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Cluster Internationalization to Tax Havens by Multinational Enterprises: An Exploration of Imitative Behaviour

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ABSTRACT

This paper explores the factors that influence the internationalization of multinational enterprises (MNEs) from clusters, with a particular focus on the use of tax havens. *Institutional Theory* is used as our theoretical framework, with mimetic isomorphism highlighted as a primary mechanism connecting cluster characteristics to MNE internationalization. By analyzing firm-level data for the UK and Germany from 2008-2019, we show that institutional features within clusters—such as imitation, the co-location of professional services, and industrial concentration—facilitate this form of internationalization. Furthermore, the findings improve research on cluster internationalization, indicating that the imitation effect is amplified by firm leadership and experience.

1. Introduction

This paper examines the characteristics of clusters that motivate firms to internationalize. Clusters have evolved into powerful drivers of globalization, attracting significant inflows of foreign direct investment (FDI) and enabling multinational enterprises (MNEs) within them to expand their operations abroad through outward FDI (OFDI) (Amdam, Lunnan, Bjarnar, & Halse, 2020; Porter, 2000; Porter & Miranda, 2009). Existing research has adopted numerous perspectives in its examination as to what contributes to the internationalization of firms within clusters (Amdam et al., 2020). Firms who are part of a cluster benefit from both cluster-level tangible and intangible resources that facilitate firms' internationalization motives (Bröcker, Dohse, & Soltwedel, 2003; Cook, Pandit, Lööf, & Johansson, 2012; Porter & Miranda, 2009; Zucchella, Palamara, & Denicolai, 2007). Clusters also foster co-localization and co-opetition, grounded in mutual trust and tacit norms, which enhance information flow and knowledge exchange (Hertenstein, Sutherland, & Anderson, 2017; Porter, 2000). This implies a potential convergence in business strategy among firms within the same cluster.

Firms within clusters are influenced by the unique institutional characteristics of their geographic area, which not only shapes the cluster's overall identity but also intensifies the motivation to internationalize (Bell, 2005; Staber & Sautter, 2011). Amdam et al. (2020) emphasize that the drive for accelerated internationalization within clusters stems from the close geographic proximity of firms, which fosters frequent social interactions and allows for peer observation, collaboration, and cognitive imitation among members. The literature indicates that the cluster environment plays a significant role in driving firm internationalization, with most studies highlighting the positive effects primarily through collaboration and networking. We expand this perspective by providing evidence that, in addition to collaboration, competitive pressures within clusters also fosters imitation among firms.

Building on the understanding of how cluster dynamics influence firms' motivations to internationalize, it is also crucial to consider the unique forms that internationalization can take within clusters. The International Business (IB) literature, however, provides limited insights into specific OFDI types that firms located in clusters pursue. Beyond the traditional FDI motives, one notable form of FDI is the use of tax havens by MNEs, which enables profit shifting to low-tax jurisdictions (Temouri, Nardella, Jones, & Brammer, 2021) and offers "secrecy" services to protect owners' interests (Buckley et al., 2015). Recent studies further emphasize that institutions significantly shape firm behaviour in their use of tax havens (Jones & Temouri, 2016; Jones, Temouri, Kirollos, & Du, 2023).

However, there is little systematic evidence as to how local-level institutions in clusters affect firm internationalization into tax havens. This is surprising given that this type of internationalization has become a widespread concern in recent years (Kemme, Parikh, & Steigner, 2020;

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Temouri et al., 2021). Tørsløv, Wier and Zucman (2023) estimate that 36 percent of MNE profits were shifted to tax havens in 2015. According to the Tax Justice Network (2023), countries worldwide lose approximately US$480 billion to tax havens, with corporate tax losses of approximately US$311 billion. Tax Justice Network, (2023) also estimates that the world is on course to lose around US$4.8 trillion over the next decade if effective tax policies are not in place.

Focusing on the use of tax havens as a specific type of firm internationalization from clusters, we seek to address the following research questions: (1) Do firms in clusters internationalize to a greater extent than firms outside of clusters? (2) What mechanisms and characteristics within a cluster drive firms to internationalize? To address these questions, we employ Institutional Theory as our primary theoretical framework, with a particular emphasis on mimetic isomorphism. This perspective suggests that firms within clusters tend to adopt similar structures, practices, and behaviours in response to institutional pressures, aligning with the norms and strategies of their peers (Dacin, 1997; DiMaggio & Powell, 1983; Fennell, 1980; Haveman, 1993). Through this lens, we argue that the cluster environment not only shapes firms' international strategies but also reinforces patterns of imitation, leading to a convergence of behaviours that support their competitive and international ambitions.

From the firm perspective, mimetic isomorphism is a process in which firms in a population resemble one another, especially when they face an ambiguous or uncertain environment. Although a firm's tax affairs are typically internalized (Jones & Temouri, 2016), clusters often provide firms with the opportunity to collaborate in a normative isomorphic sense (Barreto & Baden-Fuller, 2006; Tan et al., 2013), and to interact with a variety of stakeholders such as their customers, suppliers, regulators, and competitors (Aguilera, Crespí-Cladera, Infantes, & Pascual-Fuster, 2020). We conjecture that mimetic isomorphism acts as a mechanism, through which firms in clusters observe the prevailing practices of their peers and use them as reference points in their decision-making processes to shape their own tax affairs. This learning can occur through informal networks such as professional associations or chambers of commerce, where executives exchange insights and industry-specific knowledge (DiMaggio & Powell, 1983; Tan et al., 2013). Additionally, knowledge transfer may be facilitated by the "revolving doors" phenomenon, where finance directors and tax specialists move between consultancy, tax advisory positions, and regulatory compliance, further disseminating expertise within their field.

Recently, a literature has emerged in accounting and economics that examines "peer" or "imitation effects" of tax planning at the firm level, whereby firms consider tax strategies deployed by their competitors (Armstrong, Glaesner, & Kepler, 2019). Evidence suggests that firms follow the degree of tax avoidance by their peers in geographic space (Kelchtermans, Neicu, & Teirlinck, 2020; Liang, Li, Lu, & Shan, 2021). This hints at an important, yet under-researched role of the cluster environment, as a location where "herding" or "bandwagon" effects (Abrahamson & Rosenkopf, 1993), in terms of cluster internationalization, dominate.

Our study makes three key contributions to the literature. First, it provides a unique perspective on an understudied context by presenting a comprehensive framework for understanding cluster internationalization. We respond to the call by Amdam et al. (2020, p.10) that "more research is needed to examine other clusters' claims and their implications for firm actions". We identify cluster-specific factors that drive MNEs to internationalize to tax havens, namely imitation, the availability of professional services providers, and the degree of industrial concentration. These results enrich our current understanding of how clusters form institutional pressures that drive and influence various types of internationalization.

Second, our study extends existing research on cluster internationalization by examining a specific form of firm internationalization: the use of tax havens. This study links the cluster environment to the unique ways in which firms pursue internationalization. Unlike more conventional FDI types, tax haven use is highly secretive and challenging to observe, making it more difficult for firms outside of clusters to replicate. We argue that clusters foster closer inter-firm connections than non-cluster locations, facilitating the indirect sharing of tacit knowledge—even about sensitive tax haven strategies—which then becomes known and imitated. Through this lens, we highlight mimetic isomorphism as a key mechanism of cluster internationalization, where MNEs within clusters adopt each other's practices, even in contexts as confidential as tax haven strategy. Additionally, we identify cluster-specific amplifiers of this imitative behaviour, including the co-location of professional service providers and what we term the "amplification effect" of leadership and experience.

Third, while the current literature on cluster internationalization is mostly qualitative in nature and based on case studies (Amdam et al., 2020; Barreto & Baden-Fuller, 2006), we use unique firm-level datasets to test our theoretical predictions for the UK and Germany. We set up our empirical analysis into three stages. In the first stage, we demonstrate that MNEs located in clusters are significantly more likely to use tax havens compared to MNEs outside of clusters. However, there is some heterogeneity in the relationship, with variation between the results for the UK and German samples. In the second stage, we shed light on the cluster-specific factors (i.e., imitation, co-location of professional services, and market power) that drive MNEs' internationalization into tax havens. In the third stage, we further examine the role of market power in driving firms' imitation in terms of internationalization, showing that smaller and less experienced MNEs within clusters tend to mimic the strategies of the largest and most established MNEs. This result is robust across the UK and Germany and indicative of the "herd-like" behavior between firms or "bandwagon" effects predicted by our theory.

2. Theory and literature

Recently, empirical evidence has emerged to show that cluster membership has a significant effect on firms' internationalisation through access to collaborative networks and social cues (Amdam et al., 2020; Porter & Miranda, 2009; Zucchella et al., 2007). The collective identity of a geographically defined region, such as a cluster, can positively influence firms' external communication (Li & Bathelt, 2018). Social cues in clusters are defined as "the shared understanding of the basic industrial, technological, social, and institutional features of a cluster" (Staber & Sautter, 2011, p. 1350). At the same time, internationalization efforts are regarded as collaborative arrangements in which firms make commitments to other firms and share their identities, and therefore the internationalization process is highly socialized (Aharoni, Tihanyi, & Connelly, 2011; Wang, Yao, & Li, 2022).

Following Dunning's (2000) work, the study of FDI into clusters has gathered pace. Clusters are traditionally viewed as magnets for inward foreign direct investment, benefiting from resource pooling and knowledge spillovers. On the other hand, several recent studies have highlighted that the advantages inherent in clusters create a fertile environment that can stimulate increased outward foreign direct investment (Cook et al., 2012; Hertenstein et al., 2017). Yet, the empirical evidence on the link between clusters and firm internationalization remains scarce and much remains unknown about cluster identity characteristics and OFDI. Amdam et al. (2020) serves as a notable exception in this regard.

The use of tax havens is a specific type of OFDI that enables MNEs to take advantage of the complexity of the international system of corporate taxation to maximise the after-tax return to the firm's owners (Kemme et al., 2020). By engaging in transfer pricing techniques and the use of tax avoidance schemes, as well as navigating around complex tax legislation and accounting rules across countries, firms are assumed to be performing their fiduciary duty (Eden, 1998). Tax haven FDI is different from conventional FDI because this type of firm internationalization is highly secretive in general and can affect a firm's reputation. Furthermore, tax haven FDI may not be value-adding in the normal

sense (i.e. efficiency and productivity gains). Instead, tax haven FDI is implemented to boost firms' profitability and bring higher shareholder value, which is a different measure of firm performance (Eden, 1998; Eden, 2024). Nevertheless, literature on clusters has yet to investigate mechanisms, factors, and amplification effects behind the internationalization of MNEs from clusters in terms of their imitative behavior in the domain of taxation, and in particular the controversial use of tax havens. This gap in the literature highlights the need for a more in-depth exploration of how institutional forces within clusters encourage firms to adopt tax haven strategies observed among their peers, ultimately increasing the prevalence of these practices in cluster environments.

Fig. 1 shows our conceptual framework that is set out in three stages to operationalize our hypotheses and map them to our empirical strategy. In the first stage, we start by discussing the direct and positive link between cluster membership and tax haven use, which is motivated by the literature on firm internationalization in clusters (Amdam et al., 2020). This forms the basis for Hypothesis 1 and our first empirical test. Hence, at this point, we build into our framework insights from the theoretical literature on institutions, and particularly the lens of mimetic isomorphism.

This leads to the second stage of our model where we motivate how imitation can occur in this context. At the cluster level, we also predict other salient components stemming from the institutional environment of a cluster which influence firm behaviour. The first is the availability of professional services providers in the cluster, such as tax advisors and consultants, that firms are able to interact and collaborate with. We also argue that the professional services providers in clusters amplify the imitation effect. The second is the market power of firms within the cluster. One would expect that market leaders and dominant firms within the cluster drive this type of activity.

In the third stage of our conceptual framework, this leadership is expected to result in "herd-like" behaviour or "bandwagon" effects, as outlined in our market power prediction in the second stage. In this case, smaller and less experienced firms are argued to imitate the market leaders. Hence, we propose the amplification effect of leadership and experience. In the ensuing discussion, we set out the theory sequentially and formulate our hypotheses.

2.1. Cluster firms and internationalization into tax havens

Clusters are defined as "geographically proximate groups of interconnected firms and associated institutions in a particular field, linked by commonalities and complementarities" (Porter, 2000, p. 254). According to Institutional Theory, firms operating in ecosystems with similar institutional structures will adopt homogeneous forms of behaviour (Dacin, 1997; DiMaggio, 1988; DiMaggio & Powell, 1983). Being in homogeneous groups enhances companies' stability and survival, facilitating institutional legitimacy (Martínez-Ferrero & García-Sánchez, 2017). Recent literature has put much emphasis on the collaborative aspect of firm internationalization from clusters (Amdam et al., 2020; Felzensztein, Deans, & Dana, 2019). Co-location provides firms with opportunities to establish social attachments with their peers (Aharoni et al., 2011; Bröcker et al., 2003), facilitating access to "collective international knowledge" (Zucchella et al., 2007, p. 270), and hence helping firms to overcome any limitations in their capabilities and resources to conduct business in international markets (Andersson, Forsgren, & Holm, 2002).

Institutional Theory offers a mechanism, namely mimetic isomorphism, through which firms can achieve or maintain legitimacy by emulating the decisions of others (DiMaggio & Powell, 1983; Meyer & Rowan, 1977). Under the institutional pressure of a network, firms mimic each other to reduce uncertainty and legitimize their own practices (Algarni, Ali, Leal-Rodríguez, Albort-Morant, 2023). Firms located in clusters share a common knowledge base and expertise, and hence, are more effectively able to observe, understand, and imitate the actions of others (Child, Karmowska, & Shenkar, 2022). At the same time, clusters act as learning networks (Du and Vanino, 2021; Kelchtermans et al., 2020), and firms accumulate information from their peers (Jankowska, Götz, & Główka., 2017). Over time, imitative learning among members of the cluster leads to the creation of new knowledge, which bestows higher strategic flexibility and the ability to respond more swiftly to market conditions (Du & Vanino, 2020; Jankowska et al.,

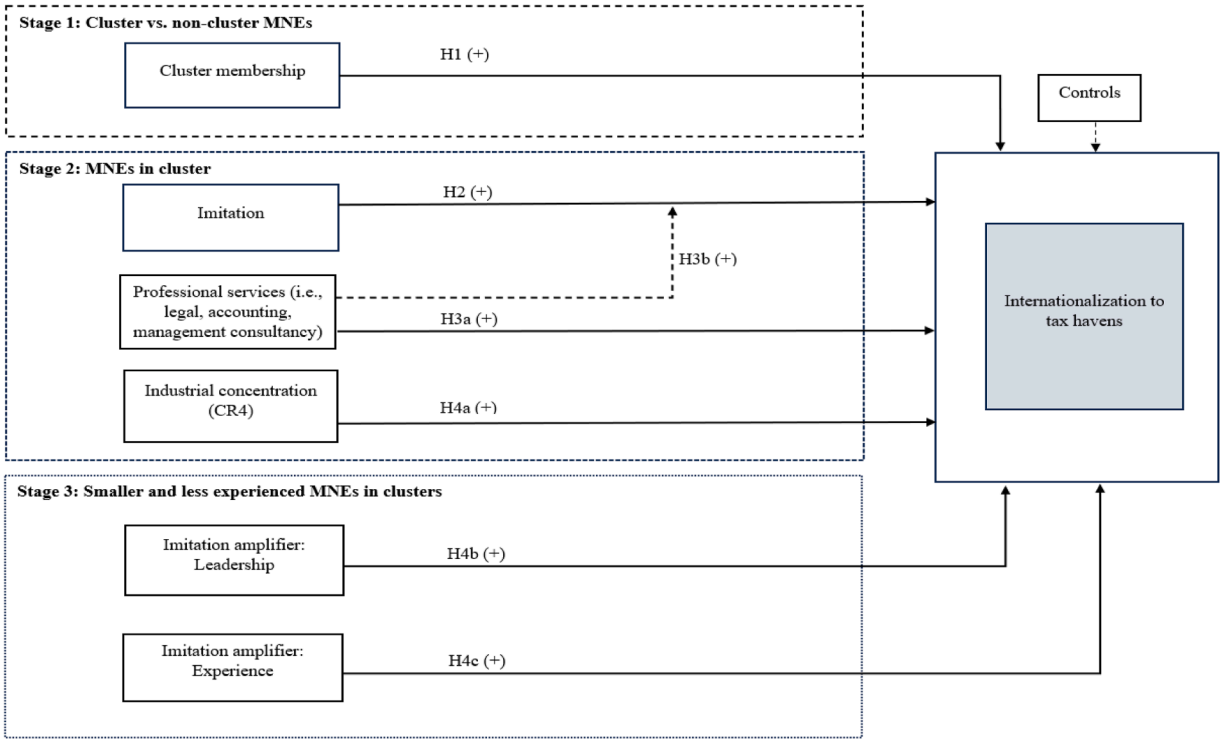

Fig. 1. Conceptual Framework

2017).

