An Analysis of the Board of Directors Network Relations Regarding Determination of their Tax Policies Planning

Reza Tagizadeh*

*Corresponding Author, Assistant Professor, Department of Accounting and Finance, Faculty of Economics, Management and Accounting, Yazd University, Yazd, Iran. (Email: rezataghizadeh@yazd.ac.ir)

GholamReza Rezaei

Assistant Professor, Department of Accounting, Faculty of Management and Economics, University of Sistan and Baluchestan, Zahedan, Iran. (Email: Rezaac.1990@acc.usb.ac.ir)

Mohammad Sadegzadeh Maharluie

Assistant Professor, Department of Accounting, Faculty of Economics, Management and Social Sciences, Shiraz University, Shiraz, Iran. (Email: mohammad.sadeghzadeh@shirazu.ac.ir)

Abstract

Tax is one of the primary sources of government revenue which is a principal part of the government budget and is considered an inevitable part of corporate payments. The Board of directors is one of the chief decision-making groups in determining corporate tax avoidance. Therefore, the relationships seen in the form of a social network between the board members of various companies can affect the tax policy of companies. The primary purpose of this study is to examine the structure of relationships between companies based on their joint board members and to detect the relationship between the companies position in the network of board members' relations with their tax planning activities. The statistical population of this research was all companies listed on the Tehran Stock Exchange from 2011 to 2020. The social network analysis approach developed on graphic techniques based on graph theory and regression analysis was used to conduct the research analysis. The research results show that some companies active in the Tehran Stock Exchange have a better position than other companies in the network. In addition, evidence showed that the status and position of companies in the network of relationships could affect the extent of their tax avoidance.

Introduction

According to the pecking order theory, there is no desired level of cash, and cash performance represents only a link between accumulated profits and investment needs. Hence, companies may do tax avoidance activities despite possessing sufficient internal resources to accumulate capital. In the case of information asymmetry, the cost of providing external funds is more than the cost of providing internal funds. Therefore, companies are more inclined to utilize the funds generated within the company than external funds. Edwards et al. (2016) provide evidence that tax planning can be used as an internal source of credit so distressed companies can attain desired investments with tax reserves. Accordingly, tax avoidance can boost corporate actions. Because of information asymmetry, the more expensive or less available external organizational resources, the more important would be the incremental returns of tax reserves as funds created within the organization (Leone, 2008; Edwards et al., 2016). Although tax avoidance may cause an increase in profit after Tax, related tax planning may prevent the company from achieving the maximum

possible profit (Khaoula & Moez, 2019).

Tax avoidance and tax evasion limit the capacity of governments to increase revenue and economic and social policies (Gioacchino & Fichera, 2020). Since a significant portion of government budgets is tax-based, and our country is no exception, tax planning policies will be significant for governments. In addition, tax planning for paying lower taxes endures social and economic consequences. In addition, there has yet to be much consensus on a definitive answer to whether tax avoidance has benefited the company so far. While most studies have shown that tax evasion is a risk-increasing activity, different external stakeholders perceive these risks differently (Dhawan et al., 2020). For example, researchers such as Blaufus et al. (2016), Goh et al. (2016), and Guenther et al. (2017) found that from the perspective of shareholders, tax avoidance is positive, or at least it is not considered harmful because of tax reserves in the company. In contrast, Hasan et al. (2014) and Shevlin et al. (2020) suggest that tax avoidance is harmful from creditors' perspectives. Hasan et al. (2014) argue that lenders do not benefit from tax reserves because they receive fixed interest but are exposed to tax avoidance risks.

