUO	0.35**	0.14**
	(0.01)	(0.01)
Age of GUO	0.16**	0.13**
	(0.01)	(0.01)
Electricity		*ref*
Administrative and support services	0.20**	0.22**
	(0.04)	(0.04)
Construction	0.06	0.08*
	(0.04)	(0.04)
Financial and insurance activities	0.17**	0.20**
	(0.04)	(0.03)
Information and communication	0.24**	0.26**
	(0.04)	(0.04)
Manufacturing	0.20**	0.22**
	(0.03)	(0.03)
Mining and quarrying	0.13**	0.16**
	(0.04)	(0.04)
Other activities (regrouped)	0.11**	0.14**
	(0.04)	(0.04)
Real estate activities	0.04	0.06
	(0.04)	(0.04)
Retail trade	0.12**	0.13**
	(0.04)	(0.04)
Professional, scientific and technical activities	0.18**	0.21**
	(0.04)	(0.04)
Transportation and storage	0.21**	0.21**
	(0.04)	(0.04)
Big Four X Size		0.39**
		(0.01)
Constant	-0.77**	-0.43**
	(0.05)	(0.05)
sd(country)	0.26**	0.25**
	(0.02)	(0.02)
sd(_cons)	0.60**	0.58**
	(0.00)	(0.00)

N=28725

p <0.05*, p< 0.01**

Source: Orbis

Notes: Number of subsidiaries in sOFC excludes the country of the Global Ultimate Owner

Multivariate regression on number of holding subsidiaries

Number of holding subsidiaries per GUO	**Model A** Coefficent (se)	**Model B** Coefficent (se)
Other Auditors	*ref*	
Big Four	0.07**	-0.40**
	(0.01)	(0.02)
Single Auditors	*ref*	
Multiple Auditors	0.02*	0.03**
	(0.01)	(0.01)
Size of GUO	0.39**	0.23**
	(0.01)	(0.01)
Age of GUO	0.01	0.00
	(0.01)	(0.01)
Electricity	*ref*	
Administrative and support services	-0.02	-0.00
	(0.03)	(0.03)
Construction	-0.03	-0.02
	(0.03)	(0.03)
Financial and insurance activities	0.59**	0.61**
	(0.03)	(0.03)
Information and communication	-0.04	-0.02
	(0.03)	(0.03)
Manufacturing	0.03	0.04
	(0.03)	(0.03)
Mining and quarrying	0.04	0.05
	(0.03)	(0.03)
Other activities (regrouped)	-0.01	0.00
	(0.03)	(0.03)
Real estate activities	0.00	0.02
	(0.03)	(0.03)
Retail trade	-0.05	-0.04
	(0.03)	(0.03)
Professional, scientific and technical activities	0.02	0.04
	(0.03)	(0.03)
Transportation and storage	-0.04	-0.04
	(0.03)	(0.03)
Big Four X Size		0.25**
		(0.01)
Constant	-0.63**	-0.37**
	(0.03)	(0.04)
sd(country)	0.17**	0.17**
	(0.02)	(0.02)
sd(_cons)	0.44**	0.43**
	(0.00)	(0.00)

N=28725
p <0.05*, p< 0.01**
Source: Orbis
Notes: Number of subsidiaries in sOFC excludes the country of the Global Ultimate Owner

