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ANTECEDENTS OF RELATIONAL CAPITAL: THE ROLE AND INTERPLAY OF ORGANIZATIONAL AND GEOGRAPHICAL PROXIMITY

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Abstract

This paper merges economic geography and relational capital perspective in order to analyze the proximity-based antecedents of relational assets in brokerage. It investigates empirically the role and interplay of geographical and cognitive proximity between a broker and her buyers in a quantitative case-study. Its contribution is threefold: first, I distinguish between the effects of cognitive and geographical proximity and explore empirically their interplay on the relational assets. Second, I contribute to the under-researched field of studying the social context of relations by accounting for buyers characteristics. Lastly, I make use the under-researched empirical field of brokers.

**PROXIMITY BASED ANTECEDENTS OF RELATIONAL ASSETS IN
BROKERAGE.**

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ABSTRACT

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|--|----|
| 1) INTRODUCTION | 1 |
| 2) BROKERAGE IN THE TRANSPORTATION SERVICES..... | 2 |
| ENVIRONMENTAL AND ORGANIZATIONAL FACTORS IN TRANSPORTATION INTERMEDIATION..... | 3 |
| SHIPBROKING INDUSTRY: SECTOR PARTICULARITIES AND FUNCTIONING..... | 4 |
| RELATIONS AND PROXIMITY IN SHIPBROKING | 5 |
| 3) THEORY AND HYPOTHESES | 8 |
| 4) SAMPLE AND DATA COLLECTION..... | 11 |
| DESCRIPTION OF VARIABLES..... | 14 |
| DEPENDENT VARIABLE | 14 |
| EXPLANATORY VARIABLES | 14 |
| CONTROLS..... | 15 |
| 5) DATA ANALYSIS | 16 |
| DESCRIPTIVE STATISTICS | 16 |
| 6) RESULTS | 17 |
| 7) DISCUSSION AND CONCLUSION..... | 17 |
| 8) BIBLIOGRAPHY | 18 |

1) INTRODUCTION

Since decades, scholars in management, networks and economic geography have been emphasizing the role of proximities, such as geographical and cognitive, for organizational outcomes. While the notion of cognitive proximity is based on similarities in levels of absorptive capacity that allow for efficient inter-organizational learning, the geographical proximity fosters face-to-face contacts by random encounters. On one hand, the investigation of management scholars focused on the role of proximity for the tie formation and persistence in context such as alliances, transactions, collaborations and networks (DiMaggio & Louch, 1998; Gulati & Nickerson, 2008; Gulati, 1995, 1998). Innovation scholars, on the other hand, explored, knowledge spillovers and inter-organizational localized learning (Boschma, 2005) in clusters. The different types of proximity have been relatively well studied as stand alone, especially in economic geography (Boschma, 2005). Nevertheless, their interplay remain opaque. While theory (Torre & Rallet, 2005) suggested that various types of proximity may substitute each other, empirical studies are still scarce.

Various management studies suggested that there is a value accruing to relations between individuals and organizations and investigated the value of such latent capital (Bidwell & Fernandez-Mateo, 2010; Elfenbein & Zenger, 2013; Kale, Singh, & Perlmutter, 2000). Such capital referred to as relational is accumulated through relational assets being added throughout repeated or lasting relations between individuals, however benefitting also organizations. Since the tie formation and persistence is defined by various aspects of proximity, proximities can be regarded as antecedents of the valuable relational asset that builds the latent relational capital.

This paper combines economic geography with the relational capital perspective and investigates the role and interplay of different types of proximity on relational assets. Its contribution is threefold: first, it fills in the gap by empirically investigating the interplay of different types of proximity (Torre & Rallet, 2005), second, it contributes to the under-researched field of studying the social context of relations (Elfenbein & Zenger, 2013) by accounting for buyers characteristics. Lastly, it explores the under-researched empirical field of brokers (Bidwell & Fernandez-Mateo, 2010).