Based on the above discussion, tax avoidance is a source of risk for companies. Second, the evidence suggests that tax avoidance activities are unbeneficial to all stakeholders. Therefore, from these groups' point of view, identifying the factors affecting the determination of corporate tax planning policies is essential. One of these factors is the Board of directors and its structure and relationships in companies (Wen et al., 2020). In most cases, the Board oversees and advises management (Fama & Jensen, 1983). Because companies that typically operate in emerging markets have weak corporate governance and poor management performance, combining the Board can improve corporate governance and management practices. Therefore, shareholders and Legislative bodies in developing countries are more critical than developed ones (Syverson, 2011). However, one of the most significant decisions involving the boards of directors is making tax planning decisions (Erle, 2008). In 2009, Douglas Shulman encouraged corporate board members to play a role in assessing and monitoring tax risk. Also, in a survey held in 2017 of multinational corporate tax executives, more than 60 percent of respondents confirmed that corporate board members are responsible for taxation (Wen et al., 2020). This result is in with many previous studies both abroad (e.g., Minnick and Noga, 2010; Lanis & Richardson, 2011; Khaoula & Moez, 2019; Wen et al., 2020) and inside the country (for example, Nazemi and Poorangha, 2018; Khajavi et al., 2018) which examine the role of the

Board in influencing the tax avoidance activities of companies. However, these studies have typically studied the effects of the Board of directors on tax avoidance at the company level. They have not considered the relationships between the boards of directors of companies. Accordingly, the present study examines and analyzes the network relationships of the boards of directors of companies listed on the Tehran Stock Exchange and their relationships with tax planning policies. This study seeks to answer two key questions: a) what pattern does the structure of relationships between companies based on their joint board members follow? B) Does the company's position in the network of relations of board members have a relationship with their tax avoidance?

Literature Review

There has yet to be a comprehensive and acceptable definition of tax avoidance in the financial literature (Safari Gerayli & Poodineh, 2016). However, according to Frank et al. (2009), tax avoidance is the downward management of taxable revenue through tax planning activities that can be legal or illegal. Recent evidence suggests that managers worldwide engage in tax avoidance activities to minimize tax payments (Lanis & Richardson, 2011). Desai and Dharmapala (2006) showed that in the agency theory framework, the analysis of tax aggression decisions by managers could be enjoyable because managers benefit from controlling the costs of other stakeholders.

According to Garg et al. (2016), previous research on tax avoidance has focused on the specific characteristics of companies. However, the characteristics of managers as decision-makers can play a key and fundamental role in this regard. Hanlon and Heitzman (2010) also pointed to the role of managers' characteristics in tax avoidance. Iazzi et al. (2022) investigate the effects of corporate governance mechanisms, namely, the Board of directors and auditors, on tax aggressiveness. The researchers found that corporate board characteristics and auditors' features increase corporate tax aggressiveness.

Generally, managers with more capabilities are less likely to engage in tax avoidance activities, especially during oversight and scrutiny by tax officials. In principle, tax avoidance requires planning in line with specific tax objectives. Tax planning is an essential investment for shareholders due to reducing the tax burden on companies and shareholders. However, shareholders may be reluctant to pursue tax planning activities due to potential costs (Chen et al., 2010). Also, the outlook for undesired assessments may affect corporate managers' decisions about tax planning (Abdul Wahab & Holland, 2012). In addition, tax planning might have a positive or negative

effect on a company's value. The effects will be favorable if tax planning maximizes shareholder value (Desai & Hines, 2002). According to Desai and Hines (2002), shareholders evaluate tax planning positively when Tax is considered a burden on society.

On the contrary, if tax planning is regarded as a risk-related activity, shareholders consider it negatively. Kovermann and Velte (2019) posit that various aspects of corporate governance, such as board composition, ownership structure, and enforcement and government relations, strongly influence corporate tax avoidance. Chytis et al. (2020) research results showed a significant positive association between board independence with tax planning.

Overall, tax planning comes with a high cost to companies and shareholders. Although decreasing Tax can increase post-tax income, at the same time, tax planning activities will be associated with the costs of agency problems (Khaoula & Moez, 2019). In the meantime, companies balance the benefits and final costs of tax expense management to determine the extent of their tax avoidance activities (Rostaei Darehmiane et al., 2015).

Therefore, shareholders must control managers in financial decisions. Lee and Swenson (2012) provided evidence of a negative relationship between the effective tax rate and stock prices. In this regard, the Board of directors of companies is one of the critical elements of the corporate governance structure. As tax risks maintain more diversity, the Board should be frequently involved in the company's tax planning policies and strategies as part of its risk management strategy (Khaoula & Moez, 2019). According to Erle (2008), the Board of directors is responsible for the company's tax policies and securing the interests of shareholders.