Multivariate regression on number of management subsidiaries

Number of management subsidiaries per GUO	**Model A** Coefficent (se)	**Model B** Coefficent (se)
Other Auditors		*ref*
Big Four	0.05**	-0.48**
	(0.01)	(0.02)
Single Auditors		*ref*
Multiple Auditors	0.01	0.02*
	(0.01)	(0.01)
Size of GUO	0.41**	0.24**
	(0.01)	(0.01)
Age of GUO	0.00	-0.00
	(0.01)	(0.01)
Electricity		*ref*
Administrative and support services	0.12**	0.13**
	(0.03)	(0.03)
Construction	-0.02	-0.00
	(0.03)	(0.03)
Financial and insurance activities	0.06*	0.09**
	(0.03)	(0.03)
Information and communication	0.07*	0.09**
	(0.03)	(0.03)
Manufacturing	0.02	0.03
	(0.03)	(0.03)
Mining and quarrying	-0.02	-0.01
	(0.03)	(0.03)
Other activities (regrouped)	0.00	0.02
	(0.03)	(0.03)
Real estate activities	0.02	0.04
	(0.03)	(0.03)
Retail trade	-0.02	-0.01
	(0.03)	(0.03)
Professional, scientific and technical activities	0.55**	0.57**
	(0.03)	(0.03)
Transportation and storage	-0.00	0.00
	(0.03)	(0.03)
Big Four X Size		0.28**
		(0.01)
Constant	-0.67**	-0.38**
	(0.03)	(0.04)
sd(country)	0.16**	0.15**
	(0.01)	(0.01)
sd(_cons)	0.45**	0.44**
	(0.00)	(0.00)

N=28725
p <0.05*, p< 0.01**
Source: Orbis
Notes: Number of subsidiaries in sOFC excludes the country of the Global Ultimate Owner

Multivariate regression on depth of subsidiary network

Max depth in subsidiary network	**Model A** Coefficent (se)	**Model B** Coefficent (se)
Other Auditors		*ref*
Big Four	-0.01**	-0.02**
	(0.00)	(0.01)
Single Auditors		*ref*
Multiple Auditors	-0.01**	-0.01**
	(0.00)	(0.00)
Size of GUO	0.17**	0.16**
	(0.00)	(0.00)
Age of GUO	0.00	0.00
	(0.00)	(0.00)
Electricity		*ref*
Administrative and support services	0.02**	0.02**
	(0.01)	(0.01)
Construction	0.01	0.01
	(0.01)	(0.01)
Financial and insurance activities	0.01	0.01
	(0.01)	(0.01)
Information and communication	0.04**	0.04**
	(0.01)	(0.01)
Manufacturing	0.05**	0.05**
	(0.01)	(0.01)
Mining and quarrying	0.06**	0.06**
	(0.01)	(0.01)
Other activities (regrouped)	-0.00	-0.00
	(0.01)	(0.01)
Real estate activities	0.00	0.00
	(0.01)	(0.01)
Retail trade	0.04**	0.04**
	(0.01)	(0.01)
Professional, scientific and technical activities	0.02*	0.02*
	(0.01)	(0.01)
Transportation and storage	0.00	0.00
	(0.01)	(0.01)
Big Four X Size		0.01*
		(0.00)
Constant	-0.07**	-0.07**
	(0.01)	(0.01)
sd(country)	0.04**	0.04**
	(0.00)	(0.00)
sd(_cons)	0.12**	0.12**
	(0.00)	(0.00)

N=28725

p <0.05*, p< 0.01**

Source: Orbis

Notes: Number of subsidiaries in sOFC excludes the country of the Global Ultimate Owner

