



Determinants and consequences of auditor dyad formation at the top level of audit teams[☆]



Benedikt Downar^a, Jürgen Ernstberger^a, Christopher Koch^{b,*}

^a Technical University of Munich, Arcisstrasse 21, D-80333, Munich, Germany

^b Johannes Gutenberg University Mainz, Jakob-Welder-Weg 9, D-55128, Mainz, Germany

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ABSTRACT

This study investigates the determinants and consequences of forming dyads at the top level of audit teams, i.e., dyads between concurring and lead auditor. We apply the sociological theory of homophily, i.e., the implicit preference for similar others, to hierarchically structured auditor dyads. Our regression analyses reveal that sharing the same gender and the same ethnicity, measured by dialect, increases the likelihood of dyad formation beyond what one would expect based on the characteristics of the pool of available auditors. Further, we observe that forming auditor dyads sharing the same age is avoided, suggesting that the need to establish a legitimate hierarchical relationship through social differentiation represents a boundary condition for homophily. Testing for the consequences of auditor dyad formation using an instrumental variable approach, we find that auditor dyads sharing the same dialect provide lower audit quality. We conclude that homophily matters in auditor dyad formation with potentially adverse consequences for audit quality.

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1. Introduction

Using a mixed method research approach, this paper examines the determinants of dyad formation at the top level of audit teams, i.e., concurring and lead auditors, as well as its consequences on audit quality. The auditor dyad of concurring and lead auditors is hierarchically structured, comparable to other reviewer-reviewee dyads within audit teams. While concurring auditors assess the work of lead auditors, lead auditors are responsible for directing,

conducting, and supervising the audit on site. Prior behavioral auditing research examines how the structure of the review process influences the output (for a literature review, see [Trotman et al., 2015](#)), yet does not address the topic of auditor dyad formation and its consequences. Prior archival auditing research examines the impact of individual auditor characteristics on audit outcomes (for a literature review, see [Lennox & Wu, 2017](#)), but leaves potential factors influencing the formation and efficiency of auditor dyads largely unexplored. We take a first step in

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* Corresponding author.

E-mail address: christopher.koch@uni-mainz.de (C. Koch).

investigating auditor dyads using archival and interview data to examine the formation and collaboration of concurring and lead auditors. We use the German setting where both concurring and lead auditors sign the audit opinion.

We rely on homophily as a key concept of sociology to explain the formation of auditor dyads.¹ Sociological literature emphasizes the role of homophily for the development of any relationship (McPherson et al., 2001). Literature distinguishes between two types of homophily. *Choice-based homophily* describes the preference of people to affiliate with others who share similar characteristics. *Induced homophily* appears when people find themselves in situations whereby they are surrounded by similar others (McPherson & Smith-Lovin, 1987). Both choice-based and induced homophily have the effect that social networks tend to be structured along similarities in characteristics, e.g., ethnicity, age, religion, education, occupation, and gender. Relationships based on homophily can develop when people have the opportunity to get to know each other in a social context, as can happen when they live in the same region or work for the same organization.

Auditing provides an institutionally rich setting to test the role of homophily in dyad formation. First, sociology usually focuses on relationships on equal terms, e.g., friendship or marriage. By contrast, as our interviews with experienced² auditors confirm, auditor dyads are hierarchically structured as reviewer-reviewee pairs. The literature on the organizational structure of hierarchy emphasizes the need to establish the legitimacy of hierarchical differentiation, resulting from differences in status or power (Halevy et al., 2011). Hierarchical differentiation facilitates a clear division of labor, thereby enhancing coordination and cooperation (e.g., Magee & Galinsky, 2008). Forming relationships based on similarity may conflict with this need, potentially diminishing the role of choice-based homophily. Second, auditing is highly regulated with requirements emphasizing the importance of competence and independence in audit team formations (Knechel, 2016). The emphasis on these criteria and the more formalized formation processes compared to other settings may reduce the influence of choice-based homophily, rendering it questionable whether theory and results of prior studies, e.g., on dyads of business partners (Gompers et al., 2016), generalize to auditing. Third, auditor dyads are formed within the organizational unit of an audit firm. The boundaries of this organizational unit restrict the pool of available partners for auditor dyad formation. This setting provides us with the opportunity to test how the number of available auditors in an audit firm or audit office influences choice-based homophilous tendencies, contributing to prior organizational research (Kleinbaum et al., 2013).

Emerging literature in economics applies the theory of homophily to the business setting of venture capitalists using a novel empirical design (Gompers et al., 2016; Hegde & Tumlinson, 2014). This research design considers not only information about the characteristics of *actually* selected business partners, but also about the pool of plausible business partners not selected, i.e.,

¹ A related concept are networks based on social ties, often defined as sharing the same social context, e.g. joint memberships in organizations, schools or business/golf clubs e.g., Fracassi and Tate (2012). In our setting, the auditors of a dyad already share the same social context because they are working for the same audit firm. Hence, using "same audit firm" as a measure for social ties would define all dyads as being socially tied. Therefore, we focus on homophily. Homophily considers the role of similarity in shaping the strength of connections of individuals sharing the same social context.

² In our study, the term experience refers to the length of general audit experience. For measuring general audit experience, we take the date of CPA appointment as the starting point. The professional register provides this date but not the date of entry in the audit profession. Our measure is a good proxy for general audit experience as the time between entry in the audit profession and CPA appointment is rather homogeneous.

counterfactual business partners. This novel approach makes it possible to disentangle the preferences for specific business partner characteristics (*choice-based homophily*) from the prevalence of those characteristics within the pool of available business partners (*induced homophily*). Moreover, the characteristics of the counterfactual business partners enable the construction of an instrumental variable for identifying causal effects of homophily-based dyads. We apply this research design to signing auditor dyads.

For our empirical tests, we use the German setting. In Germany, both the concurring and the lead auditor sign the audit opinion, rendering the actual auditor dyad at the highest level within an audit team publicly observable. The concurring and the lead auditor are both legally responsible for the audit engagement, but there still exists a hierarchical relationship between both auditors, because it is customary in Germany for a partner and (senior) manager to sign the audit opinion. Moreover, the German setting allows us to identify the pool of counterfactual auditors based on the professional register that covers the entire pool of CPAs including their demographics and audit firm affiliation. Finally, the German setting seems suitable because the financial regulations for publicly listed companies are similar across the European Union and comparable to other major economies worldwide. In recent years, the European Union has harmonized accounting rules and enforcement (Christensen et al., 2013) and has implemented major audit reforms (e.g., Gros & Worret, 2016).³ Consequently, the quality of the audit environment and enforcement activities have substantially improved in Germany (Brown et al., 2014). One remaining particularity of the German setting is limited auditor liability. However, reputational risk in case of an audit failure is substantial (e.g., Weber et al., 2008).

Given the lack of prior literature on dyad formation of signing auditors, we conduct semi-structured interviews with experienced German auditors. While sociological and economic research usually focuses on relationships on equal terms, we find that the relation of concurring and lead auditor is often hierarchically structured. In addition, prior research on homophily usually investigates settings in which individuals are free to choose their partners (McPherson et al., 2001). While our interview participants explain that concurring auditors usually have large discretion in the selection of a new lead auditor, they also emphasize that the audit firm and the audit client are involved in the process as well.

In our empirical tests, we first investigate whether *choice-based homophily* matters in the selection of the lead auditor, resulting in dyads that are more likely to share similarities than the composition of auditors within the audit firm suggests. As important similarity factors, we investigate the role of gender, age, and ethnicity (the latter measured by dialect)⁴ (McPherson et al., 2001).⁵ We find

³ In Germany, the International Financial Reporting Standards (IFRS) are mandatory for the consolidated accounts of publicly listed companies, and the German professional standards for auditors are largely identical to the International Standards on Auditing (ISA). The German Financial Reporting Enforcement Panel (FREP – DPR) monitors the financial reporting of publicly listed firms, and the professionally independent Auditor Oversight Body (AOB – APAS) monitors the auditors of publicly listed firms.

⁴ For our empirical tests, we use dialect as a measure for ethnicity. Dialect shares conceptual similarities to ethnicity, like national origin or ethnic group (e.g., Blau et al., 1982; Blum, 1984). Moreover, prior studies on communication within multinational teams illustrate that divergent dialects have a negative effect on the formation of trust in relationships (Tenzer et al., 2014).

⁵ McPherson et al. (2001) mention that homophily shapes the formation of relationships in particular with regard to ethnicity, age, religion, education, occupation, and gender. In our main analysis, we focus on ethnicity measured by dialect, gender, and age. In additional analyses, we examine the role of religion and education. The reason for not including these two latter characteristics in the main analysis is that data availability restricts us from deriving proxies for them with sufficiently high measurement precision.

that auditor dyads based on the same gender and the same dialect are more likely than the average characteristics of the potential pool of candidates suggest. These findings indicate that choice-based homophily matters for auditor dyad formation. Further, we observe that sharing the same age reduces the likelihood of dyad formation. An explanation for the latter finding is the desire to establish legitimacy in hierarchical differentiation.

Next, we explore the differential effects of choice-based homophily by exploiting the institutionally rich auditing setting. First, we distinguish between settings in which the concurring auditor has different levels of discretion in selecting the lead auditor. Having discretion in the selection decision is a precondition for choice-based homophily (Kleinbaum et al., 2013). We observe that our findings for homophily are significant in the setting of a lead auditor switch where concurring auditors have more discretion compared to the setting of an audit firm switch where other parties such as the client or the audit firm are more involved. Further, we find that the effects of choice-based homophily are strongest for medium-sized clients, implying that these clients are small enough to provide concurring auditors with sufficient discretion in selecting their lead auditor, and large enough to matter. Second, we examine the influence of the size of the organizational unit. Larger units offer more opportunities for dyad formation based on choice-based homophily, but may have more formalized processes restricting it. Our findings suggest that both effects offset each other. We observe similar effects of choice-based homophily for larger and smaller audit firms as well as audit offices. Third, we examine the need to establish legitimate hierarchies. We find that auditor dyads sharing the same hierarchical rank are less likely to be of a similar age, suggesting that age augments hierarchical rank as a base for establishing legitimacy. Further, we observe that sharing the same age is less likely for auditor dyads where both auditors are from the same audit office or from smaller audit offices and firms, implying a need for social distancing to ensure hierarchical legitimacy in a setting of proximity.

Further, we examine whether dyads sharing similar characteristics are associated with higher or lower audit quality. To control for endogenous dyad formation, we follow Gompers et al. (2016) and use an instrumental variable approach. Our instruments capture the degree to which an actual lead auditor is similar to the pool of all counterfactual lead auditors of the same audit firm concerning dialect, gender, and age. We find that homophily in dialect leads to lower audit quality, whereas sharing the same age and gender does not influence audit quality. Our finding of the negative effects of sharing the same dialect is consistent with the argument that auditors in homophily-based work relationships might exhibit insufficient levels of skepticism when evaluating the work performed by their colleagues.

Our study contributes to prior literature by providing evidence on the role of homophily within auditing. First, auditor dyads are hierarchically structured as reviewer-reviewee pairs, which contrasts prior research usually focusing on relationships on equal terms (e.g., Gompers et al., 2016). We find that choice-based homophily matters even in hierarchically structured audit teams. Auditors are more likely to form a dyad with another auditor sharing the same dialect or gender. However, our study also shows that auditors avoid forming dyads based on sharing a similar age. This observation is consistent with auditors aiming to establish legitimate hierarchical relationships. Second, auditing is highly regulated with requirements emphasizing the importance of competence and independence (Knechel, 2016). We document that audit firm policies and the influence of a client firm limit the extent of choice-based homophily. Third, auditor dyads are formed within the organizational unit of an audit firm. We document that choice-based homophily matters similarly at large and small audit firms.

By contrast, the need to establish legitimacy is more pronounced in smaller audit firms.

Moreover, our study contributes to literature on auditor dyad formation. In doing so, we apply the sociological theory of homophily to the auditing setting and employ a counterfactual approach from the economics literature. Prior research in auditing on reviewer-reviewee dyads has regularly used experiments to investigate factors contributing to the effectiveness of reviews (for a review, see Trotman et al., 2015). We are not aware of any archival studies investigating the determinants of auditor dyad formation. Finally, we provide insights into the consequences of homophily-based dyad formation in auditing. While prior research primarily focuses on the influence of individual auditor characteristics for audit quality, we find that the composition of auditor dyads also matters for audit quality.