Interactions within clusters create a unique environment where firms can benefit from shared resources (Goerze, 2007), collective learning (Amdam, et al., 2020; Du & Vanino, 2020), and mutual support (Jankowska et al., 2017; Nielsen, Asmussen, Weatherall, & Lyngemark, 2021). These interactions facilitate the rapid diffusion of best practices (Du & Vanino, 2020; Porter & Miranda, 2009), including advanced tax planning strategies (Boning, Guyton, Hodge, & Slemrod, 2020; Kelchtermans et al., 2020). Close proximity and frequent interactions among firms within clusters enhance their ability to observe, understand, and replicate successful tax strategies employed by their peers. Recent evidence has shown that firms are likely to imitate competitors' tax planning strategies in their own business practices (Armstrong et al., 2019). This observation is further corroborated by Boning et al. (2020), who show that managers typically adopt tax strategies used by their peers in the same industry. Further research builds on this finding by considering not only industry effects, but also geographic peer effects to show that a firm's degree of tax avoidance is affected by other firms in the same industry and province (Kelchtermans et al., 2020; Liang et al., 2021). Nevertheless, this emerging literature has devoted less attention to the behaviour of MNEs, particularly those in clusters, and to one of the most aggressive forms of tax avoidance—the use of tax havens.

Given the imitative behaviour fostered within clusters (Amdam et al., 2020; Barreto & Baden-Fuller, 2006; Staber, 2010), it is plausible to argue that MNEs located within these clusters are more likely to adopt aggressive tax avoidance strategies, such as the utilization of tax haven subsidiaries, to a greater extent than MNEs situated outside of clusters. The proximity and intense interaction among firms in clusters facilitate the rapid dissemination and adoption of these practices (Boning et al., 2020; Kelchtermans et al., 2020), driven by the competitive necessity to match or exceed the tax strategies of their peers. This leads us to our first hypothesis:

Hypothesis 1. MNEs in clusters internationalize to tax havens to a greater extent than MNEs located outside of clusters.

In addition to the overall tendency of MNEs in clusters to use tax havens more extensively, it is crucial to examine the density of such practices within the cluster itself. The concept of mimetic isomorphism is influenced by the ambiguity surrounding both objectives and the means to achieve them (DiMaggio, 1988). Firms in a cluster that seek to internationalize through tax havens must navigate uncertainties related to the internationalization process as well as tax management. At the same time, the mimetic isomorphism mechanism suggests that firms can effectively reduce this ambiguity by emulating or refining the institutional practices of other organizations (Deegan, 2019).

When a significant number of firms within a cluster engage in tax haven use, it creates a normative environment (Barreto & Baden-Fuller, 2006; Mickiewicz, Rebmann, & Sauka, 2019; Tan et al., 2013) that further encourages this behaviour. The prevalence of tax haven subsidiaries among firms in clusters can reinforce the perception that such practices are "business as usual" (Amdam et al., 2020; Tan et al., 2013), thereby increasing the likelihood that firms in the same cluster become more homogeneous and adopt similar strategies. This environment of pervasive tax avoidance practices can thus manifest itself within the cluster, making it more attractive and seemingly necessary for individual firms to imitate one another, to mitigate the risk of falling behind competitively (Abrahamson & Rosenkopf, 1993; Tan et al., 2013).

Adopting widely accepted behaviours or emulating the leading companies within the cluster allows firms to reduce uncertainty in challenging environments (DiMaggio & Powell, 1983; Perego & Kolk, 2012). Higher levels of uncertainty avoidance enhance mimetic isomorphism, particularly as MNEs face significant uncertainty in determining their tax positions (Depoers & Jérôme, 2020). As more firms within a cluster adopt tax haven strategies, the pressure on other firms to conform to these practices intensifies, leveraging the perceived benefits that tax havens offer in terms of cost savings and financial optimization (Boning et al., 2020; Van Roekel & Smit, 2022). Therefore, we hypothesize that the higher the number of tax haven subsidiaries owned by MNEs within a cluster, the greater the likelihood that an individual MNE within the same cluster will also own a tax haven subsidiary. This leads us to our second hypothesis that:

Hypothesis 2. There is a positive relationship between the number of tax haven subsidiaries owned by all MNEs in a cluster and the likelihood of an individual MNE in the cluster to internationalize to tax havens.

2.2. The Availability of Professional Services Providers: Collaboration in the Cluster

Within a cluster, a wide range of services, such as consulting, legal and accounting act as sources of knowledge for cluster participants (Goerzen, Asmussen, & Nielsen, 2013; Goerzen, Asmussen, & Nielsen, 2024; Wang et al., 2022; Porter & Miranda, 2009). Recent studies have highlighted how the Big 4 accounting firms (Deloitte, EY, KPMG, and PwC) and the magic circle of law firms create knowledge spillovers that influence the tax affairs of firms. Hogan and Noga (2015) find that auditor-provided tax services actively advise taxpayers to engage in offshore tax evasion or non-compliance. Jones, Temouri and Cobham (2018) show that the Big 4 accountancy firms offer accounting services and tax advice to minimize their clients' tax liabilities and facilitate MNEs to enter questionable tax arrangements. These "enablers" of corporate tax avoidance are attracted to clusters and foster spillovers among cluster members, that is sticky and tacit in terms of knowledge transfer (Felzensztein et al., 2019; Jankowska et al., 2017; Mickiewicz et al., 2019; Nielsen et al., 2021). With the availability of professional services providers, a shared sense of professional identity is created in the cluster, producing more coordinated behavior amongst the cluster's community. Greve and Taylor (2000) highlight that consulting companies facilitate innovative practices in the institutional environment. Consequently, professional services providers act as institutional agents (Boland & Tenkasi, 1995; Muzio, Brock, & Suddaby, 2013) and thus encourage firms in the cluster to adopt innovative tax-planning strategies, including the use of tax havens.

Typically, a firm's tax affairs are likely to be proprietary and secretive, hence internalized. Nevertheless, information about a firm's tax stance can leak out and it may be possible for a firm's rivals to estimate the rival's effective tax rate by analyzing the annual reports, financial statements, or other public filings, or by observing analyst reports that include information on the level of tax being paid. If a firm observes others in a cluster adopting an aggressive tax strategy via the use of tax havens, this may strengthen imitative behavior (Wang et al., 2022). Hence, informal networks are developed where executives share insights and industry specific knowledge with one another in terms of a firm's tax stance, or employee churn between firms within the cluster (including the enablers) allows firms to gain knowledge in this domain and share practice. Therefore, we propose that the availability of professional services providers who can advise MNEs on the complex tax code between countries and vast transfer pricing rules that allow firms to engage in base erosion and profit shifting is likely to be significant in clusters. As such, we propose:

Hypothesis 3a. There is a positive relationship between the number of professional services providers in a cluster and the likelihood of an individual MNE in the cluster to internationalize to tax havens.

Notwithstanding the direct effect of the availability of professional services providers to MNEs in clusters in terms of driving the use of tax havens, one would also expect their availability to amplify the imitation effect. Institutional Theory emphasizes the importance of normative pressures, mainly arising from external sources and firms that co-exist in similar environmental conditions (Dacin, 1997). It considers the processes by which structures, rules, norms, and routines, become established as authoritative guidelines to which firms must conform if they

are to receive support and legitimacy . Furthermore, mimetic isomorphism results from the increasing professionalization of the environment (DiMaggio & Powell, 1983). A shared sense of professional identity is created, thereby producing an even greater homogenization across organizations (Frumkin & Galaskiewicz, 2004). In our context therefore, the enablers of tax avoidance generate knowledge spillovers and information sharing, acting as knowledge hubs within the cluster (Boning et al., 2020; Connelly, Johnson, Tihanyi, & Ellstrand, 2011). As MNEs interact with these advisors, they likely gain exposure to the innovative tax planning techniques that will include offshore tax arrangements (Hogan & Noga, 2015; Sassen, 2012). It is in the interests of tax advisory services to emphasize the benefits of tax efficiency and at the same time to play-off firms against one another (Jones et al., 2018). This would lead to an even greater degree of imitation between firms within the cluster as they might be concerned about losing competitive advantage. Moreover, it is also in the interests of the enablers of tax avoidance to normalize such practices (Hogan & Noga, 2015), building a greater pressure between MNEs in the cluster to conform due to the fear of falling behind industry leaders.

Additionally, the presence of professional services providers within the cluster can create feedback loops (Sassen, 2012) that continually reinforces aggressive tax planning behaviours. As more MNEs adopt these sophisticated tax strategies, the advisors themselves become more adept and innovative, constantly refining their techniques and disseminating them throughout the network (Hogan & Noga, 2015). This perpetuates a collaborative cycle where tax avoidance measures are not only more accessible but also more advanced, further embedding such practices into the operational norms of the cluster (Porter & Miranda, 2009). Consequently, this ecosystem of mutual reinforcement between MNEs and their advisors contributes to a progressively sophisticated and entrenched culture of tax avoidance, making it increasingly difficult for firms within the cluster to opt out without facing significant competitive disadvantages. We argue that the availability of professional services providers in a cluster propagates the mimetic behaviour of firms in the network and intensifies their tendency to internationalize to tax havens. This leads to Hypothesis 3b which emphasises the moderating effect of the enablers of tax avoidance on the imitation effect:

Hypothesis 3b. The imitation effect of the internationalization to tax havens by MNEs in a cluster, is positively moderated by the co-location of professional services providers in the cluster.

2.3. Market Power and Bandwagon effects

2.3.1. Competition in the Cluster

Institutional isomorphism occurs when companies compete with their peers for economic, social and political power as well as institutional legitimacy (Tan et al., 2013). Competition encourages cluster-based firms to consider the actions of peers in the environment as a source of legitimacy and information, and hence mimic prevailing practices of dominant rivals (Algarni et al., 2023; DiMaggio, 1988; Tan et al., 2013). In addition, competition plays a crucial role for firms in clusters in accelerating internationalization that are connected to highly sophisticated consumers, higher competitive pressures, more advanced technologies and more sophisticated resources (Cuervo-Cazurra, Luo, Ramamurti, & Ang, 2018; Estrin et al., 2017; Porter & Miranda, 2009). Therefore, it is essential for a focal firm to sustain its competitive advantage in order to compete effectively with both its network peers and global market rivals (Barney, Kivleniece, & McGahan, 2024). The concentration of industrial power within a cluster, particularly when dominated by a few lead firms, intensifies competitive dynamics and strategic imitation (Bröcker et al., 2003; Feldman & Audretsch, 1999; Porter, 1998). When dominant firms in a cluster hold a significant share of the market, they set industry standards and practices that smaller firms are likely to follow to remain competitive (Gupta & Misangyi, 2018). These lead firms often have the resources and capabilities to engage in sophisticated tax planning (Gokalp, Lee, & Peng, 2017), including the use of tax havens, to optimize their financial performance. As these practices become more visible within the cluster, they create a benchmark that other firms feel pressured to emulate to avoid competitive disadvantages. Thus, the visibility and success of the top firms' tax strategies act as a catalyst, encouraging other cluster members to adopt similar tax planning techniques.

Moreover, the strong social networks and informal communication channels prevalent in highly concentrated clusters play a crucial role in disseminating tax strategies among firms. One would expect that the leading executives of the most powerful MNEs in the cluster drive this activity (Connelly et al., 2011). These top executives frequently interact through industry associations, conferences, and personal networks (Hogan & Noga, 2015; Porter, 1998), facilitating the rapid spread of knowledge about the benefits and methods of using tax havens. The informal exchange of information, often initiated by these influential leaders (Porter, 1998, 2000; Porter & Miranda, 2009), ensures that even firms with limited resources can learn about and implement aggressive tax avoidance strategies by mimicking the approaches of their successful peers within the cluster.

Moreover, the intense competitive environment within highly concentrated clusters creates a sense of urgency among firms to adopt any strategy that can provide a competitive advantage. In particular, the pressure to maintain or improve market position often compels firms to seek out any advantages that can improve their financial performance by closely monitoring the actions of their leading competitors and quickly implementing successful strategies observed in the cluster (Porter, 1998; 2000). This mimetic behaviour is likely to be particularly pronounced in tax planning, where the benefits of reducing tax liabilities through tax havens can significantly impact a firm's financial performance (Eden, 2024). The collective behaviour within the cluster, influenced by the actions of the top firms, thus reinforces the adoption of aggressive tax avoidance measures. If the dominant firms in a cluster use tax havens to lower their tax liabilities and operational costs, it is highly likely that other firms in the network will be inclined to follow in order to maintain their competitiveness (Haasnoot & de Vaal, 2022). Instead, if a firm chooses not to do so, this might result in a higher effective tax rate for the firm compared to that of its competitors, leading to relatively lower profits and a weaker position in the market. Based on these arguments, we state Hypothesis 4a as follows:

Hypothesis 4a. There is a positive relationship between the degree of market power in a cluster and the likelihood of an individual MNE in the cluster to internationalize to tax havens.

2.3.2. The amplification effect of leadership and experience

Given that more highly concentrated clusters, in terms of market power, are predicted to be more likely to internationalize to tax havens, we further explore what implications this has on mimetic behaviour. Large firms located in clusters play a significant role in terms of the diffusion of new knowledge and ideas to their peers (Barney et al., 2024). The observation of the actions of others offers cues that affect firms' decisions to learn and act, with some social cues being stronger than others depending on the visibility of the senders of such signals. At the same time, small and large firms differ substantially in relation to visibility (Van Roekel & Smit, 2022). In addition, extant literature widely recognizes the importance of large firms located at the core of clusters (Porter, 2000; Porter & Miranda, 2009), who take a leading role in formal and informal governance arrangements. The cumulative evidence suggests that smaller firms tend to selectively and adaptively imitate the actions undertaken by lead firms (Strang & Still, 2004). The larger size of peer firms serves as a cognitive heuristic that makes such firms' actions more emulation-worthy to observers (Gupta & Misangyi, 2018) and enhances the perceived effectiveness of their practice (see Connelly et al., 2011). Moreover, to successfully internationalize, large firms are better prepared to sustain the imitation or adaptation

strategies reflected in competitor-centric search patterns (Gupta & Misangyi, 2018).

