The Use of Tax Havens by MNEs in Business Clusters: A Cross-country and Firm-level Analysis

Walid Ghodbane, Djawad Sangdal, and Hafedh Ben abdennebi

ABSTRACT

This paper examines the use of tax havens by MNEs located in business clusters versus their non-cluster counterparts. We extend the knowledge-based theory to construct a number of empirical hypotheses that are tested using dichotomous choice models. The firm-level dataset covers 21,389 MNEs from 5 OECD countries during the years 2009-2017. We find evidence that MNEs, who are part of a business cluster use tax haven subsidiaries to a greater extent compared with MNEs, who are not part of a business cluster. This association continues to hold whilst controlling for other important factors that drive tax haven FDI. Additional insights suggest that firm age, size and technological sophistication can impact the magnitude of the correlation between MNEs in business clusters and their tax haven activity. The findings of this paper shed more light on the use of tax havens among MNEs in their international business operations and have important implications for policy makers and managers.

Keywords: business clusters, firms’ location choice, international corporate strategy, transfer pricing, tax havens.

I. INTRODUCTION

The use of tax havens by multinational enterprises (MNEs) is a pervasive activity of international business. According to OECD [1], the base erosion and profit shifting cost countries around 100-240 billion USD in lost revenues annually, which is the equivalent to 4-10% of the global corporate income tax revenue. Due to the complexity of the international tax regime, MNEs are able to take advantage and exploit gaps and mismatches of different tax regimes across countries in order to artificially shift profits into locations where little or no real economic activity takes place [2]. They do this via transfer pricing techniques that are often legally compliant but nevertheless may undermine taxpayers’ faith to voluntarily pay their tax liabilities [3]. It is estimated that approximately a third of international trade happens across national boundaries within the same corporate groups, rather than between separate MNEs [4].

Cross the world, business clusters have a significant impact upon economic activity [5], notably in Europe [6]. Business clusters play a prominent part of the value chain [5], [7], [8]. For instance, according to Sainsbury [9], business clusters in the UK contain 8 percent of the country’s businesses but generate up to 20% of UK gross value added. Business clusters are attractive locations for MNEs due to linkages with local markets and suppliers, and the ability to source high skilled labour [10]. Surprisingly, however, there is a lack of evidence in the literature that investigates financial strategies generally and tax haven aggressiveness specifically by MNEs in business clusters.

This paper addresses a number of gaps in the literature by investigating whether MNEs who are located in a business cluster are more tax aggressive (via the use of tax havens) relative to a set of MNEs who are not classified as being part of a business cluster. We adopt the knowledge-based theory [11]-[13] to explain why firms in business clusters are better placed to use tax havens compared with firms from outside business clusters. The intra-cluster cooperation in business clusters spreads knowledge among cluster members [13]-[15]. In the context of business clusters and the use of tax havens, we argue that cooperation, which manifests itself in networking, fosters knowledge exchange and knowledge creation among cluster members. As a result, firms who are part of a cluster can rapidly learn from each other about tax haven investments.

Utilising a large dataset of 50,711 observations of MNEs from five OECD countries (Austria, Belgium, Germany, France, and UK) during the years 2009-2017, we find that MNEs who are part of a business cluster have 14.9% to 23.7% higher likelihood of engaging in tax haven activity compared to MNEs who are not part of a business cluster. We also show that factors such as firm age, size and technological sophistication can positively impact the relationship between business clustering and tax haven utilization.

This paper contributes new evidence to the literature in three dimensions. First, to the best of our knowledge, this paper is among the first of its kind to examine the potential link between MNEs in business clusters and their tax haven activity. Second, we exploit an exhaustive and large-scale sample of MNEs from a group of five OECD countries. This will add richness and robustness to our findings and bring more comprehensive generalization. Third, we utilise...
disaggregated firm-level data to quantify the effect of business clusters on MNE’s tax haven activity.

The remainder of this paper is set out as follows. In the next section, we will discuss theory and hypotheses. In Section 3, information on data, variables, empirical models, and descriptive statistics will be described. The empirical results will then be presented in Section 4. Finally, we provide the discussion and conclusion to this research.

II. THEORY AND HYPOTHESES

The knowledge-based theory [11]-[13] considers knowledge as the most crucial strategic resource. More importantly, knowledge resources are very difficult to imitate [16]. Therefore, knowledge resources ensure sustainable differentiation and sustainable competitive advantages of organizations. Knowledge environment is the nature of a business cluster [7] and is one of the cluster-specific factors [17]. In the paper, we utilise this theoretical framework and extend it to derive our hypotheses related to business clusters and tax haven use. We argue that knowledge environment forms distinctive conditions for MNEs that are part of a business cluster compared to MNEs that are not part of a business cluster. Besides, the existing literature highlights firm-specific factors such as firm age, firm size [18] and level of technology [19]-[21], [23], which are important in explaining transfer pricing activity via tax havens. We focus on these three factors to examine whether those factors can moderate the relationship between MNEs in business clusters and their tax haven use. The theoretical framework we use is presented in Fig. 1.

![Fig. 1. Theoretical framework.](image)

The following sub-sections present our main theoretical contributions, which focus on the cluster-specific factor (knowledge environment) and some moderating factors (firm age, size, and technological sophistication).

A. Intra-cluster Cooperation: Toward the Knowledge-based Theory of a Cluster

One of the distinguishing features of a business cluster is the co-existence of competitive relations and cooperative relations between cluster actors [5]. Firms in clusters are often confronted with intensive competition, forcing them to engage in learning processes and to enhance their performance continuously [7]. Rosenfeld [23] argue that at first, former companies in business clusters are fierce competitors of each other and new immigrant firms. However, cluster entities are quick to realize that it is difficult to maintain any secrecy for long as they are born and raised in the same “schools” [23, p. 20]. In other words, co-located firms normally operate in a general climate of understanding and trust [24], [25]. Competing firms in business clusters then collaborate with each other for common goals, and act as networks, functioning within a particular geographical space [15], [26]-[28]. Thus, business clusters are conducive to an intra-cluster cooperation among cluster members, fostering a set of self-reinforcing mechanism.

The intra-cluster cooperation in business clusters brings favourable conditions for cluster entities to promote knowledge spill-over process [29]-[31]. The co-operative constellation is diversified as the cooperation takes place not only among firms, but also among R&D institutions, support organisations, and regional government [28], [32]. According to Jankowska et al. [15, p. 187], two critical dimensions of a business cluster, include “spatial proximity” and “relational proximity”, in which the latter is continuously supported by the former. The spatial dimension fosters cluster entities to interact in both formal and informal settings and then induce the access of reliable information, resources, and capabilities of other cluster entities [13]. The relational dimension provides co-located firms with favourable conditions to exchange information with each other and hence, ease the sharing of “tacit knowledge” [13].