We structure the paper as follows. Section 2 provides the background and develops the hypotheses drawing on prior literature and the insights from our explorative interviews. Section 3 explains our data sources and similarity measures. Section 4 presents the research design and results on the influence of similarities on auditor dyad formation, while Section 5 does the same for the consequences of dyad formation on audit quality. Section 6 concludes.

2. Background and theory

2.1. Interview method

To shed more light on the practice of dyad formation in our setting and to substantiate that prerequisites of homophily theory are valid in our setting, we conduct an explorative interview study with ten highly experienced German auditors. We interview nine male auditors and one female auditor. Our sample includes between one and three participants from each of the Big 4 ($n = 8$) and one participant each from two of the non-Big 4 audit firms ($n = 2$). On average, participants have substantial experience as signing auditor (mean = 15.8 years, ranging from 8 to 23 years) and have regularly been involved in the selection of signing auditors (mean = 11.05, ranging from 1 to 30). Nine of the auditors have experience as signing auditor for publicly listed companies, thereof seven in both the role of concurring and lead auditor. Nine participants are partners and one participant is a senior manager. We approach the participants based on the contacts of the authors as well as interview requests sent by email.

In our interviews, we cover (1) the requirements for and the relationship of signing auditors and (2) the process for selecting a new lead auditor. We ask about the requirements for signing auditors to gain an understanding of the potential pool of candidates available for concurring and lead auditors. We explore the relationship of signing auditors and the level of discretion a concurring lead auditor has in selecting a new lead auditor. To focus on the process for selecting a new lead auditor in the second part of the interview, we ask the participants to assume a scenario in which only the lead auditor switches while the concurring auditor and the audit firm remain the same. We use a semi-structured interview approach combining both open-ended interview questions that allow participants to express their personal experiences freely and closed-ended questions based on a predefined five-point Likert scale (e.g., Trompeter & Wright, 2010). After developing the first draft of the research instrument by leveraging existing research and documents, we asked colleagues from academia and audit practitioners for their advice and integrated their feedback in the final version. Further, we slightly modified the research instrument based on our experiences from the initial interviews.

One or two of the authors conducted the interviews in person or

by phone, each taking between 16 and 26 min (mean = 19.5 min). We audiotaped all interviews with permission and transcribed them word for word. Prior to the interviews, we developed an initial version of the coding scheme including categories for potential responses to each question. Based on an initial test coding of the interviews, we made minor modifications to the coding scheme by combining or adding response categories. Two of the authors coded the responses independently, and the third author reconciled all remaining differences afterward. The inter-coder agreement averaged 92.1 percent. Appendix II presents additional findings and illustrative quotes. Appendix III shows the interview guidelines.

2.2. Auditor dyads of signing auditors in Germany

In Germany, both signing auditors need to be CPAs (“Wirtschaftsprüfer”) and have the power of attorney to represent the audit firm. Both signing auditors are legally responsible for the audit engagement. The lead auditor, who is responsible for planning, directing, supervising, and concluding the audit, signs on the right-hand side. The concurring auditor, who is responsible for safeguarding the quality and client management relationship, signs on the left-hand side. The concurring auditor usually reviews significant judgments and related conclusions of the engagement team by forming an overall conclusion (Farr, 2017).

In the first part of our interview, we gathered evidence on the formal requirements for signing auditors. Participants outline two typical dyads of signing auditors: either two partners sign the audit opinion or one partner and one (senior) manager sign the audit opinion. Further, participants note that the auditor signing on the right-hand side (i.e., the lead auditor) is usually more involved in planning, directing, and supervising the audit than the auditor signing on the left-hand side (i.e., the concurring auditor).

“The auditor signing on the right-hand side is the one who goes ahead and does the work, and the auditor signing on the left-hand side [...] performs the quality control.” (R5)

However, the involvement of the concurring auditor depends on the size of the client.

“In the case of small and medium-sized clients, the partner is not continuously on site and has an involvement in terms of time of 5 to 10 percent. In the case of large clients, the partner is on site often, even though he [or she] signs on the left as concurring auditor. [...] The larger the client, the greater the involvement of the concurring and the lead auditor. And, of course, the time one spends on site.” (R8)

2.3. Homophily in auditor dyad formation

2.3.1. Homophily in social networks

Research in sociology shows that homophily shapes all types of social networks, including friendship, marriage, and working relationships. The main reasons why homophilous relationships develop are preference and opportunity (McPherson et al., 2001). People tend to associate with similar others simply because they prefer to do so, which is called *choice-based homophily*. Another driver of homophilous relationships is an opportunity, driving so-called *induced homophily*. Relationships develop within geographic and organizational boundaries. As people are not uniformly distributed in terms of social characteristics in space (Liben-Nowell et al., 2005) or across organizations (McPherson & Smith-

Lovin, 1982), the pool of available choices for entering relationships will be more homogeneous than the general population. Both choice-based and induced homophily have the effect that relationships tend to be more homogeneous than predicted by chance.

2.3.2. Homophily in hierarchical relationships

Auditing uses a hierarchical structure with a superior reviewing the work of a subordinate and providing guidance. In contrast, sociological and economic research on homophily usually focuses on relationships on equal terms (Gompers et al., 2016; McPherson et al., 2001). The hierarchical structure of audit teams may diminish the role of choice-based homophily in auditor dyad formation because the functional model of hierarchy suggests an effect opposite to sharing similar characteristics. It argues that hierarchical differentiation based on competence, status, or power is important to achieve high group performance (Halevy et al., 2011; Magee & Galinsky, 2008). Therefore, people may avoid sharing similar characteristics related to competence, status, or power to ensure legitimacy.

In our interview, we explore how auditors perceive the work relationship between the two signing auditors. We find that they characterize it as being collegial yet hierarchical. Participants emphasize that the signing auditors work closely together and attempt to reach agreement on controversial issues. However, they also acknowledge that the opinion of the concurring auditor carries more weight.

“In practice, [...] the concurring auditor, the partner, asks the manager whether he [or she] agrees with a decision. If the manager does not agree, which is possible, you have to keep talking. Well, it's not as if the partner says “we'll do it anyway, just like I said”. That does not happen, [...] the decision is a consensus decision, but the partner takes it.” (R8)

“Does the hierarchy always matters to some extent? Yes. How this is lived in detail depends on the acting persons. [...] But at the end of the day, when it comes to the oath, then, of course, it [hierarchy] does matter.” (R10)

These statements suggest that reaching a final decision is easier when it is clear who is ultimately in charge, providing some support for the need to establish a legitimate hierarchy.

2.3.3. Homophily and discretion in selecting the dyadic partner

Prior research on homophily usually investigates settings in which individuals are free to choose their partners (McPherson et al., 2001). In such a setting, the preferences of individuals matter for the formation of dyads and networks and, thus, choice-based homophily may play a role. In contrast, auditing is a highly regulated field. If auditors have limited discretion in selecting their dyadic partner, the role of choice-based homophily in auditor dyad formation will be reduced.

Given the lack of prior research, we explore the topic of auditors' level of discretion in selecting a new lead auditor in our interviews. Almost all participants mention that concurring auditors are usually strongly involved in lead auditor selection (n = 9) given that they know the specific demands of the audit engagement best and have to work together with the newly selected lead auditor in the future. The following quote illustrates these points.

“Yes, well, on the one hand, of course, the engagement partner who is responsible [is involved in the process of selecting the lead auditor]. He [or she] has the task to fill a vacancy. For him [or her], it

is the most important function of the entire audit team, with the highest responsibility and great task of trust.” (R5)

However, the participants emphasize that the selection of the lead auditor is not entirely up to the concurring auditor, but that it is also discussed within the audit firm. Accordingly, the audit firm is regularly mentioned as an important player in the selection process (n = 7). The level of involvement of the audit firm ranges from informal discussions between the concurring auditor and colleagues about the availability and suitability of potential candidates, to a more formal approval process involving risk management partners or regional executive partners. The following quote describes the involvement of the audit firm.

“That doesn’t mean that he [or she] [the concurring auditor] chooses him [or her] [the lead auditor] personally, but I think he [or she] specifies the prerequisites and then discusses within the company which person would be best suited.” (R7)

One participant emphasizes that the degree of involvement of the audit firm and the type of the responsible parties increases with the size of the client.

“With DAX companies [the 30 largest listed companies in Germany], it is our board of directors and the regional board of directors that make the decisions, and we call the PIC - partner in charge, who is basically on site for the entire audit. If it is, let’s say, an MDAX company [the 50 next largest listed companies in Germany], it would be left to the partner in charge on site, perhaps the regional board of directors would also be involved. But it wouldn’t be raised to the national level.” (R4)

Few participants explicitly bring up the role of the client in the selection process (n = 2). This lack of mention is probably due to the fact that the client does not play an active role in identifying suitable candidates. Yet, the client often has the final say once the concurring auditor together with the audit firm has pre-selected one or two candidates. Accordingly, one goal of the pre-selection process is to identify a candidate that is well suited for the client. The following quotes describe the nature of the final say of the client.

“Well, of course, you ask the client and if the chemistry is not right at all, then, of course, there are some problems.” (R2)

“Let’s just say that social skills are of no use to you if you’re a professional loser. And if you are outstanding but have no social competence, it’s up to the other side. [...] So these are the human factors - who weights what and how much, but I would say it all comes down to this, it’s a combination.” (R4)

We asked participants whether their audit firm has procedures for the selection of new lead auditors in place that are either formal guidelines that are internally codified or conventions that reflect common practices. Participants often responded by talking about lead auditor selection criteria, e.g., experience and training in IFRS. These selection criteria are often promulgated in written guidelines (n = 4) but are also sometimes mere conventions (n = 3). When we further inquired about guidelines and conventions regarding the process of lead auditor selection, we find that only one participant states that codified guidelines exist and four participants mention conventions. We conclude that audit firms usually do not have formal guidelines for the selection process in place but that conventions structuring the process may exist as illustrated in the

following quote.

“It certainly is a process. It sounds so structured [when talking about it]. It certainly involves a discussion and moderated procedures, but that is not to say that we have any written prescriptions for the process.” (R3)

2.3.4. Homophily and selection criteria

Choice-based homophily might play a less important role in auditor dyad formation if formal selection criteria exist that may restrict the opportunities of the concurring auditor to choose a lead auditor sharing similarities. Given the lack of prior research on requirements for lead auditors, we investigate this topic in our interviews. We find that participants frequently mention experience-related factors as important criteria for the selection of a new lead auditor: Industry experience (n = 9), experience with similarly complex firms (n = 8), technical experience (n = 7), and general audit experience (n = 7). However, some auditors also mention the quality of the work relationship between the concurring and the lead auditor as a criterion (n = 5). They explain this criterion as follows.

“Well, of course, you have to work together; it has to fit somehow, that you can work together. I would call it a relationship of trust. It has to be a strong relationship of trust from the partner to the manager, and of course, the manager has to get on well with the partner on a personal level, whereby I would say that this is not as crucial, but it helps. However, the partner has to trust the work of the manager.” (R4)

This statement suggests that not only professional but also relationship-based factors matter in lead auditor selection, providing the opportunity for choice-based homophily to occur. In particular, concurring auditors might be motivated to choose someone similar to themselves as lead auditors given the importance of having a good work relationship.

2.4. Hypotheses development: the role of choice-based homophily in auditor dyad formation

Auditor dyads are formed within the organizational unit of the audit firm. *Induced homophily* will matter because audit firms are composed of a selected group of auditors.⁶ Less obvious is whether *choice-based homophily* plays a role in auditor dyad formation. As discussed above, potential boundaries are the hierarchical nature of the relationship, limits to auditors’ discretion in selecting their partner, and the existence of selection criteria based on formal guidelines or conventions. Nevertheless, as the insights from the interviews reveal, concurring auditors regularly have some discretion in selecting the lead auditor and are likely to take personal factors into account when making the decision. Therefore, we expect to observe *choice-based homophily* in auditor dyad formation as long as potential boundaries do not dominate. Given the conditional nature of the effect, we develop separate hypotheses for three determinants of choice-based homophily that we can well measure in our setting: ethnicity, gender, and age.

Ethnicity is probably the most important determinant of network segregation in social and business networks (McPherson et al., 2001). Prior research observes segregation based on

⁶ For example, the predominance of male auditors at higher ranks means that auditor dyads of concurring and lead auditors will often share the same gender even in the absence of homophilous preferences.

ethnicity for many ethnicities and a long history (Smith et al., 2014). In business networks, sharing the same ethnicity is associated with the formation of trust leading to a higher likelihood of collaboration (e.g., Bengtsson & Hsu, 2015). Based on the prevalence of ethnic homophily, we expect to observe choice-based homophily in auditor dyad formation with respect to ethnicity.