In addition, experienced firms are assumed to possess superior information and knowledge to encounter the ambiguity and uncertainty associated with the internationalization process (Michailova & Wilson, 2008). Experiential knowledge has a crucial impact on the degree of internationalization (Jones & Temouri, 2016; Michailova & Wilson, 2008; Purkayastha, Delios, & Kumar, 2025). Investing in foreign countries often involves highly uncertain situations, especially for firms with little prior international experience; while older firms are much more experienced in managing high levels of risks associated with the internationalization (Zucchella et al., 2007). Zucchella et al. (2007) highlight that the later stages of international expansion build on the experience and knowledge stocks that evolve through previous internationalization. The way firms decide to follow or ignore their peers is conditional on the observable social cues and the idiosyncratic ways in which firms process information (Strang & Still, 2004). Furthermore, firms often observe more experienced peers, mimicking the unique insights these firms have gained through their international ventures as a strategy to manage uncertainty (Purkayastha et al., 2025). From this perspective, older firms can shape information processing behaviour, and hence younger firms have a greater propensity to imitate the actions of their experienced peers.

Therefore, we posit that firm size and firm experience are two important amplifiers of imitation. More specifically, they are key drivers of the "herd-like" behavior in relation to internationalization into tax havens. Thus, we hypothesize that the higher the number of tax haven subsidiaries owned by the biggest firms and the oldest firms within a cluster, the greater the likelihood that an individual MNE within the same cluster will also own a tax haven subsidiary. Hence, we extend the market power Hypothesis 4a and conceptualize Hypothesis 4b as showing the amplification effect of leadership and Hypothesis 4c as conceptualising the amplification effect of experience as follows:

Hypothesis 4b. There is a positive relationship between the average number of tax haven subsidiaries owned by the biggest MNEs in a cluster and the likelihood of an individual MNE in the cluster to internationalize to tax havens.

Hypothesis 4c. There is a positive relationship between the average number of tax haven subsidiaries owned by the oldest MNEs in a cluster and the likelihood of an individual MNE in the cluster to internationalize to tax havens.

3. Data and empirical strategy

3.1. Data and Setting

Our sample is collected from Bureau van Dijk's ORBIS database, which is a rich source of data on MNEs, providing access to financial information, business location, and subsidiary ownership at the firm-level. We use the UK and Germany as the contexts for our study due to the data coverage and the fact that they are sources of both variation and robustness in terms of the definition of what locations constitute geographic clusters. Due to the different clustering patterns found in each country, we utilized separate datasets and hence run separate models for the UK and Germany. Furthermore, our country choices fit well with the comparative capitalism literature (Hall & Soskice, 2001; Hancké, 2009) that distinguishes between liberal market economies, such as the UK, and coordinated market economies, such as Germany. By estimating our empirical models for both countries, it is possible to observe evidence of cross-country heterogeneity in our results.

We downloaded all the accounts data for every MNE available in the two countries. It is worth noting that our focus is on the MNEs headquarters because headquarters play a crucial role in making decisions regarding investment choices such as establishing subsidiary networks (Cohen, 2007) and handling tax planning, strategies and execution (Dischinger, Knoll & Riedel, 2014). We follow UNCTAD's definition of an MNE – i.e., a firm owning at least 10 percent of a subsidiary in an overseas market other than that of its own incorporation (UNCTAD, 2013). The ORBIS database enables us to identify the whole network of foreign subsidiaries owned by each MNE in our sample, including tax haven locations. We can trace the subsidiary ownership for each MNE throughout the sample period by using historic data releases of the ORBIS database. Hence, we are able to create our contemporaneous dependent variable – whether or not a MNE owns a subsidiary in a tax haven location. In addition, ORBIS allows us to identify both spatial location and industry specialization of every parent MNE. This enables us to combine these two dimensions of a cluster to construct our key independent variable, namely whether or not a MNE is located in a recognised cluster in its country of incorporation. In total, we have 3,876 UK-incorporated MNEs and 5,334 German MNEs over the course of 2008-2019. Our unbalanced panel datasets consist of 14,528 observations for the UK and 27,718 observations for Germany.

3.2. Empirical Strategy

We performed Random Effects Probit model in which the dependent variable is a contemporaneous binary variable for the ownership of tax haven subsidiaries by MNEs. All explanatory variables are lagged one period and clustered standard errors are implemented at the firm level to account for heteroskedasticity for reliable inference. We discuss in detail below the construction of the dependent and independent variables.

The first empirical model is to test Hypothesis 1 regarding the relationship between cluster membership and the use of tax havens by MNEs. The second empirical model tests for the mechanisms related to the cluster environment, including the imitation effect - Hypothesis 2, the co-location of professional services providers within the cluster - Hypothesis 3a, and industrial concentration - Hypothesis 4a. We utilize a restricted sample of MNEs that only includes MNEs who are part of a cluster in this second empirical model.

The third empirical model is estimated to test the moderating effect of co-location of professional services providers (Hypothesis 3b), on the imitation effect in relation to the tax haven use by MNEs in clusters. Again, we utilize a restricted sample of firms that only includes MNEs who are part of a cluster. For this model, we have an interaction effect in a non-linear model. Hence, reporting the interaction effect as a coefficient is not possible because the magnitude will vary depending on the levels of the interacting variables. For this reason, we include a margins plot to display the interacting effect where the vertical axis is the probability of tax haven use, the horizontal axis is the amount of imitation, and we plot separate curves for different values of the number of professional services providers available in each cluster. Given the mean values of the variable No. of professional services providers are 227 and 102 for the UK and Germany, respectively (see Table 2 and Table 3), we choose 100 and 300 professional services providers for the former, and 100 and 200 professional services providers for the latter to illustrate this.

The fourth and fifth empirical models are estimated to test the amplification effect of leadership (Hypothesis 4b) and experience (Hypothesis 4c), that drive the tax haven imitation of MNEs in clusters. We utilize a further restricted sample of cluster based MNEs by excluding lead firms (based on firm age and firm size) in each cluster by setting a threshold of the four biggest firms and four oldest firms in each cluster. This is commonly used in the economics and industrial organization literature (see Davis, 2021). As robustness tests, we alter the thresholds for these models. Details of empirical models and specifications are presented in Appendix C (Online Appendices).

3.3. Dependent Variable – Defining Tax Haven Locations

We capture the use of a tax haven by MNEs as a particular form of

internationalization, that enables MNEs to reallocate their profits into low tax jurisdictions as well as enabling secrecy services that provide confidentiality to protect the interests of owners (Temouri et al., 2021). The internationalization of MNEs into tax havens has been explored in several studies (Jones & Temouri, 2016; Jones et al., 2018; Lanis & Richardson, 2015). Palan, Murphy & Chavagneux (2010) highlight three main characteristics of tax havens, including (1) zero or close to zero tax rates for non-resident firms; (2) high levels of secrecy for the users of such structures; and (3) easy and affordable access to legal entities in the territory.

We utilize the list suggested by Jones and Temouri (2018), which is based on the Financial Secrecy Index (FSI) published by Tax Justice Network. The FSI, that focuses on a jurisdiction's secrecy and transparency, combines two elements, including (1) a global scale weight and (2) a secrecy score. The first element measures the provision of financial services of a jurisdiction to non-residents, while the second element is based on 15 indicators such as banking secrecy, transparency of company ownership, and tax court secrecy. These indicators are combined into a single score that positions each territorial jurisdiction on a range from zero (complete financial transparency) to 100 (complete secrecy). Jones and Temouri (2018) use the cut-off of 60 identified in the FSI list (2018) that shows the biggest suppliers of financial secrecy in the world to define 52 tax haven locations (see Table A1 – Online Appendices).[1].

We also take a conservative approach and utilize Hines and Rice's classification of dot tax havens (1994) to construct our tax haven measure as a robustness test. To be specific, dot tax havens are characterized as notably small island countries such as Andorra, the Cayman Islands, and Barbados. The definition of dot tax havens by Hines & Rice (1994) consists of 26 tax haven locations (See Table A1 – Online Appendices).

In addition to a dummy variable, we experiment with a count variable that capture the number of tax haven subsidiaries owned by parent MNEs as another robustness test to check the validity of our results.

Table 1
Top 10 tax havens in which UK-incorporated and German MNEs in clusters own subsidiaries

Tax havens	No. of parent UK-incorporated MNEs in clusters that own tax haven subsidiaries	Tax havens	No. of parent German MNEs in clusters that own tax haven subsidiaries
Singapore	350	Luxembourg	242
Hong Kong	316	Singapore	221
Luxembourg	199	Hong Kong	183
United Arab Emirates	179	Malaysia	100
Malaysia	156	United Arab Emirates	89
Cayman Islands	100	Cyprus	71
Cyprus	98	Cayman Islands	67
Jersey	97	Virgin Islands	54
Guernsey	86	Panama	53
Virgin Islands	79	Bermuda	43

Source: Authors' calculations from ORBIS

[1] Online Appendices present Tables A1-A11 (Table A1: Variables & Measures; Tables A2: Cluster firms in the UK samples; Tables A3-A4: Clusters classification with postcodes and NACE codes for the UK; Table A5: Cluster firms in Germany samples; Tables A6-A7: Custer classification with postcodes and NACE codes for Germany. Table A8: Additional evidence for the cluster membership effect on firms' use of tax havens; Table A9: Additional evidence for the imitation effect in clusters; Table A10: Additional evidence for co-location of professional services and industrial concentration; Table A11: Additional evidence for mechanisms related to the amplification of leadership and experience).

Table 1 presents a list of the top ten tax havens destinations for MNEs located in clusters in the UK and Germany. For the UK-incorporated MNEs, the most common location of tax haven ownership is Singapore. However, for Germany, the location that attracts the largest number of German-incorporated MNEs is Luxembourg. As shown, Luxembourg, Singapore, Hong Kong, the UAE, Malaysia, the Cayman Islands, and Cyprus are the tax haven locations that most commonly attract UK-incorporated and German-incorporated MNEs in clusters.

Tables 2 and 3 provide descriptive statistics for the main variables in our analysis. As for the tax haven dummy variable, 40.1 percent of our firm/year observations for UK MNEs were found to indicate tax haven ownership, whereas, for Germany, this figure was found to be lower, at 24.4 percent.

3.4. Independent Variable – Cluster definition

We derive the classification of clusters from maps and lists of clusters published on government websites (Office for National Statistics for the UK and Federal Ministry for Economic Affairs and Energy for Germany). We also base our classification of clusters on the cluster definition proposed by Porter (2000) that includes two key dimensions of clusters – geographical location and industry specialization – as applied in recent studies (Du & Vanino, 2020; Gutierrez-Posada, Kitsos, Nathan, & Nuccio, 2023; Kelchtermans et al., 2020). This method offers an intuitive perspective for classifying clusters.

The empirical studies in this strand of literature are plagued by the lack of prior knowledge and information on location and industry of recognized clusters in specific countries (Martin & Sunley, 2003). To address this issue, we collected information on geographical proximity and industry specialization of recognized clusters from comprehensive maps and lists available on government websites. This is a significant advancement upon the methods used in the existing cluster literature, which has mainly focused on whether industries are geographically concentrated (Du & Vanino, 2020).

According to these sources, we identified 31 clusters in the UK (see Tables A2-A4 and Graph B1) and 80 clusters in Germany (see Tables A5-A7 and Graph B2). It is worth noting that the clusters identified in the UK appear to be more broadly defined than their German counterparts. We follow a three-stage procedure to identify MNEs that are located in a cluster. First, we identify postcodes as the reference unit for geographical proximity of each cluster. Second, we use two-digit NACE industrial codes (as defined by Eurostat) as the unit for the industry specialization of each cluster. For several industries, we use four-digit NACE codes to match with some narrow industry specialization of clusters. Third, we combine information on reference postcodes and NACE codes for individual MNEs in our sample data to identify MNEs, who are part of clusters and MNEs who are not part of clusters in the sample dataset. Details for cluster classification with postcodes and NACE codes are specified in Tables A3-A4 (the UK) and Tables A6-A7 (Germany) in the Online Appendices. The descriptive statistics of the cluster and non-cluster firms in our sample are given in Tables 2 and 3. For the UK, 25.5 percent of the firm/year observations were found to identify MNEs in clusters, whereas this figure was found to be slightly higher for Germany, at 29.6 percent.

3.5. Firm Imitation

To measure the imitation effect, we utilize two measures. For the first, we aggregate the total number of foreign subsidiaries in tax haven locations, owned by MNEs in a particular cluster *j* and subtract from this the number of foreign subsidiaries in tax haven locations owned by MNE *i*. Hence, it measures the exposure of the use of tax havens to firm *i* in cluster *j* from all of the other firms located in cluster *j*. The average number of tax havens owned by other MNEs in clusters is 1,244 subsidiaries for the UK, and 1,491 subsidiaries for Germany (See Tables 2 and 3).