Previous research (e.g., Minnick and Noga, 2010; Lanis & Richardson, 2011; Khaoula & Moez, 2019; Wen et al., 2020; Bahrisales et al., 2014; Nazemi & Poorangha, 2018; Khajavi et al., 2018) supports the importance of the characteristics of the boards in tax avoidance activities. From a theoretical point of view, considering the role of the board members in managing the affairs of companies is considered the most crucial factor in controlling and supervising the company's management and protecting the interest of shareholders. However, these studies have directed less attention to the present relationships between board members of different companies. To be more precise, in this research, the effects of companies' position in the board members' network relations on their tax avoidance have yet to be regarded. Accordingly, this is the primary focus of the present study. Today, network analysis is used as a qualitative model to analyze the network configuration and

the position of interactions between the network members in the accounting and taxation field. It is also used in other fields (Erfanmanesh & Basirian, 2013).

Network analysis suggests the process of examining and evaluating the structures of a social network. Social networks are constructed when a structure of interconnected nodes is formed. A social network is a graph in which each participant is considered an actor and represented by a node in the network. Actors can be human beings, organizations, institutions, groups, or related entities (Taghizadeh et al., 2019). Based on this, the board members of different companies can be considered a network that can influence each other's decisions in inter-network relations. One of these decisions is tax planning and tax avoidance activities. According to Gioacchino and Fichera (2020), differences in tax ethics and social norms of active actors in tax decision-making influence tax avoidance activities. More precisely, the network of relationships between different actors (such as board members) can influence corporate tax policies. This issue is based on the argument that in social networks, each actor affects the other actor with whom it interacts. Therefore, the identical effect of actors in the corporate Board's relationship network can be expected to affect their tax avoidance decisions.

Research Methodology

This research utilizes a quantitative approach that is post-event in terms of implementation. It is also based on graphic techniques which are relied on graph theory. In terms of purpose, it can be placed in the applied research category. In summary, this article is done in two phases: In the first phase, the company relationship was examined based on the shareholders who could appoint the board members. This step was performed by network analysis method using PreMap software version 2, UCINET version 6, and its complementary package NetDraw. In the second phase, the issue of whether the position in the network of relations is related to tax avoidance was examined. This step was performed by regression analysis using Eviews software version 9.

The statistical population of this study is that all companies listed on Tehran Stock Exchange were active from 2011 to 2019. The statistical sample of this research was based on the following criteria:

1. The fiscal year of companies must have ended at Esfand (the final month based on the Iranian calendar),
2. They must not have been in banks and financial institutions.

Based on the abovementioned criteria, information from 1098 companies-year was gathered and analyzed.[1].

The required data were collected through the Rahvard-Novin software and the official website of the Tehran Stock Exchange organization.

The primary variable in this study was tax avoidance. An effective tax rate was used to measure tax avoidance in tax avoidance research. There is much discussion about how to calculate the effective tax rate. These arguments arise because various figures can be employed in the numerator and denominator of fraction 1. The amount utilized in the fraction's numerator was ordinarily the declared Tax without any adjustment. However, in companies where deferred tax expense appeared in the financial statements, the numerator is adjusted for deferred tax expense. Researchers employed various figures, including company sales, operating income, pre-tax income, operating cash flow, and taxable income as a denominator. Gupta and Newberry (1997) argue that using taxable income in the denominator neutralizes the effects of tax exemptions, and therefore it is not a good measure. In this study, following Zimmerman (1983) and Kim and Limpaphayom (1998), the effective tax rate was calculated through the following equation:

$$TA = \frac{TAX\ EXPENSE}{OPERATING\ INCOME} \tag{1}$$

In this regard,

TA: The effective tax rate is based on accounting standards;

TAX EXPENSE: The tax expense of the company is shown in the income statement; and

OPERATING INCOME: Indicate the company's operating income.