H1a. Auditor dyads sharing the same ethnicity are *more* common than predicted by chance based on the pool of available auditors.

Second, we investigate the effects of gender. Social networks of adults tend to be homogeneous with regard to gender, at least for non-kin networks (Marsden, 1987). Over the last decades, this homogeneity has persisted and is higher than expected by chance, indicating choice-based homophily (Smith et al., 2014). Organizational networks are characterized by high levels of gender segregation (e.g., Reskin, 1993). However, not only *induced homophily* but also *choice-based homophily* seems to be at work, in particular at more diverse and larger organizations (McPherson & Smith-Lovin, 1987).

Some studies have investigated whether men and women show different levels of gender-based homophily at the workplace. Ibarra (1992) finds that men tend to have more homophilous networks based on gender compared to women. Men are likely to turn to other men in all examined settings, while women tend to turn to other women only for social support and friendship but not for access to instrumental resources. Turning to men for access to instrumental resources can be an adaptive strategy in circumstances where women are in the minority (Ibarra, 1992). Given the dominance of male auditors at the partner level (Kornberger et al., 2010), one might expect to observe a similar pattern in auditing. However, other studies find that women exhibit even stronger choice-based homophily based on gender than men do. In a large-scale study of email exchange within an organization, Kleinbaum et al. (2013) find that women communicate at higher rates with others of the same gender both inside and outside the organizational units compared to men. Despite this mixed evidence, one general conclusion is that both women and men show preferences to interact with others of the same gender within the workplace. Thus, we formulate the following hypothesis.

H1b. Auditor dyads sharing the same gender are *more* common than predicted by chance based on the pool of available auditors.

Finally, we consider age. McPherson et al. (2001) emphasize that the degree of age homophily in networks depends mainly on the type of relationship. Age plays an equally important role in the formation of relationships, e.g., marriage and friendships. Sharing a similar age facilitates the development of relationships because it provides a common background based on growing up in a similar period and similar events occurring in their lives (Zenger & Lawrence, 1989).

However, the role of age may be different in a hierarchical relationship. Sociological research discusses age as a potentially important factor for the establishment of a hierarchy in relation to social roles or status (e.g., Elder, 1975). In auditing, age might play an important role in establishing hierarchy as the career path means that older auditors tend to hold positions of higher status and power (Carter & Spence, 2014). Because a functional hierarchical relationship within an audit team requires legitimacy based on power or status (Halevy et al., 2011; Magee & Galinsky, 2008),

we expect that auditor dyads are less likely to share the same age.⁷

H1c. Auditor dyads sharing the same age are *less* common than predicted by chance based on the pool of available auditors.

2.5. Hypothesis development: the consequences of homophily for audit quality

Social identity theory argues that sharing similarities increases the feeling of connectedness and helps individuals to maintain a positive view of themselves when relying on others (Tajfel & Turner, 1979). It is often easier to communicate, evaluate, and predict the behavior of others sharing similar characteristics (e.g., Hamm, 2000). Thus, sharing similar characteristics can help to establish mutual understanding, interpersonal trust, and solidarity (Fulmer & Gelfand, 2012; Marsden, 1988; Mollica et al., 2003). Consistent with this argument, prior research on business partnerships shows that interpersonal trust is higher for dyads sharing the same ethnical background (Jiang et al., 2011) and for dyads perceiving to share similar characteristics (Huang & Iun, 2006). Relatedly, Marsden (1988) observes that confiding relationships are often formed with people sharing the same ethnicity, age, and gender.

In many circumstances, trust improves team performance (Dirks, 1999). The reason is that trust reduces perceived uncertainty and vulnerability, enabling more effective and efficient collaboration among team members (Jones & George, 1998). Relatedly, trust developed from sharing similarities is expected to improve coordination and the exchange of information (e.g., Hegde & Tumlinson, 2014; Ibarra, 1992). Supporting this view, a meta-analysis based on 112 independent studies finds that trust has a direct positive effect on group performance (Jong et al., 2016).

For the audit setting, our interviews show that auditors emphasize the importance of sharing similarities and having trust in each other for efficiently managing the audit engagement.

"Well, of course, you have to work together, it has to be a good fit somehow. That you can work together, that you can trust ... a trusting relationship, I would call it. It has to be a strong relationship of trust from the partner into the manager and, of course, the manager has to, whereby I say this is not so mandatory but usually it helps if the manager gets along well with the partner on a human level. The partner needs a relationship of trust in the work of the manager. This does not necessarily have to be that you have worked together before." (R4)

"Certainly some similarity in the way they work, not to say in their attitude to work [is helpful]. And I think the more similar the concurring and the lead auditor are, the easier it is to manage the engagement." (R5)

However, in an auditing context, trust may have a negative effect on audit quality by reducing auditors' professional skepticism. The auditing literature emphasizes that trust might diminish professional skepticism by considering the related concept of suspicion as the opposite of trust (Hurt, 2010; Shaub, 1996). Consistent with this perspective, behavioral audit research finds that auditors with more trust in others attend less to evidence of aggressive reporting (Rose, 2007) and show less skeptical judgments (Quadackers et al., 2014). Relatedly, recent studies on auditor-client relationships indicate that similarities in terms of shared dialect, shared alma mater, or prior employment are associated with low audit quality (Du, 2019; Guan et al., 2016; He et al., 2017).

Our study differs from these prior auditing studies by investigating the role of homophily within auditor dyads. Compared to the

⁷ We follow McPherson et al. (2001) and focus on age instead of general audit experience. Additional analyses presented below suggest that age and general audit experience play a similar role in auditor dyad formation. For measuring general audit experience, we take the date of CPA appointment as the starting point.

setting of auditor-client relationships, the negative effects of homophily may be weaker in the case of auditor dyads given the higher importance of effective communication facilitated by higher levels of trust established through homophily. However, ensuring audit quality requires auditors working in dyads and teams to exercise sufficient levels of professional skepticism by questioning the work performed by their colleagues (Peecher et al., 2013). Otherwise, an auditor not exercising professional skepticism might be misled by his or her potentially biased perceptions of other team members when evaluating the quality of their work (Tan & Jamal, 2001). Given the risk that homophily-based auditor dyads show inappropriately high levels of trust in each other, resulting in insufficiently low levels of professional skepticism, we expect negative effects on audit quality when auditor dyads share the same dialect, gender, and age.⁸ We formulate the following hypothesis for all types of similarities.⁹

H2. Auditor dyads sharing similarities provide lower audit quality.

3. Data and measures for similarity

3.1. Data

Our study requires information on actual auditor dyads and counterfactual auditor dyads. The German setting provides us with the opportunity to gather this data. Actual auditor dyads are publicly observable because two auditors sign the audit opinion. We hand-collect the name of both auditors together with their audit firm affiliation directly from the audit opinion published as part of the annual report.

We derive counterfactual auditors, i.e., auditors eligible for dyad formation but not selected, using the German professional register.¹⁰ The register includes information on all German CPAs (“Wirtschaftsprüfer”) in an audit firm, enabling us to identify counterfactual auditor dyads for each actual auditor dyad. As the only legal requirement for signing auditors is to be appointed as CPA, the professional register comprises all potential counterfactual auditors. Further, the professional register includes audit firm and office affiliation as well as demographic information (gender, date of CPA appointment, date of birth, and city of birth) of all German CPAs. We use this information to construct age and gender similarity measures for actual and counterfactual signing auditor dyads and auditor-related control variables. For dialect similarity, we use the city of birth and additional data used in Falck et al. (2012). For client firm-related variables, we use Worldscope Datastream.

⁸ The same prediction derives from the functional model of hierarchy (Halevy et al., 2011). If auditor dyads do not establish a legitimate base for hierarchical differentiation due to sharing similar characteristics, work performance will be lower.

⁹ While we formulate separate hypotheses for each type of similarity as a determinant for the composition of auditor dyads (H1a-H1c), we formulate a joint hypothesis regarding the effects of sharing similarities on audit quality (H2). Sociological research focuses on homophily as a basic organizing principle shaping the structure of relationships (McPherson et al., 2001). We draw on this research for developing separate hypotheses for the effects of each of our similarity measures on dyad formation. In contrast, research on the consequences of homophily is much more limited, restricting us from developing a separate hypothesis for each type of characteristic.

¹⁰ We retrieved all German auditors from the professional register of the Chamber of Public Accountants for every year starting in 2009. Therefore, we can observe audit firm and audit office composition exactly for the years 2009–2013. However, as individual auditors rarely switch audit firms or audit offices, the register of 2009 is a good proxy for preceding years. The main concern for using 2009 as a proxy for prior years may be that information is missing about auditors retiring before 2009. We find virtually unchanged results if we exclude auditors with a maximum of four years left until the retirement age.

3.2. Measures for similarity

For our investigation of the role of choice-based homophily in auditor dyads, we use three measures indicating similarities between concurring and lead auditor with regard to ethnicity, gender, and age. For each measure, we define a binary variable indicating a high degree of similarity.

Ethnicity. To proxy for ethnicity, we use auditors’ dialect. In Germany, local dialects vary considerably by geographical regions and are often associated with distinct traditions, cultures, and attitudes. Falck et al. (2012) and Lameli et al. (2015) provide evidence that local dialects in Germany have a significant and economically important influence on trade flows within the country. We use the measure of Falck et al. (2012), comprising data on dialect similarity between all 439 administrative regions in Germany ranging from zero (no similarity) to 66 (identical dialects).¹¹ The German professional register provides data on an auditor’s city of birth, rendering information about the region where the auditor is likely to have grown up, learning the dialect as well as the traditions, cultures, and attitudes of that region. As the score is very granular, we refrain from requiring an identical dialect, but use a threshold for measuring dialect similarity. We define the indicator variable *Dialect_Same*, which takes the value of one when the concurring auditor and the lead auditor have a dialect similarity score greater than the 90 percentile of the sample distribution (i.e., similarity score of 47) and zero otherwise. Given the lack of prior studies using this measure, we use a high threshold to avoid spurious correlations.¹²

Gender. We determine auditors’ gender based on their first names. This approach yields unambiguous assignments because German regulation required that the given name reveals the gender.¹³ We define the indicator variable *Gender_Same*, which takes the value of one when the concurring and the lead auditor have the same gender and zero otherwise.¹⁴

Age. We define the indicator variable *Age_Same*, which takes the value of one when the age of the concurring auditor and the lead auditor differs by less than three years and zero otherwise. We use a threshold of three years because a certain age difference is necessary to ensure legitimacy. We use a threshold approach to account

¹¹ The measure of Falck et al. (2012) is based on the data of Georg Wenker. From 1879 to 1888, Georg Wenker conducted a linguistic survey among approximately 45,000 students in the German Empire. This survey is the most detailed documentation of a nation’s language worldwide. Similar data are not available for other countries or languages at a comparable degree of regional detail. Lameli (2010) provides a description of the Wenker survey. We thank Jens Südekum for providing us with the data on dialect similarity.

¹² The results for our main analyses are robust if we vary the threshold by using median and upper quartile thresholds for indicating same dialects. Further, we observe robust results if we use a variable indicating being born in the same region or the same German federal state. Finally, our results are robust when using a continuous measure. We note that dialect similarity is not equal to geographic distance. Even though dialect similarity decreases with geographic distance in most cases, two neighbouring cities do not necessarily share the same dialect. As an example, the cities of Cologne and Bonn jointly operate an international airport and have a dialect similarity of 54. By contrast, the cities of Goslar and Zwickau are located in different federal states (nearly 280 km apart) and have a dialect similarity of 54 too.

¹³ In the case of an ambiguous first given name, the second (or third) given name had to reveal the gender. The professional register includes all given names. The regulation was effective until 2008 when it was ruled to be unconstitutional by the Federal Constitutional Court (Federal Constitutional Court, 2008). Our sample only includes auditors born in Germany, as we require information on dialect.

¹⁴ Our results with respect to *Gender_Same* are robust if we split the variable in its individual components, i.e. both male and both female.

for a non-linear influence of age on dyad formation.¹⁵

4. Determinants of auditor dyad formation

4.1. Research design

We use the same empirical approach as Gompers et al. (2016) for investigating the role of homophily in auditor dyad formation. In detail, we examine whether auditors that are more similar are more likely to form a dyad, indicating choice-based homophily. The approach uses both actual and counterfactual observations to control for characteristics of the pool of available choices. Based on the insights from our interviews, we assume for our analyses that primarily the concurring auditor selects the lead auditor. Therefore, an *actual auditor dyad* consists of the actual concurring auditor and the *actual lead auditor*, whereas a *counterfactual auditor dyad* consists of the actual concurring auditor and a *counterfactual lead auditor*.

