Social Capital and the Firm:
Evidence from Agricultural Trade

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ABSTRACT[1]

Social capital is seldom used in the modeling of economic production processes. However, the returns to social capital in a real world with transaction costs might be as important as to labor and physical or human capital. Evidence from Madagascar shows that (i) agricultural traders rank the importance of relationships for success in business higher than input prices, output prices, and access to credit or equipment; (ii) better connected traders have significantly larger sales and gross margins than less connected traders after controlling for physical and human inputs as well as for entrepreneurial characteristics; (iii) traders who do not develop the appropriate social capital, do not grow. The evidence indicates that three dimensions of social network capital should be distinguished: relationships with other traders, which help firms to economize on transaction costs; relationships with individuals who can help in time of financial difficulties, which insure traders against liquidity risk; and family relationships, which reduce efficiency, possibly because of measurement error. Social network capital enables traders to deal with each other in a more trustworthy manner by granting and receiving credit, exchanging price information, and economizing on quality inspection.

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I. Introduction

Economists typically use physical capital and labor as inputs in the description of production processes as it is believed that these inputs are essential to produce. The same reasoning could be applied to other inputs. More in particular, anybody involved in purchases and sales activities, knows that contacts and relationships are also essential inputs for the survival of a firm. However, while the importance of this "social" capital has long been recognized in other social sciences (see for example Coleman (1988), Putnam, Leonardi and Nanetti (1993), Helliwell and Putnam (1995), Granovetter (1985, 1995)), this view has only recently received attention in the economics literature (e.g., Narayan and Pritchett (1997), Barr (1998), Fafchamps (1998), Lund and Fafchamps (1997), Grootaert (1998)).

The definition of social capital in different economic and social studies has not been uniform. Some have defined it in terms of trust and norms of civic cooperation (Knack and Keefer (1997), Temple and Johnson (1998)) or in terms of cultural values such as degrees of compassion, altruism, and tolerance (Fukuyama (1995)), while others have emphasized institutions together with the quality and quantity of "associational" life (Narayan and Pritchett (1997), Grootaert (1998), Putnam, Leonardi, and Nanetti (1993), Coleman (1988)). While those definitions have common elements, the exact meaning is imprecise and thus difficult to measure. This might have been one of the reasons why economists have been weary to use the concept.

Social capital in its broadest sense can influence economic exchange in two ways. Trust and emotional attachment to a group, society, or association may improve public sector efficiency or facilitate greater cooperation for services benefiting that group, society, or association as shown in the works by Coleman (1988), Putnam, Leonardi and Nanetti (1993), Greif (1993, 1994), Platteau (1994a,b), and Gambetta (1988). Benefits can also occur directly to the individual or the firm through knowing others with whom the individual forms networks of interconnected agents. This might facilitate screening in the labor and credit markets (Montgomery (1991), Cornell and Welch (1996), Lorenz (1998)), reduce the search costs for market opportunities (Kranton (1996)), improve the diffusion of information on innovations (Barr (1997))

as well as on bad payers or cheaters (Kandori (1992), Fafchamps (1998)), and reduce risk (Fafchamps (1992), Fafchamps and Lund (1998)). Much of the work on individual effects of social capital in the economics literature has been in markets where moral hazard issues are severe such as credit and labor.

In this paper the effect of social capital for the direct benefit of the individual or the firm in agricultural commodity markets is looked at. Social capital is measured as the number and type of relationships that are used by agricultural traders for business purposes. Hence, we shy away from norms and from memberships in local groups, associations, and institutions. Most of the recent analysis in agricultural markets focuses on price variability, price transmission and margins while studies on behavior of agricultural traders have received less attention. In the case that those studies took place, little attention has been given to transaction costs and social interaction (e.g. Badiane et al. (1997), Palaskas and Harriss-White (1994)). Notable exceptions are f.ex. Crow and Murshid (1994), Klitgaard (1995), and Staal, Delgado, and Nicholson (1997). However, none of these studies quantify the effects of social interactions.

The data in this paper originate from a recent survey on agricultural traders conducted in Madagascar. As in many other countries, Madagascar went through a liberalization experience that changed the whole agricultural marketing system. Agricultural markets were heavily controlled during a socialistic period from 1972 until 1983. From 1983 on, agricultural markets were gradually liberalized and massive trader entry ensued (Berg (1989), Barrett (1997a,b)). In the period immediate after the reforms, the government stayed present in agricultural markets through intervention in rice distribution, monopoly setting in major production areas, or price protection (Shuttleworth (1989)). The situation now is one with minimal state intervention or regulation, little restriction on product movements, and with free price setting by private traders.

This paper contributes to the literature on social capital through the illustration of the economic effect of social capital on the functioning and the performance of firms, in this case firms in agricultural commodity markets. The similarity between other types of capital and social capital are indicated. The structure of the paper is as follows. First, a overview of the survey methodology and the structure of agricultural trade in

Madagascar is given. Second, the high transaction costs in imperfect markets and the potential benefits of social capital in this environment are discussed. Third, the determinants of social capital and the quantitative impact of social capital on performance is analyzed by means of regression analysis. The paper finishes with conclusions and policy implications.