Multivariate regression on width of subsidiary network

Max width in subsidiary network	**Model A** Coefficent (se)	**Model B** Coefficent (se)
Other Auditors		*ref*
Big Four	0.01**	-0.09**
	(0.00)	(0.00)
Single Auditors		*ref*
Multiple Auditors	0.00	0.00
	(0.00)	(0.00)
Size of GUO	0.82**	0.79**
	(0.00)	(0.00)
Age of GUO	-0.01*	-0.01**
	(0.00)	(0.00)
Electricity		*ref*
Administrative and support services	-0.02*	-0.01
	(0.01)	(0.01)
Construction	-0.01	-0.01
	(0.01)	(0.01)
Financial and insurance activities	-0.01	-0.01
	(0.01)	(0.01)
Information and communication	-0.03**	-0.03**
	(0.01)	(0.01)
Manufacturing	-0.04**	-0.03**
	(0.01)	(0.01)
Mining and quarrying	-0.04**	-0.04**
	(0.01)	(0.01)
Other activities (regrouped)	0.01	0.01
	(0.01)	(0.01)
Real estate activities	0.00	0.00
	(0.01)	(0.01)
Retail trade	-0.02**	-0.02**
	(0.01)	(0.01)
Professional, scientific and technical activities	-0.02*	-0.01
	(0.01)	(0.01)
Transportation and storage	-0.00	-0.00
	(0.01)	(0.01)
Big Four X Size		0.05**
		(0.00)
Constant	-0.74**	-0.68**
	(0.01)	(0.01)
sd(country)	0.04**	0.04**
	(0.00)	(0.00)
sd(_cons)	0.10**	0.10**
	(0.00)	(0.00)

N=28725

p <0.05*, p< 0.01**

Source: Orbis

Notes: Number of subsidiaries in sOFC excludes the country of the Global Ultimate Owner

Multivariate regression on number of round-tripping in network of subsidiaries

Number of round-tripping per GUO	**Model A** Coefficent (se)	**Model B** Coefficent (se)
Other Auditors		*ref*
Big Four	0.00	-0.00
	(0.00)	(0.01)
Single Auditors		*ref*
Multiple Auditors	0.00	0.00
	(0.00)	(0.00)
Size of GUO	0.01**	0.01**
	(0.00)	(0.00)
Age of GUO	-0.01	-0.01
	(0.00)	(0.00)
Electricity		*ref*
Administrative and support services	-0.01	-0.01
	(0.01)	(0.01)
Construction	0.01	0.01
	(0.01)	(0.01)
Financial and insurance activities	-0.00	-0.00
	(0.01)	(0.01)
Information and communication	-0.00	-0.00
	(0.01)	(0.01)
Manufacturing	-0.01	-0.01
	(0.01)	(0.01)
Mining and quarrying	0.01	0.01
	(0.01)	(0.01)
Other activities (regrouped)	-0.01	-0.01
	(0.01)	(0.01)
Real estate activities	-0.01	-0.01
	(0.01)	(0.01)
Retail trade	-0.00	-0.00
	(0.01)	(0.01)
Professional, scientific and technical activities	-0.01	-0.01
	(0.01)	(0.01)
Transportation and storage	0.01	0.01
	(0.01)	(0.01)
Big Four X Size		0.00
		(0.00)
Constant	-0.01	-0.01
	(0.01)	(0.01)
sd(country)	0.01**	0.01**
	(0.00)	(0.00)
sd(_cons)	0.12**	0.12**
	(0.00)	(0.00)

N=28725

p <0.05*, p< 0.01**

Source: Orbis

Notes: Number of subsidiaries in sOFC excludes the country of the Global Ultimate Owner