It should be noted that the higher the effective tax rate, the lower the tax avoidance and the higher the corporate Tax. As mentioned earlier, the method of analyzing this research in the first part is based on analyzing social networks. In this part, in addition to the general analysis of the board network, the performance of each node in the network is also examined using component indicators. Centrality, one of the most fundamental concepts in network analysis, studies the importance and influence of people in the

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[1] It must be noted that according to the criteria, 406,470,514,547,567,592,592,618, and 680 companies were selected for the first phase of the research for the year from 2012 to 2020 accordingly. Then, applying the limitation criteria, 1098 year-companies were selected in the second phase of the research.

network. The centrality of network nodes can be studied using three indicators of degree, betweenness, and closeness. The degree of centrality of a node in a social network indicates the number of connections the node has with the other nodes which constitute the network. In other words, in a board network, the centrality degree of each individual indicates the number of relationships he or she has with other members of the network through joint stockholders (shareholders who appointed board members). The degree of node k or (pk) centrality is calculated using the following formula.

$$C_D(p_K) = \sum_{i=1}^{n} a(p_i, p_k) \qquad (2)$$

In Formula 2, n is the number of nodes in the network, and a (pi, pk) equals one if two nodes pi and pk are connected; otherwise, zero. The betweenness index of a node also indicates the number of times the node is placed in the shortest path between the other two nodes in the network. Nodes with high betweenness play a significant role in information circulation and network connectivity and have a central location in the network. The betweenness index of node k or (PK) is calculated using the following pattern:

$$C_B(p_K) = \sum_{i<j}^{n} \frac{g_{ij}(p_k)}{g_{ij}} \; ; i \neq j \neq k \qquad (3)$$

In formula 3, (gij) is the shortest path between the connection of pi and pj, and gij (pk) is the shortest path between pi and pj which passes through pk. The closeness index of a node represents the average length of the shortest paths between that node and other nodes in the network. Nodes with high closeness index have more influential power in the network, play a more central role, and have more accessibility for other nodes. The node closeness index k or (pk) is calculated using the following formula:

$$C_C(p_K) = \sum_{i=1}^{n} d(p_i, p_k)^{-1} \qquad (4)$$

In this model, d(pi, pk) is the shortest connection path between two nodes pi and pk (Abbasi et al., 2012).

In this study, according to the existing literature (Chen et al., 2010; Lanis & Richardson, 2011; Khaoula & Moez, 2019; Wen et al., 2020; Dhawan et al., 2020; BahriSales et al., 2014; Safari Gerayli & Poodineh, 2016) variables of company size (natural logarithm of total assets), the ratio of market value to book value, return on assets (ratio of net income to total assets), return on equity (ratio of net income to owners' equity), sales (natural logarithm of sales), financial leverage (ratio of total liabilities to total assets), inventory (ratio of inventory to total assets) and operating cash flow (ratio of inflows to outflows of cash from operating activities to total assets) were used as control

variables.

In these models, once all three indicators together with control variables are put in the model. Once again, all three indicators are in pairs with control variables inserted into the model, and finally, all three indicators separately with control variables are entered into the model. The reason for doing so is to examine the possible diverse effects of each indicator on the dependent variable (tax avoidance) together and separately.

Findings

This section presents the findings of the study's network and regression analysis. Table 1 presents the descriptive statistics of the research. The first part of this table presents statistics related to the relations between the companies through the relations between their joint boards of directors. The second part of the table is dedicated to the descriptive statistics of each research variable. According to Table 1, the market value of the companies included in the sample was approximately six times their book value. These companies earned income on average about 14% of their assets annually.

In contrast, their average return on equity is equal to 0.364. Moreover, based on the information in this table, it can be demonstrated that, on average, about 54% of the companies' assets are obtained from debt. Although, on average, about 22% of companies' total assets are allocated to inventory. In some years, the companies had zero inventories. In addition, the amount of cash inflows from operating activities is 12.6% of their total assets.