2. Survey Methodology and the Structure of Agricultural Trade in Madagascar

2.1. Survey Methodology

A survey of agricultural traders was conducted in 1997 in Madagascar in a joint project between IFPRI (the International Food Policy Research Institute) and the local Ministry of Scientific Research (FOFIFA). The survey consisted of two rounds. The first round was held between May 1997 and August 1997 (the main trading season) and focused on questions dealing with the individual characteristics of the traders and with the structure, conduct, and performance of the agricultural trading sector. During the second round, from September 1997 and November 1997, questions were asked about the nature of relationships with fellow traders, clients, and suppliers.

The sample design was constructed to be as representative as possible of all the traders involved in the whole food marketing chain from producer to consumer, wherever located. Three main agricultural regions were covered (Fianarantsoa, Mahajanga, and Antananarivo) and traders were surveyed in three different types of location:

- Traders operating in big and small urban markets in the main town of every province (*faritany*) and district (*fivondronana*). These traders are mostly wholesalers, semi-wholesalers, and retailers.
- Urban traders located outside the regular markets. These often are bigger traders, processors (e.g., rice millers), and wholesalers.
- Traders operating on rural markets at the level of the rural county (*firaisana*). These are mostly big and small assemblers and itinerant traders. Rural firaisanas were selected through stratified sampling based on agro-ecological characteristics to represent the various kind of marketed products and marketing seasons.

The survey focused on traders that marketed locally consumed staples such as rice, cassava, potatoes, beans, and peanuts. Traders involved primarily in export crops, fruits, vegetables, and minor crops were excluded. Most surveyed traders (67%) report rice as the agricultural product they trade most intensively. This reflects the importance of rice as the main staple food in the country[2]. Other most actively traded products are beans and lentils (18%), cassava (5%), potatoes (5%), peanuts (4%), and maize (2%).

A total number of 850 traders were surveyed in the first round, 729 of whom were surveyed again in the second round. The analysis presented here is based on traders that could be located in the two rounds[3]. The main characteristics of the respondents are summarized in Table 1. The three provinces of Antananarivo, Fianarantsoa, and Majunga are represented more or less equally in the sample. A breakdown of the sample by size and occupational category is given. Retailers constitute the bulk of the sample. They are divided into retailers with a semi-permanent selling point – usually a table or stall in the market itself; and retailers without fixed selling points, that is, those that sell immediately from the roadside. The latter are typically smaller and less formal. In contrast, the largest traders are assemblers (traders who collect large quantities from the countryside and assemble them for shipment) and wholesalers (traders who operate in bulk).

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[2] It is estimated at the national level that rice makes up half of the calorie intake of the population in rural areas (Secaline (1996)). However, the percentage is significantly higher in the regions in the survey as the province of Tulear characterized by a significantly drier climate and therefore different agricultural production and consumption habits than the rest of the country was not included in the sample.

[3] The category of traders that were hardest to trace during the second survey round are those who are least formal and have the least permanent form of operation. Therefore, itinerant traders tend to be underrepresented in the results reported here. The reader should also bear in mind that the Indo-Pakistani traders, who constitute a small minority in the total number of traders – but more important in bigger size categories –, tended to refuse participation in the survey. These traders were suspicious for any type of information sharing as they have often been blamed for wrongs in agricultural trading as for example shown by the widespread riots against them in the late 1980s. Blanchy's (1995) account of Asian businesses in Madagascar illustrates the importance of their internal networks and the reliance on family relations in the conduct of their business.

2.2. Structure of agricultural trade in Madagascar[4]

Generally, Malagasy traders are about 37 years of age, mostly male, and married with three children (Table 1). Trading in agricultural crops is often the main activity and most traders deal in different crops. Surveyed traders have on average spent 6 years trading agricultural products. 68% of the traders started their business in the 90s, significantly later than the onset of agricultural trade liberalization. However, new entry seems to have come to a halt and seems to be on the decline in recent years (Mendoza and Randrianarisoa (1998)). This seems to be driven by changes in the overall economic situation and not in the entry requirements as market licenses are easy to obtain and do not cost very much, according to the majority of the traders interviewed.

Malagasy traders employ very few people other than themselves. Permanent and temporary workers account for nearly half the total number of man months used by the trader while the other half is family and own labor. The labor use differs by category. 65 % of total labor used by wholesalers and assemblers is hired and outside labor while retailers rely heavily on own and family labor. In this case, outside labor makes up only between 5 and 20%. Marketing is highly localized, interregional trade is small and market coverage is limited. Almost 60% of the traders buy their products within a radius of 25km. This is understandable for the retailers who buy mostly from traders who bring the products to retail markets. However, even wholesalers and assemblers buy close by. Only 15% of the assemblers and 9% of the wholesalers purchase rice from an area further than 100 km. This low regional product specialization – and lack of market integration (Badiane et al., 1998) - seems partly due to the high transportation costs and less to lack of transport available as most traders report to have access to some means of transportation.

