

## AUDIT PARTNER-CLIENT FIRM INTERLOCKS AND AUDIT QUALITY

**Abstract:** The objective of this study is to examine whether the network between client firms as well as network between audit partner and client firms is associated with audit quality. In doing so, first, we examine the effect of *board (audit committee interlocks)* on audit quality. Interlocks are formed when a board member (audit committee member) of one firm is also a board member (audit committee member) of another firm. Second, we include audit partner in the interlocks and examine whether *audit partner-board (audit committee) interlocks* affect audit quality. We theorize that interlocks serve as channels of information flow enabling the exchange of accounting information and thus improving the quality of financial accounting outcomes. Using a sample of Finnish listed companies for a period 2007-2011, we find no association between *board interlocks* and audit quality. However, when the interlocks are formed via audit committee member, we find a positive association. We find a similar pattern for *audit partner-board (audit committee) interlocks*. Our empirical findings suggest that audit quality is better for the firms with interlocking audit committee members in the network of board members and audit partner. However, the results are not significant for the firms that are involved in the network of board members and audit partner. Our results lend support to the notion that audit committee members are key players and are responsible for the quality of accounting figures.

**Key words:**

**Audit quality, social networks, board (audit committee) interlocks, audit partner-board (audit committee) interlocks, dyad, triad.**

## I. INTRODUCTION

This study addresses the question of whether the network between client firms as well as network between audit partner and client firms is associated with audit quality. We study networks that are dyadic<sup>1</sup> and triadic<sup>2</sup> in nature. A dyad is formed when client firms are connected to each other through a common board or audit-committee member, *board (audit committee) interlocks henceforth*. We view such firms as *interlocked client firms*. A triad-stronger form of social ties- is formed when interlocked client firms share a common audit partner: *audit partner-board (audit committee) interlocks*. Through the interlocks, directors and audit partner may transfer and receive information about relevant accounting figures that could potentially impact the quality of earnings.

In recent years, there has been a rapidly growing interest in the role of board interlocks in audit quality or in auditor choice (Zona et al., 2015, Omer et al., 2016, Chiu et al, 2013, Larcker et al, 2013, Johansen and Pettersson, 2013). Board interlocks are assumed to allow the flow of information between the boards, increasing information available to the interlocked firms (Haunschild and Beckman, 1998). In a similar vein, audit partner-client firm interlocks are assumed to allow information exchange within the legal limitations<sup>3</sup>.

Our results show a positive association between *audit committee interlocks* and audit quality, but no association between *board interlocks* and audit quality. For triads we find a similar pattern. Combined, our results show that the type of social ties (dyad vs. triad) *per se* has no impact on audit quality, but the *role of actors* in those networks has. It appears that social ties themselves do

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<sup>1</sup>Dyad is a social relationship between two people which is the smallest possible social group in social networks. [https://en.wikipedia.org/wiki/Georg\\_Simmel#Dyad\\_and\\_triad](https://en.wikipedia.org/wiki/Georg_Simmel#Dyad_and_triad)

<sup>2</sup> A triad is seen as a group of three individuals that are directly connected to each other in order to, for example, carry out an assignment together. [https://en.wikipedia.org/wiki/Georg\\_Simmel#Dyad\\_and\\_triad](https://en.wikipedia.org/wiki/Georg_Simmel#Dyad_and_triad)

<sup>3</sup> An auditor cannot transfer confidential information captured from client i to client j, but she can process the information captured from both client firms and draw conclusions based on the information captured. Auditor's industry specialization is an example of this kind of accumulated information from multiple clients

not facilitate better information flow relevant to audit quality if the right persons (audit committee members) are not involved in those social networks. Put differently, audit committees (AC) are likely to benefit from the social ties of the members serving in other ACs. The same cannot be said about connections between boards of directors<sup>4</sup>.

We use Finnish data as it facilitates our analysis by allowing us to include auditors in social networks. This is because in Finland the audit report is signed by the individual auditor responsible for the audit. To address our research questions, we have collected five-year panel data (from 2007 to 2011) on financial statements of Finnish listed companies, their board of directors, AC members, and the auditors. Data on financial statements and individuals is hand-collected from annual reports and webpages of the companies.

Our study contributes to literature in three ways: First, we study interlocks of both board and of AC members, and find that only *audit committee interlocks* matter. Second, we expand the analysis of social ties including also auditors to the networks. Third, doing so, we are able to analyze triads by connecting auditors to the firm interlocks, and conclude that this stronger form of social ties matters only when AC members are involved. Taken together, our analyses demonstrate the importance of the *role of actors* in the network and that the key role is that of the AC.

The remainder of the paper proceeds as follows. The next section develops our hypothesis. The following section of our paper discusses our research models and presents results. The final section concludes our paper.

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<sup>4</sup> There may be different kinds of benefits from board interlocks to the firms but that analysis is beyond the scope of this paper.