I test my hypothesis on the role of geographical and cognitive proximity and their interplay on relational assets with use of a quantitative case study methodology. Such choice of

method is dictated by the data requirements. Indeed, in order to analyze the effects of different types of proximity on relational capital in brokerage, a fine-grained, longitudinal contractual data including information on the brokered parties is required. As Bidwell & Fernandez-Mateo (2010) advanced, “the need for within firm data to examine our theoretical mechanisms demands a research strategy that emphasizes depth over breadth”. Consequently, this paper makes use of a unique longitudinal dataset including 194 transactions finalized by a service brokerage company matching buyers and sellers over 8 trimesters. The longitudinal transactional data stems the records of a broker involved in transportation and more specifically in shipping.

Transportation service intermediaries are part of service intermediaries that also include staffing, real estate and finance intermediaries. Following the growth trend of services, the service intermediaries accounted to 40% of GDP in the United States (North, 1989). Transport intermediaries are accountable for a large percentage of this estimation and as such, of utmost importance for today’s economies.

The remainder of the paper is organized in four sections: the first one provides an overview of the empirical context of the study, second present the theories and hypotheses, third one describes the method and data and, last presents and discusses the outcomes.

2) BROKERAGE IN THE TRANSPORTATION SERVICES

The transportation service industry provides an interesting empirical context for studying proximities and relations. Middleman or broker matches two parties in transaction and, in order to do so, relies on her relations.

The remainder of this section aims at providing background information on the empiric context of my study with respect to both: proximities and relations. It is divided in three parts: first, I analyze environmental and organizational factors that affect transportation service intermediaries worldwide, provide information on their importance for global economies and current trends. Second, I introduce the shipbroking industry and explain sector particularities and functioning. Last, I discuss the importance of different types of proximities and relational capital for this sector.

The description of the particularities of the shipbroking industry comes from the author's interviews with the industry players: shipping companies, shipbrokers, industry associations and others.

ENVIRONMENTAL AND ORGANIZATIONAL FACTORS IN TRANSPORTATION INTERMEDIATION.

Transportation intermediaries are a typical example of market brokers operating in product differentiated markets (Spulber, 1999). They operate in all three kinds of transportation, namely: land, air and sea. Each kind includes a variety of actors and classifications or typologies vary also in terms of country-specificities. In the United States, the main actors include freight forwarders, customs brokers and non-vessels operating common carrier (NVOCC) and export management companies (World Bank Group report, 2005).

Transportation intermediaries worldwide are strongly affected by competitive pressures in the industry. Although aggregate level statistics on the importance of different types of transportation intermediaries are lacking, interestingly, scholars kept on noticing, a general country-level growth in the number of intermediaries in transportation services. Such trend has been continuously emphasized in particular by scholars analyzing intermediaries in the sea transportation¹. These numbers are the result of correlated growth of transport intermediaries with the overall shipping sector². The shipping sector itself follows, in turn, the pattern of globalization and growth of the international trade over past 60 years. The competitive pressures in the sector of transport intermediaries stem thus primarily from the growth of the transport sector itself. Second, these pressures are even more outspoken when accounted for the disintermediation risk (Burt, 2000) which occurs when brokered parties cut-off the third party in their common transaction.

Moreover, the dynamic of pressures related with industry growth and structure, are accompanied by an increasing customer's demand. Indeed, trade routes grew increasingly longer, bridging continents and hemispheres as international trade developed (Stopford, 2009). The

¹ For instance, according to the most recent evidence by Sornn-Friese & Hansen (Sornn-Friese, H, Hansen, 2012), the current number of 800 freight forwarders in Denmark is a result of a steady growth for over a decade. (Panayides & Gray, 1997) provided an evidence of growth of another, small category of transportation service intermediaries within the shipping industry: ship management companies. They claim that the number of ship managing firms worldwide rose from 226 in 1990 to 614 in 1997. Moreover, (Panayides, 2001) states also a high increase from 29 in 1984 to 76 by 1999 in the same industry in Germany.