Table 2
Descriptive statistics & correlation matrix (UK)

Variables	Obs.	Mean	S.D.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) Tax haven dummy (Jones & Temouri)	14,528	0.401	0.490	1.000												
(2) Cluster	14,528	0.255	0.368	0.078	1.000											
(3) No. of tax haven subsidiaries owned by other firms in clusters (cluster level) (Imitation effect)	4,737	1,244.1	1,675.6	0.147	0.528	1.000										
(4) No. of professional services providers in clusters (cluster level) (co-location of professional services)	3,919	227.582	42.929	0.038	0.364	0.381	1.000									
(5) Share of sales of Top 4 (cluster level) (Industrial concentration)	4,737	37.131	16.170	0.084	0.568	0.558	0.665	1.0000								
(6) Average no. of tax haven subsidiaries owned by the four biggest firms (cluster level) (Imitating lead firms)	3,719	18.482	23.480	0.235	0.562	0.624	0.346	0.154	1.0000							
(7) Average no. of tax haven subsidiaries owned by the four oldest firms (cluster level) (Imitating lead firms)	3,719	15.846	36.167	0.122	0.554	0.693	0.464	0.519	0.761	1.000						
(8) Log Turnover	14,528	17.359	2.544	0.155	-0.006	-0.026	-0.066	0.071	0.064	0.086	1.000					
(9) IATA	14,528	0.1428	0.205	0.066	0.004	-0.026	-0.053	0.002	-0.057	-0.035	0.165	1.000				
(10) Firm age	14,528	31.111	31.557	0.063	-0.077	0.088	-0.011	0.002	0.117	0.074	0.244	-0.075	1.000			
(11) No. of foreign subsidiaries	14,528	39.404	109.98	0.363	0.048	-0.026	-0.052	0.105	0.224	0.203	0.181	0.021	0.127	1.000		
(12) Log Long term debt	14,528	16.664	3.161	0.238	0.019	-0.026	0.032	0.008	0.055	0.054	0.500	0.174	0.118	0.218	1.000	
(13) Log Cash flow	14,528	16.721	2.321	0.295	-0.017	-0.001	-0.030	0.039	0.065	0.092	0.784	0.194	0.218	0.279	0.688	1.000
Tax haven count (Jones & Temouri)	14,528	4.198	16.241													
Tax haven dummy (Hines & Rice)	14,528	0.112	0.398													
No. of firms in clusters that own tax haven subsidiaries (cluster level) (Imitation effect)	4,737	14.688	18.469													
No. of tax consultancy firms in clusters (cluster level) (co-location of professional services)	3,919	29.304	9.726													
No. of tax haven subsidiaries owned by the biggest firm (cluster level) (Imitating lead firm)	4,246	31.313	22.465													
No. of tax haven subsidiaries owned by the oldest firm (cluster level) (Imitating lead firm)	4,246	22.875	18.532													
Average no. of tax haven subsidiaries owned by the three biggest firms (cluster level) (Imitating lead firms)	3,992	15.261	9.625													
Average no. of tax haven subsidiaries owned by the three oldest firms (cluster level) (Imitating lead firms)	3,992	12.3076	8.4657													

Table 3
Descriptive statistics & correlation matrix (Germany)

Variables	Obs.	Mean	S.D.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) Tax haven dummy (Jones & Temouri)	27,718	0.2443	0.4297	1.000												
(2) Cluster	27,718	0.2957	0.3874	0.037	1.000											
(3) No. of tax haven subsidiaries owned by other firms in clusters (cluster level) (Imitation effect)	6,281	1,491.700	1,572.4	0.053	0.218	1.000										
(4) No. of professional services providers in clusters (cluster level) (co-location of professional services)	6,281	102.472	25.383	0.036	0.782	0.230	1.000									
(5) Share of sales of Top 4 (cluster level) (Industrial concentration)	6,281	18.042	13.330	0.152	0.629	0.476	0.612	1.000								
(6) Average no. of tax haven subsidiaries owned by the four biggest firms (cluster level) (Imitating lead firms)	4,719	14.862	22.576	0.135	0.458	0.724	0.450	0.769	1.000							
(7) Average no. of tax haven subsidiaries owned by the four oldest firms (cluster level) (Imitating lead firms)	4,719	17.895	13.219	0.113	0.460	0.541	0.452	0.660	0.779	1.000						
(8) Lor Turnover	27,718	18.887	2.169	0.220	-0.010	-0.008	-0.013	0.015	-0.127	-0.049	1.000					
(9) IATA	27,718	0.047	0.102	0.082	0.028	-0.029	0.025	0.063	-0.067	-0.069	0.148	1.000				
(10) Firm age	27,718	44.735	44.658	0.087	-0.015	0.059	-0.016	-0.020	-0.138	-0.052	0.253	-0.029	1.000			
(11) No. of foreign subsidiaries	27,718	22.206	74.613	0.352	0.006	-0.016	0.006	0.075	0.103	0.061	0.239	0.093	0.102	1.000		
(12) Log Long term debt	27,718	15.983	2.676	0.261	0.006	-0.030	0.004	0.080	0.006	0.038	0.492	0.156	0.177	0.289	1.000	
(13) Log Cash flow	27,718	15.328	2.028	0.342	0.012	-0.007	0.008	0.055	0.056	0.029	0.692	0.180	0.192	0.368	0.576	1.000
Tax haven count (Jones & Temouri)	27,718	1.407	9.043													
Tax haven dummy (Hines & Rice)	27,718	0.096	0.294													
No. of firms in clusters that own tax haven subsidiaries (cluster level) (Imitation effect)	6,281	10.334	11.002													
No. of professional services providers in clusters (cluster level) (co-location of professional services)	6,281	43.937	9.726													
No. of tax haven subsidiaries owned by the biggest firm (cluster level) (Imitating lead firm)	5,944	15.684	15.149													
No. of tax haven subsidiaries owned by the oldest firm (cluster level) (Imitating lead firm)	5,944	19.966	6.272													
Average no. of tax haven subsidiaries owned by the three biggest firms (cluster level) (Imitating lead firms)	5,264	13.185	6.316													
Average no. of tax haven subsidiaries owned by the three oldest firms (cluster level) (Imitating lead firms)	5,264	9.283	4.854													

The second measure (reported as a robustness test) aggregates the total number of parent MNEs in cluster *j,* who utilize tax haven subsidiaries and subtract from this whether or not firm *i* owns a tax haven subsidiary. Hence, this measure proxies for exposure based upon the number of MNEs in the cluster who utilize tax havens.

3.6. Co-location of professional services providers and industrial concentration within clusters

3.6.1. Co-location of professional services

To measure the co-location of advanced professional services providers within a cluster, we compute the total number of advanced services firms located in cluster *j* using postcodes. We use NACE two-digit codes 69 and 70, which are defined as encompassing legal and accounting activities and the activities of head offices and management consultancy. Within this classification, tax advisory services are also included (Jones et al., 2018). It is important to note that for the UK, we exclude the two financial services clusters when running models for Hypothesis 3. As shown in Tables 2 and 3, the average number of advanced professional services providers in a cluster is 227 for the UK, and 102 for Germany.

3.6.2. Industrial concentration

To construct a measure of industrial concentration within a cluster we follow prior studies and calculate the four-firm concentration ratio (CR4) (see Bormans & Theodorakopoulos, 2023; Davies, 2021). First, we aggregate sales of all firms in a cluster *j*. Second, we aggregate the sales of the biggest four firms in a cluster *j*. Then we calculate the CR4 ratio which is the sales of the top four firms relative to total sales in the cluster. As shown in Tables 2 and 3, the average share of sales of the top four firms in a cluster for the UK is 37.1 percent with the standard deviation of 16.2 percent. The figure for Germany is 18 percent with the standard deviation of 13.3 percent.

3.7. The amplification effect of leadership and experience

3.7.1. The amplification effect of leadership (Firm size)

To measure the amplification effect of leadership, we use the average number of tax havens owned by the four biggest firms (based on firm size) in a particular cluster *j* as a proxy for the effect of imitating lead firms (the biggest firms) in clusters. It is worth noting that this measure captures the imitation effect itself. We then exclude the four biggest firms in each cluster when running models – therefore our sample becomes smaller. Hence, we measure the exposure of tax haven use to firm *i* in cluster *j* from the four biggest firms (lead firms) located in cluster *j*.[2] As shown in Tables 2 and 3, the average number of tax havens owned by the four biggest firms in clusters (cluster level) is 18 tax haven subsidiaries on average for the UK, and 15 subsidiaries on average for Germany. It is important to note that in robustness checks, we alter the threshold.

3.7.2. The amplification effect of experience (Firm age)

To measure the amplification effect of experience, we use the average number of tax havens owned by the four oldest firms (based on firm age) as a proxy for the effect of imitating lead firms (the oldest firms) in clusters. It is worth noting that this measure captures the imitation effect itself. We then exclude the four oldest firms in each cluster when running the models. Hence, it measures the exposure of tax haven use to firm *i* in cluster *j* from the four oldest firms (lead firms) located in cluster *j*.[3] As reported in Tables 2 and 3, the average number of tax havens owned by the four oldest firms in clusters (cluster level) is 14 tax haven subsidiaries on average for the UK, and 17 subsidiaries on average for Germany. It is important to note that in robustness checks, we alter the threshold.

3.8. Control Variables

To reflect the firm-specific factors of tax haven ownership, we use common explanatory variables in the literature. We include firm turnover as a proxy of firm size (see Lanis & Richardson, 2015), firm age, long-term debt, cash flow, and the level of internationalization that is proxied by the number of non-tax haven subsidiaries (see Jones & Temouri, 2016; Jones et al., 2023). In addition, we follow Jones et al. (2018) and include the ratio of intangible assets to total assets (IATA) that is proxied for firms' technological sophistication.

Tables 2 and 3 present descriptive statistics for each explanatory variable used in our analysis. In terms of turnover, the values for UK-incorporated MNEs and for German MNEs were found to average exp (17.4) (approximately US$32.61 million) and exp (18.9) (US$161.5 million, respectively. For UK-incorporated firms, IATA was found to average 0.1, with a standard deviation of 0.2, compared to 0.05 with a standard deviation of 0.1 for their German counterparts. In terms of firm age, the average ages for the UK-incorporated and Germany-incorporated MNEs were found to be 31 and 44, respectively. For the number of non-tax haven foreign subsidiaries, each UK-incorporated MNE was found to average 39, with a standard deviation of 110. These were found to be much higher than the corresponding values for German MNEs, which were 22 and 75, respectively. Regarding long-term debt, the UK-incorporated MNEs were found to average exp (16.6) (approximately US$17.1 million). This figure was found to be much lower for German MNEs, being around US$4.9 million. As for average cash flow, the UK-incorporated MNEs were found to have cash flow equal to exp (16.7), which is equal to approximately US$18.2 million. The value for German MNEs was found to be lower, being exp (15.3), which is equal to US$8.5 million. We use the United States GDP Deflator to deflate the monetary values in our dataset, which were in thousands of US$. Table A1 shows detailed descriptions of each of our variables.

The correlation matrices between all the variables used in our analysis for the UK and Germany are presented in Tables 2 and 3, respectively. In addition, we checked the variance inflation factors (VIFs) and found them to range from 1.2 to 4.3 for the UK, and from 1.1 to 5.5 for Germany. Such ranges are well below the commonly accepted cut-off point of 10. We therefore concluded that multicollinearity is not a problem for our models.

4. Results

4.1. Hypotheses Tests

Stage 1: Cluster vs. non-cluster firms

Table 4 reports the results for Hypothesis 1 for the UK and for Germany. In models (1) and (2), the impact of an MNE located in a cluster versus outside of a cluster on the probability of owning a tax haven subsidiary is found to be positive and significant at the 1 percent level for both the UK ($b = 0.080$, $p = 0.001$) and for Germany ($b = 0.067$, $p =$

[2] As a robustness check, we also test with the two different thresholds: (1) the exposure of tax haven use to firm *i* in cluster *j* from the biggest firm (the lead firm) located in cluster *j;* (2) the exposure of tax haven use to firm *i* in cluster *j* from the three biggest firms (the lead firms) located in cluster *j* (see Table 10).

[3] As a robustness check, we also test with the two different thresholds: (1) the exposure of tax haven use to firm *i* in cluster *j* from the oldest firm (the lead firm) located in cluster *j;* (2) the exposure of tax haven use to firm *i* in cluster *j* from the three oldest firms (the lead firms) located in cluster *j)* (see Table 10).

Table 4
Results for the cluster effect

Variables	Results for the UK Model 1 Tax haven dummy (Jones & Temouri)	Results for Germany Model 2 Tax haven dummy (Jones & Temouri)
H1: Cluster	0.0804***	0.067***
(S.E)	(0.0249)	(0.0279)
(p-value)	0.00122	2.31e-09
Log Turnover	0.0158***	0.0003
(S.E)	(0.0051)	(0.0010)
(p-value)	0.00186	0.786
IATA	0.0541	0.0083
(S.E)	(0.0372)	(0.0118)
(p-value)	0.146	0.482
Firm age	-0.0002	0.0002***
(S.E)	(0.0003)	(5.61e-05)
(p-value)	0.637	0.0020
No. of foreign subsidiaries	0.0024***	0.0007***
(S.E)	(0.0003)	(0.0001)
(p-value)	3.44e-09	3.19e-05
Log long term debt	0.0076***	0.0029***
(S.E)	(0.0017)	(0.0008)
(p-value)	4.65e-05	0.0001
Log cash flow	0.0209***	0.0086***
(S.E)	(0.0036)	(0.0017)
(p-value)	1.35e-08	4.26e-07
Industry dummies	**YES**	**YES**
Observations	**14,528**	**27,718**
Number of firms	**3,876**	**5,334**

Notes: (1) Results for the UK are presented in models (1). Results for Germany are presented in models (2).
(2) The dependent variable is tax haven dummy (Jones & Temouri) in all models; clustered standard errors at the firm level to account for heteroskedasticity.
(3) Explanatory variables are lagged by one-year period.
(4) The reported coefficients are marginal effects.
(5) A full set of year and industry dummies are included in models.
(6) Monetary values are in US dollars and are deflated using GDP deflators.
(7) Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

0.000), respectively. This is the marginal effect, so we have our first piece of evidence that being in a cluster increases the probability of tax haven ownership by 8.0 percent and 6.7 percent for the UK-incorporated MNEs and German-incorporated MNEs, respectively.

Building on this, we check if this general effect is driven by certain clusters for each country. The industrial typology of clusters in the UK and Germany varies according to the cluster's definition from government classifications (see Appendices Tables A3 and A5). Therefore, in order to examine this, we integrate several cluster specific dummy variables and use Bartlett's equal-variances test (ANOVA) to determine if there are statistically significant differences between industry clusters in terms of their tax haven use.[4] The results are presented in model (1) for the UK and model (2) for Germany in Table 5.

We find that, in general, the use of tax havens by MNEs in clusters versus MNEs outside of clusters is driven by particular industry groups of clusters in both countries. Model (1) shows evidence that Oil & Gas clusters ($b = 0.308$, $p = 0.008$); Property/Construction clusters ($b = 0.292$, $p = 0.000$); Advanced Research clusters ($b = 0.106$, $p = 0.000$); Tourism clusters ($b = 0.093$, $p = 0.002$); Business Services clusters ($b = 0.085$, $p = 0.000$); and Finance clusters ($b = 0.166$, $p = 0.060$) have

[4] For the UK, the p-value, that corresponds to the F-statistic of 159.35, is 0.000. We can conclude that there is a statistically significant difference between the means of different types of UK clusters. For Germany, the p-value, that corresponds the F-statistic of 201.36, is 0.000. Hence, we can conclude that there is a statistically significant difference between the means of different types of German clusters.