Table1. Descriptive Statistics of the Study

	Year	Minimum	Maximum	Average	Std. Dev	Number of Observation
Statistics related to interrelated companies connection in each year	2012	1	7	4.59	1.21	406
	2013	1	7	4.57	1.18	470
	2014	1	7	4.5	1.25	514
	2015	1	7	4.49	1.31	547
	2016	1	7	4.49	1.31	567
	2017	2	11	4.62	1.15	592
	2018	2	9	4.59	1.07	592
	2019	2	11	4.58	1.08	618
	2020	2	9	5.91	0.56	680
Research variables	Tax avoidance	0	0.449	0.120	0.090	1098
	Degree	0	0.116	0.023	0.029	1098
	Closeness	0.083	0.579	0.318	0.126	1098

Betweenness	0	6.302	0.278	0.603	1098
Size	10.132	21.844	14.863	1.906	1098
Market to book value	0.376	38.819	5.953	6.454	1098
ROA	-0.289	0.708	0.140	0.139	1098
Sale	7.101	20.579	13.978	1.753	1098
Financial leverage	0.025	0.996	0.537	0.198	1098
ROE	-2.482	2.139	0.364	0.341	1098
Inventory	0	0.717	0.219	0.150	1098
Operational cash flow	-0.343	0.642	0.126	0.132	1098

The general network related to the relationship between companies through their joint Board of directors for 2020 (as an example) is shown in Figure 1. The corporate network typically consists of primary, marginal, and isolated parts. In this network, there are companies with various degrees of communication. In the central part, the density of communication in the network's core is higher than in the periphery, and gradually, moving away from the core, the communication density decreases. According to Figure 1, companies located in the center of the figure (main section - denser place) generally have a better position in the network of relationships than other companies. The further distance from this center, the position in the network of relations is reduced to the point that some companies are located in an isolated area that has no connection with other companies (Units that are not in contact with other units are isolated units; which are located in the margin of the figure).
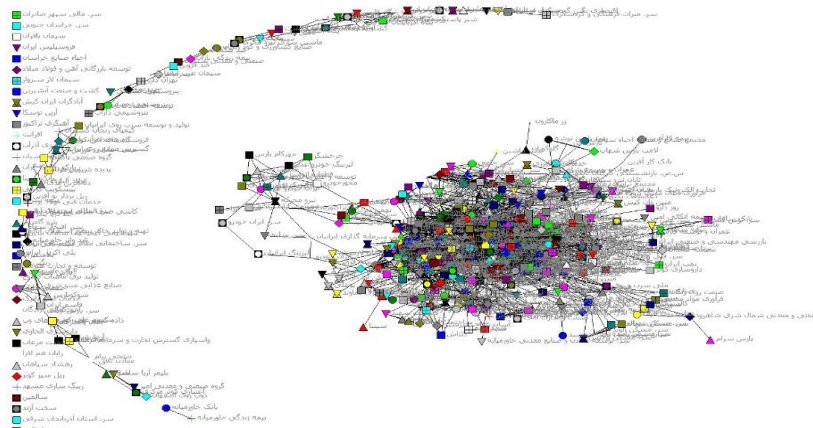

Figure1. A general network of the company's relationship

Outputs related to centrality indicators, including degree, closeness, and betweenness, indicate differences in the position and situation of companies in the communication structure. For example, Figure 2 shows the networks based on degree centrality (upper left), closeness (upper right), and betweenness (bottom) for 2020. The degree of centrality is simply the number of direct relationships a node or entity has. A node or company with a high degree of centrality is an active player in the network. The higher the degree of centrality, the more communication and network it has and the more effective it is. The centrality of closeness here also indicates how quickly a company can access more companies on the network. In addition, the centrality of betweenness in this study indicates the position of a company within the network in terms of its ability to connect other pairs, groups, or groups in the network. Also, it shows how much a company was in the communication path of other companies, and communication is done through it (Taghizadeh et al., 2019 and 2021).