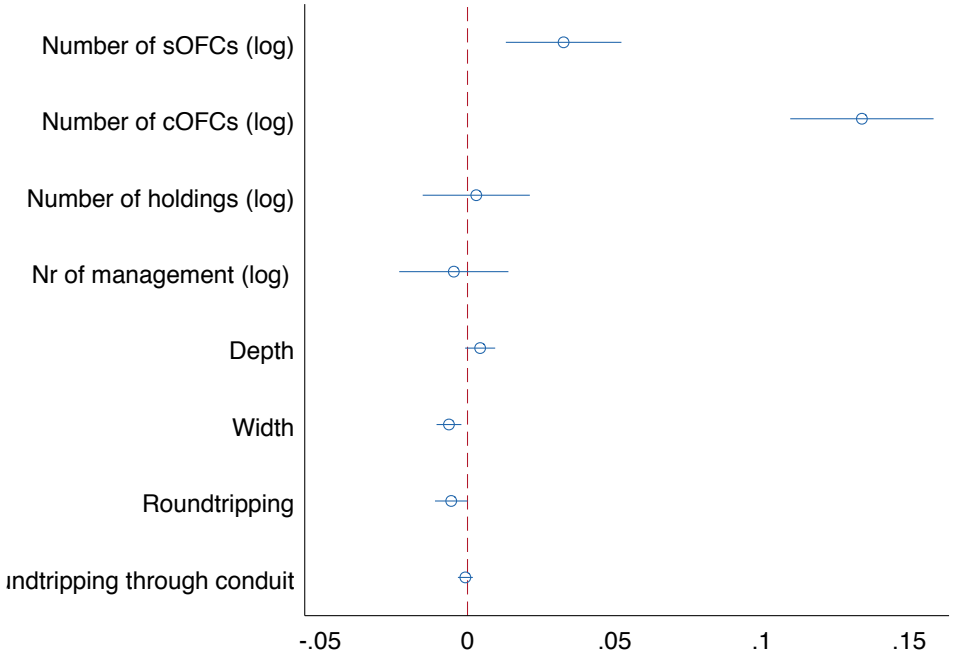
Multivariate regression on number of round-tripping through conduit in subsidiary network

Number of conduit round-tripping per GUO	**Model A** Coefficent (se)	**Model B** Coefficent (se)
Other Auditors		*ref*
Big Four	0.00	-0.00
	(0.00)	(0.01)
Single Auditors		*ref*
Multiple Auditors	0.00	0.00
	(0.00)	(0.00)
Size of GUO	0.00**	0.01**
	(0.00)	(0.00)
Age of GUO	-0.00	-0.01
	(0.00)	(0.00)
Electricity		*ref*
Administrative and support services	0.00	-0.01
	(0.00)	(0.01)
Construction	0.00	0.01
	(0.00)	(0.01)
Financial and insurance activities	0.00	-0.00
	(0.00)	(0.01)
Information and communication	0.00	-0.00
	(0.00)	(0.01)
Manufacturing	0.00	-0.01
	(0.00)	(0.01)
Mining and quarrying	0.00	0.01
	(0.00)	(0.01)
Other activities (regrouped)	0.00	-0.01
	(0.00)	(0.01)
Real estate activities	0.00	-0.01
	(0.00)	(0.01)
Retail trade	0.01	-0.00
	(0.00)	(0.01)
Professional, scientific and technical activities	0.00	-0.01
	(0.00)	(0.01)
Transportation and storage	0.00	0.01
	(0.00)	(0.01)
Big Four X Size		0.00
		(0.00)
Constant	-0.01	-0.01
	(0.00)	(0.01)
sd(country)	0.00**	0.01**
	(0.00)	(0.00)
sd(_cons)	0.06**	0.12**
	(0.00)	(0.00)

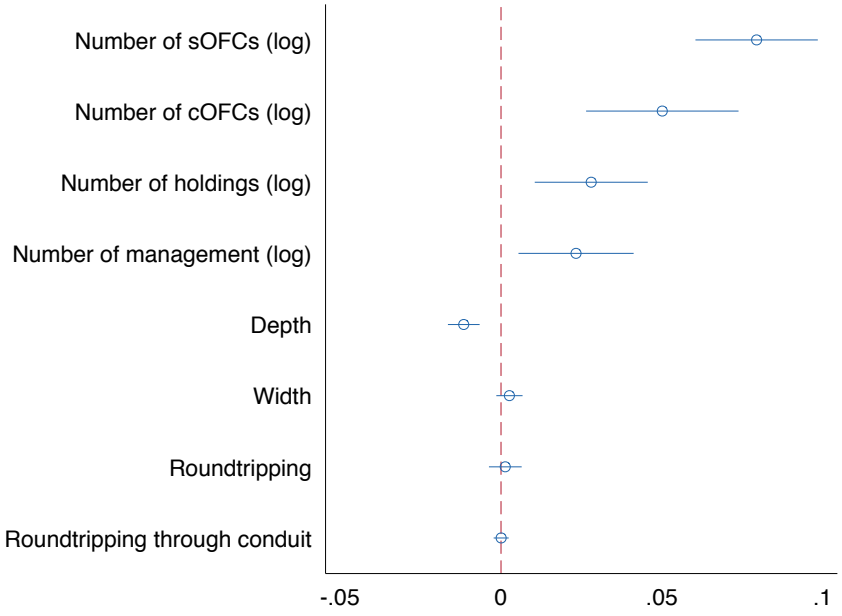
N=28725
p <0.05*, p< 0.01**
Source: Orbis
Notes: Number of subsidiaries in sOFC excludes the country of the Global Ultimate Owner

