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Abstract

This paper studies how homophily shapes informal knowledge-exchange networks and affects the performance of knowledge workers. We argue that, while homophily might make it easier for workers to request and obtain knowledge from colleagues, it might also prompt them to approach less qualified colleagues. Consistent with past research, we find evidence of homophily in knowledge-exchange networks among employees in a global investment bank. More importantly, we show that although a colleague's ability to provide valuable inputs predicts seeking help from this colleague, the effect is dampened for homophilous ties. This suggests that a trade-off might exist between the accessibility of homophilous colleagues and the ability of colleagues to provide valuable task inputs. Taking this into account, we argue that homophilous tendencies should have a positive effect on the performance of employees who are likely to experience difficulties in securing help from colleagues, but it should hinder the performance of employees who face fewer obstacles in obtaining such help.

Keywords: Homophily; Social Networks; Performance

INTRODUCTION

The tendency to associate with similar others is a well-documented phenomenon in the social sciences. Captured in the proverbial expression "birds of a feather flock together", this phenomenon was labeled "homophily" by Lazarsfeld and Merton (1954) and it has been observed in a variety of contexts and different types of relationships. In their comprehensive review of the literature, McPherson and his collaborators (McPherson, Smith-Lovin, and Cook, 2001) identified a number of attributes deemed responsible for observed homophily tendencies, including ethnicity, gender, age, religion, education, and occupation. Evidence supporting homophily has continued to accumulate since their review (see Gibbons and Olk, 2003; Mollica, Gray, and Trevino, 2003 on ethnicity; Reagans, 2005 on gender; Reagans, 2011 on age; Erez and Earley, 1993; Armstrong and Cole, 2002: 174-176; Gibson and Zellmer-Bruhn, 2001; Joshi, Labianca, and Caligiuri, 2002 on nationality). The importance of a given attribute in defining "similarity" varies according to the salience of the attribute in the specific socio-cultural context. Yet, the general idea that people seek to associate with similar others is well established: social ties between similar people are more frequent than are ties between dissimilar people.

While there is ample evidence of the effects of homophilous tendencies on tie formation, we know much less about the effects of such tendencies on outcomes associated with the actors involved in homophilous relationships. We advance in this direction by investigating the effects of homophilous tendencies on the performance of knowledge workers. The focus on knowledge workers is particularly relevant given the role informal relationships play in their performance. These workers need to acquire information and knowledge from people throughout the organization, which makes their performance dependent on the quality and the timeliness of the knowledge they are able to obtain through their informal networks (Smith, Carroll, and Ashford, 1995; Groysberg and Lee, 2008).

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Consistent with this idea, research has shown that the structure of these informal networks has a significant impact on performance (e.g., Burt, 1992, 1997; Sparrowe et al., 2001; Cross and Cummings, 2004; Gargiulo, Ertug, and Galunic, 2009). Yet, the effects of the composition of such networks on performance – in particular, those of homophilous tendencies – are less clear.

Predicting the effects of homophily on performance is not straightforward, however. On the one hand, homophilous ties should be easier to form and may facilitate the transfer of knowledge and information required for knowledge workers to do their jobs, which should then have a positive effect on performance. Because providers typically incur costs when transferring knowledge (Hansen, 1999; Reagans and McEvily, 2003), they may be more inclined to do so for acquirers who are "similar" to them. On the other hand, the tendency to rely on similar others may restrict the pool of potential providers targeted by the acquirer when seeking to obtain task-related inputs, neglecting people who could provide valuable inputs but who are viewed as less approachable. The relative ease of establishing and maintaining ties with similar others, as well as the greater responsiveness of those contacts to their requests, may lead a knowledge worker to rely on homophilous ties for acquiring task-related inputs, even at the expense of the value of the inputs received, which should have a negative impact on the worker's performance. This suggests that knowledge workers may face a trade-off between the benefits of homophily in terms of greater contact accessibility on the one hand and its costs in terms of compromises on the ability of the contact providing such inputs, on the other.

If the costs and benefits of homophily would cancel each other out, we should not expect the tendency to rely on homophilous instrumental ties to have any discernible effect on performance: what an actor gains in access is lost in value. However, the trade-off between accessibility and ability may not be the same for all actors. Knowledge workers who

face fewer difficulties in securing the attention and help of colleagues might not gain much from the access-related benefits of homophilous ties, whereas these benefits might be substantial for actors who are more likely to face such difficulties. If this is the case, the benefits and costs of homophily would not be homogeneous across organizational actors. Rather, they would be contingent upon factors that make it harder (or easier) for such actors to persuade colleagues to invest the time and energy necessary to transfer the knowledge they need to do their jobs.

While there may be a number of factors that might make it harder or easier for a knowledge worker to secure attention from his or her colleagues, the worker's position in the formal hierarchy of the firm is a particularly salient one. The position an employee occupies in the formal hierarchy is typically associated with specific levels of power and legitimacy. Because such a position is known to colleagues, it should affect their behavior towards the employee. The legitimacy aspect can be especially important in knowledge-intensive organizations such as investment banks or consulting firms, which experience high levels of turnover at the entry level rank (i.e., "associate" or "consultant"). In such a context, having moved up from the entry level rank is an important signal of being a "legitimate" player, one who has demonstrated his or her value to the firm. Finally, existing research has shown that the effects of network structure on the performance of knowledge workers are contingent upon the position the workers occupy in the formal hierarchy of the firm (Burt 1992, 1997; Gargiulo, Ertug and Galunic, 2009). In a similar vein, we argue that the tendency to form homophilous instrumental ties should benefit actors in the lower tier of the hierarchy, but should hurt those who have become legitimate players by moving up the ranks – or by being hired directly into senior ranks.

We test our ideas on a sample of bonus-eligible professional employees in a major international bank. We use nationality to capture homophily and year-end bonuses to measure

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performance. Our analysis confirms that bankers do take into account both homophily and the colleague's ability to provide valuable inputs when deciding whom to approach for task-related inputs. Consistent with the trade-off between homophily and value, we find that homophily attenuates the effect of a contact's ability to provide valuable inputs as a predictor of tie formation. Finally, we find that while the tendency to build homophilous ties has a positive effect on the performance of people in the entry rank among bonus-eligible bankers (associate directors in our sample), the same tendency has a negative effect on the performance of employees who are above this entry rank.

HOMOPHILY AND THE FORMATION OF INSTRUMENTAL TIES

At least since Lazarsfeld and Merton (1954) coined the term "homophily" to indicate people's tendency to establish contact with similar others, the phenomenon has been widely documented across different settings and kinds of relationships. In their thorough review of the literature, McPherson and his collaborators succinctly describe the phenomenon by saying that "contact between similar people occurs at a higher rate than among dissimilar people" (McPherson et al., 2001: 416). While an important part of the literature has focused on non-instrumental relationships such as marriage (Kalmijn, 1998) and friendship (Shrum et al., 1988), homophilous tendencies are also apparent in instrumental relationships within formal organizations (Lincoln and Miller, 1979; Ibarra, 1992, 1997; Brass, 1985). More recently, homophilous tendencies were documented in the formation of organizational founding teams (Ruef, Aldrich, and Carter, 2003), in the frequency of communication among employees in a research and development firm (Reagans, 2005), in friendship ties among executive MBA students (Gibbons and Olk, 2003), and in encounters and engagements among business people in a social mixer (Ingram and Morris, 2007).

The mechanisms invoked to explain homophilous tendencies include expectations of higher trustworthiness, approachability, and the likelihood of holding beliefs and assumptions that are similar to those of the focal actor. These factors should make the behavior of similar people more predictable, facilitate communication, and diminish the likelihood of interpersonal conflict (McPherson et al., 2001; Kossinets and Watts, 2009; Rivera, Soderstrom, and Uzzi, 2010). Given the salience these factors are likely to have in facilitating instrumental exchanges, it is not surprising to expect and find strong evidence of homophilous tendencies in task-related informal networks within organizations.

While the evidence of homophilous tendencies is consistent across contexts and types of relationships, the specific attributes deemed to signal similarity vary across settings. For example, Gibbons and Olk (2003) showed that race was a significant predictor of friendship formation while gender had no significant effect in a sample of MBA students, whereas Reagans (2005) found that gender (but not race) predicted communication frequency among employees of an R&D lab. This variation is not surprising, given that the salience of a specific attribute as a signal of similarity—and hence as a driver of homophilous affiliations—depends upon specific cultural and contextual clues. Attributes such as ethnicity and gender are likely to be more relevant for tie formation whenever ethnical origin or sex become an important source of collective identity (Mehra, Kilduff, and Brass, 1998), whereas nationality is likely to be salient in contexts that bring together people from different countries and cultures (Erez and Earley, 1993; Armstrong and Cole 2002; Gibson and Zellmer-Bruhn 2001; Joshi, Labianca, and Caligiuri 2002).