Table 5
Additional analysis for the cluster effect

Industry groups of clusters in UK		Industry groups of clusters in Germany	
Variables	Model 1 Tax haven dummy (Jones & Temouri)	Variables	Model 2 Tax haven dummy (Jones & Temouri)
Oil/Gas clusters	0.308***	Business services clusters	0.196***
(S.E)	(0.1160)	(S.E)	(0.0438)
(p-value)	0.008	(p-value)	7.98e-06
Property/ Construction clusters	0.292***	Digital/ ICT/ Industry 4.0 clusters	0.162***
(S.E)	(0.0288)	(S.E)	(0.0561)
(p-value)	0.000	(p-value)	0.0039
Advance research clusters	0.106***	Biotech/ Medical tech/ Nano clusters	0.329**
(S.E)	(0.0203)	(S.E)	(0.160)
(p-value)	0.000	(p-value)	0.0402
Tourism clusters	0.0934***	Transportation/ Logistics clusters	0.123**
(S.E)	(0.0297)	(S.E)	(0.0786)
(p-value)	0.002	(p-value)	0.0270
Business services clusters	0.0845***	Automotive/ Electrical/ Aerospace clusters	0.134*
(S.E)	(0.0163)	(S.E)	(0.122)
(p-value)	0.000	(p-value)	0. 0711
Finance clusters	0.1655*	Textile/ Packaging	0.141
(S.E)	(0.0349)	(S.E)	(0.170)
(p-value)	0.060	(p-value)	0.405
Creative clusters	0.0152	Measurement/ Construction clusters	-0.0446
(S.E)	(0.0345)	(S.E)	(0.0803)
(p-value)	0.660	(p-value)	0.578
Digital/ ICT clusters	-0.0330	Metal/ Furniture Wood clusters	-0.0238
(S.E)	(0.0287)	(S.E)	(0.0638)
(p-value)	0.251	(p-value)	0.708
Motor/ Automotive/ Aerospace clusters	-0.0159	Energy/ Resources/ Energy/ Materials clusters	0.0136
(S.E)	(0.0521)	(S.E)	(0.107)
(p-value)	0.760	(p-value)	0.899
Manufacturing/ Engineering clusters	0.0285	Securities Tech/ Microsystems clusters	0.118
(S.E)	(0.0398)	(S.E)	(0.129)
(p-value)	0.474	(p-value)	0.361
Furniture/ woods clusters	0.0451	Optical and Photonics clusters	-0.0258
(S.E)	(0.0357)	(S.E)	(0.179)
(p-value)	0.207	(p-value)	0.885
Whisky clusters	-0.0255		
(S.E)	0.1558		
(p-value)	0.870		
Chemical clusters	-0.0412		
(S.E)	(0.227)		
(p-value)	0.856		
Instrumental/ Metals clusters	-0.0133		
(S.E)	(0.0895)		
(p-value)	0.882		
Log Turnover	0.0177***	Log Turnover	0.0005
(S.E)	(0.0037)	(S.E)	(0.0011)
(p-value)	3.06e-06	(p-value)	0.687
IATA	0.0609***	IATA	0.0104
(S.E)	(0.0200)	(S.E)	(0.0126)
(p-value)	0.0023	(p-value)	0.409
Firm age	-5.58e-05	Firm age	0.0002***
(S.E)	(0.0001)	(S.E)	(5.96e-05)
(p-value)	0.706	(p-value)	0.0014
No of foreign subsidiaries	0.00219***	No of foreign subsidiaries	0.0008***

(*continued on next page*)

Table 5 (*continued*)

Industry groups of clusters in UK		Industry groups of clusters in Germany	
Variables	Model 1 Tax haven dummy (Jones & Temouri)	Variables	Model 2 Tax haven dummy (Jones & Temouri)
(S.E)	(0.00029)	(S.E)	(0.00025)
(p-value)	0.000	(p-value)	0.00095
Log long term debt	0.00732***	Log Long term debt	0.00341***
(S.E)	(0.0017)	(S.E)	(0.00083)
(p-value)	1.14e-05	(p-value)	3.87e-05
Log cash flow	0.0200***	Log Cash flow	0.0101***
(S.E)	(0.00310)	(S.E)	(0.0019)
(p-value)	1.07e-10	(p-value)	1.83e-07
Year dummies	**YES**	**Year dummies**	**YES**
Industry dummies	**YES**	**Industry dummies**	**YES**
Number of observations	**14,528**	**Number of observations**	**27,718**
Number of firms	**3,876**	**Number of firms**	**5,334**

Notes: (1) Results for the UK are presented in models (1). Results for Germany are presented in models (2).
(2) The dependent variable is tax haven dummy (Jones & Temouri) in all models; clustered standard errors at the firm level to account for heteroskedasticity.
(3) In model (1), types of clusters in the UK are grouped into 14 groups (Creative clusters; Digital/ ICT clusters; Business services clusters; Finance clusters; Property/ Construction clusters; Tourism clusters; Motor/ Automotive/Aerospace clusters; Manufacturing/ Engineering clusters; Furniture/ woods clusters; Advance research clusters; Chemical clusters; Oil/Gas clusters; Whisky clusters; Instrumental/ Metals clusters).
(4) In model (2), types of clusters in Germany are grouped into 11 groups (Biotech/ Medical tech/ Nano; Digital/ ICT clusters; Business services clusters; Transportation/ Logistics; Textile/ Packaging; Automotive/ Electrical/ Aerospace; Measurement/ Construction clusters; Metal/ Furniture Wood; Energy/ Resources/ Materials/ Environment; Securities tech/ Microsystems; Optical and Photonics). The group "non-cluster" is used as the reference category.
(5) Explanatory variables are lagged by one-year period.
(6) The reported coefficients are marginal effects.
(7) A full set of year and industry dummies are included in models.
(8) Monetary values are in US dollars and are deflated using GDP deflators.
(9) Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

positive and significant effect on the likelihood that a UK-incorporated MNE owns a tax haven subsidiary.

Model (2) indicates that Business Services clusters ($b = 0.196$, $p = 0.000$); Digital/ICT/Industry 4.0 clusters ($b = 0.162$, $p = 0.004$); Biotech/Medical-tech/Nano-tech clusters ($b = 0.329$, $p = 0.040$); Transportation/Logistics clusters ($b = 0.123$, $p = 0.027$) and Automotive/Electrical/Aerospace clusters ($b = 0.134$, $p = 0.071$) drive the probability of owning tax haven subsidiaries by MNEs in Germany. Hence, overall, our results indicate different strengths of the "cluster effect" within each economy, which warrants future research with cluster-specific data that requires special data collection methods, which we outline in the conclusion.

Stage 2: The factors that drive tax haven use by MNEs in clusters

In stage 2, we build upon the findings in stage 1 and show that tax haven use by MNEs in clusters is more probable if there is: (a) a greater degree of imitation in the cluster; (b) a greater availability of professional services providers in the cluster; and (c) a more concentrated cluster in terms of market power.

(a) The imitation effect

The results for Hypothesis 2 which is linked to our construct of the 'imitation effect' are reported in models (1) and (2) in Table 6. We utilize subsamples that only includes cluster located firms in the UK and Germany, respectively. As the aggregate number of tax haven subsidiaries owned by all the MNEs in a cluster increases (less the individual firms' ownership of tax haven subsidiaries), the greater the likelihood a MNE owns a tax haven subsidiary. The estimated coefficients for the imitation

Table 6
Results for the imitation effect and the cluster-specific mechanisms

	Results for the UK	Results for Germany
Variables	Model 1 Tax haven dummy (Jones & Temouri)	Model 2 Tax haven dummy (Jones & Temouri)
H2: No. of tax havens owned by other firms in clusters (cluster level) (Imitation effect) × 10	0.0949***	0.0122***
(S.E)	(0.0122)	(0.00256)
(p-value)	0.000	2.11e-06
H3a: No. of professional services providers in clusters (cluster level) (Co-location) × 10	0.0239***	0.0265***
(S.E)	(0.000732)	(0.00589)
(p-value)	0.00111	6.56e-06
H4a: Share of sales of Top4 (CR4) (cluster level) (Industrial concentration)	0.00203**	0.00331**
(S.E)	(0.000848)	(0.00141)
(p-value)	0.0167	0.0186
Log Turnover	0.00844**	-0.00163
(S.E)	(0.00418)	(0.0118)
(p-value)	0.0437	0.890
IATA	0.0506**	-0.197
(S.E)	(0.0246)	(0.151)
(p-value)	0.0399	0.191
Firm age	-0.000388**	0.000904
(S.E)	(0.000193)	(0.000818)
(p-value)	0.0445	0.269
No. of foreign subsidiaries	3.66e-05	0.00458***
(S.E)	(0.00132)	(0.00138)
(p-value)	0.978	0.000900
Log long term debt	0.00452**	0.00360
(S.E)	(0.00219)	(0.00764)
(p-value)	0.0392	0.637
Log cash flow	0.0222***	0.0179
(S.E)	(0.00463)	(0.0145)
(p-value)	1.62e-06	0.216
Year dummies	**YES**	**YES**
Industry dummies	**YES**	**YES**
Number of observations	**3,919**	**6,281**
Number of firms	**914**	**1,577**

Notes: (1) Results for the UK are presented in model (1). Results for Germany are presented in model (2).
(2) The dependent variable is tax haven dummy (Jones & Temouri) in both models; clustered standard errors at the firm level to account for heteroskedasticity.
(3) In both models, we include imitation effect, co-location of professional services, and industrial concentration together.
(4) The samples of both models include cluster firms only.
(5) The numbers of observations and firms in model (1) fall compared the baseline model due to the exclusion of two financial services clusters in the UK to measure the exposure of the professional services providers located in cluster *j* to firm *i* in cluster *j*.
(6) The reported coefficients are marginal effects.
(7) Explanatory variables are lagged by one-year period.
(8) Monetary values are in US dollars and are deflated using GDP deflators.
(9) A full set of year and industry dummies are included in models.
(10) Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

effect (multiplied by 10) are positive and significant at 1 percent level for both the UK ($b = 0.095$, $p = 0.000$) and Germany ($b = 0.012$, $p = 0.000$). This suggests that as the aggregate number of tax haven subsidiaries owned by all the MNEs in a cluster increases by 10, the propensity of a UK MNE owning a tax haven subsidiary increases by 9.5 percent. Whilst this figure is smaller at 1.2 percent for German MNEs on average. Hence, we find evidence for there being an imitation effect for both countries.

(b) The role of professional services providers

Regarding the results for Hypothesis 3a, the results are reported in model (1) for the UK and model (2) for Germany in Table 6. The

estimated coefficients for the number of professional services providers in a cluster (multiplied by 10) are positive and significant at the 1 percent level for both the UK ($b = 0.024$, $p = 0.001$), and Germany ($b = 0.027$, $p = 0.000$). The results show that as the number of professional services providers in a cluster increases by 10, the propensity of owning a tax haven subsidiary increases by 2.4 percent for the UK and by 2.7 percent for Germany. Hence, the presence of professional services within the clusters in both the UK and Germany increases the likelihood of a MNE in a cluster using a tax haven.

But does this positively moderate the imitation effect as conjectured by Hypothesis 3b? As these are non-linear models it is important to show the margins plot which illustrates graphically how the co-location of professional services providers in a cluster moderates the imitation effect on tax haven use. Figs. 2 and 3 illustrate with margins plots the interaction between imitation and professional services for the UK and Germany, respectively, where we find very interesting and nuanced results. On the vertical axis, we have the probability of owning a tax haven subsidiary. On the horizontal axis, we have total number of tax haven subsidiaries owned by other firms in a cluster as a proxy for the imitation effect. For illustrative purposes, we plot the relationship holding the number of professional services providers in a cluster constant. For both countries, it appears to be the case that presence of professional services providers positively moderates the imitation effect, but the power of the moderating effect appears to be different between the UK and Germany. In the UK context, the confidence intervals overlap, so we cannot conclude that the presence of professional services providers drives imitation in the UK. However, for Germany, the confidence intervals do not overlap, and it seems that the presence of professional services providers multiplies the imitation effect. Hence, for the UK, there is less support for hypothesis 3b, such that co-location of professional services drives the imitation effect, but the opposite can be said for Germany. One might interpret these heterogenous results based upon different institutional contexts. As the German economy is more coordinated relative to the UK, MNEs may rely more on network relationships for decision making, facilitating closer ties and trust; hence amplifying the imitation effect.

(c) The role of industrial concentration

Regarding the results for Hypotheses 4, the results are reported in model (1) for the UK and in model (2) for Germany (see Table 6). The estimated coefficients for the four-firm concentration ratio (CR4) at the cluster level are positive and significant at the 5 percent level for both the UK in model (1) ($b = 0.002$, $p = 0.017$) and for Germany in model (4) ($b = 0.003$, $p = 0.019$), respectively. The results suggest that if the CR4 in a cluster increases by 1 percentage point, the likelihood of a firm establishing a tax haven subsidiary increases by 0.2 percent and 0.3 percent for the UK and Germany, respectively. This indicates that greater industrial concentration within a cluster increases tax haven use by MNEs who are in clusters. The result is indicative that market power within a cluster is a key driver of tax haven use. It is also suggestive that the dominance of larger MNEs in a cluster may drive the behaviour of other MNEs in the cluster.

Stage 3*: *The amplification effect of leadership and experience

Building on the results for industrial concentration, in the final stage of our empirical strategy, we shed further light on the imitation effect by examining whether larger and more experienced MNEs in clusters, drive the tax haven use by comparatively smaller and younger firms located in clusters. This is essentially indicative of looking for evidence of "herd-like" behaviour between firms in clusters and hence tests Hypotheses 4b and 4c linked to the amplification effects of leadership and experience. The results are reported in Table 7. It is important to note that the samples for these empirical tests have exclusion restrictions such that we model the propensity to use tax havens by excluding larger and more experienced firms from the sample depending on various thresholds.

In models (1) and (3), we test whether firm size is a causal mechanism for the imitation of firms in clusters for the UK and Germany, respectively. The estimated coefficients for the effect of imitating the four biggest firms in a cluster (multiplied by 10) are positive and significant at 5 percent level for both the UK ($b = 0.051$, $p = 0.013$) and Germany ($b = 0.015$, $p = 0.038$). The results suggest that if the average number of tax havens owned by the four biggest firms in a cluster increases by 10, the likelihood of a firm owning a tax haven subsidiary increases by 5.1 percent in the case of the UK compared to 1.5 percent in the case of Germany. This effect shows support to Hypothesis 4b such that firm size is one of the key drivers of "herd-like" behaviours in relation to cluster internationalization through tax havens.