Furthermore, two critical dimensions of a business cluster form the basis for the effective creation of new knowledge among cluster entities. The process of knowledge creation emerges from the effective exchange and sharing of knowledge resources among members of the networks, instead of from knowledge resources alone [13]. In business clusters, a group of independent firms take similar activities of locational economies. However, individual organisations are heterogeneous entities loaded with the tacit, specific, and complex knowledge about market opportunities, products, and services [33], [34]. When such asymmetrical knowledge is exchanged in business clusters, firms are prompted to learn from successes and mistakes of other actors, leading to the creation of new knowledge over time [35]. Thus, a truly operating cluster continuously enlarges its knowledge base, thereby enabling cluster members to possess higher strategic flexibility and faster response to market changes compared to outsiders [36]. Put it another way, companies outside clusters are less likely to have a supportive environment to transfer information and create new knowledge quickly and freely compared to their cluster counterparts.
Generally, in the context of business clusters and the use of tax havens, we contend that the intra-cluster cooperation of business clusters spreads knowledge among cluster members and they can learn quickly about double benefits from business clusters and tax havens. In business clusters, companies are offered multi-cluster advantages, including flexibility advantages (high mobility of labour and other resources, efficiency advantages (lower costs, including transaction costs), and innovation advantages (knowledge spillovers)) [7]. In tax havens, MNEs receive massive reduction in tax liabilities [37]. In other words, the knowledge environment in business clusters allows cluster members to perceive that it is in their best interest to combine spatially transferable intermediate production generated in business clusters with at least some immobile factor endowments in tax havens (lower tax rates or zero tax rates). This leads to our first hypothesis:

**Hypothesis 1:** MNEs who are part of a business cluster are more likely to own a tax haven subsidiary compared to MNEs who are not part of a business cluster.

**B. Factors Moderating the Effect of Business Clusters**

**1) Firm age and firm size**

Firm age and firm size have significant effect on the degree of internationalization [38]. The literature widely recognizes that old and large enterprises play a very important role in the growth of business clusters [39], [7]. Old and large firms in business clusters have advantages on enhanced learning that leads to a non-random improvement in performance [13]. In this paper, we argue that there is a big gap in the likelihood of using tax havens between older and larger MNEs and younger and smaller MNEs in business clusters, and the gap is larger than that for MNEs outside business clusters. This is for the following reasons.

First, older, and larger firms are much more experienced than younger and smaller firms to engage in activities for minimising tax liabilities. The growth in business clusters often challenges young and small firms as they have to compete with both existing players and new immigrant firms [40]-[42]. In addition, cluster entities are subject to strong competition from other places due to the fact that business clusters normally grow into international markets [7]. Besides, business clusters evolve over time through adaptation to market fluctuations [39], [43]. Thus, firms in business clusters are required to continuously adapt to broader changes. The fierce competition and broader changes help older and larger firms to accumulate more experience but are likely to refrain younger and smaller firms from taking risks to use aggressive strategies, especially in the initial phases.

Second, a common barrier to young and small firms in business clusters is “lack of seed capital” [7, p. 16] while finance plays a crucial role in the growth of firms in business clusters. As the development in business clusters requires huge amounts of funds, it is much more difficult for younger and smaller enterprises than older and larger establishments to gather sufficient resources to build operational capability [44]. Younger and smaller entities in business clusters therefore prioritize to establish their businesses rather than engaging in tax haven utilization which normally costs a huge amount of funds.

Third, younger and smaller firms are often kept far away from formal cluster governance arrangements, thereby limiting their role in business clusters [7]. Instead, large MNEs or giants are at the core. A study conducted by the Université Pierre-Mendès France and the Reverdy Associés consultancy reveals that young and small firms in business clusters often find it challenging to involve in cluster projects [45]. As a result, there is a possibility that younger and smaller firms in business clusters do not acquire as much as information and knowledge as older and larger firms do.

For these reasons, we propose that firm age and firm size play a role in the association between MNEs in business clusters and their use of tax havens. As such, we propose hypotheses 2 and 3 as follows:

**Hypothesis 2:** The effect of firm age on the likelihood of owning a tax haven subsidiary is higher for MNEs, who are part of a business cluster compared to MNEs, who are not part of a business cluster.

**Hypothesis 3:** The effect of firm size on the likelihood of owning a tax haven subsidiary is higher for MNEs, who are part of a business cluster compared to MNEs, who are not part of a business cluster.

**2) Level of technological sophistication**

A large part of the success of business clusters is usually attributed to high level of technology and innovation [7]. We propose that there is a big gap in the likelihood of using tax havens between cluster MNEs with higher level of technology and those with lower level of technology, and the gap is bigger than that for non-cluster MNEs. This is for the
following reasons.

First, technology and innovation normally form the heart of a business cluster and firms with high level of technology and innovation are often the core part of the network [5]. Moreover, business clusters exert highest effects on firms with high technology and innovativeness [46], [47]. As a result, firms with high technological sophistication are likely to be the prominent members in business clusters who access to information and engage in knowledge spill-overs [48]. They then quickly learn the internationalisation practice and financial strategies from other cluster members. Put it another way, cluster firms with higher level of technology and innovation are normally in a more advantageous position than cluster firms with lower level of technology and innovation to use transfer prices to channel profits to low tax jurisdictions.

Second, MNEs with high level of technology sophistication are the highest-potential members in business clusters to engage in tax haven activity, as there are strong incentives for high technology firms to engage in transfer pricing via tax haven subsidiaries. Technological firms are the most suitable players to engage in tax haven utilization because they possess high levels of intangible assets such as rights, trademarks, patents, licences, and sub-licenses [20]. Parallel to that, MNEs prefer to transfer intangible assets to jurisdiction with zero or lower tax rates [19]-[22]. Thanks to knowledge spill-overs in business clusters, firms with high technological level are the first members to access information and it is likely that they are aware of their suitability to own tax haven subsidiaries in their operation. Hence, they quickly engage in transfer pricing via tax havens, right after the knowledge transfer takes place.

In sum, we argue that technological sophistication is one of the factors impacting the magnitude of the correlation between business clusters and tax havens. As such, we have:

**Hypothesis 4:** The effect of a firm’ technological sophistication on the use of tax havens is stronger for MNEs, who are part of a business cluster compared to MNEs, who are not part of a business cluster.

III. DATA, VARIABLES, AND EMPIRICAL MODEL

A. Data

All data in this research is secondary in nature and collected from the commercial firm-level database ORBIS by Bureau van Dijk, which is the world’s leading comparable data resource. This database provides the richness of various data such as financial information, location, and subsidiaries at the company level. Thus, this allows us to identify every MNE’s foreign subsidiaries, including tax haven locations. Furthermore, this dataset has the advantages of enabling presentation of data for functional cluster areas built up from municipality level. As a result, we can identify firms within business clusters. The unbalanced firm-level dataset holds 50,711 observations of MNEs from five OECD countries (Austria, Belgium, Germany, France, and UK) during the years 2009-2017. There are some rationales behind the choice of these five research countries. First, the institutional arbitrage is likely to be not significant for MNEs included in the sample as they are from West Europe countries specifically and OECD generally. The second reason relates to information availability and economic relevance. We base on available business cluster maps and lists from government websites or from the literature to identify business clusters recognized by governments in each country. We believe such research sites will provide a laboratory well-suited to examine our research questions.