Similar national origin is likely to become a relevant attribute driving affiliations in multinational organizations like the one that provides the context of this study (Marschan-Piekkari et al. 1999; Piekkari, Vaara, Tienari, and Santti 2005). People from the same nationality typically share the same cultural norms, history, tastes, and mother tongue. The

expectation that a fellow national would be more approachable, easier to interact with, and more likely to spend the time and energy necessary for an adequate transfer of the required knowledge should make people more likely to approach a co-national to obtain task-related inputs rather than to seek someone from a different nationality. An in-depth field study of 50 managers across three organizational contexts provides illustrative evidence on the salience of nationality as a driver of homophilous affiliations in multinational corporations. Nationality and shared language (together with formal rank) were the key attributes driving connections between managers across the different companies and geographical settings included in the study (Makela, Kalla and Piekkari, 2007). The authors also find evidence that national homophily can lead to the formation homogenous clusters across organizational boundaries—a phenomenon that an informant in one of the firms referred to as "the Finnish 'mafia'" (Makela, Kalla and Piekkari, 2007: 13) Hence the baseline homophily hypothesis for our study:

> *Hypothesis 1: Knowledge workers are more likely to rely on co-nationals to obtain task related inputs than on colleagues from another nationality.*

Although we expect knowledge workers to be more likely to resort to people from their same nationality for task-related interactions, workers are also likely to be concerned with the instrumental value of the knowledge they can get from their colleagues, as this value will affect their own performance (Gargiulo, Ertug and Galunic, 2009; Groysberg and Lee, 2008). Empirical studies of instrumental tie formation confirm that people seek out colleagues who are able to provide high-value inputs in task-related interactions (Borgatti and Cross, 2003). Casciaro and Lobo (2008) also show that task competence has a positive effect on being sought out for task-related interaction, although the presence of negative affect

neutralizes this effect. Similarly, in their study of software development groups comprised of undergraduate students, Hinds and her colleagues (Hinds et al., 2000) found that people chose to work with those who possess greater task-relevant skills. Hence, we should expect knowledge workers would be also likely to seek colleagues who are able to provide valuable inputs. This provides our second baseline hypothesis:

> *Hypothesis 2: Knowledge workers are more likely to rely on colleagues who are able to provide valuable task-related inputs.*

The two baseline hypotheses predict independent positive effects of homophily, which should facilitate access to colleagues and to their inputs, and of the colleague's ability to provide valuable inputs on instrumental tie formation. Yet, relying on homophilous contacts might result in neglecting other colleagues that, despite being able to provide valuable inputs, are viewed as less accessible or less likely to put the time and effort necessary to help the focal worker. While not specific to homophilous ties, there is evidence that is consistent with the idea that the accessibility of a colleague should moderate the positive main effect of this colleague's competence on instrumental tie formation, as proposed in Hypothesis 2. Examining the role of affect and competence on instrumental tie formation, Casciaro and Lobo (2008) found that people are less likely to form task-related ties with colleagues they dislike, despite acknowledging their competence. McDonald and his colleagues (McDonald, Khanna, and Westphal, 2008) found that CEOs were more likely to venture beyond the familiar territory of homophilous relationships when seeking advice when they faced strong pressure to perform, either through stock ownership or performance-based bonuses. Goodall and Roberts (2003) document the presence of strong homophilous

expatriate networks that are impenetrable to local staff, hindering the sharing of knowledge between the two clusters.

The previous discussion suggests that knowledge workers seeking task-related inputs from homophilous ties might benefit from the greater accessibility and the willingness to help of colleagues who are similar to them, but they may also end up compromising on the ability of the colleagues they approach. If this is the case, homophily should negatively moderate the effect of a colleague's ability to provide valuable inputs on the likelihood of observing an instrumental tie with this colleague:

> *Hypothesis 3: The effect of colleagues' ability to provide valuable inputs on the formation of instrumental ties is weaker for colleagues who are co-nationals of the knowledge worker.*

It is important to stress that Hypothesis 3 does not assume that knowledge workers are making a conscious trade-off between the accessibility and ability of colleagues when entering instrumental ties. Rather, it proposes that, on average, workers who build homophilous ties are more likely to seek inputs from less able colleagues. We will argue that this behavior has consequences for the knowledge workers. Whether these consequences are positive or negative is something we explore in the next point, where we analyze the relationship between homophilous tendencies and performance.

HOMOPHILY AND PERFORMANCE

Our baseline Hypotheses 1 and 2 propose that knowledge workers consider both the accessibility of similar others and the colleagues' ability to provide valuable inputs when seeking task-related inputs. Both factors should have a positive impact on performance. The

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accessibility of colleagues should make a focal worker more likely to secure their attention and to obtain the necessary inputs in a timely fashion, whereas the colleagues' ability to provide valuable inputs should also have a positive impact on the performance of the focal worker. Yet, if there is a trade-off between access and ability as suggested in Hypothesis 3, the net effect of the tendency to resort to homophilous ties on performance would depend on the result of this trade-off. If the access benefits associated with homophilous ties are totally offset by the costs of compromising on ability, there should be no relationship between the tendency to rely on homophilous contacts and performance. On the contrary, if this balance between costs and benefits does not hold, we should observe a significant effect of homophily on the performance of knowledge workers, with the direction of the effect being dependent on the net result of the cost-benefit equation.

We do not have theoretical reasons to predict the result of the trade-off between access and value on the aggregate, but it is unlikely that it would be equal for all knowledge workers. All workers might benefit to some extent from receiving valuable inputs for their work, but it is reasonable to expect that workers would face different levels of difficulty in securing the attention of colleagues to obtain task-related inputs. The harder it is for a worker to secure his or her colleagues' attention, the more he or she should benefit from homophilous instrumental ties. Such a worker would still compromise on contacts' ability, but this compromise might nevertheless be worthwhile if the alternative is failing to secure the necessary inputs altogether. Conversely, workers who face few difficulties in securing the collaboration of colleagues but who still have a tendency to rely on homophilous contacts may be compromising on ability without having any noticeable additional access benefits, which should have a negative effect on their performance. This reasoning suggests that the effect of homophilous instrumental ties on performance should be contingent upon factors

that make it harder (or easier) for workers to persuade colleagues to invest the time and energy necessary to transfer the knowledge they need to do their jobs.

While many of the factors that could make a worker more or less able to secure the attention of colleagues to obtain task-related inputs are likely to be idiosyncratic, others are likely to be consequential across people and organizations, providing a solid ground for theorizing. We argue that the position worker occupies in the formal hierarchy of the firm is probably the most consequential of such factors, for several reasons. First, an employee's formal position in the hierarchy is apparent to colleagues and thus is likely to affect their behavior towards the employee, even if they do not know anything else about him or her. Second, while knowledge-intensive service organizations such as investment banks or consulting firms have relatively flat structures in which roles and formal titles are not tightly coupled, these organizations typically also have elaborate systems of "up-or-out" evaluations, with titles indicating employee progress through the formal hierarchy. Third, the high turnover among employees at the entry level rank makes the first promotion an important signal of legitimacy for employees. Entry-level workers—typically, young graduates—still have to prove their value to the organization (and to their colleagues). Employees who have moved beyond the entry-level rank, or who have been hired away from competitors into higher ranks, have a record that speaks to their ability to be "players" in the firm. Because entry-level employees are likely to face more difficulties than their senior, "legitimate" colleagues do in securing the attention of colleagues who could provide them with task-related inputs, entry-level employees should benefit from homophilous ties. Hence:

> *Hypothesis 4: The tendency to rely on co-nationals for task-related inputs will have a positive effect on the performance of knowledge workers who are at the entry-level rank.*

Conversely, homophily should have a detrimental effect on the performance of employees who have become legitimate players, either through internal promotion or through being hired into senior ranks. While they might still derive some marginal access-related benefits from relying on homophilous ties, such additional benefits should not suffice to offset the costs associated with the corresponding compromises in contacts' ability that result from restricting themselves to homophilous relationships. Moreover, the growing task complexity and responsibilities associated with higher ranks are likely to increase the importance of relying on colleagues who are able to provide high-value inputs, increasing the costs of compromising on colleagues' ability for these employees. Hence, we predict:

> *Hypothesis 5: The tendency to rely on co-nationals for task-related inputs will have a negative effect on the performance of knowledge workers who are above the entry-level rank.*

DATA AND METHODS

Our data come from the Equities division of a major international bank. In 2001, the year of data collection, this division participated in the global primary and secondary markets for equity, equity-linked, and derivative products in more than 25 countries, covering about 100 stock markets in Europe, the Asia-Pacific area, Africa, and the Americas. Each of the employees in our sample (referred to as a "banker" for simplicity), is assigned to one of the 41 operational units, which belong both to a global function (e.g. Sales, Research, Trading) and to a geographical region (e.g. The Americas, Asia-Pacific). The bankers included in our study correspond to the bonus-eligible ranks of associate director (lowest, typically freshly-minted MBAs, often without prior banking experience), director (or vice-president), executive director (senior vice-president), and managing director (highest).