The surveyed businesses are fairly small and unsophisticated. Average working capital is around $2,000 – a large number compared to the annual GDP of Madagascar which was $230 in 1997 but very small compared to the turnover of grain trading companies in the US or Europe. Few of the traders possess their own means of

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[4] For a more extensive overview, see Fafchamps and Minten (1998a), Badiane et al. (1998), and Mendoza and Randrianarisoa (1998).

transport and investment in equipment is low compared to working capital. Most of the working capital seems to be tied up in the product itself. The size distribution among traders is quite significant. Assemblers make the highest gross margin per month, i.e. over $1800, compared to only $75 for the retailers without selling points. Moreover, Fafchamps and Minten (1998a) show that traders in the upper tercile of the firm size distribution use fifteen times more working capital and two times more labor but they obtain almost fifty times more gross margin than traders in the lower tercile. Hence, large traders have much higher total factor productivity than the small ones. In the remainder of the paper, we examine possible explanations for these differences and investigate particularly the role of social capital. In the next section, we illustrate the way traders do business in markets characterized by high transaction costs and how social capital might be of use in this type of environment.

3. Imperfect markets and social capital

Table 2 reports the importance of different factors for success in business as evaluated by the traders themselves. Relationships are by far the most important factor for success as 71% of the traders regard reputation and relationships as "very important". This percentage is much higher than for the other reasons that were suggested: access to credit, granting credit, the level of purchase or sales price, and access to transport equipment. While a surprising result at first, relationships can have multiple advantages for the trader. It is argued that traders use relationships and social capital to overcome three obstacles in imperfect markets that are fairly typical for commodity markets in developing countries: (1) poor market institutions, (2) high search costs, and (3) imperfect and asymmetric information.

3.1. Poor market institutions

(a) Credit

The use of trade credit by traders is extremely limited. 89% of the traders report that they use only their own funds to support their business operation (Table 3). A mere 4% of the traders has ever asked for credit from a formal institution (Fafchamps and Minten (1998a)) while less than 0.5% of traders actually use formal credit. The major

reasons given for non-application are ignorance, high interest rates, complicated application procedures, and lack of collateral. In the case that there is some element of credit, the funds come from the informal market. One reason why traders might value social capital is that they open access to informal trader credit[5]. However, informal credit does not substitute for lack of formal credit: still only one trader out of ten derives part of its working capital from informal credit sources.

The minor importance of formal institutions in traders' operations is further illustrated by the fact that only 15% of the surveyed traders has a bank account, 10% a savings account, and 1% a bank line of credit. Hence, it is not surprising that traders use no checks (less than 0.5% of the traders). Most of the agricultural trade – sales as well as purchases - takes place without orders (only 2% of the purchases) and without credit and are cash-and-carry transactions (82% of purchases and 86% of sales). Therefore, search and supervision costs are higher than they should be and massive amounts of currency constantly circulate in the countryside – an invitation to theft[6] and a perfect target for an inflation tax.

(b) Contract enforcement

As for credit, the use of formal institutions is also extremely rare for contract enforcement. Only 5% of the traders ever used police, lawyers or courts since the start of their business (Table 4). The dominant response to conflict resolution is negotiation with the other party or sometimes use of a third party as mediator. However, not using legal institutions does not imply that contracts are not enforced. Most of the disputes are resolved and trade continues. Contractual disputes are resolved through negotiation seemingly because the traders want to continue the relationship. A relationship is valuable as a majority of traders report that it would be fairly or very difficult to find a new supplier if they lost one. Hence, conflicts have to be solved and it is shown that conflicts are more often resolved when suppliers (clients) have a longer-term relationship (Fafchamps and Minten (1999)).

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[5] This is discussed further in section 3.3.b. on the evaluation of the credibility of suppliers and clients.

[6] Rural insecurity and cattle theft has traditionally been a big problem and some areas in Madagascar resemble the times of the Wild West in the U.S.. Rural insecurity increased apparently significantly in the lawless period after the impeachment of President Ratsiraka in 1991. It is illustrated by the fact that

(c) Insurance

Commodity trade is characterized by high variability and is subject to all kinds of risks. Co-variate risks such as bad road infrastructure, high level of insecurity, climatic calamities, and high price fluctuations and idiosyncratic risks such as non and late payment and the non-detection of bad quality - in the case of more sophistication in trade - hinder agricultural trade and might all be the cause of financial stress for small trading companies. A system of risk and insurance sharing might mitigate the consequences of adverse outcomes or might even allow traders to pursue higher return through more risky activities. In the absence of formal institutions, social capital might play this role.

