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Small businesses performance in West African border regions: Do social networks pay off?

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Abstract
This paper studies the link between economic performance and social networks in West Africa. Using data collected about 358 small-scale traders in five border markets between Niger, Nigeria and Benin, we test whether the well-connected actors are the most successful in terms of monthly profit. The results show that the overall economic performance of traders is greatly affected by the size and the nature of their network. Being in active relationship with one additional prominent figure increases profits by 50%. While social ties with local religious leaders have a negative effect on the business profit, relationship with civil servants, politicians, and, security officers, is translated into economic performance. Unlike social network, formal education is not rewarded among small traders. The paper also shows significant differences between countries and regions. Social connections developed with state representatives have a much greater effect on economic performances in Niger and Benin than in Nigeria, where average profit is much higher. Profit is higher where the Nigerian part of the cross-border region has experienced a boom in import and export activities.

Keywords: social networks; border markets; economic performance.

JEL Classification Codes: D85, F14, L14, R11

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1. Introduction

Unlike industrialized economies in which economic exchange is mainly based on impersonal transactions made possible by formal market institutions, African economies rely heavily on interpersonal relationships between entrepreneurs (Fafchamps 2004). Social networks allow entrepreneurs to develop trust relationships in a business environment where information transmission is slow and costly, access to credit is difficult, and contracts are not strictly enforced by formal institutions. While personal acquaintances are relatively unimportant in developed economies due to the predominance of arm's-length ties between firms, trust acquired through repeated business transactions and interpersonal contacts strengthen the African entrepreneurs' ability to adapt to unforeseen problems, and provide a better access to resources.

Social networks, however, do not benefit all equally (Urwin et al. 2008). Because they rely primordially on trust, they tend to promote the well-connected rather than the most qualified. If membership in a network can compensate for market imperfections and increase productivity, it also creates or amplifies distortions in the labor market. Being too embedded in a set of interpersonal relationships may also have disadvantages because a high level of embeddedness decreases the ability of traders to reach actors beyond their own group. It also limits the possibilities of gains because every business partner provides more or less the same products or services. Much larger gains can accrue to less embedded actors, who can be potentially more complementary to each other, have different ideas and better exploit cultural or monetary differentials.

Against this background, the objective of this paper is to study the link between economic performance and social networks in five West African border markets. Using primary data collected about 358 small-scale traders located in Niger, Nigeria and Benin, we are particularly interested in testing whether the most well-connected actors of trade networks are also the most successful in terms of monthly profit. In other words, we wish to determine whether the overall economic performance of small-scale traders is affected by the socio-professional position of the other actors with whom they are connected.

The border settings make the study of social networks particularly interesting for two reasons. Firstly, the presence of a border introduces an artificial distance between business partners

(Parsley and Wei 2001) in a business environment already characterized by high transport costs. We therefore assume that local traders will rely heavily on social connections with other traders that can provide information on prices and demand, and reduce the uncertainty associated with the crossing of national borders. Secondly, border regions are well known for providing a favorable environment to informal economic activities, for which the process of production and distribution is illicit but the final product is licit (Portes and Haller 2005), such as oil or second-hand clothing for example. Borders generate prices differential that well connected traders can take advantage of and remain, at the same time, institutional asymmetries that have to be negotiated. We therefore assume that local traders will engage in interpersonal relationships with state representatives that can facilitate cross-border trade.

Our results show that interactions are particularly frequent with local religious leaders – known as *marabouts* – and with civil servants. In the two border regions surveyed, small traders tend to develop fewer ties with politicians or security officers. The paper shows that interacting with traditional religious leaders does not have a significant effect on economic performance, despite the spiritual importance of such leaders, while support received from state representatives is converted into economic performance. Small traders use their connections to actors who have access to state resources or who can help them avoid tax and bans on certain products. Experience is significantly and positively related to profit whereas education is almost of no consequence for traders.

The remainder of the article is organized as follows. The next section reviews the literature that analyzes the impact of social networks on economic performance. Section 3 presents our data and describes how information was collected on small traders' social network and economic performance. It also discusses the empirical investigation strategy. Section 4 presents our results and includes both descriptive and multivariate analysis. The last section concludes with a discussion of the implications of these findings.

2. Social networks and economic performance

The study of how social relations affect economic outcomes constitutes a rapidly growing field of research in social sciences (Granovetter 2005, Fafchamps 2006), particularly as an approach to understanding employment opportunities, professional inequalities, innovation, and trade. In developed economies, particular attention has been paid to the role of social

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networks in matching workers and firms in the context of imperfect information on job markets (Schmidt and Jensen 2012). The economic benefits of social networks are particularly evident for highly-qualified workers, whose social connections help them access non-redundant information and earn higher wages, and for knowledge-intensive firms competing for a limited pool of potential jobseekers (Goyal 2012). These findings seem to hold true in the highly fragmented market of Sub-Saharan Africa, where a majority of workers are self-employed, have low levels of qualifications, and where informal recruitment procedures based on word-of-mouth are dominant. Evidence from South Africa (Burns et al. 2010, Hofmeyr 2010, Schöer et al. 2012), Ethiopia (Mano et al. 2011, Caria and Hassen 2013), and Burkina-Faso (Nordman and Pasquier-Doumer 2013), among others, indicates that social networks enhance employment opportunities.