B. Dependent Variable: Classifying Tax Havens

Our dependent variable is a binary variable, equals 1 if a MNE has at least one subsidiary located in a tax haven, and 0 otherwise. In the academic literature, there are a number of different lists available to define which jurisdictions are denoted as tax havens [49], [19], [22], [50]. We take a conservative approach in classifying tax havens. Thus, we focus on island tax havens where the use of them is mostly to do with tax avoidance. This way can exclude some jurisdictions such as Ireland and Switzerland where investments might go there for conventional FDI motives or real economic activity. For this reason, the list of tax haven locations utilized in this paper consists of 51 jurisdictions. For the full list of tax haven locations, see Table I.

C. Independent Variable: Identifying Business Clusters

Our independent variable is a binary variable, equals 1 if a MNE is located in a recognized business cluster, and 0 otherwise. The identification of business clusters for each research country is based on business cluster maps and lists available from government websites or from the literature. Those business maps and lists provide detailed information on locations and industry specializations for each business cluster. For references of business cluster maps and cluster lists, see Appendix B.

We consider the definition of industry clusters with two main characteristics, including geographical proximity and industry specialization as proposed by Porter [5]. Based on the ways suggested by Temouri [51], we establish a three-stage procedure to identify business cluster firms. First, based on business cluster maps and lists, we detect reference cities for business clusters. Second, we match NACE industrial codes (industrial activity classification as defined by Eurostat) for industry specialization of each business cluster. Third, we combine reference cities and NACE codes to obtain a list of cluster firms. After that, we are able to detect non-cluster firms in the dataset. This way is compatible with quantitative econometric analysis developed therein.

D. Explanatory Variables

The explanatory variables in our analysis are obtained from annual accounts data in ORBIS for each multinational to capture firm age, firm size (measured by turnover as proposed by Graham & Tucker [52]), technological sophistication (measured by the ratio of intangible assets over total assets (IATA) as proposed by Jones & Temouri, [22]), number of foreign subsidiaries, and cashflow. We adopt the conventional way of defining MNE, namely as a company that owns at least 10 percent of a subsidiary located abroad [53]. Furthermore, we base on the NACE two-digit industry codes which are defined by Eurostat to identify the industrial sectors in which each multinational operates. The detailed descriptions of variables are shown in Table I.
TABLE I: VARIABLES AND MEASURES

| Variable name                        | Measures                                                                 | Source    |
|--------------------------------------|--------------------------------------------------------------------------|-----------|
| **Tax haven definitions**            |                                                                          |           |
| Andorra, Anguilla, Antigua, Aruba, Bahamas, Bahrain, Barbados, Barbuda, Belize, Bermuda, Botswana, British Virgin Islands, Brunei Darussalam, Cayman Islands, Cook Islands, Curacao, Cyprus, Dominica, Ghana, Gibraltar, Grenada, Guatemala, Guernsey, Hong Kong, Isle of Man, Jersey, Lebanon, Liberia, Liechtenstein, Luxembourg, Macao, Macedonia, Malaysia, Marshall Islands, Mauritius, Monaco, Montserrat, Nauru, Netherlands Antilles, Panama, Saint Kitts and Nevis, Saint Lucia, Saint Vincent, Samoa, San Marino, Seychelles, Singapore, Switzerland, Turks and Caicos Islands, UAE, Uruguay, and Vanuatu. | ORBIS     |
| **Tax havens**                       |                                                                          |           |
| Cluster firms                        | Dummy variable (equals 1) indicating that a MNE is located in a recognized business cluster. | ORBIS     |
| Non-cluster firms                    | Dummy variable (equals 0) indicating that a MNE is not located in any recognized business cluster. | ORBIS     |
| **Business clusters definitions**    |                                                                          |           |
| Cluster firms                        |                                                                          |           |
| Non-cluster firms                    |                                                                          |           |
| **Firm characteristics**             |                                                                          |           |
| Log Turnover                         | The natural log of turnover. Turnover is listed in the Balance Sheet account and defined as Total Operating Revenue. |           |
| Age                                  | The age of a firm calculated since the year the company was incorporated. |           |
| Intangible fixed assets              | Intangible assets are listed in the Balance Sheet account.               |           |
| Total assets                         | Total assets refer to total amount of assets owned by companies.         |           |
| Log Cashflow                         | The natural log of cash flow. Cash flow is a financial variable listed in cash flow statement. It equals to the net amount of cash and cash-equivalents. |           |
| Number of Foreign subsidiaries       | The total number of foreign subsidiaries identified for the parent firm.   |           |
| **Industry activity classification** |                                                                          |           |
| High technology manufacturing        | Nace 2-digit codes: 21, 26.                                              | Eurostat  |
| Medium/High technology manufacturing | Nace 2-digit codes: 20, 27, 28, 29, 30.                                   | Eurostat  |
| Medium/Low technology manufacturing  | Nace 2-digit codes: 19, 22, 23, 24, 25, 33.                              |           |
| Low technology manufacturing         | Nace 2-digit codes: 10, 11, 12, 13, 14, 15, 16, 18, 31, 32.            |           |
| Knowledge Intensive services         | Nace 2-digit codes: 50, 51, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 70, 71, 72, 73, 74, 75, 76, 77, 78, 80, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93. |           |
| Less knowledge intensive services    | Nace 2-digit codes: 45, 46, 47, 49, 52, 53, 55, 56, 68, 77, 79, 81, 82, 94, 95, 96, 97, 98, 99. |           |
| Country                              | Austria (AT), Belgium (BE), Germany (DE), France (FR) and UK (GB) (ISO countries codes). | ORBIS     |
| Time                                 | Year of sample period: 2009-2017.                                        | Eurostat  |

E. Empirical Models

We estimate random effects probit models and run a number of specifications that revolve around five unbalanced panel data models.

Hypothesis 1 about the use of tax havens by MNEs located in a business cluster is tested using an equation in the following form:

\[
\text{Tax Haven}_{i,t} = \alpha + \beta_1 \text{Cluster}_i + \sum \beta_1 \text{FSA}_{s,i} + \sum \beta_2 \text{Sector}_{s,i} + \text{time} + \text{country} + \epsilon_{i,t}
\]  

(1)

where the index \( i \) refers to Firm, \( s \) refers to Sector, \( t \) refers to Time, and \( c \) refers to Country. The dependent variable \( \text{Tax Haven}_{i,t} \) is binary proxy variable for the use of tax havens, equals 1 if the company has at least one subsidiary in tax havens and 0 otherwise. The variable \( \text{Cluster}_{i} \) in equations is dummy variable, equals 1 if a MNE is a cluster firm, and equals 0 otherwise. \( \delta_0 \) is the coefficient of primary interest as it quantifies the impact of being located in business clusters on a firm’ presence in tax havens. The vector \( \text{FSA}_{s,i} \) captures a number of firm characteristics such as firm age, firm size, technological sophistication, number of foreign subsidiaries, and cash flow. The vector \( \text{Sector}_{s,i} \) includes sector dummy variables at two-digit NACE level as proposed by Eurostat definition. The sector dummy variable is divided into six categories, including “High technology manufacturing”, “Medium/High technology manufacturing”, “Medium/Low technology manufacturing”, “Low technology manufacturing”, “Knowledge intensive services” and “Less knowledge intensive services”, in which “Low technology manufacturing” is chosen as the base group. For detailed descriptions of NACE codes for the categorization of the industrial sectors, see Table I. The variables \( \text{time} \) and \( \text{country} \) are time and countries dummy variables, to account for business cycle and countries effects. The time dummy variable covers a research period from the year 2009 to the year 2017, in which the year 2009 is the reference year. The country dummy variable is classified into five categories, namely “Austria – AT”, “Belgium – BE”, “Germany – DE”, “France – FR” and “the UK – GB”, in which the base group is the UK, and \( \epsilon \) represents the error term.