F - Coefficient plots for age and multiple auditors on all corporate features

Effect of age on features of corporate structure

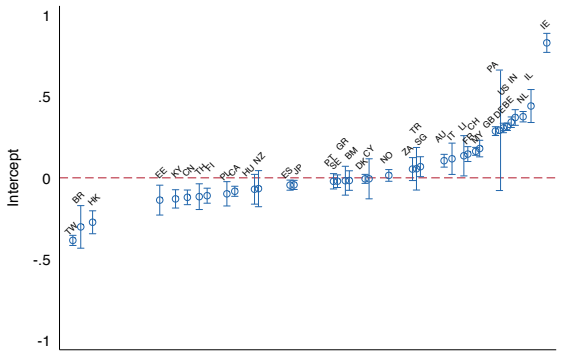


Effect of multiple auditors on features of corporate structure

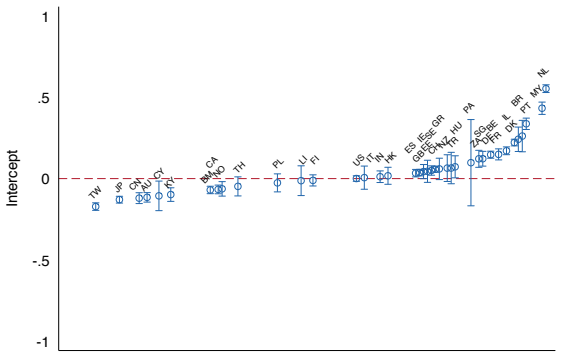


G - Caterpillarplots on country intercepts

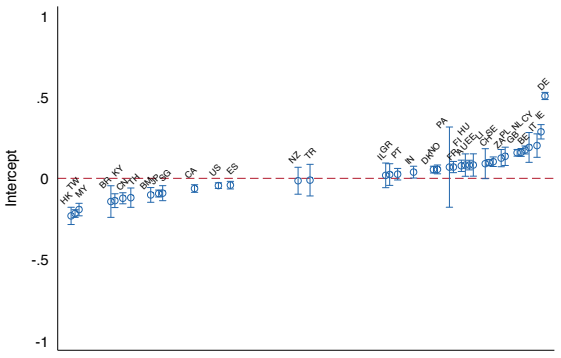
Number of cOFC subsidiaries



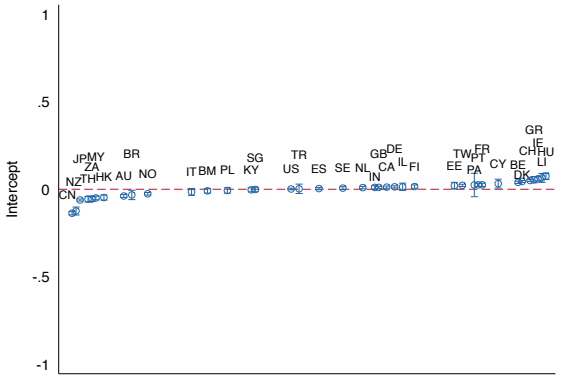
Number of holding subsidiaries



Number of management subsidiaries



Depth of subsidiary network



Width of subsidiary network