Social networks also prove effective in shaping the diffusion of new technologies. Rather than adopting new technologies randomly or following expert recommendations, early adopters often rely on their social networks to evaluate the profitability of innovation. In Ethiopia, for example, Matous et al. (2013) show that farmers are more likely to adopt a system of production that enhances productivity while preserving the environment if they belong to the same ethnic and religious group as the state agent in charge of promoting agricultural change. Studying the process of social learning in the pineapple industry in Ghana, Conley and Udry (2010) reach similar findings when they note that novice farmers introduce agricultural innovation based on their information neighborhood. In Zimbabwe, Chipika and Wilson (2006) find that technological learning, measured through investments in R&D, innovation, and quality management, is generally positively associated with networking.

In addition to favoring job matching and innovation, social networks can also enhance manufacturing and trade. In a study conducted in Nairobi, Kenya, Akoten and Otsuka (2007) show that micro-manufacturers who had developed business links with traders are more likely to adopt new technologies and to produce higher quality products than those who sold directly to consumers. Similar findings were reported by Ishiwata et al. (2014) in Ethiopia, who showed that the density of ties between micro-enterprises affect positively the sales and the skills of the manufacturers. In their study of the relationships used by agricultural traders in Madagascar, Fafchamps and Minten (1999) also found that more successful traders are better connected and make extensive use of embedded ties rather than arm's-length

transactions. The social networks developed among traders enhances productivity by helping them obtaining information about prices and market conditions, negotiating and enforcing contracts, obtaining loans, ensuring the regularity of trade flows, and reducing risks. In another study, Fafchamps and Minten (2002) assess the economic performance of traders' networks, taking into account the possible endogeneity of networks indicators. Measuring social capital – defined as "the advantage created by a person's location in a structure of relationships" (Burt 2005: 4) – by the number of contacts with others traders, suppliers and clients, they show that these variables positively influence the economic performances of the traders, even after controlling for endogeneity and other econometric shortcomings. They demonstrate that the main channels through which social capital affects traders' profit are better information on prices, the trustfulness of clients and suppliers, and potential access to commercial credit.

Considering the benefits of social networks in economics, one could expect the relation between embeddedness and economic success to be linear, with the most connected actors being also the most successful. This linear relation would only be limited by the number of stable social relationships that an individual can sustain during his life. However, the building of social ties also entails network diseconomies, which explain why the relation between the two variables follows an inverted U-shape curve (Uzzi 1996). Network diseconomies can be explained by the fact that the effects of social networks on economic outcomes do not depend only on the number of social connections, but also on the structural position of the actors to which one is connected. Social actors can gain power through their ability to be connected to a large number of other actors, or to bridge several clusters of actors. In the first instance, the most important actors have a high *degree* centrality, meaning that they are connected to many others, whereas the actors bridging clusters have a high *betweenness* centrality, and are usually known as *brokers* (Burt 1992).

Central actors intensely embedded in a local cluster of close friends and associates are unlikely to be very successful in business, because they lack the brokerage ties that could allow them to reach external resources, such as foreign business partners of a different ethnic or religious background, for example. In a number of small and medium enterprises in Zimbabwe, for example, strong kinship ties have a negative effect on technological change, mainly because they prevent manufacturers with a low level of education from accessing external resources (Chipika and Wilson 2006), illustrating the Janus face of social networks

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(Bähre 2012). Strongly embedded actors are also vulnerable to social obligations, which in Africa are well-known for undermining prosperous businesses or prevent enterprising individuals to develop innovative activities (Whitehouse 2012). Brokers that exclusively rely on external ties are also unlikely to become successful entrepreneurs since they lack the internal linkages within local clusters that provide the structural basis for trust and solidarity (Wellman 1988). As a consequence, African entrepreneurs are forced to find a balance between internal linkages within their cluster of closely-knit acquaintances, and brokerage ties built beyond their local community (Walther 2014). As Burt (2005: 97) argues, "Brokerage is about coordinating people between whom it would be valuable, but risky, to trust. Closure [embeddedness according to the author] is about making it safe to trust. The key to creating value is to put the two together, building closure around valuable bridge relations". This tradeoff – known as the entrepreneur's dilemma – appears to be valid in a wide range of domains and regions, from the shoe and garment industry in Nigeria (Meagher 2010), to international trade in Brazzaville (Whitehouse 2012).

3. Methodology

3.1. Two border regions

In order to test the association between social networks and economic performance, we use data from a survey of small traders in two West African border regions. The survey areas are the five border markets of Gaya and Birni N'Konni in Niger, Malanville in Benin and Illela and Kamba in Nigeria (Map 1). The markets of Gaya, Malanville and Kamba (hereafter GaMaKa), and of Birni N'Konni and Illela (BNI) are geographically close to each other (less than 10 km) and form two highly integrated markets between which local traders are used to develop business ties (Walther 2009, 2012).