## II. RELEVANT LITERATURE AND HYPOTHESES DEVELOPMENT

Prior studies have examined audit quality and social ties from a simple audit-client relationship to more complex social networks connecting client firms through directorships. The simple auditor-client relationship, illustrated in Figure 1a, has been studied in audit research both in the light of social networks (He et al., 2014, Lennox, 2005) and in policy standpoint such as, auditor tenure and mandatory rotation (Myers et al., 2003). Social ties matter as the connections provide channels for information sharing and enhance trust among the individuals. On the other hand, social ties may increase the feeling of familiarity between connected parties. For auditors, that might threaten objectivity<sup>5</sup> as familiarity between individuals might lead to unintentional biases in judgment and decision making. Consistent with this, He et al., (2014) finds a negative association between audit quality and social ties of auditor and AC members. Also, connections between engagement auditors and AC members might trigger favoritism among the individuals hence reducing audit quality. This view is supported by Lennox (2005) who finds that the client firms whose executives are affiliated with audit firm (if they previously worked for the firm) are more likely to receive a clean audit opinion as compared to the firms that are unaffiliated.

New yet emerging research in auditing has focused on social ties between directorates, that is, on *board interlocks* and boardroom centrality. Board interlocks are defined as when two client firms share the same board member, as shown in the Figure 1b. Boardroom centrality refers to a social network analysis (SNA) concept of centrality, which is typically measured with four dimensions: degree, closeness, betweenness and eigenvector (Bonacich 1972; Freeman 1979).

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<sup>5</sup> A threat of familiarity is one of the threats for objectivity explicitly mentioned in the Code of Ethics. Ye, P., Carson, E., & Simnett, R. (2011). Threats to auditor independence: The impact of relationship and economic bonds. *Auditing: A Journal of Practice & Theory*, 30(1), 121-148. Hussey, R. (1999). The familiarity threat and auditor independence. *Corporate Governance: An International Review*, 7(2), 190-197.

Johansen and Pettersson (2013) argue that when boards are interlocked, a member sitting on board of one firm can get recommendation about decision on auditor choice from the other firm who has already had experience with an audit firm. They hypothesize and find evidence that it is more likely that the auditor is chosen when s/he has already met the directors in other audit engagements as a result of board interlocks.

Board interlocks can also be seen as a web of directors that carry accounting knowledge and practices from one firm to the other while playing a significant role in spreading corporate behavior (Larcker et.al, 2013), however, better connected directors are less likely to adopt reporting practices that reduce financial reporting quality (Omer et.,al 2016). Another view of interlocks is provided by studies on corporate governance focusing on busyness of directors, characterizing the directors who hold multiple directorship as busy<sup>6</sup> (Ferris et.al, 2003, Tanyi and Smith, 2015).

Overall, the previous studies investigating both auditor-client relationship and board interlocks provide mixed results, and attempts to reconcile them by presenting opposite explanations how interlocks between board members work. On one hand social ties serve as channels of information transfer that could ultimately enhance audit quality. Such ties, on the other hand, have negative consequences. Intimacy between auditor and client can lead to compromise on auditor's judgment and decision making due to unwarranted trust in the relationship. In the presence of a common social background such as school ties auditors and board of directors are more likely to bring favoritism biases exerting a negative impact on audit outcomes.

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<sup>6</sup> The busyness that results from sitting on multiple boards results in demanding workload that hampers the members monitoring and oversight roles. Beasley, M. S., Carcello, J. V., Hermanson, D. R., & Neal, T. L. (2009). The Audit Committee Oversight Process\*. *Contemporary Accounting Research*, 26(1), 65-122. Contrarily, being busy auditing many clients creates reputational capital that increases auditor's independence. DeAngelo, L. E. (1981). Auditor size and audit quality. *Journal of accounting and economics*, 3(3), 183-199.

Due to the conflicting reasoning in the role of board interlocks, we propose our hypothesis on the impact of information flows facilitated by board interlocks in a null form:

**H1a:** Board interlocks are associated with audit quality.

Whereas, board interlocks may either improve or weaken audit quality (non-directional), we have grounds to expect that *audit committee interlocks* improve audit quality. This is because AC members are by definition concerned about audit quality as they are directly responsible for contracting and communicating with the auditor, and – together with the auditor – ensuring audit quality. In general, prior research shows that existence of AC, as such, are associated with better audit quality (e.g. Krishnan, 2005). However, we probe deeper into functioning of ACs, acknowledging that AC comprise a heterogeneous set of actors that are interrelated to other ACs, forming network structures (*audit committee interlocks*). The evidence by Shepardson (2013) show that in case of goodwill impairment decisions the *audit committee interlocks* are effective constraining misreporting by self-interested managers. In fact, Dharwadkar et al. (2016) document that *audit committee interlocks* facilitated firms' substitution from accrual-based earnings management to real earnings management emphasizing the critical role of AC members transmitting accounting information between firms. Lending on the findings of prior archival studies on the relationship between ACs and audit quality (Dharwadkar et al. 2016; Shepardson 2013) it is reasonable to expect that the *audit committee interlocks* would influence the audit quality, and consequently we propose the following directional hypothesis:

**H1b:** Audit committee interlocks are positively associated with audit quality.

Looking through lenses of social network analysis, prior studies on auditor-client relationship or board interlocks are conceptually dyadic social ties. However, networks are not limited to these kind of simple one-to-one social ties but are more complex. One such example is illustrated in

Figure 1c in which two board interlocked firms share the same auditor (*audit partner-board interlock*), forming a triad.