We implement the empirical approach as follows: For each client-year observation i , we identify all counterfactual lead auditors, i.e., CPAs of the concurring auditor's audit firm who could have been part of the actual dyad of the audit engagement but were not. Then, we create counterfactual auditor dyads for each client-year observation by creating n_i additional data entries where we replace the actual lead auditor by one of the n_i counterfactual lead auditors. Thus, one client-year observation i occurs n_i+1 times in our sample, once with the actual lead auditor (actual auditor dyad) and, in addition, once for each of the n_i counterfactual lead auditor (counterfactual auditor dyad). Accordingly, each occurrence in the same client-year observation relates to the same audit firm and the same concurring auditor, but to a different lead auditor.¹⁶

This approach enables us to estimate probit regressions identifying the preference for choosing a lead auditor based on shared similarities by controlling for the characteristics of the pool of counterfactual lead auditors. Our dependent variable (*LEAD_Actual*) takes a value of one for actual auditor dyads and zero for counterfactual auditor dyads. We specify the empirical model as follows:

$$P(\text{LEAD_Actual}) = \beta_0 + \beta_1 \text{Dialect_Same} + \beta_2 \text{Gender_Same} + \beta_3 \text{Age_Same} + \sum \text{LEAD controls} + \sum \text{Geographic controls} + \text{Fixed effects for year and industry} + e \quad (1)$$

where all variables are defined in Appendix I. Our main variables of interest are our similarity measures (*Dialect_Same*, *Gender_Same*, *Age_Same*). Significant positive coefficient estimates for these variables indicates that choice-based homophily is relevant for dyad formation. Significant negative coefficients indicate differentiation. In addition, we identify a set of control variables influencing the

¹⁵ We observe significant effects in our main analysis on dyad formation for *Age_Same* when employing threshold values of one, two, or three years. The effects are insignificant when employing threshold values of four years or more. In an additional test, we use continuous measures based on the absolute difference in age. To control for non-linear effects, we use the variable also in second order. We find that the likelihood of dyad formation is lower for smaller age differences. We find a non-linear effect suggesting that this effect becomes less negative for larger age differences.

¹⁶ To provide an example: *First*, let's assume that CPA X1 of audit firm XYZ is the concurring auditor and CPA X2 of audit firm XYZ is the lead auditor at the client ABC for the fiscal year 2013 audit. *Second*, let us assume that 50 CPAs work for audit firm XYZ. We define all these auditors, except for the two auditors forming the actual dyad, as counterfactual lead auditors. *Third*, we create 48 counterfactual auditor dyads consisting of CPA X1 and each of the 48 counterfactual lead auditors. The one actual auditor dyad and the 48 counterfactual auditor dyads form one group of observations. Each dyad within the group of observations relates to the same client (ABC), the same year (2013), the same concurring auditor (CPA X1), and the same audit firm (XYZ), but to 49 different lead auditors.

chances of selecting a lead auditor for the formation of the dyad. First, we include lead auditors' characteristics related to our similarity variables. We use variables indicating whether a lead auditor was born in a region speaking a dialect close to standard German (*LEAD_Dialect*), whether a lead auditor is close to retirement (*LEAD_Age*) and is female (*LEAD_Female*). Further, we include measures of lead auditors' general audit experience and busyness to control for potential selection constraints. We control for lead auditors' general audit experience based on the number of years since being appointed as CPA (*LEAD_Experience*), and we control for lead auditors' client-industry expertise, using an indicator variable showing whether or not the lead auditor already audited listed clients in the same industry (*LEAD_Specialist*). We control for lead auditors' busyness in the respective year using the total number of engagements as signing auditor for public and private clients (*LEAD_Clients*). We consider potential non-linear effects of busyness by including the variable also in the second order. Third, we include measures of geographic proximity. As outlined by interview participants, lead auditor selection is not confined to the concurring auditor's office, but less likely to occur if a potential lead auditor is located in a distant office. *LEAD-CONCURRING_Distance* indicates the linear distance between the actual (counterfactual) lead auditor's office and the concurring auditor's office. *LEAD-CLIENT_Distance* indicates the linear distance between actual (counterfactual) lead auditor office and client headquarters. Finally, we follow Gompers et al. (2016) and include year and industry fixed effects. As each client-year observation features the same client and concurring auditor characteristics, yet different lead auditor characteristics, we do not include control variables for client and concurring auditor characteristics.¹⁷ Reflecting the data structure, we cluster standard errors at the client-year level.

4.2. Sample selection

Table 1 shows the sample selection for our dyad formation analyses. The initial sample consists of all non-financial companies with consolidated accounts listed on the German stock market between 2005 and 2013. We retrieve annual reports with audit opinions for a total set of 3,461 firms-year observations. We exclude 104 observations where auditor identification is missing. In line with Gompers et al. (2016), we focus on first-time dyads of concurring auditors and lead auditors because repeated collaborations may be confounded by previous experience. Consequently, we omit 2,339 observations without a switch of the lead auditor and 117 instances of repeated collaborations of the same dyad at different engagements.¹⁸ Finally, we omit 302 observations where information for counterfactual dyad formation or estimating model (1) is not available. For example, we exclude auditors not born in Germany as we have no dialect information for these auditors. We end up with 599 actual first-time dyads of concurring auditors and lead auditors used for counterfactual dyad formation.

For each of the 599 observations of actual first-time dyads, we identify counterfactual dyads as explained above. In line with legal requirements, we consider as counterfactual lead auditors all auditors appointed as CPA and working at the same audit firm as the concurring auditor in the respective year. On average, we identify 479.5 counterfactual auditors working for the same audit firm in the same year as CPA, resulting in a total number of 287,239

¹⁷ We additionally test for the influence of client characteristics, i.e. size, profitability, insolvency risk, and firm age. We find that client controls, except for size, are insignificant. For our similarity measures, we find virtually unchanged results.

¹⁸ We find virtually unchanged results using all available dyads (i.e., not excluding multiple collaborations of the same dyad).

Table 1
Sample selection for analyzing the influence of similarities on dyad formation.

Actual lead auditors		
	Exclusions	Observations
Consolidated accounts of non-financial companies in the period 2005–2013		3,461
After exclusion of observations without lead auditor and concurring auditor available	–104	3,357
After exclusion of observations without a switch of the lead auditor	–2,339	1,018
After exclusion of observations if lead auditor and concurring auditor previously formed a dyad	–117	901
After exclusion of observations with incomplete data for multivariate analyses	–302	<u>599</u>
Counterfactual lead auditors		
	Exclusions	Observations
Number of all other auditors from the actual audit firm (with available data) for all observations of the sample of actual lead auditors		287,239
After exclusion of inactive counterfactual lead auditors	–79,139	<u>208,100</u>
Final sample		
	Actual dyads	Counterfactual dyads
Sample of dyads of actual concurring auditors and actual lead auditors (actual dyads) and actual concurring auditors and counterfactual lead auditors (counterfactual dyads)	599	208,100
After exclusion of clusters without diversity or with five or less counterfactual lead auditors	552	207,984

This table describes the sample selection for estimating model (1) on the influence of similarities between the concurring auditor and lead auditor for dyad formation.

counterfactual dyads. For our tests, we exclude all counterfactual lead auditors who are inactive throughout the sample period, i.e., never worked as lead auditor or concurring for auditor for a client during the sample period. This restriction leads to the exclusion of 79,139 counterfactual dyads. Further, we exclude client-year observations where the number of potential counterfactual lead auditors is too small to provide a sufficiently rich choice set, i.e., less than five counterfactual dyads per actual dyad or no variation in our similarity measures.¹⁹ Our final sample contains 552 unique client-year observations for 552 actual dyads and 207,984 counterfactual dyads, an average of 376.8 counterfactual lead auditors for each actual lead auditor.²⁰

4.3. Dyad composition and descriptive statistics

First, we compare characteristics of concurring auditors and actual lead auditors, i.e. the actual dyads. Table 2 presents the results. All concurring auditors are at the hierarchical rank of a partner compared to only 22.8 percent of lead auditors. On average, concurring auditors are older than lead auditors, have more general audit experience as CPAs, and are less often female. Compared to

¹⁹ As sensitivity tests, we additionally vary the requirements for the sample composition using alternative minimum requirements for the number of counterfactuals (zero and three) and do not omit inactive auditors, resulting in virtually unchanged results.

²⁰ We also considered further restrictions for counterfactual lead auditors based on general audit experience or geographical proximity. Descriptive statistics show that actual lead auditors have general audit experience since CPA appointment ranging from 0.02 years to 26.40 years. If lead auditor and concurring auditor are from different offices (36.8 percent of all cases), the geographic distance between the offices of actual lead and concurring auditors ranges from 13 km to 636 km. These wide ranges imply that general audit experience and geographical proximity are not strict criteria for lead auditor selection. Excluding all counterfactual auditors outside of the ranges observed for actual auditor dyads for general audit experience and geographical distances eliminates 4,213 observations, resulting in virtually unchanged results. We find similar results if we exclude lead auditors from offices more than 100 (300; 500) km away from the office of the concurring auditor.

lead auditors, concurring auditors serve more clients in general and more public clients in particular. All differences are significant using a two-tailed *t*-test. These results support the hierarchical relationship in auditing.

Next, we compare similarities between actual and counterfactual dyads to provide descriptive insight into the prevalence of choice-based homophily in actual auditor dyads. Table 3 presents the results for our similarity measures and the underlying characteristics. For dialect, we observe that 25 percent of the actual dyads have a similarity greater than the 90th percentile of the sample distribution (dialect similarity threshold: 47). By contrast, only 9 percent of the counterfactual dyads have a dialect similarity greater than the 90th percentile. For gender, we observe that 79 percent of the actual dyads and 76 percent of the counterfactual dyads share the same gender. While differences in the likelihood of sharing the same gender are insignificant between actual and counterfactual dyads, we observe that dyads of two female auditors are significantly more likely for actual dyads than for counterfactual dyads. For age, we observe that 16 percent of the actual dyads, yet 23 percent of the counterfactual dyads have an absolute age difference of less than three years.

Table 4 presents descriptive statistics for the control variables used for estimating model (1). On average, actual and counterfactual lead auditors do not differ in their dialect and in their gender, implying that there is no discrimination based on these variables on average. Actual lead auditors are less likely to be close to retirement than counterfactual lead auditors and, relatedly, have less general audit experience. Actual lead auditors are more likely to be industry experts, but have a smaller number of clients. Finally, geographic proximity matters with actual lead auditors being closer to the concurring auditor and to the client than counterfactual lead auditors.

Table 5 shows the correlation matrix for all variables used for

Table 2
Descriptive statistics for concurring and lead auditors of actual dyads.

Variables	Concurring auditors		Lead auditors		Difference
	Mean	Standard deviation	Mean	Standard deviation	p-value
Age	47.94	6.00	40.45	6.00	<0.001***
Experience	14.20	6.04	6.55	5.16	<0.001***
Female	0.06	0.24	0.20	0.40	<0.001***
Partner status	1.00	0.00	0.23	0.42	<0.001***
Portfolio size (all)	23.32	20.66	7.35	10.57	<0.001***
Portfolio size (listed)	1.83	1.13	1.31	0.66	<0.001***

This table presents characteristics of concurring auditors and actual lead auditors (552 actual dyads, 530 unique concurring auditors, and 506 unique lead auditors). ***, **, and * indicate significance at a 1 percent, 5 percent, and 10 percent level (two-tailed). All variables are defined in Appendix I.

Table 3
Similarity between concurring auditor and actual/counterfactual lead auditor Expand.

Similarity	Similarity between concurring auditors and ...						Difference
	actual lead auditors			counterfactual lead auditors			p-value
	N	Mean [percentage]	Standard deviation	N	Mean [percentage]	Standard deviation	
Dialect							
<i>Dialect_Same</i>	552	0.25		207,984	0.09		< 0.001***
Dialect similarity	552	37.81	13.85	207,984	31.33	11.58	<0.001***
Gender							
<i>Gender_Same</i>	552	0.79		207,984	0.76		0.139
Female both	552	0.03		207,984	0.01		0.002***
Male both	552	0.76		207,984	0.75		0.538
Age							
<i>Age_Same</i>	552	0.16		207,984	0.23		< 0.001***
Absolute age difference	552	8.91	5.81	207,984	8.04	5.78	<0.001***

This table presents similarity measures between actual dyads, i.e., actual concurring and actual lead auditor, as well as counterfactual dyads, i.e., actual concurring and counterfactual lead auditor. ***, **, and * indicate significance at a 1 percent, 5 percent, and 10 percent level (two-tailed). All variables are defined in Appendix I.