Map 1. Location of case studies
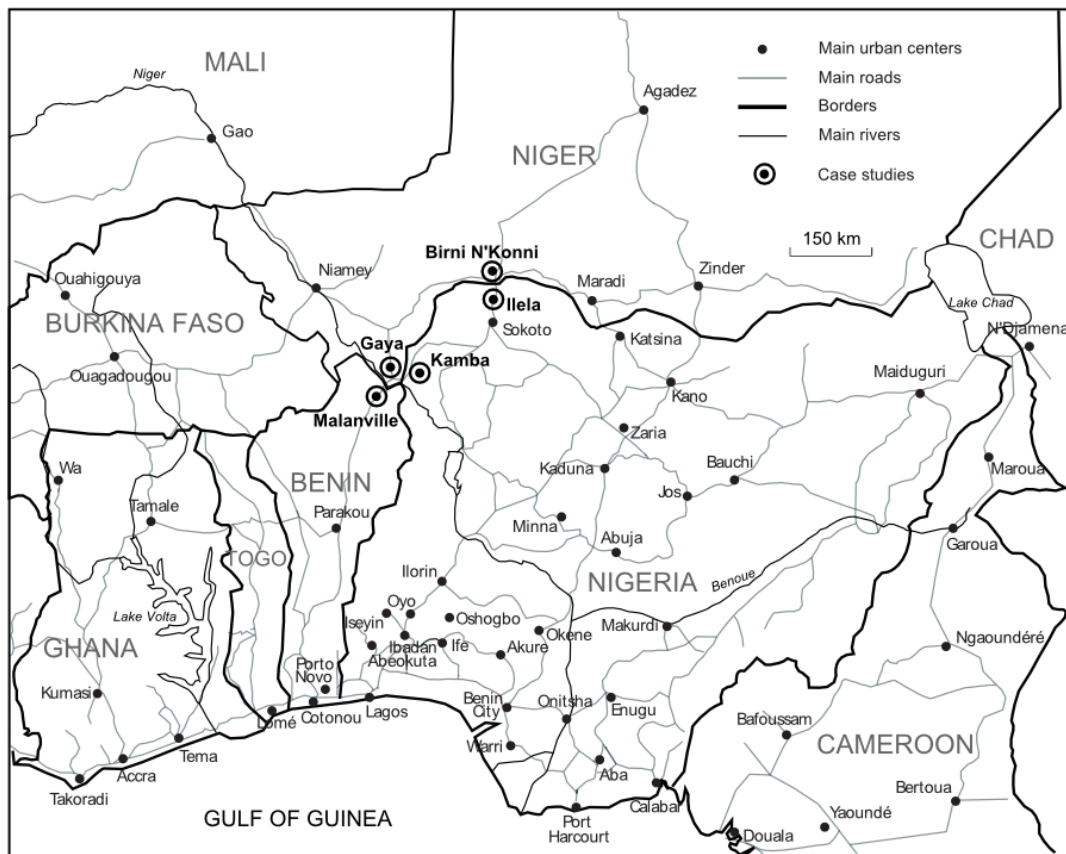
Source and cartography: authors

The survey questionnaire was designed to collect information on the social network of the traders, and various information on their business, including monthly sales and profit. The sample is made of 358 small traders from these border markets surveyed from March to May 2012 (Table 1).

Table 1. Allocation of the sample by markets

Markets	Sample size	Group markets	Sample size
Gaya	73	GaMaKa	216
Malanville	79		
Kamba	64		
Birni N'Konni	68	BNI	142
Illela	74		
Total	358		358

Source: authors

Due to the absence of reliable information on the population of traders in both countries, we defined a small trader as a businessman whose annual turnover is smaller than 100 FCFA

million (€152,000). This amount is widely regarded by local freight agents as a relevant threshold between small traders mainly engaged in petty trade and large traders able to develop transnational activities. Small traders were selected with a "pseudo-random" selection technique: A given number of small traders were assigned to every street in the market according to its length and density. For every street, every tenth small trader with a fixed position has been selected, in any direction.

3.2. Measuring social networks and economic performance

The boundaries of social networks are difficult to establish because they usually depend on the type and intensity of interactions considered between social agents (Marsden 2012). In Africa, this problem is even more acute because social interactions are pervasive and kinship relationship, religious or ethnic connections are particularly frequent. In the literature, networks are measured in different ways. Some authors consider actors in similar activity or industry (Akoten and Otsuka 2007, Ishiwata et al, 2014); others take into account suppliers and customers (Chipika and Wilson, 2006). These two approaches privilege business network in the senses that actors are in relation mostly because of their commercial transactions. Another approach consider networks whose existence is not necessarily justify by a professional link, but by association membership, family, or kinship (Fafchamps 2004, Hofmeyr, 2010, Nordman and Pasquier 2013).

In this paper, networks are measured using a pre-defined list of given social and administrative positions including: Police officer, Gendarme, Custom officer, Senior civil servant, Marabout, Member of Parliament and Minister or Head of Department, Mayor or chief of small town and village, International migrant, Other important person known. Small traders were asked to state whether they knew the incumbents of those positions and if yes, whether they had ever been in contact with them. They were also asked to name other people they considered important for them including family members or relatives. For any listed person or position, a set of questions was asked to measure the intensity of the social ties. These questions included the frequency of contacts and the benefit of any support or advice. Our underlying hypothesis in using this approach was that the performance of a small trader would depend more on the quality of his network as measured by the social position of the identified members than on the quantity.

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In our survey, the economic performance of small traders is measured by the monthly profit as estimated by the traders themselves. This declarative approach has been widely used in employment surveys to measure the earnings of entrepreneurs and self-employed workers (see De Mel et al. 2009) and is considered as robust compared with alternative methods, such as detailed reporting of sales and expenses, usage of account diaries, etc. Instead of collecting the exact amount, enumerators were instructed to collect this information by intervals[1]. The use of intervals reduces non response rate given that some traders are reluctant to provide the exact amount of their monthly profit. Finally, even if profit and sales are subject to measurement errors, these errors do not affect the estimation of regressions coefficients, as far as they are not correlated to the explanatory variables (Wooldridge 2002).