According to the degree-centric networking section in Figure 2, the companies presented in the larger circle have better network relationships and generally are at the center of the network. These relationships can influence companies' decisions, including tax avoidance, which this study studies. The closeness network section also shows that some companies interact with a minimal number of intermediaries (companies located in the center of the proximity network and represented by larger circles), and some companies interact with more intermediaries. This subject for companies with high proximity and low distance can indicate that they are more influential in various decisions (like tax avoidance). In the section related to the betweenness network (bottom) in Figure 2, you can distinguish companies with a lot of betweenness power. These companies are marked in the figure with larger circles. In principle, the flow of information and access to information is more accessible in companies with a greater betweenness and, therefore, will have more impact power. In other words, companies with a greater betweenness power can determine the behavior of related companies; this means that these companies can determine or influence the tax avoidance decisions of their affiliated companies that are weaker in terms of betweenness power.
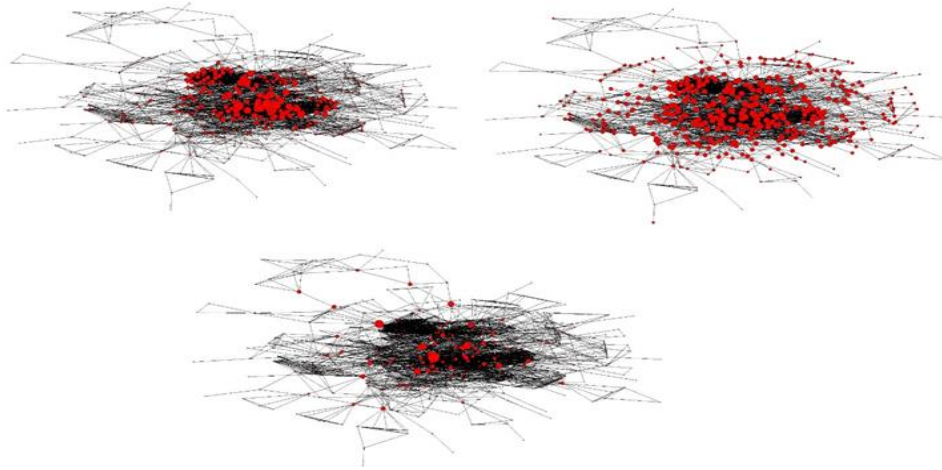
Figure 2. Networks Related to Degree, Closeness, and Betweenness

In the continuation of this section, the results related to the regression analysis of the research are presented to examine the effects of the actors in the network of companies' board relations on their tax avoidance decisions. Evidence related to these tests is presented in Table 2. Seven regression models were designed and tested according to the number of centrality indicators, which include three indicators of degree, closeness, and betweenness. In these models, once all three indicators together with control variables are put in the model. Once again, all three indicators are in pairs with control variables inserted into the model, and finally, all three indicators separately with control variables are entered into the model. The reason for doing so is to examine the possible diverse effects of each indicator on the dependent variable (tax avoidance) together and separately. In all models, the effects of the year and industry are also controlled2. According to the information in Table 2, considering the value of the adjusted coefficient of determination (R2adj), the explanatory power of the models is good and acceptable. Table 2 shows some inconsistent evidence regarding the effects of centrality indicators on corporate tax avoidance in different models. According to Model 1 (all three indicators), the betweenness and closeness indices cause positive effects, and the degree index hurts tax avoidance. In models 2, 3, and 4, where the indices are placed next to each other in pairs, the degree index and the betweenness index (model 2) positively affect tax avoidance. In Model 4, the indicators of betweenness

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[2] To examine the research models more accurately, the researcher tested all seven models listed in Table 2 without controlling the effect of year and industry, and similar results were obtained. The results were not provided due to avoid lack of overstating.

and closeness together cause positive effects on tax avoidance. However, in model 3, the degree index, along with the closeness index, causes adverse effects on tax avoidance, while the closeness index causes a positive effect on tax avoidance. Finally, in models 5 to 7, where all three centrality indicators are included separately, these indicators positively affect tax avoidance. Evidence related to control variables is also presented in Table 2. For example, firm size and financial leverage in all models positively affect tax avoidance. In addition, ROE, operating cash flow, and sales variables adversely affect tax avoidance. However, ROA, inventory, and market-to-book value variables do not significantly affect tax avoidance.