Extending the above benchmark specification, the modelling for testing hypotheses 2 and 3 on the moderating effect of firm age and firm size is as follows:

\[
\text{Tax Haven}_{i,t} = \alpha + \beta_1 \text{Cluster}_i + \sum \beta_1 \text{FSA}_{s,i} + \sum \beta_2 \text{Sector}_{s,i} + \delta_0 \text{Cluster}_i \times \text{Age}_i + \text{time} + \text{country} + \epsilon_{i,t}
\]  

(2)

\[
\text{Tax Haven}_{i,t} = \alpha + \beta_1 \text{Cluster}_i + \sum \beta_1 \text{FSA}_{s,i} + \sum \beta_2 \text{Sector}_{s,i} + \delta_0 \text{Cluster}_i \times \text{Size}_i + \text{time} + \text{country} + \epsilon_{i,t}
\]  

(3)

For hypothesis 4 on the moderating effect of a firm’s technological sophistication, the following augmented specification is used:

\[
\text{Tax Haven}_{i,t} = \alpha + \beta_1 \text{Cluster}_i + \sum \beta_1 \text{FSA}_{s,i} + \sum \beta_2 \text{Sector}_{s,i} + \delta_0 \text{Cluster}_i \times \text{IATA}_i + \text{time} + \text{country} + \epsilon_{i,t}
\]  

(4)

We then include all three interaction terms (business cluster with firm age, size, and technological sophistication) into specification (5) to verify the correlation between business clusters and tax havens, and the moderating effects.
of firm age, size, and technological sophistication. The modelling is as followed:

\[ \text{Tax Haven}_{i,t} = \alpha + \beta_1 \text{Cluster}_i + \Sigma \beta_2 \text{FSA}_{i,t} + \Sigma \beta_3 \text{Sector}_{i,t} + \delta \text{Cluster}_i \times \text{Age}_{i,t} + \gamma \text{Cluster}_i \times \text{Size}_{i,t} + \lambda \text{Cluster}_i \times \text{IATA}_{i,t} + \text{time}_i + \text{country}_i + \epsilon_{i,t} \]  

(5)

F. Descriptive Statistics

Table II gives information of a breakdown of MNEs’ countries of origin. In total there are 21,389 MNEs from five countries, in which 3,194 MNEs are located in business clusters. UK holds the largest percentage of cluster MNEs. Specifically, of the 4,825 MNEs from the UK, 43.92% locate in identified business clusters. Whilst the smallest proportion belongs to Austria where only 4.79% of MNEs locates in identified business clusters. This compares with 13.28% in Germany, 15.47% in Belgium, and 22.54% in France. 5,188 MNEs out of 21,389 MNEs have at least one subsidiary in a tax haven. UK has the biggest number of MNEs with tax haven subsidiaries, taking up 29.73% of the sample, followed by France, occupying 29.08% of the sample. The figures for Austria, Germany and Belgium are 3.61%, 17.98%, and 19.60%, respectively.

Table III provides descriptive statistics for variables included in our analysis. The panel data holds 62,048 observations of an unbalanced panel of firms for the period 2009 to 2017. As indicated, about 14.57% of the firm year observations are identified in business clusters. With regards to the tax haven dummy variable, 24.99% of the firm year observations are set equal to 31.49. In terms of firm size, as proxied for by turnover, the average firm is creating sales equal to exp (10.99), which measured in thousands of dollars is equal to approximately 59.3 million USD. The variable IATA (Intangible assets over total assets), which we use to proxy the technological sophistication is on average 0.05 with a standard deviation of 0.11. Each MNE has on average 19.55 tax haven subsidiaries with a standard deviation of 70.90. In terms of cash flow, the average firm is possessing cash flow equal to exp (8.43), which measured in thousands of dollars is equal to approximately 4.6 million USD. Each MNE has on average 1.54 tax haven subsidiaries with a standard deviation of 7.87. Due to missing values, there are some drops in the number of observations for firm size (Turnover), technological sophistication (IATA) and NACE codes, thereby reducing the number of observations after running regressions from 62,048 observations to 50,711 observations. All monetary values in the dataset are in thousands of US dollars. Hence, we use United States GDP Deflator in 2018 [54] to deflate monetary values.

Table IV reports the correlation matrix between all of the variables used in our analysis. The matrix shows that the correlations between our variables are weak, ranging from (0.0202) to 0.5577. Therefore, multicollinearity seems not a problem.

IV. EMPIRICAL RESULTS

A. Empirical Results

Table V reports the results for equations (1)-(5). Column 1 corresponds to the benchmark specification; Column 2 exhibits the results of the interaction between business cluster and firm age; Column 3 shows the results of the interaction between business cluster and firm size; Column 4 presents the results of the interaction between business cluster and a firm’s technological sophistication. Column 5 presents the results with all three interaction terms (business cluster with firm age, size, and technological sophistication). For each variable, three rows of numbers are displayed. The first row
presents the coefficient, the following shows the standard error, and the final row shows the p-value related to the variable statistical significance. The results report marginal effects.

In all specification, the coefficients of the business cluster variable are positive and significant at 1 percent level. The coefficients estimate for the effect of business clusters are in the range of 0.149-0.237, implying that being located in business clusters increases the probability of using tax havens to transfer prices by 0.149-0.237. The outcomes also show strong support for our contention that business clusters provide cluster firms with knowledge environment to learn from each other and they are inclined to engage in tax haven activity to minimize tax liabilities. Hypothesis 1 is therefore strongly supported.

Turning to firm-specific advantages, all coefficients for the variables firm age, firm size, technological sophistication (IATA), no. of subsidiaries, and cash flow are statistically significant. The coefficients of firm age range from 0.000130 to 0.000286, indicating that mature firms are more likely to engage in tax haven activity than start-up firms. The coefficients of firm size (turnover) range from 0.00272 to 0.00375, meaning that a 10% growth in turnover raises the likelihood of tax haven presence by around 0.272-0.375%. The coefficient of IATA is 0.0397-0.0570, showing that a 10% increase in the IATA ratio leads to increase in tax haven utilization by around 3.97-5.70%.

The coefficients of foreign subsidiaries hover around 0.00180-0.00207, showing that MNEs who have a higher number of foreign subsidiaries are more likely to manage larger tax haven networks. The coefficients of cashflow are in the range of 0.00587-0.00731, meaning that a 10% increase in cash flow raises the likelihood of tax haven presence by around 0.587-0.731%.