Table 4
Descriptive statistics on control variables.

Control variables	Actual dyads			Counterfactual dyads			Difference
	N	Mean	Standard deviation	N	Mean	Standard deviation	p-value
LEAD_Dialect	552	0.083	0.277	207,984	0.082	0.274	0.895
LEAD_Female	552	0.205	0.404	207,984	0.197	0.397	0.635
LEAD_Age	552	0.085	0.279	207,984	0.250	0.433	<0.001***
LEAD_Experience	552	6.459	5.119	207,984	10.039	6.773	<0.001***
LEAD_Specialist	552	0.049	0.216	207,984	0.014	0.116	<0.001***
LEAD_Clients	552	7.226	10.398	207,984	9.600	16.257	0.001***
LEAD-CONCURRING_Distance	552	0.747	1.448	207,984	2.939	1.725	<0.001***
LEAD-CLIENT_Distance	552	0.915	1.300	207,984	2.987	1.660	<0.001***

This table presents descriptive statistics of all control variables used for estimating model (1). All variables are in linear and non-log form. ***, **, and * indicate significance at a 1 percent, 5 percent, and 10 percent level (two-tailed). All variables are defined in Appendix I.

estimating model (1). We find that all pairwise correlations between the similarity measures are very small (0.01). Except for some mechanical correlations,²¹ all correlations are relatively small (<0.25). Non-centered variance inflation factors for estimating model 1 are less than five.

4.4. Multivariate results

4.4.1. Determinants of auditor dyad formation

Table 6 shows the results for testing our hypotheses H1a, H1b,

²¹ These mechanical correlations are *Gender_Same* and *LEAD_Female*; *LEAD_Age* and *LEAD_Experience*; *LEAD_Clients* and *LEAD_Clients²*; *LEAD_CONCURRING_Distance* and *LEAD_CLIENT_Distance*.

and H1c on the effects of sharing similarities on auditor dyad formation. We find positive effects for the likelihood of forming an auditor dyad for *Dialect_Same* (p < 0.01) and *Gender_Same* (p < 0.01), indicating choice-based homophily in dyad formation (H1a, H1b). We observe a negative effect for *Age_Same* (p < 0.10), suggesting differentiation (H1c). The effects of the control variables are in line with our expectations. Female auditors and auditors with industry experience are more likely to become lead auditor. By contrast, older auditors and auditors with more general audit experience are less likely to become lead auditor. We find a non-linear effect for busyness, indicating that lead auditors with multiple engagements are more likely to become lead auditors at other engagements up to a certain threshold where capacity constraints become binding. With regard to geographic proximity, we find that

Table 5
Correlations.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	
<i>Dialect_Same</i>	(1)	0.01	0.01	0.01	-0.02	0.00	0.00	0.00	0.01	0.01	-0.17	-0.14	
<i>Gender_Same</i>	(2)	0.01		0.01	0.04	-0.80	0.10	0.10	0.00	0.08	0.08	-0.02	-0.02
<i>Age_Same</i>	(3)	0.01	0.01		0.00	-0.02	-0.02	0.15	0.01	0.06	0.06	0.00	0.00
<i>LEAD_Dialect</i>	(4)	0.01	0.04	0.00		-0.05	0.02	0.00	0.00	0.01	0.01	0.00	0.01
<i>LEAD_Female</i>	(5)	-0.02	-0.80	-0.02	-0.05		-0.13	-0.12	-0.01	-0.11	-0.11	0.01	0.01
<i>LEAD_Age</i>	(6)	0.00	0.10	-0.02	0.02	-0.13		0.71	-0.03	0.14	0.14	0.00	0.00
<i>LEAD_Experience</i>	(7)	0.00	0.09	0.17	0.00	-0.12	0.62		-0.02	0.23	0.23	-0.01	0.00
<i>LEAD_Specialist</i>	(8)	0.00	0.00	0.01	0.00	-0.01	-0.03	-0.01		0.05	0.05	0.00	0.00
<i>LEAD_Clients</i>	(9)	0.01	0.07	0.05	0.01	-0.10	0.16	0.23	0.01		1.00	0.01	0.01
<i>LEAD_Clients²</i>	(10)	0.00	0.03	0.02	0.00	-0.03	0.05	0.08	0.00	0.67		0.01	0.01
<i>LEAD-CONCURRING_Distance</i>	(11)	-0.20	0.00	0.00	0.01	-0.01	0.01	0.00	0.00	0.02	0.01		0.78
<i>LEAD-CLIENT_Distance</i>	(12)	-0.15	-0.01	0.00	0.01	0.00	0.01	0.00	0.00	0.02	0.01	0.67	

This table presents Pearson (below) and Spearman (above the diagonal) pairwise correlations for all variables used for estimating model (1). Bold figures indicate statistically significant correlations that are at least at the 10 percent level. All variables are defined in Appendix I.

Table 6
Influence of similarity on dyad formation.

Dependent variable:	(I)
<i>LEAD_Actual</i>	Coef./z-stat.
<u>Similarity variables</u>	
<i>Dialect_Same</i>	0.121*** (3.077)
<i>Gender_Same</i>	0.209*** (2.900)
<i>Age_Same</i>	-0.082* (-1.839)
<u>LEAD controls</u>	
<i>LEAD_Dialect</i>	0.013 (0.215)
<i>LEAD_Female</i>	0.134* (1.769)
<i>LEAD_Age</i>	-0.207*** (-3.367)
<i>LEAD_Experience</i>	-0.193*** (-7.790)
<i>LEAD_Specialist</i>	0.509*** (6.033)
<i>LEAD_Clients</i>	0.009*** (2.715)
<i>LEAD_Clients²</i>	-0.000** (-2.154)
<u>Geographic controls</u>	
<i>LEAD-CONCURRING_Distance</i>	-0.124*** (-13.742)
<i>LEAD-CLIENT_Distance</i>	-0.170*** (-11.204)
Constant	-1.303*** (-8.626)
<u>Fixed effects</u>	
N	Industry & year 208,536
Pseudo R ²	0.199

This table shows the coefficients and z-statistics examining the influence of similarities between the concurring auditor and lead auditor on auditor dyad formation using a sample of actual and counterfactual lead auditors. The model is a probit regression with robust standard errors clustered at the client-year level. ***, **, and * indicate significance at a 1 percent, 5 percent, and 10 percent level (two-tailed). All variables are defined in Appendix I.

lead auditors situated in offices away from the concurring auditor and the clients headquarter are less likely to be part of an auditor dyad. The remaining control variables are insignificant.

4.4.2. Impact of concurring auditor discretion for dyad formation

A prerequisite for homophily and establishing legitimacy in auditor dyad formation is that concurring auditors have discretion in selecting their dyadic partner. Accordingly, one could expect weaker effects for homophily and establishing legitimacy in

circumstances where the discretion of the selecting auditor is restricted. As supported by our interviews as well as prior literature, we consider two circumstances which indicate differences in concurring auditors' discretion.

First, we investigate the case of an audit firm switch (involving the switch of the concurring and the lead auditor) and compare it to the scenario of a lead auditor switch (unconnected to an audit firm switch). Prior research suggests that a client's influence on dyad formation is strongest in the case of an audit firm switch because the client evaluates the personal characteristics of the new audit team members during the tender process and thus may influence audit team composition (Dodgson et al., 2019; Owens, 2016). Consequently, discretion in selection a dyadic partner is limited due to the influence of the client. By contrast, our interviews indicate that the influence of the client is less pronounced in case where only the lead auditor switches and the incumbent audit firm remains in charge. Thus, choice-based homophily should be more pronounced in this latter scenario.

Table 7, columns (I) and (II) present the results for the two different scenarios.²² In the case of an audit firm switch, we find insignificant effects for all similarity measures (Column I). In the case of a lead auditor switch (Column II), we find positive effects for *Dialect_Same* (p < 0.01) and *Gender_Same* (p < 0.01). This pattern implies that concurring auditors have discretion for homophily-based lead auditor selection only in the case of a lead auditor switch that is unconnected to an audit firm switch.

Second, we compare the role of homophily in auditor dyad formation across different client sizes. As outlined by interview participants, the process of selecting lead auditors becomes more formal and involves more parties within the audit firm for large clients compared to medium-sized and small clients. Consequently, we expect homophily effects to be weaker for larger clients. To address this issue, we split the sample into three terciles (large, medium-sized, and small clients) based on clients' market capitalization.²³

Table 7, columns (III) to (V) present the results. For large clients (Column III), we only find a negative effect for *Age_Same* (p < 0.05), suggesting a need for establishing legitimate hierarchies. For medium-sized clients (Column IV), we find a positive effect for *Dialect_Same* (p < 0.01) and *Gender_Same* (p < 0.01), indicating homophily. For small clients (Column V), we find no significant effect on our similarity measures. In summary, these findings imply

²² For all split-sample analyses, we split the sample based on characteristics of actual dyads.

²³ We find similar results when we split the sample in index-listed and non-index-listed firms.

Table 7
Influence of concurring auditors' discretion on lead auditor selection.

	(I)	(II)	(III)	(IV)	(V)
Dependent variable:	Audit firm switch	Lead auditor switch	Large client	Medium-sized client	Small client
LEAD_Actual	Coef./z-stat.	Coef./z-stat.	Coef./z-stat.	Coef./z-stat.	Coef./z-stat.
<i>Similarity variables</i>					
<i>Dialect_Same</i>	0.052 (0.683)	0.140*** (3.018)	0.087 (1.289)	0.201*** (3.102)	0.029 (0.382)
<i>Gender_Same</i>	0.135 (1.429)	0.253*** (2.720)	0.105 (0.834)	0.480*** (3.113)	0.116 (1.334)
<i>Age_Same</i>	-0.077 (-0.926)	-0.076 (-1.406)	-0.166** (-2.172)	-0.083 (-1.039)	-0.008 (-0.096)
<i>Control variables</i>	Included	Included	Included	Included	Included
<i>Fixed effects</i>	Industry & year	Industry & year	Industry & year	Industry & year	Industry & year
<i>N</i>	52,323	156,213	82,173	72,476	51,573
<i>Pseudo R²</i>	0.189	0.210	0.178	0.224	0.240

This table shows the coefficients and z-statistics examining the influence of similarities between concurring auditor and lead auditor on dyad formation depending on the level of concurring auditors' discretion in lead auditor selection. Column (I) refers to actual dyads and corresponding counterfactual dyads formed after an audit firm switch for a new client. Column (II) refers to actual dyads and corresponding counterfactual dyads formed after the switch of the lead auditor for an existing client. Column (III) refers to actual dyads and corresponding counterfactual dyads of large clients, column (IV) refers to actual dyads and corresponding counterfactual dyads of medium-sized clients, and column (V) refers to actual dyads and corresponding counterfactual dyads of small clients. We measure client size using firms market capitalization at the end of the year and split the sample in terciles (large, medium-sized, and small firms). Each tercile comprises the same number of actual dyads but a divergent number of counterfactual dyads. The models are probit regressions with robust standard errors clustered at the client-year level. ***, **, and * indicate significance at a 1 percent, 5 percent, and 10 percent level (two-tailed). All variables are defined in Appendix I.

that concurring auditor's discretion is restricted for larger clients with the consequence that homophilous tendencies do not appear. Results for small clients may be surprising at first sight, as audit engagements for these client firms are likely to have the least formal selection processes. However, the less intense working relationships at smaller audit engagements may reduce the need for homophily. Consistent with this argument, interview participants highlight that concurring auditors are not continuously on site in case of smaller clients. We conclude that choice-based homophily plays a role in auditor dyad formation for audit engagements that are sufficiently large to matter, yet still have a less formalized selection process.

4.4.3. Impact of the organizational size for dyad formation

The organizational unit represents the space in which homophilous relationships can develop. Thus, larger organizational units provide richer opportunities for choosing dyadic partners, facilitating the selection of similar or dissimilar others. Despite of the importance of this topic, respective prior research is largely lacking. One exception is the study of Kleinbaum et al. (2013), which provides empirical evidence that email communication between employees of the same gender is particularly prevalent in larger business units. Our setting provides the opportunity to test whether the tendency to form homophilous relationships depends on the size of the organizational unit.