In models (2) and (4), we test whether firm age is a causal mechanism for the imitation of firms in clusters for the UK and Germany, respectively. We find that the effect of imitating the four oldest firms in a

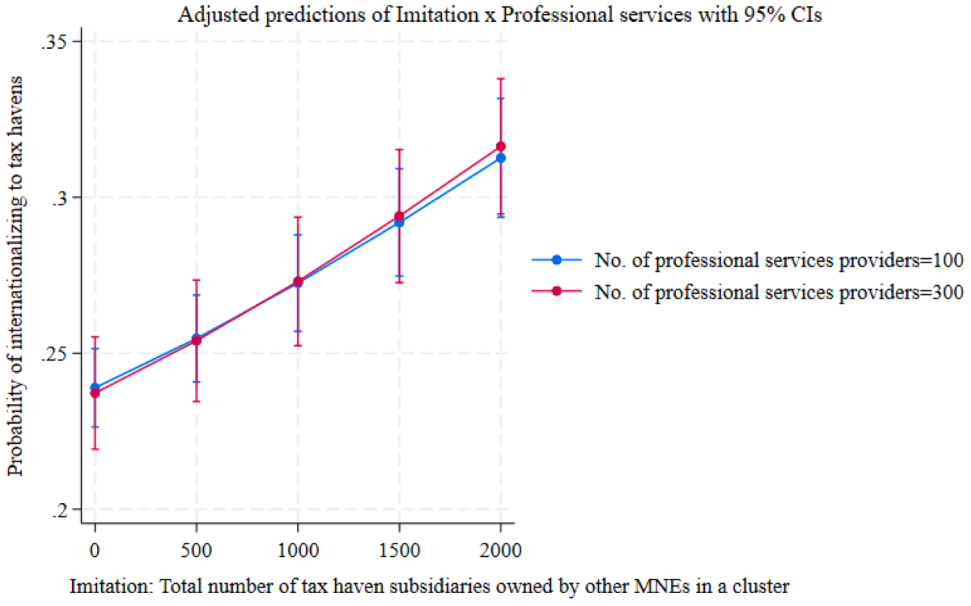

Fig. 2. Imitation × Co-location of professional services (UK)
Predictive margins of the propensity to own tax haven subsidiaries by imitation effect and cluster environment (co-location of professional services and industrial concentration): Hypothesis 3b

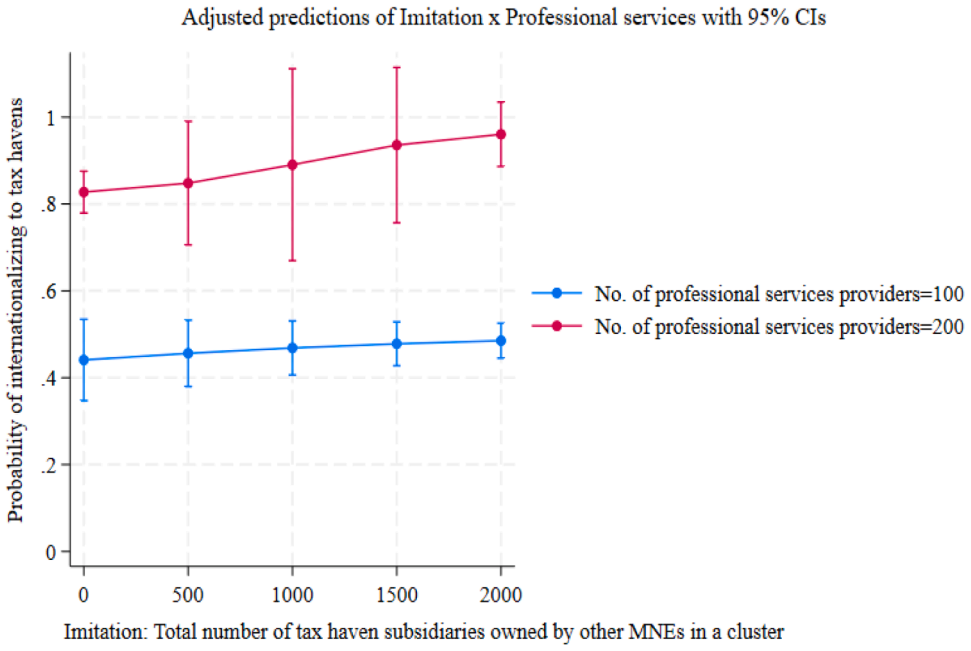

Fig. 3. Imitation × Co-location of professional services (Germany)

cluster is positive and significant on the propensity of owning tax haven subsidiaries by MNEs for both the UK ($b = 0.019$, $p = 0.000$) and Germany ($b = 0.027$, $p = 0.075$). The estimated coefficient of this imitation effect for the UK is significant at 1 percent level, while it is significant at 10 percent level for Germany. This effect offers support to Hypothesis 4c such that firm experience is one of the causal mechanisms for the imitation of firms in clusters.

Results Summary

It is useful at this point to summarize our key results. In stage 1, we show that MNEs in clusters are more likely to utilize tax havens compared to firms outside of clusters (**H1**). However, this effect is driven by specific clusters within each country. In stage 2, we examine the forces that drive tax haven use by MNEs in clusters. For MNEs who are located in clusters, MNEs are more likely to use tax havens if they imitate their peers (**H2**); if there is a significant presence of professional services providers located in the cluster (**H3a**); if there is moderating effect on imitation from co-location of professional services (**H3b**) (though this effect is only observed in the German sample); and if the cluster in which they are located is highly concentrated (**H4a**). Finally, for both sample countries, we observe "herd-like" behaviour such that smaller MNEs tend to follow larger MNEs in their propensity to use tax havens (**H4b**) and that less experienced MNEs tend to follow more experienced MNEs in their propensity to use tax havens (**H4c**).

Although it is important to be cautious when comparing our results for the UK and Germany, the results do indicate some heterogeneity. It would seem that the direct effect of being in a cluster is somewhat stronger for the UK relative to Germany. It would also seem that the direct effect of imitation is important in both countries. The same can also be said for the opportunity to use professional services providers, market power, and the "herd-like" behaviour in relation to firm's internationalization to tax havens. Nevertheless, the interaction between imitation and co-location of professional services is stronger in the German setting compared to that in the UK setting. This is suggestive of a more collusive and collaborative pattern of behaviour in Germany. Whereas the behaviour for firms in the UK is perhaps more at arms-length. These results warrant further research and are perhaps indicative of the political economy of each polity and the associated form of market capitalism.

Lastly, in terms of the control variables for each of the models, the coefficient estimates typically work as expected for both UK and German MNEs. The degree of internationalisation, the level of debt and short-term cash flow are positive predictors of tax haven ownership. The estimated coefficients for turnover and intangible assets ratio are insignificant throughout, which is somewhat surprising. However, this could be due to our sample which is composed of already established MNEs in clusters that have very high levels of turnover and intangible assets.

4.2. Robustness Checks

To assess the sensitivity of our results, we performed a range of tests to control for endogeneity, use different tax haven measures, and adopt a different proxy for the imitation effect and for the mechanisms that amplify it. The results of the robustness checks are reported in Tables 8 to 10. The descriptive statistics for all additional variables used in our robustness checks are shown in Table 2 for the UK and Table 3 for Germany.

First, one potential source of endogeneity in this context could be missing variable bias, in the sense that any decision to be in a cluster would follow the same underlying process as that to setting up a tax haven subsidiary. To address any possible endogeneity in our baseline model, we took a two-stage instrumental variable approach. We use a set of instrumental variables that are likely correlated with the decision of a firm to be part of a cluster but unlikely to be correlated with the firm's decision to utilize a tax haven. Porter (1990) highlights that a cluster is composed of a set of firms within a dense geographically concentrated area. In addition, Porter (1998, 2000) and Feldman and Audretsch (1999) emphasize the importance of human capital in clusters. Furthermore, the literature shows the role of skilled labour in clusters (Delgado et al., 2014; Feldman & Audretsch, 1999). Accordingly, we use instrumental variables that are predicted to be correlated with a firm being located in a cluster but uncorrelated with tax haven use. Data for instrumental variables comes from Office for National Statistics (ONS) for the UK and Federal Statistical Office (DESTATIS) for Germany, including number of firms by NUTS3; number of employees by NUTS3; and number of high-skilled employees by NUTS1. We also lagged these variables by one period and include them as instruments. We conduct the Durbin-Wu-Hausman (DWH) test to assess the exogeneity assumption, and a Stock-Yogo test for weak identification.

The results of those tests are presented in models (1) and (4) in

Table 7
Results for the amplification of leadership and experience

Variables	Results for the UK		Results for Germany	
	Model 1 Tax haven dummy (Jones & Temouri)	Model 2 Tax haven dummy (Jones & Temouri)	Model 3 Tax haven dummy (Jones & Temouri)	Model 4 Tax haven dummy (Jones & Temouri)
H4b: Imitating lead firms (four biggest firms) (cluster level) × 10	0.0511**		0.0149**	
(S.E)	(0.00206)		(0.00717)	
(p-value)	0.0130		0.0380	
H4c: Imitating lead firms (four oldest firms) (cluster level) × 10		0.0192***		0.0271*
(S.E)		(0.000464)		(0.00433)
(p-value)		3.34e-05		0.0746
Log Turnover	0.0191	0.00935	-0.00156	-0.00118
(S.E)	(0.0121)	(0.00600)	(0.00406)	(0.00421)
(p-value)	0.114	0.119	0.701	0.779
IATA	-0.0714	-0.0439	0.00200	-0.00609
(S.E)	(0.0760)	(0.0327)	(0.0375)	(0.0449)
(p-value)	0.347	0.180	0.957	0.892
Firm age	-0.000458	-0.00142***	0.000321	0.000616*
(S.E)	(0.00134)	(0.000412)	(0.000262)	(0.000315)
(p-value)	0.732	0.000552	0.221	0.0502
No. of foreign subsidiaries	0.00172**	0.00143***	0.000359	0.000324***
(S.E)	(0.000682)	(0.000323)	(0.000227)	(9.34e-05)
(p-value)	0.0119	9.17e-06	0.114	0.000529
Log Long term debt	0.00829**	0.00885***	0.00667*	0.00552*
(S.E)	(0.00416)	(0.00280)	(0.00341)	(0.00299)
(p-value)	0.0464	0.00157	0.0505	0.0648
Log Cash flow	0.0148**	0.00950**	0.0110*	0.0101**
(S.E)	(0.00603)	(0.00480)	(0.00579)	(0.00502)
(p-value)	0.0143	0.0477	0.0575	0.0443
Year dummies	**YES**	**YES**	**YES**	**YES**
Industry dummies	**YES**	**YES**	**YES**	**YES**
Number of observations	**3,719**	**3,719**	**4,719**	**4,719**
Number of firms	**865**	**865**	**1,257**	**1,257**

Notes: (1) Results for the UK are presented in models (1) and (2). Results for Germany are presented in models (3) and (4).
(2) The dependent variable is tax haven dummy (Jones & Temouri) in all models; clustered standard errors at the firm level to account for heteroskedasticity.
(3) In models (1) and (3), we use the average number of tax havens owned by the four biggest firms (based on firm size) as a proxy for the effect of imitating lead firms in clusters. We then exclude the four biggest firms in each cluster when running models.
(4) In models (2) and (4), we use the average number of tax havens owned by the four oldest firms (based on firm age) as a proxy for the effect of imitating lead firms in clusters. We then exclude the four oldest firms in each cluster when running models.
(5) The reported coefficients are marginal effects.
(6) Explanatory variables are lagged by one-year period.
(7) Monetary values are in US dollars and are deflated using GDP deflators.
(8) A full set of year and industry dummies are included in models.
(9) Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

Table 8 for the UK and for Germany, respectively. In model (1), the estimated coefficient for cluster dummy is statistically significant ($b = 0.426$, $p = 0.000$). This suggests that UK MNEs in clusters have a probability of tax haven ownership that is 13.7 percent (Φ (-0.434) – Φ (-0.856)) higher compared to those firms who are not located in a cluster. In model (4), the estimated coefficient for the cluster dummy is positive and statistically significant ($b = 0.434$, $p = 0.000$). This suggests that German firms in clusters have a probability of tax haven ownership that is 17.1 percent (Φ (0.287) – Φ (-0.147) higher compared to those firms who are not located in clusters. The Durbin-Wu-Hausman test reports the p-value of 0.000 for both countries, therefore confirming the validity of the used instruments. The Stock and Yogo test shows a significantly high F-statistic of 201.6 for the UK, which is much higher than F statistic of 99.2 for Germany. Hence, the assumption that the instruments are weak can be rejected.

Second, we test for other measures of tax havens by using a tax haven count variable defined by Jones & Temouri (2018) and "dots" tax haven measure defined by Hines & Rice (1994) (see Table A1). The former is a count variable, which aggregates the number of tax haven subsidiaries owned by each parent MNE. The list of tax haven locations for the former remains the same as the one we used in the baseline model, consisting of 52 tax havens. The latter is a binary variable, equal 1 if a MNE has at least one subsidiary in at least one of the 28 dot tax havens.

The results of the second test with the use of two alternative definitions of tax havens are reported in models (2) and (3) for the UK; and in models (5) and (6) for Germany, respectively (see Table 8). In model (2), we estimate a Poisson model and the dependent variable changes to the incidence rate of tax haven ownership by using the tax havens list of Jones & Temouri (2018). The results report the significant and positive coefficient for the cluster dummy variable for the UK ($b = 1.495$, $p = 0.007$). The estimated coefficient offers evidence that firms, who are located in clusters have an incidence rate of tax haven ownership 1.5 times higher than non-cluster firms. In model (4), the estimated coefficient demonstrates that German firms that are located in clusters have an incident rate of tax haven ownership 1.3 times higher than non-cluster firms ($b = 1.274$, $p = 0.007$).

In model (3), the estimated coefficient for the cluster dummy variable remains positive and significant for the UK ($b = 0.130$, $p = 0.003$). This marginal effect reports that being located in a cluster improves the probability of tax haven ownership of a UK-incorporated MNE by 13.0 percent. In model (6), the estimated coefficient for the cluster dummy variable remains positive and significant for Germany ($b = 0.089$, $p = 0.000$). This marginal effect shows that a German firm who is part of a cluster has the likelihood of using tax havens 8.9 percent higher than that for a firm outside of a cluster.

Third, we run count models to test factors that drive tax haven use by firms in clusters. As before, the sample used to conduct this experiment only consist of firms who belong to a cluster. The results of the third test applied to the count models are reported in model (1) for the UK; and in model (2) for Germany (see Table 9). In terms of the imitation effect, the estimated coefficients are positive and significant at 1 percent level for both the UK ($b = 1.297$, $p = 0.000$) and Germany ($b = 1.028$, $p = 0.000$). As for the co-location of professional services, the estimated coefficients are positive and significant at 5 percent level for the UK ($b = 1.011$, $p = 0.018$); and at 1 percent level for Germany ($b = 1.110$, $p = 0.005$). For the industrial concentration, the results report the significant and positive coefficient at 5 percent level for both the UK ($b = 1.007$, $p = 0.029$) and for Germany ($b = 1.019$, $p = 0.020$). Again, the robustness checks show a statistically significant effect of imitation, co-location of professional services, and industrial concentration that drive cluster MNEs to internationalize to tax havens.