In SNA literature, a triad is a group of three individuals that are directly connected to each other in order to, for example, carry out an assignment together (Krackhardt, 1999). Social ties in a triad, as shown in Figure 1c, differ from those in a dyad in three fundamental ways: (1) the individuals have less individualistic behavior, (2) less power to pursue their own goals, and (3) have less conflicts. Moreover, responsibility in such a relationship is equally distributed<sup>7</sup>. With such characteristics, the ties in a triad are harder to break than in dyad. Building on social network concepts (Simmel, 1950; Krackhardt, 1999), we propose a triad (audit partner-board interlocks) characterized with connected directorates and an auditor in common. We argue that triad of audit partner-board interlock facilitates channels of information, allowing enhanced knowledge transfer and social interaction, reflecting ultimately improved audit quality.

More specifically, having a triad with such characteristics, there is less chance of opportunistic behaviour among audit partner and board member since they are more socially restricted. In addition, conflicts are expected to be lower, and if any, are handled efficiently. For example, a dyad is easily broken if conflict arises but having a third individual in a triad makes the relationship more stable. Therefore, we argue that audit partner-board interlock can be seen as strongly connected, where individuals suppress their own interest for a better audit outcome.

Until recently, research in auditing has focused solely on a social dyad (board interlocks). An exception to this is a work of Chen et al., (2014) who focus on triads. They explore the triad in which at least one AC director of a firm is also AC director in other firm and these firms are audited

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<sup>7</sup> For example, you bring a sandwich and put it in the fridge. Later, when you get to eat your sandwich it is missing. Now, if you are working with only one person you easily know the culprit. However, if you add another person to this scenario, you are unable to know who ate your sandwich.  
<http://study.com/academy/lesson/social-groups-dyad-and-triad-in-groups-and-out-groups.html>

by the same auditor. The study examines how investors perceive reported earnings when such an interlocking exists. The study finds that investors' perception of earnings quality increases when the firm has audit partner-audit committee interlocking.

We argue that when an audit partner is connected to an interlocked board, it is genuine to expect that the partner gets not only direct information about the clients but also relevant indirect accounting information via interlock. Therefore, we expect that this information sharing facilitates more informed decisions and control and ultimately effect audit outcome. Thus we state our second hypothesis as:

**H2a:** Audit partner-board interlocks are positively associated with audit quality.

As in developing our hypothesis on *audit committee interlocks* (H1b), we maintain the same argument i.e. the role of AC members and expect a positive association. Moreover, building on the review of SNA literature on social triads, we have sufficient grounds to propose the following directional hypothesis:

**H2b:** Audit partner-audit committee interlocks are positively associated with audit quality.

### **III. METHODOLOGY**

#### **A. Network of audit partners and board members**

We construct a unidirectional network for board members and auditors in order to locate *board (audit committee) interlocks* and connections between client firms and auditors. The network is defined as follows: two firms are linked if they share an auditor or at least one board member, and two firms are not linked if they do not share an auditor or board member. These individual actors are nominated by the annual general meeting.



We conceptually model the network structure that is composed of three channels of connections: (A) the board of firm  $i$  and the board of firm  $j$ ; (B) the auditor of client  $i$  and the auditor of client  $j$ ; and (C) the auditor of client  $i$  and the board of firm  $j$ . Thus, there are three different channels (A, B, C) for how firms can be linked. Channel A is a direct link between board members. However, channels B and C are indirect links. For example, channel B, in which the firms' auditors are connected, is formed by auditor  $i$  and auditor  $j$  on condition that board  $i$  is connected with board  $j$ . These channels provide a network structure  $S$  for the information exchanges.

In technical terms, we create a square adjacency matrix of audit partners and board members that define whether they are connected or not. We create so-called one-mode networks viewing firm-to-firm and auditor-to-client linkages. In addition, we let audit partners to connect indirectly via board interlocks. We create the square adjacency matrix by relating firm-to-firm and partner-to-client matrixes, as well as, the transpose of the partner-to-client matrix and the audit partner level projection of the partner-to-board matrix.

We define our adjacency matrix by the three channels A, B, and C. First in the channel A, we connect firms and board members as a matrix  $F = \text{Firm} \times \text{Board member}$ . Then we project matrix  $F$  to one-mode at firm level (FP). Second, in the channel B we let audit partners to connect each other via board interlocks as a matrix  $A = \text{Auditor} \times \text{Board member}$ . Then, we project matrix  $A$  to one-mode at audit partner level (AP). Finally, in the channel C the firms and auditors are connected by the clientele linkages  $B = \text{Firm} \times \text{Auditor}$  –matrix. We create transpose of the partner-to-client matrix to let the format of the adjacency matrix be square (BT).

Our adjacency matrix  $G$  is then,

$$G = \begin{bmatrix} FP & B \\ BT & AP \end{bmatrix}$$

In which FP is the firm-level projection of firm x board member matrix (firm-to-firm matrix), B is partner-client matrix, BT is transpose of B and AP is the audit partner level projection of auditor-board member matrix.