With regards to industrial sectors, the coefficients for high technology manufacturing dummy and knowledge service dummy variables are positive and significant at 1 percent level. The outcomes correspond to the findings suggested by Jones & Temouri [22] that technologically intensive manufacturing and knowledge MNEs have greater propensity of owning a tax haven subsidiary than less technologically intensive MNEs. To explore the impact of firm age and firm size on the relationship between business clusters and the use of tax havens, the corresponding interaction terms are included in the regressions. The coefficient of the interaction term of the business cluster variable with firm age in column 2 is significant at 5 percent level. Whilst the coefficient of the interaction term of the business cluster variable with firm size in column 3 is significant at 1 percent level. As such, hypothesis 2 is supported to some extent, while hypothesis 3 is significantly supported.

In addition, we visualize the margins of tax haven utilization by firm age and firm size. Graph A1 and Graph A2 (Appendix A) illustrate the marginal effects of firm age and firm size on the relationship between business clusters and the use of tax havens. The effect of firm age on the relationship between MNEs in business clusters and their use of tax havens is not as strong as the effect of firm size on such a correlation. As firm age rises, firm age positively affects both MNEs who are part of a business cluster and MNEs who are not part of a business cluster. Whilst, as firm size increases, there is a positive effect on MNEs, who are part of a business cluster, while there is little effect on MNEs, who are not part of a business cluster.

To explore the impact of technological sophistication, the corresponding interaction term is included in the regression. The results are presented in column 4. The positive and significant coefficient of the interaction term at 1 percent level indicates that hypothesis 4 is strongly supported.

Graph A3 (Appendix A) visualizes the margins of tax haven utilization by technological sophistication. As level of technological sophistication rises, the effect of level of technological sophistication on cluster MNEs increases steadily. Whereas the effect on non-cluster firm slightly increases in accordance with the increase in level of technological sophistication.

B. Robustness Tests

To examine the strength of our findings, we adopt two approaches as robustness checks to our baseline models. First, we repeat specification 1-5 using random effect Poisson models. Accordingly, the dependent variable is no longer measured by tax haven dummy variable. Instead, we utilize a count variable which sums the number of tax haven subsidiaries owned by a parent firm. This count variable is discrete in nature and does not include negative values. Second, we lag our explanatory variables (Turnover, IATA, number of foreign subsidiaries, and cashflow) for one period to reduce any possibility of simultaneity bias. Due to lagging explanatory variables, the number of observations decreases from 50, 711 in Table V to 50, 671 observations in Table VI.

By using the different measure for the use of tax haven (Number of tax haven subsidiaries owned by each multinational), the conclusion for the main hypothesis drawn from the probit models continues to hold – MNEs in business clusters are more likely to manage tax haven utilization. The Poisson coefficients on the business cluster variable suggests that other factors being equal, the number of subsidiaries in tax havens established by MNEs within business clusters is nearly 1.416-1.766 times higher than the number of subsidiaries in tax havens established by MNEs outside business clusters.

With regards to moderating factors including firm age, size and technological sophistication, the coefficients for interaction terms between business clusters and firms’ size, and between business cluster and technological sophistication are significant at 1 percent level, that strengthen our argument about the moderating role of firm size and level of technological sophistication on the correlation between business cluster MNEs and their use of tax havens. Whilst the coefficient for interaction terms between business clusters and firms age is significant at 10 percent level. The result, however, still supports our hypothesis about the moderating role of firm age in the correlation between business clusters and tax haven activity.

In general, the results provide strong robustness check for the main proposed hypotheses related to the link between MNEs in business clusters and their use of tax havens.
### TABLE V: RANDOM EFFECTS PROBIT REGRESSION (MARGINAL EFFECTS)

| Dependent variable: Tax haven dummy variable | (1)     | (2)     | (3)     | (4)     | (5)     |
|---------------------------------------------|---------|---------|---------|---------|---------|
| **Business cluster (BCL)**                  | 0.231***| 0.220***| 0.192***| 0.237***| 0.149***|
| (S.E)                                       | (0.00921)| (0.00905)| (0.0170)| (0.00968)| (0.0165)|
| (P-value)                                   | 0.000   | 0.000   | 0.000   | 0.000   | 0.000   |
| **Firm age**                                | 0.000139***| 0.000130***| 0.000131***| 0.000146***| 0.000286***|
| (S.E)                                       | (0.000381)| (0.000380)| (0.000384)| (0.000384)| (0.000897)|
| (P-value)                                   | 0.000   | 0.030   | 0.000   | 0.000   | 0.009   |
| **Firm size (Ln Turnover)**                 | 0.00323***| 0.00375***| 0.00272***| 0.00252***| 0.00326***|
| (S.E)                                       | (0.000756)| (0.000850)| (0.000796)| (0.000763)| (0.000807)|
| (P-value)                                   | 0.000   | 0.000   | 0.000   | 0.000   | 0.000   |
| **Technological sophistication (IATA)**     | 0.0414***| 0.0449***| 0.0412***| 0.0570***| 0.0397***|
| (S.E)                                       | (0.00815)| (0.00878)| (0.00812)| (0.00964)| (0.00880)|
| (P-value)                                   | 0.000   | 0.000   | 0.000   | 0.000   | 0.000   |
| **No. of foreign subsidiaries**             | 0.00206***| 0.00198***| 0.00201***| 0.00207***| 0.00180***|
| (S.E)                                       | (0.000581)| (0.000571)| (0.000614)| (0.000589)| (0.000708)|
| (P-value)                                   | 0.000   | 0.000   | 0.000   | 0.000   | 0.000   |
| **Ln Cashflow**                             | 0.00669***| 0.00731***| 0.00647***| 0.00661***| 0.00587***|
| (S.E)                                       | (0.000798)| (0.000859)| (0.000792)| (0.000801)| (0.000770)|
| (P-value)                                   | 0.000   | 0.000   | 0.000   | 0.000   | 0.000   |
| **Ln Cashflow**                             | 0.00669***| 0.00731***| 0.00647***| 0.00661***| 0.00587***|
| (S.E)                                       | (0.000798)| (0.000859)| (0.000792)| (0.000801)| (0.000770)|
| (P-value)                                   | 0.000   | 0.000   | 0.000   | 0.000   | 0.000   |
| **Business cluster × Firm age**             | 0.000711***| 0.000113**| 0.000129**| 0.000692***| 0.00094**|
| (S.E)                                       | (0.000129)| (0.00129)| (0.00129)| (0.00129)| (0.00129)|
| (P-value)                                   | 0.000   | 0.000   | 0.000   | 0.000   | 0.000   |
| **Business cluster × Firm size**            | 0.010   | 0.0619***| 0.0430***| 0.0619***| 0.0430***|
| (S.E)                                       | (0.0186)| (0.0169)| (0.0169)| (0.0169)| (0.0169)|
| (P-value)                                   | 0.001   | 0.000   | 0.000   | 0.000   | 0.000   |
| **High technology manufacturing dummy**     | 0.0191***| 0.0169**| 0.0177***| 0.0199***| 0.0121**|
| (S.E)                                       | (0.00621)| (0.00669)| (0.00616)| (0.00645)| (0.00579)|
| (P-value)                                   | 0.002   | 0.012   | 0.004   | 0.002   | 0.038   |
| **High/Medium technology manufacturing dummy**| 0.000435| 0.00186| 0.00864| 0.000455| 0.00136|
| (S.E)                                       | (0.00528)| (0.00563)| (0.00528)| (0.00516)| (0.00486)|
| (P-value)                                   | 0.932   | 0.741   | 0.967   | 0.930   | 0.779   |
| **Medium/Low technology manufacturing dummy**| 0.00231| 0.00269| 0.00244| 0.00263| 0.00118|
| (S.E)                                       | (0.00568)| (0.00612)| (0.00566)| (0.00558)| (0.00532)|
| (P-value)                                   | 0.684   | 0.660   | 0.666   | 0.611   | 0.525   |
| **Knowledge intensive service dummy**       | 0.0390***| 0.0387***| 0.0373***| 0.0412***| 0.0289***|
| (S.E)                                       | (0.00473)| (0.00499)| (0.00470)| (0.00481)| (0.00430)|
| (P-value)                                   | 0.000   | 0.000   | 0.000   | 0.000   | 0.000   |
| **Less knowledge intensive service dummy**  | 0.0145***| 0.0128***| 0.0139***| 0.0148***| 0.00921***|
| (S.E)                                       | (0.00451)| (0.00484)| (0.00448)| (0.00449)| (0.00417)|
| (P-value)                                   | 0.001   | 0.006   | 0.001   | 0.001   | 0.022   |
| **Year dummy**                              | Yes     | Yes     | Yes     | Yes     | Yes     |
| **Country dummy**                           | Yes     | Yes     | Yes     | Yes     | Yes     |
| **Observations**                            | 50,711  | 50,711  | 50,711  | 50,711  | 50,711  |