The overwhelming majority of the traders are involved in some kind of informal insurance mechanism. 77% of the traders report to have helped others while 75% has ever been helped by others (Table 5). Moreover, larger traders are more involved in solidarity networks than their smaller competitors[7]. They also perceive relationships differently (Table 5). Large traders believe that they will be helped more by family and by others when they need it and they are more likely to help others if needed. Larger traders also perceive family and friends less as a burden than smaller traders. Not surprisingly, smaller traders are more proud of their own achievements without help.

Social capital matters when market institutions fail. Social capital can be a source of trade credit in an environment where formal credit is rare, it can be used for insurance through risk sharing, and it can be a substitute for contract enforcement where formal institutions are not effective. The results presented here resemble studies in similar situations, i.e. a mild impact of breach of contracts (e.g., Fafchamps (1998), Greif (1993, 1994), Kandori (1992)) and a low reliance on legal institutions (Fafchamps (1996), Bigsten et al. (1998)). On the other hand, it contradicts other findings where successful traders or market development are associated with more anonymous

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in 1997 an average rural village reported 2 thefts of cattle, 30 thefts of small animals, and 12 thefts of agricultural products (Minten, Randrianarisoa, and Zeller (1998)).
[7] Traders were divided in tercils, based on the size of total sales over the last year.

exchange and individualistic behavior (Platteau (1994a,b), Greif (1993, 1994)). Next, we look at the effect of search costs in commodity markets.

3.2. High search costs

(a) Supply

Search costs for supply seem to be high as 44% of the traders report that they have occasionally problems finding suppliers (Table 6). This is line with the fact that 55% of the traders have little choice between suppliers. Given these high search costs, there is an incentive for traders to try to assure regularity in supply. The traders that have the highest number of regular suppliers are also the ones that have least problems to assure a regular supply (Fafchamps and Minten (1998a)). Overall, almost 60% of the traders report that they buy from regular suppliers, accounting for almost 40% of their purchases. The importance of regular suppliers increases significantly with the size of the firm (37% for the small traders compared to 71% for the big traders). The long-term relationship between traders and regular suppliers is in the majority of the cases exclusively based on commercial and not on family, religious, or ethnical links.

Regular relationships with suppliers also allow the trader to engage in forward ordering. It is more commonplace among larger traders to do so: almost 19% of large traders place orders compared to only 7% of small traders. Apart from regularity in supply, steady relationships between suppliers and traders help to avoid losses due to bad quality products. Large traders are better able to get replacement for their products or to get refunds when a problem occurs while small traders have to solve the quality problem relatively more on their own. The quality uncertainty might be one of the reasons why 20% of the traders even refuse to buy from unknown suppliers.

(b) Demand

Search costs for clients seems less high than for suppliers as only 16% of the traders often do not find clients while almost 60% of the traders report to always have the choice between clients – significantly higher than the percentages on the supplier side

(Table 7). Hence, the incentive to develop regularity with clients is lower than for suppliers. However, it depends also on size. The small traders serve 57 clients with the quantity purchased from one supplier compared to only 25 in the case of large traders. Almost three quarter of the bigger traders sell to regular clients while only one third of the smaller traders do so. Overall, 54% of the traders sell to regular clients, representing 27% of the value of sales. The regularity leads possibly to more chance for refunds if quality turns out to be a problem. In the case that smaller traders have regular clients, this relation is more often based on family, religious, or ethnic relationships than in the case of bigger traders. Few of the traders see problems selling to an unknown client.

(c) Marketing services

A third dimension for search costs is the search for marketing services such as storage and transport. Mendoza and Randrinarisoa (1998) show that both these costs - together with wages of employees and the financial costs on the capital used - make up most of the operating costs of the trader. 82% of the traders have access to storage space, which is owned by most traders. Search costs are the main reason for storage as the majority of the traders declare to store because they wait for clients (reported by 74% of the traders). Storage for better prices is the major reason only for 12% of the traders. This latter percentage is significantly higher for the assemblers and wholesalers. Because they are on average wealthier, they might be better able to bear risk, to keep capital tied up in storage, and to reap the benefits of long-term storage (Barrett, 1997a).

78 % of the traders use transportation services. While the majority of traders reports that the supply of transport services is no problem and they do not often face problems to find transporters (71% of the traders who use transportation services say they have the choice), they still tend to develop a regularity in the trips that they undertake and in the relationships with those transporters: 52% of the traders travel often or always with the same transporter. As in the case of clients and suppliers of agricultural produce, regularity in relationships with transporters might lead to more sophisticated transactions.

An important percentage of the traders indicate that they face occasional problems finding a potential buyer or seller and that they store mainly to search for clients. Given that most of the agricultural goods are perishable and that the storage condition is often bad, high search costs could be disastrous for the business of some of the traders. The establishment of regular relationships upstream and downstream might be in the interest of traders, clients, and suppliers alike. These findings are all consistent with theoretical models on cooperation among individuals in an environment with high search costs (Ghosh and Ray (1996), Fafchamps (1998)).