3. 3. Empirical methods

Proving a causal relationship between the structure of social networks and economic outcomes has proved challenging. On the one hand, social networks can generate externalities and improve business performance by enhancing productivity and reducing uncertainty. On the other hand, wealthy entrepreneurs can be more connected because they can afford the cost of maintaining social connections over the long term, thus attracting a large number of dependents which they can control. Studies using relational approaches have tackled this issue by looking at differences in social connections within groups in order to understand variations in economic behavior across entrepreneurs faced with similar incentives (Goyal 2012).

The article uses both descriptive statistics and multivariate analysis. The descriptive analysis relies on univariate and bivariate tables and charts of frequencies and means to provide the network profile of small traders and to display a snapshot of profit levels across countries. Descriptive statistics are supplemented with a multivariate regression analysis. The following regression analysis framework was used:

$$P_i = X_i' \beta + \alpha N_i + \varepsilon_i \text{ (EQ.1)}$$

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[1] In the appendix, we run an interval regression (Table A) that explicitly accounts for this structure of the data. The estimated coefficients are qualitatively similar to those presented in the paper.

where: P is a monthly profit of the small trader, measured in CFA Francs (100 CFA=0.15€). In the first set of regressions, N measures the number of influential persons the small trader interacts with. In the second set of regressions, N is a vector of network indicators which indicates whether the small trader has a strictly positive network size and the set of people that the trader knows and interacts with. The vector X provides other covariates and contains traders characteristics (gender, education, experience); and i identifies the small trader. The vector of coefficients of interest α captures the correlation between profit and network after controlling for the effect of other factors. The equation is first estimated by ordinary least squares (OLS). Because the causal link between social networks and profit cannot be fully elaborated due to unobserved heterogeneity and reverse causality[2], we then use the instrumental variable method (IV), which proceeds as follow: Instead of directly estimating α from (EQ 1), we start by positing the following regression of N on a set of variables Z than included the vector X and instruments:

$$N_i \;=\; Z_i' \,\delta + v_i \text{ (EQ2)}$$

When N is a continuous variable (e.g. the number of network members), we use a two stage least squares approach and when N is a dummy indicating a socio-professional position of a network member, we turn to a maximum likelihood method.

When using the IV approach through two stage least squares or dummy endogenous regressors (TREAREG in STATA), the crucial challenge is to find valid instruments from the data set. A valid instrument should be uncorrelated to the error term (ε in EQ1) conditional on X and has to be correlated to N. We assume that the ethnic group of a small trader has these two properties and thus, include the ethnic group in our set of instruments. The hypothesis that the ethnic group shapes the network is motivated by the fact that most African countries are fractionalized along ethnic groups (Alesina et al. 2003) and that ethnic identification is still prevalent (Bossuroy 2011, Eifert et al. 2010). We also use the father's level of education as second instrument, given that it is a predetermined variable on which the trader has no influence, but which can impact his social network and hence his profit.

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[2] The case for reverse causality is however limited because most small traders suggested during the survey that they themselves initiated the contacts with incumbents of listed positions.

4. Results

4.1. Description of the main variables

The socio-demographic characteristics of our respondents (Table 2) show that small traders from the border markets are 35 years old on average. The average age is similar across the three countries and reflects the youth of the population involved in small businesses. Most of the small traders have spent more than a decade in the activity, particularly in Benin, where the average experience in business is over 15 years, compared with an average of 12 years in the other two countries. Education levels are extremely low: more than a third (43%) of small traders have attended only Koranic school while 15% have attended some primary level of schooling. A very limited number of the interviewees attended high school, a business school, or university. These results are congruent with adult literacy rates calculated at the national level, which indicate that only 28.7% of the population aged 15 and older had the ability to read and write in Niger (2005-10), 42.4% in Benin, and 61.3% in Nigeria (UNDP 2013), and with previous studies conducted among traders, which showed that most traders had a very low level of education (Golub and Hansen-Lewis 2012).

Almost half of the small traders interviewed came from farming families. This is particularly visible in Niger (51%) and Benin (48%), where agriculture is the predominant activity of 60% and 43% of the employed population respectively, according to World Bank (2014) indicators. A third of the traders' parents in the sample are also traders. This proportion is slightly higher in Nigeria (37%), which is a more business-oriented country, and slightly lower in Niger (28%) where employment in farming is more common. Parents of one fourth of traders in the sample are involved in various forms of activities in the nonagricultural sector, including civil servants.

Table 2. Main socio-demographic characteristics of the interviewees

	Total	Niger	Nigeria	Benin	BNI	GaMaKa
Sample size (n)	358	141	138	79	142	216
Age	35.48	34.70	35.94	36.08	35.39	35.54
Experience	12.90	11.89	12.59	15.23	13.01	12.82
Education level						
None	0.09	0.12	0.02	0.18	0.05	0.13
Koranic only	0.43	0.46	0.42	0.41	0.50	0.39
Primary	0.15	0.19	0.11	0.16	0.13	0.17
Secondary	0.27	0.21	0.36	0.22	0.27	0.26
University	0.05	0.02	0.09	0.04	0.06	0.05
Father's occupation						
Agriculture	0.46	0.51	0.38	0.48	0.49	0.43
Trader	0.33	0.28	0.37	0.32	0.35	0.32
Other activity	0.22	0.21	0.25	0.20	0.16	0.25
Previous activity in trade	0.51	0.39	0.43	0.39	0.39	0.61

Source: authors

When we compare the two regions surveyed, small traders exhibits several important differences with respect to the level of education and family background. On the Niger-Nigeria border separating the markets of Birni N'Konni and Illela (BNI), Koranic education is more predominant (50%) than it is in the trinational region of GaMaKa, where a larger proportion of traders have never attended school at all (13%). In the BNI region, a larger share of the respondents grew up in a family where the father was active in agricultural activities (49%) whereas small traders in GaMaKa region have predominantly been raised in a family where the father has a previous activity in trade (61%).