² Gubbins, 1986, Stopford, 2009

development of international trade has been strongly impacted by the revolution of containerization. The use of standardized containers, easily transportable locally outside of sea transport, resulted in use of multi-modal instead of unimodal, sea- transportation (Schramm, 2012). A standard multi-modal door-to-door transportation service often times includes: local, land- followed by sea- or air- transportation and ends again with land or courier. Such sophistication of customer's needs affects, consequently, the ability of some intermediaries to proposer in the market.

Last, the sector of transport intermediaries may seem homogeneous. However, one intermediary does not equal another in many respects. Some may experience even more the competitive pressures and hostility of the environment given their organizational structure. The service intermediaries in transportation do not dispose of any assets and match exclusively two parties in transaction (Schramm, 2012). Such organizational structure prevents them from benefitting from traditional advantages of assets ownership other than the ones linked purely with the excellence of the service they provide.

Even though transportation intermediaries, including service intermediaries, experience important competitive and customer pressures, they seem to prosper financially. The World Bank Group (2005) provides an estimate of 10% yearly growth in revenues for transportation intermediaries. This growth, especially for service intermediaries, is correlated with the growth of service sectors. The mentioned study of North, (1989) attributes up to 40% of American GDP in the United States to the service intermediaries in general and points to the transport intermediaries as accountable for a large percentage of this estimation.

The growing number of firms and their importance in global economy is also reflected in research trends. The recent review of academic research on transportation intermediaries (Schramm, 2012) shows that the number of dedicated papers has been continuously increasing since 1950.

SHIPBROKING INDUSTRY: SECTOR PARTICULARITIES AND FUNCTIONING

This paper examines a particular kind of transportation and service intermediary – the shipbroker (Gorton, L, Ihre, R, Hillenius, P, Sandevärn, 2009, Pettersen Strandenes, 2000). Shipbrokers match vessels with cargoes, that is, they bring together carriers (ship owners or operators) and charterers (who can be ship operators or cargo owners) in specific cargo voyages.

I will refer to carriers and charterers as sellers and buyers, respectively. Shipbrokers can be categorized according to the types of operations they are involved in, such as, sales and purchase, or chartering of ships. The segment of operation is another parameter shipbrokers vary on. They can thus be involved in matching parties in one or more shipping market segments, including dry cargo, tanker, gas, and container shipping as well as in more specialized segments such as offshore shipping. Of these, the dry cargo market is the most complex one, comprising a huge variety of vessels and cargoes and large variations in the charter parties (i.e., the contracts between carriers and charterers).

All shipbrokers operate in a highly competitive market; an inquiry (on either goods or ship available for transportation/rental) is often publicly disseminated among competitors through mailing lists. Upon the receipt of an inquiry, the brokerage company sums it up (including information on their commission, which is usually 1.25% of the total volume) and forwards it on to potentially interested counterparty. This part of the shipbroker's activity is called fixture operations. What follows, is an approval or rejection of the proposal at the other end. In the former case, the broker company is supposed to follow and stay in contact with both brokered parties until the transaction is successfully finalized (post-fixture activity). Finally, the payment of broker's commission is conditional on a positive outcome of transaction. All transactions that shipbrokers are involved in are based on the specific charter party signed between the seller and the buyer. Charter parties are standardized within the industry according to norms issued by the Baltic and International Maritime Council (BIMCO)³ and define the parties involved in transaction by category (shipping party versus external party), including information on the shipbroker's name and the accruing commission. The charter party also specifies the conditions of charter and duration. The former category includes a TCT contract (time charter party) and the latter a Voyage charter party.