Notes: Each column reports a separate probit regression. The dependent variable is whether a MNE own a tax haven subsidiary. Year dummies and Count are unreported for brevity. Turnover and cash flow are entered as their natural logarithms. Standard errors are provided in parentheses. The p-values are static form. *, **, and *** indicate whether the results are statistically different from zero at the 10%, 5%, and 1% significance levels, respectively.
V. DISCUSSION AND CONCLUSION

Our analysis shows that MNEs who are part of a business cluster are more likely to own a tax haven subsidiary than MNEs from outside of a business cluster. In particular, we find that MNEs who are part of a business cluster have 4.9 to 23.7% higher likelihood of engaging in tax haven activity compared to those MNEs who are not part of a business cluster. Our results suggest that the role of business clusters is far from insignificant in firms’ tax haven activity specifically and firms’ investment decisions generally. The findings show some implications for both policy makers and managers.

A. Implications for Policy Makers

Policy makers are often in very difficult position in dealing with tax avoidance issues. Whether policy makers should be very gentle or should be very strict to deter tax avoidance activities? The critical rise of tax abusive cases highlights many loopholes in the current tax legislation to manage businesses. It does appear that policy makers increasingly impose higher corporate tax rates or ungenerous allowances on companies to deter tax avoidance issues. Whether policy makers should be very gentle or should be very strict to deter tax avoidance activities? The critical rise of tax abusive cases highlights many loopholes in the current tax legislation to manage businesses. It does appear that policy makers increasingly impose higher corporate tax rates or ungenerous allowances on companies to deter tax avoidance issues [55]. That would become a huge burden on a majority of companies’ shoulders, thereby deterring investment and even worsening the global

TABLE VI: RANDOM EFFECTS POISSON REGRESSION

| Dependent variable: No. of tax haven subsidiaries | (1) | (2) | (3) | (4) | (5) |
|--------------------------------------------------|-----|-----|-----|-----|-----|
| Business cluster (BCL)                          | 1.416*** (0.0691) | 1.435*** (0.103) | 1.766*** (0.0972) | 1.456*** (0.0697) | 1.715*** (0.121) |
| Firm age                                         | 0.0135*** (0.000892) | 0.0136*** (0.000966) | 0.0133*** (0.000890) | 0.0134*** (0.000965) | 0.0133*** (0.000965) |
| Firm size (Turnover),t-1                        | 0.0063 (0.0033) | 0.0063 (0.0033) | 0.0155*** (0.0058) | 0.00511*** (0.0033) | 0.0132*** (0.0033) |
| Technological sophistication (IATA),t-1          | 0.0854* (0.0487) | 0.0855* (0.0487) | 0.0939* (0.0487) | 0.290*** (0.0676) | 0.231*** (0.0696) |
| L_n cashflow,t-1                                 | 0.0236*** (0.00389) | 0.0236*** (0.00389) | 0.0260*** (0.00392) | 0.0240*** (0.00389) | 0.0255*** (0.00392) |
| Number of foreign subsidiaries,t-1               | 0.000145*** (0.000296) | 0.000145*** (0.000296) | 0.000148*** (0.000296) | 0.000150*** (0.000297) | 0.000151*** (0.000297) |
| Business cluster x Firm age,t                   | 0.000552* (0.000224) | 0.000552* (0.000224) | 0.000529*** (0.000565) | 0.000552* (0.000566) | 0.000552* (0.000566) |
| High technology manufacturing dummy             | 0.0181*** (0.153) | 0.0180*** (0.153) | 0.0154*** (0.153) | 0.0177*** (0.153) | 0.0156*** (0.153) |
| Medium/ Low technology manufacturing dummy       | 0.036 (0.017) | 0.036 (0.017) | 0.040 (0.035) | 0.035 (0.036) | 0.036 (0.036) |
| Knowledge intensive service dummy               | 0.00494*** (0.017) | 0.00320*** (0.017) | 0.00683*** (0.017) | 0.00259*** (0.017) | 0.00275*** (0.017) |
| Less knowledge intensive service dummy           | 0.447*** (0.010) | 0.448*** (0.010) | 0.457*** (0.010) | 0.460*** (0.010) | 0.464*** (0.010) |
| Constant                                        | 1.828*** (0.117) | 1.833*** (0.119) | 1.987*** (0.121) | 1.867*** (0.118) | 1.979*** (0.122) |
| Year dummies                                     | Yes | Yes | Yes | Yes | Yes |
| Country dummies                                  | Yes | Yes | Yes | Yes | Yes |
| Observations                                    | 50,671 | 50,671 | 50,671 | 50,671 | 50,671 |

Notes: Each column reports a separate poisson regression. The dependent variable is a count variable which sums the number of tax haven subsidiaries owned by a parent firm. Year dummies and Country dummies are unreported for brevity. Turnover and cashflow are entered as their natural logarithms. Firm size (Turnover), technological sophistication, no. of foreign subsidiaries and cash flow are lagged for one period. Standard errors are provided in parentheses. ***, **, and * indicate whether the results are statistically different from zero at the 10%, 5%, and 1% significance levels, respectively.