In their in-depth study of the workings of investment banks, Eccles and Crane (1988: 38) stressed that "the complexity of the deals, the speed with which many of them are done, and the financial stakes involved require a high level of coordination among bankers across functions and hierarchical levels." The increasing speed and sophistication of product innovation and the global interconnectedness of financial markets have made the need for coordination even stronger today. While the formal structure provides a minimal background for coordination, business decisions are made by the people directly in contact with the market, and they must figure out effective and efficient ways of obtaining the information and help they need to make such decisions. A given banker should be willing to share information with others, and to do so at a pace that matches the speed of market movements. At the same time, the time and energy a banker uses to help a colleague must be balanced against the opportunity cost of investing time in helping this colleague.

Cognizant of the importance of collaboration among bankers and of the obstacles to securing such collaboration in the fast-paced, competitive environment in which their employees work, investment banks have put in place evaluation tools that aim to measure the value bankers add to colleagues, irrespective of their contribution to the business as a whole. Central among these tools is a method of cross-evaluations by which bankers evaluate the value that individual colleagues have added to their own work in a given period (see Kane and Lawler, 1978, for a discussion). The bank then uses these cross-evaluations in bonus deliberations, which happen about two months after the evaluation exercise.

In our setting, bonus-eligible bankers are asked to identify colleagues with whom they have had "substantial business interactions" during the prior year and to evaluate those colleagues based on their "real contribution to **your business**, not their popularity, not their reputation, and not your perception of their contribution to the business as a whole" (emphasis in the original). The system displays a roster with the full names of the colleagues

a banker may evaluate, organized by operational unit, from which the banker can chose and evaluate colleagues. The instructions ask the evaluating banker to consider criteria such as how effectively a colleague communicates with the evaluator, the colleague's responsiveness to the requests of the evaluator's internal and external clients, the colleague's sharing of information and resources with the evaluator, and the colleague's technical competence. To prevent "grade inflation" (Kane and Lawler, 1978) and to ensure discriminatory power, bankers are asked to place colleagues in one of four quartiles, allocating approximately equal numbers of colleagues to each quartile. The response rate is usually very high (98% for the year of our data).

Consistent with the wording of the instructions, we interpreted an evaluation from banker i (ego) to banker j (alter) as an indicator that i sought inputs from j on matters directly related to i's work. While it could be possible for an evaluation to reflect ego acknowledging unsolicited help offered by alter, this should be extremely rare in the competitive environment of investment banks. Interviews with industry participants, descriptions of their work environment (e.g., Lewis, 1989), and the existence of evaluation systems like the one described here, attest to the difficulty of securing collegial help in these organizations. This makes the offering of unsolicited help a very rare occurrence, if not altogether inexistent.

A banker is free to choose whom to evaluate, although the choices are limited to colleagues working in a subset of operational units deemed to have regular business transactions with the unit of the focal banker, including colleagues in the banker's own unit. All the ordered dyads i,j in which banker i (ego) could have evaluated banker j (alter) are included in the risk set. Our final sample consists of 1,305,420 ordered dyads involving 1,746 different bonus-eligible bankers for which we have full information on all variables in the analysis. Of these possible dyads, 119,312 (9.14%) were realized—that is, i actually rated j. On average, each banker in our estimation sample could choose from a set of 748 different

colleagues, whereas they actually evaluated 85 colleagues on average. Ninety-five percent of the bankers actually evaluated fewer than 23 percent of the colleagues they could choose from. The highest proportion of actual to possible evaluations made by a banker was 58 percent. We used the dyadic evaluations collected by the bank to create a square matrix in which cell i,j is set to 1 if banker i evaluated banker j and to 0 otherwise. The matrix represents the network of information and knowledge exchange among the bonus-eligible employees in the Equities division and provides the basis for computing network variables. In addition, we collected data on personal and organizational background on the bankers, as well as on individual performance, which are used in our estimations. Testing our hypotheses require the estimation of two different sets of models. In the first set, we estimate the effect of homophily and alter's ability on instrumental tie formation—that is, on the probability that banker i will seek task-related inputs from banker $j,$ given that j is at risk of being sought by i due to their respective responsibilities in the firm (Hypotheses 1 to 3). These models also allow us to create an individual-level measure of homophilous tendency, defined as the extent to which banker's choice of colleagues can be predicted by homophily. In the second set of models, we estimate the effect of this homophilous tendency on the performance of individual bankers (Hypotheses 4 and 5). We describe the variables used in each sets of models separately.

Variables in Models of Instrumental Ties

Dependent variable

    Instrumental Tie: This is the dichotomous dependent variable for the first set of models. We assume that an instrumental tie from i to j exists if i has cited j in the cross-rating exercise. Thus, for each ordered dyad i,j that is at risk of entering an informal instrumental relationship, we set this variable to 1 if i has cited j and to 0 otherwise.

Independent variables

Same nationality: This is our indicator of attribute similarity and the variable used to test the effect of homophily on the formation of instrumental ties (H1 and H3). For each dyad i,j that is at risk of entering an informal instrumental relationship Z_{ij}, *Same nationality* is set to 1 if i and j are of the same nationality and to 0 otherwise. Nationality is a very salient characteristic in the multinational context that provides the data for our study. The bank has offices in more than 25 countries and employs people from more than 45 different nationalities. In such a context, shared national origin is likely to make it easier for people to approach colleagues, to facilitate communication, and to increase the likelihood that those colleagues would invest sufficient time and energy to help with the request.

Alter's ability is the ability of each potential alter to provide valuable inputs. We use the mean evaluation received by alter in the cross-rating exercise as an indicator of ability. Previous research (Gargiulo, Ertug and Galunic, 2009) has shown that this measure has a significant effect on the bonus of the focal banker, attesting to its validity as an indicator of the ability of the banker's contacts. On average, mean evaluations result from ratings from 85 fellow bankers who have evaluated the potential alter for his/her contributions to their work.

Control variables

Our models control for a number of demographic, organizational, and social network variables that might have influenced the formation of instrumental ties among bankers. We describe these variables below, grouped in four categories: demographic, organizational, network position, and knowledge space location.

Demographic control variables: We control for the *Age* (in years) of each member of a dyad at risk of forming an instrumental tie. To control for possible age-homophily effects, we compute *Age similarity* and set this dummy variable to 1 if the age of alter is within one standard deviation of ego's age. We also control for possible gender similarity effects by

including *Same gender,* a variable set to 1 if ego and alter are of the same sex. We capture the availability of potential alters from either ego's or alter's nationality using two variables. *Number of potential alters of ego's nationality* counts the number of contacts among those ego could have cited who are of ego's nationality, whereas *Number of potential alters of alter's nationality* counts the number of contacts among those ego could have cited who are of the specific alter's nationality. Finally, we control for the *Nationality* of both ego and alter by including two sets of indicator variables.

Organizational control variables: We control for the *Tenure* (in years) of ego and alter, as well as for potential tenure similarity effects by computing *Tenure similarity*. This dummy variable is set to 1 if the tenure of alter is within one standard deviation of the mean tenure in the bank. We use three indicator variables to control for whether ego and alter are located in the *Same city* (a control for propinquity effects), work in the *Same function* or in the *Same operational unit*. We also control for potential rank difference effects on the likelihood of observing instrumental ties by entering two indicator variables. *Ego rank higher* is set to one if ego's formal rank is higher than that of alter, whereas *Alter rank higher* captures the opposite situation. The situation in which the two members of the dyad have the same rank is the omitted category. *Ego's ability* is the expected value of inputs provided by ego. As with alter, we use the mean evaluation received by ego in the cross-rating exercise as a measure of ego's ability to add value to colleagues. The higher the expected value of the inputs provided by ego, the easier should be for him or her to secure the collaboration of colleagues.