First, we examine the influence of large versus small audit firms. While large audit firms offer more opportunities for dyad formation due to a larger pool of auditors, large audit firms have more extensive and more formalized systems of quality assurance (DeAngelo, 1981). As quality assurance systems are likely to favor criteria in auditor dyad formation other than sharing similarities, it is not clear whether the initial findings of a more prominent role of homophily in larger organizational units apply to auditing. Table 8,

²⁴ The German Chamber of Auditors (2016) classifies BDO as a large audit firm due to its size. Prior audit research uses the same classification for investigating the German setting (e.g. Ernstberger, Koch, Schreiber, & Trompeter, 2020). We find inferentially similar albeit slightly weaker effects when classifying BDO as a small audit firm. We find inferentially unchanged results when performing a median split based on the number of available auditors for dyad formation.

columns (I) to (II) show the results of estimating model (1) separately for large and small audit firms. Following the German Chamber of Auditors (2016), we classify Deloitte, EY, KPMG, PWC, and BDO as large and all other audit firms as small audit firms.²⁴ For large audit firms (Column I), we find positive effects for *Dialect_Same* (p < 0.10) and *Gender_Same* (p < 0.10). For small audit firms (Column II), we observe a positive effect on *Gender_Same* (p < 0.05) and a negative effect on *Age_Same* (p < 0.01). These results suggest that choice-based homophily matters similarly at large and small audit firms. By contrast, the need for establishing legitimacy is more pronounced at smaller audit firms, presumably as a means to counteract the less hierarchical organizational structure in smaller audit firms (Jeppesen, 2007).

Second, we examine the influence of audit office size. While similar arguments regarding the effects of the organizational unit apply as for the audit firm, the boundaries of the organizational unit 'audit office' are less clearly defined. For example, 35.1 percent of our signing auditor pairs are from different offices.

Table 8, columns (III) and (IV) present the results for estimating model (1) separately for large offices and small offices. To differentiate between small and large offices, we perform a median split based on the number of CPAs in the lead auditor's office. For both subsamples, we observe a positive effect for *Gender_Same* (large office: p < 0.05; small office: p < 0.10) and insignificant effects for *Dialect_Same*. With regard to *Age_Same*, we observe a significant effect (p < 0.10) for smaller offices only. We conclude that homophily effects appear in larger and smaller offices and that the need for establishing legitimacy by avoiding dyad formation with someone of similar age is greater at smaller offices.

4.4.4. Impact of auditor dyad characteristics

Finally, we investigate the impact of two important auditor dyad characteristics. First, we investigate whether sharing similarities has a different effect on dyad formation when both signing auditors have the same versus a different hierarchical rank. We do not expect to observe different effects for dialect and gender consistent with our argument that homophily plays a role even in hierarchical relationships. However, the effect for age may be different across both scenarios, because the need for establishing legitimacy through age is less if a legitimate hierarchy is already established

Table 8
Influence of organizational units on lead auditor selection.

	(I)	(II)	(III)	(IV)
Dependent variable:	Large audit firm	Small audit firm	Large office	Small office
LEAD_Actual	Coef./z-stat.	Coef./z-stat.	Coef./z-stat.	Coef./z-stat.
<i>Similarity variables</i>				
Dialect_Same	0.073* (1.664)	0.038 (0.375)	0.067 (1.240)	0.001 (0.015)
Gender_Same	0.131* (1.735)	0.671** (2.399)	0.195** (2.083)	0.205* (1.893)
Age_Same	-0.056 (-1.149)	-0.344*** (-2.707)	-0.060 (-0.998)	-0.136* (-1.917)
<i>Control variables</i>				
Fixed effects	Included Industry & year	Included Industry & year	Included Industry & year	Included Industry & year
N	203,518	5,018	142,775	65,761
Pseudo R ²	0.198	0.207	0.185	0.255

This table shows the coefficients and z-statistics examining the influence of similarities between concurring auditor and lead auditor on auditor dyad formation depending on the size of the organizational unit. Column (I) refers to actual dyads and corresponding counterfactual dyads of large audit firms. Column (II) refers to actual dyads and corresponding counterfactual dyads of small audit firms. Following the German Chamber of Auditors (2016), we classify Deloitte, EY, KPMG, PWC, and BDO as large audit firms. We classify all other audit firms as small audit firms. Column (III) refers to actual dyads and corresponding counterfactual dyads belonging to a large audit office. Column (IV) refers to actual dyads and corresponding counterfactual dyads belonging to a small audit office. We measure office size based on the number of CPAs in the lead auditor's office and split the sample at the median. The models are probit regressions with robust standard errors clustered at the client-year level. ***, **, and * indicate significance at a 1 percent, 5 percent, and 10 percent level (two-tailed). All variables are defined in Appendix I.

through other mechanisms, like rank.

Table 9, columns (I) and (II) present the results for estimating model (1) separately for actual and counterfactual auditor dyads of the same hierarchical rank (both signing auditors are partners) versus actual and counterfactual auditor dyads of different hierarchical ranks. For the first type of dyads (Column I), we find a positive effect for Gender_Same (p < 0.05) and a negative effect for Age_Same (p < 0.01). For the latter type of dyads (Column II), we find a positive effect for Dialect_Same (p < 0.01) and Gender_Same (p < 0.01). These findings show that homophily plays a role in both scenarios. By contrast, age differentiation is only important for auditor dyads of the same hierarchical rank. This finding suggests that establishing legitimate hierarchies based on age becomes less important when a legitimate hierarchy based on rank already exists.

Second, we examine the influence of geographic proximity on dyad formation. McPherson et al. (2001) point out that geographic

proximity is an important precondition for the development of homophily because it facilitates connections. With regard to dyad formation in auditing, working in the same audit office offers opportunities to meet in informal settings, meetings, or training. By contrast, homophily based on relatively superficial social characteristics may be of less importance for the development of relationships when people know each other well. Table 9, column (III) and (IV) present results for estimating model (1) separately for actual dyads and corresponding counterfactual dyads where both auditors belong to the same office and for actual dyads and corresponding counterfactuals where both auditors belong to different offices. For same office dyads (Column III), we observe a positive effect for Dialect_Same (p < 0.10) and Gender_Same (p < 0.05), and a negative effect for Age_Same (p < 0.01). For different office dyads (Column IV), we observe a significant effect for Dialect_Same (p < 0.10). The effect for Gender_Same is close to being marginally significant (p = 0.108). These findings show that homophily plays a

Table 9
Influence of dyad characteristics on lead auditor selection.

	(I)	(II)	(III)	(IV)
Dependent variable:	Partner both	Only concurring partner	Same office	Different office
LEAD_Actual	Coef./z-stat.	Coef./z-stat.	Coef./z-stat.	Coef./z-stat.
<i>Similarity variables</i>				
Dialect_Same	0.055 (0.460)	0.130*** (2.848)	0.092* (1.787)	0.141* (1.894)
Gender_Same	0.713** (2.113)	0.155** (2.211)	0.211** (2.131)	0.251 (1.608)
Age_Same	-0.310*** (-2.708)	-0.026 (-0.480)	-0.187*** (-2.804)	0.051 (0.754)
<i>Control variables</i>				
Fixed effects	Included Industry & year	Included Industry & year	Included Industry & year	Included Industry & year
N	8,076	133,199	14,855	64,300
Pseudo R ²	0.245	0.230	0.060	0.150

This table shows the coefficients and z-statistics examining the influence of similarities between concurring auditor and lead auditor on first-time auditor dyad formation depending on characteristics of the actual dyads Column (I) refers to actual dyads and corresponding counterfactual dyads where both, the actual concurring and actual lead auditor, are audit partner. Column (II) refers to actual dyads and corresponding counterfactual dyads where the concurring auditor is a partner and the lead auditor is lower ranked. For column (I), we only use audit partners as counterfactual lead auditors. For column (II), we only use non-partners as counterfactual lead auditors. Column (III) refers to actual dyads and corresponding counterfactual dyads belonging to the same office. Column (IV) refers to actual dyads and corresponding counterfactual dyads belonging to different offices. For column (III), we only use counterfactual lead auditors belonging to the same office as the concurring auditor. For column (IV), we only use counterfactual lead auditors belonging to a different office than the concurring auditor. The models are probit regressions with robust standard errors clustered at the client-year level. ***, **, and * indicate significance at a 1 percent, 5 percent, and 10 percent level (two-tailed). All variables are defined in Appendix I.

role in both scenarios, whereas establishing legitimacy based on age only matters when both auditors are from the same office. We conclude that, to some extent, geographic distance substitutes for the need to establish legitimacy.

4.5. Additional analyses

Age vs. experience. In our main analyses, we use age as one important basis for the development of homophilous relationships outlined in sociological research (McPherson et al., 2001). Sharing a similar age facilitates the development of relationships because it provides a common background based on growing up in a similar period and similar events occurring in their family lives (Zenger & Lawrence, 1989). Age provides the opportunity to acquire general audit experience, rendering it difficult to disentangle both concepts. In our sample, age is highly correlated with general audit experience (corr = 0.926). However, the correlation is not perfect as indicated by a weaker correlation between *Age_Same* and *Exp_Same* (corr = 0.466).²⁵ Including *Age_Same* and *Exp_Same* into model (1) yields insignificant effects for both variables, but is plagued with issues of multicollinearity. One approach to disentangle both factors is to keep one factor at a relatively constant level while testing for the other. In detail, we test whether *Age_Same* (*Exp_Same*) still matters when restricting the sample of actual and counterfactual auditor dyads to those that are within a 5-year general audit experience (age) range. We find significant effects for the “same” variable in both cases, suggesting that both sharing the same age and sharing the same general audit experience level is less likely in auditor dyad formation.

Religion. McPherson et al. (2001) mention religion and education as two important bases for forming homophilous relationships. We do not include religion in our main model, because we do not have information available about the religion or faith of individual auditors. For additional analyses, we derive two proxies for religion based on an auditor’s city of birth.²⁶ For both variables, we find insignificant effects on dyad formation. Potential explanations for this null finding may be the lower construct validity of this measure aggregating across religions or the secularization in Europe (e.g., Stark & Iannaccone, 1994).

Education. All auditors in our sample have obtained a CPA title. This common background of auditors may diminish the role of educational homophily in auditing. Nevertheless, we test whether a similar academic background matters for auditor dyad formation based on holding a doctorate, attending the same university, and studying the same field.²⁷ We find insignificant effects on dyad

²⁵ *Exp_Same* is an indicator variable, 1: concurring auditor and lead auditor have less than three years of general audit experience difference; 0: otherwise. For measuring general experience, we take the date of CPA appointment as the starting point. In Germany, at least three years of audit experience is required before being appointed as CPA. As the professional register provides the date of CPA appointment but not the date of entering the audit profession, we use the former. As requirements for passing the German CPA exam changed during the last decades, newly appointed CPAs passed the CPA exam at a younger age compared to older auditors. These regulatory changes may lead to lower correlation between *Age_Same* and *Exp_Same*.

²⁶ First, we use a binary variable indicating whether the concurring and the lead auditor are both born in either a dominant Catholic or a dominant Protestant region. Second, we use a binary variable indicating whether the concurring auditor and the lead auditor are born in a region with a large proportion of people being members in any church. We define regions as dominant Catholic, Protestant, or overall religious when the percentage of Catholic, Protestant, or religious inhabitants is greater than the 75 percentile of all regions.

²⁷ The professional register includes information on academic title and field of study. We derive data on place of study from Downar et al. (2020), resulting in data availability of 105 (19.0 percent) actual and 28,794 (13.3 percent) counterfactual auditor dyads.

formation in terms of all measures discussed above. Potential explanations are the homogeneous academic background (i.e., more than 88 percent of auditors have a background in business or economics) and the lower identification of students with their university in Germany, than in the US (Hoffmann & Müller, 2008).

5. Consequences of similarity-based collaborations on audit quality

To test the consequences of similarity-based auditor dyads on audit quality (H2), we apply an instrumental variable approach controlling for selection effects in the formation of auditor dyads. Based on Gompers et al. (2016), we instrument for shared similarities between the concurring and actual lead auditor, using the average similarity between the actual concurring auditor and all counterfactual lead auditor of the same audit firm. We calculate a separate average similarity variable for dialect, gender, and age. The instruments capture the degree to which a concurring auditor is similar to the pool of all auditors, excluding the actual lead auditor, at the same audit firm, along each dimension.²⁸ We implement the instrumental variable approach using two-stage least square (probit) regressions. During the first stage, we regress actual similarity values on average similarities, control variables, and fixed effects. Because we are using three instruments, we estimate three separate first-stage regressions. Second, we regress the measures of audit quality on our three instrumented variables, controls variables, and fixed effects.²⁹

We measure audit quality using abnormal accruals and the likelihood of issuing going concern opinions for distressed firms. Prior literature shows that low accounting quality is associated with low-quality audits (Francis, 2011) and that large income-increasing accruals increase the likelihood of GAAP violations (e.g., Dechow et al., 2011). Specifically, we use absolute abnormal accruals, positive discretionary accruals, and negative discretionary accruals. We calculate abnormal accruals using the cross-sectional performance-adjusted modified Jones model (DeFond & Jambalvo, 1994; Kothari et al., 2005). By contrast, going concern opinions provide more direct evidence on low audit quality compared to discretionary accruals, but are limited to distressed firms only (DeFond & Zhang, 2014).