3.3. Imperfect and asymmetric information

Agricultural traders in Madagascar face imperfect and asymmetric information on the market situation, on credibility of suppliers and clients, and on products. In the absence of efficient information services, the development of social capital might help to produce necessary insights. Given weak market institutions, traders might become more efficient through the development of a credible supplier and client network that allows more sophisticated ways of trade: granting and receiving credit, forward ordering, and less quality checking.

(a) Information on the market situation

Malagasy traders have imperfect access to modern means of communication as the great majority of the traders do not have a telephone or fax for their business (Table 9). Although that the majority of traders report they would be able to have access to a phone, few actually use it. Information on the market situation is obtained through personal contacts with other traders, suppliers, clients, or through messengers while the role of public sources such as newspapers, radio, and public services is extremely marginal. The various types of information are obtained from different sources. 66 percent of the traders obtains information about price changes from fellow traders while only 19 and 16 percent do this for market demand and supply respectively. In the last case, information is gotten from suppliers and customers directly.

(b) Information on the credibility of suppliers and clients

If traders want to engage in more sophisticated ways of trading, they need to establish a system of information on the credibility of clients and suppliers to better enable contract enforcement. Table 10 illustrates the manner in which traders evaluate credibility and how the credibility of them-selves is evaluated. Forms, recommendations by other traders, or bank guaranties are seldom used as ways to verify credibility. It seems that credibility is achieved through the development of long-term relationships. Most traders report that they will never grant/receive credit or order forward when they deal with a trading partner for the first time. They will only start doing so after a minimal number of transactions (between 9 and 13 transactions on average). There seems to be little reward for immediate payment of a transaction as prices are on average only reduced by 1.5%. However, given that the delay for the payment is only between six and thirteen days, this still constitutes an extremely high yearly interest rate (compounded between 150% and 250%).

More sophisticated transactions lead to a higher incidence of problems (see Fafchamps and Minten (1999)). A significant number of traders who go beyond cash-and-carry transactions[8] are regularly not able to settle their accounts in the time required. However, a breach of contract is seemingly without large consequences. If traders are not able to honor agreements, they will mostly not obtain new supplies[9]. A threat of using the police or court to settle the problem is almost unheard of, let alone that one actually uses these institutions. Moreover, the non-payment of one supplier does not seem to have an impact on receiving credit or forward ordering by other ones[10]. However, the majority of the traders believe that it is hard to find suppliers who are willing to extend credit. Therefore, it seems that once the trader is on good terms with one particular supplier, he has an incentive to want to preserve that good relationship. On the other hand, it seems easier to find a new client to whom to grant credit. This might be due to the higher number of clients - compared to suppliers[11] - the trader interacts with.

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[8] 194 (out of 729) traders who obtain credit from suppliers; 49 traders who order forward; and 339 traders who grant occasionally credit to clients.
[9] Similar findings are reported by Fafchamps (1996) in Ghana.
[10] This seems to be in contrast to other environments where the circulation of information among traders is much faster and with more implications as for example illustrated by Hayami and Kawagoe (1993). This issue deserves more research.

(c) *Information on products*

Most traders possess and use balances to check quantities during transactions in Madagascar (Mendoza and Randrianarisoa (1998)) which implies that quality is the big unknown in the transactions of products. Quality of products shows significant variation between regions as well as within regions: only 6% and 7% of the traders report that quality never varies between regions and within regions respectively (Table 11). A multitude of local non-improved varieties with inherently different quality characteristics are found in local markets as the Green Revolution did not happen in Madagascar due to a variety of reasons (Badiane et al., 1998). Hence, verification of the quality of the product is important and necessary: 85% of traders and clients report that they *always* inspect the quality of the product before the purchase. Moreover, prices depend on it – only 7% of the traders declare that prices of products do not vary with quality.

It can be assumed that given the multi-layered nature of agricultural trade and the large number of transactions, the checking of quality is an important cost in the spread between producer and consumer prices. Moreover, quality inspection is hardly delegated (93% of the traders report to check the quality themselves). This suggests that quality checking is perceived to be critical for firm performance. As traders want to assure quality, they often have to do numerous trips to supply areas, some of which are for nothing since traders do not use telephones, can not or will not place or take orders, and must search for buyers and sellers once they are on location. In such an environment the development of reliable social capital must singularly reduce the costs of doing business. If a trader is not able to develop this social capital, his firm might show limits to growth. This is discussed in the next section.

4. Determinants of and returns to social capital

4.1 Methodology

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[11] Greater choice between clients per se is illustrated by the fact that 68% and 18% of the traders face an "infinite" number of clients and suppliers respectively.

Regression analysis is used to determine the quantitative impact of social capital and of the channels through which the social capital has an impact on performance. First, the different measures of social capital that are used in the analysis are discussed and their determinants are analyzed. Second, returns to social capital are estimated. The following production function is used:

$$Q=f(L,K,H,S)$$

where Q stands for output, L for labor, and K, H, and S for physical, human, and social capital respectively. If S would have any effect on performance, its inclusion in the production function would lead to insignificant regression coefficients. After evaluating the effects of social capital, a second specification is run to test through which channels the effects of social capital might work:

$$Q=f(L,K,H,S; C)$$

where C stands for different channels (reduction imperfect information and search costs; substitution market institutions). If S affects Q only because it reduces C, including C in the regression should result in a non-significant coefficient for S. If, however, S has an effect on output beyond its effect on C, then both C and S should be significant in the equation. Moreover, the effect of the accumulation process of inputs on firm performance is further unraveled as the channels through which experience in business experience influences performance is tested through different specifications.