Table2. Regression Results of the Study

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Degree	0.536 *** (3.432)	-0.397*** (-4.814)	0.594*** (3.753)	-	-0.436*** (-4.585)	-	-
Betweenness	-0.014*** (-3.280)	-0.017*** (3.814)	-	-0.012*** (-2.824)	-	-0.023*** (-5.405)	-
Closeness	-0.411*** (-7.571)	-	-0.446*** (-8.026)	-0264*** (-7.881)	-	-	-0.293*** (-9.190)
Size	-0.006** (-2.043)	-0.009*** (-2.700)	-0.010*** (-3.173)	-0.007** (-2.271)	-0.013*** (-4.011)	-0.009*** (-2.723)	-0.009*** (-2.769)
ROA	0.026 (0.831)	0.032 (0.331)	0.009 (0.295)	0.025 (0.788)	0.014 (0.420)	0.038 (1.151)	0.023 (0.734)
ROE	0.047*** (4.636)	0.048*** (4.562)	0.048*** (4.584)	0.048*** (4.655)	0.049*** (4.536)	0.047*** (4.479)	0.050*** (4.844)
Operational Cash Flow	0.066*** (2.971)	0.058** (2.553)	0.063*** (2.740)	0.068*** (3.021)	0.054** (2.293)	0.050** (2.179)	0.068** (3.024)
Inventory	0.019 (1.082)	0.001 ((0.089)	0.029 (1.584)	0.015 (0.822)	0.010 (0.534)	-0.001 (-0.098)	0.014 (0.791)
Market to book value	0.0002 (0.426)	0.0007 (1.203)	$-5.23*10^{-5}$ (-0.089)	0.0004 (0.745)	0.0004 (0.744)	0.0006 (1.132)	0.004 (0.843)
Sales	0.006** (2.308)	0.007*** (2.662)	0.010*** (3.630)	0.006** (2.240)	0.012*** (4.112)	0.009*** (3.053)	0.007*** (2.598)
Financial Leverage	-0.063*** (-3.089)	-0.075*** (-3.553)	-0.049** (-2.327)	-0.070*** (-3.427)	-0.060*** (-2.781)	-0.069*** (-3.264)	-0.068*** (-3.288)
Constant	0.240*** (6.363)	0.214*** (5.542)	0.237*** (6.134)	0.241*** (6.344)	0.209*** (5.292)	0.194*** (5.037)	0.252*** (6.646)
Industry effect controlled	+	+	+	+	+	+	+
Year effect controlled	+	+	+	+	+	+	+
R^2_{adj}	0.245	0.206	0.202	0.238	0.155	0.194	0.233
Observation	1098	1098	1098	1098	1098	1098	1098

The dependent variable of the regression models in this table is tax avoidance. Measuring these variables is given in the research method section. The numbers reported in parentheses are t statistics, and the other reported numbers are regression coefficients. The symbols ** and *** show significance at 0.01 and 0.05, respectively. It should be noted that according to the criterion used to measure tax avoidance (effective tax rate), which is the inverse measure of tax avoidance, all reporting coefficients in this table should be analyzed in reverse.

As the results show, while each indicator is put into the model separately, there is a positive and significant relationship between each indicator of degree, closeness, and betweenness with tax avoidance. Also, Table 2 posits that both the degree and betweenness indicators have a positive effect on tax avoidance. Furthermore, the presence of betweenness and proximity indicators causes both indicators to increase tax avoidance. However, the presence of two indicators of degree and proximity together in the model causes the degree index to have a negative effect on tax avoidance. In contrast, the degree of proximity itself has a positive effect on tax avoidance. While all three indicators were put into the models simultaneously, the betweenness and closeness indices positively affected tax avoidance. In contrast, the degree index had a negative effect on tax avoidance.

Discussion and Conclusion

The phenomenon of tax avoidance is one of the most fundamental issues and problems that all countries, both developed and developing, are grappling with. Accordingly, this study examined the phenomenon of tax avoidance and determined companies' tax policies by analyzing the board relations network. To be more precise, in this article, while determining the pattern of the structure of relations between companies based on their joint board members, this question is answered whether the position of a company in the network of board members' relations is related to its tax avoidance or not.