Social network control variables: We control for several network variables that can affect the level of difficulty ego has in accessing alter and hence could have an effect on the probability of instrumental tie formation. For each ego-alter dyad at risk of having an instrumental ties, *Alter rated ego* is set to one if alter rated ego and to 0 otherwise. The fact

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that a colleague seeks inputs from (and hence, depends upon) ego should make it easier for ego to approach him or her for inputs and secure his or her collaboration. This, however, occurs only in 34% of the dyads in our sample. The specialization of knowledge in the firm may make ego a valid source of inputs for alter while the reverse situation is not necessarily true. *Common third parties* counts the number of bankers who are connected to both ego and alter. The presence of more common third parties for a particular ego-alter pair may make it easier for ego to seek inputs from alter, and should increase pressures for alter to provide such inputs (Gargiulo, Ertug, and Galunic, 2009; Reagans and McEvily, 2003). Finally, we also control for the number actual contacts of ego and alter within each dyad. We distinguish between *Colleagues citing ego (alter)* and *Colleagues cited by ego (alter)*. These statistics are similar to the "popularity" and "expansiveness" parameters in models of tie formation (Wasserman and Faust 1994: 612-13). Holding them constant controls for actor-level baseline tendencies to send or receive instrumental ties.

Knowledge space variables: The probability that ego would seek inputs from alter also depends on their respective position in the knowledge space of the firm. The farther away ego and alter are in this knowledge space, the less likely ego would seek alter for task-related inputs, as such inputs would be less relevant for ego's work. We resort to the observed structure of the knowledge exchange network to infer the position each actor occupies in the multidimensional knowledge space. The basic intuition is that, the more two actors seek (and are sought by) the same third parties in the knowledge exchange network, the more likely they operate in similar knowledge domains. Therefore, these actors could substitute for each other as potential providers of inputs (Lorrain and White, 1971). We use this insight to calculate the Euclidean distance between all pairs of bankers in the network. This distance can vary from 0 for two bankers cited and being cited by exactly the same set of colleagues to a maximum value for the two most dissimilar bankers in the network. We then submitted the

resulting matrix of Euclidean distances to a multidimensional scaling analysis and use the three dimensions from this analysis to identify the position each banker occupies in a three-dimensional knowledge space. For each dyad at risk of forming an instrumental tie, we calculate the distance between ego and alter on each of the three dimensions in the knowledge space, normalized by the mean distance between ego and all of his or her actual alters. The larger the normalized distance between ego and the potential alter in each of these dimensions, the less the potential alter occupies a position in the knowledge space which could substitute for the average alter ego works with, and hence the less likely ego would seek the potential alter for task-related inputs. These variables allow us to control for the likelihood that alter would have relevant inputs for (and hence, would be likely to be sought out by) ego.

Variables in Models Estimating Performance Effects of Homophily

Dependent variable

Performance is measured by a banker's bonus for the year. A banker's annual compensation comprises salary and a variable bonus, which is a substantial part of the total sum. In the banking industry, salary is largely determined by formal position in the organization (see, for example, Burt, 1997: 350). Therefore, bonuses are the main way in which investment banks recognize variance in individual performance in a given year. Bonus decisions in the bank we study take place about two months after the cross-evaluation exercise, which allows us to establish a causal relationship between homophily tendency and bonuses. For reasons of confidentiality, the bank provided only *z*-scores of the monetary value of the bonuses. In this industry, the distribution of bonuses is strongly skewed, with a small number of bankers earning substantially larger bonuses than the mean. Our data conform to this pattern: The top earner in our sample received a bonus that was 12.61

standard deviations above the mean, whereas the bonus of the lowest earner was only .60 standard deviations below the mean. Therefore, we computed the natural logarithm of the *z*-scores for our analysis, after rescaling these scores so that they contain positive values only. This is the dependent variable in models testing Hypotheses 4 and 5.

Independent variable

Homophily tendency: We measure homophily tendency by a variable that captures the extent to which *Same nationality* predicts instrumental ties for each banker in the sample. We do so by comparing the predictive accuracy of the full model on the probability of observing an instrumental tie with the accuracy of a reduced model from which we remove the *Same nationality* variable. The more a banker's choices of colleagues were driven by national homophily, the less accurate the predictions of the reduced model (that is, the model without *Same nationality*) should be. Conversely, the less a banker's choices were homophilous, the more accurate the predictions from the reduced model. The computation of this variable proceeds as follows. First, we use the estimates from the full model of instrumental tie formation (that is, Model 3 in Table 3) to predict the probability P_F of observing an instrumental tie for each *i,j* ordered dyad in the sample, so that $P_F (Z_{ij} = 1)$. Second, we predict this same probability after removing the *Same nationality* variable from the full model. This yields a second vector of probabilities P_R from the reduced model, $P_R (Z_{ij} = 1)$. Third, we calculate the absolute difference D_F between the predicted probability from the full model, P_F and the actual observed value for Z_{ij} (which is either 0 or 1), $D_F = | Z_{ij} - P_F (Z_{ij} = 1) |$. Fourth, we do the same with the predicted probabilities from the reduced model to calculate the absolute difference D_R so that $D_R = | Z_{ij} - P_R (Z_{ij} = 1) |$. Fifth, we subtract the differences obtained with the full model (D_F) from those obtained with the reduced model (D_R) and average the resulting scores across all dyads *i,j* in ego's risk set to capture the homophily tendency for banker *i,* or H_i. Hence, the homophily tendency for banker *i* is calculated as $H_i =$

$\sum_i (D_R - D_F) / N$, where N is the number of potential alters in i's risk set—that is, the colleagues he could have evaluated. The larger this number, the more national homophily contributes to explain the observed instrumental network for banker i. This variable is standardized to have a mean of 0 and a standard deviation of 1.[1]

Control variables

Below we list the control variables for models estimating performance effects (Hypotheses 4-5). Again, we group them in categories for clarity.

Demographic control variables: We control for the banker's *Age* (in years) and *Tenure* (in years, logged) and *Gender*, set to 1 for males. We also control for the banker's nationality by including a set of indicator variables.

Organizational control variables: Hypotheses 4 and 5 predict that homophily effects on performance will be contingent on the formal position of the banker in the firm's hierarchy. Specifically, we argue for a significant difference between entry-level bankers (Associate Director) and the rest (Directors, Executive Directors, and Managing Directors). Consequently, we introduce an indicator variable, *Entry-level rank* set to 1 if ego is in the Associate Director rank and to 0 otherwise. This variable also allows us to control for the significant differences in bonuses across ranks, which are typical in the industry. We also control for two variables that can affect a banker's bonus. *Ego's ability* is the average rating a banker has received in the cross-evaluation exercise. The firm uses these evaluations in their

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[1] It is worth noting that by using absolute deviations from the actual outcomes we consider errors caused by predicting a tie where none exists as well as errors caused by failure to predict a tie when one exists. This is important because even if bankers display homophily tendencies on average, this is not necessarily the case for each individual banker. If a given banker does not consider the nationality of the potential alter when deciding whom to seek inputs from, the restricted model would yield more accurate predictions for this banker than the full model does, and hence $D_F > D_R$ – that is, the differences calculated using estimates from the full model would be larger than those computed using estimates from the restricted model. In this case, the change in accuracy from including homophily effects in the model would be negative, since $(D_R - D_F) < 0$. Conversely, for a banker whose choices of colleagues are strongly driven by national homophily, $D_F < D_R$ and hence $(D_R - D_F) > 0$. Our measure captures this well. The more $D_F < D_R$ is true for a given banker, the lower the homophily tendency score for that banker.

bonus determination process and thus we expect this variable to have a significant effect on bonus. *Alters' ability* averages the mean evaluations obtained by all the colleagues who actually provided task-related inputs to the focal banker (ego). We expect that a banker's performance would be affected by the ability of the colleagues from whom he or she gets task-related inputs. The more the banker gets inputs from highly-rated, colleagues, the better his or her own performance should be. Hence, holding this variable constant is important in models estimating performance. Finally, some bankers were responsible for supervising the work of their colleagues, which is likely to affect the size of their bonuses. *Direct reports* is a count of the number of colleagues directly supervised by the banker.