Potential difficulties with the specification as such might arise[12]:

- First, there might be simultaneous determination of dependent and some of the independent variables. It is possible, for instance, that traders would respond to good market opportunities by raising more working capital and hiring more workers. Hence, instrumental variables were constructed based on an extensive dataset of exogenous variables (for details see Fafchamps and Minten (1998b))[13].

- Second, measures of location and firm specific sales shocks are included to minimize the bias resulting from past co-variate and idiosyncratic shocks respectively.

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[12] Potential problems with the specification are discussed extensively and dealt with through robustness testing in Fafchamps and Minten (1998b).

[13] Instruments include family background variables, business start-up experience, personal wealth and financial assets, and access to telecommunication equipment.

- Third, the specification might be prone to omitted variable bias. If, for instance, traders that are more efficient are more sociable, then S will capture differences in entrepreneurial quality and the coefficient of S will be biased[14]. Fafchamps and Minten (1998b) run alternative specifications where variables are included that capture the entrepreneur's propensity to socialize and accumulate wealth, as well as his capacity to monitor workers. The results obtained are similar as those reported here.

- Fourth, it could be argued that social capital is just a by-product of economic success. However, discussions with respondents suggest that maintaining an extensive and up-to-date network of business contacts is not costless: socializing is time consuming and can even involve out-of-pocket expenses. Nevertheless, even supposing that socializing were costless, overaccumulation of social capital would only bias the estimated coefficient towards zero[15]. Consequently, a significant coefficient on social capital should be interpreted as a good indication that social capital matters *even* if the accumulation of network capital is costless or if it is used for other purposes than strictly business.

The definition of the variables in the empirical estimation is as follows. Output is measured through the value of sales over the last year as well as total value added[16]. Labor and physical capital are measured through the number of man-months and the value of business equipment respectively. Human capital variables, entrepreneur characteristics, and family background are included as they potentially raise the efficiency of labor and capital. The five measures for social capital (the number of relatives in agricultural trade, the number of traders known, the number of people who can help financially, and the number of suppliers and clients known personally) are entered in log form to account for the possibility that marginal returns to social capital are decreasing. The same is done for experience in trade. Non-essential inputs such as

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[14] The possible correlation between entrepreneurial characteristics and the factors of production is a general problem. It is not peculiar to social capital.

[15] Firms might also accumulate financial assets and real estate that are not required for their business. One could therefore argue that such assets should be omitted from production function analysis. In practice, it is not always possible to disentangle non-essential from essential factors of production in a firm's accounts, in which case the coefficient of capital would also be underestimated.

[16] Value added is computed by subtracting purchases from sales. Since both are subject to measurement error and the average difference between the two is small, value added is much less precisely estimated than total sales or total purchases. In addition, respondents often are reluctant to divulge their margin for fear that survey data will be used to assess taxes.

storage capacity are added as log(storage+1). This avoids losing observations when the respondent has no storage capacity while being consistent with the use of logged gross margin as dependent variables. Two measures of shocks are included: whether the firm has been victim of a theft in the preceding year; and a measure of aggregate sales shock computed as the growth in total annual sales enjoyed by traders in the same location. Location dummies are added to control for differences in competition and business environment across space.

We expect factors of production such as equipment, working capital, telephone use, and labor to have a positive and significant effect on output. We also anticipate that measures of human capital such as experience, schooling, and number of languages spoken should have a beneficial effect on productivity, together with social network capital and aggregate shocks. Before we turn to the results on the returns to social capital, we first look at determinants of the five measures of social capital used in the analysis.

4.2. Establishment of social capital

It is assumed that just like entrepreneurs need to accumulate machinery and equipment to be successful, most of the social capital has to be accumulated and busy entrepreneurs have to use valuable resources, e.g. time, to invest in it. The regression results in Table 12 clearly illustrate the accumulation process of these inputs. For all variables – except for relatives in trade – social capital increases with the number of years in trade. The elasticities range between 8% for the number of people who can help and 33% for the number of traders known. This seems intuitive as it takes more time and effort to develop a relationship with somebody who is willing to help in time of financial trouble than to develop a different type of relationship where one knows traders, suppliers, and clients personally. The number of relatives in trade seems to be difficult to influence by own actions. Although it might be the case that successful traders employ more family employees over time and thus raise the number of relatives in agricultural trade, this seems not to be a major determinant for that measure of social capital as the coefficient on experience is small and insignificant.