### **B. Measurement of audit quality**

We employ Dechow and Dichev (2002) model to calculate our proxy for audit quality and assume that firm's "normal" accruals are explained within a three-year cash flow period. In that model, audit quality is proxied by the standard deviation of the residual (error) term from the following model:

$$TAC_{i,t} = \gamma_0 + \gamma_1 CF_{i,t-1} + \gamma_2 CF_{i,t} + \gamma_3 CF_{i,t+1} + \mu_{i,t} \quad (1)$$

In equation (1), total accruals (TAC) is the difference between income before extraordinary items and operating cash flows (CF) during period  $t$ . Both TAC and CF are scaled by the average of the total assets. The residual term  $\mu$  from the regression reflects the accruals that are unrelated to cash flow realisations. Our measure of audit quality is the standard deviation of the absolute value of the error term. The lower the standard deviation of the error term, the higher the earnings quality. We multiplied the standard deviation of the error term by (-1) in order to simplify the interpretation of the results.

### **C. Research model**

We use the following OLS regression model to test our four hypothesis:

$$\begin{aligned}
AQ = & \alpha + \beta_1 \text{Test variable} + \beta_2 \text{SIZE} + \beta_3 \text{ROE} + \beta_4 \text{RET} + \beta_5 \text{P/B} + \\
& \beta_6 \text{EQUITY} + \beta_7 \text{SERIES} + \beta_8 \text{FAMILY} + \beta_9 \text{ACCEXP} + \beta_{10} \text{ACCMEET} + \\
& \beta_{11} \text{ANAFLOW} + \varepsilon
\end{aligned} \tag{2}$$

where the dependent variable is AQ (audit quality) that is measured as the standard deviation of the absolute value of the industry specific residuals of Dechow and Dichev (2002) as described in previous subsection 3.2. Originally, smaller values of AQ indicate higher audit quality. However, in order to simplify the interpretation of our results, we multiply the standard deviation of the error term in Dechow and Dichev (2002) by (-1). Doing so, if AQ is positively associated with our test variables that would be interpreted as improved quality. To test our four hypotheses, we estimate four separate regression models with one test variable in each model. To test our *H1a* that board interlocks affect audit quality we augment our model (1) with *B\_INTERLOCKS*, a dummy variable taking value 1 if a firm is interlocked to other firm via board member, 0 otherwise. For *H1b* that interlocks through AC improves audit quality, our test variable in model (2) is *AC\_INTERLOCK* which is the number of interlocking AC members of a firm. Our hypothesis 2a that examine whether triads affect audit quality, the test variable in model (3) is *TRIAD*, a dummy variable taking value 1 if a firm is involved in a triad in the network of board members and auditors. Finally, for H2b that tests whether audit quality improves for firms with more interlocking AC members in their triads, the test variable in model (4) is *AC\_TRIAD* which is the number of interlocking AC members of a firm's triad.

INSERT TABLE 1 HERE

Based on prior audit quality literature we include several control variables into our regression models. We include control variables to incorporate the effect of firm size and performance as well

as corporate governance indices (Larcker et al. 2007, 2013). The log of the market value of equity is the proxy for firm size (*SIZE*), return on equity (*ROE*) is the proxy for accounting-based performance, and the logarithmic annual buy-and-hold return (*RET*) is the proxy for economic performance. Moreover, we included the price-to-book ratio (*P/B*) to control for the growth opportunities of firms, equity ratio (*EQUITY*) to control for a firm's solvency and a dummy for firms that have several series of shares (*SERIES*).

The firm's ownership structure affects the nomination process of board members and thus, we control for family ownership concentration that has been identified as a determinant of firm performance and earnings quality (Jaggi et al. 2009). We measure family ownership (*FAMILY*) with dummy variable taking value of one when the biggest shareholder is one controlling family and they have more than 20% of total votes and zero otherwise. In an institutional setting, such as Finland, in which Type I agency conflict (conflicts between managers and shareholders) is likely to dominate rather than Type II (conflicts between controlling shareholder and minority shareholders) we expect that family ownership will limit the ability of managers to manipulate earnings that is line with the conjectures in Ashiq et al. 2007. In general, Type I agency conflicts are more likely in Western countries whereas Type II agency conflicts are more likely in East Asia Countries due to low investor protection and lack of transparency in financial reporting (Fan and Wong 2002).

The expertise of an actor has impact on accounting information (Bédard et al. 2004; Cohen et al. 2014; Krishnan et al. 2011; Liu et al. 2014). Intuitively, it would be reasonable that accounting expertise of an actor would influence a firm's earnings quality. In fact, Liu et al. (2014) found that firm managers are less likely to engage in expectation management when firms include an accounting expert on the AC. We control the accounting expertise including a dummy variable

whether an actor has experience as a chief financial officer or an authorized public accountant (*ACCEXP*). We acknowledge, that the corporate governance recommendations suggest that the AC should have financial expertise. However, we control for the accounting expertise of an actor because we think that accounting education and working experience, rather than a wide range of financial expertise, mainly affects our variable of interest.

#### **IV. SAMPLE SELECTION AND DESCRIPTIVE STATISTICS**

The data consists of non-financial Finnish firms listed on Nasdaq OMX Helsinki between 2007 and 2011 (the Main Market). December year-ends are used to ensure that all firms are subject to similar market conditions. Financial firms are excluded<sup>8</sup> due to their different accounting practices (58 firm-year observations), as well as, firms that did not have enough financial data (49 firm-year observations).