     Social network variables: We control for the network size and network density of the banker. Insofar as bankers display homophily tendencies in their instrumental networks, a homophilous banker might also be getting task-related inputs from a relatively dense set of co-nationals. Because relying on a dense network of colleagues for inputs has been shown to have a positive effect on performance (Gargiulo, Ertug, and Galunic 2009), controlling for the density of ties among the colleagues from whom a banker gets inputs is essential to obtain accurate estimates of the effect of homophily on performance. We also control for the density of ties among the colleagues who have obtained inputs from the focal banker. In addition, because network density depends on network size, our models control for network size to obtain independent estimates of the effects of density on performance. *Network size acquirer* is the total number of contacts who have been sought by the focal actor for task related input, while *Network size provider* is the total number of contacts who have sought out the focal actor for such input. *Network density acquirer* is the ratio between the number of existing ties among alters sought out by ego and the maximum possible number of ties among those alters, whereas *Network density provider* computes the same ratio for bankers who obtained inputs from ego. We use a log transformation of both pairs of measures to compensate for the

skewedness of the network size scores. Finally, *Reciprocal ties* is the ratio between the number of alters who both sought inputs from and provided inputs to ego and the total number of unique alters in ego's network.

Tables 1 and 2 present the summary statistics and correlations for the variables used in estimating instrumental ties and individual performance respectively.

Insert Tables 1 and 2 about here

Model Estimations

The characteristics of the models estimating instrumental tie formation and performance pose some specific constraints that should be considered at the time of choosing the estimation technique. We use logistic regression for the models estimating the presence of instrumental ties. To account for possible non-independence across observations within the same banker, we report robust standard errors clustered on both ego and alter (see Kleinbaum, Stuart, and Tushman, 2011 for a similar approach, based on Cameron, Gelbach, and Miller, 2011).[2] Separately clustering on either ego or alter produces the same pattern of results. We further check the significance levels reported by the logistic regression with clustered standard errors by obtaining estimates using the Quadratic Assignment Procedure (or QAP, see Krackhardt, 1987 for details). The level of significance for the estimates used to test Hypothesis 1 to 3 was the same in models using clustered standard errors and in models using QAP ($p < .001$).

We used a multilevel model to test hypotheses on performance (Hypotheses 4 and 5) to account for the nested structure of the data and to obtain unbiased estimates for the standard errors of the regression coefficients (Raudenbush and Bryk, 2002). Bankers are

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[2] We thank Prof. Adam Kleinbaum for making the *Stata* code available to us for this estimation.

nested within 41 operational units and there are significant differences in the size of bonuses across units ($p < .001$), reflecting the nature of their work and the market conditions in which each unit operates. An alternative estimation that uses OLS regression with unit fixed effects and robust standard errors produces similar estimates and statistical significance levels that are the same as the ones reported here using a multilevel model.

RESULTS

Table 3 presents the results for the models testing our hypotheses on instrumental tie formation (Hypothesis 1 to Hypothesis 3). Model 1 includes all the control variables. Among background variables, bankers are more likely to seek task-related inputs from colleagues in their same age or tenure band, and from those who are of the same gender. Bankers are also more likely to seek inputs from colleagues who also ask them for inputs, as well as from colleagues with whom they share common third parties in the knowledge exchange network. Propinquity also matters: bankers are more likely seek inputs from colleagues located in their same city than to do so from those working in different cities. Bankers are more likely to seek inputs from colleagues in their same function, but the opposite is true for co-membership in the same operational unit. While this can be due to the complementarity of units, it might also reflect the strong competition that exists among bankers, who might try to avoid seeking help from colleagues in their own unit, as these are the people they directly compete with for bonuses. Finally, the probability that a banker will seek inputs from a colleague decreases with the colleague's normalized distance from ego in each of the three dimensions that define the knowledge space. Colleagues who are closer to the "typical" person the focal banker seeks inputs from in this space presumably work on issues related to those of the focal banker, making them more likely targets for obtaining task-related inputs.

Model 2 adds *Same nationality*. Bankers display a strong tendency to rely on co-nationals when seeking task-related inputs, providing support for Hypothesis 1. Specifically, bankers are on average 58% ($e^{.458} = 1.581$) more likely to seek help from a co-national than from someone from a different nationality (*z*-test 17.06, *p* < .001). Model 3 includes *Alter's ability* to test Hypothesis 2. Bankers are more likely to seek task related inputs from colleagues who receive high average marks in the rating exercise. A unit's gain in a colleague's average rating results in a 21% increase in the probability of seeking inputs from that colleague (*z*-test 10.24, *p* < .001). The size and significance level of this coefficient are the same if we add *Alter's ability* to the baseline Model 1, without including *Same nationality*.

Model 4 adds the interaction of *Same nationality* and *Alter's ability* to test Hypothesis 3. The interaction is negative and significant (*z*-test 4.63, *p* < .001), providing support for the Hypothesis. We further check this result by running Model 4 on two different subsamples, one including same-nationality ego-alter dyads (*n* = 331,658) and another with different-nationality dyads (*n* = 973,746). Consistent with the interaction effects, the effect of *Alter's ability* in the different-nationality sub-sample is 1.42 times its effect in the same-nationality sub-sample. These results suggest that bankers might be paying less attention to the ability of alters when they seek out inputs from co-nationals than when they approach colleagues from another nationality.[3]

Table 4 presents the results for the models testing Hypotheses 4 and 5 on the relationship between homophily tendency and performance. Model 5 is the baseline model

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[3] We also checked the direction and significance of these results by using the simulation-based approach suggested and implemented by Zelner (2009). Consistent with the direction and significance of the interaction variable, and the different effect sizes in the two sub-samples, the plots also show that the slope of the line depicting the relationship between alter's ability to add value and the probability of a tie is steeper for different nationality alters than it is for same nationality alters.

with all the control variables. Both the *Banker's ability* (*z*-test 6.81 *p* < .001) and *Alters' ability* (*z*-test 1.90, *p* < .06) have positive effects on a banker's bonus. While the effect of the banker's evaluation is a consequence of the fact that management does take such evaluations into account when allocating bonuses, the effect of *Alters' ability,* albeit marginally significant, is consistent with the idea that having access to people who are able to deliver high-quality task-related inputs boosts a banker's performance and with the mechanism behind Hypothesis 2, stating that bankers are more likely to seek out colleagues who are able to provide valuable inputs. Entry-level bonus-eligible bankers—those in the Associate Director rank—earn significantly smaller bonuses than those of their higher-rank colleagues, which is a well-known phenomenon in this industry. The effects for network size and network density are consistent with the ones reported in Gargiulo, Ertug and Galunic (2009). In particular, a banker benefits from acquiring knowledge from colleagues who are connected to one another, but such connections hurt the banker's performance when they occur among people requesting inputs from the banker.

Insert Table 4 about here

Model 6 shows that, on average, *Homophily tendency* has no significant effect on the bonuses of bankers in our sample. However, this non-effect is in fact the consequence of homophily having two opposite effects on a banker's performance, which depend on the banker's position in the formal hierarchy of the firm as predicted in Hypotheses 4 and 5. Specifically, these hypotheses predict that homophily should have a positive effect on the performance of bankers at the entry-level rank (associate directors) and a negative effect on the performance of bankers above this rank. We test these hypotheses by adding an interaction between *Homophily tendency* and *Entry-level rank* in Model 7. The coefficient for

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Homophily tendency (which now indicates the effect for bankers who are above the entry-level rank) is negative and significant (-2.54 z-test, $p < .05$) while the coefficient for interaction term is positive and significant (3.31 z-test, $p < .001$). The overall effect of homophily tendency for entry-level rank employees, calculated from the main effect of *Homophily tendency* and the interaction effect, is also significant and positive (3.91 chi-squared test, $p < .05$). In other words, the tendency to rely on co-nationals for task-related inputs helps bonus-eligible bankers who are likely to face significantly higher hurdles in attracting the attention of their colleagues and securing the inputs they need for their task. The same tendency, however, hurts bankers who, because of their position in the hierarchy, are likely to have fewer difficulties accessing colleagues.

The magnitude of the homophily effects on performance is not negligible. For associate directors, (i.e., the entry-level rank), an increase of one standard deviation in *Homophily tendency* increases their bonus by two percent. The same increase in *Homophily tendency* for ranks above associate directors reduces their bonuses by 1.7 percent. To put these magnitudes in context, it is worth comparing them with the effects of *Alters'* and the *Ego's ability* using standardized effects. The overall effect of homophily tendency on bonus for associate directors is 1.87 times that of alters' ability and 0.54 times that of the banker's own ability. For the higher ranks, this overall effect is 1.59 times that of alters' ability and 0.46 times that of the banker's ability. Homophily does affect a banker's performance, but the direction of the effect is contingent on the standing of the banker in the organization.