The same type of regression was also run with labor and physical capital as dependent variables, i.e. the inputs used in a typical production function. These input variables exhibit the same type of behavior with respect to business experience. Labor and physical capital show a positive elasticity of 0.12 and 0.57 respectively. The elasticity on the value of equipment is very high. Given that physical capital is mostly a long-term investment, access to credit is often necessary to be able to finance this. As social capital might improve this access, it might indirectly have an additional influence on performance[17].

Other variables show little influence on the development of social capital. The level of education shows a positive sign in all the regressions but the coefficient is only significant in one case. The gender for the trader shows a negative sign in all regressions – and is significant in one. Women might be less successful in the development of social capital in the Malagasy context as they have to spend more of their extra time that could be used for the build-up of social capital on household chores and child rearing. The age of the trader shows also an expected positive sign for the different measures of social capital as well as a decreasing marginal effect as the quadratic term is always negative. Their coefficients are significant in two out of five cases. In short, this section shows that social capital as well as other inputs has a strong time dimension. In the next section, we look more in detail at that interaction and its effect on efficiency.

4.3. Returns to social capital

Three sets of explanatory variables are used to explain the performance of the trader: a first set with human capital variables only; a second set adding physical capital and labor; and a third set adding social capital[18]. The results are presented in Table 13. Experience turns out to be highly significant in the specification where social capital, human capital and labor are left out. In this case does a doubling of the years of the experience in trade increase sales by 50% and value added by 60%. Evaluated at the mean and controlling for other inputs, one year longer in business increases sales and

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[17] This effect is neglected in further analysis.

value added by around 10%[19]. In the specification where one controls for physical capital and labor, the size – as well as the significance - of the experience coefficient drops to 19% and 25% respectively in the total sales and value added regression.

Finally, after additionally controlling for social capital, the significance of the effect of experience in trade disappears both for the value added as for the total sales regression while the size of the elasticity drops by another 10%. Hence, we conclude that a large part of the effect of business experience on performance seems to come from the accumulation of social capital over time and less from the development of other types of expertise. Hence, in the case of traders in Madagascar, the effect of "learning by doing" over time is almost completely explained through a "learning by knowing". The major difference between other production inputs and social capital seems to be a well identified opportunity cost. While the cost of overaccumulation of labor and physical capital would show up in lower profits for the firm, this might not be the case for social capital.

Most measures of social capital are shown to raise gross margins or value added significantly even after controlling for working capital and equipment, labor, human capital, and management skills. A joint F-test for the significance of the coefficients on non-family social capital is significant in both specifications. The two most important dimensions of social capital appear to be the number of traders known and the number of people the trader can count on in times of trouble. The estimated coefficients indicate that a doubling of the number of known traders raises the value added and total sales by 27% and 19% respectively while the number of people who can help in times of trouble raises it by 18% and 29% respectively.

The number of close relatives in trade appears with the wrong sign and is highly significant in all specifications. Some insights on an explanation are given by the fact that the coefficient is no longer significant when the subsidiary dummy is omitted from the regression and it gets smaller in absolute value when one controls for close

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[18] The purpose of the different specifications is to illustrate the effect of business experience. As relatives in agricultural trade are not accumulated over time as shown in Table 12, this form of social capital is included in all specifications.

[19] As we have no panel data on traders, this does not reflect growth in the agricultural marketing sector. Only the successful traders stay in trade while others might move on to other activities.

interaction with businesses held by relatives[20]. This is consistent with the ideas that traders who have close relatives in trade have trouble mentally disentangling their business from that of their relatives and, as a result, tend to over-report the working capital and the equipment that is truly theirs. Another possibility is that unclear business boundaries dilute incentives and result in lower unobserved efforts[21]. In any case, it is clear from these results that family relationships do not constitute the only, or even the major component of social capital, contrary to what is often assumed (e.g. Granovetter (1995)). If anything, non-family networks are more important than family networks in business. This finding is consistent with Bigsten et al. (1998) and Minten and Kyle (1999) who report that family links account for only a minute portion of relationships in African manufacturing or in agricultural trade in Congo respectively.

Working capital and labor have the expected sign and are highly significant. Traders with a subsidiary are shown to more than double the value added. Equipment, storage capacity, and telephone use have mostly the expected sign but none of them are significant. In contrast, ownership of transport vehicles appears to have a negative effect on value added, possibly because respondents are engaged in transport as well as trade[22]. Being a part-time trader does not appear to have a noticeable effect on value added but year-round traders tend to create more of it. On the human capital side, schooling of the owner is shown to raise value added but its coefficient is not significant. A surprising result is also that traders who commonly speak a language other than Malagasy do less well than those who do not know another language. One explanation might be that these traders divert their attention away from domestic agricultural trading activities to import-export activities, which are not captured in the survey and in the measure of performance. Past growth rates are positively associated with performance indicating that sales shocks are correlated over time. The presence of these long-lasting shocks is consistent with Barrett's (1997a) observation that, in spite of massive entry, Madagascar grain markets remain uncompetitive.