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economies. However, if policy makers do not put pressure on MNEs, the world has to suffer huge losses to tax avoidance activities. Therefore, relevant policies should be in order to improve the general anti-avoidance provisions, and to build an imputation providing strong incentives for firms to pay the full statutory tax rates on all reported profits. The outcomes of this paper highlight that firms within business clusters have higher propensity to engage in tax haven activity. Therefore, policy makers could consider specific transparency requirements or closer regulation for cluster firms. This situation, however, should not be confused with attempts by policy makers to put excessive pressure on cluster firms. Instead, effective policies need to bring strong incentives for firms to follow the rules, and to foster cluster development through inward investment.

Recently, members of the European Parliament raised concerns about the risks presented by “freeports” in the European countries [56]. Whether a business cluster can be considered a freeport? In this research, we would not equate freeports to business clusters as business clusters cannot be created by design [9]. But it is important to note that freeports have some key characteristics of business clusters, namely spatial proximity, and industrial specialization. Freeports work as special economic zones with a range of endowments such as regulatory incentives, dubious tax, an absence of business rates and lower rates of tax on employing staff for member entities [53]. Interestingly, critics highlight the potential of a freeport to serve as a kind of tax haven with a lack of transparency [4]. In that sense, freeports allow businesses and individuals to achieve ill-gotten gains legitimately, thereby encouraging tax malpractice and undermining fair competition between EU countries. Therefore, policy makers had better thoroughly consider specific transparency requirements for such special economic zones in light of their market power and also their political influence.

Besides, the outcomes of this paper confirm that the effects of business clusters on the use of tax havens can be moderated by some firm specific covariates such as firm age, size, and technological sophistication. Particularly, the effect of firm age, size, and technological sophistication on the likelihood of owning a tax haven subsidiary is stronger for MNEs, who are part of a business cluster compared to MNEs who are not part of a business cluster. That reveals specific types of MNEs in business clusters which are more aggressive in shifting profits via tax havens. This paper therefore is to discuss evidence that will help rationalize the criteria and suggestions for the design and implementation of differentiated policy measures for MNEs.

Firms are always keen on cutting costs to a minimum and tax-cutting is one of the most common cost-cutting types for firms [60], [61]. It is highlighted that a lower tax bill made possible by the use of tax havens gives MNEs a competitive advantage [22]. However, if MNEs follow abusive tax policies, MNEs might catch policy makers’ attention. If policy makers consider tax haven use by MNEs a revenue risk; and if they consider the relationship between tax haven use and business clusters to be firmly established, they will highly entail a more cautious approach to MNEs in business clusters. At that time, cluster MNEs would suffer huge burden due to strict measures from authorities. MNEs therefore had better have effective strategies and suitable tax payment to reap multiple benefits not only from business clusters but also from tax havens.

C. Limitation and Future Research

As far as we know, this is the first cross-country, firm-level study to elaborate tax haven activity of MNEs, who are part of a business cluster. However, our research does have some limitations that future researchers may be able to address. First, we base on recognized business clusters maps and lists from government websites or literature. Then we base on two criteria including reference cities and NACE codes to identify cluster and non-cluster firms. This way might not capture the whole presence of MNEs within and outside business clusters. Future research may shed light on this, by looking at smaller samples or by taking advantage of other data sources to more specifically identified cluster firms and non-cluster firms in the sample. However, the use of recognized business clusters maps and lists is still a major contribution to ensure that the coverage of firms within and outside clusters is quite precise and accurate. Second, in this paper, we have used data for a set of five countries which are representative for Europe countries specifically and OECD countries generally. Our analysis may only reflect the phenomenon in the developed world. Future research in this area can extend the analysis beyond OECD countries to reveal broader trends in developing countries. Third, although ORBIS database allows us to access comprehensive information which is very useful for our research, we believe that future research can delve deeper into the research area by utilising different research methods and then to explore possible alternative explanations of the findings in this paper.

Given the widespread use of tax havens by MNEs, this paper opens up a new line of enquiry in terms of research that investigates the role of business clusters and tax havens in IB. There are a number of interesting questions that the literature is silent on. For example, what are the business cluster characteristics that explain different tax haven activities? Is there a non-linear relationship between business cluster firms’ performance and the use of tax haven? If so, how does this non-linearity look like and does it differ across business clusters and industry.

REFERENCES

[1] OECD (2019). What is BEPS? Available from https://www.oecd.org/tax/beps/about/. Accessed on 10 November 2019.
[2] Rohlin, S., Rosenthal, S. & Ross, A. (2014). Tax avoidance and business location in a state border model. Journal of Urban Economics,
Premium: Innovation Subsidies and R&D Collaboration Networks.” Research Policy 44 (8): 1431–1444.

30. Boschma, R. A., and K. Frenken. 2011. “Technological Relatedness and Regional Branching.” In Beyond Territory: Dynamic Geographies of Knowledge Creation, Diffusion, and Innovation, edited by H. Bathelt, M. Feldman and D. F. Kogler, 64–81. London: Routledge/Taylor Francis.

31. Ballard, P.-A., J. A. Belso-Martínez, and A. Morrison. 2016. “The Dynamics of Technical and Business Knowledge Networks in Industrial Clusters: Embeddedness, Status, or Proximity?” Economic Geography 92 (1): 35–60.

32. Butts, M., Becker, W., & Boswell, W. (2015). Hot Buttons and Time Sinks: The Effects of Electronic Communication during Nonwork Time on Anger and Work-Nonwork Conflict. Academy of Management Journal, 58, 763–788.

33. Lavie, D. 2006. The competitive advantage of interconnected firms: An extension of the resource-based view. Academy of Management Review, 31(3), 638–658.

34. Smithsonian, M., and J. Verkuilen. 2006. “A Better Lemon Squeezer? Maximum-Likelihood Regression with Beta-Distributed Dependent Variables.” Psychological Methods 11 (1): 54–71.

35. Cohen, W., & Levinthal, D. (1990). Absorptive Capacity: A New Perspective on Learning and Innovation. Administrative Science Quarterly, 35(1):128-152. doi:10.2307/2393553.

36. Curado, C. (2006). The knowledge-based view of the firm: from theoretical origins to future implications.

37. Jones, C., Temouri, Y., & Malakj, I. (2019). Has media pressure and Austerity reduced the use of tax havens by British Multinationals? Academy of Management Proceedings, 2019(1), https://doi.org/10.5465/AMBPP.2019.10416abstract.

38. Marco, G. & Francesco, G. (2016). On the effects of size and age on the degree of internationalization: An empirical analysis of Italian Food SMEs. Journal of International Business and Economics, 4(1): 29-38.

39. Hansen, J. (1992). Innovation, Firm Size and Firm Age. Small Business Economics, 4 (1): 37-44.

40. Wynnberg, K. & Lindqvist, G. (2010). The effect of clusters on the survival and performance of new firms (2010). Small Bus Econ, 34: 221-241.

41. Muendler, M.-A., J. E. Rauch, and O. Tococian. 2012. “Employee Spinoffs and Other Entrants: Stylized Facts from Brazil.” International Journal of Industrial Organization 30 (5): 447-458.