RELATIONS AND PROXIMITY IN SHIPBROKING

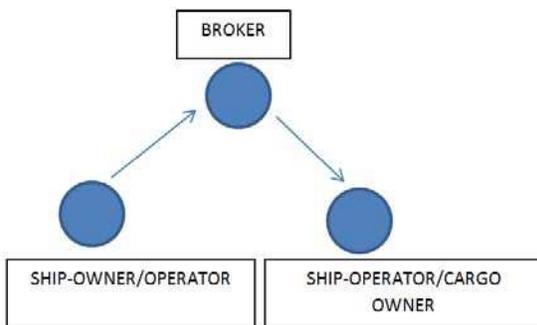
According to perceptions of the industry members themselves, the shipbroking business is built on trust and personal relationships.⁴

³ <https://www.bimco.org/>

⁴ See also the extant, and indeed rather limited literature, on the shipbroking industry (e.g., Gorton, L, Ihre, R, Hillenius, P, Sandevärn, 2009). The industry related business blog called "The Virtual Shipbroker" (www.virtualshipbroker.com) also provides useful insights on the industry.

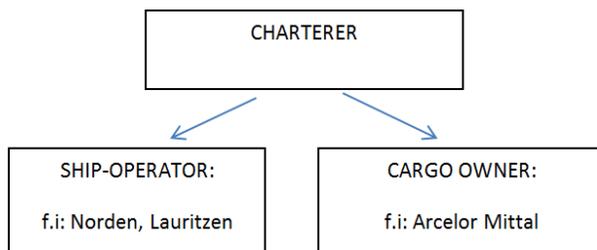
Given the persistent overcapacity in the supply of ships, in 90% of the cases⁵ a broker matches a party in possession of a capacity (either a whole ship or a spot available on a ship) with another party, in search of such. The brokered parties involved in such case are, as presented in the Figure 1 below, ship owners or operators, respectively, ship operators and cargo owners. While both ship owners and ship operators belong to the shipping, and more broadly transportation, industry, the cargo owners can represent any kind of business: from steel producers to grain traders.

Figure 1 Brokerage in the shipping industry



This implies an important diversity of brokered parties at buyers (charterers) side as presented in the Figure 2 below:

Figure 2 Types of charters



Because of the mentioned vessel overcapacity, the relationships that the shipbroker forms with the parties to a transaction are not of equal importance. The relations on the buyers' side, including parties from within and outside of the industry, are crucial.

⁵ According to the estimation provided by the industry representatives.

Shipbroking has historically been concentrated in New York, Tokyo, London and Oslo and as such, its reach has been primarily local. The industry has however evolved along with the shipping sector and became global. In Europe the shipbrokers are mostly present in shipping countries such as UK, Norway and Greece. Copenhagen is a newcomer among important shipbroking centers. The recent raise of importance of Copenhagen in shipbroking results from synergies arising from an easy access to sellers and buyers from the shipping industry and maritime clusters at national level⁶. The presence of national industrial organizations fostering cooperation is notable: the Danish Shipbroking Association, active since 1972, as an example, brings together more than 110 companies from the shipping industry in Denmark. Its role is crucial not only from the point of providing opportunities of cooperation; historically, the association has also provided professional education to brokers. A month-long, intensive “hands-on” training is offered yearly to potential candidates and newcomers in the industry. This training is a basis for building an industry-specific knowledge-base, but also for establishing the connections that are a prerequisite for commercial success.

However important, relations built by brokers do not exclusively arise as a positive externality of a cluster, or are not necessarily geographically bounded. First, the industry is globalized and characterized by shrinking distances: players from Copenhagen are very likely to know very well, most likely personally, players from London, Rotterdam, Marseille, or even Singapore, Tokyo or New York. Networking is an inherent part of the industry and takes part in many global events such as dinners organized by industry associations and other shipping institutions. In Copenhagen only, the Danish Ship-owners Association (DSA), well known in the shipping industry worldwide, organizes a dinner attended by all major global players and their partners every three years. Moreover, many yearly fair trades, networking events, “get-togethers” take place in other places in Europe and worldwide and serve of platform for communications, meeting and bonding for industry players.