The key findings related to the first part of the research related to network analysis showed that there are companies with different communication degrees in the network of relationships. Communication density in the network's core is higher than in the periphery. By getting distance from the core, the density of communication decreases. Also, the results of indicators related to the position, importance, and effectiveness (degree, closeness, and betweenness indicators) of companies in the network showed that companies generally at the center of the network have a better position and situation than others. They communicate with few intermediaries, have almost instant access, and demonstrate a higher ability to obtain information through network members. For peripheral companies, on the other hand, access is done through more intermediaries and imposes more costs on them. The occurrence of such a phenomenon is in accordance with the theoretical foundations of research and is consistent with previous studies (Sankowska & Siudak, 2016; Singh & Delius, 2017; Withers et al., 2018; Taghizadeh et al., 2019).

In the second part of this study, the relationship between corporate tax avoidance and the company's position in the board members' network was investigated using the regression analysis approach and implementation of various models. Significant findings of this part of the study showed that each of the indicators of position and situation of the company in the Board's relation network (including degree, closeness, and betweenness) could cause significant effects on increasing tax avoidance alone. However, when these indicators are put together, the evidence changes somewhat. To be more precise, the evidence related to the implementation of the models related to the second part of the research can be presented as follows:

- Entering each of the indicators into the model separately: Evidence related to these models showed a positive and significant relationship between each indicator of degree, closeness, and betweenness with tax avoidance.

- Entering the indicators in pairs in the model: Evidence related to testing these models indicates that the degree and betweenness indicators positively affect tax avoidance. In addition, the presence of betweenness and proximity indicators causes both indicators to increase tax avoidance. However, the presence of two indicators of degree and proximity together in the model causes the degree index to have a negative effect on tax avoidance. In contrast, the degree of proximity itself has a positive effect on tax avoidance.

- The inclusion of all three indicators simultaneously in the model: In such a case, the research evidence showed that the betweenness and closeness indices positively affected tax avoidance. In contrast, the degree index had a negative effect on tax avoidance. In other words, similar to the previous case (entering two indicators in the model simultaneously), the degree index next to the proximity index caused this adverse effect.

In general, the evidence gathered from the implementation of research models showed that each indicator of corporate relations alone increases tax avoidance. This finding can be justified by the fact that due to the power and influence of companies with high relations, they are more inclined to tax avoidance because, in such a case, firstly, they can identify ways of tax avoidance better (by sharing the experiences of related companies) and, secondly, they are less afraid of the possibility of tax avoidance discovery. Companies with high centrality, closeness, and betweenness have more communication, influence, and access to information flow. Therefore, these companies use their power for tax avoidance activities.

Another necessary piece of evidence of this research and what was interesting in implementing different models happened when all these indicators were included together in the model; the direction of the degree index changes from positive to negative and therefore reduces tax avoidance. The issue is due to the placement of these two indicators of degree and closeness together. One of the reasons for such a relationship stems from the role that closeness plays in corporate relationships. To be more precise, companies with a higher degree of centrality have more relationships than other companies, and companies with a high degree of closeness have shorter communication paths between them. Thus, in such a situation (high closeness index), it causes companies with a higher degree of centrality to fear the discovery of their tax avoidance (due to the closer and more significant relationship between companies and the possibility of reviewing more precisely by tax authorities), less tax avoidance occurs. Overall, the evidence for this study is consistent with the view of Gioacchino and Fichera (2020), who stated that differences in tax ethics and social norms of actors active in tax decision-making are among the factors influencing tax avoidance activities. From their point of view, the relationship network between different actors (such as board members) can influence corporate tax policies.

Due to the importance of Tax in the administration of the country, it is suggested to the officials of the Ministry of Economic Affairs and Finance ,and the tax auditors pay more attention to the existence of relations between companies through joint board members between them and shareholders who can elect board members as far as possible. Researchers are also advised to examine the relationship between the firm's position in the board member network and tax avoidance by considering corporate information transparency and corporate governance.

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