Fourth, we further test the robustness of the effect of imitating lead firms in each cluster by using two different thresholds for the number of lead firms in a particular cluster. For the amplification effect of leaders, we use: (1) the average number of tax havens owned by the biggest firm (based on firm size) in a particular cluster *j*. We then exclude the biggest firm in each cluster when running models; and (2) the average number of tax havens owned by the three biggest firms (based on firm size) in a particular cluster *j*. We then exclude the three biggest firms in each cluster when running models. For the amplification effect of experience, we use: (1) the average number of tax havens owned by the oldest firms

Table 8
Robustness check for the cluster membership effect on firms' use of tax havens

	Robustness checks for the UK			Robustness checks for Germany		
Variables	Model 1 Tax haven dummy (Jones & Temouri)	Model 2 Tax haven count (Jones & Temouri)	Model 3 Tax haven dummy (Hines & Rice)	Model 4 Tax haven dummy (Jones & Temouri)	Model 5 Tax haven count (Jones & Temouri)	Model 6 Tax haven dummy (Hines & Rice)
H1: Cluster	0.426***	1.495***	0.1304***	0.434***	1.274***	0.0893***
(S.E)	(0.0620)	(0.221)	(0.0147)	(0.108)	(0.484)	(0.0139)
(p-value)	0.000	0.00663	0.003	5.95e-05	0.00742	1.22e-10
Log Turnover	0.0141***	1.015	0.00361**	0.00165	0.984	0.00238**
(S.E)	(0.00515)	(0.0376)	(0.00466)	(0.00137)	(0.0380)	(0.00103)
(p-value)	0.00614	0.691	0.0439	0.229	0.681	0.0204
IATA	0.0137	1.155	0.0193	0.00898	0.627	0.00846
(S.E)	(0.0381)	(0.410)	(0.0273)	(0.0220)	(0.253)	(0.0117)
(p-value)	0.719	0.684	0.479	0.683	0.247	0.470
Firm age	0.000285	0.999	0.000285	0.000761***	1.000	1.19e-05
(S.E)	(0.000301)	(0.00186)	(0.000209)	(0.000147)	(0.00175)	(4.21e-05)
(p-value)	0.343	0.693	0.173	2.18e-07	0.848	0.777
No. of foreign subsidiaries	0.000482***	1.003***	0.00130***	0.000482***	1.003***	0.000736***
(S.E)	(7.13e-05)	(0.000278)	(0.000125)	(7.79e-05)	(0.000496)	(0.000117)
(p-value)	0.000	0.000	0.000	6.24e-10	0.000	2.69e-10
Log Long term debt	0.0142***	1.051*	0.00771***	0.00379***	1.060***	0.00284***
(S.E)	(0.00234)	(0.0277)	(0.00249)	(0.000725)	(0.0229)	(0.000803)
(p-value)	1.52e-09	0.061	0.00193	1.74e-07	0.0069	0.000402
Log Cash flow	0.0225***	1.160***	0.0140***	0.0108***	1.171***	0.00759***
(S.E)	(0.00347)	(0.0313)	(0.00415)	(0.00151)	(0.0649)	(0.00180)
(p-value)	7.83e-11	3.78e-08	0.000728	0.000	0.00432	2.55e-05
Constant	-0.856***	0.0191***			-0.147***	0.00683***
(S.E)	(0.0804)	(0.0135)			(0.0276)	(0.00759)
(p-value)	0.000	2.28e-08			1.06e-07	7.14e-06
Year dummies	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**
Industry dummies	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**
Number of observations	**11,815**	**14,528**	**14,528**	**27,528**	**27,718**	**27,718**
Number of firms	**3,189**	**3,876**	**3,876**	**5,298**	**5,334**	**5,334**
Durbin-Wu-Hausman (p-value)	**0**	**NO**	**NO**	**0**	**NO**	**NO**
Stock & Yogo (F statistic)	**201.569**	**NO**	**NO**	**99.178**	**NO**	**NO**

Notes: (1) Results for the UK are presented in models (1) (2) and (3). Results for Germany are presented in models (4) (5) and (6).
(2) The dependent variables are tax haven dummy (Jones & Temouri) in models (1) and (4); Tax haven count (Jones & Temouri) in model (2) and (5); and Dots tax haven dummy (Hines & Rice) in model (3) and (6); clustered standard errors at the firm level to account for heteroskedasticity.
(3) Models (1) and (4) use instrumental variables. The instrument variables for the cluster variable in model (1) include: number of firms by NUTS3; number of employees by NUTS3; number of high-skilled employees by NUTS1; number of firms by NUTS3 $_{t-1}$; number of employees by NUTS3 $_{t-1}$; number of high-skilled employees by NUTS1 $_{t-1.}$ The instrument variables for the cluster variable in model (4) include: number of employees by NUTS3; number of high-skilled employees by NUTS1; number of employees by NUTS3 $_{t-1}$; number of high-skilled employees by NUTS1$_{t-1}$.
(4) For postestimation in models (1) and (4), Durbin-WuHausman (DWH) is used to test whether the exogeneity assumption holds; Stock-Yogo test is for weak identification to test whether instruments utilized are valid.
(5) In models (1) and (4), the reported coefficient is for instrumental variable estimation of panel data with a binary dependent variable. The reported coefficient are incidence rate ratios in models (2) and (5). The reported coefficients are marginal effects in models (3) and (6).
(6) The numbers of observations and firms in model (1) fall compared to models (2) and (3) due to the availability of data used for instrumental variables. Similarly, the numbers of observations and firms in model (4) fall compared to models (5) and (6) due to the availability of data used for instrumental variables.
(7) All explanatory variables are lagged one period.
(8) All monetary values are in US dollars and are deflated using GDP deflators.
(9) All models include a full set of year and industry dummies.
(10) Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

(based on firm age) in a particular cluster *j*. We then exclude the oldest firm in each cluster when running models; and (2) the average number of tax havens owned by the three oldest firms (based on firm age) in a particular cluster *j*. We then exclude the three oldest firms in each cluster when running models.

The results of the fourth test with different thresholds for the effect of imitating lead firms in each cluster are presented in models (1) to (4) for the UK, and in models (5) to (8) for Germany (see Table 10). Models (1) and (2) report the effect of imitating the biggest firm and the oldest firm for the UK, respectively; while model (5) and model (6) reports the effect of imitating the biggest firm and the oldest firm for Germany, respectively. The estimated coefficient for the effect of imitating the biggest firm in each cluster in the UK is positive and significant at 5 percent level ($b = 0.036$, $p = 0.043$) in model (1), whereas this coefficient for Germany is positive and significant at a reduced significance level of 10 percent ($b = 0.039$, $p = 0.072$) in model (5). Likewise, the estimated coefficient for the effect of imitating the oldest firm in each cluster in the UK is positive and significant at 1 percent level ($b = 0.011$, $p = 0.000$) in model (2), whereas this coefficient for Germany is positive and less significant at 5 percent level (b = 0.014, p = 0.015) in model (6). This result again shows that the "herd-like" behavior among firms in clusters to follow lead firms in clusters in relation to cluster internationalization through tax havens remains more significant for the UK than that for Germany.

Model (3) and model (4) report the effect of imitating the three biggest firms and the three oldest firms for the UK, respectively; while

Table 9
Robustness check for the imitation effect and mechanisms related cluster environment

Variables	Robustness checks for the UK Model 1 Tax haven count (Jones & Temouri)	Robustness checks for Germany Model 2 Tax haven count (Jones & Temouri)
H2: No. of firms in clusters owning tax havens (cluster level) (Imitation effect)	1.297***	1.028***
(S.E)	(0.00819)	(0.00365)
(p-value)	0.000	0.000
H3a: No. of professional services providers in clusters (cluster level) (Co-location)	1.011**	1.110***
(S.E)	(0.000337)	(0.0407)
(p-value)	0.0176	0.00458
H4a: Share of sales of Top4 (CR4) (cluster level) (Industrial concentration)	1.007**	1.019**
(S.E)	(0.00331)	(0.00832)
(p-value)	0.0290	0.0200
Log Turnover	1.102***	0.979
(S.E)	(0.0121)	(0.0258)
(p-value)	0.000	0.415
IATA	0.890	0.762
(S.E)	(0.0870)	(0.316)
(p-value)	0.234	0.512
Firm age	1.001	0.992
(S.E)	(0.000904)	(0.00579)
(p-value)	0.576	0.154
No. of foreign subsidiaries	1.003***	0.996***
(S.E)	(8.16e-05)	(0.00137)
(p-value)	0.000	0.00242
Log long term debt	0.985**	1.068*
(S.E)	(0.00648)	(0.0407)
(p-value)	0.0247	0.0861
Log cash flow	0.957***	1.040
(S.E)	(0.0101)	(0.0341)
(p-value)	3.06e-05	0.230
Constant	0.0597***	4.87e-05***
(S.E)	(0.0204)	(0.000141)
(p-value)	0.000	0.000609
Year dummies	**YES**	**YES**
Industry dummies	**YES**	**YES**
Number of observations	**3,919**	**6,281**
Number of firms	**914**	**1,577**

Notes: (1) Results for the UK are presented in model (1). Results for Germany are presented in model (2).
(2) The dependent variables are tax haven count (Jones & Temouri) in both models; clustered standard errors at the firm level to account for heteroskedasticity.
(3 In both models, we include imitation effect, co-location of professional services, and industrial concentration together.
(4) In both models, the sample includes cluster firms only.
(5) The numbers of observations and firms in models (1) fall compared to the baseline model due to the exclusion of two financial services clusters in the UK to measure the exposure of the advanced producer services providers located in cluster *j* to firm *i*.
(6) The reported coefficients are incidence rate ratios in both models.
(7) All explanatory variables are lagged one period.
(8) All monetary values are in US dollars and are deflated using GDP deflators.
(9) All models include a full set of year and industry dummies.
(10) Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

model (7) and model (8) report the effect of imitating the three biggest firms and the three oldest firms for Germany, respectively. While the estimated coefficient for the effect of imitating the three biggest firms in each cluster in the UK is positive and highly significant at 1 percent level ($b = 0.086$, $p = 0.004$) in model (3), this coefficient for Germany is positive at a lower significance level of 10 percent ($b = 0.009$, $p = 0.089$) in model (7). Similarly, the estimated coefficient for the effect of imitating the three oldest firms in each cluster in the UK is positive and highly significant at 1 percent level ($b = 0.016$, $p = 0.000$) in model (4), this coefficient for Germany is positive and significant at 5 percent level ($b = 0.014$, $p = 0.032$) in model (8). In general, the sign and the significance remain stronger and more significant for the UK than those for Germany across our alternative models when we use the different thresholds for the effect of imitating lead firms in clusters.

Overall, the results from the robustness checks confirm the main results reported in our earlier models. We continue to find support for our hypotheses related to the cluster effect, the factors that drive tax haven use by firms in clusters (the imitation effect, co-location of professional firms, and industrial concentration), and the amplification effect of leadership and experience.

4.3. Additional evidence

We carried out a set of other tests to make sure that our results are robust to different model specifications and alternative variable measurements. First, in order to control for the possibility of selection bias of our binary cluster variable and to mitigate sample-induced endogeneity, we implement Heckman two-stage estimation applied to a binary dependent variable. In the first stage, we run Probit model with the use of instrumental variables including number of firms by NUTS3; number of employees by NUTS3; and number of high-skilled employees by NUTS1 for the cluster variable as discussed in Section 4.2. Hence, we are able to calculate the selection parameter Inverse Mills Ratio (IMR). In the second stage, the outcome equation is estimated using Probit regression where the binary selection dependent variable is the use of tax havens (Jones & Temouri, 2016). The selection variable IMR is included in the outcome equation. Second, we include a variable "Effective average tax rate (EATR)" in the baseline model that is available from CBT Oxford Tax Database to account for the corporate tax regime for each country and its effects on top of the time dummies. Third, we use an alternative measure for one of our control variables - the number of foreign subsidiaries - by changing it to the number of foreign subsidiary locations that a MNE has a presence to capture the global spread of the MNEs in our samples. Fourth, we adopt more conservative approaches by using two more restricted tax haven definitions, including Hines and Rice's dot tax havens (see Table A1) and the top three dot tax havens (i.e., British Virgin Islands, Cayman Islands, and Bermuda) published by Tax Justice Network (2021) for our cluster dependent variable. Fifth, we use another proxy for the imitation effect by calculating the total number of firms in a cluster who own tax haven subsidiary and subtracting from this whether or not an individual firm in the cluster owns a tax haven subsidiary. As before, the sample used to conduct this experiment only consists of cluster MNEs. Sixth, for the measure of co-location of professional services in clusters, we use the most granular level of industry disaggregation with the four-digit NACE code 69.20 to identify tax consultancy firms in each cluster *j*. Lastly, for an additional check of amplification effects of leadership and experience, we experiment with a smaller subsample for each country that only includes MNEs which are up to five years old. We then run models where the independent variable is the number of tax haven subsidiaries owned by the four largest or four most experienced MNEs to determine if there is a correlation between extremely young MNEs and the use of tax havens by the largest or oldest MNEs.

The results of the additional empirical evidence for the cluster effect are reported in models (1) to (8) in Table A8. The results of the additional empiric evidence for the imitation effect are reported in models (1) to (10) in Table A9. The results of the additional empiric evidence for mechanisms related to co-location of professional services and industrial concentration are reported in models (1) to (10) in Table A10. The results of the additional empirical evidence for the amplification effects of leadership and experience are reported in models (1) to (12) in Table A11. Overall, the directions and the significant levels remain consistent across our hypotheses with the alternative specifications. We

Table 10
Robustness check for the effect of imitating lead firms in clusters with different thresholds

Variables	Robustness checks for the UK				Robustness checks for German			
	Model 1 Tax haven dummy (Jones & Temouri)	Model 2 Tax haven dummy (Jones & Temouri)	Model 3 Tax haven dummy (Jones & Temouri)	Model 4 Tax haven dummy (Jones & Temouri)	Model 5 Tax haven dummy (Jones & Temouri)	Model 6 Tax haven dummy (Jones & Temouri)	Model 7 Tax haven dummy (Jones & Temouri)	Model 8 Tax haven dummy (Jones & Temouri)
H4b: Imitating lead firms (the biggest firm of each cluster) × 10	0.036**				0.0392*			
(S.E)	(0.000170)				(0.00198)			
(p-value)	0.043				0.072			
H4c: Imitating lead firms (the oldest firm of each cluster) × 10		0.0110***				0.0142**		
(S.E)		(0.000242)				(0.000986)		
(p-value)		4.97e-06				0.0149		
H4b: Imitating lead firms (three biggest firms in each cluster) × 10			0.0856***				0.00987*	
(S.E)			(0.000302)				(0.00778)	
(p-value)			0.00458				0.089	
H4c: Imitating lead firms (three oldest firms in each cluster) × 10				0.0161***				0.0140**
(S.E)				(0.000420)				(0.00106)
(p-value)				0.000132				0.0318
Log Turnover	0.00801	0.00845	0.0221***	0.00960	0.0105	-0.000600	-0.00915	-0.000347
(S.E)	(0.00763)	(0.00776)	(0.00585)	(0.00596)	(0.0104)	(0.00284)	(0.0349)	(0.00290)
(p-value)	0.294	0.276	0.000162	0.107	0.309	0.833	0.793	0.905
IATA	-0.0385	-0.0313	-0.0407	-0.0492	-0.0456	0.00678	0.0682	0.00625
(S.E)	(0.0477)	(0.0396)	(0.0315)	(0.0328)	(0.0956)	(0.0413)	(0.413)	(0.0499)
(p-value)	0.419	0.429	0.197	0.134	0.633	0.870	0.869	0.900
Firm age	-0.000697	-0.00130***	-0.000204	-0.0013***	-0.00120	0.000165	0.00135	0.000544
(S.E)	(0.000489)	(0.000372)	(0.000306)	(0.000381)	(0.000782)	(0.000492)	(0.00460)	(0.00113)
(p-value)	0.154	0.000463	0.506	0.00105	0.123	0.738	0.769	0.629
No. of foreign subsidiaries	0.00142***	0.00161***	0.00209***	0.00143***	0.00371**	0.000793*	0.00141*	0.000805**
(S.E)	(0.000252)	(0.000233)	(0.000454)	(0.000315)	(0.00160)	(0.000465)	(0.00473)	(0.000500)
(p-value)	1.72e-08	0	4.38e-06	5.60e-06	0.0202	0.0882	0.0766	0.0107
Log Long term debt	0.00890**	0.0111***	0.0108***	0.00893***	0.00757**	0.00318**	-0.00903	0.00264**
(S.E)	(0.00416)	(0.00328)	(0.00256)	(0.00283)	(0.00603)	(0.00218)	(0.0319)	(0.00211)
(p-value)	0.0323	0.000715	2.45e-05	0.00158	0.021	0.0144	0.777	0.0212
Log Cash flow	0.0102	0.0133**	0.0150***	0.00932*	0.0349***	0.00457**	0.0303	0.00975**
(S.E)	(0.00659)	(0.00619)	(0.00463)	(0.00485)	(0.0134)	(0.00440)	(0.0757)	(0.0135)
(p-value)	0.123	0.0312	0.00119	0.0549	0.00900	0.030	0.689	0.047
Year dummies	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**
Industry dummies	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**
Number of observations	**4,246**	**4,246**	**3,992**	**3,992**	**5,944**	**5,944**	**5,264**	**5,264**
Number of firms	**958**	**958**	**896**	**896**	**1,497**	**1,497**	**1,377**	**1,377**

Notes: (1) Results for the UK are presented in models (1) (2) (3) and (4). Results for Germany are presented in models (5) (6) (7) and (8).
(2) The dependent variables are tax haven dummy (Jones & Temouri) in all models; clustered standard errors at the firm level to account for heteroskedasticity.
(3) In models (1) and (5), we use the average number of tax havens owned by the biggest firms (based on firm size) as a proxy for the imitating the lead firms in a cluster.
(4) In models (2) and (6), we use the average number of tax havens owned by the oldest firm (based on firm age) as a proxy for the imitating the lead firms in a cluster.
(5) In models (3) and (7), we use the average number of tax havens owned by the three biggest firms (based on firm size) as a proxy for the imitating the lead firms in a cluster.
(6) In models (4) and (8), we use the average number of tax havens owned by the three oldest firm (based on firm age) as a proxy for the imitating the lead firms in a cluster.
(7) The sample includes cluster firms only. We then exclude the biggest firm/ the oldest firm; and the three biggest firms/the three oldest firms in each cluster when running models.
(8) The reported coefficients are marginal effects in all models.
(9) All explanatory variables are lagged one period.
(10) All monetary values are in US dollars and are deflated using GDP deflators.
(11) All models include a full set of year and industry dummies.
(12) Standard errors in parentheses; *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

continue to find support for our hypotheses on the cluster effect, the imitation effect, and the amplifiers of the imitation in clusters for both research settings (i.e., the UK and Germany).