We obtained information on the firms' boards of directors and auditors from various publicly available sources, primarily from annual reports and the web pages of firms<sup>9</sup>. In total there are 586 board members and 69 auditors in the network. The number of firms and the proportion of board members and auditors remained relatively stable within the sample period.

INSERT TABLE 2 HERE

Table 2 presents the industry breakdown of the sample firms in accordance with the Global Industry Classification Standard (GICS). The number on publicly listed firms has remained quite stable in this sample period having only few initial public offerings. Most of the observations are

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<sup>8</sup> Financial firms were excluded after the calculation of network centralities.

<sup>9</sup> We acknowledge the fact that the actors in the network may have other connections, for example, current and former employment, friends and family relationships. However, this is not examined in this study due to the fact that we examine the network that is controlled by regulation and/or corporate recommendations.

from materials and industrials ranging yearly from 42 to 46 observations (231 in total). The Finnish context is somewhat focused on IT firms and their proportion is almost one third of the total amount of observations (29.1%). Consumer discretionary and staples represents 24.7% of the total amount of observations.

Interestingly, many of the Finnish listed firms have not complied with the recommendation to nominate AC. Many of the firms explain that their magnitude of business does not require establishing an AC or the board members are jointly responsible of the AC duties. On average half of the firms in the sample (50.9%) have an established AC, a figure that grew gradually throughout the sample period.

#### INSERT TABLE 3 HERE

Table 3 reports descriptive statistics for all the variables used in our analysis. The mean and median value of absolute abnormal accruals (*AQ*) are 0.045 and 0.039, respectively. The mean value of our test variable *B\_INTERLOCK* is 0.774 which indicates that board interlocks exist in almost 77% of the cases. Moreover, the maximum number of interlocking AC member (*AC\_INTERLOCK*) of a firm is 5. The mean value of *TRIAD* is 0.526 indicating that over 50% of the sample firms have audit partner-board interlocks. Firm size (*SIZE*), measured as natural logarithm of total market value, averages as 19.02. Firm's market return (*RET*) is -0.023 on average and the financial return on equity (*ROE*) is 0.034 on average. The firms' share values (*P/B*, price-to-book) vary from zero to over eight times their valuation compared to their book values. The mean value of *EQUITY* is 0.466 reflecting the good solvency of the firms.

Descriptive statistics for corporate governance characteristics such as *SERIES* has a mean value of (0.750). The mean value family ownership (*FAMILY*) is 0.363 indicating that approximately one third of firms is owned by a controlling family. Similarly, the mean value of *ACCEXP* is 0.327

indicating that one third of firms have accounting expert among the board of directors. ACs meet 3 times on average. The maximum number of analyst following the firms (*ANAFLOW*) is 47.

## V. REGRESSION RESULTS

Table 4 reports the regression results, that is, the results regarding our tests of four hypotheses. Models 1 and 2 test our first hypotheses (H1a and H1b), providing support only for the latter. The test results show that board-interlocks are not associated with audit quality whereas when the interlock is formed by audit-committee member, it is positively associated with audit quality. The results from Model 2 show that *audit committee interlocks* are positively associated with audit quality ( $p=0.024$ ). This implies that firms having AC member<sup>10</sup> in the interlock have lower level of estimation errors in accounting accruals. These findings are consistent with the results of Chiu *et al.* (2013) and Dharwadkar *et al.* (2016) who found that the financial reporting behaviour spreads through the interlocks. When AC member of one firm is also audit AC of another firm the financial reports have less volatility in the accounting accruals that results in better audit quality. Hence, we find a support for our (H1b).

INSERT TABLE 4 HERE

For triads we find a similar pattern. Again, we fail to find support for audit partner-board interlocks effecting audit quality but find support for the positive association between *audit partner-audit committee interlocks* and audit quality. Model 3 shows the results for our hypothesis (H2a) that tests the association between triad and audit quality. Triad captures the notion of firms

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<sup>10</sup> While we are aware of the potential endogeneity issue that could be caused by self-selection bias i.e. audit committee members may select their appointment based on perceived financial reporting quality, our work is in progress in dealing with this issue.

and auditors connected to each other. The results provide no support for the hypothesis (H2a) as triads and audit quality are not associated with each other. However, the regression results from Model 4 show that the number of *audit committee interlocks* in triadic firms (*AC\_TRIAD*) has a positive association ( $p=0.092$ ) with audit quality supporting (H2b). These results regarding triads are consistent with our results on dyads, supporting the notion that AC members are key players in financial reporting outcomes.

We use several control variables to control for factors that could potentially affect audit quality. Variable *SIZE* is significant and has a positive sign suggesting that larger firms have better earnings quality. In fact, on average, they tend to have larger boards and more knowledge and resources available for preparing financial statements, which is reflected in enhanced earnings quality. In line with that we find that *ROE* is significant and positive indicating that more profitable firms enjoy better earnings quality. Interestingly, we find that *SERIES* is significant and has a negative sign. In fact, a firm with only one series of shares may indicate the non-existence of a significant block holder and suggest that these firms have lower earnings quality in general. *FAMILY* is significant and positive indicating that earnings management is limited in family-controlled firms that is consistent with the majority of family firm studies (Ashiq et al. 2007; Jaggi et al. 2009). *ACCEXP* is significant and positive in line with prior studies of an actor's expertise (Bédard et al. 2004; Cohen et al. 2014; Krishnan et al. 2011; Liu et al. 2014).