As control variables for the first- and second-stage models, we include the same set of control variables as for model (1) and additionally include control variables based on prior audit quality literature (e.g., Francis & Yu, 2009; Reichelt & Wang, 2010). We use industry, year, and audit firm fixed effects for the first- and second-stage models.³⁰ We refer to Appendix I for measurement details. Model (2) presents the second-stage model:

²⁸ Valid instruments need to be relevant and need to fulfill the exclusion restriction (e.g., Lennox et al., 2012). Our scores are relevant because a high level of similarities of the concurring auditor and the pool of potential lead auditors results in a higher number of similarities between the concurring auditor and the actual lead auditor, even if dyad formation occurs randomly, so-called *induced homophily*. Further, the instrumental variable may not directly influence the outcome variable. This exclusion restriction is fulfilled, because the level of similarity to those auditors not involved in the specific audit engagement should not have an influence on the audit quality provided for a specific client. Finally, the exogenous nature of the instrumental variable also becomes apparent, because it is exogenously imposed on the individual auditor based on the pool of auditors within the same audit firm in the respective year.

²⁹ We implement this approach using IV estimation procedures provided by STATA (i.e. *ivreg*) that take into account that instrumented variables are based on estimated values for deriving standard errors.

³⁰ Please note that the effects for the accrual measures are weaker when using a cross-sectional modified Jones model following Dechow et al. (1995).

$$AQ = \beta_0 + \beta_1 IV_Dialect + \beta_2 IV_Gender + \beta_3 IV_Age + \sum \text{Determinants model controls} + \sum \text{Audit quality controls} + \text{Fixed effects for industry, year, and audit firm} + e \tag{2}$$

AQ represents our audit quality measures, either absolute abnormal accruals, positive abnormal accruals, negative abnormal accruals, or going concern. *IV_** are the variables of interest, which represent the predicted values of the similarity variables obtained in the first stage(s).³¹

For this test, we use all non-financial publicly listed German

firms for which concurring auditor and lead auditor are identifiable. It covers the same period as our determinants model (2005–2013), but is not restricted to first-time auditor dyads. We only exclude observations with missing dependent, independent, or instrumental variables. The accrual sample has a final sample size of 1,770 observations. The going concern sample has 474 observations, because we only include observations of financially distressed firms.

Table 10 presents the results for the audit quality analysis (second-stage results). In Column (I), we find a significant positive

Table 10
Effects of similarities on audit quality.

	(I)	(II)	(III)	(IV)
	Abs_JMDA	Pos_JMDA	Neg_JMDA	Going concern (Distressed only)
	Coef./z-stat.	Coef./z-stat.	Coef./z-stat.	Coef./z-stat.
<i>Instrumented similarity variables</i>				
<i>IV_Dialect</i>	0.041* (1.687)	0.028* (1.909)	-0.024 (-0.520)	-2.147* (-1.823)
<i>IV_Gender</i>	-0.029 (-0.975)	0.011 (0.844)	-0.004 (-0.145)	0.361 (0.884)
<i>IV_Age</i>	0.011 (0.256)	-0.014 (-0.536)	-0.069 (-0.980)	-0.286 (-0.149)
<i>Determinants model controls</i>				
<i>LEAD_Dialect</i>	0.005 (0.703)	-0.002 (-0.580)	-0.003 (-0.514)	-0.404 (-1.045)
<i>LEAD_Female</i>	-0.015 (-0.677)	0.009 (0.683)	0.005 (0.198)	0.462 (0.974)
<i>LEAD_Age</i>	-0.004 (-0.763)	0.001 (0.271)	0.004 (0.898)	0.247 (0.669)
<i>LEAD_Experience</i>	-0.000 (-0.041)	0.002 (0.482)	0.005 (0.515)	-0.031 (-0.090)
<i>LEAD_Specialist</i>	0.000 (0.054)	-0.002 (-0.433)	0.008 (0.712)	0.191 (0.771)
<i>LEAD_Clients</i>	0.000 (0.378)	0.000 (0.908)	-0.000 (-0.443)	-0.002 (-0.089)
<i>LEAD_Clients²</i>	-0.000 (-0.337)	-0.000 (-1.392)	0.000 (0.531)	0.000 (0.082)
<i>LEAD-CONCURRING_Distance</i>	0.000 (0.040)	-0.000 (-0.462)	0.002* (1.784)	-0.026 (-0.558)
<i>LEAD-CLIENT_Distance</i>	0.001 (0.467)	0.004*** (3.577)	-0.003** (-2.222)	-0.029 (-0.535)
<i>Audit quality Controls</i>				
<i>CONCURRING_Experience</i>	-0.003 (-0.266)	-0.012 (-1.568)	-0.016 (-0.904)	-0.259 (-0.374)
<i>COSIGNER_Specialist</i>	0.006 (1.118)	0.004 (0.702)	0.012 (1.289)	-0.407*** (-2.750)
<i>AF_Switch</i>	0.000 (0.119)	-0.002 (-0.389)	0.010 (0.864)	-0.069 (-0.256)
<i>AP_Switch</i>	0.004 (0.502)	0.002 (0.233)	0.012 (1.448)	-0.108 (-0.295)
<i>Dec_FYE</i>	-0.002 (-0.467)	-0.005 (-1.277)	-0.001 (-0.060)	-0.383* (-1.855)
<i>Size</i>	-0.001 (-1.208)	-0.001 (-0.602)	-0.004*** (-3.430)	-0.057 (-1.222)
<i>OANCF</i>	0.056 (1.378)	-0.390*** (-21.234)	0.432*** (12.412)	-1.564 (-1.566)
<i>OANCF_Vol</i>	0.200*** (5.313)	0.072* (1.735)	0.096*** (3.032)	-0.048 (-0.052)
<i>Sales_Growth</i>	-0.010 (-1.079)	0.010 (1.057)	-0.034*** (-3.185)	0.040 (0.287)
<i>Sales_Vol</i>	-0.008 (-0.780)	0.001 (0.092)	-0.023*** (-2.831)	0.240 (0.518)
<i>MtB</i>	0.000* (1.944)	0.000 (0.594)	0.000 (1.071)	0.000 (1.428)
<i>Zscore</i>	-0.002 (-0.933)	0.005** (2.217)	-0.011*** (-4.144)	-0.100 (-0.663)

(continued on next page)

³¹ F-tests of all instrumental variables are statistically significant (p < 0.1). F-statistics range between 2.2 (*Gender_Same*) and 12.0 (*Dialect_Same*).

Table 10 (continued)

	(I) Abs_JMDA	(II) Pos_JMDA	(III) Neg_JMDA	(IV) Going concern (Distressed only)
	Coef./z-stat.	Coef./z-stat.	Coef./z-stat.	Coef./z-stat.
Loss	0.010* (1.709)	-0.033*** (-6.796)	0.045*** (6.795)	0.409 (0.716)
Debt	-0.003 (-0.245)	-0.001 (-0.123)	-0.033 (-1.359)	0.331 (0.300)
Age	-0.004* (-1.702)	-0.002 (-0.735)	-0.005* (-1.767)	0.125 (1.053)
Constant	0.084 (1.538)	0.075** (2.356)	0.112** (2.088)	0.458 (0.123)
Fixed effects	Industry, year & audit firm	Industry, year & audit firm	Industry, year & audit firm	Industry, year & audit firm
N	1,770	871	899	474

This table shows the coefficients and z-statistics for estimating the consequences of the composition of auditor dyads on audit quality. We use all non-financial observations, i.e., not only first-time dyads, for the period 2005–2013. We instrument similarities between concurring and actual lead auditors using the average similarity between concurring auditor and all other auditors of the same audit firm in the respective year. Columns (I) to (IV) are second-stage results using instrumented variables with robust standard errors clustered at the audit firm level. Predicted values of instrumental variables are based on distinct first-stage regressions for each of the three endogenous variables (*Dialect_Same*, *Gender_Same*, *Age_Same*) using all second-stage variables as control variables. We proxy for audit quality using unsigned discretionary accruals of a cross-sectional performance-adjusted modified Jones model (column I) estimated for each industry-year with at least ten observations. For column (II) and (III) we use positive or negative discretionary accruals. For column (III) we multiply negative accruals by (-1). For column (IV), we use the likelihood of issuing going concern opinions for distressed firms as the dependent variable. We define firms as financially distressed if they report either negative net income or negative cash flow from operations. Accrual and audit quality control variables are winsorized at the 1st and 99th percentiles. The industry definition is based on Frankel et al. (2002) classification. ***, **, and * indicate significance at the 1 percent, 5 percent, and 10 percent level (two-tailed). All variables are defined in Appendix I.

effect for *IV_Dialect* on absolute discretionary accruals indicating lower audit quality for auditor dyads sharing the same dialect. All other instrumented similarity variables are insignificant. Examining positive and negative discretionary accruals separately (columns (II) and (III)), we observe that the effect for *IV_Dialect* appears only for positive discretionary accruals. For going concern opinions (column (IV)), we observe a significant negative coefficient for *IV_Dialect*, indicating a lesser likelihood of issuing going concern opinions for distressed firms and, thus, lower audit quality. Overall, results indicate that auditor dyads sharing the same dialect are associated with lower audit quality, presumably due to enhanced trust and, thus, reduced professional skepticism.

6. Conclusion

This study examines the role of similarities in the formation of auditor dyads at the top level of audit teams. We use archival data from Germany where both the concurring auditor and lead auditor sign the audit opinion and biographic information is available. We apply homophily as a key concept from sociology to the auditing setting and employ a counterfactual approach from the economics literature.

We find that auditor dyads sharing the same dialect and the same gender are more likely to emerge than the average characteristics of the potential pool of candidates suggest. These findings indicate that choice-based homophily matters for auditor dyad formation. In addition, we observe that sharing the same age reduces the likelihood of dyad formation, presumably to ensure a legitimate hierarchical relationship. In additional tests, we show that homophily plays a lesser role in dyad formation when the concurring auditor has less discretion in lead auditor selection due to a stronger influence of clients and audit firms. Further, we find that homophily plays a similar role in larger and smaller organizational units. We also find that sharing the same age is particularly avoided when both signing auditors share the same hierarchical rank or when both signing auditors are from the same office. Finally, using an instrumental variable approach, we document that

sharing the same dialect is associated with lower audit quality.

Our study is subject to limitations. First, our study uses a German audit setting which may limit generalizability. However, given the higher level of harmonization of accounting and auditing within Europe as well as towards the US and the threat of substantial reputational losses in case of auditor failures, our theory and results may translate to hierarchical auditor dyads in other settings. Second, we identify choice-based homophily by investigating whether auditor dyads are more likely to share similarities than a random matching based on the composition of auditors within the audit firm would suggest. Choice-based homophily might matter at the point in time when personal networks are formed or when lead auditors are selected. As we cannot observe the complete personal network of each auditor, we cannot identify at which point in time choice-based homophily matters. To partly address this issue, we control for prior joint work experience by focusing on first-time dyads of concurring auditors and lead auditors. Third, our analysis is restricted to proxies for similarity that are publicly available. Finally, it is difficult to disentangle whether auditor dyads avoid sharing the same age or sharing the same general audit experience as both measures are highly correlated. However, our sensitivity tests suggest that both are separately relevant.

Data availability

Data are available from commercial databases and public sources identified in the paper.