4.2. Importance of social networks

Our results indicate that small traders know on average two people listed as incumbents in a social or administrative position (Table 3). The most prominent social position is the Islamic spiritual and political teacher, known as *marabout* in North and West Africa (Butler 2006), which was cited by 46% of the traders. More than half of the traders located in Benin and Niger reported connections with a *marabout*, compared with 31% for the traders based in Nigeria, where a larger proportion of traders are Christian Igbo from the South of the country. The next position is occupied by senior civil servants, with whom about 40% of the traders in the sample interact. Civil servants are more involved among Nigerian small traders (46%)

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than those of Niger (33%). The following positions are police officers (24%), gendarmes and mayors (21% each).

Table 3. Social networks of small traders

	All	Niger	Nigeria	Benin	BNI	GaMaKa
Sample size (n)	358	141	138	79	142	216
Socio-economic position						
Police officer	0.24	0.31	0.20	0.16	0.16	0.27
Gendarme	0.21	0.28	0.14	0.20	0.20	0.22
Custom officer	0.10	0.13	0.09	0.09	0.11	0.10
Senior civil servant	0.40	0.33	0.46	0.42	0.37	0.42
Marabout	0.46	0.54	0.31	0.57	0.34	0.54
MP/ Minister/Head of Department	0.08	0.08	0.08	0.06	0.05	0.09
Mayor/chief of small town, village	0.21	0.30	0.15	0.14	0.19	0.22
International migrant	0.13	0.13	0.14	0.11	0.15	0.12
Other important person known	0.15	0.06	0.30	0.04	0.13	0.17
Average number of persons known	2.05	2.23	1.91	1.99	1.74	2.26
Knows at least one person	0.82	0.81	0.83	0.81	0.78	0.84
Ever receive support from:						
Police officer	0.07	0.09	0.08	0.03	0.04	0.09
Gendarme	0.08	0.09	0.05	0.10	0.05	0.09
Custom officer	0.04	0.04	0.04	0.03	0.03	0.04
Senior civil servant	0.21	0.16	0.27	0.19	0.18	0.23
Marabout	0.37	0.41	0.27	0.49	0.25	0.45
Deputy/ Minister/ Head of Department	0.04	0.04	0.05	0.03	0.02	0.05
Mayor/chief of small town, village	0.10	0.13	0.07	0.09	0.07	0.12
International migrant	0.05	0.03	0.06	0.08	0.05	0.05
Other important person known	0.13	0.05	0.25	0.04	0.11	0.14
Ever receive support from at least one person	0.61	0.58	0.64	0.59	0.54	0.65
Average number of contacts per month with:						
Police officer	4.68	5.71	5.20	1.93	2.41	6.17
Gendarme	5.42	7.81	2.58	6.13	2.26	7.50
Custom officer	2.58	4.19	1.68	1.27	1.25	3.45
Senior civil servant	9.78	8.60	11.19	9.44	5.46	12.62
Marabout	11.99	12.92	9.86	14.06	5.56	16.22
Deputy/ Minister/ Head of Department	4.88	7.17	3.55	3.13	1.41	7.16
Mayor/chief of small town, village	9.27	14.04	5.78	6.87	4.81	12.20
International migrant	4.04	4.55	3.37	4.29	1.73	5.55
Other important person known	6.95	4.38	13.37	0.31	3.15	9.44

Sources: authors

Connections with customs officer were only reported by one tenth of the traders. Given the fact that the surveyed markets are close to national borders, where informal transactions are

conducted between traders and custom authorities, we would have expected higher level of interactions between these actors. One possible explanation may be related to the scale of activities of the surveyed small traders, who are more likely to buy goods from the local market than large traders engaged in frequent negotiations with customs officers. Another explanation could lie in the fact that custom officers are frequently rotated between border posts in order to prevent corruptive activities and have not the time to establish long-term informal relationships with small traders. The average number of monthly contacts with the incumbent of a given position aligns with their social importance: the officials that were most frequently cited as connections are also those that are more frequently contacted. A *marabout* is contacted an average of 12 times per month, a civil servant 10 times per month, while customs officers have infrequent interactions with small traders.

During the survey, information on the type of support (if any) solicited from the network was also collected. The results confirm that small traders do rely on their network presented in Table 3. Six out of ten have received support or advice from one of the incumbent listed in our survey. A large majority (82%) of small traders knows at least one person with a higher socio-economic position and 61% have received support or advice from them. Small traders request support more frequently from *marabouts* (37%) and senior civil servants (21%). Police and other security officers are less solicited. *Marabouts* play a key role for small traders most often in Benin (49%) and Niger (41%), whereas in Nigeria, *marabouts* and civil servants are equally solicited for support. Small traders from the GaMaKa region are more likely to develop ties with one of the socio-economic positions than in the BNI region, as evidenced by their higher average number of persons known (2.26 vs. 1.74). Not only do small traders receive more support from the incumbents listed in our survey; they also solicit them more frequently, up to once every three days for civil servants, marabouts, and local chiefs. The differences in support and frequency of interactions suggest that the trinational region of GaMaKa, with its numerous national legislations, requires more informal transactions between traders and representatives of the state than the binational region of BNI.