Additional Analysis

We performed a number of additional analyses to further explore the effects of homophily on performance and to test the robustness of our findings. First, although we hypothesized a clear contrast in the effects of homophily on performance between bankers at

the entry-level rank (associate directors) and the rest, we nevertheless explored whether differences also existed within the three upper ranks (directors, executive directors, and managing directors). While the effect of homophily on performance for each of these ranks is negative and significantly different from the positive effect for associate directors (with the weakest level of statistical significance being $p < .05$), there was no consistent pattern of increasing (or decreasing) negative effect between these upper ranks. This suggests that the lack of legitimacy, and not simply the lack of power, may be the key element that separate associate directors from the rest. Once the burden of illegitimacy is overcome, the access-related benefits of homophilous ties become negligible and all upper rank bankers suffer equally from relying on homophilous instrumental ties.

Second, while we focused our study on the effect of national similarity as indicator of homophilous tendencies, our dyadic analysis also revealed significant (albeit weaker) homophily effects for gender, age, and tenure in the sample. Thus, the tendency to rely on same gender, age, or tenure colleagues could also have had an impact on performance. Unlike nationality, however, homophily along these attributes did not mitigate the effect of *Alter's ability* in predicting instrumental ties. Therefore, we should not expect the resulting homophily tendencies to have a significant effect on performance according to the mechanism proposed in this paper. This is indeed the case. The attraction underlying gender, age, or tenure similarity did not make bankers compromise on the ability of the people they sought for task-related inputs, as it was the case when they sought colleagues from the same nationality, and the homophily tendency resulting from these attributes did not have a significant effect on performance, either on average (i.e., as a main effect) or for specific ranks.

Third, and consistent with the theory proposed in this paper, we find evidence of a performance effect for the interaction between *Homophily tendency* and *Ego's ability*.

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Specifically, the higher a banker's mean evaluation, the more his or her performance suffers from the tendency to resort to homophilous instrumental ties (-2.13 z-test, $p < .05$). Bankers who have received high ratings in the cross-evaluation exercise are presumably developing (or have already developed) a reputation for being reliable colleagues who contribute positively to the work of colleagues seeking their help. This reputation should make it easier for them to secure the attention of colleagues they approach for inputs, rendering the access benefits associated with homophilous ties negligible.

Fourth, the mechanism we invoke to explain the observed relationship between homophily tendency and performance proposes the existence of a trade-off between access to inputs from a colleague and the colleague's ability to provide high-value inputs. We argued that the net result of this trade-off varies with the level of difficulty the employee faces in securing the attention of his or her colleagues. The higher this difficulty, the more it pays to compromise on the ability of the colleagues to secure access. This explanatory mechanism would hold in settings where all employees benefit equally from receiving inputs from colleagues with superior ability or in contexts where such benefits actually increase as the employee moves up the ranks. While our results show that bankers on average do benefit from building instrumental ties with colleagues who provide high-value inputs, it might be the case that the benefits associated with relying on such colleagues are actually greater for entry-level bankers than they are for their senior colleagues. In this scenario, the explanatory mechanism proposed would not account for the observed pattern. Senior bankers may still not benefit from homophily, but neither would they suffer as much as their entry-level colleagues do from relying on less able colleagues. Conversely, the access benefits that entry-level bankers are supposed to get from homophilous ties would be offset by their compromising on the ability of alters, which would be critical for their performance. Yet, this is not the case. The effect of *Alters' ability* on performance is actually significantly weaker for entry-level

bankers than it is for their senior colleagues (-3.40 *z*-test *p* < .001), a pattern that is consistent with the proposed explanatory mechanism. Compromising on colleagues' ability to secure access pays for entry-level employees, as the value of the inputs they actually receive is less important for their performance than having access to responsive colleagues. The opposite is true for senior bankers, who pay a high cost for restricting themselves to homophilous ties rather than seeking out the most able colleagues.

Fifth, 11 of the 47 different nationalities in our sample were represented by only one employee each, which could have affected the results. To assess this possibility, we ran the models after removing these employees from the estimation samples. This, however, did not affect the results: all the relevant coefficients had the same significance levels and comparable magnitudes. We further tested the robustness of the results using a wide range of cut-offs, going from having two or more to 100 or more employees per nationality, which resulted in reductions of the estimation sample of up to 29 percent. Yet, all estimations yielded coefficients with the same level of statistical significance as those reported in our tables.

DISCUSSION

Despite the considerable accumulation of research documenting a tendency to establish informal relationships with similar others in a variety of contexts, scholars have largely neglected studying the consequences of such homophilous tendency on outcomes. Our paper tries to redress this neglect by examining the effects of homophilous tendency on the performance of knowledge workers, as well as by identifying and testing mechanisms through which such effects might operate. Our results show that homophily does have consequences for performance of knowledge workers, but that the nature of these consequences depends on the position workers occupy in the formal structure of the firm.

Using data on instrumental ties among bonus-eligible employees in a global investment bank, we show that the tendency to rely on co-nationals to obtain task-related inputs helps bankers at the entry-level rank, but hurts employees above this rank. We also document the mechanism behind this effect: bankers who resort to homophilous ties end up compromising on the ability of their contacts to provide valuable inputs. Our results show that this compromise benefits entry-level bankers (associates), who presumably face higher burdens to secure colleagues' attention, but hurts bankers in higher ranks.

In clarifying the effects of homophilous tendencies on performance, our paper contributes to the growing evidence on the effects of informal networks on outcomes. Although earlier network studies emphasized the effect of network composition (e.g., Lin, Vaughn, and Ensel, 1981), recent research has focused largely on the effect of network structure (see Burt, 2005 for a comprehensive review of the literature). In stressing the effect of the tendency to rely on similar others in the network for task-related inputs, our paper brings back the attention to network composition as a factor influencing outcomes. Network structure matters, but so does who is in the network. While traditionally the focus on network composition was used as a proxy for the resources commanded by the actors in the network, we argue that who is in the network may also matter for the accessibility of those resources for the focal actor.

Our paper also contributes to the idea that the effects of informal networks on outcomes are contingent on the position actors occupy in the formal structure of the organization (Burt, 1997; Gargiulo, Ertug, and Galunic, 2009). Insofar as the effect of informal networks on performance operates through facilitating access to information and resources to other organizational actors, the impact of such networks should depend on the difficulty actors experience in securing such access. This enhanced access is not without costs, however. Like relational embeddedness (Granovetter, 1990; Uzzi, 1997), homophily can

facilitate the access to resources and information controlled by other actors, but it can also entail costs (Portes and Sensenbrenner, 1993). The cost-benefit balance may be positive for actors in more dependent positions, but can become negative for actors once they are past those positions. In the same fashion, having a strong homophilous tendency helps weak or illegitimate actors overcome the negative consequences of their disadvantageous position when accessing resources, but hurts players who have other means to secure such access.

In addition to these substantive contributions, our paper also introduces a way to capture the extent to which the choices of contacts are driven by specific attributes of these contacts. While one might measure homophily tendencies by considering the proportion of contacts sharing the relevant attribute with ego (adjusted by the different baselines in the setting being studied), such a measure might over- or under-estimate the effect of homophilous considerations in ego's choices. Because the presence (or absence) of seemingly homophilous choices might be driven also by other factors statistically correlated with (but theoretically independent from) the specific characteristic used to capture similarity, parsing out those factors is essential to obtain adequate estimates of homophilous effects on tie formation. Our approach to measure the increase (or reduction) in accuracy when predicting tie formation by including (or excluding) homophily effects allows us to obtain accurate estimates of the extent to which homophily actually drives the decision to enter ties. Aggregating these estimates at the level of the actor enables us to obtain a measure of the actor's homophilous tendency, independent from other confounding factors that might have also influenced his or her choices. We believe this approach can be used in any research project seeking to evaluate the effects of aggregated choices of ties on individual-level outcomes, as is the case with this study.