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[20] Both specifications are not reported due to space limitations.
[21] Moreover, Fafchamps and Minten (1999) show also that more relatives in agricultural trade lead to more unresolved conflicts between trader and supplier and trader and client.
[22] No data are available on the benefits from transport and hence, are not included in the dependent variable.

In another experiment not shown here, we instrumented social capital variables themselves in an effort to control for possible self-selection bias. The instruments included various determinants of the respondents' propensity to form business relationships, such as their past experience with solidarity, the presence of personal friends among grain traders, the competition respondents face on the buying and selling side of their business, and their views about the role of relationships in trade and their attitude towards solidarity. Results show that non-family network variables remain jointly significant and that the instrumented number of known traders captures most of the beneficial effect of social capital on trader productivity.

4.4. Social capital and modes of transactions

In section 3 we have illustrated the type of transaction costs in agricultural commodity markets in Madagascar. We now investigate quantitatively the effect of the different modes of transaction to reduce those transaction costs on efficiency of traders. Two sets of regressions are presented (Table 14). The first regression presents the straight OLS estimates. A second regression corrects for possible simultaneity bias in working capital, labor, and modes of transactions. Multicollinearity is likely to be present, as we do not have good instruments for the propensity of traders to rely on each particular mode of transaction separately from the others.

First, we look at transaction costs due to imperfect information. The sources of price information seem to be crucial. Estimated OLS coefficients indicate that those traders able to rely on their clients and suppliers or on messengers to gather reliable information about prices perform significantly better than those who must rely on the information provided by other traders like them. In both cases, the effect is large: reporting clients and suppliers as the main source of price information is associated with a 60% increase in gross margin while the use of messengers lead to an increase of more than 100%. Not having to inspect the quality of supplies at each purchase is similarly associated with higher margins. Quality checks by the client might lead to less rent for the trader himself as shown by the negative sign. However, the coefficient is only significant for the value added – OLS specification.

A reduction of search costs measured through having regular clients is associated with higher sales and margins. However, contrary to expectations, we find that firms that place orders with suppliers get significantly lower margins, in the OLS as well as the IV specification. One possible interpretation is that Malagasy traders only place orders when they cannot find ready supplies. This interpretation is consistent with the fact that orders are often fulfilled late (Fafchamps and Minten (1999)). In this context, placing orders is a sign of weakness and is associated with smaller margins. Trader's ability to sell on credit is also shown to be an important determinant of performance. Since granting credit is a highly risky proposition, firms better able to identify reliable clients appear to be at an advantage, even after controlling for working capital, labor, education and the like. The coefficients are significant and have a high value in both specifications but the significance disappears when corrected for endogeneity.

The results provide important insights as to the particular role of the different dimensions of social capital: once we control for modes of transactions in imperfect markets, only those dimensions that raise efficiency in ways other than by facilitating transactions should remain significant. These effects can be seen through the comparison of the coefficients on the social capital variables in Table 13. The coefficient on the number of traders known drops in size. Having relationships with more traders facilitates transactions in ways that are largely captured by the mode of transaction variables. On the other hand, the number of people that can help in a financial emergency stays constant and increases even in size. This indicates that better insurance raises efficiency in ways other than through the reduction of transaction costs. The reason is likely to be that traders able to deal with liquidity risk can take better advantage of arbitrage opportunities without fear of becoming illiquid. The number of close relatives continues to have a negative and significant coefficient and its size decreases only slightly. Hence, relatives in trade seem to have little to do with transactions costs and the explanation of its effect might mostly be linked to the fact that they overstate their own resources due to inadequate distinction from those of their relatives.

5. Conclusions

In this paper the effect of social capital - measured through the number and the type of relationships - on the individual performance of the firm is studied. To this effect, an extensive dataset on agricultural traders in Madagascar is used. It is shown that traders with better relationships have higher margins. Social network capital is shown to have the same characteristics as other types of inputs that are typically put into economic production functions such as physical capital and labor. It is similarly accumulated over time and it significantly improves economic performance.

Social capital benefits the firm mainly through a reduction in the high transaction costs shown present in agricultural commodity markets. We find evidence that social network capital enable traders to deal with each other in a more trustworthy manner by granting and receiving credit, exchanging price information, and economizing on quality inspection. The evidence indicates that three dimensions of social network capital should be distinguished: relationships with other traders, which help firms to economize on transaction costs; relationships with individuals who can help in time of financial difficulties, which insure traders against liquidity risk; and family relationships, which reduce efficiency, possibly because of measurement error.

The research presented has important policy implications. Raising social capital and reducing transaction costs can be sought by encouraging interaction between traders (e.g. Chamber of Commerce), by refraining from victimizing business communities irrespective of their ethnic origin, and by facilitating better information. Moreover, the development of legislation and reliable courts is often not sufficient for efficient markets to arise. This is because the threat of court action to punish breach of contract is seldom credible for small transactions and because relationships are too valuable to risk losing. While the results of this study demonstrate the significant effect of social capital on firms in the service sector of an economy, it would be useful to extend the study to other sectors.

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