Such networking spanning the boundaries of national clusters take place especially at inter-continental, mainly European level. Yearly meeting of the industry players in Hamburg, Copenhagen or London prove important synergies at European level. Moreover, the existence of

⁶ With the world’s biggest container shipping company Maersk (detaining 15% of global market shares) and others ship operators in possession of important vessel capacities such as Norden or Lauritzen (Sornn-Friese, H, Hansen, 2012).

the Baltic Exchange⁷ involving panel brokers from the Baltic Sea in reporting on current macro-economic situation of the industry proves importance of supra-national synergies in the industry. It is also a fact that American and Asian brokers in shipping differ slightly in terms of industrial particularities: they often time represent exclusively one buyer (as in Asia) or integrate vertically (USA). For this reason, Europe as a platform for increased synergies and exchange between brokers is of prime importance.

Second, a common practice among Danish and other shipping companies is to internationalize. While implementing such strategy of growth, they combine it with employees' personal development plan. Typically employees in middle management positions are required to spend a part of their career abroad, often as a prerequisite of further career evolution. Given this particularity, friends or colleagues, having attended the same educational training and networking extensively locally, mobile employees also keep their local connections and utilize them when working abroad.

3) THEORY AND HYPOTHESES

This paper merges economic geography and relational capital perspective to investigate the proximity-based antecedents of individual relational assets.

Firstly, economic geographers have been investigating the role of proximities for inter-organizational outcomes for decades (Boschma, 2005). Co-location, or geographic proximity, has been demonstrated to positively impact knowledge spillovers between companies, foster economies of scale and reduce search costs. Network scholars (Dahlander & McFarland, 2013; Rivera, Soderstrom, & Uzzi, 2010) have similarly pointed to specific mechanisms by which proximity foster tie formation and persistence. Geographical proximity is likely to generate random encounters through which two actors are more likely to get in touch and interact frequently. Based on the premises of geographical proximity as advanced by both streams of the literature I hypothesize as follows:

H1: There is a positive association between geographical proximity of a broker and her buyer and the likelihood of a new relation between them because of random encounters in the local national community, but also in Europe.

⁷ <http://www.balticexchange.com/>

According to the theory, the likelihood and frequency of random encounters is defined by the presence of proximity. Consequently, with increased distance, the likelihood of random encounters diminishes. I thus fine-grain the first hypothesis:

H1a: The magnitude of the positive association between the geographical location of a broker and her buyer and the likelihood of a new relation between them will be diminishing with increasing distance especially outside of Europe.

However, as emphasized by both: economic geographers and network scholars, geographical proximity is not the only type of proximity positively associated with the inter-organizational outcomes.

The same positive association holds for cognitive proximity between two companies or individuals. Such proximity is understood as similar levels of knowledge, or absorptive capacity (Cohen & Levintal, 1990) that allows the parties to communicate and learn from each other. The mechanism of homophily is another way by which individual relations are more likely to be formed and persist. Homophily theory predicts that relations between actors who share common characteristics, such as commonly used signs and language (Tushman, 1878), are more likely to be formed, in a first place, and persist over time. Accordingly, we hypothesize further:

H2: The cognitive proximity between a broker and her buyer will be positively associated with the likelihood of a new relation between them occurring by the effect of socializing and learning on forums such as fairs, exhibitions or industry events locally or globally.

However important in terms of fostering efficient learning, the cognitive dimension of proximity is not the sufficient condition for learning to happen. An efficient learning requires similar, however diverse enough levels of knowledge (Cohen & Levintal, 1990). I thus fine-grain the second hypothesis:

H2a: The positive association of cognitive proximity between a broker and her buyer and the likelihood of a new relation between them will be relatively lower when the broker and her buyer share the exact levels of cognitive proximity and

H2b: As the cognitive proximity lacks between a broker and her buyer, the magnitude of its association with the likelihood of a new relation will decrease.