4.3. Social networks and profit

The initial set of the network includes nine positions, which are too many given our small sample. For the bivariate and the multivariate analyses we aggregated the positions into four homogeneous groups: (1) Marabouts; (2) Politicians and senior civil servants, including ministers, members of parliament, heads of department, and other senior civil servants; (3) Security officers, including gendarme, police, and customs officers; (4) Others.

In what follows, we wish to determine whether the average monthly profit of traders is positively or negatively affected by the people with whom they are connected. Table 4 shows that interacting with *marabouts* has a detrimental effect, unlike having connections with other categories of actors, which offers a monthly premium of at least about 25,000 FCFA (€38). This is a quite important difference since it represents approximately the monthly minimum wage in West Africa. It is in Niger and Benin that the social ties with senior civil servant and security officers make larger differences (more than 25,000 FCFA) whereas the differences are only between 9,000 FCFA (€14) and 12,000 FCFA (€18) in Nigeria.

Table 4. Average monthly profit by type of support, FCFA

Connection with:	Niger	Nigeria	Benin	BNI	GaMaKa	Total
Security officers	120,000	176,667	177,000	170,000	145,556	150,870
Politician and Senior civil servants	119,516	181,889	151,316	167,273	149,113	155,421
Marabout	92,596	169,189	122,973	123,333	124,247	124,008
Other important persons	127,500	165,854	139,286	168,864	148,194	156,034
A least one support	100,592	168,523	123,750	149,932	125,560	134,231
Overall profit	92,320	168,029	112,734	137,407	121,597	128,144

Source: authors

An analysis across regions shows that profit is always higher in the binational BNI region than in the trinational GaMaKa region, except for the social ties with marabouts, where the difference between the two case studies is negligible (less than 1000 FCFA). These results indicate that, without controlling for a number of confounding factors, the relatively higher number of connections and frequency of social ties developed by small traders in the GaMaKa region does not translate into higher profits.

4.4. Effects of network on profit

The bivariate analysis has indicated some correlations between profit and a set of network indicators, especially in Niger and Benin. However, we cannot draw conclusions regarding the effect of the network based only on this descriptive analysis because profits are likely to be influenced by other factors as well. Therefore, we turn to multivariate analysis in order to evaluate which of the social and economic characteristics of small traders have a significant influence on their business activities. Given the small size of our sample, we cannot estimate the network influence per country and must run a single model for the three countries. The estimated coefficients then represent the mean effects of networks for the whole region.

As stressed in the methodological part, when estimating the influence of network on economic performance, it is important to take into account the potential endogeneity bias. Given the nature of our survey (a one-shot survey as opposed to a panel) and the variables at our disposal, the more adequate way to tackle the endogeneity issue is the use of instrumental variables. The consequence of this strategy is that we are obliged to be parsimonious by using only one network indicator per regression, because it's almost impossible to have enough valid instruments to handle all the five network positions simultaneously in the same model[3]. To overcome these shortcomings, we adopt the following flexible approach. In a first model, we use as network indicator the dummy of having at least one support. We then turn to a second specification, using the size of the small trader network as network indicator. Finally, we run a series of models where the network is measured by dummies indicating each of the socio-professional positions of the network members (Security officer, Politicians and Civil Servants, Marabout, Other important persons).

The substantive impact of each of the network variable on the traders' economic performance is presented in Table 5 and 6, which also include several measures that allow us to assess the quality and the validity of our estimates. We resort on Sargan's (1958) and Basmann's (1960) tests of over-identifying restrictions which enable to test the validity of the instruments in the case where there are more than one instrument, which is the case in this study. One should note that the over-identifying restrictions test is a necessary but not sufficient test: if the over-identification is rejected it casts doubt on the validity of the instruments and if it is not

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[3] In order to correct for endogeneity, we should have at least as many valid instruments as endogenous variables in the model. But in our database the sole valid instrumental variable is the ethnic group.

rejected, one can still criticize the exogeneity of the instruments on theoretical grounds. Estimations suggest that we cannot reject the instruments over-identification since the associated probability is above 10% for the main specification when the network indicator is the continuous variable[4], as can be seen on the last line of Table 5. Even though this test does not give us a free hand for measuring the robustness of our instruments, it reinforces our belief in their relevance.

Table 5. Estimated effect of network indicators on small traders' profit

	Dummy endogenous regressor	IV	OLS
Dummy =1 if positive network size	1.442***		
	(0.237)		
Network size		0.462**	0.108***
		(0.201)	(0.027)
Experience as trader	0.020***	0.025***	0.020***
	(0.006)	(0.007)	(0.006)
Koranic education	-0.054	-0.069	-0.044
	(0.213)	(0.222)	(0.210)
Primary education	-0.232	-0.145	-0.168
	(0.234)	(0.241)	(0.230)
Secondary or university education	0.197	0.213	0.255
	(0.218)	(0.227)	(0.215)
Father farmer	-0.267**	-0.108	-0.264**
	(0.127)	(0.170)	(0.131)
Father trader	0.178	0.257*	0.213*
	(0.126)	(0.156)	(0.128)
GaMaKa	-0.183*	-0.514***	-0.284***
	(0.099)	(0.169)	(0.100)
Constant	10.411***	10.663***	11.180***
	(0.307)	(0.387)	(0.256)
Observations	326	326	326
R-squared			0.157
P over-identifcation (Sargan test)		0.243	