Appendix I

Variable definitions

Variable	Definition	Data Source
Determinants model		
Descriptive statistics		
<i>Age</i>	Auditor age in years.	Professional register
<i>Experience</i>	General audit experience since being appointed as CPA in years. German regulation requires at least three years of work experience in auditing before being appointed as CPA.	Professional register
<i>Female</i>	Indicator variable, 1: an auditor is female; 0: otherwise.	Professional register, identification by the first name(s)
<i>Partner status</i>	Indicator variable, 1: an auditor is of the hierarchical rank of a partner; 0: otherwise.	Professional register, audit opinion, online inquiry
<i>Portfolio size (all)</i>	Number of engagements of private and public clients as signing auditor.	Audit opinion
<i>Portfolio size (listed)</i>	Number of engagements of public clients as signing auditor.	Audit opinion
<i>Dialect similarity</i>	Dialect similarity score provided by Jens Südekum.	Professional register and dialect score from Jens Südekum (Falck et al., 2012)
<i>Female both</i>	Indicator variable, 1: concurring auditor and lead auditor are both female; 0: otherwise.	Professional register
<i>Male both</i>	Indicator variable, 1: concurring auditor and lead auditor are both male; 0: otherwise.	Professional register
<i>Absolute age difference</i>	Absolute age difference between a concurring auditor and lead auditor.	Professional register
Main dependent variable		
<i>LEAD_Actual</i>	Indicator variable, 1: actual dyad; 0: counterfactual dyad.	Audit opinion
Test variables		
<i>Dialect_Same</i>	Indicator variable, 1: concurring auditor and lead auditor have a dialect similarity greater than the 90 percent percentile of the sample distribution; 0: otherwise.	Professional register and dialect score from Jens Südekum (Falck et al., 2012)
<i>Gender_Same</i>	Indicator variable, 1: concurring auditor and lead auditor are either both male or both female; 0: otherwise.	Professional register
<i>Age_Same</i>	Indicator variable, 1: concurring auditor and lead auditor have less than three years of age difference; 0: otherwise.	Professional register
Control variables		
<i>LEAD-CONCURRING_Distance</i>	Natural logarithm of the geographic distance between the office of the lead auditor and the office of the concurring auditor.	Professional register
<i>LEAD-CLIENT_Distance</i>	Natural logarithm of the geographic distance between the office of the lead auditor and client headquarter.	Professional register and Datastream Worldscope
<i>LEAD_Dialect</i>	Indicator variable, 1: lead auditors dialect similarity to standard German is greater than the 90 percent percentile of the sample distribution; 0: otherwise.	Professional register
<i>LEAD_Age</i>	Indicator variable, 1: age of the lead auditor is in the fourth quartile of the sample distribution; 0: otherwise.	Professional register
<i>LEAD_Female</i>	Indicator variable, 1: lead auditor is female; 0: otherwise.	Professional register
<i>LEAD_Experience</i>	Natural logarithm of lead auditors' years of general audit experience since passing the CPA exam.	Professional register
<i>LEAD_Specialist</i>	Indicator variable, 1: lead auditor audited listed clients in the same industry prior to the engagement, 0: otherwise.	Audit opinion
<i>LEAD_Clients</i>	Number of lead auditors' public and private clients in year t.	Audit opinion
<i>LEAD_Clients²</i>	Squared number of lead auditors' public and private clients in year t.	Audit opinion
Audit quality analyses		
Main dependent variables		
<i>Abs_JMDA</i>	We estimate the cross-sectional modified Jones model as follows (subscripts are omitted for the sake of brevity): $TA_t = \beta_0 \cdot (1/AT_{t-1}) + \beta_1 \cdot (D_REV_t - D_REC_t) + \beta_2 \cdot PPE_t + \beta_3 \cdot ROA_{t-1}$. We use the absolute residuals as our measure of audit quality. We require at least ten observations for all industry-year accounting regime groups. TA = (net income before extraordinary items minus operating cash flow) divided by total assets at the end of year t-1. AT = total assets at the end of the year. D_REV = change in revenue from the prior year to year t divided by total assets at the end of year t-1. D_REC = change in accounts receivable from the prior year to year t. PPE = net property, plant and equipment at the end of year t divided by total assets at the end of year t-1. ROA_{t-1} = net income before interest and taxation for year t-1 divided by average total assets for year t-1. We first estimate the accrual model for the full sample of German listed firms by fiscal year, industry and GAAP used to prepare the consolidated statements. The industry definitions is based on Frankel et al.'s (2002) classification (see Ernstberger et al., 2015). We require a minimum of ten observations for all industry-year accounting regime groups, using industry definition provided by Frankel et al. (2002).	Datastream Worldscope
<i>Pos_JMDA</i>	Positive residuals of a cross-sectional performance-adjusted modified Jones model as defined above.	Datastream Worldscope
<i>Neg_JMDA</i>	Negative residuals of a cross-sectional performance-adjusted modified Jones model as defined above. We multiply negative residuals by (-1).	Datastream Worldscope
<i>Going concern</i>	Indicator variable, 1: a firm's auditor qualifies or modifies the audit opinion for going-concern risks; 0: otherwise. We only use distressed firms. We define firms as financially distressed if they report either negative net income or negative cash flow from operations.	Audit opinion
Audit quality control variables		
<i>Concurring_Experience</i>	Natural logarithm of concurring auditors' years of general audit experience since passing the CPA exam.	Professional register
<i>Concurring_Specialist</i>	Indicator variable, 1: concurring auditor audited clients in the same industry prior to the engagement, 0: otherwise	Professional register

(continued on next page)

(continued)

Variable	Definition	Data Source
AF_Switch	Indicator variable, 1: audit firm switch; 0: otherwise.	Audit opinion
AP_Switch	Indicator variable, 1: lead auditor or concurring auditor switch; 0: otherwise.	Audit opinion
Dec_FYE	Indicator variable, 1: December fiscal year end; 0: otherwise.	Datastream Worldscope
Size	Natural logarithm of total assets.	Datastream Worldscope
OANCF	Operating cash flows scaled by total assets.	Datastream Worldscope
OANCF_Vol	Standard deviation of OANCF for t = 0, -1, -2, and -3.	Datastream Worldscope
Sales_Growth	One-year growth rate of a firm's sales revenues.	Datastream Worldscope
Sales_Vol	Standard deviation of firm's sales revenues scaled by total assets for t = 0, -1, -2, and -3.	Datastream Worldscope
MtB	Ratio of market value of shares and book value of equity.	Datastream Worldscope
Zscore	Altman Z-Score (1983).	Datastream Worldscope
Loss	Indicator variable, 1: negative net income; 0: otherwise.	Datastream Worldscope
Debt	Ratio of long-term debt to total assets.	Datastream Worldscope
Age	Natural logarithm of the age of firm since foundation.	Datastream Worldscope
Instrumental variables		
IV_Dialect	Predicted values of the dialect similarity variable obtained in the first stage. To obtain predicted values, we regress <i>Dialect_Same</i> on average dialect similarity, gender similarity, and age similarity, control variables for lead auditor selection, geographic distances, and audit quality as well as fixed effects for year and audit firm. We estimate average similarities using the actual concurring auditor and all counterfactual lead auditors of the respective actual dyad, excluding the actual lead auditor.	Professional register
IV_Gender	Predicted values of the dialect similarity variable obtained in the first stage. To obtain predicted values, we regress <i>Gender_Same</i> on average dialect similarity, gender similarity, and age similarity, control variables for lead auditor selection, geographic distances, and audit quality as well as fixed effects for year and audit firm. We estimate average similarities using the actual concurring auditor and all counterfactual lead auditors of the respective actual dyad, excluding the actual lead auditor.	Professional register
IV_Age	Predicted values of the dialect similarity variable obtained in the first stage. To obtain predicted values, we regress <i>Age_Same</i> on average dialect similarity, gender similarity, and age similarity, control variables for lead auditor selection, geographic distances, and audit quality as well as fixed effects for year and audit firm. We estimate average similarities using the actual concurring auditor and all counterfactual lead auditors of the respective actual dyad, excluding the actual lead auditor.	Professional register

Appendix II

Interview study: Additional analyses

This section presents additional illustrative quotes for each section of our interview guide.

Requirements for signing auditors (concurring and lead auditor).

First, we gathered evidence on the formal requirements for signing auditors. We find that most audit firms require the auditor signing on the left-hand side to be of the hierarchical rank of a partner (n = 7) or at least director (n = 2). In contrast, the auditor signing on the right-hand side is usually only required to be manager (n = 8) or senior manager (n = 1).³²

“Generally speaking, the person who manages the operational side of the engagement and is also responsible for all content-related and operational issues. That’s always the auditor signing on the right-hand side.” (R1)

“For auditors signing on the left-hand side, the question of how much experience one has in dealing with supervisory boards is becoming more and more important, even more with the C-suite and board communication. For auditors signing on the right-hand side, however, also operational experience with this type of audits, complexities that matter then.” (R10)

The working relationship between the two signing auditors can

be characterized as being both collegial and hierarchical.

“So, of course, there is a certain hierarchical difference on the one hand due to life experience, work experience, and other things. But, it’s interpreted that they both agree at the end. And if they disagree, there are escalation processes to resolve such disagreements. So someone says, “I’m right and I’ll just push this through” that doesn’t work.” (R2)

Some auditors also mention the relationship between the concurring and lead auditor as a criterion for selecting the lead auditor.

“Everything I said before is true, of course, that the qualification and experience must be given. Nevertheless, it is of course human that then the partner, who is typically first at the job, who has the job assignment, that he [or she] looks for someone he [or she] knows.” (R5)

Lead Auditor Selection Process

Next, we explore the process of selecting a new lead auditor by asking auditors to describe it in an open-ended question, followed by closed-ended questions. We base all questions on the scenario where a new lead auditor for a listed client needs to be selected, while the concurring auditor remains in that position. We use this scenario to trigger memories of similar circumstances in practice.

The following quotes illustrate the role of the concurring auditor in selecting the lead auditor.

³² The one remaining participant only mentioned the legal requirement that signing auditors need to have power of attorney.

"Who exactly selects? So in our case, this would probably be the concurring auditor. Based on client experience, he [or she] is best placed to assess the requirements to be met by a future lead auditor." (R7)

"But of course the concurring auditor, the partner, and the incumbent have the task of transferring the mandate well. They know about the local conditions and of course, they also have contacts to the management and it is actually those who can judge it best on site." (R9)

"Well, somehow to a certain extent the concurring auditor, because he [or she] is the first in the team to know that the lead auditor is no longer available. [...] But, to set the ball rolling (for the selection process), this is probably usually done by the concurring auditor." (R10)

The following quotes illustrate the involvement of the audit firm in selecting the lead auditor.

"And because he [or she] [the concurring auditor] needs someone new from the audit firm who is typically also involved in other assignments and at least in whose order relations it must fit, he [or she] will, of course, have to talk to the other partners." (R5)

"If so, we would, of course, let's say, define a short-list and then the concurring auditor together with risk management, the partner responsible for risk management, and perhaps also the regional partner, in case of doubt, would discuss this again in a suitable committee I'd like to call it. So, the concurring auditor does not simply select his colleague." (R3)

"We have a central office for Germany. There, all [lead and concurring auditor] go through who sign audit opinions of PIE [public interest entities]. That means they say: "the team is okay or not okay." Yes, in the end, they have the final say, hop or top. Whereby, usually, all this is discussed and determined beforehand. Therefore, usually, there are no problems." (R2)

The following quotes illustrate the role of the client in selecting the lead auditor.

"One usually tries to find two candidates who can both serve the mandate well and who are then usually presented to the client - that is not completely uniform - that also differs from client to client, but it is common practice that the client should get to know two colleagues and two CVs." (R1)

"I would never recommend a candidate to a client from whom I have to assume from the outset that he [or she] will not be able to cope with the mandate at all." (R7)

After having discussed the general selection process, we asked two closed-ended questions on the involvement of various parties on lead auditor selection. Results indicate a strong involvement of the concurring auditor in the selection process. On a scale from 1 ("strongly disagree") to 5 ("strongly agree"), we find that participants agree that the concurring auditor of the engagement has a very high influence in pre-selecting candidates (mean = 4.5), defining requirements (mean = 4.4), shaping the decision (mean = 4.9), and preventing an unwanted candidate (mean = 4.5). Second, we asked participants to rate the influence of relevant parties in lead auditor selection. On a scale from 1 ("no influence at all") to 5 ("very high influence"), the following parties are considered to have a high influence on that decision: The concurring auditor (mean = 4.3), the audit firm (mean = 3.5), the client

(mean = 3.8), and the newly selected lead auditor (mean = 3.5). In contrast, the prior lead auditor is considered to play a minor role (mean = 2.4). We asked one closed-ended question on the influence of other factors on lead auditor selection. On a scale from 1 ("not all important") to 5 ("very important"), we find that the industry expertise (mean = 4.2) and available time (mean = 4.7) are more important and geographic proximity (mean = 2.8) is less important for lead auditor selection.

Appendix III

The interview guidelines can be found online at <https://doi.org/10.1016/j.aos.2020.101156>.

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