## VI. CONCLUSION

Building on SNA, we explore *board (audit committee) interlocks* and *audit partner-board (audit committee interlocks)*, and analyze the role of these social ties in the production of audit quality. We find that audit quality is higher in AC interlocks but not in board interlocks. Then, we



include the auditor to the network forming a social triad. Again, we find the similar pattern: in social triads in which interlocks between firms share the same auditor we document higher audit quality when AC members are involved but no impact when they are not involved in social triads. Taken together, our results show that whether interlocked firms share the same auditor does not *per se* have any effect on audit quality. However, when AC members are involved, be it a dyadic or triadic social tie, audit quality is higher. This indicates the role of actors in those networks makes a difference. Put differently, ACs are likely to benefit from the social ties of the members serving also in other ACs.

We contribute to the literature through a broader and more thorough analysis of different structures of social relations between client firms and their auditors than in previous studies that typically focus only on one type of social ties, e.g. board interlocks only. Contrary to that simplified view on social ties between auditors and their clients, we developed a network of board members and auditors in order to examine their inter-firm relations and structures that evolve in the network. Doing so, our analysis of social networks enhances the understanding on the role of social ties in the production of audit quality. However, empirical evidence in this area is still scarce and we call for further research. Our knowledge on the dynamic interactions of the actors involved in auditing and their dependencies is still limited. It is far too early to suggest policy recommendations based on research in this area.

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**Table 1.** Variable definitions.

Variable	Definition
AQ	Standard deviation of the absolute value of residual in Dechow and Dichev (2002) industry specific earnings quality model.
B_INTERLOCK	Dummy variable taking value of one, if a firm is interlocked to another firm in the network of board members, otherwise zero.
AC_INTERLOCK	The number of interlocking audit committee members of a firm in the network of board members.
TRIAD	Dummy variable taking value of one, if a firm is involved in audit partner-board interlock, otherwise zero.
AC_TRIAD	The number of interlocking audit committee members of the firm's triad in the network of board members and auditors.
SIZE	The natural logarithm of total market value at the end of the fiscal year.
ROE	The ratio of ordinary profit to the book value of equity.
RET	The natural logarithm of annual buy-and-hold return calculated 4 months after the fiscal year end.
P/B	Price-to-book ratio.
EQUITY	Equity divided by total assets.
SERIES	Dummy variable taking one if a firm has only one series of shares, zero otherwise.
FAMILY	Dummy variable taking one if one controlling family owns more than 20% of total votes of shares, zero otherwise.
ACCEXP	Dummy variable taking one if a board member of a firm has working experience either as Chief Financial Officer or an authorized Public Accountant.
ACMEET	Number of audit committee meetings.
ANAFLOW	Number of analyst following the company.

**Table 2.** Summary of the sample.

	2007	2008	2009	2010	2011	2007 -2011
Full sample	120	120	122	123	123	608
- Financial firms	11	11	12	12	12	58
- Missing data	13	5	8	10	13	49
Sample by industry						
Materials and industrials	42	48	47	48	46	231
Consumer discretionary and staples	23	25	25	25	26	124
Information technology	31	31	30	28	26	146
<b>Final Sample</b>	<b>96</b>	<b>104</b>	<b>102</b>	<b>101</b>	<b>98</b>	<b>501</b>
Firms that have an Audit Committee (%)	42.3%	49.0%	50.0%	57.4%	57.4%	50.9%

*Notes:* This table reports a summary of the sample from years 2007-2011. Industry breakdown of the sample is in accordance with the Global Industry Classification Standard (GICS).

**Table 3.** Descriptive statistics for variables for the sample for 2007-2011.

**N=501**

<b>Variable</b>	<b>Mean</b>	<b>Std.</b>	<b>Min</b>	<b>25%</b>	<b>Median</b>	<b>75%</b>	<b>Max</b>
AQ	0.045	0.027	0	0.025	0.039	0.064	0.128
B_INTERLOCK	0.774	0.418	0	1	1	1	1
AC_INTERLOCK	0.532	0.870	0	0	0	1	5
TRIAD	0.526	0.499	0	0	1	1	1
AC_TRIAD	0.351	0.761	0	0	0	0	5
SIZE	19.02	2.003	10.46	17.45	18.92	20.48	25.34
ROE	0.034	0.255	-0.710	-0.028	0.090	0.184	0.554
RET	-0.023	0.234	-0.599	-0.166	-0.012	0.133	0.565
P/B	2.099	1.663	0	0.957	1.575	2.607	8.493
EQUITY	0.466	0.164	0.003	0.370	0.451	0.565	0.913
SERIES	0.750	0.433	0	1	1	1	1
FAMILY	0.363	0.481	0	0	0	1	1
ACCEXP	0.327	0.469	0	0	0	1	1
ACMEET	2.483	2.750	0	0	1	5	11
ANAFLOW	6.027	8.083	0	0	3	9	47

*Notes:*

All the variables are defined in table 1.