Notes: Robust standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1). We used TREATREG to handle endogeneity.
Source: authors

Our estimations indicate that social networks play a very important role for small traders. Hence, those who are connected to any of the important personality gains 144% more than

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[4] The alternative measurements of the social network are all dummy variables (at least one support, support from senior civil servant, support from security officer, support from marabout, etc.). When the endogenous regressor is a dummy variable, we use TREATREG for which there isn't to our knowledge a version of Sargan's and Basmann's tests of overidentifying restrictions.

those who are not connected. This result is confirmed when we consider the size of the social network since each additional personality increases small traders' profit by around 46% when endogeneity is controlled for. This effect is about four times more important than the one estimated by OLS without controlling for endogeneity, meaning that OLS estimate suffers from an attenuation bias. This suggests that social networks are a very valuable resource in the border regions studied, more important than other factors. Indeed, the high return to social networks is clear in opposition with the weakness of the coefficient of the work experience and the absence of the impact of education. So it's obvious that social networks are the main factor of productivity in our setting.

As can be seen from Table 6, the impact of the network on the economic performance of small traders depends on the type of person with whom they are connected, suggesting that some social ties are not as useful from a purely business point of view.

Table 6. Estimated effects of the network type dummies on small traders' profit

VARIABLES	Security officer	Senior civil servant	Marabout	Other person
Security officer	0.709			
	(0.534)			
Senior civil servant		1.090***		
		(0.272)		
Marabout			-1.590***	
			(0.272)	
Other important personality				0.988***
				(0.287)
Experience as trader	0.021***	0.019***	0.020***	0.018***
	(0.006)	(0.006)	(0.006)	(0.006)
Koranic education	-0.021	-0.074	-0.133	-0.067
	(0.215)	(0.213)	(0.224)	(0.219)
Primary education	-0.164	-0.206	-0.254	-0.211
	(0.234)	(0.233)	(0.239)	(0.238)
Secondary or university education	0.276	0.173	0.131	0.195
	(0.220)	(0.220)	(0.230)	(0.223)
Father farmer	-0.295**	-0.272**	-0.242*	-0.278**
	(0.131)	(0.128)	(0.134)	(0.129)
Father trader	0.219*	0.218*	0.220*	0.201
	(0.130)	(0.125)	(0.127)	(0.127)
GaMaKa	-0.248**	-0.235**	-0.175*	-0.206**
	(0.098)	(0.099)	(0.100)	(0.096)
Constant	11.207***	11.051***	11.969***	11.191***
	(0.270)	(0.263)	(0.271)	(0.256)
Observations	326	326	326	326

Notes: Robust standard errors in parentheses (*** $p<0.01$, ** $p<0.05$, * $p<0.1$).
Source: authors

That is particularly the case of being in relationship with a *marabout*, which doesn't provide great financial benefit but contributes to sharply reduce the traders' profits. As religious leaders and advisors, *marabouts* play a key role in West African economics where trade and Muslim faith have, since precolonial times, been closely associated (Lydon 2009). Traders visit *marabouts* because they are supposed to intercede with God and to seek forces to ward or heal themselves against misfortunes, occult threats and attacks. Some individual in the studied regions consider persistent misfortune and affliction to be the result of malevolent supernatural occult powers in their lives. Seeking *marabout's* protection induces financial cost that in some case represents up to 46% of total monthly expenditures (LeMay-Boucher et al. 2013). The use of – and expenses related to – *marabouts* is increasingly criticized by

Islamic reform movements, such as the Society for the Removal of Innovation and Reinstatement of Tradition to which many local traders belong (Kane 2003).

Other network relations presented in Table 6 are always associated with positive outcomes, even if this effect is not always statistically significant. The positive effect of connections to politicians or senior civil servants can be explained by a conversion of social capital to economic capital: small traders that are connected with politicians and senior civil servants can call on their financial support to increase the scope of their activities. In some cases, traders and politicians or senior civil servants can even be partners, the latter providing funds and the former investing these funds. Given that they are in charge of enforcing law and rules related to trade, state representatives can use their position to favor traders with whom they are in contact. The impact of security officers such as customs officers, policemen, or gendarmes, although positive, is not statistically significant. There seems to be a leverage effect of family tradition in trade. Those whose fathers were also traders lead more profitable businesses than those whose fathers are involved in agriculture. When children perform the same activity as their fathers, they can benefit from specific "know how" linked to that activity (Pasquier-Doumer 2012).

Surprisingly, education level, which is an important determinant of individual productivity, has almost no significant impact on business profit in any of the countries. Having attended school does not seem to help in informal trade of the border regions of Niger, Benin and Nigeria. This result challenges those founded by Kuepié et al. (2009) who showed that education was still rewarding even in the informal labor market of some of the capital cities of West African. The fact that education doesn't contribute to economic performance is a matter of concern since it's an important component of human capital, which is known to be an engine of economic growth. The absence of this effect could be the result of the discrepancy between the training received and the abilities required for trade. The other human capital factor, work experience, has a positive impact on informal trade, which is in line with the literature.