Both types: cognitive and geographical proximity are positively related to inter-organizational outcomes. However, the magnitude of their impact is not necessarily comparable. First, the lack of geographical proximity can be compensated through face-to-face relations

(Torre and Rallet, 2005) and other types of proximities that organizations built in collaboration throughout time such as social and organizational proximities.

The labor mobility studies (Agrawal & Cockburn, 2003; Magnani, 2006; Maliranta, Mohnen, & Rouvinen, 2009; Marcus & Kongsted, n.d.; Rao & Drazin, 2002; Rosenkopf & Almeida, 2003; Somaya & Williamson, 2008) have postulated that relations may span geographical distance and, through inter-organizational mobility of employees generate attention mechanisms between the losing and receiving firm that eventually are mutually beneficial. Accordingly, I hypothesize:

H3: The magnitude of association of the cognitive proximity between a broker and her buyer with the likelihood of new relation will be higher, as compared to the geographical one.

According to the theory (Boschma, 2005; Torre & Rallet, 2005) different types of proximity can be considered as substitutes. Such substitution is primarily suggested by scholars to apply for the organizational and geographical proximity. Torre and Rallet (2005) suggested accordingly that the organizational proximity developed between organizations working closely together substitutes for the geographical ones. The substitution effect is however conditional on generation of personal face-to-face relations during the time of cooperation. In their theoretical discussion, Torre and Rallet (2005) suggested that the same substitution effect can be expanded to other types of proximity.

The co-occurrence of the geographical and cognitive proximity denotes a cluster. Since decades, scholars have been investigating positive externalities of clusters fostering localized learning and innovation through knowledge spillovers (P. Maskell, 2001; Peter Maskell & Lorenzen, 2004; Peter Maskell & Malmberg, 1999). Some postulated that such positive externalities of a cluster for organizations are a direct consequence of strong and cohesive ties between individuals, that, eventually spill over to the organizational level (Lawson & Lorenz, 1999; Lorenzen, 2007). However, scholars have also emphasized the need for external knowledge and threats of local search that eventually cause organizational inertia and myopia (Keld Laursen & Salter, 2006; Rosenkopf & Nerkar, 2001). The over-embeddedness occurs in a cluster when the number of organizational or individual ties to local organizations is not balanced with external ones (Uzzi, 1996). Gathering the proposition on substitution effect of various types of proximities and the negative cluster effects, I hypothesize:

H4: The positive impact of the cognitive proximity between the broker company and her buyers will be negatively moderated by geographical proximity between them due to negative cluster externalities.

4) SAMPLE AND DATA COLLECTION

The sample received from the case-company includes information on 194 transactions of a medium-sized ship brokerage company hereafter referred to as “Shipbroker”. In the analysis of antecedents of relational assets, I use a dyad, defined as Shipbroker’s employee- buyer, as unit of analysis. The 194 transactions are built by 7 employees of Shipbrokers active throughout time and 52 buyers. The number of formally finalized transactions is complemented with the transactions that have not been realized. Following the procedure in (Dahlander & McFarland, 2013), I consider a dyad is at risk of forming a transaction since the first occurrence of transaction between them. Such procedure results in 386 transactions including the potential ones. I use the collapsed dataset and 81 dyads as unit of analysis in a robustness check. The data is clean from survival bias since all of the buyers included in the dataset are still on the market in the moment the analysis is done.

The Shipbroker has been active on the market since 2009. Information on transactions has been entered, one by one, on a daily bases by each employee in charge of a specific transaction. The company has been founded as entrepreneurial start up by a single person as a result of bankruptcy of her employer. The founder continued the business in times of crisis at his own for the first four trimesters. First financial results of the company have been made public only in 2011 (according to Orbis). The case-company is located in Copenhagen, Danish center of the shipping industry. Its premises are situated in the heart of the maritime cluster nearby the main ship- owner and ship-operating companies.