5. Discussion and conclusion

We advance our understanding of cluster internationalization to tax havens by MNEs by answering two research questions: (1) showing that MNEs in clusters have a greater propensity of owning tax haven subsidiaries compared to MNEs located outside of clusters; and (2) building on this insight and showing that this type of cluster internationalization is driven by imitation, the availability of professional services providers, and the degree of industrial concentration within the cluster. Our result for the degree of industrial concentration within the cluster is indicative that powerful MNEs are critical in influencing this type of behavior, likely due to the need for competitive advantage. Subsequently, we find evidence for this process such that relatively smaller and less experienced MNEs tend to imitate the tax haven use of larger and more experienced MNEs. Lastly, additional results support the view that the availability of professional services providers in clusters also has an impact in terms of firm imitation. This is particularly the case for MNEs in Germany where collaboration between firms in clusters is likely to be more common. Our results are remarkably robust across several empirical specifications, measures of the dependent variable, tests for endogeneity and for two advanced economies with different varieties of capitalism. We elaborate on the implications of our study below.

5.1. Implications for Theory

First, our paper contributes to our current understanding on cluster internationalization by adding novel cluster-specific factors that drive the internationalization process. We provide insights into how firms located in a cluster are influenced by institutional forces and engage in mimetic behavior to internationalize - specifically within the context of tax haven internationalization. Our results build on recent literature to corroborate the fact that firms adopt similar customs and practices amongst their peers to maintain legitimacy in highly contested economic environments (Abrahamson & Rosenkopf, 1993; Barreto & Baden-Fuller, 2006; Dacin, 1997). When a significant number of firms within a cluster engage in tax haven use, it creates a set of "herd-like" behavior or "bandwagon" effects such that this type of activity becomes routine and pervasive (Depoers & Jérôme, 2020; Martínez-Ferrero & García-Sánchez, 2017).

Second, our results contribute to several underexplored channels through which imitation is amplified. In particular, our analysis shows that the availability of professional services providers to MNEs in clusters enhances the imitation effect in terms of driving the use of tax havens. This finding sheds novel light on a perspective that the effect of mimetic isomorphism results from the increasing professionalization of the environment (DiMaggio & Powell, 1983). The availability of such services in clusters normalizes innovative tax planning techniques and creates feedback loops that continually reinforces this type of behaviour. This leads to an even greater degree of imitation between firms within a cluster as they might be concerned about losing competitive advantage. Furthermore, professional services providers are inclined to work collaboratively (Muzio et al., 2013). Consequently, professional norms are capitalized on the presence of such external forces, creating isomorphic pressures within networks (Boland & Tenkasi, 1995; Frumkin & Galaskiewicz, 2004). We also add insights about "bandwagon" effects in the context of cluster internationalization to tax havens. As we found in this study, "herd-like" behaviour or "bandwagon" effects in clusters start by market leaders with higher visibility and experience. Subsequently, smaller and less experienced firms strategically follow such leaders to imitate their prevailing practices. Hence, our study highlights the key players in clusters who provide strong signals that motivate firms to replicate and to expand abroad, thereby intensifying the tendency of mimetic isomorphism.

Third, our study contributes to the literature on cluster internationalization by examining a specific type of internationalization and exploring how these findings might extend to other internationalization behaviours. Prior research in IB highlights that institutional forces through mechanisms like mimetic isomorphism, influence firm decision-making by encouraging replication of referent firms' actions. Mimetic isomorphism, which addresses uncertainty as a compelling driver for imitation (DiMaggio & Powell, 1983), aligns with similar mechanisms observed in the sparse literature on cluster internationalization (e.g., Amdam et al., 2020; Tan et al., 2013). Our study builds on this by focusing on a particular mode of internationalization—through tax havens—and identifying specific cluster characteristics that stimulate social cues among cluster firms to adopt this strategy. Thus, our study offers a nuanced perspective by linking clusters to distinct internationalization behaviours, even in sensitive contexts such as tax haven strategies. Unlike more conventional FDI types, tax haven use is highly secretive and challenging to observe, making it more difficult for firms outside of clusters to replicate. We argue that clusters foster closer inter-firm connections than non-cluster regions, facilitating the indirect sharing of tacit knowledge—even about sensitive tax haven strategies—which then becomes known and imitated. Through this lens, we highlight mimetic isomorphism as a key mechanism of cluster internationalization, where MNEs within clusters adopt each other's practices, even in contexts as confidential as tax haven strategies.

Our results have wider implications with respect to other forms of internationalization by firms from clusters that have not been studied extensively in the literature. Firms in clusters may replicate the export strategies of successful peers, leading to convergence in their choice of export markets or distribution channels (Deng, Zhu, Johanson, & Hilmersson, 2022). Similarly, firms may mimic the investment locations and entry modes of cluster counterparts, particularly when operating in uncertain regulatory environments (Porter & Miranda, 2009). Licensing models and franchise agreements may also be adopted based on observed success, allowing firms to enter new markets through imitation (Algarni et al., 2023). Moreover, the formation of strategic alliances, partnerships, or mergers and acquisitions could follow patterns set by peers within the cluster (Goerzen, 2007; Porter & Miranda, 2009). Even in the realm of digital internationalization, firms may align their strategies with those proven effective by other cluster firms, highlighting the pervasive influence of imitation in shaping various internationalization pathways (Deng et al., 2022). Hence, our study could be extended to these other forms of internationalization.

5.2. Implications for Managers

Current research streams tend to implicitly identify firm internationalization as an endogenous strategy, meaning they proactively utilize their firm-specific advantages to expand their operations in international markets (e.g., Cui et al., 2014; Wang et al., 2022). Focusing on industry clusters as the basic unit of analysis when examining location, we highlight that clusters act as learning networks that establish favorable conditions for managers to observe, learn, and imitate strategic practices from their industry peers – an effect that is amplified by the impact of co-location of advanced producer services in clusters, and the presence of large and experienced firms. Therefore, our results with respect to imitation suggest that there is also an exogenous component to the decision-making process of managers, such that they must also consider the decision-making of their peers, especially if they are in a cluster.

In terms of tax strategies, managers need to weigh the costs and benefits involved in resorting to tax havens. Although their use might lead to reduced tax liability, an increase in shareholder value, and improvements in a firm's competitive position, it may also generate reputational damage and create legal and regulatory risks, potentially leading to future tax charges and government scrutiny. Furthermore, if

tax haven use becomes widespread among firms within clusters, it may damage the cluster's reputation, heighten the risk of government intervention, and undermine support for tax allowances on research and development (R&D) as well as infrastructure subsidies. Due to the "herd-like" behavior or the "bandwagon" effects we observe, this might mean that what is a rational strategic decision for an individual firm, may not be a rational decision for the cluster as a whole - creating a coordination failure. One might posit that German firms, due to their more collaborative behavioral patterns may be better able to alleviate this type of collective action problem relative to UK based firms. This certainly warrants future research.

5.3. Implications for Policy makers

Our findings have important insights for policy makers. Concerning domestic taxation policy, our results show that engagement in the use of tax havens is more likely to occur in areas that are characterized by denser economic activity. Those policymakers that intend to raise revenue to fund the provision of public goods would do well to target resources to the fiscal authority in cluster locations. In contrast, those policymakers who are inclined to lower taxation – on the basis that it may generate greater private business investment – should encourage the agglomeration of economic activities through tax breaks and the establishment of special economic zones. However, such an approach may encourage even greater profit shifting by MNEs located in the resulting clusters based on the imitation effect we observe in our study.

Our results also have important implications regarding international corporate tax policy. Very recently, there has been multilateral agreement to move away from one of the systems key principles – the "arms-length standard" whereby MNEs' price inter-firm transactions based on similar transactions between unrelated parties – to a system where profits are taxed in the location of economic activity—essentially aligning with the First Pillar of the OECD/G20 Base Erosion and Profit Shifting (BEPS) reforms (OECD, 2020). This potentially has a significant impact on some of the world's largest MNEs. Indeed, at the time of writing, an agreement to impose a Global Minimum Tax on firms with revenues above €750mn forms the basis for the Second Pillar of reforms. Hence, larger, and more experienced firms appear to be the initial target of the OECDs reforms. This means that those firms will be expected to change their behavior, and our results indicate that this behavioral change may also create second order effects by influencing the behavior of smaller firms that are part of clusters, which could be expected to imitate their larger counterparts' 'better' behaviors.

5.4. Limitations and Direction for Future Research

It is important to note that our paper and its contributions present some limitations and potential extensions that could be addressed by future research. First, it is worth noting that our choice to focus on two developed countries may limit the generalizability of our results to other contexts. In fact, as identity claims are deeply embedded in social structures and developed over time (Staber & Sautter, 2011), one might expect that the presence and strength of these cluster identity claims will vary between clusters from developed and developing economies. Hence, future research could investigate occurrences of tax haven use among cluster firms using much broader sampling frames across countries, which would in turn improve the external validity of our results.

Second, our results show the observed relationships typically hold for two significantly different political economies and institutional contexts (i.e., liberal market economies such as the UK and coordinated market economies such as Germany). The comparative capitalism literature emphasizes the difference between liberal market economies such as the UK and coordinated market economies such as Germany (Walker, Zhang, & Ni, 2019). Jones and Temouri (2016) show that MNEs from liberal market economies are more likely to use tax havens relative to MNEs from coordinated market economies (Jones & Temouri, 2016). This is not to say that German firms do not use tax havens.[5] Our results build on this literature and importantly demonstrate that MNEs in clusters of both countries extensively use tax havens and imitate one another. However, in the case of Germany, there is greater evidence that the availability of professional services providers drives the imitative behaviour to a greater degree than in the UK. This is perhaps due to greater coordination between firms within German clusters compared to those in the UK. Future research could build on these insights by examining whether the heterogeneity observed between the UK and Germany also occurs in other liberal and coordinated market economies, thereby enhancing our understanding of the links between the literature on mimetic isomorphism (Dacin, 1997; DiMaggio & Powell, 1983) and comparative capitalism (Hall & Soskice, 2001; Hancké, 2009).

Third, our finding that the cluster effect tends to hold for certain clusters for both the UK and Germany, certainly warrants additional research. Our theory predicts that tax haven use by MNEs in a cluster is more likely to take place if there is greater imitation, a greater availability of professional services providers, and a greater degree of market power within the cluster. However, there could be additional explanations based on factors that are specific to the cluster. Future research in this area may wish to follow a case study methodological approach in the vintage of Amdam and Bjarnar (2015) who study the historical development of the maritime and furniture clusters in Norway from 1900-2010. Such an approach would allow researchers to delve more deeply into the unique historical, institutional, and cultural factors that shape cluster dynamics, thereby offering richer insights into the intersection of cluster characteristics and internationalization strategies.

Fourth, we based our classification of 'cluster' and 'non-cluster' firms on comprehensive maps and lists of recognized clusters sourced from government websites. In the future, one could use additional data sources to identify more precise cluster locations that add even greater precision to the measurement of clusters. One could also consider additional methods for measuring clusters such as geo-location data, social network analysis or satellite imagery to capture night-time light data as a proxy for dense economic activity.

Fifth, in this paper we have considered the tax haven locations as a homogenous group of countries. It is possible that certain firms from certain clusters will target specific tax haven locations that align closer to the clusters business capabilities. For example, Ireland has developed significant expertise in intellectual-property and debt-based tools for profit shifting; Panama became an expert for trusts and foundations; Switzerland and Luxemburg for banking secrecy, asset protection and wealth management; Liberia for shipping and maritime services; Cyprus and Bermuda for real estate; and the Cayman Islands for investment funds and structured finance. Future research may extend our analysis, to determine if firms within clusters imitate one another in terms of the tax haven locations they use.

Sixth, future research may adopt a qualitative approach to investigating the mimetic behavior of firms in terms of tax avoidance. As pointed out above, there is already an emerging literature in economics that shows peer effects to be important. One could perhaps build on these quantitative studies by interviewing managers to gain further complementary insights into the mechanisms through which firms imitate one another in terms of this type of practice, to discover additional key drivers of this activity. Furthermore, our research does not specifically identify the degree to which firms utilize professional services providers, just their access to them. By measuring the amount spent on tax consultants by MNEs, it would be possible to determine the magnitude of their impact on tax haven use by MNEs in clusters.

Lastly, it is important to acknowledge that in the modern globalized economy, firms operate as part of complex global supply chains and value networks that extend beyond boundaries of clusters as well as

[5] Zucman (2019) estimates the wealth held offshore for Germany to be at 16 percent compared to a world average of 9.8 percent.

heterogenous ownership structures. Hence, any imitative behaviors – in terms of tax haven use – may not only be limited to clusters and may involve whole supply chain networks and how the MNE is structured and owned geographically. This possibility of mimetic tax behavior, due to challenges emanating from backward and forward linkages with its own subsidiaries or suppliers/network alliances, certainly merits future research in uncovering further complexities in the use of tax havens by MNEs.

CRediT authorship contribution statement

Ha-Phuong Luong: Writing – review & editing, Writing – original draft, Software, Methodology, Investigation, Formal analysis, Data curation, Conceptualization, Funding acquisition. **Chris Jones:** Writing – review & editing, Writing – original draft, Supervision, Methodology, Investigation, Formal analysis, Data curation, Conceptualization, Funding acquisition. **Yama Temouri:** Writing – review & editing, Writing – original draft, Supervision, Methodology, Investigation, Funding acquisition, Data curation, Conceptualization.

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Supplementary materials

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Data availability

The authors do not have permission to share data.

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