There are some interesting parallels between our work and recent research on the importance of affect on tie formation. If we assume that homophilous instrumental ties are

more likely to be coupled with "positive affect", our findings on the effect of homophily on instrumental tie formation are consistent with the results reported by Casciaro and Lobo (2008) on the primacy of interpersonal affect over competence in the formation of task-related ties. Our results suggest that bankers did consider the ability of colleagues to provide valuable inputs when deciding who to approach, but the effect of the colleagues' ability on their choices was significantly weaker for co-nationals. In other words, our results show evidence that affinity mitigates the effect of competence, even in the cut-throat competitive environment of investment banking. Yet, we also show that while yielding to this tendency seems to be beneficial for people whose position in the organization gives them little leverage to secure access to colleagues, it can also hurt the performance of people whose position (or reputation) makes them legitimate players in the organization. The secondary nature of our data, and the lack of adequate measures of tie strength, does not allow us to measure affect within the observed instrumental ties. Despite this limitation, our results suggest that if a trade-off between positive affect and competence does exist, choosing affect over competence may have significantly different effects on performance depending on the position of the actor in the structure of the firm.

The analysis presented in this paper uses a large sample of employees of a global investment bank working in many different countries and representing more than 40 different nationalities, which we use to capture homophilous tendencies in this study. The use of secondary data and the high response achieved by the cross-rating exercise provides an excellent platform to test our hypotheses. Yet, the data also impose limitations to our analysis, which may affect the generalizability of our findings. First, although the employees in our sample can be considered an excellent example of the highly-skilled, globally-minded "knowledge worker", the fast-paced nature of the investment banking business, the fierce competition among colleagues for large rewards that are contingent on performance, and the

significant levels of turnover experienced (especially at the entry-level rank) define an environment that is not necessarily shared by all knowledge workers. The nature of work in more traditional firms is changing (Sutton and Hargadon, 1996; Hansen, Podolny, and Pfeffer, 2001), but investment banks still present some idiosyncrasies that require caution when generalizing our results.

Another limitation of our data stems from grid of cross-evaluations between operational units imposed by the bank management. If a banker had "substantial business interactions" with someone working in a unit outside the designated set, he or she would not be able to acknowledge the instrumental tie in the exercise. While this should have been very unlikely, as the matching between operational units was done with special consideration to the task interdependence of their respective operations, it may have still caused the omission of some ties in the network data. Yet, our using a multilevel model should control for these omissions. Because the roster of colleagues bankers could evaluate—and, by implication, those they could not evaluate—depends entirely on a banker's unit, a multilevel model that controls for the nested nature of the data should control for unobserved heterogeneity in the bankers' networks resulting from the evaluation grid imposed by management. As is typically the case with secondary data, what we gain in terms of sample size and unobtrusiveness of the data collection process is lost in some lack of refinement in data coverage.

Our paper also poses some interesting questions for future research on the effect of social networks on performance in general, and on the performance of weak organizational players in particular. Homophilous ties do not eliminate the underlying asymmetry of resources and authority behind the dependence affecting weaker players, but they can be an effective way to survive (and sometimes even thrive) despite this dependence. Yet, as it happens with other strategies that can help weaker parties cope with dependence, entering homophilous ties also entails costs, which may become more apparent once the beneficiary

has moved to positions with higher legitimacy and responsibilities in the organization. The case of homophilous ties is particularly important because such ties are typically stickier than other types of embedded relationships, and hence more likely to persist beyond the situation in which they were beneficial for the weak party. How do successful actors avoid being trapped in a web of homophilous relationships that in the past was a useful resource but has become now a liability? How do the cultural context and the structure of the informal network moderate the stickiness of homophilous ties? These questions go to the heart of the dynamics of social networks, calling attention on the interplay between network structure, network composition, and the larger organizational context in studying such dynamics.

In seeking to answer the question that provides the title for this paper, our analysis has contributed to clarify both the effects of homophily on performance and the mechanism through which these effects take place. Relying on similar people to form instrumental ties can be an effective survival strategy for people facing significant difficulties in securing access to the information and knowledge they need to carry out their jobs in the organization. At the same time, sticking to such a strategy when it is no longer necessary can harm performance. As it is the case with other properties of informal networks, whether homophilous ties help or hinder someone's performance depends on the position the actor occupies in the formal (and informal) structure of the organization.

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Table 1: Means, Standard Deviations, and Correlations

Variable	mean	s.d.	1	2	3	4	5	6	7	8	9	10	11	12
1. Tie exists	0.09	0.29												
2. Alter's ability	2.68	0.35	.02											
3. Same nationality	0.25	0.44	.19	-.01										
4. Age ego	35.38	6.57	-.01	.00	.03									
5. Age alter	36.37	6.85	.01	-.10	.01	.01								
6. Age similarity	0.54	0.50	.03	.04	-.02	-.14	-.26							
7. Same gender	6.53	6.00	.00	.00	.03	.47	-.01	-.08						
8. Tenure ego	7.19	6.24	.01	-.04	.02	.00	.49	-.13	.01					
9. Tenure alter	0.62	0.48	.03	.03	-.01	-.17	-.21	.14	-.30	-.40				
10. Tenure similarity	0.74	0.44	.02	.02	.03	.05	.07	-.02	.07	.08	-.03			
11. Same city	0.23	0.42	.24	-.01	.46	-.04	-.07	.01	-.01	-.02	.03	.00		
12. Same function	0.24	0.43	.12	.00	.00	.00	-.08	.06	-.05	-.11	.10	-.03	.04	
13. Same operational unit	0.10	0.30	.21	-.02	.08	.00	-.05	.03	.02	-.01	.02	.02	.13	.56
14. Ego rank higher	0.29	0.45	-.04	-.06	.02	.25	-.26	-.03	.15	-.15	.00	-.01	.03	.01
15. Ego rank lower	0.43	0.50	.01	.06	-.02	-.20	.33	-.08	-.13	.21	-.06	.03	-.04	-.16
16. Ego's ability	2.68	0.34	.02	.00	.00	-.08	-.01	.02	-.03	-.01	.03	.02	-.01	.00
17. Alter rated ego	0.08	0.27	.47	.03	.18	.03	-.05	.04	.03	-.03	.04	.02	.23	.14
18. Common third parties	18.21	25.97	.51	.02	.29	.03	.00	.03	.06	.03	.02	.04	.36	.12
19. Colleagues citing ego	80.16	73.12	.06	.00	.08	.19	-.01	-.01	.20	-.01	-.04	.02	.09	.00
20. Colleagues cited by ego	85.19	64.39	.18	-.01	.05	-.05	-.03	.02	.05	-.01	.03	.05	.06	-.01
21. Colleagues citing alter	100.49	90.07	.12	.06	.03	.00	.26	-.05	-.01	.24	-.09	.04	.03	-.13
22. Colleagues cited by alter	77.41	63.44	.08	.13	.05	-.01	-.11	.04	.01	.00	.03	.04	.08	.02
23. No. of potential alters of ego's nationality	223.34	169.66	-.01	-.01	.33	.09	-.03	-.05	.11	-.02	-.03	.03	.16	-.08
24. No. of potential alters of alter's nationality	198.63	156.46	.05	-.01	.39	.01	.00	-.03	.02	.05	-.02	.03	.22	-.09
25. Mds distance dimension 1	0.48	0.48	-.06	.08	-.07	.01	.02	-.02	.01	.02	.00	.01	-.08	-.04
26. Mds distance dimension 2	0.51	0.45	-.07	.05	-.06	-.05	-.05	.01	.00	.03	-.01	.02	-.02	-.04
27. Mds distance dimension 3	0.49	0.47	-.07	.08	-.01	-.01	-.07	.02	.00	.01	.02	.01	-.01	-.07

Table 1: Means, Standard Deviations, and Correlations (continued) [•]

Variable	mean	s.d.	13	14	15	16	17	18	19	20	21	22	23	24	25	26
14. Ego rank higher	0.29	0.45	.01													
15. Ego rank lower	0.43	0.50	-.09	-.56												
16. Expected value from ego	2.68	0.34	-.02	.08	-.06											
17. Alter rated ego	0.08	0.27	.22	.07	-.11	.01										
18. Common third parties	18.21	25.97	.29	.02	-.04	.02	.49									
19. Colleagues citing ego	80.16	73.12	.02	.33	-.27	.07	.18	.39								
20. Colleagues cited by ego	85.19	64.39	-.01	.14	-.12	.13	.07	.35	.37							
21. Colleagues citing alter	100.49	90.07	-.07	-.31	.45	-.01	-.02	.28	-.02	-.03						
22. Colleagues cited by alter	77.41	63.44	.01	-.06	.04	-.01	.21	.35	.02	.02	.22					
23. No. of potential alters of ego's nationality	223.34	169.66	-.03	.15	-.13	.03	.02	.10	.29	.19	-.08	.02				
24. No. of potential alters of alter's nationality	198.63	156.46	.01	-.06	.06	.03	.01	.12	-.03	.07	.08	.13	.19			
25. Mds distance dimension 1	0.48	0.48	-.08	-.03	.05	.01	.01	.06	.02	.00	.14	.55	.07	.02		
26. Mds distance dimension 2	0.51	0.45	-.07	-.03	.04	.00	.00	.04	.04	.06	.13	.50	.03	.05	.21	
27. Mds distance dimension 3	0.49	0.47	-.11	-.01	.01	.00	.01	.04	.02	.00	.09	.57	.03	.06	.23	.18