42. Fontagne, L., Koenig, P., Mayers, F. & Poncet, S. (2013). Cluster policies and firm selection: Evidence from France. Journal of Regional Science: 1-26.

43. Wever, E. & Stamm, E. (1998). Clusters of High Technology SMEs: The Dutch case. Regional Studies. 33(4): 391-400.

44. Capello, R. & Nijkamp, P. (2009). Development theories: Regional production factors. Development theory: Innovation, knowledge and space. Handbook of Regional growth and Development Theories. Edward Elgar, Cheltenham: 101-202.

45. Hilber, C. and Vouci, I. (2010). Agglomeration economies and the location of foreign direct investment: Empirical evidence from corporate tax data. The Quarterly Journal of Austrian Economics 13(3): 355-377.

46. Tether, B. (2002). Who co-operates for innovation, and why: An empirical analysis. Research Policy, 31 (6): 947-96.

47. Ter Wal, A. L. J. 2009. The Spatial Dynamics of the Inventor Network in German Biotechnology: Geographical Proximity versus Triadic Closure. Working paper (Economic Geography Research Group Working Paper Series), Utrecht: Utrecht University.

48. Pettiglio, R. & Reganati, F. (2015). Multinational enterprises, technological intensity and firm survival. Evidence from Italian manufacturing and service firms. Atl Econ Journal, 43: 87-106.

49. Wenting, R. 2008. “Spinoff Dynamics and the Spatial Formation of the Fashion Design Industry, 1858–2005.” Journal of Economic Geography 8 (5): 593–614.

50. Uzzi, B., and J. Spiro. 2005. “Collaboration and Creativity: The Small World Problem 1.” American Journal of Sociology 111 (2): 447–504.

51. Temoun, Y. (2012). The cluster scoreboard: Measuring the performance of local business clusters in the knowledge economy. OECD Local Economic and Employment Development (LEED) Working Papers. OECD Publishing. http://dx.doi.org/10.1787/5k94q9hpq5sk-en.

52. Graham, J. R., & Tucker, A. (2006). Tax shelters and corporate debt policy. Journal of Financial Economics, 81: 563-594.

53. UNCTAD (2019). World Investment Report 2019. United Nations Publications: New York.

54. Trading Economics (2019). United States GDP Deflator. Available from https://tradingeconomics.com/united-states/gdp-deflator. Accessed on August 2019.

55. Kim, W., & Jang, G. (2018). Relationship between tax avoidance and...
key financial indicators in Korea’s construction waste disposal industry. *Academy of Accounting and Financial Studies*, **22**(3): 3–12.

[56] Institute for Government (2019). *Trade: freeports and free zones*. Available from https://www.instituteforgovernment.org.uk/explainers/trade-freeports-free-zones. Accessed on 01 November 2019.

[57] Leonard, D., & Sensiper, S. (1998). *The Role of Tacit Knowledge in Group Innovation*. *California Management Review*, **40**(3), 112–132. https://doi.org/10.2307/41165946.

[58] Knight, L. (2012). *Corporate Tax Avoidance: How do companies do it?* BBC News. Available from https://www.bbc.co.uk/news/business-20580545. Accessed on 28 October 2018.

[59] Katz, S., Khan, U. & P. Schmidt. (2013). *Tax avoidance and Future Profitability*. Available from https://www0.gsb.columbia.edu/mygbs/faculty/research/publicfiles/5876/Tax%20Avoidance%20and%20Future%20Profitability_1.pdf. Accessed on 03 March 2018.

[60] Sørensen, J. B., and D. J. Phillips. 2011. “Competence and Commitment: Employer Size and Entrepreneurial Endurance.” *Industrial and Corporate Change* **20**(5): 1277–1304.

[61] Oquero, A.C. (2019). Puerto Rico Investment Summit: Essential Business Network: Investor, Businessowners to Learn About Tax Incentives. Opportunity Zones, Gilti Tax, Financial Services at Feb. 14 Forum. *Caribbean Business*, **5**(5): 13.

[62] ABA Invest in Austria (2019). *Clusters in Austria*. Available at: https://investinaustria.at/en/research-development/clusters.php. Accessed on 06 April 2019.

[63] Clusterexzellenz in Deutschland (2019). *Cluster excellence in Germany*. Available at https://www.clusterplatform.de/CLUSTER/Navigation/Karte/SiteGlobals/Forms/Formulare/EN/karte-formular.html. Accessed on 28 May 2019.

[64] Eden, L. (1998). *Taxing multinationals: transfer pricing and corporate income taxation in North America*. Toronto: University of Toronto Press.

[65] European Cluster Collaboration Platform (2019). *France clusters Mapster*. Available at: https://www.clustercollaboration.eu/news/france-clusters-publishes-its-mapster-2018. Accessed on 19 June 2019.

[66] European Cluster Collaboration Platform (2019). *List of cluster organisations*. Available at: https://www.clustercollaboration.eu/clusters-list. Accessed on 19 June 2019.

[67] Forsgren, M. (2017). *The Multinational Firm: A Beauty or A Beast. Theories of the Multinational Firm: A Multidimensional Creature in the Global Economy*. Third Edition. Northampton: Edward Elgar Publishing: 1-21.

[68] Hitt, M. (2016). *International Strategy and Institutional Environments*. *California Management Review*, **44**(2), 112–132. https://doi.org/10.1108/CMR-11-2015-0168.

[69] Jasniak, M. & Kozinski, J. (2017). Tax incentives as an instrument attracting investors to special economic zones. *Financial Internet Quarterly*, **13**(2): 36–44.

[70] Lee, B., Dobilianskis, K. and Minton, S. (2015). *Theories and empirical proxies for corporate tax avoidance*. *Journal of Applied Business and Economics*, **17**(3): 21–34.

[71] Li, P. & Bathelt, H. (2018). Location strategy in cluster networks. *Journal of International Business Studies*, **49**: 967-989.

[72] Madsen, E., Smith, V. & Dilling-Hansen, M. (2003). Industrial clusters, firm location and productivity – Some empirical evidence for Danish firms. *Working Paper 03-26*

[73] Oselheim, L., Randoy, T., & Stonehill, A. (2001). On the treatment of finance-specific factors within the OLI paradigm. *International Business Review*, **10**(4): 381-398.

[74] Rugman, A.M. (1981). *Inside the multinationals*. London: Croom Helm.

[75] Schwartz, D. (2006). The regional location of knowledge based economy Activities in Israel. *Journal of Technology Transfer*, **31**: 31-44.

[76] Wilson, J.D. (1991). *Tax competition with interregional differences in factor endowments*. *Regional Science and Urban Economics*, **21**: 423–51.

[77] Wilson, J.D. (1999). “Theories of tax competition”, *National Tax Journal*, **52**: 269–304.

[78] Zhang, C., Cheong, K. & Rasiah, R. (2016). *Corporate tax avoidance and performance: Evidence from China’s listed companies*. *Institutions and Economics*, **8**(3): 61-83.

DOI: http://dx.doi.org/10.24018/ejbmr.2021.6.4.883