Because of the timing of foundation coinciding with the global crisis impacting the shipping industry, the company has been focusing on building the relations to the buyers. With respect to this, there is a labour division in place according to particular geographic areas: while some of the employees deal only with the local area (North or Baltic Sea), some focus their business development efforts on more remote regions such as the Black Sea or others.

“The reporting period” of transactions includes eight trimesters, from mid-2013 until mid-2015. The historic data on the periods proceeding the reporting period is not available, thus our

sample suffers from left-truncation issue. According to the company CEO, the need of exact and precise reporting was there only once the start-up phase of their activities was over and company hired employees. The transactions that are a basis of my sample represent the mature period of activities of the case-company.

Each transactional entry includes the volume (amount) of transaction, contract type finalized between brokered parties, broker's employee in charge, name of ship supplied, name of buyer, the date of transaction.

Table 1: Correlation matrix

(1)

| | new trans | geodistance | industrydistance | totaltrans | experience |
|------------------|-----------|-------------|------------------|------------|------------|
| new trans | 1 | | | | |
| geodistance | 0.0132 | 1 | | | |
| industrydistance | 0.188*** | 0.235*** | 1 | | |
| totaltrans | 0.481*** | -0.000780 | 0.157** | 1 | |
| experience | 0.519*** | 0.00991 | 0.151** | 0.932*** | 1 |

DESCRIPTION OF VARIABLES

DEPENDENT VARIABLE

The dependent variable (new relational asset) “new trans” is a binary 0/1 variable qualifying a new relation of the broker and her buyer. The formation or repetition of tie (cooperation/alliance) is broadly used in management studies such as (Dahlander & McFarland, 2013; Uzzi, 1996) .

EXPLANATORY VARIABLES

The geographical distance “geodistance” is an ordinal variable. It takes the value of 0 to denote the lack of geographical distance when the broker and her buyers are located in Copenhagen region. Such approach is in line with extant literature dealing with geographical proximity and localized social capital has used regional level (K Laursen et al., 2012; Torre & Rallet, 2005). The value of 1 denotes first degree of distance between the broker and her buyer, occurring when the distance is within the area of North and Baltic Sea. In case when the “geo” takes value of 2, the distance is within the same continent, however different area (such as Mediterranean or Black Sea). Finally, “geo” value of 3 denotes the furthest distance between the broker and buyer in a dyad, namely spanning continents and areas (oceans or seas).

The cognitive distance denoted as “industrydistance” has been computed with the use of NACE classification. Each buyer has been first positioned on the scale as benchmarked to the case company. As a result, a lot of buyers stem from the “H” category of NACE classifications lumping up different transportation related services. I decided to fine grain the origin of these players and implement the following strategy. The “cognitive” takes a value of 0 if the buyer shares the same 4 digit NACE code with the broker, within the H category. The value of 1 defines a distance at 4 digit levels, lumping buyers from transportation sector (category H of NACE codes), whose activities are not exact equivalents of brokers. Finally, “cognitive” taking value of 2 lumps up buyers from other categories than transportation, regardless of their activities. Such approach does not offer a differentiation between buyers from segments other than transportation, which constitutes its flaw. However, given the structure and functioning of Shipbroker and the important number of relations to transportation related buyers, I decided to scarify the depth of such external buyer qualification in order to tease out the differences between the buyers from within transportation.

Table 2: Summary statistics

| | (1) mean | sd | count |
|------------------|-------------|----------|-------|
| new trans | .2823834 | .4507431 | 386 |
| geodistance | .9689119 | 1.041511 | 386 |
| industrydistance | 1.015544 | .7133363 | 386 |
| totaltrans | 17273.3 | 29074.69 | 386 |
| experience | 1.816062 | 2.464259 | 386 |
| Observations | 386 | | |

CONTROLS

The variable “totaltrans” provides the information on the volume of all transactions between an employee and particular buyer in the periods preceding the current one. It approximates the size of business or importance of particular dyad: employee-buyer.