[•] N = 1,305,420. All correlations are significant at $p < .001$

Table 2: Means, Standard Deviations, and Correlations [•]

Variable	mean	s.d.	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Performance	0.41	0.39													
2. Homophily tendency	0.00	1.00	-.11												
3. Age	35.38	6.51	.26	-.04											
4. Tenure	1.67	0.83	.16	-.02	.35										
5. Gender	0.84	0.37	.15	.01	.10	.12									
6. Entry-level rank	0.35	0.48	-.50	.03	-.36	-.18	-.15								
7. Ego's ability	2.67	0.35	.13	-.04	-.09	.01	.03	-.13							
8. Alters' ability	2.68	0.07	.05	-.05	.03	.03	-.05	.08	.09						
9. Direct reports	1.07	3.21	.48	-.07	.16	.17	.11	-.24	.09	.01					
10. Network size acquirer	4.09	0.79	.15	-.02	-.08	.12	.09	-.22	.16	-.18	.10				
11. Network size provider	4.03	0.75	.59	-.14	.14	.23	.06	-.37	.13	-.14	.33	.53			
12. Network density acquirer	3.58	0.36	.03	-.04	.09	-.08	-.05	.09	-.15	.05	.02	-.64	-.21		
13. Network density provider	3.65	0.40	-.50	.02	-.13	-.21	-.03	.25	-.12	-.06	-.28	-.27	-.63	.46	
14. Reciprocal ties	0.35	0.14	-.29	-.06	-.16	-.11	.03	.05	.11	-.09	-.10	.20	-.11	.17	.48

[•] N = 1,746. All correlations greater than |.06| are significant at $p < .01$

Table 3: Logistic Regression Predicting Instrumental Ties

Variable	Model 1	Model 2	Model 3	Model 4
Same nationality		.4581[***]	.4588[***]	.8633[***]
		(.0002)	(.0269)	(.0925)
Alter's ability			.1915[***]	.2598[***]
			(.0187)	(.0217)
Same nationality * Alter's ability				-.1506[***]
				(.0325)
Age ego	-.0037	-.0034	-.0037	-.0037
	(.0028)	(.0026	(.0026)	(.0026)
Age alter	.0036[*]	.0033[*]	.0048[***]	.0049[***]
	(.0017)	(.0016	(.0015)	(.0015)
Age similarity	.1402[***]	.1411[***]	.1394[***]	.1395[***]
	(.0144)	(.0144)	(.0144)	(.0144)
Same gender	.0558[**]	.0500[*]	.0446[*]	.0444[*]
	(.0196)	(.0196)	(.0197)	(.0197)
Tenure ego	.0126[***]	.0116[***]	.0115[***]	.0115[***]
	(.0032)	(.0032)	(.0031)	(.0031)
Tenure alter	-.0001	-.0010	-.0012	-.0013
	(.0017)	(.0018)	(.0017)	(.0017)
Tenure similarity	.1527[***]	.1525[***]	.1513[***]	.1507[***]
	(.0167)	(.0169)	(.0169)	(.0169)
Same city	.6116[***]	.4977[***]	.4981[***]	.4980[***]
	(.0240)	(.0236)	(.0235)	(.0235)
Same function	.4470[***]	.4506[***]	.4467[***]	.4470[***]
	(.0377)	(.0379)	(.0378)	(.0378)
Same operational unit	-.1446[**]	-.1183[*]	-.1133[*]	-.1142[*]
	(.0496)	(.0495)	(.0494)	(.0495)
Ego rank higher	-.3265[***]	-.3298[***]	-.3215[***]	-.3216[***]
	(.0288)	(.0289)	(.0290)	(.0290)
Ego rank lower	.0093	.0149	.0045	.0055
	(.0212)	(.0211)	(.0212)	(.0212)
Ego's ability	.2183[***]	.2205[***]	.2188[***]	.2187[***]
	(.0359)	(.0357)	(.0357)	(.0358)
Alter rated ego	2.5256[***]	2.4992[***]	2.4955[***]	2.4954[***]
	(.0309)	(.0305)	(.0305)	(.0305)
Common third parties	.0481[***]	.0465[***]	.0466[***]	.0466[***]
	(.0011)	(.0011)	(.0011)	(.0011)

Table 3: Logistic Regression Predicting Instrumental Ties[•] (continued)

Variable	Model 1	Model 2	Model 3	Model 4
Colleagues citing ego	-.0138***	-.0135***	-.0135***	-.0135***
	(.0007)	(.0007)	(.0008)	(.0008)
Colleagues cited by ego	.0079***	.0082***	.0082***	.0082***
	(.0005)	(.0006)	(.0005)	(.0005)
Colleagues citing alter	.0028***	.0030***	.0030***	.0029***
	(.0002)	(.0002)	(.0001)	(.0001)
Colleagues cited by alter	-.0062***	-.0060***	-.0060***	-.0060***
	(.0005)	(.0004)	(.0004)	(.0004)
No. of potential alters of ego's nationality	-.0023***	-.0025***	-.0025***	-.0025***
	(.0002)	(.0002)	(.0002)	(.0002)
No. of potential alters of alter's nationality	.0003	-.0001	-.0001	-.0001
	(.0002)	(.0002)	(.0002)	(.0002)
Mds distance dimension 1	-.3143***	-.2836***	-.2825***	-.2849***
	(.0322)	(.0319)	(.0319)	(.0319)
Mds distance dimension 2	-.5857***	-.5714***	-.5725***	-.5726***
	(.0336)	(.0336)	(.0338)	(.0339)
Mds distance dimension 3	-.3992***	-.3992***	-.4061***	-.4065***
	(.0304)	(.0299)	(.0300)	(.0301)
Constant	-4.5698***	-4.4249***	-4.9327***	-5.1083***
	(.2745)	(.2691)	(.2735)	(.2758)
Chi-squared	363644.61	365327.35	365554.46	365590.80

[•] N = 1,305,420. Robust standard errors, clustered for both ego and alter, are reported in parentheses. Unreported ego nationality and alter nationality fixed effects are included in all models. Improvements in fit between all nested model pairs are significant ($p < .001$).
* $p < .05$, ** $p < .01$, *** $p < .001$, two-tailed tests.

Table 4: Multi-level Linear Models Predicting Bonus[●]

Variable	Model 5	Model 6	Model 7
Age	.001	.001	.001
	(.001)	(.001)	(.001)
Tenure	-.035***	-.035***	-.035***
	(.007)	(.007)	(.007)
Gender	.065***	.065***	.062***
	(.014)	(.014)	(.014)
Entry-level rank	-.199***	-.200***	-.202***
	(.013)	(.013)	(.013)
Ego's ability	.103***	.103***	.105***
	(.015)	(.015)	(.015)
Alters' ability	.157+	.152+	.153+
	(.082)	(.082)	(.082)
Direct reports	.020***	.020***	.020***
	(.002)	(.002)	(.002)
Network size acquirer	.036**	.037**	.036**
	(.013)	(.013)	(.013)
Network size provider	.160***	.157***	.160***
	(.013)	(.014)	(.014)
Network density acquirer	.213***	.215***	.212***
	(.028)	(.028)	(.027)
Network density provider	-.159***	-.162***	-.158***
	(.028)	(.028)	(.028)
Reciprocal ties	-.520***	-.522***	-.521***
	(.053)	(.053)	(.053)
Homophily tendency		-.007	-.017*
		(.006)	(.007)
Homophily tendency * Entry-level rank			.037***
			(.011)
Constant	-1.050***	-1.025***	-1.040***
	(.292)	(.292)	(.291)
Log-likelihood	258.58	259.30	264.77

[●] N = 1,746. Unreported nationality fixed effects are included in all models. Improvements in fit between Model 1 and Model 3, and between Model 2 and Model 3 are significant ($p < .001$).
+ $p < .10$ * $p < .05$, ** $p < .01$, *** $p < .001$, two-tailed tests.

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