**Table 4.** Regression results  
**N=501**

Variable	AQ Model (1)		AQ Model (2)		AQ Model (3)		AQ Model (4)	
	Coef.	P value	Coef.	P value	Coef.	P value	Coef.	P value
B_INTERLOCK (H1a)	0.0012	0.679						
AC_INTERLOCK (H1b)			0.0026	0.024				
TRIAD (H2a)					0.0002	0.921		
AC_TRIAD (H2b)							0.0021	0.092
SIZE	0.0038	0.000	0.0039	0.000	0.0036	0.000	0.0037	0.000
ROE	0.0179	0.002	0.0176	0.002	0.0182	0.002	0.0183	0.002
RET	-0.0080	0.132	-0.0034	0.564	-0.0040	0.505	-0.0037	0.532
P/B	-0.0005	0.479	-0.0008	0.271	-0.0007	0.328	-0.0008	0.290
EQUITY	-0.0020	0.817	-0.0026	0.762	-0.0026	0.766	-0.0029	0.732
SERIES	-0.0084	0.001	-0.0085	0.001	-0.0082	0.001	-0.0082	0.001
FAMILY	0.0078	0.002	0.0069	0.006	0.0077	0.002	0.0071	0.005
ACCEXP	0.0082	0.000	0.0081	0.000	0.0082	0.000	0.0080	0.000
ACMEET	0.0006	0.216	0.0002	0.678	0.0006	0.198	0.0004	0.440
ANAFLOW	-0.0004	0.027	-0.0004	0.021	-0.0004	0.043	-0.0004	0.028
Intercept	0.1167	0.000	0.1119	0.000	0.1121	0.000	0.1123	0.000
R <sup>2</sup>	0.1666		0.1711		0.1626		0.1654	

*Notes:*

All the variables are defined in table 1. P-values are based on two-tailed tests and calculated using robust standard errors. In order to simplify the interpretation of our results, we multiply the standard deviation of the error term in Dechow and Dichev (2002) by (-1). This way, a positive sign of the test variable indicates a positive association between the variable and audit quality.

## Appendix 1

Figure 1. Illustration of social ties between auditors and their client firms

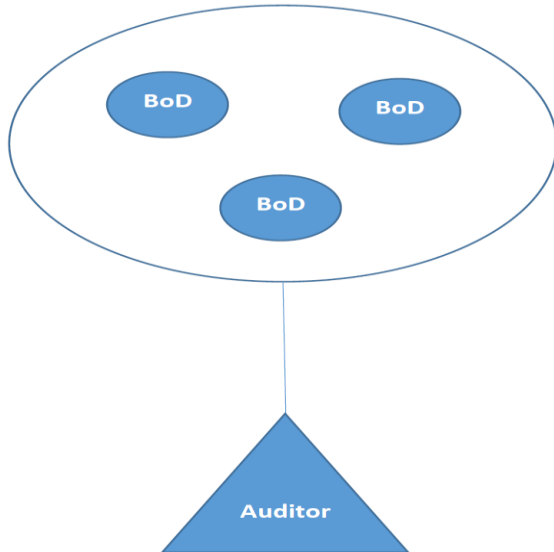


Figure 1a. The auditor and the client firm without connections (interlocks) to other firms

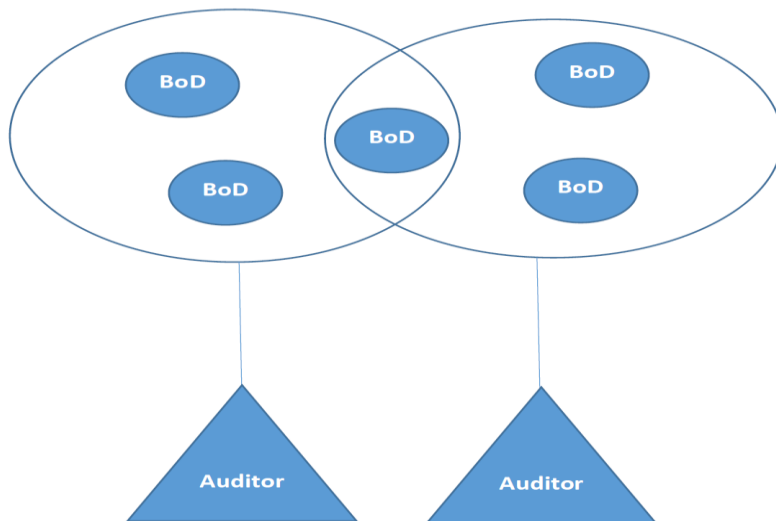
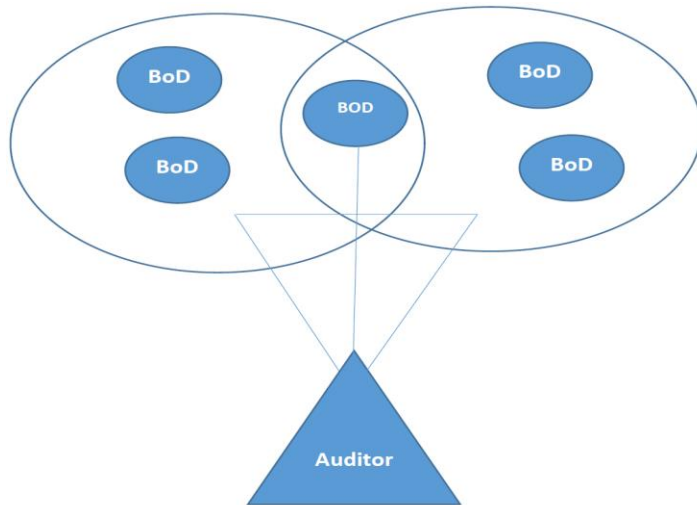