The variable “experience” is a count of number of former transactions between the particular dyad employee-buyer.

I use employee dummy (fixed effects) in order to control for individual broker’s characteristics. Indeed, since f.i. broker’s ability may impact the likelihood of having repeated relations with buyers, this approach seem legitimate. Instead of employees fixed effects, I use detailed information on Shipbroker’s employees such as: age, number of years of experience in the industry, education level and professional education in the robustness check.

I also use period dummy for period in which the first transaction within a given dyad has been finalized. This approach is supposed to: control for any time and business cycle related characteristics and also for the time elapsed since the tie formation.

The summary of all variables including name, type and description is provided in the Table 3 below:

Table 3: Summary of main variables' names, type and description

| Name | Type | Description |
|-------------------------|------------|---|
| New trans | Dummy | Denotes the presence (1) or absence (0) of a new transaction between a Shipbroker and particular buyer in t. |
| Geodistance | Ordinal | Denotes a buyer from Shipbroker's city (0), same area (1), same continent (2) or outside (3) |
| Industrydistance | Ordinal | Denotes a buyer from the same 4 digit NACE category as the broker (0), other, but related to transportation industry (1) or outside (2) |
| Totaltrans | Continuous | Total volume of transaction in t-1 |
| Experience | Continuous | Number of transactions in t-1 |

5) DATA ANALYSIS

DESCRIPTIVE STATISTICS

There are 81 employee-buyer dyads in the sample. They are the result of collapsing information on all 194 transactions from the period between mid-2013 until mid-2015. There are 52 different buyers and 7 Shipbroker's employees included in the dyad. One buyer may be part of more than one dyad, or, may transact with more than one Shipbroker's employee, which reflects the labour division in the industry. The dataset used in the data analysis includes 386 observations resulting from the inclusion of zeros.

There is a relative over-representation of geographically proximate buyers: 166 of the observations are characterized by lack of distance. 115 observations are characterized by the first degree of distance (same area, different country), then respectively 56 and 49, respectively, of medium and highest. The trend in geographical distance does not seem to be followed by the cognitive one. The transportation related though not exact equivalent buyers, are mostly represented (190 observations), as compared to 95 (distance of zero) and 101 (highest cognitive distance).

While analysing the co-occurrence of the first explanatory variables and the dependent variables, a pattern seem to emerge. New transactions have lower means at lowest (geo=0) and highest (geo=3) levels of geographical distance as compared to the medium ones (geo=1 and 2). The standard deviations do not necessarily follow this trend however. The analysis of the co-occurrence of new transactions and the industry distance demonstrates that the most proximate (industry distance=0) buyers are less likely to generate new transactions, as benchmarked to both, medium (1) and highly distant ones (2).

As demonstrated in the correlation matrix (Table 1), the two explanatory variables do not create multicollinearity issue (confirmed by a VIF test). The two controls, totaltrans and experience, on the other hand, are strongly correlated with each other and also with the dependent variable.

53 out of all 386 observations are characterized by closest degree of proximity along cognitive and geographical dimensions. There are only 27 of them that are defined by highest distance of both.

6) RESULTS

I use Logit and LMP as modelling frameworks in order to estimate the impact of both dimensions of proximity on the likelihood of new relational asset. The model looks like follows:

$$\text{New transaction} = \alpha + \beta \text{geodistance} + \gamma \text{cognitive distance} + (\delta \text{geodistance} * \text{cognitive distance}) + (\text{total of transaction}) + (\text{experience}) + (\text{employees/period dummy}) + \text{error term}$$

Model 1 introduces two controls (“totaltrans” and “experience”), Model 2 adds the employee and period dummies. Model 3 and Model 4 introduce both explanatory variables, without, respectively, with the interaction term.

I use the Logit framework with robust standard errors, standard errors clustered at buyers and dyad level.

TO BE COMPLETED

7) DISCUSSION AND CONCLUSION

8) BIBLIOGRAPHY

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