4.5. Regional effect

So far, our analysis has mainly documented the consequences of social relations for economic outcomes in the countries where small traders were surveyed. In what follows, we look at the

estimated regression coefficients in the two border regions surveyed. The rationale behind this analysis is that some regions may have unique characteristics, which can positively or negatively influence trade activities. Our results show that, all else being equal, small traders located in the GaMaKa region have significantly lower monthly profits compared to those located in the BNI region, which may be related to the divergent evolution of the Nigerian part of the two border regions.

As discussed previously, monthly profits are usually higher in Nigeria, than in Niger or Benin. Nigerian traders supported by vigorous ethnic and kinship groups, such as the Igbo, Hausa, and Yoruba, have developed informal trade activities that greatly benefitted from the imperfect removal of barriers to trade and harmonization of external tariffs put in place in Nigeria over the last decades that protect Nigerian agricultural and industrial activities (Golub 2012). As a result, Nigerian border cities have transformed into highly dynamic market places from which a large variety of manufactured and agricultural goods could be imported and exported illegally. The small town of Illela, for example, has progressively become a gateway for second-hand cars, which are exported in Nigeria where their official import is banned. Further West, the Nigerian city of Kamba has long served as a transit point for petroleum products smuggled from Nigeria, where they are heavily subsidized, as well as for other manufactured goods produced in Nigeria. The commerce of illegal oil peaked in the late 1980s, when even the residents of the capital-city of Niamey, located 300 km away, used to come and fill their cars with contraband gasoline.

Since then, the two Nigerian cities of Illela and Kamba have experienced highly contrasted developments: while Illela has maintained its strategic importance on the road between Hausaland and Sokoto and provided fertile ground for small-scale cross-border trade, Kamba has slowly declined, due to increasing insecurity and religious clashes, a deteriorated road network, and increasing domestic prices in Nigeria (Walther 2009). Many small traders – especially Christian Igbo from the South – have moved to more welcoming regions. At the same period, the neighboring cities of Gaya in Niger and Malanville in Benin have experienced a boom due to the development of re-export trade of second-hand textiles, which are illegally exported to Nigeria. The revenues generated by such trade have mainly contributed to enrich large foreign traders, who have developed transnational networks, but have generated few local spillovers for the small traders surveyed in the region, who mainly depend on petty trade.

5. Conclusion

Our objective in this paper was to investigate the role of social network on small business performances as measured by monthly profits in five border markets in West Africa. As shown by recent scholarship, social network can simultaneously be a resource which positively contributes to labor market outcomes and, in some circumstances, a social burden that limit private initiatives and leads to a negative economic impact.

Empirically, collecting data on social network has proved challenging since an actor can be connected to a myriad of family members, friends, and other relatives. So it's important to have a strategy which enables the collection of relevant information on networks. In our survey, we developed an approach of social network measurement which focused on important personalities with whom small traders were connected. At the econometric level, measuring the impact of social network on economic performance supposed to be able to control for endogeneity due to the simultaneity bias or the reverse causality. We dealt with this issue by collecting data on predetermined characteristics (ethnic groups, parents' education level) which were used in an instrumental variables estimation strategy.

The analysis shows that more than a third of the small traders surveyed interact with local religious leaders or civil servants, whereas contacts with politicians or security officers are less frequent (one tenth). Small traders receive various form of support from these categories of actors. The support received from civil servants, politicians, and security authorities is converted into economic performance. This conversion is channeled through two mechanisms: the mobilization of financial capital through connections to actors who have access to state resources and the non-compliance to law and rules concerning taxes or bans on certain products. Interactions with traditional religious leaders have no significant effect on economic performance, despite the spiritual importance of these actors. We also found that education, widely regarded as an important determinant of productivity and income, does not have a significant impact on traders' economic performance. This result could be the reflection of a misalignment between education curricula and the need of labor market. On contrary, work experience prove to have a positive impact on the traders' profit.

The fact that social networks pay off, reflects, to a certain extent, market imperfections in accessing credit, and in enforcing rules and laws. As a consequence, those who can rely on an effective network are better off than those left out. By providing access to capital, suppliers and customers, and reducing transaction costs, social networks facilitate the development of flexible and informal ties between West African businessmen. They are, however, not frictionless, and can also hamper the evolution of business, because deeply embedded actors are often conservative about whom they do business with, which can make it hard for newcomers to enter a market and bring new ideas.

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Appendix. Robustness check

The data collected on profit were transformed into a continuous variable using the midpoint of each interval. As a robustness check, we stick to row data and estimate an interval regression. This procedure explicitly accounts for the values of the lower and the upper bounds of intervals used during the survey. Estimated coefficients presented in Table A below are qualitatively similar to those presented in Table 5, which means that the network size significantly and positively affects the profit of small traders.

Table A: Estimated effect of network size on small traders' profit: interval regression

VARIABLES	Interval regression	IV interval regression
Network size	12,937***	32,156*
	(3,182)	(17,913)
Experience as trader	2,138***	2,145***
	(631.5)	(650.2)
Koranic education	-19,004	-21,259
	(18,089)	(18,574)
Primary education	-30,255	-34,841
	(20,946)	(21,526)
Secondary or university education	15,732	14,383
	(19,253)	(19,761)
Father farmer	-20,307	-12,950
	(13,323)	(15,396)
Father trader	23,491*	29,057**
	(13,960)	(14,790)
GaMaKa	-25,700**	-15,575
	(10,361)	(10,430)
Constant	107,114***	71,044*
	(23,905)	(38,560)
Observations	326	326

Notes: Robust standard errors in parentheses (*** $p<0.01$, ** $p<0.05$, * $p<0.1$).
Source: authors

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