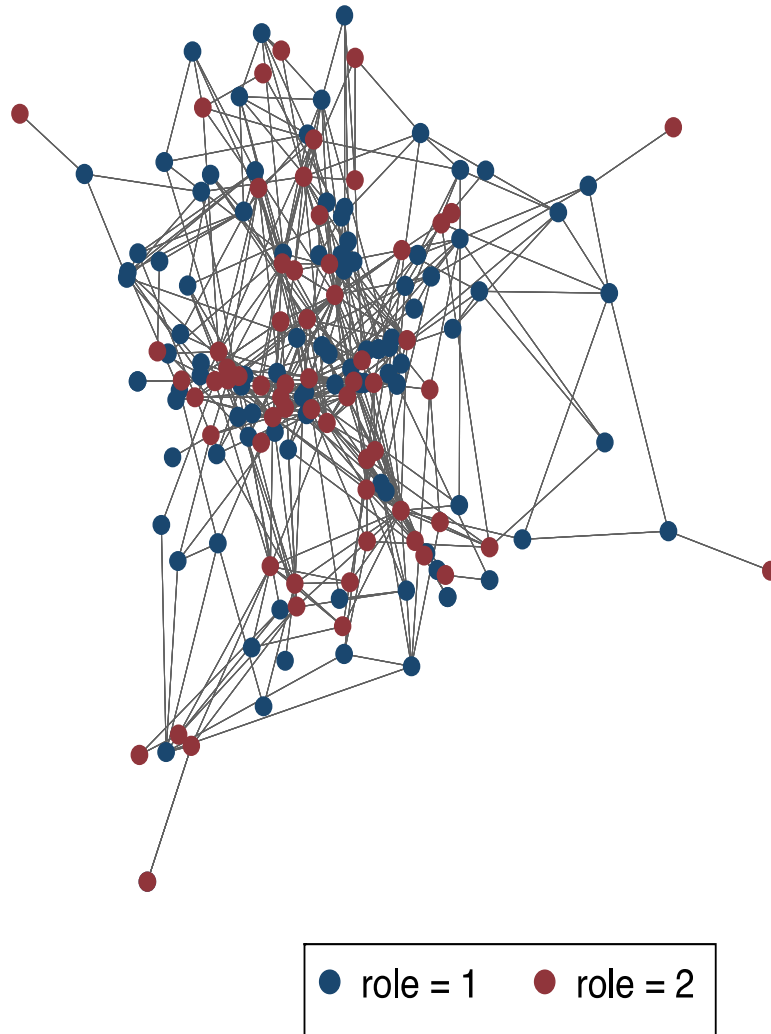
Figure 1b. Two interlocked client firms with separate auditors



*Figure 1c. Two interlocked client firms sharing the same auditor (a triad of the auditor and two client firms).*

## Appendix 2

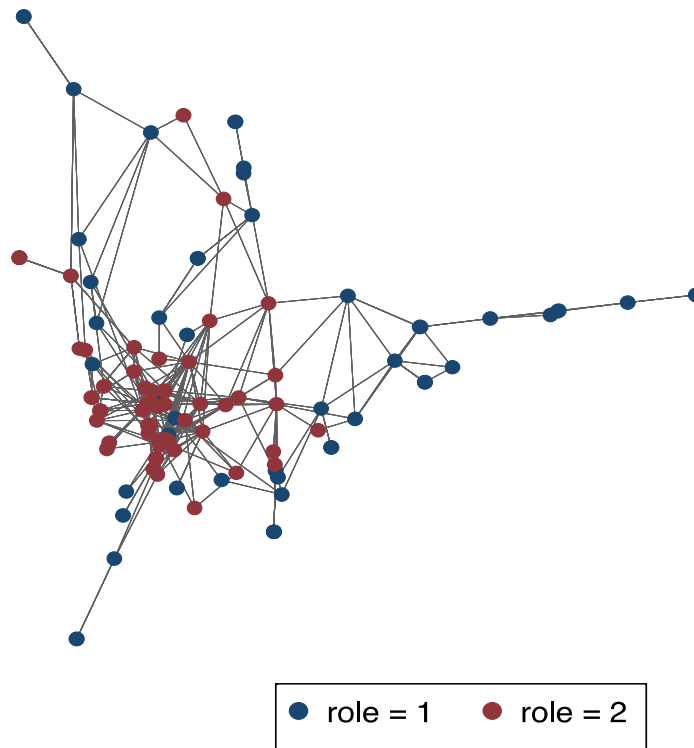
Figure 2. Visualization of network of auditors' and their client firms.



*Role 1= client firm, role 2= auditor. Figure 2 is based on the year 2007 sample.*

### Appendix 3

Figure 3. Visualization of triadic network of auditors and the board members of their client firms.



*Role 1=client firm, role 2= auditor. Figure 3 is based on the year 2007 sample.*